

wxWidgets 2.5.2: A portable C++ and Python GUI toolkit

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Contents

Copyright notice	xvi
Introduction	1
What is wxWidgets?	1
Why another cross-platform development tool?	1
wxWidgets requirements	3
Availability and location of wxWidgets	3
Acknowledgements	4
Multi-platform development with wxWidgets	5
Include files	5
Libraries	5
Configuration	6
Makefiles	6
Windows-specific files	6
Allocating and deleting wxWidgets objects	7
Architecture dependency	7
Conditional compilation	8
C++ issues	8
File handling	9
Utilities and libraries supplied with wxWidgets	10
Programming strategies	12
Strategies for reducing programming errors	12
Strategies for portability	12
Strategies for debugging	13
Libraries list	15
Alphabetical class reference	18
wxAcceleratorEntry	18
wxAcceleratorTable	19
wxAccessible	22
wxActivateEvent	29
wxApp	31
wxArray	42

wxArrayString	54
wxArtProvider	59
wxAutomationObject	63
wxBitmap	67
wxBitmapButton	80
wxBitmapDataObject	85
wxBitmapHandler	86
wxBoxSizer	90
wxBrush	91
wxBrushList	97
wxBufferedDC	99
wxBufferedPaintDC	100
wxBufferedInputStream	101
wxBufferedOutputStream	101
wxBusyCursor	102
wxBusyInfo	103
wxButton	104
wxCalculateLayoutEvent	107
wxCalendarCtrl	109
wxCalendarDateAttr	114
wxCalendarEvent	117
wxCaret	118
wxCheckBox	121
wxCheckListBox	125
wxChoice	127
wxClassInfo	130
wxClient	132
wxClientDC	134
wxClientData	134
wxClientDataContainer	135
wxClipboard	136
wxCloseEvent	139
wxCmdLineParser	142
wxColour	150
wxColourData	154
wxColourDatabase	155
wxColourDialog	157
wxComboBox	158

wxCommand	164
wxCommandEvent	165
wxCommandProcessor	171
wxCondition	174
wxConfigBase	178
wxConnection	192
wxContextHelp	196
wxContextHelpButton	198
wxControl	199
wxControlWithItems	200
wxCountingOutputStream	207
wxCriticalSection	207
wxCriticalSectionLocker	209
wxCSCnv	210
wxCursor	211
wxCustomDataObject	216
wxDataFormat	218
wxDataInputStream	220
wxDataObject	223
wxDataObjectComposite	227
wxDataObjectSimple	227
wxDataOutputStream	229
wxDateSpan	232
wxDateTime	237
wxDateTimeHolidayAuthority	264
wxDateTimeWorkDays	264
wxDb	264
wxDbColDataPtr	293
wxDbColDef	294
wxDbColFor	294
wxDbColInf	295
wxDbConnectInf	296
wxDbIdxDef	301
wxDbInf	302
wxDbTable	302
wxDbTableInf	337
wxDbGridColInfo	338
wxDbGridTableBase	340

wxDebugContext.....	342
wxDebugStreamBuf	347
wxDelegateRendererNative	348
wxDC	349
wxDCClipper	369
wxDialog	369
wxDialUpEvent.....	378
wxDialUpManager.....	379
wxDir.....	383
wxDirDialog.....	386
wxDirTraverser.....	388
wxDisplay.....	390
wxDllLoader	392
wxDocChildFrame.....	394
wxDocManager	396
wxDocMDIChildFrame	405
wxDocMDIParentFrame.....	407
wxDocParentFrame	409
wxDocTemplate	410
wxDocument	415
wxDragImage.....	423
wxDropFilesEvent	427
wxDropSource	429
wxDropTarget	432
wxDynamicLibrary.....	435
wxEncodingConverter	437
wxEraseEvent.....	440
wxEvent	441
wxEvtHandler.....	445
wxFFFile	453
wxFFFileInputStream	458
wxFFFileOutputStream	459
wxFFFileStream	460
wxFile.....	461
wxFileDataObject.....	467
wxFileDialog.....	468
wxFileDropTarget.....	473
wxFileHistory.....	474

wxFileInputStream	477
wxFileName	478
wxFileOutputStream.....	493
wxFileStream	494
wxFileSystem.....	494
wxFileSystemHandler	496
wxFileType.....	499
wxFilterInputStream	503
wxFilterOutputStream	504
wxFindDialogEvent	504
wxFindReplaceData	506
wxFindReplaceDialog	508
wxFlexGridSizer	509
wxFocusEvent.....	512
wxFont	512
wxFontData.....	521
wxFontDialog	524
wxFontEnumerator	526
wxFontList.....	527
wxFontMapper	528
wxFrame	532
wxFSFile	545
wxFTP.....	548
wxGauge.....	554
wxGBPosition.....	558
wxGBSizerItem	559
wxGBSpan	561
wxGDIObject.....	562
wxGenericDirCtrl	563
wxGenericValidator	567
wxGLCanvas.....	569
wxGrid.....	572
wxGridCellAttr	608
wxGridBagSizer	612
wxGridCellBoolEditor	615
wxGridCellChoiceEditor	615
wxGridCellEditor	616
wxGridCellFloatEditor	619

wxGridCellNumberEditor.....	619
wxGridCellTextEditor	620
wxGridEditorCreatedEvent.....	621
wxGridEvent.....	622
wxGridRangeSelectEvent	625
wxGridSizeEvent.....	627
wxGridCellBoolRenderer.....	628
wxGridCellFloatRenderer	628
wxGridCellNumberRenderer	630
wxGridCellRenderer	630
wxGridCellStringRenderer.....	631
wxGridTableBase.....	631
wxGridSizer.....	636
wxHashMap	638
wxHashTable	642
wxHelpController.....	644
wxHelpControllerHelpProvider	649
wxHelpEvent	650
wxHelpProvider	652
wxHtmlCell	653
wxHtmlColourCell.....	659
wxHtmlContainerCell.....	659
wxHtmlDCRenderer	665
wxHtmlEasyPrinting	668
wxHtmlFilter	671
wxHtmlHelpController	672
wxHtmlHelpData	677
wxHtmlHelpFrame.....	678
wxHtmlLinkInfo.....	682
wxHtmlListBox	683
wxHtmlParser.....	685
wxHtmlPrintout.....	690
wxHtmlTag.....	692
wxHtmlTagHandler.....	696
wxHtmlTagsModule.....	697
wxHtmlWidgetCell	698
wxHtmlWindow	699
wxHtmlWinParser.....	708

wxHtmlWinTagHandler	714
wxHTTP	715
wxIcon	716
wxIconBundle	723
wxIconLocation	725
wxIconizeEvent	725
wxIdleEvent	726
wxImage	728
wxImageHandler	750
wxImageList	754
wxIndividualLayoutConstraint	758
wxInitDialogEvent	761
wxInputStream	762
wxIPAddress	764
wxIPv4address	767
wxJoystick	768
wxJoystickEvent	775
wxKeyEvent	778
wxLayoutAlgorithm	782
wxLayoutConstraints	785
wxList	787
wxListbook	793
wxListBox	794
wxListCtrl	799
wxListEvent	818
wxListItem	821
wxListView	826
wxLocale	828
wxLog	844
wxLogChain	850
wxLogGui	852
wxLogNull	852
wxLogPassThrough	853
wxLogStderr	854
wxLogStream	854
wxLogTextCtrl	855
wxLogWindow	855
wxLongLong	857

wxMask.....	860
wxMaximizeEvent	862
wxMBConv.....	863
wxMBConvFile	866
wxMBConvUTF7	866
wxMBConvUTF8.....	867
wxMBConvUTF16.....	868
wxMBConvUTF32.....	869
wxMDIChildFrame.....	870
wxMDIClientWindow	873
wxMDIParentFrame	874
wxMemoryDC	881
wxMemoryFSHandler.....	882
wxMemoryInputStream	884
wxMemoryOutputStream.....	884
wxMenu	885
wxMenuBar	899
wxMenuEvent	907
wxMenuItem.....	909
wxMessageDialog	914
wxMetafile	916
wxMetafileDC.....	917
wxMimeTypesManager	918
wxMiniFrame.....	921
wxMirrorDC	924
wxModule.....	925
wxMouseCaptureChangedEvent.....	927
wxMouseEvent.....	928
wxMoveEvent.....	937
wxMultiChoiceDialog.....	938
wxMutex.....	938
wxMutexLocker	941
wxNode	942
wxNotebook	943
wxNotebookEvent	950
wxNotebookSizer	952
wxNotifyEvent	953
wxObject.....	954

wxObjectRefData	957
wxOutputStream	958
wxPageSetupDialog	960
wxPageSetupDialogData	961
wxPaintDC	966
wxPaintEvent	967
wxPalette	968
wxPanel	972
wxPathList	975
wxPen	976
wxPenList	983
wxPlotCurve	985
wxPlotWindow	987
wxPoint	991
wxPostScriptDC	991
wxPreviewCanvas	992
wxPreviewControlBar	993
wxPreviewFrame	995
wxPrintData	996
wxPrintDialog	1002
wxPrintDialogData	1003
wxPrinter	1007
wxPrinterDC	1010
wxPrintout	1010
wxPrintPreview	1014
wxPrivateDropTarget	1018
wxProcess	1019
wxProcessEvent	1024
wxProgressDialog	1025
wxProtocol	1027
wxQuantize	1029
wxQueryLayoutInfoEvent	1030
wxRadioBox	1033
wxRadioButton	1039
wxRealPoint	1041
wxRect	1042
wxRecursionGuard	1047
wxRecursionGuardFlag	1048

wxRegEx.....	1049
wxRegion.....	1052
wxRegionIterator.....	1057
wxRendererNative.....	1059
wxRendererVersion.....	1062
wxSashEvent.....	1063
wxSashLayoutWindow.....	1065
wxSashWindow.....	1068
wxScreenDC.....	1073
wxScopedArray.....	1074
wxScopedPtr.....	1076
wxScopedTiedPtr.....	1078
wxScrollBar.....	1079
wxScrolledWindow.....	1085
wxScrollEvent.....	1094
wxScrollWinEvent.....	1097
wxSemaphore.....	1099
wxServer.....	1101
wxSimpleHelpProvider.....	1102
wxSingleChoiceDialog.....	1102
wxSingleInstanceChecker.....	1105
wxSize.....	1107
wxSizeEvent.....	1109
wxSizer.....	1110
wxSizerItem.....	1117
wxSlider.....	1122
wxSocketAddress.....	1131
wxSocketBase.....	1132
wxSocketClient.....	1149
wxSocketEvent.....	1151
wxSocketInputStream.....	1152
wxSocketOutputStream.....	1153
wxSocketServer.....	1153
wxSpinButton.....	1155
wxSpinCtrl.....	1159
wxSpinEvent.....	1162
wxSplashScreen.....	1163
wxSplitterEvent.....	1165

wxSplitterWindow	1167
wxSplitterRenderParams.....	1177
wxStaticBitmap	1178
wxStaticBox	1180
wxStaticBoxSizer	1182
wxStaticLine.....	1182
wxStaticText.....	1184
wxStatusBar.....	1186
wxStopWatch	1191
wxStreamBase	1192
wxStreamBuffer	1194
wxStreamToTextRedirector.....	1200
wxString	1201
wxStringBuffer.....	1223
wxStringClientData.....	1224
wxStringList.....	1224
wxStringTokenizer.....	1226
wxSysColourChangedEvent.....	1228
wxSystemOptions	1229
wxSystemSettings.....	1231
wxTabCtrl.....	1235
wxTabEvent	1241
wxTaskBarIcon	1242
wxTempFile.....	1243
wxTextAttr	1246
wxTextCtrl.....	1250
wxTextDataObject.....	1268
wxTextDropTarget.....	1270
wxTextEntryDialog	1271
wxTextFile.....	1273
wxTextInputStream	1278
wxTextOutputStream	1282
wxTextValidator	1283
wxThread	1286
wxThreadHelper.....	1293
wxThreadHelperThread	1295
wxTimer	1297
wxTimerEvent	1299

wxTimeSpan	1300
wxTipProvider	1306
wxTipWindow	1307
wxToggleButton	1309
wxToolBar	1311
wxToolTip	1328
wxTreeCtrl	1329
wxTreeEvent	1347
wxTreeItemData	1350
wxUpdateUIEvent	1352
wxURL	1357
wxValidator	1360
wxVariant	1362
wxVariantData	1369
wxView	1371
wxVListBox	1375
wxVScrolledWindow	1382
wxSound	1386
wxWindow	1388
wxWindowDC	1441
wxWindowDisabler	1442
wxWizard	1443
wxWizardEvent	1448
wxWizardPage	1449
wxWizardPageSimple	1451
wxXmlResource	1452
wxXmlResourceHandler	1457
wxZipInputStream	1462
wxZlibInputStream	1463
wxZlibOutputStream	1464
Functions	1466
Alphabetical functions and macros list	1466
Version macros	1470
Application initialization and termination	1471
Process control functions	1475
Thread functions	1479
File functions	1481

Network, user and OS functions.....	1486
String functions	1490
Dialog functions	1495
Math functions.....	1504
GDI functions	1504
Printer settings	1507
Clipboard functions	1509
Miscellaneous functions	1511
Byte order macros.....	1519
RTTI functions.....	1521
Log functions.....	1527
Time functions.....	1533
Debugging macros and functions	1535
Environment access functions.....	1539
Constants.....	1541
Preprocessor symbols defined by wxWidgets	1541
Standard event identifiers.....	1544
Keycodes	1546
Classes by category	1548
Topic overviews	1564
Notes on using the reference	1564
Writing a wxWidgets application: a rough guide	1564
wxWidgets Hello World sample	1565
wxWidgets samples	1567
wxApp overview	1577
Run time class information overview	1579
wxString overview	1581
Date and time classes overview	1586
Unicode support in wxWidgets	1590
wxMBConv classes overview	1593
Internationalization	1596
Writing non-English applications	1597
Container classes overview.....	1599
File classes and functions overview	1600
wxStreams overview	1600
wxLog classes overview.....	1602

Debugging overview.....	1605
wxConfig classes overview	1607
wxFileSystem.....	1608
Event handling overview	1610
C++ exceptions overview	1617
Window styles	1618
Window deletion overview.....	1619
wxDialog overview	1621
wxValidator overview	1621
Constraints overview.....	1624
Sizer overview.....	1627
XML-based resource system overview.....	1634
Scrolling overview	1643
Bitmaps and icons overview.....	1645
Device context overview.....	1648
wxFont overview	1648
Font encoding overview	1650
wxSplitterWindow overview.....	1651
wxTreeCtrl overview.....	1653
wxListCtrl overview	1654
wxImageList overview	1654
Common dialogs overview	1654
Document/view overview.....	1658
Toolbar overview.....	1664
wxGrid classes overview.....	1669
wxTipProvider overview	1670
Printing overview.....	1671
Multithreading overview	1672
Drag and drop overview	1673
wxDataObject overview.....	1674
Database classes overview.....	1675
Interprocess communication overview.....	1696
wxHTML overview.....	1699
Environment variables.....	1708
wxPython overview	1709
Syntax of the builtin regular expression library	1720
Port notes	1734

wxGTK port.....	1734
wxMSW port.....	1734
wxMac port	1734
wxOS2 port	1735
wxMGL port.....	1735
wxX11 port.....	1735
Index.....	1737

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END OF TERMS AND CONDITIONS

Appendix: How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

```
<one line to give the library's name and a brief idea of what it does.>
Copyright (C) <year> <name of author>
```

```
This library is free software; you can redistribute it and/or
modify it under the terms of the GNU Library General Public
License as published by the Free Software Foundation; either
version 2 of the License, or (at your option) any later version.
```

```
This library is distributed in the hope that it will be useful,
but WITHOUT ANY WARRANTY; without even the implied warranty of
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU
Library General Public License for more details.
```

```
You should have received a copy of the GNU Library General Public
License along with this library; if not, write to the Free
Software Foundation, Inc., 675 Mass Ave, Cambridge, MA 02139, USA.
```

Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the
library `Frob' (a library for tweaking knobs) written by James Random
Hacker.
```

```
<signature of Ty Coon>, 1 April 1990
Ty Coon, President of Vice
```

That's all there is to it!

Chapter 2 Introduction

What is wxWidgets?

wxWidgets is a C++ framework providing GUI (Graphical User Interface) and other facilities on more than one platform. Version 2 currently supports all desktop versions of MS Windows, Unix with GTK+, Unix with Motif, and MacOS. An OS/2 port is in progress.

wxWidgets was originally developed at the Artificial Intelligence Applications Institute, University of Edinburgh, for internal use, and was first made publicly available in 1992. Version 2 is a vastly improved version written and maintained by Julian Smart, Robert Roebling, Vadim Zeitlin, Vaclav Slavik and many others.

This manual contains a class reference and topic overviews. For a selection of wxWidgets tutorials, please see the documentation page on the wxWidgets web site (<http://www.wxwidgets.org>).

Please note that in the following, "MS Windows" often refers to all platforms related to Microsoft Windows, including 16-bit and 32-bit variants, unless otherwise stated. All trademarks are acknowledged.

Why another cross-platform development tool?

wxWidgets was developed to provide a cheap and flexible way to maximize investment in GUI application development. While a number of commercial class libraries already existed for cross-platform development, none met all of the following criteria:

1. low price;
2. source availability;
3. simplicity of programming;
4. support for a wide range of compilers.

Since wxWidgets was started, several other free or almost-free GUI frameworks have emerged. However, none has the range of features, flexibility, documentation and the well-established development team that wxWidgets has.

As open source software, wxWidgets has benefited from comments, ideas, bug fixes, enhancements and the sheer enthusiasm of users. This gives wxWidgets a certain advantage over its commercial competitors (and over free libraries without an independent development team), plus a robustness against the transience of one individual or company. This openness and availability of source code is especially important when the future of thousands of lines of application code may depend upon the longevity of the underlying class library.

Version 2 goes much further than previous versions in terms of generality and features, allowing applications to be produced that are often indistinguishable from those produced using single-platform toolkits such as Motif, GTK+ and MFC.

The importance of using a platform-independent class library cannot be overstated, since GUI application development is very time-consuming, and sustained popularity of particular GUIs cannot be guaranteed. Code can very quickly become obsolete if it addresses the wrong platform or audience. wxWidgets helps to insulate the programmer from these winds of change. Although wxWidgets may not be suitable for every application (such as an OLE-intensive program), it provides access to most of the functionality a GUI program normally requires, plus many extras such as network programming, PostScript output, and HTML rendering; and it can of course be extended as needs dictate. As a bonus, it provides a far cleaner and easier programming interface than the native APIs. Programmers may find it worthwhile to use wxWidgets even if they are developing on only one platform.

It is impossible to sum up the functionality of wxWidgets in a few paragraphs, but here are some of the benefits:

- Low cost (free, in fact!)
- You get the source.
- Available on a variety of popular platforms.
- Works with almost all popular C++ compilers and Python.
- Over 50 example programs.
- Over 1000 pages of printable and on-line documentation.
- Includes Tex2RTF, to allow you to produce your own documentation in Windows Help, HTML and Word RTF formats.
- Simple-to-use, object-oriented API.
- Flexible event system.
- Graphics calls include lines, rounded rectangles, splines, polylines, etc.
- Constraint-based and sizer-based layouts.
- Print/preview and document/view architectures.
- Toolbar, notebook, tree control, advanced list control classes.
- PostScript generation under Unix, normal MS Windows printing on the PC.
- MDI (Multiple Document Interface) support.
- Can be used to create DLLs under Windows, dynamic libraries on Unix.
- Common dialogs for file browsing, printing, colour selection, etc.

- Under MS Windows, support for creating metafiles and copying them to the clipboard.
- An API for invoking help from applications.
- Ready-to-use HTML window (supporting a subset of HTML).
- Network support via a family of socket and protocol classes.
- Support for platform independent image processing.
- Built-in support for many file formats (BMP, PNG, JPEG, GIF, XPM, PNM, PCX).

wxWidgets requirements

To make use of wxWidgets, you currently need one of the following setups.

(a) MS-Windows:

1. A 486 or higher PC running MS Windows.
2. A Windows compiler: most are supported, but please see `install.txt` for details. Supported compilers include Microsoft Visual C++ 4.0 or higher, Borland C++, Cygwin, MinGW, Metrowerks CodeWarrior.
3. At least 60 MB of disk space.

(b) Unix:

1. Almost any C++ compiler, including GNU C++ (EGCS 1.1.1 or above).
2. Almost any Unix workstation, and one of: GTK+ 1.2, GTK+ 2.0, Motif 1.2 or higher, Lesstif. If using the wxX11 port, no such widget set is required.
3. At least 60 MB of disk space.

(c) Mac OS/Mac OS X:

1. A PowerPC Mac running Mac OS 8.6/9.x (eg. Classic) or Mac OS X 10.x.
2. CodeWarrior 5.3, 6 or 7 for Classic Mac OS.
3. The Apple Developer Tools (eg. GNU C++) or CodeWarrior 7 for Mac OS X.
4. At least 60 MB of disk space.

Availability and location of wxWidgets

wxWidgets is available by anonymous FTP and World Wide Web from <ftp://biolpc22.york.ac.uk/pub> (`ftp://biolpc22.york.ac.uk/pub`) and/or <http://www.wxwidgets.org> (`http://www.wxwidgets.org`).

You can also buy a CD-ROM using the form on the Web site.

Acknowledgements

Thanks are due to AIAI for being willing to release the original version of wxWidgets into the public domain, and to our patient partners.

We would particularly like to thank the following for their contributions to wxWidgets, and the many others who have been involved in the project over the years. Apologies for any unintentional omissions from this list. Yiorgos Adamopoulos, Jamshid Afshar, Alejandro Aguilar-Sierra, AIAI, Patrick Albert, Karsten Ballueder, Mattia Barbon, Michael Bedward, Kai Bendorf, Yura Bidus, Keith Gary Boyce, Chris Breeze, Pete Britton, Ian Brown, C. Buckley, Dmitri Chubraev, Robin Corbet, Cecil Coupe, Stefan Csomor, Andrew Davison, Gilles Depeyrot, Neil Dudman, Robin Dunn, Hermann Dunkel, Jos van Eijndhoven, Chris Elliott, David Elliott, Tom Felici, Thomas Fetting, Matthew Flatt, Pasquale Foggia, Josep Fortiana, Todd Fries, Dominic Gallagher, Guillermo Rodriguez Garcia, Wolfram Gloger, Norbert Grotz, Stefan Gunter, Bill Hale, Patrick Halke, Stefan Hammes, Guillaume Helle, Harco de Hilster, Cord Hockemeyer, Markus Holzem, Olaf Klein, Leif Jensen, Bart Jourquin, Guilhem Lavaux, Ron Lee, Jan Lessner, Nicholas Liebmann, Torsten Liermann, Per Lindqvist, Thomas Runge, Tatu Männistö, Scott Maxwell, Thomas Myers, Oliver Niedung, Stefan Neis, Hernan Otero, Ian Perrigo, Timothy Peters, Giordano Pezzoli, Harri Pasanen, Thomaso Paoletti, Garrett Potts, Marcel Rasche, Robert Roebling, Dino Scaringella, Jobst Schmalenbach, Arthur Seaton, Paul Shirley, Wlodzimierz 'ABX' Skiba, Vaclav Slavik, Julian Smart, Stein Somers, Petr Smilauer, Neil Smith, Kari Systä, George Tasker, Arthur Tetzlaff-Deas, Jonathan Tonberg, Jyrki Tuomi, Janos Vegh, Andrea Venturoli, David Webster, Otto Wyss, Vadim Zeitlin, Xiaokun Zhu, Edward Zimmermann.

'Graphplace', the basis for the wxGraphLayout library, is copyright Dr. Jos T.J. van Eijndhoven of Eindhoven University of Technology. The code has been used in wxGraphLayout with his permission.

We also acknowledge the author of XFIG, the excellent Unix drawing tool, from the source of which we have borrowed some spline drawing code. His copyright is included below.

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Chapter 3 Multi-platform development with wxWidgets

This chapter describes the practical details of using wxWidgets. Please see the file `install.txt` for up-to-date installation instructions, and `changes.txt` for differences between versions.

Include files

The main include file is `"wx/wx.h"`; this includes the most commonly used modules of wxWidgets.

To save on compilation time, include only those header files relevant to the source file. If you are using precompiled headers, you should include the following section before any other includes:

```
// For compilers that support precompilation, includes "wx.h".
#include <wx/wxprec.h>

#ifdef __BORLANDC__
#pragma hdrstop
#endif

#ifdef WX_PRECOMP
// Include your minimal set of headers here, or wx.h
#include <wx/wx.h>
#endif

... now your other include files ...
```

The file `"wx/wxprec.h"` includes `"wx/wx.h"`. Although this incantation may seem quirky, it is in fact the end result of a lot of experimentation, and several Windows compilers to use precompilation (those tested are Microsoft Visual C++, Borland C++ and Watcom C++).

Borland precompilation is largely automatic. Visual C++ requires specification of `"wx/wxprec.h"` as the file to use for precompilation. Watcom C++ is automatic apart from the specification of the `.pch` file. Watcom C++ is strange in requiring the precompiled header to be used only for object files compiled in the same directory as that in which the precompiled header was created. Therefore, the wxWidgets Watcom C++ makefiles go through hoops deleting and recreating a single precompiled header file for each module, thus preventing an accumulation of many multi-megabyte `.pch` files.

Libraries

Most ports of wxWidgets can create either a static library or a shared library. wxWidgets can also be built in multilib and monolithic variants. See the *libraries list* (p. 15) for more information on these.

Configuration

When using project files and makefiles directly to build wxWidgets, options are configurable in the file "`wx/XXX/setup.h`" where XXX is the required platform (such as msw, motif, gtk, mac). Some settings are a matter of taste, some help with platform-specific problems, and others can be set to minimize the size of the library. Please see the `setup.h` file and `install.txt` files for details on configuration.

When using the 'configure' script to configure wxWidgets (on Unix and other platforms where configure is available), the corresponding `setup.h` files are generated automatically along with suitable makefiles. When using the RPM packages for installing wxWidgets on Linux, a correct `setup.h` is shipped in the package and this must not be changed.

Makefiles

On Microsoft Windows, wxWidgets has a different set of makefiles for each compiler, because each compiler's 'make' tool is slightly different. Popular Windows compilers that we cater for, and the corresponding makefile extensions, include: Microsoft Visual C++ (.vc), Borland C++ (.bcc), OpenWatcom C++ (.wat) and MinGW/Cygwin (.gcc). Makefiles are provided for the wxWidgets library itself, samples, demos, and utilities.

On Linux, Mac and OS/2, you use the 'configure' command to generate the necessary makefiles. You should also use this method when building with MinGW/Cygwin on Windows.

We also provide project files for some compilers, such as Microsoft VC++. However, we recommend using makefiles to build the wxWidgets library itself, because makefiles can be more powerful and less manual intervention is required.

On Windows using a compiler other than MinGW/Cygwin, you would build the wxWidgets library from the `build/msw` directory which contains the relevant makefiles.

On Windows using MinGW/Cygwin, and on Unix, MacOS X and OS/2, you invoke 'configure' (found in the top-level of the wxWidgets source hierarchy), from within a suitable empty directory for containing makefiles, object files and libraries.

For details on using makefiles, configure, and project files, please see `docs/xxx/install.txt` in your distribution, where xxx is the platform of interest, such as msw, gtk, x11, mac.

Windows-specific files

wxWidgets application compilation under MS Windows requires at least two extra files, resource and module definition files.

Resource file

The least that must be defined in the Windows resource file (extension RC) is the

following statement:

```
#include "wx/msw/wx.rc"
```

which includes essential internal wxWidgets definitions. The resource script may also contain references to icons, cursors, etc., for example:

```
wxicon icon wx.ico
```

The icon can then be referenced by name when creating a frame icon. See the MS Windows SDK documentation.

Note: include `wx.rc` *after* any `ICON` statements so programs that search your executable for icons (such as the Program Manager) find your application icon first.

Allocating and deleting wxWidgets objects

In general, classes derived from `wxWindow` must dynamically allocated with *new* and deleted with *delete*. If you delete a window, all of its children and descendants will be automatically deleted, so you don't need to delete these descendants explicitly.

When deleting a frame or dialog, use **Destroy** rather than **delete** so that the wxWidgets delayed deletion can take effect. This waits until idle time (when all messages have been processed) to actually delete the window, to avoid problems associated with the GUI sending events to deleted windows.

Don't create a window on the stack, because this will interfere with delayed deletion.

If you decide to allocate a C++ array of objects (such as `wxBitmap`) that may be cleaned up by wxWidgets, make sure you delete the array explicitly before wxWidgets has a chance to do so on exit, since calling *delete* on array members will cause memory problems.

`wxColour` can be created statically: it is not automatically cleaned up and is unlikely to be shared between other objects; it is lightweight enough for copies to be made.

Beware of deleting objects such as a `wxPen` or `wxBitmap` if they are still in use. Windows is particularly sensitive to this: so make sure you make calls like `wxDC::SetPen(wxNullPen)` or `wxDC::SelectObject(wxNullBitmap)` before deleting a drawing object that may be in use. Code that doesn't do this will probably work fine on some platforms, and then fail under Windows.

Architecture dependency

A problem which sometimes arises from writing multi-platform programs is that the basic C types are not defined the same on all platforms. This holds true for both the length in bits of the standard types (such as `int` and `long`) as well as their byte order, which might be little endian (typically on Intel computers) or big endian (typically on some Unix workstations). wxWidgets defines types and macros that make it easy to write architecture independent code. The types are:

`wxInt32, wxInt16, wxInt8, wxUInt32, wxUInt16 = wxWord, wxUInt8 = wxByte`

where `wxInt32` stands for a 32-bit signed integer type etc. You can also check which architecture the program is compiled on using the `wxBYTE_ORDER` define which is either `wxBIG_ENDIAN` or `wxLITTLE_ENDIAN` (in the future maybe `wxPDP_ENDIAN` as well).

The macros handling bit-swapping with respect to the applications endianness are described in the *Byte order macros* (p. 1519) section.

Conditional compilation

One of the purposes of `wxWidgets` is to reduce the need for conditional compilation in source code, which can be messy and confusing to follow. However, sometimes it is necessary to incorporate platform-specific features (such as metafile use under MS Windows). The symbols listed in the file `symbols.txt` may be used for this purpose, along with any user-supplied ones.

C++ issues

The following documents some miscellaneous C++ issues.

Templates

`wxWidgets` does not use templates (except for some advanced features that are switched off by default) since it is a notoriously unportable feature.

RTTI

`wxWidgets` does not use C++ run-time type information since `wxWidgets` provides its own run-time type information system, implemented using macros.

Type of NULL

Some compilers (e.g. the native IRIX `cc`) define `NULL` to be `0L` so that no conversion to pointers is allowed. Because of that, all these occurrences of `NULL` in the GTK+ port use an explicit conversion such as

```
wxWindow *my_window = (wxWindow*) NULL;
```

It is recommended to adhere to this in all code using `wxWidgets` as this make the code (a bit) more portable.

Precompiled headers

Some compilers, such as Borland C++ and Microsoft C++, support precompiled headers. This can save a great deal of compiling time. The recommended approach is to precompile `"wx.h"`, using this precompiled header for compiling both `wxWidgets` itself and any `wxWidgets` applications. For Windows compilers, two dummy source files are provided (one for normal applications and one for creating DLLs) to allow initial creation of the precompiled header.

However, there are several downsides to using precompiled headers. One is that to take advantage of the facility, you often need to include more header files than would normally be the case. This means that changing a header file will cause more recompilations (in the case of `wxWidgets`, everything needs to be recompiled since everything includes `"wx.h"`!).

A related problem is that for compilers that don't have precompiled headers, including a lot of header files slows down compilation considerably. For this reason, you will find (in the common X and Windows parts of the library) conditional compilation that under Unix, includes a minimal set of headers; and when using Visual C++, includes `wx.h`. This should help provide the optimal compilation for each compiler, although it is biased towards the precompiled headers facility available in Microsoft C++.

File handling

When building an application which may be used under different environments, one difficulty is coping with documents which may be moved to different directories on other machines. Saving a file which has pointers to full pathnames is going to be inherently unportable. One approach is to store filenames on their own, with no directory information. The application searches through a number of locally defined directories to find the file. To support this, the class **`wxPathList`** makes adding directories and searching for files easy, and the global function **`wxFileNameFromPath`** allows the application to strip off the filename from the path if the filename must be stored. This has undesirable ramifications for people who have documents of the same name in different directories.

As regards the limitations of DOS 8+3 single-case filenames versus unrestricted Unix filenames, the best solution is to use DOS filenames for your application, and also for document filenames *if* the user is likely to be switching platforms regularly. Obviously this latter choice is up to the application user to decide. Some programs (such as YACC and LEX) generate filenames incompatible with DOS; the best solution here is to have your Unix makefile rename the generated files to something more compatible before transferring the source to DOS. Transferring DOS files to Unix is no problem, of course, apart from EOL conversion for which there should be a utility available (such as `dos2unix`).

See also the File Functions section of the reference manual for descriptions of miscellaneous file handling functions.

Chapter 4 Utilities and libraries supplied with wxWidgets

In addition to the core wxWidgets library, a number of further libraries and utilities are supplied with each distribution.

Some are under the 'contrib' hierarchy which mirrors the structure of the main wxWidgets hierarchy. See also the 'utils' hierarchy. The first place to look for documentation about these tools and libraries is under the wxWidgets 'docs' hierarchy, for example `docs/htmlhelp/fl.chm`.

For other user-contributed packages, please see the Contributions page on the wxWidgets Web site (<http://www.wxwidgets.org>).

Helpview Helpview is a program for displaying wxWidgets HTML Help files. In many cases, you may wish to use the wxWidgets HTML Help classes from within your application, but this provides a handy stand-alone viewer. See *wxHTML Notes* (p. 1699) for more details. You can find it in `samples/html/helpview`.

Tex2RTF Supplied with wxWidgets is a utility called Tex2RTF for converting LaTeX manuals HTML, MS HTML Help, wxHTML Help, RTF, and Windows Help RTF formats. Tex2RTF is used for the wxWidgets manuals and can be used independently by authors wishing to create on-line and printed manuals from the same LaTeX source. Please see the separate documentation for Tex2RTF. You can find it under `utils/tex2rtf`.

Helpgen Helpgen takes C++ header files and generates a Tex2RTF-compatible documentation file for each class it finds, using comments as appropriate. This is a good way to start a reference for a set of classes. Helpgen can be found in `utils/HelpGen`.

Emulator Xnest-based display emulator for X11-based PDA applications. On some systems, the Xnest window does not synchronise with the 'skin' window. This program can be found in `utils/emulator`.

Configuration Tool The wxWidgets Configuration Tool is a work in progress intended to make it easier to configure wxWidgets features in detail. It exports `setup.h` configurations and will eventually generate makefile config files. Invoking compilers is also on the cards. Since configurations are handled one at a time, the tool is of limited use until further development can be done. The program can be found in `utils/configtool`.

XRC resource system This is the sizer-aware resource system, and uses XML-based resource specifications that can be generated by tools such as wxDesigner (<http://www.roebling.de>) and XRC's own wxrcedit. You can find this in `contrib/src/xrc`, `contrib/include/wx/xrc`, `contrib/samples/xrc`, and `contrib/utils/wxrcedit`. For more information, see the *XML-based resource system overview* (p. 1634).

Object Graphics Library OGL defines an API for applications that need to display objects connected by lines. The objects can be moved around and interacted with. You can find this in `contrib/src/ogl`, `contrib/include/wx/ogl`, and `contrib/samples/ogl`.

Frame Layout library FL provides sophisticated pane dragging and docking facilities. You can find this in `contrib/src/fl`, `contrib/include/wx/fl`, and `contrib/samples/fl`.

Gizmos library Gizmos is a collection of useful widgets and other classes. Classes include `wxLEDNumberCtrl`, `wxEditableListBox`, `wxMultiCellCanvas`. You can find this in `contrib/src/gizmos`, `contrib/include/wx/gizmos`, and `contrib/samples/gizmos`.

Net library Net is a collection of very simple mail and web related classes. Currently there is only `wxEmail`, which makes it easy to send email messages via MAPI on Windows or `sendmail` on Unix. You can find this in `contrib/src/net` and `contrib/include/wx/net`.

Animate library Animate allows you to load animated GIFs and play them on a window. The library can be extended to use other animation formats. You can find this in `contrib/src/animate`, `contrib/include/wx/animate`, and `contrib/samples/animate`.

MMedia library Mmedia supports a variety of multimedia functionality. The status of this library is currently unclear. You can find this in `contrib/src/mmedia`, `contrib/include/wx/mmedia`, and `contrib/samples/mmedia`.

Styled Text Control library STC is a wrapper around Scintilla, a syntax-highlighting text editor. You can find this in `contrib/src/stc`, `contrib/include/wx/stc`, and `contrib/samples/stc`.

Plot Plot is a simple curve plotting library. You can find this in `contrib/src/plot`, `contrib/include/wx/plot`, and `contrib/samples/plot`.

Chapter 5 Programming strategies

This chapter is intended to list strategies that may be useful when writing and debugging wxWidgets programs. If you have any good tips, please submit them for inclusion here.

Strategies for reducing programming errors

Use ASSERT

Although I haven't done this myself within wxWidgets, it is good practice to use ASSERT statements liberally, that check for conditions that should or should not hold, and print out appropriate error messages. These can be compiled out of a non-debugging version of wxWidgets and your application. Using ASSERT is an example of 'defensive programming': it can alert you to problems later on.

Use wxString in preference to character arrays

Using wxString can be much safer and more convenient than using char *. Again, I haven't practiced what I'm preaching, but I'm now trying to use wxString wherever possible. You can reduce the possibility of memory leaks substantially, and it is much more convenient to use the overloaded operators than functions such as strcmp. wxString won't add a significant overhead to your program; the overhead is compensated for by easier manipulation (which means less code).

The same goes for other data types: use classes wherever possible.

Strategies for portability

Use relative positioning or constraints

Don't use absolute panel item positioning if you can avoid it. Different GUIs have very differently sized panel items. Consider using the constraint system, although this can be complex to program.

Alternatively, you could use alternative .wrc (wxWidgets resource files) on different platforms, with slightly different dimensions in each. Or space your panel items out to avoid problems.

Use wxWidgets resource files

Use .xrc (wxWidgets resource files) where possible, because they can be easily changed independently of source code.

Strategies for debugging

Positive thinking

It is common to blow up the problem in one's imagination, so that it seems to threaten weeks, months or even years of work. The problem you face may seem insurmountable: but almost never is. Once you have been programming for some time, you will be able to remember similar incidents that threw you into the depths of despair. But remember, you always solved the problem, somehow!

Perseverance is often the key, even though a seemingly trivial problem can take an apparently inordinate amount of time to solve. In the end, you will probably wonder why you worried so much. That's not to say it isn't painful at the time. Try not to worry -- there are many more important things in life.

Simplify the problem

Reduce the code exhibiting the problem to the smallest program possible that exhibits the problem. If it is not possible to reduce a large and complex program to a very small program, then try to ensure your code doesn't hide the problem (you may have attempted to minimize the problem in some way: but now you want to expose it).

With luck, you can add a small amount of code that causes the program to go from functioning to non-functioning state. This should give a clue to the problem. In some cases though, such as memory leaks or wrong deallocation, this can still give totally spurious results!

Use a debugger

This sounds like facetious advice, but it is surprising how often people don't use a debugger. Often it is an overhead to install or learn how to use a debugger, but it really is essential for anything but the most trivial programs.

Use logging functions

There is a variety of logging functions that you can use in your program: see *Logging functions* (p. 1527).

Using tracing statements may be more convenient than using the debugger in some circumstances (such as when your debugger doesn't support a lot of debugging code, or you wish to print a bunch of variables).

Use the wxWidgets debugging facilities

You can use `wxDebugContext` to check for memory leaks and corrupt memory: in fact in debugging mode, wxWidgets will automatically check for memory leaks at the end of the program if wxWidgets is suitably configured. Depending on the operating system and compiler, more or less specific information about the problem will be logged.

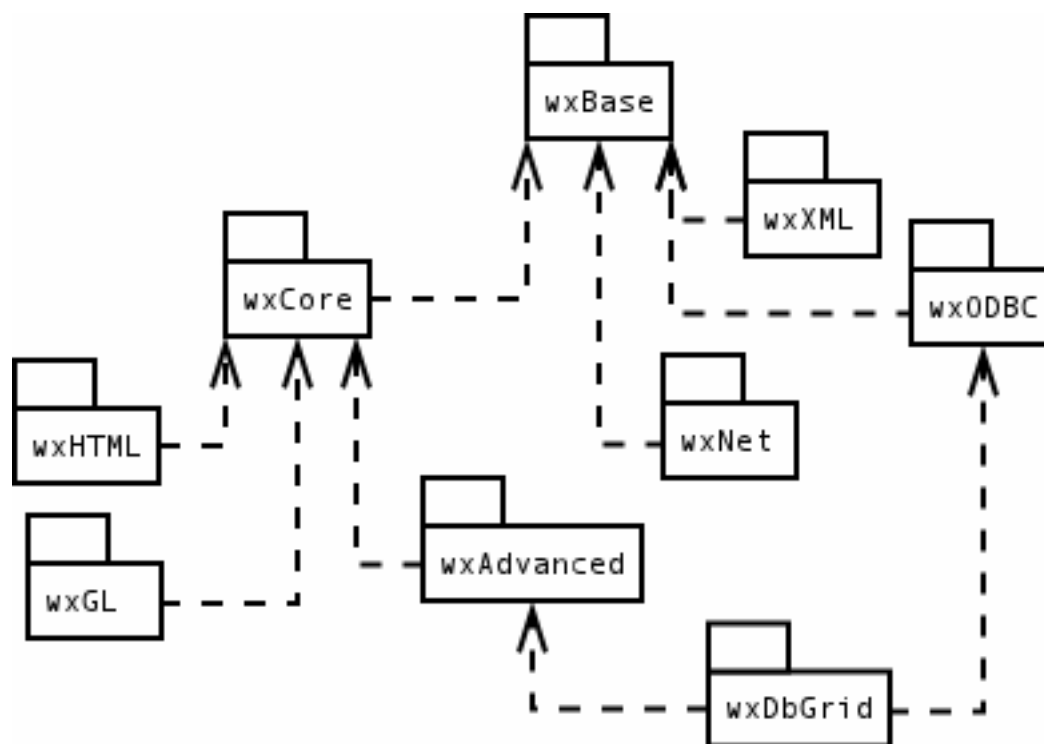
You should also use *debug macros* (p. 1535) as part of a 'defensive programming' strategy, scattering `wxASSERT`s liberally to test for problems in your code as early as possible. Forward thinking will save a surprising amount of time in the long run.

See the *debugging overview* (p. 1605) for further information.

Chapter 6 Libraries list

Starting from version 2.5.0 wxWidgets can be built either as a single large library (this is called the *monolithic build*) or as several smaller libraries (*multilib build*). Multilib build is the default.

wxWidgets library is divided into libraries briefly described below. This diagram show dependencies between them:



wxBase

Every wxWidgets application must link against this library. It contains mandatory classes that any wxWidgets code depends on (e.g. *wxString* (p. 1201)) and portability classes that abstract differences between platforms. **wxBase** can be used to develop console mode applications, it does not require any GUI libraries or running X Window System on Unix.

wxNet

Classes for network access:

- *wxSocket* classes (*wxSocketClient* (p. 1149), *wxSocketServer* (p. 1153) and related classes)
- *wxSocketOutputStream* (p. 1153) and *wxSocketInputStream* (p. 1152)

- sockets-based IPC classes (*wxTCPServer* (p. 1101), *wxTCPClient* (p. 132) and *wxTCPConnection* (p. 192))
- *wxURL* (p. 1357)
- *wxInternetFSHandler* (a *wxFileSystem handler* (p. 1608)) Requires *wxBase*.

wxXML

This library contains simple classes for parsing XML documents. Note that their API *will* change in the future and backward compatibility will not be preserved. Use of this library in your applications is not recommended, it is only meant for use by XML resources system. Future versions of *wxWidgets* will contain new XML handling classes with DOM-like API. Requires *wxBase*.

wxCore

Basic GUI classes such as GDI classes or controls are in this library. All *wxWidgets* GUI applications must link against this library, only console mode applications don't.

wxAdvanced

More advanced or rarely used GUI classes:

- *wxBufferedDC*
- *wxCalendarCtrl* (p. 109)
- *wxDragImage* (p. 423)
- *wxGrid classes* (p. 1669)
- *wxJoystick* (p. 768)
- *wxLayoutAlgorithm* (p. 782)
- *wxSplashScreen* (p. 1163)
- *wxTaskBarIcon* (p. 1242)
- *wxTipDialog*
- *wxSound* (p. 1386)
- *wxWizard* (p. 1443)
- *wxSashLayoutWindow* (p. 1065)
- *wxSashWindow* (p. 1068)

Requires *wxCore* and *wxBase*.

wxGL

This library contains *wxGLCanvas* (p. 569) class for integrating OpenGL library with *wxWidgets*. Unlike all others, this library is *not* part of the monolithic library, it is always built as separate library. Requires *wxCore* and *wxBase*.

wxHTML

Simple HTML renderer and other *HTML rendering classes* (p. 1699) are contained in this library, as well as *wxHtmlHelpController* (p. 672), *wxBestHelpController* (p. 644) and *wxHtmlListBox* (p. 683). Requires *wxCore* and *wxBase*.

wxODBC

Database classes (p. 1675). Requires *wxBase*.

wxDbGrid

wxDbGridTableBase (p. 340) class which combines *wxGrid* (p. 572) and *wxDbTable* (p. 302). Requires *wxODBC* and *wxAdvanced*.

Chapter 7 Alphabetical class reference

wxAcceleratorEntry

An object used by an application wishing to create an *accelerator table* (p. 19).

Derived from

None

Include files

<wx/accel.h>

See also

wxAcceleratorTable (p. 19), *wxWindow::SetAcceleratorTable* (p. 1422)

wxAcceleratorEntry::wxAcceleratorEntry

wxAcceleratorEntry()

Default constructor.

wxAcceleratorEntry(int flags, int keyCode, int cmd)

Constructor.

Parameters

flags

One of wxACCEL_ALT, wxACCEL_SHIFT, wxACCEL_CTRL and wxACCEL_NORMAL. Indicates which modifier key is held down.

keyCode

The keycode to be detected. See *Keycodes* (p. 1546) for a full list of keycodes.

cmd

The menu or control command identifier.

wxAcceleratorEntry::GetCommand

int GetCommand() const

Returns the command identifier for the accelerator table entry.

wxAcceleratorEntry::GetFlags

int GetFlags() const

Returns the flags for the accelerator table entry.

wxAcceleratorEntry::GetKeyCode

int GetKeyCode() const

Returns the keycode for the accelerator table entry.

wxAcceleratorEntry::Set

void Set(int flags, int keyCode, int cmd)

Sets the accelerator entry parameters.

Parameters

flags

One of wxACCEL_ALT, wxACCEL_SHIFT, wxACCEL_CTRL and wxACCEL_NORMAL. Indicates which modifier key is held down.

keyCode

The keycode to be detected. See *Keycodes* (p. 1546) for a full list of keycodes.

cmd

The menu or control command identifier.

wxAcceleratorTable

An accelerator table allows the application to specify a table of keyboard shortcuts for menus or other commands. On Windows, menu or button commands are supported; on GTK, only menu commands are supported.

The object **wxNullAcceleratorTable** is defined to be a table with no data, and is the initial accelerator table for a window.

Derived from

wxObject (p. 954)

Include files

<wx/accel.h>

Example

```
wxAcceleratorEntry entries[4];
entries[0].Set(wxACCEL_CTRL, (int) 'N', ID_NEW_WINDOW);
entries[1].Set(wxACCEL_CTRL, (int) 'X', wxID_EXIT);
entries[2].Set(wxACCEL_SHIFT, (int) 'A', ID_ABOUT);
entries[3].Set(wxACCEL_NORMAL, WXK_DELETE, wxID_CUT);
wxAcceleratorTable accel(4, entries);
frame->SetAcceleratorTable(accel);
```

Remarks

An accelerator takes precedence over normal processing and can be a convenient way to program some event handling. For example, you can use an accelerator table to enable a dialog with a multi-line text control to accept CTRL-Enter as meaning 'OK' (but not in GTK+ at present).

See also

wxAcceleratorEntry (p. 18), *wxWindow::SetAcceleratorTable* (p. 1422)

wxAcceleratorTable::wxAcceleratorTable

wxAcceleratorTable()

Default constructor.

wxAcceleratorTable(const wxAcceleratorTable& *bitmap*)

Copy constructor.

wxAcceleratorTable(int *n*, wxAcceleratorEntry *entries*[])

Creates from an array of *wxAcceleratorEntry* (p. 18) objects.

wxAcceleratorTable(const wxString& *resource*)

Loads the accelerator table from a Windows resource (Windows only).

Parameters

n

Number of accelerator entries.

entries

The array of entries.

resource

Name of a Windows accelerator.

wxPython note: The wxPython constructor accepts a list of wxAcceleratorEntry objects, or 3-tuples consisting of flags, keyCode, and cmd values like you would construct wxAcceleratorEntry objects with.

wxPerl note: The wxPerl constructor accepts a list of either Wx::AcceleratorEntry objects or references to 3-element arrays (flags, keyCode, cmd), like the parameters of Wx::AcceleratorEntry::new.

wxAcceleratorTable::~wxAcceleratorTable

~wxAcceleratorTable()

Destroys the wxAcceleratorTable object.

wxAcceleratorTable::Ok

bool Ok() const

Returns true if the accelerator table is valid.

wxAcceleratorTable::operator =

wxAcceleratorTable& operator =(const wxAcceleratorTable& accel)

Assignment operator. This operator does not copy any data, but instead passes a pointer to the data in *accel* and increments a reference counter. It is a fast operation.

Parameters

accel

Accelerator table to assign.

Return value

Returns reference to this object.

wxAcceleratorTable::operator ==

bool operator ==(const wxAcceleratorTable& accel)

Equality operator. This operator tests whether the internal data pointers are equal (a fast test).

Parameters

accel

Accelerator table to compare with

Return value

Returns true if the accelerator tables were effectively equal, false otherwise.

wxAcceleratorTable::operator !=

bool operator !=(const wxAcceleratorTable& accel)

Inequality operator. This operator tests whether the internal data pointers are unequal (a fast test).

Parameters

accel

Accelerator table to compare with

Return value

Returns true if the accelerator tables were unequal, false otherwise.

wxAccessible

The wxAccessible class allows wxWidgets applications, and wxWidgets itself, to return extended information about user interface elements to client applications such as screen readers. This is the main way in which wxWidgets implements accessibility features.

At present, only Microsoft Active Accessibility is supported by this class.

To use this class, derive from wxAccessible, implement appropriate functions, and associate an object of the class with a window using *wxWindow::SetAccessible* (p. 1423).

All functions return an indication of success, failure, or not implemented using values of the wxAccStatus enum type.

If you return wxACC_NOT_IMPLEMENTED from any function, the system will try to implement the appropriate functionality. However this will not work with all functions.

Most functions work with an *object id*, which can be zero to refer to 'this' UI element, or greater than zero to refer to the nth child element. This allows you to specify elements that don't have a corresponding wxWindow or wxAccessible; for example, the sash of a splitter window.

For details on the semantics of functions and types, please refer to the Microsoft Active Accessibility 1.2 documentation.

This class is compiled into wxWidgets only if the wxUSE_ACCESSIBILITY setup symbol is set to 1.

Derived from

wxObject (p. 954)

Include files

<wx/access.h>

Data structures

Functions return a `wxAccStatus` error code, which may be one of the following:

```
typedef enum
{
    wxACC\_FAIL,                // The function failed
    wxACC\_FALSE,               // The function returned false
    wxACC\_OK,                  // The function completed successfully
    wxACC\_NOT\_IMPLEMENTED,    // The function is not implemented
    wxACC\_NOT\_SUPPORTED      // The function is not supported
} wxAccStatus
```

Directions of navigation are represented by the following:

```
typedef enum
{
    wxNAVDIR\_DOWN,
    wxNAVDIR\_FIRSTCHILD,
    wxNAVDIR\_LASTCHILD,
    wxNAVDIR\_LEFT,
    wxNAVDIR\_NEXT,
    wxNAVDIR\_PREVIOUS,
    wxNAVDIR\_RIGHT,
    wxNAVDIR\_UP
} wxNavDir
```

The role of a user interface element is represented by the following type:

```
typedef enum {
    wxROLE\_NONE,
    wxROLE\_SYSTEM\_ALERT,
    wxROLE\_SYSTEM\_ANIMATION,
    wxROLE\_SYSTEM\_APPLICATION,
    wxROLE\_SYSTEM\_BORDER,
    wxROLE\_SYSTEM\_BUTTONDROPDOWN,
    wxROLE\_SYSTEM\_BUTTONDROPDOWNGRID,
    wxROLE\_SYSTEM\_BUTTONMENU,
    wxROLE\_SYSTEM\_CARET,
    wxROLE\_SYSTEM\_CELL,
    wxROLE\_SYSTEM\_CHARACTER,
    wxROLE\_SYSTEM\_CHART,
    wxROLE\_SYSTEM\_CHECKBUTTON,
    wxROLE\_SYSTEM\_CLIENT,
    wxROLE\_SYSTEM\_CLOCK,
    wxROLE\_SYSTEM\_COLUMN,
    wxROLE\_SYSTEM\_COLUMNHEADER,
    wxROLE\_SYSTEM\_COMBOBOX,
    wxROLE\_SYSTEM\_CURSOR,
    wxROLE\_SYSTEM\_DIAGRAM,
    wxROLE\_SYSTEM\_DIAL,
    wxROLE\_SYSTEM\_DIALOG,
    wxROLE\_SYSTEM\_DOCUMENT,
    wxROLE\_SYSTEM\_DROPLIST,
```

```

wxROLE\_SYSTEM\_EQUATION,
wxROLE\_SYSTEM\_GRAPHIC,
wxROLE\_SYSTEM\_GRIP,
wxROLE\_SYSTEM\_GROUPING,
wxROLE\_SYSTEM\_HELPPBALLOON,
wxROLE\_SYSTEM\_HOTKEYFIELD,
wxROLE\_SYSTEM\_INDICATOR,
wxROLE\_SYSTEM\_LINK,
wxROLE\_SYSTEM\_LIST,
wxROLE\_SYSTEM\_LISTITEM,
wxROLE\_SYSTEM\_MENUBAR,
wxROLE\_SYSTEM\_MENUITEM,
wxROLE\_SYSTEM\_MENUPOPUP,
wxROLE\_SYSTEM\_OUTLINE,
wxROLE\_SYSTEM\_OUTLINEITEM,
wxROLE\_SYSTEM\_PAGETAB,
wxROLE\_SYSTEM\_PAGETABLIST,
wxROLE\_SYSTEM\_PANE,
wxROLE\_SYSTEM\_PROGRESSBAR,
wxROLE\_SYSTEM\_PROPERTYPAGE,
wxROLE\_SYSTEM\_PUSHBUTTON,
wxROLE\_SYSTEM\_RADIOBUTTON,
wxROLE\_SYSTEM\_ROW,
wxROLE\_SYSTEM\_ROWHEADER,
wxROLE\_SYSTEM\_SCROLLBAR,
wxROLE\_SYSTEM\_SEPARATOR,
wxROLE\_SYSTEM\_SLIDER,
wxROLE\_SYSTEM\_SOUND,
wxROLE\_SYSTEM\_SPINBUTTON,
wxROLE\_SYSTEM\_STATICTEXT,
wxROLE\_SYSTEM\_STATUSBAR,
wxROLE\_SYSTEM\_TABLE,
wxROLE\_SYSTEM\_TEXT,
wxROLE\_SYSTEM\_TITLEBAR,
wxROLE\_SYSTEM\_TOOLBAR,
wxROLE\_SYSTEM\_TOOLTIP,
wxROLE\_SYSTEM\_WHITESPACE,
wxROLE\_SYSTEM\_WINDOW
} wxAccRole

```

Objects are represented by the following type:

```

typedef enum {
    wxOBJID\_WINDOW = 0x00000000,
    wxOBJID\_SYSMENU = 0xFFFFFFFF,
    wxOBJID\_TITLEBAR = 0xFFFFFFFFE,
    wxOBJID\_MENU = 0xFFFFFFFDD,
    wxOBJID\_CLIENT = 0xFFFFFFFCC,
    wxOBJID\_VSCROLL = 0xFFFFFFFBB,
    wxOBJID\_HSCROLL = 0xFFFFFFFBA,
    wxOBJID\_SIZEGRIP = 0xFFFFFFF9,
    wxOBJID\_CARET = 0xFFFFFFF8,
    wxOBJID\_CURSOR = 0xFFFFFFF7,
    wxOBJID\_ALERT = 0xFFFFFFF6,
    wxOBJID\_SOUND = 0xFFFFFFF5
} wxAccObject

```

Selection actions are identified by this type:

```

typedef enum
{
    wxACC\_SEL\_NONE = 0,
    wxACC\_SEL\_TAKEFOCUS = 1,
    wxACC\_SEL\_TAKESELECTION = 2,
    wxACC\_SEL\_EXTENDSELECTION = 4,

```

```

    wxACC\_SEL\_ADDSELECTION      = 8,
    wxACC\_SEL\_REMOVESELECTION = 16
} wxAccSelectionFlags

```

States are represented by the following:

```

#define wxACC\_STATE\_SYSTEM\_ALERT\_HIGH      0x00000001
#define wxACC\_STATE\_SYSTEM\_ALERT\_MEDIUM   0x00000002
#define wxACC\_STATE\_SYSTEM\_ALERT\_LOW       0x00000004
#define wxACC\_STATE\_SYSTEM\_ANIMATED         0x00000008
#define wxACC\_STATE\_SYSTEM\_BUSY             0x00000010
#define wxACC\_STATE\_SYSTEM\_CHECKED          0x00000020
#define wxACC\_STATE\_SYSTEM\_COLLAPSED        0x00000040
#define wxACC\_STATE\_SYSTEM\_DEFAULT          0x00000080
#define wxACC\_STATE\_SYSTEM\_EXPANDED         0x00000100
#define wxACC\_STATE\_SYSTEM\_EXTSELECTABLE    0x00000200
#define wxACC\_STATE\_SYSTEM\_FLOATING         0x00000400
#define wxACC\_STATE\_SYSTEM\_FOCUSABLE        0x00000800
#define wxACC\_STATE\_SYSTEM\_FOCUSED          0x00001000
#define wxACC\_STATE\_SYSTEM\_HOTTRACKED       0x00002000
#define wxACC\_STATE\_SYSTEM\_INVISIBLE        0x00004000
#define wxACC\_STATE\_SYSTEM\_MARQUEED         0x00008000
#define wxACC\_STATE\_SYSTEM\_MIXED            0x00010000
#define wxACC\_STATE\_SYSTEM\_MULTISELECTABLE  0x00020000
#define wxACC\_STATE\_SYSTEM\_OFFSCREEN        0x00040000
#define wxACC\_STATE\_SYSTEM\_PRESSED          0x00080000
#define wxACC\_STATE\_SYSTEM\_PROTECTED        0x00100000
#define wxACC\_STATE\_SYSTEM\_READONLY         0x00200000
#define wxACC\_STATE\_SYSTEM\_SELECTABLE       0x00400000
#define wxACC\_STATE\_SYSTEM\_SELECTED         0x00800000
#define wxACC\_STATE\_SYSTEM\_SELFVOICING      0x01000000
#define wxACC\_STATE\_SYSTEM\_UNAVAILABLE      0x02000000

```

Event identifiers that can be sent via *wxAccessible::NotifyEvent* (p. 29) are as follows:

```

#define wxACC\_EVENT\_SYSTEM\_SOUND            0x0001
#define wxACC\_EVENT\_SYSTEM\_ALERT            0x0002
#define wxACC\_EVENT\_SYSTEM\_FOREGROUND       0x0003
#define wxACC\_EVENT\_SYSTEM\_MENUSTART       0x0004
#define wxACC\_EVENT\_SYSTEM\_MENUEND         0x0005
#define wxACC\_EVENT\_SYSTEM\_MENUPOPUPSTART   0x0006
#define wxACC\_EVENT\_SYSTEM\_MENUPOPUPEND     0x0007
#define wxACC\_EVENT\_SYSTEM\_CAPTURESTART     0x0008
#define wxACC\_EVENT\_SYSTEM\_CAPTUREEND       0x0009
#define wxACC\_EVENT\_SYSTEM\_MOVESIZESTART     0x000A
#define wxACC\_EVENT\_SYSTEM\_MOVESIZEEND      0x000B
#define wxACC\_EVENT\_SYSTEM\_CONTEXTHELPSTART 0x000C
#define wxACC\_EVENT\_SYSTEM\_CONTEXTHELPEND   0x000D
#define wxACC\_EVENT\_SYSTEM\_DRAGDROPSTART     0x000E
#define wxACC\_EVENT\_SYSTEM\_DRAGDROPEND       0x000F
#define wxACC\_EVENT\_SYSTEM\_DIALOGSTART       0x0010
#define wxACC\_EVENT\_SYSTEM\_DIALOGEND        0x0011
#define wxACC\_EVENT\_SYSTEM\_SCROLLINGSTART    0x0012
#define wxACC\_EVENT\_SYSTEM\_SCROLLINGEND      0x0013
#define wxACC\_EVENT\_SYSTEM\_SWITCHSTART       0x0014
#define wxACC\_EVENT\_SYSTEM\_SWITCHEND        0x0015
#define wxACC\_EVENT\_SYSTEM\_MINIMIZESTART     0x0016
#define wxACC\_EVENT\_SYSTEM\_MINIMIZEEND       0x0017
#define wxACC\_EVENT\_OBJECT\_CREATE            0x8000
#define wxACC\_EVENT\_OBJECT\_DESTROY          0x8001
#define wxACC\_EVENT\_OBJECT\_SHOW             0x8002
#define wxACC\_EVENT\_OBJECT\_HIDE             0x8003
#define wxACC\_EVENT\_OBJECT\_REORDER          0x8004
#define wxACC\_EVENT\_OBJECT\_FOCUS            0x8005
#define wxACC\_EVENT\_OBJECT\_SELECTION         0x8006

```

```
#define wxACC\_EVENT\_OBJECT\_SELECTIONADD          0x8007
#define wxACC\_EVENT\_OBJECT\_SELECTIONREMOVE       0x8008
#define wxACC\_EVENT\_OBJECT\_SELECTIONWITHIN       0x8009
#define wxACC\_EVENT\_OBJECT\_STATECHANGE          0x800A
#define wxACC\_EVENT\_OBJECT\_LOCATIONCHANGE         0x800B
#define wxACC\_EVENT\_OBJECT\_NAMECHANGE           0x800C
#define wxACC\_EVENT\_OBJECT\_DESCRIPTIONCHANGE     0x800D
#define wxACC\_EVENT\_OBJECT\_VALUECHANGE          0x800E
#define wxACC\_EVENT\_OBJECT\_PARENTCHANGE         0x800F
#define wxACC\_EVENT\_OBJECT\_HELPCHANGE           0x8010
#define wxACC\_EVENT\_OBJECT\_DEFACTIONCHANGE      0x8011
#define wxACC\_EVENT\_OBJECT\_ACCELERATORCHANGE    0x8012
```

wxAccessible::wxAccessible

wxAccessible(wxWindow* win = NULL)

Constructor, taking an optional window. The object can be associated with a window later.

wxAccessible::~~wxAccessible

~wxAccessible()

Destructor.

wxAccessible::DoDefaultAction

virtual wxAccStatus DoDefaultAction(int childId)

Performs the default action for the object. *childId* is 0 (the action for this object) or greater than 0 (the action for a child). Return `wxACC_NOT_SUPPORTED` if there is no default action for this window (e.g. an edit control).

wxAccessible::GetChild

virtual wxAccStatus GetChild(int childId, wxAccessible child)**

Gets the specified child (starting from 1). If *child* is NULL and the return value is `wxACC_OK`, this means that the child is a simple element and not an accessible object.

wxAccessible::GetChildCount

virtual wxAccStatus GetChildCount(int* childCount)

Returns the number of children in *childCount*.

wxAcessible::GetDefaultAction

virtual wxAccStatus GetDefaultAction(int *childId*, wxString* *actionName*)

Gets the default action for this object (0) or a child (greater than 0). Return wxACC_OK even if there is no action. *actionName* is the action, or the empty string if there is no action. The retrieved string describes the action that is performed on an object, not what the object does as a result. For example, a toolbar button that prints a document has a default action of "Press" rather than "Prints the current document."

wxAcessible::GetDescription

virtual wxAccStatus GetDescription(int *childId*, wxString* *description*)

Returns the description for this object or a child.

wxAcessible::GetFocus

virtual wxAccStatus GetFocus(int* *childId*, wxAccessible *child*)**

Gets the window with the keyboard focus. If *childId* is 0 and *child* is NULL, no object in this subhierarchy has the focus. If this object has the focus, *child* should be 'this'.

wxAcessible::GetHelpText

virtual wxAccStatus GetHelpText(int *childId*, wxString* *helpText*)

Returns help text for this object or a child, similar to tooltip text.

wxAcessible::GetKeyboardShortcut

virtual wxAccStatus GetKeyboardShortcut(int *childId*, wxString* *shortcut*)

Returns the keyboard shortcut for this object or child. Return e.g. ALT+K.

wxAcessible::GetLocation

virtual wxAccStatus GetLocation(wxRect& *rect*, int *elementId*)

Returns the rectangle for this object (*id* is 0) or a child element (*id* is greater than 0). *rect* is in screen coordinates.

wxAcessible::GetName

virtual wxAccStatus GetName(int *childId*, wxString* *name*)

Gets the name of the specified object.

wxAAccessible::GetParent

virtual wxAccStatus GetParent(wxAccessible parent)**

Returns the parent of this object, or NULL.

wxAAccessible::GetRole

virtual wxAccStatus GetRole(int childId, wxAccRole* role)

Returns a role constant describing this object. See *wxAAccessible* (p. 22) for a list of these roles.

wxAAccessible::GetSelections

virtual wxAccStatus GetSelections(wxVariant* selections)

Gets a variant representing the selected children of this object.

Acceptable values are:

- a null variant (IsNull() returns TRUE)
- a list variant (GetType() == wxT("list"))
- an integer representing the selected child element, or 0 if this object is selected (GetType() == wxT("long"))
- a "void*" pointer to a wxAccessible child object

wxAAccessible::GetState

virtual wxAccStatus GetState(int childId, long* state)

Returns a state constant. See *wxAAccessible* (p. 22) for a list of these states.

wxAAccessible::GetValue

virtual wxAccStatus GetValue(int childId, wxString* strValue)

Returns a localized string representing the value for the object or child.

wxAAccessible::GetWindow

wxWindow* GetWindow()

Returns the window associated with this object.

wxAccessible::HitTest

virtual wxAccStatus HitTest(const wxPoint& pt, int* childId, wxAccessible childObject)**

Returns a status value and object id to indicate whether the given point was on this or a child object. Can return either a child object, or an integer representing the child element, starting from 1.

pt is in screen coordinates.

wxAccessible::Navigate

virtual wxAccStatus Navigate(wxNavDir navDir, int fromId, int* toId, wxAccessible toObject)**

Navigates from *fromId* to *toId/toObject*.

wxAccessible::NotifyEvent

virtual static void NotifyEvent(int eventType, wxWindow* window, wxAccObjectt objectType, int objectType)

Allows the application to send an event when something changes in an accessible object.

wxAccessible::Select

virtual wxAccStatus Select(int childId, wxAccSelectionFlags selectFlags)

Selects the object or child. See *wxAccessible* (p. 22) for a list of the selection actions.

wxAccessible::SetWindow

void SetWindow(wxWindow* window)

Sets the window associated with this object.

wxActivateEvent

An activate event is sent when a window or application is being activated or deactivated.

Derived from

wxEvt (p. 441)

wxObject (p. 954)

Include files

<wx/event.h>

Event table macros

To process an activate event, use these event handler macros to direct input to a member function that takes a *wxActivateEvent* argument.

EVT_ACTIVATE(func) Process a *wxEVT_ACTIVATE* event.

EVT_ACTIVATE_APP(func) Process a *wxEVT_ACTIVATE_APP* event.

Remarks

A top-level window (a dialog or frame) receives an activate event when is being activated or deactivated. This is indicated visually by the title bar changing colour, and a subwindow gaining the keyboard focus.

An application is activated or deactivated when one of its frames becomes activated, or a frame becomes inactive resulting in all application frames being inactive. (Windows only)

See also

Event handling overview (p. 1610)

wxActivateEvent::wxActivateEvent

wxActivateEvent(WXTYPE eventType = 0, bool active = true, int id = 0)

Constructor.

wxActivateEvent::m_active

bool m_active

true if the window or application was activated.

wxActivateEvent::GetActive

bool GetActive() const

Returns true if the application or window is being activated, false otherwise.

wxApp

The **wxApp** class represents the application itself. It is used to:

- set and get application-wide properties;
- implement the windowing system message or event loop;
- initiate application processing via *wxApp::OnInit* (p. 37);
- allow default processing of events not handled by other objects in the application.

You should use the macro `IMPLEMENT_APP(appClass)` in your application implementation file to tell wxWidgets how to create an instance of your application class.

Use `DECLARE_APP(appClass)` in a header file if you want the `wxGetApp` function (which returns a reference to your application object) to be visible to other files.

Derived from

wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

`<wx/app.h>`

See also

wxApp overview (p. 1577)

wxApp::wxApp

void wxApp()

Constructor. Called implicitly with a definition of a wxApp object.

wxApp::~~wxApp

void ~wxApp()

Destructor. Will be called implicitly on program exit if the wxApp object is created on the stack.

wxApp::argc

int argc

Number of command line arguments (after environment-specific processing).

wxApp::argv

char ** argv

Command line arguments (after environment-specific processing).

wxApp::CreateLogTarget

virtual wxLog* CreateLogTarget()

Creates a wxLog class for the application to use for logging errors. The default implementation returns a new wxLogGui class.

See also

wxLog (p. 844)

wxApp::Dispatch

void Dispatch()

Dispatches the next event in the windowing system event queue.

This can be used for programming event loops, e.g.

```
while (app.Pending())  
    Dispatch();
```

See also

wxApp::Pending (p. 39)

wxApp::FilterEvent

int FilterEvent(wxEvent& event)

This function is called before processing any event and allows the application to preempt the processing of some events. If this method returns -1 the event is processed normally, otherwise either `true` or `false` should be returned and the event processing stops immediately considering that the event had been already processed (for the former return value) or that it is not going to be processed at all (for the latter one).

wxApp::GetAppName

wxString GetAppName() const

Returns the application name.

Remarks

`wxWidgets` sets this to a reasonable default before calling `wxApp::OnInit` (p. 37), but the application can reset it at will.

`wxApp::GetAuto3D`

`bool GetAuto3D() const`

Returns true if 3D control mode is on, false otherwise.

See also

`wxApp::SetAuto3D` (p. 40)

`wxApp::GetClassName`

`wxString GetClassName() const`

Gets the class name of the application. The class name may be used in a platform specific manner to refer to the application.

See also

`wxApp::SetClassName` (p. 40)

`wxApp::GetExitOnFrameDelete`

`bool GetExitOnFrameDelete() const`

Returns true if the application will exit when the top-level window is deleted, false otherwise.

See also

`wxApp::SetExitOnFrameDelete` (p. 40),
wxApp shutdown overview (p. 1578)

`wxApp::GetTopWindow`

`virtual wxWindow * GetTopWindow() const`

Returns a pointer to the top window.

Remarks

If the top window hasn't been set using `wxApp::SetTopWindow` (p. 41), this function will

find the first top-level window (frame or dialog) and return that.

See also

SetTopWindow (p. 41)

wxApp::GetUseBestVisual

bool GetUseBestVisual() const

Returns true if the application will use the best visual on systems that support different visuals, false otherwise.

See also

SetUseBestVisual (p. 41)

wxApp::GetVendorName

wxString GetVendorName() const

Returns the application's vendor name.

wxApp::ExitMainLoop

void ExitMainLoop()

Call this to explicitly exit the main message (event) loop. You should normally exit the main loop (and the application) by deleting the top window.

wxApp::MainLoop

int MainLoop()

Called by wxWidgets on creation of the application. Override this if you wish to provide your own (environment-dependent) main loop.

Return value

Returns 0 under X, and the wParam of the WM_QUIT message under Windows.

wxApp::OnAssert

void OnAssert(const wxChar *file, int line, const wxChar *cond, const wxChar *msg)

This function is called when an assert failure occurs, i.e. the condition specified in `wxASSERT` (p. 1536) macro evaluated to `false`. It is only called in debug mode (when `__WXDEBUG__` is defined) as asserts are not left in the release code at all.

The base class version show the default assert failure dialog box proposing to the user to stop the program, continue or ignore all subsequent asserts.

Parameters

file

the name of the source file where the assert occurred

line

the line number in this file where the assert occurred

cond

the condition of the failed assert in string form

msg

the message specified as argument to *wxASSERT_MSG* (p. 1536) or *wxFail_MSG* (p. 1537), will be `NULL` if just *wxASSERT* (p. 1536) or *wxFail* (p. 1537) was used

wxApp::OnCmdLineError

bool OnCmdLineError(wxCmdLineParser& parser)

Called when command line parsing fails (i.e. an incorrect command line option was specified by the user). The default behaviour is to show the program usage text and abort the program.

Return `true` to continue normal execution or `false` to return `false` from *OnInit* (p. 37) thus terminating the program.

See also

OnInitCmdLine (p. 37)

wxApp::OnCmdLineHelp

bool OnCmdLineHelp(wxCmdLineParser& parser)

Called when the help option (`--help`) was specified on the command line. The default behaviour is to show the program usage text and abort the program.

Return `true` to continue normal execution or `false` to return `false` from *OnInit* (p. 37) thus terminating the program.

See also

OnInitCmdLine (p. 37)

wxApp::OnCmdLineParsed

bool OnCmdLineParsed(wxCmdLineParser& parser)

Called after the command line had been successfully parsed. You may override this method to test for the values of the various parameters which could be set from the command line.

Don't forget to call the base class version unless you want to suppress processing of the standard command line options.

Return `true` to continue normal execution or `false` to return `false` from *OnInit* (p. 37) thus terminating the program.

[See also](#)

OnInitCmdLine (p. 37)

wxApp::OnExceptionInMainLoop

`wxapponexceptioninmainloop`

virtual bool OnExceptionInMainLoop()

This function is called if an unhandled exception occurs inside the main application event loop. It can return `true` to ignore the exception and to continue running the loop or `false` to exit the loop and terminate the program. In the latter case it can also use C++ `throw` keyword to rethrow the current exception.

The default behaviour of this function is the latter in all ports except under Windows where a dialog is shown to the user which allows him to choose between the different options. You may override this function in your class to do something more appropriate.

Finally note that if the exception is rethrown from here, it can be caught in *OnUnhandledException* (p. 38).

wxApp::OnExit

virtual int OnExit()

Override this member function for any processing which needs to be done as the application is about to exit. *OnExit* is called after destroying all application windows and controls, but before `wxWidgets` cleanup. Note that it is not called at all if *OnInit* (p. 37) failed.

The return value of this function is currently ignored, return the same value as returned by the base class method if you override it.

wxApp::OnFatalException

void OnFatalException()

This function may be called if something fatal happens: an unhandled exception under Win32 or a fatal signal under Unix, for example. However, this will not happen by default: you have to explicitly call *wxHandleFatalExceptions* (p. 1473) to enable this.

Generally speaking, this function should only show a message to the user and return. You may attempt to save unsaved data but this is not guaranteed to work and, in fact, probably won't.

[See also](#)

wxHandleFatalExceptions (p. 1473)

wxApp::OnInit

bool OnInit()

This must be provided by the application, and will usually create the application's main window, optionally calling *wxApp::SetTopWindow* (p. 41). You may use *OnExit* (p. 36) to clean up anything initialized here, provided that the function returns `true`.

Notice that if you want to use the command line processing provided by *wxWidgets* you have to call the base class version in the derived class *OnInit()*.

Return `true` to continue processing, `false` to exit the application immediately.

wxApp::OnInitCmdLine

void OnInitCmdLine(wxCmdLineParser& parser)

Called from *OnInit* (p. 37) and may be used to initialize the parser with the command line options for this application. The base class versions adds support for a few standard options only.

wxApp::OnQueryEndSession

void OnQueryEndSession(wxCloseEvent& event)

This is an event handler function called when the operating system or GUI session is about to close down. Typically, an application will try to save unsaved documents at this point.

If *wxCloseEvent::CanVeto* (p. 140) returns `true`, the application is allowed to veto the shutdown by calling *wxCloseEvent::Veto* (p. 141). The application might veto the shutdown after prompting for documents to be saved, and the user has cancelled the save.

Use the `EVT_QUERY_END_SESSION` event table macro to handle query end session events.

You should check whether the application is forcing the deletion of the window using *wxCloseEvent::GetForce* (p. 141). If this is true, destroy the window using *wxWindow::Destroy* (p. 1397). If not, it is up to you whether you respond by destroying the window.

The default handler calls *wxWindow::Close* (p. 1395) on the top-level window, and vetoes the shutdown if *Close* returns false. This will be sufficient for many applications.

Remarks

Under X, *OnQueryEndSession* is called in response to the 'save session' event.

Under Windows, *OnQueryEndSession* is called in response to the *WM_QUERYENDSESSION* message.

See also

wxWindow::Close (p. 1395), *wxCloseEvent* (p. 139)

wxApp::OnRun

virtual int OnRun()

This virtual function is where the execution of a program written in wxWidgets starts. The default implementation just enters the main loop and starts handling the events until it terminates, either because *ExitMainLoop* (p. 34) has been explicitly called or because the last frame has been deleted and *GetExitOnFrameDelete* (p. 33) flag is `true` (this is the default).

The return value of this function becomes the exit code of the program, so it should return 0 in case of successful termination.

wxApp::OnUnhandledException

virtual void OnUnhandledException()

This function is called when an unhandled C++ exception occurs inside *OnRun()* (p. 38) (the exceptions which occur during the program startup and shutdown might not be caught at all). Note that the exception type is lost by now, so if you want to really handle the exception you should override *OnRun()* (p. 38) and put a try/catch clause around the call to the base class version there.

wxApp::ProcessMessage

bool ProcessMessage(WXMSG *msg)

Windows-only function for processing a message. This function is called from the main message loop, checking for windows that may wish to process it. The function returns true if the message was processed, false otherwise. If you use wxWidgets with another class library with its own message loop, you should make sure that this function is called

to allow wxWidgets to receive messages. For example, to allow co-existence with the Microsoft Foundation Classes, override the `PreTranslateMessage` function:

```
// Provide wxWidgets message loop compatibility
BOOL CTheApp::PreTranslateMessage(MSG *msg)
{
    if (wxTheApp && wxTheApp->ProcessMessage((WXMSW *)msg))
        return true;
    else
        return CWinApp::PreTranslateMessage(msg);
}
```

wxApp::Pending

bool Pending()

Returns true if unprocessed events are in the window system event queue.

See also

wxApp::Dispatch (p. 32)

wxApp::SendIdleEvents

bool SendIdleEvents(wxWindow* win, wxIdleEvent& event)

Sends idle events to a window and its children.

Please note that this function is internal to wxWidgets and shouldn't be used by user code.

Remarks

These functions poll the top-level windows, and their children, for idle event processing. If true is returned, more `OnIdle` processing is requested by one or more window.

See also

wxIdleEvent (p. 726)

wxApp::SetAppName

void SetAppName(const wxString& name)

Sets the name of the application. The name may be used in dialogs (for example by the document/view framework). A default name is set by wxWidgets.

See also

wxApp::GetAppName (p. 32)

wxApp::SetAuto3D

void SetAuto3D(const bool *auto3D*)

Switches automatic 3D controls on or off.

Parameters

auto3D

If true, all controls will be created with 3D appearances unless overridden for a control or dialog. The default is true

Remarks

This has an effect on Windows only.

See also

wxApp::GetAuto3D (p. 33)

wxApp::SetClassName

void SetClassName(const wxString& *name*)

Sets the class name of the application. This may be used in a platform specific manner to refer to the application.

See also

wxApp::GetClassName (p. 33)

wxApp::SetExitOnFrameDelete

void SetExitOnFrameDelete(bool *flag*)

Allows the programmer to specify whether the application will exit when the top-level frame is deleted.

Parameters

flag

If true (the default), the application will exit when the top-level frame is deleted. If false, the application will continue to run.

See also

wxApp::GetExitOnFrameDelete (p. 33),
wxApp shutdown overview (p. 1578)

wxApp::SetTopWindow

void SetTopWindow(wxWindow* window)

Sets the 'top' window. You can call this from within *wxApp::OnInit* (p. 37) to let wxWidgets know which is the main window. You don't have to set the top window; it is only a convenience so that (for example) certain dialogs without parents can use a specific window as the top window. If no top window is specified by the application, wxWidgets just uses the first frame or dialog in its top-level window list, when it needs to use the top window.

Parameters

window

The new top window.

See also

wxApp::GetTopWindow (p. 33), *wxApp::OnInit* (p. 37)

wxApp::SetVendorName

void SetVendorName(const wxString& name)

Sets the name of application's vendor. The name will be used in registry access. A default name is set by wxWidgets.

See also

wxApp::GetVendorName (p. 34)

wxApp::SetUseBestVisual

void SetUseBestVisual(bool flag)

Allows the programmer to specify whether the application will use the best visual on systems that support several visual on the same display. This is typically the case under Solaris and IRIX, where the default visual is only 8-bit whereas certain applications are supposed to run in TrueColour mode.

Note that this function has to be called in the constructor of the *wxApp* instance and won't have any effect when called later on.

This function currently only has effect under GTK.

Parameters

flag

If true, the app will use the best visual.

wxApp::HandleEvent

virtual void HandleEvent(wxEvtHandler *handler, wxEventFunction func, wxEvent& event) const

This function simply invokes the given method *func* of the specified event handler *handler* with the *event* as parameter. It exists solely to allow to catch the C++ exceptions which could be thrown by all event handlers in the application in one place: if you want to do this, override this function in your wxApp-derived class and add try/catch clause(s) to it.

wxApp::Yield

bool Yield(bool onlyIfNeeded = false)

Yields control to pending messages in the windowing system. This can be useful, for example, when a time-consuming process writes to a text window. Without an occasional yield, the text window will not be updated properly, and on systems with cooperative multitasking, such as Windows 3.1 other processes will not respond.

Caution should be exercised, however, since yielding may allow the user to perform actions which are not compatible with the current task. Disabling menu items or whole menus during processing can avoid unwanted reentrance of code: see `::wxSafeYield` (p. 1473) for a better function.

Note that `Yield()` will not flush the message logs. This is intentional as calling `Yield()` is usually done to quickly update the screen and popping up a message box dialog may be undesirable. If you do wish to flush the log messages immediately (otherwise it will be done during the next idle loop iteration), call `wxLog::FlushActive` (p. 848).

Calling `Yield()` recursively is normally an error and an assert failure is raised in debug build if such situation is detected. However if the `onlyIfNeeded` parameter is `true`, the method will just silently return `false` instead.

wxArray

This section describes the so called *dynamic arrays*. This is a C array-like data structure i.e. the member access time is constant (and not linear according to the number of container elements as for linked lists). However, these arrays are dynamic in the sense that they will automatically allocate more memory if there is not enough of it for adding a new element. They also perform range checking on the index values but in debug mode only, so please be sure to compile your application in debug mode to use it (see *debugging overview* (p. 1605) for details). So, unlike the arrays in some other languages, attempt to access an element beyond the arrays bound doesn't automatically expand the array but provokes an assertion failure instead in debug build and does nothing (except possibly crashing your program) in the release build.

The array classes were designed to be reasonably efficient, both in terms of run-time speed and memory consumption and the executable size. The speed of array item

access is, of course, constant (independent of the number of elements) making them much more efficient than linked lists (*wxList* (p. 787)). Adding items to the arrays is also implemented in more or less constant time - but the price is preallocating the memory in advance. In the *memory management* (p. 45) section you may find some useful hints about optimizing *wxArray* memory usage. As for executable size, all *wxArray* functions are inline, so they do not take *any space at all*.

wxWidgets has three different kinds of array. All of them derive from *wxBaseArray* class which works with untyped data and can not be used directly. The standard macros *WX_DEFINE_ARRAY()*, *WX_DEFINE_SORTED_ARRAY()* and *WX_DEFINE_OBJARRAY()* are used to define a new class deriving from it. The classes declared will be called in this documentation *wxArray*, *wxSortedArray* and *wxObjArray* but you should keep in mind that no classes with such names actually exist, each time you use one of *WX_DEFINE_XXXARRAY* macro you define a class with a new name. In fact, these names are "template" names and each usage of one of the macros mentioned above creates a template specialization for the given element type.

wxArray is suitable for storing integer types and pointers which it does not treat as objects in any way, i.e. the element pointed to by the pointer is not deleted when the element is removed from the array. It should be noted that all of *wxArray*'s functions are inline, so it costs strictly nothing to define as many array types as you want (either in terms of the executable size or the speed) as long as at least one of them is defined and this is always the case because *wxArrays* are used by *wxWidgets* internally. This class has one serious limitation: it can only be used for storing integral types (*bool*, *char*, *short*, *int*, *long* and their unsigned variants) or pointers (of any kind). An attempt to use with objects of *sizeof()* greater than *sizeof(long)* will provoke a runtime assertion failure, however declaring a *wxArray* of floats will not (on the machines where *sizeof(float) <= sizeof(long)*), yet it will **not** work, please use *wxObjArray* for storing floats and doubles (NB: a more efficient *wxArrayDouble* class is scheduled for the next release of *wxWidgets*).

wxSortedArray is a *wxArray* variant which should be used when searching in the array is a frequently used operation. It requires you to define an additional function for comparing two elements of the array element type and always stores its items in the sorted order (according to this function). Thus, it is *Index()* (p. 51) function execution time is $O(\log(N))$ instead of $O(N)$ for the usual arrays but the *Add()* (p. 50) method is slower: it is $O(\log(N))$ instead of constant time (neglecting time spent in memory allocation routine). However, in a usual situation elements are added to an array much less often than searched inside it, so *wxSortedArray* may lead to huge performance improvements compared to *wxArray*. Finally, it should be noticed that, as *wxArray*, *wxSortedArray* can be only used for storing integral types or pointers.

wxObjArray class treats its elements like "objects". It may delete them when they are removed from the array (invoking the correct destructor) and copies them using the objects copy constructor. In order to implement this behaviour the definition of the *wxObjArray* arrays is split in two parts: first, you should declare the new *wxObjArray* class using *WX_DECLARE_OBJARRAY()* macro and then you must include the file defining the implementation of template type: *<wx/arrimpl.cpp>* and define the array class with *WX_DEFINE_OBJARRAY()* macro from a point where the full (as opposed to 'forward') declaration of the array elements class is in scope. As it probably sounds very complicated here is an example:

```
#include <wx/dynarray.h>

// we must forward declare the array because it is used inside the class
// declaration
class MyDirectory;
class MyFile;

// this defines two new types: ArrayOfDirectories and ArrayOfFiles which
// can be
// now used as shown below
WX_DECLARE_OBJARRAY(MyDirectory, ArrayOfDirectories);
WX_DECLARE_OBJARRAY(MyFile, ArrayOfFiles);

class MyDirectory
{
...
    ArrayOfDirectories m_subdirectories; // all subdirectories
    ArrayOfFiles        m_files;       // all files in this directory
};

...

// now that we have MyDirectory declaration in scope we may finish the
// definition of ArrayOfDirectories -- note that this expands into some
C++
// code and so should only be compiled once (i.e., don't put this in the
// header, but into a source file or you will get linking errors)
#include <wx/arrimpl.cpp> // this is a magic incantation which must be
done!
WX_DEFINE_OBJARRAY(ArrayOfDirectories);

// that's all!
```

It is not as elegant as writing

```
typedef std::vector<MyDirectory> ArrayOfDirectories;
```

but is not that complicated and allows the code to be compiled with any, however dumb, C++ compiler in the world.

Things are much simpler for `wxArray` and `wxSortedArray` however: it is enough just to write

```
WX_DEFINE_ARRAY(int, ArrayOfDirectories);
WX_DEFINE_SORTED_ARRAY(int, ArrayOfFiles);
```

i.e. there is only one `DEFINE` macro and no need for separate `DECLARE` one.

See also:

Container classes overview (p. 1599), *wxList* (p. 787)

Include files

`<wx/dynarray.h>` for `wxArray` and `wxSortedArray` and additionally `<wx/arrimpl.cpp>` for `wxObjArray`.

Macros for template array definition

To use an array you must first define the array class. This is done with the help of the macros in this section. The class of array elements must be (at least) forward declared for `WX_DEFINE_ARRAY`, `WX_DEFINE_SORTED_ARRAY` and `WX_DECLARE_OBJARRAY` macros and must be fully declared before you use `WX_DEFINE_OBJARRAY` macro.

`WX_DEFINE_ARRAY` (p. 46)

`WX_DEFINE_EXPORTED_ARRAY` (p. 46)

`WX_DEFINE_USER_EXPORTED_ARRAY` (p. 46)

`WX_DEFINE_SORTED_ARRAY` (p. 47)

`WX_DEFINE_SORTED_EXPORTED_ARRAY` (p. 47)

`WX_DEFINE_SORTED_USER_EXPORTED_ARRAY` (p. 47)

`WX_DECLARE_EXPORTED_OBJARRAY` (p. 48)

`WX_DECLARE_USER_EXPORTED_OBJARRAY` (p. 48)

`WX_DEFINE_OBJARRAY` (p. 48)

`WX_DEFINE_EXPORTED_OBJARRAY` (p. 48)

`WX_DEFINE_USER_EXPORTED_OBJARRAY` (p. 48)

To slightly complicate the matters even further, the operator `->` defined by default for the array iterators by these macros only makes sense if the array element type is not a pointer itself and, although it still works, this provokes warnings from some compilers and to avoid them you should use the `_PTR` versions of the macros above. For example, to define an array of pointers to `double` you should use

```
WX_DEFINE_ARRAY_PTR(double *, MyArrayOfDoublePointers);
```

Constructors and destructors

Array classes are 100% C++ objects and as such they have the appropriate copy constructors and assignment operators. Copying `wxArray` just copies the elements but copying `wxObjArray` copies the arrays items. However, for memory-efficiency sake, neither of these classes has virtual destructor. It is not very important for `wxArray` which has trivial destructor anyhow, but it does mean that you should avoid deleting `wxObjArray` through a `wxBaseArray` pointer (as you would never use `wxBaseArray` anyhow it shouldn't be a problem) and that you should not derive your own classes from the array classes.

wxArray default constructor (p. 49)

wxArray copy constructors and assignment operators (p. 49)

~wxArray (p. 49)

Memory management

Automatic array memory management is quite trivial: the array starts by preallocating some minimal amount of memory (defined by `WX_ARRAY_DEFAULT_INITIAL_SIZE`) and when further new items exhaust already allocated memory it reallocates it adding 50% of the currently allocated amount, but no more than some maximal number which is defined by `ARRAY_MAXSIZE_INCREMENT` constant. Of course, this may lead to some memory being wasted (`ARRAY_MAXSIZE_INCREMENT` in the worst case, i.e. 4Kb in

the current implementation), so the *Shrink()* (p. 53) function is provided to deallocate the extra memory. The *Alloc()* (p. 50) function can also be quite useful if you know in advance how many items you are going to put in the array and will prevent the array code from reallocating the memory more times than needed.

Alloc (p. 50)

Shrink (p. 53)

Number of elements and simple item access

Functions in this section return the total number of array elements and allow to retrieve them - possibly using just the C array indexing `[]` operator which does exactly the same as *Item()* (p. 52) method.

Count (p. 51)

GetCount (p. 51)

IsEmpty (p. 52)

Item (p. 52)

Last (p. 52)

Adding items

Add (p. 50)

Insert (p. 52)

SetCount (p. 53)

WX_APPEND_ARRAY (p. 48)

Removing items

WX_CLEAR_ARRAY (p. 49)

Empty (p. 51)

Clear (p. 50)

RemoveAt (p. 53)

Remove (p. 52)

Searching and sorting

Index (p. 51)

Sort (p. 53)

WX_DEFINE_ARRAY

WX_DEFINE_ARRAY(*T*, *name*)

WX_DEFINE_EXPORTED_ARRAY(*T*, *name*)

WX_DEFINE_USER_EXPORTED_ARRAY(*T*, *name*, *exportspec*)

This macro defines a new array class named *name* and containing the elements of type *T*. The second form is used when compiling wxWidgets as a DLL under Windows and array needs to be visible outside the DLL. The third is needed for exporting an array from a user DLL.

Example:

```
WX_DEFINE_ARRAY(int, wxArrayInt);

class MyClass;
WX_DEFINE_ARRAY(MyClass *, wxArrayOfMyClass);
```

Note that wxWidgets predefines the following standard array classes: wxArrayInt, wxArrayLong and wxArrayPtrVoid.

WX_DEFINE_SORTED_ARRAY

WX_DEFINE_SORTED_ARRAY(*T*, *name*)

WX_DEFINE_SORTED_EXPORTED_ARRAY(*T*, *name*)

WX_DEFINE_SORTED_USER_EXPORTED_ARRAY(*T*, *name*)

This macro defines a new sorted array class named *name* and containing the elements of type *T*. The second form is used when compiling wxWidgets as a DLL under Windows and array needs to be visible outside the DLL. The third is needed for exporting an array from a user DLL.

Example:

```
WX_DEFINE_SORTED_ARRAY(int, wxSortedArrayInt);

class MyClass;
WX_DEFINE_SORTED_ARRAY(MyClass *, wxArrayOfMyClass);
```

You will have to initialize the objects of this class by passing a comparison function to the array object constructor like this:

```
int CompareInts(int n1, int n2)
{
    return n1 - n2;
}

wxSortedArrayInt sorted(CompareInts);

int CompareMyClassObjects(MyClass *item1, MyClass *item2)
{
    // sort the items by their address...
    return Stricmp(item1->GetAddress(), item2->GetAddress());
}

wxArrayOfMyClass another(CompareMyClassObjects);
```

WX_DECLARE_OBJARRAY

WX_DECLARE_OBJARRAY(*T*, *name*)

WX_DECLARE_EXPORTED_OBJARRAY(*T*, *name*)

WX_DECLARE_USER_EXPORTED_OBJARRAY(*T*, *name*)

This macro declares a new object array class named *name* and containing the elements of type *T*. The second form is used when compiling wxWidgets as a DLL under Windows and array needs to be visible outside the DLL. The third is needed for exporting an array from a user DLL.

Example:

```
class MyClass;
WX_DECLARE_OBJARRAY(MyClass, wxArrayOfMyClass); // note: not "MyClass *"!
```

You must use **WX_DEFINE_OBJARRAY**() (p. 48) macro to define the array class - otherwise you would get link errors.

WX_DEFINE_OBJARRAY

WX_DEFINE_OBJARRAY(*name*)

WX_DEFINE_EXPORTED_OBJARRAY(*name*)

WX_DEFINE_USER_EXPORTED_OBJARRAY(*name*)

This macro defines the methods of the array class *name* not defined by the **WX_DECLARE_OBJARRAY**() (p. 48) macro. You must include the file <wx/arrimpl.cpp> before using this macro and you must have the full declaration of the class of array elements in scope! If you forget to do the first, the error will be caught by the compiler, but, unfortunately, many compilers will not give any warnings if you forget to do the second - but the objects of the class will not be copied correctly and their real destructor will not be called. The latter two forms are merely aliases of the first to satisfy some people's sense of symmetry when using the exported declarations.

Example of usage:

```
// first declare the class!
class MyClass
{
public:
    MyClass(const MyClass&);

    ...

    virtual ~MyClass();
};

#include <wx/arrimpl.cpp>
WX_DEFINE_OBJARRAY(wxArrayOfMyClass);
```

WX_APPEND_ARRAY

void WX_APPEND_ARRAY(wxArray& array, wxArray& other)

This macro may be used to append all elements of the *other* array to the *array*. The two arrays must be of the same type.

WX_CLEAR_ARRAY

void WX_CLEAR_ARRAY(wxArray& array)

This macro may be used to delete all elements of the array before emptying it. It can not be used with wxObjArrays - but they will delete their elements anyhow when you call Empty().

Default constructors

wxArray()

wxObjArray()

Default constructor initializes an empty array object.

wxSortedArray(int (*)(T first, T second)compareFunction)

There is no default constructor for wxSortedArray classes - you must initialize it with a function to use for item comparison. It is a function which is passed two arguments of type *T* where *T* is the array element type and which should return a negative, zero or positive value according to whether the first element passed to it is less than, equal to or greater than the second one.

wxArray copy constructor and assignment operator

wxArray(const wxArray& array)

wxSortedArray(const wxSortedArray& array)

wxObjArray(const wxObjArray& array)

wxArray& operator=(const wxArray& array)

wxSortedArray& operator=(const wxSortedArray& array)

wxObjArray& operator=(const wxObjArray& array)

The copy constructors and assignment operators perform a shallow array copy (i.e. they don't copy the objects pointed to even if the source array contains the items of pointer type) for wxArray and wxSortedArray and a deep copy (i.e. the array element are copied too) for wxObjArray.

wxArray::~~wxArray

~wxArray()

~wxSortedArray()

~wxObjArray()

The wxObjArray destructor deletes all the items owned by the array. This is not done by wxArray and wxSortedArray versions - you may use `WX_CLEAR_ARRAY` (p. 49) macro for this.

wxArray::Add

void Add(T item, size_t copies = 1)

void Add(T *item)

void Add(T &item, size_t copies = 1)

Appends the given number of *copies* of the *item* to the array consisting of the elements of type *T*.

The first version is used with wxArray and wxSortedArray. The second and the third are used with wxObjArray. There is an important difference between them: if you give a pointer to the array, it will take ownership of it, i.e. will delete it when the item is deleted from the array. If you give a reference to the array, however, the array will make a copy of the item and will not take ownership of the original item. Once again, it only makes sense for wxObjArrays because the other array types never take ownership of their elements. Also note that you cannot append more than one pointer as reusing it would lead to deleting it twice (or more) and hence to a crash.

You may also use `WX_APPEND_ARRAY` (p. 48) macro to append all elements of one array to another one but it is more efficient to use *copies* parameter and modify the elements in place later if you plan to append a lot of items.

wxArray::Alloc

void Alloc(size_t count)

Preallocates memory for a given number of array elements. It is worth calling when the number of items which are going to be added to the array is known in advance because it will save unneeded memory reallocation. If the array already has enough memory for the given number of items, nothing happens.

wxArray::Clear

void Clear()

This function does the same as *Empty()* (p. 51) and additionally frees the memory allocated to the array.

wxArray::Count

size_t Count() const

Same as *GetCount()* (p. 51). This function is deprecated - it exists only for compatibility.

wxObjArray::Detach

T * Detach(size_t index)

Removes the element from the array, but, unlike, *Remove()* (p. 52) doesn't delete it. The function returns the pointer to the removed element.

wxArray::Empty

void Empty()

Empties the array. For *wxObjArray* classes, this destroys all of the array elements. For *wxArray* and *wxSortedArray* this does nothing except marking the array of being empty - this function does not free the allocated memory, use *Clear()* (p. 50) for this.

wxArray::GetCount

size_t GetCount() const

Return the number of items in the array.

wxArray::Index

int Index(T& item, bool searchFromEnd = false)**int Index(T& item)**

The first version of the function is for *wxArray* and *wxObjArray*, the second is for *wxSortedArray* only.

Searches the element in the array, starting from either beginning or the end depending on the value of *searchFromEnd* parameter. *wxNOT_FOUND* is returned if the element is not found, otherwise the index of the element is returned.

Linear search is used for the *wxArray* and *wxObjArray* classes but binary search in the sorted array is used for *wxSortedArray* (this is why *searchFromEnd* parameter doesn't make sense for it).

NB: even for *wxObjArray* classes, the operator *==()* of the elements in the array is **not** used by this function. It searches exactly the given element in the array and so will only succeed if this element had been previously added to the array, but fail even if another, identical, element is in the array.

wxArray::Insert

void Insert(T item, size_t n, size_t copies = 1)

void Insert(T *item, size_t n)

void Insert(T &item, size_t n, size_t copies = 1)

Insert the given number of *copies* of the *item* into the array before the existing item *n* - thus, *Insert(something, 0u)* will insert an item in such way that it will become the first array element.

Please see *Add()* (p. 50) for explanation of the differences between the overloaded versions of this function.

wxArray::IsEmpty

bool IsEmpty() const

Returns true if the array is empty, false otherwise.

wxArray::Item

T& Item(size_t index) const

Returns the item at the given position in the array. If *index* is out of bounds, an assert failure is raised in the debug builds but nothing special is done in the release build.

The returned value is of type "reference to the array element type" for all of the array classes.

wxArray::Last

T& Last() const

Returns the last element in the array, i.e. is the same as *Item(GetCount() - 1)*. An assert failure is raised in the debug mode if the array is empty.

The returned value is of type "reference to the array element type" for all of the array classes.

wxArray::Remove

Remove(T item)

Removes an element from the array by value: the first item of the array equal to *item* is removed, an assert failure will result from an attempt to remove an item which doesn't exist in the array.

When an element is removed from `wxObjArray` it is deleted by the array - use `Detach()` (p. 51) if you don't want this to happen. On the other hand, when an object is removed from a `wxArray` nothing happens - you should delete it manually if required:

```
T *item = array[n];
delete item;
array.Remove(n)
```

See also `WX_CLEAR_ARRAY` (p. 49) macro which deletes all elements of a `wxArray` (supposed to contain pointers).

wxArray::RemoveAt

RemoveAt(size_t index, size_t count = 1)

Removes *count* elements starting at *index* from the array. When an element is removed from `wxObjArray` it is deleted by the array - use `Detach()` (p. 51) if you don't want this to happen. On the other hand, when an object is removed from a `wxArray` nothing happens - you should delete it manually if required:

```
T *item = array[n];
delete item;
array.RemoveAt(n)
```

See also `WX_CLEAR_ARRAY` (p. 49) macro which deletes all elements of a `wxArray` (supposed to contain pointers).

wxArray::SetCount

void SetCount(size_t count, T defval = T(0))

This function ensures that the number of array elements is at least *count*. If the array has already *count* or more items, nothing is done. Otherwise, `count - GetCount()` elements are added and initialized to the value *defval*.

See also

`GetCount` (p. 51)

wxArray::Shrink

void Shrink()

Frees all memory unused by the array. If the program knows that no new items will be added to the array it may call `Shrink()` to reduce its memory usage. However, if a new item is added to the array, some extra memory will be allocated again.

wxArray::Sort

void Sort(CMPFUNC<T> compareFunction)

The notation `CMPFUNC<T>` should be read as if we had the following declaration:

```
template int CMPFUNC(T *first, T *second);
```

where *T* is the type of the array elements. I.e. it is a function returning *int* which is passed two arguments of type *T* *.

Sorts the array using the specified compare function: this function should return a negative, zero or positive value according to whether the first element passed to it is less than, equal to or greater than the second one.

`wxSortedArray` doesn't have this function because it is always sorted.

wxArrayString

`wxArrayString` is an efficient container for storing *wxString* (p. 1201) objects. It has the same features as all *wxArray* (p. 42) classes, i.e. it dynamically expands when new items are added to it (so it is as easy to use as a linked list), but the access time to the elements is constant, instead of being linear in number of elements as in the case of linked lists. It is also very size efficient and doesn't take more space than a C array *wxString[]* type (`wxArrayString` uses its knowledge of internals of *wxString* class to achieve this).

This class is used in the same way as other dynamic *arrays* (p. 42), except that no `WX_DEFINE_ARRAY` declaration is needed for it. When a string is added or inserted in the array, a copy of the string is created, so the original string may be safely deleted (e.g. if it was a *char ** pointer the memory it was using can be freed immediately after this). In general, there is no need to worry about string memory deallocation when using this class - it will always free the memory it uses itself.

The references returned by *Item* (p. 58), *Last* (p. 58) or *operator[]* (p. 56) are not constant, so the array elements may be modified in place like this

```
array.Last().MakeUpper();
```

There is also a variant of `wxArrayString` called `wxSortedArrayString` which has exactly the same methods as `wxArrayString`, but which always keeps the string in it in (alphabetical) order. `wxSortedArrayString` uses binary search in its *Index* (p. 57) function (instead of linear search for `wxArrayString::Index`) which makes it much more efficient if you add strings to the array rarely (because, of course, you have to pay for `Index()` efficiency by having `Add()` be slower) but search for them often. Several methods should not be used with sorted array (basically, all which break the order of items) which is mentioned in their description.

Final word: none of the methods of `wxArrayString` is virtual including its destructor, so this class should not be used as a base class.

Derived from

Although this is not true strictly speaking, this class may be considered as a specialization of *wxArray* (p. 42) class for the *wxString* member data: it is not implemented like this, but it does have all of the *wxArray* functions.

Include files

<wx/arrstr.h>

See also

wxArray (p. 42), *wxString* (p. 1201), *wxString overview* (p. 1581)

wxArrayString::wxArrayString

wxArrayString()

wxArrayString(const wxArrayString& array)

Default and copy constructors.

Note that when an array is assigned to a sorted array, its contents is automatically sorted during construction.

wxArrayString::~~wxArrayString

~wxArrayString()

Destructor frees memory occupied by the array strings. For the performance reasons it is not virtual, so this class should not be derived from.

wxArrayString::operator=

wxArrayString & operator =(const wxArrayString& array)

Assignment operator.

wxArrayString::operator==

bool operator ==(const wxArrayString& array) const

Compares 2 arrays respecting the case. Returns true only if the arrays have the same number of elements and the same strings in the same order.

wxArrayString::operator!=

bool operator !=(const wxArrayString& array) const

Compares 2 arrays respecting the case. Returns true if the arrays have different number of elements or if the elements don't match pairwise.

wxArrayString::operator[]

wxString& operator[](size_t nIndex)

Return the array element at position *nIndex*. An assert failure will result from an attempt to access an element beyond the end of array in debug mode, but no check is done in release mode.

This is the operator version of *Item* (p. 58) method.

wxArrayString::Add

size_t Add(const wxString& str, size_t copies = 1)

Appends the given number of *copies* of the new item *str* to the array and returns the index of the first new item in the array.

Warning: For sorted arrays, the index of the inserted item will not be, in general, equal to *GetCount()* (p. 57) - 1 because the item is inserted at the correct position to keep the array sorted and not appended.

See also: *Insert* (p. 57)

wxArrayString::Alloc

void Alloc(size_t nCount)

Preallocates enough memory to store *nCount* items. This function may be used to improve array class performance before adding a known number of items consecutively.

See also: *Dynamic array memory management* (p. 45)

wxArrayString::Clear

void Clear()

Clears the array contents and frees memory.

See also: *Empty* (p. 57)

wxArrayString::Count

size_t Count() const

Returns the number of items in the array. This function is deprecated and is for backwards compatibility only, please use *GetCount* (p. 57) instead.

wxArrayString::Empty

void Empty()

Empties the array: after a call to this function *GetCount* (p. 57) will return 0. However, this function does not free the memory used by the array and so should be used when the array is going to be reused for storing other strings. Otherwise, you should use *Clear* (p. 56) to empty the array and free memory.

wxArrayString::GetCount

size_t GetCount() const

Returns the number of items in the array.

wxArrayString::Index

int Index(const char * sz, bool bCase = true, bool bFromEnd = false)

Search the element in the array, starting from the beginning if *bFromEnd* is false or from end otherwise. If *bCase*, comparison is case sensitive (default), otherwise the case is ignored.

This function uses linear search for *wxArrayString* and binary search for *wxSortedArrayString*, but it ignores the *bCase* and *bFromEnd* parameters in the latter case.

Returns index of the first item matched or *wxNOT_FOUND* if there is no match.

wxArrayString::Insert

void Insert(const wxString& str, size_t nIndex, size_t copies = 1)

Insert the given number of *copies* of the new element in the array before the position *nIndex*. Thus, for example, to insert the string in the beginning of the array you would write

```
Insert("foo", 0);
```

If *nIndex* is equal to *GetCount()* this function behaves as *Add* (p. 56).

Warning: this function should not be used with sorted arrays because it could break the order of items and, for example, subsequent calls to *Index()* (p. 57) would then not work!

wxArrayString::IsEmpty

IsEmpty()

Returns true if the array is empty, false otherwise. This function returns the same result

as `GetCount() == 0` but is probably easier to read.

wxArrayString::Item

wxString& Item(size_t nIndex) const

Return the array element at position *nIndex*. An assert failure will result from an attempt to access an element beyond the end of array in debug mode, but no check is done in release mode.

See also *operator[]* (p. 56) for the operator version.

wxArrayString::Last

Last()

Returns the last element of the array. Attempt to access the last element of an empty array will result in assert failure in debug build, however no checks are done in release mode.

wxArrayString::Remove

void Remove(const char * sz)

Removes the first item matching this value. An assert failure is provoked by an attempt to remove an element which does not exist in debug build.

See also: *Index* (p. 57)

wxArrayString::RemoveAt

void RemoveAt(size_t nIndex, size_t count = 1)

Removes *count* items starting at position *nIndex* from the array.

wxArrayString::Shrink

void Shrink()

Releases the extra memory allocated by the array. This function is useful to minimize the array memory consumption.

See also: *Alloc* (p. 56), *Dynamic array memory management* (p. 45)

wxArrayString::Sort

void Sort(bool reverseOrder = false)

Sorts the array in alphabetical order or in reverse alphabetical order if *reverseOrder* is true. The sort is case-sensitive.

Warning: this function should not be used with sorted array because it could break the order of items and, for example, subsequent calls to *Index()* (p. 57) would then not work!

void Sort(CompareFunction compareFunction)

Sorts the array using the specified *compareFunction* for item comparison. *CompareFunction* is defined as a function taking two *const wxString&* parameters and returning an *int* value less than, equal to or greater than 0 if the first string is less than, equal to or greater than the second one.

Example

The following example sorts strings by their length.

```
static int CompareStringLen(const wxString& first, const wxString& second)
{
    return first.length() - second.length();
}

...

wxArrayString array;

array.Add("one");
array.Add("two");
array.Add("three");
array.Add("four");

array.Sort(CompareStringLen);
```

Warning: this function should not be used with sorted array because it could break the order of items and, for example, subsequent calls to *Index()* (p. 57) would then not work!

wxArtProvider

wxArtProvider class is used to customize the look of *wxWidgets* application. When *wxWidgets* need to display an icon or a bitmap (e.g. in the standard file dialog), it does not use hard-coded resource but asks *wxArtProvider* for it instead. This way the users can plug in own *wxArtProvider* class and easily replace standard art with his/her own version. It is easy thing to do: all that is needed is to derive a class from *wxArtProvider*, override its *CreateBitmap* (p. 62) method and register the provider with *wxArtProvider::PushProvider* (p. 63):

```
class MyProvider : public wxArtProvider
{
protected:
    wxBitmap CreateBitmap(const wxArtID& id,
                        const wxArtClient& client,
                        const wxSize size)
    { ... }
};

...
wxArtProvider::PushProvider(new MyProvider);
```

There's another way of taking advantage of this class: you can use it in your code and use platform native icons as provided by `wxArtProvider::GetBitmap` (p. 62) or `wxArtProvider::GetIcon` (p. 63) (NB: this is not yet really possible as of wxWidgets 2.3.3, the set of `wxArtProvider` bitmaps is too small).

Identifying art resources

Every bitmap is known to `wxArtProvider` under an unique ID that is used by when requesting a resource from it. The ID is represented by `wxArtID` type and can have one of these predefined values (you can see bitmaps represented by these constants in the `artprov` (p. 1568) sample):

- `wxART_ADD_BOOKMARK`
- `wxART_DEL_BOOKMARK`
- `wxART_HELP_SIDE_PANEL`
- `wxART_HELP_SETTINGS`
- `wxART_HELP_BOOK`
- `wxART_HELP_FOLDER`
- `wxART_HELP_PAGE`
- `wxART_GO_BACK`
- `wxART_GO_FORWARD`
- `wxART_GO_UP`
- `wxART_GO_DOWN`
- `wxART_GO_TO_PARENT`
- `wxART_GO_HOME`
- `wxART_FILE_OPEN`
- `wxART_PRINT`
- `wxART_HELP`
- `wxART_TIP`
- `wxART_REPORT_VIEW`
- `wxART_LIST_VIEW`
- `wxART_NEW_DIR`

- `wxART_FOLDER`
- `wxART_GO_DIR_UP`
- `wxART_EXECUTABLE_FILE`
- `wxART_NORMAL_FILE`
- `wxART_TICK_MARK`
- `wxART_CROSS_MARK`
- `wxART_ERROR`
- `wxART_QUESTION`
- `wxART_WARNING`
- `wxART_INFORMATION`
- `wxART_MISSING_IMAGE`

Clients

Client is the entity that calls `wxArtProvider`'s `GetBitmap` or `GetIcon` function. It is represented by `wxClietID` type and can have one of these values:

- `wxART_TOOLBAR`
- `wxART_MENU`
- `wxART_FRAME_ICON`
- `wxART_CMN_DIALOG`
- `wxART_HELP_BROWSER`
- `wxART_MESSAGE_BOX`
- `wxART_OTHER` (used for all requests that don't fit into any of the categories above) Client ID servers as a hint to `wxArtProvider` that is supposed to help it to choose the best looking bitmap. For example it is often desirable to use slightly different icons in menus and toolbars even though they represent the same action (e.g. `wx_ART_FILE_OPEN`). Remember that this is really only a hint for `wxArtProvider` -- it is common that `wxArtProvider::GetBitmap` (p. 62) returns identical bitmap for different *client* values!

See also

See the *artprov* (p. 1568) sample for an example of `wxArtProvider` usage.

Derived from

wxObject (p. 954)

Include files

<wx/artprov.h>

wxArtProvider::CreateBitmap

wxBitmap CreateBitmap(const wxArtID& *id*, const wxArtClient& *client*, const wxSize& *size*)

Derived art provider classes must override this method to create requested art resource. Note that returned bitmaps are cached by wxArtProvider and it is therefore not necessary to optimize CreateBitmap for speed (e.g. you may create wxBitmap objects from XPMs here).

Parameters

id

wxArtID unique identifier of the bitmap.

client

wxArtClient identifier of the client (i.e. who is asking for the bitmap). This only serves as a hint.

size

Preferred size of the bitmap. The function may return a bitmap of different dimensions, it will be automatically rescaled to meet client's request.

Note

This is **not** part of wxArtProvider's public API, use *wxArtProvider::GetBitmap* (p. 62) or *wxArtProvider::GetIcon* (p. 63) to query wxArtProvider for a resource.

wxArtProvider::GetBitmap

static wxBitmap GetBitmap(const wxArtID& *id*, const wxArtClient& *client* = wxART_OTHER, const wxSize& *size* = wxDefaultSize)

Query registered providers for bitmap with given ID.

Parameters

id

wxArtID unique identifier of the bitmap.

client

wxArtClient identifier of the client (i.e. who is asking for the bitmap).

size

Size of the returned bitmap or `wxDefaultSize` if size doesn't matter.

Return value

The bitmap if one of registered providers recognizes the ID or `wxNullBitmap` otherwise.

wxArtProvider::GetIcon

```
static wxIcon GetIcon(const wxArtID& id, const wxArtClient& client =  
wxART_OTHER, const wxSize& size = wxDefaultSize)
```

Same as `wxArtProvider::GetBitmap` (p. 62), but return a `wxIcon` object (or `wxNullIcon` on failure).

wxArtProvider::PopProvider

```
static bool PopProvider()
```

Remove latest added provider and delete it.

wxArtProvider::PushProvider

```
static void PushProvider(wxArtProvider* provider)
```

Register new art provider (add it to the top of providers stack).

wxArtProvider::RemoveProvider

```
static bool RemoveProvider(wxArtProvider* provider)
```

Remove a provider from the stack. The provider must have been added previously and is *not* deleted.

wxAutomationObject

The **wxAutomationObject** class represents an OLE automation object containing a single data member, an `IDispatch` pointer. It contains a number of functions that make it easy to perform automation operations, and set and get properties. The class makes heavy use of the `wxVariant` (p. 1362) class.

The usage of these classes is quite close to OLE automation usage in Visual Basic. The

API is high-level, and the application can specify multiple properties in a single string. The following example gets the current Excel instance, and if it exists, makes the active cell bold.

```
wxAutomationObject excelObject;  
if (excelObject.GetInstance("Excel.Application"))  
    excelObject.PutProperty("ActiveCell.Font.Bold", true);
```

Note that this class obviously works under Windows only.

Derived from

wxObject (p. 954)

Include files

<wx/msw/ole/automtn.h>

See also

wxVariant (p. 1362)

wxAutomationObject::wxAutomationObject

wxAutomationObject(WXIDISPATCH* dispatchPtr = NULL)

Constructor, taking an optional IDispatch pointer which will be released when the object is deleted.

wxAutomationObject::~~wxAutomationObject

~wxAutomationObject()

Destructor. If the internal IDispatch pointer is non-null, it will be released.

wxAutomationObject::CallMethod

wxVariant CallMethod(const wxString& method, int noArgs, wxVariant args[]) const

wxVariant CallMethod(const wxString& method, ...) const

Calls an automation method for this object. The first form takes a method name, number of arguments, and an array of variants. The second form takes a method name and zero to six constant references to variants. Since the variant class has constructors for the basic data types, and C++ provides temporary objects automatically, both of the following lines are syntactically valid:

```
wxVariant res = obj.CallMethod("Sum", wxVariant(1.2), wxVariant(3.4));
```

```
wxVariant res = obj.CallMethod("Sum", 1.2, 3.4);
```

Note that *method* can contain dot-separated property names, to save the application needing to call `GetProperty` several times using several temporary objects. For example:

```
object.CallMethod("ActiveCell.Font.ShowDialog", "My caption");
```

wxAutomationObject::CreateInstance

bool CreateInstance(const wxString& classId) const

Creates a new object based on the class id, returning true if the object was successfully created, or false if not.

wxAutomationObject::GetDispatchPtr

IDispatch* GetDispatchPtr() const

Gets the IDispatch pointer.

wxAutomationObject::GetInstance

bool GetInstance(const wxString& classId) const

Retrieves the current object associated with a class id, and attaches the IDispatch pointer to this object. Returns true if a pointer was successfully retrieved, false otherwise.

Note that this cannot cope with two instances of a given OLE object being active simultaneously, such as two copies of Excel running. Which object is referenced cannot currently be specified.

wxAutomationObject::GetObject

bool GetObject(wxAutomationObject&obj const wxString& property, int noArgs = 0, wxVariant args[] = NULL) const

Retrieves a property from this object, assumed to be a dispatch pointer, and initialises *obj* with it. To avoid having to deal with IDispatch pointers directly, use this function in preference to `wxAutomationObject::GetProperty` (p. 66) when retrieving objects from other objects.

Note that an IDispatch pointer is stored as a void* pointer in wxVariant objects.

[See also](#)

wxAutomationObject::GetProperty (p. 66)

wxAutomationObject::GetProperty

wxVariant GetProperty(const wxString& *property*, int *noArgs*, wxVariant *args*[]) const

wxVariant GetProperty(const wxString& *property*, ...) const

Gets a property value from this object. The first form takes a property name, number of arguments, and an array of variants. The second form takes a property name and zero to six constant references to variants. Since the variant class has constructors for the basic data types, and C++ provides temporary objects automatically, both of the following lines are syntactically valid:

```
wxVariant res = obj.GetProperty("Range", wxVariant("A1"));  
wxVariant res = obj.GetProperty("Range", "A1");
```

Note that *property* can contain dot-separated property names, to save the application needing to call `GetProperty` several times using several temporary objects.

wxAutomationObject::Invoke

bool Invoke(const wxString& *member*, int *action*, wxVariant& *retValue*, int *noArgs*, wxVariant *args*[], const wxVariant* *ptrArgs*[] = 0) const

This function is a low-level implementation that allows access to the `IDispatch` `Invoke` function. It is not meant to be called directly by the application, but is used by other convenience functions.

Parameters

member

The member function or property name.

action

Bitlist: may contain `DISPATCH_PROPERTYPUT`, `DISPATCH_PROPERTYPUTREF`, `DISPATCH_METHOD`.

retValue

Return value (ignored if there is no return value)

.

noArgs

Number of arguments in *args* or *ptrArgs*.

args

If non-null, contains an array of variants.

ptrArgs

If non-null, contains an array of constant pointers to variants.

Return value

true if the operation was successful, false otherwise.

Remarks

Two types of argument array are provided, so that when possible pointers are used for efficiency.

wxAutomationObject::PutProperty

bool PutProperty(const wxString& *property*, int *noArgs*, wxVariant *args*[]) const

bool PutProperty(const wxString& *property*, ...)

Puts a property value into this object. The first form takes a property name, number of arguments, and an array of variants. The second form takes a property name and zero to six constant references to variants. Since the variant class has constructors for the basic data types, and C++ provides temporary objects automatically, both of the following lines are syntactically valid:

```
obj.PutProperty("Value", wxVariant(23));  
obj.PutProperty("Value", 23);
```

Note that *property* can contain dot-separated property names, to save the application needing to call `GetProperty` several times using several temporary objects.

wxAutomationObject::SetDispatchPtr

void SetDispatchPtr(WXIDISPATCH* *dispatchPtr*)

Sets the IDispatch pointer. This function does not check if there is already an IDispatch pointer.

You may need to cast from IDispatch* to WXIDISPATCH* when calling this function.

wxBitmap

This class encapsulates the concept of a platform-dependent bitmap, either monochrome or colour.

Derived from

wxGDIObject (p. 562)
wxObject (p. 954)

Include file

<wx/bitmap.h>

Predefined objects

Objects:

wxNullBitmap

See also

wxBitmap overview (p. 1645), *supported bitmap file formats* (p. 1646), *wxDC::Blit* (p. 350), *wxIcon* (p. 716), *wxCursor* (p. 211), *wxBitmap* (p. 67), *wxMemoryDC* (p. 881)

wxBitmap::wxBitmap

wxBitmap()

Default constructor.

wxBitmap(const wxBitmap& *bitmap*)

Copy constructor.

wxBitmap(void* *data*, int *type*, int *width*, int *height*, int *depth* = -1)

Creates a bitmap from the given data which is interpreted in platform-dependent manner.

**wxBitmap(const char *bits*[], int *width*, int *height*
int *depth* = 1)**

Creates a bitmap from an array of bits.

You should only use this function for monochrome bitmaps (*depth* 1) in portable programs: in this case the *bits* parameter should contain an XBM image.

For other bit depths, the behaviour is platform dependent: under Windows, the data is passed without any changes to the underlying `CreateBitmap()` API. Under other platforms, only monochrome bitmaps may be created using this constructor and *wxImage* (p. 728) should be used for creating colour bitmaps from static data.

wxBitmap(int *width*, int *height*, int *depth* = -1)

Creates a new bitmap. A depth of -1 indicates the depth of the current screen or visual. Some platforms only support 1 for monochrome and -1 for the current colour setting.

wxBitmap(const char bits)**

Creates a bitmap from XPM data.

wxBitmap(const wxString& name, long type)

Loads a bitmap from a file or resource.

wxBitmap(const wxImage& img, int depth = -1)

Creates bitmap object from the image. This has to be done to actually display an image as you cannot draw an image directly on a window. The resulting bitmap will use the provided colour depth (or that of the current system if depth is -1) which entails that a colour reduction has to take place.

When in 8-bit mode (PseudoColour mode), the GTK port will use a color cube created on program start-up to look up colors. This ensures a very fast conversion, but the image quality won't be perfect (and could be better for photo images using more sophisticated dithering algorithms).

On Windows, if there is a palette present (set with SetPalette), it will be used when creating the wxBitmap (most useful in 8-bit display mode). On other platforms, the palette is currently ignored.

Parameters

bits

Specifies an array of pixel values.

width

Specifies the width of the bitmap.

height

Specifies the height of the bitmap.

depth

Specifies the depth of the bitmap. If this is omitted, the display depth of the screen is used.

name

This can refer to a resource name under MS Windows, or a filename under MS Windows and X. Its meaning is determined by the *type* parameter.

type

May be one of the following:

wxBITMAP_TYPE_BMP Load a Windows bitmap file.

wxBITMAP_TYPE_BMP_RESOURCE Load a Windows bitmap from the resource

database.

<code>wxBITMAP_TYPE_GIF</code>	Load a GIF bitmap file.
<code>wxBITMAP_TYPE_XBM</code>	Load an X bitmap file.
<code>wxBITMAP_TYPE_XPM</code>	Load an XPM bitmap file.
<code>wxBITMAP_TYPE_RESOURCE</code>	Load a Windows resource name.

The validity of these flags depends on the platform and wxWidgets configuration. If all possible wxWidgets settings are used, the Windows platform supports BMP file, BMP resource, XPM data, and XPM. Under wxGTK, the available formats are BMP file, XPM data, XPM file, and PNG file. Under wxMotif, the available formats are XBM data, XBM file, XPM data, XPM file.

In addition, `wxBitmap` can read all formats that *wxImage* (p. 728) can, which currently include `wxBITMAP_TYPE_JPEG`, `wxBITMAP_TYPE_TIF`, `wxBITMAP_TYPE_PNG`, `wxBITMAP_TYPE_GIF`, `wxBITMAP_TYPE_PCX`, and `wxBITMAP_TYPE_PNM`. Of course, you must have *wxImage* handlers loaded.

img

Platform-independent *wxImage* object.

Remarks

The first form constructs a bitmap object with no data; an assignment or another member function such as `Create` or `LoadFile` must be called subsequently.

The second and third forms provide copy constructors. Note that these do not copy the bitmap data, but instead a pointer to the data, keeping a reference count. They are therefore very efficient operations.

The fourth form constructs a bitmap from data whose type and value depends on the value of the *type* argument.

The fifth form constructs a (usually monochrome) bitmap from an array of pixel values, under both X and Windows.

The sixth form constructs a new bitmap.

The seventh form constructs a bitmap from pixmap (XPM) data, if wxWidgets has been configured to incorporate this feature.

To use this constructor, you must first include an XPM file. For example, assuming that the file `mybitmap.xpm` contains an XPM array of character pointers called `mybitmap`:

```
#include "mybitmap.xpm"
...
wxBitmap *bitmap = new wxBitmap(mybitmap);
```

The eighth form constructs a bitmap from a file or resource. *name* can refer to a resource name under MS Windows, or a filename under MS Windows and X.

Under Windows, *type* defaults to `wxBITMAP_TYPE_BMP_RESOURCE`. Under X, *type* defaults to `wxBITMAP_TYPE_XPM`.

See also

wxBitmap::LoadFile (p. 76)

wxPython note: Constructors supported by wxPython are:

- wxBitmap(name, flag)** Loads a bitmap from a file
- wxEmptyBitmap(width, height, depth = -1)** Creates an empty bitmap with the given specifications
- wxBitmapFromXPMData(listOfStrings)** Create a bitmap from a Python list of strings whose contents are XPM data.
- wxBitmapFromBits(bits, width, height, depth=-1)** Create a bitmap from an array of bits contained in a string.
- wxBitmapFromImage(image, depth=-1)** Convert a wxImage to a wxBitmap.

wxPerl note: Constructors supported by wxPerl are:

- `::Bitmap->new(width, height, depth = -1)`
- `::Bitmap->new(name, type)`
- `::Bitmap->new(icon)`
- `::Bitmap->newFromBits(bits, width, height, depth = 1)`
- `::Bitmap->newFromXPM(data)`

wxBitmap::~~wxBitmap

~wxBitmap()

Destroys the wxBitmap object and possibly the underlying bitmap data. Because reference counting is used, the bitmap may not actually be destroyed at this point - only when the reference count is zero will the data be deleted.

If the application omits to delete the bitmap explicitly, the bitmap will be destroyed automatically by wxWidgets when the application exits.

Do not delete a bitmap that is selected into a memory device context.

wxBitmap::AddHandler

static void AddHandler(wxBitmapHandler* handler)

Adds a handler to the end of the static list of format handlers.

handler

A new bitmap format handler object. There is usually only one instance of a given handler class in an application session.

See also

wxBitmapHandler (p. 86)

wxBitmap::CleanUpHandlers

static void CleanUpHandlers()

Deletes all bitmap handlers.

This function is called by wxWidgets on exit.

wxBitmap::ConvertToImage

wxImage ConvertToImage()

Creates an image from a platform-dependent bitmap. This preserves mask information so that bitmaps and images can be converted back and forth without loss in that respect.

wxBitmap::CopyFromIcon

bool CopyFromIcon(const wxIcon& icon)

Creates the bitmap from an icon.

wxBitmap::Create

virtual bool Create(int width, int height, int depth = -1)

Creates a fresh bitmap. If the final argument is omitted, the display depth of the screen is used.

virtual bool Create(void* data, int type, int width, int height, int depth = -1)

Creates a bitmap from the given data, which can be of arbitrary type.

Parameters

width

The width of the bitmap in pixels.

height

The height of the bitmap in pixels.

depth

The depth of the bitmap in pixels. If this is -1, the screen depth is used.

data

Data whose type depends on the value of *type*.

type

A bitmap type identifier - see *wxBitmap::wxBitmap* (p. 68) for a list of possible values.

Return value

true if the call succeeded, false otherwise.

Remarks

The first form works on all platforms. The portability of the second form depends on the type of data.

See also

wxBitmap::wxBitmap (p. 68)

wxBitmap::FindHandler

static wxBitmapHandler* FindHandler(const wxString& name)

Finds the handler with the given name.

static wxBitmapHandler* FindHandler(const wxString& extension, long bitmapType)

Finds the handler associated with the given extension and type.

static wxBitmapHandler* FindHandler(long bitmapType)

Finds the handler associated with the given bitmap type.

name

The handler name.

extension

The file extension, such as "bmp".

bitmapType

The bitmap type, such as wxBITMAP_TYPE_BMP.

Return value

A pointer to the handler if found, NULL otherwise.

See also

wxBitmapHandler (p. 86)

wxBitmap::GetDepth

int GetDepth() const

Gets the colour depth of the bitmap. A value of 1 indicates a monochrome bitmap.

wxBitmap::GetHandlers

static wxList& GetHandlers()

Returns the static list of bitmap format handlers.

See also

wxBitmapHandler (p. 86)

wxBitmap::GetHeight

int GetHeight() const

Gets the height of the bitmap in pixels.

wxBitmap::GetPalette

wxPalette* GetPalette() const

Gets the associated palette (if any) which may have been loaded from a file or set for the bitmap.

See also

wxPalette (p. 968)

wxBitmap::GetMask

wxMask* GetMask() const

Gets the associated mask (if any) which may have been loaded from a file or set for the bitmap.

See also

wxBitmap::SetMask (p. 78), *wxMask* (p. 860)

wxBitmap::GetWidth

int GetWidth() const

Gets the width of the bitmap in pixels.

See also

wxBitmap::GetHeight (p. 74)

wxBitmap::GetSubBitmap

wxBitmap GetSubBitmap(const wxRect&rect) const

Returns a sub bitmap of the current one as long as the rect belongs entirely to the bitmap. This function preserves bit depth and mask information.

wxBitmap::InitStandardHandlers

static void InitStandardHandlers()

Adds the standard bitmap format handlers, which, depending on wxWidgets configuration, can be handlers for Windows bitmap, Windows bitmap resource, and XPM.

This function is called by wxWidgets on startup.

See also

wxBitmapHandler (p. 86)

wxBitmap::InsertHandler

static void InsertHandler(wxBitmapHandler* handler)

Adds a handler at the start of the static list of format handlers.

handler

A new bitmap format handler object. There is usually only one instance of a given handler class in an application session.

See also

wxBitmapHandler (p. 86)

wxBitmap::LoadFile

bool LoadFile(const wxString& *name*, long *type*)

Loads a bitmap from a file or resource.

Parameters

name

Either a filename or a Windows resource name. The meaning of *name* is determined by the *type* parameter.

type

One of the following values:

wxBITMAP_TYPE_BMP Load a Windows bitmap file.

wxBITMAP_TYPE_BMP_RESOURCE Load a Windows bitmap from the resource database.

wxBITMAP_TYPE_GIF Load a GIF bitmap file.

wxBITMAP_TYPE_XBM Load an X bitmap file.

wxBITMAP_TYPE_XPM Load an XPM bitmap file.

The validity of these flags depends on the platform and wxWidgets configuration.

In addition, wxBitmap can read all formats that *wxImage* (p. 728) can (wxBITMAP_TYPE_JPEG, wxBITMAP_TYPE_PNG, wxBITMAP_TYPE_GIF, wxBITMAP_TYPE_PCX, wxBITMAP_TYPE_PNM). (Of course you must have wxImage handlers loaded.)

Return value

true if the operation succeeded, false otherwise.

Remarks

A palette may be associated with the bitmap if one exists (especially for colour Windows bitmaps), and if the code supports it. You can check if one has been created by using the *GetPalette* (p. 74) member.

See also

wxBitmap::SaveFile (p. 77)

wxBitmap::Ok

bool Ok() const

Returns true if bitmap data is present.

wxBitmap::RemoveHandler

static bool RemoveHandler(const wxString& name)

Finds the handler with the given name, and removes it. The handler is not deleted.

name

The handler name.

Return value

true if the handler was found and removed, false otherwise.

See also

wxBitmapHandler (p. 86)

wxBitmap::SaveFile

bool SaveFile(const wxString& name, int type, wxPalette* palette = NULL)

Saves a bitmap in the named file.

Parameters

name

A filename. The meaning of *name* is determined by the *type* parameter.

type

One of the following values:

wxBITMAP_TYPE_BMP Save a Windows bitmap file.

wxBITMAP_TYPE_GIF Save a GIF bitmap file.

wxBITMAP_TYPE_XBM Save an X bitmap file.

wxBITMAP_TYPE_XPM Save an XPM bitmap file.

The validity of these flags depends on the platform and wxWidgets configuration.

In addition, wxBitmap can save all formats that *wxImage* (p. 728) can (wxBITMAP_TYPE_JPEG, wxBITMAP_TYPE_PNG). (Of course you must have wxImage handlers loaded.)

palette

An optional palette used for saving the bitmap.

Return value

true if the operation succeeded, false otherwise.

Remarks

Depending on how wxWidgets has been configured, not all formats may be available.

See also

wxBitmap::LoadFile (p. 76)

wxBitmap::SetDepth

void SetDepth(int *depth*)

Sets the depth member (does not affect the bitmap data).

Parameters

depth

Bitmap depth.

wxBitmap::SetHeight

void SetHeight(int *height*)

Sets the height member (does not affect the bitmap data).

Parameters

height

Bitmap height in pixels.

wxBitmap::SetMask

void SetMask(wxMask* *mask*)

Sets the mask for this bitmap.

Remarks

The bitmap object owns the mask once this has been called.

See also

wxBitmap::GetMask (p. 74), *wxMask* (p. 860)

wxBitmap::SetPalette

void SetPalette(const wxPalette& *palette*)

Sets the associated palette.

Parameters

palette

The palette to set.

See also

wxPalette (p. 968)

wxBitmap::SetWidth

void SetWidth(int *width*)

Sets the width member (does not affect the bitmap data).

Parameters

width

Bitmap width in pixels.

wxBitmap::operator =

wxBitmap& operator =(const wxBitmap& *bitmap*)

Assignment operator. This operator does not copy any data, but instead passes a pointer to the data in *bitmap* and increments a reference counter. It is a fast operation.

Parameters

bitmap

Bitmap to assign.

Return value

Returns 'this' object.

wxBitmap::operator ==

bool operator ==(const wxBitmap& *bitmap*)

Equality operator. This operator tests whether the internal data pointers are equal (a fast test).

Parameters

bitmap

Bitmap to compare with 'this'

Return value

Returns true if the bitmaps were effectively equal, false otherwise.

wxBitmap::operator !=

bool operator !=(const wxBitmap& *bitmap*)

Inequality operator. This operator tests whether the internal data pointers are unequal (a fast test).

Parameters

bitmap

Bitmap to compare with 'this'

Return value

Returns true if the bitmaps were unequal, false otherwise.

wxBitmapButton

A bitmap button is a control that contains a bitmap. It may be placed on a *dialog box* (p. 369) or *panel* (p. 972), or indeed almost any other window.

Derived from

wxButton (p. 104)

wxControl (p. 199)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/bmpbuttn.h>

Remarks

A bitmap button can be supplied with a single bitmap, and wxWidgets will draw all button states using this bitmap. If the application needs more control, additional bitmaps for the selected state, unpressed focused state, and greyed-out state may be supplied.

Window styles

wxBU_AUTODRAW

If this is specified, the button will be drawn automatically using the label bitmap only, providing a 3D-look border. If

this style is not specified, the button will be drawn without borders and using all provided bitmaps. WIN32 only.

wxBU_LEFT

Left-justifies the bitmap label. WIN32 only.

wxBU_TOP

Aligns the bitmap label to the top of the button. WIN32 only.

wxBU_RIGHT

Right-justifies the bitmap label. WIN32 only.

wxBU_BOTTOM

Aligns the bitmap label to the bottom of the button. WIN32 only.

See also *window styles overview* (p. 1618).

Event handling**EVT_BUTTON(id, func)**

Process a `wxEVT_COMMAND_BUTTON_CLICKED` event, when the button is clicked.

See also

wxButton (p. 104)

wxBitmapButton::wxBitmapButton

wxBitmapButton()

Default constructor.

wxBitmapButton(wxWindow* parent, wxWindowID id, const wxBitmap& bitmap, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxBU_AUTODRAW, const wxValidator& validator = wxDefaultValidator, const wxString& name = "button")

Constructor, creating and showing a button.

Parameters

parent

Parent window. Must not be NULL.

id

Button identifier. A value of -1 indicates a default value.

bitmap

Bitmap to be displayed.

pos

Button position.

size

Button size. If the default size (-1, -1) is specified then the button is sized appropriately for the bitmap.

style

Window style. See *wxBitmapButton* (p. 80).

validator

Window validator.

name

Window name.

Remarks

The *bitmap* parameter is normally the only bitmap you need to provide, and *wxWidgets* will draw the button correctly in its different states. If you want more control, call any of the functions *wxBitmapButton::SetBitmapSelected* (p. 85), *wxBitmapButton::SetBitmapFocus* (p. 84), *wxBitmapButton::SetBitmapDisabled* (p. 84).

Note that the bitmap passed is smaller than the actual button created.

See also

wxBitmapButton::Create (p. 82), *wxValidator* (p. 1360)

wxBitmapButton::~~wxBitmapButton

~wxBitmapButton()

Destructor, destroying the button.

wxBitmapButton::Create

bool Create(*wxWindow* parent*, *wxWindowID id*, *const wxBitmap& bitmap*, *const wxPoint& pos*, *const wxSize& size* = *wxDefaultSize*, *long style* = 0, *const wxValidator& validator*, *const wxString& name* = "button")

Button creation function for two-step creation. For more details, see *wxBitmapButton::wxBitmapButton* (p. 81).

wxBitmapButton::GetBitmapDisabled

wxBitmap& GetBitmapDisabled() const

Returns the bitmap for the disabled state.

Return value

A reference to the disabled state bitmap.

See also

wxBitmapButton::SetBitmapDisabled (p. 84)

wxBitmapButton::GetBitmapFocus

wxBitmap& GetBitmapFocus() const

Returns the bitmap for the focused state.

Return value

A reference to the focused state bitmap.

See also

wxBitmapButton::SetBitmapFocus (p. 84)

wxBitmapButton::GetBitmapLabel

wxBitmap& GetBitmapLabel() const

Returns the label bitmap (the one passed to the constructor).

Return value

A reference to the button's label bitmap.

See also

wxBitmapButton::SetBitmapLabel (p. 84)

wxBitmapButton::GetBitmapSelected

wxBitmap& GetBitmapSelected() const

Returns the bitmap for the selected state.

Return value

A reference to the selected state bitmap.

See also

wxBitmapButton::SetBitmapSelected (p. 85)

wxBitmapButton::SetBitmapDisabled

void SetBitmapDisabled(const wxBitmap& *bitmap*)

Sets the bitmap for the disabled button appearance.

Parameters

bitmap

The bitmap to set.

See also

wxBitmapButton::GetBitmapDisabled (p. 82), *wxBitmapButton::SetBitmapLabel* (p. 84), *wxBitmapButton::SetBitmapSelected* (p. 85), *wxBitmapButton::SetBitmapFocus* (p. 84)

wxBitmapButton::SetBitmapFocus

void SetBitmapFocus(const wxBitmap& *bitmap*)

Sets the bitmap for the button appearance when it has the keyboard focus.

Parameters

bitmap

The bitmap to set.

See also

wxBitmapButton::GetBitmapFocus (p. 83), *wxBitmapButton::SetBitmapLabel* (p. 84), *wxBitmapButton::SetBitmapSelected* (p. 85), *wxBitmapButton::SetBitmapDisabled* (p. 84)

wxBitmapButton::SetBitmapLabel

void SetBitmapLabel(const wxBitmap& *bitmap*)

Sets the bitmap label for the button.

Parameters

bitmap

The bitmap label to set.

Remarks

This is the bitmap used for the unselected state, and for all other states if no other bitmaps are provided.

See also

wxBitmapButton::GetBitmapLabel (p. 83)

wxBitmapButton::SetBitmapSelected

void SetBitmapSelected(const wxBitmap& *bitmap*)

Sets the bitmap for the selected (depressed) button appearance.

Parameters

bitmap

The bitmap to set.

See also

wxBitmapButton::GetBitmapSelected (p. 83), *wxBitmapButton::SetBitmapLabel* (p. 84), *wxBitmapButton::SetBitmapFocus* (p. 84), *wxBitmapButton::SetBitmapDisabled* (p. 84)

wxBitmapDataObject

wxBitmapDataObject is a specialization of *wxDataObject* for bitmap data. It can be used without change to paste data into the *wxClipboard* (p. 136) or a *wxDropSource* (p. 429). A user may wish to derive a new class from this class for providing a bitmap on-demand in order to minimize memory consumption when offering data in several formats, such as a bitmap and GIF.

wxPython note: If you wish to create a derived *wxBitmapDataObject* class in wxPython you should derive the class from *wxPyBitmapDataObject* in order to get Python-aware capabilities for the various virtual methods.

Virtual functions to override

This class may be used as is, but *GetBitmap* (p. 86) may be overridden to increase efficiency.

Derived from

wxDataObjectSimple (p. 227)
wxDataObject (p. 223)

Include files

<wx/dataobj.h>

See also

Clipboard and drag and drop overview (p. 1673), *wxDataObject* (p. 223), *wxDataObjectSimple* (p. 227), *wxFileDataObject* (p. 467), *wxTextDataObject* (p. 1268), *wxDataObject* (p. 223)

wxBitmapDataObject(const wxBitmap& bitmap = wxNullBitmap)

Constructor, optionally passing a bitmap (otherwise use *SetBitmap* (p. 86) later).

wxBitmapDataObject::GetBitmap

virtual wxBitmap GetBitmap() const

Returns the bitmap associated with the data object. You may wish to override this method when offering data on-demand, but this is not required by wxWidgets' internals. Use this method to get data in bitmap form from the *wxClipboard* (p. 136).

wxBitmapDataObject::SetBitmap

virtual void SetBitmap(const wxBitmap& bitmap)

Sets the bitmap associated with the data object. This method is called when the data object receives data. Usually there will be no reason to override this function.

wxBitmapHandler

Overview (p. 1645)

This is the base class for implementing bitmap file loading/saving, and bitmap creation from data. It is used within *wxBitmap* and is not normally seen by the application.

If you wish to extend the capabilities of *wxBitmap*, derive a class from *wxBitmapHandler* and add the handler using *wxBitmap::AddHandler* (p. 71) in your application initialisation.

Derived from

wxObject (p. 954)

Include files

<wx/bitmap.h>

See also

wxBitmap (p. 67), *wxIcon* (p. 716), *wxCursor* (p. 211)

wxBitmapHandler::wxBitmapHandler

wxBitmapHandler()

Default constructor. In your own default constructor, initialise the members `m_name`, `m_extension` and `m_type`.

wxBitmapHandler::~~wxBitmapHandler

~wxBitmapHandler()

Destroys the `wxBitmapHandler` object.

wxBitmapHandler::Create

virtual bool Create(*wxBitmap* bitmap*, void* *data*, int *type*, int *width*, int *height*, int *depth* = -1)

Creates a bitmap from the given data, which can be of arbitrary type. The `wxBitmap` object *bitmap* is manipulated by this function.

Parameters

bitmap

The `wxBitmap` object.

width

The width of the bitmap in pixels.

height

The height of the bitmap in pixels.

depth

The depth of the bitmap in pixels. If this is -1, the screen depth is used.

data

Data whose type depends on the value of *type*.

type

A bitmap type identifier - see `wxBitmapHandler::wxBitmapHandler` (p. 68) for a list of possible values.

Return value

true if the call succeeded, false otherwise (the default).

wxBitmapHandler::GetName

wxString GetName() const

Gets the name of this handler.

wxBitmapHandler::GetExtension

wxString GetExtension() const

Gets the file extension associated with this handler.

wxBitmapHandler::GetType

long GetType() const

Gets the bitmap type associated with this handler.

wxBitmapHandler::LoadFile

bool LoadFile(wxBitmap* bitmap, const wxString& name, long type)

Loads a bitmap from a file or resource, putting the resulting data into *bitmap*.

Parameters

bitmap

The bitmap object which is to be affected by this operation.

name

Either a filename or a Windows resource name. The meaning of *name* is determined by the *type* parameter.

type

See *wxBitmap::wxBitmap* (p. 68) for values this can take.

Return value

true if the operation succeeded, false otherwise.

See also

wxBitmap::LoadFile (p. 76)

wxBitmap::SaveFile (p. 77)

wxBitmapHandler::SaveFile (p. 88)

wxBitmapHandler::SaveFile

bool SaveFile(wxBitmap* bitmap, const wxString& name, int type, wxPalette* palette)

= *NULL*)

Saves a bitmap in the named file.

Parameters

bitmap

The bitmap object which is to be affected by this operation.

name

A filename. The meaning of *name* is determined by the *type* parameter.

type

See *wxBitmap::wxBitmap* (p. 68) for values this can take.

palette

An optional palette used for saving the bitmap.

Return value

true if the operation succeeded, false otherwise.

See also

wxBitmap::LoadFile (p. 76)

wxBitmap::SaveFile (p. 77)

wxBitmapHandler::LoadFile (p. 88)

wxBitmapHandler::SetName

void SetName(const wxString& *name*)

Sets the handler name.

Parameters

name

Handler name.

wxBitmapHandler::SetExtension

void SetExtension(const wxString& *extension*)

Sets the handler extension.

Parameters

extension

Handler extension.

wxBitmapHandler::SetType

void SetType(long type)

Sets the handler type.

Parameters

name

Handler type.

wxBoxSizer

The basic idea behind a box sizer is that windows will most often be laid out in rather simple basic geometry, typically in a row or a column or several hierarchies of either.

For more information, please see *Programming with wxBoxSizer* (p. 1631).

Derived from

wxSizer (p. 1110)

wxObject (p. 954)

See also

wxSizer (p. 1110), *Sizer overview* (p. 1627)

wxBoxSizer::wxBoxSizer

wxBoxSizer(int orient)

Constructor for a *wxBoxSizer*. *orient* may be either of *wxVERTICAL* or *wxHORIZONTAL* for creating either a column sizer or a row sizer.

wxBoxSizer::RecalcSizes

void RecalcSizes()

Implements the calculation of a box sizer's dimensions and then sets the size of its children (calling *wxWindow::SetSize* (p. 1432) if the child is a window). It is used internally only and must not be called by the user. Documented for information.

wxBoxSizer::CalcMin

wxSize CalcMin()

Implements the calculation of a box sizer's minimal. It is used internally only and must not be called by the user. Documented for information.

wxBoxSizer::GetOrientation

int GetOrientation()

Returns the orientation of the box sizer, either wxVERTICAL or wxHORIZONTAL.

wxBrush

A brush is a drawing tool for filling in areas. It is used for painting the background of rectangles, ellipses, etc. It has a colour and a style.

Derived from

wxGDIObject (p. 562)

wxObject (p. 954)

Include files

<wx/brush.h>

Predefined objects

Objects:

wxNullBrush

Pointers:

wxBLUE_BRUSH
wxGREEN_BRUSH
wxWHITE_BRUSH
wxBLACK_BRUSH
wxGREY_BRUSH
wxMEDIUM_GREY_BRUSH
wxLIGHT_GREY_BRUSH
wxTRANSPARENT_BRUSH
wxCYAN_BRUSH
wxRED_BRUSH

Remarks

On a monochrome display, wxWidgets shows all brushes as white unless the colour is really black.

Do not initialize objects on the stack before the program commences, since other required structures may not have been set up yet. Instead, define global pointers to

objects and create them in *wxApp::OnInit* (p. 37) or when required.

An application may wish to create brushes with different characteristics dynamically, and there is the consequent danger that a large number of duplicate brushes will be created. Therefore an application may wish to get a pointer to a brush by using the global list of brushes **wxTheBrushList**, and calling the member function **FindOrCreateBrush**.

wxBrush uses a reference counting system, so assignments between brushes are very cheap. You can therefore use actual *wxBrush* objects instead of pointers without efficiency problems. Once one *wxBrush* object changes its data it will create its own brush data internally so that other brushes, which previously shared the data using the reference counting, are not affected.

See also

wxBrushList (p. 97), *wxDC* (p. 349), *wxDC::SetBrush* (p. 366)

wxBrush::wxBrush

wxBrush()

Default constructor. The brush will be uninitialised, and *wxBrush::Ok* (p. 95) will return false.

wxBrush(const wxColour& colour, int style = wxSOLID)

Constructs a brush from a colour object and style.

wxBrush(const wxString& colourName, int style)

Constructs a brush from a colour name and style.

wxBrush(const wxBitmap& stippleBitmap)

Constructs a stippled brush using a bitmap.

wxBrush(const wxBrush& brush)

Copy constructor. This uses reference counting so is a cheap operation.

Parameters

colour

Colour object.

colourName

Colour name. The name will be looked up in the colour database.

style

One of:

wxTRANSPARENT	Transparent (no fill).
wxSOLID	Solid.
wxSTIPPLE	Uses a bitmap as a stipple.
wxBDIAGONAL_HATCH	Backward diagonal hatch.
wxCROSSDIAG_HATCH	Cross-diagonal hatch.
wxFDIAGONAL_HATCH	Forward diagonal hatch.
wxCROSS_HATCH	Cross hatch.
wxHORIZONTAL_HATCH	Horizontal hatch.
wxVERTICAL_HATCH	Vertical hatch.

brush

Pointer or reference to a brush to copy.

stippleBitmap

A bitmap to use for stippling.

Remarks

If a stipple brush is created, the brush style will be set to `wxSTIPPLE`.

See also

wxBrushList (p. 97), *wxColour* (p. 150), *wxColourDatabase* (p. 155)

wxBrush::~~wxBrush

void ~wxBrush()

Destructor.

Remarks

The destructor may not delete the underlying brush object of the native windowing system, since `wxBrush` uses a reference counting system for efficiency.

Although all remaining brushes are deleted when the application exits, the application should try to clean up all brushes itself. This is because `wxWidgets` cannot know if a pointer to the brush object is stored in an application data structure, and there is a risk of double deletion.

wxBrush::GetColour

wxColour& GetColour() const

Returns a reference to the brush colour.

[See also](#)

wxBrush::SetColour (p. 95)

wxBrush::GetStipple

wxBitmap * GetStipple() const

Gets a pointer to the stipple bitmap. If the brush does not have a wxSTIPPLE style, this bitmap may be non-NULL but uninitialised (*wxBitmap::Ok* (p. 76) returns false).

[See also](#)

wxBrush::SetStipple (p. 95)

wxBrush::GetStyle

int GetStyle() const

Returns the brush style, one of:

wxTRANSPARENT	Transparent (no fill).
wxSOLID	Solid.
wxBDIAGONAL_HATCH	Backward diagonal hatch.
wxCROSSDIAG_HATCH	Cross-diagonal hatch.
wxFDIAGONAL_HATCH	Forward diagonal hatch.
wxCROSS_HATCH	Cross hatch.
wxHORIZONTAL_HATCH	Horizontal hatch.
wxVERTICAL_HATCH	Vertical hatch.
wxSTIPPLE	Stippled using a bitmap.
wxSTIPPLE_MASK_OPAQUE	Stippled using a bitmap's mask.

[See also](#)

wxBrush::SetStyle (p. 96), *wxBrush::SetColour* (p. 95), *wxBrush::SetStipple* (p. 95)

wxBrush::Ok

bool Ok() const

Returns true if the brush is initialised. It will return false if the default constructor has been used (for example, the brush is a member of a class, or NULL has been assigned to it).

wxBrush::SetColour

void SetColour(wxColour& colour)

Sets the brush colour using a reference to a colour object.

void SetColour(const wxString& colourName)

Sets the brush colour using a colour name from the colour database.

void SetColour(const unsigned char red, const unsigned char green, const unsigned char blue)

Sets the brush colour using red, green and blue values.

See also

wxBrush::GetColour (p. 94)

wxBrush::SetStipple

void SetStipple(const wxBitmap& bitmap)

Sets the stipple bitmap.

Parameters

bitmap

The bitmap to use for stippling.

Remarks

The style will be set to wxSTIPPLE, unless the bitmap has a mask associated to it, in which case the style will be set to wxSTIPPLE_MASK_OPAQUE.

If the wxSTIPPLE variant is used, the bitmap will be used to fill out the area to be drawn. If the wxSTIPPLE_MASK_OPAQUE is used, the current text foreground and text background determine what colours are used for displaying and the bits in the mask (which is a mono-bitmap actually) determine where to draw what.

Note that under Windows 95, only 8x8 pixel large stipple bitmaps are supported, Windows 98 and NT as well as GTK support arbitrary bitmaps.

See also

wxBitmap (p. 67)

wxBrush::SetStyle

void SetStyle(int *style*)

Sets the brush style.

style

One of:

wxTRANSPARENT	Transparent (no fill).
wxSOLID	Solid.
wxBDIAGONAL_HATCH	Backward diagonal hatch.
wxCROSSDIAG_HATCH	Cross-diagonal hatch.
wxFDIAGONAL_HATCH	Forward diagonal hatch.
wxCROSS_HATCH	Cross hatch.
wxHORIZONTAL_HATCH	Horizontal hatch.
wxVERTICAL_HATCH	Vertical hatch.
wxSTIPPLE	Stippled using a bitmap.
wxSTIPPLE_MASK_OPAQUE	Stippled using a bitmap's mask.

See also

wxBrush::GetStyle (p. 94)

wxBrush::operator =

wxBrush& operator =(const wxBrush& *brush*)

Assignment operator, using reference counting. Returns a reference to 'this'.

wxBrush::operator ==

bool operator ==(const wxBrush& *brush*)

Equality operator. Two brushes are equal if they contain pointers to the same underlying brush data. It does not compare each attribute, so two independently-created brushes

using the same parameters will fail the test.

wxBrush::operator !=

bool operator !=(const wxBrush& brush)

Inequality operator. Two brushes are not equal if they contain pointers to different underlying brush data. It does not compare each attribute.

wxBrushList

A brush list is a list containing all brushes which have been created.

Derived from

wxList (p. 787)

wxObject (p. 954)

Include files

<wx/gdicmn.h>

Remarks

There is only one instance of this class: **wxTheBrushList**. Use this object to search for a previously created brush of the desired type and create it if not already found. In some windowing systems, the brush may be a scarce resource, so it can pay to reuse old resources if possible. When an application finishes, all brushes will be deleted and their resources freed, eliminating the possibility of 'memory leaks'. However, it is best not to rely on this automatic cleanup because it can lead to double deletion in some circumstances.

There are two mechanisms in recent versions of wxWidgets which make the brush list less useful than it once was. Under Windows, scarce resources are cleaned up internally if they are not being used. Also, a referencing counting mechanism applied to all GDI objects means that some sharing of underlying resources is possible. You don't have to keep track of pointers, working out when it is safe delete a brush, because the referencing counting does it for you. For example, you can set a brush in a device context, and then immediately delete the brush you passed, because the brush is 'copied'.

So you may find it easier to ignore the brush list, and instead create and copy brushes as you see fit. If your Windows resource meter suggests your application is using too many resources, you can resort to using GDI lists to share objects explicitly.

The only compelling use for the brush list is for wxWidgets to keep track of brushes in order to clean them up on exit. It is also kept for backward compatibility with earlier versions of wxWidgets.

See also

wxBrush (p. 91)

wxBrushList::wxBrushList

void wxBrushList()

Constructor. The application should not construct its own brush list: use the object pointer **wxTheBrushList**.

wxBrushList::AddBrush

void AddBrush(wxBrush *brush)

Used internally by wxWidgets to add a brush to the list.

wxBrushList::FindOrCreateBrush

wxBrush * FindOrCreateBrush(const wxColour& colour, int style)

Finds a brush with the specified attributes and returns it, else creates a new brush, adds it to the brush list, and returns it.

wxBrush * FindOrCreateBrush(const wxString& colourName, int style)

Finds a brush with the specified attributes and returns it, else creates a new brush, adds it to the brush list, and returns it.

Finds a brush of the given specification, or creates one and adds it to the list.

Parameters

colour

Colour object.

colourName

Colour name, which should be in the colour database.

style

Brush style. See *wxBrush::SetStyle* (p. 96) for a list of styles.

wxBrushList::RemoveBrush

void RemoveBrush(wxBrush *brush)

Used by wxWidgets to remove a brush from the list.

wxBufferedDC

This simple class provides a simple way to avoid flicker: when drawing on it, everything is in fact first drawn on an in-memory buffer (a *wxBitmap* (p. 67)) and then copied to the screen only once, when this object is destroyed.

It can be used in the same way as any other device context. *wxBufferedDC* itself typically replaces *wxClientDC* (p. 134), if you want to use it in your `OnPaint()` handler, you should look at *wxBufferedPaintDC* (p. 100).

Derived from

wxMemoryDC (p. 881)

wxDC (p. 349)

wxObject (p. 954)

Include files

<wx/dcbuffer.h>

See also

wxDC (p. 349)

wxBufferedDC::wxBufferedDC

wxBufferedDC()

wxBufferedDC(wxDC *dc, const wxSize& area)

wxBufferedDC(wxDC *dc, const wxBitmap& buffer)

If you use the first, default, constructor, you must call one of the *Init* (p. 100) methods later in order to use the object.

The other constructors initialize the object immediately and `Init()` must not be called after using them.

Parameters

dc

The underlying DC: everything drawn to this object will be flushed to this DC when this object is destroyed. You may pass NULL in order to just initialize the buffer, and not flush it.

area

The size of the bitmap to be used for buffering (this bitmap is created internally when it is not given explicitly).

buffer

Explicitly provided bitmap to be used for buffering: this is the most efficient solution as the bitmap doesn't have to be recreated each time but it also requires more memory as the bitmap is never freed. The bitmap should have appropriate size, anything drawn outside of its bounds is clipped.

wxBufferedDC::Init

void Init(wxDC *dc, const wxSize& area)

void Init(wxDC *dc, const wxBitmap& buffer)

These functions initialize the object created using the default constructor. Please see *constructors documentation* (p. 99) for details.

wxBufferedDC::~wxBufferedDC

Copies everything drawn on the DC so far to the underlying DC associated with this object, if any.

wxBufferedPaintDC

This is a subclass of *wxBufferedDC* (p. 99) which can be used inside of an `OnPaint()` event handler. Just create an object of this class instead of *wxPaintDC* (p. 966) and that's all you have to do to (mostly) avoid flicker. The only thing to watch out for is that if you are using this class together with *wxScrolledWindow* (p. 1085), you probably do **not** want to call *PrepareDC* (p. 1091) on it as it already does this internally for the real underlying *wxPaintDC*.

Derived from

wxMemoryDC (p. 881)

wxDC (p. 349)

wxObject (p. 954)

Include files

<wx/dcbuffer.h>

wxBufferedPaintDC::wxBufferedPaintDC

wxBufferedPaintDC(wxWindow *window, const wxBitmap& buffer = wxNullBitmap)

As with *wxBufferedDC* (p. 99), you may either provide the bitmap to be used for buffering or let this object create one internally (in the latter case, the size of the client

part of the window is used).

wxBufferedPaintDC::~wxBufferedPaintDC

Copies everything drawn on the DC so far to the window associated with this object, using a *wxPaintDC* (p. 966).

wxBufferedInputStream

This stream acts as a cache. It caches the bytes read from the specified input stream (See *wxFilterInputStream* (p. 503)). It uses *wxStreamBuffer* and sets the default in-buffer size to 1024 bytes. This class may not be used without some other stream to read the data from (such as a file stream or a memory stream).

Derived from

wxFilterInputStream (p. 503)

Include files

<wx/stream.h>

See also

wxStreamBuffer (p. 1194), *wxInputStream* (p. 762), *wxBufferedOutputStream* (p. 101)

wxBufferedOutputStream

This stream acts as a cache. It caches the bytes to be written to the specified output stream (See *wxFilterOutputStream* (p. 504)). The data is only written when the cache is full, when the buffered stream is destroyed or when calling *SeekO()*.

This class may not be used without some other stream to write the data to (such as a file stream or a memory stream).

Derived from

wxFilterOutputStream (p. 504)

Include files

<wx/stream.h>

See also

wxStreamBuffer (p. 1194), *wxOutputStream* (p. 958)

wxBufferedOutputStream::wxBufferedOutputStream

wxBufferedOutputStream(const **wxOutputStream**& *parent*)

Creates a buffered stream using a buffer of a default size of 1024 bytes for caching the stream *parent*.

wxBufferedOutputStream::~~wxBufferedOutputStream

~wxBufferedOutputStream()

Destructor. Calls **Sync()** and destroys the internal buffer.

wxBufferedOutputStream::SeekO

off_t **SeekO**(**off_t** *pos*, **wxSeekMode** *mode*)

Calls **Sync()** and changes the stream position.

wxBufferedOutputStream::Sync

void **Sync**()

Flushes the buffer and calls **Sync()** on the parent stream.

wxBusyCursor

This class makes it easy to tell your user that the program is temporarily busy. Just create a **wxBusyCursor** object on the stack, and within the current scope, the hourglass will be shown.

For example:

```
wxBusyCursor wait;

for (int i = 0; i < 100000; i++)
    DoACalculation();
```

It works by calling *wxBeginBusyCursor* (p. 1495) in the constructor, and *wxEndBusyCursor* (p. 1497) in the destructor.

Derived from

None

Include files

<wx/utils.h>

See also

wxBeginBusyCursor (p. 1495), *wxEndBusyCursor* (p. 1497), *wxWindowDisabler* (p. 1442)

wxBusyCursor::wxBusyCursor

wxBusyCursor(wxCursor* cursor = wxHOURLASS_CURSOR)

Constructs a busy cursor object, calling *wxBeginBusyCursor* (p. 1495).

wxBusyCursor::~~wxBusyCursor

~wxBusyCursor()

Destroys the busy cursor object, calling *wxEndBusyCursor* (p. 1497).

wxBusyInfo

This class makes it easy to tell your user that the program is temporarily busy. Just create a *wxBusyInfo* object on the stack, and within the current scope, a message window will be shown.

For example:

```
wxBusyInfo wait("Please wait, working...");  
  
for (int i = 0; i < 100000; i++)  
{  
    DoACalculation();  
}
```

It works by creating a window in the constructor, and deleting it in the destructor.

You may also want to call *wxTheApp->Yield()* to refresh the window periodically (in case it had been obscured by other windows, for example) like this:

```
wxWindowDisabler disableAll;  
  
wxBusyInfo wait("Please wait, working...");  
  
for (int i = 0; i < 100000; i++)  
{  
    DoACalculation();  
  
    if ( !(i % 1000) )  
        wxTheApp->Yield();  
}
```

but take care to not cause undesirable reentrancies when doing it (see *wxApp::Yield()* (p. 42) for more details). The simplest way to do it is to use *wxWindowDisabler* (p. 1442) class as illustrated in the above example.

Derived from

None

Include files

<wx/busyinfo.h>

wxBusyInfo::wxBusyInfo

wxBusyInfo(const wxString& *msg*, wxParent **parent* = NULL)

Constructs a busy info window as child of *parent* and displays *msg* in it.

NB: If *parent* is not NULL you must ensure that it is not closed while the busy info is shown.

wxBusyInfo::~~wxBusyInfo

~wxBusyInfo()

Hides and closes the window containing the information text.

wxButton

A button is a control that contains a text string, and is one of the commonest elements of a GUI. It may be placed on a *dialog box* (p. 369) or *panel* (p. 972), or indeed almost any other window.

Derived from

wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/button.h>

Window styles

wxBU_LEFT	Left-justifies the label. Windows only.
wxBU_TOP	Aligns the label to the top of the button. Windows only.
wxBU_RIGHT	Right-justifies the bitmap label. Windows only.
wxBU_BOTTOM	Aligns the label to the bottom of the button. Windows only.
wxBU_EXACTFIT	Creates the button as small as possible instead of making

it of the standard size (which is the default behaviour).

wxNO_BORDER Creates a flat button. Windows and GTK+ only.

See also *window styles overview* (p. 1618).

Event handling

EVT_BUTTON(id, func) Process a
wxEVT_COMMAND_BUTTON_CLICKED
event, when the button is clicked.

See also

wxBitmapButton (p. 80)

wxButton::wxButton

wxButton()

Default constructor.

wxButton(wxWindow* parent, wxWindowID id, const wxString& label, const wxPoint& pos, const wxSize& size = wxDefaultSize, long style = 0, const wxValidator& validator, const wxString& name = "button")

Constructor, creating and showing a button.

Parameters

parent

Parent window. Must not be NULL.

id

Button identifier. A value of -1 indicates a default value.

label

Text to be displayed on the button.

pos

Button position.

size

Button size. If the default size (-1, -1) is specified then the button is sized appropriately for the text.

style

Window style. See *wxButton* (p. 104).

validator

Window validator.

name

Window name.

See also

wxButton::Create (p. 106), *wxValidator* (p. 1360)

wxButton::~~wxButton

~wxButton()

Destructor, destroying the button.

wxButton::Create

bool Create(wxWindow* parent, wxWindowID id, const wxString& label, const wxPoint& pos, const wxSize& size = wxDefaultSize, long style = 0, const wxValidator& validator, const wxString& name = "button")

Button creation function for two-step creation. For more details, see *wxButton::wxButton* (p. 105).

wxButton::GetLabel

wxString GetLabel() const

Returns the string label for the button.

Return value

The button's label.

See also

wxButton::SetLabel (p. 107)

wxButton::GetDefaultSize

wxSize GetDefaultSize()

Returns the default size for the buttons. It is advised to make all the dialog buttons of the same size and this function allows to retrieve the (platform and current font dependent

size) which should be the best suited for this.

wxButton::SetDefault

void SetDefault()

This sets the button to be the default item for the panel or dialog box.

Remarks

Under Windows, only dialog box buttons respond to this function. As normal under Windows and Motif, pressing return causes the default button to be depressed when the return key is pressed. See also *wxWindow::SetFocus* (p. 1428) which sets the keyboard focus for windows and text panel items, and *wxPanel::SetDefaultItem* (p. 975).

Note that under Motif, calling this function immediately after creation of a button and before the creation of other buttons will cause misalignment of the row of buttons, since default buttons are larger. To get around this, call *SetDefault* after you have created a row of buttons: *wxWidgets* will then set the size of all buttons currently on the panel to the same size.

wxButton::SetLabel

void SetLabel(const wxString& label)

Sets the string label for the button.

Parameters

label

The label to set.

See also

wxButton::GetLabel (p. 106)

wxCalculateLayoutEvent

This event is sent by *wxLayoutAlgorithm* (p. 782) to calculate the amount of the remaining client area that the window should occupy.

Derived from

wxEvent (p. 441)

wxObject (p. 954)

Include files

<wx/laywin.h>

Event table macros

EVT_CALCULATE_LAYOUT(func) Process a `wxEVT_CALCULATE_LAYOUT` event, which asks the window to take a 'bite' out of a rectangle provided by the algorithm.

See also

wxQueryLayoutInfoEvent (p. 1030), *wxSashLayoutWindow* (p. 1065), *wxLayoutAlgorithm* (p. 782).

wxCalculateLayoutEvent::wxCalculateLayoutEvent

wxCalculateLayoutEvent(wxWindowID id = 0)

Constructor.

wxCalculateLayoutEvent::GetFlags

int GetFlags() const

Returns the flags associated with this event. Not currently used.

wxCalculateLayoutEvent::GetRect

wxRect GetRect() const

Before the event handler is entered, returns the remaining parent client area that the window could occupy. When the event handler returns, this should contain the remaining parent client rectangle, after the event handler has subtracted the area that its window occupies.

wxCalculateLayoutEvent::SetFlags

void SetFlags(int flags)

Sets the flags associated with this event. Not currently used.

wxCalculateLayoutEvent::SetRect

void SetRect(const wxRect& rect)

Call this to specify the new remaining parent client area, after the space occupied by the window has been subtracted.

wxCalendarCtrl

The calendar control allows the user to pick a date interactively. For this, it displays a window containing several parts: the control to pick the month and the year at the top (either or both of them may be disabled) and a month area below them which shows all the days in the month. The user can move the current selection using the keyboard and select the date (generating `EVT_CALENDAR` event) by pressing `<Return>` or double clicking it.

It has advanced possibilities for the customization of its display. All global settings (such as colours and fonts used) can, of course, be changed. But also, the display style for each day in the month can be set independently using *wxCalendarDateAttr* (p. 114) class.

An item without custom attributes is drawn with the default colours and font and without border, but setting custom attributes with *SetAttr* (p. 114) allows to modify its appearance. Just create a custom attribute object and set it for the day you want to be displayed specially (note that the control will take ownership of the pointer, i.e. it will delete it itself). A day may be marked as being a holiday, even if it is not recognized as one by *wxDateTime* (p. 1589) using *SetHoliday* (p. 116) method.

As the attributes are specified for each day, they may change when the month is changed, so you will often want to update them in `EVT_CALENDAR_MONTH` event handler.

Derived from

wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

`<wx/calctrl.h>`

Window styles

wxCAL_SUNDAY_FIRST Show Sunday as the first day in the week

wxCAL_MONDAY_FIRST Show Monday as the first day in the week

wxCAL_SHOW_HOLIDAYS Highlight holidays in the calendar

wxCAL_NO_YEAR_CHANGE Disable the year changing

wxCAL_NO_MONTH_CHANGE Disable the month (and, implicitly, the year) changing

wxCAL_SHOW_SURROUNDING_WEEKS Show the neighbouring weeks in the previous and next months

wxCAL_SEQUENTIAL_MONTH_SELECTION Use alternative, more compact, style

for the month and year selection controls.

The default calendar style is `wxCAL_SHOW_HOLIDAYS`.

Event table macros

To process input from a calendar control, use these event handler macros to direct input to member functions that take a *wxCalendarEvent* (p. 117) argument.

EVT_CALENDAR(id, func)	A day was double clicked in the calendar.
EVT_CALENDAR_SEL_CHANGED(id, func)	The selected date changed.
EVT_CALENDAR_DAY(id, func)	The selected day changed.
EVT_CALENDAR_MONTH(id, func)	The selected month changed.
EVT_CALENDAR_YEAR(id, func)	The selected year changed.
EVT_CALENDAR_WEEKDAY_CLICKED(id, func)	User clicked on the week day header

Note that changing the selected date will result in either of `EVT_CALENDAR_DAY`, `MONTH` or `YEAR` events and `EVT_CALENDAR_SEL_CHANGED` one.

Constants

The following are the possible return values for *HitTest* (p. 114) method:

```
enum wxCalendarHitTestResult
{
    wxCAL_HITTEST_NOWHERE,    // outside of anything
    wxCAL_HITTEST_HEADER,    // on the header (weekdays)
    wxCAL_HITTEST_DAY        // on a day in the calendar
}
```

See also

Calendar sample (p. 1568)
wxCalendarDateAttr (p. 114)
wxCalendarEvent (p. 117)

wxCalendarCtrl::wxCalendarCtrl

wxCalendarCtrl()

Default constructor, use *Create* (p. 111) after it.

wxCalendarCtrl::wxCalendarCtrl

wxCalendarCtrl(wxWindow* parent, wxWindowID id, const wxDateTime& date =

```
wxDefaultDateTime, const wxPoint& pos = wxDefaultPosition, const wxSize& size =  
wxDefaultSize, long style = wxCAL_SHOW_HOLIDAYS, const wxString& name =  
wxCalendarNameStr)
```

Does the same as *Create* (p. 111) method.

wxCalendarCtrl::Create

```
bool Create(wxWindow* parent, wxWindowID id, const wxDateTime& date =  
wxDefaultDateTime, const wxPoint& pos = wxDefaultPosition, const wxSize& size =  
wxDefaultSize, long style = wxCAL_SHOW_HOLIDAYS, const wxString& name =  
wxCalendarNameStr)
```

Creates the control. See *wxWindow* (p. 1391) for the meaning of the parameters and the control overview for the possible styles.

wxCalendarCtrl::~~wxCalendarCtrl

```
~wxCalendarCtrl()
```

Destroys the control.

wxCalendarCtrl::SetDate

```
void SetDate(const wxDateTime& date)
```

Sets the current date.

wxCalendarCtrl::GetDate

```
const wxDateTime& GetDate() const
```

Gets the currently selected date.

wxCalendarCtrl::EnableYearChange

```
void EnableYearChange(bool enable = true)
```

This function should be used instead of changing `wxCAL_NO_YEAR_CHANGE` style bit directly. It allows or disallows the user to change the year interactively.

wxCalendarCtrl::EnableMonthChange

```
void EnableMonthChange(bool enable = true)
```

This function should be used instead of changing `wxCAL_NO_MONTH_CHANGE` style bit.

It allows or disallows the user to change the month interactively. Note that if the month can not be changed, the year can not be changed neither.

wxCalendarCtrl::EnableHolidayDisplay

void EnableHolidayDisplay(bool *display* = true)

This function should be used instead of changing `wxCAL_SHOW_HOLIDAYS` style bit directly. It enables or disables the special highlighting of the holidays.

wxCalendarCtrl::SetHeaderColours

void SetHeaderColours(const wxColour& *colFg*, const wxColour& *colBg*)

Set the colours used for painting the weekdays at the top of the control.

wxCalendarCtrl::GetHeaderColourFg

const wxColour& GetHeaderColourFg() const

Gets the foreground colour of the header part of the calendar window.

[See also](#)

SetHeaderColours (p. 112)

wxCalendarCtrl::GetHeaderColourBg

const wxColour& GetHeaderColourBg() const

Gets the background colour of the header part of the calendar window.

[See also](#)

SetHeaderColours (p. 112)

wxCalendarCtrl::SetHighlightColours

void SetHighlightColours(const wxColour& *colFg*, const wxColour& *colBg*)

Set the colours to be used for highlighting the currently selected date.

wxCalendarCtrl::GetHighlightColourFg

const wxColour& GetHighlightColourFg() const

Gets the foreground highlight colour.

[See also](#)

SetHighlightColours (p. 112)

wxCalendarCtrl::GetHighlightColourBg

const wxColour& GetHighlightColourBg() const

Gets the background highlight colour.

[See also](#)

SetHighlightColours (p. 112)

wxCalendarCtrl::SetHolidayColours

void SetHolidayColours(const wxColour& colFg, const wxColour& colBg)

Sets the colours to be used for the holidays highlighting (only used if the window style includes `wxCAL_SHOW_HOLIDAYS` flag).

wxCalendarCtrl::GetHolidayColourFg

const wxColour& GetHolidayColourFg() const

Return the foreground colour currently used for holiday highlighting.

[See also](#)

SetHolidayColours (p. 113)

wxCalendarCtrl::GetHolidayColourBg

const wxColour& GetHolidayColourBg() const

Return the background colour currently used for holiday highlighting.

[See also](#)

SetHolidayColours (p. 113)

wxCalendarCtrl::GetAttr

wxCalendarDateAttr * GetAttr(size_t day) const

Returns the attribute for the given date (should be in the range 1...31).

The returned pointer may be `NULL`.

wxCalendarCtrl::SetAttr

void SetAttr(size_t day, wxCalendarDateAttr* attr)

Associates the attribute with the specified date (in the range 1...31).

If the pointer is `NULL`, the items attribute is cleared.

wxCalendarCtrl::SetHoliday

void SetHoliday(size_t day)

Marks the specified day as being a holiday in the current month.

wxCalendarCtrl::ResetAttr

void ResetAttr(size_t day)

Clears any attributes associated with the given day (in the range 1...31).

wxCalendarCtrl::HitTest

wxCalendarHitTestResult HitTest(const wxPoint& pos, wxDateTime* date = NULL, wxDateTime::WeekDay* wd = NULL)

Returns one of `wxCAL_HITTEST_XXX constants` (p. 109) and fills either *date* or *wd* pointer with the corresponding value depending on the hit test code.

wxCalendarDateAttr

`wxCalendarDateAttr` is a custom attributes for a calendar date. The objects of this class are used with `wxCalendarCtrl` (p. 109).

Derived from

No base class

Constants

Here are the possible kinds of borders which may be used to decorate a date:

```
enum wxCalendarDateBorder
{
    wxCAL_BORDER_NONE,           // no border (default)
    wxCAL_BORDER_SQUARE,        // a rectangular border
    wxCAL_BORDER_ROUND          // a round border
}
```

See also

wxCalendarCtrl (p. 109)

wxCalendarDateAttr::wxCalendarDateAttr

wxCalendarDateAttr()

wxCalendarDateAttr(const wxColour& colText, const wxColour& colBack = wxNullColour, const wxColour& colBorder = wxNullColour, const wxFont& font = wxNullFont, wxCalendarDateBorder border = wxCAL_BORDER_NONE)

wxCalendarDateAttr(wxCalendarDateBorder border, const wxColour& colBorder = wxNullColour)

The constructors.

wxCalendarDateAttr::SetTextColour

void SetTextColour(const wxColour& colText)

Sets the text (foreground) colour to use.

wxCalendarDateAttr::SetBackgroundColour

void SetBackgroundColour(const wxColour& colBack)

Sets the text background colour to use.

wxCalendarDateAttr::SetBorderColour

void SetBorderColour(const wxColour& col)

Sets the border colour to use.

wxCalendarDateAttr::SetFont

void SetFont(const wxFont& font)

Sets the font to use.

wxCalendarDateAttr::SetBorder

void SetBorder(wxCalendarDateBorder border)

Sets the *border kind* (p. 114)

wxCalendarDateAttr::SetHoliday

void SetHoliday(bool holiday)

Display the date with this attribute as a holiday.

wxCalendarDateAttr::HasTextColour

bool HasTextColour() const

Returns `true` if this item has a non default text foreground colour.

wxCalendarDateAttr::HasBackgroundColour

bool HasBackgroundColour() const

Returns `true` if this attribute specifies a non default text background colour.

wxCalendarDateAttr::HasBorderColour

bool HasBorderColour() const

Returns `true` if this attribute specifies a non default border colour.

wxCalendarDateAttr::HasFont

bool HasFont() const

Returns `true` if this attribute specifies a non default font.

wxCalendarDateAttr::HasBorder

bool HasBorder() const

Returns `true` if this attribute specifies a non default (i.e. any) border.

wxCalendarDateAttr::IsHoliday

bool IsHoliday() const

Returns `true` if this attribute specifies that this item should be displayed as a holiday.

wxCalendarDateAttr::GetTextColour

const wxColour& GetTextColour() const

Returns the text colour to use for the item with this attribute.

wxCalendarDateAttr::GetBackgroundColour

const wxColour& GetBackgroundColour() const

Returns the background colour to use for the item with this attribute.

wxCalendarDateAttr::GetBorderColour

const wxColour& GetBorderColour() const

Returns the border colour to use for the item with this attribute.

wxCalendarDateAttr::GetFont

const wxFont& GetFont() const

Returns the font to use for the item with this attribute.

wxCalendarDateAttr::GetBorder

wxCalendarDateBorder GetBorder() const

Returns the *border* (p. 114) to use for the item with this attribute.

wxCalendarEvent

The `wxCalendarEvent` class is used together with `wxCalendarCtrl` (p. 109).

[See also](#)

`wxCalendarCtrl` (p. 109)

wxCalendarEvent::GetDate

`wxcalendareventgetdate`**const wxDateTime& GetDate() const**

Returns the date. This function may be called for all event types except `EVT_CALENDAR_WEEKDAY_CLICKED` one for which it doesn't make sense.

wxCalendarEvent::GetWeekDay

`wxcalendareventgetweekday`

wxDateTime::WeekDay GetWeekDay() const

Returns the week day on which the user clicked in `EVT_CALENDAR_WEEKDAY_CLICKED` handler. It doesn't make sense to call this function in other handlers.

wxCalendarEvent::SetDate

`wxcalendareventsetdate`

void SetDate(const wxDateTime& date)

Sets the date.

wxCalendarEvent::SetWeekDay

`wxcalendareventsetweekday`

void SetWeekDay(wxDateTime::WeekDay day)

Sets the week day.

wxCaret

A caret is a blinking cursor showing the position where the typed text will appear. The text controls usually have a caret but `wxCaret` class also allows to use a caret in other windows.

Currently, the caret appears as a rectangle of the given size. In the future, it will be possible to specify a bitmap to be used for the caret shape.

A caret is always associated with a window and the current caret can be retrieved using `wxWindow::GetCaret` (p. 1402). The same caret can't be reused in two different windows.

Derived from

No base class

Include files

`<wx/caret.h>`

Data structures

wxCaret::wxCaret

wxCaret()

Default constructor: you must use one of Create() functions later.

wxCaret(wxWindow* window, int width, int height)

wxCaret(wxWindowBase* window, const wxSize& size)

Create the caret of given (in pixels) width and height and associates it with the given window.

wxCaret::Create

bool Create(wxWindowBase* window, int width, int height)

bool Create(wxWindowBase* window, const wxSize& size)

Create the caret of given (in pixels) width and height and associates it with the given window (same as constructor).

wxCaret::GetBlinkTime

static int GetBlinkTime()

Returns the blink time which is measured in milliseconds and is the time elapsed between 2 inversions of the caret (blink time of the caret is the same for all carets, so this functions is static).

wxCaret::GetPosition

void GetPosition(int* x, int* y) const

wxPoint GetPosition() const

Get the caret position (in pixels).

wxPerl note: In wxPerl there are two methods instead of a single overloaded method:

GetPosition()

Returns a Wx::Point

GetPositionXY()

Returns a 2-element list (x, y)

wxCaret::GetSize

void GetSize(int* width, int* height) const**wxSize GetSize() const**

Get the caret size.

wxPerl note: In wxPerl there are two methods instead of a single overloaded method:

GetSize()Returns a `Wx::Size`**GetSizeWH()**Returns a 2-element list (`width`,
`height`)**wxCaret::GetWindow**

wxWindow* GetWindow() const

Get the window the caret is associated with.

wxCaret::Hide

void Hide()

Same as `wxCaret::Show(false)` (p. 121).

wxCaret::IsOk

bool IsOk() const

Returns true if the caret was created successfully.

wxCaret::IsVisible

bool IsVisible() const

Returns true if the caret is visible and false if it is permanently hidden (if it is blinking and not shown currently but will be after the next blink, this method still returns true).

wxCaret::Move

void Move(int x, int y)**void Move(const wxPoint& pt)**

Move the caret to given position (in logical coordinates).

wxCaret::SetBlinkTime

static void SetBlinkTime(int *milliseconds*)

Sets the blink time for all the carets.

Remarks

Under Windows, this function will change the blink time for **all** carets permanently (until the next time it is called), even for the carets in other applications.

See also

GetBlinkTime (p. 119)

wxCaret::SetSize

void SetSize(int *width*, int *height*)

void SetSize(const wxSize& *size*)

Changes the size of the caret.

wxCaret::Show

void Show(bool *show = true*)

Shows or hides the caret. Notice that if the caret was hidden N times, it must be shown N times as well to reappear on the screen.

wxCheckBox

A checkbox is a labelled box which by default is either on (checkmark is visible) or off (no checkmark). Optionally (When the wxCHK_3STATE style flag is set) it can have a third state, called the mixed or undetermined state. Often this is used as a "Does Not Apply" state.

Derived from

wxControl (p. 199)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/checkbox.h>

Window styles

wxCHK_2STATE	Create a 2-state checkbox. This is the default.
wxCHK_3STATE	Create a 3-state checkbox.
wxCHK_ALLOW_3RD_STATE_FOR_USER	By default a user can't set a 3-state checkbox to the third state. It can only be done from code. Using this flag allows the user to set the checkbox to the third state by clicking.
wxALIGN_RIGHT	Makes the text appear on the left of the checkbox.

See also *window styles overview* (p. 1618).

Event handling

EVT_CHECKBOX(id, func)	Process a <code>wxEVT_COMMAND_CHECKBOX_CLICKED</code> event, when the checkbox is clicked.
-------------------------------	--

See also

wxRadioButton (p. 1039), *wxCommandEvent* (p. 165)

wxCheckBox::wxCheckBox

wxCheckBox()

Default constructor.

wxCheckBox(wxWindow* parent, wxWindowID id, const wxString& label, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = 0, const wxValidator& val, const wxString& name = "checkBox")

Constructor, creating and showing a checkbox.

Parameters

parent

Parent window. Must not be NULL.

id

Checkbox identifier. A value of -1 indicates a default value.

label

Text to be displayed next to the checkbox.

pos

Checkbox position. If the position (-1, -1) is specified then a default position is chosen.

size

Checkbox size. If the default size (-1, -1) is specified then a default size is chosen.

style

Window style. See *wxCheckBox* (p. 121).

validator

Window validator.

name

Window name.

See also

wxCheckBox::Create (p. 123), *wxValidator* (p. 1360)

wxCheckBox::~~wxCheckBox

~wxCheckBox()

Destructor, destroying the checkbox.

wxCheckBox::Create

bool Create(wxWindow* parent, wxWindowID id, const wxString& label, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = 0, const wxValidator& val, const wxString& name = "checkBox")

Creates the checkbox for two-step construction. See *wxCheckBox::wxCheckBox* (p. 122) for details.

wxCheckBox::GetValue

bool GetValue() const

Gets the state of a 2-state checkbox.

Return value

Returns `true` if it is checked, `false` otherwise.

wxCheckBox::Get3StateValue

wxCheckBoxState Get3StateValue() const

Gets the state of a 3-state checkbox.

Return value

Returns `wxCHK_UNCHECKED` when the checkbox is unchecked, `wxCHK_CHECKED` when it is checked and `wxCHK_UNDETERMINED` when it's in the undetermined state. Asserts when the function is used with a 2-state checkbox.

wxCheckBox::Is3rdStateAllowedForUser

bool Is3rdStateAllowedForUser() const

Returns whether or not the user can set the checkbox to the third state.

Return value

Returns `true` if the user can set the third state of this checkbox, `false` if it can only be set programmatically or if it's a 2-state checkbox.

wxCheckBox::Is3State

bool Is3State() const

Returns whether or not the checkbox is a 3-state checkbox.

Return value

Returns `true` if this checkbox is a 3-state checkbox, `false` if it's a 2-state checkbox.

wxCheckBox::IsChecked

bool IsChecked() const

This is just a maybe more readable synonym for *GetValue* (p. 123): just as the latter, it returns `true` if the checkbox is checked and `false` otherwise.

wxCheckBox::SetValue

void SetValue(bool state)

Sets the checkbox to the given state. This does not cause a `wxEVT_COMMAND_CHECKBOX_CLICKED` event to get emitted.

Parameters

state

If `true`, the check is on, otherwise it is off.

wxCheckBox::Set3StateValue

void Set3StateValue(const wxCheckBoxState state)

Sets the checkbox to the given state. This does not cause a `wxEVT_COMMAND_CHECKBOX_CLICKED` event to get emitted.

Parameters

state

Can be one of: `wxCHK_UNCHECKED` (Check is off), `wxCHK_CHECKED` (Check is on) or `wxCHK_UNDETERMINED` (Check is mixed). Asserts when the checkbox is a 2-state checkbox and setting the state to `wxCHK_UNDETERMINED`.

wxCheckListBox

A checklistbox is like a listbox, but allows items to be checked or unchecked.

This class is currently implemented under Windows and GTK. When using this class under Windows `wxWidgets` must be compiled with `USE_OWNER_DRAWN` set to 1.

Only the new functions for this class are documented; see also *wxListBox* (p. 794).

Please note that `wxCheckListBox` uses client data in its implementation, and therefore this is not available to the application.

Derived from

wxListBox (p. 794)
wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/checklst.h>

Window styles

See *wxListBox* (p. 794).

Event handling

EVT_CHECKLISTBOX(id, func)

Process a `wxEVT_COMMAND_CHECKLISTBOX_TOGGLED` event, when an item in the check list box is checked or unchecked.

See also

wxListBox (p. 794), *wxChoice* (p. 127), *wxComboBox* (p. 158), *wxListCtrl* (p. 799), *wxCommandEvent* (p. 165)

wxCheckListBox::wxCheckListBox

wxCheckListBox()

Default constructor.

wxCheckListBox(wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, int n, const wxString choices[] = NULL, long style = 0, const wxValidator& validator = wxDefaultValidator, const wxString& name = "listBox")

wxCheckListBox(wxWindow* parent, wxWindowID id, const wxPoint& pos, const wxSize& size, const wxString& choices, long style = 0, const wxValidator& validator = wxDefaultValidator, const wxString& name = "listBox")

Constructor, creating and showing a list box.

Parameters

parent

Parent window. Must not be NULL.

id

Window identifier. A value of -1 indicates a default value.

pos

Window position.

size

Window size. If the default size (-1, -1) is specified then the window is sized appropriately.

n

Number of strings with which to initialise the control.

choices

An array of strings with which to initialise the control.

style

Window style. See *wxCheckListBox* (p. 125).

validator

Window validator.

name

Window name.

wxPython note: The `wxCheckListBox` constructor in wxPython reduces the `nand choices` arguments to a single argument, which is a list of strings.

wxPerl note: In wxPerl there is just an array reference in place of `nand choices`.

wxCheckListBox::~wxCheckListBox

void ~wxCheckListBox()

Destructor, destroying the list box.

wxCheckListBox::Check

void Check(int *item*, bool *check* = true)

Checks the given item. Note that calling this method doesn't result in `wxEVT_COMMAND_CHECKLISTBOX_TOGGLE` being emitted.

Parameters

item

Index of item to check.

check

true if the item is to be checked, false otherwise.

wxCheckListBox::IsChecked

bool IsChecked(int *item*) const

Returns true if the given item is checked, false otherwise.

Parameters

item

Index of item whose check status is to be returned.

wxChoice

A choice item is used to select one of a list of strings. Unlike a listbox, only the selection is visible until the user pulls down the menu of choices.

Derived from

wxControlWithItems (p. 200)
wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/choice.h>

Window styles

There are no special styles for *wxChoice*.

See also *window styles overview* (p. 1618).

Event handling

EVT_CHOICE(id, func)	Process a <code>wxEVT_COMMAND_CHOICE_SELECTED</code> event, when an item on the list is selected.
-----------------------------	---

See also

wxListBox (p. 794), *wxComboBox* (p. 158), *wxCommandEvent* (p. 165)

wxChoice::wxChoice

wxChoice()

Default constructor.

wxChoice(wxWindow *parent, wxWindowID id, const wxPoint& pos, const wxSize& size, int n, const wxString choices[], long style = 0, const wxValidator& validator = wxDefaultValidator, const wxString& name = "choice")

wxChoice(wxWindow *parent, wxWindowID id, const wxPoint& pos, const wxSize& size, const wxString& choices, long style = 0, const wxValidator& validator = wxDefaultValidator, const wxString& name = "choice")

Constructor, creating and showing a choice.

Parameters

parent

Parent window. Must not be NULL.

id

Window identifier. A value of -1 indicates a default value.

pos

Window position.

size

Window size. If the default size (-1, -1) is specified then the choice is sized appropriately.

n

Number of strings with which to initialise the choice control.

choices

An array of strings with which to initialise the choice control.

style

Window style. See *wxChoice* (p. 127).

validator

Window validator.

name

Window name.

See also

wxChoice::Create (p. 129), *wxValidator* (p. 1360)

wxPython note: The *wxChoice* constructor in wxPython reduces the *n* and *choices* arguments to a single argument, which is a list of strings.

wxPerl note: In wxPerl there is just an array reference in place of *n* and *choices*.

wxChoice::~~wxChoice

~wxChoice()

Destructor, destroying the choice item.

wxChoice::Create

```
bool Create(wxWindow *parent, wxWindowID id, const wxPoint& pos, const
wxSize& size, int n, const wxString choices[], long style = 0, const wxString& name
= "choice")
```

```
bool Create(wxWindow *parent, wxWindowID id, const wxPoint& pos, const  
wxSize& size, const wxArrayString& choices, long style = 0, const wxString& name  
= "choice")
```

Creates the choice for two-step construction. See `wxChoice::wxChoice` (p. 128).

wxChoice::Delete

```
void Delete(int n)
```

Deletes the item with the given index from the control.

Parameters

n

The item to delete.

wxChoice::GetColumns

```
int GetColumns() const
```

Gets the number of columns in this choice item.

Remarks

This is implemented for Motif only and always returns 1 for the other platforms.

wxChoice::SetColumns

```
void SetColumns(int n = 1)
```

Sets the number of columns in this choice item.

Parameters

n

Number of columns.

Remarks

This is implemented for Motif only and doesn't do anything under other platforms.

wxClassInfo

This class stores meta-information about classes. Instances of this class are not generally defined directly by an application, but indirectly through use of macros such as **DECLARE_DYNAMIC_CLASS** and **IMPLEMENT_DYNAMIC_CLASS**.

Derived from

No parent class.

Include files

<wx/object.h>

See also

Overview (p. 1580), *wxObject* (p. 954)

wxClassInfo::wxClassInfo

wxClassInfo(char* *className*, char* *baseClass1*, char* *baseClass2*, int *size*, wxObjectConstructorFn *fn*)

Constructs a wxClassInfo object. The supplied macros implicitly construct objects of this class, so there is no need to create such objects explicitly in an application.

wxClassInfo::CreateObject

wxObject* CreateObject()

Creates an object of the appropriate kind. Returns NULL if the class has not been declared dynamically creatable (typically, it is an abstract class).

wxClassInfo::FindClass

static wxClassInfo * FindClass(char* *name*)

Finds the wxClassInfo object for a class of the given string name.

wxClassInfo::GetBaseClassName1

char* GetBaseClassName1() const

Returns the name of the first base class (NULL if none).

wxClassInfo::GetBaseClassName2

char* GetBaseClassName2() const

Returns the name of the second base class (NULL if none).

wxClassInfo::GetClassName

char * GetClassName() const

Returns the string form of the class name.

wxClassInfo::GetSize

int GetSize() const

Returns the size of the class.

wxClassInfo::InitializeClasses

static void InitializeClasses()

Initializes pointers in the wxClassInfo objects for fast execution of IsKindOf. Called in base wxWidgets library initialization.

wxClassInfo::IsKindOf

bool IsKindOf(wxClassInfo* info)

Returns true if this class is a kind of (inherits from) the given class.

wxClient

A wxClient object represents the client part of a client-server DDE-like (Dynamic Data Exchange) conversation. The actual DDE-based implementation using wxDDEClient is available on Windows only, but a platform-independent, socket-based version of this API is available using wxTCPClient, which has the same API.

To create a client which can communicate with a suitable server, you need to derive a class from wxConnection and another from wxClient. The custom wxConnection class will intercept communications in a 'conversation' with a server, and the custom wxClient is required so that a user-overridden *wxClient::OnMakeConnection* (p. 133) member can return a wxConnection of the required class, when a connection is made. Look at the IPC sample and the *Interprocess communications overview* (p. 1696) for an example of how to do this.

Derived from

wxClientBase
wxObject (p. 954)

Include files

<wx/ipc.h>

See also

wxServer (p. 1101), *wxConnection* (p. 192), *Interprocess communications overview* (p. 1696)

wxClient::wxClient

wxClient()

Constructs a client object.

wxClient::MakeConnection

wxConnectionBase * MakeConnection(const wxString& host, const wxString& service, const wxString& topic)

Tries to make a connection with a server by host (machine name under UNIX - use 'localhost' for same machine; ignored when using native DDE in Windows), service name and topic string. If the server allows a connection, a wxConnection object will be returned. The type of wxConnection returned can be altered by overriding the *wxClient::OnMakeConnection* (p. 133) member to return your own derived connection object.

Under Unix, the service name may be either an integer port identifier in which case an Internet domain socket will be used for the communications, or a valid file name (which shouldn't exist and will be deleted afterwards) in which case a Unix domain socket is created.

SECURITY NOTE: Using Internet domain sockets is extremely insecure for IPC as there is absolutely no access control for them, use Unix domain sockets whenever possible!

wxClient::OnMakeConnection

wxConnectionBase * OnMakeConnection()

Called by *wxClient::MakeConnection* (p. 133), by default this simply returns a new wxConnection object. Override this method to return a wxConnection descendant customised for the application.

The advantage of deriving your own connection class is that it will enable you to intercept messages initiated by the server, such as *wxConnection::OnAdvise* (p. 194). You may also want to store application-specific data in instances of the new class.

wxClient::ValidHost

bool ValidHost(const wxString& host)

Returns true if this is a valid host name, false otherwise. This always returns true under MS Windows.

wxClientDC

A wxClientDC must be constructed if an application wishes to paint on the client area of a window from outside an **OnPaint** event. This should normally be constructed as a temporary stack object; don't store a wxClientDC object.

To draw on a window from within **OnPaint**, construct a *wxPaintDC* (p. 966) object.

To draw on the whole window including decorations, construct a *wxWindowDC* (p. 1441) object (Windows only).

Derived from

wxWindowDC (p. 1441)

wxDC (p. 349)

Include files

<wx/dcclient.h>

See also

wxDC (p. 349), *wxMemoryDC* (p. 881), *wxPaintDC* (p. 966), *wxWindowDC* (p. 1441), *wxScreenDC* (p. 1073)

wxClientDC::wxClientDC

wxClientDC(wxWindow* *window*)

Constructor. Pass a pointer to the window on which you wish to paint.

wxClientData

All classes deriving from *wxEvtHandler* (p. 445) (such as all controls and *wxApp* (p. 31)) can hold arbitrary data which is here referred to as "client data". This is useful e.g. for scripting languages which need to handle shadow objects for most of wxWidgets' classes and which store a handle to such a shadow class as client data in that class. This data can either be of type void - in which case the *datacontainer* does not take care of freeing the data again or it is of type *wxClientData* or its derivatives. In that case the container (e.g. a control) will free the memory itself later. Note that you *must not* assign both void data and data derived from the *wxClientData* class to a container.

Some controls can hold various items and these controls can additionally hold client data for each item. This is the case for *wxChoice* (p. 127), *wxComboBox* (p. 158) and

wxListBox (p. 794). *wxTreeCtrl* (p. 1329) has a specialized class *wxTreeItemData* (p. 1350) for each item in the tree.

If you want to add client data to your own classes, you may use the mix-in class *wxClientDataContainer* (p. 135).

Include files

<wx/clntdata.h>

See also

wxEvtHandler (p. 445), *wxTreeItemData* (p. 1350), *wxStringClientData* (p. 1224), *wxClientDataContainer* (p. 135)

wxClientData::wxClientData

wxClientData()

Constructor.

wxClientData::~~wxClientData

~wxClientData()

Virtual destructor.

wxClientDataContainer

This class is a mixin that provides storage and management of "client data." This data can either be of type void - in which case the *datacontainer* does not take care of freeing the data again or it is of type *wxClientData* or its derivatives. In that case the container will free the memory itself later. Note that you *must not* assign both void data and data derived from the *wxClientData* class to a container.

NOTE: This functionality is currently duplicated in *wxEvtHandler* in order to avoid having more than one vtable in that class hierarchy.

See also

wxEvtHandler (p. 445), *wxClientData* (p. 134)

Derived from

No base class

Include files

<clntdata.h>

Data structures

wxClientDataContainer::wxClientDataContainer

wxClientDataContainer()

wxClientDataContainer::~~wxClientDataContainer

~wxClientDataContainer()

wxClientDataContainer::GetClientData

void* GetClientData() const

Get the untyped client data.

wxClientDataContainer::GetClientObject

wxClientData* GetClientObject() const

Get a pointer to the client data object.

wxClientDataContainer::SetClientData

void SetClientData(void* data)

Set the untyped client data.

wxClientDataContainer::SetClientObject

void SetClientObject(wxClientData* data)

Set the client data object. Any previous object will be deleted.

wxClipboard

A class for manipulating the clipboard. Note that this is not compatible with the clipboard class from wxWidgets 1.xx, which has the same name but a different implementation.

To use the clipboard, you call member functions of the global **wxTheClipboard** object.

See also the *wxDataObject overview* (p. 1674) for further information.

Call *wxClipboard::Open* (p. 139) to get ownership of the clipboard. If this operation returns true, you now own the clipboard. Call *wxClipboard::SetData* (p. 139) to put data on the clipboard, or *wxClipboard::GetData* (p. 138) to retrieve data from the clipboard. Call *wxClipboard::Close* (p. 138) to close the clipboard and relinquish ownership. You should keep the clipboard open only momentarily.

For example:

```
// Write some text to the clipboard
if (wxTheClipboard->Open())
{
    // This data objects are held by the clipboard,
    // so do not delete them in the app.
    wxTheClipboard->SetData( new wxTextDataObject("Some text") );
    wxTheClipboard->Close();
}

// Read some text
if (wxTheClipboard->Open())
{
    if (wxTheClipboard->IsSupported( wxDF_TEXT ))
    {
        wxTextDataObject data;
        wxTheClipboard->GetData( data );
        wxMessageBox( data.GetText() );
    }
    wxTheClipboard->Close();
}
```

Derived from

wxObject (p. 954)

Include files

<wx/clipbrd.h>

See also

Drag and drop overview (p. 1673), *wxDataObject* (p. 223)

wxClipboard::wxClipboard

wxClipboard()

Constructor.

wxClipboard::~~wxClipboard

~wxClipboard()

Destructor.

wxClipboard::AddData

bool AddData(wxDataObject* data)

Call this function to add the data object to the clipboard. You may call this function repeatedly after having cleared the clipboard using *wxClipboard::Clear* (p. 138).

After this function has been called, the clipboard owns the data, so do not delete the data explicitly.

[See also](#)

wxClipboard::SetData (p. 139)

wxClipboard::Clear

void Clear()

Clears the global clipboard object and the system's clipboard if possible.

wxClipboard::Close

void Close()

Call this function to close the clipboard, having opened it with *wxClipboard::Open* (p. 139).

wxClipboard::Flush

bool Flush()

Flushes the clipboard: this means that the data which is currently on clipboard will stay available even after the application exits (possibly eating memory), otherwise the clipboard will be emptied on exit. Returns false if the operation is unsuccessful for any reason.

wxClipboard::GetData

bool GetData(wxDataObject& data)

Call this function to fill *data* with data on the clipboard, if available in the required format. Returns true on success.

wxClipboard::IsOpened

bool IsOpened() const

Returns true if the clipboard has been opened.

wxClipboard::IsSupported

bool IsSupported(const wxDataFormat& *format*)

Returns true if the format of the given data object is available on the clipboard.

wxClipboard::Open

bool Open()

Call this function to open the clipboard before calling *wxClipboard::SetData* (p. 139) and *wxClipboard::GetData* (p. 138).

Call *wxClipboard::Close* (p. 138) when you have finished with the clipboard. You should keep the clipboard open for only a very short time.

Returns true on success. This should be tested (as in the sample shown above).

wxClipboard::SetData

bool SetData(wxDataObject* *data*)

Call this function to set the data object to the clipboard. This function will clear all previous contents in the clipboard, so calling it several times does not make any sense.

After this function has been called, the clipboard owns the data, so do not delete the data explicitly.

See also

wxClipboard::AddData (p. 138)

wxClipboard::UsePrimarySelection

void UsePrimarySelection(bool *primary* = true)

On platforms supporting it (currently only GTK), selects the so called PRIMARY SELECTION as the clipboard as opposed to the normal clipboard, if *primary* is true.

wxCloseEvent

This event class contains information about window and session close events.

The handler function for EVT_CLOSE is called when the user has tried to close a a frame or dialog box using the window manager (X) or system menu (Windows). It can

also be invoked by the application itself programmatically, for example by calling the `wxWindow::Close` (p. 1395) function.

You should check whether the application is forcing the deletion of the window using `wxCloseEvent::CanVeto` (p. 140). If this is `false`, you *must* destroy the window using `wxWindow::Destroy` (p. 1397). If the return value is true, it is up to you whether you respond by destroying the window.

If you don't destroy the window, you should call `wxCloseEvent::Veto` (p. 141) to let the calling code know that you did not destroy the window. This allows the `wxWindow::Close` (p. 1395) function to return `true` or `false` depending on whether the close instruction was honoured or not.

Derived from

`wxEvent` (p. 441)

Include files

`<wx/event.h>`

Event table macros

To process a close event, use these event handler macros to direct input to member functions that take a `wxCloseEvent` argument.

EVT_CLOSE(func)	Process a close event, supplying the member function. This event applies to <code>wxFrame</code> and <code>wxDIALOG</code> classes.
EVT_QUERY_END_SESSION(func)	Process a query end session event, supplying the member function. This event applies to <code>wxApp</code> only.
EVT_END_SESSION(func)	Process an end session event, supplying the member function. This event applies to <code>wxApp</code> only.

See also

`wxWindow::Close` (p. 1395), `wxApp::OnQueryEndSession` (p. 37), *Window deletion overview* (p. 1619)

wxCloseEvent::wxCloseEvent

wxCloseEvent(WXTYPE *commandEventType* = 0, int *id* = 0)

Constructor.

wxCloseEvent::CanVeto

bool CanVeto()

Returns true if you can veto a system shutdown or a window close event. Vetoing a window close event is not possible if the calling code wishes to force the application to exit, and so this function must be called to check this.

wxCloseEvent::GetLoggingOff

bool GetLoggingOff() const

Returns true if the user is logging off.

wxCloseEvent::GetSessionEnding

bool GetSessionEnding() const

Returns true if the session is ending.

wxCloseEvent::GetForce

bool GetForce() const

Returns true if the application wishes to force the window to close. This will shortly be obsolete, replaced by CanVeto.

wxCloseEvent::SetCanVeto

void SetCanVeto(bool *canVeto*)

Sets the 'can veto' flag.

wxCloseEvent::SetForce

void SetForce(bool *force*) const

Sets the 'force' flag.

wxCloseEvent::SetLoggingOff

void SetLoggingOff(bool *loggingOff*) const

Sets the 'logging off' flag.

wxCloseEvent::Veto

void Veto(bool veto = true)

Call this from your event handler to veto a system shutdown or to signal to the calling application that a window close did not happen.

You can only veto a shutdown if `wxCloseEvent::CanVeto` (p. 140) returns true.

wxCmdLineParser

`wxCmdLineParser` is a class for parsing command line.

It has the following features:

1. distinguishes options, switches and parameters; allows option grouping
2. allows both short and long options
3. automatically generates the usage message from the command line description
4. does type checks on the options values (number, date, ...).

To use it you should follow these steps:

1. *construct* (p. 144) an object of this class giving it the command line to parse and optionally its description or use `AddXXX()` functions later
2. call `Parse()`
3. use `Found()` to retrieve the results

In the documentation below the following terminology is used:

switch	This is a boolean option which can be given or not, but which doesn't have any value. We use the word switch to distinguish such boolean options from more generic options like those described below. For example, <code>-v</code> might be a switch meaning "enable verbose mode".
--------	--

option	Option for us here is something which comes with a value 0 unlike a switch. For example, <code>-o:filename</code> might be an option which allows to specify the name of the output file.
--------	---

parameter	This is a required program argument.
-----------	--------------------------------------

Derived from

No base class

Include files

<wx/cmdline.h>

Constants

The structure `wxCmdLineEntryDesc` is used to describe the one command line switch, option or parameter. An array of such structures should be passed to `SetDesc()` (p. 148). Also, the meanings of parameters of the `AddXXX()` functions are the same as of the corresponding fields in this structure:

```
struct wxCmdLineEntryDesc
{
    wxCmdLineEntryType kind;
    const wxChar *shortName;
    const wxChar *longName;
    const wxChar *description;
    wxCmdLineParamType type;
    int flags;
};
```

The type of a command line entity is in the `kind` field and may be one of the following constants:

```
enum wxCmdLineEntryType
{
    wxCMD_LINE_SWITCH,
    wxCMD_LINE_OPTION,
    wxCMD_LINE_PARAM,
    wxCMD_LINE_NONE           // use this to terminate the list
}
```

The field `shortName` is the usual, short, name of the switch or the option. `longName` is the corresponding long name or `NULL` if the option has no long name. Both of these fields are unused for the parameters. Both the short and long option names can contain only letters, digits and the underscores.

`description` is used by the `Usage()` (p. 149) method to construct a help message explaining the syntax of the program.

The possible values of `type` which specifies the type of the value accepted by an option or parameter are:

```
enum wxCmdLineParamType
{
    wxCMD_LINE_VAL_STRING,    // default
    wxCMD_LINE_VAL_NUMBER,
    wxCMD_LINE_VAL_DATE,
    wxCMD_LINE_VAL_NONE
}
```

Finally, the `flags` field is a combination of the following bit masks:

```
enum
{
    wxCMD_LINE_OPTION_MANDATORY = 0x01, // this option must be given
    wxCMD_LINE_PARAM_OPTIONAL   = 0x02, // the parameter may be omitted
    wxCMD_LINE_PARAM_MULTIPLE   = 0x04, // the parameter may be repeated
    wxCMD_LINE_OPTION_HELP      = 0x08, // this option is a help request
    wxCMD_LINE_NEEDS_SEPARATOR = 0x10, // must have sep before the value
}
```

Notice that by default (i.e. if flags are just 0), options are optional (sic) and each call to *AddParam()* (p. 149) allows one more parameter - this may be changed by giving non-default flags to it, i.e. use `wxCMD_LINE_OPTION_MANDATORY` to require that the option is given and `wxCMD_LINE_PARAM_OPTIONAL` to make a parameter optional. Also, `wxCMD_LINE_PARAM_MULTIPLE` may be specified if the program accepts a variable number of parameters - but it only can be given for the last parameter in the command line description. If you use this flag, you will probably need to use *GetParamCount* (p. 150) to retrieve the number of parameters effectively specified after calling *Parse* (p. 149).

The last flag `wxCMD_LINE_NEEDS_SEPARATOR` can be specified to require a separator (either a colon, an equal sign or white space) between the option name and its value. By default, no separator is required.

See also

wxApp::argc (p. 31) and *wxApp::argv* (p. 32)
console sample

Construction

Before *Parse* (p. 149) can be called, the command line parser object must have the command line to parse and also the rules saying which switches, options and parameters are valid - this is called command line description in what follows.

You have complete freedom of choice as to when specify the required information, the only restriction is that it must be done before calling *Parse* (p. 149).

To specify the command line to parse you may use either one of constructors accepting it (*wxCmdLineParser(argc, argv)* (p. 145) or *wxCmdLineParser* (p. 146) usually) or, if you use *the default constructor* (p. 145), you can do it later by calling *SetCmdLine* (p. 146).

The same holds for command line description: it can be specified either in the constructor (*without command line* (p. 146) or *together with it* (p. 146)) or constructed later using either *SetDesc* (p. 148) or combination of *AddSwitch* (p. 148), *AddOption* (p. 149) and *AddParam* (p. 149) methods.

Using constructors or *SetDesc* (p. 148) uses a (usually `const static`) table containing the command line description. If you want to decide which options to accept during the run-time, using one of the *AddXXX()* functions above might be preferable.

Customization

wxCmdLineParser has several global options which may be changed by the application. All of the functions described in this section should be called before *Parse* (p. 149).

First global option is the support for long (also known as GNU-style) options. The long options are the ones which start with two dashes (" -- ") and look like this: `--verbose`, i.e. they generally are complete words and not some abbreviations of them. As long options are used by more and more applications, they are enabled by default, but may be disabled with *DisableLongOptions* (p. 147).

Another global option is the set of characters which may be used to start an option (otherwise, the word on the command line is assumed to be a parameter). Under Unix, '-' is always used, but Windows has at least two common choices for this: '-' and '/'. Some programs also use '+'. The default is to use what suits most the current platform, but may be changed with *SetSwitchChars* (p. 147) method.

Finally, *SetLogo* (p. 148) can be used to show some application-specific text before the explanation given by *Usage* (p. 149) function.

Parsing command line

After the command line description was constructed and the desired options were set, you can finally call *Parse* (p. 149) method. It returns 0 if the command line was correct and was parsed, -1 if the help option was specified (this is a separate case as, normally, the program will terminate after this) or a positive number if there was an error during the command line parsing.

In the latter case, the appropriate error message and usage information are logged by *wxCmdLineParser* itself using the standard *wxWidgets* logging functions.

Getting results

After calling *Parse* (p. 149) (and if it returned 0), you may access the results of parsing using one of overloaded *Found()* methods.

For a simple switch, you will simply call *Found* (p. 149) to determine if the switch was given or not, for an option or a parameter, you will call a version of *Found()* which also returns the associated value in the provided variable. All *Found()* functions return true if the switch or option were found in the command line or false if they were not specified.

wxCmdLineParser::wxCmdLineParser

wxCmdLineParser()

Default constructor. You must use *SetCmdLine* (p. 146) later.

wxCmdLineParser::wxCmdLineParser

wxCmdLineParser(int argc, char argv)**

Constructor specifies the command line to parse. This is the traditional (Unix) command line format. The parameters *argc* and *argv* have the same meaning as for `main()` function.

wxCmdLineParser::wxCmdLineParser

wxCmdLineParser(const wxString& cmdline)

Constructor specifies the command line to parse in Windows format. The parameter *cmdline* has the same meaning as the corresponding parameter of `WinMain()`.

wxCmdLineParser::wxCmdLineParser

wxCmdLineParser(const wxCmdLineEntryDesc* desc)

Same as *wxCmdLineParser* (p. 145), but also specifies the *command line description* (p. 148).

wxCmdLineParser::wxCmdLineParser

wxCmdLineParser(const wxCmdLineEntryDesc* desc, int argc, char argv)**

Same as *wxCmdLineParser* (p. 145), but also specifies the *command line description* (p. 148).

wxCmdLineParser::wxCmdLineParser

wxCmdLineParser(const wxCmdLineEntryDesc* desc, const wxString& cmdline)

Same as *wxCmdLineParser* (p. 146), but also specifies the *command line description* (p. 148).

wxCmdLineParser::ConvertStringToArgs

static wxArrayString ConvertStringToArgs(const wxChar *cmdline)

Breaks down the string containing the full command line in words. The words are separated by whitespace. The quotes can be used in the input string to quote the white space and the back slashes can be used to quote the quotes.

wxCmdLineParser::SetCmdLine

void SetCmdLine(int argc, char argv)**

Set command line to parse after using one of the constructors which don't do it.

See also

wxCmdLineParser (p. 145)

wxCmdLineParser::SetCmdLine

void SetCmdLine(const wxString& *cmdline*)

Set command line to parse after using one of the constructors which don't do it.

See also

wxCmdLineParser (p. 146)

wxCmdLineParser::~~wxCmdLineParser

~wxCmdLineParser()

Frees resources allocated by the object.

NB: destructor is not virtual, don't use this class polymorphically.

wxCmdLineParser::SetSwitchChars

void SetSwitchChars(const wxString& *switchChars*)

switchChars contains all characters with which an option or switch may start. Default is " - " for Unix, " - / " for Windows.

wxCmdLineParser::EnableLongOptions

void EnableLongOptions(bool *enable* = true)

Enable or disable support for the long options.

As long options are not (yet) POSIX-compliant, this option allows to disable them.

See also

Customization (p. 144) and *AreLongOptionsEnabled* (p. 148)

wxCmdLineParser::DisableLongOptions

void DisableLongOptions()

Identical to *EnableLongOptions(false)* (p. 147).

wxCmdLineParser::AreLongOptionsEnabled

bool AreLongOptionsEnabled()

Returns true if long options are enabled, otherwise false.

[See also](#)

EnableLongOptions (p. 147)

wxCmdLineParser::SetLogo

void SetLogo(const wxString& logo)

logo is some extra text which will be shown by *Usage* (p. 149) method.

wxCmdLineParser::SetDesc

void SetDesc(const wxCmdLineEntryDesc* desc)

Construct the command line description

Take the command line description from the wxCMD_LINE_NONE terminated table.

Example of usage:

```
static const wxCmdLineEntryDesc cmdLineDesc[] =
{
    { wxCMD_LINE_SWITCH, "v", "verbose", "be verbose" },
    { wxCMD_LINE_SWITCH, "q", "quiet", "be quiet" },

    { wxCMD_LINE_OPTION, "o", "output", "output file" },
    { wxCMD_LINE_OPTION, "i", "input", "input dir" },
    { wxCMD_LINE_OPTION, "s", "size", "output block size",
wxCMD_LINE_VAL_NUMBER },
    { wxCMD_LINE_OPTION, "d", "date", "output file date",
wxCMD_LINE_VAL_DATE },

    { wxCMD_LINE_PARAM, NULL, NULL, "input file", wxCMD_LINE_VAL_STRING,
wxCMD_LINE_PARAM_MULTIPLE },

    { wxCMD_LINE_NONE }
};

wxCmdLineParser parser;
parser.SetDesc(cmdLineDesc);
```

wxCmdLineParser::AddSwitch

**void AddSwitch(const wxString& name, const wxString& lng = wxEmptyString,
const wxString& desc = wxEmptyString, int flags = 0)**

Add a switch *name* with an optional long name *lng* (no long name if it is empty, which is default), description *desc* and flags *flags* to the command line description.

wxCmdLineParser::AddOption

```
void AddOption(const wxString& name, const wxString& lng = wxEmptyString,  
const wxString& desc = wxEmptyString, wxCmdLineParamType type =  
wxCMD_LINE_VAL_STRING, int flags = 0)
```

Add an option *name* with an optional long name *lng* (no long name if it is empty, which is default) taking a value of the given type (string by default) to the command line description.

wxCmdLineParser::AddParam

```
void AddParam(const wxString& desc = wxEmptyString, wxCmdLineParamType  
type = wxCMD_LINE_VAL_STRING, int flags = 0)
```

Add a parameter of the given *type* to the command line description.

wxCmdLineParser::Parse

```
int Parse(bool giveUsage = true)
```

Parse the command line, return 0 if ok, -1 if "-h" or "--help" option was encountered and the help message was given or a positive value if a syntax error occurred.

Parameters

giveUsage

If `true` (default), the usage message is given if a syntax error was encountered while parsing the command line or if help was requested. If `false`, only error messages about possible syntax errors are given, use *Usage* (p. 149) to show the usage message from the caller if needed.

wxCmdLineParser::Usage

```
void Usage()
```

Give the standard usage message describing all program options. It will use the options and parameters descriptions specified earlier, so the resulting message will not be helpful to the user unless the descriptions were indeed specified.

See also

SetLogo (p. 148)

wxCmdLineParser::Found

```
bool Found(const wxString& name) const
```

Returns true if the given switch was found, false otherwise.

wxCmdLineParser::Found

bool Found(const wxString& name, wxString* value) const

Returns true if an option taking a string value was found and stores the value in the provided pointer (which should not be NULL).

wxCmdLineParser::Found

bool Found(const wxString& name, long* value) const

Returns true if an option taking an integer value was found and stores the value in the provided pointer (which should not be NULL).

wxCmdLineParser::Found

bool Found(const wxString& name, wxDateTime* value) const

Returns true if an option taking a date value was found and stores the value in the provided pointer (which should not be NULL).

wxCmdLineParser::GetParamCount

size_t GetParamCount() const

Returns the number of parameters found. This function makes sense mostly if you had used `wxCMD_LINE_PARAM_MULTIPLE` flag.

wxCmdLineParser::GetParam

wxString GetParam(size_t n = 0u) const

Returns the value of Nth parameter (as string only for now).

[See also](#)

GetParamCount (p. 150)

wxColour

A colour is an object representing a combination of Red, Green, and Blue (RGB) intensity values, and is used to determine drawing colours. See the entry for *wxColourDatabase* (p. 155) for how a pointer to a predefined, named colour may be

returned instead of creating a new colour.

Valid RGB values are in the range 0 to 255.

You can retrieve the current system colour settings with *wxSystemSettings* (p. 1231).

Derived from

wxObject (p. 954)

Include files

<wx/colour.h>

Predefined objects

Objects:

wxNullColour

Pointers:

wxBLACK

wxWHITE

wxRED

wxBLUE

wxGREEN

wxCYAN

wxLIGHT_GREY

See also

wxColourDatabase (p. 155), *wxPen* (p. 976), *wxBrush* (p. 91), *wxColourDialog* (p. 157), *wxSystemSettings* (p. 1231)

wxColour::wxColour

wxColour()

Default constructor.

wxColour(const unsigned char *red*, const unsigned char *green*, const unsigned char *blue*)

Constructs a colour from red, green and blue values.

wxColour(const wxString& *colourName*)

Constructs a colour object using a colour name listed in **wxTheColourDatabase**.

wxColour(const wxColour& *colour*)

Copy constructor.

Parameters

red

The red value.

green

The green value.

blue

The blue value.

colourName

The colour name.

colour

The colour to copy.

See also

wxColourDatabase (p. 155)

wxPython note: Constructors supported by wxPython are:

wxColour(red=0, green=0, blue=0)

wxNamedColour(name)

wxColour::Blue

unsigned char Blue() const

Returns the blue intensity.

wxColour::GetPixel

long GetPixel() const

Returns a pixel value which is platform-dependent. On Windows, a COLORREF is returned. On X, an allocated pixel value is returned.

-1 is returned if the pixel is invalid (on X, unallocated).

wxColour::Green

unsigned char Green() const

Returns the green intensity.

wxColour::Ok

bool Ok() const

Returns `true` if the colour object is valid (the colour has been initialised with RGB values).

wxColour::Red

unsigned char Red() const

Returns the red intensity.

wxColour::Set

void Set(const unsigned char *red*, const unsigned char *green*, const unsigned char *blue*)

Sets the RGB intensity values.

wxColour::operator =

wxColour& operator =(const wxColour& *colour*)

Assignment operator, taking another colour object.

wxColour& operator =(const wxString& *colourName*)

Assignment operator, using a colour name to be found in the colour database.

[See also](#)

wxColourDatabase (p. 155)

wxColour::operator ==

bool operator ==(const wxColour& *colour*)

Tests the equality of two colours by comparing individual red, green blue colours.

wxColour::operator !=

bool operator !=(const wxColour& colour)

Tests the inequality of two colours by comparing individual red, green blue colours.

wxColourData

This class holds a variety of information related to colour dialogs.

Derived from

wxObject (p. 954)

Include files

<wx/cmndata.h>

See also

wxColour (p. 150), *wxColourDialog* (p. 157), *wxColourDialog overview* (p. 1655)

wxColourData::wxColourData

wxColourData()

Constructor. Initializes the custom colours to white, the *data colour* setting to black, and the *choose full* setting to true.

wxColourData::~~wxColourData

~wxColourData()

Destructor.

wxColourData::GetChooseFull

bool GetChooseFull() const

Under Windows, determines whether the Windows colour dialog will display the full dialog with custom colour selection controls. Has no meaning under other platforms.

The default value is true.

wxColourData::GetColour

wxColour& GetColour() const

Gets the current colour associated with the colour dialog.

The default colour is black.

wxColourData::GetCustomColour

wxColour& GetCustomColour(int *i*) const

Gets the *i*th custom colour associated with the colour dialog. *i* should be an integer between 0 and 15.

The default custom colours are all white.

wxColourData::SetChooseFull

void SetChooseFull(const bool *flag*)

Under Windows, tells the Windows colour dialog to display the full dialog with custom colour selection controls. Under other platforms, has no effect.

The default value is true.

wxColourData::SetColour

void SetColour(const wxColour& *colour*)

Sets the default colour for the colour dialog.

The default colour is black.

wxColourData::SetCustomColour

void SetCustomColour(int *i*, const wxColour& *colour*)

Sets the *i*th custom colour for the colour dialog. *i* should be an integer between 0 and 15.

The default custom colours are all white.

wxColourData::operator =

void operator =(const wxColourData& *data*)

Assignment operator for the colour data.

wxColourDatabase

wxWidgets maintains a database of standard RGB colours for a predefined set of named colours (such as "BLACK", "LIGHT GREY"). The application may add to this set if desired by using *AddColour* (p. 156) and may use it to look up colours by names using *Find* (p. 157) or find the names for the standard colour using *FindName* (p. 157).

There is one predefined instance of this class called **wxTheColourDatabase**.

Derived from

None

Include files

<wx/gdicmn.h>

Remarks

The standard database contains at least the following colours:

AQUAMARINE, BLACK, BLUE, BLUE VIOLET, BROWN, CADET BLUE, CORAL, CORNFLOWER BLUE, CYAN, DARK GREY, DARK GREEN, DARK OLIVE GREEN, DARK ORCHID, DARK SLATE BLUE, DARK SLATE GREY, DARK TURQUOISE, DIM GREY, FIREBRICK, FOREST GREEN, GOLD, GOLDENROD, GREY, GREEN, GREEN YELLOW, INDIAN RED, KHAKI, LIGHT BLUE, LIGHT GREY, LIGHT STEEL BLUE, LIME GREEN, MAGENTA, MAROON, MEDIUM AQUAMARINE, MEDIUM BLUE, MEDIUM FOREST GREEN, MEDIUM GOLDENROD, MEDIUM ORCHID, MEDIUM SEA GREEN, MEDIUM SLATE BLUE, MEDIUM SPRING GREEN, MEDIUM TURQUOISE, MEDIUM VIOLET RED, MIDNIGHT BLUE, NAVY, ORANGE, ORANGE RED, ORCHID, PALE GREEN, PINK, PLUM, PURPLE, RED, SALMON, SEA GREEN, SIENNA, SKY BLUE, SLATE BLUE, SPRING GREEN, STEEL BLUE, TAN, THISTLE, TURQUOISE, VIOLET, VIOLET RED, WHEAT, WHITE, YELLOW, YELLOW GREEN.

See also

wxColour (p. 150)

wxColourDatabase::wxColourDatabase

wxColourDatabase()

Constructs the colour database. It will be initialized at the first use.

wxColourDatabase::AddColour

void AddColour(const wxString& colourName, const wxColour& colour)

void AddColour(const wxString& colourName, wxColour* colour)

Adds a colour to the database. If a colour with the same name already exists, it is replaced.

Please note that the overload taking a pointer is deprecated and will be removed in the next wxWidgets version, please don't use it.

wxColourDatabase::Find

wxColour FindColour(const wxString& colourName)

Finds a colour given the name. Returns an invalid colour object (that is, such that its *Ok()* (p. 153) method returns *false*) if the colour wasn't found in the database.

wxColourDatabase::FindColour

wxColour* FindColour(const wxString& colourName)

Finds a colour given the name. Returns *NULL* if not found or a pointer which must be deleted by the caller otherwise.

Please note that this method is deprecated and will be removed in the next wxWidgets version, please use *Find* (p. 157) instead of it.

wxColourDatabase::FindName

wxString FindName(const wxColour& colour) const

Finds a colour name given the colour. Returns an empty string if the colour is not found in the database.

wxColourDialog

This class represents the colour chooser dialog.

Derived from

wxDialog (p. 369)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/colordlg.h>

See also

wxColourDialog Overview (p. 1655),
wxColour (p. 150),
wxColourData (p. 154),
wxGetColourFromUser (p. 1497)

wxColourDialog::wxColourDialog

wxColourDialog(wxWindow* parent, wxColourData* data = NULL)

Constructor. Pass a parent window, and optionally a pointer to a block of colour data, which will be copied to the colour dialog's colour data.

[See also](#)

wxColourData (p. 154)

wxColourDialog::~~wxColourDialog

~wxColourDialog()

Destructor.

wxColourDialog::Create

bool Create(wxWindow* parent, wxColourData* data = NULL)

Same as *constructor* (p. 158).

wxColourDialog::GetColourData

wxColourData& GetColourData()

Returns the *colour data* (p. 154) associated with the colour dialog.

wxColourDialog::ShowModal

int ShowModal()

Shows the dialog, returning `wxID_OK` if the user pressed OK, and `wxOK_CANCEL` otherwise.

wxComboBox

A combobox is like a combination of an edit control and a listbox. It can be displayed as static list with editable or read-only text field; or a drop-down list with text field; or a drop-down list without a text field.

A combobox permits a single selection only. Combobox items are numbered from zero.

Derived from

wxControlWithItems (p. 200)

wxControl (p. 199)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/combobox.h>

Window styles**wxCB_SIMPLE**

Creates a combobox with a permanently displayed list. Windows only.

wxCB_DROPDOWN

Creates a combobox with a drop-down list.

wxCB_READONLY

Same as **wxCB_DROPDOWN** but only the strings specified as the combobox choices can be selected, it is impossible to select (even from a program) a string which is not in the choices list.

wxCB_SORT

Sorts the entries in the list alphabetically.

See also *window styles overview* (p. 1618).

Event handling**EVT_COMBOBOX(id, func)**

Process a `wxEVT_COMMAND_COMBOBOX_SELECTED` event, when an item on the list is selected.

EVT_TEXT(id, func)

Process a `wxEVT_COMMAND_TEXT_UPDATED` event, when the combobox text changes.

See also

wxListBox (p. 794), *wxTextCtrl* (p. 1250), *wxChoice* (p. 127), *wxCommandEvent* (p. 165)

wxComboBox::wxComboBox

wxComboBox()

Default constructor.

wxComboBox(wxWindow* parent, wxWindowID id, const wxString& value = "", const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, int n,

```
const wxString choices[], long style = 0, const wxValidator& validator =  
wxDefaultValidator, const wxString& name = "comboBox")
```

```
wxComboBox(wxWindow* parent, wxWindowID id, const wxString& value, const  
wxPoint& pos, const wxSize& size, const wxArrayString& choices, long style = 0,  
const wxValidator& validator = wxDefaultValidator, const wxString& name =  
"comboBox")
```

Constructor, creating and showing a combobox.

Parameters

parent

Parent window. Must not be NULL.

id

Window identifier. A value of -1 indicates a default value.

value

Initial selection string. An empty string indicates no selection.

pos

Window position.

size

Window size. If the default size (-1, -1) is specified then the window is sized appropriately.

n

Number of strings with which to initialise the control.

choices

An array of strings with which to initialise the control.

style

Window style. See *wxComboBox* (p. 158).

validator

Window validator.

name

Window name.

See also

wxComboBox::Create (p. 161), *wxValidator* (p. 1360)

wxPython note: The `wxComboBox` constructor in `wxPython` reduces the `nand` `choices` arguments to a single argument, which is a list of strings.

wxPerl note: In `wxPerl` there is just an array reference in place of `nand` `choices`.

wxComboBox::~~wxComboBox

~wxComboBox()

Destructor, destroying the combobox.

wxComboBox::Create

bool Create(wxWindow* parent, wxWindowID id, const wxString& value = "", const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, int n, const wxString choices[], long style = 0, const wxValidator& validator = wxDefaultValidator, const wxString& name = "comboBox")

bool Create(wxWindow* parent, wxWindowID id, const wxString& value, const wxPoint& pos, const wxSize& size, const wxArrayString& choices, long style = 0, const wxValidator& validator = wxDefaultValidator, const wxString& name = "comboBox")

Creates the combobox for two-step construction. Derived classes should call or replace this function. See `wxComboBox::wxComboBox` (p. 159) for further details.

wxComboBox::Copy

void Copy()

Copies the selected text to the clipboard.

wxComboBox::Cut

void Cut()

Copies the selected text to the clipboard and removes the selection.

wxComboBox::GetInsertionPoint

long GetInsertionPoint() const

Returns the insertion point for the combobox's text field.

wxComboBox::GetLastPosition

long GetLastPosition() const

Returns the last position in the combobox text field.

wxComboBox::GetValue

wxString GetValue() const

Returns the current value in the combobox text field.

wxComboBox::Paste

void Paste()

Pastes text from the clipboard to the text field.

wxComboBox::Replace

void Replace(long from, long to, const wxString& text)

Replaces the text between two positions with the given text, in the combobox text field.

Parameters

from

The first position.

to

The second position.

text

The text to insert.

wxComboBox::Remove

void Remove(long from, long to)

Removes the text between the two positions in the combobox text field.

Parameters

from

The first position.

to

The last position.

wxComboBox::SetInsertionPoint

void SetInsertionPoint(long pos)

Sets the insertion point in the combobox text field.

Parameters

pos

The new insertion point.

wxComboBox::SetInsertionPointEnd

void SetInsertionPointEnd()

Sets the insertion point at the end of the combobox text field.

wxComboBox::SetSelection

void SetSelection(long from, long to)

Selects the text between the two positions, in the combobox text field.

Parameters

from

The first position.

to

The second position.

wxPython note: This method is called `SetMark` in wxPython, `SetSelectionname` is kept for `wxControlWithItems::SetSelection` (p. 206).

wxComboBox::SetValue

void SetValue(const wxString& text)

Sets the text for the combobox text field.

NB: For a combobox with `wxCB_READONLY` style the string must be in the combobox choices list, otherwise the call to `SetValue()` is ignored.

Parameters

text

The text to set.

wxCommand

`wxCommand` is a base class for modelling an application command, which is an action usually performed by selecting a menu item, pressing a toolbar button or any other means provided by the application to change the data or view.

Derived from

`wxObject` (p. 954)

Include files

`<wx/cmdproc.h>`

See also

Overview (p. 1662)

wxCommand::wxCommand

wxCommand(*bool canUndo = false*, **const wxString& name = NULL**)

Constructor. `wxCommand` is an abstract class, so you will need to derive a new class and call this constructor from your own constructor.

canUndo tells the command processor whether this command is undo-able. You can achieve the same functionality by overriding the `CanUndo` member function (if for example the criteria for undoability is context-dependent).

name must be supplied for the command processor to display the command name in the application's edit menu.

wxCommand::~~wxCommand

~wxCommand()

Destructor.

wxCommand::CanUndo

bool CanUndo()

Returns true if the command can be undone, false otherwise.

wxCommand::Do

bool Do()

Override this member function to execute the appropriate action when called. Return true to indicate that the action has taken place, false otherwise. Returning false will indicate to the command processor that the action is not undoable and should not be added to the command history.

wxCommand::GetName

wxString GetName()

Returns the command name.

wxCommand::Undo

bool Undo()

Override this member function to un-execute a previous Do. Return true to indicate that the action has taken place, false otherwise. Returning false will indicate to the command processor that the action is not redoable and no change should be made to the command history.

How you implement this command is totally application dependent, but typical strategies include:

- Perform an inverse operation on the last modified piece of data in the document. When redone, a copy of data stored in command is pasted back or some operation reapplied. This relies on the fact that you know the ordering of Undos; the user can never Undo at an arbitrary position in the command history.
- Restore the entire document state (perhaps using document transactioning). Potentially very inefficient, but possibly easier to code if the user interface and data are complex, and an 'inverse execute' operation is hard to write.

The docview sample uses the first method, to remove or restore segments in the drawing.

wxCommandEvent

This event class contains information about command events, which originate from a variety of simple controls. More complex controls, such as *wxTreeCtrl* (p. 1329), have separate command event classes.

Derived from

wxEvent (p. 441)

Include files

<wx/event.h>

Event table macros

To process a menu command event, use these event handler macros to direct input to member functions that take a `wxCommandEvent` argument.

EVT_COMMAND(id, event, func)	Process a command, supplying the window identifier, command event identifier, and member function.
EVT_COMMAND_RANGE(id1, id2, event, func)	Process a command for a range of window identifiers, supplying the minimum and maximum window identifiers, command event identifier, and member function.
EVT_BUTTON(id, func)	Process a <code>wxEVT_COMMAND_BUTTON_CLICKED</code> command, which is generated by a <code>wxButton</code> control.
EVT_CHECKBOX(id, func)	Process a <code>wxEVT_COMMAND_CHECKBOX_CLICKED</code> command, which is generated by a <code>wxCheckBox</code> control.
EVT_CHOICE(id, func)	Process a <code>wxEVT_COMMAND_CHOICE_SELECTED</code> command, which is generated by a <code>wxChoice</code> control.
EVT_LISTBOX(id, func)	Process a <code>wxEVT_COMMAND_LISTBOX_SELECTED</code> command, which is generated by a <code>wxListBox</code> control.
EVT_LISTBOX_DCLICK(id, func)	Process a <code>wxEVT_COMMAND_LISTBOX_DOUBLECLICKED</code> command, which is generated by a <code>wxListBox</code> control.
EVT_TEXT(id, func)	Process a <code>wxEVT_COMMAND_TEXT_UPDATED</code> command, which is generated by a <code>wxTextCtrl</code> control.
EVT_TEXT_ENTER(id, func)	Process a <code>wxEVT_COMMAND_TEXT_ENTER</code> command, which is generated by a <code>wxTextCtrl</code> control. Note that you must use <code>wxTE_PROCESS_ENTER</code> flag when creating the control if you want it to generate such

	events.
EVT_TEXT_MAXLEN(id, func)	Process a <code>wxEVT_COMMAND_TEXT_MAXLEN</code> command, which is generated by a <code>wxTextCtrl</code> control when the user tries to enter more characters into it than the limit previously set with <i>SetMaxLength</i> (p. 1265).
EVT_MENU(id, func)	Process a <code>wxEVT_COMMAND_MENU_SELECTED</code> command, which is generated by a menu item.
EVT_MENU_RANGE(id1, id2, func)	Process a <code>wxEVT_COMMAND_MENU_RANGE</code> command, which is generated by a range of menu items.
EVT_CONTEXT_MENU(func)	Process the event generated when the user has requested a popup menu to appear by pressing a special keyboard key (under Windows) or by right clicking the mouse.
EVT_SLIDER(id, func)	Process a <code>wxEVT_COMMAND_SLIDER_UPDATED</code> command, which is generated by a <code>wxSlider</code> control.
EVT_RADIOBOX(id, func)	Process a <code>wxEVT_COMMAND_RADIOBOX_SELECTED</code> command, which is generated by a <code>wxRadioBox</code> control.
EVT_RADIOBUTTON(id, func)	Process a <code>wxEVT_COMMAND_RADIOBUTTON_SELECTED</code> command, which is generated by a <code>wxRadioButton</code> control.
EVT_SCROLLBAR(id, func)	Process a <code>wxEVT_COMMAND_SCROLLBAR_UPDATED</code> command, which is generated by a <code>wxScrollBar</code> control. This is provided for compatibility only; more specific scrollbar event macros should be used instead (see <i>wxScrollEvent</i> (p. 1094)).
EVT_COMBOBOX(id, func)	Process a <code>wxEVT_COMMAND_COMBOBOX_SELECTED</code> command, which is generated by a <code>wxComboBox</code> control.
EVT_TOOL(id, func)	Process a <code>wxEVT_COMMAND_TOOL_CLICKED</code> event (a synonym for

	wxEVT_COMMAND_MENU_SELECTED). Pass the id of the tool.
EVT_TOOL_RANGE(id1, id2, func)	Process a wxEVT_COMMAND_TOOL_CLICKED event for a range of identifiers. Pass the ids of the tools.
EVT_TOOL_RCLICKED(id, func)	Process a wxEVT_COMMAND_TOOL_RCLICKED event. Pass the id of the tool.
EVT_TOOL_RCLICKED_RANGE(id1, id2, func)	Process a wxEVT_COMMAND_TOOL_RCLICKED event for a range of ids. Pass the ids of the tools.
EVT_TOOL_ENTER(id, func)	Process a wxEVT_COMMAND_TOOL_ENTER event. Pass the id of the toolbar itself. The value of wxCommandEvent::GetSelection is the tool id, or -1 if the mouse cursor has moved off a tool.
EVT_COMMAND_LEFT_CLICK(id, func)	Process a wxEVT_COMMAND_LEFT_CLICK command, which is generated by a control (Windows 95 and NT only).
EVT_COMMAND_LEFT_DCLICK(id, func)	Process a wxEVT_COMMAND_LEFT_DCLICK command, which is generated by a control (Windows 95 and NT only).
EVT_COMMAND_RIGHT_CLICK(id, func)	Process a wxEVT_COMMAND_RIGHT_CLICK command, which is generated by a control (Windows 95 and NT only).
EVT_COMMAND_SET_FOCUS(id, func)	Process a wxEVT_COMMAND_SET_FOCUS command, which is generated by a control (Windows 95 and NT only).
EVT_COMMAND_KILL_FOCUS(id, func)	Process a wxEVT_COMMAND_KILL_FOCUS command, which is generated by a control (Windows 95 and NT only).
EVT_COMMAND_ENTER(id, func)	Process a wxEVT_COMMAND_ENTER command, which is generated by a control.

wxCommandEvent::m_clientData

void* m_clientData

Contains a pointer to client data for listboxes and choices, if the event was a selection. Beware, this is not implemented anyway...

wxCommandEvent::m_commandInt

int m_commandInt

Contains an integer identifier corresponding to a listbox, choice or radiobox selection (only if the event was a selection, not a deselection), or a boolean value representing the value of a checkbox.

wxCommandEvent::m_commandString

wxString m_commandString

Contains a string corresponding to a listbox or choice selection.

wxCommandEvent::m_extraLong

long m_extraLong

Extra information. If the event comes from a listbox selection, it is a boolean determining whether the event was a selection (true) or a deselection (false). A listbox deselection only occurs for multiple-selection boxes, and in this case the index and string values are indeterminate and the listbox must be examined by the application.

wxCommandEvent::wxCommandEvent

wxCommandEvent(WXTYPE *commandEventType* = 0, int *id* = 0)

Constructor.

wxCommandEvent::Checked

bool Checked() const

Deprecated, use *IsChecked* (p. 170) instead.

wxCommandEvent::GetClientData

void* GetClientData()

Returns client data pointer for a listbox or choice selection event (not valid for a deselection).

wxCommandEvent::GetClientObject

wxClientData * GetClientObject()

Returns client object pointer for a listbox or choice selection event (not valid for a deselection).

wxCommandEvent::GetExtraLong

long GetExtraLong()

Returns the **m_extraLong** member.

wxCommandEvent::GetInt

int GetInt()

Returns the **m_commandInt** member.

wxCommandEvent::GetSelection

int GetSelection()

Returns item index for a listbox or choice selection event (not valid for a deselection).

wxCommandEvent::GetString

wxString GetString()

Returns item string for a listbox or choice selection event (not valid for a deselection).

wxCommandEvent::IsChecked

bool IsChecked() const

This method can be used with checkbox and menu events: for the checkboxes, the method returns `true` for a selection event and `false` for a deselection one. For the menu events, this method indicates if the menu item just has become checked or unchecked (and thus only makes sense for checkable menu items).

wxCommandEvent::IsSelection

bool IsSelection()

For a listbox or choice event, returns true if it is a selection, false if it is a deselection.

wxCommandEvent::SetClientData

void SetClientData(void* *clientData*)

Sets the client data for this event.

wxCommandEvent::SetClientObject

void SetClientObject(wxClientData* *clientObject*)

Sets the client object for this event. The client object is *not* owned by the event object and the event object will not delete the client object in its destructor. The client object must be owned and deleted by another object (e.g. a control) that has longer life time than the event object.

wxCommandEvent::SetExtraLong

void SetExtraLong(int *extraLong*)

Sets the **m_extraLong** member.

wxCommandEvent::SetInt

void SetInt(int *intCommand*)

Sets the **m_commandInt** member.

wxCommandEvent::SetString

void SetString(const wxString& *string*)

Sets the **m_commandString** member.

wxCommandProcessor

wxCommandProcessor is a class that maintains a history of wxCommands, with undo/redo functionality built-in. Derive a new class from this if you want different behaviour.

Derived from

wxObject (p. 954)

Include files

<wx/cmdproc.h>

See also

wxCommandProcessor overview (p. 1663), *wxCommand* (p. 164)

wxCommandProcessor::wxCommandProcessor

wxCommandProcessor(int *maxCommands* = -1)

Constructor.

maxCommands may be set to a positive integer to limit the number of commands stored to it, otherwise (and by default) the list of commands can grow arbitrarily.

wxCommandProcessor::~~wxCommandProcessor

~wxCommandProcessor()

Destructor.

wxCommandProcessor::CanUndo

virtual bool CanUndo()

Returns true if the currently-active command can be undone, false otherwise.

wxCommandProcessor::ClearCommands

virtual void ClearCommands()

Deletes all the commands in the list and sets the current command pointer to NULL.

wxCommandProcessor::Redo

virtual bool Redo()

Executes (redoes) the current command (the command that has just been undone if any).

wxCommandProcessor::GetCommands

wxList& GetCommands() const

Returns the list of commands.

wxCommandProcessor::GetMaxCommands

int GetMaxCommands() const

Returns the maximum number of commands that the command processor stores.

wxCommandProcessor::GetEditMenu

wxMenu* GetEditMenu() const

Returns the edit menu associated with the command processor.

wxCommandProcessor::GetRedoAccelerator

const wxString& GetRedoAccelerator() const

Returns the string that will be appended to the Redo menu item.

wxCommandProcessor::GetRedoMenuLabel

wxString GetRedoMenuLabel() const

Returns the string that will be shown for the redo menu item.

wxCommandProcessor::GetUndoAccelerator

const wxString& GetUndoAccelerator() const

Returns the string that will be appended to the Undo menu item.

wxCommandProcessor::GetUndoMenuLabel

wxString GetUndoMenuLabel() const

Returns the string that will be shown for the undo menu item.

wxCommandProcessor::Initialize

virtual void Initialize()

Initializes the command processor, setting the current command to the last in the list (if any), and updating the edit menu (if one has been specified).

wxCommandProcessor::SetEditMenu

void SetEditMenu(wxMenu* menu)

Tells the command processor to update the Undo and Redo items on this menu as appropriate. Set this to NULL if the menu is about to be destroyed and command operations may still be performed, or the command processor may try to access an invalid pointer.

wxCommandProcessor::SetMenuStrings

void SetMenuStrings()

Sets the menu labels according to the currently set menu and the current command state.

wxCommandProcessor::SetRedoAccelerator

void SetRedoAccelerator(const wxString&accel)

Sets the string that will be appended to the Redo menu item.

wxCommandProcessor::SetUndoAccelerator

void SetUndoAccelerator(const wxString&accel)

Sets the string that will be appended to the Undo menu item.

wxCommandProcessor::Submit

virtual bool Submit(wxCommand *command, bool storeIt = true)

Submits a new command to the command processor. The command processor calls `wxCommand::Do` to execute the command; if it succeeds, the command is stored in the history list, and the associated edit menu (if any) updated appropriately. If it fails, the command is deleted immediately. Once `Submit` has been called, the passed command should not be deleted directly by the application.

storeIt indicates whether the successful command should be stored in the history list.

wxCommandProcessor::Undo

virtual bool Undo()

Undoes the command just executed.

wxCondition

`wxCondition` variables correspond to `pthread` conditions or to Win32 event objects. They may be used in a multithreaded application to wait until the given condition becomes true which happens when the condition becomes signaled.

For example, if a worker thread is doing some long task and another thread has to wait until it is finished, the latter thread will wait on the condition object and the worker thread will signal it on exit (this example is not perfect because in this particular case it would be much better to just `Wait()` (p. 1293) for the worker thread, but if there are several worker threads it already makes much more sense).

Note that a call to `Signal()` (p. 177) may happen before the other thread calls `Wait()` (p. 177) and, just as with the `pthread` conditions, the signal is then lost and so if you want to be sure that you don't miss it you must keep the mutex associated with the condition initially locked and lock it again before calling `Signal()` (p. 177). Of course, this means that this call is going to block until `Wait()` (p. 177) is called by another thread.

Example

This example shows how a main thread may launch a worker thread which starts running and then waits until the main thread signals it to continue:

```
class MySignallingThread : public wxThread
{
public:
    MySignallingThread(wxMutex *mutex, wxCondition *condition)
    {
        m_mutex = mutex;
        m_condition = condition;

        Create();
    }

    virtual ExitCode Entry()
    {
        ... do our job ...

        // tell the other(s) thread(s) that we're about to terminate: we
must    // lock the mutex first or we might signal the condition before
the      // waiting threads start waiting on it!
        wxMutexLocker lock(m_mutex);
        m_condition.Broadcast(); // same as Signal() here -- one waiter
only

        return 0;
    }

private:
    wxCondition *m_condition;
    wxMutex *m_mutex;
};

int main()
{
    wxMutex mutex;
    wxCondition condition(mutex);

    // the mutex should be initially locked
    mutex.Lock();

    // create and run the thread but notice that it won't be able to
    // exit (and signal its exit) before we unlock the mutex below
    MySignallingThread *thread = new MySignallingThread(&mutex,
```

```
&condition);

    thread->Run();

    // wait for the thread termination: Wait() atomically unlocks the
mutex
    // which allows the thread to continue and starts waiting
    condition.Wait();

    // now we can exit
    return 0;
}
```

Of course, here it would be much better to simply use a joinable thread and call `wxThread::Wait` (p. 1293) on it, but this example does illustrate the importance of properly locking the mutex when using `wxCondition`.

Constants

The following return codes are returned by `wxCondition` member functions:

```
enum wxCondError
{
    wxCOND_NO_ERROR = 0,        // successful completion
    wxCOND_INVALID,            // object hasn't been initialized successfully
    wxCOND_TIMEOUT,            // WaitTimeout() has timed out
    wxCOND_MISC_ERROR          // some other error
};
```

Derived from

None.

Include files

<wx/thread.h>

See also

`wxThread` (p. 1286), `wxMutex` (p. 938)

wxCondition::wxCondition

wxCondition(wxMutex& mutex)

Default and only constructor. The *mutex* must be locked by the caller before calling *Wait* (p. 177) function.

Use *IsOk* (p. 177) to check if the object was successfully initialized.

wxCondition::~~wxCondition

~wxCondition()

Destroys the `wxCondition` object. The destructor is not virtual so this class should not be

used polymorphically.

wxCondition::Broadcast

void Broadcast()

Broadcasts to all waiting threads, waking all of them up. Note that this method may be called whether the mutex associated with this condition is locked or not.

[See also](#)

wxCondition::Signal (p. 177)

wxCondition::IsOk

bool IsOk() const

Returns `true` if the object had been initialized successfully, `false` if an error occurred.

wxCondition::Signal

void Signal()

Signals the object waking up at most one thread. If several threads are waiting on the same condition, the exact thread which is woken up is undefined. If no threads are waiting, the signal is lost and the condition would have to be signalled again to wake up any thread which may start waiting on it later.

Note that this method may be called whether the mutex associated with this condition is locked or not.

[See also](#)

wxCondition::Broadcast (p. 177)

wxCondition::Wait

wxCondError Wait()

Waits until the condition is signalled.

This method atomically releases the lock on the mutex associated with this condition (this is why it must be locked prior to calling `Wait`) and puts the thread to sleep until *Signal* (p. 177) or *Broadcast* (p. 177) is called.

Note that even if *Signal* (p. 177) had been called before `Wait` without waking up any thread, the thread would still wait for another one and so it is important to ensure that the condition will be signalled after `Wait` or the thread may sleep forever.

Return value

Returns `wxCOND_NO_ERROR` on success, another value if an error occurred.

See also

WaitTimeout (p. 178)

wxCondition::WaitTimeout

wxCondError Wait(unsigned long milliseconds)

Waits until the condition is signalled or the timeout has elapsed.

This method is identical to *Wait* (p. 177) except that it returns, with the return code of `wxCOND_TIMEOUT` as soon as the given timeout expires.

Parameters

milliseconds

Timeout in milliseconds

Return value

Returns `wxCOND_NO_ERROR` if the condition was signalled, `wxCOND_TIMEOUT` if the timeout elapsed before this happened or another error code from `wxCondError` enum.

wxConfigBase

`wxConfigBase` class defines the basic interface of all config classes. It can not be used by itself (it is an abstract base class) and you will always use one of its derivations: `wxIniConfig`, `wxFileConfig`, `wxRegConfig` or any other.

However, usually you don't even need to know the precise nature of the class you're working with but you would just use the `wxConfigBase` methods. This allows you to write the same code regardless of whether you're working with the registry under Win32 or text-based config files under Unix (or even Windows 3.1 .INI files if you're really unlucky). To make writing the portable code even easier, `wxWidgets` provides a typedef `wxConfig` which is mapped onto the native `wxConfigBase` implementation on the given platform: i.e. `wxRegConfig` under Win32 (optionally `wxIniConfig`) and `wxFileConfig` otherwise.

See *config overview* (p. 1607) for the descriptions of all features of this class.

It is highly recommended to use static functions *Get()* and/or *Set()*, so please have a *look at them*. (p. 179)

Derived from

No base class

Include files

<wx/config.h> (to let wxWidgets choose a wxConfig class for your platform)

<wx/confbase.h> (base config class)

<wx/fileconf.h> (wxFileConfig class)

<wx/msw/regconf.h> (wxRegConfig class)

<wx/msw/iniconf.h> (wxIniConfig class)

Example

Here is how you would typically use this class:

```
// using wxConfig instead of writing wxFileConfig or wxRegConfig
enhances
// portability of the code
wxConfig *config = new wxConfig("MyAppName");

wxString str;
if ( config->Read("LastPrompt", &str) ) {
    // last prompt was found in the config file/registry and its value is
now
    // in str
    ...
}
else {
    // no last prompt...
}

// another example: using default values and the full path instead of
just
// key name: if the key is not found , the value 17 is returned
long value = config->Read("/LastRun/CalculatedValues/MaxValue", 17);
...
...
...
// at the end of the program we would save everything back
config->Write("LastPrompt", str);
config->Write("/LastRun/CalculatedValues/MaxValue", value);

// the changes will be written back automatically
delete config;
```

This basic example, of course, doesn't show all wxConfig features, such as enumerating, testing for existence and deleting the entries and groups of entries in the config file, its abilities to automatically store the default values or expand the environment variables on the fly. However, the main idea is that using this class is easy and that it should normally do what you expect it to.

NB: in the documentation of this class, the words "config file" also mean "registry hive" for wxRegConfig and, generally speaking, might mean any physical storage where a wxConfigBase-derived class stores its data.

Static functions

These functions deal with the "default" config object. Although its usage is not at all mandatory it may be convenient to use a global config object instead of creating and deleting the local config objects each time you need one (especially because creating a

`wxFileConfig` object might be a time consuming operation). In this case, you may create this global config object in the very start of the program and `Set()` it as the default. Then, from anywhere in your program, you may access it using the `Get()` function. Note that you must delete this object (usually in `wxApp::OnExit` (p. 36)) in order to avoid memory leaks, `wxWidgets` won't do it automatically.

As it happens, you may even further simplify the procedure described above: you may forget about calling `Set()`. When `Get()` is called and there is no current object, it will create one using `Create()` function. To disable this behaviour `DontCreateOnDemand()` is provided.

Note: You should use either `Set()` or `Get()` because `wxWidgets` library itself would take advantage of it and could save various information in it. For example `wxFontMapper` (p. 528) or Unix version of `wxFileDialog` (p. 468) have ability to use `wxConfig` class.

`Set` (p. 191)

`Get` (p. 186)

`Create` (p. 185)

`DontCreateOnDemand` (p. 185)

Constructor and destructor

`wxConfigBase` (p. 184)

`~wxConfigBase` (p. 185)

Path management

As explained in *config overview* (p. 1607), the config classes support a file system-like hierarchy of keys (files) and groups (directories). As in the file system case, to specify a key in the config class you must use a path to it. Config classes also support the notion of the current group, which makes it possible to use the relative paths. To clarify all this, here is an example (it is only for the sake of demonstration, it doesn't do anything sensible!):

```
wxConfig *config = new wxConfig("FooBarApp");

// right now the current path is '/'
conf->Write("RootEntry", 1);

// go to some other place: if the group(s) don't exist, they will be
created
conf->SetPath("/Group/Subgroup");

// create an entry in subgroup
conf->Write("SubgroupEntry", 3);

// '..' is understood
conf->Write("../GroupEntry", 2);
conf->SetPath("../");

wxASSERT( conf->Read("Subgroup/SubgroupEntry", 0l) == 3 );

// use absolute path: it is allowed, too
wxASSERT( conf->Read("/RootEntry", 0l) == 1 );
```

Warning: it is probably a good idea to always restore the path to its old value on function exit:

```
void foo(wxConfigBase *config)
{
    wxString strOldPath = config->GetPath();

    config->SetPath("/Foo/Data");
    ...

    config->SetPath(strOldPath);
}
```

because otherwise the assert in the following example will surely fail (we suppose here that *foo()* function is the same as above except that it doesn't save and restore the path):

```
void bar(wxConfigBase *config)
{
    config->Write("Test", 17);

    foo(config);

    // we're reading "/Foo/Data/Test" here! -1 will probably be
    returned...
    wxASSERT( config->Read("Test", -1) == 17 );
}
```

Finally, the path separator in *wxConfigBase* and derived classes is always '/', regardless of the platform (i.e. it is **not** '\\' under Windows).

SetPath (p. 191)

GetPath (p. 188)

Enumeration

The functions in this section allow to enumerate all entries and groups in the config file. All functions here return false when there are no more items.

You must pass the same index to *GetNext* and *GetFirst* (don't modify it). Please note that it is **not** the index of the current item (you will have some great surprises with *wxRegConfig* if you assume this) and you shouldn't even look at it: it is just a "cookie" which stores the state of the enumeration. It can't be stored inside the class because it would prevent you from running several enumerations simultaneously, that's why you must pass it explicitly.

Having said all this, enumerating the config entries/groups is very simple:

```
wxArrayString aNames;

// enumeration variables
wxString str;
long dummy;

// first enum all entries
bool bCont = config->GetFirstEntry(str, dummy);
while ( bCont ) {
    aNames.Add(str);

    bCont = GetConfig()->GetNextEntry(str, dummy);
}
```

```
... we have all entry names in aNames...

// now all groups...
bCont = GetConfig()->GetFirstGroup(str, dummy);
while ( bCont ) {
    aNames.Add(str);

    bCont = GetConfig()->GetNextGroup(str, dummy);
}

... we have all group (and entry) names in aNames...
```

There are also functions to get the number of entries/subgroups without actually enumerating them, but you will probably never need them.

GetFirstGroup (p. 187)
GetNextGroup (p. 187)
GetFirstEntry (p. 187)
GetNextEntry (p. 188)
GetNumberOfEntries (p. 188)
GetNumberOfGroups (p. 188)

Tests of existence

HasGroup (p. 188)
HasEntry (p. 188)
Exists (p. 186)
GetEntryType (p. 186)

Miscellaneous functions

GetAppName (p. 186)
GetVendorName (p. 188)
SetUmask (p. 191)

Key access

These function are the core of *wxConfigBase* class: they allow you to read and write config file data. All *Read* function take a default value which will be returned if the specified key is not found in the config file.

Currently, only two types of data are supported: string and long (but it might change in the near future). To work with other types: for *int* or *bool* you can work with function taking/returning *long* and just use the casts. Better yet, just use *long* for all variables which you're going to save in the config file: chances are that `sizeof(bool) == sizeof(int) == sizeof(long)` anyhow on your system. For *float*, *double* and, in general, any other type you'd have to translate them to/from string representation and use string functions.

Try not to read long values into string variables and vice versa: although it just might

work with `wxFileConfig`, you will get a system error with `wxRegConfig` because in the Windows registry the different types of entries are indeed used.

Final remark: the `szKey` parameter for all these functions can contain an arbitrary path (either relative or absolute), not just the key name.

Read (p. 189)

Write (p. 192)

Flush (p. 186)

Rename entries/groups

The functions in this section allow to rename entries or subgroups of the current group. They will return false on error. typically because either the entry/group with the original name doesn't exist, because the entry/group with the new name already exists or because the function is not supported in this `wxConfig` implementation.

RenameEntry (p. 190)

RenameGroup (p. 191)

Delete entries/groups

The functions in this section delete entries and/or groups of entries from the config file. *DeleteAll()* is especially useful if you want to erase all traces of your program presence: for example, when you uninstall it.

DeleteEntry (p. 186)

DeleteGroup (p. 186)

DeleteAll (p. 185)

Options

Some aspects of `wxConfigBase` behaviour can be changed during run-time. The first of them is the expansion of environment variables in the string values read from the config file: for example, if you have the following in your config file:

```
# config file for my program
UserData = $HOME/data

# the following syntax is valid only under Windows
UserData = %windir%\\data.dat
```

the call to `config->Read("UserData")` will return something like `"/home/zeitlin/data"` if you're lucky enough to run a Linux system ;-)

Although this feature is very useful, it may be annoying if you read a value which contains '\$' or '%' symbols (% is used for environment variables expansion under Windows) which are not used for environment variable expansion. In this situation you may call `SetExpandEnvVars(false)` just before reading this value and `SetExpandEnvVars(true)` just after. Another solution would be to prefix the offending

symbols with a backslash.

The following functions control this option:

IsExpandingEnvVars (p. 189)

SetExpandEnvVars (p. 191)

SetRecordDefaults (p. 191)

IsRecordingDefaults (p. 189)

wxConfigBase::wxConfigBase

wxConfigBase(const wxString& appName = wxEmptyString, const wxString& vendorName = wxEmptyString, const wxString& localFilename = wxEmptyString, const wxString& globalFilename = wxEmptyString, long style = 0, wxMBConv& conv = wxConvUTF8)

This is the default and only constructor of the wxConfigBase class, and derived classes.

Parameters

appName

The application name. If this is empty, the class will normally use *wxApp::GetAppName* (p. 32) to set it. The application name is used in the registry key on Windows, and can be used to deduce the local filename parameter if that is missing.

vendorName

The vendor name. If this is empty, it is assumed that no vendor name is wanted, if this is optional for the current config class. The vendor name is appended to the application name for wxRegConfig.

localFilename

Some config classes require a local filename. If this is not present, but required, the application name will be used instead.

globalFilename

Some config classes require a global filename. If this is not present, but required, the application name will be used instead.

style

Can be one of wxCONFIG_USE_LOCAL_FILE and wxCONFIG_USE_GLOBAL_FILE. The style interpretation depends on the config class and is ignored by some. For wxFileConfig, these styles determine whether a local or global config file is created or used. If the flag is present but the parameter is empty, the parameter will be set to a default. If the parameter is present but the style flag not, the relevant flag will be added to the style. For wxFileConfig you can

also add `wxCONFIG_USE_RELATIVE_PATH` by logically or'ing it to either of the `_FILE` options to tell `wxFileConfig` to use relative instead of absolute paths. For `wxFileConfig`, you can also add `wxCONFIG_USE_NO_ESCAPE_CHARACTERS` which will turn off character escaping for the values of entries stored in the config file: for example a `foo` key with some backslash characters will be stored as `foo=C:\mydir` instead of the usual storage of `foo=C:\\mydir`.

The `wxCONFIG_USE_NO_ESCAPE_CHARACTERS` style can be helpful if your config file must be read or written to by a non-`wxWidgets` program (which might not understand the escape characters). Note, however, that if `wxCONFIG_USE_NO_ESCAPE_CHARACTERS` style is used, it is now your application's responsibility to ensure that there is no newline or other illegal characters in a value, before writing that value to the file.

conv

This parameter is only used by `wxFileConfig` when compiled in Unicode mode. It specifies the encoding in what the configuration file is written.

Remarks

By default, environment variable expansion is on and recording defaults is off.

wxConfigBase::~wxConfigBase

~wxConfigBase()

Empty but ensures that dtor of all derived classes is virtual.

wxConfigBase::Create

static wxConfigBase * Create()

Create a new config object: this function will create the "best" implementation of `wxConfig` available for the current platform, see comments near the definition of `wxCONFIG_WIN32_NATIVE` for details. It returns the created object and also sets it as the current one.

wxConfigBase::DontCreateOnDemand

void DontCreateOnDemand()

Calling this function will prevent `Get()` from automatically creating a new config object if the current one is `NULL`. It might be useful to call it near the program end to prevent new config object "accidental" creation.

wxConfigBase::DeleteAll

bool DeleteAll()

Delete the whole underlying object (disk file, registry key, ...). Primarily for use by desinstallation routine.

wxConfigBase::DeleteEntry

bool DeleteEntry(const wxString& key, bool bDeleteGroupIfEmpty = true)

Deletes the specified entry and the group it belongs to if it was the last key in it and the second parameter is true.

wxConfigBase::DeleteGroup

bool DeleteGroup(const wxString& key)

Delete the group (with all subgroups)

wxConfigBase::Exists

bool Exists(wxString& strName) const

returns true if either a group or an entry with a given name exists

wxConfigBase::Flush

bool Flush(bool bCurrentOnly = false)

permanently writes all changes (otherwise, they're only written from object's destructor)

wxConfigBase::Get

static wxConfigBase * Get(bool CreateOnDemand = true)

Get the current config object. If there is no current object and *CreateOnDemand* is true, creates one (using *Create*) unless *DontCreateOnDemand* was called previously.

wxConfigBase::GetAppName

wxString GetAppName() const

Returns the application name.

wxConfigBase::GetEntryType

enum wxConfigBase::EntryType GetEntryType(const wxString& name) const

Returns the type of the given entry or *Unknown* if the entry doesn't exist. This function should be used to decide which version of `Read()` should be used because some of `wxConfig` implementations will complain about type mismatch otherwise: e.g., an attempt to read a string value from an integer key with `wxRegConfig` will fail.

The result is an element of enum `EntryType`:

```
enum EntryType
{
    Unknown,
    String,
    Boolean,
    Integer,
    Float
};
```

wxConfigBase::GetFirstGroup

bool GetFirstGroup(wxString& str, long& index) const

Gets the first group.

wxPython note: The `wxPython` version of this method returns a 3-tuple consisting of the continue flag, the value string, and the index for the next call.

wxPerl note: In `wxPerl` this method takes no arguments and returns a 3-element list (`continue, str, index`).

wxConfigBase::GetFirstEntry

bool GetFirstEntry(wxString& str, long& index) const

Gets the first entry.

wxPython note: The `wxPython` version of this method returns a 3-tuple consisting of the continue flag, the value string, and the index for the next call.

wxPerl note: In `wxPerl` this method takes no arguments and returns a 3-element list (`continue, str, index`).

wxConfigBase::GetNextGroup

bool GetNextGroup(wxString& str, long& index) const

Gets the next group.

wxPython note: The `wxPython` version of this method returns a 3-tuple consisting of the continue flag, the value string, and the index for the next call.

wxPerl note: In `wxPerl` this method only takes the `index` parameter and returns a 3-

element list (*continue*, *str*, *index*).

wxConfigBase::GetNextEntry

bool GetNextEntry(wxString& *str*, long& *index*) const

Gets the next entry.

wxPython note: The wxPython version of this method returns a 3-tuple consisting of the *continue* flag, the value string, and the index for the next call.

wxPerl note: In wxPerl this method only takes the *index* parameter and returns a 3-element list (*continue*, *str*, *index*).

wxConfigBase::GetNumberOfEntries

uint GetNumberOfEntries(bool *bRecursive* = false) const

wxConfigBase::GetNumberOfGroups

uint GetNumberOfGroups(bool *bRecursive* = false) const

Get number of entries/subgroups in the current group, with or without its subgroups.

wxConfigBase::GetPath

const wxString& GetPath() const

Retrieve the current path (always as absolute path).

wxConfigBase::GetVendorName

wxString GetVendorName() const

Returns the vendor name.

wxConfigBase::HasEntry

bool HasEntry(wxString& *strName*) const

returns true if the entry by this name exists

wxConfigBase::HasGroup

bool HasGroup(const wxString& *strName*) const

returns true if the group by this name exists

wxConfigBase::IsExpandingEnvVars

bool IsExpandingEnvVars() const

Returns true if we are expanding environment variables in key values.

wxConfigBase::IsRecordingDefaults

bool IsRecordingDefaults() const

Returns true if we are writing defaults back to the config file.

wxConfigBase::Read

bool Read(const wxString& key, wxString* str) const

Read a string from the key, returning true if the value was read. If the key was not found, *str* is not changed.

bool Read(const wxString& key, wxString* str, const wxString& defaultVal) const

Read a string from the key. The default value is returned if the key was not found.

Returns true if value was really read, false if the default was used.

wxString Read(const wxString& key, const wxString& defaultVal) const

Another version of *Read()*, returning the string value directly.

bool Read(const wxString& key, long* l) const

Reads a long value, returning true if the value was found. If the value was not found, *l* is not changed.

bool Read(const wxString& key, long* l, long defaultVal) const

Reads a long value, returning true if the value was found. If the value was not found, *defaultVal* is used instead.

long Read(const wxString& key, long defaultVal) const

Reads a long value from the key and returns it. *defaultVal* is returned if the key is not found.

NB: writing

```
conf->Read("key", 0);
```

won't work because the call is ambiguous: compiler can not choose between two *Read* functions. Instead, write:

```
conf->Read("key", 01);
```

bool Read(const wxString& key, double* d) const

Reads a double value, returning true if the value was found. If the value was not found, *d* is not changed.

bool Read(const wxString& key, double* d, double defaultVal) const

Reads a double value, returning true if the value was found. If the value was not found, *defaultVal* is used instead.

bool Read(const wxString& key, bool* b) const

Reads a bool value, returning true if the value was found. If the value was not found, *b* is not changed.

bool Read(const wxString& key, bool* d, bool defaultVal) const

Reads a bool value, returning true if the value was found. If the value was not found, *defaultVal* is used instead.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

Read(key, default="")	Returns a string.
ReadInt(key, default=0)	Returns an int.
ReadFloat(key, default=0.0)	Returns a floating point number.

wxPerl note: In place of a single overloaded method, wxPerl uses:

Read(key, default="")	Returns a string
ReadInt(key, default=0)	Returns an integer
ReadFloat(key, default=0.0)	Returns a floating point number
ReadBool(key, default=0)	Returns a boolean

wxConfigBase::RenameEntry

bool RenameEntry(const wxString& oldName, const wxString& newName)

Renames an entry in the current group. The entries names (both the old and the new one) shouldn't contain backslashes, i.e. only simple names and not arbitrary paths are

accepted by this function.

Returns false if the *oldName* doesn't exist or if *newName* already exists.

wxConfigBase::RenameGroup

bool RenameGroup(const wxString& oldName, const wxString& newName)

Renames a subgroup of the current group. The subgroup names (both the old and the new one) shouldn't contain backslashes, i.e. only simple names and not arbitrary paths are accepted by this function.

Returns false if the *oldName* doesn't exist or if *newName* already exists.

wxConfigBase::Set

static wxConfigBase * Set(wxConfigBase *pConfig)

Sets the config object as the current one, returns the pointer to the previous current object (both the parameter and returned value may be NULL)

wxConfigBase::SetExpandEnvVars

void SetExpandEnvVars (bool bDolt = true)

Determine whether we wish to expand environment variables in key values.

wxConfigBase::SetPath

void SetPath(const wxString& strPath)

Set current path: if the first character is '/', it is the absolute path, otherwise it is a relative path. '..' is supported. If the strPath doesn't exist it is created.

wxConfigBase::SetRecordDefaults

void SetRecordDefaults(bool bDolt = true)

Sets whether defaults are recorded to the config file whenever an attempt to read the value which is not present in it is done.

If on (default is off) all default values for the settings used by the program are written back to the config file. This allows the user to see what config options may be changed and is probably useful only for wxFileConfig.

wxConfigBase::SetUmask

void SetUmask(int mode)

NB: this function is not in the base `wxConfigBase` class but is only implemented in `wxFileConfig`. Moreover, this function is Unix-specific and doesn't do anything on other platforms.

`SetUmask()` allows to set the mode to be used for the config file creation. For example, to create a config file which is not readable by other users (useful if it stores some sensitive information, such as passwords), you should do `SetUmask(0077)`.

wxConfigBase::Write

bool Write(const wxString& key, const wxString& value)

bool Write(const wxString& key, long value)

bool Write(const wxString& key, double value)

bool Write(const wxString& key, bool value)

These functions write the specified value to the config file and return true on success.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

Write(key, value)	Writes a string.
WriteInt(key, value)	Writes an int.
WriteFloat(key, value)	Writes a floating point number.

wxPerl note: In place of a single overloaded method, wxPerl uses:

Write(key, value)	Writes a string
WriteInt(key, value)	Writes an integer
WriteFloat(key, value)	Writes a floating point number
WriteBool(key, value)	Writes a boolean

wxConnection

A `wxConnection` object represents the connection between a client and a server. It is created by making a connection using a `wxClient` (p. 132) object, or by the acceptance of a connection by a `wxServer` (p. 1101) object. The bulk of a DDE-like (Dynamic Data Exchange) conversation is controlled by calling members in a **wxConnection** object or by overriding its members. The actual DDE-based implementation using `wxDDEConnection` is available on Windows only, but a platform-independent, socket-

based version of this API is available using `wxTCPConnection`, which has the same API.

An application should normally derive a new connection class from `wxConnection`, in order to override the communication event handlers to do something interesting.

Derived from

`wxConnectionBase`
`wxObject` (p. 954)

Include files

`<wx/ipc.h>`

Types

`wxIPCFormat` is defined as follows:

```
enum wxIPCFormat
{
    wxIPC_INVALID = 0,
    wxIPC_TEXT = 1, /* CF_TEXT */
    wxIPC_BITMAP = 2, /* CF_BITMAP */
    wxIPC_METAFILE = 3, /* CF_METAFILEPICT */
    wxIPC_SYLK = 4,
    wxIPC_DIF = 5,
    wxIPC_TIFF = 6,
    wxIPC_OEMTEXT = 7, /* CF_OEMTEXT */
    wxIPC_DIB = 8, /* CF_DIB */
    wxIPC_PALETTE = 9,
    wxIPC_PENDATA = 10,
    wxIPC_RIFF = 11,
    wxIPC_WAVE = 12,
    wxIPC_UNICODETEXT = 13,
    wxIPC_ENHMETAFILE = 14,
    wxIPC_FILENAME = 15, /* CF_HDROP */
    wxIPC_LOCALE = 16,
    wxIPC_PRIVATE = 20
};
```

See also

`wxClient` (p. 132), `wxServer` (p. 1101), *Interprocess communications overview* (p. 1696)

wxConnection::wxConnection

wxConnection()

wxConnection(char* buffer, int size)

Constructs a connection object. If no user-defined connection object is to be derived from `wxConnection`, then the constructor should not be called directly, since the default connection object will be provided on requesting (or accepting) a connection. However, if the user defines his or her own derived connection object, the `wxServer::OnAcceptConnection` (p. 1102) and/or `wxClient::OnMakeConnection` (p. 133) members should be replaced by functions which construct the new connection

object.

If the arguments of the `wxConnection` constructor are void then the `wxConnection` object manages its own connection buffer, allocating memory as needed. A programmer-supplied buffer cannot be increased if necessary, and the program will assert if it is not large enough. The programmer-supplied buffer is included mainly for backwards compatibility.

wxConnection::Advise

bool Advise(const `wxString& item`, `char* data`, `int size = -1`, `wxIPCFormat format = wxCF_TEXT`)

Called by the server application to advise the client of a change in the data associated with the given item. Causes the client connection's `wxConnection::OnAdvise` (p. 194) member to be called. Returns true if successful.

wxConnection::Execute

bool Execute(`char* data`, `int size = -1`, `wxIPCFormat format = wxCF_TEXT`)

Called by the client application to execute a command on the server. Can also be used to transfer arbitrary data to the server (similar to `wxConnection::Poke` (p. 196) in that respect). Causes the server connection's `wxConnection::OnExecute` (p. 195) member to be called. Returns true if successful.

wxConnection::Disconnect

bool Disconnect()

Called by the client or server application to disconnect from the other program; it causes the `wxConnection::OnDisconnect` (p. 194) message to be sent to the corresponding connection object in the other program. Returns true if successful or already disconnected. The application that calls **Disconnect** must explicitly delete its side of the connection.

wxConnection::OnAdvise

virtual bool OnAdvise(const `wxString& topic`, const `wxString& item`, `char* data`, `int size`, `wxIPCFormat format`)

Message sent to the client application when the server notifies it of a change in the data associated with the given item, using `Advise` (p. 194).

wxConnection::OnDisconnect

virtual bool OnDisconnect()

Message sent to the client or server application when the other application notifies it to end the connection. The default behaviour is to delete the connection object and return true, so applications should generally override **OnDisconnect**(finally calling the inherited method as well) so that they know the connection object is no longer available.

wxConnection::OnExecute

virtual bool OnExecute(const wxString& topic, char* data, int size, wxIPCFormat format)

Message sent to the server application when the client notifies it to execute the given data, using *Execute* (p. 194). Note that there is no item associated with this message.

wxConnection::OnPoke

virtual bool OnPoke(const wxString& topic, const wxString& item, char* data, int size, wxIPCFormat format)

Message sent to the server application when the client notifies it to accept the given data.

wxConnection::OnRequest

virtual char* OnRequest(const wxString& topic, const wxString& item, int *size, wxIPCFormat format)

Message sent to the server application when the client calls *wxConnection::Request* (p. 196). The server's *OnRequest* (p. 195) method should respond by returning a character string, or NULL to indicate no data, and setting *size. The character string must of course persist after the call returns.

wxConnection::OnStartAdvise

virtual bool OnStartAdvise(const wxString& topic, const wxString& item)

Message sent to the server application by the client, when the client wishes to start an 'advise loop' for the given topic and item. The server can refuse to participate by returning false.

wxConnection::OnStopAdvise

virtual bool OnStopAdvise(const wxString& topic, const wxString& item)

Message sent to the server application by the client, when the client wishes to stop an 'advise loop' for the given topic and item. The server can refuse to stop the advise loop

by returning false, although this doesn't have much meaning in practice.

wxConnection::Poke

bool Poke(const wxString& item, char* data, int size = -1, wxIPCFormat format = wxCF_TEXT)

Called by the client application to poke data into the server. Can be used to transfer arbitrary data to the server. Causes the server connection's *wxConnection::OnPoke* (p. 195) member to be called. If size is -1 the size is computed from the string length of data.

Returns true if successful.

wxConnection::Request

char* Request(const wxString& item, int *size, wxIPCFormat format = wxIPC_TEXT)

Called by the client application to request data from the server. Causes the server connection's *wxConnection::OnRequest* (p. 195) member to be called. Size may be NULL or a pointer to a variable to receive the size of the requested item.

Returns a character string (actually a pointer to the connection's buffer) if successful, NULL otherwise. This buffer does not need to be deleted.

wxConnection::StartAdvise

bool StartAdvise(const wxString& item)

Called by the client application to ask if an advise loop can be started with the server. Causes the server connection's *wxConnection::OnStartAdvise* (p. 195) member to be called. Returns true if the server okays it, false otherwise.

wxConnection::StopAdvise

bool StopAdvise(const wxString& item)

Called by the client application to ask if an advise loop can be stopped. Causes the server connection's *wxConnection::OnStopAdvise* (p. 195) member to be called. Returns true if the server okays it, false otherwise.

wxContextHelp

This class changes the cursor to a query and puts the application into a 'context-sensitive help mode'. When the user left-clicks on a window within the specified window, a *wxEVT_HELP* event is sent to that control, and the application may respond to it by

popping up some help.

For example:

```
wxContextHelp contextHelp(myWindow);
```

There are a couple of ways to invoke this behaviour implicitly:

- Use the `wxDIALOG_EX_CONTEXTHELP` style for a dialog (Windows only). This will put a question mark in the titlebar, and Windows will put the application into context-sensitive help mode automatically, with further programming.
- Create a `wxContextHelpButton` (p. 198), whose predefined behaviour is to create a context help object. Normally you will write your application so that this button is only added to a dialog for non-Windows platforms (use `wxDIALOG_EX_CONTEXTHELP` on Windows).

Derived from

`wxObject` (p. 954)

Include files

<wx/cshelp.h>

See also

`wxHelpEvent` (p. 650), `wxHelpController` (p. 644), `wxContextHelpButton` (p. 198)

wxContextHelp::wxContextHelp

wxContextHelp(wxWindow* window = NULL, bool doNow = true)

Constructs a context help object, calling `BeginContextHelp` (p. 197) if `doNow` is true (the default).

If `window` is NULL, the top window is used.

wxContextHelp::~wxContextHelp

~wxContextHelp()

Destroys the context help object.

wxContextHelp::BeginContextHelp

bool BeginContextHelp(wxWindow* window = NULL)

Puts the application into context-sensitive help mode. `window` is the window which will

be used to catch events; if NULL, the top window will be used.

Returns true if the application was successfully put into context-sensitive help mode. This function only returns when the event loop has finished.

wxContextHelp::EndContextHelp

bool EndContextHelp()

Ends context-sensitive help mode. Not normally called by the application.

wxContextHelpButton

Instances of this class may be used to add a question mark button that when pressed, puts the application into context-help mode. It does this by creating a *wxContextHelp* (p. 196) object which itself generates a `wxEVT_HELP` event when the user clicks on a window.

On Windows, you may add a question-mark icon to a dialog by use of the `wxDIALOG_EX_CONTEXTHELP` extra style, but on other platforms you will have to add a button explicitly, usually next to OK, Cancel or similar buttons.

Derived from

wxBitmapButton (p. 80)
wxButton (p. 104)
wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/cshelp.h>

See also

wxBitmapButton (p. 80), *wxContextHelp* (p. 196)

wxContextHelpButton::wxContextHelpButton

wxContextHelpButton()

Default constructor.

**wxContextHelpButton(wxWindow* parent, wxWindowID id =
wxID_CONTEXT_HELP, const wxPoint& pos = wxDefaultPosition, const wxSize&
size = wxDefaultSize, long style = wxBU_AUTODRAW)**

Constructor, creating and showing a context help button.

Parameters

parent

Parent window. Must not be NULL.

id

Button identifier. Defaults to `wxID_CONTEXT_HELP`.

pos

Button position.

size

Button size. If the default size (-1, -1) is specified then the button is sized appropriately for the question mark bitmap.

style

Window style.

Remarks

Normally you need pass only the parent window to the constructor, and use the defaults for the remaining parameters.

wxControl

This is the base class for a control or "widget".

A control is generally a small window which processes user input and/or displays one or more item of data.

Derived from

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/control.h>

See also

wxValidator (p. 1360)

wxControl::Command

void Command(wxCommandEvent& event)

Simulates the effect of the user issuing a command to the item. See *wxCommandEvent* (p. 165).

wxControl::GetLabel

wxString& GetLabel()

Returns the control's text.

wxControl::SetLabel

void SetLabel(const wxString& label)

Sets the item's text.

wxControlWithItems

This class is an abstract base class for some wxWidgets controls which contain several items, such as *wxListBox* (p. 794) and *wxCheckListBox* (p. 125) derived from it, *wxChoice* (p. 127) and *wxComboBox* (p. 158).

It defines the methods for accessing the controls items and although each of the derived classes implements them differently, they still all conform to the same interface.

The items in a *wxControlWithItems* have (non empty) string labels and, optionally, client data associated with them. Client data may be of two different kinds: either simple untyped (`void *`) pointers which are simply stored by the control but not used in any way by it, or typed pointers (`wxClientData *`) which are owned by the control meaning that the typed client data (and only it) will be deleted when an item is *deleted* (p. 201) or the entire control is *cleared* (p. 201) (which also happens when it is destroyed). Finally note that in the same control all items must have client data of the same type (typed or untyped), if any. This type is determined by the first call to *Append* (p. 201) (the version with client data pointer) or *SetClientData* (p. 205).

Derived from

wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/ctrlsub.h> but usually never included directly

wxControlWithItems::Append

int Append(const wxString& *item*)

Adds the item to the end of the list box.

int Append(const wxString& *item*, void **clientData*)**int Append(const wxString& *item*, wxClientData **clientData*)**

Adds the item to the end of the list box, associating the given, typed or untyped, client data pointer with the item.

void Append(const wxArrayString& *strings*)

Appends several items at once to the control. Notice that calling this method may be much faster than appending the items one by one if you need to add a lot of items.

Parameters*item*

String to add.

clientData

Client data to associate with the item.

Return value

When appending a single item, the return value is the index of the newly added item which may be different from the last one if the control is sorted (e.g. has `wxLB_SORT` or `wxCB_SORT` style).

wxControlWithItems::Clear

void Clear()

Removes all items from the control.

Clear() also deletes the client data of the existing items if it is owned by the control.

wxControlWithItems::Delete

void Delete(int *n*)

Deletes an item from the control. The client data associated with the item will be also deleted if it is owned by the control.

Note that it is an error (signalled by an assert failure in debug builds) to remove an item with the index negative or greater or equal than the number of items in the control.

Parameters

n

The zero-based item index.

See also

Clear (p. 201)

wxControlWithItems::FindString

int FindString(const wxString& *string*)

Finds an item whose label matches the given string.

Parameters

string

String to find.

Return value

The zero-based position of the item, or `wxNOT_FOUND` if the string was not found.

wxControlWithItems::GetClientData

void * GetClientData(int *n*) const

Returns a pointer to the client data associated with the given item (if any). It is an error to call this function for a control which doesn't have untyped client data at all although it is ok to call it even if the given item doesn't have any client data associated with it (but other items do).

Parameters

n

The zero-based position of the item.

Return value

A pointer to the client data, or `NULL` if not present.

wxControlWithItems::GetClientObject

wxClientData * GetClientObject(int *n*) const

Returns a pointer to the client data associated with the given item (if any). It is an error to call this function for a control which doesn't have typed client data at all although it is ok to call it even if the given item doesn't have any client data associated with it (but other items do).

Parameters

n

The zero-based position of the item.

Return value

A pointer to the client data, or `NULL` if not present.

wxControlWithItems::GetCount

int GetCount() const

Returns the number of items in the control.

See also

IsEmpty (p. 205)

wxControlWithItems::GetSelection

int GetSelection() const

Returns the index of the selected item or `wxNOT_FOUND` if no item is selected.

Return value

The position of the current selection.

Remarks

This method can be used with single selection list boxes only, you should use *wxListBox::GetSelections* (p. 797) for the list boxes with `wxLB_MULTIPLE` style.

See also

SetSelection (p. 206), *GetStringSelection* (p. 204)

wxControlWithItems::GetString

wxString GetString(int *n*) const

Returns the label of the item with the given index.

Parameters

n

The zero-based index.

Return value

The label of the item or an empty string if the position was invalid.

wxControlWithItems::GetStringSelection

wxString GetStringSelection() const

Returns the label of the selected item or an empty string if no item is selected.

See also

GetSelection (p. 203)

wxControlWithItems::Insert

int Insert(const wxString& *item*, int *pos*)

Inserts the item into the list before *pos*. Not valid for `wxLB_SORT` or `wxCB_SORT` styles, use `Append` instead.

int Insert(const wxString& *item*, int *pos*, void **clientData*)

int Insert(const wxString& *item*, int *pos*, wxClientData **clientData*)

Inserts the item into the list before *pos*, associating the given, typed or untyped, client data pointer with the item. Not valid for `wxLB_SORT` or `wxCB_SORT` styles, use `Append` instead.

Parameters

item

String to add.

pos

Position to insert item before, zero based.

clientData

Client data to associate with the item.

Return value

The return value is the index of the newly inserted item. If the insertion failed for some reason, -1 is returned.

wxControlWithItems::IsEmpty

bool IsEmpty() const

Returns `true` if the control is empty or `false` if it has some items.

See also

GetCount (p. 203)

wxControlWithItems::Number

int Number() const

Obsolescence note: This method is obsolete and was replaced with *GetCount* (p. 203), please use the new method in the new code. This method is only available if `wxWidgets` was compiled with `WXWIN_COMPATIBILITY_2_2` defined and will disappear completely in future versions.

wxControlWithItems::SetClientData

void SetClientData(int *n*, void **data*)

Associates the given untyped client data pointer with the given item. Note that it is an error to call this function if any typed client data pointers had been associated with the control items before.

Parameters

n

The zero-based item index.

data

The client data to associate with the item.

wxControlWithItems::SetClientObject

void SetClientObject(int *n*, wxClientData **data*)

Associates the given typed client data pointer with the given item: the *data* object will be deleted when the item is deleted (either explicitly by using *Deletes* (p. 201) or implicitly when the control itself is destroyed).

Note that it is an error to call this function if any untyped client data pointers had been associated with the control items before.

Parameters

n

The zero-based item index.

data

The client data to associate with the item.

wxControlWithItems::SetSelection

void SetSelection(int *n*)

Sets the choice by passing the desired string position. This does not cause any command events to get emitted.

Parameters

n

The string position to select, starting from zero.

See also

SetString (p. 206), *SetStringSelection* (p. 206)

wxControlWithItems::SetString

void SetString(int *n*, const wxString& *string*)

Sets the label for the given item.

Parameters

n

The zero-based item index.

string

The label to set.

wxControlWithItems::SetStringSelection

void SetStringSelection(const wxString& *string*)

Selects the item with the specified string in the control. This doesn't cause any command events being emitted.

Parameters

string

The string to select.

See also

SetSelection (p. 206)

wxCountingOutputStream

`wxCountingOutputStream` is a specialized output stream which does not write any data anyway, instead it counts how many bytes would get written if this were a normal stream. This can sometimes be useful or required if some data gets serialized to a stream or compressed by using stream compression and thus the final size of the stream cannot be known other than pretending to write the stream. One case where the resulting size would have to be known is if the data has to be written to a piece of memory and the memory has to be allocated before writing to it (which is probably always the case when writing to a memory stream).

Derived from

wxOutputStream (p. 958) *wxStreamBase* (p. 1192)

Include files

<wx/stream.h>

`wxCountingOutputStream::wxCountingOutputStream`

`wxCountingOutputStream()`

Creates a `wxCountingOutputStream` object.

`wxCountingOutputStream::~~wxCountingOutputStream`

`~wxCountingOutputStream()`

Destructor.

`wxCountingOutputStream::GetSize`

`size_t GetSize() const`

Returns the current size of the stream.

wxCriticalSection

A critical section object is used for exactly the same purpose as *mutexes* (p. 938). The only difference is that under Windows platform critical sections are only visible inside one process, while mutexes may be shared between processes, so using critical sections is slightly more efficient. The terminology is also slightly different: mutex may be locked (or acquired) and unlocked (or released) while critical section is entered and left by the program.

Finally, you should try to use *wxCriticalSectionLocker* (p. 209) class whenever possible instead of directly using *wxCriticalSection* for the same reasons *wxMutexLocker* (p. 941) is preferable to *wxMutex* (p. 938) - please see *wxMutex* for an example.

Derived from

None.

Include files

<wx/thread.h>

See also

wxThread (p. 1286), *wxCondition* (p. 174), *wxCriticalSectionLocker* (p. 209)

wxCriticalSection::wxCriticalSection

wxCriticalSection()

Default constructor initializes critical section object.

wxCriticalSection::~~wxCriticalSection

~wxCriticalSection()

Destructor frees the resources.

wxCriticalSection::Enter

void Enter()

Enter the critical section (same as locking a mutex). There is no error return for this function. After entering the critical section protecting some global data the thread running in critical section may safely use/modify it.

wxCriticalSection::Leave

void Leave()

Leave the critical section allowing other threads use the global data protected by it. There is no error return for this function.

wxCriticalSectionLocker

This is a small helper class to be used with *wxCriticalSection* (p. 207) objects. A *wxCriticalSectionLocker* enters the critical section in the constructor and leaves it in the destructor making it much more difficult to forget to leave a critical section (which, in general, will lead to serious and difficult to debug problems).

Example of using it:

```
void Set Foo()
{
    // gs_critSect is some (global) critical section guarding access to
    the
    // object "foo"
    wxCriticalSectionLocker locker(gs_critSect);

    if ( ... )
    {
        // do something
        ...

        return;
    }

    // do something else
    ...

    return;
}
```

Without *wxCriticalSectionLocker*, you would need to remember to manually leave the critical section before each `return`.

Derived from

None.

Include files

<wx/thread.h>

See also

wxCriticalSection (p. 207), *wxMutexLocker* (p. 941)

wxCriticalSectionLocker::wxCriticalSectionLocker

wxCriticalSectionLocker(wxCriticalSection& *criticalsection*)

Constructs a *wxCriticalSectionLocker* object associated with given *criticalsection* and enters it.

wxCriticalSectionLocker::~~wxCriticalSectionLocker

~wxCriticalSectionLocker()

Destructor leaves the critical section.

wxCSCnv

This class converts between any character sets and Unicode. It has one predefined instance, **wxCnvLocal**, for the default user character set.

Derived from

wxMBConv (p. 863)

Include files

<wx/strconv.h>

See also

wxMBConv (p. 863), *wxEncodingConverter* (p. 437), *wxMBConv classes overview* (p. 1593)

wxCSCnv::wxCSCnv

wxCSCnv(const wxChar* charset)**wxCSCnv(wxFontEncoding encoding)**

Constructor. You may specify either the name of the character set you want to convert from/to or an encoding constant. If the character set name is not recognized, ISO 8859-1 is used as fall back.

wxCSCnv::~~wxCSCnv

~wxCSCnv()

Destructor frees any resources needed to perform the conversion.

wxCSCnv::MB2WC

size_t MB2WC(wchar_t* buf, const char* psz, size_t n) const

Converts from the selected character set to Unicode. Returns the size of the destination buffer.

wxCSCnv::WC2MB

size_t WC2MB(char* buf, const wchar_t* psz, size_t n) const

Converts from Unicode to the selected character set. Returns the size of the destination buffer.

wxCursor

A cursor is a small bitmap usually used for denoting where the mouse pointer is, with a picture that might indicate the interpretation of a mouse click. As with icons, cursors in X and MS Windows are created in a different manner. Therefore, separate cursors will be created for the different environments. Platform-specific methods for creating a **wxCursor** object are catered for, and this is an occasion where conditional compilation will probably be required (see *wx/con* (p. 716) for an example).

A single cursor object may be used in many windows (any subwindow type). The wxWidgets convention is to set the cursor for a window, as in X, rather than to set it globally as in MS Windows, although a global `::wxSetCursor` (p. 1507) is also available for MS Windows use.

Derived from

wxBitmap (p. 67)

wxGDIObject (p. 562)

wxObject (p. 954)

Include files

<wx/cursor.h>

Predefined objects

Objects:

wxNullCursor

Pointers:

wxSTANDARD_CURSOR

wxHOURLASS_CURSOR

wxCROSS_CURSOR

See also

wxBitmap (p. 67), *wxIcon* (p. 716), *wxWindow::SetCursor* (p. 1425), `::wxSetCursor` (p. 1507)

wxCursor::wxCursor

wxCursor()

Default constructor.

wxCursor(const char bits[], int width, int height, int hotSpotX=-1, int hotSpotY=-1, const char maskBits[]=NULL, wxColour* fg=NULL, wxColour* bg=NULL)

Constructs a cursor by passing an array of bits (Motif and GTK+ only). *maskBits* is used only under Motif and GTK+. The parameters *fg* and *bg* are only present on GTK+, and force the cursor to use particular background and foreground colours.

If either *hotSpotX* or *hotSpotY* is -1, the hotspot will be the centre of the cursor image (Motif only).

wxCursor(const wxString& cursorName, long type, int hotSpotX=0, int hotSpotY=0)

Constructs a cursor by passing a string resource name or filename.

On MacOS when specifying a string resource name, first the color cursors 'crsr' and then the black/white cursors 'CURS' in the resource chain are scanned through.

hotSpotX and *hotSpotY* are currently only used under Windows when loading from an icon file, to specify the cursor hotspot relative to the top left of the image.

wxCursor(int cursorId)

Constructs a cursor using a cursor identifier.

wxCursor(const wxImage& image)

Constructs a cursor from a *wxImage*. The cursor is monochrome, colors with the RGB elements all greater than 127 will be foreground, colors less than this background. The mask (if any) will be used as transparent.

In MSW the foreground will be white and the background black. The cursor is resized to 32x32. In GTK, the two most frequent colors will be used for foreground and background. The cursor will be displayed at the size of the image. On MacOS the cursor is resized to 16x16 and currently only shown as black/white (mask respected).

wxCursor(const wxCursor& cursor)

Copy constructor. This uses reference counting so is a cheap operation.

Parameters

bits

An array of bits.

maskBits

Bits for a mask bitmap.

width

Cursor width.

height

Cursor height.

hotSpotX

Hotspot x coordinate.

hotSpotY

Hotspot y coordinate.

type

Icon type to load. Under Motif, *type* defaults to **wxBITMAP_TYPE_XBM**. Under Windows, it defaults to **wxBITMAP_TYPE_CUR_RESOURCE**. Under MacOS, it defaults to **wxBITMAP_TYPE_MACCURSOR_RESOURCE**.

Under X, the permitted cursor types are:

wxBITMAP_TYPE_XBM Load an X bitmap file.

Under Windows, the permitted types are:

wxBITMAP_TYPE_CUR Load a cursor from a .cur cursor file (only if **USE_RESOURCE_LOADING_IN_MSW** is enabled in *setup.h*).

wxBITMAP_TYPE_CUR_RESOURCE Load a Windows resource (as specified in the .rc file).

wxBITMAP_TYPE_ICO Load a cursor from a .ico icon file (only if **USE_RESOURCE_LOADING_IN_MSW** is enabled in *setup.h*). Specify *hotSpotX* and *hotSpotY*.

cursorId

A stock cursor identifier. May be one of:

wxCURSOR_ARROW A standard arrow cursor.

wxCURSOR_RIGHT_ARROW A standard arrow cursor pointing to the right.

wxCURSOR_BLANK Transparent cursor.

wxCURSOR_BULLSEYE Bullseye cursor.

wxCURSOR_CHAR Rectangular character cursor.

wxCURSOR_CROSS A cross cursor.

wxCURSOR_HAND A hand cursor.

wxCURSOR_IBEAM	An I-beam cursor (vertical line).
wxCURSOR_LEFT_BUTTON	Represents a mouse with the left button depressed.
wxCURSOR_MAGNIFIER	A magnifier icon.
wxCURSOR_MIDDLE_BUTTON	Represents a mouse with the middle button depressed.
wxCURSOR_NO_ENTRY	A no-entry sign cursor.
wxCURSOR_PAINT_BRUSH	A paintbrush cursor.
wxCURSOR_PENCIL	A pencil cursor.
wxCURSOR_POINT_LEFT	A cursor that points left.
wxCURSOR_POINT_RIGHT	A cursor that points right.
wxCURSOR_QUESTION_ARROW	An arrow and question mark.
wxCURSOR_RIGHT_BUTTON	Represents a mouse with the right button depressed.
wxCURSOR_SIZENESW	A sizing cursor pointing NE-SW.
wxCURSOR_SIZENS	A sizing cursor pointing N-S.
wxCURSOR_SIZENWSE	A sizing cursor pointing NW-SE.
wxCURSOR_SIZEWE	A sizing cursor pointing W-E.
wxCURSOR_SIZING	A general sizing cursor.
wxCURSOR_SPRAYCAN	A spraycan cursor.
wxCURSOR_WAIT	A wait cursor.
wxCURSOR_WATCH	A watch cursor.
wxCURSOR_ARROWWAIT	A cursor with both an arrow and an hourglass, (windows.)

Note that not all cursors are available on all platforms.

cursor

Pointer or reference to a cursor to copy.

wxPython note: Constructors supported by wxPython are:

wxCursor(name, flags, hotSpotX=0, hotSpotY=0) Constructs a cursor from a filename

wxStockCursor(id) Constructs a stock cursor

wxPerl note: Constructors supported by wxPerl are:

- ::Cursor->new(name, type, hotSpotX = 0, hotSpotY = 0)
- ::Cursor->new(id)
- ::Cursor->new(image)
- ::Cursor->newData(bits, width, height, hotSpotX = -1, hotSpotY = -1, maskBits = 0)

Example

The following is an example of creating a cursor from 32x32 bitmap data (`down_bits`) and a mask (`down_mask`) where 1 is black and 0 is white for the bits, and 1 is opaque and 0 is transparent for the mask. It works on Windows and GTK+.

```
static char down_bits[] = { 255, 255, 255, 255, 31,
    255, 255, 255, 31, 255, 255, 255, 31, 255, 255, 255,
    31, 255, 255, 255, 31, 255, 255, 255, 31, 255, 255,
    255, 31, 255, 255, 255, 31, 255, 255, 255, 25, 243,
    255, 255, 19, 249, 255, 255, 7, 252, 255, 255, 15, 254,
    255, 255, 31, 255, 255, 255, 191, 255, 255, 255, 255,
    255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255,
    255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255,
    255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255,
    255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255,
    255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255,
    255 };

static char down_mask[] = { 240, 1, 0, 0, 240, 1,
    0, 0, 240, 1, 0, 0, 240, 1, 0, 0, 240, 1, 0, 0, 240, 1,
    0, 0, 240, 1, 0, 0, 240, 1, 0, 0, 255, 31, 0, 0, 255,
    31, 0, 0, 254, 15, 0, 0, 252, 7, 0, 0, 248, 3, 0, 0,
    240, 1, 0, 0, 224, 0, 0, 0, 64, 0, 0, 0, 0, 0, 0, 0, 0,
    0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
    0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
    0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
    0, 0, 0, 0, 0, 0 };

#ifdef __WXMSW__
wxBitmap down_bitmap(down_bits, 32, 32);
wxBitmap down_mask_bitmap(down_mask, 32, 32);

down_bitmap.SetMask(new wxMask(down_mask_bitmap));
wxImage down_image = down_bitmap.ConvertToImage();
down_image.SetOption(wxIMAGE_OPTION_CUR_HOTSPOT_X, 6);
down_image.SetOption(wxIMAGE_OPTION_CUR_HOTSPOT_Y, 14);
wxCursor down_cursor = wxCursor(down_image);
#else
wxCursor down_cursor = wxCursor(down_bits, 32, 32,
    6, 14, down_mask, wxWHITE, wxBLACK);
#endif
```

wxCursor::~~wxCursor

~wxCursor()

Destroys the cursor. A cursor can be reused for more than one window, and does not

get destroyed when the window is destroyed. `wxWidgets` destroys all cursors on application exit, although it is best to clean them up explicitly.

wxCursor::Ok

bool Ok() const

Returns true if cursor data is present.

wxCursor::operator =

wxCursor& operator =(const wxCursor& cursor)

Assignment operator, using reference counting. Returns a reference to 'this'.

wxCursor::operator ==

bool operator ==(const wxCursor& cursor)

Equality operator. Two cursors are equal if they contain pointers to the same underlying cursor data. It does not compare each attribute, so two independently-created cursors using the same parameters will fail the test.

wxCursor::operator !=

bool operator !=(const wxCursor& cursor)

Inequality operator. Two cursors are not equal if they contain pointers to different underlying cursor data. It does not compare each attribute.

wxCustomDataObject

`wxCustomDataObject` is a specialization of `wxDataObjectSimple` (p. 227) for some application-specific data in arbitrary (either custom or one of the standard ones). The only restriction is that it is supposed that this data can be copied bitwise (i.e. with `memcpy()`), so it would be a bad idea to make it contain a C++ object (though C struct is fine).

By default, `wxCustomDataObject` stores the data inside in a buffer. To put the data into the buffer you may use either *SetData* (p. 218) or *TakeData* (p. 218) depending on whether you want the object to make a copy of data or not.

If you already store the data in another place, it may be more convenient and efficient to provide the data on-demand which is possible too if you override the virtual functions mentioned below.

Virtual functions to override

This class may be used as is, but if you don't want store the data inside the object but provide it on demand instead, you should override *GetSize* (p. 218), *GetData* (p. 218) and *SetData* (p. 218) (or may be only the first two or only the last one if you only allow reading/writing the data)

Derived from

wxDataObjectSimple (p. 227)

wxDataObject (p. 223)

Include files

<wx/dataobj.h>

See also

wxDataObject (p. 223)

wxCustomDataObject::wxCustomDataObject

wxCustomDataObject(const wxDataFormat& format = wxFormatInvalid)

The constructor accepts a *format* argument which specifies the (single) format supported by this object. If it isn't set here, *SetFormat* (p. 228) should be used.

wxCustomDataObject::~~wxCustomDataObject

~wxCustomDataObject()

The destructor will free the data hold by the object. Notice that although it calls a virtual *Free()* (p. 217) function, the base class version will always be called (C++ doesn't allow calling virtual functions from constructors or destructors), so if you override *Free()*, you should override the destructor in your class as well (which would probably just call the derived class' version of *Free()*).

wxCustomDataObject::Alloc

virtual void * Alloc(size_t size)

This function is called to allocate *size* bytes of memory from *SetData()*. The default version just uses the operator *new*.

wxCustomDataObject::Free

virtual void Free()

This function is called when the data is freed, you may override it to anything you want

(or may be nothing at all). The default version calls `operator delete[]` on the data.

wxCustomDataObject::GetSize

virtual size_t GetSize() const

Returns the data size in bytes.

wxCustomDataObject::GetData

virtual void * GetData() const

Returns a pointer to the data.

wxCustomDataObject::SetData

virtual void SetData(size_t size, const void *data)

Set the data. The data object will make an internal copy.

wxPython note: This method expects a string in wxPython. You can pass nearly any object by pickling it first.

wxCustomDataObject::TakeData

virtual void TakeData(size_t size, const void *data)

Like *SetData* (p. 218), but doesn't copy the data - instead the object takes ownership of the pointer.

wxPython note: This method expects a string in wxPython. You can pass nearly any object by pickling it first.

wxDataFormat

A `wxDataFormat` is an encapsulation of a platform-specific format handle which is used by the system for the clipboard and drag and drop operations. The applications are usually only interested in, for example, pasting data from the clipboard only if the data is in a format the program understands and a data format is something which uniquely identifies this format.

On the system level, a data format is usually just a number (`CLIPFORMAT` under Windows or `Atom` under X11, for example) and the standard formats are, indeed, just numbers which can be implicitly converted to `wxDataFormat`. The standard formats are:

<code>wxDF_INVALID</code>	An invalid format - used as default argument for functions taking a <code>wxDataFormat</code> argument sometimes
---------------------------	--

<code>wxDF_TEXT</code>	Text format (<code>wxString</code>)
<code>wxDF_BITMAP</code>	A bitmap (<code>wxBitmap</code>)
<code>wxDF_METAFILE</code>	A metafile (<code>wxMetafile</code> , Windows only)
<code>wxDF_FILENAME</code>	A list of filenames
<code>wxDF_HTML</code>	An HTML string. This is only valid when passed to <code>wxSetClipboardData</code> when compiled with Visual C++ in non-Unicode mode

As mentioned above, these standard formats may be passed to any function taking `wxDataFormat` argument because `wxDataFormat` has an implicit conversion from them (or, to be precise from the type `wxDataFormat::NativeFormat` which is the type used by the underlying platform for data formats).

Aside the standard formats, the application may also use custom formats which are identified by their names (strings) and not numeric identifiers. Although internally custom format must be created (or *registered*) first, you shouldn't care about it because it is done automatically the first time the `wxDataFormat` object corresponding to a given format name is created. The only implication of this is that you should avoid having global `wxDataFormat` objects with non-default constructor because their constructors are executed before the program has time to perform all necessary initialisations and so an attempt to do clipboard format registration at this time will usually lead to a crash!

Virtual functions to override

None

Derived from

None

See also

Clipboard and drag and drop overview (p. 1673), *DnD sample* (p. 1570), *wxDataObject* (p. 223)

wxDataFormat::wxDataFormat

wxDataFormat(NativeFormat format = wxDF_INVALID)

Constructs a data format object for one of the standard data formats or an empty data object (use *SetType* (p. 220) or *SetId* (p. 220) later in this case)

wxPerl note: In wxPerl this function is named `newNative`.

wxDataFormat::wxDataFormat

wxDataFormat(const wxChar *format)

Constructs a data format object for a custom format identified by its name *format*.

wxPerl note: In wxPerl this function is named `newUser`.

wxDataFormat::operator ==

bool operator ==(const wxDataFormat& format) const

Returns true if the formats are equal.

wxDataFormat::operator !=

bool operator !=(const wxDataFormat& format) const

Returns true if the formats are different.

wxDataFormat::GetId

wxString GetId() const

Returns the name of a custom format (this function will fail for a standard format).

wxDataFormat::GetType

NativeFormat GetType() const

Returns the platform-specific number identifying the format.

wxDataFormat::SetId

void SetId(const wxChar *format)

Sets the format to be the custom format identified by the given name.

wxDataFormat::SetType

void SetType(NativeFormat format)

Sets the format to the given value, which should be one of `wxDF_XXX` constants.

wxDatInputStream

This class provides functions that read binary data types in a portable way. Data can be

read in either big-endian or little-endian format, little-endian being the default on all architectures.

If you want to read data from text files (or streams) use *wxTextInputStream* (p. 1278) instead.

The >> operator is overloaded and you can use this class like a standard C++ iostream. Note, however, that the arguments are the fixed size types wxUInt32, wxInt32 etc and on a typical 32-bit computer, none of these match to the "long" type (wxInt32 is defined as signed int on 32-bit architectures) so that you cannot use long. To avoid problems (here and elsewhere), make use of the wxInt32, wxUInt32, etc types.

For example:

```
wxFileInputStream input( "mytext.dat" );
wxDataInputStream store( input );
wxUInt8 i1;
float f2;
wxString line;

store >> i1;           // read a 8 bit integer.
store >> i1 >> f2;     // read a 8 bit integer followed by float.
store >> line;         // read a text line
```

See also *wxDataOutputStream* (p. 229).

Derived from

None

Include files

<wx/datstrm.h>

wxDataInputStream::wxDataInputStream

wxDataInputStream(wxInputStream& stream)

wxDataInputStream(wxInputStream& stream, wxMBConv& conv = wxMBConvUTF8)

Constructs a datastream object from an input stream. Only read methods will be available. The second form is only available in Unicode build of wxWidgets.

Parameters

stream

The input stream.

conv

Charset conversion object object used to decode strings in Unicode mode (see *wxDataInputStream::ReadString* (p. 223) documentation for detailed description). Note that you must not destroy *conv* before you destroy this *wxDataInputStream*

instance!

wxDataInputStream::~wxDataInputStream

~wxDataInputStream()

Destroys the wxDataInputStream object.

wxDataInputStream::BigEndianOrdered

void BigEndianOrdered(bool *be_order*)

If *be_order* is true, all data will be read in big-endian order, such as written by programs on a big endian architecture (e.g. Sparc) or written by Java-Streams (which always use big-endian order). **wxDataInputStream::Read8**

wxUInt8 Read8()

Reads a single byte from the stream.

void Read8(wxUInt8 **buffer*, *size_t* *size*)

Reads bytes from the stream in a specified buffer. The amount of bytes to read is specified by the *size* variable.

wxDataInputStream::Read16

wxUInt16 Read16()

Reads a 16 bit unsigned integer from the stream.

void Read16(wxUInt16 **buffer*, *size_t* *size*)

Reads 16 bit unsigned integers from the stream in a specified buffer. the amount of 16 bit unsigned integer to read is specified by the *size* variable.

wxDataInputStream::Read32

wxUInt32 Read32()

Reads a 32 bit unsigned integer from the stream.

void Read32(wxUInt32 **buffer*, *size_t* *size*)

Reads 32 bit unsigned integers from the stream in a specified buffer. the amount of 32 bit unsigned integer to read is specified by the *size* variable.

wxDataInputStream::Read64

wxUint64 Read64()

Reads a 64 bit unsigned integer from the stream.

void Read64(wxUint64 *buffer, size_t size)

Reads 64 bit unsigned integers from the stream in a specified buffer. the amount of 64 bit unsigned integer to read is specified by the *size* variable.

wxDataInputStream::ReadDouble

double ReadDouble()

Reads a double (IEEE encoded) from the stream.

void ReadDouble(double *buffer, size_t size)

Reads double data (IEEE encoded) from the stream in a specified buffer. the amount of double to read is specified by the *size* variable.

wxDataInputStream::ReadString

wxString ReadString()

Reads a string from a stream. Actually, this function first reads a long integer specifying the length of the string (without the last null character) and then reads the string.

In Unicode build of wxWidgets, the fuction first reads multibyte (char*) string from the stream and then converts it to Unicode using the *convobject* passed to constructor and returns the result as wxString. You are responsible for using the same convertor as when writing the stream.

See also *wxDataOutputStream::WriteString* (p. 231).

wxDataObject

A wxDataObject represents data that can be copied to or from the clipboard, or dragged and dropped. The important thing about wxDataObject is that this is a 'smart' piece of data unlike usual 'dumb' data containers such as memory buffers or files. Being 'smart' here means that the data object itself should know what data formats it supports and how to render itself in each of supported formats.

A supported format, incidentally, is exactly the format in which the data can be requested from a data object or from which the data object may be set. In the general case, an object may support different formats on 'input' and 'output', i.e. it may be able to render itself in a given format but not be created from data on this format or vice versa. wxDataObject defines an enumeration type

```
enum Direction
{
    Get   = 0x01,    // format is supported by GetDataHere()
    Set   = 0x02,    // format is supported by SetData()
};
```

which allows to distinguish between them. See *wxDataFormat* (p. 218) documentation for more about formats.

Not surprisingly, being 'smart' comes at a price of added complexity. This is reasonable for the situations when you really need to support multiple formats, but may be annoying if you only want to do something simple like cut and paste text.

To provide a solution for both cases, *wxWidgets* has two predefined classes which derive from *wxDataObject*: *wxDataObjectSimple* (p. 227) and *wxDataObjectComposite* (p. 227). *wxDataObjectSimple* (p. 227) is the simplest *wxDataObject* possible and only holds data in a single format (such as HTML or text) and *wxDataObjectComposite* (p. 227) is the simplest way to implement *wxDataObject* which does support multiple formats because it achieves this by simply holding several *wxDataObjectSimple* objects.

So, you have several solutions when you need a *wxDataObject* class (and you need one as soon as you want to transfer data via the clipboard or drag and drop):

- 1. Use one of the built-in classes** You may use *wxTextDataObject*, *wxBitmapDataObject* or *wxFileDataObject* in the simplest cases when you only need to support one format and your data is either text, bitmap or list of files.
- 2. Use *wxDataObjectSimple*** Deriving from *wxDataObjectSimple* is the simplest solution for custom data - you will only support one format and so probably won't be able to communicate with other programs, but data transfer will work in your program (or between different copies of it).
- 3. Use *wxDataObjectComposite*** This is a simple but powerful solution which allows you to support any number of formats (either standard or custom if you combine it with the previous solution).
- 4. Use *wxDataObject* directly** This is the solution for maximal flexibility and efficiency, but it is also the most difficult to implement.

Please note that the easiest way to use drag and drop and the clipboard with multiple formats is by using *wxDataObjectComposite*, but it is not the most efficient one as each *wxDataObjectSimple* would contain the whole data in its respective formats. Now imagine that you want to paste 200 pages of text in your proprietary format, as well as Word, RTF, HTML, Unicode and plain text to the clipboard and even today's computers are in trouble. For this case, you will have to derive from *wxDataObject* directly and make it enumerate its formats and provide the data in the requested format on demand.

Note that neither the GTK data transfer mechanisms for the clipboard and drag and drop, nor the OLE data transfer copy any data until another application actually requests the data. This is in contrast to the 'feel' offered to the user of a program who would normally think that the data resides in the clipboard after having pressed 'Copy' - in reality it is only declared to be available.

There are several predefined data object classes derived from `wxDataObjectSimple`: `wxFileDataObject` (p. 467), `wxTextDataObject` (p. 1268) and `wxBitmapDataObject` (p. 85) which can be used without change.

You may also derive your own data object classes from `wxCustomDataObject` (p. 216) for user-defined types. The format of user-defined data is given as mime-type string literal, such as "application/word" or "image/png". These strings are used as they are under Unix (so far only GTK) to identify a format and are translated into their Windows equivalent under Win32 (using the OLE `IDataObject` for data exchange to and from the clipboard and for drag and drop). Note that the format string translation under Windows is not yet finished.

wxPython note: At this time this class is not directly usable from wxPython. Derive a class from `wxPyDataObjectSimple` (p. 227) instead.

wxPerl note: This class is not currently usable from wxPerl; you may use `Wx::PIDataObjectSimple` (p. 227) instead.

Virtual functions to override

Each class derived directly from `wxDataObject` must override and implement all of its functions which are pure virtual in the base class.

The data objects which only render their data or only set it (i.e. work in only one direction), should return 0 from `GetFormatCount` (p. 226).

Derived from

None

Include files

<wx/dataobj.h>

See also

Clipboard and drag and drop overview (p. 1673), *DnD sample* (p. 1570), `wxFileDataObject` (p. 467), `wxTextDataObject` (p. 1268), `wxBitmapDataObject` (p. 85), `wxCustomDataObject` (p. 216), `wxDropTarget` (p. 432), `wxDropSource` (p. 429), `wxTextDropTarget` (p. 1270), `wxFileDropTarget` (p. 473)

wxDataObject::wxDataObject

`wxDataObject()`

Constructor.

wxDataObject::~~wxDataObject

`~wxDataObject()`

Destructor.

wxDataObject::GetAllFormats

virtual void GetAllFormats(wxDataFormat *formats, Direction dir = Get) const

Copy all supported formats in the given direction to the array pointed to by *formats*. There is enough space for GetFormatCount(dir) formats in it.

wxPerl note: In wxPerl this method only takes the `dir` parameter. In scalar context it returns the first format, in list context it returns a list containing all the supported formats.

wxDataObject::GetDataHere

virtual bool GetDataHere(const wxDataFormat& format, void *buf) const

The method will write the data of the format *format* in the buffer *buf* and return true on success, false on failure.

wxDataObject::GetDataSize

virtual size_t GetDataSize(const wxDataFormat& format) const

Returns the data size of the given format *format*.

wxDataObject::GetFormatCount

virtual size_t GetFormatCount(Direction dir = Get) const

Returns the number of available formats for rendering or setting the data.

wxDataObject::GetPreferredFormat

virtual wxDataFormat GetPreferredFormat(Direction dir = Get) const

Returns the preferred format for either rendering the data (if *dir* is `Get`, its default value) or for setting it. Usually this will be the native format of the `wxDataObject`.

wxDataObject::SetData

virtual bool SetData(const wxDataFormat& format, size_t len, const void *buf)

Set the data in the format *format* of the length *len* provided in the buffer *buf*.

Returns true on success, false on failure.

wxDataObjectComposite

`wxDataObjectComposite` is the simplest `wxDataObject` (p. 223) derivation which may be used to support multiple formats. It contains several `wxDataObjectSimple` (p. 227) objects and supports any format supported by at least one of them. Only one of these data objects is *preferred* (the first one if not explicitly changed by using the second parameter of `Add` (p. 227)) and its format determines the preferred format of the composite data object as well.

See `wxDataObject` (p. 223) documentation for the reasons why you might prefer to use `wxDataObject` directly instead of `wxDataObjectComposite` for efficiency reasons.

Virtual functions to override

None, this class should be used directly.

Derived from

`wxDataObject` (p. 223)

Include files

<wx/dataobj.h>

See also

Clipboard and drag and drop overview (p. 1673), `wxDataObject` (p. 223), `wxDataObjectSimple` (p. 227), `wxFileDataObject` (p. 467), `wxTextDataObject` (p. 1268), `wxBitmapDataObject` (p. 85)

wxDataObjectComposite::wxDataObjectComposite

wxDataObjectComposite()

The default constructor.

wxDataObjectComposite::Add

void Add(wxDataObjectSimple *dataObject, bool preferred = false)

Adds the *dataObject* to the list of supported objects and it becomes the preferred object if *preferred* is true.

wxDataObjectSimple

This is the simplest possible implementation of the `wxDataObject` (p. 223) class. The data object of (a class derived from) this class only supports one format, so the number

of virtual functions to be implemented is reduced.

Notice that this is still an abstract base class and cannot be used but should be derived from.

wxPython note: If you wish to create a derived `wxDataObjectSimple` class in wxPython you should derive the class from `wxPyDataObjectSimple` in order to get Python-aware capabilities for the various virtual methods.

wxPerl note: In wxPerl, you need to derive your data object class from `Wx::PIDataObjectSimple`.

Virtual functions to override

The objects supporting rendering the data must override *GetDataSize* (p. 229) and *GetDataHere* (p. 229) while the objects which may be set must override *SetData* (p. 229). Of course, the objects supporting both operations must override all three methods.

Derived from

wxDataObject (p. 223)

Include files

<wx/dataobj.h>

See also

Clipboard and drag and drop overview (p. 1673), *DnD sample* (p. 1570), *wxFileDataObject* (p. 467), *wxTextDataObject* (p. 1268), *wxBitmapDataObject* (p. 85)

wxDataObjectSimple::wxDataObjectSimple

wxDataObjectSimple(const wxDataFormat& *format* = wxFormatInvalid)

Constructor accepts the supported format (none by default) which may also be set later with *SetFormat* (p. 228).

wxDataObjectSimple::GetFormat

const wxDataFormat& GetFormat() const

Returns the (one and only one) format supported by this object. It is supposed that the format is supported in both directions.

wxDataObjectSimple::SetFormat

void SetFormat(const wxDataFormat& *format*)

Sets the supported format.

wxDataObjectSimple::GetDataSize

virtual size_t GetDataSize() const

Gets the size of our data. Must be implemented in the derived class if the object supports rendering its data.

wxDataObjectSimple::GetDataHere

virtual bool GetDataHere(void *buf) const

Copy the data to the buffer, return true on success. Must be implemented in the derived class if the object supports rendering its data.

wxPython note: When implementing this method in wxPython, no additional parameters are required and the data should be returned from the method as a string.

wxDataObjectSimple::SetData

virtual bool SetData(size_t len, const void *buf)

Copy the data from the buffer, return true on success. Must be implemented in the derived class if the object supports setting its data.

wxPython note: When implementing this method in wxPython, the data comes as a single string parameter rather than the two shown here.

wxDataOutputStream

This class provides functions that write binary data types in a portable way. Data can be written in either big-endian or little-endian format, little-endian being the default on all architectures.

If you want to write data to text files (or streams) use *wxTextOutputStream* (p. 1282) instead.

The << operator is overloaded and you can use this class like a standard C++ iostream. See *wxDataInputStream* (p. 220) for its usage and caveats.

See also *wxDataInputStream* (p. 220).

Derived from

None

wxDataOutputStream::wxDataOutputStream

wxDataOutputStream(wxOutputStream& stream)**wxDataOutputStream(wxOutputStream& stream, wxMBConv& conv = wxMBConvUTF8)**

Constructs a datastream object from an output stream. Only write methods will be available. The second form is only available in Unicode build of wxWidgets.

Parameters*stream*

The output stream.

conv

Charset conversion object object used to encoding Unicode strings before writing them to the stream in Unicode mode (see *wxDataOutputStream::WriteString* (p. 231) documentation for detailed description). Note that you must not destroy *conv* before you destroy this *wxDataOutputStream* instance! It is recommended to use default value (UTF-8).

wxDataOutputStream::~~wxDataOutputStream

~wxDataOutputStream()

Destroys the *wxDataOutputStream* object.

wxDataOutputStream::BigEndianOrdered

void BigEndianOrdered(bool be_order)

If *be_order* is true, all data will be written in big-endian order, e.g. for reading on a Sparc or from Java-Streams (which always use big-endian order), otherwise data will be written in little-endian order.

wxDataOutputStream::Write8

void Write8(wxUInt8 i8)

Writes the single byte *i8* to the stream.

void Write8(const wxUInt8 *buffer, size_t size)

Writes an array of bytes to the stream. The amount of bytes to write is specified with the *size* variable.

wxDataOutputStream::Write16

void Write16(wxUint16 *i16*)

Writes the 16 bit unsigned integer *i16* to the stream.

void Write16(const wxUint16 **buffer*, size_t *size*)

Writes an array of 16 bit unsigned integer to the stream. The amount of 16 bit unsigned integer to write is specified with the *size* variable.

wxDataOutputStream::Write32

void Write32(wxUint32 *i32*)

Writes the 32 bit unsigned integer *i32* to the stream.

void Write32(const wxUint32 **buffer*, size_t *size*)

Writes an array of 32 bit unsigned integer to the stream. The amount of 32 bit unsigned integer to write is specified with the *size* variable.

wxDataOutputStream::Write64

void Write64(wxUint64 *i64*)

Writes the 64 bit unsigned integer *i64* to the stream.

void Write64(const wxUint64 **buffer*, size_t *size*)

Writes an array of 64 bit unsigned integer to the stream. The amount of 64 bit unsigned integer to write is specified with the *size* variable.

wxDataOutputStream::WriteDouble

void WriteDouble(double *f*)

Writes the double *f* to the stream using the IEEE format.

void WriteDouble(const double **buffer*, size_t *size*)

Writes an array of double to the stream. The amount of double to write is specified with the *size* variable.

wxDataOutputStream::WriteString

void WriteString(const wxString&*string*)

Writes *string* to the stream. Actually, this method writes the size of the string before

writing *string* itself.

In ANSI build of wxWidgets, the string is written to the stream in exactly same way it is represented in memory. In Unicode build, however, the string is first converted to multibyte representation with *conv* object passed to stream's constructor (consequently, ANSI application can read data written by Unicode application, as long as they agree on encoding) and this representation is written to the stream. UTF-8 is used by default.

wxDateSpan

This class is a "logical time span" and is useful for implementing program logic for such things as "add one month to the date" which, in general, doesn't mean to add 60*60*24*31 seconds to it, but to take the same date the next month (to understand that this is indeed different consider adding one month to Feb, 15 -- we want to get Mar, 15, of course).

When adding a month to the date, all lesser components (days, hours, ...) won't be changed unless the resulting date would be invalid: for example, Jan 31 + 1 month will be Feb 28, not (non existing) Feb 31.

Because of this feature, adding and subtracting back again the same wxDateSpan will **not**, in general give back the original date: Feb 28 - 1 month will be Jan 28, not Jan 31!

wxDateSpan objects can be either positive or negative. They may be multiplied by scalars which multiply all deltas by the scalar: i.e. 2*(1 month and 1 day) is 2 months and 2 days. They can be added together and with wxDateTime (p. 237) or wxTimeSpan (p. 1300), but the type of result is different for each case.

Beware about weeks: if you specify both weeks and days, the total number of days added will be 7*weeks + days! See also GetTotalDays() function.

Equality operators are defined for wxDateSpans. Two datespans are equal if and only if they both give the same target date when added to **every** source date. Thus wxDateSpan::Months(1) is not equal to wxDateSpan::Days(30), because they don't give the same date when added to 1 Feb. But wxDateSpan::Days(14) is equal to wxDateSpan::Weeks(2)

Finally, notice that for adding hours, minutes and so on you don't need this class at all: wxTimeSpan (p. 1300) will do the job because there are no subtleties associated with those (we don't support leap seconds).

Derived from

No base class

Include files

<wx/datetime.h>

See also

Date classes overview (p. 1586), *wxDateTime* (p. 237)

wxDateSpan::wxDateSpan

wxDateSpan(int *years* = 0, int *months* = 0, int *weeks* = 0, int *days* = 0)

Constructs the date span object for the given number of years, months, weeks and days. Note that the weeks and days add together if both are given.

wxDateSpan::Add

wxDateSpan Add(const wxDateSpan& *other*) const

wxDateSpan& Add(const wxDateSpan& *other*)

wxDateSpan& operator+=(const wxDateSpan& *other*)

Returns the sum of two date spans. The first version returns a new object, the second and third ones modify this object in place.

wxDateSpan::Day

static wxDateSpan Day()

Returns a date span object corresponding to one day.

[See also](#)

Days (p. 233)

wxDateSpan::Days

static wxDateSpan Days(int *days*)

Returns a date span object corresponding to the given number of days.

[See also](#)

Day (p. 233)

wxDateSpan::GetDays

int GetDays() const

Returns the number of days (only, that it not counting the weeks component!) in this date span.

[See also](#)

GetTotalDays (p. 234)

wxDateSpan::GetMonths

int GetMonths() const

Returns the number of the months (not counting the years) in this date span.

wxDateSpan::GetTotalDays

int GetTotalDays() const

Returns the combined number of days in this date span, counting both weeks and days. It still doesn't take neither months nor years into the account.

[See also](#)

GetWeeks (p. 234), *GetDays* (p. 233)

wxDateSpan::GetWeeks

int GetWeeks() const

Returns the number of weeks in this date span.

[See also](#)

GetTotalDays (p. 234)

wxDateSpan::GetYears

int GetYears() const

Returns the number of years in this date span.

wxDateSpan::Month

static wxDateSpan Month()

Returns a date span object corresponding to one month.

[See also](#)

Months (p. 234)

wxDateSpan::Months

static wxDateSpan Months(int *mon*)

Returns a date span object corresponding to the given number of months.

[See also](#)

Month (p. 234)

wxDateSpan::Multiply

wxDateSpan Multiply(int *factor*) const**wxDateSpan& Multiply(int *factor*)****wxDateSpan& operator*=(int *factor*)**

Returns the product of the date span by the specified *factor*. The product is computed by multiplying each of the components by the factor.

The first version returns a new object, the second and third ones modify this object in place.

wxDateSpan::Negate

wxDateSpan Negate() const

Returns the date span with the opposite sign.

[See also](#)

Neg (p. 235)

wxDateSpan::Neg

wxDateSpan& Neg()**wxDateSpan& operator-()**

Changes the sign of this date span.

[See also](#)

Negate (p. 235)

wxDateSpan::SetDays

wxDateSpan& SetDays(int *n*)

Sets the number of days (without modifying any other components) in this date span.

wxDateSpan::SetYears

wxDateSpan& SetYears(int *n*)

Sets the number of years (without modifying any other components) in this date span.

wxDateSpan::SetMonths

wxDateSpan& SetMonths(int *n*)

Sets the number of months (without modifying any other components) in this date span.

wxDateSpan::SetWeeks

wxDateSpan& SetWeeks(int *n*)

Sets the number of weeks (without modifying any other components) in this date span.

wxDateSpan::Subtract

wxDateSpan Subtract(const wxDateSpan& *other*) const**wxDateSpan& Subtract(const wxDateSpan& *other*)****wxDateSpan& operator+=(const wxDateSpan& *other*)**

Returns the difference of two date spans. The first version returns a new object, the second and third ones modify this object in place.

wxDateSpan::Week

static wxDateSpan Week()

Returns a date span object corresponding to one week.

[See also](#)

Weeks (p. 236)

wxDateSpan::Weeks

static wxDateSpan Weeks(int *weeks*)

Returns a date span object corresponding to the given number of weeks.

[See also](#)

Week (p. 236)

wxDateSpan::Year

static wxDateSpan Year()

Returns a date span object corresponding to one year.

[See also](#)

Years (p. 237)

wxDateSpan::Years

static wxDateSpan Years(int years)

Returns a date span object corresponding to the given number of years.

[See also](#)

Year (p. 237)

wxDateSpan::operator==

bool operator==(wxDateSpan& other) const

Returns `true` if this date span is equal to the other one. Two date spans are considered equal if and only if they have the same number of years and months and the same total number of days (counting both days and weeks).

wxDateSpan::operator!=

bool operator!=(wxDateSpan& other) const

Returns `true` if this date span is different from the other one.

[See also](#)

operator== (p. 237)

wxDateTime

`wxDateTime` class represents an absolute moment in the time.

Types

The type `wxDateTime_t` is typedefed as `unsigned short` and is used to contain the number of years, hours, minutes, seconds and milliseconds.

Constants

Global constant `wxDefaultDateTime` and synonym for it `wxInvalidDateTime` are defined. This constant will be different from any valid `wxDateTime` object.

All the following constants are defined inside `wxDateTime` class (i.e., to refer to them you should prepend their names with `wxDateTime::`).

Time zone symbolic names:

```
enum TZ
{
    // the time in the current time zone
    Local,

    // zones from GMT (= Greenwich Mean Time): they're guaranteed to
    // consequent numbers, so writing something like `GMT0 + offset'
    // safe if abs(offset) <= 12

    // underscore stands for minus
    GMT_12, GMT_11, GMT_10, GMT_9, GMT_8, GMT_7,
    GMT_6, GMT_5, GMT_4, GMT_3, GMT_2, GMT_1,
    GMT0,
    GMT1, GMT2, GMT3, GMT4, GMT5, GMT6,
    GMT7, GMT8, GMT9, GMT10, GMT11, GMT12,
    // Note that GMT12 and GMT_12 are not the same: there is a
    // difference
    // of exactly one day between them

    // some symbolic names for TZ

    // Europe
    WET = GMT0,                // Western Europe Time
    WEST = GMT1,              // Western Europe Summer Time
    CET = GMT1,               // Central Europe Time
    CEST = GMT2,              // Central Europe Summer Time
    EET = GMT2,               // Eastern Europe Time
    EEST = GMT3,              // Eastern Europe Summer Time
    MSK = GMT3,               // Moscow Time
    MSD = GMT4,               // Moscow Summer Time

    // US and Canada
    AST = GMT_4,              // Atlantic Standard Time
    ADT = GMT_3,              // Atlantic Daylight Time
    EST = GMT_5,              // Eastern Standard Time
    EDT = GMT_4,              // Eastern Daylight Saving

    CST = GMT_6,              // Central Standard Time
    CDT = GMT_5,              // Central Daylight Saving

    MST = GMT_7,              // Mountain Standard Time
    MDT = GMT_6,              // Mountain Daylight Saving

    PST = GMT_8,              // Pacific Standard Time
    PDT = GMT_7,              // Pacific Daylight Saving

    HST = GMT_10,             // Hawaiian Standard Time
    AKST = GMT_9,             // Alaska Standard Time
    AKDT = GMT_8,             // Alaska Daylight Saving Time

    // Australia
    A_WST = GMT8,             // Western Standard Time
    A_CST = GMT12 + 1,        // Central Standard Time

    A_EST = GMT10,            // Eastern Standard Time
    A_ESST = GMT11,           // Eastern Summer Time

    // Universal Coordinated Time = the new and politically correct
```

```

name
    // for GMT
    UTC = GMT0
};

```

Month names: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec and `Inv_Month` for an invalid month value are the values of `wxDatetime::Monthenum`.

Likewise, Sun, Mon, Tue, Wed, Thu, Fri, Sat, and `Inv_WeekDay` are the values in `wxDatetime::WeekDay enum`.

Finally, `Inv_Year` is defined to be an invalid value for year parameter.

`GetMonthName()` (p. 246) and `GetWeekDayName` (p. 246) functions use the following flags:

```

enum NameFlags
{
    Name_Full = 0x01,          // return full name
    Name_Abbr = 0x02          // return abbreviated name
};

```

Several functions accept an extra parameter specifying the calendar to use (although most of them only support now the Gregorian calendar). This parameter is one of the following values:

```

enum Calendar
{
    Gregorian, // calendar currently in use in Western countries
    Julian     // calendar in use since -45 until the 1582 (or later)
};

```

Date calculations often depend on the country and `wxDatetime` allows to set the country whose conventions should be used using `SetCountry` (p. 247). It takes one of the following values as parameter:

```

enum Country
{
    Country_Unknown, // no special information for this country
    Country_Default, // set the default country with SetCountry()
method
    // or use the default country with any other

    Country_WesternEurope_Start,
    Country_EEC = Country_WesternEurope_Start,
    France,
    Germany,
    UK,
    Country_WesternEurope_End = UK,

    Russia,

    USA
};

```

Different parts of the world use different conventions for the week start. In some countries, the week starts on Sunday, while in others -- on Monday. The ISO standard doesn't address this issue, so we support both conventions in the functions whose result depends on it (`GetWeekOfYear` (p. 253) and `GetWeekOfMonth` (p. 253)).

The desired behaviour may be specified by giving one of the following constants as

argument to these functions:

```
enum WeekFlags
{
    Default_First,    // Sunday_First for US, Monday_First for the rest
    Monday_First,     // week starts with a Monday
    Sunday_First      // week starts with a Sunday
};
```

Derived from

No base class

Include files

<wx/datetime.h>

See also

Date classes overview (p. 1586), *wxTimeSpan* (p. 1300), *wxDateSpan* (p. 232), *wxCalendarCtrl* (p. 109)

Static functions

For convenience, all static functions are collected here. These functions either set or return the static variables of *wxDateSpan* (the country), return the current moment, year, month or number of days in it, or do some general calendar-related actions.

Please note that although several function accept an extra *Calendar* parameter, it is currently ignored as only the Gregorian calendar is supported. Future versions will support other calendars.

wxPython note: These methods are standalone functions named `wxDateTime_<StaticMethodName>` in wxPython.

SetCountry (p. 247)
GetCountry (p. 245)
IsWestEuropeanCountry (p. 247)
GetCurrentYear (p. 245)
ConvertYearToBC (p. 244)
GetCurrentMonth (p. 245)
IsLeapYear (p. 247)
GetCentury (p. 245)
GetNumberOfDays (p. 246)
GetNumberOfDays (p. 246)
GetMonthName (p. 246)
GetWeekDayName (p. 246)
GetAmPmStrings (p. 245)
IsDSTApplicable (p. 247)
GetBeginDST (p. 245)
GetEndDST (p. 246)

Now (p. 247)
UNow (p. 248)
Today (p. 248)

Constructors, assignment operators and setters

Constructors and various `Set()` methods are collected here. If you construct a date object from separate values for day, month and year, you should use *IsValid* (p. 252) method to check that the values were correct as constructors can not return an error code.

wxDateTime() (p. 248)
wxDateTime(*time_t*) (p. 248)
wxDateTime(*struct tm*) (p. 248)
wxDateTime(*double jdn*) (p. 249)
wxDateTime(*h, m, s, ms*) (p. 249)
wxDateTime(*day, mon, year, h, m, s, ms*) (p. 249)
SetToCurrent (p. 249)
Set(*time_t*) (p. 249)
Set(*struct tm*) (p. 250)
Set(*double jdn*) (p. 250)
Set(*h, m, s, ms*) (p. 250)
Set(*day, mon, year, h, m, s, ms*) (p. 250)
SetFromDOS(*unsigned long ddt*) (p. 254)
ResetTime (p. 250)
SetYear (p. 250)
SetMonth (p. 251)
SetDay (p. 250)
SetHour (p. 251)
SetMinute (p. 251)
SetSecond (p. 251)
SetMillisecond (p. 251)
operator=(time_t) (p. 251)
operator=(struct tm) (p. 251)

Accessors

Here are the trivial accessors. Other functions, which might have to perform some more complicated calculations to find the answer are under the *Calendar calculations* (p. 243) section.

IsValid (p. 252)
GetTicks (p. 252)
GetYear (p. 252)
GetMonth (p. 252)
GetDay (p. 252)
GetWeekDay (p. 252)
GetHour (p. 253)
GetMinute (p. 253)

GetSecond (p. 253)
GetMillisecond (p. 253)
GetDayOfYear (p. 253)
GetWeekOfYear (p. 253)
GetWeekOfMonth (p. 253)
GetYearDay (p. 262)
IsWorkDay (p. 254)
IsGregorianDate (p. 254)
GetAsDOS (p. 254)

Date comparison

There are several function to allow date comparison. To supplement them, a few global operators `>`, `<` etc taking `wxDateTime` are defined.

IsEqualTo (p. 254)
IsEarlierThan (p. 254)
IsLaterThan (p. 255)
IsStrictlyBetween (p. 255)
IsBetween (p. 255)
IsSameDate (p. 255)
IsSameTime (p. 255)
IsEqualUpTo (p. 255)

Date arithmetics

These functions carry out *arithmetics* (p. 1588) on the `wxDateTime` objects. As explained in the overview, either `wxTimeSpan` or `wxDateSpan` may be added to `wxDateTime`, hence all functions are overloaded to accept both arguments.

Also, both `Add()` and `Subtract()` have both `const` and `non-const` version. The first one returns a new object which represents the sum/difference of the original one with the argument while the second form modifies the object to which it is applied. The operators `--` and `++` are defined to be equivalent to the second forms of these functions.

Add(wxTimeSpan) (p. 256)
Add(wxDateSpan) (p. 256)
Subtract(wxTimeSpan) (p. 256)
Subtract(wxDateSpan) (p. 256)
Subtract(wxDateTime) (p. 257)
operator+=(wxTimeSpan) (p. 256)
operator+=(wxDateSpan) (p. 256)
operator-=(wxTimeSpan) (p. 256)
operator-=(wxDateSpan) (p. 256)

Parsing and formatting dates

These functions convert `wxDateTime` objects to and from text. The conversions to text

are mostly trivial: you can either do it using the default date and time representations for the current locale (*FormatDate* (p. 259) and *FormatTime* (p. 259)), using the international standard representation defined by ISO 8601 (*FormatISODate* (p. 259) and *FormatISOTime* (p. 259)) or by specifying any format at all and using *Format* (p. 258) directly.

The conversions from text are more interesting, as there are much more possibilities to care about. The simplest cases can be taken care of with *ParseFormat* (p. 257) which can parse any date in the given (rigid) format. *ParseRfc822Date* (p. 257) is another function for parsing dates in predefined format -- the one of RFC 822 which (still...) defines the format of email messages on the Internet. This format can not be described with `strptime(3)`-like format strings used by *Format* (p. 258), hence the need for a separate function.

But the most interesting functions are *ParseTime* (p. 258), *ParseDate* (p. 258) and *ParseDateTime* (p. 258). They try to parse the date and time (or only one of them) in 'free' format, i.e. allow them to be specified in any of possible ways. These functions will usually be used to parse the (interactive) user input which is not bound to be in any predefined format. As an example, *ParseDateTime* (p. 258) can parse the strings such as "tomorrow", "March first" and even "next Sunday".

ParseRfc822Date (p. 257)

ParseFormat (p. 257)

ParseDateTime (p. 258)

ParseDate (p. 258)

ParseTime (p. 258)

Format (p. 258)

FormatDate (p. 259)

FormatTime (p. 259)

FormatISODate (p. 259)

FormatISOTime (p. 259)

Calendar calculations

The functions in this section perform the basic calendar calculations, mostly related to the week days. They allow to find the given week day in the week with given number (either in the month or in the year) and so on.

All (non-const) functions in this section don't modify the time part of the `wxDateTime` -- they only work with the date part of it.

SetToWeekDayInSameWeek (p. 259)

GetWeekDayInSameWeek (p. 259)

SetToNextWeekDay (p. 259)

GetNextWeekDay (p. 260)

SetToPrevWeekDay (p. 260)

GetPrevWeekDay (p. 260)

SetToWeekDay (p. 260)

GetWeekDay (p. 260)

SetToLastWeekDay (p. 261)

GetLastWeekDay (p. 261)

SetToTheWeek (p. 261)
GetWeek (p. 261)
SetToLastMonthDay (p. 261)
GetLastMonthDay (p. 261)
SetToYearDay (p. 262)
GetYearDay (p. 262)

Astronomical/historical functions

Some degree of support for the date units used in astronomy and/or history is provided. You can construct a *wxDateTime* object from a *JDN* (p. 250) and you may also get its *JDN*, *MJD* (p. 262) or *Rata Die number* (p. 263) from it.

wxDateTime(double jdn) (p. 249)
Set(double jdn) (p. 250)
GetJulianDayNumber (p. 262)
GetJDN (p. 262)
GetModifiedJulianDayNumber (p. 262)
GetMJD (p. 262)
GetRataDie (p. 263)

Time zone and DST support

Please see the *time zone overview* (p. 1588) for more information about time zones. Normally, these functions should be rarely used.

ToTimezone (p. 263)
MakeTimezone (p. 263)
ToGMT (p. 263)
MakeGMT (p. 263)
GetBeginDST (p. 245)
GetEndDST (p. 246)
IsDST (p. 263)

wxDateTime::ConvertYearToBC

static int ConvertYearToBC(int year)

Converts the year in absolute notation (i.e. a number which can be negative, positive or zero) to the year in BC/AD notation. For the positive years, nothing is done, but the year 0 is year 1 BC and so for other years there is a difference of 1.

This function should be used like this:

```
wxDateTime dt(...);
int y = dt.GetYear();
printf("The year is %d%s", wxDateTime::ConvertYearToBC(y), y > 0 ?
"AD" : "BC");
```

wxDateTime::GetAmPmStrings

static void GetAmPmStrings(wxString *am, wxString *pm)

Returns the translations of the strings `AM` and `PM` used for time formatting for the current locale. Either of the pointers may be `NULL` if the corresponding value is not needed.

wxDateTime::GetBeginDST

static wxDateTime GetBeginDST(int year = Inv_Year, Country country = Country_Default)

Get the beginning of DST for the given country in the given year (current one by default). This function suffers from limitations described in *DST overview* (p. 1589).

[See also](#)

GetEndDST (p. 246)

wxDateTime::GetCountry

static Country GetCountry()

Returns the current default country. The default country is used for DST calculations, for example.

[See also](#)

SetCountry (p. 247)

wxDateTime::GetCurrentYear

static int GetCurrentYear(Calendar cal = Gregorian)

Get the current year in given calendar (only Gregorian is currently supported).

wxDateTime::GetCurrentMonth

static Month GetCurrentMonth(Calendar cal = Gregorian)

Get the current month in given calendar (only Gregorian is currently supported).

wxDateTime::GetCentury

static int GetCentury(int year = Inv_Year)

Get the current century, i.e. first two digits of the year, in given calendar (only Gregorian is currently supported).

wxDateTime::GetEndDST

static wxDateTime GetEndDST(int *year* = *Inv_Year*, **Country** *country* = *Country_Default*)

Returns the end of DST for the given country in the given year (current one by default).

[See also](#)

GetBeginDST (p. 245)

wxDateTime::GetMonthName

static wxString GetMonthName(Month *month*, **NameFlags** *flags* = *Name_Full*)

Gets the full (default) or abbreviated (specify *Name_Abbr* name of the given month.

[See also](#)

GetWeekDayName (p. 246)

wxDateTime::GetNumberOfDays

static wxDateTime_t GetNumberOfDays(int *year*, **Calendar** *cal* = *Gregorian*)

static wxDateTime_t GetNumberOfDays(Month *month*, int *year* = *Inv_Year*, **Calendar** *cal* = *Gregorian*)

Returns the number of days in the given year or in the given month of the year.

The only supported value for *cal* parameter is currently *Gregorian*.

wxPython note: These two methods are named *GetNumberOfDaysInYear* and *GetNumberOfDaysInMonth* in wxPython.

wxDateTime::GetWeekDayName

static wxString GetWeekDayName(WeekDay *weekday*, **NameFlags** *flags* = *Name_Full*)

Gets the full (default) or abbreviated (specify *Name_Abbr* name of the given week day.

[See also](#)

GetMonthName (p. 246)

wxDateTime::IsLeapYear

static bool IsLeapYear(int *year* = *Inv_Year*, **Calendar** *cal* = *Gregorian*)

Returns `true` if the *year* is a leap one in the specified calendar.

This functions supports Gregorian and Julian calendars.

wxDateTime::IsWestEuropeanCountry

static bool IsWestEuropeanCountry(**Country** *country* = *Country_Default*)

This function returns `true` if the specified (or default) country is one of Western European ones. It is used internally by `wxDateTime` to determine the DST convention and date and time formatting rules.

wxDateTime::IsDSTApplicable

static bool IsDSTApplicable(int *year* = *Inv_Year*, **Country** *country* = *Country_Default*)

Returns `true` if DST was used n the given year (the current one by default) in the given country.

wxDateTime::Now

static wxDateTime Now()

Returns the object corresponding to the current time.

Example:

```
wxDateTime now = wxDateTime::Now();
printf("Current time in Paris:\t%s\n", now.Format("%c",
wxDateTime::CET).c_str());
```

Note that this function is accurate up to second: `wxDateTime::UNow` (p. 248) should be used for better precision (but it is less efficient and might not be available on all platforms).

[See also](#)

Today (p. 248)

wxDateTime::SetCountry

static void SetCountry(**Country** *country*)

Sets the country to use by default. This setting influences the DST calculations, date formatting and other things.

The possible values for *country* parameter are enumerated in *wxDatetime constants section* (p. 237).

See also

GetCountry (p. 245)

wxDatetime::Today

static wxDateTime Today()

Returns the object corresponding to the midnight of the current day (i.e. the same as *Now()* (p. 247), but the time part is set to 0).

See also

Now (p. 247)

wxDatetime::UNow

static wxDateTime UNow()

Returns the object corresponding to the current time including the milliseconds if a function to get time with such precision is available on the current platform (supported under most Unices and Win32).

See also

Now (p. 247)

wxDatetime::wxDateTime

wxDateTime()

Default constructor. Use one of *Set ()* functions to initialize the object later.

wxDatetime::wxDateTime

wxDateTime& wxDateTime(time_t *time*)

Same as *Set* (p. 248).

wxPython note: This constructor is named *wxDatetimeFromTimeT* in wxPython.

wxDatetime::wxDateTime

wxDateTime& wxDateTime(const struct tm& *tm*)

Same as *Set* (p. 248)

wxPython note: Unsupported.

wxDateTime::wxDateTime

wxDateTime& wxDateTime(double *jdn*)

Same as *Set* (p. 249)

wxPython note: This constructor is named `wxDateTimeFromJDN` in wxPython.

wxDateTime::wxDateTime

wxDateTime& wxDateTime(wxDateTime_t *hour*, wxDateTime_t *minute* = 0, wxDateTime_t *second* = 0, wxDateTime_t *millisec* = 0)

Same as *Set* (p. 249)

wxPython note: This constructor is named `wxDateTimeFromHMS` in wxPython.

wxDateTime::wxDateTime

wxDateTime& wxDateTime(wxDateTime_t *day*, Month *month* = *Inv_Month*, int *Inv_Year*, wxDateTime_t *hour* = 0, wxDateTime_t *minute* = 0, wxDateTime_t *second* = 0, wxDateTime_t *millisec* = 0)

Same as *Set* (p. 250)

wxPython note: This constructor is named `wxDateTimeFromDMY` in wxPython.

wxDateTime::SetToCurrent

wxDateTime& SetToCurrent()

Sets the date and time of to the current values. Same as assigning the result of *Now()* (p. 247) to this object.

wxDateTime::Set

wxDateTime& Set(time_t *timet*)

Constructs the object from *timet* value holding the number of seconds since Jan 1, 1970.

wxPython note: This method is named `SetTimeT` in wxPython.

wxDateTime::Set

wxDateTime& Set(const struct tm& tm)

Sets the date and time from the broken down representation in the standard `tm` structure.

wxPython note: Unsupported.

wxDateTime::Set

wxDateTime& Set(double jdn)

Sets the date from the so-called *Julian Day Number*.

By definition, the Julian Day Number, usually abbreviated as JDN, of a particular instant is the fractional number of days since 12 hours Universal Coordinated Time (Greenwich mean noon) on January 1 of the year -4712 in the Julian proleptic calendar.

wxPython note: This method is named `SetJDN` in wxPython.

wxDateTime::Set

wxDateTime& Set(wxDateTime_t hour, wxDateTime_t minute = 0, wxDateTime_t second = 0, wxDateTime_t millisec = 0)

Sets the date to be equal to *Today* (p. 248) and the time from supplied parameters.

wxPython note: This method is named `SetHMS` in wxPython.

wxDateTime::Set

wxDateTime& Set(wxDateTime_t day, Month month = Inv_Month, int year = Inv_Year, wxDateTime_t hour = 0, wxDateTime_t minute = 0, wxDateTime_t second = 0, wxDateTime_t millisec = 0)

Sets the date and time from the parameters.

wxDateTime::ResetTime

wxDateTime& ResetTime()

Reset time to midnight (00:00:00) without changing the date.

wxDateTime::SetYear

wxDateTime& SetYear(int year)

Sets the year without changing other date components.

wxDateTime::SetMonth

wxDateTime& SetMonth(Month *month*)

Sets the month without changing other date components.

wxDateTime::SetDay

wxDateTime& SetDay(wxDateTime_t *day*)

Sets the day without changing other date components.

wxDateTime::SetHour

wxDateTime& SetHour(wxDateTime_t *hour*)

Sets the hour without changing other date components.

wxDateTime::SetMinute

wxDateTime& SetMinute(wxDateTime_t *minute*)

Sets the minute without changing other date components.

wxDateTime::SetSecond

wxDateTime& SetSecond(wxDateTime_t *second*)

Sets the second without changing other date components.

wxDateTime::SetMillisecond

wxDateTime& SetMillisecond(wxDateTime_t *millisecond*)

Sets the millisecond without changing other date components.

wxDateTime::operator=

wxDateTime& operator(time_t *time*)

Same as *Set* (p. 249).

wxDateTime::operator=

wxDateTime& operator(const struct tm& *tm*)

Same as *Set* (p. 250).

wxDateTime::IsValid

bool IsValid() const

Returns `true` if the object represents a valid time moment.

wxDateTime::GetTm

Tm GetTm(const TimeZone& tz = Local) const

Returns broken down representation of the date and time.

wxDateTime::GetTicks

time_t GetTicks() const

Returns the number of seconds since Jan 1, 1970. An assert failure will occur if the date is not in the range covered by `time_t` type.

wxDateTime::GetYear

int GetYear(const TimeZone& tz = Local) const

Returns the year in the given timezone (local one by default).

wxDateTime::GetMonth

Month GetMonth(const TimeZone& tz = Local) const

Returns the month in the given timezone (local one by default).

wxDateTime::GetDay

wxDateTime_t GetDay(const TimeZone& tz = Local) const

Returns the day in the given timezone (local one by default).

wxDateTime::GetWeekDay

WeekDay GetWeekDay(const TimeZone& tz = Local) const

Returns the week day in the given timezone (local one by default).

wxDateTime::GetHour

wxDateTime_t GetHour(const TimeZone& tz = Local) const

Returns the hour in the given timezone (local one by default).

wxDateTime::GetMinute

wxDateTime_t GetMinute(const TimeZone& tz = Local) const

Returns the minute in the given timezone (local one by default).

wxDateTime::GetSecond

wxDateTime_t GetSecond(const TimeZone& tz = Local) const

Returns the seconds in the given timezone (local one by default).

wxDateTime::GetMillisecond

wxDateTime_t GetMillisecond(const TimeZone& tz = Local) const

Returns the milliseconds in the given timezone (local one by default).

wxDateTime::GetDayOfYear

wxDateTime_t GetDayOfYear(const TimeZone& tz = Local) const

Returns the day of the year (in 1...366 range) in the given timezone (local one by default).

wxDateTime::GetWeekOfYear

wxDateTime_t GetWeekOfYear(WeekFlags flags = Monday_First, const TimeZone& tz = Local) const

Returns the number of the week of the year this date is in. The first week of the year is, according to international standards, the one containing Jan 4. The week number is in 1...53 range (52 for non leap years).

The function depends on the *week start* (p. 237) convention specified by the *flags* argument.

wxDateTime::GetWeekOfMonth

wxDateTime_t GetWeekOfMonth(WeekFlags flags = Monday_First, const

TimeZone& tz = Local) const

Returns the ordinal number of the week in the month (in 1...5 range).

As *GetWeekOfYear* (p. 253), this function supports both conventions for the week start. See the description of these *week start* (p. 237) conventions.

wxDateTime::IsWorkDay

bool IsWorkDay(Country country = Country_Default) const

Returns `true` if this day is not a holiday in the given country.

wxDateTime::IsGregorianDate

bool IsGregorianDate(GregorianAdoption country = Gr_Standard) const

Returns `true` if the given date is later than the date of adoption of the Gregorian calendar in the given country (and hence the Gregorian calendar calculations make sense for it).

wxDateTime::SetFromDOS

wxDateTime& Set(unsigned long ddt)

Sets the date from the date and time in DOS

(http://developer.novell.com/ndk/doc/smscomp/index.html?page=/ndk/doc/smscomp/sms_docs/data/hc2vlu5i.html) format.

wxDateTime::GetAsDOS

unsigned long GetAsDOS() const

Returns the date and time in DOS

(http://developer.novell.com/ndk/doc/smscomp/index.html?page=/ndk/doc/smscomp/sms_docs/data/hc2vlu5i.html) format.

wxDateTime::IsEqualTo

bool IsEqualTo(const wxDateTime& datetime) const

Returns `true` if the two dates are strictly identical.

wxDateTime::IsEarlierThan

bool IsEarlierThan(const wxDateTime& datetime) const

Returns `true` if this date precedes the given one.

wxDateTime::IsLaterThan

bool IsLaterThan(const wxDateTime& *datetime*) const

Returns `true` if this date is later than the given one.

wxDateTime::IsStrictlyBetween

bool IsStrictlyBetween(const wxDateTime& *t1*, const wxDateTime& *t2*) const

Returns `true` if this date lies strictly between the two others,

[See also](#)

IsBetween (p. 255)

wxDateTime::IsBetween

bool IsBetween(const wxDateTime& *t1*, const wxDateTime& *t2*) const

Returns `true` if *IsStrictlyBetween* (p. 255) is `true` or if the date is equal to one of the limit values.

[See also](#)

IsStrictlyBetween (p. 255)

wxDateTime::IsSameDate

bool IsSameDate(const wxDateTime& *dt*) const

Returns `true` if the date is the same without comparing the time parts.

wxDateTime::IsSameTime

bool IsSameTime(const wxDateTime& *dt*) const

Returns `true` if the time is the same (although dates may differ).

wxDateTime::IsEqualUpTo

bool IsEqualUpTo(const wxDateTime& *dt*, const wxTimeSpan& *ts*) const

Returns `true` if the date is equal to another one up to the given time interval, i.e. if the

absolute difference between the two dates is less than this interval.

wxDateTime::Add

wxDateTime Add(const wxTimeSpan& diff) const

wxDateTime& Add(const wxTimeSpan& diff)

wxDateTime& operator+=(const wxTimeSpan& diff)

Adds the given time span to this object.

wxPython note: This method is named `AddTS` in wxPython.

wxDateTime::Add

wxDateTime Add(const wxDateSpan& diff) const

wxDateTime& Add(const wxDateSpan& diff)

wxDateTime& operator+=(const wxDateSpan& diff)

Adds the given date span to this object.

wxPython note: This method is named `AddDS` in wxPython.

wxDateTime::Subtract

wxDateTime Subtract(const wxTimeSpan& diff) const

wxDateTime& Subtract(const wxTimeSpan& diff)

wxDateTime& operator-=(const wxTimeSpan& diff)

Subtracts the given time span from this object.

wxPython note: This method is named `SubtractTS` in wxPython.

wxDateTime::Subtract

wxDateTime Subtract(const wxDateSpan& diff) const

wxDateTime& Subtract(const wxDateSpan& diff)

wxDateTime& operator-=(const wxDateSpan& diff)

Subtracts the given date span from this object.

wxPython note: This method is named `SubtractDS` in wxPython.

wxDateTime::Subtract

wxTimeSpan Subtract(const wxDateTime& dt) const

Subtracts another date from this one and returns the difference between them as `wxTimeSpan`.

wxDateTime::ParseRfc822Date

const wxChar * ParseRfc822Date(const wxChar* date)

Parses the string *date* looking for a date formatted according to the RFC 822 in it. The exact description of this format may, of course, be found in the RFC (section 5), but, briefly, this is the format used in the headers of Internet email messages and one of the most common strings expressing date in this format may be something like "Sat, 18 Dec 1999 00:48:30 +0100".

Returns `NULL` if the conversion failed, otherwise return the pointer to the character immediately following the part of the string which could be parsed. If the entire string contains only the date in RFC 822 format, the returned pointer will be pointing to a `NUL` character.

This function is intentionally strict, it will return an error for any string which is not RFC 822 compliant. If you need to parse date formatted in more free ways, you should use *ParseDateTime* (p. 258) or *ParseDate* (p. 258) instead.

wxDateTime::ParseFormat

**const wxChar * ParseFormat(const wxChar *date, const wxChar *format = "%c",
const wxDateTime& dateDef = wxDefaultDateTime)**

This function parses the string *date* according to the given *format*. The system `strptime(3)` function is used whenever available, but even if it is not, this function is still implemented, although support for locale-dependent format specifiers such as "%c", "%x" or "%X" may not be perfect and GNU extensions such as "%z" and "%Z" are not implemented. This function does handle the month and weekday names in the current locale on all platforms, however.

Please see the description of the ANSI C function `strptime(3)` for the syntax of the format string.

The *dateDef* parameter is used to fill in the fields which could not be determined from the format string. For example, if the format is "%d" (the day of the month), the month and the year are taken from *dateDef*. If it is not specified, *Today* (p. 248) is used as the default date.

Returns `NULL` if the conversion failed, otherwise return the pointer to the character which stopped the scan.

wxDateTime::ParseDateTime

const wxChar * ParseDateTime(const wxChar *datetime)

Parses the string *datetime* containing the date and time in free format. This function tries as hard as it can to interpret the given string as date and time. Unlike *ParseRfc822Date* (p. 257), it will accept anything that may be accepted and will only reject strings which can not be parsed in any way at all.

Returns `NULL` if the conversion failed, otherwise return the pointer to the character which stopped the scan. This method is currently not implemented, so always returns `NULL`.

wxDateTime::ParseDate

const wxChar * ParseDate(const wxChar *date)

This function is like *ParseDateTime* (p. 258), but it only allows the date to be specified. It is thus less flexible than *ParseDateTime* (p. 258), but also has less chances to misinterpret the user input.

Returns `NULL` if the conversion failed, otherwise return the pointer to the character which stopped the scan.

wxDateTime::ParseTime

const wxChar * ParseTime(const wxChar *time)

This functions is like *ParseDateTime* (p. 258), but only allows the time to be specified in the input string.

Returns `NULL` if the conversion failed, otherwise return the pointer to the character which stopped the scan.

wxDateTime::Format

wxString Format(const wxChar *format = "%c", const TimeZone& tz = Local) const

This function does the same as the standard ANSI C `strftime(3)` function. Please see its description for the meaning of *format* parameter.

It also accepts a few wxWidgets-specific extensions: you can optionally specify the width of the field to follow using `printf(3)`-like syntax and the format specification `%l` can be used to get the number of milliseconds.

[See also](#)

ParseFormat (p. 257)

wxDateTime::FormatDate

wxString FormatDate() const

Identical to calling *Format()* (p. 258) with "%x" argument (which means 'preferred date representation for the current locale').

wxDateTime::FormatTime

wxString FormatTime() const

Identical to calling *Format()* (p. 258) with "%X" argument (which means 'preferred time representation for the current locale').

wxDateTime::FormatISODate

wxString FormatISODate() const

This function returns the date representation in the ISO 8601 format (YYYY-MM-DD).

wxDateTime::FormatISOTime

wxString FormatISOTime() const

This function returns the time representation in the ISO 8601 format (HH:MM:SS).

wxDateTime::SetToWeekDayInSameWeek

wxDateTime& SetToWeekDayInSameWeek(WeekDay weekday, WeekFlags flags = Monday_First)

Adjusts the date so that it will still lie in the same week as before, but its week day will be the given one.

Returns the reference to the modified object itself.

wxDateTime::GetWeekDayInSameWeek

wxDateTime GetWeekDayInSameWeek(WeekDay weekday, WeekFlags flags = Monday_First) const

Returns the copy of this object to which *SetToWeekDayInSameWeek* (p. 259) was applied.

wxDateTime::SetToNextWeekDay

wxDatetime& SetToNextWeekDay(WeekDay weekday)

Sets the date so that it will be the first *weekday* following the current date.

Returns the reference to the modified object itself.

wxDatetime::GetNextWeekDay

wxDatetime GetNextWeekDay(WeekDay weekday) const

Returns the copy of this object to which *SetToNextWeekDay* (p. 259) was applied.

wxDatetime::SetToPrevWeekDay

wxDatetime& SetToPrevWeekDay(WeekDay weekday)

Sets the date so that it will be the last *weekday* before the current date.

Returns the reference to the modified object itself.

wxDatetime::GetPrevWeekDay

wxDatetime GetPrevWeekDay(WeekDay weekday) const

Returns the copy of this object to which *SetToPrevWeekDay* (p. 260) was applied.

wxDatetime::SetToWeekDay

bool SetToWeekDay(WeekDay weekday, int *n* = 1, Month month = Inv_Month, int year = Inv_Year)

Sets the date to the *n*-th *weekday* in the given month of the given year (the current month and year are used by default). The parameter *n* may be either positive (counting from the beginning of the month) or negative (counting from the end of it).

For example, *SetToWeekDay*(2, wxDateTime::Wed) will set the date to the second Wednesday in the current month and *SetToWeekDay*(-1, wxDateTime::Sun) -- to the last Sunday in it.

Returns `true` if the date was modified successfully, `false` otherwise meaning that the specified date doesn't exist.

wxDatetime::GetWeekDay

wxDatetime GetWeekDay(WeekDay weekday, int *n* = 1, Month month = Inv_Month, int year = Inv_Year) const

Returns the copy of this object to which *SetToWeekDay* (p. 260) was applied.

wxDateTime::SetToLastWeekDay

bool SetToLastWeekDay(WeekDay weekday, Month month = Inv_Month, int year = Inv_Year)

The effect of calling this function is the same as of calling `SetToWeekDay(-1, weekday, month, year)`. The date will be set to the last *weekday* in the given month and year (the current ones by default).

Always returns `true`.

wxDateTime::GetLastWeekDay

wxDateTime GetLastWeekDay(WeekDay weekday, Month month = Inv_Month, int year = Inv_Year)

Returns the copy of this object to which `SetToLastWeekDay` (p. 261) was applied.

wxDateTime::SetToTheWeek

bool SetToTheWeek(wxDateTime_t numWeek, WeekDay weekday = Mon, WeekFlags flags = Monday_First)

Set the date to the given *weekday* in the week with given number *numWeek*. The number should be in range 1...53 and `false` will be returned if the specified date doesn't exist. `true` is returned if the date was changed successfully.

wxDateTime::GetWeek

wxDateTime GetWeek(wxDateTime_t numWeek, WeekDay weekday = Mon, WeekFlags flags = Monday_First) const

Returns the copy of this object to which `SetToTheWeek` (p. 261) was applied.

wxDateTime::SetToLastMonthDay

wxDateTime& SetToLastMonthDay(Month month = Inv_Month, int year = Inv_Year)

Sets the date to the last day in the specified month (the current one by default).

Returns the reference to the modified object itself.

wxDateTime::GetLastMonthDay

wxDateTime GetLastMonthDay(Month month = Inv_Month, int year = Inv_Year) const

Returns the copy of this object to which *SetToLastMonthDay* (p. 261) was applied.

wxDateTime::SetToYearDay

wxDateTime& SetToYearDay(wxDateTime_t yday)

Sets the date to the day number *yday* in the same year (i.e., unlike the other functions, this one does not use the current year). The day number should be in the range 1...366 for the leap years and 1...365 for the other ones.

Returns the reference to the modified object itself.

wxDateTime::GetYearDay

wxDateTime GetYearDay(wxDateTime_t yday) const

Returns the copy of this object to which *SetToYearDay* (p. 262) was applied.

wxDateTime::GetJulianDayNumber

double GetJulianDayNumber() const

Returns the *JDN* (p. 250) corresponding to this date. Beware of rounding errors!

[See also](#)

GetModifiedJulianDayNumber (p. 262)

wxDateTime::GetJDN

double GetJDN() const

Synonym for *GetJulianDayNumber* (p. 262).

wxDateTime::GetModifiedJulianDayNumber

double GetModifiedJulianDayNumber() const

Returns the *Modified Julian Day Number* (MJD) which is, by definition, equal to JDN - 2400000.5. The MJDs are simpler to work with as the integral MJDs correspond to midnights of the dates in the Gregorian calendar and not th noons like JDN. The MJD 0 is Nov 17, 1858.

wxDateTime::GetMJD

double GetMJD() const

Synonym for *GetModifiedJulianDayNumber* (p. 262).

wxDateTime::GetRataDie

double GetRataDie() const

Return the *Rata Die number* of this date.

By definition, the Rata Die number is a date specified as the number of days relative to a base date of December 31 of the year 0. Thus January 1 of the year 1 is Rata Die day 1.

wxDateTime::ToTimezone

wxDateTime ToTimezone(const TimeZone& tz, bool noDST = false) const

Transform the date to the given time zone. If *noDST* is `true`, no DST adjustments will be made.

Returns the date in the new time zone.

wxDateTime::MakeTimezone

wxDateTime& MakeTimezone(const TimeZone& tz, bool noDST = false)

Modifies the object in place to represent the date in another time zone. If *noDST* is `true`, no DST adjustments will be made.

wxDateTime::ToGMT

wxDateTime ToGMT(bool noDST = false) const

This is the same as calling *ToTimezone* (p. 263) with the argument `GMT0`.

wxDateTime::MakeGMT

wxDateTime& MakeGMT(bool noDST = false)

This is the same as calling *MakeTimezone* (p. 263) with the argument `GMT0`.

wxDateTime::IsDST

int IsDST(Country country = Country_Default) const

Returns `true` if the DST is applied for this date in the given country.

[See also](#)

GetBeginDST (p. 245) and *GetEndDST* (p. 246)

wxDateTimeHolidayAuthority

TODO

wxDateTimeWorkDays

TODO

wxDb

A `wxDb` instance is a connection to an ODBC datasource which may be opened, closed, and re-opened an unlimited number of times. A database connection allows function to be performed directly on the datasource, as well as allowing access to any tables/views defined in the datasource to which the user has sufficient privileges.

See the *database classes overview* (p. 1675) for an introduction to using the ODBC classes.

Include files

<wx/db.h>

Helper classes and data structures

The following classes and structs are defined in `db.cpp/.h` for use with the `wxDb` class.

- *wxDbColFor* (p. 294)
- *wxDbColInf* (p. 295)
- *wxDbTableInf* (p. 337)
- *wxDbInf* (p. 302)

Constants

NOTE: In a future release, all ODBC class constants will be prefaced with 'wx'.

<code>wxDB_PATH_MAX</code>	Maximum path length allowed to be passed to the ODBC driver to indicate where the data file(s) are located.
<code>DB_MAX_COLUMN_NAME_LEN</code>	Maximum supported length for the name of a column
<code>DB_MAX_ERROR_HISTORY</code>	Maximum number of error messages retained in the queue before being overwritten by new errors.
<code>DB_MAX_ERROR_MSG_LEN</code>	Maximum supported length of an error message

	returned by the ODBC classes
DB_MAX_STATEMENT_LEN	Maximum supported length for a complete SQL statement to be passed to the ODBC driver
DB_MAX_TABLE_NAME_LEN	Maximum supported length for the name of a table
DB_MAX_WHERE_CLAUSE_LEN	Maximum supported WHERE clause length that can be passed to the ODBC driver
DB_TYPE_NAME_LEN	Maximum length of the name of a column's data type

Enumerated types

Enumerated types

enum wxDbSqlLogState

sqlLogOFF, sqlLogON

enum wxDBMS

These are the databases currently tested and working with the ODBC classes. A call to *wxDb::Dbms* (p. 274) will return one of these enumerated values listed below.

```

dbmsUNIDENTIFIED
dbmsORACLE
dbmsSYBASE_ASA      // Adaptive Server Anywhere
dbmsSYBASE_ASE      // Adaptive Server Enterprise
dbmsMS_SQL_SERVER
dbmsMY_SQL
dbmsPOSTGRES
dbmsACCESS
dbmsDBASE
dbmsINFORMIX
dbmsVIRTUOSO
dbmsDB2
dbmdINTERBASE

```

See the remarks in *wxDb::Dbms* (p. 274) for exceptions/issues with each of these database engines.

Public member variables

SWORD wxDb::cbErrorMsg

This member variable is populated as a result of calling *wxDb::GetNextError* (p. 282). Contains the count of bytes in the *wxDb::errorMsg* string.

int wxDb::DB_STATUS

The last ODBC error/status that occurred on this data connection. Possible codes are:

```

DB_ERR_GENERAL_WARNING      // SqlState = '01000'
DB_ERR_DISCONNECT_ERROR    // SqlState = '01002'
DB_ERR_DATA_TRUNCATED      // SqlState = '01004'
DB_ERR_PRIV_NOT_REVOKED    // SqlState = '01006'
DB_ERR_INVALID_CONN_STR_ATTR // SqlState = '01S00'

```

```

DB_ERR_ERROR_IN_ROW                // SqlState = '01S01'
DB_ERR_OPTION_VALUE_CHANGED        // SqlState = '01S02'
DB_ERR_NO_ROWS_UPD_OR_DEL         // SqlState = '01S03'
DB_ERR_MULTI_ROWS_UPD_OR_DEL      // SqlState = '01S04'
DB_ERR_WRONG_NO_OF_PARAMS         // SqlState = '07001'
DB_ERR_DATA_TYPE_ATTR_VIOL        // SqlState = '07006'
DB_ERR_UNABLE_TO_CONNECT          // SqlState = '08001'
DB_ERR_CONNECTION_IN_USE          // SqlState = '08002'
DB_ERR_CONNECTION_NOT_OPEN        // SqlState = '08003'
DB_ERR_REJECTED_CONNECTION        // SqlState = '08004'
DB_ERR_CONN_FAIL_IN_TRANS         // SqlState = '08007'
DB_ERR_COMM_LINK_FAILURE          // SqlState = '08S01'
DB_ERR_INSERT_VALUE_LIST_MISMATCH // SqlState = '21S01'
DB_ERR_DERIVED_TABLE_MISMATCH     // SqlState = '21S02'
DB_ERR_STRING_RIGHT_TRUNC         // SqlState = '22001'
DB_ERR_NUMERIC_VALUE_OUT_OF_RNG   // SqlState = '22003'
DB_ERR_ERROR_IN_ASSIGNMENT        // SqlState = '22005'
DB_ERR_DATETIME_FLD_OVERFLOW      // SqlState = '22008'
DB_ERR_DIVIDE_BY_ZERO             // SqlState = '22012'
DB_ERR_STR_DATA_LENGTH_MISMATCH   // SqlState = '22026'
DB_ERR_INTEGRITY_CONSTRAINT_VIOL  // SqlState = '23000'
DB_ERR_INVALID_CURSOR_STATE       // SqlState = '24000'
DB_ERR_INVALID_TRANS_STATE        // SqlState = '25000'
DB_ERR_INVALID_AUTH_SPEC          // SqlState = '28000'
DB_ERR_INVALID_CURSOR_NAME        // SqlState = '34000'
DB_ERR_SYNTAX_ERROR_OR_ACCESS_VIOL // SqlState = '37000'
DB_ERR_DUPLICATE_CURSOR_NAME      // SqlState = '3C000'
DB_ERR_SERIALIZATION_FAILURE      // SqlState = '40001'
DB_ERR_SYNTAX_ERROR_OR_ACCESS_VIOL2 // SqlState = '42000'
DB_ERR_OPERATION_ABORTED          // SqlState = '70100'
DB_ERR_UNSUPPORTED_FUNCTION       // SqlState = 'IM001'
DB_ERR_NO_DATA_SOURCE             // SqlState = 'IM002'
DB_ERR_DRIVER_LOAD_ERROR          // SqlState = 'IM003'
DB_ERR_SQLALLOCENV_FAILED         // SqlState = 'IM004'
DB_ERR_SQLALLOCCONNECT_FAILED     // SqlState = 'IM005'
DB_ERR_SQLSETCONNECTOPTION_FAILED // SqlState = 'IM006'
DB_ERR_NO_DATA_SOURCE_DLG_PROHIB  // SqlState = 'IM007'
DB_ERR_DIALOG_FAILED              // SqlState = 'IM008'
DB_ERR_UNABLE_TO_LOAD_TRANSLATION_DLL // SqlState = 'IM009'
DB_ERR_DATA_SOURCE_NAME_TOO_LONG  // SqlState = 'IM010'
DB_ERR_DRIVER_NAME_TOO_LONG       // SqlState = 'IM011'
DB_ERR_DRIVER_KEYWORD_SYNTAX_ERROR // SqlState = 'IM012'
DB_ERR_TRACE_FILE_ERROR           // SqlState = 'IM013'
DB_ERR_TABLE_OR_VIEW_ALREADY_EXISTS // SqlState = 'S0001'
DB_ERR_TABLE_NOT_FOUND            // SqlState = 'S0002'
DB_ERR_INDEX_ALREADY_EXISTS       // SqlState = 'S0011'
DB_ERR_INDEX_NOT_FOUND           // SqlState = 'S0012'
DB_ERR_COLUMN_ALREADY_EXISTS      // SqlState = 'S0021'
DB_ERR_COLUMN_NOT_FOUND          // SqlState = 'S0022'
DB_ERR_NO_DEFAULT_FOR_COLUMN     // SqlState = 'S0023'
DB_ERR_GENERAL_ERROR              // SqlState = 'S1000'
DB_ERR_MEMORY_ALLOCATION_FAILURE    // SqlState = 'S1001'
DB_ERR_INVALID_COLUMN_NUMBER      // SqlState = 'S1002'
DB_ERR_PROGRAM_TYPE_OUT_OF_RANGE  // SqlState = 'S1003'
DB_ERR_SQL_DATA_TYPE_OUT_OF_RANGE // SqlState = 'S1004'
DB_ERR_OPERATION_CANCELLED        // SqlState = 'S1008'
DB_ERR_INVALID_ARGUMENT_VALUE     // SqlState = 'S1009'
DB_ERR_FUNCTION_SEQUENCE_ERROR    // SqlState = 'S1010'
DB_ERR_OPERATION_INVALID_AT_THIS_TIME // SqlState = 'S1011'
DB_ERR_INVALID_TRANS_OPERATION_CODE // SqlState = 'S1012'
DB_ERR_NO_CURSOR_NAME_AVAIL       // SqlState = 'S1015'
DB_ERR_INVALID_STR_OR_BUF_LEN     // SqlState = 'S1090'
DB_ERR_DESCRIPTOR_TYPE_OUT_OF_RANGE // SqlState = 'S1091'
DB_ERR_OPTION_TYPE_OUT_OF_RANGE   // SqlState = 'S1092'
DB_ERR_INVALID_PARAM_NO          // SqlState = 'S1093'
DB_ERR_INVALID_SCALE_VALUE        // SqlState = 'S1094'
DB_ERR_FUNCTION_TYPE_OUT_OF_RANGE  // SqlState = 'S1095'
DB_ERR_INF_TYPE_OUT_OF_RANGE      // SqlState = 'S1096'
DB_ERR_COLUMN_TYPE_OUT_OF_RANGE   // SqlState = 'S1097'
DB_ERR_SCOPE_TYPE_OUT_OF_RANGE    // SqlState = 'S1098'
DB_ERR_NULLABLE_TYPE_OUT_OF_RANGE // SqlState = 'S1099'
DB_ERR_UNIQUENESS_OPTION_TYPE_OUT_OF_RANGE // SqlState = 'S1100'

```

```

DB_ERR_ACCURACY_OPTION_TYPE_OUT_OF_RANGE // SqlState = 'S1101'
DB_ERR_DIRECTION_OPTION_OUT_OF_RANGE    // SqlState = 'S1103'
DB_ERR_INVALID_PRECISION_VALUE           // SqlState = 'S1104'
DB_ERR_INVALID_PARAM_TYPE                // SqlState = 'S1105'
DB_ERR_FETCH_TYPE_OUT_OF_RANGE           // SqlState = 'S1106'
DB_ERR_ROW_VALUE_OUT_OF_RANGE             // SqlState = 'S1107'
DB_ERR_CONCURRENCY_OPTION_OUT_OF_RANGE   // SqlState = 'S1108'
DB_ERR_INVALID_CURSOR_POSITION            // SqlState = 'S1109'
DB_ERR_INVALID_DRIVER_COMPLETION          // SqlState = 'S1110'
DB_ERR_INVALID_BOOKMARK_VALUE             // SqlState = 'S1111'
DB_ERR_DRIVER_NOT_CAPABLE                 // SqlState = 'S1C00'
DB_ERR_TIMEOUT_EXPIRED                    // SqlState = 'S1T00'

```

struct wxDb::dbInf

This structure is internal to the wxDb class and contains details of the ODBC datasource that the current instance of the wxDb is connected to in its members. When the datasource is opened, all of the information contained in the dbInf structure is queried from the datasource. This information is used almost exclusively within the ODBC class library. Where there may be a need for particular portions of this information outside of the class library, member functions (e.g. *wxDTable::IsCursorClosedOnCommit* (p. 322)) have been added for ease of use.

```

wxChar dbmsName[40]           - Name of the dbms product
wxChar dbmsVer[64]            - Version # of the dbms product
wxChar driverName[40]         - Driver name
wxChar odbcVer[60]            - ODBC version of the driver
wxChar drvMgrOdbcVer[60]      - ODBC version of the driver manager
wxChar driverVer[60]          - Driver version
wxChar serverName[80]         - Server Name, typically a connect string
wxChar databaseName[128]      - Database filename
wxChar outerJoins[2]          - Does datasource support outer joins
wxChar procedureSupport[2]    - Does datasource support stored
                                procedures
UWORD  maxConnections         - Maximum # of connections datasource
                                supports
UWORD  maxStmts               - Maximum # of HSTMTs per HDBC
UWORD  apiConfLvl             - ODBC API conformance level
UWORD  cliConfLvl             - Is datasource SAG compliant
UWORD  sqlConfLvl             - SQL conformance level
UWORD  cursorCommitBehavior    - How cursors are affected on db commit
UWORD  cursorRollbackBehavior - How cursors are affected on db
                                rollback
UWORD  supportNotNullClause    - Does datasource support NOT NULL
                                clause
wxChar supportIEF[2]          - Integrity Enhancement Facility (Ref.
                                Integrity)
UDWORD txnIsolation           - Transaction isolation level supported by
                                driver
UDWORD txnIsolationOptions    - Transaction isolation level options
                                available
UDWORD fetchDirections        - Fetch directions supported
UDWORD lockTypes              - Lock types supported in SQLSetPos
UDWORD posOperations           - Position operations supported in
                                SQLSetPos
UDWORD posStmts               - Position statements supported
UDWORD scrollConcurrency       - Scrollable cursor concurrency options
                                supported
UDWORD scrollOptions           - Scrollable cursor options supported
UDWORD staticSensitivity       - Can additions/deletions/updates be
                                detected
UWORD  txnCapable              - Indicates if datasource supports
                                transactions
UDWORD loginTimeout           - Number seconds to wait for a login
                                request

```

wxChar **wxDdb::errorList**[DB_MAX_ERROR_HISTORY][DB_MAX_ERROR_MSG_LEN]

The last n ODBC errors that have occurred on this database connection.

wxChar **wxDdb::errorMsg**[SQL_MAX_MESSAGE_LENGTH]

This member variable is populated as a result of calling *wxDdb::GetNextError* (p. 282). It contains the ODBC error message text.

SDWORD **wxDdb::nativeError**

Set by *wxDdb::DispAllErrors*, *wxDdb::GetNextError*, and *wxDdb::DispNextError*. It contains the datasource-specific error code returned by the datasource to the ODBC driver. Used for reporting ODBC errors.

wxChar **wxDdb::sqlState**[20]

Set by *wxDdb::TranslateSqlState*(). Indicates the error state after a failed ODBC operation. Used for reporting ODBC errors.

Remarks

Default cursor scrolling is defined by *wxODBC_FWD_ONLY_CURSORS* in *setup.h* when the *wxWidgets* library is built. This behavior can be overridden when an instance of a *wxDdb* is created (see *wxDdb constructor* (p. 270)). Default setting of this value true, as not all databases/drivers support both types of cursors.

See also

wxDdbColFor (p. 294), *wxDdbCollnf* (p. 295), *wxDdbTable* (p. 302), *wxDdbTableInf* (p. 337), *wxDdbInf* (p. 302)

Associated non-class functions

The following functions are used in conjunction with the *wxDdb* class.

void wxDbCloseConnections()

Remarks

Closes all cached connections that have been made through use of the *wxDdbGetConnection* (p. 268) function.

NOTE: These connections are closed regardless of whether they are in use or not. This function should only be called after the program has finished using the connections and all *wxDdbTable* instances that use any of the connections have been closed.

This function performs a *wxDdb::CommitTrans* (p. 272) on the connection before closing it to commit any changes that are still pending, as well as to avoid any function sequence errors upon closing each connection.

int wxDbConnectionsInUse()

Remarks

Returns a count of how many database connections are currently free (not being used) that have been cached through use of the *wxDdbGetConnection* (p. 268)function.

bool wxDbFreeConnection(wxDdb *pDb)

Remarks

Searches the list of cached database connections connection for one matching the passed in wxDb instance. If found, that cached connection is freed.

Freeing a connection means that it is marked as available (free) in the cache of connections, so that a call to *wxDdbGetConnection* (p. 268)is able to return a pointer to the wxDb instance for use. Freeing a connection does NOT close the connection, it only makes the connection available again.

**wxDdb * wxDbGetConnection(wxDdbConnectInf *pDbConfig,bool
FwdOnlyCursors=(bool)wxODBC_FWD_ONLY_CURSORS)**

Remarks

This function is used to request a "new" wxDb instance for use by the program. The wxDb instance returned is also opened (see *wxDdb::Open* (p. 286)).

This function (along with *wxDdbFreeConnection()* and *wxDdbCloseConnection()*) maintain a cached of wxDb instances for user/re-use by a program. When a program needs a wxDb instance, it may call this function to obtain a wxDb instance. If there is a wxDb instance in the cache that is currently unused that matches the connection requirements specified in '*pDbConfig*' then that cached connection is marked as no longer being free, and a pointer to the wxDb instance is returned.

If there are no connections available in the cache that meet the requirements given in '*pDbConfig*', then a new wxDb instance is created to connect to the datasource specified in '*pDbConfig*' using the userID and password given in '*pDbConfig*'.

NOTE: The caching routine also uses the *wxDdb::Open* (p. 286)connection datatype copying code. If the call to *wxDdbGetConnection()* requests a connection to a datasource, and there is not one available in the cache, a new connection is created. But when the connection is opened, instead of polling the datasource over again for its datatypes, if a connection to the same datasource (using the same userID/password) has already been done previously, the new connection skips querying the datasource for its datatypes, and uses the same datatypes determined previously by the other connection(s) for that same datasource. This cuts down greatly on network traffic, database load, and connection creation time.

When the program is done using a connection created through a call to *wxDdbGetConnection()*, the program should call *wxDdbFreeConnection()* to release the wxDb instance back to the cache. DO NOT DELETE THE wxDb INSTANCE! Deleting the wxDb instance returned can cause a crash/memory corruption later in the program when the cache is cleaned up.

When exiting the program, call *wxDdbCloseConnections()* to close all the cached

connections created by calls to `wxDcGetConnection()`.

const wxChar * wxDbLogExtendedErrorMsg(const wxChar *userText, wxDb *pDb, wxChar *ErrFile, int ErrLine)

Writes a message to the wxLog window (stdout usually) when an internal error situation occurs.

bool wxDbSqlLog(wxDbSqlLogState state, const wxString &filename = SQL_LOG_FILENAME)

Remarks

This function sets the sql log state for all open wxDb objects

bool wxDbGetDataSource(HENV henv, wxChar *Dsn, SWORD DsnMax, wxChar *DsDesc, SWORD DsDescMax, UWORD direction = SQL_FETCH_NEXT)

Remarks

This routine queries the ODBC driver manager for a list of available datasources. Repeatedly call this function to obtain all the datasources available through the ODBC driver manager on the current workstation.

```
wxStringList strList;

while (wxDbGetDataSource(DbConnectInf.GetHenv(), Dsn,
    SQL_MAX_DSN_LENGTH+1, DsDesc, 255))
    strList.Add(Dsn);
```

wxDc::wxDc

wxDc()

Default constructor.

wxDc(const HENV &aHenv, bool FwdOnlyCursors=(bool)wxODBC_FWD_ONLY_CURSORS)

Constructor, used to create an ODBC connection to a datasource.

Parameters

aHenv

Environment handle used for this connection. See `wxDConnectInf::AllocHenv` (p. 298)

FwdOnlyCursors

Will cursors created for use with this datasource connection only allow forward scrolling cursors.

Remarks

This is the constructor for the `wxDdb` class. The `wxDdb` object must be created and opened before any database activity can occur.

Example

```
wxDdbConnectInf ConnectInf;
....Set values for member variables of ConnectInf here

wxDdb sampleDB(ConnectInf.GetHenv());
if (!sampleDB.Open(ConnectInf.GetDsn(), ConnectInf.GetUserID(),
                  ConnectInf.GetPassword()))
{
    // Error opening datasource
}
```

See also

wxDdbGetConnection (p. 268)

wxDdb::Catalog

```
bool Catalog(wxChar * userID, const wxString &fileName =
SQL_CATALOG_FILENAME)
```

Allows a data "dictionary" of the datasource to be created, dumping pertinent information about all data tables to which the user specified in `userID` has access.

Parameters

userID

Database user name to use in accessing the database. All tables to which this user has rights will be evaluated in the catalog.

fileName

OPTIONAL. Name of the text file to create and write the DB catalog to. Default is `SQL_CATALOG_FILENAME`.

Return value

Returns true if the catalog request was successful, or false if there was some reason that the catalog could not be generated.

Example

```
=====
TABLE NAME      COLUMN NAME      DATA TYPE      PRECISION      LENGTH
=====
EMPLOYEE        RECID              (0008)NUMBER      15              8
EMPLOYEE        USER_ID            (0012)VARCHAR2     13             13
EMPLOYEE        FULL_NAME          (0012)VARCHAR2     26             26
EMPLOYEE        PASSWORD           (0012)VARCHAR2     26             26
EMPLOYEE        START_DATE         (0011)DATE         19             16
```

wxDB::Close

void Close()

Closes the database connection.

Remarks

At the end of your program, when you have finished all of your database work, you must close the ODBC connection to the datasource. There are actually four steps involved in doing this as illustrated in the example.

Any wxDbTable instances which use this connection must be deleted before closing the database connection.

Example

```
// Commit any open transactions on the datasource
sampleDB.CommitTrans();

// Delete any remaining wxDbTable objects allocated with new
delete parts;

// Close the wxDb connection when finished with it
sampleDB.Close();
```

wxDB::CommitTrans

bool CommitTrans()

Permanently "commits" changes (insertions/deletions/updates) to the database.

Return value

Returns true if the commit was successful, or false if the commit failed.

Remarks

Transactions begin implicitly as soon as you make a change to the database with an insert/update/delete, or any other direct SQL command that performs one of these operations against the datasource. At any time thereafter, to save the changes to disk permanently, "commit" them by calling this function.

Calling this member function commits ALL open transactions on this ODBC connection. For example, if three different wxDbTable instances used the same connection to the datasource, committing changes made on one of those wxDbTable instances commits any pending transactions on all three wxDbTable instances.

Until a call to wxDb::CommitTrans() is made, no other user or cursor is able to see any changes made to the row(s) that have been inserted/modified/deleted.

Special Note : Cursors

It is important to understand that different database/ODBC driver combinations handle

transactions differently. One thing in particular that you must pay attention to is cursors, in regard to transactions. Cursors are what allow you to scroll through records forward and backward and to manipulate records as you scroll through them. When you issue a query, a cursor is created behind the scenes. The cursor keeps track of the query and keeps track of the current record pointer. After you commit or rollback a transaction, the cursor may be closed automatically. This is database dependent, and with some databases this behavior can be controlled through management functions. This means you would need to requery the datasource before you can perform any additional work using this cursor. This is only necessary however if the datasource closes the cursor after a commit or rollback. Use the `wxDbTable::IsCursorClosedOnCommit` (p. 322) member function to determine the datasource's transaction behavior. Note, in many situations it is very inefficient to assume the cursor is closed and always requery. This could put a significant, unnecessary load on datasources that leave the cursors open after a transaction.

wxDb::CreateView

bool CreateView(const wxString & viewName, const wxString & collist, const wxString & pSqlStmt)

Creates a SQL VIEW of one or more tables in a single datasource. Note that this function will only work against databases which support views (currently only Oracle as of November 21 2000).

Parameters

viewName

The name of the view. e.g. PARTS_V

collist

OPTIONAL Pass in a comma delimited list of column names if you wish to explicitly name each column in the result set. If not desired, pass in an empty string and the column names from the associated table(s) will be used.

pSqlStmt

Pointer to the select statement portion of the CREATE VIEW statement. Must be a complete, valid SQL SELECT statement.

Remarks

A 'view' is a logical table that derives columns from one or more other tables or views. Once the view is created, it can be queried exactly like any other table in the database.

NOTE: Views are not available with all datasources. Oracle is one example of a datasource which does support views.

Example

```
// Incomplete code sample
db.CreateView("PARTS_SD1", "PN, PD, QTY",
```

```
\
        "SELECT PART_NO, PART_DESC, QTY_ON_HAND * 1.1 FROM PARTS
        WHERE STORAGE_DEVICE = 1");

// PARTS_SD1 can now be queried just as if it were a data table.
// e.g. SELECT PN, PD, QTY FROM PARTS_SD1
```

wxDdb::Dbms

wxDDBMS Dbms()

Remarks

The return value will be of the enumerated type wxDBMS. This enumerated type contains a list of all the currently tested and supported databases.

Additional databases may work with these classes, but the databases returned by this function have been tested and confirmed to work with these ODBC classes.

Possible values returned by this function can be viewed in the *Enumerated types* (p. 265) section of wxDb.

There are known issues with conformance to the ODBC standards with several datasources supported by the wxWidgets ODBC classes. Please see the overview for specific details on which datasource have which issues.

Return value

The return value will indicate which of the supported datasources is currently connected to by this connection. In the event that the datasource is not recognized, a value of 'dbmsUNIDENTIFIED' is returned.

wxDdb::DispAllErrors

```
bool DispAllErrors(HENV aHenv, HDBC aHdbc = SQL_NULL_HDBC, HSTMT aHstmt
= SQL_NULL_HSTMT)
```

Used to log all database errors that occurred as a result of an executed database command. This logging is automatic and also includes debug logging when compiled in debug mode via *wxLogDebug* (p. 1530). If logging is turned on via *wxDdb::SetSqlLogging* (p. 289), then an entry is also logged to the defined log file.

Parameters

aHenv

Handle to the ODBC environment.

aHdbc

Handle to the ODBC connection. Pass this in if the ODBC function call that erred required a hdbc or hstmt argument.

aHstmt

Handle to the ODBC statement being executed against. Pass this in if the ODBC function call that failed required a hstmt argument.

Remarks

This member function will log all of the ODBC error messages for the last ODBC function call that was made. This function is normally used internally within the ODBC class library, but can be used programmatically after calling ODBC functions directly (i.e. `SQLFreeEnv()`).

Return value

The function always returns false, so a call to this function can be made in the return statement of a code block in the event of a failure to perform an action (see the example below).

See also

`wxDb::SetSqlLogging` (p. 289), `wxDbSqlLog`

Example

```
if (SQLExecDirect(hstmt, (UCHAR FAR *) pSqlStmt, SQL_NTS) !=
SQL_SUCCESS)
    // Display all ODBC errors for this stmt
    return(db.DispAllErrors(db.henv, db.hdbc, hstmt));
```

`wxDb::DispNextError`

`void DispNextError()`**Remarks**

This function is normally used internally within the ODBC class library. It could be used programmatically after calling ODBC functions directly. This function works in conjunction with `wxDb::GetNextError` (p. 282) when errors (or sometimes informational messages) returned from ODBC need to be analyzed rather than simply displaying them as an error. `GetNextError()` retrieves the next ODBC error from the ODBC error queue. The `wxDb` member variables "sqlState", "nativeError" and "errorMsg" could then be evaluated. To display the error retrieved, `DispNextError()` could then be called. The combination of `GetNextError()` and `DispNextError()` can be used to iteratively step through the errors returned from ODBC evaluating each one in context and displaying the ones you choose.

Example

```
// Drop the table before attempting to create it
sprintf(sqlStmt, "DROP TABLE %s", tableName);
// Execute the drop table statement
if (SQLExecDirect(hstmt, (UCHAR FAR *)sqlStmt, SQL_NTS) != SQL_SUCCESS)
{
    // Check for sqlState = S0002, "Table or view not found".
    // Ignore this error, bomb out on any other error.
    pDb->GetNextError(henv, hdbc, hstmt);
```

```
        if (wxStrcmp(pDb->sqlState, "S0002"))
        {
            pDb->DispNextError();    // Displayed error retrieved
            pDb->DispAllErrors(henv, hdbc, hstmt); // Display all other
errors, if any
            pDb->RollbackTrans();    // Rollback the transaction
            CloseCursor();           // Close the cursor
            return(false);           // Return Failure
        }
    }
```

wxDdb::DropView

bool DropView(const wxString &viewName)

Drops the data table view named in 'viewName'.

Parameters

viewName

Name of the view to be dropped.

Remarks

If the view does not exist, this function will return true. Note that views are not supported with all datasources.

wxDdb::ExecSql

bool ExecSql(const wxString &pSqlStmt)

Allows a native SQL command to be executed directly against the datasource. In addition to being able to run any standard SQL command, use of this function allows a user to (potentially) utilize features specific to the datasource they are connected to that may not be available through ODBC. The ODBC driver will pass the specified command directly to the datasource.

Parameters

pSqlStmt

Pointer to the SQL statement to be executed.

Remarks

This member extends the wxDb class and allows you to build and execute ANY VALID SQL statement against the datasource. This allows you to extend the class library by being able to issue any SQL statement that the datasource is capable of processing.

See also

wxDdb::GetData (p. 279), *wxDdb::GetNext* (p. 281)

wxDdb::FwdOnlyCursors

bool IsFwdOnlyCursors()

Older form (pre-2.3/2.4 of wxWidgets) of the `wxDdb::IsFwdOnlyCursors` (p. 283). This method is provided for backward compatibility only. The method `wxDdb::IsFwdOnlyCursors` (p. 283) should be used in place of this method.

wxDdbInf * GetCatalog(const wxChar *userID)

wxDdb::GetCatalog

wxDdbInf * GetCatalog(const wxChar *userID)

Returns a `wxDdbInf` (p. 302) pointer that points to the catalog (datasource) name, schema, number of tables accessible to the current user, and a `wxDdbTableInf` pointer to all data pertaining to all tables in the users catalog.

Parameters

userID

Owner/Schema of the table. Specify a *userID* when the datasource you are connected to allows multiple unique tables with the same name to be owned by different users. *userID* is evaluated as follows:

```
userID == NULL    ... UserID is ignored (DEFAULT)
userID == ""      ... UserID set equal to 'this->uid'
userID != ""      ... UserID set equal to 'userID'
```

Remarks

The returned catalog will only contain catalog entries for tables to which the user specified in 'userID' has sufficient privileges. If no user is specified (NULL passed in), a catalog pertaining to all tables in the datasource accessible to the connected user (permissions apply) via this connection will be returned.

wxDdb::GetColumnCount

int GetColumnCount(const wxString &tableName, const wxChar *userID)

Parameters

tableName

The table name you wish to obtain column information about.

userID

Name of the user that owns the table(s) (also referred to as schema). Required for some datasources for situations where there may be multiple tables with the same name in the datasource, but owned by different users. *userID* is evaluated in the

following manner:

```
userID == NULL    ... UserID is ignored (DEFAULT)
userID == ""      ... UserID set equal to 'this->uid'
userID != ""      ... UserID set equal to 'userID'
```

Return value

Returns a count of how many columns are in the specified table. If an error occurs retrieving the number of columns, this function will return a -1.

wxDdb::GetColumns

wxDdbColInf * GetColumns(const wxString &tableName, UWORD *numCols, const wxChar *userID=NULL)

wxDdbColInf * GetColumns(wxChar *tableName[], const wxChar *userID)

Parameters

tableName

The table name you wish to obtain column information about.

numCols

Pointer to a UWORD which will hold a count of the number of columns returned by this function

tableName[]

An array of pointers to table names you wish to obtain column information about. The last element of this array must be a NULL string.

userID

Name of the user that owns the table(s) (also referred to as schema). Required for some datasources for situations where there may be multiple tables with the same name in the datasource, but owned by different users. *userID* is evaluated in the following manner:

```
userID == NULL    ... UserID is ignored (DEFAULT)
userID == ""      ... UserID set equal to 'this->uid'
userID != ""      ... UserID set equal to 'userID'
```

Return value

This function returns a pointer to an array of *wxDdbColInf* (p. 295) structures, allowing you to obtain information regarding the columns of the named table(s). If no columns were found, or an error occurred, this pointer will be NULL.

THE CALLING FUNCTION IS RESPONSIBLE FOR DELETING THE *wxDdbColInf* MEMORY WHEN IT IS FINISHED WITH IT.

ALL column bindings associated with this wxDb instance are unbound by this function,
--

including those used by any `wxDbTable` instances that use this `wxDb` instance. This function should use its own `wxDb` instance to avoid undesired unbinding of columns.

See also

`wxDbColInf` (p. 295)

Example

```
wxChar *tableList[] = {"PARTS", 0};
wxDbColInf *colInf = pDb->GetColumns(tableList);
if (colInf)
{
    // Use the column inf
    .....
    // Destroy the memory
    delete [] colInf;
}
```

`wxDb::GetData`

bool `GetData(UWORD colNo, SWORD cType, PTR pData, SDWORD maxlen, SDWORD FAR * cbReturned)`

Used to retrieve result set data without binding column values to memory variables (i.e. not using a `wxDbTable` instance to access table data).

Parameters

colNo

Ordinal number of the desired column in the result set to be returned.

cType

The C data type that is to be returned. See a partial list in `wxDbTable::SetColDefs` (p. 329)

pData

Memory buffer which will hold the data returned by the call to this function.

maxLen

Maximum size of the buffer '*pData*' in characters. NOTE: Not UNICODE safe. If this is a numeric field, a value of 0 may be passed for this parameter, as the API knows the size of the expected return value.

cbReturned

Pointer to the buffer containing the length of the actual data returned. If this value comes back as `SQL_NULL_DATA`, then the `wxDb::GetData` (p. 279) call has failed.

See also

`wxDb::GetNext` (p. 281), `wxDb::ExecSql` (p. 276)

Example

```
SDWORD cb;
ULONG reqQty;
wxString sqlStmt;
sqlStmt = "SELECT SUM(REQUIRED_QTY - PICKED_QTY) FROM ORDER_TABLE
WHERE \
        PART_RECID = 1450 AND REQUIRED_QTY > PICKED_QTY";

// Perform the query
if (!pDb->ExecSql(sqlStmt.c_str()))
{
    // ERROR
    return(0);
}

// Request the first row of the result set
if (!pDb->GetNext())
{
    // ERROR
    return(0);
}

// Read column #1 of the row returned by the call to ::GetNext()
// and return the value in 'reqQty'
if (!pDb->GetData(1, SQL_C_ULONG, &reqQty, 0, &cb))
{
    // ERROR
    return(0);
}

// Check for a NULL result
if (cb == SQL_NULL_DATA)
    return(0);
```

Remarks

When requesting multiple columns to be returned from the result set (for example, the SQL query requested 3 columns be returned), the calls to this function must request the columns in ordinal sequence (1,2,3 or 1,3 or 2,3).

wxDp::GetDatabaseName

const wxChar * GetDatabaseName()

Returns the name of the database engine.

wxDp::GetDatasourceName

const wxString & GetDatasourceName()

Returns the ODBC datasource name.

wxDp::GetHDBC

HDBC GetHDBC()

Returns the ODBC handle to the database connection.

wxDdb::GetHENV

HENV GetHENV()

Returns the ODBC environment handle.

wxDdb::GetHSTMT

HSTMT GetHSTMT()

Returns the ODBC statement handle associated with this database connection.

wxDdb::GetKeyFields

int GetKeyFields(const wxString &tableName, wxDbCollnf *collnf, UWORD nocols)

Used to determine which columns are members of primary or non-primary indexes on the specified table. If a column is a member of a foreign key for some other table, that information is detected also.

This function is primarily for use by the *wxDdb::GetColumns* (p. 278) function, but may be called if desired from the client application.

Parameters*tableName*

Name of the table for which the columns will be evaluated as to their inclusion in any indexes.

collnf

Data structure containing the column definitions (obtained with *wxDdb::GetColumns* (p. 278)). This function populates the *PkCol*, *PkTableName*, and *FkTableName* members of the *collnf* structure.

nocols

Number of columns defined in the instance of *collnf*.

Return value

Currently always returns true.

See also

wxDdbCollnf (p. 295), *wxDdb::GetColumns* (p. 278)

wxDdb::GetNext

bool GetNext()

Called after executing a query, this function requests the next row in the result set after the current position of the cursor.

See also

wxDdb::ExecSql (p. 276), *wxDdb::GetData* (p. 279)

wxDdb::GetNextError

bool GetNextError(HENV aHenv, HDBC aHdbc = SQL_NULL_HDBC, HSTMT aHstmt = SQL_NULL_HSTMT)

Parameters

aHenv

A handle to the ODBC environment.

aHdbc

OPTIONAL. A handle to the ODBC connection. Pass this in if the ODBC function call that failed required a hdbc or hstmt argument.

AHstmt

OPTIONAL. A handle to the ODBC statement being executed against. Pass this in if the ODBC function call that failed requires a hstmt argument.

Example

```
if (SQLExecDirect(hstmt, (UCHAR FAR *) pSqlStmt, SQL_NTS) !=
SQL_SUCCESS)
{
    return(db.GetNextError(db.henv, db.hdbc, hstmt));
}
```

See also

wxDdb::DispNextError (p. 275), *wxDdb::DispAllErrors* (p. 274)

wxDdb::GetPassword

const wxString & GetPassword()

Returns the password used to establish this connection to the datasource.

wxDdb::GetTableCount

int GetTableCount()

Returns the number of *wxDdbTable()* instances currently using this datasource connection.

wxDb::GetUsername

const wxString & GetUsername()

Returns the user name (uid) used to establish this connection to the datasource.

wxDb::Grant

bool Grant(int privileges, const wxString &tableName, const wxString &userList = "PUBLIC")

Use this member function to GRANT privileges to users for accessing tables in the datasource.

Parameters

privileges

Use this argument to select which privileges you want to grant. Pass DB_GRANT_ALL to grant all privileges. To grant individual privileges pass one or more of the following OR'd together:

DB_GRANT_SELECT	=	1	
DB_GRANT_INSERT	=	2	
DB_GRANT_UPDATE	=	4	
DB_GRANT_DELETE	=	8	
DB_GRANT_ALL	=	DB_GRANT_SELECT DB_GRANT_INSERT DB_GRANT_UPDATE DB_GRANT_DELETE	

tableName

The name of the table you wish to grant privileges on.

userList

OPTIONAL. A comma delimited list of users to grant the privileges to. If this argument is not passed in, the privileges will be given to the general PUBLIC.

Remarks

Some databases require user names to be specified in all capital letters (i.e. Oracle). This function does not automatically capitalize the user names passed in the comma-separated list. This is the responsibility of the calling routine.

The currently logged in user must have sufficient grantor privileges for this function to be able to successfully grant the indicated privileges.

Example

```
db.Grant(DB_GRANT_SELECT | DB_GRANT_INSERT, "PARTS", "mary, sue");
```

wxDb::IsFwdOnlyCursors

bool IsFwdOnlyCursors()

This setting indicates whether this database connection was created as being capable of using only forward scrolling cursors.

This function does NOT indicate if the ODBC driver or datasource supports backward scrolling cursors. There is no standard way of detecting if the driver or datasource can support backward scrolling cursors.

If a *wxDdb* instance was created as being capable of only forward scrolling cursors, then even if the datasource and ODBC driver support backward scrolling cursors, tables using this database connection would only be able to use forward scrolling cursors.

The default setting of whether a *wxDdb* connection to a database allows forward-only or also backward scrolling cursors is defined in *setup.h* by the value of *wxODBC_FWD_ONLY_CURSORS*. This default setting can be overridden when the *wxDdb* connection is initially created (see *wxDdb constructor* (p. 270) and *wxDdbGetConnection* (p. 268)).

Return value

Returns true if this datasource connection is defined as using only forward scrolling cursors, or false if the connection is defined as being allowed to use backward scrolling cursors and their associated functions (see note above).

Remarks

Added as of *wxWidgets* v2.4 release, this function is a renamed version of *wxDdb::FwdOnlyCursors()* to match the normal *wxWidgets* naming conventions for class member functions.

This function is not available in versions prior to v2.4. You should use *wxDdb::FwdOnlyCursors* (p. 277) for *wxWidgets* versions prior to 2.4.

See also

wxDdb constructor (p. 270), *wxDdbGetConnection* (p. 268)

wxDdb::IsOpen

bool IsOpen()

Indicates whether the database connection to the datasource is currently opened.

Remarks

This function may indicate that the database connection is open, even if the call to *wxDdb::Open* (p. 286) may have failed to fully initialize the connection correctly. The connection to the database is open and can be used via the direct SQL commands, if this function returns true. Other functions which depend on the *wxDdb::Open* (p. 286) to have completed correctly may not function as expected. The return result from *wxDdb::Open* (p. 286) is the only way to know if complete initialization of this *wxDdb* connection was successful or not. See *wxDdb::Open* (p. 286) for more details on partial failures to open a

connection instance.

wxDdb::LogError

void LogError(const wxString &errMsg const wxString &SQLState= "")

errMsg

Free-form text to display describing the error/text to be logged.

SQLState

OPTIONAL. Native SQL state error. Default is 0.

Remarks

Calling this function will enter a log message in the error list maintained for the database connection. This log message is free form and can be anything the programmer wants to enter in the error list.

If SQL logging is turned on, the call to this function will also log the text into the SQL log file.

See also

wxDdb::WriteSqlLog (p. 293)

wxDdb::ModifyColumn

void ModifyColumn(const wxString &tableName const wxString &ColumnName int dataType ULONG columnLength=0 const wxString &optionalParam= "")

Used to change certain properties of a column such as the length, or whether a column allows NULLs or not.

tableName

Name of the table that the column to be modified is in.

columnName

Name of the column to be modified. NOTE: Name of column cannot be changed with this function.

dataType

Any one of DB_DATA_TYPE_VARCHAR, DB_DATA_TYPE_INTEGER, DB_DATA_TYPE_FLOAT, DB_DATA_TYPE_DATE.

columnLength

New size of the column. Valid only for DB_DATA_TYPE_VARCHAR dataType

fields. Default is 0.

optionalParam

Default is "".

Remarks

Cannot be used to modify the precision of a numeric column, therefore 'columnLength' is ignored unless the dataType is DB_DATA_TYPE_VARCHAR.

Some datasources do not allow certain properties of a column to be changed if any rows currently have data stored in that column. Those datasources that do allow columns to be changed with data in the rows many handle truncation and/or expansion in different ways. Please refer to the reference material for the datasource being used for behavioral descriptions.

Example

```
ok = pDb->ModifyColumn( "CONTACTS", "ADDRESS2",
                        DB_, colDefs[j].SzDataObj,
                        wxT( "NOT NULL" ) );
```

wxDdb::Open

bool Open(const wxString &Dsn, const wxString &Uid, const wxString &AuthStr, bool failOnDataTypeUnsupported)

bool Open(const wxString &inConnectStr, bool failOnDataTypeUnsupported)

bool Open(wxDdbConnectInf *dbConnectInf, bool failOnDataTypeUnsupported)

bool Open(wxDdb *copyDb)

Opens a connection to the datasource, sets certain behaviors of the datasource to conform to the accepted behaviors (e.g. cursor position maintained on commits), and queries the datasource for its representations of the basic datatypes to determine the form in which the data going to/from columns in the data tables are to be handled.

The second form of this function, which accepts a "wxDdb *" as a parameter, can be used to avoid the overhead (execution time, database load, network traffic) which are needed to determine the data types and representations of data that are necessary for cross-datasource support by these classes.

Normally the first form of the wxDdb::Open() function will open the connection and then send a series of queries to the datasource asking it for its representation of data types, and all the features it supports. If one connection to the datasource has already been made previously, the information gathered when that connection was created can just be copied to any new connections to the same datasource by passing a pointer to the first connection in as a parameter to the wxDdb::Open() function. Note that this new connection created from the first connections information will use the same Dsn/Uid/AuthStr as the first connection used.

Parameters

Dsn

datasource name. The name of the ODBC datasource as assigned when the datasource is initially set up through the ODBC data source manager.

Uid

User ID. The name (ID) of the user you wish to connect as to the datasource. The user name (ID) determines what objects you have access to in the datasource and what datasource privileges you have. Privileges include being able to create new objects, update objects, delete objects and so on. Users and privileges are normally administered by the database administrator.

AuthStr

The password associated with the Uid.

failOnDataTypeUnsupporte

As part of connecting to a database, the `wxDB::Open()` function will query the database to find out the native types that it supports. With some databases, some data types may not be supported, or not sufficiently supported, for use with the `wxODBC` classes. Normally a program should fail in this case, so as not to try to use a data type that is not supported. This parameter allows the programmer to override the failure if they wish and continue on using the connection.

dbConnectInf

Contains a DSN, Uid, Password, or a connection string to be used in opening a new connection to the database. If a connection string is present, then the connection string will be used. If there is no connection string present, then the DSN, Uid, and Password are used.

inConnectStr

A valid ODBC connection string used to connect to a database

copyDb

Already completely configured and opened datasource connection from which all Dsn, Uid, AuthStr, connection string, and data typing information is to be copied from for use by this datasource connection. If 'copyDb' used a connection string to create its connection originally, then the connection being made by this call to `wxDB::Open()` will use that same connection string.

Remarks

After a `wxDB` instance is created, it must then be opened. When opening a datasource, there must be three pieces of information passed. The data source name, user name (ID) and the password for the user. No database activity on the datasource can be performed until the connection is opened. This is normally done at program startup and the datasource remains open for the duration of the program/module run.

It is possible to have connections to multiple datasources open at the same time to support distributed database connections by having separate instances of wxDb objects that use either the same or different Dsn/Uid/AuthStr settings.

If this function returns a value of false, it does not necessarily mean that the connection to the datasource was not opened. It may mean that some portion of the initialization of the connection failed (such as a datatype not being able to be determined how the datasource represents it). To determine if the connection to the database failed, use the `wxDb::IsOpen` (p. 284) function after receiving a false result back from this function to determine if the connection was opened or not. If this function returns false, but `wxDb::IsOpen` (p. 284) returns true, then direct SQL commands may be passed to the database connection and can be successfully executed, but use of the datatypes (such as by a `wxDbTable` instance) that are normally determined during open will not be possible.

The *Dsn*, *Uid*, and *AuthStr* string pointers that are passed in are copied. NOT the strings themselves, only the pointers. The calling routine must maintain the memory for these three strings for the life of the wxDb instance.

Example

```
wxDb sampleDB(DbConnectInf.GetHenv());
if (!sampleDB.Open("Oracle 7.1 HP/UX", "gtasker", "myPassword"))
{
    if (sampleDb.IsOpen())
    {
        // Connection is open, but the initialization of
        // datatypes and parameter settings failed
    }
    else
    {
        // Error opening datasource
    }
}
```

wxDb::RollbackTrans

bool RollbackTrans()

Function to "undo" changes made to the database. After an insert/update/delete, the operation may be "undone" by issuing this command any time before a `wxDb::CommitTrans` (p. 272) is called on the database connection.

Remarks

Transactions begin implicitly as soon as you make a change to the database. The transaction continues until either a commit or rollback is executed. Calling `wxDb::RollbackTrans()` will result in ALL changes done using this database connection that have not already been committed to be "undone" back to the last commit/rollback that was successfully executed.

Calling this member function rolls back ALL open (uncommitted) transactions on this ODBC connection, including all `wxDbTable` instances that use this connection.

See also

wxDdb::CommitTrans (p. 272) for a special note on cursors

wxDdb::SetDebugErrorMessages

void SetDebugErrorMessages(bool state)

state

Either true (debug messages are logged) or false (debug messages are not logged).

Remarks

Turns on/off debug error messages from the ODBC class library. When this function is passed true, errors are reported to the user/logged automatically in a text or pop-up dialog when an ODBC error occurs. When passed false, errors are silently handled.

When compiled in release mode (FINAL=1), this setting has no affect.

See also

wxDdb constructor (p. 270)

wxDdb::SetSqlLogging

bool SetSqlLogging(wxDdbSqlLogState state, const wxString &filename = SQL_LOG_FILENAME, bool append = false)

Parameters

state

Either sqlLogOFF or sqlLogON (see *enum wxDdbSqlLogState* (p. 294)). Turns logging of SQL commands sent to the datasource OFF or ON.

filename

OPTIONAL. Name of the file to which the log text is to be written. Default is SQL_LOG_FILENAME.

append

OPTIONAL. Whether the file is appended to or overwritten. Default is false.

Remarks

When called with *sqlLogON*, all commands sent to the datasource engine are logged to the file specified by *filename*. Logging is done by embedded *wxDdb::WriteSqlLog* (p. 293) calls in the database member functions, or may be manually logged by adding calls to *wxDdb::WriteSqlLog* (p. 293) in your own source code.

When called with *sqlLogOFF*, the logging file is closed, and any calls to

wxDdb::WriteSqlLog (p. 293) are ignored.

wxDdb::SQLColumnName

const wxString SQLColumnName(const char * colName)

Returns the column name in a form ready for use in SQL statements. In most cases, the column name is returned verbatim. But some databases (e.g. MS Access, SQL Server, MSDE) allow for spaces in column names, which must be specially quoted. For example, if the datasource allows spaces in the column name, the returned string will have the correct enclosing marks around the name to allow it to be properly included in a SQL statement for the DBMS that is currently connected to with this connection.

Parameters

colName

Native name of the column in the table that is to be evaluated to determine if any special quoting marks needed to be added to it before including the column name in a SQL statement

See also

wxDdb::SQLTableName (p. 290)

wxDdb::SQLTableName

const wxString SQLTableName(const char * tableName)

Returns the table name in a form ready for use in SQL statements. In most cases, the table name is returned verbatim. But some databases (e.g. MS Access, SQL Server, MSDE) allow for spaces in table names, which must be specially quoted. For example, if the datasource allows spaces in the table name, the returned string will have the correct enclosing marks around the name to allow it to be properly included in a SQL statement for the data source that is currently connected to with this connection.

Parameters

tableName

Native name of the table that is to be evaluated to determine if any special quoting marks needed to be added to it before including the table name in a SQL statement

See also

wxDdb::SQLColumnName (p. 290)

wxDdb::TableExists

bool TableExists(const wxString &tableName, const wxChar *userID=NULL, const wxString &path="")

Checks the ODBC datasource for the existence of a table. If a *userID* is specified, then the table must be accessible by that user (user must have at least minimal privileges to the table).

Parameters

tableName

Name of the table to check for the existence of.

userID

Owner of the table (also referred to as schema). Specify a *userID* when the datasource you are connected to allows multiple unique tables with the same name to be owned by different users. *userID* is evaluated as follows:

```
userID == NULL    ... UserID is ignored (DEFAULT)
userID == ""      ... UserID set equal to 'this->uid'
userID != ""      ... UserID set equal to 'userID'
```

Remarks

tableName may refer to a table, view, alias or synonym.

This function does not indicate whether or not the user has privileges to query or perform other functions on the table. Use the *wxDdb::TablePrivileges* (p. 291) to determine if the user has sufficient privileges or not.

See also

wxDdb::TablePrivileges (p. 291)

wxDdb::TablePrivileges

bool TablePrivileges(const wxString &tableName, const wxString &priv, const wxChar *userID=NULL, const wxChar *schema=NULL, const wxString &path="")

Checks the ODBC datasource for the existence of a table. If a *userID* is specified, then the table must be accessible by that user (user must have at least minimal privileges to the table).

Parameters

tableName

Name of the table on which to check privileges. *tableName* may refer to a table, view, alias or synonym.

priv

The table privilege being evaluated. May be one of the following (or a datasource

specific privilege):

SELECT	: The connected user is permitted to retrieve data for one or more columns of the table.
INSERT	: The connected user is permitted to insert new rows containing data for one or more columns into the table.
UPDATE	: The connected user is permitted to update the data in one or more columns of the table.
DELETE	: The connected user is permitted to delete rows of data from the table.
REFERENCES	: Is the connected user permitted to refer to one or more columns of the table within a constraint (for example, a unique, referential, or table check constraint).

userID

OPTIONAL. User for which to determine if the privilege specified to be checked is granted or not. Default is "". *userID* is evaluated as follows:

```
userID == NULL    ... NOT ALLOWED!
userID == ""      ... UserID set equal to 'this->uid'
userID != ""      ... UserID set equal to 'userID'
```

schema

OPTIONAL. Owner of the table. Specify a userID when the datasource you are connected to allows multiple unique tables with the same name to be owned by different users. Specifying the table owner makes determination of the users privileges MUCH faster. Default is NULL. *userID* is evaluated as follows:

```
schema == NULL    ... Any owner (DEFAULT)
schema == ""      ... Owned by 'this->uid'
schema != ""      ... Owned by userID specified in 'schema'
```

path

OPTIONAL. Path to the table. Default is "". Currently unused.

Remarks

The scope of privilege allowed to the connected user by a given table privilege is datasource dependent.

For example, the privilege UPDATE might allow the connected user to update all columns in a table on one datasource, but only those columns for which the grantor (the user that granted the connected user) has the UPDATE privilege on another datasource.

Looking up a user's privileges to a table can be time consuming depending on the datasource and ODBC driver. This time can be minimized by passing a *schema* as a parameter. With some datasources/drivers, the difference can be several seconds of time difference.

wxDdb::TranslateSqlState

int TranslateSqlState(const wxString &SQLState)

Converts an ODBC sqlstate to an internal error code.

Parameters

SQLState

State to be converted.

Return value

Returns the internal class DB_ERR code. See *wxDdb::DB_STATUS* (p. 264) definition.

wxDdb::WriteSqlLog

bool WriteSqlLog(const wxString &logMsg)

Parameters

logMsg

Free form string to be written to the log file.

Remarks

Very useful debugging tool that may be turned on/off during run time (see (see *wxDdb::SetSqlLogging* (p. 289) for details on turning logging on/off). The passed in string *logMsg* will be written to a log file if SQL logging is turned on.

Return value

If SQL logging is off when a call to *WriteSqlLog()* is made, or there is a failure to write the log message to the log file, the function returns false without performing the requested log, otherwise true is returned.

See also

wxDdb::SetSqlLogging (p. 289)

wxDdbColDataPtr

Pointer to dynamic column definitions for use with a *wxDdbTable* instance. Currently there are no member functions for this class.

See the *database classes overview* (p. 1675) for an introduction to using the ODBC classes.

```
void    *PtrDataObj;  
int      SzDataObj;  
SWORD   SqlCtype;
```

wxDbColDef

This class is used to hold information about the columns bound to an instance of a wxDbTable object.

Each instance of this class describes one column in the wxDbTable object. When calling the *wxDb constructor* (p. 270), a parameter passed in indicates the number of columns that will be defined for the wxDbTable object. The constructor uses this information to allocate adequate memory for all of the column descriptions in your wxDbTable object. Private member wxDbTable::colDefs is a pointer to this chunk of memory maintained by the wxDbTable class (and can be retrieved using the *wxDbTable::GetColDefs* (p. 316) function). To access the nth column definition of your wxDbTable object, just reference wxDbColDefs element [n - 1].

Typically, *wxDbTable::SetColDefs* (p. 329) is used to populate an array of these data structures for the wxDbTable instance.

Currently there are no accessor functions for this class, so all members are public.

```

wxChar  ColName[DB_MAX_COLUMN_NAME_LEN+1]; // Column Name
int      DbDataType;      - Logical Data Type;
                        e.g. DB_DATA_TYPE_INTEGER
WORD     SqlCtype;        - C data type; e.g. SQL_C_LONG
void     *PtrDataObj;     - Address of the data object
int      SzDataObj;       - Size, in bytes, of the data object
bool     KeyField;        - Is column part of the PRIMARY KEY for the
                        table? -- Date fields should NOT be
                        KeyFields
bool     Updateable;      - Column is updateable?
bool     InsertAllowed;   - Column included in INSERT statements?
bool     DerivedCol;      - Column is a derived value?
SDWORD   CbValue;         - !!!Internal use only!!!
bool     Null;            - NOT FULLY IMPLEMENTED
                        Allows NULL values in Inserts and Updates

```

See also

database classes overview (p. 1675), *wxDbTable::GetColDefs* (p. 316), *wxDb constructor* (p. 270)

wxDbColDef::Initialize

Simply initializes all member variables to a cleared state. Called by the constructor automatically.

wxDbColFor

Beginning support for handling international formatting specifically on dates and floats.

```

wxString  s_Field;        // Formated String for Output
wxString  s_Format[7];    // Formated Objects - TIMESTAMP has
                        the biggest (7)
wxString  s_Amount[7];    // Formated Objects - amount of
                        things that can be formatted

```

```

int          i_Amount[7];    // Formated Objects -
                             // TT MM YYYY HH MM SS m
int          i_Nation;       // 0 = timestamp
                             // 1 = EU
                             // 2 = UK
                             // 3 = International
                             // 4 = US
int          i_dbDataType;   // conversion of the 'sqlDataType'
                             // to the generic data type used by
                             // these classes
SWORD        i_sqlDataType;

```

The constructor for this class initializes all the values to zero or NULL.

The destructor does nothing at this time.

Only one function is provided with this class currently.

See the *database classes overview* (p. 1675) for an introduction to using the ODBC classes.

wxDbColFor::Format

```

int Format(int Nation, int dbDataType, SWORD sqlDataType, short columnSize, short
decimalDigits)

```

Work in progress, and should be inter-related with wxLocale eventually.

wxDbColFor::Initialize

Simply initializes all member variables to a cleared state. Called by the constructor automatically.

wxDbColInf

Used with the *wxDb::GetColumns* (p. 278) functions for obtaining all retrievable information about a column's definition.

```

wxChar      catalog[128+1];
wxChar      schema[128+1];
wxChar      tableName[DB_MAX_TABLE_NAME_LEN+1];
wxChar      colName[DB_MAX_COLUMN_NAME_LEN+1];
SWORD       sqlDataType;
wxChar      typeName[128+1];
SWORD       columnSize;
SWORD       bufferLength;
short       decimalDigits;
short       numPrecRadix;
short       nullable;
wxChar      remarks[254+1];
int         dbDataType;   // conversion of the 'sqlDataType'
                           // to the generic data type used by
                           // these classes
int         PkCol;        // Primary key column
                           // 0 = No
                           // 1 = First Key
                           // 2 = Second Key, etc...

```

```
wxChar      PkTableName[DB_MAX_TABLE_NAME_LEN+1];  
                                     // Tables that use this PKey as a FKey  
int          FkCol;                  // Foreign key column  
                                     0 = No  
                                     1 = First Key  
                                     2 = Second Key, etc...  
wxChar      FkTableName[DB_MAX_TABLE_NAME_LEN+1];  
                                     // Foreign key table name  
wxDbColFor *pColFor;                // How should this column be formatted
```

The constructor for this class initializes all the values to zero, "", or NULL.

The destructor for this class takes care of deleting the pColFor member if it is non-NULL.

See the *database classes overview* (p. 1675) for an introduction to using the ODBC classes.

wxDbColInf::Initialize

Simply initializes all member variables to a cleared state. Called by the constructor automatically.

wxDbConnectInf

This class is used for holding the data necessary for connecting to the ODBC datasource. That information includes: SQL environment handle, datasource name, user ID, password and default directory path (used with dBase). Other optional fields held in this class are and file type, both for future functions planned to be added for creating/manipulating datasource definitions.

wxDbConnectInf::wxDbConnectInf

wxDbConnectInf()

Default constructor.

```
wxDbConnectInf(HENV henv, const wxString &dsn, const wxString &userID="",  
const wxString &password, const wxString &defaultDir="", const wxString  
&description="", const wxString &fileType="")
```

Constructor which allows initial settings of all the classes member variables.

See the special note below on the henv parameter for forcing this constructor to create a SQL environment handle automatically, rather than needing to pass one in to the function.

Parameters

henv

Environment handle used for this connection. See *wxDConnectInf::AllocHenv* (p. 298) for how to create an SQL environment handle. NOTE: Passing in a NULL for

this parameter will inform the constructor that it should create its own SQL environment handle. If NULL is passed for this parameter, the constructor will call *wxDConnectInf::AllocHenv* (p. 298) internally. A flag is set internally also to indicate that the HENV was created by the constructor so that when the default class destructor is called, the destructor will call *wxDConnectInf::FreeHenv* (p. 298) to free the environment handle automatically.

dsn

Name of the datasource to be used in creating wxDb instances for creating connection(s) to a datasource.

userID

OPTIONAL Many datasources allow (or even require) use of a username to determine privileges that connecting user is allowed to have when accessing the datasource or the data tables. Default is "".

password

OPTIONAL Password to be associated with the user ID specified in 'userID'. Default is "".

defaultDir

OPTIONAL Used for datasources which require the path to where the data file is stored to be specified. dBase is one example of the type of datasource which requires this information. Default is "".

description

OPTIONAL FUTURE USE Default is "".

fileType

OPTIONAL FUTURE USE Default is "".

Remarks

It is strongly recommended that programs use the longer form of the constructor and allow the constructor to create the SQL environment handle automatically, and manage the destruction of the handle.

Example

```
wxDConnectInf *DbConnectInf;  
  
DbConnectInf = new wxDbConnectInf(0, "MY_DSN", "MY_USER", "MY_PASSWORD");  
....the rest of the program  
  
delete DbConnectInf;
```

See also

wxDConnectInf::AllocHenv (p. 298), *wxDConnectInf::FreeHenv* (p. 298)

wxDConnectInf::~~wxDConnectInf

~wxDConnectInf()

Handles the default destruction of the instance of the class. If the long form of the *wxDConnectInf* (p. 296) was used, then this destructor also takes care of calling *wxDConnectInf::FreeHenv* (p. 298) to free the SQL environment handle.

wxDConnectInf::AllocHenv

bool AllocHenv()

Allocates a SQL environment handle that will be used to interface with an ODBC datasource.

Remarks

This function can be automatically called by the long form of the *wxDConnectInf* (p. 296) constructor.

wxDConnectInf::FreeHenv

void FreeHenv()

Frees the SQL environment handle being managed by the instance of this class.

Remarks

If the SQL environment handle was created using the long form of the *wxDConnectInf* (p. 296) constructor, then the flag indicating that the HENV should be destroyed when the classes destructor is called is reset to be false, so that any future handles created using the *wxDConnectInf::AllocHenv* (p. 298) function must be manually released with a call to this function.

wxDConnectInf::Initialize

Simply initializes all member variables to a cleared state. Called by the constructor automatically.

wxDConnectInf::GetAuthStr

const wxChar * GetAuthStr()

Accessor function to return the password assigned for this class instance that will be used with the user ID.

Synonymous with *wxDConnectInf::GetPassword* (p. 299)

wxDConnectInf::GetDefaultDir

const wxChar * GetDefaultDir()

Accessor function to return the default directory in which the datasource's data table is stored. This directory is only used for file based datasources like dBase. MS-Access does not require this to be set, as the path is set in the ODBC Administrator for MS-Access.

wxDConnectInf::GetDescription

const wxChar * GetDescription()

Accessor function to return the description assigned for this class instance.

NOTE: Description is a FUTURE USE item and is unused currently.

wxDConnectInf::GetDsn

const wxChar * GetDsn()

Accessor function to return the datasource name assigned for this class instance.

wxDConnectInf::GetFileType

const wxChar * GetFileType()

Accessor function to return the filetype of the ODBC datasource assigned for this class instance.

NOTE: FileType is a FUTURE USE item and is unused currently.

wxDConnectInf::GetHenv

const HENV GetHenv()

Accessor function to return the SQL environment handle being managed by this class instance.

wxDConnectInf::GetPassword

const wxChar * GetPassword()

Accessor function to return the password assigned for this class instance that will be used with the user ID.

Synonymous with *wxDConnectInf::GetAuthStr* (p. 298)

wxDbConnectInf::GetUid

const wxChar * GetUid()

Accessor function to return the user ID assigned for this class instance.

wxDbConnectInf::GetUserID

const wxChar * GetUserID()

Accessor function to return the user ID assigned for this class instance.

wxDbConnectInf::SetAuthStr

SetAuthStr(const wxString &authstr)

Accessor function to assign the password for this class instance that will be used with the user ID.

Synonymous with *wxDbConnectInf::SetPassword* (p. 301)

wxDbConnectInf::SetDefaultDir

SetDefaultDir(const wxString &defDir)

Accessor function to assign the default directory in which the datasource's data table is stored. This directory is only used for file based datasources like dBase. MS-Access does not require this to be set, as the path is set in the ODBC Administrator for MS-Access.

wxDbConnectInf::SetDescription

SetDescription(const wxString &desc)

Accessor function to assign the description assigned for this class instance.

NOTE: Description is a FUTURE USE item and is unused currently.

wxDbConnectInf::SetDsn

SetDsn(const wxString &dsn)

Accessor function to assign the datasource name for this class instance.

wxDbConnectInf::SetFileType

SetFileType(const wxString &)

Accessor function to return the filetype of the ODBC datasource assigned for this class instance.

NOTE: FileType is a FUTURE USE item and is unused currently.

wxDbConnectInf::SetHenv

void SetHenv(const HENV henv)

Accessor function to set the SQL environment handle for this class instance.

wxDbConnectInf::SetPassword

SetPassword(const wxString &password)

Accessor function to assign the password for this class instance that will be used with the user ID.

Synonymous with *wxDbConnectInf::SetAuthStr* (p. 300)

wxDbConnectInf::SetUid

SetUid(const wxString &uid)

Accessor function to set the user ID for this class instance.

wxDbConnectInf::SetUserID

SetUserID(const wxString &userID)

Accessor function to assign the user ID for this class instance.

wxDbIdxDef

Used in creation of non-primary indexes. Currently there are no member functions for this class.

```
wxChar  ColName[DB_MAX_COLUMN_NAME_LEN+1]
                                     // Name of column
bool    Ascending                   // Is index maintained in
                                     ASCENDING sequence?
```

There are no constructors/destructors as of this time, and no member functions.

See the *database classes overview* (p. 1675) for an introduction to using the ODBC classes.

wxDblnf

Contains information regarding the database connection (datasource name, number of tables, etc). A pointer to a wxDbTableInf is included in this class so a program can create a wxDbTableInf array instance to maintain all information about all tables in the datasource to have all the datasource's information in one memory structure.

Primarily, this class is used internally by the wxWidgets ODBC classes.

```
wxChar      catalog[128+1];  
wxChar      schema[128+1]; // typically means owner of table(s)  
int          numTables;    // How many tables does this  
                        datasource have  
wxDbTableInf *pTableInf;   // Equals a new  
                        wxDbTableInf[numTables];
```

The constructor for this class initializes all the values to zero, "", or NULL.

The destructor for this class takes care of deleting the pTableInf member if it is non-NULL.

See the *database classes overview* (p. 1675) for an introduction to using the ODBC classes.

wxDblnf::Initialize

Simply initializes all member variables to a cleared state. Called by the constructor automatically.

wxDbTable

A wxDbTable instance provides re-usable access to rows of data in a table contained within the associated ODBC datasource

See the *database classes overview* (p. 1675) for an introduction to using the ODBC classes.

Include files

```
<wx/dbtable.h>  
<wx/db.h>
```

Helper classes and data structures

The following classes and structs are defined in dbtable.cpp/.h for use with the wxDbTable class.

- *wxDblColDef* (p. 294)
- *wxDblColDataPtr* (p. 293)
- *wxDblIdxDef* (p. 301)

Constants

<code>wxDB_DEFAULT_CURSOR</code>	Primary cursor normally used for cursor based operations.
<code>wxDB_QUERY_ONLY</code>	Used to indicate whether a table that is opened is for query only, or if insert/update/deletes will be performed on the table. Less overhead (cursors and memory) are allocated for query only tables, plus read access times are faster with some datasources.
<code>wxDB_ROWID_LEN</code>	[Oracle only] - Used when <code>CanUpdateByRowID()</code> is true. Optimizes updates so they are faster by updating on the Oracle-specific ROWID column rather than some other index.
<code>wxDB_DISABLE_VIEW</code>	Use to indicate when a database view should not be if a table is normally set up to use a view. [Currently unsupported.]

wxDBTable::wxDBTable

wxDBTable(wxDB *pwxDb, const wxString &tblName, const UWORD numColumns, const wxString &qryTblName = "", bool qryOnly = !wxDB_QUERY_ONLY, const wxString &tblPath = "")

Default constructor.

Parameters

pwxDb

Pointer to the wxDb instance to be used by this wxDbTable instance.

tblName

The name of the table in the RDBMS.

numColumns

The number of columns in the table. (Do NOT include the ROWID column in the count if using Oracle).

qryTblName

OPTIONAL. The name of the table or view to base your queries on. This argument allows you to specify a table/view other than the base table for this object to base your queries on. This allows you to query on a view for example, but all of the INSERT, UPDATE and DELETES will still be performed on the base table for this wxDbTable object. Basing your queries on a view can provide a substantial performance increase in cases where your queries involve many tables with multiple joins. Default is "".

qryOnly

OPTIONAL. Indicates whether the table will be accessible for query purposes only, or should the table create the necessary cursors to be able to insert, update, and delete data from the table. Default is !wxDB_QUERY_ONLY.

tblPath

OPTIONAL. Some datasources (such as dBase) require a path to where the table is stored on the system. Default is "".

wxDbTable::wxDbTable

virtual ~wxDbTable()

Virtual default destructor.

wxDbTable::BuildDeleteStmt

void BuildDeleteStmt(wxString &pSqlStmt,int typeOfDel, const wxString &pWhereClause= "")

Constructs the full SQL statement that can be used to delete all rows matching the criteria in the pWhereClause.

Parameters*pSqlStmt*

Pointer to buffer for the SQL statement retrieved. To be sure you have adequate space allocated for the SQL statement, allocate DB_MAX_STATEMENT_LEN bytes.

typeOfDel

The type of delete statement being performed. Can be one of three values: DB_DEL_KEYFIELDS, DB_DEL_WHERE or DB_DEL_MATCHING

pWhereClause

OPTIONAL. If the typeOfDel is DB_DEL_WHERE, then you must also pass in a SQL WHERE clause in this argument. Default is "".

Remarks

This member function constructs a SQL DELETE statement. This can be used for debugging purposes if you are having problems executing your SQL statement.

WHERE and FROM clauses specified using *wxDbTable::SetWhereClause* (p. 334) and *wxDbTable::SetFromClause* (p. 332) are ignored by this function.

wxDbTable::BuildSelectStmt

void BuildSelectStmt(wxString &pSqlStmt, int typeOfSelect, bool distinct)

Constructs the full SQL statement that can be used to select all rows matching the criteria in the pWhereClause. This function is called internally in the wxDbTable class whenever the function *wxDbTable::Query* (p. 324) is called.

NOTE: Only the columns specified in *wxDbTable::SetColDefs* (p. 329) statements are included in the list of columns returned by the SQL statement created by a call to this function.

Parameters

pSqlStmt

Pointer to storage for the SQL statement retrieved. To be sure you have adequate space allocated for the SQL statement, allocate DB_MAX_STATEMENT_LEN bytes.

typeOfSelect

The type of select statement being performed. Can be one of four values: DB_SELECT_KEYFIELDS, DB_SELECT_WHERE, DB_SELECT_MATCHING or DB_SELECT_STATEMENT.

distinct

Whether to select distinct records only.

Remarks

This member function constructs a SQL SELECT statement. This can be used for debugging purposes if you are having problems executing your SQL statement.

WHERE and FROM clauses specified using *wxDbTable::SetWhereClause* (p. 334) and *wxDbTable::SetFromClause* (p. 332) are ignored by this function.

wxDbTable::BuildUpdateStmt

void BuildUpdateStmt(wxString &pSqlStmt, int typeOfUpd, const wxString &pWhereClause= "")

Constructs the full SQL statement that can be used to update all rows matching the criteria in the pWhereClause.

If typeOfUpd is DB_UPD_KEYFIELDS, then the current values in the bound columns are used to determine which row(s) in the table are to be updated. The exception to this is when a datasource supports ROW IDs (Oracle). The ROW ID column is used for efficiency purposes when available.

NOTE: Only the columns specified in *wxDbTable::SetColDefs* (p. 329) statements are included in the list of columns updated by the SQL statement created by a call to this

function. Any column definitions that were defined as being non-updateable will be excluded from the SQL UPDATE statement created by this function.

Parameters

pSqlStmt

Pointer to storage for the SQL statement retrieved. To be sure you have adequate space allocated for the SQL statement, allocate DB_MAX_STATEMENT_LEN bytes.

typeOfUpd

The type of update statement being performed. Can be one of two values: DB_UPD_KEYFIELDS or DB_UPD_WHERE.

pWhereClause

OPTIONAL. If the typeOfUpd is DB_UPD_WHERE, then you must also pass in a SQL WHERE clause in this argument. Default is "".

Remarks

This member function allows you to see what the SQL UPDATE statement looks like that the ODBC class library builds. This can be used for debugging purposes if you are having problems executing your SQL statement.

WHERE and FROM clauses specified using *wxDdbTable::SetWhereClause* (p. 334) and *wxDdbTable::SetFromClause* (p. 332) are ignored by this function.

wxDdbTable::BuildWhereStmt

void BuildSelectStmt(wxString &pWhereClause, int typeOfWhere, const wxString &qualTableName="", bool useLikeComparison=false)

Constructs the portion of a SQL statement which would follow the word 'WHERE' in a SQL statement to be passed to the datasource. The returned string does NOT include the word 'WHERE'.

Parameters

pWhereClause

Pointer to storage for the SQL statement retrieved. To be sure you have adequate space allocated for the SQL statement, allocate DB_MAX_STATEMENT_LEN bytes.

typeOfWhere

The type of where clause to generate. Can be one of two values: DB_WHERE_KEYFIELDS or DB_WHERE_MATCHING.

qualTableName

OPTIONAL. Prepended to all base table column names. For use when a FROM clause has been specified with the `wxDbTable::SetFromClause` (p. 332), to clarify which table a column name reference belongs to. Default is "".

useLikeComparison

OPTIONAL. Should the constructed WHERE clause utilize the LIKE comparison operator. If false, then the '=' operator is used. Default is false.

Remarks

This member function allows you to see what the SQL WHERE clause looks like that the ODBC class library builds. This can be used for debugging purposes if you are having problems executing your own SQL statements.

If using 'typeOfWhere' set to DB_WHERE_MATCHING, any bound columns currently containing a NULL value are not included in the WHERE clause's list of columns to use in the comparison.

wxDbTable::CanSelectForUpdate

bool CanSelectForUpdate()

Use this function to determine if the datasource supports SELECT ... FOR UPDATE. When the keywords "FOR UPDATE" are included as part of your SQL SELECT statement, all records *retrieved* (not just queried, but actually retrieved using `wxDbTable::GetNext` (p. 319), etc) from the result set are locked.

Remarks

Not all datasources support the "FOR UPDATE" clause, so you must use this member function to determine if the datasource currently connected to supports this behavior or not before trying to select using "FOR UPDATE".

If the `wxDbTable` instance was created with the parameter `wxDB_QUERY_ONLY`, then this function will return false. For all known databases which do not support the FOR UPDATE clause, this function will return false also.

wxDbTable::CanUpdateByROWID

bool CanUpdateByROWID()

CURRENTLY ONLY POSSIBLE IF USING ORACLE.

--- CURRENTLY DISABLED FOR *ALL* DATASOURCES --- NOV 1 2000 - gt

Every Oracle table has a hidden column named ROWID. This is a pointer to the physical location of the record in the datasource and allows for very fast updates and deletes. The key is to retrieve this ROWID during your query so it is available during an update or delete operation.

Use of the ROWID feature is always handled by the class library except in the case of *wxDdbTable::QueryBySqlStmt* (p. 325). Since you are passing in the SQL SELECT statement, it is up to you to include the ROWID column in your query. If you do not, the application will still work, but may not be as optimized. The ROWID is always the last column in the column list in your SQL SELECT statement. The ROWID is not a column in the normal sense and should not be considered part of the column definitions for the *wxDdbTable* object.

Remarks

The decision to include the ROWID in your SQL SELECT statement must be deferred until runtime since it depends on whether you are connected to an Oracle datasource or not.

Example

```
// Incomplete code sample
wxDdbTable parts;
.....
if (parts.CanUpdByROWID())
{
    // Note that the ROWID column must always be the last column
selected
    sqlStmt = "SELECT PART_NO, PART_DESC, ROWID" FROM PARTS";
}
else
    sqlStmt = "SELECT PART_NO, PART_DESC FROM PARTS";
```

wxDdbTable::ClearMemberVar

void ClearMemberVar(UWORD colNo, bool setToNull=false)

Same as *wxDdbTable::ClearMemberVars* (p. 308) except that this function clears only the specified column of its values, and optionally sets the column to be a NULL column.

colNo

Column number that is to be cleared. This number (between 0 and (noCols-1)) is the index of the column definition created using the *wxDdbTable::SetColDefs* (p. 329) function.

setToNull

OPTIONAL. Indicates whether the column should be flagged as being a NULL value stored in the bound memory variable. If true, then any value stored in the bound member variable is cleared. Default is false.

wxDdbTable::ClearMemberVars

void ClearMemberVars(bool setToNull=false)

Initializes all bound columns of the *wxDdbTable* instance to zero. In the case of a string, zero is copied to the first byte of the string.

setToNull

OPTIONAL. Indicates whether all columns should be flagged as having a NULL value stored in the bound memory variable. If true, then any value stored in the bound member variable is cleared. Default is false.

Remarks

This is useful before calling functions such as `wxDbTable::QueryMatching` (p. 327) or `wxDbTable::DeleteMatching` (p. 313) since these functions build their WHERE clauses from non-zero columns. To call either `wxDbTable::QueryMatching` (p. 327) or `wxDbTable::DeleteMatching` (p. 313) use this sequence:

- 1) `ClearMemberVars()`
- 2) Assign columns values you wish to match on
- 3) Call `wxDbTable::QueryMatching()` or `wxDbTable::DeleteMatching()`

wxDbTable::CloseCursor

bool CloseCursor(HSTMT *cursor*)

Closes the specified cursor associated with the `wxDbTable` object.

Parameters

cursor

The cursor to be closed.

Remarks

Typically handled internally by the ODBC class library, but may be used by the programmer if desired.

DO NOT CLOSE THE `wxDB_DEFAULT_CURSOR!`

wxDbTable::Count

ULONG Count(const wxString &args="*")

Returns the number of records which would be in the result set using the current query parameters specified in the WHERE and FROM clauses.

Parameters

args

OPTIONAL. This argument allows the use of the DISTINCT keyword against a column name to cause the returned count to only indicate the number of rows in the result set that have a unique value in the specified column. An example is shown below. Default is "*", meaning a count of the total number of rows matching is returned, regardless of uniqueness.

Remarks

This function can be called before or after an actual query to obtain the count of records in the result set. `Count()` uses its own cursor, so result set cursor positioning is not affected by calls to `Count()`.

WHERE and FROM clauses specified using `wxDbTable::SetWhereClause` (p. 334) and `wxDbTable::SetFromClause` (p. 332) ARE used by this function.

Example

```

USERS TABLE

FIRST_NAME      LAST_NAME
-----
John            Doe
Richard         Smith
Michael         Jones
John            Carpenter

// Incomplete code sample
wxDbTable users;
.....
users.SetWhereClause("");

// This Count() will return 4, as there are four users listed above
// that match the query parameters
totalNumberOfUsers = users.Count();

// This Count() will return 3, as there are only 3 unique first names
// in the table above - John, Richard, Michael.
totalNumberOfUniqueFirstNames = users.Count("DISTINCT FIRST_NAME");

```

wxDbTable::CreateIndex

bool CreateIndex(const wxString &idxName, bool unique, UWORD nIdxCols, wxDbIdxDef *pIdxDefs, bool attemptDrop=true)

This member function allows you to create secondary (non primary) indexes on your tables. You first create your table, normally specifying a primary index, and then create any secondary indexes on the table. Indexes in relational model are not required. You do not need indexes to look up records in a table or to join two tables together. In the relational model, indexes, if available, provide a quicker means to look up data in a table. To enjoy the performance benefits of indexes, the indexes must be defined on the appropriate columns and your SQL code must be written in such a way as to take advantage of those indexes.

Parameters

idxName

Name of the Index. Name must be unique within the table space of the datasource.

unique

Indicates if this index is unique.

nIdxCols

Number of columns in the index.

pIdxDefs

A pointer to an array *wxDbIdxDef* structures.

attemptDrop

OPTIONAL. Indicates if the function should try to execute a *wxDbTable::DropIndex* (p. 315) on the index name provided before trying to create the index name. Default is true.

Remarks

The first parameter, index name, must be unique and should be given a meaningful name. Common practice is to include the table name as a prefix in the index name (e.g. For table PARTS, you might want to call your index PARTS_IDX1). This will allow you to easily view all of the indexes defined for a given table grouped together alphabetically.

The second parameter indicates if the index is unique or not. Uniqueness is enforced at the RDBMS level preventing rows which would have duplicate indexes from being inserted into the table when violating a unique index's uniqueness.

In the third parameter, specify how many columns are in your index. This number must match the number of columns defined in the *pIdxDefs* parameter.

The fourth parameter specifies which columns make up the index using the *wxDbIdxDef* structure. For each column in the index, you must specify two things, the column name and the sort order (ascending / descending). See the example below to see how to build and pass in the *wxDbIdxDef* structure.

The fifth parameter is provided to handle the differences in datasources as to whether they will automatically overwrite existing indexes with the same name or not. Some datasources require that the existing index must be dropped first, so this is the default behavior.

Some datasources (MySQL, and possibly others) require columns which are to be part of an index to be defined as NOT NULL. When this function is called, if a column is not defined to be NOT NULL, a call to this function will modify the column definition to change any columns included in the index to be NOT NULL. In this situation, if a NULL value already exists in one of the columns that is being modified, creation of the index will fail.

PostGres is unable to handle index definitions which specify whether the index is ascending or descending, and defaults to the system default when the index is created.

It is not necessary to call *wxDb::CommitTrans* (p. 272) after executing this function.

Example

```
// Create a secondary index on the PARTS table
wxDbIdxDef idxDef[2]; // 2 columns make up the index
```

```
wxStrcpy(idxDef[0].ColName, "PART_DESC"); // Column 1
idxDef[0].Ascending = true;

wxStrcpy(idxDef[1].ColName, "SERIAL_NO"); // Column 2
idxDef[1].Ascending = false;

// Create a name for the index based on the table's name
wxString indexName;
indexName.Printf("%s_IDX1", parts->GetTableName());
parts->CreateIndex(indexName, true, 2, idxDef);
```

wxDbTable::CreateTable

bool CreateTable(bool attemptDrop=true)

Creates a table based on the definitions previously defined for this wxDbTable instance.

Parameters

attemptDrop

OPTIONAL. Indicates whether the driver should attempt to drop the table before trying to create it. Some datasources will not allow creation of a table if the table already exists in the table space being used. Default is true.

Remarks

This function creates the table and primary index (if any) in the table space associated with the connected datasource. The owner of these objects will be the user id that was given when *wxDb::Open* (p. 286) was called. The objects will be created in the default schema/table space for that user.

In your derived wxDbTable object constructor, the columns and primary index of the table are described through the *wxDbColDef* (p. 294) structure. *wxDbTable::CreateTable* (p. 312) uses this information to create the table and to add the primary index. See *wxDbTable* (p. 302) ctor and *wxDbColDef* description for additional information on describing the columns of the table.

It is not necessary to call *wxDb::CommitTrans* (p. 272) after executing this function.

wxDbTable::DB_STATUS

bool DB_STATUS()

Accessor function that returns the wxDb private member variable DB_STATUS for the database connection used by this instance of wxDbTable.

wxDbTable::Delete

bool Delete()

Deletes the row from the table indicated by the current cursor.

Remarks

Use `wxDdbTable::GetFirst` (p. 317), `wxDdbTable::GetLast` (p. 318), `wxDdbTable::GetNext` (p. 319) or `wxDdbTable::GetPrev` (p. 319) to position the cursor to a valid record. Once positioned on a record, call this function to delete the row from the table.

A `wxDdb::CommitTrans` (p. 272) or `wxDdb::RollbackTrans` (p. 288) must be called after use of this function to commit or rollback the deletion.

NOTE: Most datasources have a limited size "rollback" segment. This means that it is only possible to insert/update/delete a finite number of rows without performing a `wxDdb::CommitTrans` (p. 272) or `wxDdb::RollbackTrans` (p. 288). Size of the rollback segment varies from database to database, and is user configurable in most databases. Therefore it is usually best to try to perform a commit or rollback at relatively small intervals when processing a larger number of actions that insert/update/delete rows in a table.

wxDdbTable::DeleteCursor

bool DeleteCursor(HSTMT *hstmtDel)

Allows a program to delete a cursor.

Parameters

hstmtDel

Handle of the cursor to delete.

Remarks

For default cursors associated with the instance of `wxDdbTable`, it is not necessary to specifically delete the cursors. This is automatically done in the `wxDdbTable` destructor.

NOTE: If the cursor could not be deleted for some reason, an error is logged indicating the reason. Even if the cursor could not be deleted, the HSTMT that is passed in is deleted, and the pointer is set to NULL.

DO NOT DELETE THE <code>wxDB_DEFAULT_CURSOR</code> !
--

wxDdbTable::DeleteMatching

bool DeleteMatching()

This member function allows you to delete records from your `wxDdbTable` object by specifying the data in the columns to match on.

Remarks

To delete all users with a first name of "JOHN", do the following:

1. Clear all "columns" using `wxDdbTable::ClearMemberVars()`.

2. Set the FIRST_NAME column equal to "JOHN".
3. Call wxDbTable::DeleteMatching().

The WHERE clause is built by the ODBC class library based on all non-NULL columns. This allows deletion of records by matching on any column(s) in your wxDbTable instance, without having to write the SQL WHERE clause.

A *wxDdb::CommitTrans* (p. 272) or *wxDdb::RollbackTrans* (p. 288) must be called after use of this function to commit or rollback the deletion.

NOTE: Row(s) should be locked before deleting them to make sure they are not already in use. This can be achieved by calling *wxDdbTable::QueryMatching* (p. 327), and then retrieving the records, locking each as you go (assuming FOR UPDATE is allowed on the datasource). After the row(s) have been successfully locked, call this function.

NOTE: Most datasources have a limited "rollback" segment. This means that it is only possible to insert/update/delete a finite number of rows without performing a *wxDdb::CommitTrans* (p. 272) or *wxDdb::RollbackTrans* (p. 288). Size of the rollback segment varies from database to database, and is user configurable in most databases. Therefore it is usually best to try to perform a commit or rollback at relatively small intervals when processing a larger number of actions that insert/update/delete rows in a table.

Example

```
// Incomplete code sample to delete all users with a first name
// of "JOHN"
users.ClearMemberVars();
wxStrcpy(users.FirstName, "JOHN");
users.DeleteMatching();
```

wxDdbTable::DeleteWhere

bool DeleteWhere(const wxString &pWhereClause)

Deletes all rows from the table which match the criteria specified in the WHERE clause that is passed in.

Parameters

pWhereClause

SQL WHERE clause. This WHERE clause determines which records will be deleted from the table interfaced through the wxDbTable instance. The WHERE clause passed in must be compliant with the SQL 92 grammar. Do not include the keyword 'WHERE'

Remarks

This is the most powerful form of the wxDbTable delete functions. This function gives access to the full power of SQL. This function can be used to delete records by passing a valid SQL WHERE clause. Sophisticated deletions can be performed based on multiple criteria using the full functionality of the SQL language.

A *wxDdb::CommitTrans* (p. 272) must be called after use of this function to commit the deletions.

Note: This function is limited to deleting records from the table associated with this *wxDdbTable* object only. Deletions on joined tables is not possible.

NOTE: Most datasources have a limited size "rollback" segment. This means that it is only possible to insert/update/delete a finite number of rows without performing a *wxDdb::CommitTrans* (p. 272) or *wxDdb::RollbackTrans* (p. 288). Size of the rollback segment varies from database to database, and is user configurable in most databases. Therefore it is usually best to try to perform a commit or rollback at relatively small intervals when processing a larger number of actions that insert/update/delete rows in a table.

WHERE and FROM clauses specified using *wxDdbTable::SetWhereClause* (p. 334) and *wxDdbTable::SetFromClause* (p. 332) are ignored by this function.

Example

```
// Delete parts 1 thru 10 from containers 'X', 'Y' and 'Z' that
// are magenta in color
parts.DeleteWhere("(PART_NUMBER BETWEEN 1 AND 10) AND \
                  CONTAINER IN ('X', 'Y', 'Z') AND \
                  UPPER(COLOR) = 'MAGENTA'");
```

wxDdbTable::DropIndex

bool DropIndex(const wxString &idxName)

Allows an index on the associated table to be dropped (deleted) if the user login has sufficient privileges to do so.

Parameters

idxName

Name of the index to be dropped.

Remarks

If the index specified in the 'idxName' parameter does not exist, an error will be logged, and the function will return a result of false.

It is not necessary to call *wxDdb::CommitTrans* (p. 272) after executing this function.

wxDdbTable::DropTable

bool DropTable()

Deletes the associated table if the user has sufficient privileges to do so.

Remarks

This function returns true if the table does not exist, but only for supported databases (see *wxDdb::Dbms* (p. 274)). If a datasource is not specifically supported, and this function is called, the function will return false.

Most datasources/ODBC drivers will delete any indexes associated with the table automatically, and others may not. Check the documentation for your database to determine the behavior.

It is not necessary to call *wxDdb::CommitTrans* (p. 272) after executing this function.

wxDdbTable::From

const wxString & From()

void From(const wxString &From)

Accessor function for the private class member *wxDdbTable::from*. Can be used as a synonym for *wxDdbTable::GetFromClause* (p. 317) (the first form of this function) or *wxDdbTable::SetFromClause* (p. 332) (the second form of this function).

Parameters

From

A comma separated list of table names that are to be outer joined with the base table's columns so that the joined table's columns may be returned in the result set or used as a portion of a comparison with the base table's columns. NOTE that the base table's name must NOT be included in the FROM clause, as it is automatically included by the *wxDdbTable* class in constructing query statements.

Return value

The first form of this function returns the current value of the *wxDdbTable* member variable *from*.

The second form of the function has no return value, as it will always set the from clause successfully.

See also

wxDdbTable::GetFromClause (p. 317), *wxDdbTable::SetFromClause* (p. 332)

wxDdbTable::GetColDefs

wxDdbColDef * GetColDefs()

Accessor function that returns a pointer to the array of column definitions that are bound to the columns that this *wxDdbTable* instance is associated with.

To determine the number of elements pointed to by the returned *wxDdbColDef* (p. 294) pointer, use the *wxDdbTable::GetNumberOfColumns* (p. 319) function.

Remarks

These column definitions must not be manually redefined after they have been set.

wxDbTable::GetCursor

HSTMT GetCursor()

Returns the HSTMT value of the current cursor for this wxDbTable object.

Remarks

This function is typically used just before changing to use a different cursor so that after the program is finished using the other cursor, the current cursor can be set back to being the cursor in use.

See also

wxDbTable::SetCursor (p. 331), *wxDbTable::GetNewCursor* (p. 318)

wxDbTable::GetDb

wxDb * GetDb()

Accessor function for the private member variable pDb which is a pointer to the datasource connection that this wxDbTable instance uses.

wxDbTable::GetFirst

bool GetFirst()

Retrieves the FIRST row in the record set as defined by the current query. Before retrieving records, a query must be performed using *wxDbTable::Query* (p. 324), *wxDbTable::QueryOnKeyFields* (p. 328), *wxDbTable::QueryMatching* (p. 327) or *wxDbTable::QueryBySqlStmt* (p. 325).

Remarks

This function can only be used if the datasource connection used by the wxDbTable instance was created with FwdOnlyCursors set to false. If the connection does not allow backward scrolling cursors, this function will return false, and the data contained in the bound columns will be undefined.

See also

wxDb::IsFwdOnlyCursors (p. 283)

wxDbTable::GetFromClause

const wxString & GetFromClause()

Accessor function that returns the current FROM setting assigned with `theWxDbTable::SetFromClause` (p. 332).

See also

`WxDbTable::From` (p. 316)

WxDbTable::GetLast

bool GetLast()

Retrieves the LAST row in the record set as defined by the current query. Before retrieving records, a query must be performed using `WxDbTable::Query` (p. 324), `WxDbTable::QueryOnKeyFields` (p. 328), `WxDbTable::QueryMatching` (p. 327) or `WxDbTable::QueryBySqlStmt` (p. 325).

Remarks

This function can only be used if the datasource connection used by the `WxDbTable` instance was created with `FwdOnlyCursors` set to false. If the connection does not allow backward scrolling cursors, this function will return false, and the data contained in the bound columns will be undefined.

See also

`WxDb::IsFwdOnlyCursors` (p. 283)

WxDbTable::GetNewCursor

HSTMT * GetNewCursor(bool setCursor=false, bool bindColumns=true)

This function will create a new cursor that can be used to access the table being referenced by this `WxDbTable` instance, or to execute direct SQL commands on without affecting the cursors that are already defined and possibly positioned.

Parameters

setCursor

OPTIONAL. Should this new cursor be set to be the current cursor after successfully creating the new cursor. Default is false.

bindColumns

OPTIONAL. Should this new cursor be bound to all the memory variables that the default cursor is bound to. Default is true.

Remarks

This new cursor must be closed using `WxDbTable::DeleteCursor` (p. 313) by the calling

program before the `wxDbTable` instance is deleted, or both memory and resource leaks will occur.

wxDbTable::GetNext

bool GetNext()

Retrieves the NEXT row in the record set after the current cursor position as defined by the current query. Before retrieving records, a query must be performed using `wxDbTable::Query` (p. 324), `wxDbTable::QueryOnKeyFields` (p. 328), `wxDbTable::QueryMatching` (p. 327) or `wxDbTable::QueryBySqlStmt` (p. 325).

Return value

This function returns false when the current cursor has reached the end of the result set. When false is returned, data in the bound columns is undefined.

Remarks

This function works with both forward and backward scrolling cursors.

See also `wxDbTable::++` (p. 337)

wxDbTable::GetNumberOfColumns

UWORD GetNumberOfColumns()

Accessor function that returns the number of columns that are statically bound for access by the `wxDbTable` instance.

wxDbTable::GetOrderByClause

const wxString & GetOrderByClause()

Accessor function that returns the current ORDER BY setting assigned with the `wxDbTable::SetOrderByClause` (p. 333).

See also

`wxDbTable::OrderBy` (p. 323)

wxDbTable::GetPrev

bool GetPrev()

Retrieves the PREVIOUS row in the record set before the current cursor position as defined by the current query. Before retrieving records, a query must be performed using `wxDbTable::Query` (p. 324), `wxDbTable::QueryOnKeyFields` (p. 328), `wxDbTable::QueryMatching` (p. 327) or `wxDbTable::QueryBySqlStmt` (p. 325).

Return value

This function returns false when the current cursor has reached the beginning of the result set and there are now other rows prior to the cursors current position. When false is returned, data in the bound columns is undefined.

Remarks

This function can only be used if the datasource connection used by the wxDbTable instance was created with FwdOnlyCursors set to false. If the connection does not allow backward scrolling cursors, this function will return false, and the data contained in the bound columns will be undefined.

See also

wxDb::IsFwdOnlyCursors (p. 283), *wxDbTable::--* (p. 337)

wxDbTable::GetQueryTableName

const wxString & GetQueryTableName()

Accessor function that returns the name of the table/view that was indicated as being the table/view to query against when this wxDbTable instance was created.

See also

wxDbTable constructor (p. 303)

wxDbTable::GetRowNum

UWORD GetRowNum()

Returns the ODBC row number for performing positioned updates and deletes.

Remarks

This function is not being used within the ODBC class library and may be a candidate for removal if no use is found for it.

Row number with some datasources/ODBC drivers is the position in the result set, while in others it may be a physical position in the database. Check your database documentation to find out which behavior is supported.

wxDbTable::GetTableName

const wxString & GetTableName()

Accessor function that returns the name of the table that was indicated as being the table that this wxDbTable instance was associated with.

wxDbTable::GetTablePath

const wxString & GetTablePath()

Accessor function that returns the path to the data table that was indicated during creation of this wxDbTable instance.

Remarks

Currently only applicable to dBase and MS-Access datasources.

wxDbTable::GetWhereClause

const wxString & GetWhereClause()

Accessor function that returns the current WHERE setting assigned with *theWxDbTable::SetWhereClause* (p. 334)

See also

wxDbTable::Where (p. 336)

wxDbTable::Insert

int Insert()

Inserts a new record into the table being referenced by this wxDbTable instance. The values in the member variables of the wxDbTable instance are inserted into the columns of the new row in the database.

Return value

DB_SUCCESS	Record inserted successfully (value = 1)
DB_FAILURE	Insert failed (value = 0)
DB_ERR_INTEGRITY_CONSTRAINT_VIOL	The insert failed due to an integrity constraint violation (duplicate non-unique index entry) is attempted.

Remarks

A *wxDb::CommitTrans* (p. 272) or *wxDb::RollbackTrans* (p. 288) must be called after use of this function to commit or rollback the insertion.

Example

```
// Incomplete code snippet
wxStrcpy(parts->PartName, "10");
wxStrcpy(parts->PartDesc, "Part #10");
parts->Qty = 1000;
RETCODE retcode = parts->Insert();
switch(retcode)
{
    case DB_SUCCESS:
```

```
        parts->GetDb()->CommitTrans();
        return(true);
    case DB_ERR_INTEGRITY_CONSTRAINT_VIOL:
        // Current data would result in a duplicate key
        // on one or more indexes that do not allow duplicates
        parts->GetDb()->RollbackTrans();
        return(false);
    default:
        // Insert failed for some unexpected reason
        parts->GetDb()->RollbackTrans();
        return(false);
}
```

wxDbTable::IsColNull

bool IsColNull(UWORD colNo) const

Used primarily in the ODBC class library to determine if a column value is set to "NULL". Works for all data types supported by the ODBC class library.

Parameters

colNo

The column number of the bound column as defined by the `wxDbTable::SetColDefs` (p. 329) calls which defined the columns accessible to this `wxDbTable` instance.

Remarks

NULL column support is currently not fully implemented as of wxWidgets 2.4.

wxDbTable::IsCursorClosedOnCommit

bool IsCursorClosedOnCommit()

Accessor function to return information collected during the opening of the datasource connection that is used by this `wxDbTable` instance. The result returned by this function indicates whether an implicit closing of the cursor is done after a commit on the database connection.

Return value

Returns true if the cursor associated with this `wxDbTable` object is closed after a commit or rollback operation. Returns false otherwise.

Remarks

If more than one `wxDbTable` instance used the same database connection, all cursors which use the database connection are closed on the commit if this function indicates true.

wxDbTable::IsQueryOnly

bool IsQueryOnly()

Accessor function that returns a value indicating if this wxDbTable instance was created to allow only queries to be performed on the bound columns. If this function returns true, then no actions may be performed using this wxDbTable instance that would modify (insert/delete/update) the table's data.

wxDbTable::Open

bool Open(bool *checkPrivileges*=false, bool *checkTableExists*=true)

Every wxDbTable instance must be opened before it can be used. This function checks for the existence of the requested table, binds columns, creates required cursors, (insert/select and update if connection is not wxDB_QUERY_ONLY) and constructs the insert statement that is to be used for inserting data as a new row in the datasource.

Parameters

checkPrivileges

Indicates whether the Open() function should check whether the current connected user has at least SELECT privileges to access the table to which they are trying to open. Default is false.

checkTableExists

Indicates whether the Open() function should check whether the table exists in the database or not before opening it. Default is true.

Remarks

If the function returns a false value due to the table not existing, a log entry is recorded for the datasource connection indicating the problem that was detected when checking for table existence. Note that it is usually best for the calling routine to check for the existence of the table and for sufficient user privileges to access the table in the mode (wxDB_QUERY_ONLY or !wxDB_QUERY_ONLY) before trying to open the table for the best possible explanation as to why a table cannot be opened.

Checking the user's privileges on a table can be quite time consuming during the open phase. With most applications, the programmer already knows that the user has sufficient privileges to access the table, so this check is normally not required.

For best performance, open the table, and then use the `wxDb::TablePrivileges` (p. 291) function to check the users privileges. Passing a schema to the `TablePrivileges()` function can significantly speed up the privileges checks.

See also

`wxDb::TableExists` (p. 290), `wxDb::TablePrivileges` (p. 291)

wxDbTable::OrderBy

const wxString &OrderBy()

void OrderBy(const wxString &OrderBy)

Accessor function for the private class member `wxDbTable::orderBy`. Can be used as a synonym for `wxDbTable::GetOrderByClause` (p. 319)(the first form of this function) or `wxDbTable::SetOrderByClause` (p. 333)(the second form of this function).

Parameters

OrderBy

A comma separated list of column names that indicate the alphabetized/numeric sorting sequence that the result set is to be returned in. If a FROM clause has also been specified, each column name specified in the ORDER BY clause should be prefaced with the table name to which the column belongs using DOT notation (TABLE_NAME.COLUMN_NAME).

Return value

The first form of this function returns the current value of the `wxDbTable` member variable `::orderBy`.

The second form of the function has no return value.

See also

`wxDbTable::GetOrderByClause` (p. 319), `wxDbTable::SetFromClause` (p. 332)

wxDbTable::Query

virtual bool Query(bool forUpdate=false, bool distinct=false)

Parameters

forUpdate

OPTIONAL. Gives you the option of locking records as they are retrieved. If the RDBMS is not capable of the FOR UPDATE clause, this argument is ignored. See `wxDbTable::CanSelectForUpdate` (p. 307) for additional information regarding this argument. Default is false.

distinct

OPTIONAL. Allows selection of only distinct values from the query (SELECT DISTINCT ... FROM ...). The notion of DISTINCT applies to all columns returned in the result set, not individual columns. Default is false.

Remarks

This function queries records from the datasource based on the three `wxDbTable` members: "where", "orderBy", and "from". Use `wxDbTable::SetWhereClause` (p. 334) to filter on records to be retrieved (e.g. All users with a first name of "JOHN"). Use

`wxDbTable::SetOrderByClause` (p. 333) to change the sequence in which records are returned in the result set from the datasource (e.g. Ordered by LAST_NAME).
 Use `wxDbTable::SetFromClause` (p. 332) to allow outer joining of the base table (the one being associated with this instance of `wxDbTable`) with other tables which share a related field.

After each of these clauses are set/cleared, call `wxDbTable::Query()` to fetch the result set from the datasource.

This scheme has an advantage if you have to requery your record set frequently in that you only have to set your WHERE, ORDER BY, and FROM clauses once. Then to refresh the record set, simply call `wxDbTable::Query()` as frequently as needed.

Note that repeated calls to `wxDbTable::Query()` may tax the database server and make your application sluggish if done too frequently or unnecessarily.

The base table name is automatically prepended to the base column names in the event that the FROM clause has been set (is non-null) using `wxDbTable::SetFromClause` (p. 332).

The cursor for the result set is positioned *before* the first record in the result set after the query. To retrieve the first record, call either `wxDbTable::GetFirst` (p. 317) (only if backward scrolling cursors are available) or `wxDbTable::GetNext` (p. 319). Typically, no data from the result set is returned to the client driver until a request such as `wxDbTable::GetNext` (p. 319) is performed, so network traffic and database load are not overwhelmed transmitting data until the data is actually requested by the client. This behavior is solely dependent on the ODBC driver though, so refer to the ODBC driver's reference material for information on its behaviors.

Values in the bound columns' memory variables are undefined after executing a call to this function and remain that way until a row in the result set is requested to be returned.

The `wxDbTable::Query()` function is defined as "virtual" so that it may be overridden for application specific purposes.

Be sure to set the `wxDbTable`'s "where", "orderBy", and "from" member variables to "" if they are not to be used in the query. Otherwise, the results returned may have unexpected results (or no results) due to improper or incorrect query parameters constructed from the uninitialized clauses.

Example

```
// Incomplete code sample
parts->SetWhereClause("DESCRIPTION = 'FOOD'");
parts->SetOrderByClause("EXPIRATION_DATE");
parts->SetFromClause("");
// Query the records based on the where, orderBy and from clauses
// specified above
parts->Query();
// Display all records queried
while(parts->GetNext())
    dispPart(parts); // user defined function
```

`wxDbTable::QueryBySqlStmt`

bool QueryBySqlStmt(const wxString &pSqlStmt)

Performs a query against the datasource by accepting and passing verbatim the SQL SELECT statement passed to the function.

Parameters

pSqlStmt

Pointer to the SQL SELECT statement to be executed.

Remarks

This is the most powerful form of the query functions available. This member function allows a programmer to write their own custom SQL SELECT statement for requesting data from the datasource. This gives the programmer access to the full power of SQL for performing operations such as scalar functions, aggregate functions, table joins, and sub-queries, as well as datasource specific function calls.

The requirements of the SELECT statement are the following:

1. Must return the correct number of columns. In the derived wxDbTable constructor, it is specified how many columns are in the wxDbTable object. The SELECT statement must return exactly that many columns.
2. The columns must be returned in the same sequence as specified when defining the bounds columns using wxDbTable::SetColDefs(), and the columns returned must be of the proper data type. For example, if column 3 is defined in the wxDbTable bound column definitions to be a float, the SELECT statement must return a float for column 3 (e.g. PRICE * 1.10 to increase the price by 10
3. The ROWID can be included in your SELECT statement as the **last** column selected, if the datasource supports it. Use wxDbTable::CanUpdByROWID() to determine if the ROWID can be selected from the datasource. If it can, much better performance can be achieved on updates and deletes by including the ROWID in the SELECT statement.

Even though data can be selected from multiple tables (joins) in your select statement, only the base table associated with this wxDbTable object is automatically updated through the ODBC class library. Data from multiple tables can be selected for display purposes however. Include columns in the wxDbTable object and mark them as non-updateable (See *wxDbColDef* (p. 294) for details). This way columns can be selected and displayed from other tables, but only the base table will be updated automatically when performed through the *wxDbTable::Update* (p. 335) function after using this type of query. To update tables other than the base table, use the *wxDbTable::Update* (p. 335) function passing a SQL statement.

After this function has been called, the cursor is positioned before the first record in the record set. To retrieve the first record, call either *wxDbTable::GetFirst* (p. 317) or *wxDbTable::GetNext* (p. 319).

Example

```
// Incomplete code samples
```

```
wxString sqlStmt;
sqlStmt = "SELECT * FROM PARTS WHERE STORAGE_DEVICE = 'SD98' \
          AND CONTAINER = 12";
// Query the records using the SQL SELECT statement above
parts->QueryBySqlStmt(sqlStmt);
// Display all records queried
while(parts->GetNext())
    dispPart(&parts);

Example SQL statements
-----

// Table Join returning 3 columns
SELECT part_no, part_desc, sd_name
  from parts, storage_devices
 where parts.storage_device_id =
        storage_devices.storage_device_id

// Aggregate function returning total number of
// parts in container 99
SELECT count(*) from PARTS where container = 99

// Order by clause; ROWID, scalar function
SELECT part_no, substring(part_desc, 1, 10), qty_on_hand + 1, ROWID
  from parts
 where warehouse = 10
 order by part_no desc           // descending order

// Subquery
SELECT * from parts
  where container in (select container
                     from storage_devices
                     where device_id = 12)
```

wxDbTable::QueryMatching

virtual bool QueryMatching(bool forUpdate=false, bool distinct=false)

QueryMatching allows querying of records from the table associated with the wxDbTable object by matching "columns" to values.

For example: To query the datasource for the row with a PART_NUMBER column value of "32", clear all column variables of the wxDbTable object, set the PartNumber variable that is bound to the PART_NUMBER column in the wxDbTable object to "32", and then call wxDbTable::QueryMatching().

Parameters

forUpdate

OPTIONAL. Gives you the option of locking records as they are queried (SELECT ... FOR UPDATE). If the RDBMS is not capable of the FOR UPDATE clause, this argument is ignored. See *wxDbTable::CanSelectForUpdate* (p. 307) for additional information regarding this argument. Default is false.

distinct

OPTIONAL. Allows selection of only distinct values from the query (SELECT DISTINCT ... FROM ...). The notion of DISTINCT applies to all columns returned in the result set, not individual columns. Default is false.

Remarks

The SQL WHERE clause is built by the ODBC class library based on all non-zero/non-NULL columns in your wxDbTable object. Matches can be on one, many or all of the wxDbTable's columns. The base table name is prepended to the column names in the event that the wxDbTable's FROM clause is non-null.

This function cannot be used to perform queries which will check for columns that are 0 or NULL, as the automatically constructed WHERE clause only will contain comparisons on column member variables that are non-zero/non-NULL.

The primary difference between this function and *wxDbTable::QueryOnKeyFields* (p. 328) is that this function can query on any column(s) in the wxDbTable object. Note however that this may not always be very efficient. Searching on non-indexed columns will always require a full table scan.

The cursor is positioned before the first record in the record set after the query is performed. To retrieve the first record, the program must call either *wxDbTable::GetFirst* (p. 317) or *wxDbTable::GetNext* (p. 319).

WHERE and FROM clauses specified using *wxDbTable::SetWhereClause* (p. 334) and *wxDbTable::SetFromClause* (p. 332) are ignored by this function.

Example

```
// Incomplete code sample
parts->ClearMemberVars();           // Set all columns to zero
wxStrcpy(parts->PartNumber,"32");  // Set columns to query on
parts->OnHold = true;
parts->QueryMatching();             // Query
// Display all records queried
while(parts->GetNext())
    dispPart(parts); // Some application defined function
```

wxDbTable::QueryOnKeyFields

bool QueryOnKeyFields(bool forUpdate=false, bool distinct=false)

QueryOnKeyFields provides an easy mechanism to query records in the table associated with the wxDbTable object by the primary index column(s). Simply assign the primary index column(s) values and then call this member function to retrieve the record.

Note that since primary indexes are always unique, this function implicitly always returns a single record from the database. The base table name is prepended to the column names in the event that the wxDbTable's FROM clause is non-null.

Parameters

forUpdate

OPTIONAL. Gives you the option of locking records as they are queried (SELECT ... FOR UPDATE). If the RDBMS is not capable of the FOR UPDATE clause, this argument is ignored. See *wxDbTable::CanSelectForUpdate* (p. 307) for additional

information regarding this argument. Default is false.

distinct

OPTIONAL. Allows selection of only distinct values from the query (SELECT DISTINCT ... FROM ...). The notion of DISTINCT applies to all columns returned in the result set, not individual columns. Default is false.

Remarks

The cursor is positioned before the first record in the record set after the query is performed. To retrieve the first record, the program must call either *wxDdbTable::GetFirst* (p. 317) or *wxDdbTable::GetNext* (p. 319).

WHERE and FROM clauses specified using *wxDdbTable::SetWhereClause* (p. 334) and *wxDdbTable::SetFromClause* (p. 332) are ignored by this function.

Example

```
// Incomplete code sample
wxStrncpy(parts->PartNumber, "32");
parts->QueryOnKeyFields();
// Display all records queried
while(parts->GetNext())
    dispPart(parts); // Some application defined function
```

wxDdbTable::Refresh

bool Refresh()

This function re-reads the bound columns into the memory variables, setting them to the current values stored on the disk.

The cursor position and result set are unaffected by calls to this function. (The one exception is in the case where the record to be refreshed has been deleted by some other user or transaction since it was originally retrieved as part of the result set. For most datasources, the default behavior in this situation is to return the value that was originally queried for the result set, even though it has been deleted from the database. But this is datasource dependent, and should be tested before relying on this behavior.)

Remarks

This routine is only guaranteed to work if the table has a unique primary index defined for it. Otherwise, more than one record may be fetched and there is no guarantee that the correct record will be refreshed. The table's columns are refreshed to reflect the current data in the database.

wxDdbTable::SetColDefs

```
void SetColDefs(UWORD index, const wxString &fieldName, int dataType, void  
*pData, SWORD cType, int size, bool keyField = false, bool upd = true, bool insAllow =  
true, bool derivedCol = false)
```

wxDbColDataPtr * SetColDefs(wxDbCollnf *collnfs, UWORD numCols)

Parameters

index

Column number (0 to n-1, where n is the number of columns specified as being defined for this wxDbTable instance when the wxDbTable constructor was called.

fieldName

Column name from the associated data table.

dataType

Logical data type. Valid logical types include:

DB_DATA_TYPE_VARCHAR	: strings
DB_DATA_TYPE_INTEGER	: non-floating point numbers
DB_DATA_TYPE_FLOAT	: floating point numbers
DB_DATA_TYPE_DATE	: dates

pData

Pointer to the data object that will hold the column's value when a row of data is returned from the datasource.

cType

SQL C Type. This defines the data type that the SQL representation of the data is converted to to be stored in *pData*. Other valid types are available also, but these are the most common ones:

SQL_C_CHAR	// strings
SQL_C_LONG	
SQL_C_ULONG	
SQL_C_SHORT	
SQL_C_USHORT	
SQL_C_FLOAT	
SQL_C_DOUBLE	
SQL_C_NUMERIC	
SQL_C_TIMESTAMP	
SQL_C_BOOLEAN	// defined in db.h
SQL_C_ENUM	// defined in db.h

size

Maximum size in bytes of the *pData* object.

keyField

OPTIONAL. Indicates if this column is part of the primary index. Default is false.

upd

OPTIONAL. Are updates allowed on this column? Default is true.

insAllow

OPTIONAL. Inserts allowed on this column? Default is true.

derivedCol

OPTIONAL. Is this a derived column (non-base table column for query only)?
Default is false.

collnfs

Pointer to an array of `wxDbCollnf` instances which contains all the information necessary to create *numCols* column definitions.

numCols

Number of elements of `wxDbCollnf` type that are pointed to by *collnfs*, which are to have column definitions created from them.

Remarks

If *pData* is to hold a string of characters, be sure to include enough space for the NULL terminator in *pData* and in the byte count of *size*.

Both forms of this function provide a shortcut for defining the columns in your `wxDbTable` object. Use this function in any derived `wxDbTable` constructor when describing the column/columns in the `wxDbTable` object.

The second form of this function is primarily used when the `wxDb::GetColumns` (p. 278) function was used to query the datasource for the column definitions, so that the column definitions are already stored in `wxDbCollnf` form. One example use of using `wxDb::GetColumns` (p. 278) then using this function is if a data table existed in one datasource, and the table's column definitions were to be copied over to another datasource or table.

Example

```
// Long way not using this function
wxStrcpy(colDefs[0].ColName, "PART_NO");
colDefs[0].DbType         = DB_DATA_TYPE_VARCHAR;
colDefs[0].PtrDataObj     = PartNumber;
colDefs[0].SqlCtype       = SQL_C_CHAR;
colDefs[0].SzDataObj      = PART_NUMBER_LEN;
colDefs[0].KeyField       = true;
colDefs[0].Updateable     = false;
colDefs[0].InsertAllowed  = true;
colDefs[0].DerivedCol     = false;

// Shortcut using this function
SetColDefs(0, "PART_NUMBER", DB_DATA_TYPE_VARCHAR, PartNumber,
           SQL_C_CHAR, PART_NUMBER_LEN, true, false, true, false);
```

wxDbTable::SetCursor

```
bool SetCursor(HSTMT *hstmtActivate = (void **) wxDB_DEFAULT_CURSOR)
```

Parameters

hstmtActivate

OPTIONAL. Pointer to the cursor that is to become the current cursor. Passing no cursor handle will reset the cursor back to the wxDbTable's default (original) cursor that was created when the wxDbTable instance was first created. Default is wxDB_DEFAULT_CURSOR.

Remarks

When swapping between cursors, the member variables of the wxDbTable object are automatically refreshed with the column values of the row that the current cursor is positioned at (if any). If the cursor is not positioned, then the data in member variables is undefined.

The only way to return back to the cursor that was in use before this function was called is to programmatically determine the current cursor's HSTMT**BEFORE** calling this function using *wxDbTable::GetCursor* (p. 317) and saving a pointer to that cursor.

See also

wxDbTable::GetNewCursor (p. 318), *wxDbTable::GetCursor* (p. 317), *wxDbTable::SetCursor* (p. 331)

wxDbTable::SetFromClause

void SetFromClause(const wxString &From)

Accessor function for setting the private class member *wxDbTable::from* that indicates what other tables should be outer joined with the wxDbTable's base table for access to the columns in those other tables.

Synonym to this function is one form of *wxDbTable::From* (p. 316)

Parameters

From

A comma separated list of table names that are to be outer joined with the base table's columns so that the joined table's columns may be returned in the result set or used as a portion of a comparison with the base table's columns. NOTE that the base table's name must NOT be included in the FROM clause, as it is automatically included by the wxDbTable class in constructing query statements.

Remarks

Used by the *wxDbTable::Query* (p. 324) and *wxDbTable::Count* (p. 309) member functions to allow outer joining of records from multiple tables.

Do **not** include the keyword "FROM" when setting the FROM clause.

If using the FROM clause when performing a query, be certain to include in the corresponding WHERE clause a comparison of a column from either the base table or one of the other joined tables to each other joined table to ensure the datasource knows

on which column values the tables should be joined on.

Example

```
...
// Base table is the "LOCATION" table, and it is being
// outer joined to the "PART" table via the the field "PART_NUMBER"
// that can be related between the two tables.
location->SetWhereClause( "LOCATION.PART_NUMBER = PART.PART_NUMBER" )
location->SetFromClause( "PART" );
...
```

See also

wxDbTable::From (p. 316), *wxDbTable::GetFromClause* (p. 317)

wxDbTable::SetColNull

bool SetColNull(UWORD colNo, bool set=true)

bool SetColNull(const wxString &colName, bool set=true)

Both forms of this function allow a member variable representing a column in the table associated with this wxDbTable object to be set to NULL.

The first form allows the column to be set by the index into the column definitions used to create the wxDbTable instance, while the second allows the actual column name to be specified.

Parameters

colNo

Index into the column definitions used when first defining this wxDbTable object.

colName

Actual data table column name that is to be set to NULL.

set

Whether the column is set to NULL or not. Passing true sets the column to NULL, passing false sets the column to be non-NULL. Default is true.

Remarks

No database updates are done by this function. It only operates on the member variables in memory. Use and insert or update function to store this value to disk.

wxDbTable::SetOrderByClause

void SetOrderByClause(const wxString &OrderBy)

Accessor function for setting the private class member wxDbTable::orderBy which

determines sequence/ordering of the rows returned in the result set of a query.

A synonym to this function is one form of the function *wxDBTable::OrderBy* (p. 323)

Parameters

OrderBy

A comma separated list of column names that indicate the alphabetized sorting sequence that the result set is to be returned in. If a FROM clause has also been specified, each column name specified in the ORDER BY clause should be prefaced with the table name to which the column belongs using DOT notation (TABLE_NAME.COLUMN_NAME).

Remarks

Do **not** include the keywords "ORDER BY" when setting the ORDER BY clause.

Example

```
...
parts->SetOrderByClause( "PART_DESCRIP, QUANTITY" );
...

...
location->SetOrderByClause( "LOCATION.POSITION, PART.PART_NUMBER" );
...
```

See also

wxDBTable::OrderBy (p. 323), *wxDBTable::GetOrderByClause* (p. 319)

wxDBTable::SetQueryTimeout

bool SetQueryTimeout(UDWORD *nSeconds*)

Allows a time period to be set as the timeout period for queries.

Parameters

nSeconds

The number of seconds to wait for the query to complete before timing out.

Remarks

Neither Oracle or Access support this function as of yet. Other databases should be evaluated for support before depending on this function working correctly.

wxDBTable::SetWhereClause

void SetWhereClause(const wxString &*Where*)

Accessor function for setting the private class member *wxDBTable::where* that

determines which rows are returned in the result set by the datasource.

A synonym to this function is one form of the function *wxDbTable::Where* (p. 336)

Parameters

Where

SQL "where" clause. This clause can contain any SQL language that is legal in standard where clauses. If a FROM clause has also been specified, each column name specified in the ORDER BY clause should be prefaced with the table name to which the column belongs using DOT notation (TABLE_NAME.COLUMN_NAME).

Remarks

Do **not** include the keywords "WHERE" when setting the WHERE clause.

Example

```
...
// Simple where clause
parts->SetWhereClause("PART_NUMBER = '32'");
...
// Any comparison operators
parts->SetWhereClause("PART_DESCRIP LIKE 'HAMMER%'");
...
// Multiple comparisons, including a function call
parts->Where("QTY > 0 AND {fn UCASE(PART_DESCRIP)} LIKE '%DRILL%'");
...
// Using parameters and multiple logical combinations
parts->Where("(QTY > 10) OR (ON_ORDER > 0)) AND ON_HOLD = 0");
...
// This query uses an outer join (requiring a FROM clause also)
// that joins the PART and LOCATION table on the common field
// PART_NUMBER.
parts->Where("PART.ON_HOLD = 0 AND \
            PART.PART_NUMBER = LOCATION.PART_NUMBER AND \
            LOCATION.PART_NUMBER > 0");
```

See also

wxDbTable::Where (p. 336), *wxDbTable::GetWhereClause* (p. 321)

wxDbTable::Update

bool Update()

bool Update(const wxString &pSqlStmt)

The first form of this function will update the row that the current cursor is currently positioned at with the values in the memory variables that are bound to the columns. The actual SQL statement to perform the update is automatically created by the ODBC class, and then executed.

The second form of the function allows full access through SQL statements for updating records in the database. Write any valid SQL UPDATE statement and submit it to this function for execution. Sophisticated updates can be performed using the full power of

the SQL dialect. The full SQL statement must have the exact syntax required by the driver/datasource for performing the update. This usually is in the form of:

```
UPDATE tablename SET col1=X, col2=Y, ... where ...
```

Parameters

pSqlStmt

Pointer to SQL UPDATE statement to be executed.

Remarks

A *wxDdb::CommitTrans* (p. 272) or *wxDdb::RollbackTrans* (p. 288) must be called after use of this function to commit or rollback the update.

Example

```
wxString sqlStmt;  
sqlStmt = "update PART set QTY = 0 where PART_NUMBER = '32'";
```

wxDdbTable::UpdateWhere

bool UpdateWhere(const wxString &pWhereClause)

Performs updates to the base table of the *wxDdbTable* object, updating only the rows which match the criteria specified in the *pWhereClause*.

All columns that are bound to member variables for this *wxDdbTable* instance that were defined with the "updateable" parameter set to true will be updated with the information currently held in the memory variable.

Parameters

pWhereClause

Pointer to a valid SQL WHERE clause. Do not include the keyword 'WHERE'.

Remarks

Care should be used when updating columns that are part of indexes with this function so as not to violate a unique key constraints.

A *wxDdb::CommitTrans* (p. 272) or *wxDdb::RollbackTrans* (p. 288) must be called after use of this function to commit or rollback the update(s).

wxDdbTable::Where

const wxString & Where()

void Where(const wxString& Where)

Accessor function for the private class member *wxDdbTable::where*. Can be used as a

synonym for *wxDbTable::GetWhereClause* (p. 321)(the first form of this function) to return the current where clause or *wxDbTable::SetWhereClause* (p. 334) (the second form of this function) to set the where clause for this table instance.

Parameters

Where

A valid SQL WHERE clause. Do not include the keyword 'WHERE'.

Return value

The first form of this function returns the current value of the *wxDbTable* member variable *::where*.

The second form of the function has no return value, as it will always set the where clause successfully.

See also

wxDbTable::GetWhereClause (p. 321), *wxDbTable::SetWhereClause* (p. 334)

wxDbTable::operator ++

bool operator ++()

Synonym for *wxDbTable::GetNext* (p. 319)

See also

wxDbTable::GetNext (p. 319)

wxDbTable::operator --

bool operator --()

Synonym for *wxDbTable::GetPrev* (p. 319)

See also

wxDbTable::GetPrev (p. 319)

wxDbTableInf

```
tableName[0]    = 0;
tableType[0]    = 0;
tableRemarks[0] = 0;
numCols         = 0;
pColInf         = NULL;
```

Currently only used by *wxDb::GetCatalog* (p. 277) internally and *wxDbInf* (p. 302) class, but may be used in future releases for user functions. Contains information describing

the table (Name, type, etc). A pointer to a `wxDboCollnf` array instance is included so a program can create `awxDboCollnf` (p. 295) array instance (using `wxDbo::GetColumns` (p. 278)) to maintain all information about the columns of a table in one memory structure.

Eventually, accessor functions will be added for this class

See the *database classes overview* (p. 1675) for an introduction to using the ODBC classes.

wxDboTableInf::Initialize

Simply initializes all member variables to a cleared state. Called by the constructor automatically.

wxDboGridCollInfo

This class is used to define columns to be shown, names of the columns, order and type of data, when using `wxDboGridTableBase` (p. 340) to display a Table or query in a `wxGrid` (p. 572)

See the database grid example in `wxDboGridTableBase` (p. 340) for an introduction to using the `wxDboGrid` classes.

Include files

<wx/dbgrid.h>

wxDboGridCollInfo::wxDboGridCollInfo

wxDboGridCollInfo(int *colNo*, wxString *type*, wxString *title*, wxDboGridCollInfo **next*)

Default constructor. See the database grid example in `wxDboGridTableBase` (p. 340) to see two different ways for adding columns.

Parameters

colNo

Column number in the `wxDboTable` (p. 302) instance to be used (first column is 0).

type

Column type , wxString specifying the grid name for the datatype in this column, or use `wxGRID_VALUE_DBAUTO` to determine the type automatically from the `wxDboColDef` (p. 294) definition

title

The column label to be used in the grid display

next

A pointer to the next *wxDbGridColumnInfo* structure if using one-step construction, NULL terminates the list. Use Null also if using two step construction.

See the database grid example in *wxDbGridTableBase* (p. 340) to see two different ways for adding columns.

wxDbGridColumnInfo::~~wxDbGridColumnInfo

~wxDbGridColumnInfo()

Destructor.

wxDbGridColumnInfo::AddColumnInfo

void AddColumnInfo(int colNo, wxString type, wxString title)

Use this member function for adding columns. See the database grid example in *wxDbGridTableBase* (p. 340) to see two different ways for adding columns.

It is important to note that this class is merely a specifier to the *wxDbGridTableBase* (p. 340) constructor. Changes made to this datatype after the *wxDbGridTableBase* (p. 340) is called will not have any effect.

Parameters *colNo*

Column number in the *wxDbTable* (p. 302) instance to be used (first column is 0).

type

Column type ,wxString specifying the grid name for the datatype in this column, or use wxGRID_VALUE_DBAUTO to determine the type automatically from the *wxDbColDef* (p. 294) definition

title

The column label to be used in the grid display

Remarks

As *wxDbTable* must be defined with to have columns which match those to by a *wxDbGridColumnInfo* info structure as this is the structure which informs the grid of how you want to display your *wxDbTable* (p. 302). If no datatype conversion or the referenced column number does not exist the the behavior is undefined.

See the example at *wxDbGridColumnInfo::wxDbGridColumnInfo* (p. 338).

wxDbGridTableBase

You can view a database table in a grid using this class.

If you are deriving your own wxDbTable subclass for your table, then you may consider overriding GetCol() and SetCol() to provide calculated fields. This does work but care should be taken when using wxDbGridTableBase in this way.

The constructor and AssignDbTable() call allows you to specify the ownership if the wxDbTable object pointer. If you tell wxGridTableBase to take ownership, it will delete the passed wxDbTable when a new one is assigned or wxGridTableBase's destructor is called. However no checks for aliasing are done so Assign(table,...,true); Assign(table,...,true); is an error. If you need to request a table object the preferred way is that the client keeps ownership.

Derived From

wxGridTableBase (p. 631)

Include files

<wx/dbgrid.h>

Example

```
// First step, let's define wxDbTable
int numColumns = 2;
wxDbTable *table = new wxDbTable (db, tblName, numColumns);
int int_var;
wxChar string_name[255];
table->SetColDef (0, "column 0", DB_DATA_TYPE_INTEGER, &int_var,
                 SQL_C_LONG, sizeof(int_var), true);
table->SetColDef (1, "column 1", DB_DATA_TYPE_VARCHAR, &string_name,
                 SQL_C_LONG, sizeof(string_name), false);

// now let's define columns in the grid

// first way to do it
wxDbGridColInfo *columns;
columns = new wxDbGridColInfo(0, wxGRID_VALUE_LONG, "first column",
                              new wxDbGridColInfo(1, wxGRID_VALUE_STRING, "second column",
                                                    NULL));

// second way to do it
wxDbGridColInfo *columns;
// first column is special
columns = new wxDbGridColInfo(0, wxGRID_VALUE_LONG, "first column",
NULL);
// all the rest
columns->AddColInfo (1, wxGRID_VALUE_STRING, "second column");

// second way may be better when columns are not known at compile time

// now, let's open the table and make a Query()
table->Open();
// this step is very important
table->SetRowMode (wxDbTable::WX_ROW_MODE_QUERY);
// in the grid we will see only the rows of the result query
m_dbTable->Query();

wxDbGridTableBase *dbgrid = new wxDbGridTableBase(table, columns,
wxUSE_QUERY, true);
delete columns; // not needed anymore
```

```
wxGrid *grid = new wxGrid ( ... );  
grid->SetTable(dbgrid, true);  
grid->Fit();
```

Include files

<wx/dbgrid.h>

Helper classes and data structures

wxDbGridTableBase::wxDbGridTableBase

wxDbGridTableBase(wxDbTable *tab, wxDbGridCollInfo *CollInfo, int count = wxUSE_QUERY, bool takeOwnership = true)

Constructor.

Parameters

tab

The database table you want to display. Must be opened and queried before display the grid. See the example *above* (p. 340).

CollInfo

Columns titles, and other values. See *wxDbGridCollInfo* (p. 338).

count

You can use a query result set (wxUSE_QUERY, to use *wxDbTable::Count(wxDbTable::Count())* or you can fix the total number of rows (count >= 0) to display, or specify it if you already know the size in avoid calling

takeOwnership

If true, this class deletes *wxDbTable* when it stops referring to it, if false application must take care of deleting it.

wxDbGridTableBase::ValidateRow

void ValidateRow(int row)

It ensures that the row data is fetched from the database, and if the *wxDbTable* local buffer, the row number passed should be the grid row.

Parameters

row

Row where validation must be done.

wxDbGridTableBase::UpdateRow

bool UpdateRow(int row)

If row has changed it forces that row to be written back to the database, however support for detecting whether insert/update is required is currently not in wxDbTable, so this function is currently unsupported.

Parameters

row

Row you want to update.

wxDbGridTableBase::AssignDbTable

bool AssignDbTable(wxDbTable *tab, int count = wxUSE_QUERY, bool takeOwnership = true)

Resets the grid for using with a new database table, but using the same columns definition. This can be useful when re-querying the database and want to see the changes.

Parameters

tab

Database table you want to assign to the grid.

count

Number of rows you want to show or wxUSE_QUERY for using a query.

takeOwnership

If false, user must take care of deleting tab after deleting the wxDbGridTableBase.
If true, deletion is made by destructor class.

wxDebugContext

A class for performing various debugging and memory tracing operations. Full functionality (such as printing out objects currently allocated) is only present in a debugging build of wxWidgets, i.e. if the `__WXDEBUG__` symbol is defined. wxDebugContext and related functions and macros can be compiled out by setting wxUSE_DEBUG_CONTEXT to 0 in setup.h

Derived from

No parent class.

Include files

<wx/memory.h>

See also

Overview (p. 1606)

wxDebugContext::Check

int Check()

Checks the memory blocks for errors, starting from the currently set checkpoint.

Return value

Returns the number of errors, so a value of zero represents success. Returns -1 if an error was detected that prevents further checking.

wxDebugContext::Dump

bool Dump()

Performs a memory dump from the currently set checkpoint, writing to the current debug stream. Calls the **Dump** member function for each wxObject derived instance.

Return value

true if the function succeeded, false otherwise.

wxDebugContext::GetCheckPrevious

bool GetCheckPrevious()

Returns true if the memory allocator checks all previous memory blocks for errors. By default, this is false since it slows down execution considerably.

See also

wxDebugContext::SetCheckPrevious (p. 345)

wxDebugContext::GetDebugMode

bool GetDebugMode()

Returns true if debug mode is on. If debug mode is on, the wxObject new and delete operators store or use information about memory allocation. Otherwise, a straight malloc and free will be performed by these operators.

See also

wxDebugContext::SetDebugMode (p. 346)

wxDebugContext::GetLevel

int GetLevel()

Gets the debug level (default 1). The debug level is used by the *wxTraceLevel* function and the *WXTRACELEVEL* macro to specify how detailed the trace information is; setting a different level will only have an effect if trace statements in the application specify a value other than one.

This is obsolete, replaced by *wxLog* (p. 844) functionality.

See also

wxDebugContext::SetLevel (p. 346)

wxDebugContext::GetStream

ostream& GetStream()

Returns the output stream associated with the debug context.

This is obsolete, replaced by *wxLog* (p. 844) functionality.

See also

wxDebugContext::SetStream (p. 347)

wxDebugContext::GetStreamBuf

streambuf* GetStreamBuf()

Returns a pointer to the output stream buffer associated with the debug context. There may not necessarily be a stream buffer if the stream has been set by the user.

This is obsolete, replaced by *wxLog* (p. 844) functionality.

wxDebugContext::HasStream

bool HasStream()

Returns true if there is a stream currently associated with the debug context.

This is obsolete, replaced by *wxLog* (p. 844) functionality.

See also

wxDebugContext::SetStream (p. 347), *wxDebugContext::GetStream* (p. 344)

wxDebugContext::PrintClasses

bool PrintClasses()

Prints a list of the classes declared in this application, giving derivation and whether instances of this class can be dynamically created.

See also

wxDebugContext::PrintStatistics (p. 345)

wxDebugContext::PrintStatistics

bool PrintStatistics(bool detailed = true)

Performs a statistics analysis from the currently set checkpoint, writing to the current debug stream. The number of object and non-object allocations is printed, together with the total size.

Parameters

detailed

If true, the function will also print how many objects of each class have been allocated, and the space taken by these class instances.

See also

wxDebugContext::PrintStatistics (p. 345)

wxDebugContext::SetCheckpoint

void SetCheckpoint(bool all = false)

Sets the current checkpoint: Dump and PrintStatistics operations will be performed from this point on. This allows you to ignore allocations that have been performed up to this point.

Parameters

all

If true, the checkpoint is reset to include all memory allocations since the program started.

wxDebugContext::SetCheckPrevious

void SetCheckPrevious(bool check)

Tells the memory allocator to check all previous memory blocks for errors. By default, this is false since it slows down execution considerably.

See also

wxDebugContext::GetCheckPrevious (p. 343)

wxDebugContext::SetDebugMode

void SetDebugMode(bool debug)

Sets the debug mode on or off. If debug mode is on, the wxObject new and delete operators store or use information about memory allocation. Otherwise, a straight malloc and free will be performed by these operators.

By default, debug mode is on if `__WXDEBUG__` is defined. If the application uses this function, it should make sure that all object memory allocated is deallocated with the same value of debug mode. Otherwise, the delete operator might try to look for memory information that does not exist.

See also

wxDebugContext::GetDebugMode (p. 343)

wxDebugContext::SetFile

bool SetFile(const wxString& filename)

Sets the current debug file and creates a stream. This will delete any existing stream and stream buffer. By default, the debug context stream outputs to the debugger (Windows) or standard error (other platforms).

wxDebugContext::SetLevel

void SetLevel(int level)

Sets the debug level (default 1). The debug level is used by the wxTraceLevel function and the WXTRACELEVEL macro to specify how detailed the trace information is; setting a different level will only have an effect if trace statements in the application specify a value other than one.

This is obsolete, replaced by *wxLog* (p. 844) functionality.

See also

wxDebugContext::GetLevel (p. 344)

wxDebugContext::SetStandardError

bool SetStandardError()

Sets the debugging stream to be the debugger (Windows) or standard error (other platforms). This is the default setting. The existing stream will be flushed and deleted.

This is obsolete, replaced by *wxLog* (p. 844) functionality.

wxDebugContext::SetStream

void SetStream(ostream* stream, streambuf* streamBuf = NULL)

Sets the stream and optionally, stream buffer associated with the debug context. This operation flushes and deletes the existing stream (and stream buffer if any).

This is obsolete, replaced by *wxLog* (p. 844) functionality.

Parameters

stream

Stream to associate with the debug context. Do not set this to NULL.

streamBuf

Stream buffer to associate with the debug context.

See also

wxDebugContext::GetStream (p. 344), *wxDebugContext::HasStream* (p. 344)

wxDebugStreamBuf

This class allows you to treat debugging output in a similar (stream-based) fashion on different platforms. Under Windows, an ostream constructed with this buffer outputs to the debugger, or other program that intercepts debugging output. On other platforms, the output goes to standard error (cerr).

This is soon to be obsolete, replaced by *wxLog* (p. 844) functionality.

Derived from

streambuf

Include files

<wx/memory.h>

Example

```
wxDebugStreamBuf streamBuf;  
ostream stream(&streamBuf);
```

```
stream << "Hello world!" << endl;
```

See also

Overview (p. 1606)

wxDelegateRendererNative

`wxDelegateRendererNative` allows reuse of renderers code by forwarding all the *wxRendererNative* (p. 1059) methods to the given object and thus allowing you to only modify some of its methods -- without having to reimplement all of them.

Note that the "normal", inheritance-based approach, doesn't work with the renderers as it is impossible to derive from a class unknown at compile-time and the renderer is only chosen at run-time. So suppose that you want to only add something to the drawing of the tree control buttons but leave all the other methods unchanged -- the only way to do it, considering that the renderer class which you want to customize might not even be written yet when you write your code (it could be written later and loaded from a DLL during run-time), is by using this class.

Except for the constructor, it has exactly the same methods as *wxRendererNative* (p. 1059) and their implementation is trivial: they are simply forwarded to the real renderer. Note that the "real" renderer may, in turn, be a `wxDelegateRendererNative` as well and that there may be arbitrarily many levels like this -- but at the end of the chain there must be a real renderer which does the drawing.

Derived from

wxRendererNative (p. 1059)

Include files

<wx/renderer.h>

wxDelegateRendererNative::wxDelegateRendererNative

wxDelegateRendererNative()

wxDelegateRendererNative(wxRendererNative& *rendererNative*)

The default constructor does the same thing as the other one except that it uses the *generic renderer* (p. 1062) instead of the user-specified *rendererNative*.

In any case, this sets up the delegate renderer object to follow all calls to the specified real renderer.

Note that this object does *not* take ownership of (i.e. won't delete) *rendererNative*.

wxDelegateRendererNative::DrawXXX

DrawXXX(...)

This class also provides all the virtual methods of *wxRendererNative* (p. 1059), please refer to that class documentation for the details.

wxDC

A wxDC is a *device context* onto which graphics and text can be drawn. It is intended to represent a number of output devices in a generic way, so a window can have a device context associated with it, and a printer also has a device context. In this way, the same piece of code may write to a number of different devices, if the device context is used as a parameter.

Derived types of wxDC have documentation for specific features only, so refer to this section for most device context information.

Please note that in addition to the versions of the methods documented here, there are also versions which accept single wxPoint parameter instead of two wxCoord ones or wxPoint and wxSize instead of four of them.

Derived from

wxObject (p. 954)

Include files

<wx/dc.h>

See also

Overview (p. 1648)

wxDC::wxDC

wxDC()

Constructor.

wxDC::~~wxDC

~wxDC()

Destructor.

wxDC::BeginDrawing

void BeginDrawing()

Allows optimization of drawing code under MS Windows. Enclose drawing primitives between **BeginDrawing** and **EndDrawing** calls.

Drawing to a wxDialog panel device context outside of a system-generated OnPaint event *requires* this pair of calls to enclose drawing code. This is because a Windows dialog box does not have a retained device context associated with it, and selections such as pen and brush settings would be lost if the device context were obtained and released for each drawing operation.

wxDC::Blit

bool Blit(wxCoord xdest, wxCoord ydest, wxCoord width, wxCoord height, wxDC* source, wxCoord xsrc, wxCoord ysrc, int logicalFunc = wxCOPY, bool useMask = false, wxCoord xsrcMask = -1, wxCoord ysrcMask = -1)

Copy from a source DC to this DC, specifying the destination coordinates, size of area to copy, source DC, source coordinates, logical function, whether to use a bitmap mask, and mask source position.

Parameters

xdest

Destination device context x position.

ydest

Destination device context y position.

width

Width of source area to be copied.

height

Height of source area to be copied.

source

Source device context.

xsrc

Source device context x position.

ysrc

Source device context y position.

logicalFunc

Logical function to use: see *wxDC::SetLogicalFunction* (p. 366).

useMask

If true, Blit does a transparent blit using the mask that is associated with the bitmap selected into the source device context. The Windows implementation does the following if MaskBlit cannot be used:

1. Creates a temporary bitmap and copies the destination area into it.
2. Copies the source area into the temporary bitmap using the specified logical function.
3. Sets the masked area in the temporary bitmap to BLACK by ANDing the mask bitmap with the temp bitmap with the foreground colour set to WHITE and the bg colour set to BLACK.
4. Sets the unmasked area in the destination area to BLACK by ANDing the mask bitmap with the destination area with the foreground colour set to BLACK and the background colour set to WHITE.
5. ORs the temporary bitmap with the destination area.
6. Deletes the temporary bitmap.

This sequence of operations ensures that the source's transparent area need not be black, and logical functions are supported.

Note: on Windows, blitting with masks can be speeded up considerably by compiling wxWidgets with the `wxUSE_DC_CACHE` option enabled. You can also influence whether MaskBlit or the explicit mask blitting code above is used, by using *wxSystemOptions* (p. 1229) and setting the **no-maskblit** option to 1.

xsrcMask

Source x position on the mask. If both *xsrcMask* and *ysrcMask* are -1, *xsrc* and *ysrc* will be assumed for the mask source position. Currently only implemented on Windows.

ysrcMask

Source y position on the mask. If both *xsrcMask* and *ysrcMask* are -1, *xsrc* and *ysrc* will be assumed for the mask source position. Currently only implemented on Windows.

Remarks

There is partial support for Blit in *wxPostScriptDC*, under X.

See *wxMemoryDC* (p. 881) for typical usage.

See also

wxMemoryDC (p. 881), *wxBitmap* (p. 67), *wxMask* (p. 860)

wxDC::CalcBoundingBox

void CalcBoundingBox(wxCoord x, wxCoord y)

Adds the specified point to the bounding box which can be retrieved with *MinX* (p. 364), *MaxX* (p. 363) and *MinY* (p. 364), *MaxY* (p. 364) functions.

See also

ResetBoundingBox (p. 364)

wxDC::Clear

void Clear()

Clears the device context using the current background brush.

wxDC::CrossHair

void CrossHair(wxCoord x, wxCoord y)

Displays a cross hair using the current pen. This is a vertical and horizontal line the height and width of the window, centred on the given point.

wxDC::DestroyClippingRegion

void DestroyClippingRegion()

Destroys the current clipping region so that none of the DC is clipped. See also *wxDC::SetClippingRegion* (p. 365).

wxDC::DeviceToLogicalX

wxCoord DeviceToLogicalX(wxCoord x)

Convert device X coordinate to logical coordinate, using the current mapping mode.

wxDC::DeviceToLogicalXRel

wxCoord DeviceToLogicalXRel(wxCoord x)

Convert device X coordinate to relative logical coordinate, using the current mapping mode but ignoring the x axis orientation. Use this function for converting a width, for example.

wxDC::DeviceToLogicalY

wxCoord DeviceToLogicalY(wxCoord y)

Converts device Y coordinate to logical coordinate, using the current mapping mode.

wxDC::DeviceToLogicalYRel

wxCoord DeviceToLogicalYRel(wxCoord y)

Convert device Y coordinate to relative logical coordinate, using the current mapping mode but ignoring the y axis orientation. Use this function for converting a height, for example.

wxDC::DrawArc

void DrawArc(wxCoord x1, wxCoord y1, wxCoord x2, wxCoord y2, wxCoord xc, wxCoord yc)

Draws an arc of a circle, centred on (xc, yc), with starting point (x1, y1) and ending at (x2, y2). The current pen is used for the outline and the current brush for filling the shape.

The arc is drawn in an anticlockwise direction from the start point to the end point.

wxDC::DrawBitmap

void DrawBitmap(const wxBitmap& bitmap, wxCoord x, wxCoord y, bool transparent)

Draw a bitmap on the device context at the specified point. If *transparent* is true and the bitmap has a transparency mask, the bitmap will be drawn transparently.

When drawing a mono-bitmap, the current text foreground colour will be used to draw the foreground of the bitmap (all bits set to 1), and the current text background colour to draw the background (all bits set to 0). See also *SetTextForeground* (p. 368), *SetTextBackground* (p. 368) and *wxMemoryDC* (p. 881).

wxDC::DrawCheckMark

void DrawCheckMark(wxCoord x, wxCoord y, wxCoord width, wxCoord height)**void DrawCheckMark(const wxRect &rect)**

Draws a check mark inside the given rectangle.

wxDC::DrawCircle

void DrawCircle(wxCoord x, wxCoord y, wxCoord radius)

void DrawCircle(const wxPoint& pt, wxCoord radius)

Draws a circle with the given centre and radius.

[See also](#)

DrawEllipse (p. 354)

wxDC::DrawEllipse

void DrawEllipse(wxCoord x, wxCoord y, wxCoord width, wxCoord height)

void DrawEllipse(const wxPoint& pt, const wxSize& size)

void DrawEllipse(const wxRect& rect)

Draws an ellipse contained in the rectangle specified either with the given top left corner and the given size or directly. The current pen is used for the outline and the current brush for filling the shape.

[See also](#)

DrawCircle (p. 353)

wxDC::DrawEllipticArc

**void DrawEllipticArc(wxCoord x, wxCoord y, wxCoord width, wxCoord height,
double start, double end)**

Draws an arc of an ellipse. The current pen is used for drawing the arc and the current brush is used for drawing the pie.

x and *y* specify the *x* and *y* coordinates of the upper-left corner of the rectangle that contains the ellipse.

width and *height* specify the width and height of the rectangle that contains the ellipse.

start and *end* specify the start and end of the arc relative to the three-o'clock position from the center of the rectangle. Angles are specified in degrees (360 is a complete circle). Positive values mean counter-clockwise motion. If *start* is equal to *end*, a complete ellipse will be drawn.

wxDC::DrawIcon

void DrawIcon(const wxIcon& icon, wxCoord x, wxCoord y)

Draw an icon on the display (does nothing if the device context is PostScript). This can be the simplest way of drawing bitmaps on a window.

wxDC::DrawLine

```
void DrawLine(wxCoord x1, wxCoord y1, wxCoord x2, wxCoord y2)
```

Draws a line from the first point to the second. The current pen is used for drawing the line. Note that the point (x2, y2) is *not* part of the line and is not drawn by this function (this is consistent with the behaviour of many other toolkits).

wxDC::DrawLines

```
void DrawLines(int n, wxPoint points[], wxCoord xoffset = 0, wxCoord yoffset = 0)
```

```
void DrawLines(wxList *points, wxCoord xoffset = 0, wxCoord yoffset = 0)
```

Draws lines using an array of *points* of size *n*, or list of pointers to points, adding the optional offset coordinate. The current pen is used for drawing the lines. The programmer is responsible for deleting the list of points.

wxPython note: The wxPython version of this method accepts a Python list of wxPoint objects.

wxPerl note: The wxPerl version of this method accepts as its first parameter a reference to an array of wxPoint objects.

wxDC::DrawPolygon

```
void DrawPolygon(int n, wxPoint points[], wxCoord xoffset = 0, wxCoord yoffset = 0,  
int fill_style = wxODDEVEN_RULE)
```

```
void DrawPolygon(wxList *points, wxCoord xoffset = 0, wxCoord yoffset = 0,  
int fill_style = wxODDEVEN_RULE)
```

Draws a filled polygon using an array of *points* of size *n*, or list of pointers to points, adding the optional offset coordinate.

The last argument specifies the fill rule: **wxODDEVEN_RULE** (the default) or **wxWINDING_RULE**.

The current pen is used for drawing the outline, and the current brush for filling the shape. Using a transparent brush suppresses filling. The programmer is responsible for deleting the list of points.

Note that wxWidgets automatically closes the first and last points.

wxPython note: The wxPython version of this method accepts a Python list of wxPoint objects.

wxPerl note: The wxPerl version of this method accepts as its first parameter a reference to an array of wxPoint objects.

wxDC::DrawPolyPolygon

```
void DrawPolyPolygon(int n, int count[], wxPoint points[], wxCoord xoffset = 0,  
wxCoord yoffset = 0,  
    int fill_style = wxODDEVEN_RULE)
```

Draws two or more filled polygons using an array of *points*, adding the optional offset coordinates.

Notice that for the platforms providing a native implementation of this function (Windows and PostScript-based wxDC currently), this is more efficient than using *DrawPolygon* (p. 355) in a loop.

n specifies the number of polygons to draw, the array *count* of size *n* specifies the number of points in each of the polygons in the *points* array.

The last argument specifies the fill rule: **wxODDEVEN_RULE** (the default) or **wxWINDING_RULE**.

The current pen is used for drawing the outline, and the current brush for filling the shape. Using a transparent brush suppresses filling.

The polygons maybe disjoint or overlapping. Each polygon specified in a call to **DrawPolyPolygon** must be closed. Unlike polygons created by the *DrawPolygon* (p. 355) member function, the polygons created by **DrawPolyPolygon** are not closed automatically.

wxPython note: Not implemented yet

wxPerl note: Not implemented yet

wxDC::DrawPoint

```
void DrawPoint(wxCoord x, wxCoord y)
```

Draws a point using the current pen.

wxDC::DrawRectangle

```
void DrawRectangle(wxCoord x, wxCoord y, wxCoord width, wxCoord height)
```

Draws a rectangle with the given top left corner, and with the given size. The current pen is used for the outline and the current brush for filling the shape.

wxDC::DrawRotatedText

```
void DrawRotatedText(const wxString& text, wxCoord x, wxCoord y, double angle)
```

Draws the text rotated by *angle* degrees.

NB: Under Win9x only TrueType fonts can be drawn by this function. In particular, a font different from `wxNORMAL_FONT` should be used as the latter is not a TrueType font. `wxSWISS_FONT` is an example of a font which is.

See also

DrawText (p. 357)

wxDC::DrawRoundedRectangle

void DrawRoundedRectangle(**wxCoord** x, **wxCoord** y, **wxCoord** width, **wxCoord** height, **double** radius = 20)

Draws a rectangle with the given top left corner, and with the given size. The corners are quarter-circles using the given radius. The current pen is used for the outline and the current brush for filling the shape.

If *radius* is positive, the value is assumed to be the radius of the rounded corner. If *radius* is negative, the absolute value is assumed to be the *proportion* of the smallest dimension of the rectangle. This means that the corner can be a sensible size relative to the size of the rectangle, and also avoids the strange effects X produces when the corners are too big for the rectangle.

wxDC::DrawSpline

void DrawSpline(**wxList** *points)

Draws a spline between all given control points, using the current pen. Doesn't delete the `wxList` and contents. The spline is drawn using a series of lines, using an algorithm taken from the X drawing program 'XFIG'.

void DrawSpline(**wxCoord** x1, **wxCoord** y1, **wxCoord** x2, **wxCoord** y2, **wxCoord** x3, **wxCoord** y3)

Draws a three-point spline using the current pen.

wxPython note: The wxPython version of this method accepts a Python list of `wxPoint` objects.

wxPerl note: The wxPerl version of this method accepts a reference to an array of `wxPoint` objects.

wxDC::DrawText

void DrawText(**const wxString&** text, **wxCoord** x, **wxCoord** y)

Draws a text string at the specified point, using the current text font, and the current text foreground and background colours.

The coordinates refer to the top-left corner of the rectangle bounding the string. See

`wxDC::GetTextExtent` (p. 362) for how to get the dimensions of a text string, which can be used to position the text more precisely.

NB: under wxGTK the current *logical function* (p. 360) is used by this function but it is ignored by wxMSW. Thus, you should avoid using logical functions with this function in portable programs.

wxDC::EndDoc

void EndDoc()

Ends a document (only relevant when outputting to a printer).

wxDC::EndDrawing

void EndDrawing()

Allows optimization of drawing code under MS Windows. Enclose drawing primitives between **BeginDrawing** and **EndDrawing** calls.

wxDC::EndPage

void EndPage()

Ends a document page (only relevant when outputting to a printer).

wxDC::FloodFill

bool FloodFill(wxCoord x, wxCoord y, const wxColour& colour, int style=wxFLOOD_SURFACE)

Flood fills the device context starting from the given point, using the *current brush colour*, and using a style:

- `wxFLOOD_SURFACE`: the flooding occurs until a colour other than the given colour is encountered.
- `wxFLOOD_BORDER`: the area to be flooded is bounded by the given colour.

Returns false if the operation failed.

Note: The present implementation for non-Windows platforms may fail to find colour borders if the pixels do not match the colour exactly. However the function will still return true.

wxDC::GetBackground

wxBrush& GetBackground()

const wxBrush& GetBackground() const

Gets the brush used for painting the background (see *wxDC::SetBackground* (p. 365)).

wxDC::GetBackgroundMode

int GetBackgroundMode() const

Returns the current background mode: *wxSOLID* or *wxTRANSPARENT*.

[See also](#)

SetBackgroundMode (p. 365)

wxDC::GetBrush

wxBrush& GetBrush()

const wxBrush& GetBrush() const

Gets the current brush (see *wxDC::SetBrush* (p. 366)).

wxDC::GetCharHeight

wxCoord GetCharHeight()

Gets the character height of the currently set font.

wxDC::GetCharWidth

wxCoord GetCharWidth()

Gets the average character width of the currently set font.

wxDC::GetClippingBox

void GetClippingBox(wxCoord *x, wxCoord *y, wxCoord *width, wxCoord *height)

Gets the rectangle surrounding the current clipping region.

wxPython note: No arguments are required and the four values defining the rectangle are returned as a tuple.

wxPerl note: This method takes no arguments and returns a four element list(*x*, *y*, *width*, *height*)

wxDC::GetFont

wxFont& GetFont()**const wxFont& GetFont() const**

Gets the current font (see *wxDC::SetFont* (p. 366)).

wxDC::GetLogicalFunction

int GetLogicalFunction()

Gets the current logical function (see *wxDC::SetLogicalFunction* (p. 366)).

wxDC::GetMapMode

int GetMapMode()

Gets the *mapping mode* for the device context (see *wxDC::SetMapMode* (p. 367)).

wxDC::GetOptimization

bool GetOptimization()

Returns true if device context optimization is on. See *wxDC::SetOptimization* (p. 367) for details.

wxDC::GetPartialTextExtents

bool GetPartialTextExtents(const wxString& text, wxArrayInt& widths) const

Fills the *widths* array with the widths from the beginning of *text* to the corresponding character of *text*. The generic version simply builds a running total of the widths of each character using *GetTextExtent* (p. 362), however if the various platforms have a native API function that is faster or more accurate than the generic implementation then it should be used instead.

wxPython note: This method only takes the *text* parameter and returns a Python list of integers.

wxDC::GetPen

wxPen& GetPen()**const wxPen& GetPen() const**

Gets the current pen (see *wxDC::SetPen* (p. 368)).

wxDC::GetPixel

bool GetPixel(wxCoord x, wxCoord y, wxColour *colour)

Sets *colour* to the colour at the specified location. Not available for wxPostScriptDC or wxMetafileDC.

wxPython note: For wxPython the wxColour value is returned and is not required as a parameter.

wxPerl note: This method only takes the parameters *x* and *y* and returns a Wx::Colour value

wxDC::GetPPI

wxSize GetPPI() const

Returns the resolution of the device in pixels per inch.

wxDC::GetSize

void GetSize(wxCoord *width, wxCoord *height) const**wxSize GetSize() const**

This gets the horizontal and vertical resolution in device units. It can be used to scale graphics to fit the page. For example, if *maxX* and *maxY* represent the maximum horizontal and vertical 'pixel' values used in your application, the following code will scale the graphic to fit on the printer page:

```
wxCoord w, h;
dc.GetSize(&w, &h);
double scaleX=(double)(maxX/w);
double scaleY=(double)(maxY/h);
dc.SetUserScale(min(scaleX,scaleY),min(scaleX,scaleY));
```

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

GetSize()	Returns a wxSize
GetSizeTuple()	Returns a 2-tuple (width, height)

wxPerl note: In place of a single overloaded method, wxPerl uses:

GetSize()	Returns a Wx::Size
GetSizeWH()	Returns a 2-element list (width, height)

wxDC::GetSizeMM

void GetSizeMM(wxCoord *width, wxCoord *height) const**wxSize GetSizeMM() const**

Returns the horizontal and vertical resolution in millimetres.

wxDC::GetTextBackground

wxColour& GetTextBackground()**const wxColour& GetTextBackground() const**

Gets the current text background colour (see *wxDC::SetTextBackground* (p. 368)).

wxDC::GetTextExtent

**void GetTextExtent(const wxString& string, wxCoord *w, wxCoord *h,
wxCoord *descent = NULL, wxCoord *externalLeading = NULL, wxFont *font =
NULL)**

Gets the dimensions of the string using the currently selected font. *string* is the text string to measure, *w* and *h* are the total width and height respectively, *descent* is the dimension from the baseline of the font to the bottom of the descender, and *externalLeading* is any extra vertical space added to the font by the font designer (usually is zero).

The optional parameter *font* specifies an alternative to the currently selected font: but note that this does not yet work under Windows, so you need to set a font for the device context first.

See also *wxFont* (p. 512), *wxDC::SetFont* (p. 366).

wxPython note: The following methods are implemented in wxPython:

GetTextExtent(string) Returns a 2-tuple, (width, height)

GetFullTextExtent(string, font=NULL) Returns a 4-tuple, (width, height, descent, externalLeading)

wxPerl note: In wxPerl this method is implemented as **GetTextExtent(string, font = undef)** returning a four element array (width, height, descent, externalLeading)

wxDC::GetTextForeground

wxColour& GetTextForeground()

const wxColour& GetTextForeground() const

Gets the current text foreground colour (see *wxDC::SetTextForeground* (p. 368)).

wxDC::GetUserScale

void GetUserScale(double *x, double *y)

Gets the current user scale factor (set by *SetUserScale* (p. 368)).

wxPerl note: In wxPerl this method takes no arguments and return a two element array (*x*, *y*)

wxDC::LogicalToDeviceX

wxCoord LogicalToDeviceX(wxCoord x)

Converts logical X coordinate to device coordinate, using the current mapping mode.

wxDC::LogicalToDeviceXRel

wxCoord LogicalToDeviceXRel(wxCoord x)

Converts logical X coordinate to relative device coordinate, using the current mapping mode but ignoring the x axis orientation. Use this for converting a width, for example.

wxDC::LogicalToDeviceY

wxCoord LogicalToDeviceY(wxCoord y)

Converts logical Y coordinate to device coordinate, using the current mapping mode.

wxDC::LogicalToDeviceYRel

wxCoord LogicalToDeviceYRel(wxCoord y)

Converts logical Y coordinate to relative device coordinate, using the current mapping mode but ignoring the y axis orientation. Use this for converting a height, for example.

wxDC::MaxX

wxCoord MaxX()

Gets the maximum horizontal extent used in drawing commands so far.

wxDC::MaxY

wxCoord MaxY()

Gets the maximum vertical extent used in drawing commands so far.

wxDC::MinX

wxCoord MinX()

Gets the minimum horizontal extent used in drawing commands so far.

wxDC::MinY

wxCoord MinY()

Gets the minimum vertical extent used in drawing commands so far.

wxDC::Ok

bool Ok()

Returns true if the DC is ok to use.

wxDC::ResetBoundingBox

void ResetBoundingBox()

Resets the bounding box: after a call to this function, the bounding box doesn't contain anything.

See also

CalcBoundingBox (p. 352)

wxDC::SetAxisOrientation

void SetAxisOrientation(bool xLeftRight, bool yBottomUp)

Sets the x and y axis orientation (i.e., the direction from lowest to highest values on the axis). The default orientation is the natural orientation, e.g. x axis from left to right and y axis from bottom up.

Parameters

xLeftRight

True to set the x axis orientation to the natural left to right orientation, false to

invert it.

yBottomUp

True to set the y axis orientation to the natural bottom up orientation, false to invert it.

wxDC::SetDeviceOrigin

void SetDeviceOrigin(wxCoord x, wxCoord y)

Sets the device origin (i.e., the origin in pixels after scaling has been applied).

This function may be useful in Windows printing operations for placing a graphic on a page.

wxDC::SetBackground

void SetBackground(const wxBrush& brush)

Sets the current background brush for the DC.

wxDC::SetBackgroundMode

void SetBackgroundMode(int mode)

mode may be one of wxSOLID and wxTRANSPARENT. This setting determines whether text will be drawn with a background colour or not.

wxDC::SetClippingRegion

void SetClippingRegion(wxCoord x, wxCoord y, wxCoord width, wxCoord height)

void SetClippingRegion(const wxPoint& pt, const wxSize& sz)

void SetClippingRegion(const wxRect& rect)

void SetClippingRegion(const wxRegion& region)

Sets the clipping region for this device context to the intersection of the given region described by the parameters of this method and the previously set clipping region. You should call *DestroyClippingRegion* (p. 352) if you want to set the clipping region exactly to the region specified.

The clipping region is an area to which drawing is restricted. Possible uses for the clipping region are for clipping text or for speeding up window redraws when only a known area of the screen is damaged.

See also

wxDC::DestroyClippingRegion (p. 352), *wxRegion* (p. 1052)

wxDC::SetPalette

void SetPalette(const wxPalette& palette)

If this is a window DC or memory DC, assigns the given palette to the window or bitmap associated with the DC. If the argument is `wxNullPalette`, the current palette is selected out of the device context, and the original palette restored.

See *wxPalette* (p. 968) for further details.

wxDC::SetBrush

void SetBrush(const wxBrush& brush)

Sets the current brush for the DC.

If the argument is `wxNullBrush`, the current brush is selected out of the device context, and the original brush restored, allowing the current brush to be destroyed safely.

See also *wxBrush* (p. 91).

See also *wxMemoryDC* (p. 881) for the interpretation of colours when drawing into a monochrome bitmap.

wxDC::SetFont

void SetFont(const wxFont& font)

Sets the current font for the DC. It must be a valid font, in particular you should not pass `wxNullFont` to this method.

See also *wxFont* (p. 512).

wxDC::SetLogicalFunction

void SetLogicalFunction(int function)

Sets the current logical function for the device context. This determines how a source pixel (from a pen or brush colour, or source device context if using *wxDC::Blit* (p. 350)) combines with a destination pixel in the current device context.

The possible values and their meaning in terms of source and destination pixel values are as follows:

<code>wxAND</code>	<code>src AND dst</code>
<code>wxAND_INVERT</code>	<code>(NOT src) AND dst</code>
<code>wxAND_REVERSE</code>	<code>src AND (NOT dst)</code>
<code>wxCLEAR</code>	<code>0</code>

wxCOPY	src
wxEQUIV	(NOT src) XOR dst
wxINVERT	NOT dst
wxNAND	(NOT src) OR (NOT dst)
wxNOR	(NOT src) AND (NOT dst)
wxNO_OP	dst
wxOR	src OR dst
wxOR_INVERT	(NOT src) OR dst
wxOR_REVERSE	src OR (NOT dst)
wxSET	1
wxSRC_INVERT	NOT src
wxXOR	src XOR dst

The default is `wxCOPY`, which simply draws with the current colour. The others combine the current colour and the background using a logical operation. `wxINVERT` is commonly used for drawing rubber bands or moving outlines, since drawing twice reverts to the original colour.

wxDC::SetMapMode

void SetMapMode(int int)

The *mapping mode* of the device context defines the unit of measurement used to convert logical units to device units. Note that in X, text drawing isn't handled consistently with the mapping mode; a font is always specified in point size. However, setting the *user scale* (see `wxDC::SetUserScale` (p. 368)) scales the text appropriately. In Windows, scalable TrueType fonts are always used; in X, results depend on availability of fonts, but usually a reasonable match is found.

The coordinate origin is always at the top left of the screen/printer.

Drawing to a Windows printer device context uses the current mapping mode, but mapping mode is currently ignored for PostScript output.

The mapping mode can be one of the following:

<code>wxMM_TWIPS</code>	Each logical unit is 1/20 of a point, or 1/1440 of an inch.
<code>wxMM_POINTS</code>	Each logical unit is a point, or 1/72 of an inch.
<code>wxMM_METRIC</code>	Each logical unit is 1 mm.
<code>wxMM_LOMETRIC</code>	Each logical unit is 1/10 of a mm.
<code>wxMM_TEXT</code>	Each logical unit is 1 pixel.

wxDC::SetOptimization

void SetOptimization(bool optimize)

If *optimize* is true (the default), this function sets optimization mode on. This currently means that under X, the device context will not try to set a pen or brush property if it is known to be set already. This approach can fall down if non-`wxWidgets` code is using the same device context or window, for example when the window is a panel on which the

windowing system draws panel items. The wxWidgets device context 'memory' will now be out of step with reality.

Setting optimization off, drawing, then setting it back on again, is a trick that must occasionally be employed.

wxDC::SetPen

void SetPen(const wxPen& pen)

Sets the current pen for the DC.

If the argument is wxNullPen, the current pen is selected out of the device context, and the original pen restored.

See also *wxMemoryDC* (p. 881) for the interpretation of colours when drawing into a monochrome bitmap.

wxDC::SetTextBackground

void SetTextBackground(const wxColour& colour)

Sets the current text background colour for the DC.

wxDC::SetTextForeground

void SetTextForeground(const wxColour& colour)

Sets the current text foreground colour for the DC.

See also *wxMemoryDC* (p. 881) for the interpretation of colours when drawing into a monochrome bitmap.

wxDC::SetUserScale

void SetUserScale(double xScale, double yScale)

Sets the user scaling factor, useful for applications which require 'zooming'.

wxDC::StartDoc

bool StartDoc(const wxString& message)

Starts a document (only relevant when outputting to a printer). Message is a message to show whilst printing.

wxDC::StartPage

bool StartPage()

Starts a document page (only relevant when outputting to a printer).

wxDCClipper

This is a small helper class which sets the specified to its constructor clipping region and then automatically destroys it in its destructor. Using it ensures that unwanted clipping region is not left set on the DC.

Derived from

No base class

Include files

<wx/dc.h>

See also

wxDC (p. 349)

wxDCClipper::wxDCClipper

wxDCClipper(wxDC& dc, wxCoord x,wxCoord y,wxCoord w,wxCoord h,)

wxDCClipper(wxDC& dc, const wxRect& rect)

Constructor: sets the the clipping region for the given device context to the specified rectangle.

wxDCClipper::~wxDCClipper

~wxDCClipper()

Destructor: destroys the clipping region set in the constructor.

wxDialog

A dialog box is a window with a title bar and sometimes a system menu, which can be moved around the screen. It can contain controls and other windows and is usually used to allow the user to make some choice or to answer a question.

Derived from

wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/dialog.h>

Remarks

There are two kinds of dialog -- *modal* and *modeless*. A modal dialog blocks program flow and user input on other windows until it is dismissed, whereas a modeless dialog behaves more like a frame in that program flow continues, and input in other windows is still possible. To show a modal dialog you should use the *ShowModal* (p. 378) method while to show a dialog modelessly you simply use *Show* (p. 377), just as with frames.

Note that the modal dialog is one of the very few examples of *wxWindow*-derived objects which may be created on the stack and not on the heap. In other words, although this code snippet:

```
void AskUser()
{
    MyAskDialog *dlg = new MyAskDialog(...);
    if ( dlg->ShowModal() == wxID_OK )
        ...
    //else: dialog was cancelled or some another button pressed
    dlg->Destroy();
}
```

works, you can also achieve the same result by using a simpler code fragment below:

```
void AskUser()
{
    MyAskDialog dlg(...);
    if ( dlg.ShowModal() == wxID_OK )
        ...
    // no need to call Destroy() here
}
```

An application can define an *wxCloseEvent* (p. 139) handler for the dialog to respond to system close events.

Window styles

wxCAPTION	Puts a caption on the dialog box.
wxDEFAULT_DIALOG_STYLE	Equivalent to a combination of wxCAPTION , wxCLOSE_BOX and wxSYSTEM_MENU (the last one is not used under Unix)
wxRESIZE_BORDER	Display a resizable frame around the window.
wxSYSTEM_MENU	Display a system menu.
wxCLOSE_BOX	Displays a close box on the frame.
wxMAXIMIZE_BOX	Displays a maximize box on the dialog.

wxMINIMIZE_BOX	Displays a minimize box on the dialog.
wxTHICK_FRAME	Display a thick frame around the window.
wxSTAY_ON_TOP	The dialog stays on top of all other windows (Windows only).
wxNO_3D	Under Windows, specifies that the child controls should not have 3D borders unless specified in the control.
wxDIALOG_NO_PARENT	By default, a dialog created with a <code>NULL</code> parent window will be given the <i>application's top level window</i> (p. 33) as parent. Use this style to prevent this from happening and create an orphan dialog. This is not recommended for modal dialogs.
wxDIALOG_EX_CONTEXTHELP	Under Windows, puts a query button on the caption. When pressed, Windows will go into a context-sensitive help mode and <code>wxWidgets</code> will send a <code>wxEVT_HELP</code> event if the user clicked on an application window. <i>Note</i> that this is an extended style and must be set by calling <i>SetExtraStyle</i> (p. 1427) before <i>Create</i> is called (two-step construction).

Under Unix or Linux, MWM (the Motif Window Manager) or other window managers recognizing the MHM hints should be running for any of these styles to have an effect.

See also *Generic window styles* (p. 1618).

See also

wxDialog overview (p. 1621), *wxFrame* (p. 532), *Validator* overview (p. 1621)

wxDialog::wxDialog

wxDialog()

Default constructor.

wxDialog(wxWindow* parent, wxWindowID id, const wxString& title, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxDEFAULT_DIALOG_STYLE, const wxString& name = "dialogBox")

Constructor.

Parameters

parent

Can be `NULL`, a frame or another dialog box.

id

An identifier for the dialog. A value of -1 is taken to mean a default.

title

The title of the dialog.

pos

The dialog position. A value of (-1, -1) indicates a default position, chosen by either the windowing system or wxWidgets, depending on platform.

size

The dialog size. A value of (-1, -1) indicates a default size, chosen by either the windowing system or wxWidgets, depending on platform.

style

The window style. See *wxDialog* (p. 369).

name

Used to associate a name with the window, allowing the application user to set Motif resource values for individual dialog boxes.

See also

wxDialog::Create (p. 372)

wxDialog::~~wxDialog

~wxDialog()

Destructor. Deletes any child windows before deleting the physical window.

wxDialog::Centre

void Centre(int direction = wxBOTH)

Centres the dialog box on the display.

Parameters

direction

May be wxHORIZONTAL, wxVERTICAL or wxBOTH.

wxDialog::Create

bool Create(*wxWindow* parent*, *wxWindowID id*, **const wxString& title**, **const wxPoint& pos** = *wxDefaultPosition*, **const wxSize& size** = *wxDefaultSize*, **long style** = *wxDEFAULT_DIALOG_STYLE*, **const wxString& name** = "dialogBox")

Used for two-step dialog box construction. See *wxDialog::wxDialog* (p. 371) for details.

wxDialog::EndModal

void EndModal(*int retCode*)

Ends a modal dialog, passing a value to be returned from the *wxDialog::ShowModal* (p. 378) invocation.

Parameters

retCode

The value that should be returned by **ShowModal**.

See also

wxDialog::ShowModal (p. 378), *wxDialog::GetReturnCode* (p. 373),
wxDialog::SetReturnCode (p. 377)

wxDialog::GetReturnCode

int GetReturnCode()

Gets the return code for this window.

Remarks

A return code is normally associated with a modal dialog, where *wxDialog::ShowModal* (p. 378) returns a code to the application.

See also

wxDialog::SetReturnCode (p. 377), *wxDialog::ShowModal* (p. 378), *wxDialog::EndModal* (p. 373)

wxDialog::GetTitle

wxString GetTitle() **const**

Returns the title of the dialog box.

wxDialog::Iconize

void Iconize(**const bool iconize**)

Iconizes or restores the dialog. Windows only.

Parameters

iconize

If true, iconizes the dialog box; if false, shows and restores it.

Remarks

Note that in Windows, iconization has no effect since dialog boxes cannot be iconized. However, applications may need to explicitly restore dialog boxes under Motif which have user-iconizable frames, and under Windows calling `Iconize(false)` will bring the window to the front, as does `Show(true)`.

wxDialog::IsIconized

bool IsIconized() const

Returns true if the dialog box is iconized. Windows only.

Remarks

Always returns false under Windows since dialogs cannot be iconized.

wxDialog::IsModal

bool IsModal() const

Returns true if the dialog box is modal, false otherwise.

wxDialog::OnCharHook

void OnCharHook(wxKeyEvent& event)

This member is called to allow the window to intercept keyboard events before they are processed by child windows.

Remarks

wxDialog implements this handler to fake a cancel command if the escape key has been pressed. This will dismiss the dialog.

wxDialog::OnApply

void OnApply(wxCommandEvent& event)

The default handler for the `wxID_APPLY` identifier.

Remarks

This function calls *wxWindow::Validate* (p. 1441) and *wxWindow::TransferDataToWindow* (p. 1439).

See also

wxDialog::OnOK (p. 375), *wxDialog::OnCancel* (p. 375)

wxDialog::OnCancel

void OnCancel(wxCommandEvent& event)

The default handler for the `wxID_CANCEL` identifier.

Remarks

The function either calls **EndModal(wxDID_CANCEL)** if the dialog is modal, or sets the return value to `wxDID_CANCEL` and calls **Show(false)** if the dialog is modeless.

See also

wxDialog::OnOK (p. 375), *wxDialog::OnApply* (p. 374)

wxDialog::OnOK

void OnOK(wxCommandEvent& event)

The default handler for the `wxDID_OK` identifier.

Remarks

The function calls *wxWindow::Validate* (p. 1441), then *wxWindow::TransferDataFromWindow* (p. 1439). If this returns true, the function either calls **EndModal(wxDID_OK)** if the dialog is modal, or sets the return value to `wxDID_OK` and calls **Show(false)** if the dialog is modeless.

See also

wxDialog::OnCancel (p. 375), *wxDialog::OnApply* (p. 374)

wxDialog::OnSysColourChanged

void OnSysColourChanged(wxSysColourChangedEvent& event)

The default handler for `wxEVT_SYS_COLOUR_CHANGED`.

Parameters

event

The colour change event.

Remarks

Changes the dialog's colour to conform to the current settings (Windows only). Add an event table entry for your dialog class if you wish the behaviour to be different (such as keeping a user-defined background colour). If you do override this function, call `wxEvt::Skip` to propagate the notification to child windows and controls.

See also

wxSysColourChangedEvent (p. 1228)

wxDialog::SetIcon

void SetIcon(const wxIcon& icon)

Sets the icon for this dialog.

Parameters

icon

The icon to associate with this dialog.

See also *wxIcon* (p. 716).

wxDialog::SetIcons

void SetIcons(const wxIconBundle& icons)

Sets the icons for this dialog.

Parameters

icons

The icons to associate with this dialog.

See also *wxIconBundle* (p. 723).

wxDialog::SetModal

void SetModal(const bool flag)

NB: This function is deprecated and doesn't work for all ports, just use *ShowModal* (p. 378) to show a modal dialog instead.

Allows the programmer to specify whether the dialog box is modal (`wxDialog::Show` blocks control until the dialog is hidden) or modeless (control returns immediately).

Parameters

flag

If true, the dialog will be modal, otherwise it will be modeless.

wxDialog::SetReturnCode

void SetReturnCode(int retCode)

Sets the return code for this window.

Parameters

retCode

The integer return code, usually a control identifier.

Remarks

A return code is normally associated with a modal dialog, where *wxDialog::ShowModal* (p. 378) returns a code to the application. The function *wxDialog::EndModal* (p. 373) calls **SetReturnCode**.

See also

wxDialog::GetReturnCode (p. 373), *wxDialog::ShowModal* (p. 378), *wxDialog::EndModal* (p. 373)

wxDialog::SetTitle

void SetTitle(const wxString& title)

Sets the title of the dialog box.

Parameters

title

The dialog box title.

wxDialog::Show

bool Show(const bool show)

Hides or shows the dialog.

Parameters

show

If true, the dialog box is shown and brought to the front; otherwise the box is hidden. If false and the dialog is modal, control is returned to the calling program.

Remarks

The preferred way of dismissing a modal dialog is to use *wxDialog::EndModal* (p. 373).

wxDialog::ShowModal

int ShowModal()

Shows a modal dialog. Program flow does not return until the dialog has been dismissed with *wxDialog::EndModal* (p. 373).

Return value

The return value is the value set with *wxDialog::SetReturnCode* (p. 377).

See also

wxDialog::EndModal (p. 373), *wxDialog::GetReturnCode* (p. 373),
wxDialog::SetReturnCode (p. 377)

wxDialUpEvent

This is the event class for the dialup events sent by *wxDialUpManager* (p. 379).

Derived from

wxEvent (p. 441)
wxObject (p. 954)

Include files

<wx/dialup.h>

wxDialUpEvent::wxDialUpEvent

wxDialUpEvent(bool isConnected, bool isOwnEvent)

Constructor is only used by *wxDialUpManager* (p. 379).

wxDialUpEvent::IsConnectedEvent

bool IsConnectedEvent() const

Is this a `CONNECTED` or `DISCONNECTED` event? In other words, does it notify about

transition from offline to online state or vice versa?

wxDialUpEvent::IsOwnEvent

bool IsOwnEvent() const

Does this event come from `wxDialUpManager::Dial()` or from some external process (i.e. does it result from our own attempt to establish the connection)?

wxDialUpManager

This class encapsulates functions dealing with verifying the connection status of the workstation (connected to the Internet via a direct connection, connected through a modem or not connected at all) and to establish this connection if possible/required (i.e. in the case of the modem).

The program may also wish to be notified about the change in the connection status (for example, to perform some action when the user connects to the network the next time or, on the contrary, to stop receiving data from the net when the user hangs up the modem). For this, you need to use one of the event macros described below.

This class is different from other `wxWidgets` classes in that there is at most one instance of this class in the program accessed via `wxDialUpManager::Create()` (p. 379) and you can't create the objects of this class directly.

Derived from

No base class

Include files

`<wx/dialup.h>`

Event table macros

To be notified about the change in the network connection status, use these event handler macros to direct input to member functions that take a `wxDialUpEvent` (p. 378) argument.

EVT_DIALUP_CONNECTED(func) A connection with the network was established.

EVT_DIALUP_DISCONNECTED(func) The connection with the network was lost.

See also

dialup sample (p. 1570)

wxDialUpEvent (p. 378)

wxDialUpManager::Create

wxDialUpManager* Create()

This function should create and return the object of the platform-specific class derived from `wxDialUpManager`. You should delete the pointer when you are done with it.

wxDialUpManager::IsOk

bool IsOk() const

Returns `true` if the dialup manager was initialized correctly. If this function returns `false`, no other functions will work neither, so it is a good idea to call this function and check its result before calling any other `wxDialUpManager` methods

wxDialUpManager::~~wxDialUpManager

~wxDialUpManager()

Destructor.

wxDialUpManager::GetISPNames

size_t GetISPNames(wxArrayString& names) const

This function is only implemented under Windows.

Fills the array with the names of all possible values for the first parameter to *Dial()* (p. 380) on this machine and returns their number (may be 0).

wxDialUpManager::Dial

bool Dial(const wxString& nameOfISP = wxEmptyString, const wxString& username = wxEmptyString, const wxString& password = wxEmptyString, bool async = true)

Dial the given ISP, use *username* and *password* to authenticate.

The parameters are only used under Windows currently, for Unix you should use *SetConnectCommand* (p. 382) to customize this functions behaviour.

If no *nameOfISP* is given, the function will select the default one (proposing the user to choose among all connections defined on this machine) and if no username and/or password are given, the function will try to do without them, but will ask the user if really needed.

If *async* parameter is `false`, the function waits until the end of dialing and returns `true` upon successful completion.

If *async* is `true`, the function only initiates the connection and returns immediately - the result is reported via events (an event is sent anyhow, but if dialing failed it will be a DISCONNECTED one).

wxDialUpManager::IsDialing

bool IsDialing() const

Returns true if (async) dialing is in progress.

See also

Dial (p. 380)

wxDialUpManager::CancelDialing

bool CancelDialing()

Cancel dialing the number initiated with *Dial* (p. 380) with async parameter equal to `true`.

Note that this won't result in DISCONNECTED event being sent.

See also

IsDialing (p. 381)

wxDialUpManager::HangUp

bool HangUp()

Hang up the currently active dial up connection.

wxDialUpManager::IsAlwaysOnline

bool IsAlwaysOnline() const

Returns `true` if the computer has a permanent network connection (i.e. is on a LAN) and so there is no need to use *Dial()* function to go online.

NB: this functions tries to guess the result and it is not always guaranteed to be correct, so it is better to ask user for confirmation or give him a possibility to override it.

wxDialUpManager::IsOnline

bool IsOnline() const

Returns `true` if the computer is connected to the network: under Windows, this just means that a RAS connection exists, under Unix we check that the "well-known host" (as specified by *SetWellKnownHost* (p. 382)) is reachable.

wxDialUpManager::SetOnlineStatus

void SetOnlineStatus(bool *isOnline* = true)

Sometimes the built-in logic for determining the online status may fail, so, in general, the user should be allowed to override it. This function allows to forcefully set the online status - whatever our internal algorithm may think about it.

[See also](#)

IsOnline (p. 381)

wxDialUpManager::EnableAutoCheckOnlineStatus

bool EnableAutoCheckOnlineStatus(size_t *nSeconds* = 60)

Enable automatic checks for the connection status and sending of `wxEVT_DIALUP_CONNECTED`/`wxEVT_DIALUP_DISCONNECTED` events. The interval parameter is only for Unix where we do the check manually and specifies how often should we repeat the check (each minute by default). Under Windows, the notification about the change of connection status is sent by the system and so we don't do any polling and this parameter is ignored.

Returns `false` if couldn't set up automatic check for online status.

wxDialUpManager::DisableAutoCheckOnlineStatus

void DisableAutoCheckOnlineStatus()

Disable automatic check for connection status change - notice that the `wxEVT_DIALUP_XXX` events won't be sent any more neither.

wxDialUpManager::SetWellKnownHost

void SetWellKnownHost(const wxString& *hostname*, int *portno* = 80)

This method is for Unix only.

Under Unix, the value of well-known host is used to check whether we're connected to the internet. It is unused under Windows, but this function is always safe to call. The default value is `www.yahoo.com:80`.

wxDialUpManager::SetConnectCommand

SetConnectCommand(const wxString& *commandDial* = wxT("/usr/bin/pon"), const wxString& *commandHangup* = wxT("/usr/bin/poff"))

This method is for Unix only.

Sets the commands to start up the network and to hang up again.

See also

Dial (p. 380)

wxDir

wxDir is a portable equivalent of Unix open/read/closedir functions which allow enumerating of the files in a directory. wxDir allows enumerate files as well as directories.

wxDir also provides a flexible way to enumerate files recursively using *Traverse* (p. 385) or a simpler *GetAllFiles* (p. 384) function.

Example of use:

```

wxDir dir(wxGetCwd());

if ( !dir.IsOpened() )
{
    // deal with the error here - wxDir would already log an error
    message // explaining the exact reason of the failure
    return;
}

puts("Enumerating object files in current directory:");

wxString filename;

bool cont = dir.GetFirst(&filename, filespec, flags);
while ( cont )
{
    printf("%s\n", filename.c_str());

    cont = dir.GetNext(&filename);
}

```

Derived from

No base class

Constants

These flags define what kind of filename is included in the list of files enumerated by GetFirst/GetNext.

```

enum
{
    wxDIR_FILES      = 0x0001,      // include files
    wxDIR_DIRS       = 0x0002,      // include directories
    wxDIR_HIDDEN     = 0x0004,      // include hidden files
    wxDIR_DOTDOT     = 0x0008,      // include '.' and '..'

    // by default, enumerate everything except '.' and '..'
    wxDIR_DEFAULT    = wxDIR_FILES | wxDIR_DIRS | wxDIR_HIDDEN
}

```

Include files

<wx/dir.h>

wxDir::wxDir

wxDir()

Default constructor, use *Open()* (p. 385) afterwards.

wxDir(const wxString& dir)

Opens the directory for enumeration, use *IsOpened()* (p. 385) to test for errors.

wxDir::~~wxDir

~wxDir()

Destructor cleans up the associated resources. It is not virtual and so this class is not meant to be used polymorphically.

wxDir::Exists

static bool Exists(const wxString& dir)

Test for existence of a directory with the given name

wxDir::GetAllFiles

static size_t GetAllFiles(const wxString& dirname, wxArrayString *files, const wxString& filespec = wxEmptyString, int flags = wxDIR_DEFAULT)

The function appends the names of all the files under directory *dirname* to the array *files* (note that its old contents is preserved). Only files matching the *filespec* are taken, with empty spec matching all the files.

The *flags* parameter should always include `wxDIR_FILES` or the array would be unchanged and should include `wxDIR_DIRS` flag to recurse into subdirectories (both flags are included in the value by default).

See also: *Traverse* (p. 385)

wxDir::GetFirst

bool GetFirst(wxString* filename, const wxString& filespec = wxEmptyString, int flags = wxDIR_DEFAULT) const

Start enumerating all files matching *filespec* (or all files if it is empty) and flags, return

true on success.

wxDir::GetName

wxString GetName() const

Returns the name of the directory itself. The returned string does not have the trailing path separator (slash or backslash).

wxDir::GetNext

bool GetNext(wxString* filename) const

Continue enumerating files satisfying the criteria specified by the last call to *GetFirst* (p. 384).

wxDir::HasFiles

bool HasFiles(const wxString& filespec = wxEmptyString)

Returns `true` if the directory contains any files matching the given *filespec*. If *filespec* is empty, look for any files at all. In any case, even hidden files are taken into account.

wxDir::HasSubDirs

bool HasSubDirs(const wxString& dirs spec = wxEmptyString)

Returns `true` if the directory contains any subdirectories (if a non empty *filespec* is given, only check for directories matching it). The hidden subdirectories are taken into account as well.

wxDir::IsOpened

bool IsOpened() const

Returns true if the directory was successfully opened by a previous call to *Open* (p. 385).

wxDir::Open

bool Open(const wxString& dir)

Open the directory for enumerating, returns true on success or false if an error occurred.

wxDir::Traverse

size_t Traverse(wxDirTraverser& sink, const wxString& filespec = wxEmptyString, int flags = wxDIR_DEFAULT)

Enumerate all files and directories under the given directory recursively calling the element of the provided *wxDirTraverser* (p. 388) object for each of them.

More precisely, the function will really recurse into subdirectories if *flags* contains *wxDIR_DIRS* flag. It will ignore the files (but still possibly recurse into subdirectories) if *wxDIR_FILES* flag is given.

For each found directory, *sink.OnDir()* (p. 389) is called and *sink.OnFile()* (p. 389) is called for every file. Depending on the return value, the enumeration may continue or stop.

The function returns the total number of files found or `(size_t)-1` on error.

See also: *GetAllFiles* (p. 384)

wxDirDialog

This class represents the directory chooser dialog.

Derived from

wxDialog (p. 369)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/dirdlg.h> <wx/generic/dirdlg.h>

Window styles

wxDD_NEW_DIR_BUTTON Add "Create new directory" button and allow directory names to be editable. On Windows the new directory button is only available with recent versions of the common dialogs.

See also *Generic window styles* (p. 1618).

See also

wxDirDialog overview (p. 1657), *wxFileDialog* (p. 468)

wxDirDialog::wxDirDialog

wxDirDialog(wxWindow* parent, const wxString& message = "Choose a directory",

```
const wxString& defaultPath = "", long style = 0, const wxPoint& pos =  
wxDefaultPosition, const wxSize& size = wxDefaultSize, const wxString& name =  
"wxDirCtrl")
```

Constructor. Use *wxDirDialog::ShowModal* (p. 388) to show the dialog.

Parameters

parent

Parent window.

message

Message to show on the dialog.

defaultPath

The default path, or the empty string.

style

A dialog style, currently unused.

pos

Dialog position. Ignored under Windows.

size

Dialog size. Ignored under Windows.

name

The dialog name, not used.

wxDirDialog::~wxDirDialog

~wxDirDialog()

Destructor.

wxDirDialog::GetPath

wxString GetPath() const

Returns the default or user-selected path.

wxDirDialog::GetMessage

wxString GetMessage() const

Returns the message that will be displayed on the dialog.

wxDirDialog::GetStyle

long GetStyle() const

Returns the dialog style.

wxDirDialog::SetMessage

void SetMessage(const wxString& message)

Sets the message that will be displayed on the dialog.

wxDirDialog::SetPath

void SetPath(const wxString& path)

Sets the default path.

wxDirDialog::SetStyle

void SetStyle(long style)

Sets the dialog style. This is currently unused.

wxDirDialog::ShowModal

int ShowModal()

Shows the dialog, returning wxID_OK if the user pressed OK, and wxOK_CANCEL otherwise.

wxDirTraverser

wxDirTraverser is an abstract interface which must be implemented by objects passed to *Traverse* (p. 385) function.

Example of use (this works almost like *GetAllFiles* (p. 384)):

```
class wxDirTraverserSimple : public wxDirTraverser
{
public:
    wxDirTraverserSimple(wxArrayString& files) : m_files(files) { }

    virtual wxDirTraverseResult OnFile(const wxString& filename)
    {
        m_files.Add(filename);
    }
}
```

```
        return wxDIR_CONTINUE;
    }

    virtual wxDirTraverseResult OnDir(const wxString&
WXUNUSED(dirname))
    {
        return wxDIR_CONTINUE;
    }

private:
    wxArrayString& m_files;
};

// get the names of all files in the array
wxArrayString files;
wxDirTraverserSimple traverser(files);

wxDir dir(dirname);
dir.Traverse(traverser);
```

Derived from

No base class

Constants

The elements of `wxDirTraverseResult` are the possible return values of the callback functions:

```
enum wxDirTraverseResult
{
    wxDIR_IGNORE = -1,          // ignore this directory but continue with
others
    wxDIR_STOP,                // stop traversing
    wxDIR_CONTINUE             // continue into this directory
};
```

Include files

<wx/dir.h>

wxDirTraverser::OnDir

virtual wxDirTraverseResult OnDir(const wxString& *dirname*)

This function is called for each directory. It may return `wxDIR_STOP` to abort traversing completely, `wxDIR_IGNORE` to skip this directory but continue with others or `wxDIR_CONTINUE` to enumerate all files and subdirectories in this directory.

This is a pure virtual function and must be implemented in the derived class.

wxDirTraverser::OnFile

virtual wxDirTraverseResult OnFile(const wxString& *filename*)

This function is called for each file. It may return `wxDIR_STOP` to abort traversing (for example, if the file being searched is found) or `wxDIR_CONTINUE` to proceed.

This is a pure virtual function and must be implemented in the derived class.

wxOpenErrorTraverser::OnOpenError

virtual wxOpenErrorTraverseResult OnOpenError(const wxString& *openerrorname*)

This function is called for each directory which we failed to open for enumerating. It may return `wxSIR_STOP` to abort traversing completely, `wxDIR_IGNORE` to skip this directory but continue with others or `wxDIR_CONTINUE` to retry opening this directory once again.

The base class version always returns `wxDIR_IGNORE`.

wxDisplay

Determines the sizes and locations of displays connected to the system.

Derived from

None

Include files

<wx/display.h>

See also

wxCliëntDisplayRect (p. 1505), *wxDisplaySize* (p. 1505), *wxDisplaySizeMM* (p. 1505)

wxDisplay::wxDisplay

wxDisplay(size_t *index* = 0)

Constructor, setting up a `wxDisplay` instance with the specified display.

Parameters

index

The index of the display to use. This must be non-negative and lower than the value returned by *GetCount()* (p. 391).

wxDisplay::~~wxDisplay

void ~wxDisplay()

Destructor.

wxDisplay::GetCount

static size_t GetCount()

Returns the number of connected displays.

wxDisplay::GetDepth

int GetDepth() const

Returns the bit depth of the display whose index was passed to the constructor.

wxDisplay::GetFromPoint

static int GetFromPoint(const wxPoint& pt)

Returns the index of the display on which the given point lies. Returns -1 if the point is not on any connected display.

Parameters

pt

The point to locate.

wxDisplay::GetGeometry

wxRect GetGeometry() const

Returns the bounding rectangle of the display whose index was passed to the constructor.

wxDisplay::GetName

wxString GetName() const

Returns the display's name. A name is not available on all platforms.

wxDisplay::IsColour

bool IsColour() const

Returns true if the display is color (has a depth greater than 1).

wxDisplay::IsColor

bool IsColor() const

Same as *IsColour()* (p. 391).

wxDisplay::IsPrimary

bool IsPrimary()

Returns true if the display is the primary display. The primary display is the one whose index is 0.

wxDllLoader

`wxDllLoader` is a class providing an interface similar to Unix's `dlopen()`. It is used by the `wxLibrary` framework and manages the actual loading of shared libraries and the resolving of symbols in them. There are no instances of this class, it simply serves as a namespace for its static member functions.

Please note that class `wxDynamicLibrary` (p. 435) provides alternative, friendlier interface to `wxDllLoader`.

The terms *DLL* and *shared library/object* will both be used in the documentation to refer to the same thing: a `.dll` file under Windows or `.so` or `.sl` one under Unix.

Example of using this class to dynamically load the `strlen()` function:

```
#if defined(__WXMSW__)
    static const wxChar *LIB_NAME = _T("kernel32");
    static const wxChar *FUNC_NAME = _T("lstrlenA");
#elif defined(__UNIX__)
    static const wxChar *LIB_NAME = _T("/lib/libc-2.0.7.so");
    static const wxChar *FUNC_NAME = _T("strlen");
#endif

wxDllType dllHandle = wxDllLoader::LoadLibrary(LIB_NAME);
if ( !dllHandle )
{
    ... error ...
}
else
{
    typedef int (*strlenType)(char *);
    strlenType pfnStrlen =
        (strlenType)wxDllLoader::GetSymbol(dllHandle, FUNC_NAME);
    if ( !pfnStrlen )
    {
        ... error ...
    }
    else
    {
        if ( pfnStrlen("foo") != 3 )
        {
            ... error ...
        }
        else
        {
            ...
        }
    }
}
```

```
        ... ok! ...
    }
}

wxDllLoader::UnloadLibrary(dllHandle);
}
```

Derived from

No base class

Include files

<wx/dynlib.h>

Data structures

This header defines a platform-dependent `wxDllType` typedef which stores a handle to a loaded DLLs on the given platform.

wxDllLoader::GetDllExt

static wxString GetDllExt()

Returns the string containing the usual extension for shared libraries for the given systems (including the leading dot if not empty).

For example, this function will return ".dll" under Windows or (usually) ".so" under Unix.

wxDllLoader::GetProgramHandle

wxDllType GetProgramHandle()

This function returns a valid handle for the main program itself. Notice that the `NULL` return value is valid for some systems (i.e. doesn't mean that the function failed).

NB: This function is Unix specific. It will always fail under Windows or OS/2.

wxDllLoader::GetSymbol

void * GetSymbol(wxDllType dllHandle, const wxString& name)

This function resolves a symbol in a loaded DLL, such as a variable or function name.

Returned value will be `NULL` if the symbol was not found in the DLL or if an error occurred.

Parameters

dllHandle

Valid handle previously returned by *LoadLibrary* (p. 394)

name

Name of the symbol.

wxDllLoader::LoadLibrary

wxDllType LoadLibrary(const wxString & *libname*, bool* *success* = NULL)

This function loads a shared library into memory, with *libname* being the name of the library: it may be either the full name including path and (platform-dependent) extension, just the basename (no path and no extension) or a basename with extension. In the last two cases, the library will be searched in all standard locations.

Returns a handle to the loaded DLL. Use *success* parameter to test if it is valid. If the handle is valid, the library must be unloaded later with *UnloadLibrary* (p. 394).

Parameters

libname

Name of the shared object to load.

success

May point to a bool variable which will be set to true or false; may also be NULL.

wxDllLoader::UnloadLibrary

void UnloadLibrary(wxDllType *dllhandle*)

This function unloads the shared library. The handle *dllhandle* must have been returned by *LoadLibrary* (p. 394) previously.

wxDocChildFrame

The *wxDocChildFrame* class provides a default frame for displaying documents on separate windows. This class can only be used for SDI (not MDI) child frames.

The class is part of the document/view framework supported by *wxWidgets*, and cooperates with the *wxView* (p. 1371), *wxDocument* (p. 415), *wxDocManager* (p. 396) and *wxDocTemplate* (p. 410) classes.

See the example application in `samples/docview`.

Derived from

wxFrame (p. 532)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/docview.h>

See also

Document/view overview (p. 1658), *wxFrame* (p. 532)

wxDocChildFrame::m_childDocument

wxDocument* m_childDocument

The document associated with the frame.

wxDocChildFrame::m_childView

wxView* m_childView

The view associated with the frame.

wxDocChildFrame::wxDocChildFrame

**wxDocChildFrame(wxDocument* doc, wxView* view, wxFrame* parent,
wxWindowID id, const wxString& title, const wxPoint& pos = wxDefaultPosition,
const wxSize& size = wxDefaultSize, long style = wxDEFAULT_FRAME_STYLE,
const wxString& name = "frame")**

Constructor.

wxDocChildFrame::~~wxDocChildFrame

~wxDocChildFrame()

Destructor.

wxDocChildFrame::GetDocument

wxDocument* GetDocument() const

Returns the document associated with this frame.

wxDocChildFrame::GetView

wxView* GetView() const

Returns the view associated with this frame.

wxDocChildFrame::OnActivate

void OnActivate(wxActivateEvent event)

Sets the currently active view to be the frame's view. You may need to override (but still call) this function in order to set the keyboard focus for your subwindow.

wxDocChildFrame::OnCloseWindow

void OnCloseWindow(wxCloseEvent& event)

Closes and deletes the current view and document.

wxDocChildFrame::SetDocument

void SetDocument(wxDocument *doc)

Sets the document for this frame.

wxDocChildFrame::SetView

void SetView(wxView *view)

Sets the view for this frame.

wxDocManager

The `wxDocManager` class is part of the document/view framework supported by `wxWidgets`, and cooperates with the `wxView` (p. 1371), `wxDocument` (p. 415) and `wxDocTemplate` (p. 410) classes.

Derived from

`wxEvtHandler` (p. 445)

`wxObject` (p. 954)

Include files

<wx/docview.h>

See also

wxDocManager overview (p. 1662), *wxDocument* (p. 415), *wxView* (p. 1371), *wxDocTemplate* (p. 410), *wxFileHistory* (p. 474)

wxDocManager::m_currentView

wxView* m_currentView

The currently active view.

wxDocManager::m_defaultDocumentNameCounter

int m_defaultDocumentNameCounter

Stores the integer to be used for the next default document name.

wxDocManager::m_fileHistory

wxFileHistory* m_fileHistory

A pointer to an instance of *wxFileHistory* (p. 474), which manages the history of recently-visited files on the File menu.

wxDocManager::m_maxDocsOpen

int m_maxDocsOpen

Stores the maximum number of documents that can be opened before existing documents are closed. By default, this is 10,000.

wxDocManager::m_docs

wxList m_docs

A list of all documents.

wxDocManager::m_flags

long m_flags

Stores the flags passed to the constructor.

wxDocManager::m_lastDirectory

The directory last selected by the user when opening a file.

wxFileHistory* m_fileHistory

wxDocManager::m_templates

wxList mnTemplates

A list of all document templates.

wxDocManager::wxDocManager

void wxDocManager(long flags = wxDEFAULT_DOCMAN_FLAGS, bool initialize = true)

Constructor. Create a document manager instance dynamically near the start of your application before doing any document or view operations.

flags is currently unused.

If *initialize* is true, the *Initialize* (p. 402) function will be called to create a default history list object. If you derive from *wxDocManager*, you may wish to call the base constructor with false, and then call *Initialize* in your own constructor, to allow your own *Initialize* or *OnCreateFileHistory* functions to be called.

wxDocManager::~~wxDocManager

void ~wxDocManager()

Destructor.

wxDocManager::ActivateView

void ActivateView(wxView* doc, bool activate, bool deleting)

Sets the current view.

wxDocManager::AddDocument

void AddDocument(wxDocument *doc)

Adds the document to the list of documents.

wxDocManager::AddFileToHistory

void AddFileToHistory(const wxString& filename)

Adds a file to the file history list, if we have a pointer to an appropriate file menu.

wxDocManager::AssociateTemplate

void AssociateTemplate(wxDocTemplate *temp)

Adds the template to the document manager's template list.

wxDocManager::CloseDocuments

bool CloseDocuments(bool force = true)

Closes all currently opened documents.

wxDocManager::CreateDocument

wxDocument* CreateDocument(const wxString& path, long flags)

Creates a new document in a manner determined by the *flags* parameter, which can be:

- wxDOC_NEW Creates a fresh document.
- wxDOC_SILENT Silently loads the given document file.

If wxDOC_NEW is present, a new document will be created and returned, possibly after asking the user for a template to use if there is more than one document template. If wxDOC_SILENT is present, a new document will be created and the given file loaded into it. If neither of these flags is present, the user will be presented with a file selector for the file to load, and the template to use will be determined by the extension (Windows) or by popping up a template choice list (other platforms).

If the maximum number of documents has been reached, this function will delete the oldest currently loaded document before creating a new one.

wxDocManager::CreateView

wxView* CreateView(wxDocument* doc, long flags)

Creates a new view for the given document. If more than one view is allowed for the document (by virtue of multiple templates mentioning the same document type), a choice of view is presented to the user.

wxDocManager::DisassociateTemplate

void DisassociateTemplate(wxDocTemplate *temp)

Removes the template from the list of templates.

wxDocManager::FileHistoryAddFilesToMenu

void FileHistoryAddFilesToMenu()

Appends the files in the history list, to all menus managed by the file history object.

void FileHistoryAddFilesToMenu(wxMenu* menu)

Appends the files in the history list, to the given menu only.

wxDocManager::FileHistoryLoad

void FileHistoryLoad(wxConfigBase& config)

Loads the file history from a config object.

[See also](#)

wxConfig (p. 178)

wxDocManager::FileHistoryRemoveMenu

void FileHistoryRemoveMenu(wxMenu* menu)

Removes the given menu from the list of menus managed by the file history object.

wxDocManager::FileHistorySave

void FileHistorySave(wxConfigBase& resourceFile)

Saves the file history into a config object. This must be called explicitly by the application.

[See also](#)

wxConfig (p. 178)

wxDocManager::FileHistoryUseMenu

void FileHistoryUseMenu(wxMenu* menu)

Use this menu for appending recently-visited document filenames, for convenient access. Calling this function with a valid menu pointer enables the history list functionality.

Note that you can add multiple menus using this function, to be managed by the file history object.

wxDocManager::FindTemplateForPath

wxDocTemplate * FindTemplateForPath(const wxString& path)

Given a path, try to find template that matches the extension. This is only an approximate method of finding a template for creating a document.

wxDocManager::GetCurrentDocument

wxDocument * GetCurrentDocument()

Returns the document associated with the currently active view (if any).

wxDocManager::GetCurrentView

wxView * GetCurrentView()

Returns the currently active view

wxDocManager::GetDocuments

wxList& GetDocuments()

Returns a reference to the list of documents.

wxDocManager::GetFileHistory

wxFileHistory * GetFileHistory()

Returns a pointer to file history.

wxDocManager::GetLastDirectory

wxString GetLastDirectory() const

Returns the directory last selected by the user when opening a file. Initially empty.

wxDocManager::GetMaxDocsOpen

int GetMaxDocsOpen()

Returns the number of documents that can be open simultaneously.

wxDocManager::GetHistoryFilesCount

size_t GetHistoryFilesCount()

Returns the number of files currently stored in the file history.

wxDocManager::Initialize

bool Initialize()

Initializes data; currently just calls `OnCreateFileHistory`. Some data cannot always be initialized in the constructor because the programmer must be given the opportunity to override functionality. If `OnCreateFileHistory` was called from the constructor, an overridden virtual `OnCreateFileHistory` would not be called due to C++'s 'interesting' constructor semantics. In fact `Initialize` *is* called from the `wxDocManager` constructor, but this can be vetoed by passing false to the second argument, allowing the derived class's constructor to call `Initialize`, possibly calling a different `OnCreateFileHistory` from the default.

The bottom line: if you're not deriving from `Initialize`, forget it and construct `wxDocManager` with no arguments.

wxDocManager::MakeDefaultName

bool MakeDefaultName(const wxString& buf)

Copies a suitable default name into *buf*. This is implemented by appending an integer counter to the string **unnamed** and incrementing the counter.

wxPerl note: In wxPerl this function must return the modified name rather than just modifying the argument.

wxDocManager::OnCreateFileHistory

wxFileHistory * OnCreateFileHistory()

A hook to allow a derived class to create a different type of file history. Called from *Initialize* (p. 402).

wxDocManager::OnFileClose

void OnFileClose()

Closes and deletes the currently active document.

wxDocManager::OnFileCloseAll

void OnFileCloseAll()

Closes and deletes all the currently opened documents.

wxDocManager::OnFileNew

void OnFileNew()

Creates a document from a list of templates (if more than one template).

wxDocManager::OnFileOpen

void OnFileOpen()

Creates a new document and reads in the selected file.

wxDocManager::OnFileSave

void OnFileSave()

Saves the current document by calling wxDocument::Save for the current document.

wxDocManager::OnFileSaveAs

void OnFileSaveAs()

Calls wxDocument::SaveAs for the current document.

wxDocManager::OnMenuCommand

void OnMenuCommand(int cmd)

Processes menu commands routed from child or parent frames. This deals with the following predefined menu item identifiers:

- wxID_OPEN Creates a new document and opens a file into it.
- wxID_CLOSE Closes the current document.
- wxID_CLOSE_ALL Closes all documents.
- wxID_NEW Creates a new document.
- wxID_SAVE Saves the document.
- wxID_SAVE_AS Saves the document into a specified filename.

Unrecognized commands are routed to the currently active wxView's OnMenuCommand.

wxDocManager::RemoveDocument

void RemoveDocument(wxDocument *doc)

Removes the document from the list of documents.

wxDocManager::SelectDocumentPath

wxDocTemplate * SelectDocumentPath(wxDocTemplate **templates, int noTemplates, const wxString& path, const wxString& bufSize, long flags, bool save)

Under Windows, pops up a file selector with a list of filters corresponding to document templates. The wxDocTemplate corresponding to the selected file's extension is returned.

On other platforms, if there is more than one document template a choice list is popped up, followed by a file selector.

This function is used in wxDocManager::CreateDocument.

wxPerl note: In wxPerl `templates` is a reference to a list of templates. If you override this method in your document manager it must return two values, eg:

(doctemplate, path) = My::DocManager->SelectDocumentPath(...);

wxDocManager::SelectDocumentType

wxDocTemplate * SelectDocumentType(wxDocTemplate **templates, int noTemplates, bool sort=false)

Returns a document template by asking the user (if there is more than one template). This function is used in wxDocManager::CreateDocument.

Parameters

templates

Pointer to an array of templates from which to choose a desired template.

noTemplates

Number of templates being pointed to by the *templates* pointer.

sort

If more than one template is passed in in *templates*, then this parameter indicates whether the list of templates that the user will have to choose from is sorted or not when shown the choice box dialog. Default is false.

wxPerl note: In wxPerl `templates` is a reference to a list of templates.

wxDocManager::SelectViewType

wxDocTemplate * SelectViewType(wxDocTemplate **templates, int noTemplates, bool sort=false)

Returns a document template by asking the user (if there is more than one template), displaying a list of valid views. This function is used in `wxDocManager::CreateView`. The dialog normally will not appear because the array of templates only contains those relevant to the document in question, and often there will only be one such.

Parameters

templates

Pointer to an array of templates from which to choose a desired template.

noTemplates

Number of templates being pointed to by the *templates* pointer.

sort

If more than one template is passed in in *templates*, then this parameter indicates whether the list of templates that the user will have to choose from is sorted or not when shown the choice box dialog. Default is false.

wxPerl note: In wxPerl `templates` is a reference to a list of templates.

wxDocManager::SetLastDirectory

void SetLastDirectory(const wxString& dir)

Sets the directory to be displayed to the user when opening a file. Initially this is empty.

wxDocManager::SetMaxDocsOpen

void SetMaxDocsOpen(int n)

Sets the maximum number of documents that can be open at a time. By default, this is 10,000. If you set it to 1, existing documents will be saved and deleted when the user tries to open or create a new one (similar to the behaviour of Windows Write, for example). Allowing multiple documents gives behaviour more akin to MS Word and other Multiple Document Interface applications.

wxDocMDIChildFrame

The `wxDocMDIChildFrame` class provides a default frame for displaying documents on separate windows. This class can only be used for MDI child frames.

The class is part of the document/view framework supported by wxWidgets, and

cooperates with the *wxView* (p. 1371), *wxDocument* (p. 415), *wxDocManager* (p. 396) and *wxDocTemplate* (p. 410) classes.

See the example application in `samples/docview`.

Derived from

wxMDIChildFrame (p. 870)
wxFrame (p. 532)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/docmdi.h>

See also

Document/view overview (p. 1658), *wxMDIChildFrame* (p. 870)

wxDocMDIChildFrame::m_childDocument

wxDocument* m_childDocument

The document associated with the frame.

wxDocMDIChildFrame::m_childView

wxView* m_childView

The view associated with the frame.

wxDocMDIChildFrame::wxDocMDIChildFrame

wxDocMDIChildFrame(wxDocument* doc, wxView* view, wxFrame* parent, wxWindowID id, const wxString& title, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxDEFAULT_FRAME_STYLE, const wxString& name = "frame")

Constructor.

wxDocMDIChildFrame::~~wxDocMDIChildFrame

~wxDocMDIChildFrame()

Destructor.

wxDocMDIChildFrame::GetDocument

wxDocument* GetDocument() const

Returns the document associated with this frame.

wxDocMDIChildFrame::GetView

wxView* GetView() const

Returns the view associated with this frame.

wxDocMDIChildFrame::OnActivate

void OnActivate(wxActivateEvent event)

Sets the currently active view to be the frame's view. You may need to override (but still call) this function in order to set the keyboard focus for your subwindow.

wxDocMDIChildFrame::OnCloseWindow

void OnCloseWindow(wxCloseEvent& event)

Closes and deletes the current view and document.

wxDocMDIChildFrame::SetDocument

void SetDocument(wxDocument *doc)

Sets the document for this frame.

wxDocMDIChildFrame::SetView

void SetView(wxView *view)

Sets the view for this frame.

wxDocMDIParentFrame

The `wxDocMDIParentFrame` class provides a default top-level frame for applications using the document/view framework. This class can only be used for MDI parent frames.

It cooperates with the `wxView` (p. 1371), `wxDocument` (p. 415), `wxDocManager` (p. 396) and `wxDocTemplates` (p. 410) classes.

See the example application in `samples/docview`.

Derived from

wxMDIParentFrame (p. 874)

wxFrame (p. 532)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/docmdi.h>

See also

Document/view overview (p. 1658), *wxMDIParentFrame* (p. 874)

wxDocMDIParentFrame::wxDocMDIParentFrame

wxDocParentFrame(*wxDocManager* manager*, *wxFrame* parent*, *wxWindowID id*, **const wxString& title**, **const wxPoint& pos** = *wxDefaultPosition*, **const wxSize& size** = *wxDefaultSize*, **long style** = *wxDEFAULT_FRAME_STYLE*, **const wxString& name** = "frame")

Constructor.

wxDocMDIParentFrame::~~wxDocMDIParentFrame

~wxDocMDIParentFrame()

Destructor.

wxDocMDIParentFrame::OnCloseWindow

void OnCloseWindow(*wxCloseEvent& event*)

Deletes all views and documents. If no user input cancelled the operation, the frame will be destroyed and the application will exit.

Since understanding how document/view clean-up takes place can be difficult, the implementation of this function is shown below.

```
void wxDocParentFrame::OnCloseWindow(wxCloseEvent& event)
{
    if (m_docManager->Clear(!event.CanVeto()))
    {
        this->Destroy();
    }
    else
        event.Veto();
}
```

wxDocParentFrame

The `wxDocParentFrame` class provides a default top-level frame for applications using the document/view framework. This class can only be used for SDI (not MDI) parent frames.

It cooperates with the `wxView` (p. 1371), `wxDocument` (p. 415), `wxDocManager` (p. 396) and `wxDocTemplates` (p. 410) classes.

See the example application in `samples/docview`.

Derived from

`wxFrame` (p. 532)
`wxWindow` (p. 1388)
`wxEvtHandler` (p. 445)
`wxObject` (p. 954)

Include files

<wx/docview.h>

See also

Document/view overview (p. 1658), `wxFrame` (p. 532)

wxDocParentFrame::wxDocParentFrame

```
wxDocParentFrame(wxDocManager* manager, wxFrame *parent, wxWindowID id,  
const wxString& title, const wxPoint& pos = wxDefaultPosition, const wxSize& size =  
wxDefaultSize, long style = wxDEFAULT_FRAME_STYLE, const wxString& name =  
"frame")
```

Constructor.

wxDocParentFrame::~~wxDocParentFrame

```
~wxDocParentFrame()
```

Destructor.

wxDocParentFrame::OnCloseWindow

```
void OnCloseWindow(wxCloseEvent& event)
```

Deletes all views and documents. If no user input cancelled the operation, the frame will

be destroyed and the application will exit.

Since understanding how document/view clean-up takes place can be difficult, the implementation of this function is shown below.

```
void wxDocParentFrame::OnCloseWindow(wxCloseEvent& event)
{
    if (m_docManager->Clear(!event.CanVeto()))
    {
        this->Destroy();
    }
    else
        event.Veto();
}
```

wxDocTemplate

The `wxDocTemplate` class is used to model the relationship between a document class and a view class.

Derived from

wxObject (p. 954)

Include files

<wx/docview.h>

See also

wxDocTemplate overview (p. 1661), *wxDocument* (p. 415), *wxView* (p. 1371)

wxDocTemplate::m_defaultExt

wxString m_defaultExt

The default extension for files of this type.

wxDocTemplate::m_description

wxString m_description

A short description of this template.

wxDocTemplate::m_directory

wxString m_directory

The default directory for files of this type.

wxDocTemplate::m_docClassInfo

wxClassInfo* m_docClassInfo

Run-time class information that allows document instances to be constructed dynamically.

wxDocTemplate::m_docTypeName

wxString m_docTypeName

The named type of the document associated with this template.

wxDocTemplate::m_documentManager

wxDocTemplate* m_documentManager

A pointer to the document manager for which this template was created.

wxDocTemplate::m_fileFilter

wxString m_fileFilter

The file filter (such as *.txt) to be used in file selector dialogs.

wxDocTemplate::m_flags

long m_flags

The flags passed to the constructor.

wxDocTemplate::m_viewClassInfo

wxClassInfo* m_viewClassInfo

Run-time class information that allows view instances to be constructed dynamically.

wxDocTemplate::m_viewTypeName

wxString m_viewTypeName

The named type of the view associated with this template.

wxDocTemplate::wxDocTemplate

wxDocTemplate(wxDocManager* manager, const wxString& descr, const wxString& filter, const wxString& dir, const wxString& ext, const wxString& docTypeName, const wxString& viewTypeName, wxClassInfo* docClassInfo = NULL, wxClassInfo* viewClassInfo = NULL, long flags = wxDEFAULT_TEMPLATE_FLAGS)

Constructor. Create instances dynamically near the start of your application after creating a wxDocManager instance, and before doing any document or view operations.

manager is the document manager object which manages this template.

descr is a short description of what the template is for. This string will be displayed in the file filter list of Windows file selectors.

filter is an appropriate file filter such as *.txt.

dir is the default directory to use for file selectors.

ext is the default file extension (such as txt).

docTypeName is a name that should be unique for a given type of document, used for gathering a list of views relevant to a particular document.

viewTypeName is a name that should be unique for a given view.

docClassInfo is a pointer to the run-time document class information as returned by the CLASSINFO macro, e.g. CLASSINFO(MyDocumentClass). If this is not supplied, you will need to derive a new wxDocTemplate class and override the CreateDocument member to return a new document instance on demand.

viewClassInfo is a pointer to the run-time view class information as returned by the CLASSINFO macro, e.g. CLASSINFO(MyViewClass). If this is not supplied, you will need to derive a new wxDocTemplate class and override the CreateView member to return a new view instance on demand.

flags is a bit list of the following:

- wxTEMPLATE_VISIBLE The template may be displayed to the user in dialogs.
- wxTEMPLATE_INVISIBLE The template may not be displayed to the user in dialogs.
- wxDEFAULT_TEMPLATE_FLAGS Defined as wxTEMPLATE_VISIBLE.

wxPerl note: In wxPerl *docClassInfo* and *viewClassInfo* can be either `Wx::ClassInfo` objects or strings which contain the name of the perl packages which are to be used as `Wx::Document` and `Wx::View` classes (they must have a constructor named `new`):

```
Wx::DocTemplate->new( docmgr, descr, filter, dir, ext, docTypeName,  
                     viewTypeName, docClassInfo,  
                     viewClassInfo, flags ) will construct  
document and view objects from the class  
information
```

Wx::DocTemplate->new(docmgr, descr, filter, dir, ext, docTypeName, viewTypeName, docClassName, viewClassName, flags) will construct document and view objects from perl packages

Wx::DocTemplate->new(docmgr, descr, filter, dir, ext, docTypeName, viewTypeName)
Wx::DocTemplate::CreateDocument()
) and Wx::DocTemplate::CreateView()
must be overridden

wxDocTemplate::~~wxDocTemplate

void ~wxDocTemplate()

Destructor.

wxDocTemplate::CreateDocument

wxDocument * CreateDocument(const wxString& path, long flags = 0)

Creates a new instance of the associated document class. If you have not supplied a wxClassInfo parameter to the template constructor, you will need to override this function to return an appropriate document instance.

wxDocTemplate::CreateView

wxView * CreateView(wxDocument *doc, long flags = 0)

Creates a new instance of the associated view class. If you have not supplied a wxClassInfo parameter to the template constructor, you will need to override this function to return an appropriate view instance.

wxDocTemplate::GetDefaultExtension

wxString GetDefaultExtension()

Returns the default file extension for the document data, as passed to the document template constructor.

wxDocTemplate::GetDescription

wxString GetDescription()

Returns the text description of this template, as passed to the document template constructor.

wxDocTemplate::GetDirectory

wxString GetDirectory()

Returns the default directory, as passed to the document template constructor.

wxDocTemplate::GetDocumentManager

wxDocManager * GetDocumentManager()

Returns a pointer to the document manager instance for which this template was created.

wxDocTemplate::GetDocumentName

wxString GetDocumentName()

Returns the document type name, as passed to the document template constructor.

wxDocTemplate::GetFileFilter

wxString GetFileFilter()

Returns the file filter, as passed to the document template constructor.

wxDocTemplate::GetFlags

long GetFlags()

Returns the flags, as passed to the document template constructor.

wxDocTemplate::GetViewName

wxString GetViewName()

Returns the view type name, as passed to the document template constructor.

wxDocTemplate::IsVisible

bool IsVisible()

Returns true if the document template can be shown in user dialogs, false otherwise.

wxDocTemplate::SetDefaultExtension

void SetDefaultExtension(const wxString& ext)

Sets the default file extension.

wxDocTemplate::SetDescription

void SetDescription(const wxString& descr)

Sets the template description.

wxDocTemplate::SetDirectory

void SetDirectory(const wxString& dir)

Sets the default directory.

wxDocTemplate::SetDocumentManager

void SetDocumentManager(wxDocManager *manager)

Sets the pointer to the document manager instance for which this template was created. Should not be called by the application.

wxDocTemplate::SetFileFilter

void SetFileFilter(const wxString& filter)

Sets the file filter.

wxDocTemplate::SetFlags

void SetFlags(long flags)

Sets the internal document template flags (see the constructor description for more details).

wxDocument

The document class can be used to model an application's file-based data. It is part of the document/view framework supported by wxWidgets, and cooperates with the *wxView* (p. 1371), *wxDocTemplate* (p. 410) and *wxDocManager* (p. 396) classes.

Derived from

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/docview.h>

See also

wxDocument overview (p. 1660), *wxView* (p. 1371), *wxDocTemplate* (p. 410), *wxDocManager* (p. 396)

wxDocument::m_commandProcessor

wxCommandProcessor* m_commandProcessor

A pointer to the command processor associated with this document.

wxDocument::m_documentFile

wxString m_documentFile

Filename associated with this document ("" if none).

wxDocument::m_documentModified

bool m_documentModified

true if the document has been modified, false otherwise.

wxDocument::m_documentTemplate

wxDocTemplate * m_documentTemplate

A pointer to the template from which this document was created.

wxDocument::m_documentTitle

wxString m_documentTitle

Document title. The document title is used for an associated frame (if any), and is usually constructed by the framework from the filename.

wxDocument::m_documentTypeName

wxString m_documentTypeName

The document type name given to the `wxDocTemplate` constructor, copied to this variable when the document is created. If several document templates are created that use the same document type, this variable is used in `wxDocManager::CreateView` to collate a list of alternative view types that can be used on this kind of document. Do not change the value of this variable.

wxDocument::m_documentViews

wxList m_documentViews

List of `wxView` instances associated with this document.

wxDocument::wxDocument

wxDocument()

Constructor. Define your own default constructor to initialize application-specific data.

wxDocument::~~wxDocument

~wxDocument()

Destructor. Removes itself from the document manager.

wxDocument::AddView

virtual bool AddView(wxView *view)

If the view is not already in the list of views, adds the view and calls `OnChangedViewList`.

wxDocument::Close

virtual bool Close()

Closes the document, by calling `OnSaveModified` and then (if this returned true) `OnCloseDocument`. This does not normally delete the document object: use `DeleteAllViews` to do this implicitly.

wxDocument::DeleteAllViews

virtual bool DeleteAllViews()

Calls `wxView::Close` and deletes each view. Deleting the final view will implicitly delete the document itself, because the `wxView` destructor calls `RemoveView`. This in turns calls `wxDocument::OnChangedViewList`, whose default implementation is to save and

delete the document if no views exist.

wxDocument::GetCommandProcessor

wxCommandProcessor* GetCommandProcessor() const

Returns a pointer to the command processor associated with this document.

See *wxCommandProcessor* (p. 171).

wxDocument::GetDocumentTemplate

wxDocTemplate* GetDocumentTemplate() const

Gets a pointer to the template that created the document.

wxDocument::GetDocumentManager

wxDocManager* GetDocumentManager() const

Gets a pointer to the associated document manager.

wxDocument::GetDocumentName

wxString GetDocumentName() const

Gets the document type name for this document. See the comment for *documentTypeName* (p. 416).

wxDocument::GetDocumentWindow

wxWindow* GetDocumentWindow() const

Intended to return a suitable window for using as a parent for document-related dialog boxes. By default, uses the frame associated with the first view.

wxDocument::GetFilename

wxString GetFilename() const

Gets the filename associated with this document, or "" if none is associated.

wxDocument::GetFirstView

wxView * GetFirstView() const

A convenience function to get the first view for a document, because in many cases a document will only have a single view.

See also: *GetViews* (p. 419)

wxDocument::GetPrintableName

virtual void GetPrintableName(wxString& *name*) const

Copies a suitable document name into the supplied *name* buffer. The default function uses the title, or if there is no title, uses the filename; or if no filename, the string **unnamed**.

wxPerl note: In wxPerl this function must return the modified name rather than just modifying the argument.

wxDocument::GetTitle

wxString GetTitle() const

Gets the title for this document. The document title is used for an associated frame (if any), and is usually constructed by the framework from the filename.

wxDocument::GetViews

wxList & GetViews() const

Returns the list whose elements are the views on the document.

See also: *GetFirstView* (p. 418)

wxDocument::IsModified

virtual bool IsModified() const

Returns true if the document has been modified since the last save, false otherwise. You may need to override this if your document view maintains its own record of being modified (for example if using *wxTextWindow* to view and edit the document).

See also *Modify* (p. 420).

wxDocument::LoadObject

virtual istream& LoadObject(istream& *stream*)

virtual wxInputStream& LoadObject(wxInputStream& *stream*)

Override this function and call it from your own *LoadObject* before streaming your own

data. `LoadObject` is called by the framework automatically when the document contents need to be loaded.

Note that only one of these forms exists, depending on how `wxWidgets` was configured.

`wxDocument::Modify`

`virtual void Modify(bool modify)`

Call with `true` to mark the document as modified since the last save, `false` otherwise. You may need to override this if your document view maintains its own record of being modified (for example if using `wxTextWindow` to view and edit the document).

See also *IsModified* (p. 419).

`wxDocument::OnChangedViewList`

`virtual void OnChangedViewList()`

Called when a view is added to or deleted from this document. The default implementation saves and deletes the document if no views exist (the last one has just been removed).

`wxDocument::OnCloseDocument`

`virtual bool OnCloseDocument()`

The default implementation calls `DeleteContents` (an empty implementation) sets the modified flag to `false`. Override this to supply additional behaviour when the document is closed with `Close`.

`wxDocument::OnCreate`

`virtual bool OnCreate(const wxString& path, long flags)`

Called just after the document object is created to give it a chance to initialize itself. The default implementation uses the template associated with the document to create an initial view. If this function returns `false`, the document is deleted.

`wxDocument::OnCreateCommandProcessor`

`virtual wxCommandProcessor* OnCreateCommandProcessor()`

Override this function if you want a different (or no) command processor to be created when the document is created. By default, it returns an instance of `wxCommandProcessor`.

See *wxCommandProcessor* (p. 171).

wxDocument::OnNewDocument

virtual bool OnNewDocument()

The default implementation calls `OnSaveModified` and `DeleteContents`, makes a default title for the document, and notifies the views that the filename (in fact, the title) has changed.

wxDocument::OnOpenDocument

virtual bool OnOpenDocument(const wxString& filename)

Constructs an input file stream for the given filename (which must not be empty), and calls `LoadObject`. If `LoadObject` returns true, the document is set to unmodified; otherwise, an error message box is displayed. The document's views are notified that the filename has changed, to give windows an opportunity to update their titles. All of the document's views are then updated.

wxDocument::OnSaveDocument

virtual bool OnSaveDocument(const wxString& filename)

Constructs an output file stream for the given filename (which must not be empty), and calls `SaveObject`. If `SaveObject` returns true, the document is set to unmodified; otherwise, an error message box is displayed.

wxDocument::OnSaveModified

virtual bool OnSaveModified()

If the document has been modified, prompts the user to ask if the changes should be changed. If the user replies Yes, the `Save` function is called. If No, the document is marked as unmodified and the function succeeds. If Cancel, the function fails.

wxDocument::RemoveView

virtual bool RemoveView(wxView* view)

Removes the view from the document's list of views, and calls `OnChangedViewList`.

wxDocument::Save

virtual bool Save()

Saves the document by calling `OnSaveDocument` if there is an associated filename, or `SaveAs` if there is no filename.

wxDocument::SaveAs

virtual bool SaveAs()

Prompts the user for a file to save to, and then calls `OnSaveDocument`.

wxDocument::SaveObject

virtual ostream& SaveObject(ostream& stream)

virtual wxOutputStream& SaveObject(wxOutputStream& stream)

Override this function and call it from your own `SaveObject` before streaming your own data. `SaveObject` is called by the framework automatically when the document contents need to be saved.

Note that only one of these forms exists, depending on how `wxWidgets` was configured.

wxDocument::SetCommandProcessor

virtual void SetCommandProcessor(wxCommandProcessor *processor)

Sets the command processor to be used for this document. The document will then be responsible for its deletion. Normally you should not call this; override `OnCreateCommandProcessor` instead.

See *wxCommandProcessor* (p. 171).

wxDocument::SetDocumentName

void SetDocumentName(const wxString& name)

Sets the document type name for this document. See the comment for *documentTypeName* (p. 416).

wxDocument::SetDocumentTemplate

void SetDocumentTemplate(wxDocTemplate* templ)

Sets the pointer to the template that created the document. Should only be called by the framework.

wxDocument::SetFilename

void SetFilename(const wxString& filename, bool notifyViews = false)

Sets the filename for this document. Usually called by the framework.

If *notifyViews* is true, `wxView::OnChangeFilename` is called for all views.

wxDocument::SetTitle

void SetTitle(const wxString& title)

Sets the title for this document. The document title is used for an associated frame (if any), and is usually constructed by the framework from the filename.

wxDocument::UpdateAllViews

void UpdateAllViews(wxView* sender = NULL, wxObject* hint = NULL)

Updates all views. If *sender* is non-NULL, does not update this view.

hint represents optional information to allow a view to optimize its update.

wxDragImage

This class is used when you wish to drag an object on the screen, and a simple cursor is not enough.

On Windows, the WIN32 API is used to do achieve smooth dragging. On other platforms, `wxGenericDragImage` is used. Applications may also prefer to use `wxGenericDragImage` on Windows, too.

wxPython note: wxPython uses `wxGenericDragImage` on all platforms, but uses the `wxDragImage` name.

To use this class, when you wish to start dragging an image, create a `wxDragImage` object and store it somewhere you can access it as the drag progresses. Call `BeginDrag` to start, and `EndDrag` to stop the drag. To move the image, initially call `Show` and then `Move`. If you wish to update the screen contents during the drag (for example, highlight an item as in the `dragimag` sample), first call `Hide`, update the screen, call `Move`, and then call `Show`.

You can drag within one window, or you can use full-screen dragging either across the whole screen, or just restricted to one area of the screen to save resources. If you want the user to drag between two windows, then you will need to use full-screen dragging.

If you wish to draw the image yourself, use `wxGenericDragImage` and override `wxDragImage::DoDrawImage` (p. 426) and `wxDragImage::GetImageRect` (p. 426).

Please see `samples/dragimag` for an example.

Derived from

wxObject (p. 954)

Include files

```
<wx/dragimag.h>  
<wx/generic/dragimgg.h>
```

wxDragImage::wxDragImage

wxDragImage()

Default constructor.

wxDragImage(const wxBitmap& image, const wxCursor& cursor = wxNullCursor, const wxPoint& cursorHotspot = wxPoint(0, 0))

Constructs a drag image from a bitmap and optional cursor.

wxDragImage(const wxIcon& image, const wxCursor& cursor = wxNullCursor, const wxPoint& cursorHotspot = wxPoint(0, 0))

Constructs a drag image from an icon and optional cursor.

wxPython note: This constructor is called `wxDragIcon` in wxPython.

wxDragImage(const wxString& text, const wxCursor& cursor = wxNullCursor, const wxPoint& cursorHotspot = wxPoint(0, 0))

Constructs a drag image from a text string and optional cursor.

wxPython note: This constructor is called `wxDragString` in wxPython.

wxDragImage(const wxTreeCtrl& treeCtrl, wxTreeItemId& id)

Constructs a drag image from the text in the given tree control item, and optional cursor.

wxPython note: This constructor is called `wxDragTreeItem` in wxPython.

wxDragImage(const wxListCtrl& treeCtrl, long id)

Constructs a drag image from the text in the given tree control item, and optional cursor.

wxPython note: This constructor is called `wxDragListItem` in wxPython.

wxDragImage(const wxCursor& cursor = wxNullCursor, const wxPoint& cursorHotspot = wxPoint(0, 0))

Constructs a drag image an optional cursor. This constructor is only available for `wxGenericDragImage`, and can be used when the application supplies `wxDragImage::DoDrawImage` (p. 426) and `wxDragImage::GetImageRect` (p. 426).

Parameters

image

Icon or bitmap to be used as the drag image. The bitmap can have a mask.

text

Text used to construct a drag image.

cursor

Optional cursor to combine with the image.

hotspot

This parameter is deprecated.

treeCtrl

Tree control for constructing a tree drag image.

listCtrl

List control for constructing a list drag image.

id

Tree or list control item id.

wxDragImage::BeginDrag

bool BeginDrag(const wxPoint& hotspot, wxWindow* window, bool fullScreen = false, wxRect* rect = NULL)

Start dragging the image, in a window or full screen.

bool BeginDrag(const wxPoint& hotspot, wxWindow* window, wxWindow* boundingWindow)

Start dragging the image, using the first window to capture the mouse and the second to specify the bounding area. This form is equivalent to using the first form, but more convenient than working out the bounding rectangle explicitly.

You need to then call *wxDragImage::Show* (p. 427) and *wxDragImage::Move* (p. 427) to show the image on the screen.

Call *wxDragImage::EndDrag* (p. 426) when the drag has finished.

Note that this call automatically calls *CaptureMouse*.

Parameters*hotspot*

The location of the drag position relative to the upper-left corner of the image.

window

The window that captures the mouse, and within which the dragging is limited unless *fullScreen* is true.

boundingWindow

In the second form of the function, specifies the area within which the drag occurs.

fullScreen

If true, specifies that the drag will be visible over the full screen, or over as much of the screen as is specified by *rect*. Note that the mouse will still be captured in *window*.

rect

If non-NULL, specifies the rectangle (in screen coordinates) that bounds the dragging operation. Specifying this can make the operation more efficient by cutting down on the area under consideration, and it can also make a visual difference since the drag is clipped to this area.

wxDragImage::DoDrawImage

virtual bool DoDrawImage(wxDC& dc, const wxPoint& pos)

Draws the image on the device context with top-left corner at the given position.

This function is only available with *wxGenericDragImage*, to allow applications to draw their own image instead of using an actual bitmap. If you override this function, you must also override *wxDragImage::GetImageRect* (p. 426).

wxDragImage::EndDrag

bool EndDrag()

Call this when the drag has finished.

Note that this call automatically calls *ReleaseMouse*.

wxDragImage::GetImageRect

virtual wxRect GetImageRect(const wxPoint& pos) const

Returns the rectangle enclosing the image, assuming that the image is drawn with its top-left corner at the given point.

This function is available in *wxGenericDragImage* only, and may be overridden (together with *wxDragImage::DoDrawImage* (p. 426)) to provide a virtual drawing capability.

wxDragImage::Hide

bool Hide()

Hides the image. You may wish to call this before updating the window contents (perhaps highlighting an item). Then call *wxDragImage::Move* (p. 427) and *wxDragImage::Show* (p. 427).

wxDragImage::Move

bool Move(const wxPoint& pt)

Call this to move the image to a new position. The image will only be shown if *wxDragImage::Show* (p. 427) has been called previously (for example at the start of the drag).

pt is the position in client coordinates (relative to the window specified in *BeginDrag*).

You can move the image either when the image is hidden or shown, but in general dragging will be smoother if you move the image when it is shown.

wxDragImage::Show

bool Show()

Shows the image. Call this at least once when dragging.

wxDragImage::UpdateBackingFromWindow

bool UpdateBackingFromWindow(wxDC& windowDC, wxMemoryDC& destDC, const wxRect& sourceRect, const wxRect& destRect) const

Override this if you wish to draw the window contents to the backing bitmap yourself. This can be desirable if you wish to avoid flicker by not having to redraw the updated window itself just before dragging, which can cause a flicker just as the drag starts. Instead, paint the drag image's backing bitmap to show the appropriate graphic *minus the objects to be dragged*, and leave the window itself to be updated by the drag image. This can provide eerily smooth, flicker-free drag behaviour.

The default implementation copies the window contents to the backing bitmap. A new implementation will normally copy information from another source, such as from its own backing bitmap if it has one, or directly from internal data structures.

This function is available in *wxGenericDragImage* only.

wxDropFilesEvent

This class is used for drop files events, that is, when files have been dropped onto the

window. This functionality is currently only available under Windows. The window must have previously been enabled for dropping by calling `wxWindow::DragAcceptFiles` (p. 1398).

Important note: this is a separate implementation to the more general drag and drop implementation documented *here* (p. 1673). It uses the older, Windows message-based approach of dropping files.

Derived from

`wxEvent` (p. 441)

`wxObject` (p. 954)

Include files

`<wx/event.h>`

Event table macros

To process a drop files event, use these event handler macros to direct input to a member function that takes a `wxDropFilesEvent` argument.

EVT_DROP_FILES(func) Process a `wxEVT_DROP_FILES` event.

See also

Event handling overview (p. 1610)

wxDropFilesEvent::wxDropFilesEvent

wxDropFilesEvent(WXTYPE id = 0, int noFiles = 0, wxString* files = NULL)

Constructor.

wxDropFilesEvent::m_files

wxString* m_files

An array of filenames.

wxDropFilesEvent::m_noFiles

int m_noFiles

The number of files dropped.

wxDropFilesEvent::m_pos

wxPoint m_pos

The point at which the drop took place.

wxDropFilesEvent::GetFiles

wxString* GetFiles() const

Returns an array of filenames.

wxDropFilesEvent::GetNumberOfFiles

int GetNumberOfFiles() const

Returns the number of files dropped.

wxDropFilesEvent::GetPosition

wxPoint GetPosition() const

Returns the position at which the files were dropped.

Returns an array of filenames.

wxDropSource

This class represents a source for a drag and drop operation.

See *Drag and drop overview* (p. 1673) and *wxDataObject overview* (p. 1674) for more information.

Derived from

None

Include files

<wx/dnd.h>

Types

wxDragResult is defined as follows:

```
enum wxDragResult
{
    wxDragError,      // error prevented the d&d operation from completing
    wxDragNone,       // drag target didn't accept the data
    wxDragCopy,       // the data was successfully copied
    wxDragMove,       // the data was successfully moved
    wxDragCancel      // the operation was cancelled by user (not an error)
};
```

See also

wxDropTarget (p. 432), *wxTextDropTarget* (p. 1270), *wxFileDropTarget* (p. 473)

wxDropSource::wxDropSource

```
wxDropSource(wxWindow* win = NULL, const wxIconOrCursor& iconCopy =  
wxNullIconOrCursor, const wxIconOrCursor& iconMove = wxNullIconOrCursor, const  
wxIconOrCursor& iconNone = wxNullIconOrCursor)
```

```
wxDropSource(wxDataObject& data, wxWindow* win = NULL, const  
wxIconOrCursor& iconCopy = wxNullIconOrCursor, const wxIconOrCursor&  
iconMove = wxNullIconOrCursor, const wxIconOrCursor& iconNone =  
wxNullIconOrCursor)
```

The constructors for wxDataObject.

If you use the constructor without *data* parameter you must call *SetData* (p. 431) later.

Note that the exact type of *iconCopy* and subsequent parameters differs between wxMSW and wxGTK: these are cursors under Windows but icons for GTK. You should use the macro *wxDROP_ICON* (p. 1505) in portable programs instead of directly using either of these types.

Parameters

win

The window which initiates the drag and drop operation.

iconCopy

The icon or cursor used for feedback for copy operation.

iconMove

The icon or cursor used for feedback for move operation.

iconNone

The icon or cursor used for feedback when operation can't be done.

win is the window which initiates the drag and drop operation.

wxDropSource::~wxDropSource

```
virtual ~wxDropSource()
```

wxDropSource::SetData

void SetData(wxDataObject& data)

Sets the data *wxDataObject* (p. 223) associated with the drop source. This will not delete any previously associated data.

wxDropSource::DoDragDrop

virtual wxDragResult DoDragDrop(int flags = wxDrag_CopyOnly)

Do it (call this in response to a mouse button press, for example). This starts the drag-and-drop operation which will terminate when the user releases the mouse.

Parameters

flags

If *wxDrag_AllowMove* is included in the flags, data may be moved and not only copied (default). If *wxDrag_DefaultMove* is specified (which includes the previous flag), this is even the default operation

.

Return value

Returns the operation requested by the user, may be *wxDragCopy*, *wxDragMove*, *wxDragCancel* or *wxDragNone* if an error occurred.

wxDropSource::GiveFeedback

virtual bool GiveFeedback(wxDragResult effect, bool scrolling)

Overridable: you may give some custom UI feedback during the drag and drop operation in this function. It is called on each mouse move, so your implementation must not be too slow.

Parameters

effect

The effect to implement. One of *wxDragCopy*, *wxDragMove* and *wxDragNone*.

scrolling

true if the window is scrolling. MSW only.

Return value

Return false if you want default feedback, or true if you implement your own feedback. The return values is ignored under GTK.

wxDropTarget

This class represents a target for a drag and drop operation. A *wxDataObject* (p. 223) can be associated with it and by default, this object will be filled with the data from the drag source, if the data formats supported by the data object match the drag source data format.

There are various virtual handler functions defined in this class which may be overridden to give visual feedback or react in a more fine-tuned way, e.g. by not accepting data on the whole window area, but only a small portion of it. The normal sequence of calls is *OnEnter* (p. 433), possibly many times *OnDragOver* (p. 434), *OnDrop* (p. 433) and finally *OnData* (p. 433).

See *Drag and drop overview* (p. 1673) and *wxDataObject overview* (p. 1674) for more information.

Derived from

None

Include files

<wx/dnd.h>

Types

wxDragResult is defined as follows:

```
enum wxDragResult
{
    wxDragError,        // error prevented the d&d operation from completing
    wxDragNone,         // drag target didn't accept the data
    wxDragCopy,         // the data was successfully copied
    wxDragMove,         // the data was successfully moved
    wxDragCancel        // the operation was cancelled by user (not an error)
};
```

See also

wxDropSource (p. 429), *wxTextDropTarget* (p. 1270), *wxFileDropTarget* (p. 473), *wxDataFormat* (p. 218), *wxDataObject* (p. 223)

wxDropTarget::wxDropTarget

wxDropTarget(wxDataObject* data = NULL)

Constructor. *data* is the data to be associated with the drop target.

wxDropTarget::~wxDropTarget

~wxDropTarget()

Destructor. Deletes the associated data object, if any.

wxDropTarget::GetData

virtual void GetData()

This method may only be called from within *OnData* (p. 433). By default, this method copies the data from the drop source to the *wxDataObject* (p. 223) associated with this drop target, calling its *wxDataObject::SetData* (p. 226) method.

wxDropTarget::OnData

virtual wxDragResult OnData(wxCoord x, wxCoord y, wxDragResult def)

Called after *OnDrop* (p. 433) returns true. By default this will usually *GetData* (p. 433) and will return the suggested default value *def*.

wxDropTarget::OnDrop

virtual bool OnDrop(wxCoord x, wxCoord y)

Called when the user drops a data object on the target. Return false to veto the operation.

Parameters

x

The x coordinate of the mouse.

y

The y coordinate of the mouse.

Return value

Return true to accept the data, false to veto the operation.

wxDropTarget::OnEnter

virtual wxDragResult OnEnter(wxCoord x, wxCoord y, wxDragResult def)

Called when the mouse enters the drop target. By default, this calls *OnDragOver* (p. 434).

Parameters

x

The x coordinate of the mouse.

y

The y coordinate of the mouse.

def

Suggested default for return value. Determined by SHIFT or CONTROL key states.

Return value

Returns the desired operation or `wxDragNone`. This is used for optical feedback from the side of the drop source, typically in form of changing the icon.

wxDropTarget::OnDragOver

virtual wxDragResult OnDragOver(wxCoord x, wxCoord y, wxDragResult def)

Called when the mouse is being dragged over the drop target. By default, this calls functions return the suggested return value *def*.

Parameters

x

The x coordinate of the mouse.

y

The y coordinate of the mouse.

def

Suggested value for return value. Determined by SHIFT or CONTROL key states.

Return value

Returns the desired operation or `wxDragNone`. This is used for optical feedback from the side of the drop source, typically in form of changing the icon.

wxDropTarget::OnLeave

virtual void OnLeave()

Called when the mouse leaves the drop target.

wxDropTarget::SetDataObject

void SetDataObject(wxDataObject* data)

Sets the data *wxDataObject* (p. 223) associated with the drop target and deletes any previously associated data object.

wxDynamicLibrary

wxDynamicLibrary is a class representing dynamically loadable library (Windows DLL, shared library under Unix etc.). Just create an object of this class to load a library and don't worry about unloading it -- it will be done in the objects destructor automatically.

wxDynamicLibrary::wxDynamicLibrary

wxDynamicLibrary()

wxDynamicLibrary(const wxString& name, int flags = wxDL_DEFAULT)

Constructor. Second form calls *Load* (p. 436).

wxDynamicLibrary::CanonicalizeName

wxString CanonicalizeName(const wxString& name, wxDynamicLibraryCategory cat = wxDL_LIBRARY)

Returns the platform-specific full name for the library called *name*. E.g. it adds a ".dll" extension under Windows and "lib" prefix and ".so", ".sl" or maybe ".dylib" extension under Unix.

The possible values for *cat* are:

wxDL_LIBRARY	normal library
wxDL_MODULE	a loadable module or plugin

See also

CanonicalizePluginName (p. 435)

wxDynamicLibrary::CanonicalizePluginName

wxString CanonicalizePluginName(const wxString& name, wxPluginCategory cat = wxDL_PLUGIN_GUI)

This function does the same thing as *CanonicalizeName* (p. 435) but for *wxWidgets* plugins. The only difference is that compiler and version information are added to the name to ensure that the plugin which is going to be loaded will be compatible with the main program.

The possible values for *cat* are:

<code>wxDL_PLUGIN_GUI</code>	plugin which uses GUI classes (default)
<code>wxDL_PLUGIN_BASE</code>	plugin which only uses <code>wxBase</code>

`wxDynamicLibrary::Detach`

`wxDIType Detach()`

Detaches this object from its library handle, i.e. the object will not unload the library any longer in its destructor but it is now the callers responsibility to do this using *Unload* (p. 437).

`wxDynamicLibrary::GetSymbol`

`void* GetSymbol(const wxString& name) const`

Returns pointer to symbol *name* in the library or `NULL` if the library contains no such symbol.

[See also](#)

`wxDYNLIB_FUNCTION` (p. 1512)

`wxDynamicLibrary::IsLoaded`

`bool IsLoaded() const`

Returns `true` if the library was successfully loaded, `false` otherwise.

`wxDynamicLibrary::Load`

`bool Load(const wxString& name, int flags = wxDL_DEFAULT)`

Loads DLL with the given *name* into memory. The *flags* argument can be a combination of the following bits:

<code>wxDL_LAZY</code>	equivalent of <code>RTLD_LAZY</code> under Unix, ignored elsewhere
<code>wxDL_NOW</code>	equivalent of <code>RTLD_NOW</code> under Unix, ignored elsewhere
<code>wxDL_GLOBAL</code>	equivalent of <code>RTLD_GLOBAL</code> under Unix, ignored elsewhere
<code>wxDL_VERBATIM</code>	don't try to append the appropriate extension to the library name (this is done by default).

Returns `true` if the library was successfully loaded, `false` otherwise.

wxDynamicLibrary::Unload

void Unload()

static void Unload(wxDllType handle)

Unloads the library from memory. wxDynamicLibrary object automatically calls this method from its destructor if it had been successfully loaded.

The second version is only used if you need to keep the library in memory during a longer period of time than the scope of the wxDynamicLibrary object. In this case you may call *Detach* (p. 436) and store the handle somewhere and call this static method later to unload it.

wxEncodingConverter

This class is capable of converting strings between two 8-bit encodings/charsets. It can also convert from/to Unicode (but only if you compiled wxWidgets with wxUSE_WCHAR_T set to 1). Only limited subset of encodings is supported by wxEncodingConverter: wxFONTENCODING_ISO8859_1 . . 15, wxFONTENCODING_CP1250 . . 1257 and wxFONTENCODING_KOI8.

Note

Please use *wxMBConv* classes (p. 1593) instead if possible. *wxCSCnv* (p. 210) has much better support for various encodings than wxEncodingConverter. wxEncodingConverter is useful only if you rely on wxCONVERT_SUBSTITUTE mode of operation (see *Init* (p. 437)).

Derived from

wxObject (p. 954)

Include files

<wx/encconv.h>

See also

wxFontMapper (p. 528), *wxMBConv* (p. 863), *Writing non-English applications* (p. 1597)

wxEncodingConverter::wxEncodingConverter

wxEncodingConverter()

Constructor.

wxEncodingConverter::Init

bool Init(wxFontEncoding input_enc, wxFontEncoding output_enc, int method = wxCONVERT_STRICT)

Initialize conversion. Both output or input encoding may be wxFONTENCODING_UNICODE, but only if wxUSE_ENCODING is set to 1. All subsequent calls to *Convert()* (p. 438) will interpret its argument as a string in *input_enc* encoding and will output string in *output_enc* encoding. You must call this method before calling *Convert*. You may call it more than once in order to switch to another conversion. *Method* affects behaviour of *Convert()* in case input character cannot be converted because it does not exist in output encoding:

wxCONVERT_STRICT

follow behaviour of GNU Recode - just copy unconvertible characters to output and don't change them (its integer value will stay the same)

wxCONVERT_SUBSTITUTE

try some (lossy) substitutions - e.g. replace unconvertible latin capitals with acute by ordinary capitals, replace en-dash or em-dash by '-' etc.

Both modes guarantee that output string will have same length as input string.

Return value

false if given conversion is impossible, true otherwise (conversion may be impossible either if you try to convert to Unicode with non-Unicode build of wxWidgets or if input or output encoding is not supported.)

wxEncodingConverter::CanConvert

static bool CanConvert(wxFontEncoding encIn, wxFontEncoding encOut)

Return true if (any text in) multibyte encoding *encIn* can be converted to another one (*encOut*) losslessly.

Do not call this method with wxFONTENCODING_UNICODE as either parameter, it doesn't make sense (always works in one sense and always depends on the text to convert in the other).

wxEncodingConverter::Convert

void Convert(const char* input, char* output) const

void Convert(const wchar_t* input, wchar_t* output) const

void Convert(const char* input, wchar_t* output) const

void Convert(const wchar_t* input, char* output) const

Convert input string according to settings passed to *Init* (p. 437) and writes the result to

output.

void Convert(char* str) const

void Convert(wchar_t* str) const

Convert input string according to settings passed to *Init* (p. 437) in-place, i.e. write the result to the same memory area.

wxString Convert(const wxString& input) const

Convert wxString and return new wxString object.

Notes

You must call *Init* (p. 437) before using this method!

wchar_t versions of the method are not available if wxWidgets was compiled with wxUSE_WCHAR_T set to 0.

wxEncodingConverter::GetPlatformEquivalents

static wxFontEncodingArray GetPlatformEquivalents(wxFontEncoding enc, int platform = wxPLATFORM_CURRENT)

Return equivalents for given font that are used under given platform. Supported platforms:

- wxPLATFORM_UNIX
- wxPLATFORM_WINDOWS
- wxPLATFORM_OS2
- wxPLATFORM_MAC
- wxPLATFORM_CURRENT

wxPLATFORM_CURRENT means the platform this binary was compiled for.

Examples:

current platform	enc	returned value
unix	CP1250	{ISO8859_2}
unix	ISO8859_2	{ISO8859_2}
windows	ISO8859_2	{CP1250}
unix	CP1252	{ISO8859_1, ISO8859_15}

Equivalence is defined in terms of convertibility: two encodings are equivalent if you can convert text between them without losing information (it may - and will - happen that you lose special chars like quotation marks or em-dashes but you shouldn't lose any diacritics and language-specific characters when converting between equivalent encodings).

Remember that this function does **NOT** check for presence of fonts in system. It only tells you what are most suitable encodings. (It usually returns only one encoding.)

Notes

- Note that argument *enc* itself may be present in the returned array, so that you can, as a side-effect, detect whether the encoding is native for this platform or not.
- *Convert* (p. 438) is not limited to converting between equivalent encodings, it can convert between two arbitrary encodings.
- If *enc* is present in the returned array, then it is **always** the first item of it.
- Please note that the returned array may contain no items at all.

wxEncodingConverter::GetAllEquivalents

static wxFontEncodingArray GetAllEquivalents(wxFontEncoding enc)

Similar to *GetPlatformEquivalents* (p. 439), but this one will return ALL equivalent encodings, regardless of the platform, and including itself.

This platform's encodings are before others in the array. And again, if *enc* is in the array, it is the very first item in it.

wxEraseEvent

An erase event is sent when a window's background needs to be repainted.

On some platforms, such as GTK+, this event is simulated (simply generated just before the paint event) and may cause flicker. It is therefore recommended that you set the text background colour explicitly in order to prevent flicker. The default background colour under GTK+ is grey.

To intercept this event, use the EVT_ERASE_BACKGROUND macro in an event table definition.

You must call wxEraseEvent::GetDC and use the returned device context if it is non-NULL. If it is NULL, create your own temporary wxClientDC object.

Derived from

wxEvt (p. 441)

wxObject (p. 954)

Include files

<wx/event.h>

Event table macros

To process an erase event, use this event handler macro to direct input to a member function that takes a `wxEraseEvent` argument.

EVT_ERASE_BACKGROUND(func) Process a `wxEVT_ERASE_BACKGROUND` event.

Remarks

Use the `m_DC` device context to draw into, don't create `wxPaintDC` in the event handler.

See also

Event handling overview (p. 1610)

wxEraseEvent::wxEraseEvent

wxEraseEvent(int id = 0, wxDC* dc = NULL)

Constructor.

wxEraseEvent::m_dc

wxDC* m_dc

The device context associated with the erase event.

wxEraseEvent::GetDC

wxDC* GetDC() const

Returns the device context to draw into.

wxEvent

An event is a structure holding information about an event passed to a callback or member function. **wxEvent** used to be a multipurpose event object, and is an abstract base class for other event classes (see below).

wxPerl note: In wxPerl custom event classes should be derived from `Wx::PlEvent` and `Wx::PlCommandEvent`.

Derived from

wxObject (p. 954)

Include files

<wx/event.h>

See also

wxCommandEvent (p. 165), *wxMouseEvent* (p. 928)

wxEvent::wxEvent

wxEvent(int *id* = 0, **wxEventType** *eventType* = *wxEVT_NULL*)

Constructor. Should not need to be used directly by an application.

wxEvent::m_eventObject

wxObject* m_eventObject

The object (usually a window) that the event was generated from, or should be sent to.

wxEvent::m_eventType

WXTYPE m_eventType

The type of the event, such as *wxEVENT_TYPE_BUTTON_COMMAND*.

wxEvent::m_id

int m_id

Identifier for the window.

wxEvent::m_propagationLevel

int m_propagationLevel

Indicates how many levels the event can propagate. This member is protected and should typically only be set in the constructors of the derived classes. It may be temporarily changed by *StopPropagation* (p. 445) and *ResumePropagation* (p. 444) and tested with *ShouldPropagate* (p. 445).

The initial value is set to either *wxEVENT_PROPAGATE_NONE* (by default) meaning that the event shouldn't be propagated at all or to *wxEVENT_PROPAGATE_MAX* (for command events) meaning that it should be propagated as much as necessary.

Any positive number means that the event should be propagated but no more than the given number of times. E.g. the propagation level may be set to 1 to propagate the event to its parent only, but not to its grandparent.

wxEvtHandler::m_skipped

bool m_skipped

Set to true by **Skip** if this event should be skipped.

wxEvtHandler::m_timeStamp

long m_timeStamp

Timestamp for this event.

wxEvtHandler::Clone

virtual wxEvtHandler* Clone() const

Returns a copy of the event.

Any event that is posted to the wxWidgets event system for later action (via *wxEvtHandler::AddPendingEvent* (p. 446) or *wxEvtHandler::PostEvent* (p. 1518)) must implement this method. All wxWidgets events fully implement this method, but any derived events implemented by the user should also implement this method just in case they (or some event derived from them) are ever posted.

All wxWidgets events implement a copy constructor, so the easiest way of implementing the Clone function is to implement a copy constructor for a new event (call it MyEvent) and then define the Clone function like this:

```
wxEvtHandler *Clone(void) const { return new MyEvent(*this); }
```

wxEvtHandler::GetEventObject

wxObject* GetEventObject()

Returns the object associated with the event, if any.

wxEvtHandler::GetEventType

WEventType GetEventType()

Returns the identifier of the given event type, such as `wxEVT_TYPE_BUTTON_COMMAND`.

wxEvtHandler::GetId

int GetId() const

Returns the identifier associated with this event, such as a button command id.

wxEvt::GetSkipped

bool GetSkipped() const

Returns true if the event handler should be skipped, false otherwise.

wxEvt::GetTimestamp

long GetTimestamp()

Gets the timestamp for the event.

wxEvt::IsCommandEvent

bool IsCommandEvent() const

Returns true if the event is or is derived from *wxCommandEvent* (p. 165) else it returns false. Note: Exists only for optimization purposes.

wxEvt::ResumePropagation

void ResumePropagation(int *propagationLevel*)

Sets the propagation level to the given value (for example returned from an earlier call to *StopPropagation* (p. 445)).

wxEvt::SetEventObject

void SetEventObject(wxObject* *object*)

Sets the originating object.

wxEvt::SetEventType

void SetEventType(WXTYPE *typ*)

Sets the event type.

wxEvt::SetId

void SetId(int *id*)

Sets the identifier associated with this event, such as a button command id.

wxEvtHandler::SetTimestamp

void SetTimestamp(long timeStamp)

Sets the timestamp for the event.

Sets the originating object.

wxEvtHandler::ShouldPropagate

bool ShouldPropagate() const

Test if this event should be propagated or not, i.e. if the propagation level is currently greater than 0.

wxEvtHandler::Skip

void Skip(bool skip = true)

Called by an event handler to tell the event system that the event handler should be skipped, and the next valid handler used instead.

wxEvtHandler::StopPropagation

int StopPropagation()

Stop the event from propagating to its parent window.

Returns the old propagation level value which may be later passed to *ResumePropagation* (p. 444) to allow propagating the event again.

wxEvtHandler

A class that can handle events from the windowing system. *wxWindow* (and therefore all window classes) are derived from this class.

When events are received, *wxEvtHandler* invokes the method listed in the event table using itself as the object. When using multiple inheritance it is imperative that the *wxEvtHandler*(-derived) class be the first class inherited such that the "this" pointer for the overall object will be identical to the "this" pointer for the *wxEvtHandler* portion.

Derived from

wxObject (p. 954)

Include files

<wx/event.h>

See also

Event handling overview (p. 1610)

wxEvtHandler::wxEvtHandler

wxEvtHandler()

Constructor.

wxEvtHandler::~~wxEvtHandler

~wxEvtHandler()

Destructor. If the handler is part of a chain, the destructor will unlink itself and restore the previous and next handlers so that they point to each other.

wxEvtHandler::AddPendingEvent

void AddPendingEvent(wxEvent& event)

This function posts an event to be processed later.

Parameters

event

Event to add to process queue.

Remarks

The difference between sending an event (using the *ProcessEvent* (p. 450) method) and posting it is that in the first case the event is processed before the function returns, while in the second case, the function returns immediately and the event will be processed sometime later (usually during the next event loop iteration).

A copy of *event* is made by the function, so the original can be deleted as soon as function returns (it is common that the original is created on the stack). This requires that the *wxEvent::Clone* (p. 443) method be implemented by *event* so that it can be duplicated and stored until it gets processed.

This is also the method to call for inter-thread communication---it will post events safely between different threads which means that this method is thread-safe by using critical sections where needed. In a multi-threaded program, you often need to inform the main GUI thread about the status of other working threads and such notification should be done using this method.

This method automatically wakes up idle handling if the underlying window system is

currently idle and thus would not send any idle events. (Waking up idle handling is done calling `::wxWakeUpIdle` (p. 1474).)

wxEvtHandler::Connect

void Connect(int *id*, wxEventType *eventType*, wxObjectEventFunction *function*, wxObject* *userData* = NULL, wxEvtHandler* *eventSink* = NULL)

void Connect(int *id*, int *lastId*, wxEventType *eventType*, wxObjectEventFunction *function*, wxObject* *userData* = NULL, wxEvtHandler* *eventSink* = NULL)

Connects the given function dynamically with the event handler, *id* and event type. This is an alternative to the use of static event tables. See the 'dynamic' sample for usage.

Parameters

id

The identifier (or first of the identifier range) to be associated with the event handler function.

lastId

The second part of the identifier range to be associated with the event handler function.

eventType

The event type to be associated with this event handler.

function

The event handler function.

userData

Data to be associated with the event table entry.

eventSink

Object whose member function should be called. If this is NULL, 'this' will be used.

Example

```
frame->Connect( wxID_EXIT,
               wxEVT_COMMAND_MENU_SELECTED,
               (wxObjectEventFunction) (wxEventFunction) (wxCommandEventFunction)
               MyFrame::OnQuit );
```

wxPerl note: In wxPerl this function takes 4 arguments: *id*, *lastid*, *type*, *method*; if *method* is undef, the handler is disconnected.

wxEvtHandler::Disconnect

```
bool Disconnect(int id, wxEvtHandler eventSink = wxEvtHandler::NULL,  
wxObjectEventFunction function = NULL, wxObject* userData = NULL,  
wxEvtHandler* eventSink = NULL)
```

```
bool Disconnect(int id, int lastId = -1, wxEvtHandler eventSink = wxEvtHandler::NULL,  
wxObjectEventFunction function = NULL, wxObject* userData = NULL,  
wxEvtHandler* eventSink = NULL)
```

Disconnects the given function dynamically from the event handler, using the specified parameters as search criteria and returning true if a matching function has been found and removed. This method can only disconnect functions which have been added using the `wxEvtHandler::Connect` (p. 447) method. There is no way to disconnect functions connected using the (static) event tables.

Parameters

id

The identifier (or first of the identifier range) associated with the event handler function.

lastId

The second part of the identifier range associated with the event handler function.

eventSink

The event type associated with this event handler.

function

The event handler function.

userData

Data associated with the event table entry.

eventSink

Object whose member function should be called.

wxPerl note: In wxPerl this function takes 3 arguments: *id*, *lastid*, *type*.

wxEvtHandler::GetClientData

```
void* GetClientData()
```

Gets user-supplied client data.

Remarks

Normally, any extra data the programmer wishes to associate with the object should be made available by deriving a new class with new data members.

See also

wxEvtHandler::SetClientData (p. 451)

wxEvtHandler::GetClientObject

wxClientData* GetClientObject() const

Get a pointer to the user-supplied client data object.

See also

wxEvtHandler::SetClientObject (p. 452), *wxClientData* (p. 134)

wxEvtHandler::GetEvtHandlerEnabled

bool GetEvtHandlerEnabled()

Returns true if the event handler is enabled, false otherwise.

See also

wxEvtHandler::SetEvtHandlerEnabled (p. 452)

wxEvtHandler::GetNextHandler

wxEvtHandler* GetNextHandler()

Gets the pointer to the next handler in the chain.

See also

wxEvtHandler::SetNextHandler (p. 452), *wxEvtHandler::GetPreviousHandler* (p. 449), *wxEvtHandler::SetPreviousHandler* (p. 453), *wxWindow::PushEventHandler* (p. 1417), *wxWindow::PopEventHandler* (p. 1416)

wxEvtHandler::GetPreviousHandler

wxEvtHandler* GetPreviousHandler()

Gets the pointer to the previous handler in the chain.

See also

wxEvtHandler::SetPreviousHandler (p. 453), *wxEvtHandler::GetNextHandler* (p. 449), *wxEvtHandler::SetNextHandler* (p. 452), *wxWindow::PushEventHandler* (p. 1417), *wxWindow::PopEventHandler* (p. 1416)

wxEvtHandler::ProcessEvent

virtual bool ProcessEvent(wxEvtHandler& event)

Processes an event, searching event tables and calling zero or more suitable event handler function(s).

Parameters

event

Event to process.

Return value

true if a suitable event handler function was found and executed, and the function did not call *wxEvtHandler::Skip* (p. 445).

Remarks

Normally, your application would not call this function: it is called in the wxWidgets implementation to dispatch incoming user interface events to the framework (and application).

However, you might need to call it if implementing new functionality (such as a new control) where you define new event types, as opposed to allowing the user to override virtual functions.

An instance where you might actually override the **ProcessEvent** function is where you want to direct event processing to event handlers not normally noticed by wxWidgets. For example, in the document/view architecture, documents and views are potential event handlers. When an event reaches a frame, **ProcessEvent** will need to be called on the associated document and view in case event handler functions are associated with these objects. The property classes library (wxProperty) also overrides **ProcessEvent** for similar reasons.

The normal order of event table searching is as follows:

1. If the object is disabled (via a call to *wxEvtHandler::SetEvtHandlerEnabled* (p. 452)) the function skips to step (6).
2. If the object is a wxWindow, **ProcessEvent** is recursively called on the window's *wxValidator* (p. 1360). If this returns true, the function exits.
3. **SearchEventTable** is called for this event handler. If this fails, the base class table is tried, and so on until no more tables exist or an appropriate function was found, in which case the function exits.
4. The search is applied down the entire chain of event handlers (usually the chain has a length of one). If this succeeds, the function exits.
5. If the object is a wxWindow and the event is a wxCommandEvent, **ProcessEvent** is recursively applied to the parent window's event handler. If this returns true, the function exits.

6. Finally, **ProcessEvent** is called on the wxApp object.

See also

wxEvtHandler::SearchEventTable (p. 451)

wxEvtHandler::SearchEventTable

bool SearchEventTable(wxEventTable& table, wxEvent& event)

Searches the event table, executing an event handler function if an appropriate one is found.

Parameters

table

Event table to be searched.

event

Event to be matched against an event table entry.

Return value

true if a suitable event handler function was found and executed, and the function did not call *wxEvent::Skip* (p. 445).

Remarks

This function looks through the object's event table and tries to find an entry that will match the event.

An entry will match if:

1. The event type matches, and
2. the identifier or identifier range matches, or the event table entry's identifier is zero.

If a suitable function is called but calls *wxEvent::Skip* (p. 445), this function will fail, and searching will continue.

See also

wxEvtHandler::ProcessEvent (p. 450)

wxEvtHandler::SetClientData

void SetClientData(void* data)

Sets user-supplied client data.

Parameters

data

Data to be associated with the event handler.

Remarks

Normally, any extra data the programmer wishes to associate with the object should be made available by deriving a new class with new data members. You must not call this method and *SetClientObject* (p. 452) on the same class - only one of them.

See also

wxEvtHandler::GetClientData (p. 448)

wxEvtHandler::SetClientObject

void SetClientObject(wxClientData* data)

Set the client data object. Any previous object will be deleted.

See also

wxEvtHandler::GetClientObject (p. 449), *wxClientData* (p. 134)

wxEvtHandler::SetEventHandlerEnabled

void SetEventHandlerEnabled(bool enabled)

Enables or disables the event handler.

Parameters

enabled

true if the event handler is to be enabled, false if it is to be disabled.

Remarks

You can use this function to avoid having to remove the event handler from the chain, for example when implementing a dialog editor and changing from edit to test mode.

See also

wxEvtHandler::GetEventHandlerEnabled (p. 449)

wxEvtHandler::SetNextHandler

void SetNextHandler(wxEvtHandler* handler)

Sets the pointer to the next handler.

Parameters

handler

Event handler to be set as the next handler.

See also

wxEvtHandler::GetNextHandler (p. 449), *wxEvtHandler::SetPreviousHandler* (p. 453), *wxEvtHandler::GetPreviousHandler* (p. 449), *wxWindow::PushEventHandler* (p. 1417), *wxWindow::PopEventHandler* (p. 1416)

wxEvtHandler::SetPreviousHandler

void SetPreviousHandler(*wxEvtHandler handler)**

Sets the pointer to the previous handler.

Parameters

handler

Event handler to be set as the previous handler.

See also

wxEvtHandler::GetPreviousHandler (p. 449), *wxEvtHandler::SetNextHandler* (p. 452), *wxEvtHandler::GetNextHandler* (p. 449), *wxWindow::PushEventHandler* (p. 1417), *wxWindow::PopEventHandler* (p. 1416)

wxFile

wxFile implements buffered file I/O. This is a very small class designed to minimize the overhead of using it - in fact, there is hardly any overhead at all, but using it brings you automatic error checking and hides differences between platforms and compilers. It wraps inside it a `FILE *` handle used by standard C IO library (also known as `stdio`).

Derived from

None.

Include files

<wx/file.h>

wxFromStart

Count offset from the start of the file

wxFromCurrent

Count offset from the current position of the file pointer

wxFromEndCount offset from the end of the file
(backwards)

wxFile::wxFile

wxFile()

Default constructor.

wxFile(const char* filename, const char* mode = "r")

Opens a file with the given mode. As there is no way to return whether the operation was successful or not from the constructor you should test the return value of *IsOpened* (p. 456) to check that it didn't fail.

wxFile(FILE* fp)

Opens a file with the given file pointer, which has already been opened.

Parameters*filename*

The filename.

mode

The mode in which to open the file using standard C strings. Note that you should use "b" flag if you use binary files under Windows or the results might be unexpected due to automatic newline conversion done for the text files.

fp

An existing file descriptor, such as stderr.

wxFile::~~wxFile

~wxFile()

Destructor will close the file.

NB: it is not virtual so you should *not* derive from wxFile!

wxFile::Attach

void Attach(FILE* fp)

Attaches an existing file pointer to the wxFile object.

The descriptor should be already opened and it will be closed by `wxFile` object.

wxFile::Close

bool Close()

Closes the file and returns `true` on success.

wxFile::Detach

void Detach()

Get back a file pointer from `wxFile` object -- the caller is responsible for closing the file if this descriptor is opened. *IsOpened()* (p. 456) will return `false` after call to *Detach()*.

wxFile::fp

FILE * fp() const

Returns the file pointer associated with the file.

wxFile::Eof

bool Eof() const

Returns `true` if the an attempt has been made to read *past* the end of the file.

Note that the behaviour of the file descriptor based class *wxFile* (p. 461) is different as *wxFile::Eof* (p. 464) will return `true` here as soon as the last byte of the file has been read.

Also note that this method may only be called for opened files and may crash if the file is not opened.

See also

IsOpened (p. 456)

wxFile::Error

Returns `true` if an error has occurred on this file, similar to the standard `ferror()` function.

Please note that this method may only be called for opened files and may crash if the file is not opened.

See also

IsOpened (p. 456)

wxFile::Flush

bool Flush()

Flushes the file and returns `true` on success.

wxFile::IsOpened

bool IsOpened() const

Returns `true` if the file is opened. Most of the methods of this class may only be used for an opened file.

wxFile::Length

size_t Length() const

Returns the length of the file.

wxFile::Open

bool Open(const char* filename, const char* mode = "r")

Opens the file, returning `true` if successful.

Parameters

filename

The filename.

mode

The mode in which to open the file.

wxFile::Read

size_t Read(void* buffer, off_t count)

Reads the specified number of bytes into a buffer, returning the actual number read.

Parameters

buffer

A buffer to receive the data.

count

The number of bytes to read.

Return value

The number of bytes read.

wxFile::Seek

bool Seek(long ofs, wxSeekMode mode = wxFromStart)

Seeks to the specified position and returns `true` on success.

Parameters

ofs

Offset to seek to.

mode

One of `wxFromStart`, `wxFromEnd`, `wxFromCurrent`.

wxFile::SeekEnd

bool SeekEnd(long ofs = 0)

Moves the file pointer to the specified number of bytes before the end of the file and returns `true` on success.

Parameters

ofs

Number of bytes before the end of the file.

wxFile::Tell

size_t Tell() const

Returns the current position.

wxFile::Write

size_t Write(const void* buffer, size_t count)

Writes the specified number of bytes from a buffer.

Parameters

buffer

A buffer containing the data.

count

The number of bytes to write.

Return value

Number of bytes written.

wxFile::Write

bool Write(const wxString& s, wxMBConv& conv = wxConvUTF8)

Writes the contents of the string to the file, returns `true` on success.

The second argument is only meaningful in Unicode build of wxWidgets when *conv* is used to convert *s* to multibyte representation.

wxFileInputStream

This class represents data read in from a file. There are actually two such groups of classes: this one is based on *wxFile* (p. 453) whereas *wxFileInputStream* (p. 477) is based in the *wxFile* (p. 461) class.

Note that *wxFile* (p. 461) and *wxFile* (p. 453) differ in one aspect, namely when to report that the end of the file has been reached. This is documented in *wxFile::Eof* (p. 464) and *wxFile::Eof* (p. 455) and the behaviour of the stream classes reflects this difference, i.e. *wxFileInputStream* will report `wxSTREAM_EOF` after having read the last byte whereas *wxFileInputStream* will report `wxSTREAM_EOF` after trying to read *past* the last byte. Related to EOF behavior, note that *Seek()* (p. 764) can seek beyond the end of the stream (file) and will thus not return *wxInvalidOffset* for that.

Derived from

wxInputStream (p. 762)

Include files

<wx/wfstream.h>

See also

wxBufferedInputStream (p. 101), *wxFileOutputStream* (p. 459), *wxFileOutputStream* (p. 493)

wxFileInputStream::wxFileInputStream

wxFileInputStream(const wxString& *fileName*)

Opens the specified file using its *fileName* name in read-only mode.

wxFileInputStream(wxFile& *file*)

Initializes a file stream in read-only mode using the file I/O object *file*.

wxFileInputStream(FILE * *fp*)

Initializes a file stream in read-only mode using the specified file pointer *fp*.

wxFileInputStream::~~wxFileInputStream

~wxFileInputStream()

Destructor.

wxFileInputStream::Ok

bool Ok() const

Returns true if the stream is initialized and ready.

wxFileOutputStream

This class represents data written to a file. There are actually two such groups of classes: this one is based on *wxFile* (p. 453) whereas *wxFileInputStream* (p. 458) is based in the *wxFile* (p. 461) class.

Note that *wxFile* (p. 461) and *wxFile* (p. 453) differ in one aspect, namely when to report that the end of the file has been reached. This is documented in *wxFile::Eof* (p. 464) and *wxFile::Eof* (p. 455) and the behaviour of the stream classes reflects this difference, i.e. *wxFileInputStream* will report *wxSTREAM_EOF* after having read the last byte whereas *wxFileInputStream* will report *wxSTREAM_EOF* after trying to read *past* the last byte. Related to EOF behavior, note that *SeekO()* (p. 959) can seek beyond the end of the stream (file) and will thus not return *wxInvalidOffset* for that.

Derived from

wxOutputStream (p. 958)

Include files

<wx/wfstream.h>

See also

wxBufferedOutputStream (p. 101), *wxFFFileInputStream* (p. 458), *wxFileInputStream* (p. 477)

wxFFFileOutputStream::wxFFFileOutputStream

wxFFFileOutputStream(const wxString& ofileName)

Creates a new file with *ofilename* name and initializes the stream in write-only mode.

wxFFFileOutputStream(wxFFFile& file)

Initializes a file stream in write-only mode using the file I/O object *file*.

wxFFFileOutputStream(FILE * fp)

Initializes a file stream in write-only mode using the file descriptor *fp*.

wxFFFileOutputStream::~~wxFFFileOutputStream

~wxFFFileOutputStream()

Destructor.

wxFFFileOutputStream::Ok

bool Ok() const

Returns true if the stream is initialized and ready.

wxFFFileStream

Derived from

wxFFFileOutputStream (p. 459), *wxFFFileInputStream* (p. 458)

Include files

<wx/wfstream.h>

See also

wxStreamBuffer (p. 1194)

wxFFFileStream::wxFFFileStream

wxFFileStream(const wxString& iofilename)

Initializes a new file stream in read-write mode using the specified *iofilename* name.

wxFile

A wxFile performs raw file I/O. This is a very small class designed to minimize the overhead of using it - in fact, there is hardly any overhead at all, but using it brings you automatic error checking and hides differences between platforms and compilers. wxFile also automatically closes the file in its destructor making it unnecessary to worry about forgetting to do it. wxFile is a wrapper around `file_descriptor`. - see also *wxFFile* (p. 453) for a wrapper around `FILE` structure.

Derived from

None.

Include files

<wx/file.h>

Constants

wx/file.h defines the following constants:

```
#define wxS_IRUSR 00400
#define wxS_IWUSR 00200
#define wxS_IXUSR 00100

#define wxS_IRGRP 00040
#define wxS_IWGRP 00020
#define wxS_IXGRP 00010

#define wxS_IROTH 00004
#define wxS_IWOTH 00002
#define wxS_IXOTH 00001

// default mode for the new files: corresponds to umask 022
#define wxS_DEFAULT (wxS_IRUSR | wxS_IWUSR | wxS_IRGRP | wxS_IWGRP |
wxS_IROTH | wxS_IWOTH)
```

These constants define the file access rights and are used with *wxFile::Create* (p. 463) and *wxFile::Open* (p. 465).

The *OpenMode* enumeration defines the different modes for opening a file, it is defined inside wxFile class so its members should be specified with *wxFile::* scope resolution prefix. It is also used with *wxFile::Access* (p. 463) function.

wxFile::read	Open file for reading or test if it can be opened for reading with <i>Access()</i>
wxFile::write	Open file for writing deleting the contents of the file if it already exists or test if it can be opened for writing with <i>Access()</i>
wxFile::read_write	Open file for reading and writing; can not be

used with `Access()`

wxFile::write_append

Open file for appending: the file is opened for writing, but the old contents of the file is not erased and the file pointer is initially placed at the end of the file; can not be used with `Access()`. This is the same as **wxFile::write** if the file doesn't exist.

wxFile::write_excl

Open the file securely for writing (Uses `O_EXCL | O_CREAT`). Will fail if the file already exists, else create and open it atomically. Useful for opening temporary files without being vulnerable to race exploits.

Other constants defined elsewhere but used by `wxFile` functions are `wxInvalidOffset` which represents an invalid value of type `off_t` and is returned by functions returning `off_t` on error and the seek mode constants used with `Seek()` (p. 465):

wxFromStart

Count offset from the start of the file

wxFromCurrent

Count offset from the current position of the file pointer

wxFromEnd

Count offset from the end of the file (backwards)

wxFile::wxFile

wxFile()

Default constructor.

wxFile(const char* filename, wxFile::OpenMode mode = wxFile::read)

Opens a file with the given mode. As there is no way to return whether the operation was successful or not from the constructor you should test the return value of `IsOpened` (p. 464) to check that it didn't fail.

wxFile(int fd)

Associates the file with the given file descriptor, which has already been opened.

Parameters*filename*

The filename.

mode

The mode in which to open the file. May be one of **wxFile::read**, **wxFile::write** and **wxFile::read_write**.

fd

An existing file descriptor (see *Attach()* (p. 463) for the list of predefined descriptors)

wxFile::~~wxFile

~wxFile()

Destructor will close the file.

NB: it is not virtual so you should not use wxFile polymorphically.

wxFile::Access

static bool Access(const char * name, OpenMode mode)

This function verifies if we may access the given file in specified mode. Only values of wxFile::read or wxFile::write really make sense here.

wxFile::Attach

void Attach(int fd)

Attaches an existing file descriptor to the wxFile object. Example of predefined file descriptors are 0, 1 and 2 which correspond to stdin, stdout and stderr (and have symbolic names of **wxFile::fd_stdin**, **wxFile::fd_stdout** and **wxFile::fd_stderr**).

The descriptor should be already opened and it will be closed by wxFile object.

wxFile::Close

void Close()

Closes the file.

wxFile::Create

bool Create(const char* filename, bool overwrite = false, int access = wxS_DEFAULT)

Creates a file for writing. If the file already exists, setting **overwrite** to true will ensure it is overwritten.

wxFile::Detach

void Detach()

Get back a file descriptor from wxFile object - the caller is responsible for closing the file if this descriptor is opened. *IsOpened()* (p. 464) will return false after call to Detach().

wxFile::fd

int fd() const

Returns the file descriptor associated with the file.

wxFile::Eof

bool Eof() const

Returns true if the end of the file has been reached.

Note that the behaviour of the file pointer based class *wxFile* (p. 453) is different as *wxFile::Eof* (p. 455) will return true here only if an attempt has been made to read *past* the last byte of the file, while *wxFile::Eof()* will return true even before such attempt is made if the file pointer is at the last position in the file.

Note also that this function doesn't work on unseekable file descriptors (examples include pipes, terminals and sockets under Unix) and an attempt to use it will result in an error message in such case. So, to read the entire file into memory, you should write a loop which uses *Read* (p. 465) repeatedly and tests its return condition instead of using *Eof()* as this will not work for special files under Unix.

wxFile::Exists

static bool Exists(const char* filename)

Returns true if the given name specifies an existing regular file (not a directory or a link)

wxFile::Flush

bool Flush()

Flushes the file descriptor.

Note that *wxFile::Flush* is not implemented on some Windows compilers due to a missing *fsync* function, which reduces the usefulness of this function (it can still be called but it will do nothing on unsupported compilers).

wxFile::IsOpened

bool IsOpened() const

Returns true if the file has been opened.

wxFile::Length

off_t Length() const

Returns the length of the file.

wxFile::Open

bool Open(const char* filename, wxFile::OpenMode mode = wxFile::read)

Opens the file, returning true if successful.

Parameters

filename

The filename.

mode

The mode in which to open the file. May be one of **wxFile::read**, **wxFile::write** and **wxFile::read_write**.

wxFile::Read

off_t Read(void* buffer, off_t count)

Reads the specified number of bytes into a buffer, returning the actual number read.

Parameters

buffer

A buffer to receive the data.

count

The number of bytes to read.

Return value

The number of bytes read, or the symbol **wxInvalidOffset** (-1) if there was an error.

wxFile::Seek

off_t Seek(off_t ofs, wxSeekMode mode = wxFromStart)

Seeks to the specified position.

Parameters

ofs

Offset to seek to.

mode

One of **wxFromStart**, **wxFromEnd**, **wxFromCurrent**.

Return value

The actual offset position achieved, or **wxInvalidOffset** on failure.

wxFile::SeekEnd

off_t SeekEnd(off_t ofs = 0)

Moves the file pointer to the specified number of bytes before the end of the file.

Parameters

ofs

Number of bytes before the end of the file.

Return value

The actual offset position achieved, or **wxInvalidOffset** on failure.

wxFile::Tell

off_t Tell() const

Returns the current position or **wxInvalidOffset** if file is not opened or if another error occurred.

wxFile::Write

size_t Write(const void* buffer, off_t count)

Writes the specified number of bytes from a buffer.

Parameters

buffer

A buffer containing the data.

count

The number of bytes to write.

Return value

the number of bytes actually written

wxFile::Write

bool Write(const wxString& s, wxMBConv& conv = wxConvUTF8)

Writes the contents of the string to the file, returns true on success.

The second argument is only meaningful in Unicode build of wxWidgets when *conv* is used to convert *s* to multibyte representation.

Note that this method only works with NUL-terminated strings, if you want to write data with embedded NULs to the file you should use the other *Write()* overload (p. 466).

wxFileDataObject

`wxFileDataObject` is a specialization of `wxDataObject` (p. 223) for file names. The program works with it just as if it were a list of absolute file names, but internally it uses the same format as Explorer and other compatible programs under Windows or GNOME/KDE filemanager under Unix which makes it possible to receive files from them using this class.

Warning: Under all non-Windows platforms this class is currently "input-only", i.e. you can receive the files from another application, but copying (or dragging) file(s) from a wxWidgets application is not currently supported.

Virtual functions to override

None.

Derived from

`wxDataObjectSimple` (p. 227)

`wxDataObject` (p. 223)

Include files

<wx/dataobj.h>

See also

`wxDataObject` (p. 223), `wxDataObjectSimple` (p. 227), `wxTextDataObject` (p. 1268), `wxBitmapDataObject` (p. 85), `wxDataObject` (p. 223)

wxFileDataObject

wxFileDataObject()

Constructor.

wxFileDataObject::AddFile

virtual void AddFile(const wxString& file)

MSW only: adds a file to the file list represented by this data object.

wxFileDataObject::GetFileNames

const wxArrayString& GetFileNames() const

Returns the *array* (p. 54) of file names.

wxFileDialog

This class represents the file chooser dialog.

Derived from

wxDialog (p. 369)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/filedlg.h>

See also

wxFileDialog overview (p. 1657), *wxFileSelector* (p. 1496)

Remarks

Pops up a file selector box. In Windows, this is the common file selector dialog. In X, this is a file selector box with somewhat less functionality. The path and filename are distinct elements of a full file pathname. If path is "", the current directory will be used. If filename is "", no default filename will be supplied. The wildcard determines what files are displayed in the file selector, and file extension supplies a type extension for the required filename. Flags may be a combination of wxOPEN, wxSAVE, wxOVERWRITE_PROMPT, wxHIDE_READONLY, wxFILE_MUST_EXIST, wxMULTIPLE or 0.

Both the X and Windows versions implement a wildcard filter. Typing a filename containing wildcards (*, ?) in the filename text item, and clicking on Ok, will result in only

those files matching the pattern being displayed. The wildcard may be a specification for multiple types of file with a description for each, such as:

```
"BMP files (*.bmp)|*.bmp|GIF files (*.gif)|*.gif"
```

It must be noted that wildcard support in the native Motif file dialog is quite limited: only one alternative is supported, and it is displayed without the descriptive test; "BMP files (*.bmp)|*.bmp" is displayed as "*.bmp", and both "BMP files (*.bmp)|*.bmp|GIF files (*.gif)|*.gif" and "Image files|*.bmp;*.gif" are errors.

wxFileDialog::wxFileDialog

wxFileDialog(wxWindow* *parent*, const wxString& *message* = "Choose a file", const wxString& *defaultDir* = "", const wxString& *defaultFile* = "", const wxString& *wildcard* = ".*", long *style* = 0, const wxPoint& *pos* = wxDefaultPosition)

Constructor. Use *wxFileDialog::ShowModal* (p. 472) to show the dialog.

Parameters

parent

Parent window.

message

Message to show on the dialog.

defaultDir

The default directory, or the empty string.

defaultFile

The default filename, or the empty string.

wildcard

A wildcard, such as ".*" or "BMP files (*.bmp)|*.bmp|GIF files (*.gif)|*.gif".

Note that the native Motif dialog has some limitations with respect to wildcards; see the Remarks section above.

style

A dialog style. A bitlist of:

wxOPEN This is an open dialog.

wxSAVE This is a save dialog.

wxHIDE_READONLY For open dialog only: hide the checkbox allowing to

open the file in read-only mode.

wxOVERWRITE_PROMPT	For save dialog only: prompt for a confirmation if a file will be overwritten.
wxMULTIPLE	For open dialog only: allows selecting multiple files.
wxCHANGE_DIR	Change the current working directory to the directory where the file(s) chosen by the user are.

pos

Dialog position. Not implemented.

NB: Previous versions of wxWidgets used `wxCHANGE_DIR` by default under MS Windows which allowed the program to simply remember the last directory where user selected the files to open/save. This (desired) functionality must be implemented in the program itself now (manually remember the last path used and pass it to the dialog the next time it is called) or by using this flag.

wxFileDialog::~wxFileDialog

~wxFileDialog()

Destructor.

wxFileDialog::GetDirectory

wxString GetDirectory() const

Returns the default directory.

wxFileDialog::GetFilename

wxString GetFilename() const

Returns the default filename.

wxFileDialog::GetFileNames

void GetFileNames(wxArrayString& *filenames*) const

Fills the array *filenames* with the names of the files chosen. This function should only be used with the dialogs which have `wxMULTIPLE` style, use *GetFilename* (p. 470) for the others.

Note that under Windows, if the user selects shortcuts, the filenames include paths, since the application cannot determine the full path of each referenced file by appending

the directory containing the shortcuts to the filename.

wxFileDialog::GetFilterIndex

int GetFilterIndex() const

Returns the index into the list of filters supplied, optionally, in the wildcard parameter. Before the dialog is shown, this is the index which will be used when the dialog is first displayed. After the dialog is shown, this is the index selected by the user.

wxFileDialog::GetMessage

wxString GetMessage() const

Returns the message that will be displayed on the dialog.

wxFileDialog::GetPath

wxString GetPath() const

Returns the full path (directory and filename) of the selected file.

wxFileDialog::GetPaths

void GetPaths(wxArrayString& *paths*) const

Fills the array *paths* with the full paths of the files chosen. This function should only be used with the dialogs which have `wxMULTIPLE` style, use *GetPath* (p. 471) for the others.

wxFileDialog::GetStyle

long GetStyle() const

Returns the dialog style.

wxFileDialog::GetWildcard

wxString GetWildcard() const

Returns the file dialog wildcard.

wxFileDialog::SetDirectory

void SetDirectory(const wxString& *directory*)

Sets the default directory.

wxFileDialog::SetFilename

void SetFilename(const wxString& *setfilename*)

Sets the default filename.

wxFileDialog::SetFilterIndex

void SetFilterIndex(int *filterIndex*)

Sets the default filter index, starting from zero.

wxFileDialog::SetMessage

void SetMessage(const wxString& *message*)

Sets the message that will be displayed on the dialog.

wxFileDialog::SetPath

void SetPath(const wxString& *path*)

Sets the path (the combined directory and filename that will be returned when the dialog is dismissed).

wxFileDialog::SetStyle

void SetStyle(long *style*)

Sets the dialog style. See *wxFileDialog::wxFileDialog* (p. 469) for details.

wxFileDialog::SetWildcard

void SetWildcard(const wxString& *wildCard*)

Sets the wildcard, which can contain multiple file types, for example:

"BMP files (*.bmp)|*.bmp|GIF files (*.gif)|*.gif"

Note that the native Motif dialog has some limitations with respect to wildcards; see the Remarks section above.

wxFileDialog::ShowModal

int ShowModal()

Shows the dialog, returning `wxID_OK` if the user pressed OK, and `wxID_CANCEL` otherwise.

wxFileDropTarget

This is a *drop target* (p. 432) which accepts files (dragged from File Manager or Explorer).

Derived from

wxDropTarget (p. 432)

Include files

`<wx/dnd.h>`

See also

Drag and drop overview (p. 1673), *wxDropSource* (p. 429), *wxDropTarget* (p. 432), *wxTextDropTarget* (p. 1270)

wxFileDropTarget::wxFileDropTarget

wxFileDropTarget()

Constructor.

wxFileDropTarget::OnDrop

virtual bool OnDrop(long x, long y, const void *data, size_t size)

See *wxDropTarget::OnDrop* (p. 433). This function is implemented appropriately for files, and calls *wxFileDropTarget::OnDropFiles* (p. 473).

wxFileDropTarget::OnDropFiles

virtual bool OnDropFiles(wxCoord x, wxCoord y, const wxString& filenames)

Override this function to receive dropped files.

Parameters

x

The x coordinate of the mouse.

y

The y coordinate of the mouse.

filenames

An array of filenames.

Return value

Return true to accept the data, false to veto the operation.

wxFileHistory

The wxFileHistory encapsulates a user interface convenience, the list of most recently visited files as shown on a menu (usually the File menu).

wxFileHistory can manage one or more file menus. More than one menu may be required in an MDI application, where the file history should appear on each MDI child menu as well as the MDI parent frame.

Derived from

wxObject (p. 954)

Include files

<wx/docview.h>

See also

wxFileHistory overview (p. 1663), *wxDocManager* (p. 396)

wxFileHistory::m_fileHistory

char m_fileHistory**

A character array of strings corresponding to the most recently opened files.

wxFileHistory::m_fileHistoryN

size_t m_fileHistoryN

The number of files stored in the history array.

wxFileHistory::m_fileMaxFiles

size_t m_fileMaxFiles

The maximum number of files to be stored and displayed on the menu.

wxFileHistory::m_fileMenu

wxMenu* m_fileMenu

The file menu used to display the file history list (if enabled).

wxFileHistory::wxFileHistory

wxFileHistory(size_t maxFiles = 9, wxWindowID idBase = wxID_FILE1)

Constructor. Pass the maximum number of files that should be stored and displayed.

idBase defaults to `wxID_FILE1` and represents the id given to the first history menu item. Since menu items can't share the same ID you should change *idBase* (To one of your own defined IDs) when using more than one `wxFileHistory` in your application.

wxFileHistory::~wxFileHistory

~wxFileHistory()

Destructor.

wxFileHistory::AddFileToHistory

void AddFileToHistory(const wxString& filename)

Adds a file to the file history list, if the object has a pointer to an appropriate file menu.

wxFileHistory::AddFilesToMenu

void AddFilesToMenu()

Appends the files in the history list, to all menus managed by the file history object.

void AddFilesToMenu(wxMenu* menu)

Appends the files in the history list, to the given menu only.

wxFileHistory::GetHistoryFile

wxString GetHistoryFile(size_t index) const

Returns the file at this index (zero-based).

wxFileHistory::GetMaxFiles

size_t GetMaxFiles() const

Returns the maximum number of files that can be stored.

wxFileHistory::GetNoHistoryFiles

size_t GetNoHistoryFiles() const

Returns the number of files currently stored in the file history.

wxFileHistory::Load

void Load(wxConfigBase& config)

Loads the file history from the given config object. This function should be called explicitly by the application.

[See also](#)

wxConfig (p. 178)

wxFileHistory::RemoveMenu

void RemoveMenu(wxMenu* menu)

Removes this menu from the list of those managed by this object.

wxFileHistory::Save

void Save(wxConfigBase& config)

Saves the file history into the given config object. This must be called explicitly by the application.

[See also](#)

wxConfig (p. 178)

wxFileHistory::UseMenu

void UseMenu(wxMenu* menu)

Adds this menu to the list of those managed by this object.

wxFileInputStream

This class represents data read in from a file. There are actually two such groups of classes: this one is based on *wxFile* (p. 461) whereas *wxFFileInputStream* (p. 458) is based in the *wxFFile* (p. 453) class.

Note that *wxFile* (p. 461) and *wxFFile* (p. 453) differ in one aspect, namely when to report that the end of the file has been reached. This is documented in *wxFile::Eof* (p. 464) and *wxFFile::Eof* (p. 455) and the behaviour of the stream classes reflects this difference, i.e. *wxFileInputStream* will report *wxSTREAM_EOF* after having read the last byte whereas *wxFFileInputStream* will report *wxSTREAM_EOF* after trying to read *past* the last byte. Related to EOF behavior, note that *SeekI()* (p. 764) can seek beyond the end of the stream (file) and will thus not return *wxInvalidOffset* for that.

Derived from

wxInputStream (p. 762)

Include files

<wx/wfstream.h>

See also

wxBufferedInputStream (p. 101), *wxFileOutputStream* (p. 493), *wxFFileOutputStream* (p. 459)

wxFileInputStream::wxFileInputStream

wxFileInputStream(const wxString& *fileName*)

Opens the specified file using its *filename* name in read-only mode.

wxFileInputStream(wxFile& *file*)

Initializes a file stream in read-only mode using the file I/O object *file*.

wxFileInputStream(int *fd*)

Initializes a file stream in read-only mode using the specified file descriptor.

wxFileInputStream::~~wxFileInputStream

~wxFileInputStream()

Destructor.

wxFileInputStream::Ok

bool Ok() const

Returns true if the stream is initialized and ready.

wxFileName

`wxFileName` encapsulates a file name. This class serves two purposes: first, it provides the functions to split the file names into components and to recombine these components in the full file name which can then be passed to the OS file functions (and *wxWidgets functions* (p. 1481) wrapping them). Second, it includes the functions for working with the files itself. Note that to change the file data you should use *wxFile* (p. 461) class instead. `wxFileName` provides functions for working with the file attributes.

Derived from

No base class

Data structures

Many `wxFileName` methods accept the path format argument which is by `wxPATH_NATIVE` by default meaning to use the path format native for the current platform.

The path format affects the operation of `wxFileName` functions in several ways: first and foremost, it defines the path separator character to use, but it also affects other things such as whether the path has the drive part or not.

```
enum wxPathFormat
{
    wxPATH_NATIVE = 0,          // the path format for the current platform
    wxPATH_UNIX,
    wxPATH_BEOS = wxPATH_UNIX,
    wxPATH_MAC,
    wxPATH_DOS,
    wxPATH_WIN = wxPATH_DOS,
    wxPATH_OS2 = wxPATH_DOS,
    wxPATH_VMS,

    wxPATH_MAX // Not a valid value for specifying path format
}
```

File name format

`wxFileName` currently supports the file names in the Unix, DOS/Windows, Mac OS and VMS formats. Although these formats are quite different, `wxFileName` tries to treat them all in the same generic way. It supposes that all file names consist of the following parts: the volume (also known as drive under Windows or device under VMS), the path which is a sequence of directory names separated by the *path separators* (p. 486) and the full filename itself which, in turn, is composed from the base file name and the extension. All

of the individual components of the file name may be empty and, for example, the volume name is always empty under Unix, but if they are all empty simultaneously, the filename object is considered to be in an invalid state and *IsOk* (p. 487) returns `false` for it.

File names can be case-sensitive or not, the function *IsCaseSensitive* (p. 487) allows to determine this.

The rules for determining if the file name is absolute or relative also depends on the file name format and the only portable way to answer to this question is to use *IsAbsolute* (p. 487) method. To ensure that the filename is absolute you may use *MakeAbsolute* (p. 488). There is also an inverse function *MakeRelativeTo* (p. 488) which undoes what *Normalize(wxPATH_NORM_DOTS)* (p. 489) does.

Other functions returning information about the file format provided by this class are *GetVolumeSeparator* (p. 487), *IsPathSeparator* (p. 488).

IsRelative (p. 488)

File name construction

TODO.

File tests

Before doing the other tests you should use *IsOk* (p. 487) to verify that the filename is well defined. If it is, *FileExists* (p. 483) can be used to test if a file with such name exists and *DirExists* (p. 483) - if a directory with this name exists.

File names should be compared using *SameAs* (p. 490) method or `==` (p. 492).

File name components

These functions allow to examine and modify the directories of the path:

AppendDir (p. 481)

InsertDir (p. 487)

GetDirCount (p. 484) *PrependDir* (p. 490)

RemoveDir (p. 490)

To change the components of the file name individually you can use the following functions:

GetExt (p. 484)

GetName (p. 485)

GetVolume (p. 486)

HasExt (p. 487)

HasName (p. 487)

HasVolume (p. 487)

SetExt (p. 491)
SetName (p. 491)
SetVolume (p. 491)

Operations

These methods allow to work with the file creation, access and modification times. Note that not all filesystems under all platforms implement these times in the same way. For example, the access time under Windows has a resolution of one day (so it is really the access date and not time). The access time may be updated when the file is executed or not depending on the platform.

GetModificationTime (p. 485)
GetTimes (p. 486)
SetTimes (p. 491)
Touch (p. 492)

Other file system operations functions are:

Mkdir (p. 489)
Rmdir (p. 490)

wxFileName::wxFileName

wxFileName()

Default constructor.

wxFileName(const wxFileName& filename)

Copy constructor.

wxFileName(const wxString& fullpath, wxPathFormat format = wxPATH_NATIVE)

Constructor taking a full filename. If it terminates with a '/', a directory path is constructed (the name will be empty), otherwise a file name and extension are extracted from it.

wxFileName(const wxString& path, const wxString& name, wxPathFormat format = wxPATH_NATIVE)

Constructor from a directory name and a file name.

wxFileName(const wxString& path, const wxString& name, const wxString& ext, wxPathFormat format = wxPATH_NATIVE)

Constructor from a directory name, base file name and extension.

wxFileName(const wxString& volume, const wxString& path, const wxString& name, const wxString& ext, wxPathFormat format = wxPATH_NATIVE)

Constructor from a volume name, a directory name, base file name and extension.

wxFileName::AppendDir

void AppendDir(const wxString& dir)

Appends a directory component to the path. This component should contain a single directory name level, i.e. not contain any path or volume separators nor should it be empty, otherwise the function does nothing (and generates an assert failure in debug build).

wxFileName::Assign

void Assign(const wxFileName& filepath)

void Assign(const wxString& fullpath, wxPathFormat format = wxPATH_NATIVE)

void Assign(const wxString& volume, const wxString& path, const wxString& name, const wxString& ext, wxPathFormat format = wxPATH_NATIVE)

void Assign(const wxString& path, const wxString& name, wxPathFormat format = wxPATH_NATIVE)

void Assign(const wxString& path, const wxString& name, const wxString& ext, wxPathFormat format = wxPATH_NATIVE)

Creates the file name from various combinations of data.

wxFileName::AssignCwd

static void AssignCwd(const wxString& volume = wxEmptyString)

Makes this object refer to the current working directory on the specified volume (or current volume if *volume* is empty).

[See also](#)

GetCwd (p. 483)

wxFileName::AssignDir

void AssignDir(const wxString& dir, wxPathFormat format = wxPATH_NATIVE)

Sets this file name object to the given directory name. The name and extension will be empty.

wxFileName::AssignHomeDir

void AssignHomeDir()

Sets this file name object to the home directory.

wxFileName::AssignTempFileName

void AssignTempFileName(const wxString& prefix, wxFile *fileTemp = NULL)

The function calls *CreateTempFileName* (p. 482) to create a temporary file and sets this object to the name of the file. If a temporary file couldn't be created, the object is put into the *invalid* (p. 487) state.

wxFileName::Clear

void Clear()

Reset all components to default, uninitialized state.

wxFileName::CreateTempFileName

static wxString CreateTempFileName(const wxString& prefix, wxFile *fileTemp = NULL)

Returns a temporary file name starting with the given *prefix*. If the *prefix* is an absolute path, the temporary file is created in this directory, otherwise it is created in the default system directory for the temporary files or in the current directory.

If the function succeeds, the temporary file is actually created. If *fileTemp* is not `NULL`, this file will be opened using the name of the temporary file. When possible, this is done in an atomic way ensuring that no race condition occurs between the temporary file name generation and opening it which could often lead to security compromise on the multiuser systems. If *fileTemp* is `NULL`, the file is only created, but not opened.

Under Unix, the temporary file will have read and write permissions for the owner only to minimize the security problems.

Parameters

prefix

Prefix to use for the temporary file name construction

fileTemp

The file to open or `NULL` to just get the name

Return value

The full temporary file name or an empty string on error.

wxFileName::DirExists

bool DirExists() const**static bool DirExists(const wxString& dir)**

Returns `true` if the directory with this name exists.

wxFileName::DirName

static wxFileName DirName(const wxString& dir, wxPathFormat format = wxPATH_NATIVE)

Returns the object corresponding to the directory with the given name. The *dir* parameter may have trailing path separator or not.

wxFileName::FileExists

bool FileExists() const**static bool FileExists(const wxString& file)**

Returns `true` if the file with this name exists.

[See also](#)

DirExists (p. 483)

wxFileName::FileName

static wxFileName FileName(const wxString& file, wxPathFormat format = wxPATH_NATIVE)

Returns the file name object corresponding to the given *file*. This function exists mainly for symmetry with *DirName* (p. 483).

wxFileName::GetCwd

static wxString GetCwd(const wxString& volume = "")

Retrieves the value of the current working directory on the specified volume. If the volume is empty, the programs current working directory is returned for the current volume.

Return value

The string containing the current working directory or an empty string on error.

[See also](#)

AssignCwd (p. 481)

wxFileName::GetDirCount

size_t GetDirCount() const

Returns the number of directories in the file name.

wxFileName::GetDirs

const wxArrayString& GetDirs() const

Returns the directories in string array form.

wxFileName::GetExt

wxString GetExt() const

Returns the file name extension.

wxFileName::GetForbiddenChars

static wxString GetForbiddenChars(wxPathFormat *format* = wxPATH_NATIVE)

Returns the characters that can't be used in filenames and directory names for the specified format.

wxFileName::GetFormat

static wxPathFormat GetFormat(wxPathFormat *format* = wxPATH_NATIVE)

Returns the canonical path format for this platform.

wxFileName::GetFullName

wxString GetFullName() const

Returns the full name (including extension but excluding directories).

wxFileName::GetFullPath

wxString GetFullPath(wxPathFormat *format* = wxPATH_NATIVE) const

Returns the full path with name and extension.

wxFileName::GetHomeDir

static wxString GetHomeDir()

Returns the home directory.

wxFileName::GetLongPath

wxString GetLongPath() const

Return the long form of the path (returns identity on non-Windows platforms)

wxFileName::GetModificationTime

wxDateTime GetModificationTime() const

Returns the last time the file was last modified.

wxFileName::GetName

wxString GetName() const

Returns the name part of the filename.

wxFileName::GetPath

wxString GetPath(int flags = wxPATH_GET_VOLUME, wxPathFormat format = wxPATH_NATIVE) const

Returns the path part of the filename (without the name or extension). The possible flags values are:

wxPATH_GET_VOLUME Return the path with the volume (does nothing for the filename formats without volumes), otherwise the path without volume part is returned.

wxPATH_GET_SEPARATOR Return the path with the trailing separator, if this flag is not given there will be no separator at the end of the path.

wxFileName::GetPathSeparator

static wxChar GetPathSeparator(wxPathFormat format = wxPATH_NATIVE)

Returns the usually used path separator for this format. For all formats but `wxPATH_DOS` there is only one path separator anyhow, but for DOS there are two of them and the native one, i.e. the backslash is returned by this method.

See also

GetPathSeparators (p. 486)

wxFileName::GetPathSeparators

static wxString GetPathSeparators(wxPathFormat format = wxPATH_NATIVE)

Returns the string containing all the path separators for this format. For all formats but `wxPATH_DOS` this string contains only one character but for DOS and Windows both `' / '` and `' \ '` may be used as separators.

See also

GetPathSeparator (p. 485)

wxFileName::GetShortPath

wxString GetShortPath() const

Return the short form of the path (returns identity on non-Windows platforms).

wxFileName::GetTimes

bool GetTimes(wxDateTime* dtAccess, wxDateTime* dtMod, wxDateTime* dtCreate) const

Returns the last access, last modification and creation times. The last access time is updated whenever the file is read or written (or executed in the case of Windows), last modification time is only changed when the file is written to. Finally, the creation time is indeed the time when the file was created under Windows and the inode change time under Unix (as it is impossible to retrieve the real file creation time there anyhow) which can also be changed by many operations after the file creation.

Any of the pointers may be `NULL` if the corresponding time is not needed.

Return value

`true` on success, `false` if we failed to retrieve the times.

wxFileName::GetVolume

wxString GetVolume() const

Returns the string containing the volume for this file name, empty if it doesn't have one or if the file system doesn't support volumes at all (for example, Unix).

wxFileName::GetVolumeSeparator

static wxString GetVolumeSeparator(wxPathFormat *format* = wxPATH_NATIVE)

Returns the string separating the volume from the path for this format.

wxFileName::HasExt

bool HasExt() const

Returns `true` if an extension is present.

wxFileName::HasName

bool HasName() const

Returns `true` if a name is present.

wxFileName::HasVolume

bool HasVolume() const

Returns `true` if a volume specifier is present.

wxFileName::InsertDir

void InsertDir(int *before*, const wxString& *dir*)

Inserts a directory component before the zero-based position in the directory list. Please see *AppendDir* (p. 481) for important notes.

wxFileName::IsAbsolute

bool IsAbsolute(wxPathFormat *format* = wxPATH_NATIVE)

Returns `true` if this filename is absolute.

wxFileName::IsCaseSensitive

static bool IsCaseSensitive(wxPathFormat *format* = wxPATH_NATIVE)

Returns `true` if the file names of this type are case-sensitive.

wxFileName::IsOk

bool IsOk() const

Returns `true` if the filename is valid, `false` if it is not initialized yet. The assignment functions and *Clear* (p. 482) may reset the object to the uninitialized, invalid state (the former only do it on failure).

wxFileName::IsPathSeparator

static bool IsPathSeparator(wxChar ch, wxPathFormat format = wxPATH_NATIVE)

Returns `true` if the char is a path separator for this format.

wxFileName::IsRelative

bool IsRelative(wxPathFormat format = wxPATH_NATIVE)

Returns `true` if this filename is not absolute.

wxFileName::IsDir

bool IsDir() const

Returns `true` if this object represents a directory, `false` otherwise (i.e. if it is a file). Note that this method doesn't test whether the directory or file really exists, you should use *DirExists* (p. 483) or *FileExists* (p. 483) for this.

wxFileName::MakeAbsolute

bool MakeAbsolute(const wxString& cwd = wxEmptyString, wxPathFormat format = wxPATH_NATIVE)

Make the file name absolute. This is a shortcut for *Normalize* (p. 489) (`wxPATH_NORM_DOTS` | `wxPATH_NORM_ABSOLUTE` | `wxPATH_NORM_TILDE`, `cwd`, `format`).

See also

MakeRelativeTo (p. 488), *Normalize* (p. 489), *IsAbsolute* (p. 487)

wxFileName::MakeRelativeTo

bool MakeRelativeTo(const wxString& pathBase = wxEmptyString, wxPathFormat format = wxPATH_NATIVE)

This function tries to put this file name in a form relative to *pathBase*. In other words, it returns the file name which should be used to access this file if the current directory were *pathBase*.

pathBase

the directory to use as root, current directory is used by default

format

the file name format, native by default

Return value

`true` if the file name has been changed, `false` if we failed to do anything with it (currently this only happens if the file name is on a volume different from the volume specified by *pathBase*).

See also

Normalize (p. 489)

wxFileName::Mkdir

bool Mkdir(int perm = 0777, int flags = 0)

static bool Mkdir(const wxString& dir, int perm = 0777, int flags = 0)

dir

the directory to create

perm

the permissions for the newly created directory

flags

if the flags contain `wxPATH_MKDIR_FULL` flag, try to create each directory in the path and also don't return an error if the target directory already exists.

Return value

Returns `true` if the directory was successfully created, `false` otherwise.

wxFileName::Normalize

bool Normalize(int flags = wxPATH_NORM_ALL, const wxString& cwd = wxEmptyString, wxPathFormat format = wxPATH_NATIVE)

Normalize the path. With the default flags value, the path will be made absolute, without any `".."` and `"."` and all environment variables will be expanded in it.

flags

The kind of normalization to do with the file name. It can be any or-combination of the following constants:

wxPATH_NORM_ENV_VARS replace env vars with their values

wxPATH_NORM_DOTS squeeze all .. and . and prepend cwd

wxPATH_NORM_TILDE Unix only: replace ~ and ~user

wxPATH_NORM_CASE if filesystem is case insensitive, transform to tolower case

wxPATH_NORM_ABSOLUTE make the path absolute

wxPATH_NORM_LONG make the path the long form

wxPATH_NORM_SHORTCUT resolve if it is a shortcut (Windows only)

wxPATH_NORM_ALL all of previous flags except **wxPATH_NORM_CASE**

cwd

If not empty, this directory will be used instead of current working directory in normalization.

format

The file name format, native by default.

wxFileName::PrependDir

void PrependDir(const wxString& dir)

Prepends a directory to the file path. Please see *AppendDir* (p. 481) for important notes.

wxFileName::RemoveDir

void RemoveDir(int pos)

Removes a directory name.

wxFileName::Rmdir

bool Rmdir()

static bool Rmdir(const wxString& dir)

Deletes the specified directory from the file system.

wxFileName::SameAs

bool SameAs(const wxFileName& filepath, wxPathFormat format =

wxPATH_NATIVE) **const**

Compares the filename using the rules of this platform.

wxFileName::SetCwd

bool SetCwd()

static bool SetCwd(const wxString& cwd)

Changes the current working directory.

wxFileName::SetExt

void SetExt(const wxString& ext)

Sets the extension of this file name.

wxFileName::SetFullName

void SetFullName(const wxString& fullname)

The full name is the file name and extension (but without the path).

wxFileName::SetName

void SetName(const wxString& name)

Sets the name.

wxFileName::SetTimes

bool SetTimes(const wxDateTime* dtAccess, const wxDateTime* dtMod, const wxDateTime* dtCreate)

Sets the file creation and last access/modification times (any of the pointers may be NULL).

wxFileName::SetVolume

void SetVolume(const wxString& volume)

Sets the volume specifier.

wxFileName::SplitPath

```
static void SplitPath(const wxString& fullpath, wxString* volume, wxString* path,  
wxString* name, wxString* ext, wxPathFormat format = wxPATH_NATIVE)
```

```
static void SplitPath(const wxString& fullpath, wxString* path, wxString* name,  
wxString* ext, wxPathFormat format = wxPATH_NATIVE)
```

This function splits a full file name into components: the volume (with the first version) path (including the volume in the second version), the base name and the extension. Any of the output parameters (*volume*, *path*, *name* or *ext*) may be `NULL` if you are not interested in the value of a particular component. Also, *fullpath* may be empty on entry.

On return, *path* contains the file path (without the trailing separator), *name* contains the file name and *ext* contains the file extension without leading dot. All three of them may be empty if the corresponding component is. The old contents of the strings pointed to by these parameters will be overwritten in any case (if the pointers are not `NULL`).

wxFileName::Touch

```
bool Touch()
```

Sets the access and modification times to the current moment.

wxFileName::operator=

```
wxFileName& operator operator=(const wxFileName& filename)
```

```
wxFileName& operator operator=(const wxString& filename)
```

Assigns the new value to this filename object.

wxFileName::operator==

```
bool operator operator==(const wxFileName& filename) const
```

```
bool operator operator==(const wxString& filename) const
```

Returns `true` if the filenames are equal. The string *filenames* is interpreted as a path in the native filename format.

wxFileName::operator!=

```
bool operator operator!=(const wxFileName& filename) const
```

```
bool operator operator!=(const wxString& filename) const
```

Returns `true` if the filenames are different. The string *filenames* is interpreted as a path in the native filename format.

wxFileOutputStream

This class represents data written to a file. There are actually two such groups of classes: this one is based on *wxFile* (p. 461) whereas *wxFFileInputStream* (p. 458) is based in the *wxFFile* (p. 453) class.

Note that *wxFile* (p. 461) and *wxFFile* (p. 453) differ in one aspect, namely when to report that the end of the file has been reached. This is documented in *wxFile::Eof* (p. 464) and *wxFFile::Eof* (p. 455) and the behaviour of the stream classes reflects this difference, i.e. *wxFileInputStream* will report *wxSTREAM_EOF* after having read the last byte whereas *wxFFileInputStream* will report *wxSTREAM_EOF* after trying to read *past* the last byte. Related to EOF behavior, note that *SeekO()* (p. 959) can seek beyond the end of the stream (file) and will thus not return *wxInvalidOffset* for that.

Derived from

wxOutputStream (p. 958)

Include files

<wx/wfstream.h>

See also

wxBufferedOutputStream (p. 101), *wxFileInputStream* (p. 477), *wxFFileInputStream* (p. 458)

wxFileOutputStream::wxFileOutputStream

wxFileOutputStream(const wxString& ofileName)

Creates a new file with *ofilename* name and initializes the stream in write-only mode.

wxFileOutputStream(wxFile& file)

Initializes a file stream in write-only mode using the file I/O object *file*.

wxFileOutputStream(int fd)

Initializes a file stream in write-only mode using the file descriptor *fd*.

wxFileOutputStream::~~wxFileOutputStream

~wxFileOutputStream()

Destructor.

wxFileOutputStream::Ok

bool Ok() const

Returns true if the stream is initialized and ready.

wxFileStream

Derived from

wxFileOutputStream (p. 493), *wxFileInputStream* (p. 477)

Include files

<wx/wfstream.h>

See also

wxStreamBuffer (p. 1194)

wxFileStream::wxFileStream

wxFileStream(const wxString& *iofileName*)

Initializes a new file stream in read-write mode using the specified *iofileName* name.

wxFileSystem

This class provides an interface for opening files on different file systems. It can handle absolute and/or local filenames. It uses a system of *handlers* (p. 496) to provide access to user-defined virtual file systems.

Derived from

wxObject (p. 954)

Include files

<wx/filesys.h>

See Also

wxFileSystemHandler (p. 496), *wxFSFile* (p. 545), *Overview* (p. 1608)

wxFileSystem::wxFileSystem

wxFileSystem()

Constructor.

wxFileSystem::AddHandler

static void AddHandler(wxFileSystemHandler *handler)

This static function adds new handler into the list of handlers. The *handlers* (p. 496) provide access to virtual FS.

Note

You can call:

```
wxFileSystem::AddHandler(new My_FS_Handler);
```

This is because (a) AddHandler is a static method, and (b) the handlers are deleted in wxFileSystem's destructor so that you don't have to care about it.

wxFileSystem::ChangePathTo

void ChangePathTo(const wxString& location, bool is_dir = false)

Sets the current location. *location* parameter passed to *OpenFile* (p. 496) is relative to this path.

Caution! Unless *is_dir* is true the *location* parameter is not the directory name but the name of the file in this directory. All these commands change the path to "dir/subdir/":

```
ChangePathTo("dir/subdir/xh.htm");  
ChangePathTo("dir/subdir", true);  
ChangePathTo("dir/subdir/", true);
```

Parameters

location

the new location. Its meaning depends on the value of *is_dir*

is_dir

if true *location* is new directory. If false (default) *location* is **file** in the new directory.

Example

```
f = fs -> OpenFile("hello.htm"); // opens file 'hello.htm'  
fs -> ChangePathTo("subdir/folder", true);  
f = fs -> OpenFile("hello.htm"); // opens file 'subdir/folder/hello.htm'  
!!
```

wxFileSystem::GetPath

wxString GetPath()

Returns actual path (set by *ChangePathTo* (p. 495)).

wxFileSystem::FileNameToURL

static wxString FileNameToURL(wxFileName filename)

Converts filename into URL.

[See also](#)

wxFileSystem::URLToFileName (p. 496), *wxFileName* (p. 478)

wxFileSystem::FindFirst

wxString FindFirst(const wxString& wildcard, int flags = 0)

Works like *wxFindFirstFile* (p. 1482). Returns name of the first filename (within filesystem's current path) that matches *wildcard*. *flags* may be one of *wxFILE* (only files), *wxDIR* (only directories) or 0 (both).

wxFileSystem::FindNext

wxString FindNext()

Returns the next filename that matches parameters passed to *FindFirst* (p. 496).

wxFileSystem::OpenFile

wxFSFile* OpenFile(const wxString& location)

Opens the file and returns a pointer to a *wxFSFile* (p. 545) object or NULL if failed. It first tries to open the file in relative scope (based on value passed to *ChangePathTo*() method) and then as an absolute path. Note that the user is responsible for deleting the returned *wxFSFile*.

wxFileSystem::URLToFileName

static wxFileName URLToFileName(const wxString& url)

Converts URL into a well-formed filename. The URL must use the `file` protocol.

[See also](#)

wxFileSystem::FileNameToURL (p. 496), *wxFileName* (p. 478)

wxFileSystemHandler

Classes derived from `wxFileSystemHandler` are used to access virtual file systems. Its public interface consists of two methods: *CanOpen* (p. 497) and *OpenFile* (p. 499). It provides additional protected methods to simplify the process of opening the file: *GetProtocol*, *GetLeftLocation*, *GetRightLocation*, *GetAnchor*, *GetMimeTypeFromExt*.

Please have a look at *overview* (p. 1608) if you don't know how locations are constructed.

Also consult *list of available handlers* (p. 1608).

wxPerl note: In wxPerl, you need to derive your file system handler class from `Wx::PIFileSystemHandler`.

Notes

- The handlers are shared by all instances of `wxFileSystem`.
- `wxHTML` library provides handlers for local files and HTTP or FTP protocol
- The *location* parameter passed to *OpenFile* or *CanOpen* methods is always an **absolute** path. You don't need to check the FS's current path.

Derived from

wxObject (p. 954)

Include files

`<wx/filesys.h>`

See also

wxFileSystem (p. 494), *wxFSFile* (p. 545), *Overview* (p. 1608)

wxFileSystemHandler::wxFileSystemHandler

wxFileSystemHandler()

Constructor.

wxFileSystemHandler::CanOpen

virtual bool CanOpen(const wxString& location)

Returns true if the handler is able to open this file. This function doesn't check whether the file exists or not, it only checks if it knows the protocol. Example:

```
bool MyHand::CanOpen(const wxString& location)
{
    return (GetProtocol(location) == "http");
}
```

Must be overridden in derived handlers.

wxFileSystemHandler::GetAnchor

wxString GetAnchor(const wxString& *location*) const

Returns the anchor if present in the location. See *wxFSFile* (p. 547) for details.

Example: `GetAnchor("index.htm#chapter2") == "chapter2"`

Note: the anchor is NOT part of the left location.

wxFileSystemHandler::GetLeftLocation

wxString GetLeftLocation(const wxString& *location*) const

Returns the left location string extracted from *location*.

Example: `GetLeftLocation("file:myzipfile.zip#zip:index.htm") == "file:myzipfile.zip"`

wxFileSystemHandler::GetMimeTypeFromExt

wxString GetMimeTypeFromExt(const wxString& *location*)

Returns the MIME type based on **extension** of *location*. (While *wxFSFile::GetMimeType* returns real MIME type - either extension-based or queried from HTTP.)

Example : `GetMimeTypeFromExt("index.htm") == "text/html"`

wxFileSystemHandler::GetProtocol

wxString GetProtocol(const wxString& *location*) const

Returns the protocol string extracted from *location*.

Example: `GetProtocol("file:myzipfile.zip#zip:index.htm") == "zip"`

wxFileSystemHandler::GetRightLocation

wxString GetRightLocation(const wxString& *location*) const

Returns the right location string extracted from *location*.

Example : `GetRightLocation("file:myzipfile.zip#zip:index.htm") == "index.htm"`

wxFileSystemHandler::FindFirst

virtual wxString FindFirst(const wxString& wildcard, int flags = 0)

Works like *wxFindFirstFile* (p. 1482). Returns name of the first filename (within filesystem's current path) that matches *wildcard*. *flags* may be one of *wxFILE* (only files), *wxDIR* (only directories) or 0 (both).

This method is only called if *CanOpen* (p. 497) returns true.

wxFileSystemHandler::FindNext

virtual wxString FindNext()

Returns next filename that matches parameters passed to *FindFirst* (p. 496).

This method is only called if *CanOpen* (p. 497) returns true and *FindFirst* returned a non-empty string.

wxFileSystemHandler::OpenFile

virtual wxFSFile* OpenFile(wxFileSystem& fs, const wxString& location)

Opens the file and returns *wxFSFile* pointer or NULL if failed.

Must be overridden in derived handlers.

Parameters

fs

Parent FS (the FS from that *OpenFile* was called). See ZIP handler for details of how to use it.

location

The **absolute** location of file.

wxFileType

This class holds information about a given *file type*. File type is the same as MIME type under Unix, but under Windows it corresponds more to an extension than to MIME type (in fact, several extensions may correspond to a file type). This object may be created in several different ways: the program might know the file extension and wish to find out the corresponding MIME type or, conversely, it might want to find the right extension for the file to which it writes the contents of given MIME type. Depending on how it was created some fields may be unknown so the return value of all the accessors **must** be checked: *false* will be returned if the corresponding information couldn't be found.

The objects of this class are never created by the application code but are returned by

wxMimeTypeManager::GetFileTypeFromMimeType (p. 921) and *wxMimeTypeManager::GetFileTypeFromExtension* (p. 920) methods. But it is your responsibility to delete the returned pointer when you're done with it!

A brief reminder about what the MIME types are (see the RFC 1341 for more information): basically, it is just a pair category/type (for example, "text/plain") where the category is a basic indication of what a file is. Examples of categories are "application", "image", "text", "binary", and type is a precise definition of the document format: "plain" in the example above means just ASCII text without any formatting, while "text/html" is the HTML document source.

A MIME type may have one or more associated extensions: "text/plain" will typically correspond to the extension ".txt", but may as well be associated with ".ini" or ".conf".

Derived from

None

Include files

<wx/mimetype.h>

See also

wxMimeTypeManager (p. 918)

MessageParameters class

One of the most common usages of MIME is to encode an e-mail message. The MIME type of the encoded message is an example of a *message parameter*. These parameters are found in the message headers ("Content-XXX"). At the very least, they must specify the MIME type and the version of MIME used, but almost always they provide additional information about the message such as the original file name or the charset (for the text documents).

These parameters may be useful to the program used to open, edit, view or print the message, so, for example, an e-mail client program will have to pass them to this program. Because *wxFileType* itself can not know about these parameters, it uses *MessageParameters* class to query them. The default implementation only requires the caller to provide the file name (always used by the program to be called - it must know which file to open) and the MIME type and supposes that there are no other parameters. If you wish to supply additional parameters, you must derive your own class from *MessageParameters* and override *GetParamValue()* function, for example:

```
// provide the message parameters for the MIME type manager
class MailMessageParameters : public wxFileType::MessageParameters
{
public:
    MailMessageParameters(const wxString& filename,
                          const wxString& mimetype)
        : wxFileType::MessageParameters(filename, mimetype)
    {
    }
}
```

```
virtual wxString GetParamValue(const wxString& name) const
{
    // parameter names are not case-sensitive
    if ( name.CmpNoCase("charset") == 0 )
        return "US-ASCII";
    else
        return wxFileType::MessageParameters::GetParamValue(name);
};
```

Now you only need to create an object of this class and pass it to, for example, *GetOpenCommand* (p. 502) like this:

```
wxString command;
if ( filetype->GetOpenCommand(&command,
                             MailMessageParameters("foo.txt",
"text/plain")) )
{
    // the full command for opening the text documents is in 'command'
    // (it might be "notepad foo.txt" under Windows or "cat foo.txt" under
    Unix)
}
else
{
    // we don't know how to handle such files...
}
```

Windows: As only the file name is used by the program associated with the given extension anyhow (but no other message parameters), there is no need to ever derive from *MessageParameters* class for a Windows-only program.

wxFileType::wxFileType

wxFileType()

The default constructor is private because you should never create objects of this type: they are only returned by *wxMimeTypeManager* (p. 918) methods.

wxFileType::~~wxFileType

~wxFileType()

The destructor of this class is not virtual, so it should not be derived from.

wxFileType::GetMimeType

bool GetMimeType(wxString* mimeType)

If the function returns `true`, the string pointed to by *mimeType* is filled with full MIME type specification for this file type: for example, "text/plain".

wxFileType::GetMimeType

bool GetMimeType(wxArrayString& mimeTypes)

Same as *GetMimeType* (p. 501) but returns array of MIME types. This array will contain only one item in most cases but sometimes, notably under Unix with KDE, may contain more MIME types. This happens when one file extension is mapped to different MIME types by KDE, mailcap and mime.types.

wxFileType::GetExtensions

bool GetExtensions(wxArrayString& extensions)

If the function returns `true`, the array *extensions* is filled with all extensions associated with this file type: for example, it may contain the following two elements for the MIME type "text/html" (notice the absence of the leading dot): "html" and "htm".

Windows: This function is currently not implemented: there is no (efficient) way to retrieve associated extensions from the given MIME type on this platform, so it will only return `true` if the `wxFileType` object was created by *GetFileTypeFromExtension* (p. 920) function in the first place.

wxFileType::GetIcon

bool GetIcon(wxIconLocation * iconLoc)

If the function returns `true`, the *iconLoc* is filled with the location of the icon for this MIME type. A *wxIcon* (p. 716) may be created from *iconLoc* later.

Windows: The function returns the icon shown by Explorer for the files of the specified type.

Mac: This function is not implemented and always returns `false`.

Unix: MIME manager gathers information about icons from GNOME and KDE settings and thus *GetIcon*'s success depends on availability of these desktop environments.

wxFileType::GetDescription

bool GetDescription(wxString* desc)

If the function returns `true`, the string pointed to by *desc* is filled with a brief description for this file type: for example, "text document" for the "text/plain" MIME type.

wxFileType::GetOpenCommand

bool GetOpenCommand(wxString* command, MessageParameters& params)**wxString GetOpenCommand(const wxString& filename)**

With the first version of this method, if the `true` is returned, the string pointed to by

command is filled with the command which must be executed (see *wxExecute* (p. 1475)) in order to open the file of the given type. In this case, the name of the file as well as any other parameters is retrieved from *MessageParameters* (p. 500) class.

In the second case, only the filename is specified and the command to be used to open this kind of file is returned directly. An empty string is returned to indicate that an error occurred (typically meaning that there is no standard way to open this kind of files).

wxFileType::GetPrintCommand

bool GetPrintCommand(wxString* *command*, MessageParameters& *params*)

If the function returns `true`, the string pointed to by *command* is filled with the command which must be executed (see *wxExecute* (p. 1475)) in order to print the file of the given type. The name of the file is retrieved from *MessageParameters* (p. 500) class.

wxFileType::ExpandCommand

**static wxString ExpandCommand(const wxString& *command*,
MessageParameters& *params*)**

This function is primarily intended for *GetOpenCommand* and *GetPrintCommand* usage but may be also used by the application directly if, for example, you want to use some non default command to open the file.

The function replaces all occurrences of

format specification	with
%s	the full file name
%t	the MIME type
%{param}	the value of the parameter <i>param</i>

using the *MessageParameters* object you pass to it.

If there is no '%s' in the command string (and the string is not empty), it is assumed that the command reads the data on stdin and so the effect is the same as "< %s" were appended to the string.

Unlike all other functions of this class, there is no error return for this function.

wxFilterInputStream

A filter stream has the capability of a normal stream but it can be placed on top of another stream. So, for example, it can uncompress or decrypt the data which are read from another stream and pass it to the requester.

Derived from

wxInputStream (p. 762)
wxStreamBase (p. 1192)

Include files

<wx/stream.h>

Note

The interface of this class is the same as that of *wxInputStream*. Only a constructor differs and it is documented below.

wxFilterInputStream::wxFilterInputStream

wxFilterInputStream(*wxInputStream*& *stream*)

Initializes a "filter" stream.

wxFilterOutputStream

A filter stream has the capability of a normal stream but it can be placed on top of another stream. So, for example, it can compress, encrypt the data which are passed to it and write them to another stream.

Derived from

wxOutputStream (p. 958)
wxStreamBase (p. 1192)

Include files

<wx/stream.h>

Note

The use of this class is exactly the same as of *wxOutputStream*. Only a constructor differs and it is documented below.

wxFilterOutputStream::wxFilterOutputStream

wxFilterOutputStream(*wxOutputStream*& *stream*)

Initializes a "filter" stream.

wxFindDialogEvent

wxFindReplaceDialog events

Derived from

wxCommandEvent (p. 165)

Include files

<wx/fdrepdlg.h>

Event table macros

To process a command event from *wxFindReplaceDialog* (p. 508), use these event handler macros to direct input to member functions that take a *wxFindDialogEvent* argument. The *id* parameter is the identifier of the find dialog and you may usually specify -1 for it unless you plan to have several find dialogs sending events to the same owner window simultaneously.

EVT_FIND(id, func)	Find button was pressed in the dialog.
EVT_FIND_NEXT(id, func)	Find next button was pressed in the dialog.
EVT_FIND_REPLACE(id, func)	Replace button was pressed in the dialog.
EVT_FIND_REPLACE_ALL(id, func)	Replace all button was pressed in the dialog.
EVT_FIND_CLOSE(id, func)	The dialog is being destroyed, any pointers to it cannot be used any longer.

wxFindDialogEvent::wxFindDialogEvent

wxFindDialogEvent(wxEventType commandType = wxEVT_NULL, int id = 0)

Constructor used by wxWidgets only.

wxFindDialogEvent::GetFlags

int GetFlags() const

Get the currently selected flags: this is the combination of *wxFR_DOWN*, *wxFR_WHOLEWORD* and *wxFR_MATCHCASE* flags.

wxFindDialogEvent::GetFindString

wxString GetFindString() const

Return the string to find (never empty).

wxFindDialogEvent::GetReplaceString

const wxString& GetReplaceString() const

Return the string to replace the search string with (only for replace and replace all events).

wxFindDialogEvent::GetDialog

wxFindReplaceDialog* GetDialog() const

Return the pointer to the dialog which generated this event.

wxFindReplaceData

wxFindReplaceData holds the data for *wxFindReplaceDialog* (p. 508). It is used to initialize the dialog with the default values and will keep the last values from the dialog when it is closed. It is also updated each time a *wxFindDialogEvent* (p. 504) is generated so instead of using the *wxFindDialogEvent* methods you can also directly query this object.

Note that all *SetXXX()* methods may only be called before showing the dialog and calling them has no effect later.

Include files

```
#include <wx/fdrepdlg.h>
```

Derived from

wxObject (p. 954)

Data structures

Flags used by *wxFindReplaceData::GetFlags()* (p. 507) and *wxFindDialogEvent::GetFlags()* (p. 505):

```
enum wxFindReplaceFlags
{
    // downward search/replace selected (otherwise - upwards)
    wxFR_DOWN = 1,

    // whole word search/replace selected
    wxFR_WHOLEWORD = 2,

    // case sensitive search/replace selected (otherwise - case insensitive)
    wxFR_MATCHCASE = 4
}
```

These flags can be specified in *wxFindReplaceDialog* *ctor* (p. 508) or *Create()* (p. 508):

```
enum wxFindReplaceDialogStyles
{
    // replace dialog (otherwise find dialog)
```

```
wxFR_REPLACEDIALOG = 1,  
  
// don't allow changing the search direction  
wxFR_NOUPDOWN      = 2,  
  
// don't allow case sensitive searching  
wxFR_NOMATCHCASE   = 4,  
  
// don't allow whole word searching  
wxFR_NOWHOLEWORD   = 8  
}
```

wxFindReplaceData::wxFindReplaceData

wxFindReplaceData(wxUint32 flags = 0)

Constructor initializes the flags to default value (0).

wxFindReplaceData::GetFindString

const wxString& GetFindString()

Get the string to find.

wxFindReplaceData::GetReplaceString

const wxString& GetReplaceString()

Get the replacement string.

wxFindReplaceData::GetFlags

int GetFlags() const

Get the combination of wxFindReplaceFlags values.

wxFindReplaceData::SetFlags

void SetFlags(wxUint32 flags)

Set the flags to use to initialize the controls of the dialog.

wxFindReplaceData::SetFindString

void SetFindString(const wxString& str)

Set the string to find (used as initial value by the dialog).

wxFindReplaceData::SetReplaceString

void SetReplaceString(const wxString& str)

Set the replacement string (used as initial value by the dialog).

wxFindReplaceDialog

wxFindReplaceDialog is a standard modeless dialog which is used to allow the user to search for some text (and possibly replace it with something else). The actual searching is supposed to be done in the owner window which is the parent of this dialog. Note that it means that unlike for the other standard dialogs this one **must** have a parent window. Also note that there is no way to use this dialog in a modal way; it is always, by design and implementation, modeless.

Please see the dialogs sample for an example of using it.

Include files

```
#include <wx/fdrepdlg.h>
```

Derived from

wxDialog (p. 369)

wxFindReplaceDialog::wxFindReplaceDialog

wxFindReplaceDialog()

wxFindReplaceDialog(wxWindow * parent, wxFindReplaceData* data, const wxString& title, int style = 0)

After using default constructor *Create()* (p. 508) must be called.

The *parent* and *data* parameters must be non-NULL.

wxFindReplaceDialog::~~wxFindReplaceDialog

~wxFindReplaceDialog()

Destructor.

wxFindReplaceDialog::Create

bool Create(wxWindow * parent, wxFindReplaceData* data, const wxString& title, int style = 0)

Creates the dialog; use *Show* (p. 1438) to show it on screen.

The *parent* and *data* parameters must be non-NULL. `wxFindReplaceDialog::GetData`

const wxFindReplaceData* GetData() const

Get the *wxFindReplaceData* (p. 506) object used by this dialog.

wxFlexGridSizer

A flex grid sizer is a sizer which lays out its children in a two-dimensional table with all table fields in one row having the same height and all fields in one column having the same width, but all rows or all columns are not necessarily the same height or width as in the *wxGridSizer* (p. 636).

Since wxWidgets 2.5.0, *wxFlexGridSizer* can also size items equally in one direction but unequally ("flexibly") in the other. If the sizer is only flexible in one direction (this can be changed using *SetFlexibleDirection* (p. 511)), it needs to be decided how the sizer should grow in the other ("non flexible") direction in order to fill the available space. The *SetNonFlexibleGrowMode* (p. 511) method serves this purpose.

Derived from

wxGridSizer (p. 636)

wxSizer (p. 1110)

wxObject (p. 954)

See also

wxSizer (p. 1110), *Sizer overview* (p. 1627)

wxFlexGridSizer::wxFlexGridSizer

wxFlexGridSizer(int rows, int cols, int vgap, int hgap)

wxFlexGridSizer(int cols, int vgap = 0, int hgap = 0)

Constructor for a *wxGridSizer*. *rows* and *cols* determine the number of columns and rows in the sizer - if either of the parameters is zero, it will be calculated to form the total number of children in the sizer, thus making the sizer grow dynamically. *vgap* and *hgap* define extra space between all children.

wxFlexGridSizer::AddGrowableCol

void AddGrowableCol(size_t idx, int proportion = 0)

Specifies that column *idx* (starting from zero) should be grown if there is extra space

available to the sizer.

The *proportion* parameter has the same meaning as the stretch factor for the *sizers* (p. 1627) except that if all proportions are 0, then all columns are resized equally (instead of not being resized at all).

wxFlexGridSizer::AddGrowableRow

void AddGrowableRow(size_t idx, int proportion = 0)

Specifies that row idx (starting from zero) should be grown if there is extra space available to the sizer.

See *AddGrowableCol* (p. 509) for the description of *proportion* parameter.

wxFlexGridSizer::GetFlexibleDirection

int GetFlexibleDirections() const

Returns a wxOrientation value that specifies whether the sizer flexibly resizes its columns, rows, or both (default).

Return value

One of the following values:

wxVERTICAL	Rows are flexibly sized.
wxHORIZONTAL	Columns are flexibly sized.
wxBOTH	Both rows and columns are flexibly sized (this is the default value).

See also

SetFlexibleDrection (p. 511)

wxFlexGridSizer::GetNonFlexibleGrowMode

int GetNonFlexibleGrowMode() const

Returns the value that specifies how the sizer grows in the "non flexible" direction if there is one.

Return value

One of the following values:

wxFLEX_GROWMODE_NONE	Sizer doesn't grow in the non flexible direction.
wxFLEX_GROWMODE_SPECIFIED	Sizer honors growable columns/rows set

with *AddGrowbleCol* (p. 509) and *AddGrowbleRow* (p. 510). In this case equal sizing applies to minimum sizes of columns or rows (this is the default value).

`wxFLEX_GROWMODE_ALL`

Sizer equally stretches all columns or rows in the non flexible direction, whether they are growable or not in the flexbile direction.

See also

SetFlexibleDrection (p. 511), *SetNonFlexibleGrowMode* (p. 511)

wxFlexGridSizer::RemoveGrowableCol

void RemoveGrowableCol(size_t idx)

Specifies that column idx is no longer growable.

wxFlexGridSizer::RemoveGrowableRow

void RemoveGrowableRow(size_t idx)

Specifies that row idx is no longer growable.

wxFlexGridSizer::SetFlexibleDirection

void SetFlexibleDirections(int direction)

Specifies whether the sizer should flexibly resize its columns, rows, or both. Argument *direction* can be `wxVERTICAL`, `wxHORIZONTAL` or `wxBOTH` (which is the default value). Any other value is ignored. See *GetFlexibleDirection()* (p. 510) for the explanation of these values.

Note that this method does not trigger relayout.

wxFlexGridSizer::SetNonFlexibleGrowMode

void SetNonFlexibleGrowMode(int mode)

Specifies how the sizer should grow in the non flexible direction if there is one (so *SetFlexibleDirections()* (p. 511) must have been called previously). Argument *mode* can be one of those documented in *GetNonFlexibleGrowMode* (p. 510), please see there for their explanation.

Note that this method does not trigger relayout.

wxFocusEvent

A focus event is sent when a window's focus changes. The window losing focus receives a "kill focus" event while the window gaining it gets a "set focus" one.

Notice that the set focus event happens both when the user gives focus to the window (whether using the mouse or keyboard) and when it is done from the program itself using *SetFocus* (p. 1428).

Derived from

wxEvt (p. 441)

wxObject (p. 954)

Include files

<wx/event.h>

Event table macros

To process a focus event, use these event handler macros to direct input to a member function that takes a *wxFocusEvent* argument.

EVT_SET_FOCUS(func) Process a *wxEVT_SET_FOCUS* event.

EVT_KILL_FOCUS(func) Process a *wxEVT_KILL_FOCUS* event.

See also

Event handling overview (p. 1610)

wxFocusEvent::wxFocusEvent

wxFocusEvent(WXTYPE eventType = 0, int id = 0)

Constructor.

wxFont

A font is an object which determines the appearance of text. Fonts are used for drawing text to a device context, and setting the appearance of a window's text.

You can retrieve the current system font settings with *wxSystemSettings* (p. 1231).

wxSystemSettings (p. 1231)

Derived from

wxGDIObject (p. 562)

wxObject (p. 954)

Include files

<wx/font.h>

Constants

The font flags which can be used during the font creation are:

```
enum
{
    // no special flags: font with default weight/slant/anti-aliasing
    wxFONTFLAG_DEFAULT      = 0,

    // slant flags (default: no slant)
    wxFONTFLAG_ITALIC       = 1 << 0,
    wxFONTFLAG_SLANT        = 1 << 1,

    // weight flags (default: medium)
    wxFONTFLAG_LIGHT        = 1 << 2,
    wxFONTFLAG_BOLD         = 1 << 3,

    // anti-aliasing flag: force on or off (default: the current system
    // default)
    wxFONTFLAG_ANTI_ALIASSED = 1 << 4,
    wxFONTFLAG_NOT_ANTI_ALIASSED = 1 << 5,

    // underlined/strikethrough flags (default: no lines)
    wxFONTFLAG_UNDERLINED   = 1 << 6,
    wxFONTFLAG_STRIKETHROUGH = 1 << 7,
};
```

The known font encodings are:

```
enum wxFontEncoding
{
    wxFONTENCODING_SYSTEM = -1,      // system default
    wxFONTENCODING_DEFAULT,          // current default encoding

    // ISO8859 standard defines a number of single-byte charsets
    wxFONTENCODING_ISO8859_1,        // West European (Latin1)
    wxFONTENCODING_ISO8859_2,        // Central and East European (Latin2)
    wxFONTENCODING_ISO8859_3,        // Esperanto (Latin3)
    wxFONTENCODING_ISO8859_4,        // Baltic (old) (Latin4)
    wxFONTENCODING_ISO8859_5,        // Cyrillic
    wxFONTENCODING_ISO8859_6,        // Arabic
    wxFONTENCODING_ISO8859_7,        // Greek
    wxFONTENCODING_ISO8859_8,        // Hebrew
    wxFONTENCODING_ISO8859_9,        // Turkish (Latin5)
    wxFONTENCODING_ISO8859_10,       // Variation of Latin4 (Latin6)
    wxFONTENCODING_ISO8859_11,       // Thai
    wxFONTENCODING_ISO8859_12,       // doesn't exist currently, but put it
    // here anyhow to make all ISO8859
    // consecutive numbers
    wxFONTENCODING_ISO8859_13,       // Baltic (Latin7)
    wxFONTENCODING_ISO8859_14,       // Latin8
    wxFONTENCODING_ISO8859_15,       // Latin9 (a.k.a. Latin0, includes
    euro)
    wxFONTENCODING_ISO8859_MAX,

    // Cyrillic charset soup (see
    // http://czyborra.com/charsets/cyrillic.html)
    wxFONTENCODING_KOI8,             // we don't support any of KOI8
    variants
    wxFONTENCODING_ALTERNATIVE,      // same as MS-DOS CP866
    wxFONTENCODING_BULGARIAN,        // used under Linux in Bulgaria

    // what would we do without Microsoft? They have their own encodings
    // for DOS
    wxFONTENCODING_CP437,            // original MS-DOS codepage
};
```

```

wxFONTENCODING_CP850,          // CP437 merged with Latin1
wxFONTENCODING_CP852,          // CP437 merged with Latin2
wxFONTENCODING_CP855,          // another cyrillic encoding
wxFONTENCODING_CP866,          // and another one
    // and for Windows
wxFONTENCODING_CP874,          // WinThai
wxFONTENCODING_CP1250,         // WinLatin2
wxFONTENCODING_CP1251,         // WinCyrillic
wxFONTENCODING_CP1252,         // WinLatin1
wxFONTENCODING_CP1253,         // WinGreek (8859-7)
wxFONTENCODING_CP1254,         // WinTurkish
wxFONTENCODING_CP1255,         // WinHebrew
wxFONTENCODING_CP1256,         // WinArabic
wxFONTENCODING_CP1257,         // WinBaltic (same as Latin 7)
wxFONTENCODING_CP12_MAX,

wxFONTENCODING_UTF7,           // UTF-7 Unicode encoding
wxFONTENCODING_UTF8,           // UTF-8 Unicode encoding

wxFONTENCODING_UNICODE,        // Unicode - currently used only by
                                // wxEncodingConverter class

    wxFONTENCODING_MAX
};

```

Predefined objects

Objects:

wxNullFont

Pointers:

wxNORMAL_FONT

wxSMALL_FONT

wxITALIC_FONT

wxSWISS_FONT

See also

wxFont overview (p. 1648), *wxDC::SetFont* (p. 366), *wxDC::DrawText* (p. 357),
wxDC::GetTextExtent (p. 362), *wxFontDialog* (p. 524), *wxSystemSettings* (p. 1231)

wxFont::wxFont

wxFont()

Default constructor.

**wxFont(int pointSize, int family, int style, int weight, const bool underline = false,
const wxString& faceName = "", wxFontEncoding encoding =
wxFONTENCODING_DEFAULT)**

Creates a font object (see *font encoding overview* (p. 1650) for the meaning of the last parameter).

Parameters

pointSize

Size in points.

family

Font family, a generic way of referring to fonts without specifying actual facename. One of:

wxDEFAULT	Chooses a default font.
wxDECORATIVE	A decorative font.
wxROMAN	A formal, serif font.
wxSCRIPT	A handwriting font.
wxSWISS	A sans-serif font.
wxMODERN	A fixed pitch font.

style

One of **wxNORMAL**, **wxSLANT** and **wxITALIC**.

weight

One of **wxNORMAL**, **wxLIGHT** and **wxBOLD**.

underline

The value can be true or false. At present this has an effect on Windows and Motif 2.x only.

faceName

An optional string specifying the actual typeface to be used. If the empty string, a default typeface will chosen based on the family.

encoding

An encoding which may be one of **wxFONTENCODING_SYSTEM** Default system encoding.

wxFONTENCODING_DEFAULT Default application encoding: this is the encoding set by calls to *SetDefaultEncoding* (p. 518) and which may be set to, say, KOI8 to create all fonts by default with KOI8 encoding. Initially, the default application encoding is the same as default system encoding.

wxFONTENCODING_ISO8859_1...15 ISO8859 encodings.

wxFONTENCODING_KOI8 The standard Russian encoding for Internet.

wxFONTENCODING_CP1250...1252 Windows encodings similar to ISO8859 (but not identical).

If the specified encoding isn't available, no font is created.

Remarks

If the desired font does not exist, the closest match will be chosen. Under Windows, only scalable TrueType fonts are used.

See also *wxDC::SetFont* (p. 366), *wxDC::DrawText* (p. 357) and *wxDC::GetTextExtent* (p. 362).

wxFont::~~wxFont

~wxFont()

Destructor.

Remarks

The destructor may not delete the underlying font object of the native windowing system, since wxFont uses a reference counting system for efficiency.

Although all remaining fonts are deleted when the application exits, the application should try to clean up all fonts itself. This is because wxWidgets cannot know if a pointer to the font object is stored in an application data structure, and there is a risk of double deletion.

wxFont::IsFixedWidth

bool IsFixedWidth() const

Returns `true` if the font is a fixed width (or monospaced) font, `false` if it is a proportional one or font is invalid.

wxFont::GetDefaultEncoding

static wxFontEncoding GetDefaultEncoding()

Returns the current application's default encoding.

See also

Font encoding overview (p. 1650), *SetDefaultEncoding* (p. 518)

wxFont::GetFaceName

wxString GetFaceName() const

Returns the typeface name associated with the font, or the empty string if there is no typeface information.

[See also](#)

wxFont::SetFaceName (p. 518)

wxFont::GetFamily

int GetFamily() const

Gets the font family. See *wxFont::wxFont* (p. 514) for a list of valid family identifiers.

[See also](#)

wxFont::SetFamily (p. 519)

wxFont::GetNativeFontInfoDesc

wxString GetNativeFontInfoDesc() const

Returns the platform-dependent string completely describing this font or an empty string if the font wasn't constructed using the native font description.

[See also](#)

wxFont::SetNativeFontInfo (p. 519)

wxFont::GetPointSize

int GetPointSize() const

Gets the point size.

[See also](#)

wxFont::SetPointSize (p. 519)

wxFont::GetStyle

int GetStyle() const

Gets the font style. See *wxFont::wxFont* (p. 514) for a list of valid styles.

[See also](#)

wxFont::SetStyle (p. 520)

wxFont::GetUnderlined

bool GetUnderlined() const

Returns `true` if the font is underlined, `false` otherwise.

[See also](#)

wxFont::SetUnderlined (p. 520)

wxFont::GetWeight

int GetWeight() const

Gets the font weight. See *wxFont::wxFont* (p. 514) for a list of valid weight identifiers.

[See also](#)

wxFont::SetWeight (p. 520)

wxFont::Ok

bool Ok() const

Returns `true` if this object is a valid font, `false` otherwise.

wxFont::SetDefaultEncoding

static void SetDefaultEncoding(wxFontEncoding *encoding*)

Sets the default font encoding.

[See also](#)

Font encoding overview (p. 1650), *GetDefaultEncoding* (p. 516)

wxFont::SetFaceName

void SetFaceName(const wxString& *faceName*)

Sets the facename for the font.

Parameters

faceName

A valid facename, which should be on the end-user's system.

Remarks

To avoid portability problems, don't rely on a specific face, but specify the font family instead or as well. A suitable font will be found on the end-user's system. If both the family and the facename are specified, `wxWidgets` will first search for the specific face, and then for a font belonging to the same family.

See also

`wxFont::GetFaceName` (p. 516), `wxFont::SetFamily` (p. 519)

wxFont::SetFamily

void SetFamily(int *family*)

Sets the font family.

Parameters

family

One of:

wxDEFAULT	Chooses a default font.
wxDECORATIVE	A decorative font.
wxROMAN	A formal, serif font.
wxSCRIPT	A handwriting font.
wxSWISS	A sans-serif font.
wxMODERN	A fixed pitch font.

See also

`wxFont::GetFamily` (p. 517), `wxFont::SetFaceName` (p. 518)

wxFont::SetNativeFontInfo

void SetNativeFontInfo(const wxString& *info*)

Creates the font corresponding to the given native font description string which must have been previously returned by `GetNativeFontInfoDesc` (p. 517). If the string is invalid, font is unchanged.

wxFont::SetPointSize

void SetPointSize(int *pointSize*)

Sets the point size.

Parameters

pointSize

Size in points.

See also

wxFont::GetPointSize (p. 517)

wxFont::SetStyle

void SetStyle(int style)

Sets the font style.

Parameters

style

One of **wxNORMAL**, **wxSLANT** and **wxITALIC**.

See also

wxFont::GetStyle (p. 517)

wxFont::SetUnderlined

void SetUnderlined(const bool underlined)

Sets underlining.

Parameters

underlining

true to underline, false otherwise.

See also

wxFont::GetUnderlined (p. 518)

wxFont::SetWeight

void SetWeight(int weight)

Sets the font weight.

Parameters

weight

One of **wxNORMAL**, **wxLIGHT** and **wxBOLD**.

See also

wxFont::GetWeight (p. 518)

wxFont::operator =

wxFont& operator =(const wxFont& font)

Assignment operator, using reference counting. Returns a reference to 'this'.

wxFont::operator ==

bool operator ==(const wxFont& font)

Equality operator. Two fonts are equal if they contain pointers to the same underlying font data. It does not compare each attribute, so two independently-created fonts using the same parameters will fail the test.

wxFont::operator !=

bool operator !=(const wxFont& font)

Inequality operator. Two fonts are not equal if they contain pointers to different underlying font data. It does not compare each attribute.

wxFontData

wxFontDialog overview (p. 1656)

This class holds a variety of information related to font dialogs.

Derived from

wxObject (p. 954)

Include files

<wx/cmndata.h>

See also

Overview (p. 1656), *wxFontDialog* (p. 524)

wxFontData::wxFontData

wxFontData()

Constructor. Initializes *fontColour* to black, *showHelp* to black, *allowSymbols* to true, *enableEffects* to true, *minSize* to 0 and *maxSize* to 0.

wxFontData::~~wxFontData

~wxFontData()

Destructor.

wxFontData::EnableEffects

void EnableEffects(bool enable)

Enables or disables 'effects' under MS Windows only. This refers to the controls for manipulating colour, strikeout and underline properties.

The default value is true.

wxFontData::GetAllowSymbols

bool GetAllowSymbols()

Under MS Windows, returns a flag determining whether symbol fonts can be selected. Has no effect on other platforms.

The default value is true.

wxFontData::GetColour

wxColour& GetColour()

Gets the colour associated with the font dialog.

The default value is black.

wxFontData::GetChosenFont

wxFont GetChosenFont()

Gets the font chosen by the user if the user pressed OK (`wxFontDialog::ShowModal` returned `wxID_OK`).

wxFontData::GetEnableEffects

bool GetEnableEffects()

Determines whether 'effects' are enabled under Windows. This refers to the controls for manipulating colour, strikeout and underline properties.

The default value is true.

wxFontData::GetInitialFont

wxFont GetInitialFont()

Gets the font that will be initially used by the font dialog. This should have previously been set by the application.

wxFontData::GetShowHelp

bool GetShowHelp()

Returns true if the Help button will be shown (Windows only).

The default value is false.

wxFontData::SetAllowSymbols

void SetAllowSymbols(bool allowSymbols)

Under MS Windows, determines whether symbol fonts can be selected. Has no effect on other platforms.

The default value is true.

wxFontData::SetChosenFont

void SetChosenFont(const wxFont& font)

Sets the font that will be returned to the user (for internal use only).

wxFontData::SetColour

void SetColour(const wxColour& colour)

Sets the colour that will be used for the font foreground colour.

The default colour is black.

wxFontData::SetInitialFont

void SetInitialFont(const wxFont& font)

Sets the font that will be initially used by the font dialog.

wxFontData::SetRange

void SetRange(int min, int max)

Sets the valid range for the font point size (Windows only).

The default is 0, 0 (unrestricted range).

wxFontData::SetShowHelp

void SetShowHelp(bool showHelp)

Determines whether the Help button will be displayed in the font dialog (Windows only).

The default value is false.

wxFontData::operator =

void operator =(const wxFontData& data)

Assignment operator for the font data.

wxFontDialog

This class represents the font chooser dialog.

Derived from

wxDialog (p. 369)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/fontdlg.h>

See also

Overview (p. 1656),

wxFontData (p. 521),

wxGetFontFromUser (p. 1498)

wxFontDialog::wxFontDialog

wxFontDialog()**wxFontDialog(wxWindow* parent)****wxFontDialog(wxWindow* parent, const wxFontData& data)**

Constructor. Pass a parent window, and optionally the *font data* (p. 521) object to be used to initialize the dialog controls. If the default constructor is used, *Create()* (p. 525) must be called before the dialog can be shown.

wxFontDialog::Create

bool Create()**bool Create(wxWindow* parent)****bool Create(wxWindow* parent, const wxFontData& data)**

Creates the dialog if it the wxFontDialog object had been initialized using the default constructor. Returns `true` on success and `false` if an error occurred.

wxFontDialog::~~wxFontDialog

~wxFontDialog()

Destructor.

wxFontDialog::GetFontData

const wxFontData& GetFontData() const**wxFontData& GetFontData()**

Returns the *font data* (p. 521) associated with the font dialog.

wxFontDialog::ShowModal

int ShowModal()

Shows the dialog, returning `wxID_OK` if the user pressed Ok, and `wxID_CANCEL` otherwise.

If the user cancels the dialog (*ShowModal* returns `wxID_CANCEL`), no font will be created. If the user presses OK, a new `wxFont` will be created and stored in the font dialog's `wxFontData` structure.

wxFontEnumerator

wxFontEnumerator enumerates either all available fonts on the system or only the ones with given attributes - either only fixed-width (suited for use in programs such as terminal emulators and the like) or the fonts available in the given *encoding* (p. 1650).

To do this, you just have to call one of `EnumerateXXX()` functions - either *EnumerateFacenames* (p. 526) or *EnumerateEncodings* (p. 526) and the corresponding callback (*OnFacename* (p. 527) or *OnFontEncoding* (p. 527)) will be called repeatedly until either all fonts satisfying the specified criteria are exhausted or the callback returns false.

Virtual functions to override

Either *OnFacename* (p. 527) or *OnFontEncoding* (p. 527) should be overridden depending on whether you plan to call *EnumerateFacenames* (p. 526) or *EnumerateEncodings* (p. 526). Of course, if you call both of them, you should override both functions.

Derived from

None

Include files

<wx/fontenum.h>

See also

Font encoding overview (p. 1650), *Font sample* (p. 1572), *wxFont* (p. 512), *wxFontMapper* (p. 528)

wxFontEnumerator::EnumerateFacenames

virtual bool EnumerateFacenames(wxFontEncoding encoding = wxFONTENCODING_SYSTEM, bool fixedWidthOnly = false)

Call *OnFacename* (p. 527) for each font which supports given encoding (only if it is not wxFONTENCODING_SYSTEM) and is of fixed width (if *fixedWidthOnly* is true).

Calling this function with default arguments will result in enumerating all fonts available on the system.

wxFontEnumerator::EnumerateEncodings

virtual bool EnumerateEncodings(const wxString& font = "")

Call *OnFontEncoding* (p. 527) for each encoding supported by the given font - or for each encoding supported by at least some font if *font* is not specified.

wxFontEnumerator::GetEncodings

wxArrayString* GetEncodings()

Return array of strings containing all encodings found by *EnumerateEncodings* (p. 526). This is convenience function. It is based on default implementation of *OnFontEncoding* (p. 527) so don't expect it to work if you overwrite that method.

wxFontEnumerator::GetFacenames

wxArrayString* GetFacenames()

Return array of strings containing all facenames found by *EnumerateFacenames* (p. 526). This is convenience function. It is based on default implementation of *OnFacename* (p. 527) so don't expect it to work if you overwrite that method.

wxFontEnumerator::OnFacename

virtual bool OnFacename(const wxString& font)

Called by *EnumerateFacenames* (p. 526) for each match. Return true to continue enumeration or false to stop it.

wxFontEnumerator::OnFontEncoding

virtual bool OnFontEncoding(const wxString& font, const wxString& encoding)

Called by *EnumerateEncodings* (p. 526) for each match. Return true to continue enumeration or false to stop it.

wxFontList

A font list is a list containing all fonts which have been created. There is only one instance of this class: **wxTheFontList**. Use this object to search for a previously created font of the desired type and create it if not already found. In some windowing systems, the font may be a scarce resource, so it is best to reuse old resources if possible. When an application finishes, all fonts will be deleted and their resources freed, eliminating the possibility of 'memory leaks'.

Derived from

wxList (p. 787)

wxObject (p. 954)

Include files

<wx/gdicmn.h>

See also

wxFont (p. 512)

wxFontList::wxFontList

wxFontList()

Constructor. The application should not construct its own font list: use the object pointer **wxTheFontList**.

wxFontList::AddFont

void AddFont(wxFont *font)

Used by wxWidgets to add a font to the list, called in the font constructor.

wxFontList::FindOrCreateFont

wxFont * FindOrCreateFont(int point_size, int family, int style, int weight, bool underline = false, const wxString& facename = NULL, wxFontEncoding encoding = wxFONTENCODING_DEFAULT)

Finds a font of the given specification, or creates one and adds it to the list. See the *wxFont constructor* (p. 514) for details of the arguments.

wxFontList::RemoveFont

void RemoveFont(wxFont *font)

Used by wxWidgets to remove a font from the list.

wxFontMapper

wxFontMapper manages user-definable correspondence between logical font names and the fonts present on the machine.

The default implementations of all functions will ask the user if they are not capable of finding the answer themselves and store the answer in a config file (configurable via SetConfigXXX functions). This behaviour may be disabled by giving the value of false to "interactive" parameter.

However, the functions will always consult the config file to allow the user-defined values override the default logic and there is no way to disable this - which shouldn't be ever needed because if "interactive" was never true, the config file is never created anyhow.

In case everything else fails (i.e. there is no record in config file and "interactive" is false or user denied to choose any replacement), the class queries *wxEncodingConverter* (p. 437) for "equivalent" encodings (e.g. iso8859-2 and cp1250) and tries them.

Using wxFontMapper in conjunction with wxMBConv classes

If you need to display text in encoding which is not available at host system (see *IsEncodingAvailable* (p. 531)), you may use these two classes to find font in some similar encoding (see *GetAltForEncoding* (p. 530)) and convert the text to this encoding (*wxMBConv* classes (p. 1593)).

Following code snippet demonstrates it:

```
if (!wxFontMapper::Get()->IsEncodingAvailable(enc, facename))
{
    wxFontEncoding alternative;
    if (wxFontMapper::Get()->GetAltForEncoding(enc, &alternative,
                                                facename, false))
    {
        wxCSConv convFrom(wxFontMapper::Get()->GetEncodingName(enc));
        wxCSConv convTo(wxFontMapper::Get()->GetEncodingName(alternative));
        text = wxString(text.mb_str(convFrom), convTo);
    }
    else
        ...failure (or we may try iso8859-1/7bit ASCII)...
}
...display text...
```

Derived from

No base class

Include files

<wx/fontmap.h>

See also

wxEncodingConverter (p. 437), *Writing non-English applications* (p. 1597)

wxFontMapper::wxFontMapper

wxFontMapper()

Default ctor.

Note

The preferred way of creating a *wxFontMapper* instance is to call *wxFontMapper::Get* (p. 530).

wxFontMapper::~~wxFontMapper

~wxFontMapper()

Virtual dtor for a base class.

wxFontMapper::CharsetToEncoding

wxFontEncoding **CharsetToEncoding**(const wxString& charset, bool interactive = true)

Returns the encoding for the given charset (in the form of RFC 2046) or `wxFONTENCODING_SYSTEM` if couldn't decode it.

Be careful when using this function with *interactive* set to `true` (default value) as the function then may show a dialog box to the user which may lead to unexpected reentrancies and may also take a significantly longer time than a simple function call. For these reasons, it is almost always a bad idea to call this function from the event handlers for repeatedly generated events such as `EVT_PAINT`.

wxFontMapper::Get

static wxFontMapper * Get()

Get the current font mapper object. If there is no current object, creates one.

[See also](#)

wxFontMapper::Set (p. 532)

wxFontMapper::GetAltForEncoding

bool **GetAltForEncoding**(wxFontEncoding encoding, wxNativeEncodingInfo* info, const wxString& facename = wxEmptyString, bool interactive = true)

bool **GetAltForEncoding**(wxFontEncoding encoding, wxFontEncoding* alt_encoding, const wxString& facename = wxEmptyString, bool interactive = true)

Find an alternative for the given encoding (which is supposed to not be available on this system). If successful, return true and fill info structure with the parameters required to create the font, otherwise return false.

The first form is for wxWidgets' internal use while the second one is better suitable for general use -- it returns `wxFontEncoding` which can consequently be passed to `wxFont` constructor.

wxFontMapper::GetEncoding

static wxFontEncoding **GetEncoding**(size_t n)

Returns the *n*-th supported encoding. Together with *GetSupportedEncodingsCount()* (p.

531) this method may be used to get all supported encodings.

wxFontMapper::GetEncodingDescription

static wxString GetEncodingDescription(wxFontEncoding encoding)

Return user-readable string describing the given encoding.

wxFontMapper::GetEncodingFromName

static wxFontEncoding GetEncodingFromName(const wxString& encoding)

Return the encoding corresponding to the given internal name. This function is the inverse of *GetEncodingName* (p. 531) and is intentionally less general than *CharsetToEncoding* (p. 530), i.e. it doesn't try to make any guesses nor ever asks the user. It is meant just as a way of restoring objects previously serialized using *GetEncodingName* (p. 531).

wxFontMapper::GetEncodingName

static wxString GetEncodingName(wxFontEncoding encoding)

Return internal string identifier for the encoding (see also *GetEncodingDescription()* (p. 531))

[See also](#)

GetEncodingFromName (p. 531)

wxFontMapper::GetSupportedEncodingsCount

static size_t GetSupportedEncodingsCount()

Returns the number of the font encodings supported by this class. Together with *GetEncoding* (p. 530) this method may be used to get all supported encodings.

wxFontMapper::IsEncodingAvailable

bool IsEncodingAvailable(wxFontEncoding encoding, const wxString& facename = wxEmptyString)

Check whether given encoding is available in given face or not. If no facename is given, find *any* font in this encoding.

wxFontMapper::SetDialogParent

void SetDialogParent(wxWindow* parent)

The parent window for modal dialogs.

wxFontMapper::SetDialogTitle

void SetDialogTitle(const wxString& title)

The title for the dialogs (note that default is quite reasonable).

wxFontMapper::Set

static wxFontMapper * Set(wxFontMapper *mapper)

Set the current font mapper object and return previous one (may be NULL). This method is only useful if you want to plug-in an alternative font mapper into wxWidgets.

[See also](#)

wxFontMapper::Get (p. 530)

wxFontMapper::SetConfig

void SetConfig(wxConfigBase* config)

Set the config object to use (may be NULL to use default).

By default, the global one (from wxConfigBase::Get()) will be used) and the default root path for the config settings is the string returned by GetDefaultConfigPath().

wxFontMapper::SetConfigPath

void SetConfigPath(const wxString& prefix)

Set the root config path to use (should be an absolute path).

wxFrame

A frame is a window whose size and position can (usually) be changed by the user. It usually has thick borders and a title bar, and can optionally contain a menu bar, toolbar and status bar. A frame can contain any window that is not a frame or dialog.

A frame that has a status bar and toolbar created via the CreateStatusBar/CreateToolBar functions manages these windows, and adjusts the value returned by GetClientSize to reflect the remaining size available to application windows.

Derived from

wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/frame.h>

Window styles

wxDEFAULT_FRAME_STYLE	Defined as wxMINIMIZE_BOX wxMAXIMIZE_BOX wxRESIZE_BORDER wxSYSTEM_MENU wxCAPTION wxCLOSE_BOX .
wxICONIZE	Display the frame iconized (minimized). Windows only.
wxCAPTION	Puts a caption on the frame.
wxMINIMIZE	Identical to wxICONIZE . Windows only.
wxMINIMIZE_BOX	Displays a minimize box on the frame.
wxMAXIMIZE	Displays the frame maximized. Windows only.
wxMAXIMIZE_BOX	Displays a maximize box on the frame.
wxCLOSE_BOX	Displays a close box on the frame.
wxSTAY_ON_TOP	Stay on top of all other windows, see also wxFRAME_FLOAT_ON_PARENT . Windows only.
wxSYSTEM_MENU	Displays a system menu.
wxRESIZE_BORDER	Displays a resizable border around the window.
wxFRAME_TOOL_WINDOW	Causes a frame with a small titlebar to be created; the frame does not appear in the taskbar under Windows.
wxFRAME_NO_TASKBAR	Creates an otherwise normal frame but it does not appear in the taskbar under Windows (note that it will minimize to the desktop window which may seem strange to the users and thus it might be better to use this style only without wxMINIMIZE_BOX style). Has no effect under other platforms.
wxFRAME_FLOAT_ON_PARENT	The frame will always be on top of its parent (unlike wxSTAY_ON_TOP). A frame created with this style must have a non-NULL parent.
wxFRAME_EX_CONTEXTHELP	Under Windows, puts a query button on the caption. When pressed, Windows will go into a context-sensitive help mode and <i>wxWidgets</i> will send a wxEVT_HELP event if the user clicked on an application

window. *Note* that this is an extended style and must be set by calling *SetExtraStyle* (p. 1427) before *Create* is called (two-step construction). You cannot use this style together with `wxMAXIMIZE_BOX` or `wxMINIMIZE_BOX`, so you should use `wxDEFAULT_FRAME_STYLE & ~ (wxMINIMIZE_BOX | wxMAXIMIZE_BOX)` for the frames having this style (the dialogs don't have a minimize or a maximize box by default)

wxFRAME_SHAPED

Windows with this style are allowed to have their shape changed with the *SetShape* (p. 543) method.

The default frame style is for normal, resizable frames. To create a frame which can not be resized by user, you may use the following combination of styles:

`wxDEFAULT_FRAME_STYLE & ~ (wxRESIZE_BORDER | wxRESIZE_BOX | wxMAXIMIZE_BOX)`. See also *window styles overview* (p. 1618).

Default event processing

`wxFrame` processes the following events:

`wxEVT_SIZE` (p. 1109) If the frame has exactly one child window, not counting the status and toolbar, this child is resized to take the entire frame client area. If two or more windows are present, they should be laid out explicitly either by manually handling `wxEVT_SIZE` or using *sizers* (p. 1627)

`wxEVT_MENU_HIGHLIGHT` (p. 907) The default implementation displays the *help string* (p. 911) associated with the selected item in the first pane of the status bar, if there is one.

Remarks

An application should normally define an *wxCloseEvent* (p. 139) handler for the frame to respond to system close events, for example so that related data and subwindows can be cleaned up.

See also

wxMDIParentFrame (p. 874), *wxMDIChildFrame* (p. 870), *wxMiniFrame* (p. 921), *wxDialog* (p. 369)

wxFrame::wxFrame

wxFrame()

Default constructor.

wxFrame(`wxWindow*` parent, `wxWindowID` id, `const wxString&` title, `const wxPoint&` pos = `wxDefaultPosition`, `const wxSize&` size = `wxDefaultSize`, `long` style = `wxDEFAULT_FRAME_STYLE`, `const wxString&` name = "frame")

Constructor, creating the window.

Parameters

parent

The window parent. This may be NULL. If it is non-NULL, the frame will always be displayed on top of the parent window on Windows.

id

The window identifier. It may take a value of -1 to indicate a default value.

title

The caption to be displayed on the frame's title bar.

pos

The window position. A value of (-1, -1) indicates a default position, chosen by either the windowing system or wxWidgets, depending on platform.

size

The window size. A value of (-1, -1) indicates a default size, chosen by either the windowing system or wxWidgets, depending on platform.

style

The window style. See *wxFrame* (p. 532).

name

The name of the window. This parameter is used to associate a name with the item, allowing the application user to set Motif resource values for individual windows.

Remarks

For Motif, MWM (the Motif Window Manager) should be running for any window styles to work (otherwise all styles take effect).

See also

wxFrame::Create (p. 536)

wxFrame::~~wxFrame

void ~wxFrame()

Destructor. Destroys all child windows and menu bar if present.

wxFrame::Centre

void Centre(int direction = wxBOTH)

Centres the frame on the display.

Parameters

direction

The parameter may be `wxHORIZONTAL`, `wxVERTICAL` or `wxBOTH`.

wxFrame::Command

void Command(int id)

Simulate a menu command.

Parameters

id

The identifier for a menu item.

wxFrame::Create

bool Create(wxWindow* parent, wxWindowID id, const wxString& title, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxDEFAULT_FRAME_STYLE, const wxString& name = "frame")

Used in two-step frame construction. See `wxFrame::wxFrame` (p. 534) for further details.

wxFrame::CreateStatusBar

virtual wxStatusBar* CreateStatusBar(int number = 1, long style = 0, wxWindowID id = -1, const wxString& name = "statusBar")

Creates a status bar at the bottom of the frame.

Parameters

number

The number of fields to create. Specify a value greater than 1 to create a multi-field status bar.

style

The status bar style. See `wxStatusBar` (p. 1186) for a list of valid styles.

id

The status bar window identifier. If -1, an identifier will be chosen by `wxWidgets`.

name

The status bar window name.

Return value

A pointer to the the status bar if it was created successfully, NULL otherwise.

Remarks

The width of the status bar is the whole width of the frame (adjusted automatically when resizing), and the height and text size are chosen by the host windowing system.

By default, the status bar is an instance of `wxStatusBar`. To use a different class, override `wxFrame::OnCreateStatusBar` (p. 540).

Note that you can put controls and other windows on the status bar if you wish.

See also

`wxFrame::SetStatusText` (p. 543), `wxFrame::OnCreateStatusBar` (p. 540),
`wxFrame::GetStatusBar` (p. 538)

wxFrame::CreateToolBar

```
virtual wxToolBar* CreateToolBar(long style = wxNO_BORDER |  
wxTB_HORIZONTAL, wxWindowID id = -1, const wxString& name = "toolBar")
```

Creates a toolbar at the top or left of the frame.

Parameters

style

The toolbar style. See `wxToolBar` (p. 1311) for a list of valid styles.

id

The toolbar window identifier. If -1, an identifier will be chosen by `wxWidgets`.

name

The toolbar window name.

Return value

A pointer to the the toolbar if it was created successfully, NULL otherwise.

Remarks

By default, the toolbar is an instance of `wxToolBar` (which is defined to be a suitable toolbar class on each platform, such as `wxToolBar95`). To use a different class, override `wxFrame::OnCreateToolBar` (p. 541).

When a toolbar has been created with this function, or made known to the frame with *wxFrame::SetToolBar* (p. 544), the frame will manage the toolbar position and adjust the return value from *wxWindow::GetClientSize* (p. 1403) to reflect the available space for application windows.

See also

wxFrame::CreateStatusBar (p. 536), *wxFrame::OnCreateToolBar* (p. 541),
wxFrame::SetToolBar (p. 544), *wxFrame::GetToolBar* (p. 539)

wxFrame::GetClientAreaOrigin

wxPoint GetClientAreaOrigin() const

Returns the origin of the frame client area (in client coordinates). It may be different from (0, 0) if the frame has a toolbar.

wxFrame::GetMenuBar

wxMenuBar* GetMenuBar() const

Returns a pointer to the menubar currently associated with the frame (if any).

See also

wxFrame::SetMenuBar (p. 542), *wxMenuBar* (p. 899), *wxMenu* (p. 885)

wxFrame::GetStatusBar

wxStatusBar* GetStatusBar() const

Returns a pointer to the status bar currently associated with the frame (if any).

See also

wxFrame::CreateStatusBar (p. 536), *wxStatusBar* (p. 1186)

wxFrame::GetStatusBarPane

int GetStatusBarPane()

Returns the status bar pane used to display menu and toolbar help.

See also

wxFrame::SetStatusBarPane (p. 543)

wxFrame::GetTitle

wxString GetTitle() const

Gets a string containing the frame title. See *wxFrame::SetTitle* (p. 544).

wxFrame::GetToolBar

wxToolBar* GetToolBar() const

Returns a pointer to the toolbar currently associated with the frame (if any).

See also

wxFrame::CreateToolBar (p. 537), *wxToolBar* (p. 1311), *wxFrame::SetToolBar* (p. 544)

wxFrame::Iconize

void Iconize(bool iconize)

Iconizes or restores the frame.

Parameters

iconize

If true, iconizes the frame; if false, shows and restores it.

See also

wxFrame::IsIconized (p. 539), *wxFrame::Maximize* (p. 540).

wxFrame::IsFullScreen

bool IsFullScreen()

Returns true if the frame is in fullscreen mode.

See also

wxFrame::ShowFullScreen (p. 545)

wxFrame::IsIconized

bool IsIconized() const

Returns true if the frame is iconized.

wxFrame::IsMaximized

bool IsMaximized() const

Returns true if the frame is maximized.

wxFrame::Maximize

void Maximize(bool *maximize*)

Maximizes or restores the frame.

Parameters

maximize

If true, maximizes the frame, otherwise it restores it.

Remarks

This function only works under Windows.

See also

wxFrame::Iconize (p. 539)

wxFrame::OnCreateStatusBar

virtual wxStatusBar* OnCreateStatusBar(int *number*, long *style*, wxWindowID *id*, const wxString& *name*)

Virtual function called when a status bar is requested by *wxFrame::CreateStatusBar* (p. 536).

Parameters

number

The number of fields to create.

style

The window style. See *wxStatusBar* (p. 1186) for a list of valid styles.

id

The window identifier. If -1, an identifier will be chosen by wxWidgets.

name

The window name.

Return value

A status bar object.

Remarks

An application can override this function to return a different kind of status bar. The default implementation returns an instance of *wxStatusBar* (p. 1186).

See also

wxFrame::CreateStatusBar (p. 536), *wxStatusBar* (p. 1186).

wxFrame::OnCreateToolBar

virtual wxToolBar* OnCreateToolBar(long style, wxWindowID id, const wxString& name)

Virtual function called when a toolbar is requested by *wxFrame::CreateToolBar* (p. 537).

Parameters

style

The toolbar style. See *wxToolBar* (p. 1311) for a list of valid styles.

id

The toolbar window identifier. If -1, an identifier will be chosen by wxWidgets.

name

The toolbar window name.

Return value

A toolbar object.

Remarks

An application can override this function to return a different kind of toolbar. The default implementation returns an instance of *wxToolBar* (p. 1311).

See also

wxFrame::CreateToolBar (p. 537), *wxToolBar* (p. 1311).

wxFrame::SendSizeEvent

void SendSizeEvent()

This function sends a dummy *size event* (p. 1109) to the frame forcing it to reevaluate its children positions. It is sometimes useful to call this function after adding or deleting a children after the frame creation or if a child size changes.

Note that if the frame is using either sizers or constraints for the children layout, it is enough to call *Layout()* (p. 1414) directly and this function should not be used in this

case.

wxFrame::SetIcon

void SetIcon(const wxIcon& *icon*)

Sets the icon for this frame.

Parameters

icon

The icon to associate with this frame.

Remarks

The frame takes a 'copy' of *icon*, but since it uses reference counting, the copy is very quick. It is safe to delete *icon* after calling this function.

See also *wxIcon* (p. 716).

wxFrame::SetIcons

void SetIcons(const wxIconBundle& *icons*)

Sets the icons for this frame.

Parameters

icons

The icons to associate with this frame.

See also *wxIconBundle* (p. 723).

wxFrame::SetMenuBar

void SetMenuBar(wxMenuBar* *menuBar*)

Tells the frame to show the given menu bar.

Parameters

menuBar

The menu bar to associate with the frame.

Remarks

If the frame is destroyed, the menu bar and its menus will be destroyed also, so do not delete the menu bar explicitly (except by resetting the frame's menu bar to another frame

or NULL).

Under Windows, a size event is generated, so be sure to initialize data members properly before calling **SetMenuBar**.

Note that on some platforms, it is not possible to call this function twice for the same frame object.

See also

wxFrame::GetMenuBar (p. 538), *wxMenuBar* (p. 899), *wxMenu* (p. 885).

wxFrame::SetShape

bool SetShape(const wxRegion& region)

If the platform supports it, sets the shape of the window to that depicted by *region*. The system will not display or respond to any mouse event for the pixels that lie outside of the region. To reset the window to the normal rectangular shape simply call *SetShape* again with an empty region. Returns TRUE if the operation is successful.

wxFrame::SetStatusBar

void SetStatusBar(wxStatusBar* statusBar)

Associates a status bar with the frame.

See also

wxFrame::CreateStatusBar (p. 536), *wxStatusBar* (p. 1186), *wxFrame::GetStatusBar* (p. 538)

wxFrame::SetStatusBarPane

void SetStatusBarPane(int n)

Set the status bar pane used to display menu and toolbar help. Using -1 disables help display.

wxFrame::SetStatusText

virtual void SetStatusText(const wxString& text, int number = 0)

Sets the status bar text and redraws the status bar.

Parameters

text

The text for the status field.

number

The status field (starting from zero).

Remarks

Use an empty string to clear the status bar.

See also

wxFrame::CreateStatusBar (p. 536), *wxStatusBar* (p. 1186)

wxFrame::SetStatusWidths

virtual void SetStatusWidths(int *n*, int **widths*)

Sets the widths of the fields in the status bar.

Parameters

n The number of fields in the status bar. It must be the same used in *CreateStatusBar* (p. 536).

widths

Must contain an array of *n* integers, each of which is a status field width in pixels. A value of -1 indicates that the field is variable width; at least one field must be -1. You should delete this array after calling **SetStatusWidths**.

Remarks

The widths of the variable fields are calculated from the total width of all fields, minus the sum of widths of the non-variable fields, divided by the number of variable fields.

wxPython note: Only a single parameter is required, a Python list of integers.

wxPerl note: In wxPerl this method takes the field widths as parameters.

wxFrame::SetToolBar

void SetToolBar(wxToolBar* *toolBar*)

Associates a toolbar with the frame.

See also

wxFrame::CreateToolBar (p. 537), *wxToolBar* (p. 1311), *wxFrame::GetToolBar* (p. 539)

wxFrame::SetTitle

virtual void SetTitle(const wxString& title)

Sets the frame title.

Parameters

title

The frame title.

See also

wxFrame::GetTitle (p. 538)

wxFrame::ShowFullScreen

bool ShowFullScreen(bool show, long style = wxFULLSCREEN_ALL)

Depending on the value of *show* parameter the frame is either shown full screen or restored to its normal state. *style* is a bit list containing some or all of the following values, which indicate what elements of the frame to hide in full-screen mode:

- wxFULLSCREEN_NOMENUBAR
- wxFULLSCREEN_NOTOOLBAR
- wxFULLSCREEN_NOSTATUSBAR
- wxFULLSCREEN_NOBORDER
- wxFULLSCREEN_NOCAPTION
- wxFULLSCREEN_ALL (all of the above)

This function has not been tested with MDI frames.

Note that showing a frame full screen also actually *Show()*s (p. 1438) if it hadn't been shown yet.

See also

wxFrame::IsFullScreen (p. 539)

wxFSFile

This class represents a single file opened by *wxFileSystem* (p. 494). It provides more information than *wxWindow*'s input stream (stream, filename, mime type, anchor).

Note: Any pointer returned by a method of *wxFSFile* is valid only as long as the *wxFSFile* object exists. For example a call to *GetStream()* doesn't *create* the stream but only returns the pointer to it. In other words after 10 calls to *GetStream()* you will obtain ten identical pointers.

Derived from

wxObject (p. 954)

Include files

<wx/filesys.h>

See Also

wxFileSystemHandler (p. 496), *wxFileSystem* (p. 494), *Overview* (p. 1608)

wxFSFile::wxFSFile

wxFSFile(wxInputStream *stream, const wxString& loc, const wxString& mimetype, const wxString& anchor)

Constructor. You probably won't use it. See Notes for details.

Parameters

stream

The input stream that will be used to access data

location

The full location (aka filename) of the file

mimetype

MIME type of this file. Mime type is either extension-based or HTTP Content-Type

anchor

Anchor. See *GetAnchor()* (p. 547) for details.

If you are not sure of the meaning of these params, see the description of the *GetXXXX()* functions.

Notes

It is seldom used by the application programmer but you will need it if you are writing your own virtual FS. For example you may need something similar to *wxMemoryInputStream*, but because *wxMemoryInputStream* doesn't free the memory when destroyed and thus passing a memory stream pointer into *wxFSFile* constructor would lead to memory leaks, you can write your own class derived from *wxFSFile*:

```
class wxMyFSFile : public wxFSFile
{
private:
    void *m_Mem;
public:
    wxMyFSFile(.....)
```

```
~wxMyFSFile() {free(m_Mem);}
                // of course dtor is virtual ;-)
};
```

wxFSFile::GetAnchor

const wxString& GetAnchor() const

Returns anchor (if present). The term of **anchor** can be easily explained using few examples:

```
index.htm#anchor           /* 'anchor' is anchor */
index/wx001.htm           /* NO anchor here!    */
archive/main.zip#zip:index.htm#global /* 'global'          */
archive/main.zip#zip:index.htm /* NO anchor here!    */
```

Usually an anchor is presented only if the MIME type is 'text/html'. But it may have some meaning with other files; for example myanim.avi#200 may refer to position in animation or reality.wrl#MyView may refer to a predefined view in VRML.

wxFSFile::GetLocation

const wxString& GetLocation() const

Returns full location of the file, including path and protocol. Examples :

```
http://www.wxwidgets.org
http://www.ms.mff.cuni.cz/~vsla8348/wxhtml/archive.zip#zip:info.txt
file:/home/vasek/index.htm
relative-file.htm
```

wxFSFile::GetMimeType

const wxString& GetMimeType() const

Returns the MIME type of the content of this file. It is either extension-based (see wxMimeTypesManager) or extracted from HTTP protocol Content-Type header.

wxFSFile::GetModificationTime

wxDateTime GetModificationTime() const

Returns time when this file was modified.

wxFSFile::GetStream

wxInputStream* GetStream() const

Returns pointer to the stream. You can use the returned stream to directly access data.

You may suppose that the stream provide Seek and GetSize functionality (even in the case of the HTTP protocol which doesn't provide this by default. wxHtml uses local cache to work around this and to speed up the connection).

wxFTP

wxFTP can be used to establish a connection to an FTP server and perform all the usual operations. Please consult the RFC 959 for more details about the FTP protocol.

To use a commands which doesn't involve file transfer (i.e. directory oriented commands) you just need to call a corresponding member function or use the generic *SendCommand* (p. 550) method. However to actually transfer files you just get or give a stream to or from this class and the actual data are read or written using the usual stream methods.

Example of using wxFTP for file downloading:

```
wxFTP ftp;

// if you don't use these lines anonymous login will be used
ftp.SetUser("user");
ftp.SetPassword("password");

if ( !ftp.Connect("ftp.wxwindows.org") )
{
    wxLogError("Couldn't connect");
    return;
}

ftp.ChDir("/pub");
wxInputStream *in = ftp.GetInputStream("wxWidgets-4.2.0.tar.gz");
if ( !in )
{
    wxLogError("Coudln't get file");
}
else
{
    size_t size = in->GetSize();
    char *data = new char[size];
    if ( !in->Read(data, size) )
    {
        wxLogError("Read error");
    }
    else
    {
        // file data is in the buffer
        ...
    }

    delete [] data;
    delete in;
}
```

To upload a file you would do (assuming the connection to the server was opened successfully):

```
wxOutputStream *out = ftp.GetOutputStream("filename");
if ( out )
{
    out->Write(...); // your data
    delete out;
}
```

Constants

`wxFTP` defines constants corresponding to the two supported transfer modes:

```
enum TransferMode
{
    ASCII,
    BINARY
};
```

Derived from

`wxProtocol` (p. 1027)

Include files

`<wx/protocol/ftp.h>`

See also

`wxSocketBase` (p. 1132)

`wxFTP::wxFTP`

`wxFTP()`

Default constructor.

`wxFTP::~~wxFTP`

`~wxFTP()`

Destructor will close the connection if connected.

`wxFTP::Abort`

`bool Abort()`

Aborts the download currently in process, returns `true` if ok, `false` if an error occurred.

`wxFTP::CheckCommand`

`bool CheckCommand(const wxString& command, char ret)`

Send the specified *command* to the FTP server. *ret* specifies the expected result.

Return value

true if the command has been sent successfully, else false.

wxFTP::SendCommand

char SendCommand(const wxString& *command*)

Send the specified *command* to the FTP server and return the first character of the return code.

wxFTP::GetLastResult

const wxString& GetLastResult()

Returns the last command result, i.e. the full server reply for the last command.

wxFTP::ChDir

bool ChDir(const wxString& *dir*)

Change the current FTP working directory. Returns true if successful.

wxFTP::MkDir

bool MkDir(const wxString& *dir*)

Create the specified directory in the current FTP working directory. Returns true if successful.

wxFTP::RmDir

bool RmDir(const wxString& *dir*)

Remove the specified directory from the current FTP working directory. Returns true if successful.

wxFTP::Pwd

wxString Pwd()

Returns the current FTP working directory.

wxFTP::Rename

bool Rename(const wxString& *src*, const wxString& *dst*)

Rename the specified *src* element to *dst*. Returns true if successful.

wxFTP::RmFile

bool RmFile(const wxString& *path*)

Delete the file specified by *path*. Returns true if successful.

wxFTP::SetAscii

bool SetAscii()

Sets the transfer mode to ASCII. It will be used for the next transfer.

wxFTP::SetBinary

bool SetBinary()

Sets the transfer mode to binary (IMAGE). It will be used for the next transfer.

wxFTP::SetTransferMode

bool SetTransferMode(TransferMode *mode*)

Sets the transfer mode to the specified one. It will be used for the next transfer.

If this function is never called, binary transfer mode is used by default.

wxFTP::SetUser

void SetUser(const wxString& *user*)

Sets the user name to be sent to the FTP server to be allowed to log in.

Default value

The default value of the user name is "anonymous".

Remark

This parameter can be included in a URL if you want to use the URL manager. For example, you can use: "ftp://a_user:a_password@a.host:service/a_directory/a_file" to specify a user and a password.

wxFTP::SetPassword

void SetPassword(const wxString& passwd)

Sets the password to be sent to the FTP server to be allowed to log in.

Default value

The default value of the user name is your email address. For example, it could be "username@userhost.domain". This password is built by getting the current user name and the host name of the local machine from the system.

Remark

This parameter can be included in a URL if you want to use the URL manager. For example, you can use: "ftp://a_user:a_password@a.host:service/a_directory/a_file" to specify a user and a password.

wxFTP::FileExists

bool FileExists(const wxString& filename)

Returns `true` if the given remote file exists, `false` otherwise.

wxFTP::GetFileSize

int GetFileSize(const wxString& filename)

Returns the file size in bytes or -1 if the file doesn't exist or the size couldn't be determined. Notice that this size can be approximative size only and shouldn't be used for allocating the buffer in which the remote file is copied, for example.

wxFTP::GetDirList

bool GetDirList(wxArrayString& files, const wxString& wildcard = "")

The `GetList` function is quite low-level. It returns the list of the files in the current directory. The list can be filtered using the *wildcard* string. If *wildcard* is empty (default), it will return all files in directory.

The form of the list can change from one peer system to another. For example, for a UNIX peer system, it will look like this:

```
-r--r--r--  1 guilhem  lavaux      12738 Jan 16 20:17 cmndata.cpp
-r--r--r--  1 guilhem  lavaux      10866 Jan 24 16:41 config.cpp
-rw-rw-rw-  1 guilhem  lavaux     29967 Dec 21 19:17 cwlex_yy.c
-rw-rw-rw-  1 guilhem  lavaux     14342 Jan 22 19:51 cwy_tab.c
-r--r--r--  1 guilhem  lavaux     13890 Jan 29 19:18 date.cpp
-r--r--r--  1 guilhem  lavaux       3989 Feb  8 19:18 datstrm.cpp
```

But on Windows system, it will look like this:

```
winamp~1 exe      520196 02-25-1999  19:28  winamp204.exe
      1 file(s)              520 196 bytes
```

Return value: true if the file list was successfully retrieved, false otherwise.

See also

GetFilesList (p. 553)

wxFTP::GetFilesList

bool GetFilesList(wxArrayString& files, const wxString& wildcard = "")

This function returns the computer-parsable list of the files in the current directory (optionally only of the files matching the *wildcard*, all files by default). This list always has the same format and contains one full (including the directory path) file name per line.

Return value: true if the file list was successfully retrieved, false otherwise.

wxFTP::GetOutputStream

wxOutputStream * GetOutputStream(const wxString& file)

Initializes an output stream to the specified *file*. The returned stream has all but the seek functionality of wxStreams. When the user finishes writing data, he has to delete the stream to close it.

Return value

An initialized write-only stream.

See also

wxOutputStream (p. 958)

wxFTP::GetInputStream

wxInputStream * GetInputStream(const wxString& path)

Creates a new input stream on the the specified path. You can use all but the seek functionality of wxStream. Seek isn't available on all streams. For example, http or ftp streams do not deal with it. Other functions like Tell are not available for this sort of stream, at present. You will be notified when the EOF is reached by an error.

Return value

Returns NULL if an error occurred (it could be a network failure or the fact that the file doesn't exist).

Returns the initialized stream. You will have to delete it yourself when you don't need it anymore. The destructor closes the DATA stream connection but will leave the COMMAND stream connection opened. It means that you can still send new commands

without reconnecting.

Example of a standalone connection (without wxURL)

```
wxFTP ftp;
wxInputStream *in_stream;
char *data;

ftp.Connect("a.host.domain");
ftp.ChDir("a_directory");
in_stream = ftp.GetInputStream("a_file_to_get");

data = new char[in_stream->GetSize()];

in_stream->Read(data, in_stream->GetSize());
if (in_stream->LastError() != wxStream_NOERROR) {
    // Do something.
}

delete in_stream; /* Close the DATA connection */
ftp.Close(); /* Close the COMMAND connection */
```

See also

wxInputStream (p. 762)

wxGauge

A gauge is a horizontal or vertical bar which shows a quantity (often time). There are no user commands for the gauge.

Derived from

wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/gauge.h>

Window styles

wxGA_HORIZONTAL	Creates a horizontal gauge.
wxGA_VERTICAL	Creates a vertical gauge.
wxGA_SMOOTH	Creates smooth progress bar with one pixel wide update step (not supported by all platforms).

See also *window styles overview* (p. 1618).

Event handling

wxGauge is read-only so generates no events.

See also

wxSlider (p. 1122), *wxScrollBar* (p. 1079)

wxGauge::wxGauge

wxGauge()

Default constructor.

wxGauge(wxWindow* parent, wxWindowID id, int range, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxGA_HORIZONTAL, const wxValidator& validator = wxDefaultValidator, const wxString& name = "gauge")

Constructor, creating and showing a gauge.

Parameters

parent

Window parent.

id

Window identifier.

range

Integer range (maximum value) of the gauge.

pos

Window position.

size

Window size.

style

Gauge style. See *wxGauge* (p. 554).

name

Window name.

See also

wxGauge::Create (p. 556)

wxGauge::~~wxGauge

~wxGauge()

Destructor, destroying the gauge.

wxGauge::Create

```
bool Create(wxWindow* parent, wxWindowID id, int range, const wxPoint& pos =  
wxDefaultPosition, const wxSize& size = wxDefaultSize, long style =  
wxGA_HORIZONTAL, const wxValidator& validator = wxDefaultValidator, const  
wxString& name = "gauge")
```

Creates the gauge for two-step construction. See *wxGauge::wxGauge* (p. 555) for further details.

wxGauge::GetBezelFace

int GetBezelFace() const

Returns the width of the 3D bezel face.

Remarks

This method is not implemented (returns 0) for most platforms.

See also

wxGauge::SetBezelFace (p. 557)

wxGauge::GetRange

int GetRange() const

Returns the maximum position of the gauge.

Remarks

This method is not implemented (doesn't do anything) for most platforms.

See also

wxGauge::SetRange (p. 557)

wxGauge::GetShadowWidth

int GetShadowWidth() const

Returns the 3D shadow margin width.

Remarks

This method is not implemented (returns 0) for most platforms.

See also

wxGauge::SetShadowWidth (p. 558)

wxGauge::GetValue

int GetValue() const

Returns the current position of the gauge.

See also

wxGauge::SetValue (p. 558)

wxGauge::IsVertical

bool IsVertical() const

Returns `true` if the gauge is vertical (has `wxGA_VERTICAL` style) and `false` otherwise.

wxGauge::SetBezelFace

void SetBezelFace(int width)

Sets the 3D bezel face width.

Remarks

This method is not implemented (doesn't do anything) for most platforms.

See also

wxGauge::GetBezelFace (p. 556)

wxGauge::SetRange

void SetRange(int range)

Sets the range (maximum value) of the gauge.

See also

wxGauge::GetRange (p. 556)

wxGauge::SetShadowWidth

void SetShadowWidth(int *width*)

Sets the 3D shadow width.

Remarks

This method is not implemented (doesn't do anything) for most platforms.

wxGauge::SetValue

void SetValue(int *pos*)

Sets the position of the gauge.

Parameters

pos

Position for the gauge level.

See also

wxGauge::GetValue (p. 557)

wxGBPosition

This class represents the position of an item in a virtual grid of rows and columns managed by a *wxGridBagSizer* (p. 612).

Derived from

No base class

Include files

<wx/gbsizer.h>

wxGBPosition::wxGBPosition

wxGBPosition()**wxGBPosition(int *row*, int *col*)**

Construct a new *wxGBPosition*, optionally setting the row and column. The default is (0,0).

wxGBPosition::GetCol

int GetCol() const

Get the current column value.

wxGBPosition::GetRow

int GetRow() const

Get the current row value.

wxGBPosition::SetCol

void SetCol(int col)

Set a new column value.

wxGBPosition::SetRow

void SetRow(int row)

Set a new row value.

wxGBPosition::operator!

bool operator!(const wxGBPosition& p) const

Is the wxGBPosition valid? (An invalid wxGBPosition is (-1,-1).)

wxGBPosition::operator==

bool operator==(const wxGBPosition& p) const

Compare equality of two wxGBPositions.

wxGBSizerItem

The `wxGBSizerItem` class is used by the `wxGridBagSizer` (p. 612) for tracking the items in the sizer. It adds grid position and spanning information to the normal `wxSizerItem` (p. 1117) by adding `wxGBPosition` (p. 558) and `wxGBSpan` (p. 561) attributes. Most of the time you will not need to use a `wxGBSizerItem` directly in your code, but there are a couple of cases where it is handy.

Derived from

wxSizerItem (p. 1117)

Include files

<wx/gbsizer.h>

wxGBSizerItem::wxGBSizerItem

wxGBSizerItem(int width, int height, const wxGBPosition& pos, const wxGBSpan& span, int flag, int border, wxObject* userData)

Construct a sizer item for tracking a spacer.

wxGBSizerItem(wxWindow* window, const wxGBPosition& pos, const wxGBSpan& span, int flag, int border, wxObject* userData)

Construct a sizer item for tracking a window.

wxGBSizerItem(wxSizer* sizer, const wxGBPosition& pos, const wxGBSpan& span, int flag, int border, wxObject* userData)

Construct a sizer item for tracking a subsizer.

wxGBSizerItem::GetEndPos

void GetEndPos(int& row, int& col)

Get the row and column of the endpoint of this item

wxGBSizerItem::GetPos

wxGBPosition GetPos() const

void GetPos(int& row, int& col) const

Get the grid position of the item.

wxGBSizerItem::GetSpan

wxGBSpan GetSpan() const

void GetSpan(int& rowspan, int& colspan) const

Get the row and column spanning of the item.

wxGBSizerItem::Intersects

bool Intersects(const wxGBSizerItem& other)

Returns true if this item and the other item intersect

bool Intersects(const wxGBPosition& pos, const wxGBSpan& span)

Returns true if the given pos/span would intersect with this item.

wxGBSizerItem::SetPos

bool SetPos(const wxGBPosition& pos)

If the item is already a member of a sizer then first ensure that there is no other item that would intersect with this one at the new position, then set the new position. Returns true if the change is successful and after the next Layout the item will be moved.

wxGBSizerItem::SetSpan

bool SetSpan(const wxGBSpan& span)

If the item is already a member of a sizer then first ensure that there is no other item that would intersect with this one with its new spanning size, then set the new spanning. Returns true if the change is successful and after the next Layout the item will be resized.

wxGBSpan

This class is used to hold the row and column spanning attributes of items in a *wxGridBagSizer* (p. 612).

Derived from

No base class

Include files

<wx/gbsizer.h>

wxGBSpan::wxGBSpan

wxGBSpan()

wxGBSpan(int rowspan, int colspan)

Construct a new wxGBSpan, optionally setting the rowspan and colspan. The default is (1,1). (Meaning that the item occupies one cell in each direction.

wxGBSpan::GetColspan

int GetColspan() const

Get the current colspan value.

wxGBSpan::GetRowspan

int GetRowspan() const

Get the current rowspan value.

wxGBSpan::SetColspan

void SetColspan(int colspan)

Set a new colspan value.

wxGBSpan::SetRowspan

void SetRowspan(int rowspan)

Set a new rowspan value.

wxGBSpan::operator!

bool operator!(const wxGBSpan& o) const

Is the wxGBSpan valid? (An invalid wxGBPosition is (-1,-1).)

wxGBSpan::operator==

bool operator operator==(const wxGBSpan& o) const

Compare equality of two wxGBSpans.

wxGDIObject

This class allows platforms to implement functionality to optimise GDI objects, such as wxPen, wxBrush and wxFont. On Windows, the underlying GDI objects are a scarce resource and are cleaned up when a usage count goes to zero. On some platforms this class may not have any special functionality.

Since the functionality of this class is platform-specific, it is not documented here in detail.

Derived from

wxObject (p. 954)

Include files

<wx/gdiobj.h>

See also

wxPen (p. 976), *wxBrush* (p. 91), *wxFont* (p. 512)

wxGDIObject::wxGDIObject

wxGDIObject()

Default constructor.

wxGenericDirCtrl

This control can be used to place a directory listing (with optional files) on an arbitrary window.

The control contains a *wxTreeCtrl* (p. 1329) window representing the directory hierarchy, and optionally, a *wxChoice* (p. 127) window containing a list of filters.

Derived from

wxControl (p. 199)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/dirctrl.h>

Window styles

<code>wxDIRCTRL_DIR_ONLY</code>	Only show directories, and not files.
<code>wxDIRCTRL_3D_INTERNAL</code>	Use 3D borders for internal controls.
<code>wxDIRCTRL_SELECT_FIRST</code>	When setting the default path, select the first file in the directory.
<code>wxDIRCTRL_SHOW_FILTERS</code>	Show the drop-down filter list.
<code>wxDIRCTRL_EDIT_LABELS</code>	Allow the folder and file labels to be editable.

See also *Generic window styles* (p. 1618).

Data structures

wxGenericDirCtrl::wxGenericDirCtrl

wxGenericDirCtrl()

Default constructor.

wxGenericDirCtrl(*wxWindow** parent, **const wxWindowID** id = -1, **const wxString&** dir = *wxDirDialogDefaultFolderStr*, **const wxPoint&** pos = *wxDefaultPosition*, **const wxSize&** size = *wxDefaultSize*, **long** style = *wxDIRCTRL_3D_INTERNAL|wxSUNKEN_BORDER*, **const wxString&** filter = *wxEmptyString*, **int** defaultFilter = 0, **const wxString&** name = *wxTreeCtrlNameStr*)

Main constructor.

Parameters

parent

Parent window.

id

Window identifier.

dir

Initial folder.

pos

Position.

size

Size.

style

Window style. Please see *wxGenericDirCtrl* (p. 563) for a list of possible styles.

filter

A filter string, using the same syntax as that for *wxFileDialog* (p. 468). This may be empty if filters are not being used.

Example: "All files (*.*)|*.jpg|JPEG files (*.jpg)|*.jpg"

defaultFilter

The zero-indexed default filter setting.

name

The window name.

wxGenericDirCtrl::~wxGenericDirCtrl

~wxGenericDirCtrl()

Destructor.

wxGenericDirCtrl::Create

bool Create(wxWindow* parent, const wxWindowID id = -1, const wxString& dir = wxDirDialogDefaultFolderStr, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxDIRCTRL_3D_INTERNAL|wxSUNKEN_BORDER, const wxString& filter = wxEmptyString, int defaultFilter = 0, const wxString& name = wxTreeCtrlNameStr)

Create function for two-step construction. See *wxGenericDirCtrl::wxGenericDirCtrl* (p. 564) for details.

wxGenericDirCtrl::Init

void Init()

Initializes variables.

wxGenericDirCtrl::ExpandPath

bool ExpandPath(const wxString& path)

Tries to expand as much of the given path as possible, so that the filename or directory is visible in the tree control.

wxGenericDirCtrl::GetDefaultPath

wxString GetDefaultPath() const

Gets the default path.

wxGenericDirCtrl::GetPath

wxString GetPath() const

Gets the currently-selected directory or filename.

wxGenericDirCtrl::GetFilePath

wxString GetFilePath() const

Gets selected filename path only (else empty string).

This function doesn't count a directory as a selection.

wxGenericDirCtrl::GetFilter

wxString GetFilter() const

Returns the filter string.

wxGenericDirCtrl::GetFilterIndex

int GetFilterIndex() const

Returns the current filter index (zero-based).

wxGenericDirCtrl::GetFilterListCtrl

wxDirFilterListCtrl* GetFilterListCtrl() const

Returns a pointer to the filter list control (if present).

wxGenericDirCtrl::GetRootId

wxTreeItemId GetRootId()

Returns the root id for the tree control.

wxGenericDirCtrl::GetTreeCtrl

wxTreeCtrl* GetTreeCtrl() const

Returns a pointer to the tree control.

wxGenericDirCtrl::SetDefaultPath

void SetDefaultPath(const wxString& path)

Sets the default path.

wxGenericDirCtrl::SetFilter

void SetFilter(const wxString& filter)

Sets the filter string.

wxGenericDirCtrl::SetFilterIndex

void SetFilterIndex(int n)

Sets the current filter index (zero-based).

wxGenericDirCtrl::SetPath

void SetPath(const wxString& path)

Sets the current path.

wxGenericValidator

wxGenericValidator performs data transfer (but not validation or filtering) for the following basic controls: wxButton, wxCheckBox, wxListBox, wxStaticText, wxRadioButton, wxRadioBox, wxChoice, wxComboBox, wxGauge, wxSlider, wxScrollBar, wxSpinButton, wxTextCtrl, wxCheckListBox.

It checks the type of the window and uses an appropriate type for that window. For example, wxButton and wxTextCtrl transfer data to and from a wxString variable; wxListBox uses a wxArrayInt; wxCheckBox uses a bool.

For more information, please see *Validator overview* (p. 1621).

Derived from

wxValidator (p. 1360)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/valgen.h>

See also

Validator overview (p. 1621), *wxValidator* (p. 1360), *wxTextValidator* (p. 1283)

wxGenericValidator::wxGenericValidator

wxGenericValidator(const wxGenericValidator& validator)

Copy constructor.

wxGenericValidator(bool* valPtr)

Constructor taking a bool pointer. This will be used for wxCheckBox and wxRadioButton.

wxGenericValidator(wxString* valPtr)

Constructor taking a wxString pointer. This will be used for wxButton, wxComboBox, wxStaticText, wxTextCtrl.

wxGenericValidator(int* valPtr)

Constructor taking an integer pointer. This will be used for wxGauge, wxScrollBar, wxRadioBox, wxSpinButton, wxChoice.

wxGenericValidator(wxArrayInt* valPtr)

Constructor taking a wxArrayInt pointer. This will be used for wxListBox, wxCheckListBox.

Parameters

validator

Validator to copy.

valPtr

A pointer to a variable that contains the value. This variable should have a lifetime equal to or longer than the validator lifetime (which is usually determined by the lifetime of the window).

wxGenericValidator::~~wxGenericValidator

~wxGenericValidator()

Destructor.

wxGenericValidator::Clone

virtual wxValidator* Clone() const

Clones the generic validator using the copy constructor.

wxGenericValidator::TransferFromWindow

virtual bool TransferFromWindow()

Transfers the value from the window to the appropriate data type.

wxGenericValidator::TransferToWindow

virtual bool TransferToWindow()

Transfers the value to the window.

wxGLCanvas

wxGLCanvas is a class for displaying OpenGL graphics. There are wrappers for OpenGL on Windows, and GTK+ and Motif.

To use this class, create a wxGLCanvas window, call *wxGLCanvas::SetCurrent* (p. 571) to direct normal OpenGL commands to the window, and then call *wxGLCanvas::SwapBuffers* (p. 572) to show the OpenGL buffer on the window.

To set up the attributes for the rendering context (number of bits for the depth buffer, number of bits for the stencil buffer and so on) you should set up the correct values of the *attribList* parameter. The values that should be set up and their meanings will be described below.

To switch wxGLCanvas support on under Windows, edit *setup.h* and set *wxUSE_GLCANVAS* to 1. You may also need to have to add *opengl32.lib* to the list of libraries your program is linked with. On Unix, pass *--with-opengl* to configure to compile using OpenGL or Mesa.

Derived from

wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/glcanvas.h>

Window styles

There are no specific window styles for this class.

See also *window styles overview* (p. 1618).

Constants

The generic GL implementation doesn't support many of these options, such as stereo, auxiliary buffers, alpha channel, and accum buffer. Other implementations may support them.

WX_GL_RGBA Use true colour

WX_GL_BUFFER_SIZE	Bits for buffer if not WX_GL_RGBA
WX_GL_LEVEL	0 for main buffer, >0 for overlay, <0 for underlay
WX_GL_DOUBLEBUFFER	Use doublebuffer
WX_GL_STEREO	Use stereoscopic display
WX_GL_AUX_BUFFERS	Number of auxiliary buffers (not all implementation support this option)
WX_GL_MIN_RED	Use red buffer with most bits (> MIN_RED bits)
WX_GL_MIN_GREEN	Use green buffer with most bits (> MIN_GREEN bits)
WX_GL_MIN_BLUE	Use blue buffer with most bits (> MIN_BLUE bits)
WX_GL_MIN_ALPHA	Use alpha buffer with most bits (> MIN_ALPHA bits)
WX_GL_DEPTH_SIZE	Bits for Z-buffer (0,16,32)
WX_GL_STENCIL_SIZE	Bits for stencil buffer
WX_GL_MIN_ACCUM_RED	Use red accum buffer with most bits (> MIN_ACCUM_RED bits)
WX_GL_MIN_ACCUM_GREEN	Use green buffer with most bits (> MIN_ACCUM_GREEN bits)
WX_GL_MIN_ACCUM_BLUE	Use blue buffer with most bits (> MIN_ACCUM_BLUE bits)
WX_GL_MIN_ACCUM_ALPHA	Use blue buffer with most bits (> MIN_ACCUM_ALPHA bits)

wxGLCanvas::wxGLCanvas

```
void wxGLCanvas(wxWindow* parent, wxWindowID id = -1, const wxPoint& pos,  
const wxSize& size, long style=0, const wxString& name="GLCanvas", int* attribList  
= 0, const wxPalette& palette = wxNullPalette)
```

```
void wxGLCanvas(wxWindow* parent, wxGLCanvas* sharedCanvas = NULL,  
wxWindowID id = -1, const wxPoint& pos, const wxSize& size, long style=0, const  
wxString& name="GLCanvas", int* attribList = 0, const wxPalette& palette =  
wxNullPalette)
```

```
void wxGLCanvas(wxWindow* parent, wxGLContext* sharedContext = NULL,  
wxWindowID id = -1, const wxPoint& pos, const wxSize& size, long style=0, const  
wxString& name="GLCanvas", int* attribList = 0, const wxPalette& palette =  
wxNullPalette)
```

Constructor.

parent

Pointer to a parent window.

id

Window identifier. If -1, will automatically create an identifier.

pos

Window position. wxDefaultPosition is (-1, -1) which indicates that wxWidgets should generate a default position for the window.

size

Window size. wxDefaultSize is (-1, -1) which indicates that wxWidgets should generate a default size for the window. If no suitable size can be found, the window will be sized to 20x20 pixels so that the window is visible but obviously not correctly sized.

style

Window style.

name

Window name.

attribList

Array of int. With this parameter you can set the device context attributes associated to this window. This array is zero-terminated: it should be set up with constants described in the table above. If a constant should be followed by a value, put it in the next array position. For example, the WX_GL_DEPTH_SIZE should be followed by the value that indicates the number of bits for the depth buffer, so:

```
attribList[index]= WX_GL_DEPTH_SIZE;  
attribList[index+1]=32;  
and so on.
```

palette

If the window has the palette, it should by pass this value. Note: palette and WX_GL_RGBA are mutually exclusive.

wxGLCanvas::SetCurrent

void SetCurrent()

Sets this canvas as the current recipient of OpenGL calls. Each canvas contain an OpenGL device context that has been created during the creation of this window. So this

call sets the current device context as the target device context for OpenGL operations.

wxGLCanvas::SetColour

void SetColour(const char* colour)

Sets the current colour for this window, using the wxWidgets colour database to find a named colour.

wxGLCanvas::SwapBuffers

void SwapBuffers()

Displays the previous OpenGL commands on the window.

wxGrid

wxGrid and its related classes are used for displaying and editing tabular data. They provide a rich set of features for display, editing, and interacting with a variety of data sources. For simple applications, and to help you get started, wxGrid is the only class you need to refer to directly. It will set up default instances of the other classes and manage them for you. For more complex applications you can derive your own classes for custom grid views, grid data tables, cell editors and renderers. The *wxGrid classes overview* (p. 1669) has examples of simple and more complex applications, explains the relationship between the various grid classes and has a summary of the keyboard shortcuts and mouse functions provided by wxGrid.

wxGrid has been greatly expanded and redesigned for wxWidgets 2.2 onwards. If you have been using the old wxGrid class you will probably want to have a look at the *wxGrid classes overview* (p. 1669) to see how things have changed. The new grid classes are reasonably backward-compatible but there are some exceptions. There are also easier ways of doing many things compared to the previous implementation.

Derived from

wxScrolledWindow (p. 1085)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/grid.h>

Window styles

There are presently no specific window styles for wxGrid.

Event handling

The event handler for the following functions takes a *wxGridEvent* (p. 622) parameter.

- EVT_GRID_CELL_LEFT_CLICK(func)** The user clicked a cell with the left mouse button. Processes a `wxEVT_GRID_CELL_LEFT_CLICK`.
- EVT_GRID_CELL_RIGHT_CLICK(func)** The user clicked a cell with the right mouse button. Processes a `wxEVT_GRID_CELL_RIGHT_CLICK`.
- EVT_GRID_CELL_LEFT_DCLICK(func)** The user double-clicked a cell with the left mouse button. Processes a `wxEVT_GRID_CELL_LEFT_DCLICK`.
- EVT_GRID_CELL_RIGHT_DCLICK(func)** The user double-clicked a cell with the right mouse button. Processes a `wxEVT_GRID_CELL_RIGHT_DCLICK`.
- EVT_GRID_LABEL_LEFT_CLICK(func)** The user clicked a label with the left mouse button. Processes a `wxEVT_GRID_LABEL_LEFT_CLICK`.
- EVT_GRID_LABEL_RIGHT_CLICK(func)** The user clicked a label with the right mouse button. Processes a `wxEVT_GRID_LABEL_RIGHT_CLICK`.
- EVT_GRID_LABEL_LEFT_DCLICK(func)** The user double-clicked a label with the left mouse button. Processes a `wxEVT_GRID_LABEL_LEFT_DCLICK`.
- EVT_GRID_LABEL_RIGHT_DCLICK(func)** The user double-clicked a label with the right mouse button. Processes a `wxEVT_GRID_LABEL_RIGHT_DCLICK`.
- EVT_GRID_CELL_CHANGE(func)** The user changed the data in a cell. Processes a `wxEVT_GRID_CELL_CHANGE`.
- EVT_GRID_SELECT_CELL(func)** The user moved to, and selected a cell. Processes a `wxEVT_GRID_SELECT_CELL`.
- EVT_GRID_EDITOR_HIDDEN(func)** The editor for a cell was hidden. Processes a `wxEVT_GRID_EDITOR_HIDDEN`.
- EVT_GRID_EDITOR_SHOWN(func)** The editor for a cell was shown. Processes a `wxEVT_GRID_EDITOR_SHOWN`.

The event handler for the following functions takes a *wxGridSizeEvent* (p. 627) parameter.

- EVT_GRID_COL_SIZE(func)** The user resized a column by dragging it. Processes a `wxEVT_GRID_COL_SIZE`.
- EVT_GRID_ROW_SIZE(func)** The user resized a row by dragging it. Processes a `wxEVT_GRID_ROW_SIZE`.

The event handler for the following functions takes a *wxGridRangeSelectEvent* (p. 625) parameter.

EVT_GRID_RANGE_SELECT(func) The user selected a group of contiguous cells. Processes a *wxEVT_GRID_RANGE_SELECT*.

The event handler for the following functions takes a *wxGridEditorCreatedEvent* (p. 621) parameter.

EVT_GRID_EDITOR_CREATED(func) The editor for a cell was created. Processes a *wxEVT_GRID_EDITOR_CREATED*.

See also

wxGrid overview (p. 1669)

Constructors and initialization

wxGrid (p. 574)
~wxGrid (p. 575)
CreateGrid (p. 578)
SetTable (p. 600)

Display format

Selection functions

wxGrid::ClearSelection (p. 578)
wxGrid::IsSelection (p. 589)
wxGrid::SelectAll (p. 592)
wxGrid::SelectBlock (p. 592)
wxGrid::SelectCol (p. 592)
wxGrid::SelectRow (p. 592)

wxGrid::wxGrid

wxGrid()

Default constructor

wxGrid(wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxWANTS_CHARS, const wxString& name = wxPanelNameStr)

Constructor to create a grid object. Call either *wxGrid::CreateGrid* (p. 578) or *wxGrid::SetTable* (p. 600) directly after this to initialize the grid before using it.

wxGrid::~~wxGrid

~wxGrid()

Destructor. This will also destroy the associated grid table unless you passed a table object to the grid and specified that the grid should not take ownership of the table (see *wxGrid::SetTable* (p. 600)).

wxGrid::AppendCols

bool AppendCols(int numCols = 1, bool updateLabels = true)

Appends one or more new columns to the right of the grid and returns true if successful. The updateLabels argument is not used at present.

If you are using a derived grid table class you will need to override *wxGridTableBase::AppendCols* (p. 634). See *wxGrid::InsertCols* (p. 587) for further information.

wxGrid::AppendRows

bool AppendRows(int numRows = 1, bool updateLabels = true)

Appends one or more new rows to the bottom of the grid and returns true if successful. The updateLabels argument is not used at present.

If you are using a derived grid table class you will need to override *wxGridTableBase::AppendRows* (p. 634). See *wxGrid::InsertRows* (p. 588) for further information.

wxGrid::AutoSize

void AutoSize()

Automatically sets the height and width of all rows and columns to fit their contents.

Note

wxGrid sets up arrays to store individual row and column sizes when non-default sizes are used. The memory requirements for this could become prohibitive if your grid is very large.

wxGrid::AutoSizeColumn

void AutoSizeColumn(int col, bool setAsMin = true)

Automatically sizes the column to fit its contents. If setAsMin is true the calculated width will also be set as the minimal width for the column.

Note

wxGrid sets up arrays to store individual row and column sizes when non-default sizes are used. The memory requirements for this could become prohibitive if your grid is very large.

wxGrid::AutoSizeColumns

void AutoSizeColumns(bool setAsMin = true)

Automatically sizes all columns to fit their contents. If setAsMin is true the calculated widths will also be set as the minimal widths for the columns.

Note

wxGrid sets up arrays to store individual row and column sizes when non-default sizes are used. The memory requirements for this could become prohibitive if your grid is very large.

wxGrid::AutoSizeRow

void AutoSizeRow(int row, bool setAsMin = true)

Automatically sizes the row to fit its contents. If setAsMin is true the calculated height will also be set as the minimal height for the row.

Note

wxGrid sets up arrays to store individual row and column sizes when non-default sizes are used. The memory requirements for this could become prohibitive if your grid is very large.

wxGrid::AutoSizeRows

void AutoSizeRows(bool setAsMin = true)

Automatically sizes all rows to fit their contents. If setAsMin is true the calculated heights will also be set as the minimal heights for the rows.

Note

wxGrid sets up arrays to store individual row and column sizes when non-default sizes are used. The memory requirements for this could become prohibitive if your grid is very large.

wxGrid::BeginBatch

void BeginBatch()

Increments the grid's batch count. When the count is greater than zero repainting of the grid is suppressed. Each call to BeginBatch must be matched by a later call to *wxGrid::EndBatch* (p. 580). Code that does a lot of grid modification can be enclosed

between `BeginBatch` and `EndBatch` calls to avoid screen flicker. The final `EndBatch` will cause the grid to be repainted.

wxGrid::CanDragColSize

bool CanDragColSize()

Returns true if columns can be resized by dragging with the mouse. Columns can be resized by dragging the edges of their labels. If grid line dragging is enabled they can also be resized by dragging the right edge of the column in the grid cell area (see *wxGrid::EnableDragGridSize* (p. 579)).

wxGrid::CanDragRowSize

bool CanDragRowSize()

Returns true if rows can be resized by dragging with the mouse. Rows can be resized by dragging the edges of their labels. If grid line dragging is enabled they can also be resized by dragging the lower edge of the row in the grid cell area (see *wxGrid::EnableDragGridSize* (p. 579)).

wxGrid::CanDragGridSize

bool CanDragGridSize()

Return true if the dragging of grid lines to resize rows and columns is enabled or false otherwise.

wxGrid::CanEnableCellControl

bool CanEnableCellControl() const

Returns true if the in-place edit control for the current grid cell can be used and false otherwise (e.g. if the current cell is read-only).

wxGrid::CellToRect

wxRect CellToRect(int row, int col)**wxRect CellToRect(const wxGridCellCoords& coords)**

Return the rectangle corresponding to the grid cell's size and position in logical coordinates.

wxGrid::ClearGrid

void ClearGrid()

Clears all data in the underlying grid table and repaints the grid. The table is not deleted by this function. If you are using a derived table class then you need to override *wxGridTableBase::Clear* (p. 634) for this function to have any effect.

wxGrid::ClearSelection

void ClearSelection()

Deselects all cells that are currently selected.

wxGrid::CreateGrid

bool CreateGrid(int numRows, int numCols, wxGrid::wxGridSelectionMode selmode = wxGrid::wxGridSelectCells)

Creates a grid with the specified initial number of rows and columns. Call this directly after the grid constructor. When you use this function wxGrid will create and manage a simple table of string values for you. All of the grid data will be stored in memory.

For applications with more complex data types or relationships, or for dealing with very large datasets, you should derive your own grid table class and pass a table object to the grid with *wxGrid::SetTable* (p. 600).

wxGrid::DeleteCols

bool DeleteCols(int pos = 0, int numCols = 1, bool updateLabels = true)

Deletes one or more columns from a grid starting at the specified position and returns true if successful. The updateLabels argument is not used at present.

If you are using a derived grid table class you will need to override *wxGridTableBase::DeleteCols* (p. 634). See *wxGrid::InsertCols* (p. 587) for further information.

wxGrid::DeleteRows

bool DeleteRows(int pos = 0, int numRows = 1, bool updateLabels = true)

Deletes one or more rows from a grid starting at the specified position and returns true if successful. The updateLabels argument is not used at present.

If you are using a derived grid table class you will need to override *wxGridTableBase::DeleteRows* (p. 634). See *wxGrid::InsertRows* (p. 588) for further information.

wxGrid::DisableCellEditControl

void DisableCellEditControl()

Disables in-place editing of grid cells. Equivalent to calling `EnableCellEditControl(false)`.

wxGrid::DisableDragColSize

void DisableDragColSize()

Disables column sizing by dragging with the mouse. Equivalent to passing false to `wxGrid::EnableDragColSize` (p. 579).

wxGrid::DisableDragGridSize

void DisableDragGridSize()

Disable mouse dragging of grid lines to resize rows and columns. Equivalent to passing false to `wxGrid::EnableDragGridSize` (p. 579)

wxGrid::DisableDragRowSize

void DisableDragRowSize()

Disables row sizing by dragging with the mouse. Equivalent to passing false to `wxGrid::EnableDragRowSize` (p. 580).

wxGrid::EnableCellEditControl

void EnableCellEditControl(bool enable = true)

Enables or disables in-place editing of grid cell data. The grid will issue either a `wxEVT_GRID_EDITOR_SHOWN` or `wxEVT_GRID_EDITOR_HIDDEN` event.

wxGrid::EnableDragColSize

void EnableDragColSize(bool enable = true)

Enables or disables column sizing by dragging with the mouse.

wxGrid::EnableDragGridSize

void EnableDragGridSize(bool enable = true)

Enables or disables row and column resizing by dragging gridlines with the mouse.

wxGrid::EnableDragRowSize

void EnableDragRowSize(bool *enable* = true)

Enables or disables row sizing by dragging with the mouse.

wxGrid::EnableEditing

void EnableEditing(bool *edit*)

If the edit argument is false this function sets the whole grid as read-only. If the argument is true the grid is set to the default state where cells may be editable. In the default state you can set single grid cells and whole rows and columns to be editable or read-only via *wxGridCellAttribute::SetReadOnly* (p. 610). For single cells you can also use the shortcut function *wxGrid::SetReadOnly* (p. 598).

For more information about controlling grid cell attributes see the *wxGridCellAttr* (p. 608) cell attribute class and the *wxGrid classes overview* (p. 1669).

wxGrid::EnableGridLines

void EnableGridLines(bool *enable* = true)

Turns the drawing of grid lines on or off.

wxGrid::EndBatch

void EndBatch()

Decrements the grid's batch count. When the count is greater than zero repainting of the grid is suppressed. Each previous call to *wxGrid::BeginBatch* (p. 576) must be matched by a later call to *EndBatch*. Code that does a lot of grid modification can be enclosed between *BeginBatch* and *EndBatch* calls to avoid screen flicker. The final *EndBatch* will cause the grid to be repainted.

wxGrid::ForceRefresh

void ForceRefresh()

Causes immediate repainting of the grid. Use this instead of the usual *wxWindow::Refresh*.

wxGrid::GetBatchCount

int GetBatchCount()

Returns the number of times that *wxGrid::BeginBatch* (p. 576) has been called without

(yet) matching calls to `wxGrid::EndBatch` (p. 580). While the grid's batch count is greater than zero the display will not be updated.

wxGrid::GetCellAlignment

void GetCellAlignment(int row, int col, int* horiz, int* vert)

Sets the arguments to the horizontal and vertical text alignment values for the grid cell at the specified location.

Horizontal alignment will be one of `wxALIGN_LEFT`, `wxALIGN_CENTRE` or `wxALIGN_RIGHT`.

Vertical alignment will be one of `wxALIGN_TOP`, `wxALIGN_CENTRE` or `wxALIGN_BOTTOM`.

wxPerl note: This method only takes the parameters `row` and `col` and returns a 2-element list (`horiz, vert`).

wxGrid::GetCellBackgroundColour

wxColour GetCellBackgroundColour(int row, int col)

Returns the background colour of the cell at the specified location.

wxGrid::GetCellEditor

wxGridCellEditor* GetCellEditor(int row, int col)

Returns a pointer to the editor for the cell at the specified location.

See *wxGridCellEditor* (p. 616) and the *wxGrid overview* (p. 1669) for more information about cell editors and renderers.

wxGrid::GetCellFont

wxFont GetCellFont(int row, int col)

Returns the font for text in the grid cell at the specified location.

wxGrid::GetCellRenderer

wxGridCellRenderer* GetCellRenderer(int row, int col)

Returns a pointer to the renderer for the grid cell at the specified location.

See *wxGridCellRenderer* (p. 630) and the *wxGrid overview* (p. 1669) for more information about cell editors and renderers.

wxGrid::GetCellTextColour

wxColour GetCellTextColour(int row, int col)

Returns the text colour for the grid cell at the specified location.

wxGrid::GetCellValue

wxString GetCellValue(int row, int col)**wxString GetCellValue(const wxGridCellCoords&coords)**

Returns the string contained in the cell at the specified location. For simple applications where a grid object automatically uses a default grid table of string values you use this function together with *wxGrid::SetCellValue* (p. 593) to access cell values.

For more complex applications where you have derived your own grid table class that contains various data types (e.g. numeric, boolean or user-defined custom types) then you only use this function for those cells that contain string values.

See *wxGridTableBase::CanGetValueAs* (p. 633) and the *wxGrid overview* (p. 1669) for more information.

wxGrid::GetColLabelAlignment

void GetColLabelAlignment(int* horiz, int* vert)

Sets the arguments to the current column label alignment values.

Horizontal alignment will be one of *wxALIGN_LEFT*, *wxALIGN_CENTRE* or *wxALIGN_RIGHT*.

Vertical alignment will be one of *wxALIGN_TOP*, *wxALIGN_CENTRE* or *wxALIGN_BOTTOM*.

wxPerl note: This method takes no parameters and returns a 2-element list (*horiz*, *vert*).

wxGrid::GetColLabelSize

int GetColLabelSize()

Returns the current height of the column labels.

wxGrid::GetColLabelValue

wxString GetColLabelValue(int col)

Returns the specified column label. The default grid table class provides column labels of the form A,B...Z,AA,AB...ZZ,AAA... If you are using a custom grid table you can

override `wxGridTableBase::GetColLabelValue` (p. 635) to provide your own labels.

wxGrid::GetColSize

int GetColSize(int col)

Returns the width of the specified column.

wxGrid::GetDefaultCellAlignment

void GetDefaultCellAlignment(int* horiz, int* vert)

Sets the arguments to the current default horizontal and vertical text alignment values.

Horizontal alignment will be one of `wxALIGN_LEFT`, `wxALIGN_CENTRE` or `wxALIGN_RIGHT`.

Vertical alignment will be one of `wxALIGN_TOP`, `wxALIGN_CENTRE` or `wxALIGN_BOTTOM`.

wxGrid::GetDefaultCellBackgroundColour

wxColour GetDefaultCellBackgroundColour()

Returns the current default background colour for grid cells.

wxGrid::GetDefaultCellFont

wxFont GetDefaultCellFont()

Returns the current default font for grid cell text.

wxGrid::GetDefaultCellTextColour

wxColour GetDefaultCellTextColour()

Returns the current default colour for grid cell text.

wxGrid::GetDefaultColLabelSize

int GetDefaultColLabelSize()

Returns the default height for column labels.

wxGrid::GetDefaultColSize

int GetDefaultColSize()

Returns the current default width for grid columns.

wxGrid::GetDefaultEditor

wxGridCellEditor* GetDefaultEditor() const

Returns a pointer to the current default grid cell editor.

See *wxGridCellEditor* (p. 616) and the *wxGrid overview* (p. 1669) for more information about cell editors and renderers.

wxGrid::GetDefaultRenderer

wxGridCellRenderer* GetDefaultRenderer() const

Returns a pointer to the current default grid cell renderer.

See *wxGridCellRenderer* (p. 630) and the *wxGrid overview* (p. 1669) for more information about cell editors and renderers.

wxGrid::GetDefaultRowLabelSize

int GetDefaultRowLabelSize()

Returns the default width for the row labels.

wxGrid::GetDefaultRowSize

int GetDefaultRowSize()

Returns the current default height for grid rows.

wxGrid::GetGridCursorCol

int GetGridCursorCol()

Returns the current grid cell column position.

wxGrid::GetGridCursorRow

int GetGridCursorRow()

Returns the current grid cell row position.

wxGrid::GetGridLineColour

wxColour GetGridLineColour()

Returns the colour used for grid lines.

wxGrid::GridLinesEnabled

bool GridLinesEnabled()

Returns true if drawing of grid lines is turned on, false otherwise.

wxGrid::GetLabelBackgroundColour

wxColour GetLabelBackgroundColour()

Returns the colour used for the background of row and column labels.

wxGrid::GetLabelFont

wxFont GetLabelFont()

Returns the font used for row and column labels.

wxGrid::GetLabelTextColour

wxColour GetLabelTextColour()

Returns the colour used for row and column label text.

wxGrid::GetNumberCols

int GetNumberCols()

Returns the total number of grid columns (actually the number of columns in the underlying grid table).

wxGrid::GetNumberRows

int GetNumberRows()

Returns the total number of grid rows (actually the number of rows in the underlying grid table).

wxGrid::GetRowLabelAlignment

void GetRowLabelAlignment(int* horiz, int* vert)

Sets the arguments to the current row label alignment values.

Horizontal alignment will be one of wxLEFT, wxCENTRE or wxRIGHT.
Vertical alignment will be one of wxTOP, wxCENTRE or wxBOTTOM.

wxPerl note: This method takes no parameters and returns a 2-element list (`horiz`, `vert`).

wxGrid::GetRowLabelSize

int GetRowLabelSize()

Returns the current width of the row labels.

wxGrid::GetRowLabelValue

wxString GetRowLabelValue(int row)

Returns the specified row label. The default grid table class provides numeric row labels. If you are using a custom grid table you can override *wxGridTableBase::GetRowLabelValue* (p. 635) to provide your own labels.

wxGrid::GetRowSize

int GetRowSize(int row)

Returns the height of the specified row.

wxGrid::GetSelectionMode

wxGrid::wxGridSelectionModes GetSelectionMode() const

Returns the current selection mode, see *wxGrid::SetSelectionMode* (p. 600).

wxGrid::GetSelectedCells

wxGridCellCoordsArray GetSelectedCells() const

Returns an array of singly selected cells.

wxGrid::GetSelectedCols

wxArrayInt GetSelectedCols() const

Returns an array of selected cols.

wxGrid::GetSelectedRows

wxArrayInt GetSelectedRows() const

Returns an array of selected rows.

wxGrid::GetSelectionBlockTopLeft

wxGridCellCoordsArray GetSelectionBlockTopLeft() const

Returns an array of the top left corners of blocks of selected cells, see *wxGrid::GetSelectionBlockBottomRight* (p. 587).

wxGrid::GetSelectionBlockBottomRight

wxGridCellCoordsArray GetSelectionBlockBottomRight() const

Returns an array of the bottom right corners of blocks of selected cells, see *wxGrid::GetSelectionBlockTopLeft* (p. 587).

wxGrid::GetTable

wxGridTableBase * GetTable() const

Returns a base pointer to the current table object.

wxGrid::HideCellEditControl

void HideCellEditControl()

Hides the in-place cell edit control.

wxGrid::InsertCols

bool InsertCols(int pos = 0, int numCols = 1, bool updateLabels = true)

Inserts one or more new columns into a grid with the first new column at the specified position and returns true if successful. The *updateLabels* argument is not used at present.

The sequence of actions begins with the grid object requesting the underlying grid table to insert new columns. If this is successful the table notifies the grid and the grid updates the display. For a default grid (one where you have called *wxGrid::CreateGrid* (p. 578)) this process is automatic. If you are using a custom grid table (specified with

wxGrid::SetTable (p. 600)) then you must override *wxGridTableBase::InsertCols* (p. 634) in your derived table class.

wxGrid::InsertRows

bool InsertRows(int pos = 0, int numRows = 1, bool updateLabels = true)

Inserts one or more new rows into a grid with the first new row at the specified position and returns true if successful. The *updateLabels* argument is not used at present.

The sequence of actions begins with the grid object requesting the underlying grid table to insert new rows. If this is successful the table notifies the grid and the grid updates the display. For a default grid (one where you have called *wxGrid::CreateGrid* (p. 578)) this process is automatic. If you are using a custom grid table (specified with *wxGrid::SetTable* (p. 600)) then you must override *wxGridTableBase::InsertRows* (p. 634) in your derived table class.

wxGrid::IsCellEditControlEnabled

bool IsCellEditControlEnabled() const

Returns true if the in-place edit control is currently enabled.

wxGrid::IsCurrentCellReadOnly

bool IsCurrentCellReadOnly() const

Returns true if the current cell has been set to read-only (see *wxGrid::SetReadOnly* (p. 598)).

wxGrid::IsEditable

bool IsEditable()

Returns false if the whole grid has been set as read-only or true otherwise. See *wxGrid::EnableEditing* (p. 580) for more information about controlling the editing status of grid cells.

wxGrid::IsInSelection

bool IsInSelection(int row, int col) const

bool IsInSelection(const wxGridCellCoords& coords) const

Is this cell currently selected.

wxGrid::IsReadOnly

bool IsReadOnly(int row, int col) const

Returns true if the cell at the specified location can't be edited. See also *wxGrid::IsReadOnly* (p. 589).

wxGrid::IsSelection

bool IsSelection()

Returns true if there are currently rows, columns or blocks of cells selected.

wxGrid::IsVisible

bool IsVisible(int row, int col, bool wholeCellVisible = true)**bool IsVisible(const wxGridCellCoords& coords, bool wholeCellVisible = true)**

Returns true if a cell is either wholly visible (the default) or at least partially visible in the grid window.

wxGrid::MakeCellVisible

void MakeCellVisible(int row, int col)**void MakeCellVisible(const wxGridCellCoords& coords)**

Brings the specified cell into the visible grid cell area with minimal scrolling. Does nothing if the cell is already visible.

wxGrid::MoveCursorDown

bool MoveCursorDown(bool expandSelection)

Moves the grid cursor down by one row. If a block of cells was previously selected it will expand if the argument is true or be cleared if the argument is false.

Keyboard

This function is called for Down cursor key presses or Shift+Down to expand a selection.

wxGrid::MoveCursorLeft

bool MoveCursorLeft(bool expandSelection)

Moves the grid cursor left by one column. If a block of cells was previously selected it will expand if the argument is true or be cleared if the argument is false.

Keyboard

This function is called for Left cursor key presses or Shift+Left to expand a selection.

wxGrid::MoveCursorRight

bool MoveCursorRight(bool *expandSelection*)

Moves the grid cursor right by one column. If a block of cells was previously selected it will expand if the argument is true or be cleared if the argument is false.

Keyboard

This function is called for Right cursor key presses or Shift+Right to expand a selection.

wxGrid::MoveCursorUp

bool MoveCursorUp(bool *expandSelection*)

Moves the grid cursor up by one row. If a block of cells was previously selected it will expand if the argument is true or be cleared if the argument is false.

Keyboard

This function is called for Up cursor key presses or Shift+Up to expand a selection.

wxGrid::MoveCursorDownBlock

bool MoveCursorDownBlock(bool *expandSelection*)

Moves the grid cursor down in the current column such that it skips to the beginning or end of a block of non-empty cells. If a block of cells was previously selected it will expand if the argument is true or be cleared if the argument is false.

Keyboard

This function is called for the Ctrl+Down key combination. Shift+Ctrl+Down expands a selection.

wxGrid::MoveCursorLeftBlock

bool MoveCursorLeftBlock(bool *expandSelection*)

Moves the grid cursor left in the current row such that it skips to the beginning or end of a block of non-empty cells. If a block of cells was previously selected it will expand if the argument is true or be cleared if the argument is false.

Keyboard

This function is called for the Ctrl+Left key combination. Shift+Ctrl+left expands a selection.

wxGrid::MoveCursorRightBlock

bool MoveCursorRightBlock(bool *expandSelection*)

Moves the grid cursor right in the current row such that it skips to the beginning or end of a block of non-empty cells. If a block of cells was previously selected it will expand if the argument is true or be cleared if the argument is false.

Keyboard

This function is called for the Ctrl+Right key combination. Shift+Ctrl+Right expands a selection.

wxGrid::MoveCursorUpBlock

bool MoveCursorUpBlock(bool *expandSelection*)

Moves the grid cursor up in the current column such that it skips to the beginning or end of a block of non-empty cells. If a block of cells was previously selected it will expand if the argument is true or be cleared if the argument is false.

Keyboard

This function is called for the Ctrl+Up key combination. Shift+Ctrl+Up expands a selection.

wxGrid::MovePageDown

bool MovePageDown()

Moves the grid cursor down by some number of rows so that the previous bottom visible row becomes the top visible row.

Keyboard

This function is called for PgDn keypresses.

wxGrid::MovePageUp

bool MovePageUp()

Moves the grid cursor up by some number of rows so that the previous top visible row becomes the bottom visible row.

Keyboard

This function is called for PgUp keypresses.

wxGrid::SaveEditControlValue

void SaveEditControlValue()

Sets the value of the current grid cell to the current in-place edit control value. This is called automatically when the grid cursor moves from the current cell to a new cell. It is also a good idea to call this function when closing a grid since any edits to the final cell location will not be saved otherwise.

wxGrid::SelectAll

void SelectAll()

Selects all cells in the grid.

wxGrid::SelectBlock

void SelectBlock(int topRow, int leftCol, int bottomRow, int rightCol, bool addToSelected = false)**void SelectBlock(const wxGridCellCoords& topLeft, const wxGridCellCoords& bottomRight, bool addToSelected = false)**

Selects a rectangular block of cells. If addToSelected is false then any existing selection will be deselected; if true the column will be added to the existing selection.

wxGrid::SelectCol

void SelectCol(int col, bool addToSelected = false)

Selects the specified column. If addToSelected is false then any existing selection will be deselected; if true the column will be added to the existing selection.

wxGrid::SelectRow

void SelectRow(int row, bool addToSelected = false)

Selects the specified row. If addToSelected is false then any existing selection will be deselected; if true the row will be added to the existing selection.

wxGrid::SetCellAlignment

void SetCellAlignment(int row, int col, int horiz, int vert)**void SetCellAlignment(int align, int row, int col)****void SetCellAlignment(int align)**

Sets the horizontal and vertical alignment for grid cell text at the specified location.

Horizontal alignment should be one of wxALIGN_LEFT, wxALIGN_CENTRE or

`wxALIGN_RIGHT`.

Vertical alignment should be one of `wxALIGN_TOP`, `wxALIGN_CENTRE` or `wxALIGN_BOTTOM`.

`wxGrid::SetCellEditor`

`void SetCellEditor(int row, int col, wxGridCellEditor* editor)`

Sets the editor for the grid cell at the specified location. The grid will take ownership of the pointer.

See *wxGridCellEditor* (p. 616) and the *wxGrid overview* (p. 1669) for more information about cell editors and renderers.

`wxGrid::SetCellFont`

`void SetCellFont(int row, int col, const wxFont& font)`

Sets the font for text in the grid cell at the specified location.

`wxGrid::SetCellRenderer`

`void SetCellRenderer(int row, int col, wxGridCellRenderer* renderer)`

Sets the renderer for the grid cell at the specified location. The grid will take ownership of the pointer.

See *wxGridCellRenderer* (p. 630) and the *wxGrid overview* (p. 1669) for more information about cell editors and renderers.

`wxGrid::SetCellTextColour`

`void SetCellTextColour(int row, int col, const wxColour& colour)`

`void SetCellTextColour(const wxColour& val, int row, int col)`

`void SetCellTextColour(const wxColour& colour)`

Sets the text colour for the grid cell at the specified location.

`wxGrid::SetCellValue`

`void SetCellValue(int row, int col, const wxString& s)`

`void SetCellValue(const wxGridCellCoords& coords, const wxString& s)`

`void SetCellValue(const wxString& val, int row, int col)`

Sets the string value for the cell at the specified location. For simple applications where a grid object automatically uses a default grid table of string values you use this function together with *wxGrid::GetCellValue* (p. 582) to access cell values.

For more complex applications where you have derived your own grid table class that contains various data types (e.g. numeric, boolean or user-defined custom types) then you only use this function for those cells that contain string values.

The last form is for backward compatibility only.

See *wxGridTableBase::CanSetValueAs* (p. 633) and the *wxGrid overview* (p. 1669) for more information.

wxGrid::SetColAttr

void SetColAttr(int col, wxGridCellAttr* attr)

Sets the cell attributes for all cells in the specified column.

For more information about controlling grid cell attributes see the *wxGridCellAttr* (p. 608) cell attribute class and the *wxGrid classes overview* (p. 1669).

wxGrid::SetColFormatBool

void SetColFormatBool(int col)

Sets the specified column to display boolean values. *wxGrid* displays boolean values with a checkbox.

wxGrid::SetColFormatNumber

void SetColFormatNumber(int col)

Sets the specified column to display integer values.

wxGrid::SetColFormatFloat

void SetColFormatFloat(int col, int width = -1, int precision = -1)

Sets the specified column to display floating point values with the given width and precision.

wxGrid::SetColFormatCustom

void SetColFormatCustom(int col, const wxString& typeName)

Sets the specified column to display data in a custom format. See the *wxGrid overview*

(p. 1669) for more information on working with custom data types.

wxGrid::SetColLabelAlignment

void SetColLabelAlignment(int *horiz*, int *vert*)

Sets the horizontal and vertical alignment of column label text.

Horizontal alignment should be one of `wxALIGN_LEFT`, `wxALIGN_CENTRE` or `wxALIGN_RIGHT`.

Vertical alignment should be one of `wxALIGN_TOP`, `wxALIGN_CENTRE` or `wxALIGN_BOTTOM`.

wxGrid::SetColLabelSize

void SetColLabelSize(int *height*)

Sets the height of the column labels.

wxGrid::SetColLabelValue

void SetColLabelValue(int *col*, const wxString& *value*)

Set the value for the given column label. If you are using a derived grid table you must override `wxGridTableBase::SetColLabelValue` (p. 635) for this to have any effect.

wxGrid::SetColMinimalWidth

void SetColMinimalWidth(int *col*, int *width*)

Sets the minimal width for the specified column. This should normally be called when creating the grid because it will not resize a column that is already narrower than the minimal width. The width argument must be higher than the minimal acceptable column width, see `wxGrid::GetColMinimalAcceptableWidth` (p. 596).

wxGrid::SetColMinimalAcceptableWidth

void SetColMinimalAcceptableWidth(int *width*)

This modifies the minimum column width that can be handled correctly. Specifying a low value here allows smaller grid cells to be dealt with correctly. Specifying a value here which is much smaller than the actual minimum size will incur a performance penalty in the functions which perform grid cell index lookup on the basis of screen coordinates. This should normally be called when creating the grid because it will not resize existing columns with sizes smaller than the value specified here.

wxGrid::GetColMinimalAcceptableWidth

int GetColMinimalAcceptableWidth()

This returns the value of the lowest column width that can be handled correctly. See member *SetColMinimalAcceptableWidth* (p. 595) for details.

wxGrid::SetColSize

void SetColSize(int col, int width)

Sets the width of the specified column.

This function does not refresh the grid. If you are calling it outside of a *BeginBatch / EndBatch* block you can use *wxGrid::ForceRefresh* (p. 580) to see the changes.

Automatically sizes the column to fit its contents. If *setAsMin* is true the calculated width will also be set as the minimal width for the column.

Note

wxGrid sets up arrays to store individual row and column sizes when non-default sizes are used. The memory requirements for this could become prohibitive if your grid is very large.

wxGrid::SetDefaultCellAlignment

void SetDefaultCellAlignment(int horiz, int vert)

Sets the default horizontal and vertical alignment for grid cell text.

Horizontal alignment should be one of *wxALIGN_LEFT*, *wxALIGN_CENTRE* or *wxALIGN_RIGHT*.

Vertical alignment should be one of *wxALIGN_TOP*, *wxALIGN_CENTRE* or *wxALIGN_BOTTOM*.

wxGrid::SetDefaultCellBackgroundColour

void SetDefaultCellBackgroundColour(const wxColour& colour)

Sets the default background colour for grid cells.

wxGrid::SetDefaultCellFont

void SetDefaultCellFont(const wxFont& font)

Sets the default font to be used for grid cell text.

wxGrid::SetDefaultEditor

void SetDefaultEditor(wxGridCellEditor* editor)

Sets the default editor for grid cells. The grid will take ownership of the pointer.

See *wxGridCellEditor* (p. 616) and the *wxGrid overview* (p. 1669) for more information about cell editors and renderers.

wxGrid::SetDefaultRenderer

void SetDefaultRenderer(wxGridCellRenderer* renderer)

Sets the default renderer for grid cells. The grid will take ownership of the pointer.

See *wxGridCellRenderer* (p. 630) and the *wxGrid overview* (p. 1669) for more information about cell editors and renderers.

wxGrid::SetDefaultColSize

void SetDefaultColSize(int width, bool resizeExistingCols = false)

Sets the default width for columns in the grid. This will only affect columns subsequently added to the grid unless *resizeExistingCols* is true.

wxGrid::SetDefaultRowSize

void SetDefaultRowSize(int height, bool resizeExistingRows = false)

Sets the default height for rows in the grid. This will only affect rows subsequently added to the grid unless *resizeExistingRows* is true.

wxGrid::SetGridCursor

void SetGridCursor(int row, int col)

Set the grid cursor to the specified cell. This function calls *wxGrid::MakeCellVisible* (p. 589).

wxGrid::SetGridLineColour

void SetGridLineColour(const wxColour& colour)

Sets the colour used to draw grid lines.

wxGrid::SetLabelBackgroundColour

void SetLabelBackgroundColour(const wxColour& colour)

Sets the background colour for row and column labels.

wxGrid::SetLabelFont

void SetLabelFont(const wxFont& font)

Sets the font for row and column labels.

wxGrid::SetLabelTextColour

void SetLabelTextColour(const wxColour& colour)

Sets the colour for row and column label text.

wxGrid::SetReadOnly

void SetReadOnly(int row, int col, bool isReadOnly = true)

Makes the cell at the specified location read-only or editable. See also *wxGrid::IsReadOnly* (p. 589).

wxGrid::SetRowAttr

void SetRowAttr(int row, wxGridCellAttr* attr)

Sets the cell attributes for all cells in the specified row. See the *wxGridCellAttr* (p. 608) class for more information about controlling cell attributes.

wxGrid::SetRowLabelAlignment

void SetRowLabelAlignment(int horiz, int vert)

Sets the horizontal and vertical alignment of row label text.

Horizontal alignment should be one of `wxALIGN_LEFT`, `wxALIGN_CENTRE` or `wxALIGN_RIGHT`.

Vertical alignment should be one of `wxALIGN_TOP`, `wxALIGN_CENTRE` or `wxALIGN_BOTTOM`.

wxGrid::SetRowLabelSize

void SetRowLabelSize(int width)

Sets the width of the row labels.

wxGrid::SetRowLabelValue

void SetRowLabelValue(int row, const wxString& value)

Set the value for the given row label. If you are using a derived grid table you must override *wxGridTableBase::SetRowLabelValue* (p. 635) for this to have any effect.

wxGrid::SetRowMinimalHeight

void SetRowMinimalHeight(int row, int height)

Sets the minimal height for the specified row. This should normally be called when creating the grid because it will not resize a row that is already shorter than the minimal height. The height argument must be higher than the minimal acceptable row height, see *wxGrid::GetRowMinimalAcceptableHeight* (p. 599).

wxGrid::SetRowMinimalAcceptableHeight

void SetRowMinimalAcceptableHeight(int height)

This modifies the minimum row width that can be handled correctly. Specifying a low value here allows smaller grid cells to be dealt with correctly. Specifying a value here which is much smaller than the actual minimum size will incur a performance penalty in the functions which perform grid cell index lookup on the basis of screen coordinates. This should normally be called when creating the grid because it will not resize existing rows with sizes smaller than the value specified here.

wxGrid::GetRowMinimalAcceptableHeight

int GetRowMinimalAcceptableHeight()

This returns the value of the lowest row width that can be handled correctly. See member *SetRowMinimalAcceptableHeight* (p. 599) for details.

wxGrid::SetRowSize

void SetRowSize(int row, int height)

Sets the height of the specified row.

This function does not refresh the grid. If you are calling it outside of a *BeginBatch / EndBatch* block you can use *wxGrid::ForceRefresh* (p. 580) to see the changes.

Automatically sizes the column to fit its contents. If *setAsMin* is true the calculated width will also be set as the minimal width for the column.

Note

`wxGrid` sets up arrays to store individual row and column sizes when non-default sizes are used. The memory requirements for this could become prohibitive if your grid is very large.

`wxGrid::SetSelectionMode`

`void SetSelectionMode(wxGrid::wxGridSelectionModes selmode)`

Set the selection behaviour of the grid.

Parameters

`wxGrid::wxGridSelectCells`

The default mode where individual cells are selected.

`wxGrid::wxGridSelectRows`

Selections will consist of whole rows.

`wxGrid::wxGridSelectionColumns`

Selections will consist of whole columns.

`wxGrid::SetTable`

`bool SetTable(wxGridTableBase* table, bool takeOwnership = false, wxGrid::wxGridSelectionModes selmode = wxGrid::wxGridSelectCells)`

Passes a pointer to a custom grid table to be used by the grid. This should be called after the grid constructor and before using the grid object. If `takeOwnership` is set to true then the table will be deleted by the `wxGrid` destructor.

Use this function instead of `wxGrid::CreateGrid` (p. 578) when your application involves complex or non-string data or data sets that are too large to fit wholly in memory.

`wxGrid::ShowCellEditControl`

`void ShowCellEditControl()`

Displays the in-place cell edit control for the current cell.

`wxGrid::XToCol`

`int XToCol(int x)`

Returns the grid column that corresponds to the logical x coordinate. Returns

wxNOT_FOUND if there is no column at the x position.

wxGrid::XToEdgeOfCol

int XToEdgeOfCol(int x)

Returns the column whose right hand edge is close to the given logical x position. If no column edge is near to this position wxNOT_FOUND is returned.

wxGrid::YToEdgeOfRow

int YToEdgeOfRow(int y)

Returns the row whose bottom edge is close to the given logical y position. If no row edge is near to this position wxNOT_FOUND is returned.

wxGrid::YToRow

int YToRow(int y)

Returns the grid row that corresponds to the logical y coordinate. Returns wxNOT_FOUND if there is no row at the y position.

wxGrid::BlockToDeviceRect

wxRect BlockToDeviceRect(const wxGridCellCoords & topLeft, const wxGridCellCoords & bottomRight)

This function returns the rectangle that encloses the block of cells limited by TopLeft and BottomRight cell in device coords and clipped to the client size of the grid window.

wxGrid::SelectionToDeviceRect

wxRect SelectionToDeviceRect()

This function returns the rectangle that encloses the selected cells in device coords and clipped to the client size of the grid window.

wxGrid::GetSelectionBackground

wxColour GetSelectionBackground() const

Access or update the selection fore/back colours

wxGrid::GetSelectionForeground

wxColour GetSelectionForeground() const

wxGrid::SetSelectionBackground

void SetSelectionBackground(const wxColour& c)

wxGrid::SetSelectionForeground

void SetSelectionForeground(const wxColour& c)

wxGrid::RegisterDataType

void RegisterDataType(const wxString& typeName, wxGridCellRenderer* renderer, wxGridCellEditor* editor)

Methods for a registry for mapping data types to Renderers/Editors

wxGrid::GetDefaultEditorForCell

wxGridCellEditor* GetDefaultEditorForCell(int row, int col) const

wxGridCellEditor* GetDefaultEditorForCell(const wxGridCellCoords& c) const

wxGrid::GetDefaultRendererForCell

wxGridCellRenderer* GetDefaultRendererForCell(int row, int col) const

wxGrid::GetDefaultEditorForType

wxGridCellEditor* GetDefaultEditorForType(const wxString& typeName) const

wxGrid::GetDefaultRendererForType

wxGridCellRenderer* GetDefaultRendererForType(const wxString& typeName) const

wxGrid::SetMargins

void SetMargins(int extraWidth, int extraHeight)

A grid may occupy more space than needed for its rows/columns. This function allows to

set how big this extra space is

wxGrid::wxGrid

wxGrid(**wxWindow*** *parent*, **int** *x*, **int** *y*, **int** *w* = -1, **int** *h* = -1, **long** *style* = *wxWANTS_CHARS*, **const wxString&** *name* = *wxPanelNameStr*)

Backward compatibility.

wxGrid::UpdateDimensions

void **UpdateDimensions**()

Backward compatibility.

wxGrid::GetRows

int **GetRows**()

Backward compatibility.

wxGrid::GetCols

int **GetCols**()

Backward compatibility.

wxGrid::GetCursorRow

int **GetCursorRow**()

Backward compatibility.

wxGrid::GetCursorColumn

int **GetCursorColumn**()

Backward compatibility.

wxGrid::GetScrollPosX

int **GetScrollPosX**()

Backward compatibility.

wxGrid::GetScrollPosY

int GetScrollPosY()

Backward compatibility.

wxGrid::SetScrollX

void SetScrollX(int x)

Backward compatibility.

wxGrid::SetScrollY

void SetScrollY(int y)

Backward compatibility.

wxGrid::SetColumnWidth

void SetColumnWidth(int col, int width)

Backward compatibility.

wxGrid::GetColumnWidth

int GetColumnWidth(int col)

Backward compatibility.

wxGrid::SetRowHeight

void SetRowHeight(int row, int height)

Backward compatibility.

wxGrid::GetViewHeight

int GetViewHeight()

Backward compatibility.

wxGrid::GetViewWidth

int GetViewWidth()

Returned number of whole cols visible.

wxGrid::SetLabelSize

void SetLabelSize(int *orientation*, int *sz*)

wxGrid::GetLabelSize

int GetLabelSize(int *orientation*)

wxGrid::SetLabelAlignment

void SetLabelAlignment(int *orientation*, int *align*)

wxGrid::GetLabelAlignment

int GetLabelAlignment(int *orientation*, int *align*)

wxGrid::SetLabelValue

void SetLabelValue(int *orientation*, const wxString& *val*, int *pos*)

wxGrid::GetLabelValue

wxString GetLabelValue(int *orientation*, int *pos*)

wxGrid::GetCellTextFont

wxFont GetCellTextFont() const

wxFont GetCellTextFont(int *row*, int *col*) const

wxGrid::SetCellTextFont

void SetCellTextFont(const wxFont& *fnt*)

void SetCellTextFont(const wxFont& *fnt*, int *row*, int *col*)

wxGrid::SetCellBackgroundColour

void SetCellBackgroundColour(const wxColour& *col*)

void SetCellBackgroundColour(int row, int col, const wxColour& colour)

void SetCellBackgroundColour(const wxColour& colour, int row, int col)

wxGrid::GetEditable

bool GetEditable()

wxGrid::SetEditable

void SetEditable(bool edit = true)

wxGrid::GetEditInPlace

bool GetEditInPlace()

wxGrid::SetEditInPlace

void SetEditInPlace(bool edit = true)

wxGrid::SetCellBitmap

void SetCellBitmap(wxBitmap* bitmap, int row, int col)

wxGrid::SetDividerPen

void SetDividerPen(const wxPen& pen)

wxGrid::GetDividerPen

wxPen& GetDividerPen() const

wxGrid::OnActivate

void OnActivate(bool active)

wxGrid::Fit

void Fit()

Overridden wxWindow methods

wxGrid::DoGetBestSize

wxSize DoGetBestSize() const

wxGrid::InitRowHeights

void InitRowHeights()

NB: *never* access m_row/col arrays directly because they are created on demand, *always* use accessor functions instead!

Init the m_rowHeights/Bottoms arrays with default values.

wxGrid::InitColWidths

void InitColWidths()

Init the m_colWidths/Rights arrays

wxGrid::GetColWidth

int GetColWidth(int col) const

Get the col/row coords

wxGrid::GetColLeft

int GetColLeft(int col) const

wxGrid::GetColRight

int GetColRight(int col) const

wxGrid::GetRowHeight

int GetRowHeight(int row) const

This function must be public for compatibility.

wxGrid::GetRowTop

int GetRowTop(int row) const

wxGrid::GetRowBottom

```
int GetRowBottom(int row) const
```

wxGrid::SetOrCalcColumnSizes

```
int SetOrCalcColumnSizes(bool calcOnly, bool setAsMin = true)
```

Common part of AutoSizeColumn/Row() and GetBestSize()

wxGrid::SetOrCalcRowSizes

```
int SetOrCalcRowSizes(bool calcOnly, bool setAsMin = true)
```

wxGrid::AutoSizeColOrRow

```
void AutoSizeColOrRow(int n, bool setAsMin, bool column)
```

Common part of AutoSizeColumn/Row() or row?

wxGrid::GetColMinimalWidth

```
int GetColMinimalWidth(int col) const
```

get the minimal width of the given column/row

wxGrid::GetRowMinimalHeight

```
int GetRowMinimalHeight(int col) const
```

wxGrid::CanHaveAttributes

```
bool CanHaveAttributes()
```

Do we have some place to store attributes in?

wxGrid::GetOrCreateCellAttr

```
wxGridCellAttr* GetOrCreateCellAttr(int row, int col) const
```

wxGridCellAttr

This class can be used to alter the cells' appearance in the grid by changing their

colour/font/... from default. An object of this class may be returned by `wxGridTable::GetAttr()`.

Derived from

No base class

Data structures

wxGridCellAttr::wxGridCellAttr

wxGridCellAttr()

Default constructor. **wxGridCellAttr(const wxColour& colText, const wxColour& colBack, const wxFont& font, int hAlign, int vAlign)**

VZ: considering the number of members `wxGridCellAttr` has now, this ctor seems to be pretty useless... may be we should just remove it?

wxGridCellAttr::Clone

wxGridCellAttr* Clone() const

Creates a new copy of this object.

wxGridCellAttr::IncRef

void IncRef()

This class is ref counted: it is created with ref count of 1, so calling `DecRef()` once will delete it. Calling `IncRef()` allows to lock it until the matching `DecRef()` is called

wxGridCellAttr::DecRef

void DecRef()

wxGridCellAttr::SetTextColour

void SetTextColour(const wxColour& colText)

Sets the text colour.

wxGridCellAttr::SetBackgroundColour

void SetBackgroundColour(const wxColour& colBack)

Sets the background colour.

wxGridCellAttr::SetFont

void SetFont(const wxFont& font)

Sets the font.

wxGridCellAttr::SetAlignment

void SetAlignment(int hAlign, int vAlign)

Sets the alignment.

wxGridCellAttr::SetReadOnly

void SetReadOnly(bool isReadOnly = true)

wxGridCellAttr::SetRenderer

void SetRenderer(wxGridCellRenderer* renderer)

takes ownership of the pointer

wxGridCellAttr::SetEditor

void SetEditor(wxGridCellEditor* editor)

wxGridCellAttr::HasTextColour

bool HasTextColour() const

accessors

wxGridCellAttr::HasBackgroundColour

bool HasBackgroundColour() const

wxGridCellAttr::HasFont

bool HasFont() const

wxGridCellAttr::HasAlignment

bool HasAlignment() const

wxGridCellAttr::HasRenderer

bool HasRenderer() const

wxGridCellAttr::HasEditor

bool HasEditor() const

wxGridCellAttr::GetTextColour

const wxColour& GetTextColour() const

wxGridCellAttr::GetBackgroundColour

const wxColour& GetBackgroundColour() const

wxGridCellAttr::GetFont

const wxFont& GetFont() const

wxGridCellAttr::GetAlignment

void GetAlignment(int* hAlign, int* vAlign) const

wxPerl note: This method takes no parameters and returns a 2-element list (*hAlign*, *vAlign*).

wxGridCellAttr::GetRenderer

wxGridCellRenderer* GetRenderer(wxGrid* grid, int row, int col) const

wxGridCellAttr::GetEditor

wxGridCellEditor* GetEditor(wxGrid* grid, int row, int col) const

wxGridCellAttr::IsReadOnly

bool IsReadOnly() const

wxGridCellAttr::SetDefAttr

void SetDefAttr(wxGridCellAttr* defAttr)

wxGridBagSizer

A *wxSizer* (p. 1110) that can lay out items in a virtual grid like a *wxFlexGridSizer* (p. 509) but in this case explicit positioning of the items is allowed using *wxGBPosition* (p. 558), and items can optionally span more than one row and/or column using *wxGBSpan* (p. 561).

Derived from

wxFlexGridSizer (p. 509)

wxGridSizer (p. 636)

wxSizer (p. 1110)

wxObject (p. 954)

Include files

<wx/gbsizer.h>

wxGridBagSizer::wxGridBagSizer

wxGridBagSizer(int vgap = 0, int hgap = 0)

Constructor, with optional parameters to specify the gap between the rows and columns.

wxGridBagSizer::Add

bool Add(wxWindow* window, const wxGBPosition& pos, const wxGBSpan& span = wxDefaultSpan, int flag = 0, int border = 0, wxObject* userData = NULL)

bool Add(wxSizer* sizer, const wxGBPosition& pos, const wxGBSpan& span = wxDefaultSpan, int flag = 0, int border = 0, wxObject* userData = NULL)

bool Add(int width, int height, const wxGBPosition& pos, const wxGBSpan& span = wxDefaultSpan, int flag = 0, int border = 0, wxObject* userData = NULL)

bool Add(wxGBSizerItem* item)

The Add methods return true if the item was successfully placed at the given position, false if something was already there.

wxGridBagSizer::CalcMin

wxSize CalcMin()

Called when the managed size of the sizer is needed or when layout needs done.

wxGridBagSizer::CheckForIntersection

bool CheckForIntersection(wxGBSizerItem* item, wxGBSizerItem* excludeItem = NULL)**bool CheckForIntersection(const wxGBPosition& pos, const wxGBSpan& span, wxGBSizerItem* excludeItem = NULL)**

Look at all items and see if any intersect (or would overlap) the given item. Returns true if so, false if there would be no overlap. If an excludeItem is given then it will not be checked for intersection, for example it may be the item we are checking the position of.

wxGridBagSizer::FindItem

wxGBSizerItem* FindItem(wxWindow* window)**wxGBSizerItem* FindItem(wxSizer* sizer)**

Find the sizer item for the given window or subsizer, returns NULL if not found. (non-recursive)

wxGridBagSizer::FindItemAtPoint

wxGBSizerItem* FindItemAtPoint(const wxPoint& pt)

Return the sizer item located at the point given in pt, or NULL if there is no item at that point. The (x,y) coordinates in pt correspond to the client coordinates of the window using the sizer for layout. (non-recursive)

wxGridBagSizer::FindItemAtPosition

wxGBSizerItem* FindItemAtPosition(const wxGBPosition& pos)

Return the sizer item for the given grid cell, or NULL if there is no item at that position. (non-recursive)

wxGridBagSizer::FindItemWithData

wxGBSizerItem* FindItemWithData(const wxObject* userData)

Return the sizer item that has a matching user data (it only compares pointer values) or

NULL if not found. (non-recursive)

wxGridBagSizer::GetCellSize

wxSize GetCellSize(int row, int col) const

Get the size of the specified cell, including hgap and vgap. Only valid after a Layout.

wxGridBagSizer::GetEmptyCellSize

wxSize GetEmptyCellSize() const

Get the size used for cells in the grid with no item.

wxGridBagSizer::GetItemPosition

wxGBPosition GetItemPosition(wxWindow* window)

wxGBPosition GetItemPosition(wxSizer* sizer)

wxGBPosition GetItemPosition(size_t index)

Get the grid position of the specified item.

wxGridBagSizer::GetItemSpan

wxGBSpan GetItemSpan(wxWindow* window)

wxGBSpan GetItemSpan(wxSizer* sizer)

wxGBSpan GetItemSpan(size_t index)

Get the row/col spanning of the specified item

wxGridBagSizer::RecalcSizes

void RecalcSizes()

Called when the managed size of the sizer is needed or when layout needs done.

wxGridBagSizer::SetEmptyCellSize

void SetEmptyCellSize(const wxSize& sz)

Set the size used for cells in the grid with no item.

wxGridBagSizer::SetItemPosition

bool SetItemPosition(wxWindow* window, const wxGBPosition& pos)

bool SetItemPosition(wxSizer* sizer, const wxGBPosition& pos)

bool SetItemPosition(size_t index, const wxGBPosition& pos)

Set the grid position of the specified item. Returns true on success. If the move is not allowed (because an item is already there) then false is returned.

wxGridBagSizer::SetItemSpan

bool SetItemSpan(wxWindow* window, const wxGBSpan& span)

bool SetItemSpan(wxSizer* sizer, const wxGBSpan& span)

bool SetItemSpan(size_t index, const wxGBSpan& span)

Set the row/col spanning of the specified item. Returns true on success. If the move is not allowed (because an item is already there) then false is returned.

wxGridCellBoolEditor

The editor for boolean data.

Derived from

wxGridCellEditor (p. 616)

See also

wxGridCellEditor (p. 616), *wxGridCellFloatEditor* (p. 619), *wxGridCellNumberEditor* (p. 619), *wxGridCellTextEditor* (p. 620), *wxGridCellChoiceEditor* (p. 615)

wxGridCellBoolEditor::wxGridCellBoolEditor

wxGridCellBoolEditor()

Default constructor.

wxGridCellChoiceEditor

The editor for string data allowing to choose from a list of strings.

Derived from

wxGridCellEditor (p. 616)

See also

wxGridCellEditor (p. 616), *wxGridCellFloatEditor* (p. 619), *wxGridCellBoolEditor* (p. 615), *wxGridCellTextEditor* (p. 620), *wxGridCellNumberEditor* (p. 619)

wxGridCellChoiceEditor::wxGridCellChoiceEditor

wxGridCellChoiceEditor(*size_t count* = 0, **const wxString** *choices*[] = *NULL*, **bool** *allowOthers* = *false*)

wxGridCellChoiceEditor(**const wxArrayString&** *choices*, **bool** *allowOthers* = *false*)

count

Number of strings from which the user can choose.

choices

An array of strings from which the user can choose.

allowOthers

If *allowOthers* is true, the user can type a string not in *choices* array.

wxGridCellChoiceEditor::SetParameters

void SetParameters(**const wxString&** *params*)

Parameters string format is "item1[,item2[...itemN]]"

wxGridCellEditor

This class is responsible for providing and manipulating the in-place edit controls for the grid. Instances of *wxGridCellEditor* (actually, instances of derived classes since it is an abstract class) can be associated with the cell attributes for individual cells, rows, columns, or even for the entire grid.

Derived from

wxGridCellWorker

See also

wxGridCellTextEditor (p. 620), *wxGridCellFloatEditor* (p. 619), *wxGridCellBoolEditor* (p. 615), *wxGridCellNumberEditor* (p. 619), *wxGridCellChoiceEditor* (p. 615)

wxGridCellEditor::wxGridCellEditor

wxGridCellEditor()

wxGridCellEditor::IsCreated

bool IsCreated()

wxGridCellEditor::Create

void Create(wxWindow* parent, wxWindowID id, wxEvtHandler* evtHandler)

Creates the actual edit control.

wxGridCellEditor::SetSize

void SetSize(const wxRect& rect)

Size and position the edit control.

wxGridCellEditor::Show

void Show(bool show, wxGridCellAttr* attr = NULL)

Show or hide the edit control, use the specified attributes to set colours/fonts for it.

wxGridCellEditor::PaintBackground

void PaintBackground(const wxRect& rectCell, wxGridCellAttr* attr)

Draws the part of the cell not occupied by the control: the base class version just fills it with background colour from the attribute.

wxGridCellEditor::BeginEdit

void BeginEdit(int row, int col, wxGrid* grid)

Fetch the value from the table and prepare the edit control to begin editing. Set the focus to the edit control.

wxGridCellEditor::EndEdit

bool EndEdit(int row, int col, wxGrid* grid)

Complete the editing of the current cell. Returns true if the value has changed. If

necessary, the control may be destroyed.

wxGridCellEditor::Reset

void Reset()

Reset the value in the control back to its starting value.

wxGridCellEditor::StartingKey

void StartingKey(wxKeyEvent& event)

If the editor is enabled by pressing keys on the grid, this will be called to let the editor do something about that first key if desired.

wxGridCellEditor::StartingClick

void StartingClick()

If the editor is enabled by clicking on the cell, this method will be called.

wxGridCellEditor::HandleReturn

void HandleReturn(wxKeyEvent& event)

Some types of controls on some platforms may need some help with the Return key.

wxGridCellEditor::Destroy

void Destroy()

Final cleanup.

wxGridCellEditor::Clone

wxGridCellEditor* Clone() const

Create a new object which is the copy of this one.

wxGridCellEditor::~wxGridCellEditor

~wxGridCellEditor()

The dtor is private because only DecRef() can delete us.

wxGridCellFloatEditor

The editor for floating point numbers data.

Derived from

wxGridCellTextEditor (p. 620)

wxGridCellEditor (p. 616)

See also

wxGridCellEditor (p. 616), *wxGridCellNumberEditor* (p. 619), *wxGridCellBoolEditor* (p. 615), *wxGridCellTextEditor* (p. 620), *wxGridCellChoiceEditor* (p. 615)

wxGridCellFloatEditor::wxGridCellFloatEditor

wxGridCellFloatEditor(int *width* = -1, int *precision* = -1)

width

Minimum number of characters to be shown.

precision

Number of digits after the decimal dot.

wxGridCellFloatEditor::SetParameters

void SetParameters(const wxString& *params*)

Parameters string format is "width,precision"

wxGridCellNumberEditor

The editor for numeric integer data.

Derived from

wxGridCellTextEditor (p. 620)

wxGridCellEditor (p. 616)

See also

wxGridCellEditor (p. 616), *wxGridCellFloatEditor* (p. 619), *wxGridCellBoolEditor* (p. 615), *wxGridCellTextEditor* (p. 620), *wxGridCellChoiceEditor* (p. 615)

wxGridCellNumberEditor::wxGridCellNumberEditor

wxGridCellNumberEditor(int *min* = -1, int *max* = -1)

Allows to specify the range for acceptable data; if *min* == *max* == -1, no range checking is done

wxGridCellNumberEditor::GetString

wxString GetString() const

String representation of the value.

wxGridCellNumberEditor::HasRange

bool HasRange() const

If the return value is true, the editor uses a wxSpinCtrl to get user input, otherwise it uses a wxTextCtrl.

wxGridCellNumberEditor::SetParameters

void SetParameters(const wxString& *params*)

Parameters string format is "min,max".

wxGridCellTextEditor

The editor for string/text data.

Derived from

wxGridCellEditor (p. 616)

See also

wxGridCellEditor (p. 616), *wxGridCellFloatEditor* (p. 619), *wxGridCellBoolEditor* (p. 615), *wxGridCellNumberEditor* (p. 619), *wxGridCellChoiceEditor* (p. 615)

wxGridCellTextEditor::wxGridCellTextEditor

wxGridCellTextEditor()

Default constructor.

wxGridCellTextEditor::SetParameters

void SetParameters(const wxString& params)

The parameters string format is "n" where n is a number representing the maximum width.

wxGridEditorCreatedEvent

Derived from

wxCommandEvent (p. 165)

wxEvent (p. 441)

wxObject (p. 954)

Event handling

The event handler for the following functions takes a *wxGridEditorCreatedEvent* (p. 621) parameter.

EVT_GRID_EDITOR_CREATED(func) The editor for a cell was created. Processes a `wxEVT_GRID_EDITOR_CREATED`.

wxGridEditorCreatedEvent::wxGridEditorCreatedEvent

wxGridEditorCreatedEvent()

Default constructor.

wxGridEditorCreatedEvent(int id, wxEventType type, wxObject* obj, int row, int col, wxControl* ctrl)

wxGridEditorCreatedEvent::GetCol

int GetCol()

Returns the column at which the event occurred.

wxGridEditorCreatedEvent::GetControl

wxControl* GetControl()

Returns the edit control.

wxGridEditorCreatedEvent::GetRow

int GetRow()

Returns the row at which the event occurred.

wxGridEditorCreatedEvent::SetCol

void SetCol(int col)

Sets the column at which the event occurred.

wxGridEditorCreatedEvent::SetControl

void SetControl(wxControl* ctrl)

Sets the edit control.

wxGridEditorCreatedEvent::SetRow

void SetRow(int row)

Sets the row at which the event occurred.

wxGridEvent

This event class contains information about various grid events.

Derived from

wxNotifyEvent (p. 953)

wxCommandEvent (p. 165)

wxEvent (p. 441)

wxObject (p. 954)

Include files

<wx/grid.h>

Event handling

The event handler for the following functions takes a *wxGridEvent* (p. 622) parameter.

EVT_GRID_CELL_LEFT_CLICK(func) The user clicked a cell with the left mouse button. Processes a `wxEVT_GRID_CELL_LEFT_CLICK`.

EVT_GRID_CELL_RIGHT_CLICK(func) The user clicked a cell with the right mouse button. Processes a `wxEVT_GRID_CELL_RIGHT_CLICK`.

EVT_GRID_CELL_LEFT_DCLICK(func)	The user double-clicked a cell with the left mouse button. Processes a <code>wxEVT_GRID_CELL_LEFT_DCLICK</code> .
EVT_GRID_CELL_RIGHT_DCLICK(func)	The user double-clicked a cell with the right mouse button. Processes a <code>wxEVT_GRID_CELL_RIGHT_DCLICK</code> .
EVT_GRID_LABEL_LEFT_CLICK(func)	The user clicked a label with the left mouse button. Processes a <code>wxEVT_GRID_LABEL_LEFT_CLICK</code> .
EVT_GRID_LABEL_RIGHT_CLICK(func)	The user clicked a label with the right mouse button. Processes a <code>wxEVT_GRID_LABEL_RIGHT_CLICK</code> .
EVT_GRID_LABEL_LEFT_DCLICK(func)	The user double-clicked a label with the left mouse button. Processes a <code>wxEVT_GRID_LABEL_LEFT_DCLICK</code> .
EVT_GRID_LABEL_RIGHT_DCLICK(func)	The user double-clicked a label with the right mouse button. Processes a <code>wxEVT_GRID_LABEL_RIGHT_DCLICK</code> .
EVT_GRID_CELL_CHANGE(func)	The user changed the data in a cell. Processes a <code>wxEVT_GRID_CELL_CHANGE</code> .
EVT_GRID_SELECT_CELL(func)	The user moved to, and selected a cell. Processes a <code>wxEVT_GRID_SELECT_CELL</code> .
EVT_GRID_EDITOR_HIDDEN(func)	The editor for a cell was hidden. Processes a <code>wxEVT_GRID_EDITOR_HIDDEN</code> .
EVT_GRID_EDITOR_SHOWN(func)	The editor for a cell was shown. Processes a <code>wxEVT_GRID_EDITOR_SHOWN</code> .

wxGridEvent::wxGridEvent

wxGridEvent()

Default constructor.

wxGridEvent(int id, wxEventType type, wxObject* obj, int row = -1, int col = -1, int x = -1, int y = -1, bool sel = true, bool control = false, bool shift = false, bool alt = false, bool meta = false)

Parameters

wxGridEvent::AltDown

bool AltDown()

Returns true if the Alt key was down at the time of the event.

wxGridEvent::ControlDown

bool ControlDown()

Returns true if the Control key was down at the time of the event.

wxGridEvent::GetCol

int GetCol()

Column at which the event occurred.

wxGridEvent::GetPosition

wxPoint GetPosition()

Position in pixels at which the event occurred.

wxGridEvent::GetRow

int GetRow()

Row at which the event occurred.

wxGridEvent::MetaDown

bool MetaDown()

Returns true if the Meta key was down at the time of the event.

wxGridEvent::Selecting

bool Selecting()

Returns true if the user deselected a cell, false if the user deselected a cell.

wxGridEvent::ShiftDown

bool ShiftDown()

Returns true if the Shift key was down at the time of the event.

wxGridRangeSelectEvent

Derived from

wxNotifyEvent (p. 953)
wxCommandEvent (p. 165)
wxEvent (p. 441)
wxObject (p. 954)

Event handling

The event handler for the following functions takes a *wxGridRangeSelectEvent* (p. 625) parameter.

EVT_GRID_RANGE_SELECT(func) The user selected a group of contiguous cells.
Processes a *wxEVT_GRID_RANGE_SELECT*.

wxGridRangeSelectEvent::wxGridRangeSelectEvent

wxGridRangeSelectEvent()

Default constructor.

wxGridRangeSelectEvent(int id, wxEventType type, wxObject* obj, const wxGridCellCoords& topLeft, const wxGridCellCoords& bottomRight, bool sel = true, bool control = false, bool shift = false, bool alt = false, bool meta = false)

wxGridRangeSelectEvent::AltDown

bool AltDown()

Returns true if the Alt key was down at the time of the event.

wxGridRangeSelectEvent::ControlDown

bool ControlDown()

Returns true if the Control key was down at the time of the event.

wxGridRangeSelectEvent::GetBottomRightCoords

wxGridCellCoords GetBottomRightCoords()

Top left corner of the rectangular area that was (de)selected.

wxGridRangeSelectEvent::GetBottomRow

int GetBottomRow()

Bottom row of the rectangular area that was (de)selected.

wxGridRangeSelectEvent::GetLeftCol

int GetLeftCol()

Left column of the rectangular area that was (de)selected.

wxGridRangeSelectEvent::GetRightCol

int GetRightCol()

Right column of the rectangular area that was (de)selected.

wxGridRangeSelectEvent::GetTopLeftCoords

wxGridCellCoords GetTopLeftCoords()

Top left corner of the rectangular area that was (de)selected.

wxGridRangeSelectEvent::GetTopRow

int GetTopRow()

Top row of the rectangular area that was (de)selected.

wxGridRangeSelectEvent::MetaDown

bool MetaDown()

Returns true if the Meta key was down at the time of the event.

wxGridRangeSelectEvent::Selecting

bool Selecting()

Returns true if the area was selected, false otherwise.

wxGridRangeSelectEvent::ShiftDown

bool ShiftDown()

Returns true if the Shift key was down at the time of the event.

wxGridSizeEvent

This event class contains information about a row/column resize event.

Derived from

wxNotifyEvent (p. 953)
wxCommandEvent (p. 165)
wxEvt (p. 441)
wxObject (p. 954)

Include files

<wx/grid.h>

Event handling

The event handler for the following functions takes a *wxGridSizeEvent* (p. 627) parameter.

EVT_GRID_COL_SIZE(func)	The user resized a column by dragging it. Processes a <i>wxEVT_GRID_COL_SIZE</i> .
EVT_GRID_ROW_SIZE(func)	The user resized a row by dragging it. Processes a <i>wxEVT_GRID_ROW_SIZE</i> .

wxGridSizeEvent::wxGridSizeEvent

wxGridSizeEvent()

Default constructor.

wxGridSizeEvent(int id, wxEventType type, wxObject* obj, int rowOrCol = -1, int x = -1, int y = -1, bool control = false, bool shift = false, bool alt = false, bool meta = false)

wxGridSizeEvent::AltDown

bool AltDown()

Returns true if the Alt key was down at the time of the event.

wxGridSizeEvent::ControlDown

bool ControlDown()

Returns true if the Control key was down at the time of the event.

wxGridSizeEvent::GetPosition

wxPoint GetPosition()

Position in pixels at which the event occurred.

wxGridSizeEvent::GetRowOrCol

int GetRowOrCol()

Row or column at that was resized.

wxGridSizeEvent::MetaDown

bool MetaDown()

Returns true if the Meta key was down at the time of the event.

wxGridSizeEvent::ShiftDown

bool ShiftDown()

Returns true if the Shift key was down at the time of the event.

wxGridCellBoolRenderer

This class may be used to format boolean data in a cell. for string cells.

Derived from

wxGridCellRenderer (p. 630)

See also

wxGridCellRenderer (p. 630), *wxGridCellStringRenderer* (p. 631),
wxGridCellFloatRenderer (p. 628), *wxGridCellNumberRenderer* (p. 630)

wxGridCellBoolRenderer::wxGridCellBoolRenderer

wxGridCellBoolRenderer()

Default constructor

wxGridCellFloatRenderer

This class may be used to format floating point data in a cell.

Derived from

wxGridCellStringRenderer (p. 631)

wxGridCellRenderer (p. 630)

See also

wxGridCellRenderer (p. 630), *wxGridCellNumberRenderer* (p. 630),

wxGridCellStringRenderer (p. 631), *wxGridCellBoolRenderer* (p. 628)

wxGridCellFloatRenderer::wxGridCellFloatRenderer

wxGridCellFloatRenderer(*int width* = -1, *int precision* = -1)

width

Minimum number of characters to be shown.

precision

Number of digits after the decimal dot.

wxGridCellFloatRenderer::GetPrecision

int GetPrecision() const

Returns the precision (see *wxGridCellFloatRenderer* (p. 629)).

wxGridCellFloatRenderer::GetWidth

int GetWidth() const

Returns the width (see *wxGridCellFloatRenderer* (p. 629)).

wxGridCellFloatRenderer::SetParameters

void SetParameters(const *wxString& params*)

Parameters string format is "width[,precision]".

wxGridCellFloatRenderer::SetPrecision

void SetPrecision(*int precision*)

Sets the precision (see *wxGridCellFloatRenderer* (p. 629)).

wxGridCellFloatRenderer::SetWidth

void SetWidth(int width)

Sets the width (see *wxGridCellFloatRenderer* (p. 629))

wxGridCellNumberRenderer

This class may be used to format integer data in a cell.

Derived from

wxGridCellStringRenderer (p. 631)

wxGridCellRenderer (p. 630)

See also

wxGridCellRenderer (p. 630), *wxGridCellStringRenderer* (p. 631),
wxGridCellFloatRenderer (p. 628), *wxGridCellBoolRenderer* (p. 628)

wxGridCellNumberRenderer::wxGridCellNumberRenderer

wxGridCellNumberRenderer()

Default constructor

wxGridCellRenderer

This class is responsible for actually drawing the cell in the grid. You may pass it to the *wxGridCellAttr* (below) to change the format of one given cell or to *wxGrid::SetDefaultRenderer()* to change the view of all cells. This is an abstract class, and you will normally use one of the predefined derived classes or derive your own class from it.

Derived from

wxGridCellWorker

See also

wxGridCellStringRenderer (p. 631), *wxGridCellNumberRenderer* (p. 630),
wxGridCellFloatRenderer (p. 628), *wxGridCellBoolRenderer* (p. 628)

wxGridCellRenderer::Draw

void Draw(wxGrid& *grid*, wxGridCellAttr& *attr*, wxDC& *dc*, const wxRect& *rect*, int *row*, int *col*, bool *isSelected*)

Draw the given cell on the provided DC inside the given rectangle using the style specified by the attribute and the default or selected state corresponding to the *isSelected* value.

This pure virtual function has a default implementation which will prepare the DC using the given attribute: it will draw the rectangle with the background colour from *attr* and set the text colour and font.

wxGridCellRenderer::GetBestSize

wxSize GetBestSize(wxGrid& *grid*, wxGridCellAttr& *attr*, wxDC& *dc*, int *row*, int *col*)

Get the preferred size of the cell for its contents.

wxGridCellRenderer::Clone

wxGridCellRenderer* Clone() const

wxGridCellStringRenderer

This class may be used to format string data in a cell; it is the default for string cells.

Derived from

wxGridCellRenderer (p. 630)

See also

wxGridCellRenderer (p. 630), *wxGridCellNumberRenderer* (p. 630),
wxGridCellFloatRenderer (p. 628), *wxGridCellBoolRenderer* (p. 628)

wxGridCellStringRenderer::wxGridCellStringRenderer

wxGridCellStringRenderer()

Default constructor

wxGridTableBase

Grid table classes.

Derived from

wxObject (p. 954)

Data structures

wxGridTableBase::wxGridTableBase

wxGridTableBase()

wxGridTableBase::~~wxGridTableBase

~wxGridTableBase()

wxGridTableBase::GetNumberRows

int GetNumberRows()

You must override these functions in a derived table class.

wxGridTableBase::GetNumberCols

int GetNumberCols()

wxGridTableBase::IsEmptyCell

bool IsEmptyCell(int *row*, int *col*)

wxGridTableBase::GetValue

wxString GetValue(int *row*, int *col*)

wxGridTableBase::SetValue

void SetValue(int *row*, int *col*, const wxString& *value*)

wxGridTableBase::GetTypeNames

wxString GetTypeNames(int *row*, int *col*)

Data type determination and value access.

wxGridTableBase::CanGetValueAs

bool CanGetValueAs(int row, int col, const wxString& typeName)

wxGridTableBase::CanSetValueAs

bool CanSetValueAs(int row, int col, const wxString& typeName)

wxGridTableBase::GetValueAsLong

long GetValueAsLong(int row, int col)

wxGridTableBase::GetValueAsDouble

double GetValueAsDouble(int row, int col)

wxGridTableBase::GetValueAsBool

bool GetValueAsBool(int row, int col)

wxGridTableBase::SetValueAsLong

void SetValueAsLong(int row, int col, long value)

wxGridTableBase::SetValueAsDouble

void SetValueAsDouble(int row, int col, double value)

wxGridTableBase::SetValueAsBool

void SetValueAsBool(int row, int col, bool value)

wxGridTableBase::GetValueAsCustom

void* GetValueAsCustom(int row, int col, const wxString& typeName)

For user defined types

wxGridTableBase::SetValueAsCustom

void SetValueAsCustom(int row, int col, const wxString& typeName, void* value)

wxGridTableBase::SetView

```
void SetView(wxGrid* grid)
```

Overriding these is optional

wxGridTableBase::GetView

```
wxGrid * GetView() const
```

wxGridTableBase::Clear

```
void Clear()
```

wxGridTableBase::InsertRows

```
bool InsertRows(size_t pos = 0, size_t numRows = 1)
```

wxGridTableBase::AppendRows

```
bool AppendRows(size_t numRows = 1)
```

wxGridTableBase::DeleteRows

```
bool DeleteRows(size_t pos = 0, size_t numRows = 1)
```

wxGridTableBase::InsertCols

```
bool InsertCols(size_t pos = 0, size_t numCols = 1)
```

wxGridTableBase::AppendCols

```
bool AppendCols(size_t numCols = 1)
```

wxGridTableBase::DeleteCols

```
bool DeleteCols(size_t pos = 0, size_t numCols = 1)
```

wxGridTableBase::GetRowLabelValue

```
wxString GetRowLabelValue(int row)
```

wxGridTableBase::GetColLabelValue

wxString GetColLabelValue(int *col*)

wxGridTableBase::SetRowLabelValue

void SetRowLabelValue(int *WXUNUSED(row)*, **const** *wxString&*)

wxGridTableBase::SetColLabelValue

void SetColLabelValue(int *WXUNUSED(col)*, **const** *wxString&*)

wxGridTableBase::SetAttrProvider

void SetAttrProvider(*wxGridCellAttrProvider** *attrProvider*)

Attribute handling give us the attr provider to use - we take ownership of the pointer

wxGridTableBase::GetAttrProvider

*wxGridCellAttrProvider** **GetAttrProvider()** **const**

get the currently used attr provider (may be NULL)

wxGridTableBase::CanHaveAttributes

bool CanHaveAttributes()

Does this table allow attributes? Default implementation creates a *wxGridCellAttrProvider* if necessary.

wxGridTableBase::UpdateAttrRows

void UpdateAttrRows(*size_t pos*, *int numRows*)

change row/col number in attribute if needed

wxGridTableBase::UpdateAttrCols

void UpdateAttrCols(*size_t pos*, *int numCols*)

wxGridTableBase::GetAttr

wxGridCellAttr* GetAttr(int row, int col)

by default forwarded to wxGridCellAttrProvider if any. May be overridden to handle attributes directly in the table.

wxGridTableBase::SetAttr

void SetAttr(wxGridCellAttr* attr, int row, int col)

these functions take ownership of the pointer

wxGridTableBase::SetRowAttr

void SetRowAttr(wxGridCellAttr* attr, int row)

wxGridTableBase::SetColAttr

void SetColAttr(wxGridCellAttr* attr, int col)

wxGridSizer

A grid sizer is a sizer which lays out its children in a two-dimensional table with all table fields having the same size, i.e. the width of each field is the width of the widest child, the height of each field is the height of the tallest child.

Derived from

wxSizer (p. 1110)

wxObject (p. 954)

See also

wxSizer (p. 1110), *Sizer overview* (p. 1627)

wxGridSizer::wxGridSizer

wxGridSizer(int rows, int cols, int vgap, int hgap)

wxGridSizer(int cols, int vgap = 0, int hgap = 0)

Constructor for a wxGridSizer. *rows* and *cols* determine the number of columns and rows in the sizer - if either of the parameters is zero, it will be calculated to form the total number of children in the sizer, thus making the sizer grow dynamically. *vgap* and *hgap* define extra space between all children.

wxGridSizer::GetCols

int GetCols()

Returns the number of columns in the sizer.

wxGridSizer::GetHGap

int GetHGap()

Returns the horizontal gap (in pixels) between cells in the sizer.

wxGridSizer::GetRows

int GetRows()

Returns the number of rows in the sizer.

wxGridSizer::GetVGap

int GetVGap()

Returns the vertical gap (in pixels) between the cells in the sizer.

wxGridSizer::SetCols

void SetCols(int cols)

Sets the number of columns in the sizer.

wxGridSizer::SetHGap

void SetHGap(int gap)

Sets the horizontal gap (in pixels) between cells in the sizer.

wxGridSizer::SetRows

void SetRows(int rows)

Sets the number of rows in the sizer.

wxGridSizer::SetVGap

void SetVGap(int gap)

Sets the vertical gap (in pixels) between the cells in the sizer.

wxHashMap

This is a simple, type-safe, and reasonably efficient hash map class, whose interface is a subset of the interface of STL containers. In particular, the interface is modelled after `std::map`, and the various, non standard, `std::hash_map`.

Example

```
class MyClass { /* ... */ };

// declare a hash map with string keys and int values
WX_DECLARE_STRING_HASH_MAP( int, MyHash5 );
// same, with int keys and MyClass* values
WX_DECLARE_HASH_MAP( int, MyClass*, wxIntegerHash, wxIntegerEqual,
MyHash1 );
// same, with wxString keys and int values
WX_DECLARE_STRING_HASH_MAP( int, MyHash3 );
// same, with wxString keys and values
WX_DECLARE_STRING_HASH_MAP( wxString, MyHash2 );

MyHash1 h1;
MyHash2 h2;

// store and retrieve values
h1[1] = new MyClass( 1 );
h1[100000000] = NULL;
h1[50000] = new MyClass( 2 );
h2["Bill"] = "ABC";
wxString tmp = h2["Bill"];
// since element with key "Joe" is not present, this will return
// the default value, which is an empty string in the case of wxString
MyClass tmp2 = h2["Joe"];

// iterate over all the elements in the class
MyHash2::iterator it;
for( it = h2.begin(); it != h2.end(); ++it )
{
    wxString key = it->first, value = it->second;
    // do something useful with key and value
}
```

Declaring new hash table types

```
WX_DECLARE_STRING_HASH_MAP( VALUE_T,      // type of the values
                             CLASSNAME ); // name of the class
```

Declares an hash map class named `CLASSNAME`, with `wxString` keys and `VALUE_T` values.

```
WX_DECLARE_VOIDPTR_HASH_MAP( VALUE_T,      // type of the values
                             CLASSNAME ); // name of the class
```

Declares an hash map class named `CLASSNAME`, with `void*` keys and `VALUE_T` values.

```
WX_DECLARE_HASH_MAP( KEY_T,      // type of the keys
                    VALUE_T,     // type of the values
                    HASH_T,      // hasher
                    KEY_EQ_T,    // key equality predicate
                    CLASSNAME ); // name of the class
```

The `HASH_T` and `KEY_EQ_T` are the types used for the hashing function and key comparison. `wxWidgets` provides three predefined hashing functions: `wxIntegerHash` for integer types (`int`, `long`, `short`, and their unsigned counterparts), `wxStringHash` for strings (`wxString`, `wxChar*`, `char*`), and `wxPointerHash` for any kind of pointer. Similarly three equality predicates: `wxIntegerEqual`, `wxStringEqual`, `wxPointerEqual` are provided.

Using this you could declare a hash map mapping `int` values to `wxString` like this:

```
WX_DECLARE_HASH_MAP( int,
                    wxString,
                    wxIntegerHash,
                    wxIntegerEqual,
                    MyHash );

// using an user-defined class for keys
class MyKey { /* ... */ };

// hashing function
class MyKeyHash
{
public:
    MyKeyHash() { }

    unsigned long operator()( const MyKey& k ) const
    { /* compute the hash */ }

    MyKeyHash& operator=(const MyKeyHash&) { return *this; }
};

// comparison operator
class MyKeyEqual
{
public:
    MyKeyEqual() { }
    bool operator()( const MyKey& a, const MyKey& b ) const
    { /* compare for equality */ }

    MyKeyEqual& operator=(const MyKeyEqual&) { return *this; }
};

WX_DECLARE_HASH_MAP( MyKey,          // type of the keys
                    SOME_TYPE,      // any type you like
                    MyKeyHash,      // hasher
                    MyKeyEqual,     // key equality predicate
                    CLASSNAME);     // name of the class
```

In the documentation below you should replace `wxHashMap` with the name you used in the class declaration.

<code>wxHashMap::key_type</code>	Type of the hash keys
<code>wxHashMap::mapped_type</code>	Type of the values stored in the hash map
<code>wxHashMap::value_type</code>	Equivalent to <code>struct { key_type first; mapped_type second };</code>
<code>wxHashMap::iterator</code>	Used to enumerate all the elements in an hash map; it is similar to a <code>value_type*</code>

<code>wxHashMap::const_iterator</code>	Used to enumerate all the elements in a constant hash map; it is similar to a <code>const value_type*</code>
<code>wxHashMap::size_type</code>	Used for sizes

Iterators

An iterator is similar to a pointer, and so you can use the usual pointer operations: `++it` (and `it++`) to move to the next element, `*it` to access the element pointed to, `it->first(it->second)` to access the key (value) of the element pointed to. Hash maps provide forward only iterators, this means that you can't use `--it`, `it + 3`, `it1 - it2`.

Include files

`<wx/hashmap.h>`

wxHashMap::wxHashMap

wxHashMap(size_type size = 10)

The size parameter is just an hint, the table will resize automatically to preserve performance.

wxHashMap(const wxHashMap& map)

Copy constructor.

wxHashMap::begin

const_iterator begin() const

iterator begin()

Returns an iterator pointing at the first element of the hash map. Please remember that hash maps do not guarantee ordering.

wxHashMap::clear

void clear()

Removes all elements from the hash map.

wxHashMap::count

size_type count(const key_type& key) const

Counts the number of elements with the given key present in the map. This function can actually return 0 or 1.

wxHashMap::empty

bool empty() const

Returns true if the hash map does not contain any element, false otherwise.

wxHashMap::end

const_iterator end() const

iterator end()

Returns an iterator pointing at the one-after-the-last element of the hash map. Please remember that hash maps do not guarantee ordering.

wxHashMap::erase

size_type erase(const key_type& key)

Erases the element with the given key, and returns the number of element erased (either 0 or 1).

void erase(iterator it)

void erase(const_iterator it)

Erases the element pointed to by the iterator. After the deletion the iterator is no longer valid and must not be used.

wxHashMap::find

iterator find(const key_type& key)

const_iterator find(const key_type& key) const

If an element with the given key is present, the functions returns an iterator pointing at that element, otherwise an invalid iterator is returned (i.e. `hashmap.find(non_existent_key) == hashmap.end()`).

wxHashMap::insert

void insert(const value_type& v)

Inserts the given value in the hash map.

wxHashMap::operator[]

mapped_type& operator[](const key_type& key)

Use it as an array subscript. The only difference is that if the given key is not present in the hash map, an element with the default `value_type()` is inserted in the table.

wxHashMap::size

size_type size() const

Returns the numbers of elements in the map.

wxHashTable

Please note that this class is retained for backward compatibility reasons; you should use *wxHashMap* (p. 638).

This class provides hash table functionality for *wxWidgets*, and for an application if it wishes. Data can be hashed on an integer or string key.

Derived from

wxObject (p. 954)

Include files

<wx/hash.h>

Example

Below is an example of using a hash table.

```
wxHashTable table(KEY_STRING);

wxPoint *point = new wxPoint(100, 200);
table.Put("point 1", point);

....

wxPoint *found_point = (wxPoint *)table.Get("point 1");
```

A hash table is implemented as an array of pointers to lists. When no data has been stored, the hash table takes only a little more space than this array (default size is 1000). When a data item is added, an integer is constructed from the integer or string key that is within the bounds of the array. If the array element is NULL, a new (keyed) list is created for the element. Then the data object is appended to the list, storing the key in case other data objects need to be stored in the list also (when a 'collision' occurs).

Retrieval involves recalculating the array index from the key, and searching along the keyed list for the data object whose stored key matches the passed key. Obviously this is quicker when there are fewer collisions, so hashing will become inefficient if the number of items to be stored greatly exceeds the size of the hash table.

See also

wxList (p. 787)

wxHashTable::wxHashTable

wxHashTable(unsigned int *key_type*, int *size* = 1000)

Constructor. *key_type* is one of `wxKEY_INTEGER`, or `wxKEY_STRING`, and indicates what sort of keying is required. *size* is optional.

wxHashTable::~~wxHashTable

~wxHashTable()

Destroys the hash table.

wxHashTable::BeginFind

void BeginFind()

The counterpart of *Next*. If the application wishes to iterate through all the data in the hash table, it can call *BeginFind* and then loop on *Next*.

wxHashTable::Clear

void Clear()

Clears the hash table of all nodes (but as usual, doesn't delete user data).

wxHashTable::Delete

wxObject * Delete(long *key*)

wxObject * Delete(const wxString& *key*)

Deletes entry in hash table and returns the user's data (if found).

wxHashTable::DeleteContents

void DeleteContents(bool *flag*)

If set to true data stored in hash table will be deleted when hash table object is destroyed.

wxHashTable::Get

wxObject * Get(long key)**wxObject * Get(const char* key)**

Gets data from the hash table, using an integer or string key (depending on which hash table constructor was used).

wxHashTable::MakeKey

long MakeKey(const wxString& string)

Makes an integer key out of a string. An application may wish to make a key explicitly (for instance when combining two data values to form a key).

wxHashTable::Next

wxHashTable::Node * Next()

If the application wishes to iterate through all the data in the hash table, it can call *BeginFind* and then loop on *Next*. This function returns a **wxHashTable::Node** pointer (or NULL if there are no more nodes). The return value is functionally equivalent to **wxNode** but might not be implemented as a **wxNode**. The user will probably only wish to use the **GetData** method to retrieve the data; the node may also be deleted.

wxHashTable::Put

void Put(long key, wxObject *object)**void Put(const char* key, wxObject *object)**

Inserts data into the hash table, using an integer or string key (depending on which hash table constructor was used). The key string is copied and stored by the hash table implementation.

wxHashTable::GetCount

size_t GetCount() const

Returns the number of elements in the hash table.

wxHelpController

This is a family of classes by which applications may invoke a help viewer to provide on-line help.

A help controller allows an application to display help, at the contents or at a particular topic, and shut the help program down on termination. This avoids proliferation of many instances of the help viewer whenever the user requests a different topic via the application's menus or buttons.

Typically, an application will create a help controller instance when it starts, and immediately call **Initialize** to associate a filename with it. The help viewer will only get run, however, just before the first call to display something.

Most help controller classes actually derive from `wxHelpControllerBase` and have names of the form `wxXXXHelpController` or `wxHelpControllerXXX`. An appropriate class is aliased to the name `wxHelpController` for each platform, as follows:

- On Windows, `wxWinHelpController` is used.
- On all other platforms, `wxHtmlHelpController` is used if `wxHTML` is compiled into `wxWidgets`; otherwise `wxExtHelpController` is used (for invoking an external browser).

The remaining help controller classes need to be named explicitly by an application that wishes to make use of them.

There are currently the following help controller classes defined:

- `wxWinHelpController`, for controlling Windows Help.
- `wxCHMHelpController`, for controlling MS HTML Help. To use this, you need to set `wxUSE_MS_HTML_HELP` to 1 in `setup.h` and have `htmlhelp.h` header from Microsoft's HTML Help kit (you don't need VC++ specific `htmlhelp.lib` because `wxWidgets` loads necessary DLL at runtime and so it works with all compilers).
- `wxBestHelpController`, for controlling MS HTML Help or, if Microsoft's runtime is not available, *wxHtmlHelpController* (p. 672). You need to provide **both** CHM and HTB versions of the help file. For 32bit Windows only.
- `wxExtHelpController`, for controlling external browsers under Unix. The default browser is Netscape Navigator. The 'help' sample shows its use.
- *wxHtmlHelpController* (p. 672), a sophisticated help controller using `wxHTML` (p. 1699), in a similar style to the Microsoft HTML Help viewer and using some of the same files. Although it has an API compatible with other help controllers, it has more advanced features, so it is recommended that you use the specific API for this class instead. Note that if you use `.zip` or `.htb` formats for your books, you must add this line to your application initialization:
`wxFileSystem::AddHandler(new wxZipFSHandler);` or nothing will be shown in your help window.

Derived from

`wxHelpControllerBase`
`wxObject` (p. 954)

Include files

<wx/help.h> (wxWidgets chooses the appropriate help controller class)
<wx/helpbase.h> (wxHelpControllerBase class)
<wx/helpwin.h> (Windows Help controller)
<wx/msw/helpchm.h> (MS HTML Help controller)
<wx/generic/helpext.h> (external HTML browser controller)
<wx/html/helpctrl.h> (wxHTML based help controller: wxHtmlHelpController)

See also

wxHtmlHelpController (p. 672), *wxHTML* (p. 1699)

wxHelpController::wxHelpController

wxHelpController()

Constructs a help instance object, but does not invoke the help viewer.

wxHelpController::~~wxHelpController

~wxHelpController()

Destroys the help instance, closing down the viewer if it is running.

wxHelpController::Initialize

virtual void Initialize(const wxString& file)

virtual void Initialize(const wxString& file, int server)

Initializes the help instance with a help filename, and optionally a server socket number if using wxHelp (now obsolete). Does not invoke the help viewer. This must be called directly after the help instance object is created and before any attempts to communicate with the viewer.

You may omit the file extension and a suitable one will be chosen. For wxHtmlHelpController, the extensions zip, htb and hhp will be appended while searching for a suitable file. For WinHelp, the hlp extension is appended.

wxHelpController::DisplayBlock

virtual bool DisplayBlock(long blockNo)

If the help viewer is not running, runs it and displays the file at the given block number.

WinHelp: Refers to the context number.

MS HTML Help: Refers to the context number.

External HTML help: the same as for `wxHelpController::DisplaySection` (p. 647).

wxHtmlHelpController: `sectionNo` is an identifier as specified in the `.hhc` file. See *Help files format* (p. 1701).

This function is for backward compatibility only, and applications should use `wxHelpController` (p. 647) instead.

wxHelpController::DisplayContents

virtual bool DisplayContents()

If the help viewer is not running, runs it and displays the contents.

wxHelpController::DisplayContextPopup

virtual bool DisplayContextPopup(int contextId)

Displays the section as a popup window using a context id.

Returns false if unsuccessful or not implemented.

wxHelpController::DisplaySection

virtual bool DisplaySection(const wxString& section)

If the help viewer is not running, runs it and displays the given section.

The interpretation of `section` differs between help viewers. For most viewers, this call is equivalent to `KeywordSearch`. For MS HTML Help, wxHTML help and external HTML help, if `section` has a `.htm` or `.html` extension, that HTML file will be displayed; otherwise a keyword search is done.

virtual bool DisplaySection(int sectionNo)

If the help viewer is not running, runs it and displays the given section.

WinHelp, MS HTML Help `sectionNo` is a context id.

External HTML help: `wxExtHelpController` implements `sectionNo` as an id in a map file, which is of the form:

```
0  wx.html           ; Index
1  wx34.html#classref ; Class reference
2  wx204.html        ; Function reference
```

wxHtmlHelpController: `sectionNo` is an identifier as specified in the `.hhc` file. See *Help files format* (p. 1701).

See also the help sample for notes on how to specify section numbers for various help file formats.

wxHelpController::DisplayTextPopup

virtual bool DisplayTextPopup(const wxString& text, const wxPoint& pos)

Displays the text in a popup window, if possible.

Returns false if unsuccessful or not implemented.

wxHelpController::GetFrameParameters

virtual wxFrame * GetFrameParameters(const wxSize * size = NULL, const wxPoint * pos = NULL, bool *newFrameEachTime = NULL)

wxHtmlHelpController returns the frame, size and position.

For all other help controllers, this function does nothing and just returns NULL.

Parameters

viewer

This defaults to "netscape" for wxExtHelpController.

flags

This defaults to wxHELP_NETSCAPE for wxExtHelpController, indicating that the viewer is a variant of Netscape Navigator.

wxHelpController::KeywordSearch

virtual bool KeywordSearch(const wxString& keyWord, wxHelpSearchMode mode = wxHELP_SEARCH_ALL)

If the help viewer is not running, runs it, and searches for sections matching the given keyword. If one match is found, the file is displayed at this section. The optional parameter allows the search the index (wxHELP_SEARCH_INDEX) but this currently only supported by the wxHtmlHelpController.

WinHelp, MS HTML Help: If more than one match is found, the first topic is displayed.

External HTML help, simple wxHTML help: If more than one match is found, a choice of topics is displayed.

wxHtmlHelpController: see *wxHtmlHelpController::KeywordSearch* (p. 675).

wxHelpController::LoadFile

virtual bool LoadFile(const wxString& file = "")

If the help viewer is not running, runs it and loads the given file. If the filename is not

supplied or is empty, the file specified in **Initialize** is used. If the viewer is already displaying the specified file, it will not be reloaded. This member function may be used before each display call in case the user has opened another file.

`wxHtmlHelpController` ignores this call.

wxHelpController::OnQuit

virtual bool OnQuit()

Overridable member called when this application's viewer is quit by the user.

This does not work for all help controllers.

wxHelpController::SetFrameParameters

virtual void SetFrameParameters(const wxString & title, const wxSize & size, const wxPoint & pos = wxDefaultPosition, bool newFrameEachTime = false)

For `wxHtmlHelpController`, the title is set (again with %s indicating the page title) and also the size and position of the frame if the frame is already open. *newFrameEachTime* is ignored.

For all other help controllers this function has no effect.

wxHelpController::SetViewer

virtual void SetViewer(const wxString& viewer, long flags)

Sets detailed viewer information. So far this is only relevant to `wxExtHelpController`.

Some examples of usage:

```
m_help.SetViewer("kdehelp");  
m_help.SetViewer("gnome-help-browser");  
m_help.SetViewer("netscape", wxHELP_NETSCAPE);
```

wxHelpController::Quit

virtual bool Quit()

If the viewer is running, quits it by disconnecting.

For Windows Help, the viewer will only close if no other application is using it.

wxHelpControllerHelpProvider

`wxHelpControllerHelpProvider` is an implementation of `wxHelpProvider` which supports

both context identifiers and plain text help strings. If the help text is an integer, it is passed to `wxHelpController::DisplayContextPopup`. Otherwise, it shows the string in a tooltip as per `wxSimpleHelpProvider`. If you use this with a `wxCHMHelpController` instance on windows, it will use the native style of tip window instead of `wxTipWindow` (p. 1307).

You can use the convenience function **`wxContextId`** to convert an integer context id to a string for passing to `wxWindow::SetHelpText` (p. 1429).

Derived from

`wxSimpleHelpProvider` (p. 1102)

`wxHelpProvider` (p. 652)

Include files

`<wx/cshelp.h>`

See also

`wxHelpProvider` (p. 652), `wxSimpleHelpProvider` (p. 1102), `wxContextHelp` (p. 196), `wxWindow::SetHelpText` (p. 1429), `wxWindow::GetHelpText` (p. 1406)

`wxHelpControllerHelpProvider::wxHelpControllerHelpProvider`

`wxHelpControllerHelpProvider(wxHelpControllerBase* hc = NULL)`

Note that the instance doesn't own the help controller. The help controller should be deleted separately.

`wxHelpControllerHelpProvider::SetHelpController`

`void SetHelpController(wxHelpControllerBase* hc)`

Sets the help controller associated with this help provider.

`wxHelpControllerHelpProvider::GetHelpController`

`wxHelpControllerBase* GetHelpController() const`

Returns the help controller associated with this help provider.

`wxHelpEvent`

A help event is sent when the user has requested context-sensitive help. This can either be caused by the application requesting context-sensitive help mode via `wxContextHelp`

(p. 196), or (on MS Windows) by the system generating a WM_HELP message when the user pressed F1 or clicked on the query button in a dialog caption.

A help event is sent to the window that the user clicked on, and is propagated up the window hierarchy until the event is processed or there are no more event handlers. The application should call `wxEvt::GetId` to check the identity of the clicked-on window, and then either show some suitable help or call `wxEvt::Skip` if the identifier is unrecognised. Calling `Skip` is important because it allows `wxWidgets` to generate further events for ancestors of the clicked-on window. Otherwise it would be impossible to show help for container windows, since processing would stop after the first window found.

Derived from

wxCommandEvent (p. 165)

wxEvt (p. 441)

wxObject (p. 954)

Include files

<wx/event.h>

Event table macros

To process an activate event, use these event handler macros to direct input to a member function that takes a `wxHelpEvent` argument.

EVT_HELP(id, func) Process a `wxEVT_HELP` event.

EVT_HELP_RANGE(id1, id2, func) Process a `wxEVT_HELP` event for a range of ids.

See also

wxContextHelp (p. 196), *wxDialog* (p. 369), *Event handling overview* (p. 1610)

wxHelpEvent::wxHelpEvent

wxHelpEvent(WXTYPE eventType = 0, bool active = true, wxWindowID id = 0, const wxPoint& point)

Constructor.

wxHelpEvent::GetPosition

const wxPoint& GetPosition() const

Returns the left-click position of the mouse, in screen coordinates. This allows the application to position the help appropriately.

wxHelpEvent::SetPosition

void SetPosition(const wxPoint& pt)

Sets the left-click position of the mouse, in screen coordinates.

wxHelpProvider

wxHelpProvider is an abstract class used by a program implementing context-sensitive help to show the help text for the given window.

The current help provider must be explicitly set by the application using wxHelpProvider::Set().

Derived from

No base class

Include files

<wx/cshelp.h>

See also

wxContextHelp (p. 196), wxContextHelpButton (p. 198), wxSimpleHelpProvider (p. 1102), wxHelpControllerHelpProvider (p. 649), wxWindow::SetHelpText (p. 1429), wxWindow::GetHelpText (p. 1406)

wxHelpProvider::~~wxHelpProvider

~wxHelpProvider()

Virtual destructor for any base class.

wxHelpProvider::AddHelp

void AddHelp(wxWindowBase* window, const wxString& text)

Associates the text with the given window or id. Although all help providers have these functions to allow making wxWindow::SetHelpText (p. 1429) work, not all of them implement the functions.

wxHelpProvider::Get

wxHelpProvider* Get()

Unlike some other classes, the help provider is not created on demand. This must be

explicitly done by the application.

wxHelpProvider::GetHelp

wxString GetHelp(const wxWindowBase* window)

Gets the help string for this window. Its interpretation is dependent on the help provider except that empty string always means that no help is associated with the window.

void AddHelp(wxWindowID id, const wxString& text)

This version associates the given text with all windows with this id. May be used to set the same help string for all Cancel buttons in the application, for example.

wxHelpProvider::RemoveHelp

void RemoveHelp(wxWindowBase* window)

Removes the association between the window pointer and the help text. This is called by the wxWindow destructor. Without this, the table of help strings will fill up and when window pointers are reused, the wrong help string will be found.

wxHelpProvider::Set

wxHelpProvider* Set(wxHelpProvider* helpProvider)

Get/set the current, application-wide help provider. Returns the previous one.

wxHelpProvider::ShowHelp

bool ShowHelp(wxWindowBase* window)

Shows help for the given window. Uses *GetHelp* (p. 653) internally if applicable.

Returns true if it was done, or false if no help was available for this window.

wxHtmlCell

Internal data structure. It represents fragments of parsed HTML page, the so-called **cell** - a word, picture, table, horizontal line and so on. It is used by *wxHtmlWindow* (p. 699) and *wxHtmlWinParser* (p. 708) to represent HTML page in memory.

You can divide cells into two groups : *visible* cells with non-zero width and height and *helper* cells (usually with zero width and height) that perform special actions such as color or font change.

Derived from

wxObject (p. 954)

Include files

<wx/html/htmlcell.h>

See Also

Cells Overview (p. 1703), *wxHtmlContainerCell* (p. 659)

wxHtmlCell::wxHtmlCell

wxHtmlCell()

Constructor.

wxHtmlCell::AdjustPagebreak

virtual bool AdjustPagebreak(int * pagebreak)

This method is used to adjust pagebreak position. The parameter is variable that contains y-coordinate of page break (= horizontal line that should not be crossed by words, images etc.). If this cell cannot be divided into two pieces (each one on another page) then it moves the pagebreak few pixels up.

Returns true if pagebreak was modified, false otherwise

```
Usage: while (container->AdjustPagebreak(&p)) {}
```

wxHtmlCell::Draw

virtual void Draw(wxDC& dc, int x, int y, int view_y1, int view_y2)

Renders the cell.

Parameters

dc

Device context to which the cell is to be drawn

x,y

Coordinates of parent's upper left corner (origin). You must add this to `m_PosX,m_PosY` when passing coordinates to `dc`'s methods Example : `dc -> DrawText("hello", x + m_PosX, y + m_PosY)`

view_y1

y-coord of the first line visible in window. This is used to optimize rendering speed

view_y2

y-coord of the last line visible in window. This is used to optimize rendering speed

wxHtmlCell::DrawInvisible

virtual void DrawInvisible(wxDC& *dc*, int *x*, int *y*)

This method is called instead of *Draw* (p. 654) when the cell is certainly out of the screen (and thus invisible). This is not nonsense - some tags (like *wxHtmlColourCell* (p. 659) or font setter) must be drawn even if they are invisible!

Parameters

dc

Device context to which the cell is to be drawn

x,y

Coordinates of parent's upper left corner. You must add this to *m_PosX*, *m_PosY* when passing coordinates to *dc*'s methods Example : *dc -> DrawText("hello", x + m_PosX, y + m_PosY)*

wxHtmlCell::Find

virtual const wxHtmlCell* Find(int *condition*, const void* *param*)

Returns pointer to itself if this cell matches *condition* (or if any of the cells following in the list matches), NULL otherwise. (In other words if you call top-level container's *Find* it will return pointer to the first cell that matches the *condition*)

It is recommended way how to obtain pointer to particular cell or to cell of some type (e.g. *wxHtmlAnchorCell* reacts on *wxHTML_COND_ISANCHOR* condition)

Parameters

condition

Unique integer identifier of condition

param

Optional parameters

Defined conditions

wxHTML_COND_ISANCHOR

Finds particular anchor. *param* is pointer to *wxString* with name of the anchor.

wxHTML_COND_USER

User-defined conditions start from this number.

wxHtmlCell::GetDescent

int GetDescent() const

Returns descent value of the cell (m_Descent member). See explanation:

**wxHtmlCell::GetHeight**

int GetHeight() const

Returns height of the cell (m_Height member).

wxHtmlCell::GetId

virtual wxString GetId() const

Returns unique cell identifier if there is any, empty string otherwise.

wxHtmlCell::GetLink

virtual wxHtmlLinkInfo* GetLink(int x = 0, int y = 0) const

Returns hypertext link if associated with this cell or NULL otherwise. See *wxHtmlLinkInfo* (p. 682). (Note: this makes sense only for visible tags).

Parameters

x,y

Coordinates of position where the user pressed mouse button. These coordinates are used e.g. by COLORMAP. Values are relative to the upper left corner of THIS cell (i.e. from 0 to m_Width or m_Height)

wxHtmlCell::GetNext

wxHtmlCell* GetNext() const

Returns pointer to the next cell in list (see *htmlcell.h* if you're interested in details).

wxHtmlCell::GetParent

wxHtmlContainerCell* GetParent() const

Returns pointer to parent container.

wxHtmlCell::GetPosX

int GetPosX() const

Returns X position within parent (the value is relative to parent's upper left corner). The returned value is meaningful only if parent's *Layout* (p. 657) was called before!

wxHtmlCell::GetPosY

int GetPosY() const

Returns Y position within parent (the value is relative to parent's upper left corner). The returned value is meaningful only if parent's *Layout* (p. 657) was called before!

wxHtmlCell::GetWidth

int GetWidth() const

Returns width of the cell (`m_Width` member).

wxHtmlCell::Layout

virtual void Layout(int w)

This method performs two actions:

1. adjusts the cell's width according to the fact that maximal possible width is *w*. (this has sense when working with horizontal lines, tables etc.)
2. prepares layout (=fill-in `m_PosX`, `m_PosY` (and sometimes `m_Height`) members) based on actual width *w*

It must be called before displaying cells structure because `m_PosX` and `m_PosY` are undefined (or invalid) before calling *Layout*.

wxHtmlCell::OnMouseClicked

virtual void OnMouseClicked(wxWindow* parent, int x, int y, const wxMouseEvent& event)

This function is simple event handler. Each time the user clicks mouse button over a cell

within *wxHtmlWindow* (p. 699) this method of that cell is called. Default behavior is that it calls *wxHtmlWindow::LoadPage* (p. 702).

Note

If you need more "advanced" event handling you should use *wxHtmlBinderCell* instead.

Parameters

parent

parent window (always *wxHtmlWindow*!)

x, y

coordinates of mouse click (this is relative to cell's origin)

left, middle, right

boolean flags for mouse buttons. true if the left/middle/right button is pressed, false otherwise

wxHtmlCell::SetId

void SetId(const wxString& id)

Sets unique cell identifier. Default value is no identifier, i.e. empty string.

wxHtmlCell::SetLink

void SetLink(const wxHtmlLinkInfo& link)

Sets the hypertext link associated with this cell. (Default value is *wxHtmlLinkInfo* (p. 682)("", "") (no link))

wxHtmlCell::SetNext

void SetNext(wxHtmlCell *cell)

Sets the next cell in the list. This shouldn't be called by user - it is to be used only by *wxHtmlContainerCell::InsertCell* (p. 661).

wxHtmlCell::SetParent

void SetParent(wxHtmlContainerCell *p)

Sets parent container of this cell. This is called from *wxHtmlContainerCell::InsertCell* (p. 661).

wxHtmlCell::SetPos

void SetPos(int x, int y)

Sets the cell's position within parent container.

wxHtmlColourCell

This cell changes the colour of either the background or the foreground.

Derived from

wxHtmlCell (p. 653)

Include files

<wx/html/htmlcell.h>

wxHtmlColourCell::wxHtmlColourCell

wxHtmlColourCell(wxColour clr, int flags = wxHTML_CLR_FOREGROUND)

Constructor.

Parameters

clr

The color

flags

Can be one of following:

wxHTML_CLR_FOREGROUND	change color of text
wxHTML_CLR_BACKGROUND	change background color

wxHtmlContainerCell

The *wxHtmlContainerCell* class is an implementation of a cell that may contain more cells in it. It is heavily used in the *wxHTML* layout algorithm.

Derived from

wxHtmlCell (p. 653)

Include files

<wx/html/htmlcell.h>

See Also

Cells Overview (p. 1703)

wxHtmlContainerCell::wxHtmlContainerCell

wxHtmlContainerCell(wxHtmlContainerCell *parent)

Constructor. *parent* is pointer to parent container or NULL.

wxHtmlContainerCell::GetAlignHor

int GetAlignHor() const

Returns container's horizontal alignment.

wxHtmlContainerCell::GetAlignVer

int GetAlignVer() const

Returns container's vertical alignment.

wxHtmlContainerCell::GetBackgroundColour

wxColour GetBackgroundColour()

Returns the background colour of the container or `wxNullColour` if no background colour is set.

wxHtmlContainerCell::GetFirstCell

wxHtmlCell* GetFirstCell()

Returns pointer to the first cell in the list. You can then use `wxHtmlCell`'s `GetNext` method to obtain pointer to the next cell in list.

Note: This shouldn't be used by the end user. If you need some way of finding particular cell in the list, try *Find* (p. 655) method instead.

wxHtmlContainerCell::GetIndent

int GetIndent(int *ind*) const

Returns the indentation. *ind* is one of the **wxHTML_INDENT_*** constants.

Note: You must call *GetIndentUnits* (p. 661) with same *ind* parameter in order to correctly interpret the returned integer value. It is NOT always in pixels!

wxHtmlContainerCell::GetIndentUnits

int GetIndentUnits(int *ind*) const

Returns the units of indentation for *ind* where *ind* is one of the **wxHTML_INDENT_*** constants.

wxHtmlContainerCell::InsertCell

void InsertCell(wxHtmlCell **cell*)

Inserts new cell into the container.

wxHtmlContainerCell::SetAlign

void SetAlign(const wxHtmlTag& *tag*)

Sets the container's alignment (both horizontal and vertical) according to the values stored in *tag*. (Tags **ALIGN** parameter is extracted.) In fact it is only a front-end to *SetAlignHor* (p. 661) and *SetAlignVer* (p. 662).

wxHtmlContainerCell::SetAlignHor

void SetAlignHor(int *al*)

Sets the container's *horizontal alignment*. During *Layout* (p. 657) each line is aligned according to *al* value.

Parameters

al

new horizontal alignment. May be one of these values:

wxHTML_ALIGN_LEFT	lines are left-aligned (default)
wxHTML_ALIGN_JUSTIFY	lines are justified
wxHTML_ALIGN_CENTER	lines are centered
wxHTML_ALIGN_RIGHT	lines are right-aligned

wxHtmlContainerCell::SetAlignVer

void SetAlignVer(int *aI*)

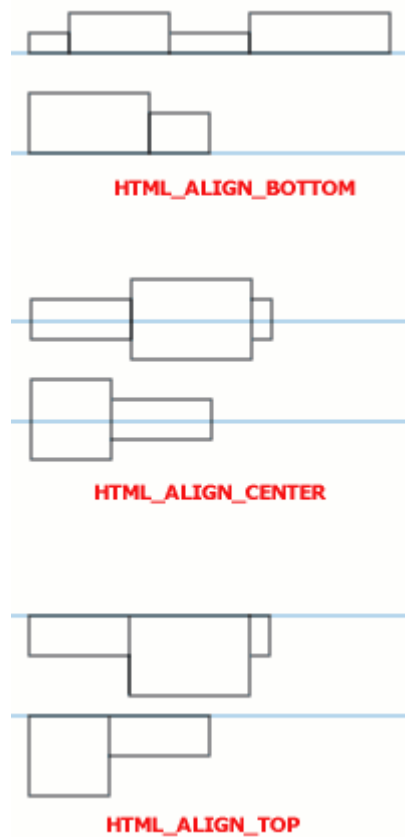
Sets the container's *vertical alignment*. This is per-line alignment!

Parameters

aI

new vertical alignment. May be one of these values:

wxHTML_ALIGN_BOTTOM	cells are over the line (default)
wxHTML_ALIGN_CENTER	cells are centered on line
wxHTML_ALIGN_TOP	cells are under the line



wxHtmlContainerCell::SetBackgroundColour

void SetBackgroundColour(const wxColour& *clr*)

Sets the background colour for this container.

wxHtmlContainerCell::SetBorder

void SetBorder(const wxColour& *clr1*, const wxColour& *clr2*)

Sets the border (frame) colours. A border is a rectangle around the container.

Parameters*clr1*

Colour of top and left lines

clr2

Colour of bottom and right lines

wxHtmlContainerCell::SetIndent

void SetIndent(int *i*, int *what*, int *units* = wxHTML_UNITS_PIXELS)

Sets the indentation (free space between borders of container and subcells).

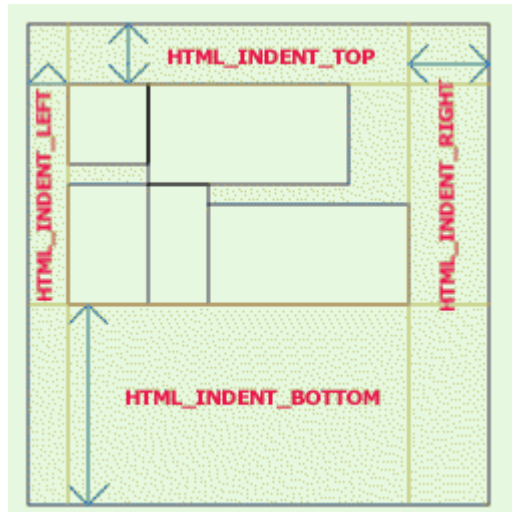
Parameters*i*

Indentation value.

what

Determines which of the four borders we're setting. It is OR combination of following constants:

wxHTML_INDENT_TOP	top border
wxHTML_INDENT_BOTTOM	bottom
wxHTML_INDENT_LEFT	left
wxHTML_INDENT_RIGHT	right
wxHTML_INDENT_HORIZONTAL	left and right
wxHTML_INDENT_VERTICAL	top and bottom
wxHTML_INDENT_ALL	all 4 borders



units

Units of *i*. This parameter affects interpretation of *i* value.

wxHTML_UNITS_PIXELS *i* is number of pixels

wxHTML_UNITS_PERCENT *i* is interpreted as percents of width of parent container

wxHtmlContainerCell::SetMinHeight

void SetMinHeight(int *h*, int *align* = wxHTML_ALIGN_TOP)

Sets minimal height of the container.

When container's *Layout* (p. 657) is called, *m_Height* is set depending on layout of subcells to the height of area covered by layed-out subcells. Calling this method guarantees you that the height of container is never smaller than *h* - even if the subcells cover much smaller area.

Parameters

h

The minimal height.

align

If height of the container is lower than the minimum height, empty space must be inserted somewhere in order to ensure minimal height. This parameter is one of **wxHTML_ALIGN_TOP**, **wxHTML_ALIGN_BOTTOM**, **wxHTML_ALIGN_CENTER**. It refers to the *contents*, not to the empty place.

wxHtmlContainerCell::SetWidthFloat

void SetWidthFloat(int w, int units)

void SetWidthFloat(const wxHtmlTag& tag, double pixel_scale = 1.0)

Sets floating width adjustment.

The normal behaviour of container is that its width is the same as the width of parent container (and thus you can have only one sub-container per line). You can change this by setting FWA.

pixel_scale is number of real pixels that equals to 1 HTML pixel.

Parameters

w

Width of the container. If the value is negative it means complement to full width of parent container (e.g. `SetWidthFloat(-50, wxHTML_UNITS_PIXELS)` sets the width of container to parent's width minus 50 pixels. This is useful when creating tables - you can call `SetWidthFloat(50)` and `SetWidthFloat(-50)`)

units

Units of *w* This parameter affects the interpretation of *w* value.

wxHTML_UNITS_PIXELS

w is number of pixels

wxHTML_UNITS_PERCENT

w is interpreted as percents of width of parent container

tag

In the second version of method, *w* and *units* info is extracted from tag's `WIDTH` parameter.

wxPython note: The second form of this method is named `SetWidthFloatFromTag` in wxPython.

wxHtmlDCRenderer

This class can render HTML document into a specified area of a DC. You can use it in your own printing code, although use of *wxHtmlEasyPrinting* (p. 668) or *wxHtmlPrintout* (p. 690) is strongly recommended.

Derived from

wxObject (p. 954)

Include files

<wx/html/htmprint.h>

wxHtmlDCRenderer::wxHtmlDCRenderer

wxHtmlDCRenderer()

Constructor.

wxHtmlDCRenderer::SetDC

void SetDC(wxDC* dc, double pixel_scale = 1.0)

Assign DC instance to the renderer.

pixel_scale can be used when rendering to high-resolution DCs (e.g. printer) to adjust size of pixel metrics. (Many dimensions in HTML are given in pixels -- e.g. image sizes. 300x300 image would be only one inch wide on typical printer. With *pixel_scale* = 3.0 it would be 3 inches.)

wxHtmlDCRenderer::SetFont

void SetFont(wxString normal_face, wxString fixed_face, const int *sizes = NULL)

Sets fonts. See *wxHtmlWindow::SetFont* (p. 706) for detailed description.

See also *SetSize* (p. 666).

wxHtmlDCRenderer::SetSize

void SetSize(int width, int height)

Set size of output rectangle, in pixels. Note that you **can't** change width of the rectangle between calls to *Render* (p. 667)! (You can freely change height.)

wxHtmlDCRenderer::SetHtmlText

void SetHtmlText(const wxString& html, const wxString& basepath = wxEmptyString, bool isdir = true)

Assign text to the renderer. *Render* (p. 667) then draws the text onto DC.

Parameters*html*

HTML text. This is *not* a filename.

basepath

base directory (html string would be stored there if it was in file). It is used to determine path for loading images, for example.

isdir

false if basepath is filename, true if it is directory name (see *wxFileSystem* (p. 494) for detailed explanation)

wxHtmlDCRenderer::Render

int Render(int x, int y, int from = 0, int dont_render = false)

Renders HTML text to the DC.

Parameters

x,y

position of upper-left corner of printing rectangle (see *SetSize* (p. 666))

from

y-coordinate of the very first visible cell

dont_render

if true then this method only returns y coordinate of the next page and does not output anything

Returned value is y coordinate of first cell than didn't fit onto page. Use this value as *from* in next call to *Render* in order to print multipages document.

Caution!

The Following three methods **must** always be called before any call to *Render* (preferably in this order):

- *SetDC* (p. 666)
- *SetSize* (p. 666)
- *SetHtmlText* (p. 666)

Render() changes the DC's user scale and does NOT restore it.

wxHtmlDCRenderer::GetTotalHeight

int GetTotalHeight()

Returns the height of the HTML text. This is important if area height (see *SetSize* (p. 666)) is smaller than total height and thus the page cannot fit into it. In that case you're supposed to call *Render* (p. 667) as long as its return value is smaller than

GetTotalHeight's.

wxHtmlEasyPrinting

This class provides very simple interface to printing architecture. It allows you to print HTML documents using only a few commands.

Note

Do not create this class on the stack only. You should create an instance on app startup and use this instance for all printing operations. The reason is that this class stores various settings in it.

Derived from

wxObject (p. 954)

Include files

<wx/html/htmpprint.h>

wxHtmlEasyPrinting::wxHtmlEasyPrinting

wxHtmlEasyPrinting(const wxString& *name* = "Printing", wxWindow* *parentWindow* = NULL)

Constructor.

Parameters

name

Name of the printing object. Used by preview frames and setup dialogs.

parentWindow

pointer to the window that will own the preview frame and setup dialogs. May be NULL.

wxHtmlEasyPrinting::PreviewFile

bool PreviewFile(const wxString& *htmlfile*)

Preview HTML file.

Returns false in case of error -- call *wxPrinter::GetLastError* (p. 1008) to get detailed information about the kind of the error.

wxHtmlEasyPrinting::PreviewText

bool PreviewText(const wxString& *htmltext*, const wxString& *basepath* = *wxEmptyString*)

Preview HTML text (not file!).

Returns false in case of error -- call *wxPrinter::GetLastError* (p. 1008) to get detailed information about the kind of the error.

Parameters

htmltext

HTML text.

basepath

base directory (html string would be stored there if it was in file). It is used to determine path for loading images, for example.

wxHtmlEasyPrinting::PrintFile

bool PrintFile(const wxString& *htmlfile*)

Print HTML file.

Returns false in case of error -- call *wxPrinter::GetLastError* (p. 1008) to get detailed information about the kind of the error.

wxHtmlEasyPrinting::PrintText

bool PrintText(const wxString& *htmltext*, const wxString& *basepath* = *wxEmptyString*)

Print HTML text (not file!).

Returns false in case of error -- call *wxPrinter::GetLastError* (p. 1008) to get detailed information about the kind of the error.

Parameters

htmltext

HTML text.

basepath

base directory (html string would be stored there if it was in file). It is used to determine path for loading images, for example.

wxHtmlEasyPrinting::PrinterSetup

void PrinterSetup()

Display printer setup dialog and allows the user to modify settings.

wxHtmlEasyPrinting::PageSetup

void PageSetup()

Display page setup dialog and allows the user to modify settings.

wxHtmlEasyPrinting::SetFont

void SetFont(wxString normal_face, wxString fixed_face, const int *sizes = NULL)

Sets fonts. See *wxHtmlWindow::SetFont* (p. 706) for detailed description.

wxHtmlEasyPrinting::SetHeader

void SetHeader(const wxString& header, int pg = wxPAGE_ALL)

Set page header.

Parameters*header*

HTML text to be used as header. You can use macros in it:

- @PAGENUM@ is replaced by page number
- @PAGESCNT@ is replaced by total number of pages

pg

one of wxPAGE_ODD, wxPAGE_EVEN and wxPAGE_ALL constants.

wxHtmlEasyPrinting::SetFooter

void SetFooter(const wxString& footer, int pg = wxPAGE_ALL)

Set page footer.

Parameters*footer*

HTML text to be used as footer. You can use macros in it:

- @PAGENUM@ is replaced by page number
- @PAGESCNT@ is replaced by total number of pages

pg

one of wxPAGE_ODD, wxPAGE_EVEN and wxPAGE_ALL constants.

wxHtmlEasyPrinting::GetPrintData

wxPrintData* GetPrintData()

Returns pointer to *wxPrintData* (p. 996) instance used by this class. You can set its parameters (via SetXXXX methods).

wxHtmlEasyPrinting::GetPageSetupData

wxPageSetupDialogData* GetPageSetupData()

Returns a pointer to *wxPageSetupDialogData* (p. 961) instance used by this class. You can set its parameters (via SetXXXX methods).

wxHtmlFilter

This class is an input filter for *wxHtmlWindow* (p. 699). It allows you to read and display files of different file formats.

Derived from

wxObject (p. 954)

Include files

<wx/html/htmlfilt.h>

See Also

Overview (p. 1703)

wxHtmlFilter::wxHtmlFilter

wxHtmlFilter()

Constructor.

wxHtmlFilter::CanRead

bool CanRead(const wxFSFile& file)

Returns true if this filter is capable of reading file *file*.

Example:

```
bool MyFilter::CanRead(const wxFSFile& file)
{
    return (file.GetMimeType() == "application/x-ugh");
}
```

wxHtmlFilter::ReadFile

wxString ReadFile(const wxFSFile& file)

Reads the file and returns string with HTML document.

Example:

```
wxString MyImgFilter::ReadFile(const wxFSFile& file)
{
    return "<html><body><img src=\"\" +
        file.GetLocation() +
        \"\"></body></html>";
}
```

wxHtmlHelpController

WARNING! Although this class has an API compatible with other wxWidgets help controllers as documented by *wxHelpController* (p. 644), it is recommended that you use the enhanced capabilities of wxHtmlHelpController's API.

This help controller provides an easy way of displaying HTML help in your application (see *test* sample). The help system is based on **books** (see *AddBook* (p. 674)). A book is a logical section of documentation (for example "User's Guide" or "Programmer's Guide" or "C++ Reference" or "wxWidgets Reference"). The help controller can handle as many books as you want.

wxHTML uses Microsoft's HTML Help Workshop project files (.hhp, .hhk, .hnc) as its native format. The file format is described *here* (p. 1701). Have a look at docs/html/ directory where sample project files are stored.

You can use Tex2RTF to produce these files when generating HTML, if you set **htmlWorkshopFiles** to **true** in your tex2rtf.ini file.

Note

It is strongly recommended to use preprocessed **.hhp.cached** version of projects. It can be either created on-the-fly (see *SetTempDir* (p. 676)) or you can use **hhp2cached** utility from *utils/hhp2cached* to create it and distribute the cached version together with helpfiles. See *samples/html/help* sample for demonstration of its use.

See also

Information about wxBestHelpController (p. 644)

Derived from

wxHelpControllerBase

Include files

<wx/html/helpctrl.h>

wxHtmlHelpController::wxHtmlHelpController

wxHtmlHelpController(int *style* = *wxHF_DEFAULT_STYLE*)

Constructor.

Parameters

style is combination of these flags:

wxHF_TOOLBAR	Help frame has toolbar.
wxHF_FLAT_TOOLBAR	Help frame has toolbar with flat buttons (aka coolbar).
wxHF_CONTENTS	Help frame has contents panel.
wxHF_INDEX	Help frame has index panel.
wxHF_SEARCH	Help frame has search panel.
wxHF_BOOKMARKS	Help frame has bookmarks controls.
wxHF_OPEN_FILES	Allow user to open arbitrary HTML document.
wxHF_PRINT	Toolbar contains "print" button.
wxHF_MERGE_BOOKS	Contents pane does not show book nodes. All books are merged together and appear as single book to the user.
wxHF_ICONS_BOOK	All nodes in contents pane have a book icon. This is how Microsoft's HTML help viewer behaves.
wxHF_ICONS_FOLDER	Book nodes in contents pane have a book icon, book's sections have a folder icon. This is the default.
wxHF_ICONS_BOOK_CHAPTER	Both book nodes and nodes of top-level

sections of a book (i.e. chapters) have a book icon, all other sections (sections, subsections, ...) have a folder icon.

wxHF_DEFAULT_STYLE

```
wxHF_TOOLBAR | wxHF_CONTENTS |  
wxHF_INDEX | wxHF_SEARCH |  
wxHF_BOOKMARKS | wxHF_PRINT
```

wxHtmlHelpController::AddBook

bool AddBook(const wxString& book_file, bool show_wait_msg)

bool AddBook(const wxString& book_url, bool show_wait_msg)

Adds book (.hhp file (p. 1701) - HTML Help Workshop project file) into the list of loaded books. This must be called at least once before displaying any help.

book_file or *book_url* may be either .hhp file or ZIP archive that contains arbitrary number of .hhp files in top-level directory. This ZIP archive must have .zip or .htb extension (the latter stands for "HTML book"). In other words, `AddBook(wxFileName("help.zip"))` is possible and, in fact, recommended way.

Parameters

show_wait_msg

If true then a decoration-less window with progress message is displayed.

book_file

Help book filename. It is recommended to use this prototype instead of the one taking URL, because it is less error-prone.

book_url

Help book URL (note that syntax of filename and URL is different on most platforms)

Note

Don't forget to install wxFileSystem ZIP handler
`withwxFileSystem::AddHandler(new wxZipFHandler);` before calling this method on a .zip or .htb file!

wxHtmlHelpController::CreateHelpFrame

virtual wxHtmlHelpFrame* CreateHelpFrame(wxHtmlHelpData * data)

This protected virtual method may be overridden so that the controller uses slightly different frame. See *samples/html/helpview* sample for an example.

wxHtmlHelpController::Display

void Display(const wxString& x)

Displays page x. This is THE important function - it is used to display the help in application.

You can specify the page in many ways:

- as direct filename of HTML document
- as chapter name (from contents) or as a book name
- as some word from index
- even as any word (will be searched)

Looking for the page runs in these steps:

1. try to locate file named x (if x is for example "doc/howto.htm")
2. try to open starting page of book named x
3. try to find x in contents (if x is for example "How To ...")
4. try to find x in index (if x is for example "How To ...")
5. switch to Search panel and start searching

void Display(const int id)

This alternative form is used to search help contents by numeric IDs.

wxPython note: The second form of this method is named DisplayId in wxPython.

wxHtmlHelpController::DisplayContents

void DisplayContents()

Displays help window and focuses contents panel.

wxHtmlHelpController::DisplayIndex

void DisplayIndex()

Displays help window and focuses index panel.

wxHtmlHelpController::KeywordSearch

bool KeywordSearch(const wxString& keyword, wxHelpSearchMode mode = wxHELP_SEARCH_ALL)

Displays help window, focuses search panel and starts searching. Returns true if the keyword was found. Optionally it searches through the index (mode = wxHELP_SEARCH_INDEX), default the content (mode = wxHELP_SEARCH_ALL).

Important: KeywordSearch searches only pages listed in .hhc file(s). You should list all pages in the contents file.

wxHtmlHelpController::ReadCustomization

void ReadCustomization(wxConfigBase* cfg, wxString path = wxEmptyString)

Reads the controller's setting (position of window, etc.)

wxHtmlHelpController::SetTempDir

void SetTempDir(const wxString& path)

Sets the path for storing temporary files - cached binary versions of index and contents files. These binary forms are much faster to read. Default value is empty string (empty string means that no cached data are stored). Note that these files are *not* deleted when program exits.

Once created these cached files will be used in all subsequent executions of your application. If cached files become older than corresponding .hhp file (e.g. if you regenerate documentation) it will be refreshed.

wxHtmlHelpController::SetTitleFormat

void SetTitleFormat(const wxString& format)

Sets format of title of the frame. Must contain exactly one "%s" (for title of displayed HTML page).

wxHtmlHelpController::UseConfig

void UseConfig(wxConfigBase* config, const wxString& rootpath = wxEmptyString)

Associates *config* object with the controller.

If there is associated config object, wxHtmlHelpController automatically reads and writes settings (including wxHtmlWindow's settings) when needed.

The only thing you must do is create wxConfig object and call UseConfig.

If you do not use *UseConfig*, wxHtmlHelpController will use default wxConfig object if available (for details see *wxConfigBase::Get* (p. 186) and *wxConfigBase::Set* (p. 191)).

wxHtmlHelpController::WriteCustomization

void WriteCustomization(wxConfigBase* *cfg*, wxString *path* = wxEmptyString)

Stores controllers setting (position of window etc.)

wxHtmlHelpData

This class is used by *wxHtmlHelpController* (p. 672) and *wxHtmlHelpFrame* (p. 678) to access HTML help items. It is internal class and should not be used directly - except for the case you're writing your own HTML help controller.

Derived from

wxObject (p. 954)

Include files

<wx/html/helpdata.h>

wxHtmlHelpData::wxHtmlHelpData

wxHtmlHelpData()

Constructor.

wxHtmlHelpData::AddBook

bool AddBook(const wxString& *book_url*)

Adds new book. *book* is URL (not filename!) of HTML help project (hhp) or ZIP file that contains arbitrary number of .hhp projects (this zip file can have either .zip or .htb extension, htb stands for "html book"). Returns success.

wxHtmlHelpData::FindPageById

wxString FindPageById(int *id*)

Returns page's URL based on integer ID stored in project.

wxHtmlHelpData::FindPageByName

wxString FindPageByName(const wxString& *page*)

Returns page's URL based on its (file)name.

wxHtmlHelpData::GetBookRecArray

const wxHtmlBookRecArray& GetBookRecArray()

Returns array with help books info.

wxHtmlHelpData::GetContents

wxHtmlContentsItem* GetContents()

Returns contents lists pointer.

wxHtmlHelpData::GetContentsCnt

int GetContentsCnt()

Returns size of contents list.

wxHtmlHelpData::GetIndex

wxHtmlContentsItem* GetIndex()

Returns pointer to index items list.

wxHtmlHelpData::GetIndexCnt

int GetIndexCnt()

Returns size of index list.

wxHtmlHelpData::SetTempDir

void SetTempDir(const wxString& path)

Sets temporary directory where binary cached versions of MS HTML Workshop files will be stored. (This is turned off by default and you can enable this feature by setting non-empty temp dir.)

wxHtmlHelpFrame

This class is used by *wxHtmlHelpController* (p. 672) to display help. It is an internal class and should not be used directly - except for the case when you're writing your own HTML help controller.

Derived from

wxFrame (p. 532)

Include files

<wx/html/helpfrm.h>

wxHtmlHelpFrame::wxHtmlHelpFrame

wxHtmlHelpFrame(wxHtmlHelpData* data = NULL)

wxHtmlHelpFrame(wxWindow* parent, int wxWindowID, const wxString& title = wxEmptyString, int style = wxHF_DEFAULT_STYLE, wxHtmlHelpData* data = NULL)

Constructor.

style is combination of these flags:

wxHF_TOOLBAR	Help frame has toolbar.
wxHF_FLAT_TOOLBAR	Help frame has toolbar with flat buttons (aka coolbar).
wxHF_CONTENTS	Help frame has contents panel.
wxHF_INDEX	Help frame has index panel.
wxHF_SEARCH	Help frame has search panel.
wxHF_BOOKMARKS	Help frame has bookmarks controls.
wxHF_OPEN_FILES	Allow user to open arbitrary HTML document.
wxHF_PRINT	Toolbar contains "print" button.
wxHF_MERGE_BOOKS	Contents pane does not show book nodes. All books are merged together and appear as single book to the user.
wxHF_ICONS_BOOK	All nodes in contents pane have a book icon. This is how Microsoft's HTML help viewer behaves.
wxHF_ICONS_FOLDER	Book nodes in contents pane have a book icon, book's sections have a folder icon. This is the default.
wxHF_ICONS_BOOK_CHAPTER	Both book nodes and nodes of top-level sections of a book (i.e. chapters) have a book icon, all other sections (sections, subsections, ...) have a folder icon.
wxHF_DEFAULT_STYLE	wxHF_TOOLBAR wxHF_CONTENTS

```
wxHF_INDEX | wxHF_SEARCH |  
wxHF_BOOKMARKS | wxHF_PRINT
```

wxHtmlHelpFrame::Create

```
bool Create(wxWindow* parent, wxWindowID id, const wxString& title =  
wxEmptyString, int style = wxHF_DEFAULT_STYLE)
```

Creates the frame. See *the constructor* (p. 679) for parameters description.

wxHtmlHelpFrame::CreateContents

```
void CreateContents(bool show_progress = false)
```

Creates contents panel. (May take some time.)

wxHtmlHelpFrame::CreateIndex

```
void CreateIndex(bool show_progress = false)
```

Creates index panel. (May take some time.)

wxHtmlHelpFrame::CreateSearch

```
void CreateSearch()
```

Creates search panel.

wxHtmlHelpFrame::Display

```
bool Display(const wxString& x)
```

```
bool Display(const int id)
```

Displays page x. If not found it will give the user the choice of searching books. Looking for the page runs in these steps:

1. try to locate file named x (if x is for example "doc/howto.htm")
2. try to open starting page of book x
3. try to find x in contents (if x is for example "How To ...")
4. try to find x in index (if x is for example "How To ...")

The second form takes numeric ID as the parameter. (uses extension to MS format, <param name="ID" value=id>)

wxPython note: The second form of this method is named `DisplayId` in wxPython.

wxHtmlHelpFrame::DisplayContents

bool DisplayContents()

Displays contents panel.

wxHtmlHelpFrame::DisplayIndex

bool DisplayIndex()

Displays index panel.

wxHtmlHelpFrame::GetData

wxHtmlHelpData* GetData()

Return wxHtmlHelpData object.

wxHtmlHelpFrame::KeywordSearch

bool KeywordSearch(const wxString& keyword, wxHelpSearchMode mode = wxHELP_SEARCH_ALL)

Search for given keyword. Optionally it searches through the index (mode = wxHELP_SEARCH_INDEX), default the content (mode = wxHELP_SEARCH_ALL).

wxHtmlHelpFrame::ReadCustomization

void ReadCustomization(wxConfigBase* cfg, const wxString& path = wxEmptyString)

Reads user's settings for this frame (see *wxHtmlHelpController::ReadCustomization* (p. 676))

wxHtmlHelpFrame::RefreshLists

void RefreshLists(bool show_progress = false)

Refresh all panels. This is necessary if a new book was added.

wxHtmlHelpFrame::SetTitleFormat

void SetTitleFormat(const wxString& format)

Sets the frame's title format. *format* must contain exactly one "%s" (it will be replaced by the page title).

wxHtmlHelpFrame::UseConfig

void UseConfig(wxConfigBase* *config*, const wxString& *rootpath* = wxEmptyString)

Add books to search choice panel.

wxHtmlHelpFrame::WriteCustomization

void WriteCustomization(wxConfigBase* *cfg*, const wxString& *path* = wxEmptyString)

Saves user's settings for this frame (see *wxHtmlHelpController::WriteCustomization* (p. 677)).

wxHtmlHelpFrame::AddToolBarButtons

virtual void AddToolBarButtons(wxToolBar **toolBar*, int *style*)

You may override this virtual method to add more buttons into help frame's toolbar. *toolBar* is a pointer to the toolbar and *style* is the style flag as passed to *Create* method.

wxToolBar::Realize is called immediately after returning from this function.

See *samples/html/helpview* for an example.

wxHtmlLinkInfo

This class stores all necessary information about hypertext links (as represented by <A> tag in HTML documents). In current implementation it stores URL and target frame name. *Note that frames are not currently supported by wxHTML!*

Derived from

wxObject (p. 954)

Include files

<wx/html/htmlcell.h>

wxHtmlLinkInfo::wxHtmlLinkInfo

wxHtmlLinkInfo()

Default ctor.

wxHtmlLinkInfo(const wxString& href, const wxString& target = wxEmptyString)

Construct hypertext link from HREF (aka URL) and TARGET (name of target frame).

wxHtmlLinkInfo::GetEvent

const wxMouseEvent * GetEvent()

Return pointer to event that generated OnLinkClicked event. Valid only within *wxHtmlWindow::OnLinkClicked* (p. 703), NULL otherwise.

wxHtmlLinkInfo::GetHtmlCell

const wxHtmlCell * GetHtmlCell()

Return pointer to the cell that was clicked. Valid only within *wxHtmlWindow::OnLinkClicked* (p. 703), NULL otherwise.

wxHtmlLinkInfo::GetHref

wxString GetHref()

Return *HREF* value of the <A> tag.

wxHtmlLinkInfo::GetTarget

wxString GetTarget()

Return *TARGET* value of the <A> tag (this value is used to specify in which frame should be the page pointed by *Href* (p. 683) opened).

wxHtmlListBox

wxHtmlListBox is an implementation of *wxVListBox* (p. 1375) which shows HTML content in the listbox rows. This is still an abstract base class and you will need to derive your own class from it (see *htmlbox* sample for the example) but you will only need to override a single *OnGetItem()* (p. 685) function.

Derived from

wxVListBox (p. 1375)

Include files

<wx/html/llbox.h>

wxHtmlListBox::wxHtmlListBox

wxHtmlListBox(wxWindow* *parent*, wxWindowID *id* = wxID_ANY, const wxPoint& *pos* = wxDefaultPosition, const wxSize& *size* = wxDefaultSize, size_t *countItems* = 0, long *style* = 0, const wxString& *name* = wxVListBoxNameStr)

Normal constructor which calls *Create()* (p. 684) internally.

wxHtmlListBox()

Default constructor, you must call *Create()* (p. 684) later.

wxHtmlListBox::~wxHtmlListBox

~wxHtmlListBox()

Destructor cleans up whatever resources we use.

wxHtmlListBox::Create

bool Create(wxWindow* *parent*, wxWindowID *id* = wxID_ANY, const wxPoint& *pos* = wxDefaultPosition, const wxSize& *size* = wxDefaultSize, long *style* = 0, const wxString& *name* = wxVListBoxNameStr)

Creates the control and optionally sets the initial number of items in it (it may also be set or changed later with *SetItemCount()* (p. 1380)).

There are no special styles defined for wxHtmlListBox, in particular the wxListBox styles can not be used here.

Returns `true` on success or `false` if the control couldn't be created

wxHtmlListBox::GetFileSystem

wxFileSystem& GetFileSystem()

const wxFileSystem& GetFileSystem() const

Returns the *wxFileSystem* (p. 494) used by the HTML parser of this object. The file system object is used to resolve the paths in HTML fragments displayed in the control and you should use *wxFileSystem::ChangePathTo* (p. 495) if you use relative paths for the images or other resources embedded in your HTML.

wxHtmlListBox::GetSelectedTextBgColour

wxColour GetSelectedTextBgColour(const wxColour& colBg) const

This virtual function may be overridden to change the appearance of the background of the selected cells in the same way as *GetSelectedTextColour* (p. 685).

It should be rarely, if ever, used because *SetSelectionBackground* (p. 1381) allows to change the selection background for all cells at once and doing anything more fancy is probably going to look strangely.

See also

GetSelectedTextColour (p. 685)

wxHtmlListBox::GetSelectedTextColour

wxColour GetSelectedTextColour(const wxColour& colFg) const

This virtual function may be overridden to customize the appearance of the selected cells. It is used to determine how the colour *colFg* is going to look inside selection. By default all original colours are completely ignored and the standard, system-dependent, selection colour is used but the program may wish to override this to achieve some custom appearance.

See also

GetSelectedTextBgColour (p. 684),
SetSelectionBackground (p. 1381),
wxSystemSettings::GetColour (p. 1232)

wxHtmlListBox::OnGetItem

wxString OnGetItem(size_t n) const

This method must be implemented in the derived class and should return the body (i.e. without `<html>` nor `<body>` tags) of the HTML fragment for the given item.

wxHtmlListBox::OnGetItemMarkup

wxString OnGetItemMarkup(size_t n) const

This function may be overridden to decorate HTML returned by *OnGetItem()* (p. 685).

wxHtmlParser

This class handles the **generic** parsing of HTML document: it scans the document and divide it into blocks of tags (where one block consists of beginning and ending tag and of text between these two tags).

It is independent from `wxHtmlWindow` and can be used as stand-alone parser (Julian Smart's idea of speech-only HTML viewer or `wget`-like utility - see `InetGet` sample for example).

It uses system of tag handlers to parse the HTML document. Tag handlers are not statically shared by all instances but are created for each `wxHtmlParser` instance. The reason is that the handler may contain document-specific temporary data used during parsing (e.g. complicated structures like tables).

Typically the user calls only the *Parse* (p. 689) method.

Derived from

`wxObject`

Include files

`<wx/html/htmlpars.h>`

See also

Cells Overview (p. 1703), *Tag Handlers Overview* (p. 1704), *wxHtmlTag* (p. 692)

`wxHtmlParser::wxHtmlParser`

`wxHtmlParser()`

Constructor.

`wxHtmlParser::AddTag`

`void AddTag(const wxHtmlTag& tag)`

This may (and may not) be overwritten in derived class.

This method is called each time new tag is about to be added. *tag* contains information about the tag. (See *wxHtmlTag* (p. 692) for details.)

Default (`wxHtmlParser`) behaviour is this: First it finds a handler capable of handling this tag and then it calls handler's `HandleTag` method.

`wxHtmlParser::AddTagHandler`

`virtual void AddTagHandler(wxHtmlTagHandler *handler)`

Adds handler to the internal list (& hash table) of handlers. This method should not be called directly by user but rather by derived class' constructor.

This adds the handler to this **instance** of `wxHtmlParser`, not to all objects of this class!

(Static front-end to AddTagHandler is provided by wxHtmlWinParser).

All handlers are deleted on object deletion.

wxHtmlParser::AddText

virtual void AddWord(const char* txt)

Must be overwritten in derived class.

This method is called by *DoParsing* (p. 687) each time a part of text is parsed. *txt* is NOT only one word, it is substring of input. It is not formatted or preprocessed (so white spaces are unmodified).

wxHtmlParser::DoParsing

void DoParsing(int begin_pos, int end_pos)

void DoParsing()

Parses the m_Source from begin_pos to end_pos-1. (in noparams version it parses whole m_Source)

wxHtmlParser::DoneParser

virtual void DoneParser()

This must be called after DoParsing().

wxHtmlParser::GetFS

wxFileSystem* GetFS() const

Returns pointer to the file system. Because each tag handler has reference to it is parent parser it can easily request the file by calling

```
wxFSFile *f = m_Parser -> GetFS() -> OpenFile("image.jpg");
```

wxHtmlParser::GetProduct

virtual wxObject* GetProduct()

Returns product of parsing. Returned value is result of parsing of the document. The type of this result depends on internal representation in derived parser (but it must be derived from wxObject!).

See wxHtmlWinParser for details.

wxHtmlParser::GetSource

wxString* GetSource()

Returns pointer to the source being parsed.

wxHtmlParser::InitParser

virtual void InitParser(const wxString& source)

Setups the parser for parsing the *source* string. (Should be overridden in derived class)

wxHtmlParser::OpenURL

virtual wxFSFile* OpenURL(wxHtmlURLType type, const wxString& url)

Opens given URL and returns `wxFSFile` object that can be used to read data from it. This method may return NULL in one of two cases: either the URL doesn't point to any valid resource or the URL is blocked by overridden implementation of *OpenURL* in derived class.

Parameters*type*

Indicates type of the resource. Is one of:

wxHTML_URL_PAGE	Opening a HTML page.
wxHTML_URL_IMAGE	Opening an image.
wxHTML_URL_OTHER	Opening a resource that doesn't fall into any other category.

url

URL being opened.

Notes

Always use this method in tag handlers instead of `GetFS()->OpenFile()` because it can block the URL and is thus more secure.

Default behaviour is to call *wxHtmlWindow::OnOpeningURL* (p. 704) of the associated *wxHtmlWindow* object (which may decide to block the URL or redirect it to another one), if there's any, and always open the URL if the parser is not used with *wxHtmlWindow*.

Returned `wxFSFile` object is not guaranteed to point to *url*, it might have been redirected!

wxHtmlParser::Parse

wxObject* Parse(const wxString& source)

Proceeds parsing of the document. This is end-user method. You can simply call it when you need to obtain parsed output (which is parser-specific)

The method does these things:

1. calls *InitParser(source)* (p. 688)
2. calls *DoParsing* (p. 687)
3. calls *GetProduct* (p. 687)
4. calls *DoneParser* (p. 687)
5. returns value returned by *GetProduct*

You shouldn't use *InitParser*, *DoParsing*, *GetProduct* or *DoneParser* directly.

wxHtmlParser::PushTagHandler

void PushTagHandler(wxHtmlTagHandler* handler, wxString tags)

Forces the handler to handle additional tags (not returned by *GetSupportedTags* (p. 697)). The handler should already be added to this parser.

Parameters

handler

the handler

tags

List of tags (in same format as *GetSupportedTags*'s return value). The parser will redirect these tags to *handler* (until call to *PopTagHandler* (p. 690)).

Example

Imagine you want to parse following pseudo-html structure:

```
<myitems>
  <param name="one" value="1">
  <param name="two" value="2">
</myitems>

<execute>
  <param program="text.exe">
</execute>
```

It is obvious that you cannot use only one tag handler for `<param>` tag. Instead you must use context-sensitive handlers for `<param>` inside `<myitems>` and `<param>` inside `<execute>`.

This is the preferred solution:

```
    TAG_HANDLER_BEGIN(MYITEM, "MYITEMS")
    TAG_HANDLER_PROC(tag)
    {
        // ...something...

        m_Parser -> PushTagHandler(this, "PARAM");
        ParseInner(tag);
        m_Parser -> PopTagHandler();

        // ...something...
    }
    TAG_HANDLER_END(MYITEM)
```

wxHtmlParser::PopTagHandler

void PopTagHandler()

Restores parser's state before last call to *PushTagHandler* (p. 689).

wxHtmlParser::SetFS

void SetFS(wxFileSystem *fs)

Sets the virtual file system that will be used to request additional files. (For example tag handler requests wxFSFile with the image data.)

wxHtmlParser::StopParsing

void StopParsing()

Call this function to interrupt parsing from a tag handler. No more tags will be parsed afterward. This function may only be called from *wxHtmlParser::Parse* (p. 689) or any function called by it (i.e. from tag handlers).

wxHtmlPrintout

This class serves as printout class for HTML documents.

Derived from

wxPrintout (p. 1010)

Include files

<wx/html/htmprint.h>

wxHtmlPrintout::wxHtmlPrintout

wxHtmlPrintout(const wxString& title = "Printout")

Constructor.

wxHtmlPrintout::AddFilter

static void AddFilter(wxHtmlFilter* filter)

Adds a filter to the static list of filters for wxHtmlPrintout. See *wxHtmlFilter* (p. 671) for further information.

wxHtmlPrintout::SetFont

void SetFont(wxString normal_face, wxString fixed_face, const int *sizes = NULL)

Sets fonts. See *wxHtmlWindow::SetFont* (p. 706) for detailed description.

wxHtmlPrintout::SetFooter

void SetFooter(const wxString& footer, int pg = wxPAGE_ALL)

Sets page footer.

Parameters

footer

HTML text to be used as footer. You can use macros in it:

- @PAGENUM@ is replaced by page number
- @PAGESCNT@ is replaced by total number of pages

pg

one of wxPAGE_ODD, wxPAGE_EVEN and wxPAGE_ALL constants.

wxHtmlPrintout::SetHeader

void SetHeader(const wxString& header, int pg = wxPAGE_ALL)

Sets page header.

Parameters

header

HTML text to be used as header. You can use macros in it:

- @PAGENUM@ is replaced by page number
- @PAGESCNT@ is replaced by total number of pages

pg

one of wxPAGE_ODD, wxPAGE_EVEN and wxPAGE_ALL constants.

wxHtmlPrintout::SetHtmlFile

void SetHtmlFile(const wxString& *htmlfile*)

Prepare the class for printing this HTML **file**. The file may be located on any virtual file system or it may be normal file.

wxHtmlPrintout::SetHtmlText

void SetHtmlText(const wxString& *html*, const wxString& *basepath* = wxEmptyString, bool *isdir* = true)

Prepare the class for printing this HTML text.

Parameters

html

HTML text. (NOT file!)

basepath

base directory (html string would be stored there if it was in file). It is used to determine path for loading images, for example.

isdir

false if basepath is filename, true if it is directory name (see *wxFileSystem* (p. 494) for detailed explanation)

wxHtmlPrintout::SetMargins

void SetMargins(float *top* = 25.2, float *bottom* = 25.2, float *left* = 25.2, float *right* = 25.2, float *spaces* = 5)

Sets margins in millimeters. Defaults to 1 inch for margins and 0.5cm for space between text and header and/or footer

wxHtmlTag

This class represents a single HTML tag. It is used by *tag handlers* (p. 1704).

Derived from

wxObject

Include files

<wx/html/htmltag.h>

wxHtmlTag::wxHtmlTag

wxHtmlTag(const wxString& source, int pos, int end_pos, wxHtmlTagsCache* cache)

Constructor. You will probably never have to construct a wxHtmlTag object yourself. Feel free to ignore the constructor parameters. Have a look at src/html/htmlpars.cpp if you're interested in creating it.

wxHtmlTag::GetAllParams

const wxString& GetAllParams() const

Returns a string containing all parameters.

Example : tag contains . Call to tag.GetAllParams() would return SIZE=+2 COLOR="#000000".

wxHtmlTag::GetBeginPos

int GetBeginPos() const

Returns beginning position of the text *between* this tag and paired ending tag. See explanation (returned position is marked with '|'):

```
bla bla bla <MYTAG> bla bla internal text</MYTAG> bla bla
                  |
```

wxHtmlTag::GetEndPos1

int GetEndPos1() const

Returns ending position of the text *between* this tag and paired ending tag. See explanation (returned position is marked with '|'):

```
bla bla bla <MYTAG> bla bla internal text</MYTAG> bla bla
                                     |
```

wxHtmlTag::GetEndPos2

int GetEndPos2() const

Returns ending position 2 of the text *between* this tag and paired ending tag. See explanation (returned position is marked with '|'):

```
bla bla bla <MYTAG> bla bla internal text</MYTAG> bla bla
                                     |
```

wxHtmlTag::GetName

wxString GetName() const

Returns tag's name. The name is always in uppercase and it doesn't contain '<' or '/' characters. (So the name of tag is "FONT" and name of </table> is "TABLE")

wxHtmlTag::GetParam

wxString GetParam(const wxString& par, bool with_commas = false) const

Returns the value of the parameter. You should check whether the parameter exists or not (use *HasParam* (p. 695)) first.

Parameters*par*

The parameter's name.

with_commas

true if you want to get commas as well. See example.

Example

```
...
/* you have wxHtmlTag variable tag which is equal to
   HTML tag <FONT SIZE=+2 COLOR="#0000FF"> */
dummy = tag.GetParam("SIZE");
// dummy == "+2"
dummy = tag.GetParam("COLOR");
// dummy == "#0000FF"
dummy = tag.GetParam("COLOR", true);
// dummy == "\"#0000FF\"" -- see the difference!!
```

wxHtmlTag::GetParamAsColour

bool GetParamAsColour(const wxString& par, wxColour *clr) const

Interprets tag parameter *par* as colour specification and saves its value into wxColour variable pointed by *clr*.

Returns true on success and false if *par* is not colour specification or if the tag has no such parameter.

wxHtmlTag::GetParamAsInt

bool GetParamAsInt(const wxString& par, int *value) const

Interprets tag parameter *par* as an integer and saves its value into int variable pointed by *value*.

Returns true on success and false if *par* is not an integer or if the tag has no such parameter.

wxHtmlTag::HasEnding

bool HasEnding() const

Returns true if this tag is paired with ending tag, false otherwise.

See the example of HTML document:

```
<html><body>
Hello<p>
How are you?
<p align=center>This is centered...</p>
Oops<br>Ooops!
</body></html>
```

In this example tags HTML and BODY have ending tags, first P and BR doesn't have ending tag while the second P has. The third P tag (which is ending itself) of course doesn't have ending tag.

wxHtmlTag::HasParam

bool HasParam(const wxString& par) const

Returns true if the tag has a parameter of the given name. Example : has two parameters named "SIZE" and "COLOR".

Parameters

par

the parameter you're looking for.

wxHtmlTag::IsEnding

bool IsEnding() const

Returns true if this tag is ending one. (is ending tag, is not)

wxHtmlTag::ScanParam

wxString ScanParam(const wxString& *par*, const wxChar **format*, void **value*)
const

This method scans the given parameter. Usage is exactly the same as `sscanf`'s usage except that you don't pass a string but a parameter name as the first argument and you can only retrieve one value (i.e. you can use only one "%" element in *format*).

Parameters

par

The name of the tag you want to query

format

`scanf()`-like format string.

value

pointer to a variable to store the value in

wxHtmlTagHandler

Derived from

wxObject (p. 954)

Include files

<wx/html/htmlpars.h>

See Also

Overview (p. 1704), *wxHtmlTag* (p. 692)

wxHtmlTagHandler::m_Parser

wxHtmlParser* m_Parser

This attribute is used to access parent parser. It is protected so that it can't be accessed by user but can be accessed from derived classes.

wxHtmlTagHandler::wxHtmlTagHandler

wxHtmlTagHandler()

Constructor.

wxHtmlTagHandler::GetSupportedTags

virtual wxString GetSupportedTags()

Returns list of supported tags. The list is in uppercase and tags are delimited by ','.

Example : " I , B , FONT , P "

wxHtmlTagHandler::HandleTag

virtual bool HandleTag(const wxHtmlTag& tag)

This is the core method of each handler. It is called each time one of supported tags is detected. *tag* contains all necessary info (see *wxHtmlTag* (p. 692) for details).

Return value

true if *ParseInner* (p. 697) was called, false otherwise.

Example

```
bool MyHandler::HandleTag(const wxHtmlTag& tag)
{
    ...
    // change state of parser (e.g. set bold face)
    ParseInner(tag);
    ...
    // restore original state of parser
}
```

You shouldn't call *ParseInner* if the tag is not paired with an ending one.

wxHtmlTagHandler::ParseInner

void ParseInner(const wxHtmlTag& tag)

This method calls parser's *DoParsing* (p. 687) method for the string between this tag and the paired ending tag:

```
...<A HREF="x.htm">Hello, world!</A>...
```

In this example, a call to *ParseInner* (with *tag* pointing to A tag) will parse 'Hello, world!'.

wxHtmlTagHandler::SetParser

virtual void SetParser(wxHtmlParser *parser)

Assigns *parser* to this handler. Each **instance** of handler is guaranteed to be called only from the parser.

wxHtmlTagsModule

This class provides easy way of filling wxHtmlWinParser's table of tag handlers. It is used almost exclusively together with the set of *TAGS_MODULE_* macros* (p. 1704)

Derived from

wxModule (p. 925)

Include files

<wx/html/winpars.h>

See Also

Tag Handlers (p. 1704), *wxHtmlTagHandler* (p. 696), *wxHtmlWinTagHandler* (p. 714),

wxHtmlTagsModule::FillHandlersTable

virtual void FillHandlersTable(wxHtmlWinParser *parser)

You must override this method. In most common case its body consists only of lines of the following type:

```
parser -> AddTagHandler(new MyHandler);
```

I recommend using the **TAGS_MODULE_*** macros.

Parameters

parser

Pointer to the parser that requested tables filling.

wxHtmlWidgetCell

wxHtmlWidgetCell is a class that provides a connection between HTML cells and widgets (an object derived from wxWindow). You can use it to display things like forms, input boxes etc. in an HTML window.

wxHtmlWidgetCell takes care of resizing and moving window.

Derived from

wxHtmlCell (p. 653)

Include files

<wx/html/htmlcell.h>

wxHtmlWidgetCell::wxHtmlWidgetCell

wxHtmlWidgetCell(wxWindow* wnd, int w = 0)

Constructor.

Parameters

wnd

Connected window. It is parent window **must** be the wxHtmlWindow object within which it is displayed!

w

Floating width. If non-zero width of *wnd* window is adjusted so that it is always *w* percents of parent container's width. (For example *w* = 100 means that the window will always have same width as parent container)

wxHtmlWindow

wxHtmlWindow is probably the only class you will directly use unless you want to do something special (like adding new tag handlers or MIME filters).

The purpose of this class is to display HTML pages (either local file or downloaded via HTTP protocol) in a window. The width of the window is constant - given in the constructor - and virtual height is changed dynamically depending on page size. Once the window is created you can set its content by calling *SetPage(text)* (p. 707), *LoadPage(filename)* (p. 702) or *LoadFile* (p. 702).

Note

wxHtmlWindow uses the *wxImage* (p. 728) class for displaying images. Don't forget to initialize all image formats you need before loading any page! (See *wxInitAllImageHandlers* (p. 1473) and *wxImage::AddHandler* (p. 733).)

Derived from

wxScrolledWindow (p. 1085)

Include files

<wx/html/htmlwin.h>

Window styles

wxHW_SCROLLBAR_NEVER Never display scrollbars, not even when the page is larger than the window.

wxHW_SCROLLBAR_AUTO Display scrollbars only if page's size exceeds window's size.

wxHW_NO_SELECTION Don't allow the user to select text.

wxHtmlWindow::wxHtmlWindow

wxHtmlWindow()

Default constructor.

wxHtmlWindow(wxWindow *parent, wxWindowID id = -1, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxHW_SCROLLBAR_AUTO, const wxString& name = "htmlWindow")

Constructor. The parameters are the same as for the *wxScrolledWindow* (p. 1085) constructor.

Parameters

style

Window style. See *wxHtmlWindow* (p. 699).

wxHtmlWindow::AddFilter

static void AddFilter(wxHtmlFilter *filter)

Adds *input filter* (p. 1703) to the static list of available filters. These filters are present by default:

- `text/html` MIME type
- `image/*` MIME types
- Plain Text filter (this filter is used if no other filter matches)

wxHtmlWindow::AppendToPage

bool AppendToPage(const wxString& source)

Appends HTML fragment to currently displayed text and refreshes the window.

Parameters

source

HTML code fragment

Return value

false if an error occurred, true otherwise.

wxHtmlWindow::GetInternalRepresentation

wxHtmlContainerCell* GetInternalRepresentation() const

Returns pointer to the top-level container.

See also: *Cells Overview* (p. 1703), *Printing Overview* (p. 1701)

wxHtmlWindow::GetOpenedAnchor

wxString GetOpenedAnchor()

Returns anchor within currently opened page (see *GetOpenedPage* (p. 701)). If no page is opened or if the displayed page wasn't produced by call to *LoadPage*, empty string is returned.

wxHtmlWindow::GetOpenedPage

wxString GetOpenedPage()

Returns full location of the opened page. If no page is opened or if the displayed page wasn't produced by call to *LoadPage*, empty string is returned.

wxHtmlWindow::GetOpenedPageTitle

wxString GetOpenedPageTitle()

Returns title of the opened page or *wxEmptyString* if current page does not contain `<TITLE>` tag.

wxHtmlWindow::GetRelatedFrame

wxFrame* GetRelatedFrame() const

Returns the related frame.

wxHtmlWindow::HistoryBack

bool HistoryBack()

Moves back to the previous page. (each page displayed using *LoadPage* (p. 702) is stored in history list.)

wxHtmlWindow::HistoryCanBack

bool HistoryCanBack()

Returns true if it is possible to go back in the history (i.e. *HistoryBack()* won't fail).

wxHtmlWindow::HistoryCanForward

bool HistoryCanForward()

Returns true if it is possible to go forward in the history (i.e. HistoryBack() won't fail).

wxHtmlWindow::HistoryClear

void HistoryClear()

Clears history.

wxHtmlWindow::HistoryForward

bool HistoryForward()

Moves to next page in history.

wxHtmlWindow::LoadFile

virtual bool LoadFile(const wxFileName& *filename*)

Loads HTML page from file and displays it.

Return value

false if an error occurred, true otherwise

See also

LoadPage (p. 702)

wxHtmlWindow::LoadPage

virtual bool LoadPage(const wxString& *location*)

Unlike SetPage this function first loads HTML page from *location* and then displays it. See example:

```
htmlwin->LoadPage("help/myproject/index.htm");
```

Parameters

location

The address of document. See *wxFileSystem* (p. 494) for details on address format and behaviour of "opener".

Return value

false if an error occurred, true otherwise

See also

LoadFile (p. 702)

wxHtmlWindow::OnCellClicked

virtual void OnCellClicked(wxHtmlCell *cell, wxCoord x, wxCoord y, const wxMouseEvent& event)

This method is called when a mouse button is clicked inside wxHtmlWindow. The default behaviour is to call *OnLinkClicked* (p. 703) if the cell contains a hypertext link.

Parameters

cell

The cell inside which the mouse was clicked, always a simple (i.e. non container) cell

x, y

The logical coordinates of the click point

event

The mouse event containing other information about the click

wxHtmlWindow::OnCellMouseHover

virtual void OnCellMouseHover(wxHtmlCell *cell, wxCoord x, wxCoord y)

This method is called when a mouse moves over an HTML cell.

Parameters

cell

The cell inside which the mouse is currently, always a simple (i.e. non container) cell

x, y

The logical coordinates of the click point

wxHtmlWindow::OnLinkClicked

virtual void OnLinkClicked(const wxHtmlLinkInfo& link)

Called when user clicks on hypertext link. Default behaviour is to call *LoadPage* (p. 702)

and do nothing else.

Also see *wxHtmlLinkInfo* (p. 682).

wxHtmlWindow::OnOpeningURL

virtual wxHtmlOpeningStatus OnOpeningURL(wxHtmlURLType type, const wxString& url, wxString *redirect)

Called when an URL is being opened (either when the user clicks on a link or an image is loaded). The URL will be opened only if `OnOpeningURL` returns `wxHTML_OPEN`. This method is called by *wxHtmlParser::OpenURL* (p. 688). You can override `OnOpeningURL` to selectively block some URLs (e.g. for security reasons) or to redirect them elsewhere. Default behaviour is to always return `wxHTML_OPEN`.

Parameters

type

Indicates type of the resource. Is one of **wxHTML_URL_PAGE** Opening a HTML page.

wxHTML_URL_IMAGE Opening an image.

wxHTML_URL_OTHER Opening a resource that doesn't fall into any other category.

url

URL being opened.

redirect

Pointer to `wxString` variable that must be filled with an URL if `OnOpeningURL` returns `wxHTML_REDIRECT`.

Return value **wxHTML_OPEN** Open the URL.

wxHTML_BLOCK Deny access to the URL, *wxHtmlParser::OpenURL* (p. 688) will return `NULL`.

wxHTML_REDIRECT Don't open *url*, redirect to another URL. `OnOpeningURL` must fill **redirect* with the new URL. `OnOpeningURL` will be called again on returned URL.

wxHtmlWindow::OnSetTitle

virtual void OnSetTitle(const wxString& title)

Called on parsing `<TITLE>` tag.

wxHtmlWindow::ReadCustomization

virtual void ReadCustomization(wxConfigBase *cfg, wxString path = wxEmptyString)

This reads custom settings from wxConfig. It uses the path 'path' if given, otherwise it saves info into currently selected path. The values are stored in sub-path `wxHtmlWindow`

Read values: all things set by `SetFont`s, `SetBorders`.

Parameters

cfg

wxConfig from which you want to read the configuration.

path

Optional path in config tree. If not given current path is used.

wxHtmlWindow::SelectAll

void SelectAll()

Selects all text in the window.

See also

SelectLine (p. 705), *SelectWord* (p. 705)

wxHtmlWindow::SelectLine

void SelectLine(const wxPoint& pos)

Selects the line of text that *pos* points at. Note that *pos* is relative to the top of displayed page, not to window's origin, use *CalcUnscrolledPosition* (p. 1089) to convert physical coordinate.

See also

SelectAll (p. 705), *SelectWord* (p. 705)

wxHtmlWindow::SelectWord

void SelectWord(const wxPoint& pos)

Selects the word at position *pos*. Note that *pos* is relative to the top of displayed page, not to window's origin, use *CalcUnscrolledPosition* (p. 1089) to convert physical coordinate.

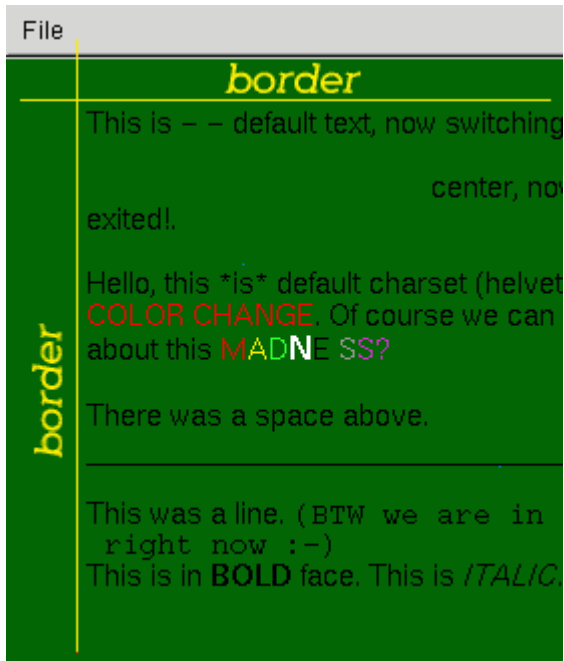
See also

SelectAll (p. 705), *SelectLine* (p. 705)

wxHtmlWindow::SetBorders

void SetBorders(int *b*)

This function sets the space between border of window and HTML contents. See image:

**Parameters**

b

indentation from borders in pixels

wxHtmlWindow::SetFont

void SetFont(wxString *normal_face*, wxString *fixed_face*, const int **sizes* = NULL)

This function sets font sizes and faces.

Parameters

normal_face

This is face name for normal (i.e. non-fixed) font. It can be either empty string (then the default face is chosen) or platform-specific face name. Examples are "helvetica" under Unix or "Times New Roman" under Windows.

fixed_face

The same thing for fixed face (`<TT>..</TT>`)

sizes

This is an array of 7 items of *int* type. The values represent size of font with HTML size from -2 to +4 (`` to ``). Default sizes are used if *sizes* is NULL.

Defaults

Default font sizes are defined by constants `wxHTML_FONT_SIZE_1`, `wxHTML_FONT_SIZE_2`, ..., `wxHTML_FONT_SIZE_7`. Note that they differ among platforms. Default face names are empty strings.

wxHtmlWindow::SetPage

bool SetPage(const wxString& source)

Sets HTML page and display it. This won't **load** the page!! It will display the *source*. See example:

```
htmlwin -> SetPage("<html><body>Hello, world!</body></html>");
```

If you want to load a document from some location use *LoadPage* (p. 702) instead.

Parameters

source

The HTML document source to be displayed.

Return value

false if an error occurred, true otherwise.

wxHtmlWindow::SetRelatedFrame

void SetRelatedFrame(wxFrame* frame, const wxString& format)

Sets the frame in which page title will be displayed. *format* is format of frame title, e.g. "HtmlHelp : %s". It must contain exactly one %s. This %s is substituted with HTML page title.

wxHtmlWindow::SetRelatedStatusBar

void SetRelatedStatusBar(int bar)

After calling *SetRelatedFrame* (p. 707), this sets statusbar slot where messages will be displayed. (Default is -1 = no messages.)

Parameters

bar

statusbar slot number (0..n)

wxHtmlWindow::WriteCustomization

virtual void WriteCustomization(wxConfigBase *cfg, wxString path = wxEmptyString)

Saves custom settings into wxConfig. It uses the path 'path' if given, otherwise it saves info into currently selected path. Regardless of whether the path is given or not, the function creates sub-path `wxHtmlWindow`.

Saved values: all things set by `SetFont`s, `SetBorders`.

Parameters

cfg

wxConfig to which you want to save the configuration.

path

Optional path in config tree. If not given, the current path is used.

wxHtmlWinParser

This class is derived from `wxHtmlParser` (p. 685) and its main goal is to parse HTML input so that it can be displayed in `wxHtmlWindow` (p. 699). It uses a special `wxHtmlWinTagHandler` (p. 714).

Notes

The product of parsing is a `wxHtmlCell` (resp. `wxHtmlContainer`) object.

Derived from

`wxHtmlParser` (p. 685)

Include files

<wx/html/winpars.h>

See Also

Handlers overview (p. 1704)

wxHtmlWinParser::wxHtmlWinParser

wxHtmlWinParser()**wxHtmlWinParser(wxHtmlWindow *wnd)**

Constructor. Don't use the default one, use constructor with *wnd* parameter (*wnd* is pointer to associated *wxHtmlWindow* (p. 699))

wxHtmlWinParser::AddModule

static void AddModule(wxHtmlTagsModule *module)

Adds *module* (p. 1704) to the list of *wxHtmlWinParser* tag handler.

wxHtmlWinParser::CloseContainer

wxHtmlContainerCell* CloseContainer()

Closes the container, sets actual container to the parent one and returns pointer to it (see *Overview* (p. 1703)).

wxHtmlWinParser::CreateCurrentFont

virtual wxFont* CreateCurrentFont()

Creates font based on current setting (see *SetFontSize* (p. 713), *SetFontBold* (p. 713), *SetFontItalic* (p. 713), *SetFontFixed* (p. 713), *SetFontUnderlined* (p. 713)) and returns pointer to it. If the font was already created only a pointer is returned.

wxHtmlWinParser::GetActualColor

const wxColour& GetActualColor() const

Returns actual text colour.

wxHtmlWinParser::GetAlign

int GetAlign() const

Returns default horizontal alignment.

wxHtmlWinParser::GetCharHeight

int GetCharHeight() const

Returns (average) char height in standard font. It is used as DC-independent metrics.

Note: This function doesn't return the *actual* height. If you want to know the height of the current font, call `GetDC -> GetCharHeight()`.

wxHtmlWinParser::GetCharWidth

int GetCharWidth() const

Returns average char width in standard font. It is used as DC-independent metrics.

Note: This function doesn't return the *actual* width. If you want to know the height of the current font, call `GetDC -> GetCharWidth()`

wxHtmlWinParser::GetContainer

wxHtmlContainerCell* GetContainer() const

Returns pointer to the currently opened container (see *Overview* (p. 1703)). Common use:

```
m_WParser -> GetContainer() -> InsertCell(new ...);
```

wxHtmlWinParser::GetDC

wxDC* GetDC()

Returns pointer to the DC used during parsing.

wxHtmlWinParser::GetEncodingConverter

wxEncodingConverter * GetEncodingConverter() const

Returns *wxEncodingConverter* (p. 437) class used to do conversion between *input encoding* (p. 711) and *output encoding* (p. 712).

wxHtmlWinParser::GetFontBold

int GetFontBold() const

Returns true if actual font is bold, false otherwise.

wxHtmlWinParser::GetFontFace

wxString GetFontFace() const

Returns actual font face name.

wxHtmlWinParser::GetFontFixed

int GetFontFixed() const

Returns true if actual font is fixed face, false otherwise.

wxHtmlWinParser::GetFontItalic

int GetFontItalic() const

Returns true if actual font is italic, false otherwise.

wxHtmlWinParser::GetFontSize

int GetFontSize() const

Returns actual font size (HTML size varies from -2 to +4)

wxHtmlWinParser::GetFontUnderlined

int GetFontUnderlined() const

Returns true if actual font is underlined, false otherwise.

wxHtmlWinParser::GetInputEncoding

wxFontEncoding GetInputEncoding() const

Returns input encoding.

wxHtmlWinParser::GetLink

const wxHtmlLinkInfo& GetLink() const

Returns actual hypertext link. (This value has a non-empty *Href* (p. 683) string if the parser is between `<A>` and `` tags, `wxEmptyString` otherwise.)

wxHtmlWinParser::GetLinkColor

const wxColour& GetLinkColor() const

Returns the colour of hypertext link text.

wxHtmlWinParser::GetOutputEncoding

wxFontEncoding GetOutputEncoding() const

Returns output encoding, i.e. closest match to document's input encoding that is supported by operating system.

wxHtmlWinParser::GetWindow

wxHtmlWindow* GetWindow()

Returns associated window (wxHtmlWindow). This may be NULL! (You should always test if it is non-NULL. For example `TITLE` handler sets window title only if some window is associated, otherwise it does nothing)

wxHtmlWinParser::OpenContainer

wxHtmlContainerCell* OpenContainer()

Opens new container and returns pointer to it (see *Overview* (p. 1703)).

wxHtmlWinParser::SetActualColor

void SetActualColor(const wxColour& clr)

Sets actual text colour. Note: this DOESN'T change the colour! You must create *wxHtmlColourCell* (p. 659) yourself.

wxHtmlWinParser::SetAlign

void SetAlign(int a)

Sets default horizontal alignment (see *wxHtmlContainerCell::SetAlignHor* (p. 661).) Alignment of newly opened container is set to this value.

wxHtmlWinParser::SetContainer

wxHtmlContainerCell* SetContainer(wxHtmlContainerCell *c)

Allows you to directly set opened container. This is not recommended - you should use *OpenContainer* wherever possible.

wxHtmlWinParser::SetDC

virtual void SetDC(wxDC *dc, double pixel_scale = 1.0)

Sets the DC. This must be called before *Parse* (p. 689)! *pixel_scale* can be used when rendering to high-resolution DCs (e.g. printer) to adjust size of pixel metrics. (Many dimensions in HTML are given in pixels -- e.g. image sizes. 300x300 image would be only one inch wide on typical printer. With *pixel_scale* = 3.0 it would be 3 inches.)

wxHtmlWinParser::SetFontBold

void SetFontBold(int x)

Sets bold flag of actualfont. x is either true or false.

wxHtmlWinParser::SetFontFace

void SetFontFace(const wxString& face)

Sets current font face to *face*. This affects either fixed size font or proportional, depending on context (whether the parser is inside <TT> tag or not).

wxHtmlWinParser::SetFontFixed

void SetFontFixed(int x)

Sets fixed face flag of actualfont. x is either true or false.

wxHtmlWinParser::SetFontItalic

void SetFontItalic(int x)

Sets italic flag of actualfont. x is either true or false.

wxHtmlWinParser::SetFontSize

void SetFontSize(int s)

Sets actual font size (HTML size varies from 1 to 7)

wxHtmlWinParser::SetFontUnderlined

void SetFontUnderlined(int x)

Sets underlined flag of actualfont. x is either true or false.

wxHtmlWinParser::SetFonts

void SetFonts(wxString normal_face, wxString fixed_face, const int *sizes = NULL)

Sets fonts. See `wxHtmlWindow::SetFont`s (p. 706) for detailed description.

wxHtmlWinParser::SetInputEncoding

void SetInputEncoding(wxFontEncoding enc)

Sets input encoding. The parser uses this information to build conversion tables from document's encoding to some encoding supported by operating system.

wxHtmlWinParser::SetLink

void SetLink(const wxHtmlLinkInfo& link)

Sets actual hypertext link. Empty link is represented by `wxHtmlLinkInfo` (p. 682) with *Href* equal to `wxEmptyString`.

wxHtmlWinParser::SetLinkColor

void SetLinkColor(const wxColour& clr)

Sets colour of hypertext link.

wxHtmlWinTagHandler

This is basically `wxHtmlTagHandler` except that it is extended with protected member `m_WParser` pointing to the `wxHtmlWinParser` object (value of this member is identical to `wxHtmlParser`'s `m_Parser`).

Derived from

`wxHtmlTagHandler` (p. 696)

Include files

<wx/html/winpars.h>

wxHtmlWinTagHandler::m_WParser

wxHtmlWinParser* m_WParser

Value of this attribute is identical to value of `m_Parser`. The only different is that `m_WParser` points to `wxHtmlWinParser` object while `m_Parser` points to `wxHtmlParser` object. (The same object, but overcast.)

wxHTTP

Derived from

wxProtocol (p. 1027)

Include files

<wx/protocol/http.h>

See also

wxSocketBase (p. 1132), *wxURL* (p. 1357)

wxHTTP::GetResponse

int GetResponse() const

Returns the HTTP response code returned by the server. Please refer to the RFC 2616 for the list of the responses.

wxHTTP::GetInputStream

wxInputStream * GetInputStream(const wxString& path)

Creates a new input stream on the the specified path. You can use all except the seek functionality of *wxStream*. Seek isn't available on all streams. For example, http or ftp streams doesn't deal with it. Other functions like Tell and SeekI for this sort of stream. You will be notified when the EOF is reached by an error.

Note

You can know the size of the file you are getting using *wxStreamBase::GetSize()* (p. 1194). But there is a limitation: as HTTP servers aren't obliged to pass the size of the file, in some case, you will be returned 0xffffffff by *GetSize()*. In these cases, you should use the value returned by *wxInputStream::LastRead()* (p. 763): this value will be 0 when the stream is finished.

Return value

Returns the initialized stream. You will have to delete it yourself once you don't use it anymore. The destructor closes the network connection. The next time you will try to get a file the network connection will have to be reestablished: but you don't have to take care of this *wxHTTP* reestablishes it automatically.

See also

wxInputStream (p. 762)

wxHTTP::SetHeader

void SetHeader(const wxString& header, const wxString& h_data)

It sets data of a field to be sent during the next request to the HTTP server. The field name is specified by *header* and the content by *h_data*. This is a low level function and it assumes that you know what you are doing.

wxHTTP::GetHeader

wxString GetHeader(const wxString& header)

Returns the data attached with a field whose name is specified by *header*. If the field doesn't exist, it will return an empty string and not a NULL string.

Note

The header is not case-sensitive: I mean that "CONTENT-TYPE" and "content-type" represent the same header.

wxIcon

An icon is a small rectangular bitmap usually used for denoting a minimized application. It differs from a *wxBitmap* in always having a mask associated with it for transparent drawing. On some platforms, icons and bitmaps are implemented identically, since there is no real distinction between a *wxBitmap* with a mask and an icon; and there is no specific icon format on some platforms (X-based applications usually standardize on XPMs for small bitmaps and icons). However, some platforms (such as Windows) make the distinction, so a separate class is provided.

Derived from

wxBitmap (p. 67)

wxGDIObject (p. 562)

wxObject (p. 954)

Include files

<wx/icon.h>

Predefined objects

Objects:

wxNullIcon

Remarks

It is usually desirable to associate a pertinent icon with a frame. Icons can also be used for other purposes, for example with *wxTreeCtrl* (p. 1329) and *wxListCtrl* (p. 799).

Icons have different formats on different platforms. Therefore, separate icons will usually be created for the different environments. Platform-specific methods for creating a

wxIcon structure are catered for, and this is an occasion where conditional compilation will probably be required.

Note that a new icon must be created for every time the icon is to be used for a new window. In Windows, the icon will not be reloaded if it has already been used. An icon allocated to a frame will be deleted when the frame is deleted.

For more information please see *Bitmap and icon overview* (p. 1645).

See also

Bitmap and icon overview (p. 1645), *supported bitmap file formats* (p. 1646), *wxDC::DrawIcon* (p. 354), *wxCursor* (p. 211)

wxIcon::wxIcon

wxIcon()

Default constructor.

wxIcon(const wxIcon& icon)

Copy constructor.

wxIcon(void* data, int type, int width, int height, int depth = -1)

Creates an icon from the given data, which can be of arbitrary type.

**wxIcon(const char bits[], int width, int height
int depth = 1)**

Creates an icon from an array of bits.

wxIcon(int width, int height, int depth = -1)

Creates a new icon.

wxIcon(char bits)**

wxIcon(const char bits)**

Creates an icon from XPM data.

wxIcon(const wxString& name, long type, int desiredWidth = -1, int desiredHeight = -1)

Loads an icon from a file or resource.

wxIcon(const wxIconLocation& loc)

Loads an icon from the specified *location* (p. 725).

Parameters

bits

Specifies an array of pixel values.

width

Specifies the width of the icon.

height

Specifies the height of the icon.

desiredWidth

Specifies the desired width of the icon. This parameter only has an effect in Windows (32-bit) where icon resources can contain several icons of different sizes.

desiredHeight

Specifies the desired height of the icon. This parameter only has an effect in Windows (32-bit) where icon resources can contain several icons of different sizes.

depth

Specifies the depth of the icon. If this is omitted, the display depth of the screen is used.

name

This can refer to a resource name under MS Windows, or a filename under MS Windows and X. Its meaning is determined by the *flags* parameter.

loc

The object describing the location of the native icon, see *wxIconLocation* (p. 725).

type

May be one of the following:

`wxBITMAP_TYPE_ICO` Load a Windows icon file.

`wxBITMAP_TYPE_ICO_RESOURCE` Load a Windows icon from the resource database.

`wxBITMAP_TYPE_GIF` Load a GIF bitmap file.

`wxBITMAP_TYPE_XBM` Load an X bitmap file.

`wxBITMAP_TYPE_XPM` Load an XPM bitmap file.

The validity of these flags depends on the platform and wxWidgets configuration. If all possible wxWidgets settings are used, the Windows platform supports ICO file, ICO resource, XPM data, and XPM file. Under wxGTK, the available formats are

BMP file, XPM data, XPM file, and PNG file. Under wxMotif, the available formats are XBM data, XBM file, XPM data, XPM file.

Remarks

The first form constructs an icon object with no data; an assignment or another member function such as `Create` or `LoadFile` must be called subsequently.

The second and third forms provide copy constructors. Note that these do not copy the icon data, but instead a pointer to the data, keeping a reference count. They are therefore very efficient operations.

The fourth form constructs an icon from data whose type and value depends on the value of the *type* argument.

The fifth form constructs a (usually monochrome) icon from an array of pixel values, under both X and Windows.

The sixth form constructs a new icon.

The seventh form constructs an icon from pixmap (XPM) data, if wxWidgets has been configured to incorporate this feature.

To use this constructor, you must first include an XPM file. For example, assuming that the file `mybitmap.xpm` contains an XPM array of character pointers called `mybitmap`:

```
#include "mybitmap.xpm"

...

wxIcon *icon = new wxIcon(mybitmap);
```

A macro, `wxICON`, is available which creates an icon using an XPM on the appropriate platform, or an icon resource on Windows.

```
wxIcon icon(wxICON(mondrian));

// Equivalent to:

#ifdef __WXGTK__ || defined(__WXMOTIF__)
wxIcon icon(mondrian_xpm);
#endif

#ifdef __WXMSW__
wxIcon icon("mondrian");
#endif
```

The eighth form constructs an icon from a file or resource. *name* can refer to a resource name under MS Windows, or a filename under MS Windows and X.

Under Windows, *type* defaults to `wxBITMAP_TYPE_ICO_RESOURCE`. Under X, *type* defaults to `wxBITMAP_TYPE_XPM`.

See also

wxIcon::CopyFromBitmap

void CopyFromBitmap(const wxBitmap& bmp)

Copies *bmp* bitmap to this icon. Under MS Windows the bitmap must have mask colour set.

wxIcon::LoadFile (p. 721)

wxPerl note: Constructors supported by wxPerl are:

- `::Icon->new(width, height, depth = -1)`
- `::Icon->new(name, type, desiredWidth = -1, desiredHeight = -1)`
- `::Icon->newFromBits(bits, width, height, depth = 1)`
- `::Icon->newFromXPM(data)`

wxIcon::~wxIcon

~wxIcon()

Destroys the *wxIcon* object and possibly the underlying icon data. Because reference counting is used, the icon may not actually be destroyed at this point - only when the reference count is zero will the data be deleted.

If the application omits to delete the icon explicitly, the icon will be destroyed automatically by *wxWidgets* when the application exits.

Do not delete an icon that is selected into a memory device context.

wxIcon::GetDepth

int GetDepth() const

Gets the colour depth of the icon. A value of 1 indicates a monochrome icon.

wxIcon::GetHeight

int GetHeight() const

Gets the height of the icon in pixels.

wxIcon::GetWidth

int GetWidth() const

Gets the width of the icon in pixels.

See also

wxIcon::GetHeight (p. 720)

wxIcon::LoadFile

bool LoadFile(const wxString& *name*, long *type*)

Loads an icon from a file or resource.

Parameters

name

Either a filename or a Windows resource name. The meaning of *name* is determined by the *type* parameter.

type

One of the following values:

wxBITMAP_TYPE_ICO Load a Windows icon file.

wxBITMAP_TYPE_ICO_RESOURCE Load a Windows icon from the resource database.

wxBITMAP_TYPE_GIF Load a GIF bitmap file.

wxBITMAP_TYPE_XBM Load an X bitmap file.

wxBITMAP_TYPE_XPM Load an XPM bitmap file.

The validity of these flags depends on the platform and wxWidgets configuration.

Return value

true if the operation succeeded, false otherwise.

See also

wxIcon::wxIcon (p. 717)

wxIcon::Ok

bool Ok() const

Returns true if icon data is present.

wxIcon::SetDepth

void SetDepth(int *depth*)

Sets the depth member (does not affect the icon data).

Parameters*depth*

Icon depth.

wxIcon::SetHeight

void SetHeight(int *height*)

Sets the height member (does not affect the icon data).

Parameters*height*

Icon height in pixels.

wxIcon::SetOk

void SetOk(int *isOk*)

Sets the validity member (does not affect the icon data).

Parameters*isOk*

Validity flag.

wxIcon::SetWidth

void SetWidth(int *width*)

Sets the width member (does not affect the icon data).

Parameters*width*

Icon width in pixels.

wxIcon::operator =

wxIcon& operator =(const wxIcon& *icon*)Assignment operator. This operator does not copy any data, but instead passes a pointer to the data in *icon* and increments a reference counter. It is a fast operation.**Parameters**

icon

Icon to assign.

Return value

Returns 'this' object.

wxIcon::operator ==

bool operator ==(const wxIcon& *icon*)

Equality operator. This operator tests whether the internal data pointers are equal (a fast test).

Parameters

icon

Icon to compare with 'this'

Return value

Returns true if the icons were effectively equal, false otherwise.

wxIcon::operator !=

bool operator !=(const wxIcon& *icon*)

Inequality operator. This operator tests whether the internal data pointers are unequal (a fast test).

Parameters

icon

Icon to compare with 'this'

Return value

Returns true if the icons were unequal, false otherwise.

wxIconBundle

This class contains multiple copies of an icon in different sizes, see also *wxDialog::SetIcons* (p. 376) and *wxFrame::SetIcons* (p. 542).

Derived from

No base class

wxIconBundle::wxIconBundle

wxIconBundle()

Default constructor.

wxIconBundle(const wxString& file, long type)

Initializes the bundle with the icon(s) found in the file.

wxIconBundle(const wxIcon& icon)

Initializes the bundle with a single icon.

wxIconBundle(const wxIconBundle& ic)

Copy constructor.

wxIconBundle::~~wxIconBundle

~wxIconBundle()

Destructor.

wxIconBundle::AddIcon

void AddIcon(const wxString& file, long type)

Adds all the icons contained in the file to the bundle; if the collection already contains icons with the same width and height, they are replaced by the new ones.

void AddIcon(const wxIcon& icon)

Adds the icon to the collection; if the collection already contains an icon with the same width and height, it is replaced by the new one.

wxIconBundle::GetIcon

const wxIcon& GetIcon(const wxSize& size) constReturns the icon with the given size; if no such icon exists, returns the icon with size `wxSYS_ICON_X/wxSYS_ICON_Y`; if no such icon exists, returns the first icon in the bundle. If `size = wxSize(-1, -1)`, returns the icon with size `wxSYS_ICON_X/wxSYS_ICON_Y`.**const wxIcon& GetIcon(wxCoord size = -1) const**

Same as `GetIcon(wxSize(size, size))`.

wxIconBundle::operator=

const wxIconBundle& operator=(const wxIconBundle& ic)

Assignment operator.

wxIconLocation

`wxIconLocation` is a tiny class describing the location of an (external, i.e. not embedded into the application resources) icon. For most platforms it simply contains the file name but under some others (notably Windows) the same file may contain multiple icons and so this class also stores the index of the icon inside the file.

In any case, its details should be of no interest to the application code and most of them are not even documented here (on purpose) as it is only meant to be used as an opaque class: the application may get the object of this class from somewhere and the only reasonable thing to do with it later is to create a *wxIcon* (p. 716) from it.

Derived from

None.

Include files

`<wx/iconloc.h>`

See also

wxIcon (p. 716), *wxFileType::GetIcon* (p. 502)

wxIconLocation::IsOk

bool IsOk() const

Returns `true` if the object is valid, i.e. was properly initialized, and `false` otherwise.

wxIconizeEvent

An event being sent when the frame is iconized (minimized) or restored.

Currently only `wxMSW` and `wxGTK` generate such events.

Derived from

wxEvt (p. 441)
wxObject (p. 954)

Include files

<wx/event.h>

Event table macros

To process an iconize event, use this event handler macro to direct input to a member function that takes a *wxIconizeEvent* argument.

EVT_ICONIZE(func) Process a *wxEVT_ICONIZE* event.

See also

Event handling overview (p. 1610), *wxFrame::Iconize* (p. 539), *wxFrame::IsIconized* (p. 539)

wxIconizeEvent::wxIconizeEvent

wxIconizeEvent(int id = 0, bool iconized = true)

Constructor.

wxIconizeEvent::Iconized

bool Iconized() const

Returns *true* if the frame has been iconized, *false* if it has been restored.

wxIdleEvent

This class is used for idle events, which are generated when the system is idle.

By default, idle events are sent to all windows. If this is causing a significant overhead in your application, you can call *wxIdleEvent::SetMode* (p. 728) with the value *wxIDLE_PROCESS_SPECIFIED*, and set the *wxWS_EX_PROCESS_IDLE* extra window style for every window which should receive idle events.

The function *wxWindow::OnInternalIdle* (p. 1416) is also provided for internal purposes, and cannot be disabled. *wxUpdateUIEvents* are sent from *OnInternalIdle*.

Derived from

wxEvt (p. 441)
wxObject (p. 954)

Include files

```
<wx/event.h>
```

Event table macros

To process an idle event, use this event handler macro to direct input to a member function that takes a `wxIdleEvent` argument.

EVT_IDLE(func)	Process a wxEVT_IDLE event.
-----------------------	-----------------------------

Remarks

Idle events can be caught by the `wxApp` class, or by top-level window classes.

See also

Event handling overview (p. 1610), *wxUpdateUIEvent* (p. 1352), *wxWindow::OnInternalIdle* (p. 1416)

wxIdleEvent::wxIdleEvent

wxIdleEvent()

Constructor.

wxIdleEvent::CanSend

static bool CanSend(wxWindow* window)

Returns `true` if it is appropriate to send idle events to this window.

This function looks at the mode used (see `wxIdleEvent::SetMode` (p. 728)), and the `wxWS_EX_PROCESS_IDLE` style in `window` to determine whether idle events should be sent to this window now. By default this will always return `true` because the update mode is initially `wxIDLE_PROCESS_ALL`. You can change the mode to only send idle events to windows with the `wxWS_EX_PROCESS_IDLE` extra window style set.

See also

wxIdleEvent::SetMode (p. 728)

wxIdleEvent::GetMode

static wxIdleMode GetMode()

Static function returning a value specifying how wxWidgets will send idle events: to all windows, or only to those which specify that they will process the events.

See *wxIdleEvent::SetMode* (p. 728).

wxIdleEvent::RequestMore

void RequestMore(bool *needMore* = true)

Tells wxWidgets that more processing is required. This function can be called by an OnIdle handler for a window or window event handler to indicate that wxApp::OnIdle should forward the OnIdle event once more to the application windows. If no window calls this function during OnIdle, then the application will remain in a passive event loop (not calling OnIdle) until a new event is posted to the application by the windowing system.

See also

wxIdleEvent::MoreRequested (p. 728)

wxIdleEvent::MoreRequested

bool MoreRequested() const

Returns true if the OnIdle function processing this event requested more processing time.

See also

wxIdleEvent::RequestMore (p. 728)

wxIdleEvent::SetMode

static void SetMode(wxIdleMode *mode*)

Static function for specifying how wxWidgets will send idle events: to all windows, or only to those which specify that they will process the events.

mode can be one of the following values. The default is wxIDLE_PROCESS_ALL.

```
enum wxIdleMode
{
    // Send idle events to all windows
    wxIDLE_PROCESS_ALL,

    // Send idle events to windows that have
    // the wxWS_EX_PROCESS_IDLE flag specified
    wxIDLE_PROCESS_SPECIFIED
};
```

wxImage

This class encapsulates a platform-independent image. An image can be created from data, or using *wxBitmap::ConvertToImage* (p. 72). An image can be loaded from a file in a variety of formats, and is extensible to new formats via image format handlers. Functions are available to set and get image bits, so it can be used for basic image

manipulation.

A `wxImage` cannot (currently) be drawn directly to a `wxDC` (p. 349). Instead, a platform-specific `wxBitmap` (p. 67) object must be created from it using the `wxBitmap::wxBitmap(wxImage, int depth)` (p. 68) constructor. This bitmap can then be drawn in a device context, using `wxDC::DrawBitmap` (p. 353).

One colour value of the image may be used as a mask colour which will lead to the automatic creation of a `wxMask` (p. 860) object associated to the bitmap object.

Alpha channel support

Starting from `wxWidgets` 2.5.0 `wxImage` supports alpha channel data, that is in addition to a byte for the red, green and blue colour components for each pixel it also stores a byte representing the pixel opacity. The alpha value of 0 corresponds to a transparent pixel (null opacity) while the value of 255 means that the pixel is 100% opaque.

Unlike the RGB data, not all images have the alpha channel and before using `GetAlpha` (p. 736) you should check if this image contains alpha value with `HasAlpha` (p. 740). In fact, currently only images loaded from PNG files with transparency information will have alpha channel but support for it will be added to the other formats as well (as well as support for saving images with alpha channel which is not still implemented either).

Available image handlers

The following image handlers are available. **wxBMPHandler** is always installed by default. To use other image formats, install the appropriate handler with `wxImage::AddHandler` (p. 733) or `wxInitAllImageHandlers` (p. 1473).

<code>wxBMPHandler</code>	For loading and saving, always installed.
<code>wxPNGHandler</code>	For loading (including alpha support) and saving.
<code>wxJPEGHandler</code>	For loading and saving.
<code>wxGIFHandler</code>	Only for loading, due to legal issues.
<code>wxPCXHandler</code>	For loading and saving (see below).
<code>wxPNMHandler</code>	For loading and saving (see below).
<code>wxTIFFHandler</code>	For loading and saving.
<code>wxIFFHandler</code>	For loading only.
<code>wxXPMHandler</code>	For loading and saving.
<code>wxICOHandler</code>	For loading and saving.
<code>wxCURHandler</code>	For loading and saving.
<code>wxANIHandler</code>	For loading only.

When saving in PCX format, **wxPCXHandler** will count the number of different colours in the image; if there are 256 or less colours, it will save as 8 bit, else it will save as 24 bit.

Loading PNM images only works for ASCII or raw RGB images. When saving in PNM format, **wxPNMHandler** will always save as raw RGB.

Derived from

wxObject (p. 954)

Include files

<wx/image.h>

See also

wxBitmap (p. 67), *wxInitAllImageHandlers* (p. 1473)

wxImage::wxImage

wxImage()

Default constructor.

wxImage(const wxImage& image)

Copy constructor.

wxImage(const wxBitmap& bitmap)

(Deprecated form, use *wxBitmap::ConvertToImage* (p. 72) instead.) Constructs an image from a platform-dependent bitmap. This preserves mask information so that bitmaps and images can be converted back and forth without loss in that respect.

wxImage(int width, int height, bool clear=true)

Creates an image with the given width and height. If *clear* is true, the new image will be initialized to black. Otherwise, the image data will be uninitialized.

wxImage(int width, int height, unsigned char* data, bool static_data=false)

Creates an image from given data with the given width and height. If *static_data* is true, then *wxImage* will not delete the actual image data in its destructor, otherwise it will free it by calling *free()*.

wxImage(const wxString& name, long type = wxBITMAP_TYPE_ANY, int index = -1)

wxImage(const wxString& name, const wxString& mimetype, int index = -1)

Loads an image from a file.

wxImage(wxInputStream& stream, long type = wxBITMAP_TYPE_ANY, int index = -1)

wxImage(wxInputStream& stream, const wxString& mimetype, int index = -1)

Loads an image from an input stream.

Parameters

width

Specifies the width of the image.

height

Specifies the height of the image.

name

Name of the file from which to load the image.

stream

Opened input stream from which to load the image. Currently, the stream must support seeking.

type

May be one of the following:

<code>wxBITMAP_TYPE_BMP</code>	Load a Windows bitmap file.
<code>wxBITMAP_TYPE_GIF</code>	Load a GIF bitmap file.
<code>wxBITMAP_TYPE_JPEG</code>	Load a JPEG bitmap file.
<code>wxBITMAP_TYPE_PNG</code>	Load a PNG bitmap file.
<code>wxBITMAP_TYPE_PCX</code>	Load a PCX bitmap file.
<code>wxBITMAP_TYPE_PNM</code>	Load a PNM bitmap file.
<code>wxBITMAP_TYPE_TIF</code>	Load a TIFF bitmap file.
<code>wxBITMAP_TYPE_XPM</code>	Load a XPM bitmap file.
<code>wxBITMAP_TYPE_ICO</code>	Load a Windows icon file (ICO).
<code>wxBITMAP_TYPE_CUR</code>	Load a Windows cursor file (CUR).
<code>wxBITMAP_TYPE_ANI</code>	Load a Windows animated cursor file (ANI).
<code>wxBITMAP_TYPE_ANY</code>	Will try to autodetect the format.

mimetype

MIME type string (for example 'image/jpeg')

index

Index of the image to load in the case that the image file contains multiple images. This is only used by GIF, ICO and TIFF handlers. The default value (-1) means "choose the default image" and is interpreted as the first image (index=0) by the GIF and TIFF handler and as the largest and most colourful one by the ICO handler.

Remarks

Depending on how wxWidgets has been configured, not all formats may be available.

Note: any handler other than BMP must be previously initialized with *wxImage::AddHandler* (p. 733) or *wxInitAllImageHandlers* (p. 1473).

```
Note: you can use GetOptionInt (p. 740) to get the hotspot for loaded
cursor file:      int hotspot_x =
image.GetOptionInt(wxIMAGE_OPTION_CUR_HOTSPOT_X);
int hotspot_y = image.GetOptionInt(wxIMAGE_OPTION_CUR_HOTSPOT_Y);
```

See also

wxImage::LoadFile (p. 741)

wxPython note: Constructors supported by wxPython are:

wxImage(name, flag)	Loads an image from a file
wxNullImage()	Create a null image (has no size or image data)
wxEmptyImage(width, height)	Creates an empty image of the given size
wxImageFromMime(name, mimetype)	Creates an image from the given file of the given mimetype
wxImageFromBitmap(bitmap)	Creates an image from a platform-dependent bitmap

wxPerl note: Constructors supported by wxPerl are:

- `Image->new(bitmap)`
- `Image->new(icon)`
- `Image->new(width, height)`
- `Image->new(width, height, data)`
- `Image->new(file, type, index)`
- `Image->new(file, mimetype, index)`
- `Image->new(stream, type, index)`
- `Image->new(stream, mimetype, index)`

wxImage::~wxImage

~wxImage()

Destructor.

wxImage::AddHandler

static void AddHandler(wxImageHandler* handler)

Adds a handler to the end of the static list of format handlers.

handler

A new image format handler object. There is usually only one instance of a given handler class in an application session.

See also

wxImageHandler (p. 750)

bool CanRead(const wxString& filename)

returns true if the current image handlers can read this file

wxPython note: In wxPython this static method is named **wxImage_AddHandler.wxImage::CleanUpHandlers**

static void CleanUpHandlers()

Deletes all image handlers.

This function is called by wxWidgets on exit.

wxImage::ComputeHistogram

unsigned long ComputeHistogram(wxImageHistogram& histogram) const

Computes the histogram of the image. *histogram* is a reference to *wxImageHistogram* object. *wxImageHistogram* is a specialization of *wxHashMap* (p. 638) "template" and is defined as follows:

```
class WXDLLEXPORT wxImageHistogramEntry
{
public:
    wxImageHistogramEntry() : index(0), value(0) {}
    unsigned long index;
    unsigned long value;
};

WX_DECLARE_EXPORTED_HASH_MAP(unsigned long, wxImageHistogramEntry,
                             wxIntegerHash, wxIntegerEqual,
                             wxImageHistogram);
```

Return value

Returns number of colours in the histogram.

wxImage::ConvertToBitmap

wxBitmap ConvertToBitmap() const

Deprecated, use equivalent *wxBitmap constructor* (p. 68)(which takes *wxImage* and *depth* as its arguments) instead.

wxImage::ConvertToMono

wxImage ConvertToMono(unsigned char *r*, unsigned char *g*, unsigned char *b*) const

Returns monochromatic version of the image. The returned image has white colour where the original has (*r,g,b*) colour and black colour everywhere else.

wxImage::Copy

wxImage Copy() const

Returns an identical copy of the image.

wxImage::Create

bool Create(int *width*, int *height*, bool *clear=true*)

Creates a fresh image. If *clear* is true, the new image will be initialized to black. Otherwise, the image data will be uninitialized.

Parameters

width

The width of the image in pixels.

height

The height of the image in pixels.

Return value

true if the call succeeded, false otherwise.

wxImage::Destroy

bool Destroy()

Destroys the image data.

wxImage::FindFirstUnusedColour

bool FindFirstUnusedColour(unsigned char * *r*, unsigned char * *g*, unsigned char * *b*, unsigned char *startR* = 1, unsigned char *startG* = 0, unsigned char *startB* = 0)

Parameters

r, g, b

Pointers to variables to save the colour.

startR, startG, startB

Initial values of the colour. Returned colour will have RGB values equal to or greater than these.

Finds the first colour that is never used in the image. The search begins at given initial colour and continues by increasing R, G and B components (in this order) by 1 until an unused colour is found or the colour space exhausted.

Return value

Returns false if there is no unused colour left, true on success.

Notes

Note that this method involves computing the histogram, which is computationally intensive operation.

wxImage::FindHandler

static wxImageHandler* FindHandler(const wxString& *name*)

Finds the handler with the given name.

static wxImageHandler* FindHandler(const wxString& *extension*, long *imageType*)

Finds the handler associated with the given extension and type.

static wxImageHandler* FindHandler(long *imageType*)

Finds the handler associated with the given image type.

static wxImageHandler* FindHandlerMime(const wxString& *mimetype*)

Finds the handler associated with the given MIME type.

name

The handler name.

extension

The file extension, such as "bmp".

imageType

The image type, such as wxBITMAP_TYPE_BMP.

mimetype

MIME type.

Return value

A pointer to the handler if found, NULL otherwise.

See also

wxImageHandler (p. 750)

wxImage::GetImageExtWildcard

static wxString GetImageExtWildcard()

Iterates all registered wxImageHandler objects, and returns a string containing file extension masks suitable for passing to file open/save dialog boxes.

Return value

The format of the returned string is "(*.ext1;*.ext2)|*.ext1;*.ext2".

It is usually a good idea to prepend a description before passing the result to the dialog.

Example:

```
wxFileDialog FileDlg( this, "Choose Image", ::wxGetWorkingDirectory(),  
    "", _("Image Files ") + wxImage::GetImageExtWildcard(), wxOPEN );
```

See also

wxImageHandler (p. 750)

wxImage::GetAlpha

unsigned char GetAlpha(int x, int y) const

Returns the alpha value for the given pixel. This function may only be called for the images with alpha channel, use *HasAlpha* (p. 740) to check for this.

The returned value is the *opacity* of the image, i.e. the value of 0 corresponds to the transparent pixels while the value of 255 -- to the opaque ones.

unsigned char * GetAlpha() const

Returns pointer to the array storing the alpha values for this image. This pointer is `NULL` for the images without the alpha channel. If the image does have it, this pointer may be used to directly manipulate the alpha values which are stored as the *RGB* (p. 737) ones.

wxImage::GetBlue

unsigned char GetBlue(int x, int y) const

Returns the blue intensity at the given coordinate.

wxImage::GetData

unsigned char* GetData() const

Returns the image data as an array. This is most often used when doing direct image manipulation. The return value points to an array of characters in *RGBRGBRGB...* format in the top-to-bottom, left-to-right order, that is the first *RGB* triplet corresponds to the pixel (0, 0), the second one --- to (0, 1) and so on.

You should not delete the returned pointer nor pass it to *wxImage::SetData* (p. 747).

wxImage::GetGreen

unsigned char GetGreen(int x, int y) const

Returns the green intensity at the given coordinate.

wxImage::GetImageCount

static int GetImageCount(const wxString& filename, long type = *wxBITMAP_TYPE_ANY*)

static int GetImageCount(wxInputStream& stream, long type = *wxBITMAP_TYPE_ANY*)

If the image file contains more than one image and the image handler is capable of retrieving these individually, this function will return the number of available images.

name

Name of the file to query.

stream

Opened input stream with image data. Currently, the stream must support seeking.

type

May be one of the following:

<code>wxBITMAP_TYPE_BMP</code>	Load a Windows bitmap file.
<code>wxBITMAP_TYPE_GIF</code>	Load a GIF bitmap file.
<code>wxBITMAP_TYPE_JPEG</code>	Load a JPEG bitmap file.
<code>wxBITMAP_TYPE_PNG</code>	Load a PNG bitmap file.
<code>wxBITMAP_TYPE_PCX</code>	Load a PCX bitmap file.
<code>wxBITMAP_TYPE_PNM</code>	Load a PNM bitmap file.
<code>wxBITMAP_TYPE_TIF</code>	Load a TIFF bitmap file.
<code>wxBITMAP_TYPE_XPM</code>	Load a XPM bitmap file.
<code>wxBITMAP_TYPE_ICO</code>	Load a Windows icon file (ICO).
<code>wxBITMAP_TYPE_CUR</code>	Load a Windows cursor file (CUR).
<code>wxBITMAP_TYPE_ANI</code>	Load a Windows animated cursor file (ANI).
<code>wxBITMAP_TYPE_ANY</code>	Will try to autodetect the format.

Return value

Number of available images. For most image handlers, this is 1 (exceptions are TIFF and ICO formats).

wxImage::GetHandlers

static wxList& GetHandlers()

Returns the static list of image format handlers.

See also

wxImageHandler (p. 750)

wxImage::GetHeight

int GetHeight() const

Gets the height of the image in pixels.

wxImage::GetMaskBlue

unsigned char GetMaskBlue() const

Gets the blue value of the mask colour.

wxImage::GetMaskGreen

unsigned char GetMaskGreen() const

Gets the green value of the mask colour.

wxImage::GetMaskRed

unsigned char GetMaskRed() const

Gets the red value of the mask colour.

wxImage::GetPalette

const wxPalette& GetPalette() const

Returns the palette associated with the image. Currently the palette is only used when converting to wxBitmap under Windows.

Eventually wxImage handlers will set the palette if one exists in the image file.

wxImage::GetRed

unsigned char GetRed(int x, int y) const

Returns the red intensity at the given coordinate.

wxImage::GetSubImage

wxImage GetSubImage(const wxRect& rect) const

Returns a sub image of the current one as long as the rect belongs entirely to the image.

wxImage::GetWidth

int GetWidth() const

Gets the width of the image in pixels.

See also

wxImage::GetHeight (p. 738)

wxImage::HasAlpha

bool HasAlpha() const

Returns true if this image has alpha channel, false otherwise.

[See also](#)

GetAlpha (p. 736), *SetAlpha* (p. 747)

wxImage::HasMask

bool HasMask() const

Returns true if there is a mask active, false otherwise.

wxImage::GetOption

wxString GetOption(const wxString& name) const

Gets a user-defined option. The function is case-insensitive to *name*.

For example, when saving as a JPEG file, the option **quality** is used, which is a number between 0 and 100 (0 is terrible, 100 is very good).

[See also](#)

wxImage::SetOption (p. 748), *wxImage::GetOptionInt* (p. 740), *wxImage::HasOption* (p. 740)

wxImage::GetOptionInt

int GetOptionInt(const wxString& name) const

Gets a user-defined option as an integer. The function is case-insensitive to *name*.

[See also](#)

wxImage::SetOption (p. 748), *wxImage::GetOption* (p. 740), *wxImage::HasOption* (p. 740)

wxImage::HasOption

bool HasOption(const wxString& name) const

Returns true if the given option is present. The function is case-insensitive to *name*.

[See also](#)

wxImage::SetOption (p. 748), *wxImage::GetOption* (p. 740), *wxImage::GetOptionInt* (p. 740)

wxImage::InitStandardHandlers

static void InitStandardHandlers()

Internal use only. Adds standard image format handlers. It only install BMP for the time being, which is used by *wxBitmap*.

This function is called by *wxWidgets* on startup, and shouldn't be called by the user.

See also

wxImageHandler (p. 750), *wxInitAllImageHandlers* (p. 1473)

wxImage::InsertHandler

static void InsertHandler(*wxImageHandler handler)**

Adds a handler at the start of the static list of format handlers.

handler

A new image format handler object. There is usually only one instance of a given handler class in an application session.

See also

wxImageHandler (p. 750)

wxImage::LoadFile

bool LoadFile(const *wxString&* name, long type = *wxBITMAP_TYPE_ANY*, int index = -1)

bool LoadFile(const *wxString&* name, const *wxString&* mimetype, int index = -1)

Loads an image from a file. If no handler type is provided, the library will try to autodetect the format.

bool LoadFile(*wxInputStream&* stream, long type, int index = -1)

bool LoadFile(*wxInputStream&* stream, const *wxString&* mimetype, int index = -1)

Loads an image from an input stream.

Parameters

name

Name of the file from which to load the image.

stream

Opened input stream from which to load the image. Currently, the stream must support seeking.

type

One of the following values:

wxBITMAP_TYPE_BMP	Load a Windows image file.
wxBITMAP_TYPE_GIF	Load a GIF image file.
wxBITMAP_TYPE_JPEG	Load a JPEG image file.
wxBITMAP_TYPE_PCX	Load a PCX image file.
wxBITMAP_TYPE_PNG	Load a PNG image file.
wxBITMAP_TYPE_PNM	Load a PNM image file.
wxBITMAP_TYPE_TIF	Load a TIFF image file.
wxBITMAP_TYPE_XPM	Load a XPM image file.
wxBITMAP_TYPE_ICO	Load a Windows icon file (ICO).
wxBITMAP_TYPE_CUR	Load a Windows cursor file (CUR).
wxBITMAP_TYPE_ANI	Load a Windows animated cursor file (ANI).
wxBITMAP_TYPE_ANY	Will try to autodetect the format.

mimetype

MIME type string (for example 'image/jpeg')

index

Index of the image to load in the case that the image file contains multiple images. This is only used by GIF, ICO and TIFF handlers. The default value (-1) means "choose the default image" and is interpreted as the first image (index=0) by the GIF and TIFF handler and as the largest and most colourful one by the ICO handler.

Remarks

Depending on how wxWidgets has been configured, not all formats may be available.

```
Note: you can use GetOptionInt (p. 740) to get the hotspot for loaded
cursor file:      int hotspot_x =
image.GetOptionInt(wxIMAGE_OPTION_CUR_HOTSPOT_X);
      int hotspot_y = image.GetOptionInt(wxIMAGE_OPTION_CUR_HOTSPOT_Y);
```

Return value

true if the operation succeeded, false otherwise. If the optional index parameter is out of range, false is returned and a call to `wxLogError()` takes place.

See also

wxImage::SaveFile (p. 744)

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

LoadFile(filename, type) Loads an image of the given type from a file

LoadMimeFile(filename, mimetype) Loads an image of the given mimetype from a file

wxPerl note: Methods supported by wxPerl are:

- >LoadFile(name, type)
- >LoadFile(name, mimetype)

wxImage::Ok

bool Ok() const

Returns true if image data is present.

wxImage::RemoveHandler

static bool RemoveHandler(const wxString& name)

Finds the handler with the given name, and removes it. The handler is not deleted.

name

The handler name.

Return value

true if the handler was found and removed, false otherwise.

See also

wxImageHandler (p. 750)

wxImage::Mirror

wxImage Mirror(*bool horizontally = true*) **const**

Returns a mirrored copy of the image. The parameter *horizontally* indicates the orientation.

wxImage::Replace

void Replace(*unsigned char r1, unsigned char g1, unsigned char b1, unsigned char r2, unsigned char g2, unsigned char b2*)

Replaces the colour specified by *r1,g1,b1* by the colour *r2,g2,b2*.

wxImage::Rescale

wxImage & Rescale(*int width, int height*)

Changes the size of the image in-place: after a call to this function, the image will have the given width and height.

Returns the (modified) image itself.

[See also](#)

Scale (p. 746)

wxImage::Rotate

wxImage Rotate(*double angle, const wxPoint& rotationCentre, bool interpolating = true, wxPoint* offsetAfterRotation = NULL*)

Rotates the image about the given point, by *angle* radians. Passing true to *interpolating* results in better image quality, but is slower. If the image has a mask, then the mask colour is used for the uncovered pixels in the rotated image background. Else, black (rgb 0, 0, 0) will be used.

Returns the rotated image, leaving this image intact.

wxImage::Rotate90

wxImage Rotate90(*bool clockwise = true*) **const**

Returns a copy of the image rotated 90 degrees in the direction indicated by *clockwise*.

wxImage::SaveFile

bool SaveFile(*const wxString& name, int type*) **const**

bool SaveFile(*const wxString& name, const wxString& mimetype*) **const**

Saves an image in the named file.

bool SaveFile(const wxString& *name*) const

Saves an image in the named file. File type is determined from the extension of the file name. Note that this function may fail if the extension is not recognized! You can use one of the forms above to save images to files with non-standard extensions.

bool SaveFile(wxOutputStream& *stream*, int *type*) const

bool SaveFile(wxOutputStream& *stream*, const wxString& *mimetype*) const

Saves an image in the given stream.

Parameters

name

Name of the file to save the image to.

stream

Opened output stream to save the image to.

type

Currently these types can be used:

wxBITMAP_TYPE_BMP	Save a BMP image file.
wxBITMAP_TYPE_JPEG	Save a JPEG image file.
wxBITMAP_TYPE_PNG	Save a PNG image file.
wxBITMAP_TYPE_PCX	Save a PCX image file (tries to save as 8-bit if possible, falls back to 24-bit otherwise).
wxBITMAP_TYPE_PNM	Save a PNM image file (as raw RGB always).
wxBITMAP_TYPE_TIFF	Save a TIFF image file.
wxBITMAP_TYPE_XPM	Save a XPM image file.
wxBITMAP_TYPE_ICO	Save a Windows icon file (ICO) (the size may be up to 255 wide by 127 high. A single image is saved in 8 colors at the size supplied).
wxBITMAP_TYPE_CUR	Save a Windows cursor file (CUR).

mimetype

MIME type.

Return value

true if the operation succeeded, false otherwise.

Remarks

Depending on how wxWidgets has been configured, not all formats may be available.

Note: you can use *GetOptionInt* (p. 740) to set the hotspot before saving an image into a cursor file (default hotspot is in the centre of the image):

```
image:    image.SetOption(wxIMAGE_OPTION_CUR_HOTSPOT_X, hotspotX);
          image.SetOption(wxIMAGE_OPTION_CUR_HOTSPOT_Y, hotspotY);
```

See also

wxImage::LoadFile (p. 741)

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

SaveFile(filename, type) Saves the image using the given type to the named file

SaveMimeFile(filename, mimetype) Saves the image using the given mimetype to the named file

wxPerl note: Methods supported by wxPerl are:

- >SaveFile(name, type)
- >SaveFile(name, mimetype)

wxImage::Scale

wxImage Scale(int width, int height) const

Returns a scaled version of the image. This is also useful for scaling bitmaps in general as the only other way to scale bitmaps is to blit a wxMemoryDC into another wxMemoryDC.

It may be mentioned that the GTK port uses this function internally to scale bitmaps when using mapping modes in wxDC.

Example:

```
// get the bitmap from somewhere
wxBitmap bmp = ...;

// rescale it to have size of 32*32
if ( bmp.GetWidth() != 32 || bmp.GetHeight() != 32 )
{
    wxImage image = bmp.ConvertToImage();
    bmp = wxBitmap(image.Scale(32, 32));

    // another possibility:
    image.Rescale(32, 32);
    bmp = image;
```

```
}
```

See also

Rescale (p. 744)

wxImage::SetAlpha

void SetAlpha(unsigned char *alpha = NULL)

This function is similar to *SetData* (p. 747) and has similar restrictions. The pointer passed to it may however be `NULL` in which case the function will allocate the alpha array internally -- this is useful to add alpha channel data to an image which doesn't have any. If the pointer is not `NULL`, it must have one byte for each image pixel and be allocated with `malloc()`. `wxImage` takes ownership of the pointer and will free it.

void SetAlpha(int x, int y, unsigned char alpha)

Sets the alpha value for the given pixel. This function should only be called if the image has alpha channel data, use *HasAlpha* (p. 740) to check for this.

wxImage::SetData

void SetData(unsigned char*data)

Sets the image data without performing checks. The data given must have the size (width*height*3) or results will be unexpected. Don't use this method if you aren't sure you know what you are doing.

The data must have been allocated with `malloc()`, **NOT** with `operator new`.

After this call the pointer to the data is owned by the `wxImage` object, that will be responsible for deleting it. Do not pass to this function a pointer obtained through *wxImage::GetData* (p. 737).

wxImage::SetMask

void SetMask(bool hasMask = true)

Specifies whether there is a mask or not. The area of the mask is determined by the current mask colour.

wxImage::SetMaskColour

void SetMaskColour(unsigned char red, unsigned char green, unsigned char blue)

Sets the mask colour for this image (and tells the image to use the mask).

wxImage::SetMaskFromImage

bool SetMaskFromImage(const wxImage& *mask*, unsigned char *mr*, unsigned char *mg*, unsigned char *mb*)

Parameters

mask

The mask image to extract mask shape from. Must have same dimensions as the image.

mr,mg,mb

RGB value of pixels in *mask* that will be used to create the mask.

Sets image's mask so that the pixels that have RGB value of *mr,mg,mb* in *mask* will be masked in the image. This is done by first finding an unused colour in the image, setting this colour as the mask colour and then using this colour to draw all pixels in the image who corresponding pixel in *mask* has given RGB value.

Return value

Returns false if *mask* does not have same dimensions as the image or if there is no unused colour left. Returns true if the mask was successfully applied.

Notes

Note that this method involves computing the histogram, which is computationally intensive operation.

wxImage::SetOption

void SetOption(const wxString& *name*, const wxString& *value*)

void SetOption(const wxString& *name*, int *value*)

Sets a user-defined option. The function is case-insensitive to *name*.

For example, when saving as a JPEG file, the option **quality** is used, which is a number between 0 and 100 (0 is terrible, 100 is very good).

See also

wxImage::GetOption (p. 740), *wxImage::GetOptionInt* (p. 740), *wxImage::HasOption* (p. 740)

wxImage::SetPalette

void SetPalette(const wxPalette& *palette*)

Associates a palette with the image. The palette may be used when converting wxImage

to wxBitmap (MSW only at present) or in file save operations (none as yet).

wxImage::SetRGB

void SetRGB(int x, int y, unsigned char *red*, unsigned char *green*, unsigned char *blue*)

Sets the pixel at the given coordinate. This routine performs bounds-checks for the coordinate so it can be considered a safe way to manipulate the data, but in some cases this might be too slow so that the data will have to be set directly. In that case you will have to get access to the image data using the *GetData* (p. 737) method.

wxImage::operator =

wxImage& operator =(const wxImage& *image*)

Assignment operator. This operator does not copy any data, but instead passes a pointer to the data in *image* and increments a reference counter. It is a fast operation.

Parameters

image

Image to assign.

Return value

Returns 'this' object.

wxImage::operator ==

bool operator ==(const wxImage& *image*) const

Equality operator. This operator tests whether the internal data pointers are equal (a fast test).

Parameters

image

Image to compare with 'this'

Return value

Returns true if the images were effectively equal, false otherwise.

wxImage::operator !=

bool operator !=(const wxImage& *image*) const

Inequality operator. This operator tests whether the internal data pointers are unequal (a fast test).

Parameters

image

Image to compare with 'this'

Return value

Returns true if the images were unequal, false otherwise.

wxImageHandler

This is the base class for implementing image file loading/saving, and image creation from data. It is used within wxImage and is not normally seen by the application.

If you wish to extend the capabilities of wxImage, derive a class from wxImageHandler and add the handler using *wxImage::AddHandler* (p. 733) in your application initialisation.

Note (Legal Issue)

This software is based in part on the work of the Independent JPEG Group.

(Applies when wxWidgets is linked with JPEG support. wxJPEGHandler uses libjpeg created by IJG.)

Derived from

wxObject (p. 954)

Include files

<wx/image.h>

See also

wxImage (p. 728), *wxInitAllImageHandlers* (p. 1473)

wxImageHandler::wxImageHandler

wxImageHandler()

Default constructor. In your own default constructor, initialise the members *m_name*, *m_extension* and *m_type*.

wxImageHandler::~~wxImageHandler

~wxImageHandler()

Destroys the wxImageHandler object.

wxImageHandler::GetName

wxString GetName() const

Gets the name of this handler.

wxImageHandler::GetExtension

wxString GetExtension() const

Gets the file extension associated with this handler.

wxImageHandler::GetImageCount

int GetImageCount(wxInputStream& stream)

If the image file contains more than one image and the image handler is capable of retrieving these individually, this function will return the number of available images.

stream

Opened input stream for reading image data. Currently, the stream must support seeking.

Return value

Number of available images. For most image handlers, this is 1 (exceptions are TIFF and ICO formats).

wxImageHandler::GetType

long GetType() const

Gets the image type associated with this handler.

wxImageHandler::GetMimeType

wxString GetMimeType() const

Gets the MIME type associated with this handler.

wxImageHandler::LoadFile

bool LoadFile(wxImage* image, wxInputStream& stream, bool verbose=true, int index=0)

Loads a image from a stream, putting the resulting data into *image*. If the image file contains more than one image and the image handler is capable of retrieving these individually, *index* indicates which image to read from the stream.

Parameters

image

The image object which is to be affected by this operation.

stream

Opened input stream for reading image data.

verbose

If set to true, errors reported by the image handler will produce wxLogMessages.

index

The index of the image in the file (starting from zero).

Return value

true if the operation succeeded, false otherwise.

See also

wxImage::LoadFile (p. 741), *wxImage::SaveFile* (p. 744), *wxImageHandler::SaveFile* (p. 752)

wxImageHandler::SaveFile

bool SaveFile(wxImage* image, wxOutputStream& stream)

Saves a image in the output stream.

Parameters

image

The image object which is to be affected by this operation.

stream

Opened output stream for writing the data.

Return value

true if the operation succeeded, false otherwise.

See also

wxImage::LoadFile (p. 741), *wxImage::SaveFile* (p. 744), *wxImageHandler::LoadFile* (p. 751)

wxImageHandler::SetName

void SetName(const wxString& *name*)

Sets the handler name.

Parameters

name

Handler name.

wxImageHandler::SetExtension

void SetExtension(const wxString& *extension*)

Sets the handler extension.

Parameters

extension

Handler extension.

wxImageHandler::SetMimeType

void SetMimeType(const wxString& *mimetype*)

Sets the handler MIME type.

Parameters

mimename

Handler MIME type.

wxImageHandler::SetType

void SetType(long *type*)

Sets the handler type.

Parameters

name

Handler type.

wxImageList

A `wxImageList` contains a list of images, which are stored in an unspecified form. Images can have masks for transparent drawing, and can be made from a variety of sources including bitmaps and icons.

`wxImageList` is used principally in conjunction with `wxTreeCtrl` (p. 1329) and `wxListCtrl` (p. 799) classes.

Derived from

`wxObject` (p. 954)

Include files

<wx/imaglist.h>

See also

`wxTreeCtrl` (p. 1329), `wxListCtrl` (p. 799)

wxImageList::wxImageList

`wxImageList()`

Default constructor.

`wxImageList(int width, int height, const bool mask = true, int initialCount = 1)`

Constructor specifying the image size, whether image masks should be created, and the initial size of the list.

Parameters

width

Width of the images in the list.

height

Height of the images in the list.

mask

true if masks should be created for all images.

initialCount

The initial size of the list.

See also

wxImageList::Create (p. 756)

wxImageList::Add

int Add(const wxBitmap& *bitmap*, const wxBitmap& *mask* = wxNullBitmap)

Adds a new image using a bitmap and optional mask bitmap.

int Add(const wxBitmap& *bitmap*, const wxColour& *maskColour*)

Adds a new image using a bitmap and mask colour.

int Add(const wxIcon& *icon*)

Adds a new image using an icon.

Parameters

bitmap

Bitmap representing the opaque areas of the image.

mask

Monochrome mask bitmap, representing the transparent areas of the image.

maskColour

Colour indicating which parts of the image are transparent.

icon

Icon to use as the image.

Return value

The new zero-based image index.

Remarks

The original bitmap or icon is not affected by the **Add** operation, and can be deleted afterwards.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

Add(bitmap, mask=wxNullBitmap)

AddWithColourMask(bitmap, colour)

AddIcon(icon)

wxImageList::Create

bool Create(int *width*, int *height*, const bool *mask* = true, int *initialCount* = 1)

Initializes the list. See *wxImageList::wxImageList* (p. 754) for details.

wxImageList::Draw

bool Draw(int *index*, wxDC& *dc*, int *x*, int *y*, int *flags* = wxIMAGELIST_DRAW_NORMAL, const bool *solidBackground* = false)

Draws a specified image onto a device context.

Parameters

index

Image index, starting from zero.

dc

Device context to draw on.

x

X position on the device context.

y

Y position on the device context.

flags

How to draw the image. A bitlist of a selection of the following:

wxIMAGELIST_DRAW_NORMAL Draw the image normally.

wxIMAGELIST_DRAW_TRANSPARENT Draw the image with transparency.

wxIMAGELIST_DRAW_SELECTED Draw the image in selected state.

wxIMAGELIST_DRAW_FOCUSED Draw the image in a focused state.

solidBackground

For optimisation - drawing can be faster if the function is told that the background is solid.

wxImageList::GetImageCount

int GetImageCount() const

Returns the number of images in the list.

wxImageList::GetSize

bool GetSize(int *index*, int& *width*, int &*height*) const

Retrieves the size of the images in the list. Currently, the *index* parameter is ignored as all images in the list have the same size.

Parameters

index

currently unused, should be 0

width

receives the width of the images in the list

height

receives the height of the images in the list

Return value

true if the function succeeded, false if it failed (for example, if the image list was not yet initialized).

wxImageList::Remove

bool Remove(int *index*)

Removes the image at the given position.

wxImageList::RemoveAll

bool RemoveAll()

Removes all the images in the list.

wxImageList::Replace

bool Replace(int *index*, const wxBitmap& *bitmap*, const wxBitmap& *mask* = wxNullBitmap)

Replaces the existing image with the new image.

bool Replace(int *index*, const wxIcon& *icon*)

Replaces the existing image with the new image.

Parameters

bitmap

Bitmap representing the opaque areas of the image.

mask

Monochrome mask bitmap, representing the transparent areas of the image.

icon

Icon to use as the image.

Return value

true if the replacement was successful, false otherwise.

Remarks

The original bitmap or icon is not affected by the **Replace** operation, and can be deleted afterwards.

wxPython note: The second form is called `ReplaceIcon` in wxPython.

wxIndividualLayoutConstraint

Objects of this class are stored in the `wxLayoutConstraint` class as one of eight possible constraints that a window can be involved in.

Constraints are initially set to have the relationship `wxUnconstrained`, which means that their values should be calculated by looking at known constraints.

Derived from

wxObject (p. 954)

Include files

<wx/layout.h>

See also

Overview and examples (p. 1624), *wxLayoutConstraints* (p. 785), *wxWindow::SetConstraints* (p. 1425).

Edges and relationships

The *wxEdge* enumerated type specifies the type of edge or dimension of a window.

<code>wxLeft</code>	The left edge.
<code>wxTop</code>	The top edge.
<code>wxRight</code>	The right edge.
<code>wxBottom</code>	The bottom edge.
<code>wxCentreX</code>	The x-coordinate of the centre of the window.
<code>wxCentreY</code>	The y-coordinate of the centre of the window.

The *wxRelationship* enumerated type specifies the relationship that this edge or dimension has with another specified edge or dimension. Normally, the user doesn't use these directly because functions such as *Below* and *RightOf* are a convenience for using the more general *Set* function.

<code>wxUnconstrained</code>	The edge or dimension is unconstrained (the default for edges).
<code>wxAsIs</code>	The edge or dimension is to be taken from the current window position or size (the default for dimensions).
<code>wxAbove</code>	The edge should be above another edge.
<code>wxBelow</code>	The edge should be below another edge.
<code>wxLeftOf</code>	The edge should be to the left of another edge.
<code>wxRightOf</code>	The edge should be to the right of another edge.
<code>wxSameAs</code>	The edge or dimension should be the same as another edge or dimension.
<code>wxPercentOf</code>	The edge or dimension should be a percentage of another edge or dimension.
<code>wxAbsolute</code>	The edge or dimension should be a given absolute value.

wxIndividualLayoutConstraint::wxIndividualLayoutConstraint

void wxIndividualLayoutConstraint()

Constructor. Not used by the end-user.

wxIndividualLayoutConstraint::Above

void Above(wxWindow *otherWin, int margin = 0)

Constrains this edge to be above the given window, with an optional margin. Implicitly,

this is relative to the top edge of the other window.

wxIndividualLayoutConstraint::Absolute

void Absolute(int value)

Constrains this edge or dimension to be the given absolute value.

wxIndividualLayoutConstraint::AsIs

void AsIs()

Sets this edge or constraint to be whatever the window's value is at the moment. If either of the width and height constraints are *as is*, the window will not be resized, but moved instead. This is important when considering panel items which are intended to have a default size, such as a button, which may take its size from the size of the button label.

wxIndividualLayoutConstraint::Below

void Below(wxWindow *otherWin, int margin = 0)

Constrains this edge to be below the given window, with an optional margin. Implicitly, this is relative to the bottom edge of the other window.

wxIndividualLayoutConstraint::Unconstrained

void Unconstrained()

Sets this edge or dimension to be unconstrained, that is, dependent on other edges and dimensions from which this value can be deduced.

wxIndividualLayoutConstraint::LeftOf

void LeftOf(wxWindow *otherWin, int margin = 0)

Constrains this edge to be to the left of the given window, with an optional margin. Implicitly, this is relative to the left edge of the other window.

wxIndividualLayoutConstraint::PercentOf

void PercentOf(wxWindow *otherWin, wxEdge edge, int per)

Constrains this edge or dimension to be to a percentage of the given window, with an optional margin.

wxIndividualLayoutConstraint::RightOf

void RightOf(wxWindow *otherWin, int margin = 0)

Constrains this edge to be to the right of the given window, with an optional margin. Implicitly, this is relative to the right edge of the other window.

wxIndividualLayoutConstraint::SameAs

void SameAs(wxWindow *otherWin, wxEdge edge, int margin = 0)

Constrains this edge or dimension to be to the same as the edge of the given window, with an optional margin.

wxIndividualLayoutConstraint::Set

void Set(wxRelationship rel, wxWindow *otherWin, wxEdge otherEdge, int value = 0, int margin = 0)

Sets the properties of the constraint. Normally called by one of the convenience functions such as Above, RightOf, SameAs.

wxInitDialogEvent

A wxInitDialogEvent is sent as a dialog or panel is being initialised. Handlers for this event can transfer data to the window. The default handler calls *wxWindow::TransferDataToWindow* (p. 1439).

Derived from

wxEvent (p. 441)
wxObject (p. 954)

Include files

<wx/event.h>

Event table macros

To process an activate event, use these event handler macros to direct input to a member function that takes a wxInitDialogEvent argument.

EVT_INIT_DIALOG(func) Process a wxEVT_INIT_DIALOG event.

See also

Event handling overview (p. 1610)

wxInitDialogEvent::wxInitDialogEvent

wxInitDialogEvent(int id = 0)

Constructor.

wxInputStream

wxInputStream is an abstract base class which may not be used directly.

Derived from*wxStreamBase* (p. 1192)**Include files**

<wx/stream.h>

wxInputStream::wxInputStream

wxInputStream()

Creates a dummy input stream.

wxInputStream::~~wxInputStream

~wxInputStream()

Destructor.

wxInputStream::GetC

char GetC()

Returns the first character in the input queue and removes it, blocking until it appears if necessary.

Note

If EOF, return value is undefined and LastRead() will return 0 and not 1.

wxInputStream::Eof

wxInputStream Eof() const

Returns true if the end of stream has been reached.

Note

For some streams `Eof()` will not return true until an attempt has been made to read past the end of the stream. `LastRead()` (p. 763) should be called after each read to check that a non-zero number of bytes have been read.

`wxInputStream::LastRead`

`size_t LastRead()` **const**

Returns the last number of bytes read.

`wxInputStream::Peek`

`char Peek()`

Returns the first character in the input queue without removing it.

Note

Blocks until something appears in the stream if necessary, if nothing ever does (i.e. EOF) `LastRead()` will return 0 (and the return value is undefined), otherwise `LastRead()` returns 1.

`wxInputStream::Read`

`wxInputStream& Read(void *buffer, size_t size)`

Reads the specified amount of bytes and stores the data in *buffer*.

Warning

The buffer absolutely needs to have at least the specified size.

Return value

This function returns a reference on the current object, so the user can test any states of the stream right away.

`wxInputStream& Read(wxOutputStream& stream_out)`

Reads data from the input queue and stores it in the specified output stream. The data is read until an error is raised by one of the two streams.

Return value

This function returns a reference on the current object, so the user can test any states of the stream right away.

wxInputStream::Seekl

off_t Seekl(off_t pos, wxSeekMode mode = wxFromStart)

Changes the stream current position.

Parameters

pos

Offset to seek to.

mode

One of **wxFromStart**, **wxFromEnd**, **wxFromCurrent**.

Return value

The new stream position or **wxInvalidOffset** on error.

wxInputStream::Telll

off_t Telll() const

Returns the current stream position.

wxInputStream::Ungetch

size_t Ungetch(const char* buffer, size_t size)

This function is only useful in *read* mode. It is the manager of the "Write-Back" buffer. This buffer acts like a temporary buffer where data which has to be read during the next read IO call are put. This is useful when you get a big block of data which you didn't want to read: you can replace them at the top of the input queue by this way.

Be very careful about this call in connection with calling **Seekl()** on the same stream. Any call to **Seekl()** will invalidate any previous call to this method (otherwise you could **Seekl()** to one position, "unread" a few bytes there, **Seekl()** to another position and data would be either lost or corrupted).

Return value

Returns the amount of bytes saved in the Write-Back buffer.

bool Ungetch(char c)

This function acts like the previous one except that it takes only one character: it is sometimes shorter to use than the generic function.

wxIPAddress

`wxIPAddress` is an abstract base class for all internet protocol address objects. Currently, only `wxIPv4address` (p. 767) is implemented. An experimental implementation for IPV6, `wxIPv6address`, is being developed.

Derived from

`wxSocketAddress` (p. 1131)

Include files

`<wx/socket.h>`

`wxIPAddress::Hostname`

virtual bool `Hostname(const wxString& hostname)`

Set the address to *hostname*, which can be a host name or an IP-style address in a format dependent on implementation.

Return value

Returns true on success, false if something goes wrong (invalid hostname or invalid IP address).

`wxIPAddress::Hostname`

virtual wxString `Hostname()`

Returns the hostname which matches the IP address.

`wxIPAddress::IPAddress`

virtual wxString `IPAddress()`

Returns a `wxString` containing the IP address.

`wxIPAddress::Service`

virtual bool `Service(const wxString& service)`

Set the port to that corresponding to the specified *service*.

Return value

Returns true on success, false if something goes wrong (invalid service).

wxIPAddress::Service

virtual bool Service(unsigned short *service*)

Set the port to that corresponding to the specified *service*.

Return value

Returns true on success, false if something goes wrong (invalid service).

wxIPAddress::Service

virtual unsigned short Service()

Returns the current service.

wxIPAddress::AnyAddress

virtual bool AnyAddress()

Internally, this is the same as setting the IP address to **INADDR_ANY**.

On IPV4 implementations, 0.0.0.0

On IPV6 implementations, ::

Return value

Returns true on success, false if something went wrong.

wxIPAddress::LocalHost

virtual bool LocalHost()

Set address to localhost.

On IPV4 implementations, 127.0.0.1

On IPV6 implementations, ::1

Return value

Returns true on success, false if something went wrong.

wxIPAddress::IsLocalHost

virtual bool IsLocalHost()

Determines if current address is set to localhost.

Return value

Returns true if address is localhost, false if internet address.

wxIPv4address**Derived from**

wxIPAddress (p. 764)

Include files

<wx/socket.h>

wxIPv4address::Hostname

bool *Hostname*(const **wxString&** *hostname*)

Set the address to *hostname*, which can be a host name or an IP-style address in dot notation (a.b.c.d)

Return value

Returns true on success, false if something goes wrong (invalid hostname or invalid IP address).

wxIPv4address::Hostname

wxString *Hostname*()

Returns the hostname which matches the IP address.

wxIPv4address::IPAddress

wxString *IPAddress*()

Returns a **wxString** containing the IP address in dot quad (127.0.0.1) format.

wxIPv4address::Service

bool *Service*(const **wxString&** *service*)

Set the port to that corresponding to the specified *service*.

Return value

Returns true on success, false if something goes wrong (invalid service).

wxIPV4address::Service

bool Service(unsigned short service)

Set the port to that corresponding to the specified *service*.

Return value

Returns true on success, false if something goes wrong (invalid service).

wxIPV4address::Service

unsigned short Service()

Returns the current service.

wxIPV4address::AnyAddress

bool AnyAddress()

Set address to any of the addresses of the current machine. Whenever possible, use this function instead of *wxIPV4address::LocalHost* (p. 768), as this correctly handles multi-homed hosts and avoids other small problems. Internally, this is the same as setting the IP address to **INADDR_ANY**.

Return value

Returns true on success, false if something went wrong.

wxIPV4address::LocalHost

bool LocalHost()

Set address to localhost (127.0.0.1). Whenever possible, use the *wxIPV4address::AnyAddress* (p. 768), function instead of this one, as this will correctly handle multi-homed hosts and avoid other small problems.

Return value

Returns true on success, false if something went wrong.

wxJoystick

wxJoystick allows an application to control one or more joysticks.

Derived from

wxObject (p. 954)

Include files

<wx/joystick.h>

See also

wxJoystickEvent (p. 775)

wxJoystick::wxJoystick

wxJoystick(int joystick = wxJOYSTICK1)

Constructor. *joystick* may be one of `wxJOYSTICK1`, `wxJOYSTICK2`, indicating the joystick controller of interest.

wxJoystick::~~wxJoystick

~wxJoystick()

Destroys the `wxJoystick` object.

wxJoystick::GetButtonState

int GetButtonState() const

Returns the state of the joystick buttons. Every button is mapped to a single bit in the returned integer, with the first button being mapped to the least significant bit, and so on. A bitlist of `wxJOY_BUTTONn` identifiers, where *n* is 1, 2, 3 or 4 is available for historical reasons.

wxJoystick::GetManufacturerId

int GetManufacturerId() const

Returns the manufacturer id.

wxJoystick::GetMovementThreshold

int GetMovementThreshold() const

Returns the movement threshold, the number of steps outside which the joystick is deemed to have moved.

wxJoystick::GetNumberAxes

int GetNumberAxes() const

Returns the number of axes for this joystick.

wxJoystick::GetNumberButtons

int GetNumberButtons() const

Returns the number of buttons for this joystick.

wxJoystick::GetNumberJoysticks

int GetNumberJoysticks() const

Returns the number of joysticks currently attached to the computer.

wxJoystick::GetPollingMax

int GetPollingMax() const

Returns the maximum polling frequency.

wxJoystick::GetPollingMin

int GetPollingMin() const

Returns the minimum polling frequency.

wxJoystick::GetProductId

int GetProductId() const

Returns the product id for the joystick.

wxJoystick::GetProductName

wxString GetProductName() const

Returns the product name for the joystick.

wxJoystick::GetPosition

wxPoint GetPosition() const

Returns the x, y position of the joystick.

wxJoystick::GetPOVPosition

int GetPOVPosition() const

Returns the point-of-view position, expressed in continuous, one-hundredth of a degree units, but limited to return 0, 9000, 18000 or 27000. Returns -1 on error.

wxJoystick::GetPOVCTSPosition

int GetPOVCTSPosition() const

Returns the point-of-view position, expressed in continuous, one-hundredth of a degree units. Returns -1 on error.

wxJoystick::GetRudderMax

int GetRudderMax() const

Returns the maximum rudder position.

wxJoystick::GetRudderMin

int GetRudderMin() const

Returns the minimum rudder position.

wxJoystick::GetRudderPosition

int GetRudderPosition() const

Returns the rudder position.

wxJoystick::GetUMax

int GetUMax() const

Returns the maximum U position.

wxJoystick::GetUMin

int GetUMin() const

Returns the minimum U position.

wxJoystick::GetUPosition

int GetUPosition() const

Gets the position of the fifth axis of the joystick, if it exists.

wxJoystick::GetVMax

int GetVMax() const

Returns the maximum V position.

wxJoystick::GetVMin

int GetVMin() const

Returns the minimum V position.

wxJoystick::GetVPosition

int GetVPosition() const

Gets the position of the sixth axis of the joystick, if it exists.

wxJoystick::GetXMax

int GetXMax() const

Returns the maximum x position.

wxJoystick::GetXMin

int GetXMin() const

Returns the minimum x position.

wxJoystick::GetYMax

int GetYMax() const

Returns the maximum y position.

wxJoystick::GetYMin

int GetYMin() const

Returns the minimum y position.

wxJoystick::GetZMax

int GetZMax() const

Returns the maximum z position.

wxJoystick::GetZMin

int GetXMin() const

Returns the minimum z position.

wxJoystick::GetZPosition

int GetZPosition() const

Returns the z position of the joystick.

wxJoystick::HasPOV

bool HasPOV() const

Returns true if the joystick has a point of view control.

wxJoystick::HasPOV4Dir

bool HasPOV4Dir() const

Returns true if the joystick point-of-view supports discrete values (centered, forward, backward, left, and right).

wxJoystick::HasPOVCTS

bool HasPOVCTS() const

Returns true if the joystick point-of-view supports continuous degree bearings.

wxJoystick::HasRudder

bool HasRudder() const

Returns true if there is a rudder attached to the computer.

wxJoystick::HasU

bool HasU() const

Returns true if the joystick has a U axis.

wxJoystick::HasV

bool HasV() const

Returns true if the joystick has a V axis.

wxJoystick::HasZ

bool HasZ() const

Returns true if the joystick has a Z axis.

wxJoystick::IsOk

bool IsOk() const

Returns true if the joystick is functioning.

wxJoystick::ReleaseCapture

bool ReleaseCapture()

Releases the capture set by **SetCapture**.

Return value

true if the capture release succeeded.

See also

wxJoystick::SetCapture (p. 774), *wxJoystickEvent* (p. 775)

wxJoystick::SetCapture

bool SetCapture(wxWindow* win, int pollingFreq = 0)

Sets the capture to direct joystick events to *win*.

Parameters

win

The window that will receive joystick events.

pollingFreq

If zero, movement events are sent when above the threshold. If greater than zero, events are received every *pollingFreq* milliseconds.

Return value

true if the capture succeeded.

See also

wxJoystick::ReleaseCapture (p. 774), *wxJoystickEvent* (p. 775)

wxJoystick::SetMovementThreshold

void SetMovementThreshold(int threshold)

Sets the movement threshold, the number of steps outside which the joystick is deemed to have moved.

wxJoystickEvent

This event class contains information about mouse events, particularly events received by windows.

Derived from

wxEvent (p. 441)

Include files

<wx/event.h>

Event table macros

To process a mouse event, use these event handler macros to direct input to member functions that take a *wxJoystickEvent* argument.

EVT_JOY_BUTTON_DOWN(func)	Process a <i>wxEVT_JOY_BUTTON_DOWN</i> event.
EVT_JOY_BUTTON_UP(func)	Process a <i>wxEVT_JOY_BUTTON_UP</i> event.
EVT_JOY_MOVE(func)	Process a <i>wxEVT_JOY_MOVE</i> event.
EVT_JOY_ZMOVE(func)	Process a <i>wxEVT_JOY_ZMOVE</i> event.

See also

wxJoystick (p. 768)

wxJoystickEvent::wxJoystickEvent

wxJoystickEvent(WXTYPE *eventType* = 0, int *state* = 0, int *joystick* = wxJOYSTICK1, int *change* = 0)

Constructor.

wxJoystickEvent::ButtonDown

bool **ButtonDown**(int *button* = wxJOY_BUTTON_ANY) **const**

Returns true if the event was a down event from the specified button (or any button).

Parameters

button

Can be wxJOY_BUTTONn where n is 1, 2, 3 or 4; or wxJOY_BUTTON_ANY to indicate any button down event.

wxJoystickEvent::ButtonIsDown

bool **ButtonIsDown**(int *button* = wxJOY_BUTTON_ANY) **const**

Returns true if the specified button (or any button) was in a down state.

Parameters

button

Can be wxJOY_BUTTONn where n is 1, 2, 3 or 4; or wxJOY_BUTTON_ANY to indicate any button down event.

wxJoystickEvent::ButtonUp

bool **ButtonUp**(int *button* = wxJOY_BUTTON_ANY) **const**

Returns true if the event was an up event from the specified button (or any button).

Parameters

button

Can be wxJOY_BUTTONn where n is 1, 2, 3 or 4; or wxJOY_BUTTON_ANY to indicate any button down event.

wxJoystickEvent::GetButtonChange

int GetButtonChange() const

Returns the identifier of the button changing state. This is a wxJOY_BUTTONn identifier, where n is one of 1, 2, 3, 4.

wxJoystickEvent::GetButtonState

int GetButtonState() const

Returns the down state of the buttons. This is a bitlist of wxJOY_BUTTONn identifiers, where n is one of 1, 2, 3, 4.

wxJoystickEvent::GetJoystick

int GetJoystick() const

Returns the identifier of the joystick generating the event - one of wxJOYSTICK1 and wxJOYSTICK2.

wxJoystickEvent::GetPosition

wxPoint GetPosition() const

Returns the x, y position of the joystick event.

wxJoystickEvent::GetZPosition

int GetZPosition() const

Returns the z position of the joystick event.

wxJoystickEvent::IsButton

bool IsButton() const

Returns true if this was a button up or down event (*not* 'is any button down?').

wxJoystickEvent::IsMove

bool IsMove() const

Returns true if this was an x, y move event.

wxJoystickEvent::IsZMove

bool IsZMove() const

Returns true if this was a z move event.

wxKeyEvent

This event class contains information about keypress (character) events.

Notice that there are three different kinds of keyboard events in wxWidgets: key down and up events and char events. The difference between the first two is clear - the first corresponds to a key press and the second to a key release - otherwise they are identical. Just note that if the key is maintained in a pressed state you will typically get a lot of (automatically generated) down events but only one up so it is wrong to assume that there is one up event corresponding to each down one.

Both key events provide untranslated key codes while the char event carries the translated one. The untranslated code for alphanumeric keys is always an upper case value. For the other keys it is one of `WXK_XXX` values from the *keycodes table* (p. 1546). The translated key is, in general, the character the user expects to appear as the result of the key combination when typing the text into a text entry zone, for example.

A few examples to clarify this (all assume that CAPS LOCK is unpressed and the standard US keyboard): when the 'A' key is pressed, the key down event key code is equal to `ASCII A == 65`. But the char event key code is `ASCII a == 97`. On the other hand, if you press both SHIFT and 'A' keys simultaneously, the key code in key down event will still be just 'A' while the char event key code parameter will now be 'A' as well.

Although in this simple case it is clear that the correct key code could be found in the key down event handler by checking the value returned by *ShiftDown()* (p. 782), in general you should use `EVT_CHAR` for this as for non alphanumeric keys the translation is keyboard-layout dependent and can only be done properly by the system itself.

Another kind of translation is done when the control key is pressed: for example, for CTRL-A key press the key down event still carries the same key code 'a' as usual but the char event will have key code of 1, the ASCII value of this key combination.

You may discover how the other keys on your system behave interactively by running the *text* (p. 1575) wxWidgets sample and pressing some keys in any of the text controls shown in it.

Note: If a key down (`EVT_KEY_DOWN`) event is caught and the event handler does not call `event.Skip()` then the corresponding char event (`EVT_CHAR`) will not happen. This is by design and enables the programs that handle both types of events to be a bit simpler.

Note for Windows programmers: The key and char events in wxWidgets are similar to but slightly different from Windows `WM_KEYDOWN` and `WM_CHAR` events. In particular, Alt-x combination will generate a char event in wxWidgets (unless it is used as an

accelerator).

Tip: be sure to call `event.Skip()` for events that you don't process in key event function, otherwise menu shortcuts may cease to work under Windows.

Derived from

wxEvent (p. 441)

Include files

<wx/event.h>

Event table macros

To process a key event, use these event handler macros to direct input to member functions that take a *wxKeyEvent* argument.

EVT_KEY_DOWN(func)	Process a <i>wxEVT_KEY_DOWN</i> event (any key has been pressed).
EVT_KEY_UP(func)	Process a <i>wxEVT_KEY_UP</i> event (any key has been released).
EVT_CHAR(func)	Process a <i>wxEVT_CHAR</i> event.

wxKeyEvent::m_altDown

bool m_altDown

true if the Alt key is pressed down.

wxKeyEvent::m_controlDown

bool m_controlDown

true if control is pressed down.

wxKeyEvent::m_keyCode

long m_keyCode

Virtual keycode. See *Keycodes* (p. 1546) for a list of identifiers.

wxKeyEvent::m_metaDown

bool m_metaDown

true if the Meta key is pressed down.

wxKeyEvent::m_shiftDown

bool m_shiftDown

true if shift is pressed down.

wxKeyEvent::m_x

int m_x

X position of the event.

wxKeyEvent::m_y

int m_y

Y position of the event.

wxKeyEvent::wxKeyEvent

wxKeyEvent(WXTYPE *keyEventType*)

Constructor. Currently, the only valid event types are wxEVT_CHAR and wxEVT_CHAR_HOOK.

wxKeyEvent::AltDown

bool AltDown() const

Returns true if the Alt key was down at the time of the key event.

wxKeyEvent::ControlDown

bool ControlDown() const

Returns true if the control key was down at the time of the key event.

wxKeyEvent::GetKeyCode

int GetKeyCode() const

Returns the virtual key code. ASCII events return normal ASCII values, while non-ASCII events return values such as **WXK_LEFT** for the left cursor key. See *Keycodes* (p.

1546) for a full list of the virtual key codes.

wxKeyEvent::GetRawKeyCode

wxUInt32 GetRawKeyCode() const

Returns the raw key code for this event. This is a platform-dependent scan code which should only be used in advanced applications.

NB: Currently the raw key codes are not supported by all ports, use `#ifdef wxHAS_RAW_KEY_CODES` to determine if this feature is available.

wxKeyEvent::GetRawKeyFlags

wxUInt32 GetRawKeyFlags() const

Returns the low level key flags for this event. The flags are platform-dependent and should only be used in advanced applications.

NB: Currently the raw key flags are not supported by all ports, use `#ifdef wxHAS_RAW_KEY_CODES` to determine if this feature is available.

wxKeyEvent::GetX

long GetX() const

Returns the X position (in client coordinates) of the event.

wxKeyEvent::GetY

long GetY() const

Returns the Y (in client coordinates) position of the event.

wxKeyEvent::MetaDown

bool MetaDown() const

Returns true if the Meta key was down at the time of the key event.

wxKeyEvent::GetPosition

wxPoint GetPosition() const

void GetPosition(long *x, long *y) const

Obtains the position (in client coordinates) at which the key was pressed.

wxKeyEvent::HasModifiers

bool HasModifiers() const

Returns true if either CTRL or ALT keys was down at the time of the key event. Note that this function does not take into account neither SHIFT nor META key states (the reason for ignoring the latter is that it is common for NUMLOCK key to be configured as META under X but the key presses even while NUMLOCK is on should be still processed normally).

wxKeyEvent::ShiftDown

bool ShiftDown() const

Returns true if the shift key was down at the time of the key event.

wxLayoutAlgorithm

wxLayoutAlgorithm implements layout of subwindows in MDI or SDI frames. It sends a wxCalculateLayoutEvent event to children of the frame, asking them for information about their size. For MDI parent frames, the algorithm allocates the remaining space to the MDI client window (which contains the MDI child frames). For SDI (normal) frames, a 'main' window is specified as taking up the remaining space.

Because the event system is used, this technique can be applied to any windows, which are not necessarily 'aware' of the layout classes (no virtual functions in wxWindow refer to wxLayoutAlgorithm or its events). However, you may wish to use *wxSashLayoutWindow* (p. 1065) for your subwindows since this class provides handlers for the required events, and accessors to specify the desired size of the window. The sash behaviour in the base class can be used, optionally, to make the windows user-resizable.

wxLayoutAlgorithm is typically used in IDE (integrated development environment) applications, where there are several resizable windows in addition to the MDI client window, or other primary editing window. Resizable windows might include toolbars, a project window, and a window for displaying error and warning messages.

When a window receives an OnCalculateLayout event, it should call SetRect in the given event object, to be the old supplied rectangle minus whatever space the window takes up. It should also set its own size accordingly.

wxSashLayoutWindow::OnCalculateLayout generates an OnQueryLayoutInfo event which it sends to itself to determine the orientation, alignment and size of the window, which it gets from internal member variables set by the application.

The algorithm works by starting off with a rectangle equal to the whole frame client area. It iterates through the frame children, generating OnCalculateLayout events which

subtract the window size and return the remaining rectangle for the next window to process. It is assumed (by `wxSashLayoutWindow::OnCalculateLayout`) that a window stretches the full dimension of the frame client, according to the orientation it specifies. For example, a horizontal window will stretch the full width of the remaining portion of the frame client area. In the other orientation, the window will be fixed to whatever size was specified by `OnQueryLayoutInfo`. An alignment setting will make the window 'stick' to the left, top, right or bottom of the remaining client area. This scheme implies that order of window creation is important. Say you wish to have an extra toolbar at the top of the frame, a project window to the left of the MDI client window, and an output window above the status bar. You should therefore create the windows in this order: toolbar, output window, project window. This ensures that the toolbar and output window take up space at the top and bottom, and then the remaining height in-between is used for the project window.

`wxLayoutAlgorithm` is quite independent of the way in which `OnCalculateLayout` chooses to interpret a window's size and alignment. Therefore you could implement a different window class with a new `OnCalculateLayout` event handler, that has a more sophisticated way of laying out the windows. It might allow specification of whether stretching occurs in the specified orientation, for example, rather than always assuming stretching. (This could, and probably should, be added to the existing implementation).

Note: `wxLayoutAlgorithm` has nothing to do with `wxLayoutConstraints`. It is an alternative way of specifying layouts for which the normal constraint system is unsuitable.

Derived from

`wxObject` (p. 954)

Include files

<wx/laywin.h>

Event handling

The algorithm object does not respond to events, but itself generates the following events in order to calculate window sizes.

- | | |
|------------------------------------|---|
| EVT_QUERY_LAYOUT_INFO(func) | Process a <code>wxEVT_QUERY_LAYOUT_INFO</code> event, to get size, orientation and alignment from a window. See <i>wxQueryLayoutInfoEvent</i> (p. 1030). |
| EVT_CALCULATE_LAYOUT(func) | Process a <code>wxEVT_CALCULATE_LAYOUT</code> event, which asks the window to take a 'bite' out of a rectangle provided by the algorithm. See <i>wxCalculateLayoutEvent</i> (p. 107). |

Data types

```
enum wxLayoutOrientation {  
    wxLAYOUT_HORIZONTAL,  
    wxLAYOUT_VERTICAL  
};  
  
enum wxLayoutAlignment {
```

```
    wxLAYOUT_NONE ,  
    wxLAYOUT_TOP ,  
    wxLAYOUT_LEFT ,  
    wxLAYOUT_RIGHT ,  
    wxLAYOUT_BOTTOM ,  
};
```

See also

wxSashEvent (p. 1063), *wxSashLayoutWindow* (p. 1065), *Event handling overview* (p. 1610)

wxCalculateLayoutEvent (p. 107), *wxQueryLayoutInfoEvent* (p. 1030),
wxSashLayoutWindow (p. 1065), *wxSashWindow* (p. 1068)

wxLayoutAlgorithm::wxLayoutAlgorithm

wxLayoutAlgorithm()

Default constructor.

wxLayoutAlgorithm::~~wxLayoutAlgorithm

~wxLayoutAlgorithm()

Destructor.

wxLayoutAlgorithm::LayoutFrame

bool LayoutFrame(wxFrame* frame, wxWindow* mainWindow = NULL) const

Lays out the children of a normal frame. *mainWindow* is set to occupy the remaining space.

This function simply calls *wxLayoutAlgorithm::LayoutWindow* (p. 785).

wxLayoutAlgorithm::LayoutMDIFrame

bool LayoutMDIFrame(wxMDIParentFrame* frame, wxRect* rect = NULL) const

Lays out the children of an MDI parent frame. If *rect* is non-NULL, the given rectangle will be used as a starting point instead of the frame's client area.

The MDI client window is set to occupy the remaining space.

wxLayoutAlgorithm::LayoutWindow

bool LayoutWindow(wxWindow* parent, wxWindow* mainWindow = NULL) const

Lays out the children of a normal frame or other window.

mainWindow is set to occupy the remaining space. If this is not specified, then the last window that responds to a calculate layout event in query mode will get the remaining space (that is, a non-query OnCalculateLayout event will not be sent to this window and the window will be set to the remaining size).

wxLayoutConstraints

Note: constraints are now deprecated and you should use *sizers* (p. 1627) instead.

Objects of this class can be associated with a window to define its layout constraints, with respect to siblings or its parent.

The class consists of the following eight constraints of class `wxIndividualLayoutConstraint`, some or all of which should be accessed directly to set the appropriate constraints.

- **left:** represents the left hand edge of the window
- **right:** represents the right hand edge of the window
- **top:** represents the top edge of the window
- **bottom:** represents the bottom edge of the window
- **width:** represents the width of the window
- **height:** represents the height of the window
- **centreX:** represents the horizontal centre point of the window
- **centreY:** represents the vertical centre point of the window

Most constraints are initially set to have the relationship `wxUnconstrained`, which means that their values should be calculated by looking at known constraints. The exceptions are *width* and *height*, which are set to `wxAsIs` to ensure that if the user does not specify a constraint, the existing width and height will be used, to be compatible with panel items which often have take a default size. If the constraint is `wxAsIs`, the dimension will not be changed.

```
wxPerl note: In wxPerl the constraints are accessed as  constraint =  
Wx::LayoutConstraints->new();  
constraint->centreX->AsIs();  
constraint->centreY->Unconstrained();
```

Derived from

wxObject (p. 954)

Include files

<wx/layout.h>

See also

Overview and examples (p. 1624), *wxIndividualLayoutConstraint* (p. 758),
wxWindow::SetConstraints (p. 1425)

wxLayoutConstraints::wxLayoutConstraints

wxLayoutConstraints()

Constructor.

wxLayoutConstraints::bottom

wxIndividualLayoutConstraint bottom

Constraint for the bottom edge.

wxLayoutConstraints::centreX

wxIndividualLayoutConstraint centreX

Constraint for the horizontal centre point.

wxLayoutConstraints::centreY

wxIndividualLayoutConstraint centreY

Constraint for the vertical centre point.

wxLayoutConstraints::height

wxIndividualLayoutConstraint height

Constraint for the height.

wxLayoutConstraints::left

wxIndividualLayoutConstraint left

Constraint for the left-hand edge.

wxLayoutConstraints::right

wxIndividualLayoutConstraint right

Constraint for the right-hand edge.

wxLayoutConstraints::top

wxIndividualLayoutConstraint top

Constraint for the top edge.

wxLayoutConstraints::width

wxIndividualLayoutConstraint width

Constraint for the width.

wxList

wxList classes provide linked list functionality for wxWidgets, and for an application if it wishes. Depending on the form of constructor used, a list can be keyed on integer or string keys to provide a primitive look-up ability, but please note that this feature is **deprecated**. See *wxHashMap* (p. 638) for a faster method of storage when random access is required.

While wxList class in the previous versions of wxWidgets only could contain elements of type wxObject and had essentially untyped interface (thus allowing you to put apples in the list and read back oranges from it), the new wxList classes family may contain elements of any type and has much more strict type checking. Unfortunately, it also requires an additional line to be inserted in your program for each list class you use (which is the only solution short of using templates which is not done in wxWidgets because of portability issues).

The general idea is to have the base class wxListBase working with *void *data* but make all of its dangerous (because untyped) functions protected, so that they can only be used from derived classes which, in turn, expose a type safe interface. With this approach a new wxList-like class must be defined for each list type (i.e. list of ints, of wxStrings or of MyObjects). This is done with *WX_DECLARE_LIST* and *WX_DEFINE_LIST* macros like this (notice the similarity with *WX_DECLARE_OBJARRAY* and *WX_IMPLEMENT_OBJARRAY* macros):

Example

```
// this part might be in a header or source (.cpp) file
class MyListElement
```

```

    {
        ... // whatever
    };

    // declare our list class: this macro declares and partly implements
    MyList
    // class (which derives from wxListBase)
    WX_DECLARE_LIST(MyListElement, MyList);

    ...

    // the only requirement for the rest is to be AFTER the full
    declaration of
    // MyListElement (for WX_DECLARE_LIST forward declaration is enough),
    but
    // usually it will be found in the source file and not in the header

    #include <wx/listimpl.cpp>
    WX_DEFINE_LIST(MyList);

    // now MyList class may be used as a usual wxList, but all of its
    methods
    // will take/return the objects of the right (i.e. MyListElement)
    type. You
    // also have MyList::Node type which is the type-safe version of
    wxNode.
    MyList list;
    MyListElement element;
    list.Append(element);        // ok
    list.Append(17);             // error: incorrect type

    // let's iterate over the list
    for ( MyList::Node *node = list.GetFirst(); node; node = node-
    >GetNext() )
    {
        MyListElement *current = node->GetData();

        ...process the current element...
    }

```

For compatibility with previous versions `wxList` and `wxStringList` classes are still defined, but their usage is deprecated and they will disappear in the future versions completely. The use of the latter is especially discouraged as it is not only unsafe but is also much less efficient than `wxArrayString` (p. 54) class.

In the documentation of the list classes below, the template notations are used even though these classes are not really templates at all -- but it helps to think about them as if they were. You should replace `wxNode<T>` with `wxListName::Node` and `T` itself with the list element type (i.e. the first parameter of `WX_DECLARE_LIST`).

Derived from

`wxObject` (p. 954)

Include files

`<wx/list.h>`

Example

It is very common to iterate on a list as follows:

```

...
wxWindow *win1 = new wxWindow(...);
wxWindow *win2 = new wxWindow(...);

```

```
wxList SomeList;
SomeList.Append(win1);
SomeList.Append(win2);

...

wxNode *node = SomeList.GetFirst();
while (node)
{
    wxWindow *win = node->GetData();
    ...
    node = node->GetNext();
}
```

To delete nodes in a list as the list is being traversed, replace

```
...
node = node->GetNext();
...
```

with

```
...
delete win;
delete node;
node = SomeList.GetFirst();
...
```

See *wxNode* (p. 942) for members that retrieve the data associated with a node, and members for getting to the next or previous node.

See also

wxNode (p. 942), *wxStringList* (p. 1224), *wxArray* (p. 42)

wxList::wxList

wxList()

wxList(int *n*, T **objects*[])

wxList(T **object*, ...)

Note: keyed lists are deprecated and should not be used in new code.

wxList(unsigned int *key_type*)

Constructors. *key_type* is one of `wxKEY_NONE`, `wxKEY_INTEGER`, or `wxKEY_STRING`, and indicates what sort of keying is required (if any).

objects is an array of *n* objects with which to initialize the list.

The variable-length argument list constructor must be supplied with a terminating NULL.

wxList::~~wxList

~wxList()

Destroys the list. Also destroys any remaining nodes, but does not destroy client data held in the nodes.

wxList::Append

wxNode<T> * Append(T *object)

Note: keyed lists are deprecated and should not be used in new code.

wxNode<T> * Append(long key, T *object)**wxNode<T> * Append(const wxString& key, T *object)**

Appends a new *wxNode* (p. 942) to the end of the list and puts a pointer to the *object* in the node. The last two forms store a key with the object for later retrieval using the key. The new node is returned in each case.

The key string is copied and stored by the list implementation.

wxList::Clear

void Clear()

Clears the list (but does not delete the client data stored with each node unless you called `DeleteContents(true)`, in which case it deletes data).

wxList::DeleteContents

void DeleteContents(bool destroy)

If *destroy* is `true`, instructs the list to call *delete* on the client contents of a node whenever the node is destroyed. The default is `false`.

wxList::DeleteNode

bool DeleteNode(wxNode<T> *node)

Deletes the given node from the list, returning `true` if successful.

wxList::DeleteObject

bool DeleteObject(T *object)

Finds the given client *object* and deletes the appropriate node from the list,

returning `true` if successful. The application must delete the actual object separately.

wxList::Find

wxNode<T> * Find(T * object)

Returns the node whose client data is *object* or NULL if none found.

Note: keyed lists are deprecated and should not be used in new code.

wxNode<T> * Find(long key)

wxNode<T> * Find(const wxString& key)

Returns the node whose stored key matches *key*. Use on a keyed list only.

wxList::GetCount

size_t GetCount() const

Returns the number of elements in the list.

wxList::GetFirst

wxNode<T> * GetFirst()

Returns the first node in the list (NULL if the list is empty).

wxList::GetLast

wxNode<T> * GetLast()

Returns the last node in the list (NULL if the list is empty).

wxList::IndexOf

int IndexOf(T* obj)

Returns the index of *obj* within the list or `wxNOT_FOUND` if *obj* is not found in the list.

wxList::Insert

wxNode<T> * Insert(T *object)

Insert object at front of list.

wxNode<T> * Insert(size_t position, T *object)

Insert object before *position*, i.e. the index of the new item in the list will be equal to *position*. *position* should be less than or equal to *GetCount* (p. 791); if it is equal to it, this is the same as calling *Append* (p. 790).

wxNode<T> * Insert(wxNode<T> *node, T *object)

Inserts the object before the given *node*.

wxList::IsEmpty

bool IsEmpty() const

Returns `true` if the list is empty, `false` otherwise.

wxList::Item

wxNode<T> * Item(size_t index) const

Returns the node at given position in the list.

wxList::Member

wxNode<T> * Member(T *object)

NB: This function is deprecated, use *Find* (p. 791) instead.

Returns the node associated with *object* if it is in the list, `NULL` otherwise.

wxList::Nth

wxNode<T> * Nth(int n)

NB: This function is deprecated, use *Item* (p. 792) instead.

Returns the *nth* node in the list, indexing from zero (`NULL` if the list is empty or the *nth* node could not be found).

wxList::Number

int Number()

NB: This function is deprecated, use *GetCount* (p. 791) instead.

Returns the number of elements in the list.

wxList::Sort

void Sort(wxSortCompareFunction compfunc)

```
// Type of compare function for list sort operation (as in 'qsort')
typedef int (*wxSortCompareFunction)(const void *elem1, const void
*elem2);
```

Allows the sorting of arbitrary lists by giving a function to compare two list elements. We use the system **qsort** function for the actual sorting process.

If you use untyped `wxList` the sort function receives pointers to `wxObject` pointers (`wxObject **`), so be careful to dereference appropriately - but, of course, a better solution is to use list of appropriate type defined with `WX_DECLARE_LIST`.

Example:

```
int listcompare(const void *arg1, const void *arg2)
{
    return(compare((wxString **)arg1,    // use the wxString 'compare'
                  **(wxString **)arg2)); // function
}

void main()
{
    wxList list;

    list.Append(new wxString("DEF"));
    list.Append(new wxString("GHI"));
    list.Append(new wxString("ABC"));
    list.Sort(listcompare);
}
```

wxListbook

`wxListbook` is a class similar to `wxNotebook` (p. 943) but which uses a `wxListCtrl` (p. 799) to show the labels instead of the tabs.

There is no documentation for this class yet but its usage is identical to `wxNotebook` (except for the features clearly related to tabs only), so please refer to that class documentation for now. You can also use the *notebook sample* (p. 1574) to see `wxListbook` in action.

Derived from

`wxControl` (p. 199)
`wxWindow` (p. 1388)
`wxEvtHandler` (p. 445)
`wxObject` (p. 954)

Include files

<wx/listbook.h>

Window styles

wxLB_DEFAULT

Choose the default location for the labels depending on the current platform (left everywhere except Mac where it is

top).

wxLB_TOP	Place labels above the page area.
wxLB_LEFT	Place labels on the left side.
wxLB_RIGHT	Place labels on the right side.
wxLB_BOTTOM	Place labels below the page area.

See also

wxNotebook (p. 943), *notebook sample* (p. 1574)

wxListBox

A listbox is used to select one or more of a list of strings. The strings are displayed in a scrolling box, with the selected string(s) marked in reverse video. A listbox can be single selection (if an item is selected, the previous selection is removed) or multiple selection (clicking an item toggles the item on or off independently of other selections).

List box elements are numbered from zero. Their number is limited in some platforms (e.g. ca. 2000 on GTK).

A listbox callback gets an event `wxEVT_COMMAND_LISTBOX_SELECT` for single clicks, and `wxEVT_COMMAND_LISTBOX_DOUBLE_CLICKED` for double clicks.

Derived from

wxControlWithItems (p. 200)
wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

`<wx/listbox.h>`

Window styles

wxLB_SINGLE	Single-selection list.
wxLB_MULTIPLE	Multiple-selection list: the user can toggle multiple items on and off.
wxLB_EXTENDED	Extended-selection list: the user can select multiple items using the SHIFT key and the mouse or special key combinations.
wxLB_HSCROLL	Create horizontal scrollbar if contents are too wide (Windows only).

wxLB_ALWAYS_SB	Always show a vertical scrollbar.
wxLB_NEEDED_SB	Only create a vertical scrollbar if needed.
wxLB_SORT	The listbox contents are sorted in alphabetical order.

Note that `wxLB_SINGLE`, `wxLB_MULTIPLE` and `wxLB_EXTENDED` styles are mutually exclusive and you can specify at most one of them (single selection is the default).

See also *window styles overview* (p. 1618).

Event handling

EVT_LISTBOX(id, func)	Process a <code>wxEVT_COMMAND_LISTBOX_SELECTED</code> event, when an item on the list is selected.
EVT_LISTBOX_DCLICK(id, func)	Process a <code>wxEVT_COMMAND_LISTBOX_DOUBLECLICKED</code> event, when the listbox is double-clicked.

See also

`wxChoice` (p. 127), `wxComboBox` (p. 158), `wxListCtrl` (p. 799), `wxCommandEvent` (p. 165)

wxListBox::wxListBox

wxListBox()

Default constructor.

wxListBox(wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, int n, const wxString choices[] = NULL, long style = 0, const wxValidator& validator = wxDefaultValidator, const wxString& name = "listBox")

wxListBox(wxWindow* parent, wxWindowID id, const wxPoint& pos, const wxSize& size, const wxString& choices, long style = 0, const wxValidator& validator = wxDefaultValidator, const wxString& name = "listBox")

Constructor, creating and showing a list box.

Parameters

parent

Parent window. Must not be NULL.

id

Window identifier. A value of -1 indicates a default value.

pos

Window position.

size

Window size. If the default size (-1, -1) is specified then the window is sized appropriately.

n

Number of strings with which to initialise the control.

choices

An array of strings with which to initialise the control.

style

Window style. See *wxListBox* (p. 794).

validator

Window validator.

name

Window name.

See also

wxListBox::Create (p. 796), *wxValidator* (p. 1360)

wxPython note: The *wxListBox* constructor in wxPython reduces the *n* and *choices* arguments are to a single argument, which is a list of strings.

wxPerl note: In wxPerl there is just an array reference in place of *n* and *choices*.

wxListBox::~~wxListBox

void ~wxListBox()

Destructor, destroying the list box.

wxListBox::Create

bool Create(wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, int n, const wxString choices[] = NULL, long style = 0, const wxValidator& validator = wxDefaultValidator, const wxString& name = "listBox")

bool Create(wxWindow* parent, wxWindowID id, const wxPoint& pos, const wxSize& size, const wxString& choices, long style = 0, const wxValidator&

```
validator = wxDefaultValidator, const wxString& name = "listBox")
```

Creates the listbox for two-step construction. See `wxListBox::wxListBox` (p. 795) for further details.

wxListBox::Deselect

```
void Deselect(int n)
```

Deselects an item in the list box.

Parameters

n

The zero-based item to deselect.

Remarks

This applies to multiple selection listboxes only.

wxListBox::GetSelections

```
int GetSelections(wxArrayInt& selections) const
```

Fill an array of ints with the positions of the currently selected items.

Parameters

selections

A reference to an `wxArrayInt` instance that is used to store the result of the query.

Return value

The number of selections.

Remarks

Use this with a multiple selection listbox.

See also

`wxControlWithItems::GetSelection` (p. 203), `wxControlWithItems::GetStringSelection` (p. 204), `wxControlWithItems::SetSelection` (p. 206)

wxPython note: The wxPython version of this method takes no parameters and returns a tuple of the selected items.

wxPerl note: In wxPerl this method takes no parameters and return the selected items as a list.

wxListBox::InsertItems

void InsertItems(int *nItems*, const wxString* *items*, int *pos*)

Insert the given number of strings before the specified position.

Parameters

nItems

Number of items in the array *items*

items

Labels of items to be inserted

pos

Position before which to insert the items: for example, if *pos* is 0 the items will be inserted in the beginning of the listbox

wxPython note: The first two parameters are collapsed into a single parameter for wxPython, which is a list of strings.

wxPerl note: In wxPerl there is just an array reference in place of *nItems* and *items*.

wxListBox::Selected

bool Selected(int *n*) const

Determines whether an item is selected.

Parameters

n

The zero-based item index.

Return value

true if the given item is selected, false otherwise.

wxListBox::Set

void Set(int *n*, const wxString* *choices*, void*clientData* = NULL)**

void Set(const wxString& *choices*, void*clientData* = NULL)**

Clears the list box and adds the given strings to it.

Parameters

n

The number of strings to set.

choices

An array of strings to set.

clientData

Options array of client data pointers

Remarks

You may free the array from the calling program after this function has been called.

wxListBox::SetFirstItem

void SetFirstItem(int *n*)

void SetFirstItem(const wxString& *string*)

Set the specified item to be the first visible item. Windows only.

Parameters

n

The zero-based item index.

string

The string that should be visible.

wxListCtrl

A list control presents lists in a number of formats: list view, report view, icon view and small icon view. In any case, elements are numbered from zero. For all these modes, the items are stored in the control and must be added to it using *InsertItem* (p. 811) method.

A special case of report view quite different from the other modes of the list control is a virtual control in which the items data (including text, images and attributes) is managed by the main program and is requested by the control itself only when needed which allows to have controls with millions of items without consuming much memory. To use virtual list control you must use *SetItemCount* (p. 816) first and overload at least *OnGetItemText* (p. 812) (and optionally *OnGetItemImage* (p. 812) and *OnGetItemAttr* (p. 812)) to return the information about the items when the control requests it. Virtual list control can be used as a normal one except that no operations which can take time proportional to the number of items in the control happen -- this is required to allow having a practically infinite number of items. For example, in a multiple selection virtual list control, the selections won't be sent when many items are selected at once because this could mean iterating over all the items.

Using many of `wxListCtrl` features is shown in the *corresponding sample* (p. 1573).

To intercept events from a list control, use the event table macros described in *wxCommandEvent* (p. 818).

Derived from

wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/listctrl.h>

Window styles

wxLC_LIST	multicolumn list view, with optional small icons. Columns are computed automatically, i.e. you don't set columns as in <code>wxLC_REPORT</code> . In other words, the list wraps, unlike a <code>wxListBox</code> .
wxLC_REPORT	single or multicolumn report view, with optional header.
wxLC_VIRTUAL	virtual control, may only be used with <code>wxLC_REPORT</code>
wxLC_ICON	Large icon view, with optional labels.
wxLC_SMALL_ICON	Small icon view, with optional labels.
wxLC_ALIGN_TOP	Icons align to the top. Win32 default, Win32 only.
wxLC_ALIGN_LEFT	Icons align to the left.
wxLC_AUTOARRANGE	Icons arrange themselves. Win32 only.
wxLC_VIRTUAL	The application provides items text on demand.
wxLC_EDIT_LABELS	Labels are editable: the application will be notified when editing starts.
wxLC_NO_HEADER	No header in report mode.
wxLC_SINGLE_SEL	Single selection (default is multiple).
wxLC_SORT_ASCENDING	Sort in ascending order (must still supply a comparison callback in <code>SortItems</code>).
wxLC_SORT_DESCENDING	Sort in descending order (must still supply a comparison callback in <code>SortItems</code>).

wxLC_HRULES	Draws light horizontal rules between rows in report mode.
wxLC_VRULES	Draws light vertical rules between columns in report mode.

See also *window styles overview* (p. 1618).

Event handling

To process input from a list control, use these event handler macros to direct input to member functions that take a *wxMouseEvent* (p. 818) argument.

EVT_LIST_BEGIN_DRAG(id, func)	Begin dragging with the left mouse button.
EVT_LIST_BEGIN_RDRAG(id, func)	Begin dragging with the right mouse button.
EVT_LIST_BEGIN_LABEL_EDIT(id, func)	Begin editing a label. This can be prevented by calling <i>Veto()</i> (p. 954).
EVT_LIST_END_LABEL_EDIT(id, func)	Finish editing a label. This can be prevented by calling <i>Veto()</i> (p. 954).
EVT_LIST_DELETE_ITEM(id, func)	Delete an item.
EVT_LIST_DELETE_ALL_ITEMS(id, func)	Delete all items.
EVT_LIST_ITEM_SELECTED(id, func)	The item has been selected.
EVT_LIST_ITEM_DESELECTED(id, func)	The item has been deselected.
EVT_LIST_ITEM_ACTIVATED(id, func)	The item has been activated (ENTER or double click).
EVT_LIST_ITEM_FOCUSED(id, func)	The currently focused item has changed.
EVT_LIST_ITEM_MIDDLE_CLICK(id, func)	The middle mouse button has been clicked on an item.
EVT_LIST_ITEM_RIGHT_CLICK(id, func)	The right mouse button has been clicked on an item.
EVT_LIST_KEY_DOWN(id, func)	A key has been pressed.
EVT_LIST_INSERT_ITEM(id, func)	An item has been inserted.
EVT_LIST_COL_CLICK(id, func)	A column (m_col) has been left-clicked.
EVT_LIST_COL_RIGHT_CLICK(id, func)	A column (m_col) has been right-clicked.
EVT_LIST_COL_BEGIN_DRAG(id, func)	The user started resizing a column - can be vetoed.
EVT_LIST_COL_DRAGGING(id, func)	The divider between columns is being dragged.
EVT_LIST_COL_END_DRAG(id, func)	A column has been resized by the user.

EVT_LIST_CACHE_HINT(id, func) Prepare cache for a virtual list control

See also

wxListCtrl overview (p. 1654), *wxListBox* (p. 794), *wxTreeCtrl* (p. 1329), *wxImageList* (p. 754), *wxListEvent* (p. 818), *wxListItem* (p. 821)

wxListCtrl::wxListCtrl

wxListCtrl()

Default constructor.

wxListCtrl(wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxLC_ICON, const wxValidator& validator = wxDefaultValidator, const wxString& name = "listCtrl")

Constructor, creating and showing a list control.

Parameters

parent

Parent window. Must not be NULL.

id

Window identifier. A value of -1 indicates a default value.

pos

Window position.

size

Window size. If the default size (-1, -1) is specified then the window is sized appropriately.

style

Window style. See *wxListCtrl* (p. 799).

validator

Window validator.

name

Window name.

See also

wxListCtrl::Create (p. 803), *wxValidator* (p. 1360)

wxListCtrl::~~wxListCtrl

void ~wxListCtrl()

Destructor, destroying the list control.

wxListCtrl::Arrange

bool Arrange(int *flag* = *wxLIST_ALIGN_DEFAULT*)

Arranges the items in icon or small icon view. This only has effect on Win32. *flag* is one of:

wxLIST_ALIGN_DEFAULT Default alignment.

wxLIST_ALIGN_LEFT Align to the left side of the control.

wxLIST_ALIGN_TOP Align to the top side of the control.

wxLIST_ALIGN_SNAP_TO_GRID Snap to grid.

wxListCtrl::AssignImageList

void AssignImageList(wxImageList* *imageList*, int *which*)

Sets the image list associated with the control and takes ownership of it (i.e. the control will, unlike when using *SetImageList*, delete the list when destroyed). *which* is one of *wxIMAGE_LIST_NORMAL*, *wxIMAGE_LIST_SMALL*, *wxIMAGE_LIST_STATE* (the last is unimplemented).

[See also](#)

wxListCtrl::SetImageList (p. 814)

wxListCtrl::ClearAll

void ClearAll()

Deletes all items and all columns.

wxListCtrl::Create

bool Create(wxWindow* *parent*, wxWindowID *id*, const wxPoint& *pos* = *wxDefaultPosition*, const wxSize& *size* = *wxDefaultSize*, long *style* = *wxLC_ICON*, const wxValidator& *validator* = *wxDefaultValidator*, const wxString& *name* = "listCtrl")

Creates the list control. See *wxListCtrl::wxListCtrl* (p. 802) for further details.

wxListCtrl::DeleteAllItems

bool DeleteAllItems()

Deletes all the items in the list control.

NB: This function does *not* send the `wxEVT_COMMAND_LIST_DELETE_ITEM` event because deleting many items from the control would be too slow then (unlike *DeleteItem* (p. 804)).

wxListCtrl::DeleteColumn

bool DeleteColumn(int col)

Deletes a column.

wxListCtrl::DeleteItem

bool DeleteItem(long item)

Deletes the specified item. This function sends the `wxEVT_COMMAND_LIST_DELETE_ITEM` event for the item being deleted.

See also: *DeleteAllItems* (p. 804)

wxListCtrl::EditLabel

void EditLabel(long item)

Starts editing the label of the given item. This function generates a `EVT_LIST_BEGIN_LABEL_EDIT` event which can be vetoed so that no text control will appear for in-place editing.

If the user changed the label (i.e. s/he does not press ESC or leave the text control without changes, a `EVT_LIST_END_LABEL_EDIT` event will be sent which can be vetoed as well.

wxListCtrl::EnsureVisible

bool EnsureVisible(long item)

Ensures this item is visible.

wxListCtrl::FindItem

long FindItem(long start, const wxString& str, const bool partial = false)

Find an item whose label matches this string, starting from *start* or the beginning if *start* is -1.

long FindItem(long start, long data)

Find an item whose data matches this data, starting from *start* or the beginning if 'start' is -1.

long FindItem(long start, const wxPoint& pt, int direction)

Find an item nearest this position in the specified direction, starting from *start* or the beginning if *start* is -1.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

FindItem(start, str, partial=false)

FindItemData(start, data)

FindItemAtPos(start, point, direction)

wxPerl note: In wxPerl there are three methods instead of a single overloaded method:

FindItem(start, str, partial = false)

FindItemData(start, data)

FindItemAtPos(start, point, direction)

wxListCtrl::GetColumn

bool GetColumn(int col, wxListItem& item) const

Gets information about this column. See *wxListCtrl::SetItem* (p. 814) for more information.

wxPerl note: In wxPerl this method takes only the **col** parameter and returns a *Wx::ListItem* (or undef).

wxListCtrl::GetColumnCount

int GetColumnCount() const

Returns the number of columns.

wxListCtrl::GetColumnWidth

int GetColumnWidth(int col) const

Gets the column width (report view only).

wxListCtrl::GetCountPerPage

int GetCountPerPage() const

Gets the number of items that can fit vertically in the visible area of the list control (list or report view) or the total number of items in the list control (icon or small icon view).

wxListCtrl::GetEditControl

wxTextCtrl * GetEditControl() const

Returns the edit control being currently used to edit a label. Returns `NULL` if no label is being edited.

NB: It is currently only implemented for wxMSW.

wxListCtrl::GetImageList

wxImageList* GetImageList(int *which*) const

Returns the specified image list. *which* may be one of:

wxIMAGE_LIST_NORMAL The normal (large icon) image list.

wxIMAGE_LIST_SMALL The small icon image list.

wxIMAGE_LIST_STATE The user-defined state image list (unimplemented).

wxListCtrl::GetItem

bool GetItem(wxListItem& *info*) const

Gets information about the item. See *wxListCtrl::SetItem* (p. 814) for more information.

You must call *info.SetId()* to the ID of item you're interested in before calling this method.

wxPython note: The wxPython version of this method takes an integer parameter for the item ID, an optional integer for the column number, and returns the `wxListItem` object.

wxPerl note: In wxPerl this method takes as parameter the **ID** of the item and (optionally) the column, and returns a `Wx::ListItem` object.

wxListCtrl::GetItemBackgroundColour

wxColour GetItemBackgroundColour(long *item*) const

Returns the colour for this item. If the item has no specific colour, returns an invalid colour (and not the default background control of the control itself).

See also

GetItemTextColour (p. 808)

wxListCtrl::GetItemCount

int GetItemCount() const

Returns the number of items in the list control.

wxListCtrl::GetItemData

long GetItemData(long *item*) const

Gets the application-defined data associated with this item.

wxListCtrl::GetItemPosition

bool GetItemPosition(long *item*, wxPoint& *pos*) const

Returns the position of the item, in icon or small icon view.

wxPython note: The wxPython version of this method accepts only the item ID and returns the wxPoint.

wxPerl note: In wxPerl this method takes only the **item** parameter and returns a Wx::Point (or undef).

wxListCtrl::GetItemRect

bool GetItemRect(long *item*, wxRect& *rect*, int *code* = wxLIST_RECT_BOUNDS) const

Returns the rectangle representing the item's size and position, in client coordinates.

code is one of wxLIST_RECT_BOUNDS, wxLIST_RECT_ICON, wxLIST_RECT_LABEL.

wxPython note: The wxPython version of this method accepts only the item ID and *code* and returns the wxRect.

wxPerl note: In wxPerl this method takes only the **item** parameter and returns a Wx::Rect (or undef).

wxListCtrl::GetItemSpacing

wxSize GetItemSpacing() const

Retrieves the spacing between icons in pixels: horizontal spacing is returned as *x* component of the *wxSize* (p. 1107) object and the vertical spacing as its *y* component.

wxListCtrl::GetItemState

int GetItemState(long *item*, long *stateMask*) const

Gets the item state. For a list of state flags, see *wxListCtrl::SetItem* (p. 814).

The **stateMask** indicates which state flags are of interest.

wxListCtrl::GetItemText

wxString GetItemText(long *item*) const

Gets the item text for this item.

wxListCtrl::GetItemTextColour

wxColour GetItemTextColour(long *item*) const

Returns the colour for this item. If the item has no specific colour, returns an invalid colour (and not the default foreground control of the control itself as this wouldn't allow distinguishing between items having the same colour as the current control foreground and items with default colour which, hence, have always the same colour as the control).

wxListCtrl::GetNextItem

long GetNextItem(long *item*, int *geometry* = *wxLIST_NEXT_ALL*, int *state* = *wxLIST_STATE_DONTCARE*) const

Searches for an item with the given geometry or state, starting from *item* but excluding the *item* itself. If *item* is -1, the first item that matches the specified flags will be returned.

Returns the first item with given state following *item* or -1 if no such item found.

This function may be used to find all selected items in the control like this:

```
long item = -1;
for ( ;; )
{
    item = listctrl->GetNextItem(item,
                                wxLIST_NEXT_ALL,
                                wxLIST_STATE_SELECTED);

    if ( item == -1 )
        break;

    // this item is selected - do whatever is needed with it
    wxLogMessage("Item %ld is selected.", item);
}
```

geometry can be one of:

<code>wxLIST_NEXT_ABOVE</code>	Searches for an item above the specified item.
<code>wxLIST_NEXT_ALL</code>	Searches for subsequent item by index.
<code>wxLIST_NEXT_BELOW</code>	Searches for an item below the specified item.
<code>wxLIST_NEXT_LEFT</code>	Searches for an item to the left of the specified item.
<code>wxLIST_NEXT_RIGHT</code>	Searches for an item to the right of the specified item.

NB: this parameters is only supported by wxMSW currently and ignored on other platforms.

state can be a bitlist of the following:

<code>wxLIST_STATE_DONTCARE</code>	Don't care what the state is.
<code>wxLIST_STATE_DROPHILITED</code>	The item indicates it is a drop target.
<code>wxLIST_STATE_FOCUSED</code>	The item has the focus.
<code>wxLIST_STATE_SELECTED</code>	The item is selected.
<code>wxLIST_STATE_CUT</code>	The item is selected as part of a cut and paste operation.

wxListCtrl::GetSelectedItemCount

int GetSelectedItemCount() const

Returns the number of selected items in the list control.

wxListCtrl::GetTextColour

wxColour GetTextColour() const

Gets the text colour of the list control.

wxListCtrl::GetTopItem

long GetTopItem() const

Gets the index of the topmost visible item when in list or report view.

wxListCtrl::GetViewRect

wxRect GetViewRect() const

Returns the rectangle taken by all items in the control. In other words, if the controls client size were equal to the size of this rectangle, no scrollbars would be needed and no free space would be left.

Note that this function only works in the icon and small icon views, not in list or report views (this is a limitation of the native Win32 control).

wxListCtrl::HitTest

long HitTest(const wxPoint& point, int& flags)

Determines which item (if any) is at the specified point, giving details in *flags*. *flags* will be a combination of the following flags:

wxLIST_HITTEST_ABOVE Above the client area.

wxLIST_HITTEST_BELOW Below the client area.

wxLIST_HITTEST_NOWHERE In the client area but below the last item.

wxLIST_HITTEST_ONITEMICON On the bitmap associated with an item.

wxLIST_HITTEST_ONITEMLABEL On the label (string) associated with an item.

wxLIST_HITTEST_ONITEMRIGHT In the area to the right of an item.

wxLIST_HITTEST_ONITEMSTATEICON On the state icon for a tree view item that is in a user-defined state.

wxLIST_HITTEST_TOLEFT To the right of the client area.

wxLIST_HITTEST_TORIGHT To the left of the client area.

wxLIST_HITTEST_ONITEM Combination of wxLIST_HITTEST_ONITEMICON, wxLIST_HITTEST_ONITEMLABEL, wxLIST_HITTEST_ONITEMSTATEICON.

wxPython note: A tuple of values is returned in the wxPython version of this method. The first value is the item id and the second is the flags value mentioned above.

wxPerl note: In wxPerl this method only takes the **point** parameter and returns a 2-element list (*item*, *flags*).

wxListCtrl::InsertColumn

long InsertColumn(long col, wxListItem& info)

long InsertColumn(long col, const wxString& heading, int format = wxLIST_FORMAT_LEFT, int width = -1)

For report view mode (only), inserts a column. For more details, see *wxListCtrl::SetItem* (p. 814).

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

InsertColumn(col, heading, format=wxLIST_FORMAT_LEFT, width=-1)
Creates a column using a header string only.

InsertColumnInfo(col, item) Creates a column using a wxListInfo.

wxListCtrl::InsertItem

long InsertItem(wxListItem& info)

Inserts an item, returning the index of the new item if successful, -1 otherwise.

long InsertItem(long index, const wxString& label)

Inserts a string item.

long InsertItem(long index, int imageIndex)

Inserts an image item.

long InsertItem(long index, const wxString& label, int imageIndex)

Insert an image/string item.

Parameters

info

wxListItem object

index

Index of the new item, supplied by the application

label

String label

imageIndex

index into the image list associated with this control and view style

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

InsertItem(item) Inserts an item using a wxListItem.

InsertStringItem(index, label) Inserts a string item.

InsertImageItem(index, imageIndex) Inserts an image item.

InsertImageStringItem(index, label, imageIndex) Insert an image/string item.

wxPerl note: In wxPerl there are four methods instead of a single overloaded method:

InsertItem(item) Inserts a Wx::ListItem

InsertStringItem(index, label) Inserts a string item

InsertImageItem(index, imageIndex) Inserts an image item

InsertImageStringItem(index, label, imageIndex) Inserts an item with a string and an image

wxListCtrl::OnGetItemAttr

virtual wxListItemAttr * OnGetItemAttr(long item)

This function may be overloaded in the derived class for a control with `wxLC_VIRTUAL` style. It should return the attribute for the specified `item` or `NULL` to use the default appearance parameters.

The base class version always returns `NULL`.

See also

OnGetItemImage (p. 812),
OnGetItemText (p. 812)

wxListCtrl::OnGetItemImage

virtual int OnGetItemImage(long item)

This function must be overloaded in the derived class for a control with `wxLC_VIRTUAL` style having an *image list* (p. 814) (if the control doesn't have an image list, it is not necessary to overload it). It should return the index of the items image in the controls image list or -1 for no image.

The base class version always returns -1.

See also

OnGetItemText (p. 812),
OnGetItemAttr (p. 812)

wxListCtrl::OnGetItemText

virtual wxString OnGetItemText(long item, long column)

This function **must** be overloaded in the derived class for a control with `wxLC_VIRTUAL` style. It should return the string containing the text of the given *column* for the specified *item*.

See also

SetItemCount (p. 816),
OnGetItemImage (p. 812),
OnGetItemAttr (p. 812)

wxListCtrl::RefreshItem

void RefreshItem(long item)

Redraws the given *item*. This is only useful for the virtual list controls as without calling this function the displayed value of the item doesn't change even when the underlying data does change.

See also

RefreshItems (p. 813)

wxListCtrl::RefreshItems

void RefreshItems(long itemFrom, long itemTo)

Redraws the items between *itemFrom* and *itemTo*. The starting item must be less than or equal to the ending one.

Just as *RefreshItem* (p. 813) this is only useful for virtual list controls.

wxListCtrl::ScrollList

bool ScrollList(int dx, int dy)

Scrolls the list control. If in icon, small icon or report view mode, *dx* specifies the number of pixels to scroll. If in list view mode, *dx* specifies the number of columns to scroll. *dy* always specifies the number of pixels to scroll vertically.

NB: This method is currently only implemented in the Windows version.

wxListCtrl::SetBackgroundColour

void SetBackgroundColour(const wxColour& col)

Sets the background colour (*GetBackgroundColour* already implicit in *wxWindow* class).

wxListCtrl::SetColumn

bool SetColumn(int col, wxListItem& item)

Sets information about this column. See *wxListCtrl::SetItem* (p. 814) for more information.

wxListCtrl::SetColumnWidth

bool SetColumnWidth(int col, int width)

Sets the column width.

width can be a width in pixels or `wxLIST_AUTOSIZE` (-1) or `wxLIST_AUTOSIZE_USEHEADER` (-2). `wxLIST_AUTOSIZE` will resize the column to the length of its longest item. `wxLIST_AUTOSIZE_USEHEADER` will resize the column to the length of the header (Win32) or 80 pixels (other platforms).

In small or normal icon view, *col* must be -1, and the column width is set for all columns.

wxListCtrl::SetImageList

void SetImageList(wxImageList* imageList, int which)

Sets the image list associated with the control. *which* is one of `wxIMAGE_LIST_NORMAL`, `wxIMAGE_LIST_SMALL`, `wxIMAGE_LIST_STATE` (the last is unimplemented).

This method does not take ownership of the image list, you have to delete it yourself.

See also

wxListCtrl::AssignImageList (p. 803)

wxListCtrl::SetItem

bool SetItem(wxListItem& info)

long SetItem(long index, int col, const wxString& label, int imageId = -1)

Sets information about the item.

`wxListItem` is a class with the following members:

long m_mask	Indicates which fields are valid. See the list of valid mask flags below.
long m_itemId	The zero-based item position.
int m_col	Zero-based column, if in report mode.

<code>long m_state</code>	The state of the item. See the list of valid state flags below.
<code>long m_stateMask</code>	A mask indicating which state flags are valid. See the list of valid state flags below.
<code>wxString m_text</code>	The label/header text.
<code>int m_image</code>	The zero-based index into an image list.
<code>long m_data</code>	Application-defined data.
<code>int m_format</code>	For columns only: the format. Can be <code>wxLIST_FORMAT_LEFT</code> , <code>wxLIST_FORMAT_RIGHT</code> or <code>wxLIST_FORMAT_CENTRE</code> .
<code>int m_width</code>	For columns only: the column width.

The **m_mask** member contains a bitlist specifying which of the other fields are valid. The flags are:

<code>wxLIST_MASK_STATE</code>	The m_state field is valid.
<code>wxLIST_MASK_TEXT</code>	The m_text field is valid.
<code>wxLIST_MASK_IMAGE</code>	The m_image field is valid.
<code>wxLIST_MASK_DATA</code>	The m_data field is valid.
<code>wxLIST_MASK_WIDTH</code>	The m_width field is valid.
<code>wxLIST_MASK_FORMAT</code>	The m_format field is valid.

The **m_stateMask** and **m_state** members take flags from the following:

The `wxListItem` object can also contain item-specific colour and font information: for this you need to call one of `SetTextColour()`, `SetBackgroundColour()` or `SetFont()` functions on it passing it the colour/font to use. If the colour/font is not specified, the default list control colour/font is used.

<code>wxLIST_STATE_DONTCARE</code>	Don't care what the state is. Win32 only.
<code>wxLIST_STATE_DROPHILITED</code>	The item is highlighted to receive a drop event. Win32 only.
<code>wxLIST_STATE_FOCUSED</code>	The item has the focus.
<code>wxLIST_STATE_SELECTED</code>	The item is selected.
<code>wxLIST_STATE_CUT</code>	The item is in the cut state. Win32 only.

long SetItem(long index, int col, const wxString& label, int imageId = -1)

Sets a string field at a particular column.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

SetItem(item)	Sets information about the given wxListItem.
SetStringItem(index, col, label, imageld)	Sets a string or image at a given location.

wxListCtrl::SetItemBackgroundColour

void SetItemBackgroundColour(long item, const wxColour& col)

Sets the background colour for this item. This function only works in report view.

The colour can be retrieved using *GetItemBackgroundColour* (p. 806).

wxListCtrl::SetItemCount

void SetItemCount(long count)

This method can only be used with virtual list controls. It is used to indicate to the control the number of items it contains. After calling it, the main program should be ready to handle calls to various item callbacks (such as *OnGetItemText* (p. 812)) for all items in the range from 0 to *count*.

wxListCtrl::SetItemData

bool SetItemData(long item, long data)

Associates application-defined data with this item.

wxListCtrl::SetItemImage

bool SetItemImage(long item, int image, int selImage)

Sets the unselected and selected images associated with the item. The images are indices into the image list associated with the list control.

wxListCtrl::SetItemPosition

bool SetItemPosition(long item, const wxPoint& pos)

Sets the position of the item, in icon or small icon view.

wxListCtrl::SetItemState

bool SetItemState(long item, long state, long stateMask)

Sets the item state. For a list of state flags, see *wxListCtrl::SetItem* (p. 814).

The **stateMask** indicates which state flags are valid.

wxListCtrl::SetItemText

void SetItemText(long item, const wxString& text)

Sets the item text for this item.

wxListCtrl::SetItemTextColour

void SetItemTextColour(long item, const wxColour& col)

Sets the colour for this item. This function only works in report view.

The colour can be retrieved using *GetItemTextColour* (p. 808).

wxListCtrl::SetSingleStyle

void SetSingleStyle(long style, const bool add = true)

Adds or removes a single window style.

wxListCtrl::SetTextColour

void SetTextColour(const wxColour& col)

Sets the text colour of the list control.

wxListCtrl::SetWindowStyleFlag

void SetWindowStyleFlag(long style)

Sets the whole window style, deleting all items.

wxListCtrl::SortItems

bool SortItems(wxListCtrlCompare fnSortCallBack, long data)

Call this function to sort the items in the list control. Sorting is done using the specified *fnSortCallBack* function. This function must have the following prototype:

```
int wxCALLBACK wxListCompareFunction(long item1, long item2, long
sortData)
```

It is called each time when the two items must be compared and should return 0 if the

items are equal, negative value if the first item is less than the second one and positive value if the first one is greater than the second one (the same convention as used by `qsort(3)`).

Parameters

item1

client data associated with the first item (**NOT** the index).

item2

client data associated with the second item (**NOT** the index).

data

the value passed to `SortItems()` itself.

Notice that the control may only be sorted on client data associated with the items, so you **must** use *SetItemData* (p. 816) if you want to be able to sort the items in the control.

Please see the *listctrl sample* (p. 1573) for an example of using this function.

wxPython note: wxPython uses the `sortData` parameter to pass the Python function to call, so it is not available for programmer use. Call `SortItems` with a reference to a callable object that expects two parameters.

wxPerl note: In wxPerl the comparison function must take just two parameters; however, you may use a closure to achieve an effect similar to the `SortItems` third parameter.

wxListEvent

A list event holds information about events associated with `wxListCtrl` objects.

Derived from

wxNotifyEvent (p. 953)

wxCommandEvent (p. 165)

wxEvent (p. 441)

wxObject (p. 954)

Include files

<wx/listctrl.h>

Event table macros

To process input from a list control, use these event handler macros to direct input to member functions that take a `wxListEvent` argument.

EVT_LIST_BEGIN_DRAG(id, func) Begin dragging with the left mouse button.

- EVT_LIST_BEGIN_RDRAG(id, func)** Begin dragging with the right mouse button.
- EVT_LIST_BEGIN_LABEL_EDIT(id, func)** Begin editing a label. This can be prevented by calling *Veto()* (p. 954).
- EVT_LIST_END_LABEL_EDIT(id, func)** Finish editing a label. This can be prevented by calling *Veto()* (p. 954).
- EVT_LIST_DELETE_ITEM(id, func)** Delete an item.
- EVT_LIST_DELETE_ALL_ITEMS(id, func)** Delete all items.
- EVT_LIST_ITEM_SELECTED(id, func)** The item has been selected.
- EVT_LIST_ITEM_DESELECTED(id, func)** The item has been deselected.
- EVT_LIST_ITEM_ACTIVATED(id, func)** The item has been activated (ENTER or double click).
- EVT_LIST_ITEM_FOCUSED(id, func)** The currently focused item has changed.
- EVT_LIST_ITEM_MIDDLE_CLICK(id, func)** The middle mouse button has been clicked on an item.
- EVT_LIST_ITEM_RIGHT_CLICK(id, func)** The right mouse button has been clicked on an item.
- EVT_LIST_KEY_DOWN(id, func)** A key has been pressed.
- EVT_LIST_INSERT_ITEM(id, func)** An item has been inserted.
- EVT_LIST_COL_CLICK(id, func)** A column (**m_col**) has been left-clicked.
- EVT_LIST_COL_RIGHT_CLICK(id, func)** A column (**m_col**) (which can be -1 if the click occurred outside any column) has been right-clicked.
- EVT_LIST_COL_BEGIN_DRAG(id, func)** The user started resizing a column - can be vetoed.
- EVT_LIST_COL_DRAGGING(id, func)** The divider between columns is being dragged.
- EVT_LIST_COL_END_DRAG(id, func)** A column has been resized by the user.
- EVT_LIST_CACHE_HINT(id, func)** Prepare cache for a virtual list control

See also

wxListCtrl (p. 799)

wxListEvent::wxListEvent

wxListEvent(WXTYPE *commandType* = 0, int *id* = 0)

Constructor.

wxListEvent::GetCacheFrom

long GetCacheFrom() const

For `EVT_LIST_CACHE_HINT` event only: return the first item which the list control advises us to cache.

wxListEvent::GetCacheTo

long GetCacheTo() const

For `EVT_LIST_CACHE_HINT` event only: return the last item (inclusive) which the list control advises us to cache.

wxListEvent::GetKeyCode

int GetKeyCode() const

Key code if the event is a keypress event.

wxListEvent::GetIndex

long GetIndex() const

The item index.

wxListEvent::GetColumn

int GetColumn() const

The column position: it is only used with `COL` events. For the column dragging events, it is the column to the left of the divider being dragged, for the column click events it may be -1 if the user clicked in the list control header outside any column.

wxListEvent::GetPoint

wxPoint GetPoint() const

The position of the mouse pointer if the event is a drag event.

wxListEvent::GetLabel

const wxString& GetLabel() const

The (new) item label for `EVT_LIST_END_LABEL_EDIT` event.

wxListEvent::GetText

const wxString& GetText() const

The text.

wxListEvent::GetImage

int GetImage() const

The image.

wxListEvent::GetData

long GetData() const

The data.

wxListEvent::GetMask

long GetMask() const

The mask.

wxListEvent::GetItem

const wxListItem& GetItem() const

An item object, used by some events. See also *wxListCtrl::SetItem* (p. 814).

wxListEvent::IsEditCancelled

bool IsEditCancelled() const

This method only makes sense for `EVT_LIST_END_LABEL_EDIT` message and returns `true` if the label editing has been cancelled by the user (*GetLabel* (p. 820) returns an empty string in this case but it doesn't allow to distinguish between really cancelling the edit and, admittedly rare, case when the user wants to rename it to an empty string).

wxListItem

This class stores information about a `wxListCtrl` item or column.

Derived from

wxObject (p. 954)

Include files

<wx/listctrl.h>

wxListItem::wxListItem

wxListItem()

Constructor.

wxListItem::Clear

void Clear()

Resets the item state to the default.

wxListItem::GetAlign

wxListColumnFormat GetAlign() const

Returns the alignment for this item. Can be one of `wxLIST_FORMAT_LEFT`, `wxLIST_FORMAT_RIGHT` or `wxLIST_FORMAT_CENTRE`.

wxListItem::GetBackgroundColour

wxColour GetBackgroundColour() const

Returns the background colour for this item.

wxListItem::GetColumn

int GetColumn() const

Returns the zero-based column; meaningful only in report mode.

wxListItem::GetData

long GetData() const

Returns client data associated with the control.

wxListItem::GetFont

wxFont GetFont() const

Returns the font used to display the item.

wxListItem::GetId

long GetId() const

Returns the zero-based item position.

wxListItem::GetImage

int GetImage() const

Returns the zero-based index of the image associated with the item into the image list.

wxListItem::GetMask

long GetMask() const

Returns a bit mask indicating which fields of the structure are valid; can be any combination of the following values:

<code>wxLIST_MASK_STATE</code>	The GetState is valid.
<code>wxLIST_MASK_TEXT</code>	The GetText is valid.
<code>wxLIST_MASK_IMAGE</code>	The GetImage is valid.
<code>wxLIST_MASK_DATA</code>	The GetData is valid.
<code>wxLIST_MASK_WIDTH</code>	The GetWidth is valid.
<code>wxLIST_MASK_FORMAT</code>	The GetAlign is valid.

wxListItem::GetState

long GetState() const

Returns a bit field representing the state of the item. Can be any combination of:

<code>wxLIST_STATE_DONTCARE</code>	Don't care what the state is. Win32 only.
<code>wxLIST_STATE_DROPHILITED</code>	The item is highlighted to receive a drop event. Win32 only.
<code>wxLIST_STATE_FOCUSED</code>	The item has the focus.

`wxLIST_STATE_SELECTED` The item is selected.

`wxLIST_STATE_CUT` The item is in the cut state. Win32 only.

`wxListItem::GetText`

`const wxString& GetText() const`

Returns the label/header text.

`wxListItem::GetTextColour`

`wxColour GetTextColour() const`

Returns the text colour.

`wxListItem::GetWidth`

`int GetWidth() const`

Meaningful only for column headers in report mode. Returns the column width.

`wxListItem::SetAlign`

`void SetAlign(wxListColumnFormat align)`

Sets the alignment for the item. See also `wxListItem::SetAlign` (p. 824)

`wxListItem::SetBackgroundColour`

`void SetBackgroundColour(const wxColour& colBack)`

Sets the background colour for the item.

`wxListItem::SetColumn`

`void SetColumn(int col)`

Sets the zero-based column. Meaningful only in report mode.

`wxListItem::SetData`

`void SetData(long data)`

`void SetData(void* data)`

Sets client data for the item.

wxListItem::SetFont

void SetFont(const wxFont& font)

Sets the font for the item.

wxListItem::SetId

void SetId(long id)

Sets the zero-based item position.

wxListItem::SetImage

void SetImage(int image)

Returns the zero-based index of the image associated with the item into the image list.

wxListItem::SetMask

void SetMask(long mask)

Sets the mask of valid fields. See *wxListItem::GetMask* (p. 823).

wxListItem::SetState

void SetState(long state)

Sets the item state flags (note that the valid state flags are influenced by the value of the state mask, see *wxListItem::SetStateMask* (p. 825)). See *wxListItem::GetState* (p. 825) for valid flag values.

wxListItem::SetStateMask

void SetStateMask(long stateMask)

Sets the bitmask that is used to determine which of the state flags are to be set. See also *wxListItem::SetState* (p. 825).

wxListItem::SetText

void SetText(const wxString& text)

Sets the text label for the item.

wxListItem::SetTextColour

void SetTextColour(const wxColour& colText)

Sets the text colour for the item.

wxListItem::SetWidth

void SetWidth(int width)

Meaningful only for column headers in report mode. Sets the column width.

wxListView

This class currently simply presents a simpler to use interface for the *wxListCtrl* (p. 799) -- it can be thought of as a *façade* for that complicated class. Using it is preferable to using *wxListCtrl* (p. 799) directly whenever possible because in the future some ports might implement *wxListView* but not the full set of *wxListCtrl* features.

Other than different interface, this class is identical to *wxListCtrl*. In particular, it uses the same events, same windows styles and so on.

Derived from

wxListCtrl (p. 799)
wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/listctrl.h>

wxListView::ClearColumnImage

void ClearColumnImage(int col)

Resets the column image -- after calling this function, no image will be shown.

Parameters

col

the column to clear image for

See also

SetColumnImage (p. 828)

wxListView::Focus

void Focus(long *index*)

Sets focus to the item with the given *index*.

wxListView::GetFirstSelected

long GetFirstSelected() const

Returns the first selected item in a (presumably) multiple selection control. Together with *GetNextSelected* (p. 827) it can be used to iterate over all selected items in the control.

Return value

The first selected item, if any, -1 otherwise.

wxListView::GetFocusedItem

long GetFocusedItem() const

Returns the currently focused item or -1 if none.

See also

IsSelected (p. 827),
Focus (p. 827)

wxListView::GetNextSelected

long GetNextSelected(long *item*) const

Used together with *GetFirstSelected* (p. 827) to iterate over all selected items in the control.

Return value

Returns the next selected item or -1 if there are no more of them.

wxListView::IsSelected

bool IsSelected(long *index*)

Returns `true` if the item with the given *index* is selected, `false` otherwise.

See also

GetFirstSelected (p. 827),
GetNextSelected (p. 827)

wxListView::Select

void Select(long *n*, **bool** *on* = *true*)

Selects or unselects the given item.

Parameters

n

the item to select or unselect

on

if *true* (default), selects the item, otherwise unselects it

See also

SetItemState (p. 816)

wxListView::SetColumnImage

void SetColumnImage(int *col*, int *image*)

Sets the column image for the specified column. To use the column images, the control must have a valid image list with at least one image.

Parameters

col

the column to set image for

image

the index of the column image in the controls image list

See also

ClearColumnImage (p. 826),
SetImageList (p. 814)

wxLocale

wxLocale class encapsulates all language-dependent settings and is a generalization of the C locale concept.

In `wxWidgets` this class manages message catalogs which contain the translations of the strings used to the current language.

wxPerl note: In `wxPerl` you can't use the `'_'` function name, so the `Wx::Locale` module can export the `gettext` and `gettext_noop` under any given name.

```
# this imports gettext ( equivalent to Wx::GetTranslation
# and gettext_noop ( a noop )
# into your module
use Wx::Locale qw(:default);

# ....

# use the functions
print gettext( ``Panic!!' ' );

button = Wx::Button->new( window, -1, gettext( ``Label' ' ) );
```

If you need to translate a lot of strings, then adding `gettext()` around each one is a long task (that is why `_()` was introduced), so just choose a shorter name for `gettext`:

```
#
use Wx::Locale 'gettext' => 't',
               'gettext_noop' => 'gettext_noop';

# ...

# use the functions
print t( ``Panic!!' ' );

# ...
```

Derived from

No base class

See also

Internationalization overview (p. 1596),
Internat sample (p. 1573)

Include files

<wx/intl.h>

Supported languages

The following `wxLanguage` constants may be used to specify the language in *Init* (p. 842) and are returned by *GetSystemLanguage* (p. 842):

- `wxLANGUAGE_DEFAULT` -- user's default language as obtained from the operating system
- `wxLANGUAGE_UNKNOWN` -- returned by *GetSystemLanguage* (p. 842) if it fails to detect the default language

- wxLANGUAGE_USER_DEFINED -- user defined languages' integer identifiers should start from this
- wxLANGUAGE_ABKHAZIAN
- wxLANGUAGE_AFAR
- wxLANGUAGE_AFRIKAANS
- wxLANGUAGE_ALBANIAN
- wxLANGUAGE_AMHARIC
- wxLANGUAGE_ARABIC
- wxLANGUAGE_ARABIC_ALGERIA
- wxLANGUAGE_ARABIC_BAHRAIN
- wxLANGUAGE_ARABIC_EGYPT
- wxLANGUAGE_ARABIC_IRAQ
- wxLANGUAGE_ARABIC_JORDAN
- wxLANGUAGE_ARABIC_KUWAIT
- wxLANGUAGE_ARABIC_LEBANON
- wxLANGUAGE_ARABIC_LIBYA
- wxLANGUAGE_ARABIC_MOROCCO
- wxLANGUAGE_ARABIC_OMAN
- wxLANGUAGE_ARABIC_QATAR
- wxLANGUAGE_ARABIC_SAUDI_ARABIA
- wxLANGUAGE_ARABIC_SUDAN
- wxLANGUAGE_ARABIC_SYRIA
- wxLANGUAGE_ARABIC_TUNISIA
- wxLANGUAGE_ARABIC_UAE
- wxLANGUAGE_ARABIC_YEMEN
- wxLANGUAGE_ARMENIAN
- wxLANGUAGE_ASSAMESE
- wxLANGUAGE_AYMARA

- wxLANGUAGE_AZERI
- wxLANGUAGE_AZERI_CYRILLIC
- wxLANGUAGE_AZERI_LATIN
- wxLANGUAGE_BASHKIR
- wxLANGUAGE_BASQUE
- wxLANGUAGE_BELARUSIAN
- wxLANGUAGE_BENGALI
- wxLANGUAGE_BHUTANI
- wxLANGUAGE_BIHARI
- wxLANGUAGE_BISLAMA
- wxLANGUAGE_BRETON
- wxLANGUAGE_BULGARIAN
- wxLANGUAGE_BURMESE
- wxLANGUAGE_CAMBODIAN
- wxLANGUAGE_CATALAN
- wxLANGUAGE_CHINESE
- wxLANGUAGE_CHINESE_SIMPLIFIED
- wxLANGUAGE_CHINESE_TRADITIONAL
- wxLANGUAGE_CHINESE_HONGKONG
- wxLANGUAGE_CHINESE_MACAU
- wxLANGUAGE_CHINESE_SINGAPORE
- wxLANGUAGE_CHINESE_TAIWAN
- wxLANGUAGE_CORSICAN
- wxLANGUAGE_CROATIAN
- wxLANGUAGE_CZECH
- wxLANGUAGE_DANISH
- wxLANGUAGE_DUTCH
- wxLANGUAGE_DUTCH_BELGIAN

- wxLANGUAGE_ENGLISH
- wxLANGUAGE_ENGLISH_UK
- wxLANGUAGE_ENGLISH_US
- wxLANGUAGE_ENGLISH_AUSTRALIA
- wxLANGUAGE_ENGLISH_BELIZE
- wxLANGUAGE_ENGLISH_BOTSWANA
- wxLANGUAGE_ENGLISH_CANADA
- wxLANGUAGE_ENGLISH_CARIBBEAN
- wxLANGUAGE_ENGLISH_DENMARK
- wxLANGUAGE_ENGLISH_EIRE
- wxLANGUAGE_ENGLISH_JAMAICA
- wxLANGUAGE_ENGLISH_NEW_ZEALAND
- wxLANGUAGE_ENGLISH_PHILIPPINES
- wxLANGUAGE_ENGLISH_SOUTH_AFRICA
- wxLANGUAGE_ENGLISH_TRINIDAD
- wxLANGUAGE_ENGLISH_ZIMBABWE
- wxLANGUAGE_ESPERANTO
- wxLANGUAGE_ESTONIAN
- wxLANGUAGE_FAEROESE
- wxLANGUAGE_FARSI
- wxLANGUAGE_FIJI
- wxLANGUAGE_FINNISH
- wxLANGUAGE_FRENCH
- wxLANGUAGE_FRENCH_BELGIAN
- wxLANGUAGE_FRENCH_CANADIAN
- wxLANGUAGE_FRENCH_LUXEMBOURG
- wxLANGUAGE_FRENCH_MONACO
- wxLANGUAGE_FRENCH_SWISS

- wxLANGUAGE_FRISIAN
- wxLANGUAGE_GALICIAN
- wxLANGUAGE_GEORGIAN
- wxLANGUAGE_GERMAN
- wxLANGUAGE_GERMAN_AUSTRIAN
- wxLANGUAGE_GERMAN_BELGIUM
- wxLANGUAGE_GERMAN_LIECHTENSTEIN
- wxLANGUAGE_GERMAN_LUXEMBOURG
- wxLANGUAGE_GERMAN_SWISS
- wxLANGUAGE_GREEK
- wxLANGUAGE_GREENLANDIC
- wxLANGUAGE_GUARANI
- wxLANGUAGE_GUJARATI
- wxLANGUAGE_HAUSA
- wxLANGUAGE_HEBREW
- wxLANGUAGE_HINDI
- wxLANGUAGE_HUNGARIAN
- wxLANGUAGE_ICELANDIC
- wxLANGUAGE_INDONESIAN
- wxLANGUAGE_INTERLINGUA
- wxLANGUAGE_INTERLINGUE
- wxLANGUAGE_INUKTITUT
- wxLANGUAGE_INUPIAK
- wxLANGUAGE_IRISH
- wxLANGUAGE_ITALIAN
- wxLANGUAGE_ITALIAN_SWISS
- wxLANGUAGE_JAPANESE
- wxLANGUAGE_JAVANESE

- wxLANGUAGE_KANNADA
- wxLANGUAGE_KASHMIRI
- wxLANGUAGE_KASHMIRI_INDIA
- wxLANGUAGE_KAZAKH
- wxLANGUAGE_KERNEWEK
- wxLANGUAGE_KINYARWANDA
- wxLANGUAGE_KIRGHIZ
- wxLANGUAGE_KIRUNDI
- wxLANGUAGE_KONKANI
- wxLANGUAGE_KOREAN
- wxLANGUAGE_KURDISH
- wxLANGUAGE_LAOTHIAN
- wxLANGUAGE_LATIN
- wxLANGUAGE_LATVIAN
- wxLANGUAGE_LINGALA
- wxLANGUAGE_LITHUANIAN
- wxLANGUAGE_MACEDONIAN
- wxLANGUAGE_MALAGASY
- wxLANGUAGE_MALAY
- wxLANGUAGE_MALAYALAM
- wxLANGUAGE_MALAY_BRUNEI_DARUSSALAM
- wxLANGUAGE_MALAY_MALAYSIA
- wxLANGUAGE_MALTESE
- wxLANGUAGE_MANIPURI
- wxLANGUAGE_MAORI
- wxLANGUAGE_MARATHI
- wxLANGUAGE_MOLDAVIAN
- wxLANGUAGE_MONGOLIAN

- wxLANGUAGE_NAURU
- wxLANGUAGE_NEPALI
- wxLANGUAGE_NEPALI_INDIA
- wxLANGUAGE_NORWEGIAN_BOKMAL
- wxLANGUAGE_NORWEGIAN_NYNORSK
- wxLANGUAGE_OCCITAN
- wxLANGUAGE_ORIYA
- wxLANGUAGE_OROMO
- wxLANGUAGE_PASHTO
- wxLANGUAGE_POLISH
- wxLANGUAGE_PORTUGUESE
- wxLANGUAGE_PORTUGUESE_BRAZILIAN
- wxLANGUAGE_PUNJABI
- wxLANGUAGE_QUECHUA
- wxLANGUAGE_RHAETO_ROMANCE
- wxLANGUAGE_ROMANIAN
- wxLANGUAGE_RUSSIAN
- wxLANGUAGE_RUSSIAN_UKRAINE
- wxLANGUAGE_SAMOAN
- wxLANGUAGE_SANGHO
- wxLANGUAGE_SANSKRIT
- wxLANGUAGE_SCOTS_GAELIC
- wxLANGUAGE_SERBIAN
- wxLANGUAGE_SERBIAN_CYRILLIC
- wxLANGUAGE_SERBIAN_LATIN
- wxLANGUAGE_SERBO_CROATIAN
- wxLANGUAGE_SESOTHO
- wxLANGUAGE_SETSWANA

- wxLANGUAGE_SHONA
- wxLANGUAGE_SINDHI
- wxLANGUAGE_SINHALESE
- wxLANGUAGE_SISWATI
- wxLANGUAGE_SLOVAK
- wxLANGUAGE_SLOVENIAN
- wxLANGUAGE_SOMALI
- wxLANGUAGE_SPANISH
- wxLANGUAGE_SPANISH_ARGENTINA
- wxLANGUAGE_SPANISH_BOLIVIA
- wxLANGUAGE_SPANISH_CHILE
- wxLANGUAGE_SPANISH_COLOMBIA
- wxLANGUAGE_SPANISH_COSTA_RICA
- wxLANGUAGE_SPANISH_DOMINICAN_REPUBLIC
- wxLANGUAGE_SPANISH_ECUADOR
- wxLANGUAGE_SPANISH_EL_SALVADOR
- wxLANGUAGE_SPANISH_GUATEMALA
- wxLANGUAGE_SPANISH_HONDURAS
- wxLANGUAGE_SPANISH_MEXICAN
- wxLANGUAGE_SPANISH_MODERN
- wxLANGUAGE_SPANISH_NICARAGUA
- wxLANGUAGE_SPANISH_PANAMA
- wxLANGUAGE_SPANISH_PARAGUAY
- wxLANGUAGE_SPANISH_PERU
- wxLANGUAGE_SPANISH_PUERTO_RICO
- wxLANGUAGE_SPANISH_URUGUAY
- wxLANGUAGE_SPANISH_US
- wxLANGUAGE_SPANISH_VENEZUELA

- wxLANGUAGE_SUNDANESE
- wxLANGUAGE_SWAHILI
- wxLANGUAGE_SWEDISH
- wxLANGUAGE_SWEDISH_FINLAND
- wxLANGUAGE_TAGALOG
- wxLANGUAGE_TAJIK
- wxLANGUAGE_TAMIL
- wxLANGUAGE_TATAR
- wxLANGUAGE_TELUGU
- wxLANGUAGE_THAI
- wxLANGUAGE_TIBETAN
- wxLANGUAGE_TIGRINYA
- wxLANGUAGE_TONGA
- wxLANGUAGE_TSONGA
- wxLANGUAGE_TURKISH
- wxLANGUAGE_TURKMEN
- wxLANGUAGE_TWI
- wxLANGUAGE_UGHUR
- wxLANGUAGE_UKRAINIAN
- wxLANGUAGE_URDU
- wxLANGUAGE_URDU_INDIA
- wxLANGUAGE_URDU_PAKISTAN
- wxLANGUAGE_UZBEK
- wxLANGUAGE_UZBEK_CYRILLIC
- wxLANGUAGE_UZBEK_LATIN
- wxLANGUAGE_VIETNAMESE
- wxLANGUAGE_VOLAPUK
- wxLANGUAGE_WELSH

- wxLANGUAGE_WOLOF
- wxLANGUAGE_XHOSA
- wxLANGUAGE_YIDDISH
- wxLANGUAGE_YORUBA
- wxLANGUAGE_ZHUANG
- wxLANGUAGE_ZULU

wxLocale::wxLocale

wxLocale()

This is the default constructor and it does nothing to initialize the object: *Init()* (p. 842) must be used to do that.

wxLocale(int language, int flags = wxLOCALE_LOAD_DEFAULT | wxLOCALE_CONV_ENCODING)

See *Init()* (p. 842) for parameters description.

wxLocale(const char *szName, const char *szShort = NULL, const char *szLocale = NULL, bool bLoadDefault = true, bool bConvertEncoding = false)

See *Init()* (p. 842) for parameters description.

The call of this function has several global side effects which you should understand: first of all, the application locale is changed - note that this will affect many of standard C library functions such as *printf()* or *strftime()*. Second, this *wxLocale* object becomes the new current global locale for the application and so all subsequent calls to *wxGetTranslation()* will try to translate the messages using the message catalogs for this locale.

wxLocale::~~wxLocale

~wxLocale()

The destructor, like the constructor, also has global side effects: the previously set locale is restored and so the changes described in *Init* (p. 842) documentation are rolled back.

wxLocale::AddCatalog

bool AddCatalog(const char *szDomain)

Add a catalog for use with the current locale: it is searched for in standard places (current directory first, then the system one), but you may also prepend additional directories to the search path with *AddCatalogLookupPathPrefix()* (p. 839).

All loaded catalogs will be used for message lookup by `GetString()` for the current locale.

Returns true if catalog was successfully loaded, false otherwise (which might mean that the catalog is not found or that it isn't in the correct format).

wxLocale::AddCatalogLookupPathPrefix

void AddCatalogLookupPathPrefix(const wxString& prefix)

Add a prefix to the catalog lookup path: the message catalog files will be looked up under `prefix/<lang>/LC_MESSAGES`, `prefix/LC_MESSAGES` and `prefix` (in this order).

This only applies to subsequent invocations of `AddCatalog()`!

wxLocale::AddLanguage

static void AddLanguage(const wxLanguageInfo& info)

Adds custom, user-defined language to the database of known languages. This database is used in conjunction with the first form of *Init* (p. 842).

`wxLanguageInfo` is defined as follows:

```
struct WXDLLEXPORT wxLanguageInfo
{
    int Language;                // wxLanguage id
    wxString CanonicalName;      // Canonical name, e.g. fr_FR
#ifdef __WIN32__
    wxUint32 WinLang, WinSublang; // Win32 language identifiers
                                   // (LANG_XXXX, SUBLANG_XXXX)
#elseif
    wxString Description;        // human-readable name of the language
};
```

Language should be greater than `wxLANGUAGE_USER_DEFINED`.

wxPerl note: In wxPerl `Wx::LanguageInfo` has only one method:

`Wx::LanguageInfo->new(language, canonicalName, WinLang, WinSubLang, Description)`

wxLocale::FindLanguageInfo

`wxlocalefindlanguageinfo`

static wxLanguageInfo * FindLanguageInfo(const wxString& locale) const

This function may be used to find the language description structure for the given locale, specified either as a two letter ISO language code (for example, "pt"), a language code followed by the country code ("pt_BR") or a full, human readable, language description ("Portuguese-Brazil").

Returns the information for the given language or `NULL` if this language is unknown.

Note that even if the returned pointer is valid, the caller should *not* delete it.

See also

GetLanguageInfo (p. 840)

wxLocale::GetCanonicalName

wxString GetSysName() const

Returns the canonical form of current locale name. Canonical form is the one that is used on UNIX systems: it is a two- or five-letter string in *xx* or *xx_YY* format, where *xx* is ISO 639 code of language and *YY* is ISO 3166 code of the country. Examples are "en", "en_GB", "en_US" or "fr_FR".

This form is internally used when looking up message catalogs.

Compare *GetSysName* (p. 841).

wxLocale::GetLanguage

int GetLanguage() const

Returns *wxLanguage* (p. 829) constant of current language. Note that you can call this function only if you used the form of *Init* (p. 842) that takes *wxLanguage* argument.

wxLocale::GetLanguageInfo

static wxLanguageInfo * GetLanguageInfo(int lang) const

Returns a pointer to *wxLanguageInfo* structure containing information about the given language or `NULL` if this language is unknown. Note that even if the returned pointer is valid, the caller should *not* delete it.

See *AddLanguage* (p. 839) for the *wxLanguageInfo* description.

wxLocale::GetLanguageName

static wxString GetLanguageName(int lang) const

Returns English name of the given language or empty string if this language is unknown.

wxLocale::GetLocale

const char* GetLocale() const

Returns the locale name as passed to the constructor or *Init()* (p. 842). This is full, human-readable name, e.g. "English" or "French".

wxLocale::GetName

const wxString& GetName() const

Returns the current short name for the locale (as given to the constructor or the Init() function).

wxLocale::GetString

**const char* GetString(const char *szOrigString, const char *szDomain = NULL)
const**

**const char* GetString(const char *szOrigString, const char *szOrigString2, size_t n,
const char *szDomain = NULL) const**

Retrieves the translation for a string in all loaded domains unless the szDomain parameter is specified (and then only this catalog/domain is searched).

Returns original string if translation is not available (in this case an error message is generated the first time a string is not found; use *wxLogNull* (p. 1602) to suppress it).

The second form is used when retrieving translation of string that has different singular and plural form in English or different plural forms in some other language. It takes two extra arguments: *szOrigString* parameter must contain the singular form of the string to be converted. It is also used as the key for the search in the catalog. The *szOrigString2* parameter is the plural form (in English). The parameter *n* is used to determine the plural form. If no message catalog is found *szOrigString* is returned if 'n == 1', otherwise *szOrigString2*. See GNU gettext manual

(http://www.gnu.org/manual/gettext/html_chapter/gettext_10.html#SEC150) for additional information on plural forms handling.

Remarks

Domains are searched in the last to first order, i.e. catalogs added later override those added before.

wxLocale::GetSysName

wxString GetSysName() const

Returns current platform-specific locale name as passed to *setlocale()*.

Compare *GetCanonicalName* (p. 840).

wxLocale::GetSystemEncoding

static wxFontEncoding GetSystemEncoding() const

Tries to detect the user's default font encoding. Returns *wxFontEncoding* (p. 512) value or **wxFONTENCODING_SYSTEM** if it couldn't be determined.

wxLocale::GetSystemEncodingName

static wxString GetSystemEncodingName() const

Tries to detect the name of the user's default font encoding. This string isn't particularly useful for the application as its form is platform-dependent and so you should probably use *GetSystemEncoding* (p. 841) instead.

Returns a user-readable string value or an empty string if it couldn't be determined.

wxLocale::GetSystemLanguage

static int GetSystemLanguage() const

Tries to detect the user's default language setting. Returns *wxLanguage* (p. 829) value or **wxLANGUAGE_UNKNOWN** if the language-guessing algorithm failed.

wxLocale::Init

bool Init(int language = wxLANGUAGE_DEFAULT, int flags = wxLOCALE_LOAD_DEFAULT | wxLOCALE_CONV_ENCODING)

bool Init(const char *szName, const char *szShort = NULL, const char *szLocale = NULL, bool bLoadDefault = true, bool bConvertEncoding = false)

The second form is deprecated, use the first one unless you know what you are doing.

Parameters

language

wxLanguage (p. 829) identifier of the locale. **wxLANGUAGE_DEFAULT** has special meaning -- *wxLocale* will use system's default language (see *GetSystemLanguage* (p. 842)).

flags

Combination of the following:
wxLOCALE_LOAD_DEFAULT Load the message catalog for the given locale containing the translations of standard *wxWidgets* messages automatically.

wxLOCALE_CONV_ENCODING Automatically convert message catalogs to platform's default encoding. Note that it will do only basic conversion between well-known pair like iso8859-1 and windows-1252 or iso8859-2 and windows-1250. See *Writing non-English applications* (p. 1597) for detailed description of this behaviour. Note that this flag is meaningless in Unicode build.

szName

The name of the locale. Only used in diagnostic messages.

szShort

The standard 2 letter locale abbreviation and is used as the directory prefix when looking for the message catalog files.

szLocale

The parameter for the call to `setlocale()`. Note that it is platform-specific.

bLoadDefault

May be set to false to prevent loading of the message catalog for the given locale containing the translations of standard wxWidgets messages. This parameter would be rarely used in normal circumstances.

bConvertEncoding

May be set to true to do automatic conversion of message catalogs to platform's native encoding. Note that it will do only basic conversion between well-known pair like iso8859-1 and windows-1252 or iso8859-2 and windows-1250. See *Writing non-English applications* (p. 1597) for detailed description of this behaviour.

The call of this function has several global side effects which you should understand: first of all, the application locale is changed - note that this will affect many of standard C library functions such as `printf()` or `strftime()`. Second, this `wxLocale` object becomes the new current global locale for the application and so all subsequent calls to `wxGetTranslation()` will try to translate the messages using the message catalogs for this locale.

Returns true on success or false if the given locale couldn't be set.

wxLocale::IsLoaded

bool IsLoaded(const char* domain) const

Check if the given catalog is loaded, and returns true if it is.

According to GNU gettext tradition, each catalog normally corresponds to 'domain' which is more or less the application name.

See also: *AddCatalog* (p. 838)

wxLocale::IsOk

bool IsOk() const

Returns true if the locale could be set successfully.

wxLog

wxLog class defines the interface for the *log targets* used by wxWidgets logging functions as explained in the *wxLog overview* (p. 1602). The only situations when you need to directly use this class is when you want to derive your own log target because the existing ones don't satisfy your needs. Another case is if you wish to customize the behaviour of the standard logging classes (all of which respect the wxLog settings): for example, set which trace messages are logged and which are not or change (or even remove completely) the timestamp on the messages.

Otherwise, it is completely hidden behind the *wxLogXXX()* functions and you may not even know about its existence.

See *log overview* (p. 1602) for the descriptions of wxWidgets logging facilities.

Derived from

No base class

Include files

<wx/log.h>

Static functions

The functions in this section work with and manipulate the active log target. The *OnLog()* (p. 847) is called by the *wxLogXXX()* functions and invokes the *DoLog()* (p. 848) of the active log target if any. Get/Set methods are used to install/query the current active target and, finally, *DontCreateOnDemand()* (p. 848) disables the automatic creation of a standard log target if none actually exists. It is only useful when the application is terminating and shouldn't be used in other situations because it may easily lead to a loss of messages.

OnLog (p. 847)

GetActiveTarget (p. 847)

SetActiveTarget (p. 847)

DontCreateOnDemand (p. 848)

Suspend (p. 847)

Resume (p. 848)

Logging functions

There are two functions which must be implemented by any derived class to actually process the log messages: *DoLog* (p. 848) and *DoLogString* (p. 848). The second function receives a string which just has to be output in some way and the easiest way to write a new log target is to override just this function in the derived class. If more control over the output format is needed, then the first function must be overridden which allows to construct custom messages depending on the log level or even do completely

different things depending on the message severity (for example, throw away all messages except warnings and errors, show warnings on the screen and forward the error messages to the user's (or programmer's) cell phone - maybe depending on whether the timestamp tells us if it is day or night in the current time zone).

There also functions to support message buffering. Why are they needed? Some of `wxLog` implementations, most notably the standard `wxLogGui` class, buffer the messages (for example, to avoid showing the user a zillion of modal message boxes one after another -- which would be really annoying). `Flush()` (p. 848) shows them all and clears the buffer contents. This function doesn't do anything if the buffer is already empty.

Flush (p. 848)

FlushActive (p. 848)

Customization

The functions below allow some limited customization of `wxLog` behaviour without writing a new log target class (which, aside of being a matter of several minutes, allows you to do anything you want).

The verbose messages are the trace messages which are not disabled in the release mode and are generated by `wxLogVerbose` (p. 1529). They are not normally shown to the user because they present little interest, but may be activated, for example, in order to help the user find some program problem.

As for the (real) trace messages, their handling depends on the settings of the (application global) *trace mask*. There are two ways to specify it: either by using `SetTraceMask` (p. 850) and `GetTraceMask` (p. 850) and using `wxLogTrace` (p. 1530) which takes an integer mask or by using `AddTraceMask` (p. 846) for string trace masks.

The difference between bit-wise and string trace masks is that a message using integer trace mask will only be logged if all bits of the mask are set in the current mask while a message using string mask will be logged simply if the mask had been added before to the list of allowed ones.

For example,

```
// wxTraceOleCalls is one of standard bit masks
wxLogTrace(wxTraceRefCount | wxTraceOleCalls, "Active object ref count:
%d", nRef);
```

will do something only if the current trace mask contains both `wxTraceRefCount` and `wxTraceOle`, but

```
// wxTRACE_OleCalls is one of standard string masks
wxLogTrace(wxTRACE_OleCalls, "IFoo::Bar() called");
```

will log the message if it was preceded by

```
wxLog::AddTraceMask(wxTRACE_OleCalls);
```

Using string masks is simpler and allows to easily add custom ones, so this is the

preferred way of working with trace messages. The integer trace mask is kept for compatibility and for additional (but very rarely needed) flexibility only.

The standard trace masks are given in *wxLogTrace* (p. 1530) documentation.

Finally, the *wxLog::DoLog()* function automatically prepends a time stamp to all the messages. The format of the time stamp may be changed: it can be any string with % specifications fully described in the documentation of the standard *strftime()* function. For example, the default format is "[%d/%b/%y %H:%M:%S] " which gives something like "[17/Sep/98 22:10:16] " (without quotes) for the current date. Setting an empty string as the time format disables timestamping of the messages completely.

NB: Timestamping is disabled for Visual C++ users in debug builds by default because otherwise it would be impossible to directly go to the line from which the log message was generated by simply clicking in the debugger window on the corresponding error message. If you wish to enable it, please use *SetTimestamp* (p. 849) explicitly.

AddTraceMask (p. 846)

RemoveTraceMask (p. 850)

ClearTraceMasks (p. 846)

GetTraceMasks (p. 847)

IsAllowedTraceMask (p. 850)

SetVerbose (p. 849)

GetVerbose (p. 849)

SetTimestamp (p. 849)

GetTimestamp (p. 849)

SetTraceMask (p. 850)

GetTraceMask (p. 850)

wxLog::AddTraceMask

static void AddTraceMask(const wxString& mask)

Add the *mask* to the list of allowed masks for *wxLogTrace* (p. 1530).

See also

RemoveTraceMask (p. 850) *GetTraceMasks* (p. 847)

wxLog::ClearTraceMasks

static void ClearTraceMasks()

Removes all trace masks previously set with *AddTraceMask* (p. 846).

See also

RemoveTraceMask (p. 850)

wxLog::GetTraceMasks

static const wxArrayString & GetTraceMasks()

Returns the currently allowed list of string trace masks.

[See also](#)

AddTraceMask (p. 846).

wxLog::OnLog

static void OnLog(wxLogLevel level, const char * message)

Forwards the message at specified level to the *DoLog()* function of the active log target if there is any, does nothing otherwise.

wxLog::GetActiveTarget

static wxLog * GetActiveTarget()

Returns the pointer to the active log target (may be NULL).

wxLog::SetActiveTarget

static wxLog * SetActiveTarget(wxLog * logtarget)

Sets the specified log target as the active one. Returns the pointer to the previous active log target (may be NULL).

wxLog::Suspend

static void Suspend()

Suspends the logging until *Resume* (p. 848) is called. Note that the latter must be called the same number of times as the former to undo it, i.e. if you call *Suspend()* twice you must call *Resume()* twice as well.

Note that suspending the logging means that the log sink won't be flushed periodically, it doesn't have any effect if the current log target does the logging immediately without waiting for *Flush* (p. 848) to be called (the standard GUI log target only shows the log dialog when it is flushed, so *Suspend()* works as expected with it).

[See also](#)

Resume (p. 848),
wxLogNull (p. 1602)

wxLog::Resume

static void Resume()

Resumes logging previously suspended by a call to *Suspend* (p. 847). All messages logged in the meanwhile will be flushed soon.

wxLog::DoLog

virtual void DoLog(wxLogLevel level, const wxChar *msg, time_t timestamp)

Called to process the message of the specified severity. *msg* is the text of the message as specified in the call of *wxLogXXX()* function which generated it and *timestamp* is the moment when the message was generated.

The base class version prepends the timestamp to the message, adds a prefix corresponding to the log level and then calls *DoLogString* (p. 848) with the resulting string.

wxLog::DoLogString

virtual void DoLogString(const wxChar *msg, time_t timestamp)

Called to log the specified string. The timestamp is already included into the string but still passed to this function.

A simple implementation may just send the string to `stdout` or, better, `stderr`.

wxLog::DontCreateOnDemand

static void DontCreateOnDemand()

Instructs *wxLog* to not create new log targets on the fly if there is none currently. (Almost) for internal use only: it is supposed to be called by the application shutdown code.

Note that this function also calls *ClearTraceMasks* (p. 846).

wxLog::Flush

virtual void Flush()

Shows all the messages currently in buffer and clears it. If the buffer is already empty, nothing happens.

wxLog::FlushActive

static void FlushActive()

Flushes the current log target if any, does nothing if there is none.

See also

Flush (p. 848)

wxLog::SetVerbose

static void SetVerbose(bool verbose = true)

Activates or deactivates verbose mode in which the verbose messages are logged as the normal ones instead of being silently dropped.

wxLog::GetVerbose

static bool GetVerbose()

Returns whether the verbose mode is currently active.

wxLog::SetLogLevel

static void SetLogLevel(wxLogLevel logLevel)

Specifies that log messages with level > logLevel should be ignored and not sent to the active log target.

wxLog::GetLogLevel

static wxLogLevel GetLogLevel()

Returns the current log level limit.

wxLog::SetTimestamp

void SetTimestamp(const char * format)

Sets the timestamp format prepended by the default log targets to all messages. The string may contain any normal characters as well as %prefixed format specifiers, see *strftime()* manual for details. Passing a NULL value (not empty string) to this function disables message timestamping.

wxLog::GetTimestamp

const char * GetTimestamp() const

Returns the current timestamp format string.

wxLog::SetTraceMask

static void SetTraceMask(wxTraceMask mask)

Sets the trace mask, see *Customization* (p. 845) section for details.

wxLog::GetTraceMask

Returns the current trace mask, see *Customization* (p. 845) section for details.

wxLog::IsAllowedTraceMask

static bool IsAllowedTraceMask(const wxChar *mask)

Returns true if the *mask* is one of allowed masks for *wxLogTrace* (p. 1530).

See also: *AddTraceMask* (p. 846), *RemoveTraceMask* (p. 850)

wxLog::RemoveTraceMask

static void RemoveTraceMask(const wxString& mask)

Remove the *mask* from the list of allowed masks for *wxLogTrace* (p. 1530).

See also: *AddTraceMask* (p. 846)

wxLogChain

This simple class allows to chain log sinks, that is to install a new sink but keep passing log messages to the old one instead of replacing it completely as *SetActiveTarget* (p. 847) does.

It is especially useful when you want to divert the logs somewhere (for example to a file or a log window) but also keep showing the error messages using the standard dialogs as *wxLogGui* (p. 1602) does by default.

Example of usage:

```
wxLogChain *logChain = new wxLogChain(new wxLogStderr);  
  
// all the log messages are sent to stderr and also processed as usually  
...  
  
// don't delete logChain directly as this would leave a dangling  
// pointer as active log target, use SetActiveTarget() instead  
delete wxLog::SetActiveTarget(...something else or NULL...);
```

Derived from

wxLog (p. 844)

Include files

<wx/log.h>

wxLogChain::wxLogChain

wxLogChain(wxLog *logger)

Sets the specified *logger* (which may be `NULL`) as the default log target but the log messages are also passed to the previous log target if any.

wxLogChain::~~wxLogChain

~wxLogChain()

Destroys the previous log target.

wxLogChain::GetOldLog

wxLog * GetOldLog() const

Returns the pointer to the previously active log target (which may be `NULL`).

wxLogChain::IsPassingMessages

bool IsPassingMessages() const

Returns `true` if the messages are passed to the previously active log target (default) or `false` if *PassMessages* (p. 851) had been called.

wxLogChain::PassMessages

void PassMessages(bool passMessages)

By default, the log messages are passed to the previously active log target. Calling this function with `false` parameter disables this behaviour (presumably temporarily, as you shouldn't use *wxLogChain* at all otherwise) and it can be reenabled by calling it again with *passMessages* set to `true`.

wxLogChain::SetLog

void SetLog(wxLog *logger)

Sets another log target to use (may be `NULL`). The log target specified in the *constructor* (p. 851) or in a previous call to this function is deleted.

This doesn't change the old log target value (the one the messages are forwarded to) which still remains the same as was active when `wxLogChain` object was created.

wxLogGui

This is the default log target for the GUI `wxWidgets` applications. It is passed to `wxLog::SetActiveTarget` (p. 847) at the program startup and is deleted by `wxWidgets` during the program shut down.

Derived from

`wxLog` (p. 844)

Include files

`<wx/log.h>`

wxLogGui::wxLogGui

wxLogGui()

Default constructor.

wxLogNull

This class allows to temporarily suspend logging. All calls to the log functions during the life time of an object of this class are just ignored.

In particular, it can be used to suppress the log messages given by `wxWidgets` itself but it should be noted that it is rarely the best way to cope with this problem as **all** log messages are suppressed, even if they indicate a completely different error than the one the programmer wanted to suppress.

For instance, the example of the overview:

```
wxFile file;

// wxFile.Open() normally complains if file can't be opened, we don't
// want it
{
    wxLogNull logNo;
    if ( !file.Open("bar") )
```

```
    ... process error ourselves ...  
} // ~wxLogNull called, old log sink restored  
  
wxLogMessage("..."); // ok
```

would be better written as:

```
wxFile file;  
  
// don't try to open file if it doesn't exist, we are prepared to deal  
with  
// this ourselves - but all other errors are not expected  
if ( wxFile::Exists("bar") )  
{  
    // gives an error message if the file couldn't be opened  
    file.Open("bar");  
}  
else  
{  
    ...  
}
```

Derived from

wxLog (p. 844)

Include files

<wx/log.h>

wxLogNull::wxLogNull

wxLogNull()

Suspends logging.

wxLogNull::~~wxLogNull

Resumes logging.

wxLogPassThrough

A special version of *wxLogChain* (p. 850) which uses itself as the new log target. Maybe more clearly, it means that this is a log target which forwards the log messages to the previously installed one in addition to processing them itself.

Unlike *wxLogChain* (p. 850) which is usually used directly as is, this class must be derived from to implement *DoLog* (p. 848) and/or *DoLogString* (p. 848) methods.

Derived from

wxLogChain (p. 850)

Include files

<wx/log.h>

wxLogPassThrough::wxLogPassThrough

Default ctor installs this object as the current active log target.

wxLogStderr

This class can be used to redirect the log messages to a C file stream (not to be confused with C++ streams). It is the default log target for the non-GUI wxWidgets applications which send all the output to `stderr`.

Derived from

wxLog (p. 844)

Include files

<wx/log.h>

See also

wxLogStream (p. 854)

wxLogStderr::wxLogStderr

wxLogStderr(FILE *fp = NULL)

Constructs a log target which sends all the log messages to the given `FILE`. If it is `NULL`, the messages are sent to `stderr`.

wxLogStream

This class can be used to redirect the log messages to a C++ stream.

Please note that this class is only available if wxWidgets was compiled with the standard iostream library support (`wxUSE_STD_Iostream` must be on).

Derived from

wxLog (p. 844)

Include files

<wx/log.h>

See also

wxLogStderr (p. 854),
wxStreamToTextRedirector (p. 1200)

wxLogStream::wxLogStream

wxLogStream(std::ostream *ostr = NULL)

Constructs a log target which sends all the log messages to the given output stream. If it is `NULL`, the messages are sent to `cerr`.

wxLogTextCtrl

Using these target all the log messages can be redirected to a text control. The text control must have been created with `wxTE_MULTILINE` style by the caller previously.

Derived from

wxLog (p. 844)

Include files

<wx/log.h>

See also

wxLogTextCtrl (p. 855),
wxStreamToTextRedirector (p. 1200)

wxLogTextCtrl::wxLogTextCtrl

wxLogTextCtrl(wxTextCtrl *textctrl)

Constructs a log target which sends all the log messages to the given text control. The *textctrl* parameter cannot be `NULL`.

wxLogWindow

This class represents a background log window: to be precise, it collects all log messages in the log frame which it manages but also passes them on to the log target which was active at the moment of its creation. This allows, for example, to show all the

log messages in a frame but still continue to process them normally by showing the standard log dialog.

Derived from

wxLogPassThrough (p. 853)

Include files

<wx/log.h>

See also

wxLogTextCtrl (p. 855)

wxLogWindow::wxLogWindow

wxLogWindow(*wxFrame* *parent, const *wxChar* *title, bool show = true, bool passToOld = true)

Creates the log frame window and starts collecting the messages in it.

Parameters

parent

The parent window for the log frame, may be `NULL`

title

The title for the log frame

show

`true` to show the frame initially (default), otherwise *wxLogWindow::Show* (p. 856) must be called later.

passToOld

`true` to process the log messages normally in addition to logging them in the log frame (default), `false` to only log them in the log frame.

wxLogWindow::Show

void Show(bool show = true)

Shows or hides the frame.

wxLogWindow::GetFrame

wxFrame * GetFrame() const

Returns the associated log frame window. This may be used to position or resize it but use `wxLogWindow::Show` (p. 856) to show or hide it.

wxLogWindow::OnFrameCreate

virtual void OnFrameCreate(wxFrame *frame)

Called immediately after the log frame creation allowing for any extra initializations.

wxLogWindow::OnFrameClose

virtual void OnFrameClose(wxFrame *frame)

Called if the user closes the window interactively, will not be called if it is destroyed for another reason (such as when program exits).

Return `true` from here to allow the frame to close, `false` to prevent this from happening.

[See also](#)

`wxLogWindow::OnFrameDelete` (p. 857)

wxLogWindow::OnFrameDelete

virtual void OnFrameDelete(wxFrame *frame)

Called right before the log frame is going to be deleted: will always be called unlike `OnFrameClose()` (p. 857).

wxLongLong

This class represents a signed 64 bit long number. It is implemented using the native 64 bit type where available (machines with 64 bit longs or compilers which have (an analog of) `long long` type) and uses the emulation code in the other cases which ensures that it is the most efficient solution for working with 64 bit integers independently of the architecture.

`wxLongLong` defines all usual arithmetic operations such as addition, subtraction, bitwise shifts and logical operations as well as multiplication and division (not yet for the machines without native `long long`). It also has operators for implicit construction from and conversion to the native `long long` type if it exists and `long`.

You would usually use this type in exactly the same manner as any other (built-in) arithmetic type. Note that `wxLongLong` is a signed type, if you want unsigned values use `wxULongLong` which has exactly the same API as `wxLongLong` except when explicitly

mentioned otherwise.

If a native (i.e. supported directly by the compiler) 64 bit integer type was found to exist, `wxLongLong_t` macro will be defined to correspond to it. Also, in this case only, two additional macros will be defined: `wxLongLongFmtSpec` (p. 1513) for printing 64 bit integers using the standard `printf()` function (but see also `ToString()` (p. 859) for a more portable solution) and `wxLL` (p. 1512) for defining 64 bit integer compile-time constants.

Derived from

No base class

Include files

<wx/longlong.h>

wxLongLong::wxLongLong

wxLongLong()

Default constructor initializes the object to 0.

wxLongLong::wxLongLong

wxLongLong(wxLongLong_t ll)

Constructor from native long long (only for compilers supporting it).

wxLongLong::wxLongLong

wxLongLong(long hi, unsigned long lo)

Constructor from 2 longs: the high and low part are combined into one wxLongLong.

wxLongLong::operator=

wxLongLong& operator operator=(wxLongLong_t ll)

Assignment operator from native long long (only for compilers supporting it).

wxLongLong::Abs

wxLongLong Abs() const

wxLongLong& Abs()

Returns an absolute value of `wxLongLong` - either making a copy (const version) or modifying it in place (the second one). Not in `wxULongLong`.

`wxLongLong::Assign`

`wxLongLong& Assign(double d)`

This allows to convert a double value to `wxLongLong` type. Such conversion is not always possible in which case the result will be silently truncated in a platform-dependent way. Not in `wxULongLong`.

`wxLongLong::GetHi`

`long GetHi() const`

Returns the high 32 bits of 64 bit integer.

`wxLongLong::GetLo`

`unsigned long GetLo() const`

Returns the low 32 bits of 64 bit integer.

`wxLongLong::GetValue`

`wxLongLong_t GetValue() const`

Convert to native long long (only for compilers supporting it)

`wxLongLong::ToLong`

`long ToLong() const`

Truncate `wxLongLong` to long. If the conversion loses data (i.e. the `wxLongLong` value is outside the range of built-in long type), an assert will be triggered in debug mode.

`wxLongLong::ToString`

`wxString ToString() const`

Returns the string representation of a `wxLongLong`.

`wxLongLong::operator+`

`wxLongLong operator+(const wxLongLong& //) const`

Adds 2 wxLongLongs together and returns the result.

wxLongLong::operator+=

wxLongLong& operator+(const wxLongLong& //)

Add another wxLongLong to this one.

wxLongLong::operator++

wxLongLong& operator++()

wxLongLong& operator++(int)

Pre/post increment operator.

wxLongLong::operator-

wxLongLong operator-() const

Returns the value of this wxLongLong with opposite sign. Not in wxULongLong.

wxLongLong::operator-

wxLongLong operator-(const wxLongLong& //) const

Subtracts 2 wxLongLongs and returns the result.

wxLongLong::operator-=

wxLongLong& operator-(const wxLongLong& //)

Subtracts another wxLongLong from this one.

wxLongLong::operator--

wxLongLong& operator--()

wxLongLong& operator--(int)

Pre/post decrement operator.

wxMask

This class encapsulates a monochrome mask bitmap, where the masked area is black

and the unmasked area is white. When associated with a bitmap and drawn in a device context, the unmasked area of the bitmap will be drawn, and the masked area will not be drawn.

Derived from

wxObject (p. 954)

Include files

<wx/bitmap.h>

Remarks

A mask may be associated with a *wxBitmap* (p. 67). It is used in *wxDC::Blit* (p. 350) when the source device context is a *wxMemoryDC* (p. 881) with *wxBitmap* selected into it that contains a mask.

See also

wxBitmap (p. 67), *wxDC::Blit* (p. 350), *wxMemoryDC* (p. 881)

wxMask::wxMask

wxMask()

Default constructor.

wxMask(const wxBitmap (p. 67)& bitmap)

Constructs a mask from a monochrome bitmap.

wxPython note: This is the default constructor for *wxMask* in *wxPython*.

wxMask(const wxBitmap (p. 67)& bitmap, const wxColour (p. 150)& colour)

Constructs a mask from a bitmap and a colour that indicates the background.

wxPython note: *wxPython* has an alternate *wxMask* constructor matching this form called *wxMaskColour*.

wxMask(const wxBitmap& bitmap, int index)

Constructs a mask from a bitmap and a palette index that indicates the background. Not yet implemented for GTK.

Parameters

bitmap

A valid bitmap.

colour

A colour specifying the transparency RGB values.

index

Index into a palette, specifying the transparency colour.

wxMask::~~wxMask

~wxMask()

Destroys the wxMask object and the underlying bitmap data.

wxMask::Create

bool Create(const wxBitmap& *bitmap*)

Constructs a mask from a monochrome bitmap.

bool Create(const wxBitmap& *bitmap*, const wxColour& *colour*)

Constructs a mask from a bitmap and a colour that indicates the background.

bool Create(const wxBitmap& *bitmap*, int *index*)

Constructs a mask from a bitmap and a palette index that indicates the background. Not yet implemented for GTK.

Parameters

bitmap

A valid bitmap.

colour

A colour specifying the transparency RGB values.

index

Index into a palette, specifying the transparency colour.

wxMaximizeEvent

An event being sent when the frame is maximized (minimized) or restored.

Derived from

wxEvent (p. 441)

wxObject (p. 954)

Include files

<wx/event.h>

Event table macros

To process a maximize event, use this event handler macro to direct input to a member function that takes a `wxMaximizeEvent` argument.

EVT_MAXIMIZE(func) Process a `wxEVT_MAXIMIZE` event.

See also

Event handling overview (p. 1610), *wxFrame::Maximize* (p. 540), *wxFrame::IsMaximized* (p. 539)

wxMaximizeEvent::wxMaximizeEvent

wxMaximizeEvent(int id = 0)

Constructor.

wxMBConv

This class is the base class of a hierarchy of classes capable of converting text strings between multibyte (SBCS or DBCS) encodings and Unicode. It is itself a wrapper around the standard libc `mbstowcs()` and `wcstombs()` routines, and has one predefined instance, **wxConvLibc**.

Derived from

No base class

Include files

<wx/strconv.h>

See also

wxCSSConv (p. 210), *wxEncodingConverter* (p. 437), *wxMBConv classes overview* (p. 1593)

wxMBConv::wxMBConv

wxMBConv()

Constructor.

wxMBConv::MB2WC

virtual size_t MB2WC(wchar_t* buf, const char* psz, size_t n) const

Converts from a string *psz* in multibyte encoding to Unicode putting the output into the buffer *buf* of the size *n* (in wide characters, not bytes). If *buf* is `NULL`, nothing is written to it but the length of the string which would result from the conversion is calculated and returned. Note that this is the length and not size, i.e. the returned value does **not** include the trailing NUL. But when the function is called with a non-`NULL` buffer, the *n* parameter should be the size of the buffer and so it **should** take into account the trailing NUL.

Parameters*buf*

the output buffer, may be `NULL` if the caller is only interested in the length of the resulting string

psz

the NUL-terminated input string, cannot be `NULL`

n

the size of the output buffer, ignored if *buf* is `NULL`

Return value

The length of the converted string.

wxMBConv::WC2MB

virtual size_t WC2MB(char* buf, const wchar_t* psz, size_t n) const

Converts from Unicode to multibyte encoding. The semantics of this function (including the return value meaning) is the same as for *MB2WC* (p. 864).

Notice that when the function is called with a non-`NULL` buffer, the *n* parameter should be the size of the buffer and so it **should** take into account the trailing NUL, which might take two or four bytes for some encodings (UTF-16 and UTF-32).

wxMBConv::cMB2WC

const wxWCharBuffer cMB2WC(const char* psz) const

Converts from multibyte encoding to Unicode by calling *MB2WC*, allocating a temporary `wxWCharBuffer` to hold the result.

wxMBConv::cWC2MB

const wxCharBuffer cWC2MB(const wchar_t* psz) const

Converts from Unicode to multibyte encoding by calling WC2MB, allocating a temporary wxCharBuffer to hold the result.

wxMBConv::cMB2WX

const char* cMB2WX(const char* psz) const

const wxWCharBuffer cMB2WX(const char* psz) const

Converts from multibyte encoding to the current wxChar type (which depends on whether wxUSE_UNICODE is set to 1). If wxChar is char, it returns the parameter unaltered. If wxChar is wchar_t, it returns the result in a wxWCharBuffer. The macro wxMB2WXbuf is defined as the correct return type (without const).

wxMBConv::cWX2MB

const char* cWX2MB(const wxChar* psz) const

const wxCharBuffer cWX2MB(const wxChar* psz) const

Converts from the current wxChar type to multibyte encoding. If wxChar is char, it returns the parameter unaltered. If wxChar is wchar_t, it returns the result in a wxCharBuffer. The macro wxWX2MBbuf is defined as the correct return type (without const).

wxMBConv::cWC2WX

const wchar_t* cWC2WX(const wchar_t* psz) const

const wxCharBuffer cWC2WX(const wchar_t* psz) const

Converts from Unicode to the current wxChar type. If wxChar is wchar_t, it returns the parameter unaltered. If wxChar is char, it returns the result in a wxCharBuffer. The macro wxWC2WXbuf is defined as the correct return type (without const).

wxMBConv::cWX2WC

const wchar_t* cWX2WC(const wxChar* psz) const

const wxWCharBuffer cWX2WC(const wxChar* psz) const

Converts from the current wxChar type to Unicode. If wxChar is wchar_t, it returns the parameter unaltered. If wxChar is char, it returns the result in a wxWCharBuffer. The macro wxWX2WCbuf is defined as the correct return type (without const).

wxMBConvFile

This class converts file names between filesystem multibyte encoding and Unicode. It has one predefined instance, **wxConvFile**. Since some platforms (e.g. Win32) use Unicode in the filenames, and others (e.g. Unix) use multibyte encodings, this class should only be used directly if wxMBFILES is defined to 1. A convenience macro, wxFNCONV, is defined to wxConvFile.cWX2MB in this case. You could use it like this:

```
wxChar *name = wxT("rawfile.doc");  
FILE *fil = fopen(wxFNCONV(name), "r");
```

(although it would be better to use wxFopen(name, wxT("r")) in this case.)

Derived from

wxMBConv (p. 863)

Include files

<wx/strconv.h>

See also

wxMBConv classes overview (p. 1593)

wxMBConvFile::MB2WC

size_t MB2WC(wchar_t* buf, const char* psz, size_t n) const

Converts from multibyte filename encoding to Unicode. Returns the size of the destination buffer.

wxMBConvFile::WC2MB

size_t WC2MB(char* buf, const wchar_t* psz, size_t n) const

Converts from Unicode to multibyte filename encoding. Returns the size of the destination buffer.

wxMBConvUTF7

This class converts between the UTF-7 encoding and Unicode. It has one predefined instance, **wxConvUTF7**.

WARNING: this class is not implemented yet.

Derived from

wxMBConv (p. 863)

Include files

<wx/strconv.h>

See also

wxMBConvUTF8 (p. 867), *wxMBConv classes overview* (p. 1593)

wxMBConvUTF7::MB2WC

size_t MB2WC(wchar_t* buf, const char* psz, size_t n) const

Converts from UTF-7 encoding to Unicode. Returns the size of the destination buffer.

wxMBConvUTF7::WC2MB

size_t WC2MB(char* buf, const wchar_t* psz, size_t n) const

Converts from Unicode to UTF-7 encoding. Returns the size of the destination buffer.

wxMBConvUTF8

This class converts between the UTF-8 encoding and Unicode. It has one predefined instance, **wxConvUTF8**.

Derived from

wxMBConv (p. 863)

Include files

<wx/strconv.h>

See also

wxMBConvUTF7 (p. 866), *wxMBConv classes overview* (p. 1593)

Remarks

UTF-8 is a compatibility encoding used to encode Unicode text into anything that was originally written for 8-bit strings, including (but not limited to) filenames, transfer protocols, and database fields. Notable properties include:

- Variable-length encoding able to encode up to 31 bits per character
- ASCII characters (character values under 128) are encoded as plain ASCII (1 byte per character)

- Null bytes do not occur in the encoding, except when there's an actual Unicode null character
- Preserves sort ordering for plain 8-bit comparison routines like `strcmp()`
- High bit patterns disambiguates character boundaries, and makes it easy to detect whether a string is encoded with UTF-8 or not

All of these properties make UTF-8 a very favorable solution in any situation where full Unicode character support is desired while remaining compatible with code written with only 8-bit extended-ASCII characters in mind.

wxMBConvUTF8::MB2WC

size_t MB2WC(wchar_t* buf, const char* psz, size_t n) const

Converts from UTF-8 encoding to Unicode. Returns the size of the destination buffer.

wxMBConvUTF8::WC2MB

size_t WC2MB(char* buf, const wchar_t* psz, size_t n) const

Converts from Unicode to UTF-8 encoding. Returns the size of the destination buffer.

wxMBConvUTF16

This class is used to convert between multibyte encodings and UTF-16 Unicode encoding (also known as UCS-2). Unlike *UTF-8* (p. 867) encoding, UTF-16 uses words and not bytes and hence depends on the byte ordering: big or little endian. Hence this class is provided in two versions: `wxMBConvUTF16LE` and `wxMBConvUTF16BE` and `wxMBConvUTF16` itself is just a typedef for one of them (native for the given platform, e.g. LE under Windows and BE under Mac).

Derived from

`wxMBConv` (p. 863)

Include files

`<wx/strconv.h>`

See also

`wxMBConvUTF8` (p. 867), `wxMBConvUTF32` (p. 869), *wxMBConv classes overview* (p. 1593)

wxMBConvUTF16::MB2WC

size_t MB2WC(wchar_t* buf, const char* psz, size_t n) const

Converts from UTF-16 encoding to Unicode. Returns the size of the destination buffer.

wxMBConvUTF16::WC2MB

size_t WC2MB(char* buf, const wchar_t* psz, size_t n) const

Converts from Unicode to UTF-16 encoding. Returns the size of the destination buffer.

wxMBConvUTF32

This class is used to convert between multibyte encodings and UTF-32 Unicode encoding (also known as UCS-4). Unlike *UTF-8* (p. 867) encoding, UTF-32 uses (double) words and not bytes and hence depends on the byte ordering: big or little endian. Hence this class is provided in two versions: *wxMBConvUTF32LE* and *wxMBConvUTF32BE* and *wxMBConvUTF32* itself is just a typedef for one of them (native for the given platform, e.g. LE under Windows and BE under Mac).

Derived from

wxMBConv (p. 863)

Include files

<wx/strconv.h>

See also

wxMBConvUTF8 (p. 867), *wxMBConvUTF16* (p. 868), *wxMBConv classes overview* (p. 1593)

wxMBConvUTF32::MB2WC

size_t MB2WC(wchar_t* buf, const char* psz, size_t n) const

Converts from UTF-32 encoding to Unicode. Returns the size of the destination buffer.

wxMBConvUTF32::WC2MB

size_t WC2MB(char* buf, const wchar_t* psz, size_t n) const

Converts from Unicode to UTF-32 encoding. Returns the size of the destination buffer.

wxMDIChildFrame

An MDI child frame is a frame that can only exist on a *wxMDIClientWindow* (p. 873), which is itself a child of *wxMDIParentFrame* (p. 874).

Derived from

wxFrame (p. 532)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/mdi.h>

Window styles

wxCAPTION	Puts a caption on the frame.
wxDEFAULT_FRAME_STYLE	Defined as wxMINIMIZE_BOX wxMAXIMIZE_BOX wxTHICK_FRAME wxSYSTEM_MENU wxCAPTION .
wxICONIZE	Display the frame iconized (minimized) (Windows only).
wxMAXIMIZE	Displays the frame maximized (Windows only).
wxMAXIMIZE_BOX	Displays a maximize box on the frame (Windows and Motif only).
wxMINIMIZE	Identical to wxICONIZE .
wxMINIMIZE_BOX	Displays a minimize box on the frame (Windows and Motif only).
wxRESIZE_BORDER	Displays a resizable border around the window (Motif only; for Windows, it is implicit in wxTHICK_FRAME).
wxSTAY_ON_TOP	Stay on top of other windows (Windows only).
wxSYSTEM_MENU	Displays a system menu (Windows and Motif only).
wxTHICK_FRAME	Displays a thick frame around the window (Windows and Motif only).

See also *window styles overview* (p. 1618).

Remarks

Although internally an MDI child frame is a child of the MDI client window, in *wxWidgets* you create it as a child of *wxMDIParentFrame* (p. 874). You can usually forget that the client window exists.

MDI child frames are clipped to the area of the MDI client window, and may be iconized

on the client window.

You can associate a menubar with a child frame as usual, although an MDI child doesn't display its menubar under its own title bar. The MDI parent frame's menubar will be changed to reflect the currently active child frame. If there are currently no children, the parent frame's own menubar will be displayed.

See also

wxMDIClientWindow (p. 873), *wxMDIParentFrame* (p. 874), *wxFrame* (p. 532)

wxMDIChildFrame::wxMDIChildFrame

wxMDIChildFrame()

Default constructor.

wxMDIChildFrame(wxMDIParentFrame* parent, wxWindowID id, const wxString& title, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxDEFAULT_FRAME_STYLE, const wxString& name = "frame")

Constructor, creating the window.

Parameters

parent

The window parent. This should not be NULL.

id

The window identifier. It may take a value of -1 to indicate a default value.

title

The caption to be displayed on the frame's title bar.

pos

The window position. A value of (-1, -1) indicates a default position, chosen by either the windowing system or wxWidgets, depending on platform.

size

The window size. A value of (-1, -1) indicates a default size, chosen by either the windowing system or wxWidgets, depending on platform.

style

The window style. See *wxMDIChildFrame* (p. 870).

name

The name of the window. This parameter is used to associate a name with the item, allowing the application user to set Motif resource values for individual windows.

Remarks

None.

See also

wxMDIChildFrame::Create (p. 872)

wxMDIChildFrame::~~wxMDIChildFrame

~wxMDIChildFrame()

Destructor. Destroys all child windows and menu bar if present.

wxMDIChildFrame::Activate

void Activate()

Activates this MDI child frame.

See also

wxMDIChildFrame::Maximize (p. 872), *wxMDIChildFrame::Restore* (p. 872)

wxMDIChildFrame::Create

bool Create(wxWindow* parent, wxWindowID id, const wxString& title, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxDEFAULT_FRAME_STYLE, const wxString& name = "frame")

Used in two-step frame construction. See *wxMDIChildFrame::wxMDIChildFrame* (p. 871) for further details.

wxMDIChildFrame::Maximize

void Maximize()

Maximizes this MDI child frame.

See also

wxMDIChildFrame::Activate (p. 872), *wxMDIChildFrame::Restore* (p. 872)

wxMDIChildFrame::Restore

void Restore()

Restores this MDI child frame (unmaximizes).

See also

wxMDIChildFrame::Activate (p. 872), *wxMDIChildFrame::Maximize* (p. 872)

wxMDIClientWindow

An MDI client window is a child of *wxMDIParentFrame* (p. 874), and manages zero or more *wxMDIChildFrame* (p. 870) objects.

Derived from

wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/mdi.h>

Remarks

The client window is the area where MDI child windows exist. It doesn't have to cover the whole parent frame; other windows such as toolbars and a help window might coexist with it. There can be scrollbars on a client window, which are controlled by the parent window style.

The **wxMDIClientWindow** class is usually adequate without further derivation, and it is created automatically when the MDI parent frame is created. If the application needs to derive a new class, the function *wxMDIParentFrame::OnCreateClient* (p. 880) must be overridden in order to give an opportunity to use a different class of client window.

Under Windows 95, the client window will automatically have a sunken border style when the active child is not maximized, and no border style when a child is maximized.

See also

wxMDIChildFrame (p. 870), *wxMDIParentFrame* (p. 874), *wxFrame* (p. 532)

wxMDIClientWindow::wxMDIClientWindow

wxMDIClientWindow()

Default constructor.

wxMDIClientWindow(wxMDIParentFrame* parent, long style = 0)

Constructor, creating the window.

Parameters

parent

The window parent.

style

The window style. Currently unused.

Remarks

The second style of constructor is called within *wxMDIParentFrame::OnCreateClient* (p. 880).

See also

wxMDIParentFrame::wxMDIParentFrame (p. 876), *wxMDIParentFrame::OnCreateClient* (p. 880)

wxMDIClientWindow::~~wxMDIClientWindow

~wxMDIClientWindow()

Destructor.

wxMDIClientWindow::CreateClient

bool CreateClient(wxMDIParentFrame* parent, long style = 0)

Used in two-step frame construction. See *wxMDIClientWindow::wxMDIClientWindow* (p. 873) for further details.

wxMDIParentFrame

An MDI (Multiple Document Interface) parent frame is a window which can contain MDI child frames in its own 'desktop'. It is a convenient way to avoid window clutter, and is used in many popular Windows applications, such as Microsoft Word(TM).

Derived from

wxFrame (p. 532)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/mdi.h>

Remarks

There may be multiple MDI parent frames in a single application, but this probably only makes sense within programming development environments.

Child frames may be of class *wxMDIChildFrame* (p. 870) (contained within the parent frame) or *wxFrame* (p. 532) (shown as a top-level frame).

An MDI parent frame always has a *wxMDIClientWindow* (p. 873) associated with it, which is the parent for MDI client frames. This client window may be resized to accommodate non-MDI windows, as seen in Microsoft Visual C++ (TM) and Microsoft Publisher (TM), where a documentation window is placed to one side of the workspace.

MDI remains popular despite dire warnings from Microsoft itself that MDI is an obsolete user interface style.

The implementation is native in Windows, and simulated under Motif. Under Motif, the child window frames will often have a different appearance from other frames because the window decorations are simulated.

Window styles

wxCAPTION	Puts a caption on the frame.
wxDEFAULT_FRAME_STYLE	Defined as wxMINIMIZE_BOX wxMAXIMIZE_BOX wxTHICK_FRAME wxSYSTEM_MENU wxCAPTION .
wxHSCROLL	Displays a horizontal scrollbar in the <i>client window</i> , allowing the user to view child frames that are off the current view.
wxICONIZE	Display the frame iconized (minimized) (Windows only).
wxMAXIMIZE	Displays the frame maximized (Windows only).
wxMAXIMIZE_BOX	Displays a maximize box on the frame (Windows and Motif only).
wxMINIMIZE	Identical to wxICONIZE .
wxMINIMIZE_BOX	Displays a minimize box on the frame (Windows and Motif only).
wxRESIZE_BORDER	Displays a resizable border around the window (Motif only; for Windows, it is implicit in wxTHICK_FRAME).
wxSTAY_ON_TOP	Stay on top of other windows (Windows only).
wxSYSTEM_MENU	Displays a system menu (Windows and Motif only).
wxTHICK_FRAME	Displays a thick frame around the window (Windows and Motif only).

wxVSCROLL Displays a vertical scrollbar in the *client window*, allowing the user to view child frames that are off the current view.

wxFRAME_NO_WINDOW_MENU Under Windows, removes the Window menu that is normally added automatically.

See also *window styles overview* (p. 1618).

See also

wxMDIChildFrame (p. 870), *wxMDIClientWindow* (p. 873), *wxFrame* (p. 532), *wxDialog* (p. 369)

wxMDIParentFrame::wxMDIParentFrame

wxMDIParentFrame()

Default constructor.

wxMDIParentFrame(*wxWindow** parent, *wxWindowID* id, **const wxString&** title, **const wxPoint&** pos = *wxDefaultPosition*, **const wxSize&** size = *wxDefaultSize*, **long** style = *wxDEFAULT_FRAME_STYLE* | *wxVSCROLL* | *wxHSCROLL*, **const wxString&** name = "frame")

Constructor, creating the window.

Parameters

parent

The window parent. This should be NULL.

id

The window identifier. It may take a value of -1 to indicate a default value.

title

The caption to be displayed on the frame's title bar.

pos

The window position. A value of (-1, -1) indicates a default position, chosen by either the windowing system or wxWidgets, depending on platform.

size

The window size. A value of (-1, -1) indicates a default size, chosen by either the windowing system or wxWidgets, depending on platform.

style

The window style. See *wxMDIParentFrame* (p. 874).

name

The name of the window. This parameter is used to associate a name with the item, allowing the application user to set Motif resource values for individual windows.

Remarks

During the construction of the frame, the client window will be created. To use a different class from *wxMDIClientWindow* (p. 873), override *wxMDIParentFrame::OnCreateClient* (p. 880).

Under Windows 95, the client window will automatically have a sunken border style when the active child is not maximized, and no border style when a child is maximized.

See also

wxMDIParentFrame::Create (p. 878), *wxMDIParentFrame::OnCreateClient* (p. 880)

wxMDIParentFrame::~~wxMDIParentFrame

~wxMDIParentFrame()

Destructor. Destroys all child windows and menu bar if present.

wxMDIParentFrame::ActivateNext

void ActivateNext()

Activates the MDI child following the currently active one.

See also

wxMDIParentFrame::ActivatePrevious (p. 877)

wxMDIParentFrame::ActivatePrevious

void ActivatePrevious()

Activates the MDI child preceding the currently active one.

See also

wxMDIParentFrame::ActivateNext (p. 877)

wxMDIParentFrame::ArrangeIcons

void ArrangeIcons()

Arranges any iconized (minimized) MDI child windows.

See also

wxMDIParentFrame::Cascade (p. 878), *wxMDIParentFrame::Tile* (p. 881)

wxMDIParentFrame::Cascade

void Cascade()

Arranges the MDI child windows in a cascade.

See also

wxMDIParentFrame::Tile (p. 881), *wxMDIParentFrame::ArrangeIcons* (p. 877)

wxMDIParentFrame::Create

bool Create(*wxWindow* parent*, *wxWindowID id*, **const wxString& title**, **const wxPoint& pos** = *wxDefaultPosition*, **const wxSize& size** = *wxDefaultSize*, **long style** = *wxDEFAULT_FRAME_STYLE* | *wxVSCROLL* | *wxHSCROLL*, **const wxString& name** = *"frame"*)

Used in two-step frame construction. See *wxMDIParentFrame::wxMDIParentFrame* (p. 876) for further details.

wxMDIParentFrame::GetClientSize

virtual void GetClientSize(*int* width*, *int* height*) **const**

This gets the size of the frame 'client area' in pixels.

Parameters

width

Receives the client width in pixels.

height

Receives the client height in pixels.

Remarks

The client area is the area which may be drawn on by the programmer, excluding title bar, border, status bar, and toolbar if present.

If you wish to manage your own toolbar (or perhaps you have more than one), provide an **OnSize** event handler. Call **GetClientSize** to find how much space there is for your

windows and don't forget to set the size and position of the MDI client window as well as your toolbar and other windows (but not the status bar).

If you have set a toolbar with `wxMDIParentFrame::SetToolBar` (p. 880), the client size returned will have subtracted the toolbar height. However, the available positions for the client window and other windows of the frame do not start at zero - you must add the toolbar height.

The position and size of the status bar and toolbar (if known to the frame) are always managed by **wxMDIParentFrame**, regardless of what behaviour is defined in your **OnSize** event handler. However, the client window position and size are always set in **OnSize**, so if you override this event handler, make sure you deal with the client window.

You do not have to manage the size and position of MDI child windows, since they are managed automatically by the client window.

See also

`wxMDIParentFrame::GetToolBar` (p. 879), `wxMDIParentFrame::SetToolBar` (p. 880), `wxMDIClientWindow` (p. 873)

wxPython note: The wxPython version of this method takes no arguments and returns a tuple containing width and height.

wxMDIParentFrame::GetActiveChild

wxMDIChildFrame* GetActiveChild() const

Returns a pointer to the active MDI child, if there is one.

wxMDIParentFrame::GetClientWindow

wxMDIClientWindow* GetClientWindow() const

Returns a pointer to the client window.

See also

`wxMDIParentFrame::OnCreateClient` (p. 880)

wxMDIParentFrame::GetToolBar

virtual wxWindow* GetToolBar() const

Returns the window being used as the toolbar for this frame.

See also

`wxMDIParentFrame::SetToolBar` (p. 880)

wxMDIParentFrame::GetWindowMenu

wxMenu* GetWindowMenu() const

Returns the current Window menu (added by wxWidgets to the menubar). This function is available under Windows only.

wxMDIParentFrame::OnCreateClient

virtual wxMDIClientWindow* OnCreateClient()

Override this to return a different kind of client window. If you override this function, you must create your parent frame in two stages, or your function will never be called, due to the way C++ treats virtual functions called from constructors. For example:

```
frame = new MyParentFrame;  
frame->Create(parent, myParentFrameId, wxT("My Parent Frame"));
```

Remarks

You might wish to derive from *wxMDIClientWindow* (p. 873) in order to implement different erase behaviour, for example, such as painting a bitmap on the background.

Note that it is probably impossible to have a client window that scrolls as well as painting a bitmap or pattern, since in **OnScroll**, the scrollbar positions always return zero. (Solutions to: julian.smart@btopenworld.com).

See also

wxMDIParentFrame::GetClientWindow (p. 879), *wxMDIClientWindow* (p. 873)

wxMDIParentFrame::SetToolBar

virtual void SetToolBar(wxWindow* toolbar)

Sets the window to be used as a toolbar for this MDI parent window. It saves the application having to manage the positioning of the toolbar MDI client window.

Parameters*toolbar*

Toolbar to manage.

Remarks

When the frame is resized, the toolbar is resized to be the width of the frame client area, and the toolbar height is kept the same.

The parent of the toolbar must be this frame.

If you wish to manage your own toolbar (or perhaps you have more than one), don't call

this function, and instead manage your subwindows and the MDI client window by providing an **OnSize** event handler. Call `wxMDIParentFrame::GetClientSize` (p. 878) to find how much space there is for your windows.

Note that SDI (normal) frames and MDI child windows must always have their toolbars managed by the application.

See also

`wxMDIParentFrame::GetToolBar` (p. 879), `wxMDIParentFrame::GetClientSize` (p. 878)

wxMDIParentFrame::SetWindowMenu

void SetWindowMenu(wxMenu* menu)

Call this to change the current Window menu. Ownership of the menu object passes to the frame when you call this function.

This call is available under Windows only.

To remove the window completely, use the `wxFRAME_NO_WINDOW_MENU` window style.

wxMDIParentFrame::Tile

void Tile()

Tiles the MDI child windows.

See also

`wxMDIParentFrame::Cascade` (p. 878), `wxMDIParentFrame::ArrangeIcons` (p. 877)

wxMemoryDC

A memory device context provides a means to draw graphics onto a bitmap. When drawing in to a mono-bitmap, using `wxWHITE`, `wxWHITE_PEN` and `wxWHITE_BRUSH` will draw the background colour (i.e. 0) whereas all other colours will draw the foreground colour (i.e. 1).

Derived from

`wxDC` (p. 349)

`wxObject` (p. 954)

Include files

<wx/dcmemory.h>

Remarks

A bitmap must be selected into the new memory DC before it may be used for anything. Typical usage is as follows:

```
// Create a memory DC
wxMemoryDC temp_dc;
temp_dc.SelectObject(test_bitmap);

// We can now draw into the memory DC...
// Copy from this DC to another DC.
old_dc.Blit(250, 50, BITMAP_WIDTH, BITMAP_HEIGHT, temp_dc, 0, 0);
```

Note that the memory DC *must* be deleted (or the bitmap selected out of it) before a bitmap can be reselected into another memory DC.

See also

wxBitmap (p. 67), *wxDC* (p. 349)

wxMemoryDC::wxMemoryDC

wxMemoryDC()

Constructs a new memory device context.

Use the *Ok* member to test whether the constructor was successful in creating a usable device context. Don't forget to select a bitmap into the DC before drawing on it.

wxMemoryDC::SelectObject

SelectObject(const wxBitmap& *bitmap*)

Selects the given bitmap into the device context, to use as the memory bitmap. Selecting the bitmap into a memory DC allows you to draw into the DC (and therefore the bitmap) and also to use **Blit** to copy the bitmap to a window. For this purpose, you may find *wxDC::DrawIcon* (p. 354) easier to use instead.

If the argument is *wxNullBitmap* (or some other uninitialised *wxBitmap*) the current bitmap is selected out of the device context, and the original bitmap restored, allowing the current bitmap to be destroyed safely.

wxMemoryFSHandler

This *wxFileSystem* (p. 494) handler can store arbitrary data in memory stream and make them accessible via URL. It is particularly suitable for storing bitmaps from resources or included XPM files so that they can be used with *wxHTML*.

Filenames are prefixed with "memory:", e.g. "memory:myfile.html".

Example:

```

#ifndef __WXMSW__
#include "logo.xpm"
#endif

void MyFrame::OnAbout(wxCommandEvent&)
{
    wxBusyCursor bcur;
    wxFileSystem::AddHandler(new wxMemoryFSHandler);
    wxMemoryFSHandler::AddFile("logo.pcx", wxBITMAP(logo),
wxBITMAP_TYPE_PCX);
    wxMemoryFSHandler::AddFile("about.htm",
                                "<html><body>About: "
                                "<img
src=\"memory:logo.pcx\"></body></html>");

    wxDialog dlg(this, -1, wxString(_("About")));
    wxBoxSizer *topsizer;
    wxHtmlWindow *html;
    topsizer = new wxBoxSizer(wxVERTICAL);
    html = new wxHtmlWindow(&dlg, -1, wxDefaultPosition,
                            wxSize(380, 160), wxHW_SCROLLBAR_NEVER);
    html->SetBorders(0);
    html->LoadPage("memory:about.htm");
    html->SetSize(html->GetInternalRepresentation()->GetWidth(),
                  html->GetInternalRepresentation()->GetHeight());
    topsizer->Add(html, 1, wxALL, 10);
    topsizer->Add(new wxStaticLine(&dlg, -1), 0, wxEXPAND | wxLEFT |
wxRIGHT, 10);
    topsizer->Add(new wxButton(&dlg, wxID_OK, "Ok"),
                  0, wxALL | wxALIGN_RIGHT, 15);
    dlg.SetAutoLayout(true);
    dlg.SetSizer(topsizer);
    topsizer->Fit(&dlg);
    dlg.Centre();
    dlg.ShowModal();

    wxMemoryFSHandler::RemoveFile("logo.pcx");
    wxMemoryFSHandler::RemoveFile("about.htm");
}

```

Derived from

wxFileSystemHandler (p. 496)

Include files

<wx/fs_mem.h>

wxMemoryFSHandler::wxMemoryFSHandler

wxMemoryFSHandler()

Constructor.

wxMemoryFSHandler::AddFile

static void AddFile(const wxString& filename, wxImage& image, long type)

static void AddFile(const wxString& filename, const wxBitmap& bitmap, long type)

static void AddFile(const wxString& filename, const wxString& textdata)

static void AddFile(const wxString& filename, const void* binarydata, size_t size)

Add file to list of files stored in memory. Stored data (bitmap, text or raw data) will be copied into private memory stream and available under name "memory:" + filename.

Note that when storing image/bitmap, you must use image format that wxWidgets can write (e.g. JPG, PNG, see *wxImage documentation* (p. 728))!

wxMemoryFSHandler::RemoveFile

static void RemoveFile(const wxString& filename)

Remove file from memory FS and free occupied memory.

wxMemoryInputStream

Derived from

wxInputStream (p. 762)

Include files

<wx/mstream.h>

See also

wxStreamBuffer (p. 1194), *wxMemoryOutputStream* (p. 884)

wxMemoryInputStream::wxMemoryInputStream

wxMemoryInputStream(const char * data, size_t len)

Initializes a new read-only memory stream which will use the specified *bufferdata* of length *len*. The stream does not take ownership of the buffer, i.e. that it will not delete in its destructor.

wxMemoryInputStream::~~wxMemoryInputStream

~wxMemoryInputStream()

Destructor.

wxMemoryOutputStream

Derived from

wxOutputStream (p. 958)

Include files

<wx/mstream.h>

See also

wxStreamBuffer (p. 1194)

wxMemoryOutputStream::wxMemoryOutputStream

wxMemoryOutputStream(char * *data* = *NULL*, size_t *length* = 0)

If *data* is *NULL*, then it will initialize a new empty buffer which will grow if required.

Warning

If the buffer is created, it will be destroyed at the destruction of the stream.

wxMemoryOutputStream::~~wxMemoryOutputStream

~wxMemoryOutputStream()

Destructor.

wxMemoryOutputStream::CopyTo

size_t **CopyTo**(char **buffer*, size_t *len*) const

CopyTo allowed you to transfer data from the internal buffer of *wxMemoryOutputStream* to an external buffer. *len* specifies the size of the buffer.

Returned value

CopyTo returns the number of bytes copied to the buffer. Generally it is either *len* or the size of the stream buffer.

wxMenu

A menu is a popup (or pull down) list of items, one of which may be selected before the menu goes away (clicking elsewhere dismisses the menu). Menus may be used to construct either menu bars or popup menus.

A menu item has an integer ID associated with it which can be used to identify the

selection, or to change the menu item in some way. A menu item with a special identifier -1 is a separator item and doesn't have an associated command but just makes a separator line appear in the menu.

Menu items may be either normal items, check items or radio items. Normal items don't have any special properties while the check items have a boolean flag associated to them and they show a checkmark in the menu when the flag is set. `wxWidgets` automatically toggles the flag value when the item is clicked and its value may be retrieved using either *IsChecked* (p. 895) method of `wxMenu` or `wxMenuBar` itself or by using *wxEvent::IsChecked* (p. 170) when you get the menu notification for the item in question.

The radio items are similar to the check items except that all the other items in the same radio group are unchecked when a radio item is checked. The radio group is formed by a contiguous range of radio items, i.e. it starts at the first item of this kind and ends with the first item of a different kind (or the end of the menu). Notice that because the radio groups are defined in terms of the item positions inserting or removing the items in the menu containing the radio items risks to not work correctly. Finally note that the radio items are only supported under Windows and GTK+ currently.

Allocation strategy

All menus except the popup ones must be created on the heap. All menus attached to a menubar or to another menu will be deleted by their parent when it is deleted. As the frame menubar is deleted by the frame itself, it means that normally all menus used are deleted automatically.

Derived from

wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/menu.h>

Event handling

If the menu is part of a menubar, then *wxMenuBar* (p. 899) event processing is used.

With a popup menu, there is a variety of ways to handle a menu selection event (`wxEVT_COMMAND_MENU_SELECTED`).

1. Derive a new class from `wxMenu` and define event table entries using the `EVT_MENU` macro.
2. Set a new event handler for `wxMenu`, using an object whose class has `EVT_MENU` entries.
3. Provide `EVT_MENU` handlers in the window which pops up the menu, or in an ancestor of this window.
4. Define a callback of type `wxFunction`, which you pass to the `wxMenu` constructor. The callback takes a reference to the menu, and a reference to

awxCommandEvent (p. 165). This method is deprecated and should not be used in the new code, it is provided for backwards compatibility only.

See also

wxMenuBar (p. 899), *wxWindow::PopupMenu* (p. 1417), *Event handling overview* (p. 1610)

wxMenu::wxMenu

wxMenu(const wxString& title = "", long style = 0)

Constructs a wxMenu object.

Parameters

title

A title for the popup menu: the empty string denotes no title.

style

If set to `wxMENU_TEAROFF`, the menu will be detachable (wxGTK only).

wxMenu(long style)

Constructs a wxMenu object.

Parameters

style

If set to `wxMENU_TEAROFF`, the menu will be detachable (wxGTK only).

wxMenu::~wxMenu

~wxMenu()

Destructor, destroying the menu.

Note: under Motif, a popup menu must have a valid parent (the window it was last popped up on) when being destroyed. Therefore, make sure you delete or re-use the popup menu *before* destroying the parent window. Re-use in this context means popping up the menu on a different window from last time, which causes an implicit destruction and recreation of internal data structures.

wxMenu::Append

wxMenuItem* Append(int id, const wxString& item, const wxString& helpString = "",

wxItemKind *kind* = wxITEM_NORMAL)

Adds a string item to the end of the menu.

wxMenuItem* **Append**(int *id*, const wxString& *item*, wxMenu **subMenu*, const wxString& *helpString* = "")

Adds a pull-right submenu to the end of the menu. Append the submenu to the parent menu *after* you have added your menu items, or accelerators may not be registered properly.

wxMenuItem* **Append**(wxMenuItem* *menuItem*)

Adds a menu item object. This is the most generic variant of Append() method because it may be used for both items (including separators) and submenus and because you can also specify various extra properties of a menu item this way, such as bitmaps and fonts.

Parameters

id

The menu command identifier.

item

The string to appear on the menu item.

menu

Pull-right submenu.

kind

May be wxITEM_SEPARATOR, wxITEM_NORMAL, wxITEM_CHECK or wxITEM_RADIO

helpString

An optional help string associated with the item. By default, the handler for the wxEVT_MENU_HIGHLIGHT event displays this string in the status line.

menuItem

A menuItem object. It will be owned by the wxMenu object after this function is called, so do not delete it yourself.

Remarks

This command can be used after the menu has been shown, as well as on initial creation of a menu or menubar.

The *item* string for the normal menu items (not submenus or separators) may include the accelerator which can be used to activate the menu item from keyboard. The accelerator string follows the item label and is separated from it by a TAB character ('\t '). Its

general syntax is any combination of "CTRL", "ALT" and "SHIFT" strings (case doesn't matter) separated by either '-' or '+' characters and followed by the accelerator itself. The accelerator may be any alphanumeric character, any function key (from F1 to F12) or one of the special characters listed in the table below (again, case doesn't matter):

DEL or DELETE	Delete key
INS or INSERT	Insert key
ENTER or RETURN	Enter key
PGUP	PageUp key
PGDN	PageDown key
LEFT	Left cursor arrow key
RIGHT	Right cursor arrow key
UP	Up cursor arrow key
DOWN	Down cursor arrow key
HOME	Home key
END	End key
SPACE	Space
TAB	Tab key
ESC or ESCAPE	Escape key (Windows only)

See also

wxMenu::AppendSeparator (p. 890), *wxMenu::AppendCheckItem* (p. 889), *wxMenu::AppendRadioItem* (p. 890), *wxMenu::Insert* (p. 894), *wxMenu::SetLabel* (p. 898), *wxMenu::GetHelpString* (p. 893), *wxMenu::SetHelpString* (p. 897), *wxMenuItem* (p. 909)

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

Append(id, string, helpStr="", checkable=false)

AppendMenu(id, string, aMenu, helpStr="")

AppendItem(aMenuItem)

wxMenu::AppendCheckItem

wxMenuItem* AppendCheckItem(int id, const wxString& item, const wxString&

helpString = "")

Adds a checkable item to the end of the menu.

See also

wxMenu::Append (p. 887), *wxMenu::InsertCheckItem* (p. 894)

wxMenu::AppendRadioItem

wxMenuItem* AppendRadioItem(int id, const wxString& item, const wxString& helpString = "")

Adds a radio item to the end of the menu. All consequent radio items form a group and when an item in the group is checked, all the others are automatically unchecked.

NB: Currently only implemented under Windows and GTK, use `#if wxHAS_RADIO_MENU_ITEMS` to test for availability of this feature.

See also

wxMenu::Append (p. 887), *wxMenu::InsertRadioItem* (p. 895)

wxMenu::AppendSeparator

wxMenuItem* AppendSeparator()

Adds a separator to the end of the menu.

See also

wxMenu::Append (p. 887), *wxMenu::InsertSeparator* (p. 895)

wxMenu::Break

void Break()

Inserts a break in a menu, causing the next appended item to appear in a new column.

wxMenu::Check

void Check(int id, const bool check)

Checks or unchecks the menu item.

Parameters

id

The menu item identifier.

check

If true, the item will be checked, otherwise it will be unchecked.

See also

wxMenu::IsChecked (p. 895)

wxMenu::Delete

void Delete(int *id*)

void Delete(wxMenuItem **item*)

Deletes the menu item from the menu. If the item is a submenu, it will **not** be deleted. Use *Destroy* (p. 891) if you want to delete a submenu.

Parameters

id

Id of the menu item to be deleted.

item

Menu item to be deleted.

See also

wxMenu::FindItem (p. 892), *wxMenu::Destroy* (p. 891), *wxMenu::Remove* (p. 897)

wxMenu::Destroy

void Destroy(int *id*)

void Destroy(wxMenuItem **item*)

Deletes the menu item from the menu. If the item is a submenu, it will be deleted. Use *Remove* (p. 897) if you want to keep the submenu (for example, to reuse it later).

Parameters

id

Id of the menu item to be deleted.

item

Menu item to be deleted.

See also

wxMenu::FindItem (p. 892), *wxMenu::Deletes* (p. 891), *wxMenu::Remove* (p. 897)

wxMenu::Enable

void Enable(int id, const bool enable)

Enables or disables (greys out) a menu item.

Parameters

id

The menu item identifier.

enable

true to enable the menu item, false to disable it.

See also

wxMenu::IsEnabled (p. 895)

wxMenu::FindItem

int FindItem(const wxString& itemString) const

Finds the menu item id for a menu item string.

wxMenuItem * FindItem(int id, wxMenu **menu = NULL) const

Finds the menu item object associated with the given menu item identifier and, optionally, the (sub)menu it belongs to.

wxPerl note: In wxPerl this method takes just the *id* parameter; in scalar context it returns the associated `Wx::MenuItem`, in list context it returns a 2-element list (*item*, *submenu*)

Parameters

itemString

Menu item string to find.

id

Menu item identifier.

menu

If the pointer is not NULL, it will be filled with the items parent menu (if the item was found)

Return value

First form: menu item identifier, or `wxNOT_FOUND` if none is found.

Second form: returns the menu item object, or NULL if it is not found.

Remarks

Any special menu codes are stripped out of source and target strings before matching.

wxPython note: The name of this method in wxPython is `FindItemById` and it does not support the second parameter.

wxMenu::FindItemByPosition

wxMenuItem* FindItemByPosition(size_t position) const

Returns the wxMenuItem given a position in the menu.

wxMenu::GetHelpString

wxString GetHelpString(int id) const

Returns the help string associated with a menu item.

Parameters

id

The menu item identifier.

Return value

The help string, or the empty string if there is no help string or the item was not found.

See also

wxMenu::SetHelpString (p. 897), *wxMenu::Append* (p. 887)

wxMenu::GetLabel

wxString GetLabel(int id) const

Returns a menu item label.

Parameters

id

The menu item identifier.

Return value

The item label, or the empty string if the item was not found.

See also

wxMenu::SetLabel (p. 898)

wxMenu::GetMenuItemCount

size_t GetMenuItemCount() const

Returns the number of items in the menu.

wxMenu::GetMenuItems

wxMenuItemList& GetMenuItems() const

Returns the list of items in the menu. *wxMenuItemList* is a pseudo-template list class containing *wxMenuItem* pointers.

wxMenu::GetTitle

wxString GetTitle() const

Returns the title of the menu.

Remarks

This is relevant only to popup menus, use *wxMenuBar::GetLabelTop* (p. 903) for the menus in the menubar.

See also

wxMenu::SetTitle (p. 898)

wxMenu::Insert

wxMenuItem* Insert(size_t pos, wxMenuItem *item)

wxMenuItem* Insert(size_t pos, int id, const wxString& item, const wxString& helpString = "", wxItemKind kind = wxITEM_NORMAL)

Inserts the given *item* before the position *pos*. Inserting the item at the position *GetMenuItemCount* (p. 894) is the same as appending it.

See also

wxMenu::Append (p. 887), *wxMenu::Prepend* (p. 896)

wxMenu::InsertCheckItem

wxMenuItem* InsertCheckItem(size_t pos, int id, const wxString& item, const wxString& helpString = "")

Inserts a checkable item at the given position.

See also

wxMenu::Insert (p. 894), *wxMenu::AppendCheckItem* (p. 889)

wxMenu::InsertRadioItem

wxMenuItem* InsertRadioItem(size_t pos, int id, const wxString& item, const wxString& helpString = "")

Inserts a radio item at the given position.

See also

wxMenu::Insert (p. 894), *wxMenu::AppendRadioItem* (p. 890)

wxMenu::InsertSeparator

wxMenuItem* InsertSeparator(size_t pos)

Inserts a separator at the given position.

See also

wxMenu::Insert (p. 894), *wxMenu::AppendSeparator* (p. 890)

wxMenu::IsChecked

bool IsChecked(int id) const

Determines whether a menu item is checked.

Parameters

id

The menu item identifier.

Return value

true if the menu item is checked, false otherwise.

See also

wxMenu::Check (p. 890)

wxMenu::IsEnabled

bool IsEnabled(int id) const

Determines whether a menu item is enabled.

Parameters

id

The menu item identifier.

Return value

true if the menu item is enabled, false otherwise.

See also

wxMenu::Enable (p. 892)

wxMenu::Prepend

wxMenuItem* Prepend(wxMenuItem *item)

wxMenuItem* Prepend(int id, const wxString& item, const wxString& helpString = "", wxItemKind kind = wxITEM_NORMAL)

Inserts the given *item* at the position 0, i.e. before all the other existing items.

See also

wxMenu::Append (p. 887), *wxMenu::Inserts* (p. 894)

wxMenu::PrependCheckItem

wxMenuItem* PrependCheckItem(int id, const wxString& item, const wxString& helpString = "")

Inserts a checkable item at the position 0.

See also

wxMenu::Prepend (p. 896), *wxMenu::AppendCheckItem* (p. 889)

wxMenu::PrependRadioItem

wxMenuItem* PrependRadioItem(int id, const wxString& item, const wxString& helpString = "")

Inserts a radio item at the position 0.

See also

wxMenu::Prepend (p. 896), *wxMenu::AppendRadioItem* (p. 890)

wxMenu::PrependSeparator

wxMenuItem* PrependSeparator(size_t pos)

Inserts a separator at the position 0.

See also

wxMenu::Prepend (p. 896), *wxMenu::AppendSeparator* (p. 890)

wxMenu::Remove

wxMenuItem * Remove(int id)

wxMenuItem * Remove(wxMenuItem *item)

Removes the menu item from the menu but doesn't delete the associated C++ object. This allows to reuse the same item later by adding it back to the menu (especially useful with submenus).

Parameters

id

The identifier of the menu item to remove.

item

The menu item to remove.

Return value

The item which was detached from the menu.

wxMenu::SetHelpString

void SetHelpString(int id, const wxString& helpString)

Sets an item's help string.

Parameters

id

The menu item identifier.

helpString

The help string to set.

See also

wxMenu::GetHelpString (p. 893)

wxMenu::SetLabel

void SetLabel(int *id*, const wxString& *label*)

Sets the label of a menu item.

Parameters

id

The menu item identifier.

label

The menu item label to set.

See also

wxMenu::Append (p. 887), *wxMenu::GetLabel* (p. 893)

wxMenu::SetTitle

void SetTitle(const wxString& *title*)

Sets the title of the menu.

Parameters

title

The title to set.

Remarks

This is relevant only to popup menus, use *wxMenuBar::SetLabelTop* (p. 907) for the menus in the menubar.

See also

wxMenu::GetTitle (p. 894)

wxMenu::UpdateUI

void UpdateUI(wxEvtHandler* *source* = NULL) const

Sends events to *source* (or owning window if NULL) to update the menu UI. This is called just before the menu is popped up with *wxWindow::PopupMenu* (p. 1417), but the application may call it at other times if required.

See also

wxUpdateUIEvent (p. 1352)

wxMenuBar

A menu bar is a series of menus accessible from the top of a frame.

Derived from

wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/menu.h>

Event handling

To respond to a menu selection, provide a handler for `EVT_MENU`, in the frame that contains the menu bar. If you have a toolbar which uses the same identifiers as your `EVT_MENU` entries, events from the toolbar will also be processed by your `EVT_MENU` event handlers.

Tip: under Windows, if you discover that menu shortcuts (for example, Alt-F to show the file menu) are not working, check any `EVT_CHAR` events you are handling in child windows. If you are not calling `event.Skip()` for events that you don't process in these event handlers, menu shortcuts may cease to work.

See also

wxMenu (p. 885), *Event handling overview* (p. 1610)

wxMenuBar::wxMenuBar

void wxMenuBar(long style = 0)

Default constructor.

void wxMenuBar(int n, wxMenu* menus[], const wxString titles[])

Construct a menu bar from arrays of menus and titles.

Parameters

n

The number of menus.

menus

An array of menus. Do not use this array again - it now belongs to the menu bar.

titles

An array of title strings. Deallocate this array after creating the menu bar.

style

If `wxMB_DOCKABLE` the menu bar can be detached (wxGTK only).

wxPython note: Only the default constructor is supported in wxPython. Use `wxMenuBar.Append` instead.

wxPerl note: wxPerl only supports the first constructor: use `Append` instead.

wxMenuBar::~~wxMenuBar

void ~wxMenuBar()

Destructor, destroying the menu bar and removing it from the parent frame (if any).

wxMenuBar::Append

bool Append(wxMenu *menu, const wxString& title)

Adds the item to the end of the menu bar.

Parameters

menu

The menu to add. Do not deallocate this menu after calling **Append**.

title

The title of the menu.

Return value

true on success, false if an error occurred.

See also

`wxMenuBar::Insert` (p. 904)

wxMenuBar::Check

void Check(int id, const bool check)

Checks or unchecks a menu item.

Parameters

id

The menu item identifier.

check

If true, checks the menu item, otherwise the item is unchecked.

Remarks

Only use this when the menu bar has been associated with a frame; otherwise, use the `wxMenu` equivalent call.

wxMenuBar::Enable

void Enable(int *id*, const bool *enable*)

Enables or disables (greys out) a menu item.

Parameters

id

The menu item identifier.

enable

true to enable the item, false to disable it.

Remarks

Only use this when the menu bar has been associated with a frame; otherwise, use the `wxMenu` equivalent call.

wxMenuBar::EnableTop

void EnableTop(int *pos*, const bool *enable*)

Enables or disables a whole menu.

Parameters

pos

The position of the menu, starting from zero.

enable

true to enable the menu, false to disable it.

Remarks

Only use this when the menu bar has been associated with a frame.

wxMenuBar::FindMenu

int FindMenu(const wxString& title) const

Returns the index of the menu with the given *title* or wxNOT_FOUND if no such menu exists in this menubar. The *title* parameter may specify either the menu title (with accelerator characters, i.e. "&File") or just the menu label ("File") indifferently.

wxMenuBar::FindMenuItem

int FindMenuItem(const wxString& menuString, const wxString& itemString) const

Finds the menu item id for a menu name/menu item string pair.

Parameters

menuString

Menu title to find.

itemString

Item to find.

Return value

The menu item identifier, or wxNOT_FOUND if none was found.

Remarks

Any special menu codes are stripped out of source and target strings before matching.

wxMenuBar::FindItem

wxMenuItem * FindItem(int id, wxMenu **menu = NULL) const

Finds the menu item object associated with the given menu item identifier.

Parameters

id

Menu item identifier.

menu

If not NULL, menu will get set to the associated menu.

Return value

The found menu item object, or NULL if one was not found.

wxMenuBar::GetHelpString

wxString GetHelpString(int *id*) const

Gets the help string associated with the menu item identifier.

Parameters

id

The menu item identifier.

Return value

The help string, or the empty string if there was no help string or the menu item was not found.

See also

wxMenuBar::SetHelpString (p. 906)

wxMenuBar::GetLabel

wxString GetLabel(int *id*) const

Gets the label associated with a menu item.

Parameters

id

The menu item identifier.

Return value

The menu item label, or the empty string if the item was not found.

Remarks

Use only after the menubar has been associated with a frame.

wxMenuBar::GetLabelTop

wxString GetLabelTop(int *pos*) const

Returns the label of a top-level menu. Note that the returned string does not include the accelerator characters which could have been specified in the menu title string during its construction.

Parameters

pos

Position of the menu on the menu bar, starting from zero.

Return value

The menu label, or the empty string if the menu was not found.

Remarks

Use only after the menubar has been associated with a frame.

See also

wxMenuBar::SetLabelTop (p. 907)

wxMenuBar::GetMenu

wxMenu* GetMenu(int *menuIndex*) const

Returns the menu at *menuIndex* (zero-based).

wxMenuBar::GetMenuCount

int GetMenuCount() const

Returns the number of menus in this menubar.

wxMenuBar::Insert

bool Insert(size_t *pos*, wxMenu **menu*, const wxString& *title*)

Inserts the menu at the given position into the menu bar. Inserting menu at position 0 will insert it in the very beginning of it, inserting at position *GetMenuCount()* (p. 904) is the same as calling *Append()* (p. 900).

Parameters

pos

The position of the new menu in the menu bar

menu

The menu to add. wxMenuBar owns the menu and will free it.

title

The title of the menu.

Return value

true on success, false if an error occurred.

See also

wxMenuBar::Append (p. 900)

wxMenuBar::IsChecked

bool IsChecked(int *id*) const

Determines whether an item is checked.

Parameters

id

The menu item identifier.

Return value

true if the item was found and is checked, false otherwise.

wxMenuBar::IsEnabled

bool IsEnabled(int *id*) const

Determines whether an item is enabled.

Parameters

id

The menu item identifier.

Return value

true if the item was found and is enabled, false otherwise.

wxMenuBar::Refresh

void Refresh()

Redraw the menu bar

wxMenuBar::Remove

wxMenu * Remove(size_t *pos*)

Removes the menu from the menu bar and returns the menu object - the caller is responsible for deleting it. This function may be used together with *wxMenuBar::Insert* (p. 904) to change the menubar dynamically.

See also

wxMenuBar::Replace (p. 906)

wxMenuBar::Replace

wxMenu * Replace(size_t pos, wxMenu *menu, const wxString& title)

Replaces the menu at the given position with another one.

Parameters

pos

The position of the new menu in the menu bar

menu

The menu to add.

title

The title of the menu.

Return value

The menu which was previously at the position *pos*. The caller is responsible for deleting it.

See also

wxMenuBar::Insert (p. 904), *wxMenuBar::Remove* (p. 905)

wxMenuBar::SetHelpString

void SetHelpString(int id, const wxString& helpString)

Sets the help string associated with a menu item.

Parameters

id

Menu item identifier.

helpString

Help string to associate with the menu item.

See also

wxMenuBar::GetHelpString (p. 902)

wxMenuBar::SetLabel

void SetLabel(int *id*, const wxString& *label*)

Sets the label of a menu item.

Parameters

id

Menu item identifier.

label

Menu item label.

Remarks

Use only after the menubar has been associated with a frame.

See also

wxMenuBar::GetLabel (p. 903)

wxMenuBar::SetLabelTop

void SetLabelTop(int *pos*, const wxString& *label*)

Sets the label of a top-level menu.

Parameters

pos

The position of a menu on the menu bar, starting from zero.

label

The menu label.

Remarks

Use only after the menubar has been associated with a frame.

See also

wxMenuBar::GetLabelTop (p. 903)

wxMenuEvent

This class is used for a variety of menu-related events. Note that these do not include menu command events, which are handled using *wxCommandEvent* (p. 165) objects.

The default handler for `wxEVT_MENU_HIGHLIGHT` displays help text in the first field of the status bar.

Derived from

wxEvt (p. 441)

wxObject (p. 954)

Include files

<wx/event.h>

Event table macros

To process a menu event, use these event handler macros to direct input to member functions that take a *wxMenuEvent* argument.

EVT_MENU_OPEN(func)	A menu is about to be opened. On Windows, this is only sent once for each navigation of the menubar (up until all menus have closed).
EVT_MENU_CLOSE(func)	A menu has been just closed.
EVT_MENU_HIGHLIGHT(id, func)	The menu item with the specified id has been highlighted: used to show help prompts in the status bar by <i>wxFrame</i> (p. 532)
EVT_MENU_HIGHLIGHT_ALL(func)	A menu item has been highlighted, i.e. the currently selected menu item has changed.

See also

Command events (p. 165),

Event handling overview (p. 1610)

wxMenuEvent::wxMenuEvent

wxMenuEvent(WXTYPE id = 0, int id = 0, wxDC* dc = NULL)

Constructor.

wxMenuEvent::m_menuid

int m_menuid

The relevant menu identifier.

wxMenuEvent::GetMenuId

int GetMenuId() const

Returns the menu identifier associated with the event. This method should be only used

with the `HIGHLIGHT` events.

`wxMenuEvent::IsPopup`

`bool IsPopup() const`

Returns `true` if the menu which is being opened or closed is a popup menu, `false` if it is a normal one.

This method should be only used with the `OPEN` and `CLOSE` events.

`wxMenuItem`

A menu item represents an item in a menu. Note that you usually don't have to deal with it directly as *wxMenu* (p. 885) methods usually construct an object of this class for you.

Also please note that the methods related to fonts and bitmaps are currently only implemented for Windows.

Derived from

wxOwnerDrawn (Windows only)
wxObject (p. 954)

Include files

<wx/menuitem.h>

See also

wxMenuBar (p. 899), *wxMenu* (p. 885)

`wxMenuItem::wxMenuItem`

```
wxMenuItem(wxMenu* parentMenu = NULL, int id = wxID_SEPARATOR, const
wxString& text = "", const wxString& helpString = "", wxItemKind kind =
wxITEM_NORMAL, wxMenu* subMenu = NULL, )
```

Constructs a `wxMenuItem` object.

Parameters

parentMenu

Menu that the menu item belongs to.

id

Identifier for this menu item, or `wxID_SEPARATOR` to indicate a separator.

text

Text for the menu item, as shown on the menu. An accelerator key can be specified using the ampersand '&' character. In order to embed an ampersand character in the menu item text, the ampersand must be doubled.

helpString

Optional help string that will be shown on the status bar.

kind

May be `wxITEM_SEPARATOR`, `wxITEM_NORMAL`, `wxITEM_CHECK` or `wxITEM_RADIO`

subMenu

If non-NULL, indicates that the menu item is a submenu.

`wxMenuItem::~wxMenuItem`

`~wxMenuItem()`

Destructor.

`wxMenuItem::Check`

`void Check(bool check)`

Checks or unchecks the menu item.

`wxMenuItem::Enable`

`void Enable(bool enable)`

Enables or disables the menu item.

`wxMenuItem::GetBackgroundColour`

`wxColour& GetBackgroundColour() const`

Returns the background colour associated with the menu item (Windows only).

`wxMenuItem::GetBitmap`

`wxBitmap& GetBitmap(bool checked = true) const`

Returns the checked or unchecked bitmap (Windows only).

wxMenuItem::GetFont

wxFont& GetFont() const

Returns the font associated with the menu item (Windows only).

wxMenuItem::GetHelp

wxString GetHelp() const

Returns the help string associated with the menu item.

wxMenuItem::GetId

int GetId() const

Returns the menu item identifier.

wxMenuItem::GetKind

wxItemKind GetKind() const

Returns the item kind, one of `wxITEM_SEPARATOR`, `wxITEM_NORMAL`, `wxITEM_CHECK` or `wxITEM_RADIO`.

wxMenuItem::GetLabel

wxString GetLabel() const

Returns the text associated with the menu item without any accelerator characters it might contain.

See also

GetText (p. 912), *GetLabelFromText* (p. 911)

wxMenuItem::GetLabelFromText

static wxString GetLabelFromText(const wxString& text)

Strips all accelerator characters and mnemonics from the given *text*. For example,

```
wxMenuItem::GetLabelFromText("&Hello\tCtrl-H");
```

will return just "Hello".

See also

GetText (p. 912), *GetLabel* (p. 911)

wxMenuItem::GetMarginWidth

int GetMarginWidth() const

Gets the width of the menu item checkmark bitmap (Windows only).

wxMenuItem::GetName

wxString GetName() const

Returns the text associated with the menu item.

NB: this function is deprecated, please use *GetText* (p. 912) or *GetLabel* (p. 911) instead.

wxMenuItem::GetText

wxString GetText() const

Returns the text associated with the menu item, such as it was passed to the *wxMenuItem* constructor, i.e. with any accelerator characters it may contain.

See also

GetLabel (p. 911), *GetLabelFromText* (p. 911)

wxMenuItem::GetSubMenu

wxMenu* GetSubMenu() const

Returns the submenu associated with the menu item, or NULL if there isn't one.

wxMenuItem::GetTextColour

wxColour& GetTextColour() const

Returns the text colour associated with the menu item (Windows only).

wxMenuItem::IsCheckable

bool IsCheckable() const

Returns true if the item is checkable.

wxMenuItem::IsChecked

bool IsChecked() const

Returns true if the item is checked.

wxMenuItem::IsEnabled

bool IsEnabled() const

Returns true if the item is enabled.

wxMenuItem::IsSeparator

bool IsSeparator() const

Returns true if the item is a separator.

wxMenuItem::SetBackgroundColour

void SetBackgroundColour(const wxColour& colour) const

Sets the background colour associated with the menu item (Windows only).

wxMenuItem::SetBitmap

void SetBitmap(const wxBitmap& bmp) const

Sets the bitmap for the menu item (Windows and GTK+ only). It is equivalent to *SetBitmaps* (p. 913)(bmp, wxNullBitmap).

wxMenuItem::SetBitmaps

void SetBitmaps(const wxBitmap& checked, const wxBitmap& unchecked = wxNullBitmap) const

Sets the checked/unchecked bitmaps for the menu item (Windows only). The first bitmap is also used as the single bitmap for uncheckable menu items.

wxMenuItem::SetFont

void SetFont(const wxFont& font) const

Sets the font associated with the menu item (Windows only).

wxMenuItem::SetHelp

void SetHelp(const wxString& *helpString*) const

Sets the help string.

wxMenuItem::SetMarginWidth

void SetMarginWidth(int *width*) const

Sets the width of the menu item checkmark bitmap (Windows only).

wxMenuItem::SetText

void SetText(const wxString& *text*) const

Sets the text associated with the menu item.

wxMenuItem::SetTextColour

void SetTextColour(const wxColour& *colour*) const

Sets the text colour associated with the menu item (Windows only).

wxMessageDialog

This class represents a dialog that shows a single or multi-line message, with a choice of OK, Yes, No and Cancel buttons.

Derived from

wxDialog (p. 369)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/msgdlg.h>

See also

wxMessageDialog overview (p. 1658)

wxMessageDialog::wxMessageDialog

wxMessageDialog(wxWindow* *parent*, const wxString& *message*, const wxString& *caption* = "Message box", long *style* = wxOK | wxCANCEL, const wxPoint& *pos* = wxDefaultPosition)

Constructor. Use `wxMessageDialog::ShowModal` (p. 916) to show the dialog.

Parameters

parent

Parent window.

message

Message to show on the dialog.

caption

The dialog caption.

style

A dialog style (bitlist) containing flags chosen from the following:

wxOK	Show an OK button.
wxCANCEL	Show a Cancel button.
wxYES_NO	Show Yes and No buttons.
wxYES_DEFAULT	Used with wxYES_NO , makes Yes button the default - which is the default behaviour.
wxNO_DEFAULT	Used with wxYES_NO , makes No button the default.
wxICON_EXCLAMATION	Shows an exclamation mark icon.
wxICON_HAND	Shows an error icon.
wxICON_ERROR	Shows an error icon - the same as wxICON_HAND .
wxICON_QUESTION	Shows a question mark icon.
wxICON_INFORMATION	Shows an information (i) icon.
wxSTAY_ON_TOP	The message box stays on top of all other window, even those of the other applications (Windows only).

pos

Dialog position. Not Windows.

wxMessageDialog::~~wxMessageDialog

~wxMessageDialog()

Destructor.

wxMessageDialog::ShowModal

int ShowModal()

Shows the dialog, returning one of wxID_OK, wxID_CANCEL, wxID_YES, wxID_NO.

wxMetafile

A **wxMetafile** represents the MS Windows metafile object, so metafile operations have no effect in X. In wxWidgets, only sufficient functionality has been provided for copying a graphic to the clipboard; this may be extended in a future version. Presently, the only way of creating a metafile is to use a wxMetafileDC.

Derived from

wxObject (p. 954)

Include files

<wx/metafile.h>

See also

wxMetafileDC (p. 917)

wxMetafile::wxMetafile

wxMetafile(const wxString& filename = "")

Constructor. If a filename is given, the Windows disk metafile is read in. Check whether this was performed successfully by using the *wxMetafile::Ok* (p. 916) member.

wxMetafile::~~wxMetafile

~wxMetafile()

Destructor.

wxMetafile::Ok

bool Ok()

Returns true if the metafile is valid.

wxMetafile::Play

bool Play(wxDC *dc)

Plays the metafile into the given device context, returning true if successful.

wxMetafile::SetClipboard

bool SetClipboard(int width = 0, int height = 0)

Passes the metafile data to the clipboard. The metafile can no longer be used for anything, but the wxMetafile object must still be destroyed by the application.

Below is a example of metafile, metafile device context and clipboard use from the `hello.cpp` example. Note the way the metafile dimensions are passed to the clipboard, making use of the device context's ability to keep track of the maximum extent of drawing commands.

```
wxMetafileDC dc;
if (dc.Ok())
{
    Draw(dc, false);
    wxMetafile *mf = dc.Close();
    if (mf)
    {
        bool success = mf->SetClipboard((int)(dc.MaxX() + 10),
(int)(dc.MaxY() + 10));
        delete mf;
    }
}
```

wxMetafileDC

This is a type of device context that allows a metafile object to be created (Windows only), and has most of the characteristics of a normal **wxDC**. The `wxMetafileDC::Close` (p. 918) member must be called after drawing into the device context, to return a metafile. The only purpose for this at present is to allow the metafile to be copied to the clipboard (see *wxMetafile* (p. 916)).

Adding metafile capability to an application should be easy if you already write to a wxDC; simply pass the wxMetafileDC to your drawing function instead. You may wish to conditionally compile this code so it is not compiled under X (although no harm will result if you leave it in).

Note that a metafile saved to disk is in standard Windows metafile format, and cannot be imported into most applications. To make it importable, call the function `::wxMakeMetafilePlaceable` (p. 1506) after closing your disk-based metafile device context.

Derived from

wxDC (p. 349)
wXObject (p. 954)

Include files

<wx/metafile.h>

See also

wxMetafile (p. 916), *wxDC* (p. 349)

wxMetafileDC::wxMetafileDC

wxMetafileDC(const wxString& *filename* = "")

Constructor. If no filename is passed, the metafile is created in memory.

wxMetafileDC::~~wxMetafileDC

~wxMetafileDC()

Destructor.

wxMetafileDC::Close

wxMetafile * Close()

This must be called after the device context is finished with. A metafile is returned, and ownership of it passes to the calling application (so it should be destroyed explicitly).

wxMimeTypeManager

This class allows the application to retrieve the information about all known MIME types from a system-specific location and the filename extensions to the MIME types and vice versa. After initialization the functions *wxMimeTypeManager::GetFileTypeFromMimeType* (p. 921) and *wxMimeTypeManager::GetFileTypeFromExtension* (p. 920) may be called: they will return a *wxFileType* (p. 499) object which may be further queried for file description, icon and other attributes.

Windows: MIME type information is stored in the registry and no additional initialization is needed.

Unix: MIME type information is stored in the files *mailcap* and *mime.types* (system-wide) and *.mailcap* and *.mime.types* in the current user's home directory: all of these files are searched for and loaded if found by default. However, additional functions

wxMimeTypeManager::ReadMailcap (p. 921) and *wxMimeTypeManager::ReadMimeType* (p. 921) are provided to load additional files.

If GNOME or KDE desktop environment is installed, then *wxMimeTypeManager* gathers MIME information from respective files (e.g. *.kdeInk* files under KDE).

NB: Currently, *wxMimeTypeManager* is limited to reading MIME type information but it will support modifying it as well in the future versions.

Global objects

Global instance of *wxMimeTypeManager* is always available. It is defined as follows:

```
wxMimeTypeManager *wxTheMimeTypeManager;
```

It is recommended to use this instance instead of creating your own because gathering MIME information may take quite a long on Unix systems.

Derived from

No base class.

Include files

<wx/mimetype.h>

See also

wxFileType (p. 499)

Helper functions

All of these functions are static (i.e. don't need a *wxMimeTypeManager* object to call them) and provide some useful operations for string representations of MIME types. Their usage is recommended instead of directly working with MIME types using *wxString* functions.

IsOfType (p. 921)

Constructor and destructor

NB: You won't normally need to use more than one *wxMimeTypeManager* object in a program.

wxMimeTypeManager (p. 920)

~wxMimeTypeManager (p. 920)

Query database

These functions are the heart of this class: they allow to find a *file type* (p. 499) object from either file extension or MIME type. If the function is successful, it returns a pointer to the `wxFileType` object which **must** be deleted by the caller, otherwise `NULL` will be returned.

GetFileTypeFromMimeType (p. 921)

GetFileTypeFromExtension (p. 920)

Initialization functions

Unix: These functions may be used to load additional files (except for the default ones which are loaded automatically) containing MIME information in either mailcap(5) or mime.types(5) format.

ReadMailcap (p. 921)

ReadMimeType (p. 921)

AddFallbacks (p. 920)

`wxMimeTypeManager::wxMimeTypeManager`

`wxMimeTypeManager()`

Constructor puts the object in the "working" state, no additional initialization are needed - but *ReadXXX* (p. 920) may be used to load additional mailcap/mime.types files.

`wxMimeTypeManager::~~wxMimeTypeManager`

`~wxMimeTypeManager()`

Destructor is not virtual, so this class should not be derived from.

`wxMimeTypeManager::AddFallbacks`

`void AddFallbacks(const wxFileTypeInfo *fallbacks)`

This function may be used to provide hard-wired fallbacks for the MIME types and extensions that might not be present in the system MIME database.

Please see the `typetest` sample for an example of using it.

`wxMimeTypeManager::GetFileTypeFromExtension`

`wxFileType* GetFileTypeFromExtension(const wxString& extension)`

Gather information about the files with given extension and return the corresponding

wxFileType (p. 499) object or NULL if the extension is unknown.

wxMimeTypeManager::GetFileTypeFromMimeType

wxFileType* GetFileTypeFromMimeType(const wxString& *mimeType*)

Gather information about the files with given MIME type and return the corresponding *wxFileType* (p. 499) object or NULL if the MIME type is unknown.

wxMimeTypeManager::IsOfType

bool IsOfType(const wxString& *mimeType*, const wxString& *wildcard*)

This function returns true if either the given *mimeType* is exactly the same as *wildcard* or if it has the same category and the subtype of *wildcard* is '*'. Note that the '*' wildcard is not allowed in *mimeType* itself.

The comparison don by this function is case insensitive so it is not necessary to convert the strings to the same case before calling it.

wxMimeTypeManager::ReadMailcap

bool ReadMailcap(const wxString& *filename*, **bool** *fallback* = false)

Load additional file containing information about MIME types and associated information in mailcap format. See `metamail(1)` and `mailcap(5)` for more information.

fallback parameter may be used to load additional mailcap files without overriding the settings found in the standard files: normally, entries from files loaded with `ReadMailcap` will override the entries from files loaded previously (and the standard ones are loaded in the very beginning), but this will not happen if this parameter is set to true (default is false).

The return value is true if there were no errors in the file or false otherwise.

wxMimeTypeManager::ReadMimeType

bool ReadMimeType(const wxString& *filename*)

Load additional file containing information about MIME types and associated information in mime.types file format. See `metamail(1)` and `mailcap(5)` for more information.

The return value is true if there were no errors in the file or false otherwise.

wxMiniFrame

A miniframe is a frame with a small title bar. It is suitable for floating toolbars that must

not take up too much screen area.

Derived from

wxFrame (p. 532)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/minifram.h>

Window styles

wxICONIZE	Display the frame iconized (minimized) (Windows only).
wxCAPTION	Puts a caption on the frame.
wxDEFAULT_FRAME_STYLE	Defined as wxMINIMIZE_BOX wxMAXIMIZE_BOX wxTHICK_FRAME wxSYSTEM_MENU wxCAPTION wxCLOSE_BOX .
wxMINIMIZE	Identical to wxICONIZE .
wxMINIMIZE_BOX	Displays a minimize box on the frame (Windows and Motif only).
wxMAXIMIZE	Displays the frame maximized (Windows only).
wxMAXIMIZE_BOX	Displays a maximize box on the frame (Windows and Motif only).
wxCLOSE_BOX	Displays a close box on the frame.
wxSTAY_ON_TOP	Stay on top of other windows (Windows only).
wxSYSTEM_MENU	Displays a system menu (Windows and Motif only).
wxTHICK_FRAME	Displays a thick frame around the window (Windows and Motif only).
wxTINY_CAPTION_HORIZ	This style is obsolete and not used any longer.
wxTINY_CAPTION_VERT	This style is obsolete and not used any longer.
wxRESIZE_BORDER	Displays a resizable border around the window (Motif only; for Windows, it is implicit in wxTHICK_FRAME).

See also *window styles overview* (p. 1618). Note that all the window styles above are ignored under GTK and the mini frame cannot be resized by the user.

Remarks

This class has miniframe functionality under Windows and GTK, i.e. the presence of mini

frame will not be noted in the task bar and focus behaviour is different. On other platforms, it behaves like a normal frame.

See also

wxMDIParentFrame (p. 874), *wxMDIChildFrame* (p. 870), *wxFrame* (p. 532), *wxDialog* (p. 369)

wxMiniFrame::wxMiniFrame

wxMiniFrame()

Default constructor.

wxMiniFrame(*wxWindow** *parent*, *wxWindowID* *id*, **const** *wxString&* *title*, **const** *wxPoint&* *pos* = *wxDefaultPosition*, **const** *wxSize&* *size* = *wxDefaultSize*, **long** *style* = *wxDEFAULT_FRAME_STYLE*, **const** *wxString&* *name* = "frame")

Constructor, creating the window.

Parameters

parent

The window parent. This may be NULL. If it is non-NULL, the frame will always be displayed on top of the parent window on Windows.

id

The window identifier. It may take a value of -1 to indicate a default value.

title

The caption to be displayed on the frame's title bar.

pos

The window position. A value of (-1, -1) indicates a default position, chosen by either the windowing system or wxWidgets, depending on platform.

size

The window size. A value of (-1, -1) indicates a default size, chosen by either the windowing system or wxWidgets, depending on platform.

style

The window style. See *wxMiniFrame* (p. 921).

name

The name of the window. This parameter is used to associate a name with the

item, allowing the application user to set Motif resource values for individual windows.

Remarks

The frame behaves like a normal frame on non-Windows platforms.

See also

wxMiniFrame::Create (p. 924)

wxMiniFrame::~~wxMiniFrame

void ~wxMiniFrame()

Destructor. Destroys all child windows and menu bar if present.

wxMiniFrame::Create

bool Create(wxWindow* parent, wxWindowID id, const wxString& title, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxDEFAULT_FRAME_STYLE, const wxString& name = "frame")

Used in two-step frame construction. See *wxMiniFrame::wxMiniFrame* (p. 923) for further details.

wxMirrorDC

wxMirrorDC is a simple wrapper class which is always associated with a real *wxDC* (p. 349) object and either forwards all of its operations to it without changes (no mirroring takes place) or exchanges *x* and *y* coordinates which makes it possible to reuse the same code to draw a figure and its mirror -- i.e. reflection related to the diagonal line $x == y$.

wxMirrorDC has been added in *wxWidgets* version 2.5.0.

Derived from

wxDC (p. 349)

Include files

<wx/dcmirror.h>

wxMirrorDC::wxMirrorDC

wxMirrorDC(wxDC& dc, bool mirror)

Creates a (maybe) mirrored DC associated with the real *dc*. Everything drawn on *wxMirrorDC* will appear (and maybe mirrored) on *dc*.

mirror specifies if we do mirror (if it is `true`) or not (if it is `false`).

wxModule

The module system is a very simple mechanism to allow applications (and parts of *wxWidgets* itself) to define initialization and cleanup functions that are automatically called on *wxWidgets* startup and exit.

To define a new kind of module, derive a class from *wxModule*, override the *OnInit* and *OnExit* functions, and add the `DECLARE_DYNAMIC_CLASS` and `IMPLEMENT_DYNAMIC_CLASS` to header and implementation files (which can be the same file). On initialization, *wxWidgets* will find all classes derived from *wxModule*, create an instance of each, and call each *OnInit* function. On exit, *wxWidgets* will call the *OnExit* function for each module instance.

Note that your module class does not have to be in a header file.

For example:

```
// A module to allow DDE initialization/cleanup
// without calling these functions from app.cpp or from
// the user's application.

class wxDDEModule: public wxModule
{
    DECLARE_DYNAMIC_CLASS(wxDDEModule)
public:
    wxDDEModule() {}
    bool OnInit() { wxDDEInitialize(); return true; };
    void OnExit() { wxDDECleanUp(); };
};

IMPLEMENT_DYNAMIC_CLASS(wxDDEModule, wxModule)
```

Derived from

wxObject (p. 954)

Include files

<wx/module.h>

wxModule::wxModule

wxModule()

Constructs a *wxModule* object.

wxModule::~~wxModule

~wxModule()

Destructor.

wxModule::~CleanupModules

static void CleanupModules()

Calls Exit for each module instance. Called by wxWidgets on exit, so there is no need for an application to call it.

wxModule::~Exit

void Exit()

Calls OnExit. This function is called by wxWidgets and should not need to be called by an application.

wxModule::~Init

bool Init()

Calls OnInit. This function is called by wxWidgets and should not need to be called by an application.

wxModule::~InitializeModules

static bool InitializeModules()

Calls Init for each module instance. Called by wxWidgets on startup, so there is no need for an application to call it.

wxModule::~OnExit

virtual void OnExit()

Provide this function with appropriate cleanup for your module.

wxModule::~OnInit

virtual bool OnInit()

Provide this function with appropriate initialization for your module. If the function returns false, wxWidgets will exit immediately.

wxModule::RegisterModule

static void RegisterModule(wxModule* module)

Registers this module with wxWidgets. Called by wxWidgets on startup, so there is no need for an application to call it.

wxModule::RegisterModules

static bool RegisterModules()

Creates instances of and registers all modules. Called by wxWidgets on startup, so there is no need for an application to call it.

wxMouseCaptureChangedEvent

An mouse capture changed event is sent to a window that loses its mouse capture. This is called even if wxWindow::ReleaseCapture was called by the application code. Handling this event allows an application to cater for unexpected capture releases which might otherwise confuse mouse handling code.

This event is implemented under Windows only.

Derived from

wxEvent (p. 441)

wxObject (p. 954)

Include files

<wx/event.h>

Event table macros

To process this event, use the following event handler macro to direct input to a member function that takes a wxMouseCaptureChangedEvent argument.

EVT_MOUSE_CAPTURE_CHANGED(func) Process a
 wxEVT_MOUSE_CAPTURE_CHANGED
 event.

See also

Event handling overview (p. 1610), *wxWindow::CaptureMouse* (p. 1392),
wxWindow::ReleaseMouse (p. 1419), *wxWindow::GetCapture* (p. 1402)

wxMouseCaptureChangedEvent::wxMouseCaptureChangedEvent

wxMouseCaptureChangedEvent(wxWindowID *windowId* = 0, wxWindow* *gainedCapture* = NULL)

Constructor.

wxActivateEvent::GetCapturedWindow

wxWindow* GetCapturedWindow() const

Returns the window that gained the capture, or NULL if it was a non-wxWidgets window.

wxMouseEvent

This event class contains information about the events generated by the mouse: they include mouse buttons press and release events and mouse move events.

All mouse events involving the buttons use `wxMOUSE_BTN_LEFT` for the left mouse button, `wxMOUSE_BTN_MIDDLE` for the middle one and `wxMOUSE_BTN_RIGHT` for the right one. Note that not all mice have a middle button so a portable application should avoid relying on the events from it.

NB: Note that under Windows mouse enter and leave events are not natively supported by the system but are generated by wxWidgets itself. This has several drawbacks: the `LEAVE_WINDOW` event might be received some time after the mouse left the window and the state variables for it may have changed during this time.

NB: Note the difference between methods like *LeftDown* (p. 935) and *LeftIsDown* (p. 935): the former returns `true` when the event corresponds to the left mouse button click while the latter returns `true` if the left mouse button is currently being pressed. For example, when the user is dragging the mouse you can use *LeftIsDown* (p. 935) to test whether the left mouse button is (still) depressed. Also, by convention, if *LeftDown* (p. 935) returns `true`, *LeftIsDown* (p. 935) will also return `true` in wxWidgets whatever the underlying GUI behaviour is (which is platform-dependent). The same applies, of course, to other mouse buttons as well.

Derived from

wxEvent (p. 441)

Include files

<wx/event.h>

Event table macros

To process a mouse event, use these event handler macros to direct input to member functions that take a `wxMouseEvent` argument.

EVT_LEFT_DOWN(func) Process a `wxEVT_LEFT_DOWN` event.

EVT_LEFT_UP(func) Process a `wxEVT_LEFT_UP` event.

EVT_LEFT_DCLICK(func)	Process a wxEVT_LEFT_DCLICK event.
EVT_MIDDLE_DOWN(func)	Process a wxEVT_MIDDLE_DOWN event.
EVT_MIDDLE_UP(func)	Process a wxEVT_MIDDLE_UP event.
EVT_MIDDLE_DCLICK(func)	Process a wxEVT_MIDDLE_DCLICK event.
EVT_RIGHT_DOWN(func)	Process a wxEVT_RIGHT_DOWN event.
EVT_RIGHT_UP(func)	Process a wxEVT_RIGHT_UP event.
EVT_RIGHT_DCLICK(func)	Process a wxEVT_RIGHT_DCLICK event.
EVT_MOTION(func)	Process a wxEVT_MOTION event.
EVT_ENTER_WINDOW(func)	Process a wxEVT_ENTER_WINDOW event.
EVT_LEAVE_WINDOW(func)	Process a wxEVT_LEAVE_WINDOW event.
EVT_MOUSEWHEEL(func)	Process a wxEVT_MOUSEWHEEL event.
EVT_MOUSE_EVENTS(func)	Process all mouse events.

wxMouseEvent::m_altDown

bool m_altDown

true if the Alt key is pressed down.

wxMouseEvent::m_controlDown

bool m_controlDown

true if control key is pressed down.

wxMouseEvent::m_leftDown

bool m_leftDown

true if the left mouse button is currently pressed down.

wxMouseEvent::m_middleDown

bool m_middleDown

true if the middle mouse button is currently pressed down.

wxMouseEvent::m_rightDown

bool m_rightDown

true if the right mouse button is currently pressed down.

wxMouseEvent::m_metaDown

bool m_metaDown

true if the Meta key is pressed down.

wxMouseEvent::m_shiftDown

bool m_shiftDown

true if shift is pressed down.

wxMouseEvent::m_x

long m_x

X-coordinate of the event.

wxMouseEvent::m_y

long m_y

Y-coordinate of the event.

wxMouseEvent::m_wheelRotation

int m_wheelRotation

The distance the mouse wheel is rotated.

wxMouseEvent::m_wheelDelta

int m_wheelDelta

The wheel delta, normally 120.

wxMouseEvent::m_linesPerAction

int m_linesPerAction

The configured number of lines (or whatever) to be scrolled per wheel action.

wxMouseEvent::wxMouseEvent

wxMouseEvent(WXTYPE *mouseEventType* = 0, int *id* = 0)

Constructor. Valid event types are:

- **wxEVT_ENTER_WINDOW**
- **wxEVT_LEAVE_WINDOW**
- **wxEVT_LEFT_DOWN**
- **wxEVT_LEFT_UP**
- **wxEVT_LEFT_DCLICK**
- **wxEVT_MIDDLE_DOWN**
- **wxEVT_MIDDLE_UP**
- **wxEVT_MIDDLE_DCLICK**
- **wxEVT_RIGHT_DOWN**
- **wxEVT_RIGHT_UP**
- **wxEVT_RIGHT_DCLICK**
- **wxEVT_MOTION**
- **wxEVT_MOUSEWHEEL**

wxMouseEvent::AltDown

bool AltDown()

Returns true if the Alt key was down at the time of the event.

wxMouseEvent::Button

bool Button(int *button*)

Returns true if the identified mouse button is changing state. Valid values of *button* are:

wxMOUSE_BTN_LEFT	check if left button was pressed
wxMOUSE_BTN_MIDDLE	check if left button was pressed
wxMOUSE_BTN_RIGHT	check if left button was pressed

`wxMOUSE_BTN_ANY`

check if any button was pressed

wxMouseEvent::ButtonDClick

bool ButtonDClick(int *but* = `wxMOUSE_BTN_ANY`)

If the argument is omitted, this returns true if the event was a mouse double click event. Otherwise the argument specifies which double click event was generated (see *Button* (p. 931) for the possible values).

wxMouseEvent::ButtonDown

bool ButtonDown(int *but* = -1)

If the argument is omitted, this returns true if the event was a mouse button down event. Otherwise the argument specifies which button-down event was generated (see *Button* (p. 931) for the possible values).

wxMouseEvent::ButtonUp

bool ButtonUp(int *but* = -1)

If the argument is omitted, this returns true if the event was a mouse button up event. Otherwise the argument specifies which button-up event was generated (see *Button* (p. 931) for the possible values).

wxMouseEvent::ControlDown

bool ControlDown()

Returns true if the control key was down at the time of the event.

wxMouseEvent::Dragging

bool Dragging()

Returns true if this was a dragging event (motion while a button is depressed).

See also

Moving (p. 936)

wxMouseEvent::Entering

bool Entering()

Returns true if the mouse was entering the window.

See also *wxMouseEvent::Leaving* (p. 934).

wxMouseEvent::GetButton

int GetButton() const

Returns the mouse button which generated this event or `wxMOUSE_BTN_NONE` if no button is involved (for mouse move, enter or leave event, for example). Otherwise `wxMOUSE_BTN_LEFT` is returned for the left button down, up and double click events, `wxMOUSE_BTN_MIDDLE` and `wxMOUSE_BTN_RIGHT` for the same events for the middle and the right buttons respectively.

wxMouseEvent::GetPosition

wxPoint GetPosition() const

void GetPosition(wxCoord* x, wxCoord* y) const

void GetPosition(long* x, long* y) const

Sets *x and *y to the position at which the event occurred.

Returns the physical mouse position in pixels.

wxMouseEvent::GetLogicalPosition

wxPoint GetLogicalPosition(const wxDC& dc) const

Returns the logical mouse position in pixels (i.e. translated according to the translation set for the DC, which usually indicates that the window has been scrolled).

wxMouseEvent::GetLinesPerAction

int GetLinesPerAction() const

Returns the configured number of lines (or whatever) to be scrolled per wheel action. Defaults to three.

wxMouseEvent::GetWheelRotation

int GetWheelRotation() const

Get wheel rotation, positive or negative indicates direction of rotation. Current devices all send an event when rotation is equal to +/-WheelDelta, but this allows for finer resolution devices to be created in the future. Because of this you shouldn't assume that

one event is equal to 1 line or whatever, but you should be able to either do partial line scrolling or wait until +/-WheelDelta rotation values have been accumulated before scrolling.

wxMouseEvent::GetWheelDelta

int GetWheelDelta() const

Get wheel delta, normally 120. This is the threshold for action to be taken, and one such action (for example, scrolling one increment) should occur for each delta.

wxMouseEvent::GetX

long GetX() const

Returns X coordinate of the physical mouse event position.

wxMouseEvent::GetY

long GetY()

Returns Y coordinate of the physical mouse event position.

wxMouseEvent::IsButton

bool IsButton() const

Returns true if the event was a mouse button event (not necessarily a button down event - that may be tested using *ButtonDown*).

wxMouseEvent::IsPageScroll

bool IsPageScroll() const

Returns true if the system has been setup to do page scrolling with the mouse wheel instead of line scrolling.

wxMouseEvent::Leaving

bool Leaving() const

Returns true if the mouse was leaving the window.

See also *wxMouseEvent::Entering* (p. 932).

wxMouseEvent::LeftDClick

bool LeftDClick() const

Returns true if the event was a left double click.

wxMouseEvent::LeftDown

bool LeftDown() const

Returns true if the left mouse button changed to down.

wxMouseEvent::LeftIsDown

bool LeftIsDown() const

Returns true if the left mouse button is currently down, independent of the current event type.

Please notice that it is **not** the same as *LeftDown* (p. 935) which returns true if the left mouse button was just pressed. Rather, it describes the state of the mouse button before the event happened.

This event is usually used in the mouse event handlers which process "move mouse" messages to determine whether the user is (still) dragging the mouse.

wxMouseEvent::LeftUp

bool LeftUp() const

Returns true if the left mouse button changed to up.

wxMouseEvent::MetaDown

bool MetaDown() const

Returns true if the Meta key was down at the time of the event.

wxMouseEvent::MiddleDClick

bool MiddleDClick() const

Returns true if the event was a middle double click.

wxMouseEvent::MiddleDown

bool MiddleDown() const

Returns true if the middle mouse button changed to down.

wxMouseEvent::MiddleIsDown

bool MiddleIsDown() const

Returns true if the middle mouse button is currently down, independent of the current event type.

wxMouseEvent::MiddleUp

bool MiddleUp() const

Returns true if the middle mouse button changed to up.

wxMouseEvent::Moving

bool Moving() const

Returns true if this was a motion event and no mouse buttons were pressed. If any mouse button is held pressed, then this method returns `false` and *Dragging* (p. 932) returns `true`.

wxMouseEvent::RightDClick

bool RightDClick() const

Returns true if the event was a right double click.

wxMouseEvent::RightDown

bool RightDown() const

Returns true if the right mouse button changed to down.

wxMouseEvent::RightIsDown

bool RightIsDown() const

Returns true if the right mouse button is currently down, independent of the current event type.

wxMouseEvent::RightUp

bool RightUp() const

Returns true if the right mouse button changed to up.

wxMouseEvent::ShiftDown

bool ShiftDown() const

Returns true if the shift key was down at the time of the event.

wxMoveEvent

A move event holds information about move change events.

Derived from

wxEvent (p. 441)

wxObject (p. 954)

Include files

<wx/event.h>

Event table macros

To process a move event, use this event handler macro to direct input to a member function that takes a *wxMoveEvent* argument.

EVT_MOVE(func) Process a *wxEVT_MOVE* event, which is generated when a window is moved.

See also

wxPoint (p. 991), *Event handling overview* (p. 1610)

wxMoveEvent::wxMoveEvent

wxMoveEvent(const wxPoint& pt, int id = 0)

Constructor.

wxMoveEvent::GetPosition

wxPoint GetPosition() const

Returns the position of the window generating the move change event.

wxMultiChoiceDialog

This class represents a dialog that shows a list of strings, and allows the user to select one or more.

Derived from

wxDialog (p. 369)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/choicdlg.h>

See also

wxMultiChoiceDialog overview (p. 1658)

wxMutex

A mutex object is a synchronization object whose state is set to signaled when it is not owned by any thread, and nonsignaled when it is owned. Its name comes from its usefulness in coordinating mutually-exclusive access to a shared resource as only one thread at a time can own a mutex object.

Mutexes may be recursive in the sense that a thread can lock a mutex which it had already locked before (instead of dead locking the entire process in this situation by starting to wait on a mutex which will never be released while the thread is waiting) but using them is not recommended and they are **not** recursive by default. The reason for this is that recursive mutexes are not supported by all Unix flavours and, worse, they cannot be used with *wxCondition* (p. 174).

For example, when several thread use the data stored in the linked list, modifications to the list should be only allowed to one thread at a time because during a new node addition the list integrity is temporarily broken (this is also called *program invariant*).

Example

```
// this variable has an "s_" prefix because it is static: seeing an
"s_" in
// a multithreaded program is in general a good sign that you should
use a
// mutex (or a critical section)
static wxMutex *s_mutexProtectingTheGlobalData;

// we store some numbers in this global array which is presumably used
by
// several threads simultaneously
wxArrayInt s_data;

void MyThread::AddNewNode(int num)
```

```
{
    // ensure that no other thread accesses the list
    s_mutexProtectingTheGlobalList->Lock();

    s_data.Add(num);

    s_mutexProtectingTheGlobalList->Unlock();
}

// return true the given number is greater than all array elements
bool MyThread::IsGreater(int num)
{
    // before using the list we must acquire the mutex
    wxMutexLocker lock(s_mutexProtectingTheGlobalData);

    size_t count = s_data.Count();
    for ( size_t n = 0; n < count; n++ )
    {
        if ( s_data[n] > num )
            return false;
    }

    return true;
}
```

Notice how `wxMutexLocker` was used in the second function to ensure that the mutex is unlocked in any case: whether the function returns true or false (because the destructor of the local object *lock* is always called). Using this class instead of directly using `wxMutex` is, in general safer and is even more so if your program uses C++ exceptions.

Constants

```
enum wxMutexType
{
    // normal mutex: try to always use this one
    wxMUTEX_DEFAULT,

    // recursive mutex: don't use these ones with wxCondition
    wxMUTEX_RECURSIVE
};
```

Derived from

None.

Include files

`<wx/thread.h>`

See also

wxThread (p. 1286), *wxCondition* (p. 174), *wxMutexLocker* (p. 941), *wxCriticalSection* (p. 207)

wxMutex::wxMutex

wxMutex(wxMutexType type = *wxMUTEX_DEFAULT*)

Default constructor.

wxMutex::~~wxMutex

~wxMutex()

Destroys the wxMutex object.

wxMutex::Lock

wxMutexError Lock()

Locks the mutex object.

Return value

One of:

wxMUTEX_NO_ERROR	There was no error.
wxMUTEX_DEAD_LOCK	A deadlock situation was detected.
wxMUTEX_BUSY	The mutex is already locked by another thread.

wxMutex::TryLock

wxMutexError TryLock()

Tries to lock the mutex object. If it can't, returns immediately with an error.

Return value

One of:

wxMUTEX_NO_ERROR	There was no error.
wxMUTEX_DEAD_LOCK	A deadlock situation was detected.
wxMUTEX_BUSY	The mutex is already locked by another thread.

wxMutex::Unlock

wxMutexError Unlock()

Unlocks the mutex object.

Return value

One of:

wxMUTEX_NO_ERROR	There was no error.
wxMUTEX_DEAD_LOCK	A deadlock situation was detected.
wxMUTEX_BUSY	The mutex is already locked by another thread.
wxMUTEX_UNLOCKED	The calling thread tries to unlock an unlocked mutex.

wxMutexLocker

This is a small helper class to be used with *wxMutex* (p. 938) objects. A *wxMutexLocker* acquires a mutex lock in the constructor and releases (or unlocks) the mutex in the destructor making it much more difficult to forget to release a mutex (which, in general, will promptly lead to the serious problems). See *wxMutex* (p. 938) for an example of *wxMutexLocker* usage.

Derived from

None.

Include files

<wx/thread.h>

See also

wxMutex (p. 938), *wxCriticalSectionLocker* (p. 209)

wxMutexLocker::wxMutexLocker

wxMutexLocker(wxMutex& mutex)

Constructs a *wxMutexLocker* object associated with mutex and locks it. Call *IsLocked* (p. 941) to check if the mutex was successfully locked.

wxMutexLocker::~~wxMutexLocker

~wxMutexLocker()

Destructor releases the mutex if it was successfully acquired in the ctor.

wxMutexLocker::IsOk

bool IsOk() const

Returns true if mutex was acquired in the constructor, false otherwise.

wxNode

wxNodeBase is the node structure used in linked lists (see *wxList* (p. 787)) and derived classes. You should never use wxNodeBase class directly, however, because it works with untyped (`void *`) data and this is unsafe. Use wxNodeBase-derived classes which are automatically defined by `WX_DECLARE_LIST` and `WX_DEFINE_LIST` macros instead as described in *wxList* (p. 787) documentation (see example there). Also note that although there is a class called wxNode, it is defined for backwards compatibility only and usage of this class is strongly deprecated.

In the documentation below, the type `T` should be thought of as a "template" parameter: this is the type of data stored in the linked list or, in other words, the first argument of `WX_DECLARE_LIST` macro. Also, wxNode is written as `wxNode<T>` even though it isn't really a template class -- but it helps to think of it as if it were.

Derived from

None.

Include files

`<wx/list.h>`

See also

wxList (p. 787), *wxHashTable* (p. 642)

wxNode<T>::GetData

T * GetData() const

Retrieves the client data pointer associated with the node.

wxNode<T>::GetNext

wxNode<T> * GetNext() const

Retrieves the next node or NULL if this node is the last one.

wxNode<T>::GetPrevious

wxNode<T> * GetPrevious()

Retrieves the previous node or NULL if this node is the first one in the list.

wxNode<T>::SetData

void SetData(T *data)

Sets the data associated with the node (usually the pointer will have been set when the node was created).

wxNode<T>::IndexOf

int IndexOf()

Returns the zero-based index of this node within the list. The return value will be NOT_FOUND if the node has not been added to a list yet.

wxNotebook

This class represents a notebook control, which manages multiple windows with associated tabs.

To use the class, create a wxNotebook object and call *AddPage* (p. 945) or *InsertPage* (p. 948), passing a window to be used as the page. Do not explicitly delete the window for a page that is currently managed by wxNotebook.

wxNotebookPage is a typedef for wxWindow.

Derived from

wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/notebook.h>

Window styles

wxNB_LEFT	Place tabs on the left side. Not supported under Windows XP.
wxNB_RIGHT	Place tabs on the right side. Not supported under Windows XP.
wxNB_BOTTOM	Place tabs under instead of above the notebook pages. Not supported under Windows XP.
wxNB_FIXEDWIDTH	(Windows only) All tabs will have same width.
wxNB_MULTILINE	(Windows only) There can be several rows of tabs.

See also *window styles overview* (p. 1618).

Event handling

To process input from a notebook control, use the following event handler macros to direct input to member functions that take a *wxNotebookEvent* (p. 950) argument.

EVT_NOTEBOOK_PAGE_CHANGED(id, func) The page selection was changed. Processes a `wxEVT_COMMAND_NOTEBOOK_PAGE_CHANGED` event.

EVT_NOTEBOOK_PAGE_CHANGING(id, func) The page selection is about to be changed. Processes a `wxEVT_COMMAND_NOTEBOOK_PAGE_CHANGING` event. This event can be *vetoed* (p. 954).

See also

wxNotebookEvent (p. 950), *wxImageList* (p. 754), *wxTabCtrl* (p. 1235)

wxNotebook::wxNotebook

wxNotebook()

Default constructor.

wxNotebook(wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = 0, const wxString& name = "notebook")

Constructs a notebook control.

Note that sometimes you can reduce flicker by passing the `wxCLIP_CHILDREN` window style.

Parameters

parent

The parent window. Must be non-NULL.

id

The window identifier.

pos

The window position.

size

The window size.

style

The window style. See *wxNotebook* (p. 943).

name

The name of the control (used only under Motif).

wxNotebook::~~wxNotebook

~wxNotebook()

Destroys the wxNotebook object.

wxNotebook::AddPage

bool AddPage(wxNotebookPage* page, const wxString& text, bool select = false, int imageld = -1)

Adds a new page.

The call to this function may generate the page changing events.

Parameters

page

Specifies the new page.

text

Specifies the text for the new page.

select

Specifies whether the page should be selected.

imageld

Specifies the optional image index for the new page.

Return value

true if successful, false otherwise.

Remarks

Do not delete the page, it will be deleted by the notebook.

See also

wxNotebook::InsertPage (p. 948)

wxNotebook::AdvanceSelection

void AdvanceSelection(bool *forward* = true)

Cycles through the tabs.

The call to this function generates the page changing events.

wxNotebook::AssignImageList

void AssignImageList(wxImageList* *imageList*)

Sets the image list for the page control and takes ownership of the list.

[See also](#)

wxImageList (p. 754), *SetImageList* (p. 949)

wxNotebook::Create

bool Create(wxWindow* *parent*, wxWindowID *id*, const wxPoint& *pos* = *wxDefaultPosition*, const wxSize& *size*, long *style* = 0, const wxString& *name* = "notebook")

Creates a notebook control. See *wxNotebook::wxNotebook* (p. 944) for a description of the parameters.

wxNotebook::DeleteAllPages

bool DeleteAllPages()

Deletes all pages.

wxNotebook::DeletePage

bool DeletePage(size_t *page*)

Deletes the specified page, and the associated window.

The call to this function generates the page changing events.

wxNotebook::GetImageList

wxImageList* GetImageList() const

Returns the associated image list.

[See also](#)

wxImageList (p. 754), *wxNotebook::SetImageList* (p. 949)

wxNotebook::GetPage

wxNotebookPage* GetPage(size_t page)

Returns the window at the given page position.

wxNotebook::GetPageCount

size_t GetPageCount() const

Returns the number of pages in the notebook control.

wxNotebook::GetPageImage

int GetPageImage(size_t nPage) const

Returns the image index for the given page.

wxNotebook::GetPageText

wxString GetPageText(size_t nPage) const

Returns the string for the given page.

wxNotebook::GetRowCount

int GetRowCount() const

Returns the number of rows in the notebook control.

wxNotebook::GetSelection

int GetSelection() const

Returns the currently selected page, or -1 if none was selected.

Note that this method may return either the previously or newly selected page when called from the `EVT_NOTEBOOK_PAGE_CHANGED` handler depending on the platform and so *wxNotebookEvent::GetSelection* (p. 951) should be used instead in this case.

wxNotebook::HitTest

int HitTest(const wxPoint& pt, long *flags = NULL)

Returns the index of the tab at the specified position or `wxNOT_FOUND` if none. If *flags* parameter is non `NULL`, the position of the point inside the tab is returned as well.

NB: This method is currently only implemented under wxMSW and wxUniv.

Parameters

pt

Specifies the point for the hit test.

flags

Return value for detailed information. One of the following values:
wxNB_HITTEST_NOWHERE
There was no tab under this point.

wxNB_HITTEST_ONICON

The point was over an icon (currently wxMSW only).

wxNB_HITTEST_ONLABEL

The point was over a label (currently wxMSW only).

wxNB_HITTEST_ONITEM

The point was over an item, but not on the label or icon.

Return value

Returns the zero-based tab index or **wxNOT_FOUND** if there is no tab is at the specified position.

wxNotebook::InsertPage

bool InsertPage(size_t index, wxNotebookPage* page, const wxString& text, bool select = false, int imageld = -1)

Inserts a new page at the specified position.

Parameters

index

Specifies the position for the new page.

page

Specifies the new page.

text

Specifies the text for the new page.

select

Specifies whether the page should be selected.

imageId

Specifies the optional image index for the new page.

Return value

true if successful, false otherwise.

Remarks

Do not delete the page, it will be deleted by the notebook.

See also

wxNotebook::AddPage (p. 945)

wxNotebook::OnSelChange

void OnSelChange(wxNotebookEvent& event)

An event handler function, called when the page selection is changed.

See also

wxNotebookEvent (p. 950)

wxNotebook::RemovePage

bool RemovePage(size_t page)

Deletes the specified page, without deleting the associated window.

wxNotebook::SetImageList

void SetImageList(wxImageList* imageList)

Sets the image list for the page control. It does not take ownership of the image list, you must delete it yourself.

See also

wxImageList (p. 754), *AssignImageList* (p. 946)

wxNotebook::SetPadding

void SetPadding(const wxSize& padding)

Sets the amount of space around each page's icon and label, in pixels.

NB: The vertical padding cannot be changed in wxGTK.

wxNotebook::SetPageSize

void SetPageSize(const wxSize& size)

Sets the width and height of the pages.

NB: This method is currently not implemented for wxGTK.

wxNotebook::SetPageImage

bool SetPageImage(size_t page, int image)

Sets the image index for the given page. *image* is an index into the image list which was set with *wxNotebook::SetImageList* (p. 949).

wxNotebook::SetPageText

bool SetPageText(size_t page, const wxString& text)

Sets the text for the given page.

wxNotebook::SetSelection

int SetSelection(size_t page)

Sets the selection for the given page, returning the previous selection.

The call to this function generates the page changing events.

See also

wxNotebook::GetSelection (p. 947)

wxNotebookEvent

This class represents the events generated by a notebook control: currently, there are two of them. The `PAGE_CHANGING` event is sent before the current page is changed. It allows to the program to examine the current page (which can be retrieved with *GetOldSelection()* (p. 951)) and to veto the page change by calling *Veto()* (p. 954) if, for example, the current values in the controls of the old page are invalid.

The second event - `PAGE_CHANGED` - is sent after the page has been changed and the program cannot veto it any more, it just informs it about the page change.

To summarize, if the program is interested in validating the page values before allowing the user to change it, it should process the `PAGE_CHANGING` event, otherwise `PAGE_CHANGED` is probably enough. In any case, it is probably unnecessary to process both events at once.

Derived from

wxNotifyEvent (p. 953)
wxCommandEvent (p. 165)
wxEvent (p. 441)
wxObject (p. 954)

Include files

<wx/notebook.h>

Event handling

To process input from a notebook control, use the following event handler macros to direct input to member functions that take a *wxNotebookEvent* (p. 950) argument.

EVT_NOTEBOOK_PAGE_CHANGED(id, func) The page selection was changed. Processes a *wxEVT_COMMAND_NOTEBOOK_PAGE_CHANGED* event.

EVT_NOTEBOOK_PAGE_CHANGING(id, func) The page selection is about to be changed. Processes a *wxEVT_COMMAND_NOTEBOOK_PAGE_CHANGING* event. This event can be *vetoed* (p. 954).

See also

wxNotebook (p. 943), *wxTabCtrl* (p. 1235), *wxTabEvent* (p. 1241)

wxNotebookEvent::wxNotebookEvent

wxNotebookEvent(wxEvtType eventType = wxEVT_NULL, int id = 0, int sel = -1, int oldSel = -1)

Constructor (used internally by wxWidgets only).

wxNotebookEvent::GetOldSelection

int GetOldSelection() const

Returns the page that was selected before the change, -1 if none was selected.

wxNotebookEvent::GetSelection

int GetSelection() const

Returns the currently selected page, or -1 if none was selected.

NB: under Windows, `GetSelection()` will return the same value as *GetOldSelection()* (p. 951) when called from `EVT_NOTEBOOK_PAGE_CHANGING` handler and not the page which is going to be selected.

wxNotebookEvent::SetOldSelection

void SetOldSelection(int page)

Sets the id of the page selected before the change.

wxNotebookEvent::SetSelection

void SetSelection(int page)

Sets the selection member variable.

See also

wxNotebookEvent::GetSelection (p. 951)

wxNotebookSizer

`wxNotebookSizer` is a specialized sizer to make sizers work in connection with using notebooks. This sizer is different from any other sizer as you must not add any children to it - instead, it queries the notebook class itself. The only thing this sizer does is to determine the size of the biggest page of the notebook and report an adjusted minimal size to a more toplevel sizer.

For more information, please see *Programming with wxNotebookSizer* (p. 1633).

Derived from

wxSizer (p. 1110)

wxObject (p. 954)

See also

wxSizer (p. 1110), *wxNotebook* (p. 943), *Sizer overview* (p. 1627)

wxNotebookSizer::wxNotebookSizer

wxNotebookSizer(wxNotebook* notebook)

Constructor. It takes an associated notebook as its only parameter.

wxNotebookSizer::GetNotebook

wxNotebook* GetNotebook()

Returns the notebook associated with the sizer.

wxNotifyEvent

This class is not used by the event handlers by itself, but is a base class for other event classes (such as *wxNotebookEvent* (p. 950)).

It (or an object of a derived class) is sent when the controls state is being changed and allows the program to *Veto()* (p. 954) this change if it wants to prevent it from happening.

Derived from

wxCommandEvent (p. 165)

wxEvtHandler (p. 441)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/event.h>

Event table macros

None

See also

wxNotebookEvent (p. 950)

wxNotifyEvent::wxNotifyEvent

wxNotifyEvent(wxEventType eventType = wxEVT_NULL, int id = 0)

Constructor (used internally by wxWidgets only).

wxNotifyEvent::Allow

void Allow()

This is the opposite of *Veto()* (p. 954): it explicitly allows the event to be processed. For most events it is not necessary to call this method as the events are allowed anyhow but some are forbidden by default (this will be mentioned in the corresponding event description).

wxNotifyEvent::IsAllowed

bool IsAllowed() const

Returns true if the change is allowed (*Veto()* (p. 954) hasn't been called) or false otherwise (if it was).

wxNotifyEvent::Veto

void Veto()

Prevents the change announced by this event from happening.

It is in general a good idea to notify the user about the reasons for vetoing the change because otherwise the applications behaviour (which just refuses to do what the user wants) might be quite surprising.

wxObject

This is the root class of all wxWidgets classes. It declares a virtual destructor which ensures that destructors get called for all derived class objects where necessary.

wxObject is the hub of a dynamic object creation scheme, enabling a program to create instances of a class only knowing its string class name, and to query the class hierarchy.

The class contains optional debugging versions of **new** and **delete**, which can help trace memory allocation and deallocation problems.

wxObject can be used to implement reference counted objects, such as wxPen, wxBitmap and others.

See also

wxClassInfo (p. 130), *Debugging overview* (p. 1605), *wxObjectRefData* (p. 957)

wxObject::wxObject

wxObject()**wxObject(const wxObject& other)**

Default and copy constructors.

wxObject::~~wxObject

wxObject()

Destructor. Performs dereferencing, for those objects that use reference counting.

wxObject::m_refData

wxObjectRefData* m_refData

Pointer to an object which is the object's reference-counted data.

See also

wxObject::Ref (p. 956), *wxObject::UnRef* (p. 957), *wxObject::SetRefData* (p. 957), *wxObject::GetRefData* (p. 955), *wxObjectRefData* (p. 957)

wxObject::Dump

void Dump(ostream& stream)

A virtual function that may be redefined by derived classes to allow dumping of memory states.

This function is only defined in debug build and doesn't exist at all if `__WXDEBUG__` is not defined.

Parameters

stream

Stream on which to output dump information.

Remarks

Currently wxWidgets does not define Dump for derived classes, but programmers may wish to use it for their own applications. Be sure to call the Dump member of the class's base class to allow all information to be dumped.

The implementation of this function in wxObject just writes the class name of the object.

wxObject::GetClassInfo

wxClassInfo * GetClassInfo()

This virtual function is redefined for every class that requires run-time type information, when using DECLARE_CLASS macros.

wxObject::GetRefData

wxObjectRefData* GetRefData() const

Returns the `m_refData` pointer.

See also

wxObject::Ref (p. 956), *wxObject::UnRef* (p. 957), *wxObject::m_refData* (p. 955), *wxObject::SetRefData* (p. 957), *wxObjectRefData* (p. 957)

wxObject::IsKindOf

bool IsKindOf(wxClassInfo *info)

Determines whether this class is a subclass of (or the same class as) the given class.

Parameters

info

A pointer to a class information object, which may be obtained by using the CLASSINFO macro.

Return value

true if the class represented by *info* is the same class as this one or is derived from it.

Example

```
bool tmp = obj->IsKindOf(CLASSINFO(wxFram));
```

wxObject::Ref

void Ref(const wxObject& clone)

Makes this object refer to the data in *clone*.

Parameters

clone

The object to 'clone'.

Remarks

First this function calls *wxObject::UnRef* (p. 957) on itself to decrement (and perhaps free) the data it is currently referring to.

It then sets its own *m_refData* to point to that of *clone*, and increments the reference count inside the data.

See also

wxObject::UnRef (p. 957), *wxObject::m_refData* (p. 955), *wxObject::SetRefData* (p. 957), *wxObject::GetRefData* (p. 955), *wxObjectRefData* (p. 957)

wxObject::SetRefData

void SetRefData(wxObjectRefData* data)

Sets the **m_refData** pointer.

See also

wxObject::Ref (p. 956), *wxObject::UnRef* (p. 957), *wxObject::m_refData* (p. 955), *wxObject::GetRefData* (p. 955), *wxObjectRefData* (p. 957)

wxObject::UnRef

void UnRef()

Decrements the reference count in the associated data, and if it is zero, deletes the data. The **m_refData** member is set to NULL.

See also

wxObject::Ref (p. 956), *wxObject::m_refData* (p. 955), *wxObject::SetRefData* (p. 957), *wxObject::GetRefData* (p. 955), *wxObjectRefData* (p. 957)

wxObject::operator new

void * new(size_t size, const wxString& filename = NULL, int lineNum = 0)

The *new* operator is defined for debugging versions of the library only, when the identifier `__WXDEBUG__` is defined. It takes over memory allocation, allowing `wxDebugContext` operations.

wxObject::operator delete

void delete(void buf)

The *delete* operator is defined for debugging versions of the library only, when the identifier `__WXDEBUG__` is defined. It takes over memory deallocation, allowing `wxDebugContext` operations.

wxObjectRefData

This class is used to store reference-counted data. Derive classes from this to store your own data. When retrieving information from a **wxObject**'s reference data, you will need to cast to your own derived class.

Friends

wxObject (p. 954)

See also

wxObject (p. 954)

wxObjectRefData::m_count

int m_count

Reference count. When this goes to zero during a *wxObject::UnRef* (p. 957), an object can delete the **wxObjectRefData** object.

wxObjectRefData::wxObjectRefData

wxObjectRefData()

Default constructor. Initialises the **m_count** member to 1.

wxObjectRefData::~~wxObjectRefData

wxObjectRefData()

Destructor.

wxOutputStream

wxOutputStream is an abstract base class which may not be used directly.

Derived from

wxStreamBase (p. 1192)

Include files

<wx/stream.h>

wxOutputStream::wxOutputStream

wxOutputStream()

Creates a dummy *wxOutputStream* object.

wxOutputStream::~~wxOutputStream

~wxOutputStream()

Destructor.

wxOutputStream::LastWrite

size_t LastWrite() const

Returns the number of bytes written during the last Write().

wxOutputStream::PutC

void PutC(char c)

Puts the specified character in the output queue and increments the stream position.

wxOutputStream::SeekO

off_t SeekO(off_t pos, wxSeekMode mode = wxFromStart)

Changes the stream current position.

Parameters

pos

Offset to seek to.

mode

One of **wxFromStart**, **wxFromEnd**, **wxFromCurrent**.

Return value

The new stream position or **wxInvalidOffset** on error.

wxOutputStream::TellO

off_t TellO() const

Returns the current stream position.

wxOutputStream::Write

wxOutputStream& Write(const void *buffer, size_t size)

Writes the specified amount of bytes using the data of *buffer*. **WARNING!** The buffer absolutely needs to have at least the specified size.

This function returns a reference on the current object, so the user can test any states of the stream right away.

wxOutputStream& Write(wxInputStream& stream_in)

Reads data from the specified input stream and stores them in the current stream. The data is read until an error is raised by one of the two streams.

wxPageSetupDialog

This class represents the page setup common dialog. The page setup dialog is standard from Windows 95 on, replacing the print setup dialog (which is retained in Windows and wxWidgets for backward compatibility). On Windows 95 and NT 4.0 and above, the page setup dialog is native to the windowing system, otherwise it is emulated.

The page setup dialog contains controls for paper size (A4, A5 etc.), orientation (landscape or portrait), and controls for setting left, top, right and bottom margin sizes in millimetres.

When the dialog has been closed, you need to query the *wxPageSetupDialogData* (p. 961) object associated with the dialog.

Note that the OK and Cancel buttons do not destroy the dialog; this must be done by the application.

Derived from

wxDialog (p. 369)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/printdlg.h>

See also

wxPrintDialog (p. 1002), *wxPageSetupDialogData* (p. 961)

wxPageSetupDialog::wxPageSetupDialog

wxPageSetupDialog(wxWindow* parent, wxPageSetupDialogData* data = NULL)

Constructor. Pass a parent window, and optionally a pointer to a block of page setup data, which will be copied to the print dialog's internal data.

wxPageSetupDialog::~~wxPageSetupDialog

~wxPageSetupDialog()

Destructor.

wxPageSetupDialog::GetPageSetupData

wxPageSetupDialogData& GetPageSetupData()

Returns the *page setup data* (p. 961) associated with the dialog.

wxPageSetupDialog::ShowModal

int ShowModal()

Shows the dialog, returning wxID_OK if the user pressed OK, and wxID_CANCEL otherwise.

wxPageSetupDialogData

This class holds a variety of information related to *wxPageSetupDialog* (p. 960).

It contains a *wxPrintData* (p. 996) member which is used to hold basic printer configuration data (as opposed to the user-interface configuration settings stored by *wxPageSetupDialogData*).

Derived from

wxObject (p. 954)

Include files

<wx/cmndata.h>

See also

wxPageSetupDialog (p. 960)

wxPageSetupDialogData::wxPageSetupDialogData

wxPageSetupDialogData()

Default constructor.

wxPageSetupDialogData(wxPageSetupDialogData& data)

Copy constructor.

wxPageSetupDialogData(wxPrintData& *printData*)

Construct an object from a print data object.

wxPageSetupDialogData::~~wxPageSetupDialogData

~wxPageSetupDialogData()

Destructor.

wxPageSetupDialogData::EnableHelp

void EnableHelp(bool *flag*)

Enables or disables the 'Help' button (Windows only).

wxPageSetupDialogData::EnableMargins

void EnableMargins(bool *flag*)

Enables or disables the margin controls (Windows only).

wxPageSetupDialogData::EnableOrientation

void EnableOrientation(bool *flag*)

Enables or disables the orientation control (Windows only).

wxPageSetupDialogData::EnablePaper

void EnablePaper(bool *flag*)

Enables or disables the paper size control (Windows only).

wxPageSetupDialogData::EnablePrinter

void EnablePrinter(bool *flag*)

Enables or disables the **Printer** button, which invokes a printer setup dialog.

wxPageSetupDialogData::GetDefaultMinMargins

bool GetDefaultMinMargins() const

Returns true if the page setup dialog will take its minimum margin values from the

currently selected printer properties. Windows only.

wxPageSetupDialogData::GetEnableMargins

bool GetEnableMargins() const

Returns true if the margin controls are enabled (Windows only).

wxPageSetupDialogData::GetEnableOrientation

bool GetEnableOrientation() const

Returns true if the orientation control is enabled (Windows only).

wxPageSetupDialogData::GetEnablePaper

bool GetEnablePaper() const

Returns true if the paper size control is enabled (Windows only).

wxPageSetupDialogData::GetEnablePrinter

bool GetEnablePrinter() const

Returns true if the printer setup button is enabled.

wxPageSetupDialogData::GetEnableHelp

bool GetEnableHelp() const

Returns true if the printer setup button is enabled.

wxPageSetupDialogData::GetDefaultInfo

bool GetDefaultInfo() const

Returns true if the dialog will simply return default printer information (such as orientation) instead of showing a dialog. Windows only.

wxPageSetupDialogData::GetMarginTopLeft

wxPoint GetMarginTopLeft() const

Returns the left (x) and top (y) margins in millimetres.

wxPageSetupDialogData::GetMarginBottomRight

wxPoint GetMarginBottomRight() const

Returns the right (x) and bottom (y) margins in millimetres.

wxPageSetupDialogData::GetMinMarginTopLeft

wxPoint GetMinMarginTopLeft() const

Returns the left (x) and top (y) minimum margins the user can enter (Windows only). Units are in millimetres

wxPageSetupDialogData::GetMinMarginBottomRight

wxPoint GetMinMarginBottomRight() const

Returns the right (x) and bottom (y) minimum margins the user can enter (Windows only). Units are in millimetres

wxPageSetupDialogData::GetPaperId

wxPaperSize GetPaperId() const

Returns the paper id (stored in the internal wxPrintData object).

For further information, see *wxPrintData::SetPaperId* (p. 1000).

wxPageSetupDialogData::GetPaperSize

wxSize GetPaperSize() const

Returns the paper size in millimetres.

wxPageSetupDialogData::GetPrintData

wxPrintData& GetPrintData()

Returns a reference to the *print data* (p. 996) associated with this object.

wxPageSetupDialogData::Ok

bool Ok() const

Returns true if the print data associated with the dialog data is valid. This can return false on Windows if the current printer is not set, for example. On all other platforms, it

returns true.

wxPageSetupDialogData::SetDefaultInfo

void SetDefaultInfo(bool *flag*)

Pass true if the dialog will simply return default printer information (such as orientation) instead of showing a dialog. Windows only.

wxPageSetupDialogData::SetDefaultMinMargins

void SetDefaultMinMargins(bool *flag*)

Pass true if the page setup dialog will take its minimum margin values from the currently selected printer properties. Windows only. Units are in millimetres

wxPageSetupDialogData::SetMarginTopLeft

void SetMarginTopLeft(const wxPoint& *pt*)

Sets the left (x) and top (y) margins in millimetres.

wxPageSetupDialogData::SetMarginBottomRight

void SetMarginBottomRight(const wxPoint& *pt*)

Sets the right (x) and bottom (y) margins in millimetres.

wxPageSetupDialogData::SetMinMarginTopLeft

void SetMinMarginTopLeft(const wxPoint& *pt*)

Sets the left (x) and top (y) minimum margins the user can enter (Windows only). Units are in millimetres.

wxPageSetupDialogData::SetMinMarginBottomRight

void SetMinMarginBottomRight(const wxPoint& *pt*)

Sets the right (x) and bottom (y) minimum margins the user can enter (Windows only). Units are in millimetres.

wxPageSetupDialogData::SetPaperId

void SetPaperId(wxPaperSize& *id*)

Sets the paper size id. For further information, see *wxPrintData::SetPaperId* (p. 1000).

Calling this function overrides the explicit paper dimensions passed in *wxPageSetupDialogData::SetPaperSize* (p. 966).

wxPageSetupDialogData::SetPaperSize

void SetPaperSize(const wxSize& size)

Sets the paper size in millimetres. If a corresponding paper id is found, it will be set in the internal *wxPrintData* object, otherwise the paper size overrides the paper id.

wxPageSetupDialogData::SetPrintData

void SetPrintData(const wxPrintData& printData)

Sets the *print data* (p. 996) associated with this object.

wxPageSetupDialogData::operator =

void operator =(const wxPrintData& data)

Assigns print data to this object.

void operator =(const wxPageSetupDialogData& data)

Assigns page setup data to this object.

wxPaintDC

A *wxPaintDC* must be constructed if an application wishes to paint on the client area of a window from within an **OnPaint** event. This should normally be constructed as a temporary stack object; don't store a *wxPaintDC* object. If you have an *OnPaint* handler, you *must* create a *wxPaintDC* object within it even if you don't actually use it.

Using *wxPaintDC* within *OnPaint* is important because it automatically sets the clipping area to the damaged area of the window. Attempts to draw outside this area do not appear.

To draw on a window from outside **OnPaint**, construct a *wxClientDC* (p. 134) object.

To draw on the whole window including decorations, construct a *wxWindowDC* (p. 1441) object (Windows only).

Derived from

wxWindowDC (p. 1441)

wxDC (p. 349)

Include files

<wx/dcclient.h>

See also

wxDC (p. 349), *wxMemoryDC* (p. 881), *wxPaintDC* (p. 966), *wxWindowDC* (p. 1441), *wxScreenDC* (p. 1073)

wxPaintDC::wxPaintDC

wxPaintDC(**wxWindow*** *window*)

Constructor. Pass a pointer to the window on which you wish to paint.

wxPaintEvent

A paint event is sent when a window's contents needs to be repainted.

Derived from

wxEvent (p. 441)

wxObject (p. 954)

Include files

<wx/event.h>

Event table macros

To process a paint event, use this event handler macro to direct input to a member function that takes a *wxPaintEvent* argument.

EVT_PAINT(func) Process a *wxEVT_PAINT* event.

See also

Event handling overview (p. 1610)

Remarks

Note that In a paint event handler, the application must *always* create a *wxPaintDC* (p. 966) object, even if you do not use it. Otherwise, under MS Windows, refreshing for this and other windows will go wrong.

For example:

```
void MyWindow::OnPaint(wxPaintEvent& event)
{
    wxPaintDC dc(this);

    DrawMyDocument(dc);
}
```

You can optimize painting by retrieving the rectangles that have been damaged and only repainting these. The rectangles are in terms of the client area, and are unscrolled, so you will need to do some calculations using the current view position to obtain logical, scrolled units.

Here is an example of using the *wxRegionIterator* (p. 1057) class:

```
// Called when window needs to be repainted.
void MyWindow::OnPaint(wxPaintEvent& event)
{
    wxPaintDC dc(this);

    // Find Out where the window is scrolled to
    int vbX,vbY; // Top left corner of client
    GetViewStart(&vbX,&vbY);

    int vX,vY,vW,vH; // Dimensions of client area in pixels
    wxRegionIterator upd(GetUpdateRegion()); // get the update rect list

    while (upd)
    {
        vX = upd.GetX();
        vY = upd.GetY();
        vW = upd.GetW();
        vH = upd.GetH();

        // Alternatively we can do this:
        // wxRect rect(upd.GetRect());

        // Repaint this rectangle
        ...some code...

        upd ++ ;
    }
}
```

wxPaintEvent::wxPaintEvent

wxPaintEvent(int id = 0)

Constructor.

wxPalette

A palette is a table that maps pixel values to RGB colours. It allows the colours of a low-depth bitmap, for example, to be mapped to the available colours in a display.

Derived from

wxGDIObject (p. 562)

wxObject (p. 954)

Include files

<wx/palette.h>

Predefined objects

Objects:

wxNullPalette

See also

wxDC::SetPalette (p. 366), *wxBitmap* (p. 67)

wxPalette::wxPalette

wxPalette()

Default constructor.

wxPalette(const wxPalette& palette)

Copy constructor. This uses reference counting so is a cheap operation.

**wxPalette(int n, const unsigned char* red,
const unsigned char* green, const unsigned char* blue)**

Creates a palette from arrays of size *n*, one for each red, blue or green component.

Parameters

palette

A pointer or reference to the palette to copy.

n

The number of indices in the palette.

red

An array of red values.

green

An array of green values.

blue

An array of blue values.

See also

wxPalette::Create (p. 970)

wxPerl note: In wxPerl the third constructor form takes as parameters 3 array references (they must be of the same length).

wxPalette::~~wxPalette

~wxPalette()

Destructor.

wxPalette::Create

bool Create(int *n*, const unsigned char* *red*, const unsigned char* *green*, const unsigned char* *blue*)Creates a palette from arrays of size *n*, one for each red, blue or green component.**Parameters***n*

The number of indices in the palette.

red

An array of red values.

green

An array of green values.

blue

An array of blue values.

Return value

true if the creation was successful, false otherwise.

See also*wxPalette::wxPalette* (p. 969)**wxPalette::GetPixel**

int GetPixel(const unsigned char *red*, const unsigned char *green*, const unsigned char *blue*) const

Returns a pixel value (index into the palette) for the given RGB values.

Parameters*red*

Red value.

green

Green value.

blue

Blue value.

Return value

The nearest palette index.

See also

`wxPalette::GetRGB` (p. 971)

wxPalette::GetRGB

```
bool GetPixel(int pixel, const unsigned char* red, const unsigned char* green,  
const unsigned char* blue) const
```

Returns RGB values for a given palette index.

Parameters

pixel

The palette index.

red

Receives the red value.

green

Receives the green value.

blue

Receives the blue value.

Return value

true if the operation was successful.

See also

`wxPalette::GetPixel` (p. 970)

wxPerl note: In wxPerl this method takes only the `pixel` parameter and returns a 3-element list (or the empty list upon failure).

wxPalette::Ok

```
bool Ok() const
```

Returns true if palette data is present.

wxPalette::operator =

wxPalette& operator =(const wxPalette& palette)

Assignment operator, using reference counting. Returns a reference to 'this'.

wxPalette::operator ==

bool operator ==(const wxPalette& palette)

Equality operator. Two palettes are equal if they contain pointers to the same underlying palette data. It does not compare each attribute, so two independently-created palettes using the same parameters will fail the test.

wxPalette::operator !=

bool operator !=(const wxPalette& palette)

Inequality operator. Two palettes are not equal if they contain pointers to different underlying palette data. It does not compare each attribute.

wxPanel

A panel is a window on which controls are placed. It is usually placed within a frame. It contains minimal extra functionality over and above its parent class `wxWindow`; its main purpose is to be similar in appearance and functionality to a dialog, but with the flexibility of having any window as a parent.

Note: if not all characters are being intercepted by your `OnKeyDown` or `OnChar` handler, it may be because you are using the `wxTAB_TRAVERSAL` style, which grabs some keypresses for use by child controls.

Derived from

`wxWindow` (p. 1388)
`wxEvtHandler` (p. 445)
`wxObject` (p. 954)

Include files

<wx/panel.h>

Window styles

There are no specific styles for this window.

See also *window styles overview* (p. 1618).

Remarks

By default, a panel has the same colouring as a dialog.

See also

*wxDialo*g (p. 369)

wxPanel::wxPanel

wxPanel()

Default constructor.

wxPanel(wxWindow* parent, wxWindowID id = -1, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxTAB_TRAVERSAL, const wxString& name = "panel")

Constructor.

Parameters

parent

The parent window.

id

An identifier for the panel. A value of -1 is taken to mean a default.

pos

The panel position. A value of (-1, -1) indicates a default position, chosen by either the windowing system or wxWidgets, depending on platform.

size

The panel size. A value of (-1, -1) indicates a default size, chosen by either the windowing system or wxWidgets, depending on platform.

style

The window style. See *wxPanel* (p. 972).

name

Used to associate a name with the window, allowing the application user to set Motif resource values for individual dialog boxes.

See also

wxPanel::Create (p. 974)

wxPanel::~~wxPanel

~wxPanel()

Destructor. Deletes any child windows before deleting the physical window.

wxPanel::Create

bool Create(wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxTAB_TRAVERSAL, const wxString& name = "panel")

Used for two-step panel construction. See *wxPanel::wxPanel* (p. 973) for details.

wxPanel::GetDefaultItem

wxButton* GetDefaultItem() const

Returns a pointer to the button which is the default for this window, or NULL. The default button is the one activated by pressing the Enter key.

wxPanel::InitDialog

void InitDialog()

Sends a *wxInitDialogEvent* (p. 761), which in turn transfers data to the dialog via validators.

See also

wxInitDialogEvent (p. 761)

wxPanel::OnSysColourChanged

void OnSysColourChanged(wxSysColourChangedEvent& event)

The default handler for `wxEVT_SYS_COLOUR_CHANGED`.

Parameters

event

The colour change event.

Remarks

Changes the panel's colour to conform to the current settings (Windows only). Add an event table entry for your panel class if you wish the behaviour to be different (such as keeping a user-defined background colour). If you do override this function, call `wxEvt::Skip` to propagate the notification to child windows and controls.

See also

wxSysColourChangedEvent (p. 1228)

wxPanel::SetDefaultItem

void SetDefaultItem(wxButton *btn)

Changes the default button for the panel.

See also

GetDefaultItem (p. 974)

wxPathList

The path list is a convenient way of storing a number of directories, and when presented with a filename without a directory, searching for an existing file in those directories. Storing the filename only in an application's files and using a locally-defined list of directories makes the application and its files more portable.

Use the *wxFileNameFromPath* global function to extract the filename from the path.

Derived from

wxList (p. 787)

wxObject (p. 954)

Include files

<wx/filefn.h>

See also

wxList (p. 787)

wxPathList::wxPathList

wxPathList()

Constructor.

wxPathList::AddEnvList

void AddEnvList(const wxString& env_variable)

Finds the value of the given environment variable, and adds all paths to the path list. Useful for finding files in the PATH variable, for example.

wxPathList::Add

void Add(const wxString& path)

Adds the given directory to the path list, but does not check if the path was already on the list (use `wxPathList::Member` for this).

wxPathList::EnsureFileAccessible

void EnsureFileAccessible(const wxString& filename)

Given a full filename (with path), ensures that files in the same path can be accessed using the pathlist. It does this by stripping the filename and adding the path to the list if not already there.

wxPathList::FindAbsolutePath

wxString FindAbsolutePath(const wxString& file)

Searches for a full path for an existing file by appending *file* to successive members of the path list. If the file exists, a temporary pointer to the absolute path is returned.

wxPathList::FindValidPath

wxString FindValidPath(const wxString& file)

Searches for a full path for an existing file by appending *file* to successive members of the path list. If the file exists, a temporary pointer to the full path is returned. This path may be relative to the current working directory.

wxPathList::Member

bool Member(const wxString& file)

true if the path is in the path list (ignoring case).

wxPen

A pen is a drawing tool for drawing outlines. It is used for drawing lines and painting the outline of rectangles, ellipses, etc. It has a colour, a width and a style.

Derived from

wxGDIObject (p. 562)

wxObject (p. 954)

Include files

<wx/pen.h>

Predefined objects

Objects:

wxNullPen

Pointers:

wxRED_PEN

wxCYAN_PEN

wxGREEN_PEN

wxBLACK_PEN

wxWHITE_PEN

wxTRANSPARENT_PEN

wxBLACK_DASHED_PEN

wxGREY_PEN

wxMEDIUM_GREY_PEN

wxLIGHT_GREY_PEN

Remarks

On a monochrome display, *wxWidgets* shows all non-white pens as black.

Do not initialize objects on the stack before the program commences, since other required structures may not have been set up yet. Instead, define global pointers to objects and create them in *OnInit* or when required.

An application may wish to dynamically create pens with different characteristics, and there is the consequent danger that a large number of duplicate pens will be created. Therefore an application may wish to get a pointer to a pen by using the global list of pens **wxThePenList**, and calling the member function **FindOrCreatePen**. See the entry for *wxPenList* (p. 983).

wxPen uses a reference counting system, so assignments between brushes are very cheap. You can therefore use actual *wxPen* objects instead of pointers without efficiency problems. Once one *wxPen* object changes its data it will create its own pen data internally so that other pens, which previously shared the data using the reference counting, are not affected.

See also

wxPenList (p. 983), *wxDC* (p. 349), *wxDC::SetPen* (p. 368)

wxPen::wxPen

wxPen()

Default constructor. The pen will be uninitialised, and *wxPen::Ok* (p. 981) will return false.

wxPen(const wxColour& colour, int width = 1, int style = wxSOLID)

Constructs a pen from a colour object, pen width and style.

wxPen(const wxString& colourName, int width, int style)

Constructs a pen from a colour name, pen width and style.

wxPen(const wxBitmap& stipple, int width)

Constructs a stippled pen from a stipple bitmap and a width.

wxPen(const wxPen& pen)

Copy constructor. This uses reference counting so is a cheap operation.

Parameters*colour*

A colour object.

colourName

A colour name.

width

Pen width. Under Windows, the pen width cannot be greater than 1 if the style is wxDOT, wxLONG_DASH, wxSHORT_DASH, wxDOT_DASH, or wxUSER_DASH.

stipple

A stipple bitmap.

pen

A pointer or reference to a pen to copy.

style

The style may be one of the following:

wxSOLID

Solid style.

wxTRANSPARENT

No pen is used.

wxDOT	Dotted style.
wxLONG_DASH	Long dashed style.
wxSHORT_DASH	Short dashed style.
wxDOT_DASH	Dot and dash style.
wxSTIPPLE	Use the stipple bitmap.
wxUSER_DASH	Use the user dashes: see <i>wxPen::SetDashes</i> (p. 982).
wxBDIAGONAL_HATCH	Backward diagonal hatch.
wxCROSSDIAG_HATCH	Cross-diagonal hatch.
wxFDIAGONAL_HATCH	Forward diagonal hatch.
wxCROSS_HATCH	Cross hatch.
wxHORIZONTAL_HATCH	Horizontal hatch.
wxVERTICAL_HATCH	Vertical hatch.

Remarks

Different versions of Windows and different versions of other platforms support *very* different subsets of the styles above - there is no similarity even between Windows95 and Windows98 - so handle with care.

If the named colour form is used, an appropriate **wxColour** structure is found in the colour database.

See also

wxPen::SetStyle (p. 983), *wxPen::SetColour* (p. 982), *wxPen::SetWidth* (p. 983), *wxPen::SetStipple* (p. 982)

wxPerl note: Constructors supported by wxPerl are:

- `Pen->new(colour, width, style)`
- `Pen->new(colourName, width, style)`
- `Pen->new(stipple, width)`

wxPen::~~wxPen

~wxPen()

Destructor.

Remarks

The destructor may not delete the underlying pen object of the native windowing system, since `wxBrush` uses a reference counting system for efficiency.

Although all remaining pens are deleted when the application exits, the application should try to clean up all pens itself. This is because `wxWidgets` cannot know if a pointer to the pen object is stored in an application data structure, and there is a risk of double deletion.

`wxPen::GetCap`

`int GetCap() const`

Returns the pen cap style, which may be one of `wxCAP_ROUND`, `wxCAP_PROJECTING` and `wxCAP_BUTT`. The default is `wxCAP_ROUND`.

See also

`wxPen::SetCap` (p. 981)

`wxPen::GetColour`

`wxColour& GetColour() const`

Returns a reference to the pen colour.

See also

`wxPen::SetColour` (p. 982)

`wxPen::GetDashes`

`int GetDashes(wxDash dashes) const`**

Gets an array of dashes (defined as `char` in X, `DWORD` under Windows). *dashes* is a pointer to the internal array. Do not deallocate or store this pointer. The function returns the number of dashes associated with this pen.

See also

`wxPen::SetDashes` (p. 982)

`wxPen::GetJoin`

`int GetJoin() const`

Returns the pen join style, which may be one of `wxJOIN_BEVEL`, `wxJOIN_ROUND` and `wxJOIN_MITER`. The default is `wxJOIN_ROUND`.

See also

wxPen::SetJoin (p. 982)

wxPen::GetStipple

wxBitmap* GetStipple() const

Gets a pointer to the stipple bitmap.

See also

wxPen::SetStipple (p. 982)

wxPen::GetStyle

int GetStyle() const

Returns the pen style.

See also

wxPen::wxPen (p. 978), *wxPen::SetStyle* (p. 983)

wxPen::GetWidth

int GetWidth() const

Returns the pen width.

See also

wxPen::SetWidth (p. 983)

wxPen::Ok

bool Ok() const

Returns true if the pen is initialised.

wxPen::SetCap

void SetCap(int capStyle)

Sets the pen cap style, which may be one of **wxCAP_ROUND**, **wxCAP_PROJECTING** and **wxCAP_BUTT**. The default is **wxCAP_ROUND**.

See also

wxPen::GetCap (p. 980)

wxPen::SetColour

void SetColour(wxColour& colour)

void SetColour(const wxString& colourName)

void SetColour(int red, int green, int blue)

The pen's colour is changed to the given colour.

[See also](#)

wxPen::GetColour (p. 980)

wxPen::SetDashes

void SetDashes(int n, wxDash* dashes)

Associates an array of pointers to dashes (defined as char in X, DWORD under Windows) with the pen. The array is not deallocated by wxPen, but neither must it be deallocated by the calling application until the pen is deleted or this function is called with a NULL array.

[See also](#)

wxPen::GetDashes (p. 980)

wxPen::SetJoin

void SetJoin(int join_style)

Sets the pen join style, which may be one of **wxJOIN_BEVEL**, **wxJOIN_ROUND** and **wxJOIN_MITER**. The default is **wxJOIN_ROUND**.

[See also](#)

wxPen::GetJoin (p. 980)

wxPen::SetStipple

void SetStipple(wxBitmap* stipple)

Sets the bitmap for stippling.

[See also](#)

wxPen::GetStipple (p. 981)

wxPen::SetStyle

void SetStyle(int style)

Set the pen style.

[See also](#)

wxPen::wxPen (p. 978)

wxPen::SetWidth

void SetWidth(int width)

Sets the pen width.

[See also](#)

wxPen::GetWidth (p. 981)

wxPen::operator =

wxPen& operator =(const wxPen& pen)

Assignment operator, using reference counting. Returns a reference to 'this'.

wxPen::operator ==

bool operator ==(const wxPen& pen)

Equality operator. Two pens are equal if they contain pointers to the same underlying pen data. It does not compare each attribute, so two independently-created pens using the same parameters will fail the test.

wxPen::operator !=

bool operator !=(const wxPen& pen)

Inequality operator. Two pens are not equal if they contain pointers to different underlying pen data. It does not compare each attribute.

wxPenList

There is only one instance of this class: **wxThePenList**. Use this object to search for a previously created pen of the desired type and create it if not already found. In some windowing systems, the pen may be a scarce resource, so it can pay to reuse old resources if possible. When an application finishes, all pens will be deleted and their

resources freed, eliminating the possibility of 'memory leaks'. However, it is best not to rely on this automatic cleanup because it can lead to double deletion in some circumstances.

There are two mechanisms in recent versions of wxWidgets which make the pen list less useful than it once was. Under Windows, scarce resources are cleaned up internally if they are not being used. Also, a referencing counting mechanism applied to all GDI objects means that some sharing of underlying resources is possible. You don't have to keep track of pointers, working out when it is safe to delete a pen, because the referencing counting does it for you. For example, you can set a pen in a device context, and then immediately delete the pen you passed, because the pen is 'copied'.

So you may find it easier to ignore the pen list, and instead create and copy pens as you see fit. If your Windows resource meter suggests your application is using too many resources, you can resort to using GDI lists to share objects explicitly.

The only compelling use for the pen list is for wxWidgets to keep track of pens in order to clean them up on exit. It is also kept for backward compatibility with earlier versions of wxWidgets.

[See also](#)

wxPen (p. 976)

wxPenList::wxPenList

void wxPenList()

Constructor. The application should not construct its own pen list: use the object pointer **wxThePenList**.

wxPenList::AddPen

void AddPen(wxPen* pen)

Used internally by wxWidgets to add a pen to the list.

wxPenList::FindOrCreatePen

wxPen* FindOrCreatePen(const wxColour& colour, int width, int style)

Finds a pen with the specified attributes and returns it, else creates a new pen, adds it to the pen list, and returns it.

wxPen* FindOrCreatePen(const wxString& colourName, int width, int style)

Finds a pen with the specified attributes and returns it, else creates a new pen, adds it to the pen list, and returns it.

Parameters

colour

Colour object.

colourName

Colour name, which should be in the *colour database* (p. 155).

width

Width of pen.

style

Pen style. See *wxPen::wxPen* (p. 978) for a list of styles.

wxPenList::RemovePen

void RemovePen(wxPen* pen)

Used by wxWidgets to remove a pen from the list.

wxPlotCurve

The *wxPlotCurve* class represents a curve displayed in a *wxPlotWindow* (p. 987). It is a virtual curve, i.e. it acts only as an interface, leaving it to the programmer to care for how the values pairs are matched. *wxPlotWindow* and *wxPlotCurve* are designed to display large amounts of data, i.e. most typically data measured by some sort of machine.

This class is abstract, i.e. you have to derive your own class and implement the pure virtual functions (*GetStartX()* (p. 986), *GetEndX()* (p. 985) and *GetY()* (p. 986)).

Derived from

wxObject (p. 954)

wxPlotCurve::wxPlotCurve

wxPlotCurve(int offsetY, double startY, double endY)

Constructor assigning start values. See below for interpretation.

wxPlotCurve::GetEndX

wxInt32 GetEndX()

Must be overridden. This function should return the index of the last value of this curve, typically 99 if 100 values have been measured.

wxPlotCurve::GetEndY

double GetEndY()

See *SetStartY* (p. 986).

wxPlotCurve::GetOffsetY

int GetOffsetY()

Returns the vertical offset.wxPlotCurve::GetY

double GetY(wxInt32 x)

Must be overridden. This function will return the actual Y value corresponding to the given X value. The x value is of an integer type because it is considered to be an index in row of measured values.

wxPlotCurve::GetStartX

wxInt32 GetStartX()

Must be overridden. This function should return the index of the first value of this curve, typically zero.

wxPlotCurve::GetStartY

double GetStartY()

See *SetStartY* (p. 987).

wxPlotCurve::SetEndY

void SetEndY(double endY)

The value returned by this function tells the plot window what the highest values in the curve will be so that a suitable scale can be found for the display. If the Y values in this curve are in the range of -1.5 to 0.5, this function should return 0.5 or maybe 1.0 for nicer aesthetics.

wxPlotCurve::SetOffsetY

void SetOffsetY(int offsetY)

When displaying several curves in one window, it is often useful to assign different offsets to the curves. You should call *wxPlotWindow::Move* (p. 989) to set this value after you have added the curve to the window.

wxPlotCurve::SetStartY

void SetStartY(double startY)

The value returned by this function tells the plot window what the lowest values in the curve will be so that a suitable scale can be found for the display. If the Y values in this curve are in the range of -1.5 to 0.5, this function should return -1.5 or maybe -2.0 for nicer aesthetics.

wxPlotWindow

wxPlotWindow is a specialized window designed to display data that typically has been measured by machines, i.e. that may have thousands of values. One example of such data would be the well known ECG measuring the electrical activity of your heart: the measuring device will produce thousands of values per minute, several measurements are done simultaneously and you might want to have a look at parts of the curves, enlarging them or scrolling from one position to another. Note that this window is not useful for real-time measuring or for displaying charts with error bars etc.

A single curve in the plot window is represented by the *wxPlotCurve* (p. 985) class.

The *wxPlotWindow* interacts with program using events, for example when clicking or double clicking on a curve or when selecting one by clicking on it (which can be vetoed). Future versions will hopefully feature selecting values or sections of the displayed curves etc.

Derived from

wxScrolledWindow (p. 1085)

wxPanel (p. 972)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Window styles

wxPLOT_BUTTON_MOVE

Display buttons to allow moving individual curves up or down.

wxPLOT_BUTTON_ENLARGE

Display buttons to allow enlarging individual curves vertically.

wxPLOT_BUTTON_ZOOM

Display buttons to allow zooming all curves horizontally.

wxPLOT_BUTTON_ALL	Display all buttons.
wxPLOT_Y_AXIS	Display an Y axis to the left of the drawing area.
wxPLOT_X_AXIS	Display a X axis at the bottom of the drawing area.
wxPLOT_DEFAULT	All of the above options.

wxPlotWindow::wxPlotWindow

wxPlotWindow()

wxPlotWindow(wxWindow* parent, wxWindowID id, const wxPoint& pos, const wxSize& size, int flags = wxPLOT_DEFAULT)

Constructor.

wxPlotWindow::~~wxPlotWindow

~wxPlotWindow()

The destructor will not delete the curves associated to the window.

wxPlotWindow::Add

void Add(wxPlotCurve* curve)

Add a curve to the window.

wxPlotWindow::GetCount

size_t GetCount()

Returns number of curves.

wxPlotWindow::GetAt

wxPlotCurve* GetAt(size_t n)

Get the nth curve.

wxPlotWindow::SetCurrentCurve

void SetCurrentCurve(wxPlotCurve* current)

Make one curve the current curve. This will emit a wxPlotEvent.

wxPlotWindow::GetCurrentCurve

wxPlotCurve* GetCurrentCurve()

Returns a pointer to the current curve, or NULL.

wxPlotWindow::Delete

void Delete(wxPlotCurve* curve)

Removes a curve from the window and delete is on screen. This does not delete the actual curve. If the curve removed was the current curve, the current curve will be set to NULL.

wxPlotWindow::Move

void Move(wxPlotCurve* curve, int pixels_up)

Move the curve *curve* up by *pixels_up* pixels. Down if the value is negative.

wxPlotWindow::Enlarge

void Enlarge(wxPlotCurve* curve, double factor)

Changes the representation of the given curve. A *factor* of more than one will stretch the curve vertically. The Y axis will change accordingly.

wxPlotWindow::SetUnitsPerValue

void SetUnitsPerValue(double upv)

This sets the virtual units per value. Normally, you will not be interested in what measured value you see, but what it stands for. If you want to display seconds on the X axis and the measuring device produced 50 values per second, set this value to 50. This will affect all curves being displayed.

wxPlotWindow::GetUnitsPerValue

double GetUnitsPerValue()

See *SetUnitsPerValue* (p. 989).

wxPlotWindow::SetZoom

void SetZoom(double zoom)

This functions zooms all curves in their horizontal dimension. The X axis will be changed accordingly.

wxPlotWindow::GetZoom

double GetZoom()

See *SetZoom* (p. 990).

wxPlotWindow::RedrawEverything

void RedrawEverything()

Helper function which redraws both axes and the central area.

wxPlotWindow::RedrawXAxis

void RedrawXAxis()

Helper function which redraws the X axis.

wxPlotWindow::RedrawYAxis

void RedrawYAxis()

Helper function which redraws the Y axis.

wxPlotWindow::SetScrollOnThumbRelease

void SetScrollOnThumbRelease(bool onrelease = true)

This function controls if the plot area will get scrolled only if the scrollbar thumb has been release or also if the thumb is being dragged. When displaying large amounts of data, it might become impossible to display the data fast enough to produce smooth scrolling and then this function should be called.

wxPlotWindow::SetEnlargeAroundWindowCentre

void SetEnlargeAroundWindowCentre(bool aroundwindow = true)

Depending on the kind of data you display, enlarging the individual curves might have different desired effects. Sometimes, the data will be supposed to get enlarged with the

fixed point being the origin, sometimes the fixed point should be the centre of the current drawing area. This function controls this behaviour.

wxPoint

A **wxPoint** is a useful data structure for graphics operations. It simply contains integer *x* and *y* members.

See also *wxRealPoint* (p. 1041) for a floating point version.

Derived from

None

Include files

<wx/gdicmn.h>

See also

wxRealPoint (p. 1041)

wxPoint::wxPoint

wxPoint()

wxPoint(int *x*, int *y*)

Create a point.

wxPoint::x

int *x*

x member.

wxPoint::y

int *y*

y member.

wxPostScriptDC

This defines the wxWidgets Encapsulated PostScript device context, which can write

PostScript files on any platform. See *wxDC* (p. 349) for descriptions of the member functions.

Derived from

wxDC (p. 349)
wXObject (p. 954)

Include files

<wx/dcps.h>

wxPostScriptDC::wxPostScriptDC

wxPostScriptDC(const wxPrintData& *printData*)

Constructs a PostScript printer device context from a *wxPrintData* (p. 996) object.

wxPostScriptDC(const wxString& *output*, bool *interactive* = true, wxWindow **parent*)

Constructor. *output* is an optional file for printing to, and if *interactive* is true a dialog box will be displayed for adjusting various parameters. *parent* is the parent of the printer dialog box.

Use the *Ok* member to test whether the constructor was successful in creating a usable device context.

See *Printer settings* (p. 1507) for functions to set and get PostScript printing settings.

This constructor and the global printer settings are now deprecated; use the *wxPrintData* constructor instead.

wxPostScriptDC::SetResolution

static void SetResolution(int *ppi*)

Set resolution (in pixels per inch) that will be used in PostScript output. Default is 720ppi.

wxPostScriptDC::GetResolution

static int GetResolution()

Return resolution used in PostScript output. See *SetResolution* (p. 992).

wxPreviewCanvas

A preview canvas is the default canvas used by the print preview system to display the preview.

Derived from

wxScrolledWindow (p. 1085)
wxWindow (p. 1388)
wxevthandler (p. 445)
wxObject (p. 954)

Include files

<wx/print.h>

See also

wxPreviewFrame (p. 995), *wxPreviewControlBar* (p. 993), *wxPrintPreview* (p. 1014)

wxPreviewCanvas::wxPreviewCanvas

wxPreviewCanvas(*wxPrintPreview** preview, *wxWindow** parent, **const** *wxPoint&* pos = *wxDefaultPosition*, **const** *wxSize&* size = *wxDefaultSize*, **long** style = 0, **const** *wxString&* name = "canvas")

Constructor.

wxPreviewCanvas::~~wxPreviewCanvas

~wxPreviewCanvas()

Destructor.

wxPreviewCanvas::OnPaint

void OnPaint(*wxPaintEvent&* event)

Calls *wxPrintPreview::PaintPage* (p. 1017) to refresh the canvas.

wxPreviewControlBar

This is the default implementation of the preview control bar, a panel with buttons and a zoom control. You can derive a new class from this and override some or all member functions to change the behaviour and appearance; or you can leave it as it is.

Derived from

wxPanel (p. 972)
wxWindow (p. 1388)
wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/print.h>

See also

wxPreviewFrame (p. 995), *wxPreviewCanvas* (p. 992), *wxPrintPreview* (p. 1014)

wxPreviewControlBar::wxPreviewControlBar

wxPreviewControlBar(*wxPrintPreview** preview, *long* buttons, *wxWindow** parent, *const wxPoint&* pos = *wxDefaultPosition*, *const wxSize&* size = *wxDefaultSize*, *long* style = 0, *const wxString&* name = "panel")

Constructor.

The buttons parameter may be a combination of the following, using the bitwise 'or' operator.

<code>wxPREVIEW_PRINT</code>	Create a print button.
<code>wxPREVIEW_NEXT</code>	Create a next page button.
<code>wxPREVIEW_PREVIOUS</code>	Create a previous page button.
<code>wxPREVIEW_ZOOM</code>	Create a zoom control.
<code>wxPREVIEW_DEFAULT</code>	Equivalent to a combination of <code>wxPREVIEW_PREVIOUS</code> , <code>wxPREVIEW_NEXT</code> and <code>wxPREVIEW_ZOOM</code> .

wxPreviewControlBar::~~wxPreviewControlBar

~wxPreviewControlBar()

Destructor.

wxPreviewControlBar::CreateButtons

void CreateButtons()

Creates buttons, according to value of the button style flags.

wxPreviewControlBar::GetPrintPreview

wxPrintPreview * GetPrintPreview()

Gets the print preview object associated with the control bar.

wxPreviewControlBar::GetZoomControl

int GetZoomControl()

Gets the current zoom setting in percent.

wxPreviewControlBar::SetZoomControl

void SetZoomControl(int percent)

Sets the zoom control.

wxPreviewFrame

This class provides the default method of managing the print preview interface. Member functions may be overridden to replace functionality, or the class may be used without derivation.

Derived from

wxFrame (p. 532)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/print.h>

See also

wxPreviewCanvas (p. 992), *wxPreviewControlBar* (p. 993), *wxPrintPreview* (p. 1014)

wxPreviewFrame::wxPreviewFrame

wxPreviewFrame(wxPrintPreview* preview, wxWindow* parent, const wxString& title, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxDEFAULT_FRAME_STYLE, const wxString& name = "frame")

Constructor. Pass a print preview object plus other normal frame arguments. The print preview object will be destroyed by the frame when it closes.

wxPreviewFrame::~wxPreviewFrame

~wxPreviewFrame()

Destructor.

wxPreviewFrame::CreateControlBar

void CreateControlBar()

Creates a wxPreviewControlBar. Override this function to allow a user-defined preview control bar object to be created.

wxPreviewFrame::CreateCanvas

void CreateCanvas()

Creates a wxPreviewCanvas. Override this function to allow a user-defined preview canvas object to be created.

wxPreviewFrame::Initialize

void Initialize()

Creates the preview canvas and control bar, and calls wxWindow::MakeModal(true) to disable other top-level windows in the application.

This function should be called by the application prior to showing the frame.

wxPreviewFrame::OnCloseWindow

void OnCloseWindow(wxCloseEvent& event)

Enables the other frames in the application, and deletes the print preview object, implicitly deleting any printout objects associated with the print preview object.

wxPrintData

This class holds a variety of information related to printers and printer device contexts. This class is used to create a wxPrinterDC and a wxPostScriptDC. It is also used as a data member of wxPrintDialogData and wxPageSetupDialogData, as part of the mechanism for transferring data between the print dialogs and the application.

Derived from

wxObject (p. 954)

Include files

<wx/cmndata.h>

See also

wxPrintDialog (p. 1002), *wxPageSetupDialog* (p. 960), *wxPrintDialogData* (p. 1003), *wxPageSetupDialogData* (p. 961), *wxPrintDialog Overview* (p. 1657), *wxPrinterDC* (p. 1010), *wxPostScriptDC* (p. 991)

Remarks

The following functions are specific to PostScript printing and have not yet been documented:

```
const wxString& GetPrinterCommand() const ;
const wxString& GetPrinterOptions() const ;
const wxString& GetPreviewCommand() const ;
const wxString& GetFilename() const ;
const wxString& GetFontMetricPath() const ;
double GetPrinterScaleX() const ;
double GetPrinterScaleY() const ;
long GetPrinterTranslateX() const ;
long GetPrinterTranslateY() const ;
// wxPRINT_MODE_PREVIEW, wxPRINT_MODE_FILE, wxPRINT_MODE_PRINTER
wxPrintMode GetPrintMode() const ;

void SetPrinterCommand(const wxString& command) ;
void SetPrinterOptions(const wxString& options) ;
void SetPreviewCommand(const wxString& command) ;
void SetFilename(const wxString& filename) ;
void SetFontMetricPath(const wxString& path) ;
void SetPrinterScaleX(double x) ;
void SetPrinterScaleY(double y) ;
void SetPrinterScaling(double x, double y) ;
void SetPrinterTranslateX(long x) ;
void SetPrinterTranslateY(long y) ;
void SetPrinterTranslation(long x, long y) ;
void SetPrintMode(wxPrintMode printMode) ;
```

wxPrintData::wxPrintData

wxPrintData()

Default constructor.

wxPrintData(const wxPrintData& data)

Copy constructor.

wxPrintData::~~wxPrintData

~wxPrintData()

Destructor.

wxPrintData::GetCollate

bool GetCollate() const

Returns true if collation is on.

wxPrintData::GetColour

bool GetColour() const

Returns true if colour printing is on.

wxPrintData::GetDuplex

wxDuplexMode GetDuplex() const

Returns the duplex mode. One of `wxDUPLEX_SIMPLEX`, `wxDUPLEX_HORIZONTAL`, `wxDUPLEX_VERTICAL`.

wxPrintData::GetNoCopies

int GetNoCopies() const

Returns the number of copies requested by the user.

wxPrintData::GetOrientation

int GetOrientation() const

Gets the orientation. This can be `wxLANDSCAPE` or `wxPORTRAIT`.

wxPrintData::GetPaperId

wxPaperSize GetPaperId() const

Returns the paper size id. For more information, see *wxPrintData::SetPaperId* (p. 1000).

wxPrintData::GetPrinterName

const wxString& GetPrinterName() const

Returns the printer name. If the printer name is the empty string, it indicates that the default printer should be used.

wxPrintData::GetQuality

wxPrintQuality GetQuality() const

Returns the current print quality. This can be a positive integer, denoting the number of dots per inch, or one of the following identifiers:

```
wxPRINT_QUALITY_HIGH  
wxPRINT_QUALITY_MEDIUM  
wxPRINT_QUALITY_LOW  
wxPRINT_QUALITY_DRAFT
```

On input you should pass one of these identifiers, but on return you may get back a positive integer indicating the current resolution setting.

wxPrintData::Ok**bool Ok() const**

Returns true if the print data is valid for using in print dialogs. This can return false on Windows if the current printer is not set, for example. On all other platforms, it returns true.

wxPrintData::SetCollate**void SetCollate(bool flag)**

Sets collation to on or off.

wxPrintData::SetColour**void SetColour(bool flag)**

Sets colour printing on or off.

wxPrintData::SetDuplex**void SetDuplex(wxDuplexMode mode)**

Returns the duplex mode. One of wxDUPLEX_SIMPLEX, wxDUPLEX_HORIZONTAL, wxDUPLEX_VERTICAL.

wxPrintData::SetNoCopies**void SetNoCopies(int n)**

Sets the default number of copies to be printed out.

wxPrintData::SetOrientation

void SetOrientation(int orientation)

Sets the orientation. This can be wxLANDSCAPE or wxPORTRAIT.

wxPrintData::SetPaperId**void SetPaperId(wxPaperSize paperId)**

Sets the paper id. This indicates the type of paper to be used. For a mapping between paper id, paper size and string name, see wxPrintPaperDatabase in `paper.h` (not yet documented).

paperId can be one of:

wxPAPER_NONE,	// Use specific dimensions
wxPAPER_LETTER,	// Letter, 8 1/2 by 11 inches
wxPAPER_LEGAL,	// Legal, 8 1/2 by 14 inches
wxPAPER_A4,	// A4 Sheet, 210 by 297 millimeters
wxPAPER_CSHEET,	// C Sheet, 17 by 22 inches
wxPAPER_DSHEET,	// D Sheet, 22 by 34 inches
wxPAPER_ESHEET,	// E Sheet, 34 by 44 inches
wxPAPER_LETTERSMALL,	// Letter Small, 8 1/2 by 11 inches
wxPAPER_TABLOID,	// Tabloid, 11 by 17 inches
wxPAPER_LEDGER,	// Ledger, 17 by 11 inches
wxPAPER_STATEMENT,	// Statement, 5 1/2 by 8 1/2 inches
wxPAPER_EXECUTIVE,	// Executive, 7 1/4 by 10 1/2 inches
wxPAPER_A3,	// A3 sheet, 297 by 420 millimeters
wxPAPER_A4SMALL,	// A4 small sheet, 210 by 297 millimeters
wxPAPER_A5,	// A5 sheet, 148 by 210 millimeters
wxPAPER_B4,	// B4 sheet, 250 by 354 millimeters
wxPAPER_B5,	// B5 sheet, 182-by-257-millimeter paper
wxPAPER_FOLIO,	// Folio, 8-1/2-by-13-inch paper
wxPAPER_QUARTO,	// Quarto, 215-by-275-millimeter paper
wxPAPER_10X14,	// 10-by-14-inch sheet
wxPAPER_11X17,	// 11-by-17-inch sheet
wxPAPER_NOTE,	// Note, 8 1/2 by 11 inches
wxPAPER_ENV_9,	// #9 Envelope, 3 7/8 by 8 7/8 inches
wxPAPER_ENV_10,	// #10 Envelope, 4 1/8 by 9 1/2 inches
wxPAPER_ENV_11,	// #11 Envelope, 4 1/2 by 10 3/8 inches
wxPAPER_ENV_12,	// #12 Envelope, 4 3/4 by 11 inches
wxPAPER_ENV_14,	// #14 Envelope, 5 by 11 1/2 inches
wxPAPER_ENV_DL,	// DL Envelope, 110 by 220 millimeters
wxPAPER_ENV_C5,	// C5 Envelope, 162 by 229 millimeters
wxPAPER_ENV_C3,	// C3 Envelope, 324 by 458 millimeters
wxPAPER_ENV_C4,	// C4 Envelope, 229 by 324 millimeters
wxPAPER_ENV_C6,	// C6 Envelope, 114 by 162 millimeters
wxPAPER_ENV_C65,	// C65 Envelope, 114 by 229 millimeters
wxPAPER_ENV_B4,	// B4 Envelope, 250 by 353 millimeters
wxPAPER_ENV_B5,	// B5 Envelope, 176 by 250 millimeters
wxPAPER_ENV_B6,	// B6 Envelope, 176 by 125 millimeters
wxPAPER_ENV_ITALY,	// Italy Envelope, 110 by 230 millimeters
wxPAPER_ENV_MONARCH,	// Monarch Envelope, 3 7/8 by 7 1/2 inches
wxPAPER_ENV_PERSONAL,	// 6 3/4 Envelope, 3 5/8 by 6 1/2 inches
wxPAPER_FANFOLD_US,	// US Std Fanfold, 14 7/8 by 11 inches
wxPAPER_FANFOLD_STD_GERMAN,	// German Std Fanfold, 8 1/2 by 12 inches
wxPAPER_FANFOLD_LGL_GERMAN,	// German Legal Fanfold, 8 1/2 by 13 inches

Windows 95 only:

wxPAPER_ISO_B4,	// B4 (ISO) 250 x 353 mm
wxPAPER_JAPANESE_POSTCARD,	// Japanese Postcard 100 x 148 mm
wxPAPER_9X11,	// 9 x 11 in
wxPAPER_10X11,	// 10 x 11 in
wxPAPER_15X11,	// 15 x 11 in
wxPAPER_ENV_INVITE,	// Envelope Invite 220 x 220 mm
wxPAPER_LETTER_EXTRA,	// Letter Extra 9 \275 x 12 in

```
    wxPAPER_LEGAL_EXTRA,           // Legal Extra 9 \275 x 15 in
    wxPAPER_TABLOID_EXTRA,         // Tabloid Extra 11.69 x 18 in
    wxPAPER_A4_EXTRA,              // A4 Extra 9.27 x 12.69 in
    wxPAPER_LETTER_TRANSVERSE,     // Letter Transverse 8 \275 x 11 in
    wxPAPER_A4_TRANSVERSE,         // A4 Transverse 210 x 297 mm
    wxPAPER_LETTER_EXTRA_TRANSVERSE, // Letter Extra Transverse 9\275 x 12
in
    wxPAPER_A_PLUS,                // SuperA/SuperA/A4 227 x 356 mm
    wxPAPER_B_PLUS,                // SuperB/SuperB/A3 305 x 487 mm
    wxPAPER_LETTER_PLUS,           // Letter Plus 8.5 x 12.69 in
    wxPAPER_A4_PLUS,               // A4 Plus 210 x 330 mm
    wxPAPER_A5_TRANSVERSE,         // A5 Transverse 148 x 210 mm
    wxPAPER_B5_TRANSVERSE,         // B5 (JIS) Transverse 182 x 257 mm
    wxPAPER_A3_EXTRA,              // A3 Extra 322 x 445 mm
    wxPAPER_A5_EXTRA,              // A5 Extra 174 x 235 mm
    wxPAPER_B5_EXTRA,              // B5 (ISO) Extra 201 x 276 mm
    wxPAPER_A2,                   // A2 420 x 594 mm
    wxPAPER_A3_TRANSVERSE,         // A3 Transverse 297 x 420 mm
    wxPAPER_A3_EXTRA_TRANSVERSE    // A3 Extra Transverse 322 x 445 mm
```

wxPrintData::SetPrinterName

void SetPrinterName(const wxString& printerName)

Sets the printer name. This can be the empty string to indicate that the default printer should be used.

wxPrintData::SetQuality

void SetQuality(wxPrintQuality quality)

Sets the desired print quality. This can be a positive integer, denoting the number of dots per inch, or one of the following identifiers:

```
wxPRINT_QUALITY_HIGH
wxPRINT_QUALITY_MEDIUM
wxPRINT_QUALITY_LOW
wxPRINT_QUALITY_DRAFT
```

On input you should pass one of these identifiers, but on return you may get back a positive integer indicating the current resolution setting.

wxPrintData::operator =

void operator =(const wxPrintData& data)

Assigns print data to this object.

void operator =(const wxPrintSetupData& data)

Assigns print setup data to this object. wxPrintSetupData is deprecated, but retained for backward compatibility.

wxPrintDialog

This class represents the print and print setup common dialogs. You may obtain a *wxPrinterDC* (p. 1010) device context from a successfully dismissed print dialog.

Derived from

wxDialog (p. 369)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/printdlg.h>

See also

wxPrintDialog Overview (p. 1657)

wxPrintDialog::wxPrintDialog

wxPrintDialog(wxWindow* parent, wxPrintDialogData* data = NULL)

Constructor. Pass a parent window, and optionally a pointer to a block of print data, which will be copied to the print dialog's print data.

See also

wxPrintDialogData (p. 1003)

wxPrintDialog::~~wxPrintDialog

~wxPrintDialog()

Destructor. If *wxPrintDialog::GetPrintDC* has *not* been called, the device context obtained by the dialog (if any) will be deleted.

wxPrintDialog::GetPrintDialogData

wxPrintDialogData& GetPrintDialogData()

Returns the *print dialog data* (p. 1003) associated with the print dialog.

wxPrintDialog::GetPrintDC

wxDC* GetPrintDC()

Returns the device context created by the print dialog, if any. When this function has been called, the ownership of the device context is transferred to the application, so it must then be deleted explicitly.

wxPrintDialog::Ok

bool Ok() const

Returns true if the print data associated with the dialog is valid. This can return false on Windows if the current printer is not set, for example. On all other platforms, it returns true.

wxPrintDialog::ShowModal

int ShowModal()

Shows the dialog, returning `wxID_OK` if the user pressed OK, and `wxID_CANCEL` otherwise. After this function is called, a device context may be retrievable using `wxPrintDialog::GetPrintDC` (p. 1002).

wxPrintDialogData

This class holds information related to the visual characteristics of `wxPrintDialog`. It contains a `wxPrintData` object with underlying printing settings.

Derived from

wxObject (p. 954)

Include files

<wx/cmndata.h>

See also

wxPrintDialog (p. 1002), *wxPrintDialog Overview* (p. 1657)

wxPrintDialogData::wxPrintDialogData

wxPrintDialogData()

Default constructor.

wxPrintDialogData(wxPrintDialogData& dialogData)

Copy constructor.

wxPrintDialogData(wxPrintData& *printData*)

Construct an object from a print dialog data object.

wxPrintDialogData::~wxPrintDialogData

~wxPrintDialogData()

Destructor.

wxPrintDialogData::EnableHelp

void EnableHelp(bool *flag*)

Enables or disables the 'Help' button.

wxPrintDialogData::EnablePageNumbers

void EnablePageNumbers(bool *flag*)

Enables or disables the 'Page numbers' controls.

wxPrintDialogData::EnablePrintToFile

void EnablePrintToFile(bool *flag*)

Enables or disables the 'Print to file' checkbox.

wxPrintDialogData::EnableSelection

void EnableSelection(bool *flag*)

Enables or disables the 'Selection' radio button.

wxPrintDialogData::GetAllPages

bool GetAllPages() const

Returns true if the user requested that all pages be printed.

wxPrintDialogData::GetCollate

bool GetCollate() const

Returns true if the user requested that the document(s) be collated.

wxPrintDialogData::GetFromPage

int GetFromPage() const

Returns the *from* page number, as entered by the user.

wxPrintDialogData::GetMaxPage

int GetMaxPage() const

Returns the *maximum* page number.

wxPrintDialogData::GetMinPage

int GetMinPage() const

Returns the *minimum* page number.

wxPrintDialogData::GetNoCopies

int GetNoCopies() const

Returns the number of copies requested by the user.

wxPrintDialogData::GetPrintData

wxPrintData& GetPrintData()

Returns a reference to the internal wxPrintData object.

wxPrintDialogData::GetPrintToFile

bool GetPrintToFile() const

Returns true if the user has selected printing to a file.

wxPrintDialogData::GetSelection

bool GetSelection() const

Returns true if the user requested that the selection be printed (where 'selection' is a concept specific to the application).

wxPrintDialogData::GetToPage

int GetToPage() const

Returns the *to* page number, as entered by the user.

wxPrintDialogData::Ok

bool Ok() const

Returns true if the print data is valid for using in print dialogs. This can return false on Windows if the current printer is not set, for example. On all other platforms, it returns true.

wxPrintDialogData::SetCollate

void SetCollate(bool *flag*)

Sets the 'Collate' checkbox to true or false.

wxPrintDialogData::SetFromPage

void SetFromPage(int *page*)

Sets the *from* page number.

wxPrintDialogData::SetMaxPage

void SetMaxPage(int *page*)

Sets the *maximum* page number.

wxPrintDialogData::SetMinPage

void SetMinPage(int *page*)

Sets the *minimum* page number.

wxPrintDialogData::SetNoCopies

void SetNoCopies(int *n*)

Sets the default number of copies the user has requested to be printed out.

wxPrintDialogData::SetPrintData

void SetPrintData(const wxPrintData& *printData*)

Sets the internal `wxPrintData`.

wxPrintDialogData::SetPrintToFile

void SetPrintToFile(bool *flag*)

Sets the 'Print to file' checkbox to true or false.

wxPrintDialogData::SetSelection

void SetSelection(bool *flag*)

Selects the 'Selection' radio button. The effect of printing the selection depends on how the application implements this command, if at all.

wxPrintDialogData::SetSetupDialog

void SetSetupDialog(bool *flag*)

Determines whether the dialog to be shown will be the Print dialog (pass false) or Print Setup dialog (pass true).

Note that the setup dialog is (according to Microsoft) obsolete from Windows 95, though retained for backward compatibility.

wxPrintDialogData::SetToPage

void SetToPage(int *page*)

Sets the *to* page number.

wxPrintDialogData::operator =

void operator =(const wxPrintData& *data*)

Assigns print data to this object.

void operator =(const wxPrintDialogData& *data*)

Assigns another print dialog data object to this object.

wxPrinter

This class represents the Windows or PostScript printer, and is the vehicle through which printing may be launched by an application. Printing can also be achieved through using of lower functions and classes, but this and associated classes provide a more

convenient and general method of printing.

Derived from

wxObject (p. 954)

Include files

<wx/print.h>

See also

Printing framework overview (p. 1671), *wxPrinterDC* (p. 1010), *wxPrintDialog* (p. 1002), *wxPrintout* (p. 1010), *wxPrintPreview* (p. 1014).

wxPrinter::wxPrinter

wxPrinter(wxPrintDialogData* data = NULL)

Constructor. Pass an optional pointer to a block of print dialog data, which will be copied to the printer object's local data.

See also

wxPrintDialogData (p. 1003), *wxPrintData* (p. 996)

wxPrinter::~~wxPrinter

~wxPrinter()

Destructor.

wxPrinter::Abort

bool Abort()

Returns true if the user has aborted the print job.

wxPrinter::CreateAbortWindow

void CreateAbortWindow(wxWindow* parent, wxPrintout* printout)

Creates the default printing abort window, with a cancel button.

wxPrinter::GetLastError

static wxPrinterError GetLastError()

Return last error. Valid after calling *Print* (p. 1009), *PrintDialog* (p. 1009) or *wxPrintPreview::Print* (p. 1017). These functions set last error to **wxPRINTER_NO_ERROR** if no error happened.

Returned value is one of the following:

wxPRINTER_NO_ERROR	No error happened.
wxPRINTER_CANCELLED	The user cancelled printing.
wxPRINTER_ERROR	There was an error during printing.

wxPrinter::GetPrintDialogData

wxPrintDialogData& GetPrintDialogData()

Returns the *print data* (p. 996) associated with the printer object.

wxPrinter::Print

bool Print(wxWindow *parent, wxPrintout *printout, bool prompt=true)

Starts the printing process. Provide a parent window, a user-defined wxPrintout object which controls the printing of a document, and whether the print dialog should be invoked first.

Print could return false if there was a problem initializing the printer device context (current printer not set, for example) or the user cancelled printing. Call *wxPrinter::GetLastError* (p. 1008) to get detailed information about the kind of the error.

wxPrinter::PrintDialog

wxDC* PrintDialog(wxWindow *parent)

Invokes the print dialog. If successful (the user did not press Cancel and no error occurred), a suitable device context will be returned (otherwise NULL is returned -- call *wxPrinter::GetLastError* (p. 1008) to get detailed information about the kind of the error).

The application must delete this device context to avoid a memory leak.

wxPrinter::ReportError

void ReportError(wxWindow *parent, wxPrintout *printout, const wxString& message)

Default error-reporting function.

wxPrinter::Setup

bool Setup(wxWindow *parent)

Invokes the print setup dialog. Note that the setup dialog is obsolete from Windows 95, though retained for backward compatibility.

wxPrinterDC

A printer device context is specific to Windows, and allows access to any printer with a Windows driver. See *wxDC* (p. 349) for further information on device contexts, and *wxDC::GetSize* (p. 361) for advice on achieving the correct scaling for the page.

Derived from

wxDC (p. 349)

wxObject (p. 349)

Include files

<wx/dcprint.h>

See also

wxDC (p. 349), *Printing framework overview* (p. 1671)

wxPrinterDC::wxPrinterDC

wxPrinterDC(const wxPrintData& printData)

Pass a *wxPrintData* (p. 996) object with information necessary for setting up a suitable printer device context. This is the recommended way to construct a *wxPrinterDC*.

wxPrinterDC(const wxString& driver, const wxString& device, const wxString& output, const bool interactive = true, int orientation = wxPORTRAIT)

Constructor. With empty strings for the first three arguments, the default printer dialog is displayed. *device* indicates the type of printer and *output* is an optional file for printing to. The *driver* parameter is currently unused. Use the *Ok* member to test whether the constructor was successful in creating a usable device context.

This constructor is deprecated and retained only for backward compatibility.

wxPrintout

This class encapsulates the functionality of printing out an application document. A new class must be derived and members overridden to respond to calls such as `OnPrintPage` and `HasPage`. Instances of this class are passed to `wxPrinter::Print` or a `wxPrintPreview` object to initiate printing or previewing.

Derived from

wxObject (p. 954)

Include files

`<wx/print.h>`

See also

Printing framework overview (p. 1671), *wxPrinterDC* (p. 1010), *wxPrintDialog* (p. 1002), *wxPrinter* (p. 1007), *wxPrintPreview* (p. 1014)

wxPrintout::wxPrintout

wxPrintout(const wxString& title = "Printout")

Constructor. Pass an optional title argument - the current filename would be a good idea. This will appear in the printing list (at least in MSW)

wxPrintout::~~wxPrintout

~wxPrintout()

Destructor.

wxPrintout::GetDC

wxDC * GetDC()

Returns the device context associated with the printout (given to the printout at start of printing or previewing). This will be a `wxPrinterDC` if printing under Windows, a `wxPostScriptDC` if printing on other platforms, and a `wxMemoryDC` if previewing.

wxPrintout::GetPageInfo

void GetPageInfo(int *minPage, int *maxPage, int *pageFrom, int *pageTo)

Called by the framework to obtain information from the application about minimum and maximum page values that the user can select, and the required page range to be printed. By default this returns 1, 32000 for the page minimum and maximum values, and 1, 1 for the required page range.

If *minPage* is zero, the page number controls in the print dialog will be disabled.

wxPython note: When this method is implemented in a derived Python class, it should be designed to take no parameters (other than the self reference) and to return a tuple of four integers.

wxPerl note: When this method is overridden in a derived class, it must not take any parameters, and returns a 4-element list.

wxPrintout::GetPageSizeMM

void GetPageSizeMM(int *w, int *h)

Returns the size of the printer page in millimetres.

wxPython note: This method returns the output-only parameters as a tuple.

wxPerl note: In wxPerl this method takes no arguments and returns a 2-element list (w, h)

wxPrintout::GetPageSizePixels

void GetPageSizePixels(int *w, int *h)

Returns the size of the printer page in pixels. These may not be the same as the values returned from *wxDC::GetSize* (p. 361) if the printout is being used for previewing, since in this case, a memory device context is used, using a bitmap size reflecting the current preview zoom. The application must take this discrepancy into account if previewing is to be supported.

wxPython note: This method returns the output-only parameters as a tuple.

wxPerl note: In wxPerl this method takes no arguments and returns a 2-element list (w, h)

wxPrintout::GetPPIPrinter

void GetPPIPrinter(int *w, int *h)

Returns the number of pixels per logical inch of the printer device context. Dividing the printer PPI by the screen PPI can give a suitable scaling factor for drawing text onto the printer. Remember to multiply this by a scaling factor to take the preview DC size into account.

wxPython note: This method returns the output-only parameters as a tuple.

wxPerl note: In wxPerl this method takes no arguments and returns a 2-element list (w, h)

wxPrintout::GetPPIScreen

void GetPPIScreen(int *w, int *h)

Returns the number of pixels per logical inch of the screen device context. Dividing the printer PPI by the screen PPI can give a suitable scaling factor for drawing text onto the printer. Remember to multiply this by a scaling factor to take the preview DC size into account.

wxPrintout::GetTitle

wxString GetTitle()

Returns the title of the printout

wxPython note: This method returns the output-only parameters as a tuple.

wxPerl note: In wxPerl this method takes no arguments and returns a 2-element list (*w*, *h*)

wxPrintout::HasPage

bool HasPage(int pageNum)

Should be overridden to return true if the document has this page, or false if not. Returning false signifies the end of the document. By default, HasPage behaves as if the document has only one page.

wxPrintout::IsPreview

bool IsPreview()

Returns true if the printout is currently being used for previewing.

wxPrintout::OnBeginDocument

bool OnBeginDocument(int startPage, int endPage)

Called by the framework at the start of document printing. Return false from this function cancels the print job. OnBeginDocument is called once for every copy printed.

The base `wxPrintout::OnBeginDocument` *must* be called (and the return value checked) from within the overridden function, since it calls `wxDC::StartDoc`.

wxPython note: If this method is overridden in a Python class then the base class version can be called by using the `methodbase_OnBeginDocument(startPage, endPage)`.

wxPrintout::OnEndDocument

void OnEndDocument()

Called by the framework at the end of document printing. OnEndDocument is called once for every copy printed.

The base wxPrintout::OnEndDocument *must* be called from within the overridden function, since it calls wxDC::EndDoc.

wxPrintout::OnBeginPrinting

void OnBeginPrinting()

Called by the framework at the start of printing. OnBeginPrinting is called once for every print job (regardless of how many copies are being printed).

wxPrintout::OnEndPrinting

void OnEndPrinting()

Called by the framework at the end of printing. OnEndPrinting is called once for every print job (regardless of how many copies are being printed).

wxPrintout::OnPreparePrinting

void OnPreparePrinting()

Called once by the framework before any other demands are made of the wxPrintout object. This gives the object an opportunity to calculate the number of pages in the document, for example.

wxPrintout::OnPrintPage

bool OnPrintPage(int pageNum)

Called by the framework when a page should be printed. Returning false cancels the print job. The application can use wxPrintout::GetDC to obtain a device context to draw on.

wxPrintPreview

Objects of this class manage the print preview process. The object is passed a wxPrintout object, and the wxPrintPreview object itself is passed to a wxPreviewFrame object. Previewing is started by initializing and showing the preview frame. Unlike wxPrinter::Print, flow of control returns to the application immediately after the frame is

shown.

Derived from

wxObject (p. 954)

Include files

<wx/print.h>

See also

Printing framework overview (p. 1671), *wxPrinterDC* (p. 1010), *wxPrintDialog* (p. 1002), *wxPrintout* (p. 1010), *wxPrinter* (p. 1007), *wxPreviewCanvas* (p. 992), *wxPreviewControlBar* (p. 993), *wxPreviewFrame* (p. 995).

wxPrintPreview::wxPrintPreview

wxPrintPreview(*wxPrintout* printout*, *wxPrintout* printoutForPrinting*, *wxPrintData* data=NULL*)

Constructor. Pass a printout object, an optional printout object to be used for actual printing, and the address of an optional block of printer data, which will be copied to the print preview object's print data.

If *printoutForPrinting* is non-NULL, a **Print...** button will be placed on the preview frame so that the user can print directly from the preview interface.

Do not explicitly delete the printout objects once this destructor has been called, since they will be deleted in the *wxPrintPreview* constructor. The same does not apply to the *data* argument.

Test the *Ok* member to check whether the *wxPrintPreview* object was created correctly. *Ok* could return false if there was a problem initializing the printer device context (current printer not set, for example).

wxPrintPreview::~~wxPrintPreview

~wxPrinter()

Destructor. Deletes both print preview objects, so do not destroy these objects in your application.

wxPrintPreview::DrawBlankPage

bool DrawBlankPage(*wxWindow* window*)

Draws a representation of the blank page into the preview window. Used internally.

wxPrintPreview::GetCanvas

wxPreviewCanvas* GetCanvas()

Gets the preview window used for displaying the print preview image.

wxPrintPreview::GetCurrentPage

int GetCurrentPage()

Gets the page currently being previewed.

wxPrintPreview::GetFrame

wxFrame * GetFrame()

Gets the frame used for displaying the print preview canvas and control bar.

wxPrintPreview::GetMaxPage

int GetMaxPage()

Returns the maximum page number.

wxPrintPreview::GetMinPage

int GetMinPage()

Returns the minimum page number.

wxPrintPreview::GetPrintData

wxPrintData& GetPrintData()

Returns a reference to the internal print data.

wxPrintPreview::GetPrintout

wxPrintout * GetPrintout()

Gets the preview printout object associated with the wxPrintPreview object.

wxPrintPreview::GetPrintoutForPrinting

wxPrintout * GetPrintoutForPrinting()

Gets the printout object to be used for printing from within the preview interface, or NULL if none exists.

wxPrintPreview::Ok

bool Ok()

Returns true if the wxPrintPreview is valid, false otherwise. It could return false if there was a problem initializing the printer device context (current printer not set, for example).

wxPrintPreview::PaintPage

bool PaintPage(wxWindow* window)

This refreshes the preview window with the preview image. It must be called from the preview window's OnPaint member.

The implementation simply blits the preview bitmap onto the canvas, creating a new preview bitmap if none exists.

wxPrintPreview::Print

bool Print(bool prompt)

Invokes the print process using the second wxPrintout object supplied in the wxPrintPreview constructor. Will normally be called by the **Print...** panel item on the preview frame's control bar.

Returns false in case of error -- call *wxPrinter::GetLastError* (p. 1008) to get detailed information about the kind of the error.

wxPrintPreview::RenderPage

bool RenderPage(int pageNum)

Renders a page into a wxMemoryDC. Used internally by wxPrintPreview.

wxPrintPreview::SetCanvas

void SetCanvas(wxPreviewCanvas window)**

Sets the window to be used for displaying the print preview image.

wxPrintPreview::SetCurrentPage

void SetCurrentPage(int pageNum)

Sets the current page to be previewed.

wxPrintPreview::SetFrame

void SetFrame(wxFrame *frame)

Sets the frame to be used for displaying the print preview canvas and control bar.

wxPrintPreview::SetPrintout

void SetPrintout(wxPrintout *printout)

Associates a printout object with the wxPrintPreview object.

wxPrintPreview::SetZoom

void SetZoom(int percent)

Sets the percentage preview zoom, and refreshes the preview canvas accordingly.

wxPrivateDropTarget

wxPrivateDropTarget is for...

Derived from

wxDropTarget (p. 432)

Include files

<wx/dnd.h>

See also

wxDropTarget (p. 432)

wxPrivateDropTarget::wxPrivateDropTarget

wxPrivateDropTarget()

wxPrivateDropTarget::SetId

void SetId(const wxString& id)

You have to override `OnDrop` to get at the data. The string ID identifies the format of clipboard or DnD data. A word processor would e.g. add a `wxTextDataObject` and a `wxPrivateDataObject` to the clipboard - the latter with the Id "WXWORD_FORMAT".

wxPrivateDropTarget::GetId

virtual wxString GetId() const

wxProcess

The objects of this class are used in conjunction with the `wxExecute` (p. 1475) function. When a `wxProcess` object is passed to `wxExecute()`, its `OnTerminate()` (p. 1023) virtual method is called when the process terminates. This allows the program to be (asynchronously) notified about the process termination and also retrieve its exit status which is unavailable from `wxExecute()` in the case of asynchronous execution.

Please note that if the process termination notification is processed by the parent, it is responsible for deleting the `wxProcess` object which sent it. However, if it is not processed, the object will delete itself and so the library users should only delete those objects whose notifications have been processed (and call `Detach()` (p. 1020) for others).

`wxProcess` also supports IO redirection of the child process. For this, you have to call its `Redirect` (p. 1024) method before passing it to `wxExecute` (p. 1475). If the child process was launched successfully, `GetInputStream` (p. 1021), `GetOutputStream` (p. 1021) and `GetErrorStream` (p. 1021) can then be used to retrieve the streams corresponding to the child process standard output, input and error output respectively.

wxPerl note: In `wxPerl` this class has an additional `Destroy` method, for explicit destruction.

Derived from

`wxEvtHandler` (p. 445)

Include files

<wx/process.h>

See also

`wxExecute` (p. 1475)
`exec sample` (p. 1572)

wxProcess::wxProcess

wxProcess(wxEvtHandler * parent = NULL, int id = -1)

wxProcess(int flags)

Constructs a process object. *id* is only used in the case you want to use wxWidgets events. It identifies this object, or another window that will receive the event.

If the *parent* parameter is different from NULL, it will receive a wxEVT_END_PROCESS notification event (you should insert EVT_END_PROCESS macro in the event table of the parent to handle it) with the given *id*.

The second constructor creates an object without any associated parent (and hence no *id* neither) but allows to specify the *flags* which can have the value of wxPROCESS_DEFAULT or wxPROCESS_REDIRECT. Specifying the former value has no particular effect while using the latter one is equivalent to calling *Redirect* (p. 1024).

Parameters

parent

The event handler parent.

id

id of an event.

flags

either wxPROCESS_DEFAULT or wxPROCESS_REDIRECT

wxProcess::~~wxProcess**~wxProcess()**

Destroys the wxProcess object.

wxProcess::CloseOutput**void CloseOutput()**

Closes the output stream (the one connected to the stdin of the child process). This function can be used to indicate to the child process that there is no more data to be read - usually, a filter program will only terminate when the input stream is closed.

wxProcess::Detach**void Detach()**

Normally, a wxProcess object is deleted by its parent when it receives the notification about the process termination. However, it might happen that the parent object is destroyed before the external process is terminated (e.g. a window from which this external process was launched is closed by the user) and in this case it **should not**

delete the `wxProcess` object, but **should call `Detach()`** instead. After the `wxProcess` object is detached from its parent, no notification events will be sent to the parent and the object will delete itself upon reception of the process termination notification.

`wxProcess::GetErrorStream`

`wxInputStream* GetErrorStream() const`

Returns an input stream which corresponds to the standard error output (`stderr`) of the child process.

`wxProcess::GetInputStream`

`wxInputStream* GetInputStream() const`

It returns an input stream corresponding to the standard output stream of the subprocess. If it is `NULL`, you have not turned on the redirection. See *`wxProcess::Redirect`* (p. 1024).

`wxProcess::GetOutputStream`

`wxOutputStream* GetOutputStream() const`

It returns an output stream corresponding to the input stream of the subprocess. If it is `NULL`, you have not turned on the redirection. See *`wxProcess::Redirect`* (p. 1024).

`wxProcess::IsErrorAvailable`

`bool IsErrorAvailable() const`

Returns `true` if there is data to be read on the child process standard error stream.

[See also](#)

`IsInputAvailable` (p. 1021)

`wxProcess::IsInputAvailable`

`bool IsInputAvailable() const`

Returns `true` if there is data to be read on the child process standard output stream. This allows to write simple (and extremely inefficient) polling-based code waiting for a better mechanism in future `wxWidgets` versions.

See the *`exec sample`* (p. 1572) for an example of using this function.

[See also](#)

IsInputOpened (p. 1022)

wxProcess::IsInputOpened

bool IsInputOpened() const

Returns `true` if the child process standard output stream is opened.

wxProcess::Kill

static wxKillError Kill(int pid, wxSignal signal = wxSIGNAL_NONE)

Send the specified signal to the given process. Possible signal values are:

```
enum wxSignal
{
    wxSIGNAL_NONE = 0,    // verify if the process exists under Unix
    wxSIGNAL_HUP,
    wxSIGNAL_INT,
    wxSIGNAL_QUIT,
    wxSIGNAL_ILL,
    wxSIGNAL_TRAP,
    wxSIGNAL_ABRT,
    wxSIGNAL_EMT,
    wxSIGNAL_FPE,
    wxSIGNAL_KILL,        // forcefully kill, dangerous!
    wxSIGNAL_BUS,
    wxSIGNAL_SEGV,
    wxSIGNAL_SYS,
    wxSIGNAL_PIPE,
    wxSIGNAL_LRM,
    wxSIGNAL_TERM        // terminate the process gently
};
```

`wxSIGNAL_NONE`, `wxSIGNAL_KILL` and `wxSIGNAL_TERM` have the same meaning under both Unix and Windows but all the other signals are equivalent to `wxSIGNAL_TERM` under Windows.

Returns the element of `wxKillError` enum:

```
enum wxKillError
{
    wxKILL_OK,                // no error
    wxKILL_BAD_SIGNAL,        // no such signal
    wxKILL_ACCESS_DENIED,     // permission denied
    wxKILL_NO_PROCESS,        // no such process
    wxKILL_ERROR              // another, unspecified error
};
```

See also

wxProcess::Exists (p. 1022), *wxKill* (p. 1477), *Exec sample* (p. 1572)

wxProcess::Exists

static bool Exists(int pid)

Returns `true` if the given process exists in the system.

See also

wxProcess::Kill (p. 1022), *Exec sample* (p. 1572)

wxProcess::OnTerminate

void OnTerminate(int *pid*, int *status*) const

It is called when the process with the pid *pid* finishes. It raises a wxWidgets event when it isn't overridden.

pid

The pid of the process which has just terminated.

status

The exit code of the process.

wxProcess::Open

static wxProcess * Open(const wxString& *cmd* int *flags* = wxEXEC_ASYNC)

This static method replaces the standard `popen()` function: it launches the process specified by the *cmd* parameter and returns the wxProcess object which can be used to retrieve the streams connected to the standard input, output and error output of the child process.

If the process couldn't be launched, `NULL` is returned. Note that in any case the returned pointer should **not** be deleted, rather the process object will be destroyed automatically when the child process terminates. This does mean that the child process should be told to quit before the main program exits to avoid memory leaks.

Parameters

cmd

The command to execute, including optional arguments.

flags

The flags to pass to *wxExecute* (p. 1475). NOTE: `wxEXEC_SYNC` should not be used.

Return value

A pointer to new wxProcess object or `NULL` on error.

See also

wxExecute (p. 1475)

wxProcess::Redirect

void Redirect()

Turns on redirection. `wxExecute` will try to open a couple of pipes to catch the subprocess stdio. The caught input stream is returned by `GetOutputStream()` as a non-seekable stream. The caught output stream is returned by `GetInputStream()` as a non-seekable stream.

wxProcessEvent

A process event is sent when a process is terminated.

Derived from

wxEvent (p. 441)

wxObject (p. 954)

Include files

<wx/process.h>

Event table macros

To process a `wxProcessEvent`, use these event handler macros to direct input to a member function that takes a `wxProcessEvent` argument.

EVT_END_PROCESS(id, func)	Process a <code>wxEVT_END_PROCESS</code> event. <i>id</i> is the identifier of the process object (the id passed to the <code>wxProcess</code> constructor) or a window to receive the event.
----------------------------------	---

See also

wxProcess (p. 1019), *Event handling overview* (p. 1610)

wxProcessEvent::wxProcessEvent

wxProcessEvent(int id = 0, int pid = 0, int exitcode = 0)

Constructor. Takes a `wxProcessObject` or window id, a process id and an exit status.

wxProcessEvent::GetPid

int GetPid() const

Returns the process id.

wxProcessEvent::GetExitCode

int GetExitCode()

Returns the exist status.

wxProgressDialog

This class represents a dialog that shows a short message and a progress bar. Optionally, it can display an ABORT button.

Derived from

wxFrame (p. 532)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/progdlg.h>

wxProgressDialog::wxProgressDialog

wxProgressDialog(const wxString& *title*, const wxString& *message*, int *maximum* = 100, wxWindow* *parent* = NULL, int *style* = wxPD_AUTO_HIDE | wxPD_APP_MODAL)

Constructor. Creates the dialog, displays it and disables user input for other windows, or, if wxPD_APP_MODAL flag is not given, for its parent window only.

Parameters

title

Dialog title to show in titlebar.

message

Message displayed above the progress bar.

maximum

Maximum value for the progress bar.

parent

Parent window.

style

The dialog style. This is the combination of the following bitmask constants defined in `wx/defs.h`:

wxPD_APP_MODAL	Make the progress dialog modal. If this flag is not given, it is only "locally" modal - that is the input to the parent window is disabled, but not to the other ones.
wxPD_AUTO_HIDE	Causes the progress dialog to disappear from screen as soon as the maximum value of the progress meter has been reached.
wxPD_CAN_ABORT	This flag tells the dialog that it should have a "Cancel" button which the user may press. If this happens, the next call to <i>Update()</i> (p. 1026) will return false.
wxPD_ELAPSED_TIME	This flag tells the dialog that it should show elapsed time (since creating the dialog).
wxPD_ESTIMATED_TIME	This flag tells the dialog that it should show estimated time.
wxPD_REMAINING_TIME	This flag tells the dialog that it should show remaining time.

wxProgressDialog::~wxProgressDialog

~wxMessageDialog()

Destructor. Deletes the dialog and enables all top level windows.

wxProgressDialog::Resume

void Resume()

Can be used to continue with the dialog, after the user had chosen ABORT.

wxProgressDialog::Update

virtual bool Update(int value, const wxString& newmsg = "")

Updates the dialog, setting the progress bar to the new value and, if given changes the message above it. Returns true unless the Cancel button has been pressed.

If false is returned, the application can either immediately destroy the dialog or ask the user for the confirmation and if the abort is not confirmed the dialog may be resumed

with *Resume* (p. 1026) function.

Parameters

value

The new value of the progress meter. It must be strictly less than the maximum value given to the constructor (i.e., as usual in C, the index runs from 0 to maximum-1).

newmsg

The new messages for the progress dialog text, if it is empty (which is the default) the message is not changed.

wxProtocol

Derived from

wxSocketClient (p. 1149)

Include files

<wx/protocol/protocol.h>

See also

wxSocketBase (p. 1132), *wxURL* (p. 1357)

wxProtocol::Reconnect

bool Reconnect()

Tries to reestablish a previous opened connection (close and renegotiate connection).

Return value

true, if the connection is established, else false.

wxProtocol::GetInputStream

wxInputStream * GetInputStream(const wxString& path)

Creates a new input stream on the the specified path. You can use all but seek functionality of *wxStream*. Seek isn't available on all stream. For example, http or ftp streams doesn't deal with it. Other functions like *StreamSize* and *Tell* aren't available for the moment for this sort of stream. You will be notified when the EOF is reached by an error.

Return value

Returns the initialized stream. You will have to delete it yourself once you don't use it anymore. The destructor closes the network connection.

See also

wxInputStream (p. 762)

wxProtocol::Abort

bool Abort()

Abort the current stream.

Warning

It is advised to destroy the input stream instead of aborting the stream this way.

Return value

Returns true, if successful, else false.

wxProtocol::GetError

wxProtocolError GetError()

Returns the last occurred error.

wxPROTO_NOERR	No error.
wxPROTO_NETERR	A generic network error occurred.
wxPROTO_PROTERR	An error occurred during negotiation.
wxPROTO_CONNERR	The client failed to connect the server.
wxPROTO_INVVAL	Invalid value.
wxPROTO_NOHNDLR	.
wxPROTO_NOFILE	The remote file doesn't exist.
wxPROTO_ABRT	Last action aborted.
wxPROTO_RCNECT	An error occurred during reconnection.
wxPROTO_STREAM	Someone tried to send a command during a transfer.

wxProtocol::GetContentType

wxString GetContentType()

Returns the type of the content of the last opened stream. It is a mime-type.

wxProtocol::SetUser

void SetUser(const wxString& user)

Sets the authentication user. It is mainly useful when FTP is used.

wxProtocol::SetPassword

void SetPassword(const wxString& user)

Sets the authentication password. It is mainly useful when FTP is used.

wxQuantize

Performs quantization, or colour reduction, on a wxImage.

Functions in this class are static and so a wxQuantize object need not be created.

Derived from

wxObject (p. 954)

Include files

<wx/quantize.h>

wxQuantize::wxQuantize

wxQuantize()

Constructor. You do not need to construct a wxQuantize object since its functions are static.

wxQuantize::Quantize

bool Quantize(const wxImage& src, wxImage& dest, wxPalette pPalette, int desiredNoColours = 236, unsigned char** eightBitData = 0, int flags = wxQUANTIZE_INCLUDE_WINDOWS_COLOURS|wxQUANTIZE_FILL_DESTINATION_IMAGE|wxQUANTIZE_RETURN_8BIT_DATA)**

Reduce the colours in the source image and put the result into the destination image.

Both images may be the same, to overwrite the source image. Specify an optional palette pointer to receive the resulting palette. This palette may be passed to `ConvertImageToBitmap`, for example.

If you pass a palette pointer, you must free the palette yourself.

```
bool Quantize(const wxImage& src, wxImage& dest, int desiredNoColours = 236,  
unsigned char** eightBitData = 0, int flags =  
wxQUANTIZE_INCLUDE_WINDOWS_COLOURS|wxQUANTIZE_FILL_DESTINATION_  
IMAGE|wxQUANTIZE_RETURN_8BIT_DATA)
```

This version sets a palette in the destination image so you don't have to manage it yourself.

wxQuantize::DoQuantize

```
void DoQuantize(unsigned w, unsigned h, unsigned char** in_rows, unsigned  
char** out_rows, unsigned char* palette, int desiredNoColours)
```

Converts input bitmap(s) into 8bit representation with custom palette.

`in_rows` and `out_rows` are arrays `[0..h-1]` of pointer to rows (`in_rows` contains `w * 3` bytes per row, `out_rows` `w` bytes per row).

Fills `out_rows` with indexes into palette (which is also stored into palette variable).

wxQueryLayoutInfoEvent

This event is sent when `wxLayoutAlgorithm` (p. 782) wishes to get the size, orientation and alignment of a window. More precisely, the event is sent by the `OnCalculateLayout` handler which is itself invoked by `wxLayoutAlgorithm`.

Derived from

`wxEvent` (p. 441)

`wxObject` (p. 954)

Include files

<wx/laywin.h>

Event table macros

EVT_QUERY_LAYOUT_INFO(func)	Process a <code>wxEVT_QUERY_LAYOUT_INFO</code> event, to get size, orientation and alignment from a window.
------------------------------------	---

Data structures

```
enum wxLayoutOrientation {  
    wxLAYOUT_HORIZONTAL,  
    wxLAYOUT_VERTICAL
```

```
};  
  
enum wxLayoutAlignment {  
    wxLAYOUT_NONE,  
    wxLAYOUT_TOP,  
    wxLAYOUT_LEFT,  
    wxLAYOUT_RIGHT,  
    wxLAYOUT_BOTTOM,  
};
```

See also

wxCalculateLayoutEvent (p. 107), *wxSashLayoutWindow* (p. 1065), *wxLayoutAlgorithm* (p. 782).

wxQueryLayoutInfoEvent::wxQueryLayoutInfoEvent

wxQueryLayoutInfoEvent(wxWindowID id = 0)

Constructor.

wxQueryLayoutInfoEvent::GetAlignment

void GetAlignment() const

Specifies the alignment of the window (which side of the remaining parent client area the window sticks to). One of `wxLAYOUT_TOP`, `wxLAYOUT_LEFT`, `wxLAYOUT_RIGHT`, `wxLAYOUT_BOTTOM`.

wxQueryLayoutInfoEvent::GetFlags

int GetFlags() const

Returns the flags associated with this event. Not currently used.

wxQueryLayoutInfoEvent::GetOrientation

wxLayoutOrientation GetOrientation() const

Returns the orientation that the event handler specified to the event object. May be one of `wxLAYOUT_HORIZONTAL`, `wxLAYOUT_VERTICAL`.

wxQueryLayoutInfoEvent::GetRequestedLength

int GetRequestedLength() const

Returns the requested length of the window in the direction of the window orientation. This information is not yet used.

wxQueryLayoutInfoEvent::GetSize

wxSize GetSize() const

Returns the size that the event handler specified to the event object as being the requested size of the window.

wxQueryLayoutInfoEvent::SetAlignment

void SetAlignment(wxLayoutAlignment alignment)

Call this to specify the alignment of the window (which side of the remaining parent client area the window sticks to). May be one of wxLAYOUT_TOP, wxLAYOUT_LEFT, wxLAYOUT_RIGHT, wxLAYOUT_BOTTOM.

wxQueryLayoutInfoEvent::SetFlags

void SetFlags(int flags)

Sets the flags associated with this event. Not currently used.

wxQueryLayoutInfoEvent::SetOrientation

void SetOrientation(wxLayoutOrientation orientation)

Call this to specify the orientation of the window. May be one of wxLAYOUT_HORIZONTAL, wxLAYOUT_VERTICAL.

wxQueryLayoutInfoEvent::SetRequestedLength

void SetRequestedLength(int length)

Sets the requested length of the window in the direction of the window orientation. This information is not yet used.

wxQueryLayoutInfoEvent::SetSize

void SetSize(const wxSize& size)

Call this to let the calling code know what the size of the window is.

wxRadioBox

A radio box item is used to select one of number of mutually exclusive choices. It is displayed as a vertical column or horizontal row of labelled buttons.

Derived from

wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/radiobox.h>

Window styles

wxRA_SPECIFY_ROWS	The major dimension parameter refers to the maximum number of rows.
wxRA_SPECIFY_COLS	The major dimension parameter refers to the maximum number of columns.

See also *window styles overview* (p. 1618).

Event handling

EVT_RADIOBOX(id, func)	Process a wxEVT_COMMAND_RADIOBOX_SELECTED event, when a radiobutton is clicked.
-------------------------------	--

See also

Event handling overview (p. 1610), *wxRadioButton* (p. 1039), *wxCheckBox* (p. 121)

wxRadioBox::wxRadioBox

wxRadioBox()

Default constructor.

wxRadioBox(wxWindow* parent, wxWindowID id, const wxString& label, const wxPoint& point = wxDefaultPosition, const wxSize& size = wxDefaultSize, int n = 0, const wxString choices[] = NULL, int majorDimension = 0, long style = wxRA_SPECIFY_COLS, const wxValidator& validator = wxDefaultValidator, const wxString& name = "radioBox")

wxRadioBox(wxWindow* parent, wxWindowID id, const wxString& label, const wxPoint& point, const wxSize& size, const wxString& choices, int majorDimension = 0, long style = wxRA_SPECIFY_COLS, const wxValidator&

validator = *wxDefaultValidator*, **const wxString&** *name* = "radioBox")

Constructor, creating and showing a radiobox.

Parameters

parent

Parent window. Must not be NULL.

id

Window identifier. A value of -1 indicates a default value.

label

Label for the static box surrounding the radio buttons.

pos

Window position. If the position (-1, -1) is specified then a default position is chosen.

size

Window size. If the default size (-1, -1) is specified then a default size is chosen.

n

Number of choices with which to initialize the radiobox.

choices

An array of choices with which to initialize the radiobox.

majorDimension

Specifies the maximum number of rows (if style contains *wxRA_SPECIFY_ROWS*) or columns (if style contains *wxRA_SPECIFY_COLS*) for a two-dimensional radiobox.

style

Window style. See *wxRadioBox* (p. 1033).

validator

Window validator.

name

Window name.

See also

wxRadioBox::Create (p. 1035), *wxValidator* (p. 1360)

wxPython note: The `wxRadioBox` constructor in wxPython reduces the `nand choices` arguments are to a single argument, which is a list of strings.

wxPerl note: In wxPerl there is just an array reference in place of `nand choices`.

wxRadioBox::~wxRadioBox

~wxRadioBox()

Destructor, destroying the radiobox item.

wxRadioBox::Create

bool Create(wxWindow* parent, wxWindowID id, const wxString& label, const wxPoint& point = wxDefaultPosition, const wxSize& size = wxDefaultSize, int n = 0, const wxString choices[] = NULL, int majorDimension = 0, long style = wxRA_SPECIFY_COLS, const wxValidator& validator = wxDefaultValidator, const wxString& name = "radioBox")

bool Create(wxWindow* parent, wxWindowID id, const wxString& label, const wxPoint& point, const wxSize& size, const wxString& choices, int majorDimension = 0, long style = wxRA_SPECIFY_COLS, const wxValidator& validator = wxDefaultValidator, const wxString& name = "radioBox")

Creates the radiobox for two-step construction. See `wxRadioBox::wxRadioBox` (p. 1033) for further details.

wxRadioBox::Enable

void Enable(bool enable = true)

Enables or disables the entire radiobox.

void Enable(int n, bool enable = true)

Enables or disables an individual button in the radiobox.

Parameters

enable

true to enable, false to disable.

n

The zero-based button to enable or disable.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

Enable(flag)	Enables or disables the entire radiobox.
EnableItem(n, flag)	Enables or disables an individual button in the radiobox.

wxRadioBox::FindString

int FindString(const wxString& *string*) const

Finds a button matching the given string, returning the position if found, or -1 if not found.

Parameters

string

The string to find.

wxRadioBox::GetCount

int GetCount() const

Returns the number of items in the radiobox.

wxRadioBox::GetLabel

wxString GetLabel() const

Returns the radiobox label.

wxString GetLabel(int *n*) const

Returns the label for the given button.

Parameters

n

The zero-based button index.

See also

wxRadioBox::SetLabel (p. 1037)

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

GetLabel()	Returns the radiobox label.
-------------------	-----------------------------

GetItemLabel(n)

Returns the label for the given button.

wxRadioBox::GetSelection

int GetSelection() const

Returns the zero-based position of the selected button.

wxRadioBox::GetStringSelection

wxString GetStringSelection() const

Returns the selected string.

wxRadioBox::GetString

wxString GetString(int *n*) const

Returns the label for the button at the given position.

Parameters

n

The zero-based button position.

wxRadioBox::Number

int Number() const

Obsolescence note: This method is obsolete and was replaced with *GetCount* (p. 1036), please use the new method in the new code. This method is only available if wxWidgets was compiled with `WXWIN_COMPATIBILITY_2_2` defined and will disappear completely in future versions.

Returns the number of buttons in the radiobox.

wxRadioBox::SetLabel

void SetLabel(const wxString& *label*)

Sets the radiobox label.

void SetLabel(int *n*, const wxString& *label*)

Sets a label for a radio button.

Parameters

label

The label to set.

n

The zero-based button index.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

SetLabel(string)

Sets the radiobox label.

SetItemLabel(n, string)

Sets a label for a radio button.

wxRadioBox::SetSelection

void SetSelection(int *n*)

Sets a button by passing the desired string position. This does not cause a wxEVT_COMMAND_RADIOBOX_SELECTED event to get emitted.

Parameters

n

The zero-based button position.

wxRadioBox::SetStringSelection

void SetStringSelection(const wxString& *string*)

Sets the selection to a button by passing the desired string. This does not cause a wxEVT_COMMAND_RADIOBOX_SELECTED event to get emitted.

Parameters

string

The label of the button to select.

wxRadioBox::Show

void Show(const bool *show*)

Shows or hides the entire radiobox.

void Show(int *item*, const bool *show*)

Shows or hides individual buttons.

Parameters

show

true to show, false to hide.

item

The zero-based position of the button to show or hide.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

Show(flag)	Shows or hides the entire radiobox.
ShowItem(n, flag)	Shows or hides individual buttons.

wxRadioButton

A radio button item is a button which usually denotes one of several mutually exclusive options. It has a text label next to a (usually) round button.

Derived from

wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/radiobut.h>

Window styles

wxRB_GROUP	Marks the beginning of a new group of radio buttons.
wxRB_SINGLE	If your radio buttons are not consecutive siblings, they cannot form a group under Windows and you should use this style to indicate that each of them is handled individually.

See also *window styles overview* (p. 1618).

Event handling

EVT_RADIOBUTTON(id, func)	Process a <code>wxEVT_COMMAND_RADIOBUTTON_SELECTED</code> event, when the radiobutton is clicked.
----------------------------------	---

See also

Event handling overview (p. 1610), *wxRadioBox* (p. 1033), *wxCheckBox* (p. 121)

wxRadioButton::wxRadioButton

wxRadioButton()

Default constructor.

wxRadioButton(wxWindow* parent, wxWindowID id, const wxString& label, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = 0, const wxValidator& validator = wxDefaultValidator, const wxString& name = "radioButton")

Constructor, creating and showing a radio button.

Parameters

parent

Parent window. Must not be NULL.

id

Window identifier. A value of -1 indicates a default value.

label

Label for the radio button.

pos

Window position. If the position (-1, -1) is specified then a default position is chosen.

size

Window size. If the default size (-1, -1) is specified then a default size is chosen.

style

Window style. See *wxRadioBox* (p. 1039).

validator

Window validator.

name

Window name.

See also

wxRadioButton::Create (p. 1041), *wxValidator* (p. 1360)

wxRadioButton::~~wxRadioButton

void ~wxRadioButton()

Destructor, destroying the radio button item.

wxRadioButton::Create

bool Create(wxWindow* parent, wxWindowID id, const wxString& label, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = 0, const wxValidator& validator = wxDefaultValidator, const wxString& name = "radioButton")

Creates the choice for two-step construction. See *wxRadioButton::wxRadioButton* (p. 1040) for further details.

wxRadioButton::GetValue

bool GetValue() const

Returns true if the radio button is depressed, false otherwise.

wxRadioButton::SetValue

void SetValue(const bool value)

Sets the radio button to selected or deselected status. This does not cause a `wxEVT_COMMAND_RADIOBUTTON_SELECTED` event to get emitted.

Parameters

value

true to select, false to deselect.

wxRealPoint

A **wxRealPoint** is a useful data structure for graphics operations. It contains floating point `x` and `y` members. See also *wxPoint* (p. 991) for an integer version.

Derived from

None

Include files

<wx/gdicmn.h>

See also

wxPoint (p. 991)

wxRealPoint::wxRealPoint

wxRealPoint()

wxRealPoint(double x, double y)

Create a point.

double x

double y

Members of the **wxRealPoint** object.

wxRect

A class for manipulating rectangles.

Derived from

None

Include files

<wx/gdicmn.h>

See also

wxPoint (p. 991), *wxSize* (p. 1107)

wxRect::wxRect

wxRect()

Default constructor.

wxRect(int x, int y, int width, int height)

Creates a **wxRect** object from x, y, width and height values.

wxRect(const wxPoint& topLeft, const wxPoint& bottomRight)

Creates a wxRect object from top-left and bottom-right points.

wxRect(const wxPoint& pos, const wxSize& size)

Creates a wxRect object from position and size values.

wxRect::x

int x

x coordinate of the top-level corner of the rectangle.

wxRect::y

int y

y coordinate of the top-level corner of the rectangle.

wxRect::width

int width

Width member.

wxRect::height

int height

Height member.

wxRect::Deflate

void Deflate(wxCoord dx, wxCoord dy)

void Deflate(wxCoord diff)

wxRect Deflate(wxCoord dx, wxCoord dy) const

Decrease the rectangle size by *dx* in x direction and *dy* in y direction. Both (or one of) parameters may be negative to increase the rectngle size. This method is the opposite of *Inflate* (p. 1045).

The second form uses the same *diff* for both *dx* and *dy*.

The first two versions modify the rectangle in place, the last one returns a new rectangle leaving this one unchanged.

See also

Inflate (p. 1045)

wxRect::GetBottom

int GetBottom() const

Gets the bottom point of the rectangle.

wxRect::GetHeight

int GetHeight() const

Gets the height member.

wxRect::GetLeft

int GetLeft() const

Gets the left point of the rectangle (the same as *wxRect::GetX* (p. 1045)).

wxRect::GetPosition

wxPoint GetPosition() const

Gets the position.

wxRect::GetTopLeft

wxPoint GetTopLeft() const

Gets the topleft position of the rectangle. (Same as *GetPosition*).

wxRect::GetBottomRight

wxPoint GetBottomRight() const

Gets the the bottom right position. Returns the bottom right point inside the rectangle.

wxRect::GetRight

int GetRight() const

Gets the right point of the rectangle.

wxRect::GetSize

wxSize GetSize() const

Gets the size.

wxRect::GetTop

int GetTop() const

Gets the top point of the rectangle (the same as *wxRect::GetY* (p. 1045)).

wxRect::GetWidth

int GetWidth() const

Gets the width member.

wxRect::GetX

int GetX() const

Gets the x member.

wxRect::GetY

int GetY() const

Gets the y member.

wxRect::Inflate

void Inflate(wxCoord dx, wxCoord dy)**void Inflate(wxCoord diff)****wxRect Inflate(wxCoord dx, wxCoord dy) const**

Increase the rectangle size by *dx* in x direction and *dy* in y direction. Both (or one of) parameters may be negative to decrease the rectangle size.

The second form uses the same *diff* for both *dx* and *dy*.

The first two versions modify the rectangle in place, the last one returns a new rectangle leaving this one unchanged.

[See also](#)

Deflate (p. 1043)

wxRect::Inside

bool Inside(int x, int y) const

bool Inside(const wxPoint& pt) const

Returns `true` if the given point is inside the rectangle (or on its boundary) and `false` otherwise.

wxRect::Intersects

bool Intersects(const wxRect& rect) const

Returns `true` if this rectangle has a non empty intersection with the rectangle *rect* and `false` otherwise.

wxRect::Offset

void Offset(wxCoord dx, wxCoord dy)

void Offset(const wxPoint& pt)

Moves the rectangle by the specified offset. If *dx* is positive, the rectangle is moved to the right, if *dy* is positive, it is moved to the bottom, otherwise it is moved to the left or top respectively.

wxRect::SetHeight

void SetHeight(int height)

Sets the height.

wxRect::SetWidth

void SetWidth(int width)

Sets the width.

wxRect::SetX

void SetX(int x)

Sets the x position.

wxRect::SetY

void SetY(int y)

Sets the y position.

wxRect::operator =

void operator =(const wxRect& rect)

Assignment operator.

wxRect::operator ==

bool operator ==(const wxRect& rect)

Equality operator.

wxRect::operator !=

bool operator !=(const wxRect& rect)

Inequality operator.

wxRecursionGuard

wxRecursionGuard is a very simple class which can be used to prevent reentrancy problems in a function. It is not thread-safe and so should be used only in the single-threaded programs or in combination with some thread synchronization mechanisms.

```
wxRecursionGuard is always used together with the wxRecursionGuardFlag (p.
1048) like in this example:    void Foo()
{
    static wxRecursionGuardFlag s_flag;
    wxRecursionGuard guard(s_flag);
    if ( guard.IsInside() )
    {
        // don't allow reentrancy
        return;
    }
    ...
}
```

As you can see, wxRecursionGuard simply tests the flag value and sets it to true if it hadn't been already set. *IsInside()* (p. 1048) allows testing the old flag value. The advantage of using this class compared to directly manipulating the flag is that the flag is always reset in the wxRecursionGuard destructor and so you don't risk to forget to do it even if the function returns in an unexpected way (for example because an exception has been thrown).

Derived from

No base class

Include files

<wx/recguard.h>

wxRecursionGuard::wxRecursionGuard

wxRecursionGuard(wxRecursionGuardFlag& flag)

A `wxRecursionGuard` object must always be initialized with a (static) `wxRecursionGuardFlag` (p. 1048). The constructor saves the value of the flag to be able to return the correct value from `IsInside` (p. 1048).

wxRecursionGuard::~~wxRecursionGuard

~wxRecursionGuard()

The destructor resets the flag value so that the function can be entered again the next time.

Note that it is not virtual and so this class is not meant to be derived from (besides, there is absolutely no reason to do it anyhow).

wxRecursionGuard::IsInside

bool IsInside() const

Returns `true` if we're already inside the code block "protected" by this `wxRecursionGuard` (i.e. between this line and the end of current scope). Usually the function using `wxRecursionGuard` takes some specific actions in such case (may be simply returning) to prevent reentrant calls to itself.

If this method returns `false`, it is safe to continue.

wxRecursionGuardFlag

This is a completely opaque class which exists only to be used with `wxRecursionGuard` (p. 1047), please see the example in that class documentation.

Please notice that `wxRecursionGuardFlag` object *must* be declared `static` or the recursion would never be detected.

Derived from

No base class

Include files

<wx/recguard.h>

wxRegEx

wxRegEx represents a regular expression. This class provides support for regular expressions matching and also replacement.

It is built on top of either the system library (if it has support for POSIX regular expressions - which is the case of the most modern Unices) or uses the built in Henry Spencer's library. Henry Spencer would appreciate being given credit in the documentation of software which uses his library, but that is not a requirement.

Regular expressions, as defined by POSIX, come in two flavours: *extended* and *basic*. The builtin library also adds a third flavour of expression *advanced* (p. 1720), which is not available when using the system library.

Unicode is fully supported only when using the builtin library. When using the system library in Unicode mode, the expressions and data are translated to the default 8-bit encoding before being passed to the library.

On platforms where a system library is available, the default is to use the builtin library for Unicode builds, and the system library otherwise. It is possible to use the other if preferred by selecting it when building the wxWidgets.

Derived from

No base class

Data structures

Flags for regex compilation to be used with *Compile()* (p. 1051):

```
enum
{
    // use extended regex syntax
    wxRE_EXTENDED = 0,

    // use advanced RE syntax (builtin regex only)
#ifdef wxHAS_REGEX_ADVANCED
    wxRE_ADVANCED = 1,
#endif

    // use basic RE syntax
    wxRE_BASIC = 2,

    // ignore case in match
    wxRE_ICASE = 4,

    // only check match, don't set back references
    wxRE_NOSUB = 8,

    // if not set, treat '\n' as an ordinary character, otherwise it is
    // special: it is not matched by '.' and '^' and '$' always match
    // after/before it regardless of the setting of wxRE_NOT[BE]OL
}
```

```
    wxRE_NEWLINE    = 16,  
    // default flags  
    wxRE_DEFAULT    = wxRE_EXTENDED  
}
```

Flags for regex matching to be used with *Matches()* (p. 1051).

These flags are mainly useful when doing several matches in a long string to prevent erroneous matches for `'^'` and `'$'`:

```
enum  
{  
    // '^' doesn't match at the start of line  
    wxRE_NOTBOL = 32,  
  
    // '$' doesn't match at the end of line  
    wxRE_NOTEOL = 64  
}
```

Examples

A bad example of processing some text containing email addresses (the example is bad because the real email addresses can have more complicated form than `user@host.net`):

```
wxString text;  
...  
wxRegex reEmail = "(^[^@]+)@([[:alnum:]-_])+([[:alnum:]]+)" ;  
if ( reEmail.Matches(text) )  
{  
    wxString text = reEmail.GetMatch(email);  
    wxString username = reEmail.GetMatch(email, 1);  
    if ( reEmail.GetMatch(email, 3) == "com" ) // .com TLD?  
    {  
        ...  
    }  
}  
  
// or we could do this to hide the email address  
size_t count = reEmail.ReplaceAll(text, "HIDDEN@\\2\\3");  
printf("text now contains %u hidden addresses", count);
```

wxRegex::wxRegex

wxRegex()

Default ctor: use *Compile()* (p. 1051) later.

wxRegex(const wxString& expr, int flags = wxRE_DEFAULT)

Create and compile the regular expression, use *IsValid* (p. 1051) to test for compilation errors.

wxRegex::~~wxRegex

~wxRegEx()

dtor not virtual, don't derive from this class

wxRegEx::Compile

bool Compile(const wxString& pattern, int flags = wxRE_DEFAULT)

Compile the string into regular expression, return `true` if ok or `false` if string has a syntax error.

wxRegEx::IsValid

bool IsValid() const

Return `true` if this is a valid compiled regular expression, `false` otherwise.

wxRegEx::GetMatch

bool GetMatch(size_t* start, size_t* len, size_t index = 0) const

Get the start index and the length of the match of the expression (if *index* is 0) or a bracketed subexpression (*index* different from 0).

May only be called after successful call to *Matches()* (p. 1051) and only if `wxRE_NOSUB` was **not** used in *Compile()* (p. 1051).

Returns `false` if no match or if an error occurred.

wxString GetMatch(const wxString& text, size_t index = 0) const

Returns the part of string corresponding to the match where *index* is interpreted as above. Empty string is returned if match failed

May only be called after successful call to *Matches()* (p. 1051) and only if `wxRE_NOSUB` was **not** used in *Compile()* (p. 1051).

wxRegEx::GetMatchCount

size_t GetMatchCount() const

Returns the size of the array of matches, i.e. the number of bracketed subexpressions plus one for the expression itself, or 0 on error.

May only be called after successful call to *Compile()* (p. 1051). and only if `wxRE_NOSUB` was **not** used.

wxRegEx::Matches

bool Matches(const wxChar* text, int flags = 0) const

Matches the precompiled regular expression against the string *text*, returns `true` if matches and `false` otherwise.

Flags may be combination of `wxRE_NOTBOL` and `wxRE_NOTEOL`.

May only be called after successful call to *Compile()* (p. 1051).

wxRegEx::Replace

int Replace(wxString* text, const wxString& replacement, size_t maxMatches = 0) const

Replaces the current regular expression in the string pointed to by *text*, with the text in *replacement* and return number of matches replaced (maybe 0 if none found) or -1 on error.

The replacement text may contain back references `\number` which will be replaced with the value of the corresponding subexpression in the pattern match. `\0` corresponds to the entire match and `&` is a synonym for it. Backslash may be used to quote itself or `&` character.

maxMatches may be used to limit the number of replacements made, setting it to 1, for example, will only replace first occurrence (if any) of the pattern in the text while default value of 0 means replace all.

wxRegEx::ReplaceAll

int ReplaceAll(wxString* text, const wxString& replacement) const

Replace all occurrences: this is actually a synonym for *Replace()* (p. 1052).

[See also](#)

ReplaceFirst (p. 1052)

wxRegEx::ReplaceFirst

int ReplaceFirst(wxString* text, const wxString& replacement) const

Replace the first occurrence.

[See also](#)

Replace (p. 1052)

wxRegion

A `wxRegion` represents a simple or complex region on a device context or window. It uses reference counting, so copying and assignment operations are fast.

Derived from

wxGDIObject (p. 562)

wxObject (p. 954)

Include files

`<wx/region.h>`

See also

wxRegionIterator (p. 1057)

wxRegion::wxRegion

wxRegion()

Default constructor.

wxRegion(wxCoord x, wxCoord y, wxCoord width, wxCoord height)

Constructs a rectangular region with the given position and size.

wxRegion(const wxPoint& topLeft, const wxPoint& bottomRight)

Constructs a rectangular region from the top left point and the bottom right point.

wxRegion(const wxRect& rect)

Constructs a rectangular region a `wxRect` object.

wxRegion(const wxRegion& region)

Constructs a region by copying another region.

wxRegion(size_t n, const wxPoint *points, int fillStyle = wxWINDING_RULE)

Constructs a region corresponding to the polygon made of *n* points in the provided array. *fillStyle* parameter may have values `wxWINDING_RULE` or `wxODDEVEN_RULE`.

NB: This constructor is only implemented for Win32 and GTK+ `wxWidgets` ports.

wxRegion(const wxBitmap& bmp, const wxColour& transColour = wxNullColour, int tolerance = 0)

Constructs a region using the non-transparent pixels of a bitmap. See *Union* (p. 1056) for more details.

wxRegion::~~wxRegion

~wxRegion()

Destructor.

wxRegion::Clear

void Clear()

Clears the current region.

wxRegion::Contains

wxRegionContain Contains(long& x, long& y) const

Returns a value indicating whether the given point is contained within the region.

wxRegionContain Contains(const wxPoint& pt) const

Returns a value indicating whether the given point is contained within the region.

wxRegionContain Contains(long& x, long& y, long& width, long& height) const

Returns a value indicating whether the given rectangle is contained within the region.

wxRegionContain Contains(const wxRect& rect) const

Returns a value indicating whether the given rectangle is contained within the region.

Return value

The return value is one of wxOutRegion, wxPartRegion and wxInRegion.

On Windows, only wxOutRegion and wxInRegion are returned; a value wxInRegion then indicates that all or some part of the region is contained in this region.

wxRegion::ConvertToBitmap

wxBitmap ConvertToBitmap() const

Convert the region to a black and white bitmap with the white pixels being inside the region.

wxRegion::GetBox

void GetBox(long& x, long& y, long& width, long& height) const

Returns the outer bounds of the region.

wxRect GetBox() const

Returns the outer bounds of the region.

wxRegion::Intersect

bool Intersect(wxCoord x, wxCoord y, wxCoord width, wxCoord height)

Finds the intersection of this region and another, rectangular region, specified using position and size.

bool Intersect(const wxRect& rect)

Finds the intersection of this region and another, rectangular region.

bool Intersect(const wxRegion& region)

Finds the intersection of this region and another region.

Return value

`true` if successful, `false` otherwise.

Remarks

Creates the intersection of the two regions, that is, the parts which are in both regions. The result is stored in this region.

wxRegion::IsEmpty

bool IsEmpty() const

Returns `true` if the region is empty, `false` otherwise.

wxRegion::Subtract

bool Subtract(const wxRect& rect)

Subtracts a rectangular region from this region.

bool Subtract(const wxRegion& region)

Subtracts a region from this region.

Return value

`true` if successful, `false` otherwise.

Remarks

This operation combines the parts of 'this' region that are not part of the second region.

The result is stored in this region.

wxRegion::Offset

bool Offset(wxCoord x, wxCoord y)

Moves the region by the specified offsets in horizontal and vertical directions.

Return value

`true` if successful, `false` otherwise (the region is unchanged then).

wxRegion::Union

bool Union(wxCoord x, wxCoord y, wxCoord width, wxCoord height)

Finds the union of this region and another, rectangular region, specified using position and size.

bool Union(const wxRect& rect)

Finds the union of this region and another, rectangular region.

bool Union(const wxRegion& region)

Finds the union of this region and another region.

bool Union(const wxBitmap& bmp, const wxColour& transColour = wxNullColour, int tolerance = 0)

Finds the union of this region and the the non-transparent pixels of a bitmap. If the bitmap has a mask then it will be used, otherwise the colour to be treated as transparent may be specified, along with an optional colour tolerance value.

Return value

`true` if successful, `false` otherwise.

Remarks

This operation creates a region that combines all of this region and the second region. The result is stored in this region.

wxRegion::Xor

bool Xor(wxCoord x, wxCoord y, wxCoord width, wxCoord height)

Finds the Xor of this region and another, rectangular region, specified using position and size.

bool Xor(const wxRect& rect)

Finds the Xor of this region and another, rectangular region.

bool Xor(const wxRegion& *region*)

Finds the Xor of this region and another region.

Return value

`true` if successful, `false` otherwise.

Remarks

This operation creates a region that combines all of this region and the second region, except for any overlapping areas. The result is stored in this region.

wxRegion::operator =

void operator =(const wxRegion& *region*)

Copies *region* by reference counting.

wxRegionIterator

This class is used to iterate through the rectangles in a region, typically when examining the damaged regions of a window within an `OnPaint` call.

To use it, construct an iterator object on the stack and loop through the regions, testing the object and incrementing the iterator at the end of the loop.

See *wxPaintEvent* (p. 967) for an example of use.

Derived from

wxObject (p. 954)

Include files

<wx/region.h>

See also

wxPaintEvent (p. 967)

wxRegionIterator::wxRegionIterator

wxRegionIterator()

Default constructor.

wxRegionIterator(const wxRegion& region)

Creates an iterator object given a region.

wxRegionIterator::GetX

wxCoord GetX() const

Returns the x value for the current region.

wxRegionIterator::GetY

wxCoord GetY() const

Returns the y value for the current region.

wxRegionIterator::GetW

wxCoord GetW() const

An alias for GetWidth.

wxRegionIterator::GetWidth

wxCoord GetWidth() const

Returns the width value for the current region.

wxRegionIterator::GetH

wxCoord GetH() const

An alias for GetHeight.

wxRegionIterator::GetHeight

wxCoord GetWidth() const

Returns the width value for the current region.

wxRegionIterator::GetRect

wxRect GetRect() const

Returns the current rectangle.

wxRegionIterator::HaveRects

bool HaveRects() const

Returns `true` if there are still some rectangles; otherwise returns `false`.

wxRegionIterator::Reset

void Reset()

Resets the iterator to the beginning of the rectangles.

void Reset(const wxRegion& region)

Resets the iterator to the given region.

wxRegionIterator::operator ++

void operator ++()

Increment operator. Increments the iterator to the next region.

wxPython note: A wxPython alias for this operator is called `Next`.

wxRegionIterator::operator bool

operator bool() const

Returns `true` if there are still some rectangles; otherwise returns `false`.

You can use this to test the iterator object as if it were of type `bool`.

wxRendererNative

First, a brief introduction to `wxRenderer` and why it is needed.

Usually `wxWidgets` uses the underlying low level GUI system to draw all the controls -- this is what we mean when we say that it is a "native" framework. However not all controls exist under all (or even any) platforms and in this case `wxWidgets` provides a default, generic, implementation of them written in `wxWidgets` itself.

These controls don't have the native appearance if only the standard line drawing and other graphics primitives are used, because the native appearance is different under different platforms while the lines are always drawn in the same way.

This is why we have renderers: `wxRenderer` is a class which virtualizes the drawing, i.e. it abstracts the drawing operations and allows you to draw say, a button, without caring about exactly how this is done. Of course, as we can draw the button differently in

different renderers, this also allows us to emulate the native look and feel.

So the renderers work by exposing a large set of high-level drawing functions which are used by the generic controls. There is always a default global renderer but it may be changed or extended by the user, see *Render sample* (p. 1574).

All drawing functions take some standard parameters:

- *win* is the window being drawn. It is normally not used and when it is it should only be used as a generic *wxWindow* (p. 1388) (in order to get its low level handle, for example), but you should~~not~~ assume that it is of some given type as the same renderer function may be reused for drawing different kinds of control.
- *dc* is the *wxDC* (p. 349) to draw on. Only this device context should be used for drawing. It is not necessary to restore pens and brushes for it on function exit but, on the other hand, you shouldn't assume that it is in any specific state on function entry: the rendering functions should always prepare it.
- *rect* the bounding rectangle for the element to be drawn.
- *flags* the optional flags (none by default) which can be a combination of the `wxCONTROL_XXX` constants below.

Constants

The following rendering flags are defined:

```
enum
{
    wxCONTROL_DISABLED    = 0x00000001, // control is disabled
    wxCONTROL_FOCUSED     = 0x00000002, // currently has keyboard focus
    wxCONTROL_PRESSED     = 0x00000004, // (button) is pressed
    wxCONTROL_ISDEFAULT   = 0x00000008, // only applies to the buttons
    wxCONTROL_ISSUBMENU   = wxCONTROL_ISDEFAULT, // only for menu items
    wxCONTROL_EXPANDED    = wxCONTROL_ISDEFAULT, // only for the tree items
    wxCONTROL_CURRENT     = 0x00000010, // mouse is currently over the
control
    wxCONTROL_SELECTED    = 0x00000020, // selected item in e.g. listbox
    wxCONTROL_CHECKED     = 0x00000040, // (check/radio button) is checked
    wxCONTROL_CHECKABLE   = 0x00000080 // (menu) item can be checked
};
```

Derived from

No base class

Include files

<wx/renderer.h>

wxRendererNative::~~wxRendererNative

~wxRendererNative()

Virtual destructor as for any base class.

wxRendererNative::DrawHeaderButton

void DrawHeaderButton(wxWindow* win, wxDC& dc, const wxRect& rect, int flags = 0)

Draw the header control button (used by *wxListCtrl* (p. 799)).

wxRendererNative::DrawSplitterBorder

void DrawSplitterBorder(wxWindow* win, wxDC& dc, const wxRect& rect, int flags = 0)

Draw the border for sash window: this border must be such that the sash drawn by *DrawSash* (p. 1061) blends into it well.

wxRendererNative::DrawSplitterSash

void DrawSplitterSash(wxWindow* win, wxDC& dc, const wxSize& size, wxCoord position, wxOrientation orient, int flags = 0)

Draw a sash. The *orient* parameter defines whether the sash should be vertical or horizontal and how should the *position* be interpreted.

wxRendererNative::DrawTreeItemButton

void DrawTreeItemButton(wxWindow* win, wxDC& dc, const wxRect& rect, int flags = 0)

Draw the expanded/collapsed icon for a tree control item. To draw an expanded button the *flags* parameter must contain `wxCONTROL_EXPANDED` bit.

wxRendererNative::Get

wxRendererNative& Get()

Return the currently used renderer.

wxRendererNative::GetDefault

wxRendererNative& GetDefault()

Return the default (native) implementation for this platform -- this is also the one used by default but this may be changed by calling *Set* (p. 1062) in which case the return value of this method may be different from the return value of *Get* (p. 1061).

wxRendererNative::GetGeneric

wxRendererNative& GetGeneric()

Return the generic implementation of the renderer. Under some platforms, this is the default renderer implementation, others have platform-specific default renderer which can be retrieved by calling *GetDefault* (p. 1061).

wxRendererNative::GetSplitterParams

wxSplitterRenderParams GetSplitterParams(const wxWindow* win)

Get the splitter parameters, see *wxSplitterRenderParams* (p. 1177).

wxRendererNative::GetVersion

wxRendererVersion GetVersion() const

This function is used for version checking: *Load* (p. 1062) refuses to load any shared libraries implementing an older or incompatible version.

The implementation of this method is always the same in all renderers (simply construct *wxRendererVersion* (p. 1062) using the `wxRendererVersion::Current_XXX` values), but it has to be in the derived, not base, class, to detect mismatches between the renderers versions and so you have to implement it anew in all renderers.

wxRendererNative::Load

wxRendererNative* Load(const wxString& name)

Load the renderer from the specified DLL, the returned pointer must be deleted by caller if not `NULL` when it is not used any more.

The *name* should be just the base name of the renderer and not the full name of the DLL file which is constructed differently (using *wxDynamicLibrary::CanonicalizePluginName* (p. 435)) on different systems.

wxRendererNative::Set

wxRendererNative* Set(wxRendererNative* renderer)

Set the renderer to use, passing `NULL` reverts to using the default renderer (the global renderer must always exist).

Return the previous renderer used with *Set()* or `NULL` if none.

wxRendererVersion

This simple struct represents the *wxRendererNative* (p. 1059) interface version and is only used as the return value of *wxRendererNative::GetVersion* (p. 1062).

The version has two components: the version itself and the age. If the main program and the renderer have different versions they are never compatible with each other because the version is only changed when an existing virtual function is modified or removed. The age, on the other hand, is incremented each time a new virtual method is added and so, at least for the compilers using a common C++ object model, the calling program is compatible with any renderer which has the age greater or equal to its age. This verification is done by *IsCompatible* (p. 1063) method.

Derived from

No base class

Include files

<wx/renderer.h>

wxRendererVersion::IsCompatible

static bool IsCompatible(const wxRendererVersion& ver)

Checks if the main program is compatible with the renderer having the version *ver*, returns *true* if it is and *false* otherwise.

This method is used by *wxRendererNative::Load* (p. 1062) to determine whether a renderer can be used.

wxRendererVersion::version

const int version

The version component.

wxRendererVersion::age

const int age

The age component.

wxSashEvent

A sash event is sent when the sash of a *wxSashWindow* (p. 1068) has been dragged by the user.

Derived from

wxCommandEvent (p. 165)

wxEvent (p. 441)

wxObject (p. 954)

Include files

<wx/sashwin.h>

Event table macros

To process an activate event, use these event handler macros to direct input to a member function that takes a *wxSashEvent* argument.

EVT_SASH_DRAGGED(id, func) Process a *wxEVT_SASH_DRAGGED* event, when the user has finished dragging a sash.

EVT_SASH_DRAGGED_RANGE(id1, id2, func) Process a *wxEVT_SASH_DRAGGED_RANGE* event, when the user has finished dragging a sash. The event handler is called when windows with ids in the given range have their sashes dragged.

Data structures

```
enum wxSashDragStatus
{
    wxSASH_STATUS_OK,
    wxSASH_STATUS_OUT_OF_RANGE
};
```

Remarks

When a sash belonging to a sash window is dragged by the user, and then released, this event is sent to the window, where it may be processed by an event table entry in a derived class, a plug-in event handler or an ancestor class.

Note that the *wxSashWindow* doesn't change the window's size itself. It relies on the application's event handler to do that. This is because the application may have to handle other consequences of the resize, or it may wish to veto it altogether. The event handler should look at the drag rectangle: see *wxSashEvent::GetDragRect* (p. 1065) to see what the new size of the window would be if the resize were to be applied. It should also call *wxSashEvent::GetDragStatus* (p. 1065) to see whether the drag was OK or out of the current allowed range.

See also

wxSashWindow (p. 1068), *Event handling overview* (p. 1610)

wxSashEvent::wxSashEvent

wxSashEvent(int *id* = 0, wxSashEdgePosition *edge* = wxSASH_NONE)

Constructor.

wxSashEvent::GetEdge

wxSashEdgePosition GetEdge() const

Returns the dragged edge. The return value is one of wxSASH_TOP, wxSASH_RIGHT, wxSASH_BOTTOM, wxSASH_LEFT.

wxSashEvent::GetDragRect

wxRect GetDragRect() const

Returns the rectangle representing the new size the window would be if the resize was applied. It is up to the application to set the window size if required.

wxSashEvent::GetDragStatus

wxSashDragStatus GetDragStatus() const

Returns the status of the sash: one of wxSASH_STATUS_OK, wxSASH_STATUS_OUT_OF_RANGE. If the drag caused the notional bounding box of the window to flip over, for example, the drag will be out of range.

wxSashLayoutWindow

wxSashLayoutWindow responds to OnCalculateLayout events generated by *wxLayoutAlgorithm* (p. 782). It allows the application to use simple accessors to specify how the window should be laid out, rather than having to respond to events. The fact that the class derives from wxSashWindow allows sashes to be used if required, to allow the windows to be user-resizable.

The documentation for *wxLayoutAlgorithm* (p. 782) explains the purpose of this class in more detail.

Derived from

wxSashWindow (p. 1068)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/laywin.h>

Window styles

See *wxSashWindow* (p. 1068).

Event handling

This class handles the `EVT_QUERY_LAYOUT_INFO` and `EVT_CALCULATE_LAYOUT` events for you. However, if you use sashes, see *wxSashWindow* (p. 1068) for relevant event information.

See also *wxLayoutAlgorithm* (p. 782) for information about the layout events.

See also

wxLayoutAlgorithm (p. 782), *wxSashWindow* (p. 1068), *Event handling overview* (p. 1610)

wxSashLayoutWindow::wxSashLayoutWindow

wxSashLayoutWindow()

Default constructor.

wxSashLayoutWindow(wxSashLayoutWindow* parent, wxSashLayoutWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxCLIP_CHILDREN | wxSW_3D, const wxString& name = "layoutWindow")

Constructs a sash layout window, which can be a child of a frame, dialog or any other non-control window.

Parameters

parent

Pointer to a parent window.

id

Window identifier. If -1, will automatically create an identifier.

pos

Window position. `wxDefaultPosition` is (-1, -1) which indicates that `wxSashLayoutWindows` should generate a default position for the window. If using the `wxSashLayoutWindow` class directly, supply an actual position.

size

Window size. `wxDefaultSize` is (-1, -1) which indicates that `wxSashLayoutWindows`

should generate a default size for the window.

style

Window style. For window styles, please see *wxSashLayoutWindow* (p. 1065).

name

Window name.

wxSashLayoutWindow::~~wxSashLayoutWindow

~wxSashLayoutWindow()

Destructor.

wxSashLayoutWindow::GetAlignment

wxLayoutAlignment GetAlignment() const

Returns the alignment of the window: one of `wxLAYOUT_TOP`, `wxLAYOUT_LEFT`, `wxLAYOUT_RIGHT`, `wxLAYOUT_BOTTOM`.

wxSashLayoutWindow::GetOrientation

wxLayoutOrientation GetOrientation() const

Returns the orientation of the window: one of `wxLAYOUT_HORIZONTAL`, `wxLAYOUT_VERTICAL`.

wxSashLayoutWindow::OnCalculateLayout

void OnCalculateLayout(wxCalculateLayoutEvent& event)

The default handler for the event that is generated by *wxLayoutAlgorithm*. The implementation of this function calls *wxCalculateLayoutEvent::SetRect* to shrink the provided size according to how much space this window takes up. For further details, see *wxLayoutAlgorithm* (p. 782) and *wxCalculateLayoutEvent* (p. 107).

wxSashLayoutWindow::OnQueryLayoutInfo

void OnQueryLayoutInfo(wxQueryLayoutInfoEvent& event)

The default handler for the event that is generated by *OnCalculateLayout* to get size, alignment and orientation information for the window. The implementation of this function uses member variables as set by accessors called by the application. For further details, see *wxLayoutAlgorithm* (p. 782) and *wxQueryLayoutInfoEvent* (p. 1030).

wxSashLayoutWindow::SetAlignment

void SetAlignment(wxLayoutAlignment *alignment*)

Sets the alignment of the window (which edge of the available parent client area the window is attached to). *alignment* is one of wxLAYOUT_TOP, wxLAYOUT_LEFT, wxLAYOUT_RIGHT, wxLAYOUT_BOTTOM.

wxSashLayoutWindow::SetDefaultSize

void SetDefaultSize(const wxSize& *size*)

Sets the default dimensions of the window. The dimension other than the orientation will be fixed to this value, and the orientation dimension will be ignored and the window stretched to fit the available space.

wxSashLayoutWindow::SetOrientation

void SetOrientation(wxLayoutOrientation *orientation*)

Sets the orientation of the window (the direction the window will stretch in, to fill the available parent client area). *orientation* is one of wxLAYOUT_HORIZONTAL, wxLAYOUT_VERTICAL.

wxSashWindow

wxSashWindow allows any of its edges to have a sash which can be dragged to resize the window. The actual content window will be created by the application as a child of wxSashWindow. The window (or an ancestor) will be notified of a drag via a *wxSashEvent* (p. 1063) notification.

Derived from

wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/sashwin.h>

Window styles

The following styles apply in addition to the normal wxWindow styles.

wxSW_3D	Draws a 3D effect sash and border.
wxSW_3DSASH	Draws a 3D effect sash.
wxSW_3DBORDER	Draws a 3D effect border.

wxSW_BORDER Draws a thin black border.

See also *window styles overview* (p. 1618).

Event handling

EVT_SASH_DRAGGED(id, func) Process a wxEVT_SASH_DRAGGED event, when the user has finished dragging a sash.

EVT_SASH_DRAGGED_RANGE(id1, id2, func) Process a wxEVT_SASH_DRAGGED_RANGE event, when the user has finished dragging a sash. The event handler is called when windows with ids in the given range have their sashes dragged.

Data types

```
enum wxSashEdgePosition {  
    wxSASH_TOP = 0,  
    wxSASH_RIGHT,  
    wxSASH_BOTTOM,  
    wxSASH_LEFT,  
    wxSASH_NONE = 100  
};
```

See also

wxSashEvent (p. 1063), *wxSashLayoutWindow* (p. 1065), *Event handling overview* (p. 1610)

wxSashWindow::wxSashWindow

wxSashWindow()

Default constructor.

wxSashWindow(wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxCLIP_CHILDREN | wxSW_3D, const wxString& name = "sashWindow")

Constructs a sash window, which can be a child of a frame, dialog or any other non-control window.

Parameters

parent

Pointer to a parent window.

id

Window identifier. If -1, will automatically create an identifier.

pos

Window position. `wxDefaultPosition` is (-1, -1) which indicates that `wxSashWindows` should generate a default position for the window. If using the `wxSashWindow` class directly, supply an actual position.

size

Window size. `wxDefaultSize` is (-1, -1) which indicates that `wxSashWindows` should generate a default size for the window.

style

Window style. For window styles, please see *wxSashWindow* (p. 1068).

name

Window name.

wxSashWindow::~~wxSashWindow

~wxSashWindow()

Destructor.

wxSashWindow::GetSashVisible

bool GetSashVisible(wxSashEdgePosition *edge*) const

Returns true if a sash is visible on the given edge, false otherwise.

Parameters

edge

Edge. One of `wxSASH_TOP`, `wxSASH_RIGHT`, `wxSASH_BOTTOM`, `wxSASH_LEFT`.

See also

wxSashWindow::SetSashVisible (p. 1072)

wxSashWindow::GetMaximumSizeX

int GetMaximumSizeX() const

Gets the maximum window size in the x direction.

wxSashWindow::GetMaximumSizeY

int GetMaximumSizeY() const

Gets the maximum window size in the y direction.

wxSashWindow::GetMinimumSizeX

int GetMinimumSizeX()

Gets the minimum window size in the x direction.

wxSashWindow::GetMinimumSizeY

int GetMinimumSizeY(int *min*) const

Gets the minimum window size in the y direction.

wxSashWindow::HasBorder

bool HasBorder(wxSashEdgePosition *edge*) const

Returns true if the sash has a border, false otherwise.

Parameters*edge*

Edge. One of wxSASH_TOP, wxSASH_RIGHT, wxSASH_BOTTOM, wxSASH_LEFT.

See also

wxSashWindow::SetSashBorder (p. 1072)

wxSashWindow::SetMaximumSizeX

void SetMaximumSizeX(int *min*)

Sets the maximum window size in the x direction.

wxSashWindow::SetMaximumSizeY

void SetMaximumSizeY(int *min*)

Sets the maximum window size in the y direction.

wxSashWindow::SetMinimumSizeX

void SetMinimumSizeX(int *min*)

Sets the minimum window size in the x direction.

wxSashWindow::SetMinimumSizeY

void SetMinimumSizeY(int *min*)

Sets the minimum window size in the y direction.

wxSashWindow::SetSashVisible

void SetSashVisible(wxSashEdgePosition *edge*, bool *visible*)

Call this function to make a sash visible or invisible on a particular edge.

Parameters*edge*

Edge to change. One of wxSASH_TOP, wxSASH_RIGHT, wxSASH_BOTTOM, wxSASH_LEFT.

visible

true to make the sash visible, false to make it invisible.

See also

wxSashWindow::GetSashVisible (p. 1070)

wxSashWindow::SetSashBorder

void SetSashBorder(wxSashEdgePosition *edge*, bool *hasBorder*)

Call this function to give the sash a border, or remove the border.

Parameters*edge*

Edge to change. One of wxSASH_TOP, wxSASH_RIGHT, wxSASH_BOTTOM, wxSASH_LEFT.

hasBorder

true to give the sash a border visible, false to remove it.

See also

wxSashWindow::HasBorder (p. 1071)

wxScreenDC

A `wxScreenDC` can be used to paint on the screen. This should normally be constructed as a temporary stack object; don't store a `wxScreenDC` object.

Derived from

wxDC (p. 349)

Include files

<wx/dcscreen.h>

See also

wxDC (p. 349), *wxMemoryDC* (p. 881), *wxPaintDC* (p. 966), *wxClientDC* (p. 134), *wxWindowDC* (p. 1441)

wxScreenDC::wxScreenDC

wxScreenDC()

Constructor.

wxScreenDC::StartDrawingOnTop

bool StartDrawingOnTop(wxWindow* window)

bool StartDrawingOnTop(wxRect* rect = NULL)

Use this in conjunction with *EndDrawingOnTop* (p. 1074) to ensure that drawing to the screen occurs on top of existing windows. Without this, some window systems (such as X) only allow drawing to take place underneath other windows.

By using the first form of this function, an application is specifying that the area that will be drawn on coincides with the given window.

By using the second form, an application can specify an area of the screen which is to be drawn on. If `NULL` is passed, the whole screen is available.

It is recommended that an area of the screen is specified because with large regions, flickering effects are noticeable when destroying the temporary transparent window used to implement this feature.

You might use this pair of functions when implementing a drag feature, for example as in the *wxSplitterWindow* (p. 1167) implementation.

Remarks

This function is probably obsolete since the X implementations allow drawing directly on the screen now. However, the fact that this function allows the screen to be refreshed afterwards, may be useful to some applications.

wxScreenDC::EndDrawingOnTop

bool EndDrawingOnTop()

Use this in conjunction with *StartDrawingOnTop* (p. 1073).

This function destroys the temporary window created to implement on-top drawing (X only).

wxScopedArray

This is a simple scoped smart pointer array implementation that is similar to the Boost (<http://www.boost.org>) smart pointers but rewritten to use macros instead.

Example

Below is an example of using a wxWidgets scoped smart pointer and pointer array.

```
class MyClass { /* ... */ };

// declare a smart pointer to a MyClass called wxMyClassPtr
wxDECLARE_SCOPED_PTR(MyClass, wxMyClassPtr)
// declare a smart pointer to an array of chars
wxDECLARE_SCOPED_ARRAY(char, wxCharArray)

...

// define the first pointer class, must be complete
wxDEFINE_SCOPED_PTR(MyClass, wxMyClassPtr)
// define the second pointer class
wxDEFINE_SCOPED_ARRAY(char, wxCharArray)

// create an object with a new pointer to MyClass
wxMyClassPtr theObj(new MyClass());
// reset the pointer (deletes the previous one)
theObj.reset(new MyClass());

// access the pointer
theObj->MyFunc();

// create an object with a new array of chars
wxCharArray theCharObj(new char[100]);

// access the array
theCharObj[0] = "!";
```

Declaring new smart pointer types

```
wxDECLAR_SCOPED_ARRAY( TYPE,          // type of the values
                      CLASSNAME ); // name of the class
```

A smart pointer holds a pointer to an object (which must be complete when

`wxDEFINE_SCOPED_ARRAY()` is called). The memory used by the object is deleted when the smart pointer goes out of scope. The first argument of the macro is the pointer type, the second is the name of the new smart pointer class being created. Below we will use `wxScopedArray` to represent the scoped pointer array class, but the user may create the class with any legal name.

Include files

`<wx/ptr_scpd.h>`

See also

`wxScopedPtr` (p. 1076)

`wxScopedArray::wxScopedArray`

`wxScopedArray(type * T = NULL)`

Creates the smart pointer with the given pointer or none if `NULL`. On compilers that support it, this uses the `explicit` keyword.

`wxScopedArray::reset`

`reset(T p * = NULL)`

Deletes the currently held pointer and sets it to 'p' or to `NULL` if no arguments are specified. This function does check to make sure that the pointer you are assigning is not the same pointer that is already stored.

`wxScopedArray::operator []`

`const T & operator [] (long int i)`

This operator acts like the standard `[]` indexing operator for C++ arrays. The function does not do bounds checking.

`wxScopedArray::get`

`const T* get()`

This operator gets the pointer stored in the smart pointer or returns `NULL` if there is none.

`wxScopedArray::swap`

swap(wxScopedPtr & ot)

Swap the pointer inside the smart pointer with 'ot'. The pointer being swapped must be of the same type (hence the same class name).

wxScopedPtr

This is a simple scoped smart pointer implementation that is similar to the Boost (<http://www.boost.org/>) smart pointers but rewritten to use macros instead.

A smart pointer holds a pointer to an object. The memory used by the object is deleted when the smart pointer goes out of scope. This class is different from the `std::auto_ptr<>` in so far as it doesn't provide copy constructor nor assignment operator. This limits what you can do with it but is much less surprising than the "destructive copy" behaviour of the standard class.

Example

Below is an example of using a wxWidgets scoped smart pointer and pointer array.

```
class MyClass { /* ... */ };

// declare a smart pointer to a MyClass called wxMyClassPtr
wxDECLARE_SCOPED_PTR(MyClass, wxMyClassPtr)
// declare a smart pointer to an array of chars
wxDECLARE_SCOPED_ARRAY(char, wxCharArray)

...

// define the first pointer class, must be complete
wxDEFINE_SCOPED_PTR(MyClass, wxMyClassPtr)
// define the second pointer class
wxDEFINE_SCOPED_ARRAY(char, wxCharArray)

// create an object with a new pointer to MyClass
wxMyClassPtr theObj(new MyClass());
// reset the pointer (deletes the previous one)
theObj.reset(new MyClass());

// access the pointer
theObj->MyFunc();

// create an object with a new array of chars
wxCharArray theCharObj(new char[100]);

// access the array
theCharObj[0] = "!";
```

Declaring new smart pointer types

To declare the smart pointer class `CLASSNAME` containing pointers to a (possibly incomplete) type `TYPE` you should use

```
wxDECLARE_SCOPED_PTR( TYPE,          // type of the values
                     CLASSNAME ); // name of the class
```

And later, when `TYPE` is fully defined, you must also use

```
wxDEFINE_SCOPED_PTR( TYPE, CLASSNAME );
```

to implement the scoped pointer class.

The first argument of these macro is the pointer type, the second is the name of the new smart pointer class being created. Below we will use `wxScopedPtr` to represent the scoped pointer class, but the user may create the class with any legal name.

Alternatively, if you don't have to separate the point of declaration and definition of this class and if you accept the standard naming convention, that is that the scoped pointer for the class `Foo` is called `FooPtr`, you can use a single macro which replaces two macros above:

```
wxDEFINE_SCOPED_PTR_TYPE( TYPE );
```

Once again, in this case `CLASSNAME` will be `TYPEPtr`.

Include files

`<wx/ptr_scpd.h>`

See also

wxScopedArray (p. 1074)

wxScopedPtr::wxScopedPtr

explicit wxScopedPtr(type * T = NULL)

Creates the smart pointer with the given pointer or none if `NULL`. On compilers that support it, this uses the `explicit` keyword.

wxScopedPtr::~~wxScopedPtr

~wxScopedPtr()

Destructor frees the pointer held by this object if it is not `NULL`.

wxScopedPtr::release

T * release()

Returns the currently held pointer and resets the smart pointer object to `NULL`. After a call to this function the caller is responsible for deleting the pointer.

wxScopedPtr::reset

reset(T p * = NULL)

Deletes the currently held pointer and sets it to *p* or to NULL if no arguments are specified. This function does check to make sure that the pointer you are assigning is not the same pointer that is already stored.

wxScopedPtr::operator *

const T& operator *()

This operator works like the standard C++ pointer operator to return the object being pointed to by the pointer. If the pointer is NULL or invalid this will crash.

wxScopedPtr::operator ->

const T* operator ->() This operator works like the standard C++ pointer operator to return the pointer in the smart pointer or NULL if it is empty.

wxScopedPtr::get

const T* get()

This operator gets the pointer stored in the smart pointer or returns NULL if there is none.

wxScopedPtr::swap

swap(wxScopedPtr & other)

Swap the pointer inside the smart pointer with *other*. The pointer being swapped must be of the same type (hence the same class name).

wxScopedTiedPtr

This is a variation on the topic of *wxScopedPtr* (p. 1076). This class is also a smart pointer but in addition it "ties" the pointer value to another variable. In other words, during the life time of this class the value of that variable is set to be the same as the value of the pointer itself and it is reset to its old value when the object is destroyed. This class is especially useful when converting the existing code (which may already store the pointers value in some variable) to the smart pointers.

Example

Derives from

wxScopedPtr (p. 1076)

Include files

<wx/ptr_scpd.h>

wxScopedTiedPtr::wxScopedTiedPtr

wxScopedTiedPtr(T **ppTie, T *ptr)

Constructor creates a smart pointer initialized with *ptr* and stores *ptr* in the location specified by *ppTie* which must not be `NULL`.

wxScopedTiedPtr::~~wxScopedTiedPtr

~wxScopedTiedPtr()

Destructor frees the pointer held by this object and restores the value stored at the tied location (as specified in the *constructor* (p. 1079)) to the old value.

Warning: this location may now contain an uninitialized value if it hadn't been initialized previously, in particular don't count on it magically being `NULL`!

wxScrollBar

A `wxScrollBar` is a control that represents a horizontal or vertical scrollbar. It is distinct from the two scrollbars that some windows provide automatically, but the two types of scrollbar share the way events are received.

Derived from

`wxControl` (p. 199)
`wxWindow` (p. 1388)
`wxEvtHandler` (p. 445)
`wxObject` (p. 954)

Include files

<wx/scrolbar.h>

Remarks

A scrollbar has the following main attributes: *range*, *thumb size*, *page size*, and *position*.

The range is the total number of units associated with the view represented by the scrollbar. For a table with 15 columns, the range would be 15.

The thumb size is the number of units that are currently visible. For the table example, the window might be sized so that only 5 columns are currently visible, in which case the application would set the thumb size to 5. When the thumb size becomes the same as or greater than the range, the scrollbar will be automatically hidden on most platforms.

The page size is the number of units that the scrollbar should scroll by, when 'paging' through the data. This value is normally the same as the thumb size length, because it is natural to assume that the visible window size defines a page.

The scrollbar position is the current thumb position.

Most applications will find it convenient to provide a function called **AdjustScrollbars** which can be called initially, from an **OnSize** event handler, and whenever the application data changes in size. It will adjust the view, object and page size according to the size of the window and the size of the data.

Window styles

wxSB_HORIZONTAL Specifies a horizontal scrollbar.

wxSB_VERTICAL Specifies a vertical scrollbar.

See also *window styles overview* (p. 1618).

Event table macros

To process a scroll event, use these event handler macros to direct input to member functions that take a `wxScrollEvent` argument. You can use `EVT_COMMAND_SCROLL...` macros with window IDs for when intercepting scroll events from controls, or `EVT_SCROLL...` macros without window IDs for intercepting scroll events from the receiving window - except for this, the macros behave exactly the same.

EVT_SCROLL(func)	Process all scroll events.
EVT_SCROLL_TOP(func)	Process <code>wxEVT_SCROLL_TOP</code> scroll-to-top events (minium position).
EVT_SCROLL_BOTTOM(func)	Process <code>wxEVT_SCROLL_TOP</code> scroll-to-bottom events (maximum position).
EVT_SCROLL_LINEUP(func)	Process <code>wxEVT_SCROLL_LINEUP</code> line up events.
EVT_SCROLL_LINEDOWN(func)	Process <code>wxEVT_SCROLL_LINEDOWN</code> line down events.
EVT_SCROLL_PAGEUP(func)	Process <code>wxEVT_SCROLL_PAGEUP</code> page up events.
EVT_SCROLL_PAGEDOWN(func)	Process <code>wxEVT_SCROLL_PAGEDOWN</code> page down events.
EVT_SCROLL_THUMBTRACK(func)	Process <code>wxEVT_SCROLL_THUMBTRACK</code>

	thumbtrack events (frequent events sent as the user drags the thumbtrack).
EVT_SCROLL_THUMBRELEASE(func)	Process wxEVT_SCROLL_THUMBRELEASE thumb release events.
EVT_SCROLL_ENDSCROLL(func)	Process wxEVT_SCROLL_ENDSCROLL end of scrolling events (MSW only).
EVT_COMMAND_SCROLL(id, func)	Process all scroll events.
EVT_COMMAND_SCROLL_TOP(id, func)	Process wxEVT_SCROLL_TOP scroll-to-top events (minimum position).
EVT_COMMAND_SCROLL_BOTTOM(id, func)	Process wxEVT_SCROLL_TOP scroll-to-bottom events (maximum position).
EVT_COMMAND_SCROLL_LINEUP(id, func)	Process wxEVT_SCROLL_LINEUP line up events.
EVT_COMMAND_SCROLL_LINEDOWN(id, func)	Process wxEVT_SCROLL_LINEDOWN line down events.
EVT_COMMAND_SCROLL_PAGEUP(id, func)	Process wxEVT_SCROLL_PAGEUP page up events.
EVT_COMMAND_SCROLL_PAGEDOWN(id, func)	Process wxEVT_SCROLL_PAGEDOWN page down events.
EVT_COMMAND_SCROLL_THUMBTRACK(id, func)	Process wxEVT_SCROLL_THUMBTRACK thumbtrack events (frequent events sent as the user drags the thumbtrack).
EVT_COMMAND_SCROLL_THUMBRELEASE(func)	Process wxEVT_SCROLL_THUMBRELEASE thumb release events.
EVT_COMMAND_SCROLL_ENDSCROLL(func)	Process wxEVT_SCROLL_ENDSCROLL end of scrolling events (MSW only).

The difference between `EVT_SCROLL_THUMBRELEASE` and `EVT_SCROLL_ENDSCROLL`

The `EVT_SCROLL_THUMBRELEASE` event is only emitted when actually dragging the thumb using the mouse and releasing it (This `EVT_SCROLL_THUMBRELEASE` event is also followed by an `EVT_SCROLL_ENDSCROLL` event).

The `EVT_SCROLL_ENDSCROLL` event also occurs when using the keyboard to change the thumb position, and when clicking next to the thumb (In all these cases the `EVT_SCROLL_THUMBRELEASE` event does not happen).

In short, the `EVT_SCROLL_ENDSCROLL` event is triggered when scrolling/ moving has finished. The only exception (unfortunately) is that changing the thumb position using the mousewheel does give a `EVT_SCROLL_THUMBRELEASE` event but NOT an `EVT_SCROLL_ENDSCROLL` event.

Please see the widgets sample ("Slider" page) to see the difference between `EVT_SCROLL_THUMBRELEASE` and `EVT_SCROLL_ENDSCROLL` in action.

See also

Scrolling overview (p. 1643), *Event handling overview* (p. 1610), *wxScrolledWindow* (p. 1085)

wxScrollBar::wxScrollBar

wxScrollBar()

Default constructor.

wxScrollBar(wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxSB_HORIZONTAL, const wxValidator& validator = wxDefaultValidator, const wxString& name = "scrollBar")

Constructor, creating and showing a scrollbar.

Parameters

parent

Parent window. Must not be NULL.

id

Window identifier. A value of -1 indicates a default value.

pos

Window position. If the position (-1, -1) is specified then a default position is chosen.

size

Window size. If the default size (-1, -1) is specified then a default size is chosen.

style

Window style. See *wxScrollBar* (p. 1079).

validator

Window validator.

name

Window name.

See also

wxScrollBar::Create (p. 1083), *wxValidator* (p. 1360)

wxScrollBar::~~wxScrollBar

void ~wxScrollBar()

Destructor, destroying the scrollbar.

wxScrollBar::Create

bool Create(wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxSB_HORIZONTAL, const wxValidator& validator = wxDefaultValidator, const wxString& name = "scrollBar")

Scrollbar creation function called by the scrollbar constructor. See *wxScrollBar::wxScrollBar* (p. 1082) for details.

wxScrollBar::GetRange

int GetRange() const

Returns the length of the scrollbar.

See also

wxScrollBar::SetScrollbar (p. 1084)

wxScrollBar::GetPageSize

int GetPageSize() const

Returns the page size of the scrollbar. This is the number of scroll units that will be

scrolled when the user pages up or down. Often it is the same as the thumb size.

See also

wxScrollBar::SetScrollbar (p. 1084)

wxScrollBar::GetThumbPosition

int GetThumbPosition() const

Returns the current position of the scrollbar thumb.

See also

wxScrollBar::SetThumbPosition (p. 1084)

wxScrollBar::GetThumbSize

int GetThumbSize() const

Returns the thumb or 'view' size.

See also

wxScrollBar::SetScrollbar (p. 1084)

wxScrollBar::SetThumbPosition

void SetThumbPosition(int viewStart)

Sets the position of the scrollbar.

Parameters

viewStart

The position of the scrollbar thumb.

See also

wxScrollBar::GetThumbPosition (p. 1084)

wxScrollBar::SetScrollbar

virtual void SetScrollbar(int position, int thumbSize, int range, int pageSize, const bool refresh = true)

Sets the scrollbar properties.

Parameters

position

The position of the scrollbar in scroll units.

thumbSize

The size of the thumb, or visible portion of the scrollbar, in scroll units.

range

The maximum position of the scrollbar.

pageSize

The size of the page size in scroll units. This is the number of units the scrollbar will scroll when it is paged up or down. Often it is the same as the thumb size.

refresh

true to redraw the scrollbar, false otherwise.

Remarks

Let's say you wish to display 50 lines of text, using the same font. The window is sized so that you can only see 16 lines at a time.

You would use:

```
scrollbar->SetScrollbar(0, 16, 50, 15);
```

The page size is 1 less than the thumb size so that the last line of the previous page will be visible on the next page, to help orient the user.

Note that with the window at this size, the thumb position can never go above 50 minus 16, or 34.

You can determine how many lines are currently visible by dividing the current view size by the character height in pixels.

When defining your own scrollbar behaviour, you will always need to recalculate the scrollbar settings when the window size changes. You could therefore put your scrollbar calculations and `SetScrollbar` call into a function named `AdjustScrollbars`, which can be called initially and also from a *wxSizeEvent* (p. 1109) event handler function.

See also

Scrolling overview (p. 1643), *wxWindow::SetScrollbar* (p. 1430), *wxScrolledWindow* (p. 1085)

wxScrolledWindow

The `wxScrolledWindow` class manages scrolling for its client area, transforming the

coordinates according to the scrollbar positions, and setting the scroll positions, thumb sizes and ranges according to the area in view.

Starting from version 2.4 of wxWidgets, there are several ways to use a `wxScrolledWindow`. In particular, there are now three ways to set the size of the scrolling area:

One way is to set the scrollbars directly using a call to `wxScrolledWindow::SetScrollbars` (p. 1093). This is the way it used to be in any previous version of wxWidgets and it will be kept for backwards compatibility.

An additional method of manual control, which requires a little less computation of your own, is to set the total size of the scrolling area by calling either `wxWindow::SetVirtualSize` (p. 1436), or `wxWindow::FitInside` (p. 1401), and setting the scrolling increments for it by calling `wxScrolledWindow::SetScrollRate` (p. 1094). Scrolling in some orientation is enabled by setting a non zero increment for it.

The most automatic and newest way is to simply let sizers determine the scrolling area. This is now the default when you set an interior sizer into a `wxScrolledWindow` with `wxWindow::SetSizer` (p. 1434). The scrolling area will be set to the size requested by the sizer and the scrollbars will be assigned for each orientation according to the need for them and the scrolling increment set by `wxScrolledWindow::SetScrollRate` (p. 1094). As above, scrolling is only enabled in orientations with a non-zero increment. You can influence the minimum size of the scrolled area controlled by a sizer by calling `wxWindow::SetVirtualSizeHints` (p. 1436). (calling `wxScrolledWindow::SetScrollbars` (p. 1093) has analogous effects in wxWidgets 2.4 -- in later versions it may not continue to override the sizer)

Note: if Maximum size hints are still supported by `SetVirtualSizeHints`, use them at your own dire risk. They may or may not have been removed for 2.4, but it really only makes sense to set minimum size hints here. We should probably replace `SetVirtualSizeHints` with `SetMinVirtualSize` or similar and remove it entirely in future.

As with all windows, an application can draw onto a `wxScrolledWindow` using a *device context* (p. 1648).

You have the option of handling the `OnPaint` handler or overriding the `OnDraw` (p. 1092) function, which is passed a pre-scrolled device context (prepared by `PrepareDC` (p. 1091)).

If you don't wish to calculate your own scrolling, you must call `PrepareDC` when not drawing from within `OnDraw`, to set the device origin for the device context according to the current scroll position.

A `wxScrolledWindow` will normally scroll itself and therefore its child windows as well. It might however be desired to scroll a different window than itself: e.g. when designing a spreadsheet, you will normally only have to scroll the (usually white) cell area, whereas the (usually grey) label area will scroll very differently. For this special purpose, you can call `SetTargetWindow` (p. 1094) which means that pressing the scrollbars will scroll a different window.

Note that the underlying system knows nothing about scrolling coordinates, so that all system functions (mouse events, expose events, refresh calls etc) as well as the position

of subwindows are relative to the "physical" origin of the scrolled window. If the user insert a child window at position (10,10) and scrolls the window down 100 pixels (moving the child window out of the visible area), the child window will report a position of (10,-90).

Derived from

wxPanel (p. 972)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/scrolwin.h>

Window styles

wxRETAINED Uses a backing pixmap to speed refreshes. Motif only.

See also *window styles overview* (p. 1618).

Remarks

Use *wxScrolledWindow* for applications where the user scrolls by a fixed amount, and where a 'page' can be interpreted to be the current visible portion of the window. For more sophisticated applications, use the *wxScrolledWindow* implementation as a guide to build your own scroll behaviour.

See also

wxScrollBar (p. 1079), *wxClientDC* (p. 134),
wxPaintDC (p. 966), *wxVScrolledWindow* (p. 1382)

wxScrolledWindow::wxScrolledWindow

wxScrolledWindow()

Default constructor.

wxScrolledWindow(*wxWindow** parent, **wxWindowID** id = -1, **const wxPoint&** pos = *wxDefaultPosition*, **const wxSize&** size = *wxDefaultSize*, **long** style = *wxHSCROLL* | *wxVSCROLL*, **const wxString&** name = "scrolledWindow")

Constructor.

Parameters

parent

Parent window.

id

Window identifier. A value of -1 indicates a default value.

pos

Window position. If a position of (-1, -1) is specified then a default position is chosen.

size

Window size. If a size of (-1, -1) is specified then the window is sized appropriately.

style

Window style. See *wxScrolledWindow* (p. 1085).

name

Window name.

Remarks

The window is initially created without visible scrollbars. Call *wxScrolledWindow::SetScrollbars* (p. 1093) to specify how big the virtual window size should be.

wxScrolledWindow::~~wxScrolledWindow

~wxScrolledWindow()

Destructor.

wxScrolledWindow::CalcScrolledPosition

void CalcScrolledPosition(int x, int y, int *xx, int *yy) const

Translates the logical coordinates to the device ones. For example, if a window is scrolled 10 pixels to the bottom, the device coordinates of the origin are (0, 0) (as always), but the logical coordinates are (0, 10) and so the call to *CalcScrolledPosition*(0, 10, &xx, &yy) will return 0 in yy.

See also

CalcUnscrolledPosition (p. 1089)

wxPython note: The wxPython version of this methods accepts only two parameters and returns xx and yy as a tuple of values.

wxPerl note: In wxPerl this method takes two parameters and returns a 2-element list (*xx*, *yy*).

wxScrolledWindow::CalcUnscrolledPosition

void CalcUnscrolledPosition(int x, int y, int *xx, int *yy) const

Translates the device coordinates to the logical ones. For example, if a window is scrolled 10 pixels to the bottom, the device coordinates of the origin are (0, 0) (as always), but the logical coordinates are (0, 10) and so the call to `CalcUnscrolledPosition(0, 0, &xx, &yy)` will return 10 in `yy`.

See also

CalcScrolledPosition (p. 1088)

wxPython note: The wxPython version of this methods accepts only two parameters and returns `xx` and `yy` as a tuple of values.

wxPerl note: In wxPerl this method takes two parameters and returns a 2-element list (`xx, yy`).

wxScrolledWindow::Create

bool Create(wxWindow* parent, wxWindowID id = -1, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxHSCROLL | wxVSCROLL, const wxString& name = "scrolledWindow")

Creates the window for two-step construction. Derived classes should call or replace this function. See *wxScrolledWindow::wxScrolledWindow* (p. 1087) for details.

wxScrolledWindow::EnableScrolling

void EnableScrolling(const bool xScrolling, const bool yScrolling)

Enable or disable physical scrolling in the given direction. Physical scrolling is the physical transfer of bits up or down the screen when a scroll event occurs. If the application scrolls by a variable amount (e.g. if there are different font sizes) then physical scrolling will not work, and you should switch it off. Note that you will have to reposition child windows yourself, if physical scrolling is disabled.

Parameters

xScrolling

If true, enables physical scrolling in the x direction.

yScrolling

If true, enables physical scrolling in the y direction.

Remarks

Physical scrolling may not be available on all platforms. Where it is available, it is enabled by default.

wxScrolledWindow::GetScrollPixelsPerUnit

void GetScrollPixelsPerUnit(int* xUnit, int* yUnit) const

Get the number of pixels per scroll unit (line), in each direction, as set by *wxScrolledWindow::SetScrollbars* (p. 1093). A value of zero indicates no scrolling in that direction.

Parameters*xUnit*

Receives the number of pixels per horizontal unit.

yUnit

Receives the number of pixels per vertical unit.

See also

wxScrolledWindow::SetScrollbars (p. 1093), *wxScrolledWindow::GetVirtualSize* (p. 1091)

wxPython note: The wxPython version of this methods accepts no parameters and returns a tuple of values for xUnit and yUnit.

wxPerl note: In wxPerl this method takes no parameters and returns a 2-element list (*xUnit*, *yUnit*).

wxScrolledWindow::GetViewStart

void GetViewStart(int* x, int* y) const

Get the position at which the visible portion of the window starts.

Parameters*x*

Receives the first visible x position in scroll units.

y

Receives the first visible y position in scroll units.

Remarks

If either of the scrollbars is not at the home position, x and/or y will be greater than zero. Combined with *wxWindow::GetClientSize* (p. 1403), the application can use this function to efficiently redraw only the visible portion of the window. The positions are in logical scroll units, not pixels, so to convert to pixels you will have to multiply by the number of pixels per scroll increment.

See also

wxScrolledWindow::SetScrollbars (p. 1093)

wxPython note: The wxPython version of this methods accepts no parameters and returns a tuple of values for x and y.

wxPerl note: In wxPerl this method takes no parameters and returns a 2-element list (`x, y`).

wxScrolledWindow::GetVirtualSize

void GetVirtualSize(int* x, int* y) const

Gets the size in device units of the scrollable window area (as opposed to the client size, which is the area of the window currently visible).

Parameters

x

Receives the length of the scrollable window, in pixels.

y

Receives the height of the scrollable window, in pixels.

Remarks

Use *wxDC::DeviceToLogicalX* (p. 352) and *wxDC::DeviceToLogicalY* (p. 353) to translate these units to logical units.

See also

wxScrolledWindow::SetScrollbars (p. 1093), *wxScrolledWindow::GetScrollPixelsPerUnit* (p. 1090)

wxPython note: The wxPython version of this methods accepts no parameters and returns a tuple of values for x and y.

wxPerl note: In wxPerl this method takes no parameters and returns a 2-element list (`x, y`).

wxScrolledWindow::IsRetained

bool IsRetained() const

Motif only: true if the window has a backing bitmap.

wxScrolledWindow::PrepareDC

void PrepareDC(wxDC& dc)

Call this function to prepare the device context for drawing a scrolled image. It sets the device origin according to the current scroll position.

PrepareDC is called automatically within the default `wxScrolledWindow::OnPaint` event handler, so your `wxScrolledWindow::OnDraw` (p. 1092) override will be passed a 'pre-scrolled' device context. However, if you wish to draw from outside of `OnDraw` (via `OnPaint`), or you wish to implement `OnPaint` yourself, you must call this function yourself. For example:

```
void MyWindow::OnEvent(wxMouseEvent& event)
{
    wxClientDC dc(this);
    PrepareDC(dc);

    dc.SetPen(*wxBLACK_PEN);
    float x, y;
    event.Position(&x, &y);
    if (xpos > -1 && ypos > -1 && event.Dragging())
    {
        dc.DrawLine(xpos, ypos, x, y);
    }
    xpos = x;
    ypos = y;
}
```

wxScrolledWindow::OnDraw

virtual void OnDraw(wxDC& dc)

Called by the default paint event handler to allow the application to define painting behaviour without having to worry about calling `wxScrolledWindow::PrepareDC` (p. 1091).

Instead of overriding this function you may also just process the paint event in the derived class as usual, but then you will have to call `PrepareDC()` yourself.

wxScrolledWindow::Scroll

void Scroll(int x, int y)

Scrolls a window so the view start is at the given point.

Parameters

x

The x position to scroll to, in scroll units.

y

The y position to scroll to, in scroll units.

Remarks

The positions are in scroll units, not pixels, so to convert to pixels you will have to

multiply by the number of pixels per scroll increment. If either parameter is -1, that position will be ignored (no change in that direction).

See also

wxScrolledWindow::SetScrollbars (p. 1093), *wxScrolledWindow::GetScrollPixelsPerUnit* (p. 1090)

wxScrolledWindow::SetScrollbars

void SetScrollbars(int *pixelsPerUnitX*, int *pixelsPerUnitY*, int *noUnitsX*, int *noUnitsY*, int *xPos* = 0, int *yPos* = 0, bool *noRefresh* = false)

Sets up vertical and/or horizontal scrollbars.

Parameters

pixelsPerUnitX

Pixels per scroll unit in the horizontal direction.

pixelsPerUnitY

Pixels per scroll unit in the vertical direction.

noUnitsX

Number of units in the horizontal direction.

noUnitsY

Number of units in the vertical direction.

xPos

Position to initialize the scrollbars in the horizontal direction, in scroll units.

yPos

Position to initialize the scrollbars in the vertical direction, in scroll units.

noRefresh

Will not refresh window if true.

Remarks

The first pair of parameters give the number of pixels per 'scroll step', i.e. amount moved when the up or down scroll arrows are pressed. The second pair gives the length of scrollbar in scroll steps, which sets the size of the virtual window.

xPos and *yPos* optionally specify a position to scroll to immediately.

For example, the following gives a window horizontal and vertical scrollbars with 20

pixels per scroll step, and a size of 50 steps (1000 pixels) in each direction.

```
window->SetScrollbars(20, 20, 50, 50);
```

`wxScrolledWindow` manages the page size itself, using the current client window size as the page size.

Note that for more sophisticated scrolling applications, for example where scroll steps may be variable according to the position in the document, it will be necessary to derive a new class from `wxWindow`, overriding **OnSize** and adjusting the scrollbars appropriately.

See also

`wxWindow::SetVirtualSize` (p. 1436)

wxScrolledWindow::SetScrollRate

```
void SetScrollRate(int xstep, int ystep)
```

Set the horizontal and vertical scrolling increment only. See the `pixelsPerUnit` parameter in `SetScrollbars`.

wxScrolledWindow::SetTargetWindow

```
void SetTargetWindow(wxWindow* window)
```

Call this function to tell `wxScrolledWindow` to perform the actual scrolling on a different window (and not on itself).

wxScrollEvent

A scroll event holds information about events sent from stand-alone *scrollbars* (p. 1079) and *sliders* (p. 1122). Note that starting from `wxWidgets 2.1`, scrolled windows send the *wxScrollWinEvent* (p. 1097) which does not derive from `wxCommandEvent`, but from `wxEvent` directly - don't confuse these two kinds of events and use the event table macros mentioned below only for the scrollbar-like controls.

Derived from

`wxCommandEvent` (p. 165)

`wxEvent` (p. 441)

`wxObject` (p. 954)

Include files

<wx/event.h>

Event table macros

To process a scroll event, use these event handler macros to direct input to member functions that take a `wxScrollEvent` argument. You can use `EVT_COMMAND_SCROLL` . . . macros with window IDs for when intercepting scroll events from controls, or `EVT_SCROLL` . . . macros without window IDs for intercepting scroll events from the receiving window - except for this, the macros behave exactly the same.

EVT_SCROLL(func)	Process all scroll events.
EVT_SCROLL_TOP(func)	Process <code>wxEVT_SCROLL_TOP</code> scroll-to-top events (minimum position).
EVT_SCROLL_BOTTOM(func)	Process <code>wxEVT_SCROLL_BOTTOM</code> scroll-to-bottom events (maximum position).
EVT_SCROLL_LINEUP(func)	Process <code>wxEVT_SCROLL_LINEUP</code> line up events.
EVT_SCROLL_LINEDOWN(func)	Process <code>wxEVT_SCROLL_LINEDOWN</code> line down events.
EVT_SCROLL_PAGEUP(func)	Process <code>wxEVT_SCROLL_PAGEUP</code> page up events.
EVT_SCROLL_PAGEDOWN(func)	Process <code>wxEVT_SCROLL_PAGEDOWN</code> page down events.
EVT_SCROLL_THUMBTRACK(func)	Process <code>wxEVT_SCROLL_THUMBTRACK</code> thumbtrack events (frequent events sent as the user drags the thumbtrack).
EVT_SCROLL_THUMBRELEASE(func)	Process <code>wxEVT_SCROLL_THUMBRELEASE</code> thumb release events.
EVT_SCROLL_ENDSCROLL(func)	Process <code>wxEVT_SCROLL_ENDSCROLL</code> end of scrolling events (MSW only).
EVT_COMMAND_SCROLL(id, func)	Process all scroll events.
EVT_COMMAND_SCROLL_TOP(id, func)	Process <code>wxEVT_SCROLL_TOP</code> scroll-to-top events (minimum position).
EVT_COMMAND_SCROLL_BOTTOM(id, func)	Process <code>wxEVT_SCROLL_BOTTOM</code> scroll-to-bottom events (maximum position).

	position).
EVT_COMMAND_SCROLL_LINEUP(id, func)	Process wxEVT_SCROLL_LINEUP line up events.
EVT_COMMAND_SCROLL_LINEDOWN(id, func)	Process wxEVT_SCROLL_LINEDOWN line down events.
EVT_COMMAND_SCROLL_PAGEUP(id, func)	Process wxEVT_SCROLL_PAGEUP page up events.
EVT_COMMAND_SCROLL_PAGEDOWN(id, func)	Process wxEVT_SCROLL_PAGEDOWN page down events.
EVT_COMMAND_SCROLL_THUMBTRACK(id, func)	Process wxEVT_SCROLL_THUMBTRACK thumbtrack events (frequent events sent as the user drags the thumbtrack).
EVT_COMMAND_SCROLL_THUMBRELEASE(func)	Process wxEVT_SCROLL_THUMBRELEASE thumb release events.
EVT_COMMAND_SCROLL_ENDSCROLL(func)	Process wxEVT_SCROLL_ENDSCROLL end of scrolling events (MSW only).

The difference between EVT_SCROLL_THUMBRELEASE and EVT_SCROLL_ENDSCROLL

The EVT_SCROLL_THUMBRELEASE event is only emitted when actually dragging the thumb using the mouse and releasing it (This EVT_SCROLL_THUMBRELEASE event is also followed by an EVT_SCROLL_ENDSCROLL event).

The EVT_SCROLL_ENDSCROLL event also occurs when using the keyboard to change the thumb position, and when clicking next to the thumb (In all these cases the EVT_SCROLL_THUMBRELEASE event does not happen).

In short, the EVT_SCROLL_ENDSCROLL event is triggered when scrolling/ moving has finished. The only exception (unfortunately) is that changing the thumb position using the mousewheel does give a EVT_SCROLL_THUMBRELEASE event but NOT an EVT_SCROLL_ENDSCROLL event.

Please see the widgets sample ("Slider" page) to see the difference between EVT_SCROLL_THUMBRELEASE and EVT_SCROLL_ENDSCROLL in action.

Remarks

Note that unless specifying a scroll control identifier, you will need to test for scrollbar orientation with `wxScrollEvent::GetOrientation` (p. 1097), since horizontal and vertical

scroll events are processed using the same event handler.

See also

wxScrollBar (p. 1079), *wxSlider* (p. 1122), *wxSpinButton* (p. 1155),
wxScrollWinEvent (p. 1097), *Event handling overview* (p. 1610)

wxScrollEvent::wxScrollEvent

wxScrollEvent(WXTYPE *commandType* = 0, int *id* = 0, int *pos* = 0, int *orientation* = 0)

Constructor.

wxScrollEvent::GetOrientation

int GetOrientation() const

Returns wxHORIZONTAL or wxVERTICAL, depending on the orientation of the scrollbar.

wxScrollEvent::GetPosition

int GetPosition() const

Returns the position of the scrollbar.

wxScrollWinEvent

A scroll event holds information about events sent from scrolling windows.

Derived from

wxEvent (p. 441)

wxObject (p. 954)

Include files

<wx/event.h>

Event table macros

To process a scroll window event, use these event handler macros to direct input to member functions that take a *wxScrollWinEvent* argument. You can use the EVT_SCROLLWIN... macros for intercepting scroll window events from the receiving window.

EVT_SCROLLWIN(func)

Process all scroll events.

EVT_SCROLLWIN_TOP(func)	Process wxEVT_SCROLLWIN_TOP scroll-to-top events.
EVT_SCROLLWIN_BOTTOM(func)	Process wxEVT_SCROLLWIN_TOP scroll-to-bottom events.
EVT_SCROLLWIN_LINEUP(func)	Process wxEVT_SCROLLWIN_LINEUP line up events.
EVT_SCROLLWIN_LINEDOWN(func)	Process wxEVT_SCROLLWIN_LINEDOWN line down events.
EVT_SCROLLWIN_PAGEUP(func)	Process wxEVT_SCROLLWIN_PAGEUP page up events.
EVT_SCROLLWIN_PAGEDOWN(func)	Process wxEVT_SCROLLWIN_PAGEDOWN page down events.
EVT_SCROLLWIN_THUMBTRACK(func)	Process wxEVT_SCROLLWIN_THUMBTRACK thumbtrack events (frequent events sent as the user drags the thumbtrack).
EVT_SCROLLWIN_THUMBRELEASE(func)	Process wxEVT_SCROLLWIN_THUMBRELEASE thumb release events.

See also

wxScrollEvent (p. 1094), *Event handling overview* (p. 1610)

wxScrollWinEvent::wxScrollWinEvent

wxScrollWinEvent(WXTYPE *commandType* = 0, int *id* = 0, int *pos* = 0, int *orientation* = 0)

Constructor.

wxScrollWinEvent::GetOrientation

int GetOrientation() const

Returns wxHORIZONTAL or wxVERTICAL, depending on the orientation of the scrollbar.

wxScrollWinEvent::GetPosition

int GetPosition() const

Returns the position of the scrollbar for the thumb track and release events. Note that this field can't be used for the other events, you need to query the window itself for the current position in that case.

wxSemaphore

wxSemaphore is a counter limiting the number of threads concurrently accessing a shared resource. This counter is always between 0 and the maximum value specified during the semaphore creation. When the counter is strictly greater than 0, a call to *Wait* (p. 1100) returns immediately and decrements the counter. As soon as it reaches 0, any subsequent calls to *Wait* (p. 1100) block and only return when the semaphore counter becomes strictly positive again as the result of calling *Post* (p. 1099) which increments the counter.

In general, the semaphores are useful to restrict access to a shared resource which can only be accessed by some fixed number of clients at once. For example, when modeling a hotel reservation system a semaphore with the counter equal to the total number of available rooms could be created. Each time a room is reserved, the semaphore should be acquired by calling *Wait* (p. 1100) and each time a room is freed it should be released by calling *Post* (p. 1099).

Derived from

No base class

Include files

<wx/thread.h>

wxSemaphore::wxSemaphore

wxSemaphore(int *initialcount* = 0, int *maxcount* = 0)

Specifying a *maxcount* of 0 actually makes wxSemaphore behave as if there is no upper limit. If *maxcount* is 1 the semaphore behaves exactly as a mutex.

initialcount is the initial value of the semaphore which must be between 0 and *maxcount* (if it is not set to 0).

wxSemaphore::~~wxSemaphore

~wxSemaphore()

Destructor is not virtual, don't use this class polymorphically.

wxSemaphore::Post

wxSemaError Post()

Increments the semaphore count and signals one of the waiting threads in an atomic way. Returns `wxSEMA_OVERFLOW` if the count would increase the counter past the maximum.

Return value

One of:

wxSEMA_NO_ERROR	There was no error.
wxSEMA_INVALID	Semaphore hasn't been initialized successfully.
wxSEMA_OVERFLOW	Post() would increase counter past the max.
wxSEMA_MISC_ERROR	Miscellaneous error.

wxSemaphore::TryWait

wxSemaError TryWait()

Same as *Wait()* (p. 1100), but returns immediately.

Return value

One of:

wxSEMA_NO_ERROR	There was no error.
wxSEMA_INVALID	Semaphore hasn't been initialized successfully.
wxSEMA_BUSY	Returned by TryWait() if Wait() would block, i.e. the count is zero.
wxSEMA_MISC_ERROR	Miscellaneous error.

wxSemaphore::Wait

wxSemaError Wait()

Wait indefinitely until the semaphore count becomes strictly positive and then decrement it and return.

Return value

One of:

wxSEMA_NO_ERROR	There was no error.
wxSEMA_INVALID	Semaphore hasn't been initialized successfully.
wxSEMA_MISC_ERROR	Miscellaneous error.

wxSemaphore::WaitTimeout

wxSemaError WaitTimeout(unsigned long *timeout_millis*)

Same as *Wait()* (p. 1100), but with a timeout limit.

Return value

One of:

wxSEMA_NO_ERROR	There was no error.
wxSEMA_INVALID	Semaphore hasn't been initialized successfully.
wxSEMA_TIMEOUT	Timeout occurred without receiving semaphore.
wxSEMA_MISC_ERROR	Miscellaneous error.

wxServer

A *wxServer* object represents the server part of a client-server DDE-like (Dynamic Data Exchange) conversation. The actual DDE-based implementation using *wxDDEServer* is available on Windows only, but a platform-independent, socket-based version of this API is available using *wxTCPServer*, which has the same API.

To create a server which can communicate with a suitable client, you need to derive a class from *wxConnection* and another from *wxServer*. The custom *wxConnection* class will intercept communications in a 'conversation' with a client, and the custom *wxServer* is required so that a user-overridden *wxServer::OnAcceptConnection* (p. 1102) member can return a *wxConnection* of the required class, when a connection is made. Look at the IPC sample and the *Interprocess communications overview* (p. 1696) for an example of how to do this.

Derived from

wxServerBase

Include files

<wx/ipc.h>

See also

wxClient (p. 132), *wxConnection* (p. 192), *IPC overview* (p. 1696)

wxServer::wxServer

wxServer()

Constructs a server object.

wxServer::Create

bool Create(const wxString& service)

Registers the server using the given service name. Under Unix, the service name may be either an integer port identifier in which case an Internet domain socket will be used for the communications, or a valid file name (which shouldn't exist and will be deleted afterwards) in which case a Unix domain socket is created. false is returned if the call failed (for example, the port number is already in use).

wxServer::OnAcceptConnection

virtual wxConnectionBase * OnAcceptConnection(const wxString& topic)

When a client calls **MakeConnection**, the server receives the message and this member is called. The application should derive a member to intercept this message and return a connection object of either the standard wxConnection type, or (more likely) of a user-derived type.

If the topic is **STDIO**, the application may wish to refuse the connection. Under UNIX, when a server is created the OnAcceptConnection message is always sent for standard input and output, but in the context of DDE messages it doesn't make a lot of sense.

wxSimpleHelpProvider

wxSimpleHelpProvider is an implementation of *wxHelpProvider* (p. 652) which supports only plain text help strings, and shows the string associated with the control (if any) in a tooltip.

Derived from

wxHelpProvider (p. 652)

Include files

<wx/cshelp.h>

See also

wxHelpProvider (p. 652), *wxHelpControllerHelpProvider* (p. 649), *wxContextHelp* (p. 196), *wxWindow::SetHelpText* (p. 1429), *wxWindow::GetHelpText* (p. 1406)

wxSingleChoiceDialog

This class represents a dialog that shows a list of strings, and allows the user to select one. Double-clicking on a list item is equivalent to single-clicking and then pressing OK.

Derived from

*wxDialo*g (p. 369)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/choicdlg.h>

See also

wxSingleChoiceDialog overview (p. 1658)

wxSingleChoiceDialog::wxSingleChoiceDialog

wxSingleChoiceDialog(*wxWindow** *parent*, **const** *wxString*& *message*, **const** *wxString*& *caption*, **int** *n*, **const** *wxString** *choices*, **void**** *clientData* = *NULL*, **long** *style* = *wxOK* | *wxCANCEL* | *wxCENTRE*, **const** *wxPoint*& *pos* = *wxDefaultPosition*)

Constructor, taking an array of *wxString* choices and optional client data.

Parameters

parent

Parent window.

message

Message to show on the dialog.

caption

The dialog caption.

n

The number of choices.

choices

An array of strings, or a string list, containing the choices.

style

A dialog style (bitlist) containing flags chosen from the following:

wxOK	Show an OK button.
wxCANCEL	Show a Cancel button.
wxCENTRE	Centre the message. Not Windows.

pos

Dialog position. Not Windows.

Remarks

Use *wxSingleChoiceDialog::ShowModal* (p. 1104) to show the dialog.

wxPython note: For Python the two parameters *n* and *choices* are collapsed into a single parameter *choices* which is expected to be a Python list of strings.

wxPerl note: In wxPerl there is just an array reference in place of *n* and *choices*, and the client data array, if present, must have the same length as the *choices* array.

wxSingleChoiceDialog::~wxSingleChoiceDialog

~wxSingleChoiceDialog()

Destructor.

wxSingleChoiceDialog::GetSelection

int GetSelection() const

Returns the index of selected item.

wxSingleChoiceDialog::GetSelectionClientData

char* GetSelectionClientData() const

Returns the client data associated with the selection.

wxSingleChoiceDialog::GetStringSelection

wxString GetStringSelection() const

Returns the selected string.

wxSingleChoiceDialog::SetSelection

void SetSelection(int *selection*) const

Sets the index of the initially selected item.

wxSingleChoiceDialog::ShowModal

int ShowModal()

Shows the dialog, returning either `wxID_OK` or `wxID_CANCEL`.

wxSingleInstanceChecker

`wxSingleInstanceChecker` class allows to check that only a single instance of a program is running. To do it, you should create an object of this class. As long as this object is alive, calls to `IsAnotherRunning()` (p. 1106) from other processes will return `true`.

As the object should have the life span as big as possible, it makes sense to create it either as a global or in `wxApp::OnInit` (p. 37). For example:

```
bool MyApp::OnInit()
{
    const wxString name = wxString::Format("MyApp-%s",
wxGetUserId().c_str());
    m_checker = new wxSingleInstanceChecker(name);
    if ( m_checker->IsAnotherRunning() )
    {
        wxLogError(_("Another program instance is already running,
aborting."));

        return false;
    }

    ... more initializations ...

    return true;
}

int MyApp::OnExit()
{
    delete m_checker;

    return 0;
}
```

Note using `wxGetUserId()` (p. 1488) to construct the name: this allows different user to run the application concurrently which is usually the intended goal. If you don't use the user name in the `wxSingleInstanceChecker` name, only one user would be able to run the application at a time.

This class is implemented for Win32 and Unix platforms (supporting `fcntl()` system call, but almost all of modern Unix systems do) only.

Derived from

No base class

Include files

<wx/snglinst.h>

wxSingleInstanceChecker::wxSingleInstanceChecker

wxSingleInstanceChecker()

Default ctor, use *Create()* (p. 1106) after it.

wxSingleInstanceChecker::wxSingleInstanceChecker

wxSingleInstanceChecker(const wxString& name, const wxString& path = wxEmptyString)

Like *Create()* (p. 1106) but without error checking.

wxSingleInstanceChecker::Create

bool Create(const wxString& name, const wxString& path = wxEmptyString)

Initialize the object if it had been created using the default constructor. Note that you can't call *Create()* more than once, so calling it if the *non default ctor* (p. 1106) had been used is an error.

Parameters

name

must be given and be as unique as possible. It is used as the mutex name under Win32 and the lock file name under Unix. *GetAppName()* (p. 32) and *wxGetUserId()* (p. 1488) are commonly used to construct this parameter.

path

is optional and is ignored under Win32 and used as the directory to create the lock file in under Unix (default is *wxGetHomeDir()* (p. 1487))

Return value

Returns *false* if initialization failed, it doesn't mean that another instance is running - use *IsAnotherRunning()* (p. 1106) to check for it.

wxSingleInstanceChecker::IsAnotherRunning

bool IsAnotherRunning() const

Returns *true* if another copy of this program is already running, *false* otherwise.

wxSingleInstanceChecker::~wxSingleInstanceChecker

~wxSingleInstanceChecker()

Destructor frees the associated resources.

Note that it is not virtual, this class is not meant to be used polymorphically

wxSize

A **wxSize** is a useful data structure for graphics operations. It simply contains integer *width* and *height* members.

wxSize is used throughout wxWidgets as well as wxPoint which, although almost equivalent to wxSize, has a different meaning: wxPoint represents a position while wxSize - the size.

wxPython note: wxPython defines aliases for the `x` and `y` members named `width` and `height` since it makes much more sense for sizes.

Derived from

None

Include files

<wx/gdicmn.h>

See also

wxPoint (p. 991), *wxRealPoint* (p. 1041)

wxSize::wxSize

wxSize()

wxSize(int *width*, int *height*)

Creates a size object.

wxSize::DecTo

wxSize& DecTo(const wxSize& *size*)

Decrements this object so that both of its dimensions are not greater than the corresponding dimensions of the *size*.

See also

IncTo (p. 1108)

wxSize::IsFullySpecified

bool IsFullySpecified() const

Returns `true` if neither of the size object components is equal to -1, which is used as default for the size values in `wxWidgets` (hence the predefined `wxDefaultSize` has both of its components equal to -1).

This method is typically used before calling *SetDefaults* (p. 1108).

wxSize::GetWidth

int GetWidth() const

Gets the width member.

wxSize::GetHeight

int GetHeight() const

Gets the height member.

wxSize::IncTo

wxSize& IncTo(const wxSize& size)

Increments this object so that both of its dimensions are not less than the corresponding dimensions of the *size*.

See also

DecTo (p. 1107)

wxSize::Set

void Set(int width, int height)

Sets the width and height members.

wxSize::SetDefaults

void SetDefaults(const wxSize& sizeDefault)

```
Combine this size object with another one replacing the default (i.e.
equal to -1) components of this object with those of the other. It is
typically used like this:    if ( !size.IsFullySpecified() )
    {
        size.SetDefaults(GetDefaultSize());
    }
```

See also

IsFullySpecified (p. 1107)

wxSize::SetHeight

void SetHeight(int height)

Sets the height.

wxSize::SetWidth

void SetWidth(int width)

Sets the width.

wxSize::operator =

void operator =(const wxSize& sz)

Assignment operator.

wxSizeEvent

A size event holds information about size change events.

The EVT_SIZE handler function will be called when the window has been resized.

You may wish to use this for frames to resize their child windows as appropriate.

Note that the size passed is of the whole window: call *wxWindow::GetClientSize* (p. 1403) for the area which may be used by the application.

When a window is resized, usually only a small part of the window is damaged and you may only need to repaint that area. However, if your drawing depends on the size of the window, you may need to clear the DC explicitly and repaint the whole window. In which case, you may need to call *wxWindow::Refresh* (p. 1418) to invalidate the entire window.

Derived from

wxEvent (p. 441)

wxObject (p. 954)

Include files

<wx/event.h>

Event table macros

To process a size event, use this event handler macro to direct input to a member function that takes a *wxSizeEvent* argument.

EVT_SIZE(func)

Process a wxEVT_SIZE event.

See also*wxSize* (p. 1107), *Event handling overview* (p. 1610)

wxSizeEvent::wxSizeEvent

wxSizeEvent(const wxSize& sz, int id = 0)

Constructor.

wxSizeEvent::GetSize

wxSize GetSize() const

Returns the entire size of the window generating the size change event.

wxSizer

wxSizer is the abstract base class used for laying out subwindows in a window. You cannot use wxSizer directly; instead, you will have to use one of the sizer classes derived from it. Currently there are *wxBoxSizer* (p. 90), *wxStaticBoxSizer* (p. 1182), *wxNotebookSizer* (p. 952), *wxGridSizer* (p. 636) *wxFlexGridSizer* (p. 509) and *wxGridBagSizer* (p. 612).

The layout algorithm used by sizers in wxWidgets is closely related to layout in other GUI toolkits, such as Java's AWT, the GTK toolkit or the Qt toolkit. It is based upon the idea of the individual subwindows reporting their minimal required size and their ability to get stretched if the size of the parent window has changed. This will most often mean, that the programmer does not set the original size of a dialog in the beginning, rather the dialog will assigned a sizer and this sizer will be queried about the recommended size. The sizer in turn will query its children, which can be normal windows, empty space or other sizers, so that a hierarchy of sizers can be constructed. Note that wxSizer does not derive from wxWindow and thus do not interfere with tab ordering and requires very little resources compared to a real window on screen.

What makes sizers so well fitted for use in wxWidgets is the fact that every control reports its own minimal size and the algorithm can handle differences in font sizes or different window (dialog item) sizes on different platforms without problems. If e.g. the standard font as well as the overall design of Motif widgets requires more space than on Windows, the initial dialog size will automatically be bigger on Motif than on Windows.

wxPython note: If you wish to create a sizer class in wxPython you should derive the class from *wxPySizer* in order to get Python-aware capabilities for the various virtual methods.

Derived from

wxObject (p. 954)

See also

Sizer overview (p. 1627)

wxSizer::wxSizer

wxSizer()

The constructor. Note that `wxSizer` is an abstract base class and may not be instantiated.

wxSizer::~~wxSizer

~wxSizer()

The destructor.

wxSizer::Add

void Add(wxWindow* window, int proportion = 0, int flag = 0, int border = 0, wxObject* userData = NULL)

void Add(wxSizer* sizer, int proportion = 0, int flag = 0, int border = 0, wxObject* userData = NULL)

void Add(int width, int height, int proportion = 0, int flag = 0, int border = 0, wxObject* userData = NULL)

Appends a child to the sizer. `wxSizer` itself is an abstract class, but the parameters are equivalent in the derived classes that you will instantiate to use it so they are described here:

window

The window to be added to the sizer. Its initial size (either set explicitly by the user or calculated internally when using `wxDefaultSize`) is interpreted as the minimal and in many cases also the initial size. This is particularly useful in connection with *SetSizeHints* (p. 1116).

sizer

The (child-)sizer to be added to the sizer. This allows placing a child sizer in a sizer and thus to create hierarchies of sizers (typically a vertical box as the top sizer and several horizontal boxes on the level beneath).

width and height

The dimension of a spacer to be added to the sizer. Adding spacers to sizers gives more flexibility in the design of dialogs; imagine for example a horizontal box with two buttons at the bottom of a dialog: you might want to insert a space between the two buttons and make that space stretchable using the *proportion* flag and the result will be that the left button will be aligned with the left side of the dialog and the right button with the right side - the space in between will shrink and grow with the dialog.

proportion

Although the meaning of this parameter is undefined in `wxSizer`, it is used in `wxBoxSizer` to indicate if a child of a sizer can change its size in the main orientation of the `wxBoxSizer` - where 0 stands for not changeable and a value of more than zero is interpreted relative to the value of other children of the same `wxBoxSizer`. For example, you might have a horizontal `wxBoxSizer` with three children, two of which are supposed to change their size with the sizer. Then the two stretchable windows would get a value of 1 each to make them grow and shrink equally with the sizer's horizontal dimension.

flag

This parameter can be used to set a number of flags which can be combined using the binary OR operator `|`. Two main behaviours are defined using these flags. One is the border around a window: the *border* parameter determines the border width whereas the flags given here determine which side(s) of the item that the border will be added. The other flags determine how the sizer item behaves when the space allotted to the sizer changes, and is somewhat dependent on the specific kind of sizer used.

wxTOP

wxBOTTOM

wxLEFT

wxRIGHT

wxALL These flags are used to specify which side(s) of the sizer item the *border* width will apply to.

wxEXPAND

The item will be expanded to fill the space allotted to the item.

wxSHAPED

The item will be expanded as much as possible while also maintaining its aspect ratio

wxFIXED_MINSIZE

Normally `wxSizers` will use *GetAdjustedBestSize* (p. 1401) to determine what the minimal size of window items should be, and will use that size to calculate the layout. This allows layouts to adjust when an item changes and it's *best size* becomes different. If you would rather have a window item stay the size it started with then use `wxFIXED_MINSIZE`.

wxALIGN_CENTER

wxALIGN_LEFT

wxALIGN_RIGHT
wxALIGN_TOP
wxALIGN_BOTTOM
wxALIGN_CENTER_VERTICAL
wxALIGN_CENTER_HORIZONTAL The **wxALIGN** flags allow you to specify the alignment of the item within the space allotted to it by the sizer, adjusted for the border if any.

border

Determines the border width, if the *flag* parameter is set to include any border flag.

userData

Allows an extra object to be attached to the sizer item, for use in derived classes when sizing information is more complex than the *proportion* and *flag* will allow for.

wxSizer::CalcMin

wxSize CalcMin()

This method is abstract and has to be overwritten by any derived class. Here, the sizer will do the actual calculation of its children minimal sizes.

wxSizer::Detach

bool Detach(wxWindow* window)

bool Detach(wxSizer* sizer)

bool Detach(size_t index)

Detach a child from the sizer without destroying it. *window* is the window to be detached, *sizer* is the equivalent sizer and *index* is the position of the child in the sizer, typically 0 for the first item. This method does not cause any layout or resizing to take place, call *wxSizer::Layout* (p. 1115) to update the layout "on screen" after detaching a child from the sizer.

Returns true if the child item was found and detached, false otherwise.

See also

wxSizer::Remove (p. 1115)

wxSizer::Fit

wxSize Fit(wxWindow* window)

Tell the sizer to resize the *window* to match the sizer's minimal size. This is commonly done in the constructor of the window itself, see sample in the description of *wxBoxSizer* (p. 90). Returns the new size.

For a top level window this is the total window size, not client size.

wxSizer::FitInside

void FitInside(wxWindow* window)

Tell the sizer to resize the virtual size of the *window* to match the sizer's minimal size. This will not alter the on screen size of the window, but may cause the addition/removal/alteration of scrollbars required to view the virtual area in windows which manage it.

See also

wxScrolledWindow::SetScrollbars (p. 1093), *wxSizer::SetVirtualSizeHints* (p. 1117)

wxSizer::GetSize

wxSize GetSize()

Returns the current size of the sizer.

wxSizer::GetPosition

wxPoint GetPosition()

Returns the current position of the sizer.

wxSizer::GetMinSize

wxSize GetMinSize()

Returns the minimal size of the sizer. This is either the combined minimal size of all the children and their borders or the minimal size set by *SetMinSize* (p. 1116), depending on which is bigger.

wxSizer::Insert

void Insert(size_t index, wxWindow* window, int proportion = 0, int flag = 0, int border = 0, wxObject* userData = NULL)

void Insert(size_t index, wxSizer* sizer, int proportion = 0, int flag = 0, int border = 0, wxObject* userData = NULL)

void Insert(size_t index, int width, int height, int proportion = 0, int flag = 0, int border = 0, wxObject* userData = NULL)

Insert a child into the sizer before any existing item at *index*.

index

The position this child should assume in the sizer.

See `wxSizer::Add` (p. 1111) for the meaning of the other parameters.

wxSizer::Layout

void Layout()

Call this to force layout of the children anew, e.g. after having added a child to or removed a child (window, other sizer or space) from the sizer while keeping the current dimension.

wxSizer::Prepend

void Prepend(wxWindow* window, int proportion = 0, int flag = 0, int border = 0, wxObject* userData = NULL)

void Prepend(wxSizer* sizer, int proportion = 0, int flag = 0, int border = 0, wxObject* userData = NULL)

void Prepend(int width, int height, int proportion = 0, int flag = 0, int border = 0, wxObject* userData = NULL)

Same as `wxSizer::Add` (p. 1111), but prepends the items to the beginning of the list of items (windows, subsizers or spaces) owned by this sizer.

wxSizer::RecalcSizes

void RecalcSizes()

This method is abstract and has to be overwritten by any derived class. Here, the sizer will do the actual calculation of its children's positions and sizes.

wxSizer::Remove

bool Remove(wxWindow* window)

bool Remove(wxSizer* sizer)

bool Remove(size_t index)

Removes a child from the sizer and destroys it. *sizer* is the `wxSizer` to be removed, *index*

is the position of the child in the sizer, typically 0 for the first item. This method does not cause any layout or resizing to take place, call `wxSizer::Layout` (p. 1115) to update the layout "on screen" after removing a child from the sizer.

NB: The method taking a `wxWindow*` parameter is deprecated. For historical reasons it does not destroy the window as would usually be expected from `Remove`. You should use `wxSizer::Detach` (p. 1113) in new code instead. There is currently no `wxSizer` method that will both detach and destroy a `wxWindow` item.

Returns true if the child item was found and removed, false otherwise.

wxSizer::SetDimension

void SetDimension(int x, int y, int width, int height)

Call this to force the sizer to take the given dimension and thus force the items owned by the sizer to resize themselves according to the rules defined by the parameter in the *Add* (p. 1111) and *Prepend* (p. 1115) methods.

wxSizer::SetMinSize

void SetMinSize(int width, int height)

void SetMinSize(wxSize size)

Call this to give the sizer a minimal size. Normally, the sizer will calculate its minimal size based purely on how much space its children need. After calling this method *GetMinSize* (p. 1114) will return either the minimal size as requested by its children or the minimal size set here, depending on which is bigger.

wxSizer::SetItemMinSize

void SetItemMinSize(wxWindow* window, int width, int height)

void SetItemMinSize(wxSizer* sizer, int width, int height)

void SetItemMinSize(size_t index, int width, int height)

Set an item's minimum size by window, sizer, or position. The item will be found recursively in the sizer's descendants. This function enables an application to set the size of an item after initial creation.

wxSizer::SetSizeHints

void SetSizeHints(wxWindow* window)

Tell the sizer to set (and *Fit* (p. 1113)) the minimal size of the *window* to match the sizer's minimal size. This is commonly done in the constructor of the window itself, see

sample in the description of *wxBoxSizer* (p. 90) if the window is resizable (as are many dialogs under Unix and frames on probably all platforms).

wxSizer::SetVirtualSizeHints

void SetVirtualSizeHints(wxWindow* window)

Tell the sizer to set the minimal size of the *window* virtual area to match the sizer's minimal size. For windows with managed scrollbars this will set them appropriately.

[See also](#)

wxScrolledWindow::SetScrollbars (p. 1093)

wxSizer::Show

void Show(wxWindow* window, bool show = true)

void Show(wxSizer* sizer, bool show = true)

void Show(size_t index, bool show = true)

Shows or hides the *window*, *sizer*, or item at *index*. To make a sizer item disappear or reappear, use *Show()* followed by *Layout()*.

Note that this only works with *wxBoxSizer* and *wxFlexGridSizer*, since they are the only two sizer classes that can size rows/columns independently.

wxSizerItem

The *wxSizerItem* class is used to track the position, size and other attributes of each item managed by a *wxSizer* (p. 1110). In normal usage user code should never need to deal directly with a *wxSizerItem*, but derived sizer classes will.

[Derived from](#)

wxObject (p. 954)

[Include files](#)

<wx/sizer.h>

wxSizerItem::wxSizerItem

wxSizerItem(int width, int height, int proportion, int flag, int border, wxObject* userData)

Construct a sizer item for tracking a spacer.

wxSizerItem(wxWindow* window, int proportion, int flag, int border, wxObject* userData)

Construct a sizer item for tracking a window.

wxSizerItem(wxSizer* sizer, int proportion, int flag, int border, wxObject* userData)

Construct a sizer item for tracking a subsizer.

wxSizerItem::~wxSizerItem

~wxSizerItem()

Deletes the user data and subsizer, if any.

wxSizerItem::CalcMin

wxSize CalcMin()

Calculates the minimum desired size for the item, including any space needed by borders.

wxSizerItem::DeleteWindows

void DeleteWindows()

Destroy the window or the windows in a subsizer, depending on the type of item.

wxSizerItem::DetachSizer

void DetachSizer()

Enable deleting the SizerItem without destroying the contained sizer.

wxSizerItem::GetBorder

int GetBorder() const

Return the border attribute.

wxSizerItem::GetFlag

int GetFlag() const

Return the flags attribute.

wxSizerItem::GetMinSize

wxSize GetMinSize() const

Get the minimum size needed for the item.

wxSizerItem::GetPosition

wxPoint GetPosition() const

What is the current position of the item, as set in the last Layout.

wxSizerItem::GetProportion

int GetProportion() const

Get the proportion item attribute.

wxSizerItem::GetRatio

float GetRatio() const

Get the ration item attribute.

wxSizerItem::GetSize

wxSize GetSize() const

Get the current size of the item, as set in the last Layout.

wxSizerItem::GetSizer

wxSizer* GetSizer() const

If this item is tracking a sizer, return it. NULL otherwise.

wxSizerItem::GetSpacer

const wxSize& GetSpacer() const

If this item is tracking a spacer, return its size.

wxSizerItem::GetUserData

wxObject* GetUserData() const

Get the userData item attribute.

wxSizerItem::GetWindow

wxWindow* GetWindow() const

If this item is trackign a window then return it. NULL otherwise.

wxSizerItem::IsShown

bool IsShown() const

Is this item shown?

wxSizerItem::IsSizer

bool IsSizer() const

Is this item a sizer?

wxSizerItem::IsSpacer

bool IsSpacer() const

Is this item a spacer?

wxSizerItem::IsWindow

bool IsWindow() const

Is this item a window?

wxSizerItem::SetBorder

void SetBorder(int *border*)

Set the border item attribute.

wxSizerItem::SetDimension

void SetDimension(wxPoint *pos*, wxSize *size*)

Set the position and size of the space allocated to the sizer, and adjust the position and size of the item to be within that space taking alignment and borders into account.

wxSizerItem::SetFlag

void SetFlag(int *flag*)

Set the flag item attribute.

wxSizerItem::SetInitSize

void SetInitSize(int *x*, int *y*)

wxSizerItem::SetProportion

void SetProportion(int *proportion*)

Set the proportion item attribute.

wxSizerItem::SetRatio

void SetRatio(int *width*, int *height*)

void SetRatio(wxSize *size*)

void SetRatio(float *ratio*)

Set the ratio item attribute.

wxSizerItem::SetSizer

void SetSizer(wxSizer* *sizer*)

Set the sizer tracked by this item.

wxSizerItem::SetSpacer

void SetSpacer(const wxSize& *size*)

Set the size of the spacer tracked by this item.

wxSizerItem::SetWindow

void SetWindow(wxWindow* *window*)

Set the window to be tracked by this item.

wxSizerItem::Show

void Show(bool *show*)

Set the show item attribute, which sizers use to determine if the item is to be made part of the layout or not. If the item is tracking a window then it is shown or hidden as needed.

wxSlider

A slider is a control with a handle which can be pulled back and forth to change the value.

In Windows versions below Windows 95, a scrollbar is used to simulate the slider. In Windows 95, the track bar control is used.

Slider events are handled in the same way as a scrollbar.

Derived from

wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/slider.h>

Window styles

wxSL_HORIZONTAL	Displays the slider horizontally.
wxSL_VERTICAL	Displays the slider vertically.
wxSL_AUTOTICKS	Displays tick marks.
wxSL_LABELS	Displays minimum, maximum and value labels. (NB: only displays the current value label under wxGTK)
wxSL_LEFT	Displays ticks on the left, if a vertical slider.
wxSL_RIGHT	Displays ticks on the right, if a vertical slider.
wxSL_TOP	Displays ticks on the top, if a horizontal slider.
wxSL_SELRange	Allows the user to select a range on the slider. Windows 95 only.

See also *window styles overview* (p. 1618).

Event table macros

To process a scroll event, use these event handler macros to direct input to member functions that take a `wxScrollEvent` argument. You can use `EVT_COMMAND_SCROLL...` macros with window IDs for when intercepting scroll events from controls, or `EVT_SCROLL...` macros without window IDs for intercepting scroll events from the receiving window - except for this, the macros behave exactly the same.

EVT_SCROLL(func)	Process all scroll events.
EVT_SCROLL_TOP(func)	Process <code>wxEVT_SCROLL_TOP</code> scroll-to-top events (minimum position).
EVT_SCROLL_BOTTOM(func)	Process <code>wxEVT_SCROLL_TOP</code> scroll-to-bottom events (maximum position).
EVT_SCROLL_LINEUP(func)	Process <code>wxEVT_SCROLL_LINEUP</code> line up events.
EVT_SCROLL_LINEDOWN(func)	Process <code>wxEVT_SCROLL_LINEDOWN</code> line down events.
EVT_SCROLL_PAGEUP(func)	Process <code>wxEVT_SCROLL_PAGEUP</code> page up events.
EVT_SCROLL_PAGEDOWN(func)	Process <code>wxEVT_SCROLL_PAGEDOWN</code> page down events.
EVT_SCROLL_THUMBTRACK(func)	Process <code>wxEVT_SCROLL_THUMBTRACK</code> thumbtrack events (frequent events sent as the user drags the thumbtrack).
EVT_SCROLL_THUMBRELEASE(func)	Process <code>wxEVT_SCROLL_THUMBRELEASE</code> thumb release events.
EVT_SCROLL_ENDSCROLL(func)	Process <code>wxEVT_SCROLL_ENDSCROLL</code> end of scrolling events (MSW only).
EVT_COMMAND_SCROLL(id, func)	Process all scroll events.
EVT_COMMAND_SCROLL_TOP(id, func)	Process <code>wxEVT_SCROLL_TOP</code> scroll-to-top events (minimum position).
EVT_COMMAND_SCROLL_BOTTOM(id, func)	Process <code>wxEVT_SCROLL_TOP</code>

	scroll-to-bottom events (maximum position).
EVT_COMMAND_SCROLL_LINEUP(id, func)	Process wxEVT_SCROLL_LINEUP line up events.
EVT_COMMAND_SCROLL_LINEDOWN(id, func)	Process wxEVT_SCROLL_LINEDOWN line down events.
EVT_COMMAND_SCROLL_PAGEUP(id, func)	Process wxEVT_SCROLL_PAGEUP page up events.
EVT_COMMAND_SCROLL_PAGEDOWN(id, func)	Process wxEVT_SCROLL_PAGEDOWN page down events.
EVT_COMMAND_SCROLL_THUMBTRACK(id, func)	Process wxEVT_SCROLL_THUMBTRACK thumbtrack events (frequent events sent as the user drags the thumbtrack).
EVT_COMMAND_SCROLL_THUMBRELEASE(func)	Process wxEVT_SCROLL_THUMBRELEASE thumb release events.
EVT_COMMAND_SCROLL_ENDSCROLL(func)	Process wxEVT_SCROLL_ENDSCROLL end of scrolling events (MSW only).

The difference between EVT_SCROLL_THUMBRELEASE and EVT_SCROLL_ENDSCROLL

The EVT_SCROLL_THUMBRELEASE event is only emitted when actually dragging the thumb using the mouse and releasing it (This EVT_SCROLL_THUMBRELEASE event is also followed by an EVT_SCROLL_ENDSCROLL event).

The EVT_SCROLL_ENDSCROLL event also occurs when using the keyboard to change the thumb position, and when clicking next to the thumb (In all these cases the EVT_SCROLL_THUMBRELEASE event does not happen).

In short, the EVT_SCROLL_ENDSCROLL event is triggered when scrolling/ moving has finished. The only exception (unfortunately) is that changing the thumb position using the mousewheel does give a EVT_SCROLL_THUMBRELEASE event but NOT an EVT_SCROLL_ENDSCROLL event.

Please see the widgets sample ("Slider" page) to see the difference between EVT_SCROLL_THUMBRELEASE and EVT_SCROLL_ENDSCROLL in action.

See also

Event handling overview (p. 1610), *wxScrollBar* (p. 1079)

wxSlider::wxSlider

wxSlider()

Default slider.

wxSlider(wxWindow* parent, wxWindowID id, int value , int minValue, int maxValue, const wxPoint& point = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxSL_HORIZONTAL, const wxValidator& validator = wxDefaultValidator, const wxString& name = "slider")

Constructor, creating and showing a slider.

Parameters

parent

Parent window. Must not be NULL.

id

Window identifier. A value of -1 indicates a default value.

value

Initial position for the slider.

minValue

Minimum slider position.

maxValue

Maximum slider position.

size

Window size. If the default size (-1, -1) is specified then a default size is chosen.

style

Window style. See *wxSlider* (p. 1122).

validator

Window validator.

name

Window name.

See also

wxSlider::Create (p. 1126), *wxValidator* (p. 1360)

wxSlider::~~wxSlider

void ~wxSlider()

Destructor, destroying the slider.

wxSlider::ClearSel

void ClearSel()

Clears the selection, for a slider with the **wxSL_SELRANGE** style.

Remarks

Windows 95 only.

wxSlider::ClearTicks

void ClearTicks()

Clears the ticks.

Remarks

Windows 95 only.

wxSlider::Create

bool Create(*wxWindow* parent*, *wxWindowID id*, *int value*, *int minValue*, *int maxValue*, **const wxPoint& point** = *wxDefaultPosition*, **const wxSize& size** = *wxDefaultSize*, **long style** = *wxSL_HORIZONTAL*, **const wxValidator& validator** = *wxDefaultValidator*, **const wxString& name** = "slider")

Used for two-step slider construction. See *wxSlider::wxSlider* (p. 1125) for further details.

wxSlider::GetLineSize

int GetLineSize() const

Returns the line size.

See also

wxSlider::SetLineSize (p. 1129)

wxSlider::GetMax

int GetMax() const

Gets the maximum slider value.

See also

wxSlider::GetMin (p. 1127), *wxSlider::SetRange* (p. 1128)

wxSlider::GetMin

int GetMin() const

Gets the minimum slider value.

See also

wxSlider::GetMin (p. 1127), *wxSlider::SetRange* (p. 1128)

wxSlider::GetPageSize

int GetPageSize() const

Returns the page size.

See also

wxSlider::SetPageSize (p. 1129)

wxSlider::GetSelEnd

int GetSelEnd() const

Returns the selection end point.

Remarks

Windows 95 only.

See also

wxSlider::GetSelStart (p. 1127), *wxSlider::SetSelection* (p. 1130)

wxSlider::GetSelStart

int GetSelStart() const

Returns the selection start point.

Remarks

Windows 95 only.

See also

wxSlider::GetSelEnd (p. 1127), *wxSlider::SetSelection* (p. 1130)

wxSlider::GetThumbLength

int GetThumbLength() const

Returns the thumb length.

Remarks

Windows 95 only.

See also

wxSlider::SetThumbLength (p. 1130)

wxSlider::GetTickFreq

int GetTickFreq() const

Returns the tick frequency.

Remarks

Windows 95 only.

See also

wxSlider::SetTickFreq (p. 1129)

wxSlider::GetValue

int GetValue() const

Gets the current slider value.

See also

wxSlider::GetMin (p. 1127), *wxSlider::GetMax* (p. 1127), *wxSlider::SetValue* (p. 1131)

wxSlider::SetRange

void SetRange(int minValue**, int max**Value**)**

Sets the minimum and maximum slider values.

See also

wxSlider::GetMin (p. 1127), *wxSlider::GetMax* (p. 1127)

wxSlider::SetTickFreq

void SetTickFreq(int *n*, int *pos*)

Sets the tick mark frequency and position.

Parameters

n

Frequency. For example, if the frequency is set to two, a tick mark is displayed for every other increment in the slider's range.

pos

Position. Must be greater than zero. TODO: what is this for?

Remarks

Windows 95 only.

See also

wxSlider::GetTickFreq (p. 1128)

wxSlider::SetLineSize

void SetLineSize(int *lineSize*)

Sets the line size for the slider.

Parameters

lineSize

The number of steps the slider moves when the user moves it up or down a line.

See also

wxSlider::GetLineSize (p. 1126)

wxSlider::SetPageSize

void SetPageSize(int *pageSize*)

Sets the page size for the slider.

Parameters

pageSize

The number of steps the slider moves when the user pages up or down.

See also

wxSlider::GetPageSize (p. 1127)

wxSlider::SetSelection

void SetSelection(int startPos, int endPos)

Sets the selection.

Parameters

startPos

The selection start position.

endPos

The selection end position.

Remarks

Windows 95 only.

See also

wxSlider::GetSelStart (p. 1127), *wxSlider::GetSelEnd* (p. 1127)

wxSlider::SetThumbLength

void SetThumbLength(int len)

Sets the slider thumb length.

Parameters

len

The thumb length.

Remarks

Windows 95 only.

See also

wxSlider::GetThumbLength (p. 1128)

wxSlider::SetTick

void SetTick(int tickPos)

Sets a tick position.

Parameters

tickPos

The tick position.

Remarks

Windows 95 only.

See also

wxSlider::SetTickFreq (p. 1129)

wxSlider::SetValue

void SetValue(int value)

Sets the slider position.

Parameters

value

The slider position.

See also

wxSlider::GetValue (p. 1128)

wxSocketAddress

You are unlikely to need to use this class: only *wxSocketBase* uses it.

Derived from

wxObject (p. 954)

Include files

<wx/socket.h>

See also

wxSocketBase (p. 1132) *wxIPAddress* (p. 764) *wxIPv4address* (p. 767)

wxSocketAddress::wxSocketAddress

wxSocketAddress()

Default constructor.

wxSocketAddress::~~wxSocketAddress

~wxSocketAddress()

Default destructor.

wxSocketAddress::Clear

void Clear()

Delete all informations about the address.

wxSocketAddress::SockAddrLen

int SockAddrLen()

Returns the length of the socket address.

wxSocketBase

wxSocketBase is the base class for all socket-related objects, and it defines all basic IO functionality.

Derived from*wxObject* (p. 954)**Include files**

<wx/socket.h>

wxSocket errors**wxSOCKET_NOERROR**

No error happened.

wxSOCKET_INVOP

Invalid operation.

wxSOCKET_IOERR

Input/Output error.

wxSOCKET_INVADDR

Invalid address passed to wxSocket.

wxSOCKET_INVSOCK

Invalid socket (uninitialized).

wxSOCKET_NOHOST	No corresponding host.
wxSOCKET_INVPORT	Invalid port.
wxSOCKET_WOULDBLOCK	The socket is non-blocking and the operation would block.
wxSOCKET_TIMEDOUT	The timeout for this operation expired.
wxSOCKET_MEMERR	Memory exhausted.

wxSocket events

wxSOCKET_INPUT	There is data available for reading.
wxSOCKET_OUTPUT	The socket is ready to be written to.
wxSOCKET_CONNECTION	Incoming connection request (server), or successful connection establishment (client).
wxSOCKET_LOST	The connection has been closed.

A brief note on how to use these events:

The **wxSOCKET_INPUT** event will be issued whenever there is data available for reading. This will be the case if the input queue was empty and new data arrives, or if the application has read some data yet there is still more data available. This means that the application does not need to read all available data in response to a **wxSOCKET_INPUT** event, as more events will be produced as necessary.

The **wxSOCKET_OUTPUT** event is issued when a socket is first connected with *Connect* (p. 1149) or accepted with *Accept* (p. 1154). After that, new events will be generated only after an output operation fails with **wxSOCKET_WOULDBLOCK** and buffer space becomes available again. This means that the application should assume that it can write data to the socket until an **wxSOCKET_WOULDBLOCK** error occurs; after this, whenever the socket becomes writable again the application will be notified with another **wxSOCKET_OUTPUT** event.

The **wxSOCKET_CONNECTION** event is issued when a delayed connection request completes successfully (client) or when a new connection arrives at the incoming queue (server).

The **wxSOCKET_LOST** event is issued when a close indication is received for the socket. This means that the connection broke down or that it was closed by the peer. Also, this event will be issued if a connection request fails.

Event handling

To process events coming from a socket object, use the following event handler macro to direct events to member functions that take a *wxSocketEvent* (p. 1151) argument.

EVT_SOCKET(id, func)	Process a wxEVT_SOCKET event.
-----------------------------	-------------------------------

See also

wxSocketEvent (p. 1151), *wxSocketClient* (p. 1149), *wxSocketServer* (p. 1153), *Sockets sample* (p. 1574)

Construction and destruction

wxSocketBase (p. 1135)
~wxSocketBase (p. 1135)
Destroy (p. 1137)

Socket state

Functions to retrieve current state and miscellaneous info.

Error (p. 1137)
GetLocal (p. 1138)
GetPeer (p. 1138)/*IsConnected* (p. 1138)
IsData (p. 1139)
IsDisconnected (p. 1139)
LastCount (p. 1139)
LastError (p. 1139)
Ok (p. 1139)
SaveState (p. 1140)
RestoreState (p. 1140)

Basic IO

Functions that perform basic IO functionality.

Close (p. 1136)
Discard (p. 1137)
Peek (p. 1143)
Read (p. 1143)
ReadMsg (p. 1144)
Unread (p. 1145)
Write (p. 1147)
WriteMsg (p. 1148)

Functions that perform a timed wait on a certain IO condition.

InterruptWait (p. 1138)
Wait (p. 1145)
WaitForLost (p. 1146)
WaitForRead (p. 1146)
WaitForWrite (p. 1147)

and also:

wxSocketServer::WaitForAccept (p. 1155)

wxSocketClient::WaitOnConnect (p. 1150)

Functions that allow applications to customize socket IO as needed.

GetFlags (p. 1138)

SetFlags (p. 1141)

SetTimeout (p. 1142)

Handling socket events

Functions that allow applications to receive socket events.

Notify (p. 1139)

SetNotify (p. 1142)

GetClientData (p. 1137)

SetClientData (p. 1140)

SetEventHandler (p. 1140)

Callback functions are also available, but they are provided for backwards compatibility only. Their use is strongly discouraged in favour of events, and should be considered deprecated. Callbacks may be unsupported in future releases of wxWidgets.

Callback (p. 1135)

CallbackData (p. 1136)

wxSocketBase::wxSocketBase

wxSocketBase()

Default constructor. Don't use it directly; instead, use *wxSocketClient* (p. 1149) to construct a socket client, or *wxSocketServer* (p. 1153) to construct a socket server.

wxSocketBase::~~wxSocketBase

~wxSocketBase()

Destructor. Do not destroy a socket using the delete operator directly; use *Destroy* (p. 1137) instead. Also, do not create socket objects in the stack.

wxSocketBase::Callback

wxSocketBase::wxSockCbk *Callback*(**wxSocketBase::wxSockCbk** *callback*)

You can setup a callback function to be called when an event occurs. The function will be called only for those events for which notification has been enabled with *Notify* (p.

1139) and *SetNotify* (p. 1142). The prototype of the callback must be as follows:

```
void SocketCallback(wxSocketBase& sock, wxSocketNotify evt, char *cdata);
```

The first parameter is a reference to the socket object in which the event occurred. The second parameter tells you which event occurred. (See *wxSocket events* (p. 1132)). The third parameter is the user data you specified using *CallbackData* (p. 1136).

Return value

A pointer to the previous callback.

Remark/Warning

Note that callbacks are now deprecated and unsupported, and they remain for backwards compatibility only. Use events instead.

See also

wxSocketBase::CallbackData (p. 1136), *wxSocketBase::SetNotify* (p. 1142),
wxSocketBase::Notify (p. 1139)

wxSocketBase::CallbackData

```
char * CallbackData(char *cdata)
```

This function sets the the user data which will be passed to a callback function set via *Callback* (p. 1135).

Return value

A pointer to the previous user data.

Remark/Warning

Note that callbacks are now deprecated and unsupported, and they remain for backwards compatibility only. Use events instead.

See also

wxSocketBase::Callback (p. 1135), *wxSocketBase::SetNotify* (p. 1142),
wxSocketBase::Notify (p. 1139)

wxSocketBase::Close

```
void Close()
```

This function shuts down the socket, disabling further transmission and reception of data; it also disables events for the socket and frees the associated system resources. Upon socket destruction, *Close* is automatically called, so in most cases you won't need to do it yourself, unless you explicitly want to shut down the socket, typically to notify the peer that you are closing the connection.

Remark/Warning

Although `Close` immediately disables events for the socket, it is possible that event messages may be waiting in the application's event queue. The application must therefore be prepared to handle socket event messages even after calling `Close`.

wxSocketBase::Destroy

bool Destroy()

Destroys the socket safely. Use this function instead of the delete operator, since otherwise socket events could reach the application even after the socket has been destroyed. To prevent this problem, this function appends the `wxSocket` to a list of object to be deleted on idle time, after all events have been processed. For the same reason, you should avoid creating socket objects in the stack.

`Destroy` calls `Close` (p. 1136) automatically.

Return value

Always true.

wxSocketBase::Discard

wxSocketBase& Discard()

This function simply deletes all bytes in the incoming queue. This function always returns immediately and its operation is not affected by IO flags.

Use `LastCount` (p. 1139) to verify the number of bytes actually discarded.

If you use `Error` (p. 1137), it will always return false.

wxSocketBase::Error

bool Error() const

Returns true if an error occurred in the last IO operation.

Use this function to check for an error condition after one of the following calls: `Discard`, `Peek`, `Read`, `ReadMsg`, `Unread`, `Write`, `WriteMsg`.

wxSocketBase::GetClientData

void * GetClientData() const

Returns a pointer of the client data for this socket, as set with `SetClientData` (p. 1140)

wxSocketBase::GetLocal

bool GetLocal(wxSockAddress& addr) const

This function returns the local address field of the socket. The local address field contains the complete local address of the socket (local address, local port, ...).

Return value

true if no error happened, false otherwise.

wxSocketBase::GetFlags

wxSocketFlags GetFlags() const

Returns current IO flags, as set with *SetFlags* (p. 1141)

wxSocketBase::GetPeer

bool GetPeer(wxSockAddress& addr) const

This function returns the peer address field of the socket. The peer address field contains the complete peer host address of the socket (address, port, ...).

Return value

true if no error happened, false otherwise.

wxSocketBase::InterruptWait

void InterruptWait()

Use this function to interrupt any wait operation currently in progress. Note that this is not intended as a regular way to interrupt a *Wait* call, but only as an escape mechanism for exceptional situations where it is absolutely necessary to use it, for example to abort an operation due to some exception or abnormal problem. *InterruptWait* is automatically called when you *Close* (p. 1136) a socket (and thus also upon socket destruction), so you don't need to use it in these cases.

wxSocketBase::Wait (p. 1145), *wxSocketServer::WaitForAccept* (p. 1155),
wxSocketBase::WaitForLost (p. 1146), *wxSocketBase::WaitForRead* (p. 1146),
wxSocketBase::WaitForWrite (p. 1147), *wxSocketClient::WaitOnConnect* (p. 1150)

wxSocketBase::IsConnected

bool IsConnected() const

Returns true if the socket is connected.

wxSocketBase::IsData

bool IsData() const

This function waits until the socket is readable. This might mean that queued data is available for reading or, for streamed sockets, that the connection has been closed, so that a read operation will complete immediately without blocking (unless the **wxSOCKET_WAITALL** flag is set, in which case the operation might still block).

wxSocketBase::IsDisconnected

bool IsDisconnected() const

Returns true if the socket is not connected.

wxSocketBase::LastCount

wxUInt32 LastCount() const

Returns the number of bytes read or written by the last IO call.

Use this function to get the number of bytes actually transferred after using one of the following IO calls: Discard, Peek, Read, ReadMsg, Unread, Write, WriteMsg.

wxSocketBase::LastError

wxSocketError LastError() const

Returns the last wxSocket error. See *wxSocket errors* (p. 1132).

Please note that this function merely returns the last error code, but it should not be used to determine if an error has occurred (this is because successful operations do not change the LastError value). Use *Error* (p. 1137) first, in order to determine if the last IO call failed. If this returns true, use LastError to discover the cause of the error.

wxSocketBase::Notify

void Notify(bool *notify*)

According to the *notify* value, this function enables or disables socket events. If *notify* is true, the events configured with *SetNotify* (p. 1142) will be sent to the application. If *notify* is false; no events will be sent.

wxSocketBase::Ok

bool Ok() const

Returns true if the socket is initialized and ready and false in other cases.

Remark/Warning

For *wxSocketClient* (p. 1149), *Ok* won't return true unless the client is connected to a server.

For *wxSocketServer* (p. 1153), *Ok* will return true if the server could bind to the specified address and is already listening for new connections.

Ok does not check for IO errors; use *Error* (p. 1137) instead for that purpose.

wxSocketBase::RestoreState

void RestoreState()

This function restores the previous state of the socket, as saved with *SaveState* (p. 1140)

Calls to *SaveState* and *RestoreState* can be nested.

See also

wxSocketBase::SaveState (p. 1140)

wxSocketBase::SaveState

void SaveState()

This function saves the current state of the socket in a stack. Socket state includes flags, as set with *SetFlags* (p. 1141), event mask, as set with *SetNotify* (p. 1142) and *Notify* (p. 1139), user data, as set with *SetClientData* (p. 1140), and asynchronous callback settings, as set with *Callback* (p. 1135) and *CallbackData* (p. 1136).

Calls to *SaveState* and *RestoreState* can be nested.

See also

wxSocketBase::RestoreState (p. 1140)

wxSocketBase::SetClientData

void SetClientData(void *data)

Sets user-supplied client data for this socket. All socket events will contain a pointer to this data, which can be retrieved with the *wxSocketEvent::GetClientData* (p. 1152) function.

wxSocketBase::SetEventHandler

void SetEventHandler(wxEvtHandler& handler, int id = -1)

Sets an event handler to be called when a socket event occurs. The handler will be called for those events for which notification is enabled with *SetNotify* (p. 1142) and *Notify* (p. 1139).

Parameters

handler

Specifies the event handler you want to use.

id

The id of socket event.

See also

wxSocketBase::SetNotify (p. 1142), *wxSocketBase::Notify* (p. 1139), *wxSocketEvent* (p. 1151), *wxEvtHandler* (p. 445)

wxSocketBase::SetFlags

void SetFlags(wxSocketFlags flags)

Use *SetFlags* to customize IO operation for this socket. The *flags* parameter may be a combination of flags ORed together. The following flags can be used:

wxSOCKET_NONE	Normal functionality.
wxSOCKET_NOWAIT	Read/write as much data as possible and return immediately.
wxSOCKET_WAITALL	Wait for all required data to be read/written unless an error occurs.
wxSOCKET_BLOCK	Block the GUI (do not yield) while reading/writing data.

A brief overview on how to use these flags follows.

If no flag is specified (this is the same as **wxSOCKET_NONE**), IO calls will return after some data has been read or written, even when the transfer might not be complete. This is the same as issuing exactly one blocking low-level call to *recv()* or *send()*. Note that *blocking* here refers to when the function returns, not to whether the GUI blocks during this time.

If **wxSOCKET_NOWAIT** is specified, IO calls will return immediately. Read operations will retrieve only available data. Write operations will write as much data as possible, depending on how much space is available in the output buffer. This is the same as issuing exactly one nonblocking low-level call to *recv()* or *send()*. Note that *nonblocking* here refers to when the function returns, not to whether the GUI blocks during this time.

If **wxSOCKET_WAITALL** is specified, IO calls won't return until ALL the data has been read or written (or until an error occurs), blocking if necessary, and issuing several low level calls if necessary. This is the same as having a loop which makes as many blocking low-level calls to `recv()` or `send()` as needed so as to transfer all the data. Note that *blocking* here refers to when the function returns, not to whether the GUI blocks during this time.

The **wxSOCKET_BLOCK** flag controls whether the GUI blocks during IO operations. If this flag is specified, the socket will not yield during IO calls, so the GUI will remain blocked until the operation completes. If it is not used, then the application must take extra care to avoid unwanted reentrance.

So:

wxSOCKET_NONE will try to read at least SOME data, no matter how much.

wxSOCKET_NOWAIT will always return immediately, even if it cannot read or write ANY data.

wxSOCKET_WAITALL will only return when it has read or written ALL the data.

wxSOCKET_BLOCK has nothing to do with the previous flags and it controls whether the GUI blocks.

wxSocketBase::SetNotify

void SetNotify(wxSocketEventFlags flags)

SetNotify specifies which socket events are to be sent to the event handler. The *flags* parameter may be combination of flags ORed together. The following flags can be used:

wxSOCKET_INPUT_FLAG	to receive wxSOCKET_INPUT
wxSOCKET_OUTPUT_FLAG	to receive wxSOCKET_OUTPUT
wxSOCKET_CONNECTION_FLAG	to receive wxSOCKET_CONNECTION
wxSOCKET_LOST_FLAG	to receive wxSOCKET_LOST

For example:

```
sock.SetNotify(wxSOCKET_INPUT_FLAG | wxSOCKET_LOST_FLAG);  
sock.Notify(true);
```

In this example, the user will be notified about incoming socket data and whenever the connection is closed.

For more information on socket events see *wxSocket events* (p. 1132).

wxSocketBase::SetTimeout

void SetTimeout(int seconds)

This function sets the default socket timeout in seconds. This timeout applies to all IO calls, and also to the *Wait* (p. 1145) family of functions if you don't specify a wait interval. Initially, the default timeout is 10 minutes.

wxSocketBase::Peek

wxSocketBase& Peek(void * *buffer*, wxUint32 *nbytes*)

This function peeks a buffer of *nbytes* bytes from the socket. Peeking a buffer doesn't delete it from the socket input queue.

Use *LastCount* (p. 1139) to verify the number of bytes actually peeked.

Use *Error* (p. 1137) to determine if the operation succeeded.

Parameters

buffer

Buffer where to put peeked data.

nbytes

Number of bytes.

Return value

Returns a reference to the current object.

Remark/Warning

The exact behaviour of `wxSocketBase::Peek` depends on the combination of flags being used. For a detailed explanation, see `wxSocketBase::SetFlags` (p. 1141)

See also

`wxSocketBase::Error` (p. 1137), `wxSocketBase::LastError` (p. 1139),
`wxSocketBase::LastCount` (p. 1139), `wxSocketBase::SetFlags` (p. 1141)

wxSocketBase::Read

wxSocketBase& Read(void * *buffer*, wxUint32 *nbytes*)

This function reads a buffer of *nbytes* bytes from the socket.

Use *LastCount* (p. 1139) to verify the number of bytes actually read.

Use *Error* (p. 1137) to determine if the operation succeeded.

Parameters

buffer

Buffer where to put read data.

nbytes

Number of bytes.

Return value

Returns a reference to the current object.

Remark/Warning

The exact behaviour of `wxSocketBase::Read` depends on the combination of flags being used. For a detailed explanation, see `wxSocketBase::SetFlags` (p. 1141).

See also

`wxSocketBase::Error` (p. 1137), `wxSocketBase::LastError` (p. 1139),
`wxSocketBase::LastCount` (p. 1139), `wxSocketBase::SetFlags` (p. 1141)

wxSocketBase::ReadMsg

wxSocketBase& ReadMsg(void * buffer, wxUint32 nbytes)

This function reads a buffer sent by `WriteMsg` (p. 1148) on a socket. If the buffer passed to the function isn't big enough, the remaining bytes will be discarded. This function always waits for the buffer to be entirely filled, unless an error occurs.

Use `LastCount` (p. 1139) to verify the number of bytes actually read.

Use `Error` (p. 1137) to determine if the operation succeeded.

Parameters

buffer

Buffer where to put read data.

nbytes

Size of the buffer.

Return value

Returns a reference to the current object.

Remark/Warning

`wxSocketBase::ReadMsg` will behave as if the `wxSOCKET_WAITALL` flag was always set and it will always ignore the `wxSOCKET_NOWAIT` flag. The exact behaviour of `ReadMsg` depends on the `wxSOCKET_BLOCK` flag. For a detailed explanation, see `wxSocketBase::SetFlags` (p. 1141).

See also

wxSocketBase::Error (p. 1137), *wxSocketBase::LastError* (p. 1139),
wxSocketBase::LastCount (p. 1139), *wxSocketBase::SetFlags* (p. 1141),
wxSocketBase::WriteMsg (p. 1148)

wxSocketBase::Unread

wxSocketBase& Unread(const void * *buffer*, wxUInt32 *nbytes*)

This function unread a buffer. That is, the data in the buffer is put back in the incoming queue. This function is not affected by *wxSocket* flags.

If you use *LastCount* (p. 1139), it will always return *nbytes*.

If you use *Error* (p. 1137), it will always return false.

Parameters

buffer

Buffer to be unread.

nbytes

Number of bytes.

Return value

Returns a reference to the current object.

See also

wxSocketBase::Error (p. 1137), *wxSocketBase::LastCount* (p. 1139),
wxSocketBase::LastError (p. 1139)

wxSocketBase::Wait

bool Wait(long *seconds* = -1, long *millisecond* = 0)

This function waits until any of the following conditions is true:

- The socket becomes readable.
- The socket becomes writable.
- An ongoing connection request has completed (*wxSocketClient* (p. 1149) only)
- An incoming connection request has arrived (*wxSocketServer* (p. 1153) only)
- The connection has been closed.

Note that it is recommended to use the individual Wait functions to wait for the required condition, instead of this one.

Parameters

seconds

Number of seconds to wait. If -1, it will wait for the default timeout, as set with *SetTimeout* (p. 1142).

millisecond

Number of milliseconds to wait.

Return value

Returns true when any of the above conditions is satisfied, false if the timeout was reached.

See also

wxSocketBase::InterruptWait (p. 1138), *wxSocketServer::WaitForAccept* (p. 1155), *wxSocketBase::WaitForLost* (p. 1146), *wxSocketBase::WaitForRead* (p. 1146), *wxSocketBase::WaitForWrite* (p. 1147), *wxSocketClient::WaitOnConnect* (p. 1150)

wxSocketBase::WaitForLost

bool *Wait*(**long** *seconds* = -1, **long** *millisecond* = 0)

This function waits until the connection is lost. This may happen if the peer gracefully closes the connection or if the connection breaks.

Parameters

seconds

Number of seconds to wait. If -1, it will wait for the default timeout, as set with *SetTimeout* (p. 1142).

millisecond

Number of milliseconds to wait.

Return value

Returns true if the connection was lost, false if the timeout was reached.

See also

wxSocketBase::InterruptWait (p. 1138), *wxSocketBase::Wait* (p. 1145)

wxSocketBase::WaitForRead

bool *WaitForRead*(**long** *seconds* = -1, **long** *millisecond* = 0)

This function waits until the socket is readable. This might mean that queued data is

available for reading or, for streamed sockets, that the connection has been closed, so that a read operation will complete immediately without blocking (unless the **wxSOCKET_WAITALL** flag is set, in which case the operation might still block).

Parameters

seconds

Number of seconds to wait. If -1, it will wait for the default timeout, as set with *SetTimeout* (p. 1142).

millisecond

Number of milliseconds to wait.

Return value

Returns true if the socket becomes readable, false on timeout.

See also

wxSocketBase::InterruptWait (p. 1138), *wxSocketBase::Wait* (p. 1145)

wxSocketBase::WaitForWrite

bool WaitForWrite(long seconds = -1, long millisecond = 0)

This function waits until the socket becomes writable. This might mean that the socket is ready to send new data, or for streamed sockets, that the connection has been closed, so that a write operation is guaranteed to complete immediately (unless the **wxSOCKET_WAITALL** flag is set, in which case the operation might still block).

Parameters

seconds

Number of seconds to wait. If -1, it will wait for the default timeout, as set with *SetTimeout* (p. 1142).

millisecond

Number of milliseconds to wait.

Return value

Returns true if the socket becomes writable, false on timeout.

See also

wxSocketBase::InterruptWait (p. 1138), *wxSocketBase::Wait* (p. 1145)

wxSocketBase::Write

wxSocketBase& Write(const void * buffer, wxUint32 nbytes)

This function writes a buffer of *nbytes* bytes to the socket.

Use *LastCount* (p. 1139) to verify the number of bytes actually written.

Use *Error* (p. 1137) to determine if the operation succeeded.

Parameters

buffer

Buffer with the data to be sent.

nbytes

Number of bytes.

Return value

Returns a reference to the current object.

Remark/Warning

The exact behaviour of `wxSocketBase::Write` depends on the combination of flags being used. For a detailed explanation, see `wxSocketBase::SetFlags` (p. 1141).

See also

`wxSocketBase::Error` (p. 1137), `wxSocketBase::LastError` (p. 1139),
`wxSocketBase::LastCount` (p. 1139), `wxSocketBase::SetFlags` (p. 1141)

wxSocketBase::WriteMsg

wxSocketBase& WriteMsg(const void * buffer, wxUint32 nbytes)

This function writes a buffer of *nbytes* bytes from the socket, but it writes a short header before so that *ReadMsg* (p. 1144) knows how much data should it actually read. So, a buffer sent with *WriteMsg* **must** be read with *ReadMsg*. This function always waits for the entire buffer to be sent, unless an error occurs.

Use *LastCount* (p. 1139) to verify the number of bytes actually written.

Use *Error* (p. 1137) to determine if the operation succeeded.

Parameters

buffer

Buffer with the data to be sent.

nbytes

Number of bytes to send.

Return value

Returns a reference to the current object.

Remark/Warning

`wxSocketBase::WriteMsg` will behave as if the `wxSOCKET_WAITALL` flag was always set and it will always ignore the `wxSOCKET_NOWAIT` flag. The exact behaviour of `WriteMsg` depends on the `wxSOCKET_BLOCK` flag. For a detailed explanation, see `wxSocketBase::SetFlags` (p. 1141).

See also

`wxSocketBase::Error` (p. 1137), `wxSocketBase::LastError` (p. 1139),
`wxSocketBase::LastCount` (p. 1139), `wxSocketBase::SetFlags` (p. 1141),
`wxSocketBase::ReadMsg` (p. 1144)

wxSocketClient**Derived from**

`wxSocketBase` (p. 1132)

Include files

<wx/socket.h>

wxSocketClient::wxSocketClient

`wxSocketClient(wxSocketFlags flags = wxSOCKET_NONE)`

Constructor.

Parameters

flags

Socket flags (See `wxSocketBase::SetFlags` (p. 1141))

wxSocketClient::~~wxSocketClient

`~wxSocketClient()`

Destructor. Please see `wxSocketBase::Destroy` (p. 1137).

wxSocketClient::Connect

bool Connect(wxSockAddress& *address*, bool *wait* = true)

Connects to a server using the specified address.

If *wait* is true, Connect will wait until the connection completes. **Warning:** This will block the GUI.

If *wait* is false, Connect will try to establish the connection and return immediately, without blocking the GUI. When used this way, even if Connect returns false, the connection request can be completed later. To detect this, use *WaitOnConnect* (p. 1150), or catch **wxSOCKET_CONNECTION** events (for successful establishment) and **wxSOCKET_LOST** events (for connection failure).

Parameters

address

Address of the server.

wait

If true, waits for the connection to complete.

Return value

Returns true if the connection is established and no error occurs.

If *wait* was true, and Connect returns false, an error occurred and the connection failed.

If *wait* was false, and Connect returns false, you should still be prepared to handle the completion of this connection request, either with *WaitOnConnect* (p. 1150) or by watching **wxSOCKET_CONNECTION** and **wxSOCKET_LOST** events.

See also

wxSocketClient::WaitOnConnect (p. 1150), *wxSocketBase::SetNotify* (p. 1142), *wxSocketBase::Notify* (p. 1139)

wxSocketClient::WaitOnConnect

bool WaitOnConnect(long *seconds* = -1, long *milliseconds* = 0)

Wait until a connection request completes, or until the specified timeout elapses. Use this function after issuing a call to *Connect* (p. 1149) with *wait* set to false.

Parameters

seconds

Number of seconds to wait. If -1, it will wait for the default timeout, as set with *SetTimeout* (p. 1142).

millisecond

Number of milliseconds to wait.

Return value

WaitOnConnect returns true if the connection request completes. This does not necessarily mean that the connection was successfully established; it might also happen that the connection was refused by the peer. Use *IsConnected* (p. 1138) to distinguish between these two situations.

If the timeout elapses, WaitOnConnect returns false.

These semantics allow code like this:

```
// Issue the connection request
client->Connect(addr, false);

// Wait until the request completes or until we decide to give up
bool waitmore = true;
while ( !client->WaitOnConnect(seconds, millis) && waitmore )
{
    // possibly give some feedback to the user,
    // and update waitmore as needed.
}
bool success = client->IsConnected();
```

See also

wxSocketClient::Connect (p. 1149), *wxSocketBase::InterruptWait* (p. 1138),
wxSocketBase::IsConnected (p. 1138)

wxSocketEvent

This event class contains information about socket events.

Derived from

wxEvent (p. 441)

Include files

<wx/socket.h>

Event table macros

To process a socket event, use these event handler macros to direct input to member functions that take a *wxSocketEvent* argument.

EVT_SOCKET(id, func)	Process a socket event, supplying the member function.
-----------------------------	--

See also

wxSocketBase (p. 1132), *wxSocketClient* (p. 1149), *wxSocketServer* (p. 1153)

wxSocketEvent::wxSocketEvent

wxSocketEvent(int id = 0)

Constructor.

wxSocketEvent::GetClientData

void * GetClientData()

Gets the client data of the socket which generated this event, as set with *wxSocketBase::SetClientData* (p. 1140).

wxSocketEvent::GetSocket

wxSocketBase * GetSocket() const

Returns the socket object to which this event refers to. This makes it possible to use the same event handler for different sockets.

wxSocketEvent::GetSocketEvent

wxSocketNotify GetSocketEvent() const

Returns the socket event type.

wxSocketInputStream

This class implements an input stream which reads data from a connected socket. Note that this stream is purely sequential and it does not support seeking.

Derived from

wxInputStream (p. 762)

Include files

<wx/sckstrm.h>

See also

wxSocketBase (p. 1132)

wxSocketInputStream::wxSocketInputStream

wxSocketInputStream(wxSocketBase& s)

Creates a new read-only socket stream using the specified initialized socket connection.

wxSocketOutputStream

This class implements an output stream which writes data from a connected socket. Note that this stream is purely sequential and it does not support seeking.

Derived from

wxOutputStream (p. 958)

Include files

<wx/sckstrm.h>

See also

wxSocketBase (p. 1132)

wxSocketOutputStream::wxSocketOutputStream

wxSocketInputStream(wxSocketBase& s)

Creates a new write-only socket stream using the specified initialized socket connection.

wxSocketServer**Derived from**

wxSocketBase (p. 1132)

Include files

<wx/socket.h>

wxSocketServer::wxSocketServer

**wxSocketServer(wxSockAddress& address, wxSocketFlags flags =
wxSOCKET_NONE)**

Constructs a new server and tries to bind to the specified *address*. Before trying to accept new connections, test whether it succeeded with *wxSocketBase::Ok* (p. 1139).

Parameters

address

Specifies the local address for the server (e.g. port number).

flags

Socket flags (See `wxSocketBase::SetFlags` (p. 1141))

wxSocketServer::~~wxSocketServer

~wxSocketServer()

Destructor (it doesn't close the accepted connections).

wxSocketServer::Accept

wxSocketBase * Accept(*bool wait = true*)

Accepts an incoming connection request, and creates a new `wxSocketBase` (p. 1132) object which represents the server-side of the connection.

If *wait* is true and there are no pending connections to be accepted, it will wait for the next incoming connection to arrive. **Warning:** This will block the GUI.

If *wait* is false, it will try to accept a pending connection if there is one, but it will always return immediately without blocking the GUI. If you want to use `Accept` in this way, you can either check for incoming connections with `WaitForAccept` (p. 1155) or catch **wxSOCKET_CONNECTION** events, then call `Accept` once you know that there is an incoming connection waiting to be accepted.

Return value

Returns an opened socket connection, or NULL if an error occurred or if the *wait* parameter was false and there were no pending connections.

See also

`wxSocketServer::WaitForAccept` (p. 1155), `wxSocketBase::SetNotify` (p. 1142), `wxSocketBase::Notify` (p. 1139), `wxSocketServer::AcceptWith` (p. 1154)

wxSocketServer::AcceptWith

bool AcceptWith(`wxSocketBase& socket`, *bool wait = true*)

Accept an incoming connection using the specified socket object.

Parameters

socket

Socket to be initialized

Return value

Returns true on success, or false if an error occurred or if the *wait* parameter was false and there were no pending connections.

wxSocketServer::WaitForAccept (p. 1155), *wxSocketBase::SetNotify* (p. 1142),
wxSocketBase::Notify (p. 1139), *wxSocketServer::Accept* (p. 1154)

wxSocketServer::WaitForAccept

bool WaitForAccept(long seconds = -1, long millisecond = 0)

This function waits for an incoming connection. Use it if you want to call *Accept* (p. 1154) or *AcceptWith* (p. 1154) with *wait* set to false, to detect when an incoming connection is waiting to be accepted.

Parameters

seconds

Number of seconds to wait. If -1, it will wait for the default timeout, as set with *SetTimeout* (p. 1142).

millisecond

Number of milliseconds to wait.

Return value

Returns true if an incoming connection arrived, false if the timeout elapsed.

See also

wxSocketServer::Accept (p. 1154), *wxSocketServer::AcceptWith* (p. 1154), *wxSocketBase::InterruptWait* (p. 1138)

wxSpinButton

A *wxSpinButton* has two small up and down (or left and right) arrow buttons. It is often used next to a text control for increment and decrementing a value. Portable programs should try to use *wxSpinCtrl* (p. 1159) instead as *wxSpinButton* is not implemented for all platforms (Win32 and GTK only currently).

NB: the range supported by this control (and *wxSpinCtrl*) depends on the platform but is at least -0x8000 to 0x7fff. Under GTK and Win32 with sufficiently new version of *comctl32.dll* (at least 4.71 is required, 5.80 is recommended) the full 32 bit range is supported.

Derived from

wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

See also

wxSpinCtrl (p. 1159)

Include files

<wx/spinbutt.h>

Window styles

wxSP_HORIZONTAL	Specifies a horizontal spin button (note that this style is not supported in wxGTK).
wxSP_VERTICAL	Specifies a vertical spin button.
wxSP_ARROW_KEYS	The user can use arrow keys.
wxSP_WRAP	The value wraps at the minimum and maximum.

See also *window styles overview* (p. 1618).

Event handling

To process input from a spin button, use one of these event handler macros to direct input to member functions that take a *wxSpinEvent* (p. 1162) argument:

EVT_SPIN(id, func)	Generated whenever an arrow is pressed.
EVT_SPIN_UP(id, func)	Generated when left/up arrow is pressed.
EVT_SPIN_DOWN(id, func)	Generated when right/down arrow is pressed.

Note that if you handle both SPIN and UP or DOWN events, you will be notified about each of them twice: first the UP/DOWN event will be received and then, if it wasn't vetoed, the SPIN event will be sent. [See also](#) *Event handling overview* (p. 1610)

wxSpinButton::wxSpinButton

wxSpinButton()

Default constructor.

wxSpinButton(wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxSP_HORIZONTAL, const wxString& name = "spinButton")

Constructor, creating and showing a spin button.

Parameters

parent

Parent window. Must not be NULL.

id

Window identifier. A value of -1 indicates a default value.

pos

Window position. If the position (-1, -1) is specified then a default position is chosen.

size

Window size. If the default size (-1, -1) is specified then a default size is chosen.

style

Window style. See *wxSpinButton* (p. 1155).

validator

Window validator.

name

Window name.

See also

wxSpinButton::Create (p. 1157), *wxValidator* (p. 1360)

wxSpinButton::~~wxSpinButton

void ~wxSpinButton()

Destructor, destroys the spin button control.

wxSpinButton::Create

```
bool Create(wxWindow* parent, wxWindowID id, const wxPoint& pos =  
wxDefaultPosition, const wxSize& size = wxDefaultSize, long style =  
wxSP_HORIZONTAL, const wxString& name = "spinButton")
```

Scrollbar creation function called by the spin button constructor. See *wxSpinButton::wxSpinButton* (p. 1156) for details.

wxSpinButton::GetMax

int GetMax() const

Returns the maximum permissible value.

[See also](#)

wxSpinButton::SetRange (p. 1158)

wxSpinButton::GetMin

int GetMin() const

Returns the minimum permissible value.

[See also](#)

wxSpinButton::SetRange (p. 1158)

wxSpinButton::GetValue

int GetValue() const

Returns the current spin button value.

[See also](#)

wxSpinButton::SetValue (p. 1159)

wxSpinButton::SetRange

void SetRange(int *min*, int *max*)

Sets the range of the spin button.

Parameters

min

The minimum value for the spin button.

max

The maximum value for the spin button.

[See also](#)

wxSpinButton::GetMin (p. 1158), *wxSpinButton::GetMax* (p. 1158)

wxSpinButton::SetValue

void SetValue(int value)

Sets the value of the spin button.

Parameters

value

The value for the spin button.

See also

wxSpinButton::GetValue (p. 1158)

wxSpinCtrl

wxSpinCtrl combines *wxTextCtrl* (p. 1250) and *wxSpinButton* (p. 1155) in one control.

Derived from

wxControl (p. 199)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/spinctrl.h>

Window styles

wxSP_ARROW_KEYS The user can use arrow keys.

wxSP_WRAP The value wraps at the minimum and maximum.

Event handling

To process input from a spin button, use one of these event handler macros to direct input to member functions that take a *wxSpinEvent* (p. 1162) argument:

EVT_SPINCTRL(id, func) Generated whenever the numeric value of the spinctrl is updated

You may also use the *wxSpinButton* (p. 1155) event macros, however the corresponding events will not be generated under all platforms. Finally, if the user modifies the text in the edit part of the spin control directly, the **EVT_TEXT** is generated, like for the *wxTextCtrl* (p. 1250).

See also

Event handling overview (p. 1610), *wxSpinButton* (p. 1155), *wxControl* (p. 199)

wxSpinCtrl::wxSpinCtrl

wxSpinCtrl()

Default constructor.

wxSpinCtrl(wxWindow* parent, wxWindowID id = -1, const wxString& value = wxEmptyString, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxSP_ARROW_KEYS, int min = 0, int max = 100, int initial = 0, const wxString& name = _T("wxSpinCtrl"))

Constructor, creating and showing a spin control.

Parameters

parent

Parent window. Must not be NULL.

value

Default value.

id

Window identifier. A value of -1 indicates a default value.

pos

Window position. If the position (-1, -1) is specified then a default position is chosen.

size

Window size. If the default size (-1, -1) is specified then a default size is chosen.

style

Window style. See *wxSpinButton* (p. 1155).

min

Minimal value.

max

Maximal value.

initial

Initial value.

name

Window name.

See also

wxSpinCtrl::Create (p. 1161)

wxSpinCtrl::Create

```
bool Create(wxWindow* parent, wxWindowID id = -1, const wxString& value =  
wxEmptyString, const wxPoint& pos = wxDefaultPosition, const wxSize& size =  
wxDefaultSize, long style = wxSP_ARROW_KEYS, int min = 0, int max = 100, int initial  
= 0, const wxString& name = _T("wxSpinCtrl"))
```

Creation function called by the spin control constructor.

See *wxSpinCtrl::wxSpinCtrl* (p. 1160) for details.

wxSpinCtrl::SetValue

```
void SetValue(const wxString& text)
```

```
void SetValue(int value)
```

Sets the value of the spin control.

wxSpinCtrl::GetValue

```
int GetValue() const
```

Gets the value of the spin control.

wxSpinCtrl::SetRange

```
void SetRange(int minVal, int maxVal)
```

Sets range of allowable values.

wxSpinCtrl::SetSelection

```
void SetSelection(long from, long to)
```

Select the text in the text part of the control between positions *from* (inclusive) and *to* (exclusive). This is similar to *wxTextCtrl::SetSelection* (p. 1266).

NB: this is currently only implemented for Windows and generic versions of the control.

wxSpinCtrl::GetMin

int GetMin() const

Gets minimal allowable value.

wxSpinCtrl::GetMax

int GetMax() const

Gets maximal allowable value.

wxSpinEvent

This event class is used for the events generated by *wxSpinButton* (p. 1155) and *wxSpinCtrl* (p. 1159).

Derived from

wxNotifyEvent (p. 953)
wxCommandEvent (p. 165)
wxEvent (p. 441)
wxObject (p. 954)

Include files

<wx/spinbutt.h> or <wx/spinctrl.h>

Event handling

To process input from a spin button, use one of these event handler macros to direct input to member functions that take a *wxSpinEvent* (p. 1162) argument:

EVT_SPIN(id, func)	Generated whenever an arrow is pressed.
EVT_SPIN_UP(id, func)	Generated when left/up arrow is pressed.
EVT_SPIN_DOWN(id, func)	Generated when right/down arrow is pressed.

Note that if you handle both SPIN and UP or DOWN events, you will be notified about each of them twice: first the UP/DOWN event will be received and then, if it wasn't vetoed, the SPIN event will be sent. [See also](#) *wxSpinButton* (p. 1155) and *wxSpinCtrl* (p. 1159)

wxSpinEvent::wxSpinEvent

wxSpinEvent(wxEventType commandType = wxEVT_NULL, int id = 0)

The constructor is not normally used by the user code.

wxSpinEvent::GetPosition

int GetPosition() const

Retrieve the current spin button or control value.

wxSpinEvent::SetPosition

void SetPosition(int pos)

Set the value associated with the event.

wxSplashScreen

`wxSplashScreen` shows a window with a thin border, displaying a bitmap describing your application. Show it in application initialisation, and then either explicitly destroy it or let it time-out.

Example usage:

```
wxBitmap bitmap;
if (bitmap.LoadFile("splash16.png", wxBITMAP_TYPE_PNG))
{
    wxSplashScreen* splash = new wxSplashScreen(bitmap,
        wxSPLASH_CENTRE_ON_SCREEN|wxSPLASH_TIMEOUT,
        6000, NULL, -1, wxDefaultPosition, wxDefaultSize,
        wxSIMPLE_BORDER|wxSTAY_ON_TOP);
}
wxYield();
```

Derived from

`wxFrame` (p. 532)

`wxWindow` (p. 1388)

`wxEvtHandler` (p. 445)

`wxObject` (p. 954)

Include files

<wx/splash.h>

wxSplashScreen::wxSplashScreen

**wxSplashScreen(const wxBitmap& bitmap, long splashStyle, int milliseconds,
wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const
wxSize& size = wxDefaultSize, long style =**

`wxSIMPLE_BORDER|wxFRAME_NO_TASKBAR|wxSTAY_ON_TOP)`

Construct the splash screen passing a bitmap, a style, a timeout, a window id, optional position and size, and a window style.

splashStyle is a bitlist of some of the following:

- `wxSPLASH_CENTRE_ON_PARENT`
- `wxSPLASH_CENTRE_ON_SCREEN`
- `wxSPLASH_NO_CENTRE`
- `wxSPLASH_TIMEOUT`
- `wxSPLASH_NO_TIMEOUT`

milliseconds is the timeout in milliseconds.

`wxSplashScreen::~~wxSplashScreen`

`~wxSplashScreen()`

Destroys the splash screen.

`wxSplashScreen::OnCloseWindow`

`void OnCloseWindow(wxCloseEvent& event)`

Reimplement this event handler if you want to set an application variable on window destruction, for example.

`wxSplashScreen::GetSplashStyle`

`long GetSplashStyle() const`

Returns the splash style (see `wxSplashScreen::wxSplashScreen` (p. 1163) for details).

`wxSplashScreen::GetSplashWindow`

`wxSplashScreenWindow* GetSplashWindow() const`

Returns the window used to display the bitmap.

`wxSplashScreen::GetTimeout`

`int GetTimeout() const`

Returns the timeout in milliseconds.

wxSplitterEvent

This class represents the events generated by a splitter control. Also there is only one event class, the data associated to the different events is not the same and so not all accessor functions may be called for each event. The documentation mentions the kind of event(s) for which the given accessor function makes sense: calling it for other types of events will result in assert failure (in debug mode) and will return meaningless results.

Derived from

wxNotifyEvent (p. 953)
wxCommandEvent (p. 165)
wxEvent (p. 441)
wxObject (p. 954)

Include files

<wx/splitter.h>

Event table macros

To process a splitter event, use these event handler macros to direct input to member functions that take a `wxSplitterEvent` argument.

EVT_SPLITTER_SASH_POS_CHANGING(id, func)

The sash position is in the process of being changed. You may prevent this change from happening by calling *Veto* (p. 954) or you may also modify the position of the tracking bar to properly reflect the position that would be set if the drag were to be completed at this point. Processes a `wxEVT_COMMAND_SPLITTER_SASH_POS_CHANGING` event.

EVT_SPLITTER_SASH_POS_CHANGED(id, func)

The sash position was changed. May be used to modify the sash position before it is set, or to prevent the change from taking place. Processes a `wxEVT_COMMAND_SPLITTER_SASH_POS_CHANGED` event.

EVT_SPLITTER_UNSPLOT(id, func)

The splitter has been just unsplit. Processes a `wxEVT_COMMAND_SPLITTER_UNSPLOT` event. This event can't be vetoed.

EVT_SPLITTER_DCLICK(id, func)

The sash was double clicked. The default behaviour is to unsplit the window when this happens (unless the minimum pane size has been set to a value greater than zero). This won't happen if you veto this event. Processes a `wxEVT_COMMAND_SPLITTER_DOUBLECLICKED` event.

See also

wxSplitterWindow (p. 1167), *Event handling overview* (p. 1610)

wxSplitterEvent::wxSplitterEvent

**wxSplitterEvent(wxEventType eventType = wxEVT_NULL,
wxSplitterWindow * splitter = NULL)**

Constructor. Used internally by wxWidgets only.

wxSplitterEvent::GetSashPosition

int GetSashPosition() const

Returns the new sash position.

May only be called while processing `wxEVT_COMMAND_SPLITTER_SASH_POS_CHANGING` and `wxEVT_COMMAND_SPLITTER_SASH_POS_CHANGED` events.

wxSplitterEvent::GetX

int GetX() const

Returns the x coordinate of the double-click point.

May only be called while processing `wxEVT_COMMAND_SPLITTER_DOUBLECLICKED` events.

wxSplitterEvent::GetY

int GetY() const

Returns the y coordinate of the double-click point.

May only be called while processing
wxEVT_COMMAND_SPLITTER_DOUBLECLICKED events.

wxSplitterEvent::GetWindowBeingRemoved

wxWindow* GetWindowBeingRemoved() const

Returns a pointer to the window being removed when a splitter window is unsplit.

May only be called while processing wxEVT_COMMAND_SPLITTER_UNSPLOT events.

wxSplitterEvent::SetSashPosition

void SetSashPosition(int pos)

In the case of wxEVT_COMMAND_SPLITTER_SASH_POS_CHANGED events, sets the the new sash position. In the case of
wxEVT_COMMAND_SPLITTER_SASH_POS_CHANGING events, sets the new tracking bar position so visual feedback during dragging will represent that change that will actually take place. Set to -1 from the event handler code to prevent repositioning.

May only be called while processing
wxEVT_COMMAND_SPLITTER_SASH_POS_CHANGING and
wxEVT_COMMAND_SPLITTER_SASH_POS_CHANGED events.

Parameters*pos*

New sash position.

wxSplitterWindow

wxSplitterWindow overview (p. 1651)

This class manages up to two subwindows. The current view can be split into two programmatically (perhaps from a menu command), and unsplit either programmatically or via the wxSplitterWindow user interface.

Window styles**wxSP_3D**

Draws a 3D effect border and sash.

wxSP_3DSASH	Draws a 3D effect sash.
wxSP_3DBORDER	Synonym for <code>wxSP_BORDER</code> .
wxSP_BORDER	Draws a standard border.
wxSP_NOBORDER	No border (default).
wxSP_NO_XP_THEME	Under Windows XP, switches off the attempt to draw the splitter using Windows XP theming, so the borders and sash will take on the pre-XP look.
wxSP_PERMIT_UNSPPLIT	Always allow to unsplit, even with the minimum pane size other than zero.
wxSP_LIVE_UPDATE	Don't draw XOR line but resize the child windows immediately.

See also *window styles overview* (p. 1618).

Derived from

wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/splitter.h>

Event handling

To process input from a splitter control, use the following event handler macros to direct input to member functions that take a *wxSplitterEvent* (p. 1165) argument.

EVT_SPLITTER_SASH_POS_CHANGING(id, func)	The sash position is in the process of being changed. May be used to modify the position of the tracking bar to properly reflect the position that would be set if the drag were to be completed at this point. Processes a <code>wxEVT_COMMAND_SPLITTER_SASH_POS_CHANGING</code> event.
EVT_SPLITTER_SASH_POS_CHANGED(id, func)	The sash position was

	changed. May be used to modify the sash position before it is set, or to prevent the change from taking place. Processes a <code>wxEVT_COMMAND_SPLITTER_SASH_POS_CHANGED</code> event.
EVT_SPLITTER_UNSPLOT(id, func)	The splitter has been just unsplit. Processes a <code>wxEVT_COMMAND_SPLITTER_UNSPLOT</code> event.
EVT_SPLITTER_DCLICK(id, func)	The sash was double clicked. The default behaviour is to unsplit the window when this happens (unless the minimum pane size has been set to a value greater than zero). Processes a <code>wxEVT_COMMAND_SPLITTER_DOUBLECLICKED</code> event.

See also

wxSplitterEvent (p. 1165)

wxSplitterWindow::wxSplitterWindow

wxSplitterWindow()

Default constructor.

wxSplitterWindow(wxWindow* parent, wxWindowID id, const wxPoint& point = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style=wxSP_3D, const wxString& name = "splitterWindow")

Constructor for creating the window.

Parameters

parent

The parent of the splitter window.

id

The window identifier.

pos

The window position.

size

The window size.

style

The window style. See *wxSplitterWindow* (p. 1167).

name

The window name.

Remarks

After using this constructor, you must create either one or two subwindows with the splitter window as parent, and then call one of *wxSplitterWindow::Initialize* (p. 1171), *wxSplitterWindow::SplitVertically* (p. 1176) and *wxSplitterWindow::SplitHorizontally* (p. 1175) in order to set the pane(s).

You can create two windows, with one hidden when not being shown; or you can create and delete the second pane on demand.

See also

wxSplitterWindow::Initialize (p. 1171), *wxSplitterWindow::SplitVertically* (p. 1176), *wxSplitterWindow::SplitHorizontally* (p. 1175), *wxSplitterWindow::Create* (p. 1170)

wxSplitterWindow::~~wxSplitterWindow

~wxSplitterWindow()

Destroys the *wxSplitterWindow* and its children.

wxSplitterWindow::Create

bool Create(wxWindow* parent, wxWindowID id, int x, const wxPoint& point = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style=wxSP_3D, const wxString& name = "splitterWindow")

Creation function, for two-step construction. See *wxSplitterWindow::wxSplitterWindow* (p. 1169) for details.

wxSplitterWindow::GetMinimumPaneSize

int GetMinimumPaneSize() const

Returns the current minimum pane size (defaults to zero).

See also

wxSplitterWindow::SetMinimumPaneSize (p. 1174)

wxSplitterWindow::GetSashPosition

int GetSashPosition()

Returns the current sash position.

See also

wxSplitterWindow::SetSashPosition (p. 1173)

wxSplitterWindow::GetSplitMode

int GetSplitMode() const

Gets the split mode.

See also

wxSplitterWindow::SetSplitMode (p. 1174), *wxSplitterWindow::SplitVertically* (p. 1176), *wxSplitterWindow::SplitHorizontally* (p. 1175).

wxSplitterWindow::GetWindow1

wxWindow* GetWindow1() const

Returns the left/top or only pane.

wxSplitterWindow::GetWindow2

wxWindow* GetWindow2() const

Returns the right/bottom pane.

wxSplitterWindow::Initialize

void Initialize(wxWindow* window)

Initializes the splitter window to have one pane.

Parameters

window

The pane for the unsplit window.

Remarks

This should be called if you wish to initially view only a single pane in the splitter window.

See also

wxSplitterWindow::SplitVertically (p. 1176), *wxSplitterWindow::SplitHorizontally* (p. 1175)

wxSplitterWindow::IsSplit

bool IsSplit() const

Returns true if the window is split, false otherwise.

wxSplitterWindow::OnDoubleClickSash

virtual void OnDoubleClickSash(int x, int y)

Application-overrideable function called when the sash is double-clicked with the left mouse button.

Parameters

x

The x position of the mouse cursor.

y

The y position of the mouse cursor.

Remarks

The default implementation of this function calls *Unsplit* (p. 1176) if the minimum pane size is zero.

See also

wxSplitterWindow::Unsplit (p. 1176)

wxSplitterWindow::OnUnsplit

virtual void OnUnsplit(wxWindow* removed)

Application-overrideable function called when the window is unsplit, either programmatically or using the *wxSplitterWindow* user interface.

Parameters

removed

The window being removed.

Remarks

The default implementation of this function simply hides *removed*. You may wish to delete the window.

wxSplitterWindow::OnSashPositionChange

virtual bool OnSashPositionChange(int *newSashPosition*)

Application-overridable function called when the sash position is changed by user. It may return false to prevent the change or true to allow it.

Parameters

newSashPosition

The new sash position (always positive or zero)

Remarks

The default implementation of this function verifies that the sizes of both panes of the splitter are greater than minimum pane size.

wxSplitterWindow::ReplaceWindow

bool ReplaceWindow(wxWindow * *winOld*, wxWindow * *winNew*)

This function replaces one of the windows managed by the `wxSplitterWindow` with another one. It is in general better to use it instead of calling `Unsplit()` and then resplitting the window back because it will provoke much less flicker (if any). It is valid to call this function whether the splitter has two windows or only one.

Both parameters should be non-NULL and *winOld* must specify one of the windows managed by the splitter. If the parameters are incorrect or the window couldn't be replaced, false is returned. Otherwise the function will return true, but please notice that it will not delete the replaced window and you may wish to do it yourself.

See also

`wxSplitterWindow::GetMinimumPaneSize` (p. 1170)

See also

`wxSplitterWindow::Unsplit` (p. 1176)

`wxSplitterWindow::SplitVertically` (p. 1176)

`wxSplitterWindow::SplitHorizontally` (p. 1175)

wxSplitterWindow::SetSashPosition

void SetSashPosition(int *position*, const bool *redraw* = true)

Sets the sash position.

Parameters

position

The sash position in pixels.

redraw

If true, resizes the panes and redraws the sash and border.

Remarks

Does not currently check for an out-of-range value.

See also

wxSplitterWindow::GetSashPosition (p. 1171)

wxSplitterWindow::SetMinimumPaneSize

void SetMinimumPaneSize(int *paneSize*)

Sets the minimum pane size.

Parameters

paneSize

Minimum pane size in pixels.

Remarks

The default minimum pane size is zero, which means that either pane can be reduced to zero by dragging the sash, thus removing one of the panes. To prevent this behaviour (and veto out-of-range sash dragging), set a minimum size, for example 20 pixels. If the `wxSP_PERMIT_UNSPPLIT` style is used when a splitter window is created, the window may be unsplit even if minimum size is non-zero.

See also

wxSplitterWindow::GetMinimumPaneSize (p. 1170)

wxSplitterWindow::SetSplitMode

void SetSplitMode(int *mode*)

Sets the split mode.

Parameters

mode

Can be `wxSPLIT_VERTICAL` or `wxSPLIT_HORIZONTAL`.

Remarks

Only sets the internal variable; does not update the display.

See also

`wxSplitterWindow::GetSplitMode` (p. 1171), `wxSplitterWindow::SplitVertically` (p. 1176), `wxSplitterWindow::SplitHorizontally` (p. 1175).

`wxSplitterWindow::SplitHorizontally`

`bool SplitHorizontally(wxWindow* window1, wxWindow* window2, int sashPosition = 0)`

Initializes the top and bottom panes of the splitter window.

Parameters

window1

The top pane.

window2

The bottom pane.

sashPosition

The initial position of the sash. If this value is positive, it specifies the size of the upper pane. If it is negative, it is absolute value gives the size of the lower pane. Finally, specify 0 (default) to choose the default position (half of the total window height).

Return value

true if successful, false otherwise (the window was already split).

Remarks

This should be called if you wish to initially view two panes. It can also be called at any subsequent time, but the application should check that the window is not currently split using `IsSplit` (p. 1172).

See also

`wxSplitterWindow::SplitVertically` (p. 1176), `wxSplitterWindow::IsSplit` (p. 1172), `wxSplitterWindow::Unsplit` (p. 1176)

wxSplitterWindow::SplitVertically

bool SplitVertically(wxWindow* window1, wxWindow* window2, int sashPosition = 0)

Initializes the left and right panes of the splitter window.

Parameters

window1

The left pane.

window2

The right pane.

sashPosition

The initial position of the sash. If this value is positive, it specifies the size of the left pane. If it is negative, it is absolute value gives the size of the right pane. Finally, specify 0 (default) to choose the default position (half of the total window width).

Return value

true if successful, false otherwise (the window was already split).

Remarks

This should be called if you wish to initially view two panes. It can also be called at any subsequent time, but the application should check that the window is not currently split using *IsSplit* (p. 1172).

See also

wxSplitterWindow::SplitHorizontally (p. 1175), *wxSplitterWindow::IsSplit* (p. 1172), *wxSplitterWindow::Unsplit* (p. 1176).

wxSplitterWindow::Unsplit

bool Unsplit(wxWindow* toRemove = NULL)

Unsplits the window.

Parameters

toRemove

The pane to remove, or NULL to remove the right or bottom pane.

Return value

true if successful, false otherwise (the window was not split).

Remarks

This call will not actually delete the pane being removed; it calls *OnUnsplit* (p. 1172) which can be overridden for the desired behaviour. By default, the pane being removed is hidden.

See also

wxSplitterWindow::SplitHorizontally (p. 1175), *wxSplitterWindow::SplitVertically* (p. 1176), *wxSplitterWindow::IsSplit* (p. 1172), *wxSplitterWindow::OnUnsplit* (p. 1172)

wxSplitterWindow::UpdateSize

void UpdateSize()

Causes any pending sizing of the sash and child panes to take place immediately.

Such resizing normally takes place in idle time, in order to wait for layout to be completed. However, this can cause unacceptable flicker as the panes are resized after the window has been shown. To work around this, you can perform window layout (for example by sending a size event to the parent window), and then call this function, before showing the top-level window.

wxSplitterRenderParams

This is just a simple `struct` used as a return value of *wxRendererNative::GetSplitterParams* (p. 1062).

It doesn't have any methods and all of its fields are constant and so can be only examined but not modified.

Include files

<wx/renderer.h>

wxEvent::widthSash

const wxCoord widthSash

The width of the splitter sash.

wxSplitterRenderParams::border

const wxCoord border

The width of the border drawn by the splitter inside it, may be 0.

wxSplitterRenderParams::isHotSensitive

const bool isHotSensitive

`true` if the sash changes appearance when the mouse passes over it, `false` otherwise.

wxStaticBitmap

A static bitmap control displays a bitmap. It is meant for display of the small icons in the dialog boxes and is not meant to be a general purpose image display control. In particular, under Windows 9x the size of bitmap is limited to 64*64 pixels and thus you should use your own control if you want to display larger images portably.

Derived from

wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/statbmp.h>

Window styles

There are no special styles for this control.

See also *window styles overview* (p. 1618).

See also

wxStaticBitmap (p. 1178), *wxStaticBox* (p. 1180)

Remarks

The bitmap to be displayed should have a small number of colours, such as 16, to avoid palette problems.

wxStaticBitmap::wxStaticBitmap

wxStaticBitmap()

Default constructor.

wxStaticBitmap(wxWindow* parent, wxWindowID id, const wxBitmap& label, const wxPoint& pos, const wxSize& size = wxDefaultSize, long style = 0, const wxString& name = "staticBitmap")

Constructor, creating and showing a text control.

Parameters

parent

Parent window. Should not be NULL.

id

Control identifier. A value of -1 denotes a default value.

label

Bitmap label.

pos

Window position.

size

Window size.

style

Window style. See *wxStaticBitmap* (p. 1178).

name

Window name.

See also

wxStaticBitmap::Create (p. 1179)

wxStaticBitmap::Create

```
bool Create(wxWindow* parent, wxWindowID id, const wxBitmap& label, const  
wxPoint& pos, const wxSize& size = wxDefaultSize, long style = 0, const wxString&  
name = "staticBitmap")
```

Creation function, for two-step construction. For details see *wxStaticBitmap::wxStaticBitmap* (p. 1178).

wxStaticBitmap::GetBitmap

```
wxBitmap& GetBitmap() const
```

Returns a reference to the label bitmap.

See also

wxStaticBitmap::SetBitmap (p. 1180)

wxStaticBitmap::SetBitmap

virtual void SetBitmap(const wxBitmap& *label*)

Sets the bitmap label.

Parameters

label

The new bitmap.

See also

wxStaticBitmap::GetBitmap (p. 1179)

wxStaticBox

A static box is a rectangle drawn around other panel items to denote a logical grouping of items.

Please note that a static box should **not** be used as the parent for the controls it contains, instead they should be siblings of each other. Although using a static box as a parent might work in some versions of wxWidgets, it results in a crash under, for example, wxGTK.

Also, please note that because of this, the order in which you create new controls is important. Create your wxStaticBox control **before** any siblings that are to appear inside the wxStaticBox in order to preserve the correct Z-Order of controls.

Derived from

wxControl (p. 199)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/statbox.h>

Window styles

There are no special styles for this control.

See also *window styles overview* (p. 1618).

See also

wxStaticText (p. 1184)

wxStaticBox::wxStaticBox

wxStaticBox()

Default constructor.

wxStaticBox(*wxWindow** parent, *wxWindowID* id, **const wxString&** label, **const wxPoint&** pos = *wxDefaultPosition*, **const wxSize&** size = *wxDefaultSize*, **long** style = 0, **const wxString&** name = "staticBox")

Constructor, creating and showing a static box.

Parameters

parent

Parent window. Must not be NULL.

id

Window identifier. A value of -1 indicates a default value.

label

Text to be displayed in the static box, the empty string for no label.

pos

Window position. If the position (-1, -1) is specified then a default position is chosen.

size

Checkbox size. If the size (-1, -1) is specified then a default size is chosen.

style

Window style. See *wxStaticBox* (p. 1180).

name

Window name.

See also

wxStaticBox::Create (p. 1182)

wxStaticBox::~~wxStaticBox

void ~wxStaticBox()

Destructor, destroying the group box.

wxStaticBox::Create

bool Create(wxWindow* *parent*, wxWindowID *id*, const wxString& *label*, const wxPoint& *pos* = wxDefaultPosition, const wxSize& *size* = wxDefaultSize, long *style* = 0, const wxString& *name* = "staticBox")

Creates the static box for two-step construction. See *wxStaticBox::wxStaticBox* (p. 1181) for further details.

wxStaticBoxSizer

wxStaticBoxSizer is a sizer derived from *wxBoxSizer* but adds a static box around the sizer. Note that this static box has to be created separately.

Derived from

wxBoxSizer (p. 90)

wxSizer (p. 1110)

wxObject (p. 954)

See also

wxSizer (p. 1110), *wxStaticBox* (p. 1180), *wxBoxSizer* (p. 90), *Sizer overview* (p. 1627)

wxStaticBoxSizer::wxStaticBoxSizer

wxStaticBoxSizer(wxStaticBox* *box*, int *orient*)

Constructor. It takes an associated static box and the orientation *orient* as parameters - *orient* can be either of *wxVERTICAL* or *wxHORIZONTAL*.

wxStaticBoxSizer::GetStaticBox

wxStaticBox* **GetStaticBox**()

Returns the static box associated with the sizer.

wxStaticLine

A static line is just a line which may be used in a dialog to separate the groups of controls. The line may be only vertical or horizontal.

Derived from

wxControl (p. 199)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/statline.h>

Window styles

wxLI_HORIZONTAL Creates a horizontal line.

wxLI_VERTICAL Creates a vertical line.

See also

wxStaticBox (p. 1180)

wxStaticLine::wxStaticLine

wxStaticLine()

Default constructor.

wxStaticLine(*wxWindow* parent*, *wxWindowID id*, **const wxPoint& pos** = *wxDefaultPosition*, **const wxSize& size** = *wxDefaultSize*, **long style** = *wxLI_HORIZONTAL*, **const wxString& name** = *"staticLine"*)

Constructor, creating and showing a static line.

Parameters

parent

Parent window. Must not be NULL.

id

Window identifier. A value of -1 indicates a default value.

pos

Window position. If the position (-1, -1) is specified then a default position is chosen.

size

Size. Note that either the height or the width (depending on whether the line is horizontal or vertical) is ignored.

style

Window style (either *wxLI_HORIZONTAL* or *wxLI_VERTICAL*).

name

Window name.

See also

wxStaticLine::Create (p. 1184)

wxStaticLine::Create

bool Create(wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = 0, const wxString& name = "staticLine")

Creates the static line for two-step construction. See *wxStaticLine::wxStaticLine* (p. 1183) for further details.

wxStaticLine::IsVertical

bool IsVertical() const

Returns true if the line is vertical, false if horizontal.

wxStaticLine::GetDefaultSize

int GetDefaultSize()

This static function returns the size which will be given to the smaller dimension of the static line, i.e. its height for a horizontal line or its width for a vertical one.

wxStaticText

A static text control displays one or more lines of read-only text.

Derived from

wxControl (p. 199)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/stattext.h>

Window styles

wxALIGN_LEFT

Align the text to the left

wxALIGN_RIGHT	Align the text to the right
wxALIGN_CENTRE	Center the text (horizontally)
wxST_NO_AUTORESIZE	By default, the control will adjust its size to exactly fit to the size of the text when <i>SetLabel</i> (p. 1186) is called. If this style flag is given, the control will not change its size (this style is especially useful with controls which also have wxALIGN_RIGHT or CENTER style because otherwise they won't make sense any longer after a call to <i>SetLabel</i>)

See also *window styles overview* (p. 1618).

See also

wxStaticBitmap (p. 1178), *wxStaticBox* (p. 1180)

wxStaticText::wxStaticText

wxStaticText()

Default constructor.

wxStaticText(wxWindow* parent, wxWindowID id, const wxString& label, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = 0, const wxString& name = "StaticText")

Constructor, creating and showing a text control.

Parameters

parent

Parent window. Should not be NULL.

id

Control identifier. A value of -1 denotes a default value.

label

Text label.

pos

Window position.

size

Window size.

style

Window style. See *wxStaticText* (p. 1184).

name

Window name.

See also

wxStaticText::Create (p. 1186)

wxStaticText::Create

bool Create(wxWindow* parent, wxWindowID id, const wxString& label, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = 0, const wxString& name = "staticText")

Creation function, for two-step construction. For details see *wxStaticText::wxStaticText* (p. 1185).

wxStaticText::GetLabel

wxString GetLabel() const

Returns the contents of the control.

wxStaticText::SetLabel

virtual void SetLabel(const wxString& label)

Sets the static text label and updates the controls size to exactly fit the label unless the control has `wxST_NO_AUTORESIZE` flag.

Parameters

label

The new label to set. It may contain newline characters.

wxStatusBar

A status bar is a narrow window that can be placed along the bottom of a frame to give small amounts of status information. It can contain one or more fields, one or more of which can be variable length according to the size of the window.

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Derived from

wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/statusbr.h>

Window styles

wxST_SIZEGRIP On Windows 95, displays a gripper at right-hand side of the status bar.

See also *window styles overview* (p. 1618).

Remarks

It is possible to create controls and other windows on the status bar. Position these windows from an **OnSize** event handler.

See also

wxFrame (p. 532), *Status bar sample* (p. 1575)

wxStatusBar::wxStatusBar

wxStatusBar()

Default constructor.

wxStatusBar(*wxWindow** parent, *wxWindowID* id, *long* style = *wxST_SIZEGRIP*,
const wxString& name = *"statusBar"*)

Constructor, creating the window.

Parameters

parent

The window parent, usually a frame.

id

The window identifier. It may take a value of -1 to indicate a default value.

style

The window style. See *wxStatusBar* (p. 1186).

name

The name of the window. This parameter is used to associate a name with the

item, allowing the application user to set Motif resource values for individual windows.

See also

wxStatusBar::Create (p. 1188)

wxStatusBar::~~wxStatusBar

void ~wxStatusBar()

Destructor.

wxStatusBar::Create

bool Create(wxWindow* parent, wxWindowID id, long style = wxST_SIZEGRIP, const wxString& name = "statusBar")

Creates the window, for two-step construction.

See *wxStatusBar::wxStatusBar* (p. 1187) for details.

wxStatusBar::GetFieldRect

virtual bool GetFieldRect(int i, wxRect& rect) const

Returns the size and position of a field's internal bounding rectangle.

Parameters

i

The field in question.

rect

The rectangle values are placed in this variable.

Return value

true if the field index is valid, false otherwise.

See also

wxRect (p. 1042)

wxPerl note: In wxPerl this function returns a `Wx::Rect` if the field index is valid, `undef` otherwise.

wxStatusBar::GetFieldsCount

int GetFieldsCount() const

Returns the number of fields in the status bar.

wxStatusBar::GetStatusText

virtual wxString GetStatusText(int *i* = 0) const

Returns the string associated with a status bar field.

Parameters

i

The number of the status field to retrieve, starting from zero.

Return value

The status field string if the field is valid, otherwise the empty string.

See also

wxStatusBar::SetStatusText (p. 1190)

wxStatusBar::PopStatusText

void PopStatusText(int *field* = 0)

Sets the field text to the top of the stack, and pops the stack of saved strings.

See also

wxStatusBar::PushStatusText (p. 1189)

wxStatusBar::PushStatusText

void PushStatusText(const wxString& *string*, int *field* = 0)

Saves the current field text in a per field stack, and sets the field text to the string passed as argument.

wxStatusBar::SetFieldsCount

virtual void SetFieldsCount(int *number* = 1, int* *widths* = NULL)

Sets the number of fields, and optionally the field widths.

wxPython note: Only the first parameter is accepted. Use *SetStatusWidths* to set the widths of the fields.

wxPerl note: In wxPerl this function accepts only the `n` parameter. Use `SetStatusWidths` to set the field widths.

Parameters

number

The number of fields.

widths

An array of *n* integers interpreted in the same way as in *SetStatusWidths* (p. 1190)

wxStatusBar::SetMinHeight

void SetMinHeight(int *height*)

Sets the minimal possible height for the status bar. The real height may be bigger than the height specified here depending on the size of the font used by the status bar.

wxStatusBar::SetStatusText

virtual void SetStatusText(const wxString& *text*, int *i* = 0)

Sets the text for one field.

Parameters

text

The text to be set. Use an empty string ("") to clear the field.

i

The field to set, starting from zero.

See also

wxStatusBar::GetStatusText (p. 1189), *wxFrame::SetStatusText* (p. 543)

wxStatusBar::SetStatusWidths

virtual void SetStatusWidths(int *n*, int **widths*)

Sets the widths of the fields in the status line. There are two types of fields: fixed widths one and variable width fields. For the fixed width fields you should specify their (constant) width in pixels. For the variable width fields, specify a negative number which indicates how should the field expand: the space left for all variable width fields is divided between them according to the absolute value of this number. A variable width field with width of -2 gets twice as much of it as a field with width -1 and so on.

For example, to create one fixed width field of width 50 in the right part of the status bar and two more fields which get 66% and 33% of the remaining space correspondingly, you should use an array containing -2, -1 and 100.

Parameters

n

The number of fields in the status bar. Must be equal to the number passed to *SetFieldsCount* (p. 1189) the last time it was called.

widths

Contains an array of *n* integers, each of which is either an absolute status field width in pixels if positive or indicates a variable width field if negative

Remarks

The widths of the variable fields are calculated from the total width of all fields, minus the sum of widths of the non-variable fields, divided by the number of variable fields.

See also

wxStatusBar::SetFieldsCount (p. 1189), *wxFrame::SetStatusWidths* (p. 544)

wxPython note: Only a single parameter is required, a Python list of integers.

wxPerl note: In wxPerl this method takes as parameters the field widths.

wxStopWatch

The *wxStopWatch* class allow you to measure time intervals. For example, you may use it to measure the time elapsed by some function:

```
wxStopWatch sw;
CallLongRunningFunction();
wxLogMessage("The long running function took %ldms to execute",
             sw.Time());

sw.Pause();
... stopwatch is stopped now ...
sw.Resume();
CallLongRunningFunction();
wxLogMessage("And calling it twice took %ldms in all", sw.Time());
```

Include files

<wx/timer.h>

See also

::*wxStartTimer* (p. 1535), ::*wxGetElapsedTime* (p. 1533), *wxTimer* (p. 1297)

wxStopWatch::wxStopWatch

wxStopWatch()

Constructor. This starts the stop watch.

wxStopWatch::Pause

void Pause()

Pauses the stop watch. Call *wxStopWatch::Resume* (p. 1192) to resume time measuring again.

If this method is called several times, *Resume* () must be called the same number of times to really resume the stop watch. You may, however, call *Start* (p. 1192) to resume it unconditionally.

wxStopWatch::Resume

void Resume()

Resumes the stop watch which had been paused with *wxStopWatch::Pause* (p. 1192).

wxStopWatch::Start

void Start(long milliseconds = 0)

(Re)starts the stop watch with a given initial value.

wxStopWatch::Time

long Time() const

Returns the time in milliseconds since the start (or restart) or the last call of *wxStopWatch::Pause* (p. 1192).

wxStreamBase

This class is the base class of most stream related classes in wxWidgets. It must not be used directly.

Derived from

None

Include files

<wx/stream.h>

[See also](#)

wxStreamBuffer (p. 1194)

wxStreamBase::wxStreamBase

wxStreamBase()

Creates a dummy stream object. It doesn't do anything.

wxStreamBase::~~wxStreamBase

~wxStreamBase()

Destructor.

wxStreamBase::IsOk

wxStreamError IsOk() const

Returns true if no error occurred on the stream.

[See also](#)

GetLastError (p. 1193)

wxStreamBase::GetLastError

wxStreamError GetLastError() const

This function returns the last error.

wxSTREAM_NO_ERROR No error occurred.

wxSTREAM_EOF An End-Of-File occurred.

wxSTREAM_WRITE_ERROR A generic error occurred on the last write call.

wxSTREAM_READ_ERROR A generic error occurred on the last read call.

wxStreamBase::OnSysRead

size_t OnSysRead(void* *buffer*, size_t *bufsize*)

Internal function. It is called when the stream wants to read data of the specified size. It should return the size that was actually read.

wxStreamBase::OnSysSeek

off_t OnSysSeek(off_t pos, wxSeekMode mode)

Internal function. It is called when the stream needs to change the current position.

wxStreamBase::OnSysTell

off_t OnSysTell() const

Internal function. Is is called when the stream needs to know the real position.

wxStreamBase::OnSysWrite

size_t OnSysWrite(void *buffer, size_t bufsize)

See *OnSysRead* (p. 1193).

wxStreamBase::GetSize

size_t GetSize() const

This function returns the size of the stream. For example, for a file it is the size of the file.

Warning

There are streams which do not have size by definition, such as socket streams. In that cases, *GetSize* returns 0 so you should always test its return value.

wxStreamBuffer

Derived from

None

Include files

<wx/stream.h>

See also

wxStreamBase (p. 1192)

wxStreamBuffer::wxStreamBuffer

wxStreamBuffer(wxStreamBase& stream, BufMode mode)

Constructor, creates a new stream buffer using *stream* as a parent stream and *mode* as the IO mode. *mode* can be: wxStreamBuffer::read, wxStreamBuffer::write, wxStreamBuffer::read_write.

One stream can have many stream buffers but only one is used internally to pass IO call (e.g. wxInputStream::Read() -> wxStreamBuffer::Read()), but you can call directly wxStreamBuffer::Read without any problems. Note that all errors and messages linked to the stream are stored in the stream, not the stream buffers:

```
streambuffer.Read(...);
streambuffer2.Read(...); /* This call erases previous error messages set
by                               ``streambuffer'' */
```

wxStreamBuffer(BufMode mode)

Constructor, creates a new empty stream buffer which won't flush any data to a stream. *mode* specifies the type of the buffer (read, write, read_write). This stream buffer has the advantage to be stream independent and to work only on memory buffers but it is still compatible with the rest of the wxStream classes. You can write, read to this special stream and it will grow (if it is allowed by the user) its internal buffer. Briefly, it has all functionality of a "normal" stream.

Warning

The "read_write" mode may not work: it isn't completely finished.

wxStreamBuffer(const wxStreamBuffer&buffer)

Constructor. It initializes the stream buffer with the data of the specified stream buffer. The new stream buffer has the same attributes, size, position and they share the same buffer. This will cause problems if the stream to which the stream buffer belong is destroyed and the newly cloned stream buffer continues to be used, trying to call functions in the (destroyed) stream. It is advised to use this feature only in very local area of the program.

See also

wxStreamBuffer::SetBufferIO (p. 1197)

wxStreamBuffer::~~wxStreamBuffer

wxStreamBuffer(~wxStreamBuffer)

Destructor. It finalizes all IO calls and frees all internal buffers if necessary.

wxStreamBuffer::Read

size_t Read(void *buffer, size_t size)

Reads a block of the specified *size* and stores the data in *buffer*. This function tries to read from the buffer first and if more data has been requested, reads more data from the associated stream and updates the buffer accordingly until all requested data is read.

Return value

It returns the size of the data read. If the returned size is different of the specified *size*, an error has occurred and should be tested using *GetLastError* (p. 1193).

size_t Read(wxStreamBuffer *buffer)

Reads a *buffer*. The function returns when *buffer* is full or when there isn't data anymore in the current buffer.

See also

wxStreamBuffer::Write (p. 1196)

wxStreamBuffer::Write

size_t Write(const void *buffer, size_t size)

Writes a block of the specified *size* using data of *buffer*. The data are cached in a buffer before being sent in one block to the stream.

size_t Write(wxStreamBuffer *buffer)

See *Read* (p. 1195).

wxStreamBuffer::GetChar

char GetChar()

Gets a single char from the stream buffer. It acts like the *Read* call.

Problem

You aren't directly notified if an error occurred during the IO call.

See also

wxStreamBuffer::Read (p. 1195)

wxStreamBuffer::PutChar

void PutChar(char c)

Puts a single char to the stream buffer.

Problem

You aren't directly notified if an error occurred during the IO call.

See also

`wxStreamBuffer::Read` (p. 1196)

wxStreamBuffer::Tell

off_t Tell() const

Gets the current position in the stream. This position is calculated from the *real* position in the stream and from the internal buffer position: so it gives you the position in the *real* stream counted from the start of the stream.

Return value

Returns the current position in the stream if possible, `wxInvalidOffset` in the other case.

wxStreamBuffer::Seek

off_t Seek(off_t pos, wxSeekMode mode)

Changes the current position.

mode may be one of the following:

wxFromStart	The position is counted from the start of the stream.
wxFromCurrent	The position is counted from the current position of the stream.
wxFromEnd	The position is counted from the end of the stream.

Return value

Upon successful completion, it returns the new offset as measured in bytes from the beginning of the stream. Otherwise, it returns `wxInvalidOffset`.

wxStreamBuffer::ResetBuffer

void ResetBuffer()

Resets to the initial state variables concerning the buffer.

wxStreamBuffer::SetBufferIO

void SetBufferIO(char* buffer_start, char* buffer_end)

Specifies which pointers to use for stream buffering. You need to pass a pointer on the start of the buffer end and another on the end. The object will use this buffer to cache stream data. It may be used also as a source/destination buffer when you create an empty stream buffer (See *wxStreamBuffer::wxStreamBuffer* (p. 1195)).

Remarks

When you use this function, you will have to destroy the IO buffers yourself after the stream buffer is destroyed or don't use it anymore. In the case you use it with an empty buffer, the stream buffer will not resize it when it is full.

See also

wxStreamBuffer constructor (p. 1195)

wxStreamBuffer::Fixed (p. 1199)

wxStreamBuffer::Flushable (p. 1199)

void SetBufferIO(size_t bufsize)

Destroys or invalidates the previous IO buffer and allocates a new one of the specified size.

Warning

All previous pointers aren't valid anymore.

Remark

The created IO buffer is growable by the object.

See also

wxStreamBuffer::Fixed (p. 1199)

wxStreamBuffer::Flushable (p. 1199)

wxStreamBuffer::GetBufferStart

char * GetBufferStart() const

Returns a pointer on the start of the stream buffer.

wxStreamBuffer::GetBufferEnd

char * GetBufferEnd() const

Returns a pointer on the end of the stream buffer.

wxStreamBuffer::GetBufferPos

char * GetBufferPos() const

Returns a pointer on the current position of the stream buffer.

wxStreamBuffer::GetIntPosition

off_t GetIntPosition() const

Returns the current position (counted in bytes) in the stream buffer.

wxStreamBuffer::SetIntPosition

void SetIntPosition(size_t pos)

Sets the current position (in bytes) in the stream buffer.

Warning

Since it is a very low-level function, there is no check on the position: specifying an invalid position can induce unexpected results.

wxStreamBuffer::GetLastAccess

size_t GetLastAccess() const

Returns the amount of bytes read during the last IO call to the parent stream.

wxStreamBuffer::Fixed

void Fixed(bool fixed)

Toggles the fixed flag. Usually this flag is toggled at the same time as *flushable*. This flag allows (when it has the false value) or forbids (when it has the true value) the stream buffer to resize dynamically the IO buffer.

See also

wxStreamBuffer::SetBufferIO (p. 1197)

wxStreamBuffer::Flushable

void Flushable(bool flushable)

Toggles the flushable flag. If *flushable* is disabled, no data are sent to the parent stream.

wxStreamBuffer::FlushBuffer

bool FlushBuffer()

Flushes the IO buffer.

wxStreamBuffer::FillBuffer

bool FillBuffer()

Fill the IO buffer.

wxStreamBuffer::GetDataLeft

size_t GetDataLeft()

Returns the amount of available data in the buffer.

wxStreamBuffer::Stream

wxStreamBase* Stream()

Returns the parent stream of the stream buffer.

wxStreamToTextRedirector

This class can be used to (temporarily) redirect all output sent to a C++ ostream object to a *wxTextCtrl* (p. 1250) instead.

NB: Some compilers and/or build configurations don't support multiply inheriting *wxTextCtrl* (p. 1250) from `std::streambuf` in which case this class is not compiled in. You also must have `wxUSE_STD_Iostream` option on (i.e. set to 1) in your `setup.h` to be able to use it. Under Unix, specify `--enable-std_iostreams` switch when running configure for this.

```
Example of usage:  using namespace std;

wxTextCtrl *text = new wxTextCtrl(...);

{
    wxStreamToTextRedirector redirect(text);

    // this goes to the text control
    cout << "Hello, text!" << endl;
}

// this goes somewhere else, presumably to stdout
cout << "Hello, console!" << endl;
```

Derived from

No base class

Include files

<wx/textctrl.h>

See also

wxTextCtrl (p. 1250)

wxStreamToTextRedirector::wxStreamToTextRedirector

wxStreamToTextRedirector(wxTextCtrl *text, ostream *ostr = NULL)

The constructor starts redirecting output sent to *ostr* or *cout* for the default parameter value to the text control *text*.

Parameters

text

The text control to append output too, must be non NULL

ostr

The C++ stream to redirect, *cout* is used if it is NULL

wxStreamToTextRedirector::~~wxStreamToTextRedirector

~wxStreamToTextRedirector()

When a *wxStreamToTextRedirector* object is destroyed, the redirection is ended and any output sent to the C++ ostream which had been specified at the time of the object construction will go to its original destination.

wxString

wxString is a class representing a character string. Please see the *wxString overview* (p. 1581) for more information about it. As explained there, *wxString* implements about 90% of methods of the `std::string` class (iterators are not supported, nor all methods which use them). These standard functions are not documented in this manual so please see the STL documentation. The behaviour of all these functions is identical to the behaviour described there (except that *wxString* is sensitive to null character).

You may notice that *wxString* sometimes has many functions which do the same thing like, for example, *Length()* (p. 1215), *Len()* (p. 1215) and *length()* which all return the string length. In all cases of such duplication the `std::string`-compatible method (*length()* in this case, always the lowercase version) should be used as it will ensure smoother transition to `std::string` when *wxWidgets* starts using it instead of *wxString*.

Derived from

None

Include files

<wx/string.h>

Predefined objects

Objects:

wxEmptyString

See also

Overview (p. 1581)

Constructors and assignment operators

A string may be constructed either from a C string, (some number of copies of) a single character or a wide (UNICODE) string. For all constructors (except the default which creates an empty string) there is also a corresponding assignment operator.

wxString (p. 1208)

operator = (p. 1220)

~wxString (p. 1208)

String length

These functions return the string length and check whether the string is empty or empty it.

Len (p. 1215)

IsEmpty (p. 1213)

operator! (p. 1220)

Empty (p. 1211)

Clear (p. 1210)

Character access

Many functions in this section take a character index in the string. As with C strings and/or arrays, the indices start from 0, so the first character of a string is `string[0]`. Attempt to access a character beyond the end of the string (which may be even 0 if the string is empty) will provoke an assert failure in *debug build* (p. 1605), but no checks are done in release builds.

This section also contains both implicit and explicit conversions to C style strings. Although implicit conversion is quite convenient, it is advised to use explicit *c_str()* (p. 1210) method for the sake of clarity. Also see *overview* (p. 1583) for the cases where it

is necessary to use it.

GetChar (p. 1212)
GetWritableChar (p. 1213)
SetChar (p. 1217)
Last (p. 1214)
operator [] (p. 1221)
c_str (p. 1210)
*operator const char** (p. 1222)

Concatenation

Anything may be concatenated (appended to) with a string. However, you can't append something to a C string (including literal constants), so to do this it should be converted to a *wxString* first.

operator << (p. 1222)
operator += (p. 1221)
operator + (p. 1221)
Append (p. 1209)
Prepend (p. 1216)

Comparison

The default comparison function *Cmp* (p. 1210) is case-sensitive and so is the default version of *IsSameAs* (p. 1214). For case insensitive comparisons you should use *CmpNoCase* (p. 1210) or give a second parameter to *IsSameAs*. This last function is may be more convenient if only equality of the strings matters because it returns a boolean true value if the strings are the same and not 0 (which is usually false in C) as *Cmp ()* does.

Matches (p. 1216) is a poor man's regular expression matcher: it only understands '*' and '?' metacharacters in the sense of DOS command line interpreter.

StartsWith (p. 1218) is helpful when parsing a line of text which should start with some predefined prefix and is more efficient than doing direct string comparison as you would also have to precalculate the length of the prefix then.

Cmp (p. 1210)
CmpNoCase (p. 1210)
IsSameAs (p. 1214)
Matches (p. 1216)
StartsWith (p. 1218)

Substring extraction

These functions allow to extract substring from this string. All of them don't modify the original string and return a new string containing the extracted substring.

Mid (p. 1216)
operator() (p. 1221)
Left (p. 1215)
Right (p. 1217)
BeforeFirst (p. 1210)
BeforeLast (p. 1210)
AfterFirst (p. 1209)
AfterLast (p. 1209)
StartsWith (p. 1218)

Case conversion

The *MakeXXX()* variants modify the string in place, while the other functions return a new string which contains the original text converted to the upper or lower case and leave the original string unchanged.

MakeUpper (p. 1215)
Upper (p. 1220)
MakeLower (p. 1215)
Lower (p. 1215)

Searching and replacing

These functions replace the standard *strchr()* and *strstr()* functions.

Find (p. 1211)
Replace (p. 1217)

Conversion to numbers

The string provides functions for conversion to signed and unsigned integer and floating point numbers. All three functions take a pointer to the variable to put the numeric value in and return true if the **entire** string could be converted to a number.

ToLong (p. 1219)
ToULong (p. 1219)
ToDouble (p. 1218)

Writing values into the string

Both formatted versions (*Printf* (p. 1216)) and stream-like insertion operators exist (for basic types only). Additionally, the *Format* (p. 1212) function allows to use simply append formatted value to a string:

```
// the following 2 snippets are equivalent  
  
wxString s = "...";  
s += wxString::Format("%d", n);
```

```
wxString s;  
s.Printf("...%d", n);
```

Format (p. 1212)
FormatV (p. 1212)
Printf (p. 1216)
PrintfV (p. 1216)
operator << (p. 1222)

Memory management

These are "advanced" functions and they will be needed quite rarely. *Alloc* (p. 1209) and *Shrink* (p. 1217) are only interesting for optimization purposes. *GetWriteBuf* (p. 1213) may be very useful when working with some external API which requires the caller to provide a writable buffer, but extreme care should be taken when using it: before performing any other operation on the string *UngetWriteBuf* (p. 1220) **must** be called!

Alloc (p. 1209)
Shrink (p. 1217)
GetWriteBuf (p. 1213)
UngetWriteBuf (p. 1220)

Miscellaneous

Other string functions.

Trim (p. 1219)
Pad (p. 1216)
Truncate (p. 1220)

wxWidgets 1.xx compatibility functions

These functions are deprecated, please consider using new wxWidgets 2.0 functions instead of them (or, even better, `std::string` compatible variants).

SubString (p. 1218)
sprintf (p. 1218)
CompareTo (p. 1211)
Length (p. 1215)
Freq (p. 1212)
LowerCase (p. 1215)
UpperCase (p. 1220)
Strip (p. 1218)
Index (p. 1213)
Remove (p. 1217)
First (p. 1211)
Last (p. 1214)
Contains (p. 1211)
IsNull (p. 1214)

IsAscii (p. 1213)
IsNumber (p. 1214)
IsWord (p. 1214)

std::string compatibility functions

The supported functions are only listed here, please see any STL reference for their documentation.

```
// take nLen chars starting at nPos
wxString(const wxString& str, size_t nPos, size_t nLen);
// take all characters from pStart to pEnd (poor man's iterators)
wxString(const void *pStart, const void *pEnd);

// lib.string.capacity
// return the length of the string
size_t size() const;
// return the length of the string
size_t length() const;
// return the maximum size of the string
size_t max_size() const;
// resize the string, filling the space with c if c != 0
void resize(size_t nSize, char ch = '\0');
// delete the contents of the string
void clear();
// returns true if the string is empty
bool empty() const;

// lib.string.access
// return the character at position n
char at(size_t n) const;
// returns the writable character at position n
char& at(size_t n);

// lib.string.modifiers
// append a string
wxString& append(const wxString& str);
// append elements str[pos], ..., str[pos+n]
wxString& append(const wxString& str, size_t pos, size_t n);
// append first n (or all if n == npos) characters of sz
wxString& append(const char *sz, size_t n = npos);

// append n copies of ch
wxString& append(size_t n, char ch);

// same as `this_string = str'
wxString& assign(const wxString& str);
// same as ` = str[pos..pos + n]
wxString& assign(const wxString& str, size_t pos, size_t n);
// same as ` = first n (or all if n == npos) characters of sz'
wxString& assign(const char *sz, size_t n = npos);
// same as ` = n copies of ch'
wxString& assign(size_t n, char ch);

// insert another string
wxString& insert(size_t nPos, const wxString& str);
// insert n chars of str starting at nStart (in str)
wxString& insert(size_t nPos, const wxString& str, size_t nStart, size_t
n);

// insert first n (or all if n == npos) characters of sz
wxString& insert(size_t nPos, const char *sz, size_t n = npos);
// insert n copies of ch
wxString& insert(size_t nPos, size_t n, char ch);

// delete characters from nStart to nStart + nLen
wxString& erase(size_t nStart = 0, size_t nLen = npos);
```

```

    // replaces the substring of length nLen starting at nStart
wxString& replace(size_t nStart, size_t nLen, const char* sz);
    // replaces the substring with nCount copies of ch
wxString& replace(size_t nStart, size_t nLen, size_t nCount, char ch);
    // replaces a substring with another substring
wxString& replace(size_t nStart, size_t nLen,
                  const wxString& str, size_t nStart2, size_t nLen2);
    // replaces the substring with first nCount chars of sz
wxString& replace(size_t nStart, size_t nLen,
                  const char* sz, size_t nCount);

    // swap two strings
void swap(wxString& str);

    // All find() functions take the nStart argument which specifies the
    // position to start the search on, the default value is 0. All
functions
    // return npos if there were no match.

    // find a substring
size_t find(const wxString& str, size_t nStart = 0) const;

    // find first n characters of sz
size_t find(const char* sz, size_t nStart = 0, size_t n = npos) const;

    // find the first occurrence of character ch after nStart
size_t find(char ch, size_t nStart = 0) const;

    // rfind() family is exactly like find() but works right to left

    // as find, but from the end
size_t rfind(const wxString& str, size_t nStart = npos) const;

    // as find, but from the end
size_t rfind(const char* sz, size_t nStart = npos,
              size_t n = npos) const;
    // as find, but from the end
size_t rfind(char ch, size_t nStart = npos) const;

    // find first/last occurrence of any character in the set

    //
size_t find_first_of(const wxString& str, size_t nStart = 0) const;
    //
size_t find_first_of(const char* sz, size_t nStart = 0) const;
    // same as find(char, size_t)
size_t find_first_of(char c, size_t nStart = 0) const;
    //
size_t find_last_of (const wxString& str, size_t nStart = npos) const;
    //
size_t find_last_of (const char* s, size_t nStart = npos) const;
    // same as rfind(char, size_t)
size_t find_last_of (char c, size_t nStart = npos) const;

    // find first/last occurrence of any character not in the set

    //
size_t find_first_not_of(const wxString& str, size_t nStart = 0) const;
    //
size_t find_first_not_of(const char* s, size_t nStart = 0) const;
    //
size_t find_first_not_of(char ch, size_t nStart = 0) const;
    //
size_t find_last_not_of(const wxString& str, size_t nStart=npos) const;
    //
size_t find_last_not_of(const char* s, size_t nStart = npos) const;
    //
size_t find_last_not_of(char ch, size_t nStart = npos) const;

    // All compare functions return a negative, zero or positive value
    // if the [sub]string is less, equal or greater than the compare()

```

argument.

```
// just like strcmp()
int compare(const wxString& str) const;
// comparison with a substring
int compare(size_t nStart, size_t nLen, const wxString& str) const;
// comparison of 2 substrings
int compare(size_t nStart, size_t nLen,
            const wxString& str, size_t nStart2, size_t nLen2) const;
// just like strcmp()
int compare(const char* sz) const;
// substring comparison with first nCount characters of sz
int compare(size_t nStart, size_t nLen,
            const char* sz, size_t nCount = npos) const;

// substring extraction
wxString substr(size_t nStart = 0, size_t nLen = npos) const;
```

wxString::wxString

wxString()

Default constructor.

wxString(const wxString& x)

Copy constructor.

wxString(char ch, size_t n = 1)

Constructs a string of *n* copies of character *ch*.

wxString(const char* psz, size_t nLength = wxSTRING_MAXLEN)

Takes first *nLength* characters from the C string *psz*. The default value of `wxSTRING_MAXLEN` means to take all the string.

Note that this constructor may be used even if *psz* points to a buffer with binary data (i.e. containing NUL characters) as long as you provide the correct value for *nLength*. However, the default form of it works only with strings without intermediate NULs because it uses `strlen()` to calculate the effective length and it would not give correct results otherwise.

wxString(const unsigned char* psz, size_t nLength = wxSTRING_MAXLEN)

For compilers using unsigned char: takes first *nLength* characters from the C string *psz*. The default value of `wxSTRING_MAXLEN` means take all the string.

wxString(const wchar_t* psz)

Constructs a string from the wide (UNICODE) string.

wxString::~~wxString

~wxString()

String destructor. Note that this is not virtual, so `wxString` must not be inherited from.

wxString::Alloc

void Alloc(size_t nLen)

Preallocate enough space for `wxString` to store *nLen* characters. This function may be used to increase speed when the string is constructed by repeated concatenation as in

```
// delete all vowels from the string
wxString DeleteAllVowels(const wxString& original)
{
    wxString result;

    size_t len = original.length();

    result.Alloc(len);

    for ( size_t n = 0; n < len; n++ )
    {
        if ( strchr("aeuio", tolower(original[n])) == NULL )
            result += original[n];
    }

    return result;
}
```

because it will avoid the need of reallocating string memory many times (in case of long strings). Note that it does not set the maximal length of a string - it will still expand if more than *nLen* characters are stored in it. Also, it does not truncate the existing string (use *Truncate()* (p. 1220) for this) even if its current length is greater than *nLen*

wxString::Append

wxString& Append(const char* psz)

Concatenates *psz* to this string, returning a reference to it.

wxString& Append(char ch, int count = 1)

Concatenates character *ch* to this string, *count* times, returning a reference to it.

wxString::AfterFirst

wxString AfterFirst(char ch) const

Gets all the characters after the first occurrence of *ch*. Returns the empty string if *ch* is not found.

wxString::AfterLast

wxString AfterLast(char ch) const

Gets all the characters after the last occurrence of *ch*. Returns the whole string if *ch* is not found.

wxString::BeforeFirst

wxString BeforeFirst(char ch) const

Gets all characters before the first occurrence of *ch*. Returns the whole string if *ch* is not found.

wxString::BeforeLast

wxString BeforeLast(char ch) const

Gets all characters before the last occurrence of *ch*. Returns the empty string if *ch* is not found.

wxString::c_str

const char * c_str() const

Returns a pointer to the string data.

wxString::Clear

void Clear()

Empties the string and frees memory occupied by it.

See also: *Empty* (p. 1211)

wxString::Cmp

int Cmp(const char* psz) const

Case-sensitive comparison.

Returns a positive value if the string is greater than the argument, zero if it is equal to it or a negative value if it is less than the argument (same semantics as the standard *strcmp()* function).

See also *CmpNoCase* (p. 1210), *IsSameAs* (p. 1214).

wxString::CmpNoCase

int CmpNoCase(const char* psz) const

Case-insensitive comparison.

Returns a positive value if the string is greater than the argument, zero if it is equal to it or a negative value if it is less than the argument (same semantics as the standard *strcmp()* function).

See also *Cmp* (p. 1210), *IsSameAs* (p. 1214).

wxString::CompareTo

```
#define NO_POS ((int)(-1)) // undefined position
enum caseCompare {exact, ignoreCase};
```

int CompareTo(const char* psz, caseCompare cmp = exact) const

Case-sensitive comparison. Returns 0 if equal, 1 if greater or -1 if less.

wxString::Contains

bool Contains(const wxString& str) const

Returns 1 if target appears anywhere in wxString; else 0.

wxString::Empty

void Empty()

Makes the string empty, but doesn't free memory occupied by the string.

See also: *Clear()* (p. 1210).

wxString::Find

int Find(char ch, bool fromEnd = false) const

Searches for the given character. Returns the starting index, or -1 if not found.

int Find(const char* sz) const

Searches for the given string. Returns the starting index, or -1 if not found.

wxString::First

int First(char c)**int First(const char* psz) const**

int First(const wxString& str) const

Same as *Find* (p. 1211).

wxString::Format

static wxString Format(const wxChar *format, ...)

This static function returns the string containing the result of calling *Printf* (p. 1216) with the passed parameters on it.

[See also](#)

FormatV (p. 1212), *Printf* (p. 1216)

wxString::FormatV

static wxString Format(const wxChar *format, va_list argptr)

This static function returns the string containing the result of calling *PrintfV* (p. 1216) with the passed parameters on it.

[See also](#)

Format (p. 1212), *PrintfV* (p. 1216)

wxString::Freq

int Freq(char ch) const

Returns the number of occurrences of *ch* in the string.

wxString::FromAscii

static wxString FromAscii(const char* s)

static wxString FromAscii(const char c)

Converts the string or character from an ASCII, 7-bit form to the native wxString representation. Most useful when using a Unicode build of wxWidgets.

wxString::GetChar

char GetChar(size_t n) const

Returns the character at position *n* (read-only).

wxString::GetData

const char* GetData() const

wxWidgets compatibility conversion. Returns a constant pointer to the data in the string.

wxString::GetWritableChar

char& GetWritableChar(size_t n)

Returns a reference to the character at position *n*.

wxString::GetWriteBuf

wxChar* GetWriteBuf(size_t len)

Returns a writable buffer of at least *len* bytes. It returns a pointer to a new memory block, and the existing data will not be copied.

Call *wxString::UngetWriteBuf* (p. 1220) as soon as possible to put the string back into a reasonable state.

wxString::Index

size_t Index(char ch) const**size_t Index(const char* sz) const**

Same as *wxString::Find* (p. 1211).

size_t Index(const char* sz, bool caseSensitive = true, bool fromEnd = false) const

Search the element in the array, starting from either side.

If *fromEnd* is true, reverse search direction.

If **caseSensitive**, comparison is case sensitive (the default).

Returns the index of the first item matched, or `wxNOT_FOUND`.

wxString::IsAscii

bool IsAscii() const

Returns true if the string contains only ASCII characters.

wxString::IsEmpty

bool IsEmpty() const

Returns true if the string is empty.

wxString::IsNull

bool IsNull() const

Returns true if the string is empty (same as *IsEmpty* (p. 1213)).

wxString::IsNumber

bool IsNumber() const

Returns true if the string is an integer (with possible sign).

wxString::IsSameAs

bool IsSameAs(const char* psz, bool caseSensitive = true) const

Test for string equality, case-sensitive (default) or not.

caseSensitive is true by default (case matters).

Returns true if strings are equal, false otherwise.

See also *Cmp* (p. 1210), *CmpNoCase* (p. 1210), *IsSameAs* (p. 1214)

wxString::IsSameAs

bool IsSameAs(char c, bool caseSensitive = true) const

Test whether the string is equal to the single character *c*. The test is case-sensitive if *caseSensitive* is true (default) or not if it is false.

Returns true if the string is equal to the character, false otherwise.

See also *Cmp* (p. 1210), *CmpNoCase* (p. 1210), *IsSameAs* (p. 1214)

wxString::IsWord

bool IsWord() const

Returns true if the string is a word. TODO: what's the definition of a word?

wxString::Last

char Last() const

Returns the last character.

char& Last()

Returns a reference to the last character (writable).

wxString::Left

wxString Left(size_t count) const

Returns the first *count* characters of the string.

wxString::Len

size_t Len() const

Returns the length of the string.

wxString::Length

size_t Length() const

Returns the length of the string (same as Len).

wxString::Lower

wxString Lower() const

Returns this string converted to the lower case.

wxString::LowerCase

void LowerCase()

Same as MakeLower.

wxString::MakeLower

wxString& MakeLower()

Converts all characters to lower case and returns the result.

wxString::MakeUpper

wxString& MakeUpper()

Converts all characters to upper case and returns the result.

wxString::Matches

bool Matches(const char* szMask) const

Returns true if the string contents matches a mask containing '*' and '?'.

wxString::Mid

wxString Mid(size_t first, size_t count = wxSTRING_MAXLEN) const

Returns a substring starting at *first*, with length *count*, or the rest of the string if *count* is the default value.

wxString::Pad

wxString& Pad(size_t count, char pad = ' ', bool fromRight = true)

Adds *count* copies of *pad* to the beginning, or to the end of the string (the default).

Removes spaces from the left or from the right (default).

wxString::Prepend

wxString& Prepend(const wxString& str)

Prepends *str* to this string, returning a reference to this string.

wxString::Printf

int Printf(const char* pszFormat, ...)

Similar to the standard function *sprintf()*. Returns the number of characters written, or an integer less than zero on error.

NB: This function will use a safe version of *vsprintf()* (usually called *vsnprintf()*) whenever available to always allocate the buffer of correct size. Unfortunately, this function is not available on all platforms and the dangerous *vsprintf()* will be used then which may lead to buffer overflows.

wxString::PrintfV

int PrintfV(const char* pszFormat, va_list argPtr)

Similar to `vprintf`. Returns the number of characters written, or an integer less than zero on error.

wxString::Remove

wxString& Remove(size_t pos)

Same as `Truncate`. Removes the portion from *pos* to the end of the string.

wxString& Remove(size_t pos, size_t len)

Removes the *len* characters from the string, starting at *pos*.

wxString::RemoveLast

wxString& RemoveLast()

Removes the last character.

wxString::Replace

size_t Replace(const char* szOld, const char* szNew, bool replaceAll = true)

Replace first (or all) occurrences of substring with another one.

replaceAll: global replace (default), or only the first occurrence.

Returns the number of replacements made.

wxString::Right

wxString Right(size_t count) const

Returns the last *count* characters.

wxString::SetChar

void SetChar(size_t n, char ch)

Sets the character at position *n*.

wxString::Shrink

void Shrink()

Minimizes the string's memory. This can be useful after a call to `Alloc()` (p. 1209) if too

much memory were preallocated.

wxString::sprintf

void sprintf(const char* *fmt*)

The same as Printf.

wxString::StartsWith

bool StartsWith(const wxChar **prefix*, wxString **rest* = NULL) const

This function can be used to test if the string starts with the specified *prefix*. If it does, the function will return `true` and put the rest of the string (i.e. after the prefix) into *rest* string if it is not `NULL`. Otherwise, the function returns `false` and doesn't modify the *rest*.

wxString::Strip

`enum stripType {leading = 0x1, trailing = 0x2, both = 0x3};`

wxString Strip(stripType *s* = *trailing*) const

Strip characters at the front and/or end. The same as Trim except that it doesn't change this string.

wxString::SubString

wxString SubString(size_t *from*, size_t *to*) const

Deprecated, use *Mid* (p. 1216) instead (but note that parameters have different meaning).

Returns the part of the string between the indices *from* and *to* inclusive.

wxString::ToAscii

const char* ToAscii() const

Converts the string to an ASCII, 7-bit string (ANSI builds only).

const wxCharBuffer ToAscii() const

Converts the string to an ASCII, 7-bit string in the form of a wxCharBuffer (Unicode builds only).

wxString::ToDouble

bool ToDouble(double *val) const

Attempts to convert the string to a floating point number. Returns `true` on success (the number is stored in the location pointed to by *val*) or `false` if the string does not represent such number.

See also

wxString::ToLong (p. 1219),
wxString::ToULong (p. 1219)

wxString::ToLong

bool ToLong(long *val, int base = 10) const

Attempts to convert the string to a signed integer in base *base*. Returns `true` on success in which case the number is stored in the location pointed to by *val* or `false` if the string does not represent a valid number in the given base.

The value of *base* must be comprised between 2 and 36, inclusive, or be a special value 0 which means that the usual rules of C numbers are applied: if the number starts with `0x` it is considered to be in base16, if it starts with `0 -` in base 8 and in base 10 otherwise. Note that you may not want to specify the base 0 if you are parsing the numbers which may have leading zeroes as they can yield unexpected (to the user not familiar with C) results.

See also

wxString::ToDouble (p. 1218),
wxString::ToULong (p. 1219)

wxString::ToULong

bool ToULong(unsigned long *val, int base = 10) const

Attempts to convert the string to a unsigned integer in base *base*. Returns `true` on success in which case the number is stored in the location pointed to by *val* or `false` if the string does not represent a valid number in the given base.

See *wxString::ToLong* (p. 1219) for the more detailed description of the *base* parameter.

See also

wxString::ToDouble (p. 1218),
wxString::ToLong (p. 1219)

wxString::Trim

wxString& Trim(bool *fromRight* = true)

Removes spaces from the left or from the right (default).

wxString::Truncate

wxString& Truncate(size_t len)

Truncate the string to the given length.

wxString::UngetWriteBuf

void UngetWriteBuf()

void UngetWriteBuf(size_t len)

Puts the string back into a reasonable state (in which it can be used normally), after *wxString::GetWriteBuf* (p. 1213) was called.

The version of the function without the *len* parameter will calculate the new string length itself assuming that the string is terminated by the first `NUL` character in it while the second one will use the specified length and thus is the only version which should be used with the strings with embedded `NUL`s (it is also slightly more efficient as `strlen()` doesn't have to be called).

wxString::Upper

wxString Upper() const

Returns this string converted to upper case.

wxString::UpperCase

void UpperCase()

The same as `MakeUpper`.

wxString::operator!

bool operator!() const

Empty string is false, so `!string` will only return true if the string is empty. This allows the tests for `NULL`ness of a *const char ** pointer and emptiness of the string to look the same in the code and makes it easier to port old code to `wxString`.

See also *IsEmpty()* (p. 1213).

wxString::operator =

wxString& operator =(const wxString& str)

wxString& operator =(const char* psz)

wxString& operator =(char c)

wxString& operator =(const unsigned char* psz)

wxString& operator =(const wchar_t* pwz)

Assignment: the effect of each operation is the same as for the corresponding constructor (see *wxString constructors* (p. 1208)).

wxString::operator +

Concatenation: all these operators return a new string equal to the sum of the operands.

wxString operator +(const wxString& x, const wxString& y)

wxString operator +(const wxString& x, const char* y)

wxString operator +(const wxString& x, char y)

wxString operator +(const char* x, const wxString& y)

wxString::operator +=

void operator +=(const wxString& str)

void operator +=(const char* psz)

void operator +=(char c)

Concatenation in place: the argument is appended to the string.

wxString::operator []

char& operator [] (size_t i)

char operator [] (size_t i)

char operator [] (int i)

Element extraction.

wxString::operator ()

wxString operator () (size_t start, size_t len)

Same as Mid (substring extraction).

wxString::operator <<

wxString& operator <<(const wxString& str)

wxString& operator <<(const char* psz)

wxString& operator <<(char ch)

Same as +=.

wxString& operator <<(int i)

wxString& operator <<(float f)

wxString& operator <<(double d)

These functions work as C++ stream insertion operators: they insert the given value into the string. Precision or format cannot be set using them, you can use *Printf* (p. 1216) for this.

wxString::operator >>

friend istream& operator >>(istream& is, wxString& str)

Extraction from a stream.

wxString::operator const char*

operator const char*() const

Implicit conversion to a C string.

Comparison operators

bool operator ==(const wxString& x, const wxString& y)

bool operator ==(const wxString& x, const char* t)

bool operator !=(const wxString& x, const wxString& y)

bool operator !=(const wxString& x, const char* t)

bool operator >(const wxString& x, const wxString& y)

bool operator >(const wxString& x, const char* t)

bool operator >=(const wxString& x, const wxString& y)

bool operator >=(const wxString& x, const char* t)

bool operator <(const wxString& x, const wxString& y)

bool operator <(const wxString& x, const char* t)

bool operator <=(const wxString& x, const wxString& y)

bool operator <=(const wxString& x, const char* t)

Remarks

These comparisons are case-sensitive.

wxStringBuffer

This tiny class allows to conveniently access the *wxString* (p. 1201) internal buffer as a writable pointer without any risk to forget to restore the string to the usable state later.

For example, assuming you have a low-level OS function called `GetMeaningOfLifeAsString(char *)` returning the value in the provided buffer (which must be writable, of course) you might call it like this:

```
wxString theAnswer;
GetMeaningOfLifeAsString(wxStringBuffer(theAnswer, 1024));
if ( theAnswer != "42" )
{
    wxLogError("Something is very wrong!");
}
```

Derived from

None

Include files

<wx/string.h>

wxStringBuffer::wxStringBuffer

wxStringBuffer(const wxString& str, size_t len)

Constructs a writable string buffer object associated with the given string and containing enough space for at least *len* characters. Basically, this is equivalent to calling *GetWriteBuf* (p. 1213) and saving the result.

wxStringBuffer::~~wxStringBuffer

~wxStringBuffer()

Restores the string passed to the constructor to the usable state by calling *UngetWriteBuf* (p. 1220) on it.

wxStringBuffer::operator wxChar *

wxChar * operator wxChar *() const

Returns the writable pointer to a buffer of the size at least equal to the length specified in the constructor.

wxStringClientData

Predefined client data class for holding a string.

Derived from

wxClientData (p. 134)

Include files

<clntdata.h>

Data structures

wxStringClientData::wxStringClientData

wxStringClientData()

Empty constructor.

wxStringClientData(const wxString& data)

Create client data with string.

wxStringClientData::GetData

const wxString& GetData() const

Get string client data.

wxStringClientData::SetData

void SetData(const wxString& data)

Set string client data.

wxStringList

NB: This class is obsolete, please don't use it any longer. You can use either *wxArrayString* (p. 54) or a *type safe* (p. 787) list class instead.

A string list is a list which is assumed to contain strings. Memory is allocated when strings are added to the list, and deallocated by the destructor or by the **Delete** member.

Derived from

wxList (p. 787)
wxObject (p. 954)

Include files

<wx/list.h>

See also

wxString (p. 1201), *wxList* (p. 787)

wxStringList::wxStringList

wxStringList()

Constructor.

void wxStringList(char* first, ...)

Constructor, taking NULL-terminated string argument list. *wxStringList* allocates memory for the strings.

wxStringList::~~wxStringList

~wxStringList()

Deletes string list, deallocating strings.

wxStringList::Add

wxNode * Add(const wxString& s)

Adds string to list, allocating memory.

wxStringList::Clear

void Clear()

Clears all strings from the list.

wxStringList::Delete

void Delete(const wxString& s)

Searches for string and deletes from list, deallocating memory.

wxStringList::ListToArray

char* ListToArray(bool new_copies = false)

Converts the list to an array of strings, only allocating new memory if **new_copies** is true.

wxStringList::Member

bool Member(const wxString& s)

Returns true if **s** is a member of the list (tested using **strcmp**).

wxStringList::Sort

void Sort()

Sorts the strings in ascending alphabetical order. Note that all nodes (but not strings) get deallocated and new ones allocated.

wxStringTokenizer

wxStringTokenizer helps you to break a string up into a number of tokens. It replaces the standard C function `strtok()` and also extends it in a number of ways.

To use this class, you should create a **wxStringTokenizer** object, give it the string to tokenize and also the delimiters which separate tokens in the string (by default, white space characters will be used).

Then *GetNextToken* (p. 1228) may be called repeatedly until it *HasMoreTokens* (p. 1228) returns `false`.

For example:

```
wxStringTokenizer tkz(wxT("first:second:third:fourth"), wxT(":"));
while ( tkz.HasMoreTokens() )
{
    wxString token = tkz.GetNextToken();
    // process token here
}
```

By default, **wxStringTokenizer** will behave in the same way as `strtok()` if the delimiters string only contains white space characters but, unlike the standard function, it

will return empty tokens if this is not the case. This is helpful for parsing strictly formatted data where the number of fields is fixed but some of them may be empty (i.e. TAB or comma delimited text files).

The behaviour is governed by the last *constructor* (p. 1227)/*SetString* (p. 1228) parameter `mode` which may be one of the following:

<code>wxTOKEN_DEFAULT</code>	Default behaviour (as described above): same as <code>wxTOKEN_STRTOK</code> if the delimiter string contains only whitespaces, same as <code>wxTOKEN_RET_EMPTY</code> otherwise
<code>wxTOKEN_RET_EMPTY</code>	In this mode, the empty tokens in the middle of the string will be returned, i.e. "a:b:" will be tokenized in three tokens 'a', " and 'b'.
<code>wxTOKEN_RET_EMPTY_ALL</code>	In this mode, empty trailing token (after the last delimiter character) will be returned as well. The string as above will contain four tokens: the already mentioned ones and another empty one as the last one.
<code>wxTOKEN_RET_DELIMS</code>	In this mode, the delimiter character after the end of the current token (there may be none if this is the last token) is returned appended to the token. Otherwise, it is the same mode as <code>wxTOKEN_RET_EMPTY</code> .
<code>wxTOKEN_STRTOK</code>	In this mode the class behaves exactly like the standard <code>strtok()</code> function. The empty tokens are never returned.

Derived from

wxObject (p. 954)

Include files

<wx/tokenzr.h>

wxStringTokenizer::wxStringTokenizer

wxStringTokenizer()

Default constructor. You must call *SetString* (p. 1228) before calling any other methods.

**wxStringTokenizer(const wxString& str, const wxString& delims = " \t\r\n",
wxStringTokenizerMode mode = wxTOKEN_DEFAULT)**

Constructor. Pass the string to tokenize, a string containing delimiters and the mode specifying how the string should be tokenized.

wxStringTokenizer::CountTokens

int CountTokens() const

Returns the number of tokens remaining in the input string. The number of tokens returned by this function is decremented each time *GetNextToken* (p. 1228) is called and when it reaches 0 *HasMoreTokens* (p. 1228) returns `false`.

wxStringTokenizer::HasMoreTokens

bool HasMoreTokens() const

Returns `true` if the tokenizer has further tokens, `false` if none are left.

wxStringTokenizer::GetNextToken

wxString GetNextToken()

Returns the next token or empty string if the end of string was reached.

wxStringTokenizer::GetPosition

size_t GetPosition() const

Returns the current position (i.e. one index after the last returned token or 0 if *GetNextToken*() has never been called) in the original string.

wxStringTokenizer::GetString

wxString GetString() const

Returns the part of the starting string without all token already extracted.

wxStringTokenizer::SetString

**void SetString(const wxString& to_tokenize, const wxString& delims = "\t\r\n",
wxStringTokenizerMode mode = wxTOKEN_DEFAULT)**

Initializes the tokenizer.

Pass the string to tokenize, a string containing delimiters, and the mode specifying how the string should be tokenized.

wxSysColourChangedEvent

This class is used for system colour change events, which are generated when the user changes the colour settings using the control panel. This is only appropriate under

Windows.

Derived from

wxEvt (p. 441)

wxObject (p. 954)

Include files

<wx/event.h>

Event table macros

To process a system colour changed event, use this event handler macro to direct input to a member function that takes a `wxSysColourChanged` argument.

EVT_SYS_COLOUR_CHANGED(func) Process a `wxEVT_SYS_COLOUR_CHANGED` event.

Remarks

The default event handler for this event propagates the event to child windows, since Windows only sends the events to top-level windows. If intercepting this event for a top-level window, remember to call the base class handler, or to pass the event on to the window's children explicitly.

See also

Event handling overview (p. 1610)

wxSysColourChangedEvent::wxSysColourChanged

wxSysColourChanged()

Constructor.

wxSystemOptions

`wxSystemOptions` stores option/value pairs that `wxWidgets` itself or applications can use to alter behaviour at run-time. It can be used to optimize behaviour that doesn't deserve a distinct API, but is still important to be able to configure.

These options are currently recognised by `wxWidgets`:

Option	Value
no-maskblt	1 to never use WIN32's <code>MaskBlt</code> function, 0 to allow it to be used where possible. Default: 0. In some circumstances the <code>MaskBlt</code> function can be slower than using the fallback code,

especially if using DC cacheing. By default, MaskBlt will be used where it is implemented by the operating system and driver.

mgl.aa-threshold

(wxMGL only) Set this integer option to point size below which fonts are not antialiased. Default: 10.

mgl.aa-threshold

(wxMGL only) Screen refresh rate in Hz. Reasonable default is used if not specified.

The compile-time option to include or exclude this functionality is `wxUSE_SYSTEM_OPTIONS`.

Derived from

wxObject (p. 954)

Include files

`<wx/sysopt.h>`

wxSystemOptions::wxSystemOptions

wxSystemOptions()

Default constructor. You don't need to create an instance of `wxSystemOptions` since all of its functions are static.

wxSystemOptions::GetOption

wxString GetOption(const wxString& *name*) const

Gets an option. The function is case-insensitive to *name*.

See also

wxSystemOptions::SetOption (p. 1231), *wxSystemOptions::GetOptionInt* (p. 1230), *wxSystemOptions::HasOption* (p. 1231)

wxSystemOptions::GetOptionInt

int GetOptionInt(const wxString& *name*) const

Gets an option as an integer. The function is case-insensitive to *name*.

See also

wxSystemOptions::SetOption (p. 1231), *wxSystemOptions::GetOption* (p. 1230),

wxSystemOptions::HasOption (p. 1231)

wxSystemOptions::HasOption

bool HasOption(const wxString& *name*) const

Returns true if the given option is present. The function is case-insensitive to *name*.

See also

wxSystemOptions::SetOption (p. 1231), *wxSystemOptions::GetOption* (p. 1230),
wxSystemOptions::GetOptionInt (p. 1230)

wxSystemOptions::SetOption

void SetOption(const wxString& *name*, const wxString& *value*)

void SetOption(const wxString& *name*, int *value*)

Sets an option. The function is case-insensitive to *name*.

See also

wxSystemOptions::GetOption (p. 1230), *wxSystemOptions::GetOptionInt* (p. 1230),
wxSystemOptions::HasOption (p. 1231)

wxSystemSettings

wxSystemSettings allows the application to ask for details about the system. This can include settings such as standard colours, fonts, and user interface element sizes.

Derived from

wxObject (p. 954)

Include files

<wx/settings.h>

See also

wxFont (p. 512), *wxColour* (p. 150)

wxSystemSettings::wxSystemSettings

wxSystemSettings()

Default constructor. You don't need to create an instance of `wxSystemSettings` since all of its functions are static.

wxSystemSettings::GetColour

static wxColour GetColour(wxSystemColour *index*)

Returns a system colour.

index can be one of:

wxSYS_COLOUR_SCROLLBAR	The scrollbar grey area.
wxSYS_COLOUR_BACKGROUND	The desktop colour.
wxSYS_COLOUR_ACTIVECAPTION	Active window caption.
wxSYS_COLOUR_INACTIVECAPTION	Inactive window caption.
wxSYS_COLOUR_MENU	Menu background.
wxSYS_COLOUR_WINDOW	Window background.
wxSYS_COLOUR_WINDOWFRAME	Window frame.
wxSYS_COLOUR_MENUTEXT	Menu text.
wxSYS_COLOUR_WINDOWTEXT	Text in windows.
wxSYS_COLOUR_CAPTIONTEXT	Text in caption, size box and scrollbar arrow box.
wxSYS_COLOUR_ACTIVEBORDER	Active window border.
wxSYS_COLOUR_INACTIVEBORDER	Inactive window border.
wxSYS_COLOUR_APPWORKSPACE	Background colour MDI applications.
wxSYS_COLOUR_HIGHLIGHT	Item(s) selected in a control.
wxSYS_COLOUR_HIGHLIGHTTEXT	Text of item(s) selected in a control.
wxSYS_COLOUR_BTNFACE	Face shading on push buttons.
wxSYS_COLOUR_BTNSHADOW	Edge shading on push buttons.
wxSYS_COLOUR_GRAYTEXT	Greyed (disabled) text.
wxSYS_COLOUR_BTNTEXT	Text on push buttons.
wxSYS_COLOUR_INACTIVECAPTIONTEXT	Colour of text in active captions.
wxSYS_COLOUR_BTNHIGHLIGHT	Highlight colour for buttons (same as <code>wxSYS_COLOUR_3DHILIGHT</code>).

wxSYS_COLOUR_3DDKSHADOW	Dark shadow for three-dimensional display elements.
wxSYS_COLOUR_3DLIGHT	Light colour for three-dimensional display elements.
wxSYS_COLOUR_INFOTEXT	Text colour for tooltip controls.
wxSYS_COLOUR_INFOBK	Background colour for tooltip controls.
wxSYS_COLOUR_DESKTOP	Same as wxSYS_COLOUR_BACKGROUND.
wxSYS_COLOUR_3DFACE	Same as wxSYS_COLOUR_BTNFACE.
wxSYS_COLOUR_3DSHADOW	Same as wxSYS_COLOUR_BTNSHADOW.
wxSYS_COLOUR_3DHIGHLIGHT	Same as wxSYS_COLOUR_BTNHIGHLIGHT.
wxSYS_COLOUR_3DHILIGHT	Same as wxSYS_COLOUR_BTNHIGHLIGHT.
wxSYS_COLOUR_BTNHILIGHT	Same as wxSYS_COLOUR_BTNHIGHLIGHT.

wxPython note: This static method is implemented in Python as a standalone function named `wxSystemSettings_GetColour`

wxSystemSettings::GetFont

static wxFont GetFont(wxSystemFont index)

Returns a system font.

index can be one of:

wxSYS_OEM_FIXED_FONT	Original equipment manufacturer dependent fixed-pitch font.
wxSYS_ANSI_FIXED_FONT	Windows fixed-pitch font.
wxSYS_ANSI_VAR_FONT	Windows variable-pitch (proportional) font.
wxSYS_SYSTEM_FONT	System font.
wxSYS_DEVICE_DEFAULT_FONT	Device-dependent font (Windows NT only).
wxSYS_DEFAULT_GUI_FONT	Default font for user interface objects such as menus and dialog boxes. Note that with modern GUIs nothing guarantees that the same font is used for all GUI elements, so some controls might use a different font by default.

wxPython note: This static method is implemented in Python as a standalone function named `wxSystemSettings_GetFont`

wxSystemSettings::GetMetric

static int GetMetric(wxSystemMetric *index*)

Returns a system metric.

index can be one of:

wxSYS_MOUSE_BUTTONS	Number of buttons on mouse, or zero if no mouse was installed.
wxSYS_BORDER_X	Width of single border.
wxSYS_BORDER_Y	Height of single border.
wxSYS_CURSOR_X	Width of cursor.
wxSYS_CURSOR_Y	Height of cursor.
wxSYS_DCLICK_X	Width in pixels of rectangle within which two successive mouse clicks must fall to generate a double-click.
wxSYS_DCLICK_Y	Height in pixels of rectangle within which two successive mouse clicks must fall to generate a double-click.
wxSYS_DRAG_X	Width in pixels of a rectangle centered on a drag point to allow for limited movement of the mouse pointer before a drag operation begins.
wxSYS_DRAG_Y	Height in pixels of a rectangle centered on a drag point to allow for limited movement of the mouse pointer before a drag operation begins.
wxSYS_EDGE_X	Width of a 3D border, in pixels.
wxSYS_EDGE_Y	Height of a 3D border, in pixels.
wxSYS_HSCROLL_ARROW_X	Width of arrow bitmap on horizontal scrollbar.
wxSYS_HSCROLL_ARROW_Y	Height of arrow bitmap on horizontal scrollbar.
wxSYS_HTHUMB_X	Width of horizontal scrollbar thumb.
wxSYS_ICON_X	The default width of an icon.
wxSYS_ICON_Y	The default height of an icon.
wxSYS_ICONSPACING_X	Width of a grid cell for items in large icon view, in pixels. Each item fits into a rectangle of this size when arranged.
wxSYS_ICONSPACING_Y	Height of a grid cell for items in large icon view, in pixels. Each item fits into a rectangle of this

	size when arranged.
wxSYS_WINDOWMIN_X	Minimum width of a window.
wxSYS_WINDOWMIN_Y	Minimum height of a window.
wxSYS_SCREEN_X	Width of the screen in pixels.
wxSYS_SCREEN_Y	Height of the screen in pixels.
wxSYS_FRAME_SIZE_X	Width of the window frame for a wxTHICK_FRAME window.
wxSYS_FRAME_SIZE_Y	Height of the window frame for a wxTHICK_FRAME window.
wxSYS_SMALLICON_X	Recommended width of a small icon (in window captions, and small icon view).
wxSYS_SMALLICON_Y	Recommended height of a small icon (in window captions, and small icon view).
wxSYS_HSCROLL_Y	Height of horizontal scrollbar in pixels.
wxSYS_VSCROLL_X	Width of vertical scrollbar in pixels.
wxSYS_VSCROLL_ARROW_X	Width of arrow bitmap on a vertical scrollbar.
wxSYS_VSCROLL_ARROW_Y	Height of arrow bitmap on a vertical scrollbar.
wxSYS_VTHUMB_Y	Height of vertical scrollbar thumb.
wxSYS_CAPTION_Y	Height of normal caption area.
wxSYS_MENU_Y	Height of single-line menu bar.
wxSYS_NETWORK_PRESENT	1 if there is a network present, 0 otherwise.
wxSYS_PENWINDOWS_PRESENT	1 if PenWindows is installed, 0 otherwise.
wxSYS_SHOW_SOUNDS	Non-zero if the user requires an application to present information visually in situations where it would otherwise present the information only in audible form; zero otherwise.
wxSYS_SWAP_BUTTONS	Non-zero if the meanings of the left and right mouse buttons are swapped; zero otherwise.

wxPython note: This static method is implemented in Python as a standalone function named `wxSystemSettings_GetMetric`

wxTabCtrl

This class represents a tab control, which manages multiple tabs.

Derived from

wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/tabctrl.h>

See also

wxTabEvent (p. 1241), *wxImageList* (p. 754), *wxNotebook* (p. 943)

wxTabCtrl::wxTabCtrl

wxTabCtrl()

Default constructor.

wxTabCtrl(wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size, long style = 0, const wxString& name = "tabCtrl")

Constructs a tab control.

Parameters

parent

The parent window. Must be non-NULL.

id

The window identifier.

pos

The window position.

size

The window size.

style

The window style. Its value is a bit list of zero or more of **wxTC_MULTILINE**, **wxTC_RIGHTJUSTIFY**, **wxTC_FIXEDWIDTH** and **wxTC_OWNERDRAW**.

wxTabCtrl::~~wxTabCtrl

~wxTabCtrl()

Destroys the wxTabCtrl object.

wxTabCtrl::Create

bool Create(wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size, long style = 0, const wxString& name = "tabCtrl")

Creates a tab control. See *wxTabCtrl::wxTabCtrl* (p. 1236) for a description of the parameters.

wxTabCtrl::DeleteAllItems

bool DeleteAllItems()

Deletes all tab items.

wxTabCtrl::DeleteItem

bool DeleteItem(int item)

Deletes the specified tab item.

wxTabCtrl::GetCurFocus

int GetCurFocus() const

Returns the index for the tab with the focus, or -1 if none has the focus.

wxTabCtrl::GetImageList

wxImageList* GetImageList() const

Returns the associated image list.

See also

wxImageList (p. 754), *wxTabCtrl::SetImageList* (p. 1240)

wxTabCtrl::GetItemCount

int GetItemCount() const

Returns the number of tabs in the tab control.

wxTabCtrl::GetItemData

void* GetItemData() const

Returns the client data for the given tab.

wxTabCtrl::GetItemImage

int GetItemImage() const

Returns the image index for the given tab.

wxTabCtrl::GetItemRect

bool GetItemRect(int *item*, wxRect& *rect*) const

Returns the rectangle bounding the given tab.

[See also](#)

wxRect (p. 1042)

wxTabCtrl::GetItemText

wxString GetItemText() const

Returns the string for the given tab.

wxTabCtrl::GetRowCount

int GetRowCount() const

Returns the number of rows in the tab control.

wxTabCtrl::GetSelection

int GetSelection() const

Returns the index for the currently selected tab.

[See also](#)

wxTabCtrl::SetSelection (p. 1241)

wxTabCtrl::HitTest

int HitTest(const wxPoint& *pt*, long& *flags*)

Tests whether a tab is at the specified position.

Parameters

pt

Specifies the point for the hit test.

flags

Return value for detailed information. One of the following values:

wxTAB_HITTEST_NOWHERE	There was no tab under this point.
wxTAB_HITTEST_ONICON	The point was over an icon.
wxTAB_HITTEST_ONLABEL	The point was over a label.
wxTAB_HITTEST_ONITEM	The point was over an item, but not on the label or icon.

Return value

Returns the zero-based tab index or -1 if no tab is at the specified position.

wxTabCtrl::InsertItem

void InsertItem(int *item*, const wxString& *text*, int *imageId* = -1, void* *clientData* = NULL)

Inserts a new tab.

Parameters

item

Specifies the index for the new item.

text

Specifies the text for the new item.

imageId

Specifies the optional image index for the new item.

clientData

Specifies the optional client data for the new item.

Return value

true if successful, false otherwise.

wxTabCtrl::SetItemData

bool SetItemData(int *item*, void* *data*)

Sets the client data for a tab.

wxTabCtrl::SetItemImage

bool SetItemImage(int *item*, int *image*)

Sets the image index for the given tab. *image* is an index into the image list which was set with *wxTabCtrl::SetImageList* (p. 1240).

wxTabCtrl::SetImageList

void SetImageList(wxImageList* *imageList*)

Sets the image list for the tab control.

See also

wxImageList (p. 754)

wxTabCtrl::SetItemSize

void SetItemSize(const wxSize& *size*)

Sets the width and height of the tabs.

wxTabCtrl::SetItemText

bool SetItemText(int *item*, const wxString& *text*)

Sets the text for the given tab.

wxTabCtrl::SetPadding

void SetPadding(const wxSize& *padding*)

Sets the amount of space around each tab's icon and label.

wxTabCtrl::SetSelection

int SetSelection(int item)

Sets the selection for the given tab, returning the index of the previously selected tab. Returns -1 if the call was unsuccessful.

See also

wxTabCtrl::GetSelection (p. 1238)

wxTabEvent

This class represents the events generated by a tab control.

Derived from

wxCommandEvent (p. 165)

wxEvent (p. 441)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/tabctrl.h>

Event table macros

To process a tab event, use these event handler macros to direct input to member functions that take a *wxTabEvent* argument.

EVT_TAB_SEL_CHANGED(id, func) Process a *wxEVT_TAB_SEL_CHANGED* event, indicating that the tab selection has changed.

EVT_TAB_SEL_CHANGING(id, func) Process a *wxEVT_TAB_SEL_CHANGING* event, indicating that the tab selection is changing.

See also

wxTabCtrl (p. 1235)

wxTabEvent::wxTabEvent

wxTabEvent(WXTYPE commandType = 0, int id = 0)

Constructor.

wxTaskBarIcon

This class represents a taskbar icon, appearing in the 'system tray' and responding to mouse clicks. An icon has an optional tooltip. This class is only supported for Windows 95/NT and for X Window System ports (wxGTK, wxMotif, wxX11), assuming the window manager supports KDE and GNOME 1.2 systray methods.

Derived from

wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/taskbar.h>

Event handling

To process input from a taskbar icon, use the following event handler macros to direct input to member functions that take a `wxTaskBarIconEvent` argument.

EVT_TASKBAR_MOVE(func)	Process a <code>wxEVT_TASKBAR_MOVE</code> event.
EVT_TASKBAR_LEFT_DOWN(func)	Process a <code>wxEVT_TASKBAR_LEFT_DOWN</code> event.
EVT_TASKBAR_LEFT_UP(func)	Process a <code>wxEVT_TASKBAR_LEFT_UP</code> event.
EVT_TASKBAR_RIGHT_DOWN(func)	Process a <code>wxEVT_TASKBAR_RIGHT_DOWN</code> event.
EVT_TASKBAR_RIGHT_UP(func)	Process a <code>wxEVT_TASKBAR_RIGHT_UP</code> event.
EVT_TASKBAR_LEFT_DCLICK(func)	Process a <code>wxEVT_TASKBAR_LEFT_DCLICK</code> event.
EVT_TASKBAR_RIGHT_DCLICK(func)	Process a <code>wxEVT_TASKBAR_RIGHT_DCLICK</code> event.

wxTaskBarIcon::wxTaskBarIcon

wxTaskBarIcon()

Default constructor.

wxTaskBarIcon::~~wxTaskBarIcon

~wxTaskBarIcon()

Destroys the `wxTaskBarIcon` object, removing the icon if not already removed.

wxTaskBarIcon::IsIconInstalled

bool IsIconInstalled()

Returns true if *SetIcon* (p. 1243) was called with no subsequent *RemoveIcon* (p. 1243).

wxTaskBarIcon::IsOk

bool IsOk()

Returns true if the object initialized successfully.

wxTaskBarIcon::PopupMenu

bool PopupMenu(wxMenu* menu)

Pops up a menu at the current mouse position. The events can be handled by a class derived from `wxTaskBarIcon`.

wxTaskBarIcon::RemoveIcon

bool RemoveIcon()

Removes the icon previously set with *SetIcon* (p. 1243).

wxTaskBarIcon::SetIcon

bool SetIcon(const wxIcon& icon, const wxString& tooltip)

Sets the icon, and optional tooltip text.

wxTempFile

`wxTempFile` provides a relatively safe way to replace the contents of the existing file. The name is explained by the fact that it may be also used as just a temporary file if you don't replace the old file contents.

Usually, when a program replaces the contents of some file it first opens it for writing, thus losing all of the old data and then starts recreating it. This approach is not very safe because during the regeneration of the file bad things may happen: the program may find that there is an internal error preventing it from completing file generation, the user may interrupt it (especially if file generation takes long time) and, finally, any other external interrupts (power supply failure or a disk error) will leave you without either the

original file or the new one.

`wxTempFile` addresses this problem by creating a temporary file which is meant to replace the original file - but only after it is fully written. So, if the user interrupts the program during the file generation, the old file won't be lost. Also, if the program discovers itself that it doesn't want to replace the old file there is no problem - in fact, `wxTempFile` will **not** replace the old file by default, you should explicitly call *Commit* (p. 1245) to do it. Calling *Discard* (p. 1245) explicitly discards any modifications: it closes and deletes the temporary file and leaves the original file unchanged. If you don't call neither of `Commit()` and `Discard()`, the destructor will call `Discard()` automatically.

To summarize: if you want to replace another file, create an instance of `wxTempFile` passing the name of the file to be replaced to the constructor (you may also use default constructor and pass the file name to *Open* (p. 1244)). Then you can *write* (p. 1245) to `wxTempFile` using *wxFile* (p. 461)-like functions and later call `Commit()` to replace the old file (and close this one) or call `Discard()` to cancel the modifications.

Derived from

No base class

Include files

`<wx/file.h>`

See also:

wxFile (p. 461)

wxTempFile::wxTempFile

wxTempFile()

Default constructor - *Open* (p. 1244) must be used to open the file.

wxTempFile::wxTempFile

wxTempFile(const wxString& strName)

Associates `wxTempFile` with the file to be replaced and opens it. You should use *IsOpened* (p. 1245) to verify if the constructor succeeded.

wxTempFile::Open

bool Open(const wxString& strName)

Open the temporary file, returns `true` on success, `false` if an error occurred.

strName is the name of file to be replaced. The temporary file is always created in the directory where *strName* is. In particular, if *strName* doesn't include the path, it is created in the current directory and the program should have write access to it for the function to succeed.

wxTempFile::IsOpened

bool IsOpened() const

Returns `true` if the file was successfully opened.

wxTempFile::Write

bool Write(const void *p, size_t n)

Write to the file, return `true` on success, `false` on failure.

wxTempFile::Write

bool Write(const wxString& str, wxMBConv& conv = wxConvLibc)

Write to the file, return `true` on success, `false` on failure.

The second argument is only meaningful in Unicode build of wxWidgets when *conv* is used to convert *str* to multibyte representation.

wxTempFile::Commit

bool Commit()

Validate changes: deletes the old file of name `m_strName` and renames the new file to the old name. Returns `true` if both actions succeeded. If `false` is returned it may unfortunately mean two quite different things: either that either the old file couldn't be deleted or that the new file couldn't be renamed to the old name.

wxTempFile::Discard

void Discard()

Discard changes: the old file contents is not changed, temporary file is deleted.

wxTempFile::~~wxTempFile

~wxTempFile()

Destructor calls *Discard()* (p. 1245) if temporary file is still opened.

wxTextAttr

wxTextAttr represents the character and paragraph attributes, or style, for a range of text in a *wxTextCtrl* (p. 1250).

When setting up a wxTextAttr object, pass a bitlist mask to SetFlags to indicate which style elements should be changed. As a convenience, when you call a setter such as SetFont, the relevant bit will be set.

Derived from

No base class

Include files

<wx/textctrl.h>

Typedefs

wxTextPos is the type containing the index of a position in a text control.

wxTextCoord contains the index of a column or a row in the control.

Note that although both of these types should probably have been unsigned, due to backwards compatibility reasons, are defined as `long` currently. Their use (instead of plain `long`) is still encouraged as it makes the code more readable.

Constants

The following values can be passed to SetAlignment to determine paragraph alignment.

```
enum wxTextAttrAlignment
{
    wxTEXT_ALIGNMENT_DEFAULT,
    wxTEXT_ALIGNMENT_LEFT,
    wxTEXT_ALIGNMENT_CENTRE,
    wxTEXT_ALIGNMENT_CENTER = wxTEXT_ALIGNMENT_CENTRE,
    wxTEXT_ALIGNMENT_RIGHT,
    wxTEXT_ALIGNMENT_JUSTIFIED
};
```

These values are passed in a bitlist to SetFlags to determine what attributes will be considered when setting the attributes for a text control.

```
#define wxTEXT_ATTR_TEXT_COLOUR          0x0001
#define wxTEXT_ATTR_BACKGROUND_COLOUR    0x0002
#define wxTEXT_ATTR_FONT_FACE            0x0004
#define wxTEXT_ATTR_FONT_SIZE            0x0008
#define wxTEXT_ATTR_FONT_WEIGHT          0x0010
#define wxTEXT_ATTR_FONT_ITALIC          0x0020
#define wxTEXT_ATTR_FONT_UNDERLINE       0x0040
#define wxTEXT_ATTR_FONT \
    wxTEXT_ATTR_FONT_FACE | wxTEXT_ATTR_FONT_SIZE | wxTEXT_ATTR_FONT_WEIGHT \
    | wxTEXT_ATTR_FONT_ITALIC | wxTEXT_ATTR_FONT_UNDERLINE
#define wxTEXT_ATTR_ALIGNMENT            0x0080
#define wxTEXT_ATTR_LEFT_INDENT          0x0100
#define wxTEXT_ATTR_RIGHT_INDENT         0x0200
#define wxTEXT_ATTR_TABS                 0x0400
```

```
The values below are the possible return codes of the HitTest (p. 1260)
method:// the point asked is ...
enum wxTextCtrlHitTestResult
{
    wxTE_HT_UNKNOWN = -2,    // this means HitTest() is simply not
    implemented
    wxTE_HT_BEFORE,          // either to the left or upper
    wxTE_HT_ON_TEXT,         // directly on
    wxTE_HT_BELOW,           // below [the last line]
    wxTE_HT_BEYOND           // after [the end of line]
};
// ... the character returned
```

wxTextAttr::wxTextAttr

wxTextAttr()

wxTextAttr(const wxColour& colText, const wxColour& colBack = wxNullColour, const wxFont& font = wxNullFont, wxTextAttrAlignment alignment = wxTEXT_ALIGNMENT_DEFAULT)

The constructors initialize one or more of the text foreground colour, background colour, font, and alignment. The values not initialized in the constructor can be set later, otherwise *wxTextCtrl::SetStyle* (p. 1266) will use the default values for them.

wxTextAttr::GetAlignment

wxTextAttrAlignment GetAlignment() const

Returns the paragraph alignment.

wxTextAttr::GetBackgroundColour

const wxColour& GetBackgroundColour() const

Return the background colour specified by this attribute.

wxTextAttr::GetFont

const wxFont& GetFont() const

Return the text font specified by this attribute.

wxTextAttr::GetLeftIndent

int GetLeftIndent() const

Returns the left indent in tenths of a millimetre.

wxTextAttr::GetLeftSubIndent

int GetLeftSubIndent() const

Returns the left sub indent for all lines but the first line in a paragraph in tenths of a millimetre.

wxTextAttr::GetRightIndent

int GetRightIndent() const

Returns the right indent in tenths of a millimetre.

wxTextAttr::GetTabs

const wxArrayInt& GetTabs() const

Returns the array of integers representing the tab stops. Each array element specifies the tab stop in tenths of a millimetre.

wxTextAttr::GetTextColour

const wxColour& GetTextColour() const

Return the text colour specified by this attribute.

wxTextAttr::HasBackgroundColour

bool HasBackgroundColour() const

Returns `true` if this style specifies the background colour to use.

wxTextAttr::HasFont

bool HasFont() const

Returns `true` if this style specifies the font to use.

wxTextAttr::HasTextColour

bool HasTextColour() const

Returns `true` if this style specifies the foreground colour to use.

wxTextAttr::GetFlags

long GetFlags()

Returns a bitlist indicating which attributes will be set.

wxTextAttr::IsDefault

bool IsDefault() const

Returns `true` if this style specifies any non-default attributes.

wxTextAttr::SetAlignment

void SetAlignment(wxTextAttrAlignment *alignment*)

Sets the paragraph alignment.

wxTextAttr::SetBackgroundColour

void SetBackgroundColour(const wxColour& *colour*)

Sets the background colour.

wxTextAttr::SetFlags

void SetFlags(long *flags*)

Pass a bitlist indicating which attributes will be set.

wxTextAttr::SetFont

void SetFont(const wxFont& *font*)

Sets the text font.

wxTextAttr::SetLeftIndent

void SetLeftIndent(int *indent*, int *subIndent* = 0)

Sets the left indent in tenths of a millimetre. *subIndent* sets the indent for all lines but the

first line in a paragraph relative to the first line.

wxTextAttr::SetRightIndent

void SetRightIndent(int *indent*)

Sets the right indent in tenths of a millimetre.

wxTextAttr::SetTabs

void SetTabs(const wxArrayInt& *tabs*)

Sets the array of integers representing the tab stops. Each array element specifies the tab stop in tenths of a millimetre.

wxTextAttr::SetTextColour

void SetTextColour(const wxColour& *colour*)

Sets the text colour.

wxTextCtrl

A text control allows text to be displayed and edited. It may be single line or multi-line.

Derived from

streambuf
wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/textctrl.h>

Window styles

- | | |
|---------------------------|--|
| wxTE_PROCESS_ENTER | The control will generate the message <code>wxEVENT_TYPE_TEXT_ENTER_COMMAND</code> (otherwise pressing Enter key is either processed internally by the control or used for navigation between dialog controls). |
| wxTE_PROCESS_TAB | The control will receive <code>EVT_CHAR</code> messages for TAB pressed - normally, TAB is used for passing to the next control in a dialog instead. For the control created with this style, you can still use Ctrl-Enter to pass to the next control |

	from the keyboard.
wxTE_MULTILINE	The text control allows multiple lines.
wxTE_PASSWORD	The text will be echoed as asterisks.
wxTE_READONLY	The text will not be user-editable.
wxTE_RICH	Use rich text control under Win32, this allows to have more than 64KB of text in the control even under Win9x. This style is ignored under other platforms.
wxTE_RICH2	Use rich text control version 2.0 or 3.0 under Win32, this style is ignored under other platforms
wxTE_AUTO_URL	Highlight the URLs and generate the <code>wxTextUrlEvents</code> when mouse events occur over them. This style is supported under Win32 only and requires <code>wxTE_RICH</code> .
wxTE_NOHIDESEL	By default, the Windows text control doesn't show the selection when it doesn't have focus - use this style to force it to always show it. It doesn't do anything under other platforms.
wxHSCROLL	A horizontal scrollbar will be created and used, so that text won't be wrapped. No effect under GTK+.
wxTE_LEFT	The text in the control will be left-justified (default).
wxTE_CENTRE	The text in the control will be centered (currently <code>wxMSW</code> and <code>wxGTK2</code> only).
wxTE_RIGHT	The text in the control will be right-justified (currently <code>wxMSW</code> and <code>wxGTK2</code> only).
wxTE_DONTWRAP	Same as <code>wxHSCROLL</code> style.
wxTE_LINEWRAP	Wrap the lines too long to be shown entirely at any position (<code>wxUniv</code> only currently).
wxTE_WORDWRAP	Wrap the lines too long to be shown entirely at word boundaries only (<code>wxUniv</code> only currently).

See also *window styles overview* (p. 1618) and *wxTextCtrl::wxTextCtrl* (p. 1254).

wxTextCtrl text format

The multiline text controls always store the text as a sequence of lines separated by `\n` characters, i.e. in the Unix text format even on non-Unix platforms. This allows the user code to ignore the differences between the platforms but at a price: the indices in the control such as those returned by *GetInsertionPoint* (p. 1257) or *GetSelection* (p. 1259) can **not** be used as indices into the string returned by *GetValue* (p. 1260) as they're going to be slightly off for platforms using `\r\n` as separator (as Windows does), for example.

Instead, if you need to obtain a substring between the 2 indices obtained from the control with the help of the functions mentioned above, you should use *GetRange* (p. 1259). And the indices themselves can only be passed to other methods, for example *SetInsertionPoint* (p. 1265) or *SetSelection* (p. 1266).

To summarize: never use the indices returned by (multiline) `wxTextCtrl` as indices into the string it contains, but only as arguments to be passed back to the other `wxTextCtrl` methods.

wxTextCtrl styles

Multi-line text controls support the styles, i.e. provide a possibility to set colours and font for individual characters in it (note that under Windows `wxTE_RICH` style is required for style support). To use the styles you can either call *SetDefaultStyle* (p. 1264) before inserting the text or call *SetStyle* (p. 1266) later to change the style of the text already in the control (the first solution is much more efficient).

In either case, if the style doesn't specify some of the attributes (for example you only want to set the text colour but without changing the font nor the text background), the values of the default style will be used for them. If there is no default style, the attributes of the text control itself are used.

So the following code correctly describes what it does: the second call to *SetDefaultStyle* (p. 1264) doesn't change the text foreground colour (which stays red) while the last one doesn't change the background colour (which stays grey):

```
text->SetDefaultStyle(wxTextAttr(*wxRED));
text->AppendText("Red text\n");
text->SetDefaultStyle(wxTextAttr(wxNullColour, *wxLIGHT_GREY));
text->AppendText("Red on grey text\n");
text->SetDefaultStyle(wxTextAttr(*wxBLUE));
text->AppendText("Blue on grey text\n");
```

wxTextCtrl and C++ streams

This class multiply-inherits from **streambuf** where compilers allow, allowing code such as the following:

```
wxTextCtrl *control = new wxTextCtrl(...);

ostream stream(control)

stream << 123.456 << " some text\n";
stream.flush();
```

If your compiler does not support derivation from **streambuf** and gives a compile error, define the symbol **NO_TEXT_WINDOW_STREAM** in the `wxTextCtrl` header file.

Note that independently of this setting you can always use `wxTextCtrl` itself in a stream-like manner:

```
wxTextCtrl *control = new wxTextCtrl(...);

*control << 123.456 << " some text\n";
```

always works. However the possibility to create an `ostream` associated with `wxTextCtrl` may be useful if you need to redirect the output of a function taking an `ostream` as

parameter to a text control.

Another commonly requested need is to redirect **std::cout** to the text control. This could be done in the following way:

```
#include <iostream>

wxTextCtrl *control = new wxTextCtrl(...);

std::streambuf *sbOld = std::cout.rdbuf();
std::cout.rdbuf(*control);

// use cout as usual, the output appears in the text control
...

std::cout.rdbuf(sbOld);
```

But *wxWidgets* provides a convenient class to make it even simpler so instead you may just do

```
#include <iostream>

wxTextCtrl *control = new wxTextCtrl(...);

wxStreamToTextRedirector redirect(control);

// all output to cout goes into the text control until the exit from
current
// scope
```

See *wxStreamToTextRedirector* (p. 1200) for more details.

Event handling

The following commands are processed by default event handlers in *wxTextCtrl*: *wxID_CUT*, *wxID_COPY*, *wxID_PASTE*, *wxID_UNDO*, *wxID_REDO*. The associated UI update events are also processed automatically, when the control has the focus.

To process input from a text control, use these event handler macros to direct input to member functions that take a *wxCommandEvent* (p. 165) argument.

EVT_TEXT(id, func)	Respond to a <i>wxEVT_COMMAND_TEXT_UPDATED</i> event, generated when the text changes. Notice that this event will always be sent when the text controls contents changes - whether this is due to user input or comes from the program itself (for example, if <i>SetValue()</i> is called)
EVT_TEXT_ENTER(id, func)	Respond to a <i>wxEVT_COMMAND_TEXT_ENTER</i> event, generated when enter is pressed in a text control (which must have <i>wxTE_PROCESS_ENTER</i> style for this event to be generated).
EVT_TEXT_URL(id, func)	A mouse event occurred over an URL in the text control (Win32 only)

EVT_TEXT_MAXLEN(id, func) User tried to enter more text into the control than the limit set by *SetMaxLength* (p. 1265).

wxTextCtrl::wxTextCtrl

wxTextCtrl()

Default constructor.

wxTextCtrl(wxWindow* parent, wxWindowID id, const wxString& value = "", const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = 0, const wxValidator& validator = wxDefaultValidator, const wxString& name = wxTextCtrlNameStr)

Constructor, creating and showing a text control.

Parameters

parent

Parent window. Should not be NULL.

id

Control identifier. A value of -1 denotes a default value.

value

Default text value.

pos

Text control position.

size

Text control size.

style

Window style. See *wxTextCtrl* (p. 1250).

validator

Window validator.

name

Window name.

Remarks

The horizontal scrollbar (**wxHSCROLL** style flag) will only be created for multi-line text

controls. Without a horizontal scrollbar, text lines that don't fit in the control's size will be wrapped (but no newline character is inserted). Single line controls don't have a horizontal scrollbar, the text is automatically scrolled so that the *insertion point* (p. 1257) is always visible.

See also

wxTextCtrl::Create (p. 1256), *wxValidator* (p. 1360)

wxTextCtrl::~~wxTextCtrl

~wxTextCtrl()

Destructor, destroying the text control.

wxTextCtrl::AppendText

void AppendText(const wxString& text)

Appends the text to the end of the text control.

Parameters

text

Text to write to the text control.

Remarks

After the text is appended, the insertion point will be at the end of the text control. If this behaviour is not desired, the programmer should use *GetInsertionPoint* (p. 1257) and *SetInsertionPoint* (p. 1265).

See also

wxTextCtrl::WriteText (p. 1267)

wxTextCtrl::CanCopy

virtual bool CanCopy()

Returns `true` if the selection can be copied to the clipboard.

wxTextCtrl::CanCut

virtual bool CanCut()

Returns `true` if the selection can be cut to the clipboard.

wxTextCtrl::CanPaste

virtual bool CanPaste()

Returns `true` if the contents of the clipboard can be pasted into the text control. On some platforms (Motif, GTK) this is an approximation and returns `true` if the control is editable, `false` otherwise.

wxTextCtrl::CanRedo

virtual bool CanRedo()

Returns `true` if there is a redo facility available and the last operation can be redone.

wxTextCtrl::CanUndo

virtual bool CanUndo()

Returns `true` if there is an undo facility available and the last operation can be undone.

wxTextCtrl::Clear

virtual void Clear()

Clears the text in the control.

Note that this function will generate a `wxEVT_COMMAND_TEXT_UPDATED` event.

wxTextCtrl::Copy

virtual void Copy()

Copies the selected text to the clipboard under Motif and MS Windows.

wxTextCtrl::Create

bool Create(wxWindow* parent, wxWindowID id, const wxString& value = "", const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = 0, const wxValidator& validator = wxDefaultValidator, const wxString& name = wxTextCtrlNameStr)

Creates the text control for two-step construction. Derived classes should call or replace this function. See `wxTextCtrl::wxTextCtrl` (p. 1254) for further details.

wxTextCtrl::Cut

virtual void Cut()

Copies the selected text to the clipboard and removes the selection.

wxTextCtrl::DiscardEdits

void DiscardEdits()

Resets the internal 'modified' flag as if the current edits had been saved.

wxTextCtrl::EmulateKeyPress

bool EmulateKeyPress(const wxKeyEvent& event)

This functions inserts into the control the character which would have been inserted if the given key event had occurred in the text control. The *event* object should be the same as the one passed to `EVT_KEY_DOWN` handler previously by `wxWidgets`.

Please note that this function doesn't currently work correctly for all keys under any platform but MSW.

Return value

`true` if the event resulted in a change to the control, `false` otherwise.

wxTextCtrl::GetDefaultStyle

const wxTextAttr& GetDefaultStyle() const

Returns the style currently used for the new text.

See also

SetDefaultStyle (p. 1264)

wxTextCtrl::GetInsertionPoint

virtual long GetInsertionPoint() const

Returns the insertion point. This is defined as the zero based index of the character position to the right of the insertion point. For example, if the insertion point is at the end of the text control, it is equal to both *GetValue()* (p. 1260).*Length()* and *GetLastPosition()* (p. 1258).

The following code snippet safely returns the character at the insertion point or the zero character if the point is at the end of the control.

```
char GetCurrentChar(wxTextCtrl *tc) {
    if (tc->GetInsertionPoint() == tc->GetLastPosition())
        return '\0';
}
```

```
    return tc->GetValue[tc->GetInsertionPoint()];  
}
```

wxTextCtrl::GetLastPosition

virtual long GetLastPosition() const

Returns the zero based index of the last position in the text control, which is equal to the number of characters in the control.

wxTextCtrl::GetLineLength

int GetLineLength(long *lineNo*) const

Gets the length of the specified line, not including any trailing newline character(s).

Parameters*lineNo*

Line number (starting from zero).

Return value

The length of the line, or -1 if *lineNo* was invalid.

wxTextCtrl::GetLineText

wxString GetLineText(long *lineNo*) const

Returns the contents of a given line in the text control, not including any trailing newline character(s).

Parameters*lineNo*

The line number, starting from zero.

Return value

The contents of the line.

wxTextCtrl::GetNumberOfLines

int GetNumberOfLines() const

Returns the number of lines in the text control buffer.

Remarks

Note that even empty text controls have one line (where the insertion point is), so `GetNumberOfLines()` never returns 0.

For `gtk_text` (multi-line) controls, the number of lines is calculated by actually counting newline characters in the buffer. You may wish to avoid using functions that work with line numbers if you are working with controls that contain large amounts of text.

wxTextCtrl::GetRange

virtual wxString GetRange(long from, long to) const

Returns the string containing the text starting in the positions *from* and up to *to* in the control. The positions must have been returned by another `wxTextCtrl` method.

Please note that the positions in a multiline `wxTextCtrl` do **not** correspond to the indices in the string returned by *GetValue* (p. 1260) because of the different new line representations (CR or CR LF) and so this method should be used to obtain the correct results instead of extracting parts of the entire value. It may also be more efficient, especially if the control contains a lot of data.

wxTextCtrl::GetSelection

virtual void GetSelection(long* from, long* to) const

Gets the current selection span. If the returned values are equal, there was no selection.

Please note that the indices returned may be used with the other `wxTextctrl` methods but don't necessarily represent the correct indices into the string returned by *GetValue()* (p. 1260) for multiline controls under Windows (at least,) you should use *GetStringSelection()* (p. 1259) to get the selected text.

Parameters

from

The returned first position.

to

The returned last position.

wxPython note: The wxPython version of this method returns a tuple consisting of the *from* and *to* values.

wxPerl note: In wxPerl this method takes no parameter and returns a 2-element list (*from*, *to*).

wxTextCtrl::GetStringSelection

virtual wxString GetStringSelection()

Gets the text currently selected in the control. If there is no selection, the returned string is empty.

wxTextCtrl::GetStyle

bool GetStyle(long *position*, **wxTextAttr&** *style*)

Returns the style at this position in the text control. Not all platforms support this function.

Return value

`true` on success, `false` if an error occurred - it may also mean that the styles are not supported under this platform.

See also

wxTextCtrl::SetStyle (p. 1266), *wxTextAttr* (p. 1246)

wxTextCtrl::GetValue

wxString GetValue() **const**

Gets the contents of the control. Notice that for a multiline text control, the lines will be separated by (Unix-style) `\n` characters, even under Windows where they are separated by a `\r\n` sequence in the native control.

wxTextCtrl::HitTest

wxTextCtrlHitTestResult HitTest(const **wxPoint&** *pt*, **wxTextCoord** **col*, **wxTextCoord** **row*) **const**

This function finds the character at the specified position expressed in pixels. If the return code is not `wxTE_HT_UNKNOWN` the row and column of the character closest to this position are returned in the *col* and *row* parameters (unless the pointers are `NULL` which is allowed).

Please note that this function is currently only implemented in `wxUniv` and `wxMSW` ports.

See also

PositionToXY (p. 1262), *XYToPosition* (p. 1268)

wxPerl note: In `wxPerl` this function takes only the position argument and returns a 3-element list (`result`, `col`, `row`).

wxTextCtrl::IsEditable

bool IsEditable() const

Returns `true` if the controls contents may be edited by user (note that it always can be changed by the program), i.e. if the control hasn't been put in read-only mode by a previous call to *SetEditable* (p. 1264).

wxTextCtrl::IsModified

bool IsModified() const

Returns `true` if the text has been modified by user. Note that calling *SetValue* (p. 1266) doesn't make the control modified.

wxTextCtrl::IsMultiLine

bool IsMultiLine() const

Returns `true` if this is a multi line edit control and `false` otherwise.

See also

IsSingleLine (p. 1261)

wxTextCtrl::IsSingleLine

bool IsSingleLine() const

Returns `true` if this is a single line edit control and `false` otherwise.

See also

IsMultiLine (p. 1261)

wxTextCtrl::LoadFile

bool LoadFile(const wxString& filename)

Loads and displays the named file, if it exists.

Parameters

filename

The filename of the file to load.

Return value

`true` if successful, `false` otherwise.

wxTextCtrl::OnDropFiles

void OnDropFiles(wxDropFilesEvent& event)

This event handler function implements default drag and drop behaviour, which is to load the first dropped file into the control.

Parameters

event

The drop files event.

Remarks

This is not implemented on non-Windows platforms.

See also

wxDropFilesEvent (p. 427)

wxTextCtrl::Paste

virtual void Paste()

Pastes text from the clipboard to the text item.

wxTextCtrl::PositionToXY

bool PositionToXY(long pos, long *x, long *y) const

Converts given position to a zero-based column, line number pair.

Parameters

pos

Position.

x

Receives zero based column number.

y

Receives zero based line number.

Return value

`true` on success, `false` on failure (most likely due to a too large position parameter).

See also

wxTextCtrl::XYToPosition (p. 1268)

wxPython note: In Python, `PositionToXY()` returns a tuple containing the x and y values, so `(x,y) = PositionToXY()` is equivalent to the call described above.

wxPerl note: In wxPerl this method only takes the `pos` parameter, and returns a 2-element list (`x`, `y`).

wxTextCtrl::Redo

virtual void Redo()

If there is a redo facility and the last operation can be redone, redoes the last operation. Does nothing if there is no redo facility.

wxTextCtrl::Remove

virtual void Remove(long from, long to)

Removes the text starting at the first given position up to (but not including) the character at the last position.

Parameters

from

The first position.

to

The last position.

wxTextCtrl::Replace

virtual void Replace(long from, long to, const wxString& value)

Replaces the text starting at the first position up to (but not including) the character at the last position with the given text.

Parameters

from

The first position.

to

The last position.

value

The value to replace the existing text with.

wxTextCtrl::SaveFile

bool SaveFile(const wxString& filename)

Saves the contents of the control in a text file.

Parameters

filename

The name of the file in which to save the text.

Return value

`true` if the operation was successful, `false` otherwise.

wxTextCtrl::SetDefaultStyle

bool SetDefaultStyle(const wxTextAttr& style)

Changes the default style to use for the new text which is going to be added to the control using *WriteText* (p. 1267) or *AppendText* (p. 1255).

If either of the font, foreground, or background colour is not set in *style*, the values of the previous default style are used for them. If the previous default style didn't set them neither, the global font or colours of the text control itself are used as fall back.

However if the *style* parameter is the default `wxTextAttr`, then the default style is just reset (instead of being combined with the new style which wouldn't change it at all).

Parameters

style

The style for the new text.

Return value

`true` on success, `false` if an error occurred - may also mean that the styles are not supported under this platform.

See also

GetDefaultStyle (p. 1257)

wxTextCtrl::SetEditable

virtual void SetEditable(const bool editable)

Makes the text item editable or read-only, overriding the **wxTE_READONLY** flag.

Parameters

editable

If `true`, the control is editable. If `false`, the control is read-only.

See also

IsEditable (p. 1260)

wxTextCtrl::SetInsertionPoint

virtual void SetInsertionPoint(long pos)

Sets the insertion point at the given position.

Parameters

pos

Position to set.

wxTextCtrl::SetInsertionPointEnd

virtual void SetInsertionPointEnd()

Sets the insertion point at the end of the text control. This is equivalent to *SetInsertionPoint* (p. 1265)(*GetLastPosition* (p. 1258)()).

wxTextCtrl::SetMaxLength

virtual void SetMaxLength(unsigned long len)

This function sets the maximum number of characters the user can enter into the control. In other words, it allows to limit the text value length to *len* not counting the terminating NUL character.

If *len* is 0, the previously set max length limit, if any, is discarded and the user may enter as much text as the underlying native text control widget supports (typically at least 32Kb).

If the user tries to enter more characters into the text control when it already is filled up to the maximal length, `awxEVT_COMMAND_TEXT_MAXLEN` event is sent to notify the program about it (giving it the possibility to show an explanatory message, for example) and the extra input is discarded.

Note that this function may only be used with single line text controls.

Compatibility

Only implemented in wxMSW/wxGTK starting with wxWidgets 2.3.2.

wxTextCtrl::SetSelection

virtual void SetSelection(long *from*, long *to*)

Selects the text starting at the first position up to (but not including) the character at the last position. If both parameters are equal to -1 all text in the control is selected.

Parameters

from

The first position.

to

The last position.

wxTextCtrl::SetStyle

bool SetStyle(long *start*, long *end*, const wxTextAttr& *style*)

Changes the style of the given range. If any attribute within *style* is not set, the correspondign attribute from *GetDefaultStyle()* (p. 1257) is used.

Parameters

start

The start of the range to change.

end

The end of the range to change.

style

The new style for the range.

Return value

`true` on success, `false` if an error occured - it may also mean that the styles are not supported under this platform.

See also

wxTextCtrl::GetStyle (p. 1260), *wxTextAttr* (p. 1246)

wxTextCtrl::SetValue

virtual void SetValue(const wxString& value)

Sets the text value and marks the control as not-modified (which means that *IsModified* (p. 1261) would return `false` immediately after the call to `SetValue`).

Note that this function will generate a `wxEVT_COMMAND_TEXT_UPDATED` event.

Parameters

value

The new value to set. It may contain newline characters if the text control is multi-line.

wxTextCtrl::ShowPosition

void ShowPosition(long pos)

Makes the line containing the given position visible.

Parameters

pos

The position that should be visible.

wxTextCtrl::Undo

virtual void Undo()

If there is an undo facility and the last operation can be undone, undoes the last operation. Does nothing if there is no undo facility.

wxTextCtrl::WriteText

void WriteText(const wxString& text)

Writes the text into the text control at the current insertion position.

Parameters

text

Text to write to the text control.

Remarks

Newlines in the text string are the only control characters allowed, and they will cause appropriate line breaks. See `wxTextCtrl::<<` (p. 1268) and `wxTextCtrl::AppendText` (p. 1255) for more convenient ways of writing to the window.

After the write operation, the insertion point will be at the end of the inserted text, so subsequent write operations will be appended. To append text after the user may have interacted with the control, call `wxTextCtrl::SetInsertionPointEnd` (p. 1265) before writing.

wxTextCtrl::XYToPosition

long XYToPosition(long x, long y)

Converts the given zero based column and line number to a position.

Parameters

x

The column number.

y

The line number.

Return value

The position value.

wxTextCtrl::operator <<

wxTextCtrl& operator <<(const wxString& s)

wxTextCtrl& operator <<(int i)

wxTextCtrl& operator <<(long i)

wxTextCtrl& operator <<(float f)

wxTextCtrl& operator <<(double d)

wxTextCtrl& operator <<(char c)

Operator definitions for appending to a text control, for example:

```
wxTextCtrl *wnd = new wxTextCtrl(my_frame);  
(*wnd) << "Welcome to text control number " << 1 << ".\n";
```

wxTextDataObject

`wxTextDataObject` is a specialization of `wxDataObject` for text data. It can be used without change to paste data into the `wxClipboard` (p. 136) or a `wxDropSource` (p. 429). A user may wish to derive a new class from this class for providing text on-demand in order to minimize memory consumption when offering data in several formats, such as plain text and RTF because by default the text is stored in a string in this class, but it

might as well be generated when requested. For this, *GetTextLength* (p. 1269) and *GetText* (p. 1269) will have to be overridden.

Note that if you already have the text inside a string, you will not achieve any efficiency gain by overriding these functions because copying wxStrings is already a very efficient operation (data is not actually copied because wxStrings are reference counted).

wxPython note: If you wish to create a derived wxTextDataObject class in wxPython you should derive the class from wxPyTextDataObject in order to get Python-aware capabilities for the various virtual methods.

Virtual functions to override

This class may be used as is, but all of the data transfer functions may be overridden to increase efficiency.

Derived from

wxDataObjectSimple (p. 227)

wxDataObject (p. 223)

Include files

<wx/dataobj.h>

See also

Clipboard and drag and drop overview (p. 1673), *wxDataObject* (p. 223), *wxDataObjectSimple* (p. 227), *wxFileDataObject* (p. 467), *wxBitmapDataObject* (p. 85)

wxTextDataObject::wxTextDataObject

wxTextDataObject(const wxString& text = wxEmptyString)

Constructor, may be used to initialise the text (otherwise *SetText* (p. 1270) should be used later).

wxTextDataObject::GetTextLength

virtual size_t GetTextLength() const

Returns the data size. By default, returns the size of the text data set in the constructor or using *SetText* (p. 1270). This can be overridden to provide text size data on-demand. It is recommended to return the text length plus 1 for a trailing zero, but this is not strictly required.

wxTextDataObject::GetText

virtual wxString GetText() const

Returns the text associated with the data object. You may wish to override this method when offering data on-demand, but this is not required by wxWidgets' internals. Use this method to get data in text form from the *wxClipboard* (p. 136).

wxTextDataObject::SetText

virtual void SetText(const wxString& strText)

Sets the text associated with the data object. This method is called when the data object receives the data and, by default, copies the text into the member variable. If you want to process the text on the fly you may wish to override this function.

wxTextDropTarget

A predefined drop target for dealing with text data.

Derived from

wxDropTarget (p. 432)

Include files

<wx/dnd.h>

See also

Drag and drop overview (p. 1673), *wxDropSource* (p. 429), *wxDropTarget* (p. 432), *wxFileDropTarget* (p. 473)

wxTextDropTarget::wxTextDropTarget

wxTextDropTarget()

Constructor.

wxTextDropTarget::OnDrop

virtual bool OnDrop(long x, long y, const void *data, size_t size)

See *wxDropTarget::OnDrop* (p. 433). This function is implemented appropriately for text, and calls *wxTextDropTarget::OnDropText* (p. 1270).

wxTextDropTarget::OnDropText

virtual bool OnDropText(long x, long y, const char *data)

Override this function to receive dropped text.

Parameters

x

The x coordinate of the mouse.

y

The y coordinate of the mouse.

data

The data being dropped: a NULL-terminated string.

Return value

Return true to accept the data, false to veto the operation.

wxTextEntryDialog

This class represents a dialog that requests a one-line text string from the user. It is implemented as a generic wxWidgets dialog.

Derived from

wxDialog (p. 369)

wxWindow (p. 1388)

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/textdlg.h>

See also

wxTextEntryDialog overview (p. 1657)

wxTextEntryDialog::wxTextEntryDialog

wxTextEntryDialog(wxWindow* parent, const wxString& message, const wxString& caption = "Please enter text", const wxString& defaultValue = "", long style = wxOK | wxCANCEL | wxCENTRE, const wxPoint& pos = wxDefaultPosition)

Constructor. Use *wxTextEntryDialog::ShowModal* (p. 1272) to show the dialog.

Parameters

parent

Parent window.

message

Message to show on the dialog.

defaultValue

The default value, which may be the empty string.

style

A dialog style, specifying the buttons (wxOK, wxCANCEL) and an optional wxCENTRE style. Additionally, wxTextCtrl styles (such as wxTE_PASSWORD) may be specified here.

pos

Dialog position.

wxTextEntryDialog::~wxTextEntryDialog

~wxTextEntryDialog()

Destructor.

wxTextEntryDialog::GetValue

wxString GetValue() const

Returns the text that the user has entered if the user has pressed OK, or the original value if the user has pressed Cancel.

wxTextEntryDialog::SetValue

void SetValue(const wxString& value)

Sets the default text value.

wxTextEntryDialog::ShowModal

int ShowModal()

Shows the dialog, returning wxID_OK if the user pressed OK, and wxOK_CANCEL otherwise.

wxTextFile

The `wxTextFile` is a simple class which allows to work with text files on line by line basis. It also understands the differences in line termination characters under different platforms and will not do anything bad to files with "non native" line termination sequences - in fact, it can be also used to modify the text files and change the line termination characters from one type (say DOS) to another (say Unix).

One word of warning: the class is not at all optimized for big files and so it will load the file entirely into memory when opened. Of course, you should not work in this way with large files (as an estimation, anything over 1 Megabyte is surely too big for this class). On the other hand, it is not a serious limitation for the small files like configuration files or programs sources which are well handled by `wxTextFile`.

The typical things you may do with `wxTextFile` in order are:

- Create and open it: this is done with either *Create* (p. 1274) or *Open* (p. 1278) function which opens the file (name may be specified either as the argument to these functions or in the constructor), reads its contents in memory (in the case of `Open()`) and closes it.
- Work with the lines in the file: this may be done either with "direct access" functions like *GetLineCount* (p. 1275) and *GetLine* (p. 1275) (*operator[]* does exactly the same but looks more like array addressing) or with "sequential access" functions which include *GetFirstLine* (p. 1276)/*GetNextLine* (p. 1276) and also *GetLastLine* (p. 1277)/*GetPrevLine* (p. 1277). For the sequential access functions the current line number is maintained: it is returned by *GetCurrentLine* (p. 1275) and may be changed with *GoToLine* (p. 1276).
- Add/remove lines to the file: *AddLine* (p. 1274) and *InsertLine* (p. 1277) add new lines while *RemoveLine* (p. 1278) deletes the existing ones. *Clear* (p. 1278) resets the file to empty.
- Save your changes: notice that the changes you make to the file will **not** be saved automatically; calling *Close* (p. 1274) or doing nothing discards them! To save the changes you must explicitly call *Write* (p. 1278) - here, you may also change the line termination type if you wish.

Derived from

No base class

Include files

<wx/textfile.h>

Data structures

The following constants identify the line termination type:

```
enum wxTextFileType
{
    wxTextFileType_None,    // incomplete (the last line of the file only)
    wxTextFileType_Unix,    // line is terminated with 'LF' = 0xA = 10 =
```

```
'\n'
    wxTextFileType_Dos,    //
    wxTextFileType_Mac    //
'\r'
};

'CR' 'LF'
'CR' = 0xD = 13 =
```

See also

wxFile (p. 461)

wxTextFile::wxTextFile

wxTextFile() const

Default constructor, use *Create* (p. 1274) or *Open* (p. 1278) with a file name parameter to initialize the object.

wxTextFile::wxTextFile

wxTextFile(const wxString& strFile) const

Constructor does not load the file into memory, use *Open()* to do it.

wxTextFile::~~wxTextFile

~wxTextFile() const

Destructor does nothing.

wxTextFile::AddLine

void AddLine(const wxString& str, wxTextFileType type = typeDefault) const

Adds a line to the end of file.

wxTextFile::Close

bool Close() const

Closes the file and frees memory, **losing all changes**. Use *Write()* (p. 1278) if you want to save them.

wxTextFile::Create

bool Create() const

bool Create(const wxString& strFile) const

Creates the file with the given name or the name which was given in the *constructor* (p. 1274). The array of file lines is initially empty.

It will fail if the file already exists, *Open* (p. 1278) should be used in this case.

wxTextFile::Exists

bool Exists() const

Return true if file exists - the name of the file should have been specified in the constructor before calling *Exists()*.

wxTextFile::IsOpened

bool IsOpened() const

Returns true if the file is currently opened.

wxTextFile::GetLineCount

size_t GetLineCount() const

Get the number of lines in the file.

wxTextFile::GetLine

wxString& GetLine(size_t n) const

Retrieves the line number *n* from the file. The returned line may be modified but you shouldn't add line terminator at the end - this will be done by *wxTextFile*.

wxTextFile::operator[]

wxString& operator[](size_t n) const

The same as *GetLine* (p. 1275).

wxTextFile::GetCurrentLine

size_t GetCurrentLine() const

Returns the current line: it has meaning only when you're using *GetFirstLine()/GetNextLine()* functions, it doesn't get updated when you're using "direct access" functions like *GetLine()*. *GetFirstLine()* and *GetLastLine()* also change the value

of the current line, as well as `GoToLine()`.

wxTextFile::GoToLine

void GoToLine(size_t n) const

Changes the value returned by *GetCurrentLine* (p. 1275) and used by *GetFirstLine()* (p. 1276)/*GetNextLine()* (p. 1276).

wxTextFile::Eof

bool Eof() const

Returns true if the current line is the last one.

wxTextFile::GetEOL

static const char* GetEOL(wxTextFileType type = typeDefault) const

Get the line termination string corresponding to given constant. *typeDefault* is the value defined during the compilation and corresponds to the native format of the platform, i.e. it will be `wxTextFileType_Dos` under Windows, `wxTextFileType_Unix` under Unix (including Mac OS X when compiling with the Apple Developer Tools) and `wxTextFileType_Mac` under Mac OS (including Mac OS X when compiling with CodeWarrior).

wxTextFile::GetFirstLine

wxString& GetFirstLine() const

This method together with *GetNextLine()* (p. 1276) allows more "iterator-like" traversal of the list of lines, i.e. you may write something like:

```
wxTextFile file;
...
for ( str = file.GetFirstLine(); !file.Eof(); str = file.GetNextLine() )
{
    // do something with the current line in str
}
// do something with the last line in str
```

wxTextFile::GetNextLine

wxString& GetNextLine()

Gets the next line (see *GetFirstLine* (p. 1276) for the example).

wxTextFile::GetPrevLine

wxString& GetPrevLine()

Gets the previous line in the file.

wxTextFile::GetLastLine

wxString& GetLastLine()

Gets the last line of the file. Together with *GetPrevLine* (p. 1277) it allows to enumerate the lines in the file from the end to the beginning like this:

```
wxTextFile file;
...
for ( str = file.GetLastLine();
      file.GetCurrentLine() > 0;
      str = file.GetPrevLine() )
{
    // do something with the current line in str
}
// do something with the first line in str
```

wxTextFile::GetLineType

wxTextFileType GetLineType(size_t n) const

Get the type of the line (see also *GetEOL* (p. 1276))

wxTextFile::GuessType

wxTextFileType GuessType() const

Guess the type of file (which is supposed to be opened). If sufficiently many lines of the file are in DOS/Unix/Mac format, the corresponding value will be returned. If the detection mechanism fails *wxTextFileType_None* is returned.

wxTextFile::GetName

const char* GetName() const

Get the name of the file.

wxTextFile::InsertLine

**void InsertLine(const wxString& str, size_t n, wxTextFileType type = typeDefault)
const**

Insert a line before the line number *n*.

wxTextFile::Open

bool Open(wxMBConv& conv = wxConvUTF8) const

bool Open(const wxString& strFile, wxMBConv& conv = wxConvUTF8) const

Open() opens the file with the given name or the name which was given in the *constructor* (p. 1274) and also loads file in memory on success. It will fail if the file does not exist, *Create* (p. 1274) should be used in this case.

The *conv* argument is only meaningful in Unicode build of wxWidgets when it is used to convert the file to wide character representation.

wxTextFile::RemoveLine

void RemoveLine(size_t n) const

Delete line number *n* from the file.

wxTextFile::Clear

void Clear() const

Delete all lines from the file, set current line number to 0.

wxTextFile::Write

bool Write(wxTextFileType typeNew = wxTextFileType_None, wxMBConv& conv = wxConvUTF8) const

Change the file on disk. The *typeNew* parameter allows you to change the file format (default argument means "don't change type") and may be used to convert, for example, DOS files to Unix.

The *conv* argument is only meaningful in Unicode build of wxWidgets when it is used to convert all lines to multibyte representation before writing them to physical file.

Returns true if operation succeeded, false if it failed.

wxTextInputStream

This class provides functions that read text datas using an input stream. So, you can read *text* floats, integers.

The *wxTextInputStream* correctly reads text files (or streams) in DOS, Macintosh and Unix formats and reports a single newline char as a line ending.

Operator >> is overloaded and you can use this class like a standard C++ *iostream*.

Note, however, that the arguments are the fixed size types `wxUInt32`, `wxInt32` etc and on a typical 32-bit computer, none of these match to the "long" type (`wxInt32` is defined as `int` on 32-bit architectures) so that you cannot use `long`. To avoid problems (here and elsewhere), make use of `wxInt32`, `wxUInt32` and similar types.

If you're scanning through a file using `wxTextInputStream`, you should check for EOF **before** reading the next item (word / number), because otherwise the last item may get lost. You should however be prepared to receive an empty item (empty string / zero number) at the end of file, especially on Windows systems. This is unavoidable because most (but not all) files end with whitespace (i.e. usually a newline).

For example:

```
wxFileInputStream input( "mytext.txt" );
wxTextInputStream text( input );
wxUInt8 il;
float f2;
wxString line;

text >> il;           // read a 8 bit integer.
text >> il >> f2;      // read a 8 bit integer followed by float.
text >> line;         // read a text line
```

Include files

<wx/txtstrm.h>

wxTextInputStream::wxTextInputStream

wxTextInputStream(wxInputStream& stream, const wxString& sep="\\t", wxMBConv& conv = wxConvUTF8)

Constructs a text stream object from an input stream. Only read methods will be available.

Parameters

stream

The underlying input stream.

sep

The initial string separator characters.

conv

In Unicode build only: The encoding converter used to convert the bytes in the underlying input stream to characters.

wxTextInputStream::~~wxTextInputStream

~wxTextInputStream()

Destroys the wxTextInputStream object.

wxTextInputStream::Read8

wxUInt8 Read8(int base = 10)

Reads a single unsigned byte from the stream, given in base *base*.

The value of *base* must be comprised between 2 and 36, inclusive, or be a special value 0 which means that the usual rules of C numbers are applied: if the number starts with 0x it is considered to be in base16, if it starts with 0 - in base 8 and in base 10 otherwise. Note that you may not want to specify the base 0 if you are parsing the numbers which may have leading zeroes as they can yield unexpected (to the user not familiar with C) results.

wxTextInputStream::Read8S

wxInt8 Read8S(int base = 10)

Reads a single signed byte from the stream.

See *wxTextInputStream::Read8* (p. 1280) for the description of the *base* parameter.

wxTextInputStream::Read16

wxUInt16 Read16(int base = 10)

Reads a unsigned 16 bit integer from the stream.

See *wxTextInputStream::Read8* (p. 1280) for the description of the *base* parameter.

wxTextInputStream::Read16S

wxInt16 Read16S(int base = 10)

Reads a signed 16 bit integer from the stream.

See *wxTextInputStream::Read8* (p. 1280) for the description of the *base* parameter.

wxTextInputStream::Read32

wxUInt32 Read32(int base = 10)

Reads a 32 bit unsigned integer from the stream.

See *wxTextInputStream::Read8* (p. 1280) for the description of the *base* parameter.

wxTextInputStream::Read32S

wxInt32 Read32S(int base = 10)

Reads a 32 bit signed integer from the stream.

See *wxTextInputStream::Read8* (p. 1280) for the description of the *base* parameter.

wxTextInputStream::ReadChar

wxChar wxTextInputStream::ReadChar()

Reads a character, returns 0 if there are no more characters in the stream.

wxTextInputStream::ReadDouble

double ReadDouble()

Reads a double (IEEE encoded) from the stream.

wxTextInputStream::ReadLine

wxString wxTextInputStream::ReadLine()

Reads a line from the input stream and returns it (without the end of line character).

wxTextInputStream::ReadString

wxString wxTextInputStream::ReadString()

NB: This method is deprecated, use *ReadLine* (p. 1281) or *ReadWord* (p. 1281) instead.

Same as *ReadLine* (p. 1281).

wxTextInputStream::ReadWord

wxString wxTextInputStream::ReadWord()

Reads a word (a sequence of characters until the next separator) from the input stream.

See also

SetStringSeparators (p. 1281)

wxTextInputStream::SetStringSeparators

void SetStringSeparators(const wxString& sep)

Sets the characters which are used to define the word boundaries in *ReadWord* (p. 1281).

The default separators are the space and TAB characters.

wxTextOutputStream

This class provides functions that write text datas using an output stream. So, you can write *text* floats, integers.

You can also simulate the C++ `cout` class:

```
wxFileOutputStream output( stderr );
wxTextOutputStream cout( output );

cout << "This is a text line" << endl;
cout << 1234;
cout << 1.23456;
```

The `wxTextOutputStream` writes text files (or streams) on DOS, Macintosh and Unix in their native formats (concerning the line ending).

wxTextOutputStream::wxTextOutputStream

wxTextOutputStream(wxOutputStream& stream, wxEOL mode = wxEOL_NATIVE)

Constructs a text stream object from an output stream. Only write methods will be available.

Parameters

stream

The output stream.

mode

The end-of-line mode. One of **wxEOL_NATIVE**, **wxEOL_DOS**, **wxEOL_MAC** and **wxEOL_UNIX**.

wxTextOutputStream::~~wxTextOutputStream

~wxTextOutputStream()

Destroys the `wxTextOutputStream` object.

wxTextOutputStream::GetMode

wxEOL wxTextOutputStream::GetMode()

Returns the end-of-line mode. One of **wxEOL_DOS**, **wxEOL_MAC** and **wxEOL_UNIX**.

wxTextOutputStream::SetMode

void wxTextOutputStream::SetMode(wxEOL mode = wxEOL_NATIVE)

Set the end-of-line mode. One of **wxEOL_NATIVE**, **wxEOL_DOS**, **wxEOL_MAC** and **wxEOL_UNIX**.

wxTextOutputStream::Write8

void wxTextOutputStream::Write8(wxUint8 i8)

Writes the single byte *i8* to the stream.

wxTextOutputStream::Write16

void wxTextOutputStream::Write16(wxUint16 i16)

Writes the 16 bit integer *i16* to the stream.

wxTextOutputStream::Write32

void wxTextOutputStream::Write32(wxUint32 i32)

Writes the 32 bit integer *i32* to the stream.

wxTextOutputStream::WriteDouble

virtual void wxTextOutputStream::WriteDouble(double f)

Writes the double *f* to the stream using the IEEE format.

wxTextOutputStream::WriteString

virtual void wxTextOutputStream::WriteString(const wxString& string)

Writes *string* as a line. Depending on the end-of-line mode the end of line ('\n') characters in the string are converted to the correct line ending terminator.

wxTextValidator

`wxTextValidator` validates text controls, providing a variety of filtering behaviours.

For more information, please see *Validator overview* (p. 1621).

Derived from

`wxValidator` (p. 1360)
`wxEvtHandler` (p. 445)
`wxObject` (p. 954)

Include files

<wx/valtext.h>

See also

Validator overview (p. 1621), `wxValidator` (p. 1360), `wxGenericValidator` (p. 567)

`wxTextValidator::wxTextValidator`

`wxTextValidator(const wxTextValidator& validator)`

Copy constructor.

`wxTextValidator(long style = wxFILTER_NONE, wxString* valPtr = NULL)`

Constructor, taking a style and optional pointer to a `wxString` variable.

Parameters

style

A bitlist of flags, which can be:

- | | |
|------------------------------|---|
| wxFILTER_NONE | No filtering takes place. |
| wxFILTER_ASCII | Non-ASCII characters are filtered out. |
| wxFILTER_ALPHA | Non-alpha characters are filtered out. |
| wxFILTER_ALPHANUMERIC | Non-alphanumeric characters are filtered out. |
| wxFILTER_NUMERIC | Non-numeric characters are filtered out. |
| wxFILTER_INCLUDE_LIST | Use an include list. The validator checks if the user input is on the list, complaining if not. See <code>wxTextValidator::SetIncludeList</code> (p. 1286). |
| wxFILTER_EXCLUDE_LIST | Use an exclude list. The validator checks if the user input is on the list, complaining if it is. See <code>wxTextValidator::SetExcludeList</code> (p. 1286). |

wxFILTER_INCLUDE_CHAR_LIST Use an include list. The validator checks if each input character is in the list (one character per list element), complaining if not. See *wxTextValidator::SetIncludeList* (p. 1286).

wxFILTER_EXCLUDE_CHAR_LIST Use an include list. The validator checks if each input character is in the list (one character per list element), complaining if it is. See *wxTextValidator::SetExcludeList* (p. 1286).

valPtr

A pointer to a *wxString* variable that contains the value. This variable should have a lifetime equal to or longer than the validator lifetime (which is usually determined by the lifetime of the window).

wxTextValidator::~~wxTextValidator

~wxTextValidator()

Destructor.

wxTextValidator::Clone

virtual wxValidator* Clone() const

Clones the text validator using the copy constructor.

wxTextValidator::GetExcludeList

wxStringList& GetExcludeList() const

Returns a reference to the exclude list (the list of invalid values).

wxTextValidator::GetIncludeList

wxStringList& GetIncludeList() const

Returns a reference to the include list (the list of valid values).

wxTextValidator::GetStyle

long GetStyle() const

Returns the validator style.

wxTextValidator::OnChar

void OnChar(wxKeyEvent& *event*)

Receives character input from the window and filters it according to the current validator style.

wxTextValidator::SetExcludeList

void SetExcludeList(const wxStringList& *stringList*)

Sets the exclude list (invalid values for the user input).

wxTextValidator::SetIncludeList

void SetIncludeList(const wxStringList& *stringList*)

Sets the include list (valid values for the user input).

wxTextValidator::SetStyle

void SetStyle(long *style*)

Sets the validator style.

wxTextValidator::TransferFromWindow

virtual bool TransferFromWindow()

Transfers the value in the text control to the string.

wxTextValidator::TransferToWindow

virtual bool TransferToWindow()

Transfers the string value to the text control.

wxTextValidator::Validate

virtual bool Validate(wxWindow* *parent*)

Validates the window contents against the include or exclude lists, depending on the validator style.

wxThread

A thread is basically a path of execution through a program. Threads are sometimes called *light-weight processes*, but the fundamental difference between threads and processes is that memory spaces of different processes are separated while all threads share the same address space. While it makes it much easier to share common data between several threads, it also makes much easier to shoot oneself in the foot, so careful use of synchronization objects such as *mutexes* (p. 938) and/or *critical sections* (p. 207) is recommended.

There are two types of threads in `wxWidgets`: *detached* and *joinable* ones, just as in the POSIX thread API (but unlike Win32 threads where all threads are joinable). The difference between the two is that only joinable threads can return a return code -- this is returned by the `Wait()` function. Detached threads (the default type) cannot be waited for.

You shouldn't hurry to create all the threads joinable, however, because this has a disadvantage as well: you **must** `Wait()` for a joinable thread or the system resources used by it will never be freed, and you also must delete the corresponding `wxThread` object yourself. In contrast, detached threads are of the "fire-and-forget" kind: you only have to start a detached thread and it will terminate and destroy itself.

This means, of course, that all detached threads **must** be created on the heap because the thread will call `delete this;` upon termination. Joinable threads may be created on the stack although more usually they will be created on the heap as well. Don't create global thread objects because they allocate memory in their constructor, which will cause problems for the memory checking system.

Derived from

None.

Include files

<wx/thread.h>

See also

wxMutex (p. 938), *wxCondition* (p. 174), *wxCriticalSection* (p. 207)

wxThread::wxThread

wxThread(wxThreadKind kind = wxTHREAD_DETACHED)

This constructor creates a new detached (default) or joinable C++ thread object. It does not create or start execution of the real thread -- for this you should use the *Create* (p. 1288) and *Run* (p. 1292) methods.

The possible values for *kind* parameters are:

wxTHREAD_DETACHED	Create a detached thread.
wxTHREAD_JOINABLE	Create a joinable thread

wxThread::~~wxThread

~wxThread()

The destructor frees the resources associated with the thread. Notice that you should never delete a detached thread -- you may only call *Delete* (p. 1288) on it or wait until it terminates (and auto destructs) itself. Because the detached threads delete themselves, they can only be allocated on the heap.

Joinable threads should be deleted explicitly. The *Delete* (p. 1288) and *Kill* (p. 1291) functions will not delete the C++ thread object. It is also safe to allocate them on stack.

wxThread::Create

wxThreadError Create(unsigned int *stackSize* = 0)

Creates a new thread. The thread object is created in the suspended state, and you should call *Run* (p. 1292) to start running it. You may optionally specify the stack size to be allocated to it (Ignored on platforms that don't support setting it explicitly, eg. Unix).

Return value

One of:

wxTHREAD_NO_ERROR	There was no error.
wxTHREAD_NO_RESOURCE	There were insufficient resources to create a new thread.
wxTHREAD_RUNNING	The thread is already running.

wxThread::Delete

void Delete()

Calling *Delete* (p. 1288) is a graceful way to terminate the thread. It asks the thread to terminate and, if the thread code is well written, the thread will terminate after the next call to *TestDestroy* (p. 1293) which should happen quite soon.

However, if the thread doesn't call *TestDestroy* (p. 1293) often enough (or at all), the function will not return immediately, but wait until the thread terminates. As it may take a long time, and the message processing is not stopped during this function execution, message handlers may be called from inside it!

Delete() may be called for a thread in any state: running, paused or even not yet created. Moreover, it must be called if *Create* (p. 1288) or *Run* (p. 1292) fail in order to free the memory occupied by the thread object. However, you should not call Delete() on a detached thread which already terminated -- doing so will probably result in a crash because the thread object doesn't exist any more.

For detached threads Delete() will also delete the C++ thread object, but it will not do

this for joinable ones.

This function can only be called from another thread context.

wxThread::Entry

virtual ExitCode Entry()

This is the entry point of the thread. This function is pure virtual and must be implemented by any derived class. The thread execution will start here.

The returned value is the thread exit code which is only useful for joinable threads and is the value returned by *Wait* (p. 1293).

This function is called by wxWidgets itself and should never be called directly.

wxThread::Exit

void Exit(ExitCode exitcode = 0)

This is a protected function of the wxThread class and thus can only be called from a derived class. It also can only be called in the context of this thread, i.e. a thread can only exit from itself, not from another thread.

This function will terminate the OS thread (i.e. stop the associated path of execution) and also delete the associated C++ object for detached threads. *wxThread::OnExit* (p. 1291) will be called just before exiting.

wxThread::GetCPUCount

static int GetCPUCount()

Returns the number of system CPUs or -1 if the value is unknown.

[See also](#)

SetConcurrency (p. 1292)

wxThread::GetCurrentId

static unsigned long GetCurrentId()

Returns the platform specific thread ID of the current thread as a long. This can be used to uniquely identify threads, even if they are not wxThreads.

wxThread::GetId

unsigned long GetId() const

Gets the thread identifier: this is a platform dependent number that uniquely identifies the thread throughout the system during its existence (i.e. the thread identifiers may be reused).

wxThread::GetPriority

int GetPriority() const

Gets the priority of the thread, between zero and 100.

The following priorities are defined:

WXTHREAD_MIN_PRIORITY	0
WXTHREAD_DEFAULT_PRIORITY	50
WXTHREAD_MAX_PRIORITY	100

wxThread::IsAlive

bool IsAlive() const

Returns `true` if the thread is alive (i.e. started and not terminating).

Note that this function can only be safely used with joinable threads, not detached ones as the latter delete themselves and so when the real thread is not alive any longer it is not possible to call this function neither because the `wxThread` object doesn't exist any more as well.

wxThread::IsDetached

bool IsDetached() const

Returns `true` if the thread is of the detached kind, `false` if it is a joinable one.

wxThread::IsMain

static bool IsMain()

Returns `true` if the calling thread is the main application thread.

wxThread::IsPaused

bool IsPaused() const

Returns `true` if the thread is paused.

wxThread::IsRunning

bool IsRunning() const

Returns `true` if the thread is running.

This method may only be safely used for joinable threads, see the remark in *IsAlive* (p. 1290).

wxThread::Kill

wxThreadError Kill()

Immediately terminates the target thread. **This function is dangerous and should be used with extreme care (and not used at all whenever possible)!** The resources allocated to the thread will not be freed and the state of the C runtime library may become inconsistent. Use *Delete()* (p. 1288) instead.

For detached threads *Kill()* will also delete the associated C++ object. However this will not happen for joinable threads and this means that you will still have to delete the *wxThread* object yourself to avoid memory leaks. In neither case *OnExit* (p. 1291) of the dying thread will be called, so no thread-specific cleanup will be performed.

This function can only be called from another thread context, i.e. a thread cannot kill itself.

It is also an error to call this function for a thread which is not running or paused (in the latter case, the thread will be resumed first) -- if you do it, a `wxTHREAD_NOT_RUNNING` error will be returned.

wxThread::OnExit

void OnExit()

Called when the thread exits. This function is called in the context of the thread associated with the *wxThread* object, not in the context of the main thread. This function will not be called if the thread *waskilled* (p. 1291).

This function should never be called directly.

wxThread::Pause

wxThreadError Pause()

Suspends the thread. Under some implementations (Win32), the thread is suspended immediately, under others it will only be suspended when it calls *TestDestroy* (p. 1293) for the next time (hence, if the thread doesn't call it at all, it won't be suspended).

This function can only be called from another thread context.

wxThread::Run

wxThreadError Run()

Starts the thread execution. Should be called after *Create* (p. 1288).

This function can only be called from another thread context.

wxThread::SetPriority

void SetPriority(int *priority*)

Sets the priority of the thread, between 0 and 100. It can only be set after calling *Create()* (p. 1288) but before calling *Run()* (p. 1292).

The following priorities are already defined:

WXTHREAD_MIN_PRIORITY	0
WXTHREAD_DEFAULT_PRIORITY	50
WXTHREAD_MAX_PRIORITY	100

wxThread::Sleep

static void Sleep(unsigned long *milliseconds*)

Pauses the thread execution for the given amount of time.

This function should be used instead of *wxSleep* (p. 1535) by all worker threads (i.e. all except the main one).

wxThread::Resume

wxThreadError Resume()

Resumes a thread suspended by the call to *Pause* (p. 1291).

This function can only be called from another thread context.

wxThread::SetConcurrency

static bool SetConcurrency(size_t *level*)

Sets the thread concurrency level for this process. This is, roughly, the number of threads that the system tries to schedule to run in parallel. The value of 0 for *level* may be used to set the default one.

Returns `true` on success or false otherwise (for example, if this function is not

implemented for this platform -- currently everything except Solaris).

wxThread::TestDestroy

virtual bool TestDestroy()

This function should be called periodically by the thread to ensure that calls to *Pause* (p. 1291) and *Delete* (p. 1288) will work. If it returns `true`, the thread should exit as soon as possible.

Notice that under some platforms (POSIX), implementation of *Pause* (p. 1291) also relies on this function being called, so not calling it would prevent both stopping and suspending thread from working.

wxThread::This

static wxThread * This()

Return the thread object for the calling thread. NULL is returned if the calling thread is the main (GUI) thread, but *IsMain* (p. 1290) should be used to test whether the thread is really the main one because NULL may also be returned for the thread not created with `wxThread` class. Generally speaking, the return value for such a thread is undefined.

wxThread::Yield

void Yield()

Give the rest of the thread time slice to the system allowing the other threads to run. See also *Sleep()* (p. 1292).

wxThread::Wait

ExitCode Wait() const

Waits until the thread terminates and returns its exit code or `(ExitCode)-1` on error.

You can only `Wait()` for joinable (not detached) threads.

This function can only be called from another thread context.

wxThreadHelper

The `wxThreadHelper` class is a mix-in class that manages a single background thread. By deriving from `wxThreadHelper`, a class can implement the thread code in its own *wxThreadHelper::Entry* (p. 1295) method and easily share data and synchronization objects between the main thread and the worker thread. Doing this prevents the awkward passing of pointers that is needed when the original object in the main thread

needs to synchronize with its worker thread in its own `wxThread` derived object.

For example, `wxFrame` (p. 532) may need to make some calculations in a background thread and then display the results of those calculations in the main window.

Ordinarily, a `wxThread` (p. 1286) derived object would be created with the calculation code implemented in `wxThread::Entry` (p. 1289). To access the inputs to the calculation, the frame object would often to pass a pointer to itself to the thread object. Similarly, the frame object would hold a pointer to the thread object. Shared data and synchronization objects could be stored in either object though the object without the data would have to access the data through a pointer.

However, with `wxThreadHelper`, the frame object and the thread object are treated as the same object. Shared data and synchronization variables are stored in the single object, eliminating a layer of indirection and the associated pointers.

Derived from

None.

Include files

`<wx/thread.h>`

See also

`wxThread` (p. 1286)

`wxThreadHelper::wxThreadHelper`

`wxThreadHelper()`

This constructor simply initializes a member variable.

`wxThreadHelper::m_thread`

`wxThread * m_thread`

the actual `wxThread` (p. 1286) object.

`wxThread::~~wxThreadHelper`

`~wxThreadHelper()`

The destructor frees the resources associated with the thread.

`wxThreadHelper::Create`

wxThreadError Create(unsigned int *stackSize* = 0)

Creates a new thread. The thread object is created in the suspended state, and you should call *GetThread()->Run()* (p. 1292) to start running it. You may optionally specify the stack size to be allocated to it (Ignored on platforms that don't support setting it explicitly, eg. Unix).

Return value

One of:

wxTHREAD_NO_ERROR	There was no error.
wxTHREAD_NO_RESOURCE	There were insufficient resources to create a new thread.
wxTHREAD_RUNNING	The thread is already running.

wxThreadHelper::Entry

virtual ExitCode Entry()

This is the entry point of the thread. This function is pure virtual and must be implemented by any derived class. The thread execution will start here.

The returned value is the thread exit code which is only useful for joinable threads and is the value returned by *GetThread()->Wait()* (p. 1293).

This function is called by *wxWidgets* itself and should never be called directly.

wxThreadHelper::GetThread

wxThread * GetThread()

This is a public function that returns the *wxThread* (p. 1286) object associated with the thread.

wxThreadHelperThread

The *wxThreadHelperThread* class is used internally by the *wxThreadHelper* (p. 1293) mix-in class. This class simply calls *wxThreadHelper::Entry* (p. 1295) in its owner class when the thread runs.

Derived from

wxThread (p. 1286)

Include files

<wx/thread.h>

See also

wxThread (p. 1286), *wxThreadHelper* (p. 1293)

wxThreadHelperThread::wxThreadHelperThread

wxThreadHelperThread()

This constructor simply initializes member variables.

wxThreadHelperThread::m_owner

wxThreadHelperThread& m_owner

the *wxThreadHelper* (p. 1293) object which holds the code to run inside the thread.

wxThreadHelperThread::Entry

virtual ExitCode Entry()

This is the entry point of the thread. This function eventually calls *wxThreadHelper::Entry* (p. 1295). The actual worker thread code should be implemented in *wxThreadHelper::Entry* (p. 1295), not here, so all shared data and synchronization objects can be shared easily between the main thread and the worker thread.

The returned value is the thread exit code which is the value returned by *Wait()* (p. 1293).

This function is called by *wxWidgets* itself and should never be called directly.

wxThreadHelperThread::CallEntry

virtual ExitCode CallEntry()

This is a convenience method that actually calls *wxThreadHelper::Entry* (p. 1295). This function eventually calls *wxThreadHelper::Entry* (p. 1295). The actual worker thread code should be implemented in *wxThreadHelper::Entry* (p. 1295), not here, so all shared data and synchronization objects can be shared easily between the main thread and the worker thread.

It must be declared after *wxThreadHelper* (p. 1293) so it can access *wxThreadHelper::Entry* (p. 1295) and avoid circular dependencies. Thus, it uses the inline keyword to allow its definition outside of the class definition. To avoid any conflicts between the virtual and inline keywords, it is a non-virtual method.

The returned value is the thread exit code which is the value returned by *Wait()* (p. 1293).

This function is called by *wxWidgets* itself and should never be called directly.

wxTimer

The `wxTimer` class allows you to execute code at specified intervals. Its precision is platform-dependent, but in general will not be better than 1ms nor worse than 1s.

There are two different ways to use this class:

1. You may derive a new class from `wxTimer` and override the *Notify* (p. 1298) member to perform the required action.
2. Or you may redirect the notifications to any *wxEvtHandler* (p. 445) derived object by using the non default constructor or *SetOwner* (p. 1298). Then use the `EVT_TIMER` macro to connect it to the event handler which will receive *wxTimerEvent* (p. 1299) notifications.
3. Or you may use a derived class and the `EVT_TIMER` macro to connect it to an event handler defined in the derived class. If the default constructor is used, the timer object will be its own owner object, since it is derived from *wxEvtHandler*.

In any case, you must start the timer with *Start* (p. 1298) after constructing it before it actually starts sending notifications. It can be stopped later with *Stop* (p. 1299).

NB: note that timer can only be used from the main thread currently.

Derived from

wxEvtHandler (p. 445)

Include files

<wx/timer.h>

See also

`::wxStartTimer` (p. 1535), `::wxGetElapsedTime` (p. 1533), *wxStopWatch* (p. 1191)

wxTimer::wxTimer

`wxTimer()`

Default constructor. If you use it to construct the object and don't call *SetOwner* (p. 1298) later, you must override *Notify* (p. 1298) method to process the notifications.

`wxTimer(wxEvtHandler *owner, int id = -1)`

Creates a timer and associates it with *owner*. Please see *SetOwner* (p. 1298) for the description of parameters.

wxTimer::~~wxTimer

~wxTimer()

Destructor. Stops the timer if it is running.

wxTimer::GetInterval

int GetInterval() const

Returns the current interval for the timer (in milliseconds).

wxTimer::IsOneShot

bool IsOneShot() const

Returns `true` if the timer is one shot, i.e. if it will stop after firing the first notification automatically.

wxTimer::IsRunning

bool IsRunning() const

Returns `true` if the timer is running, `false` if it is stopped.

wxTimer::Notify

void Notify()

This member should be overridden by the user if the default constructor was used and *SetOwner* (p. 1298) wasn't called.

Perform whatever action which is to be taken periodically here.

wxTimer::SetOwner

void SetOwner(wxEvtHandler *owner, int id = -1)

Associates the timer with the given *owner* object. When the timer is running, the owner will receive *timer events* (p. 1299) with id equal to *id* specified here.

wxTimer::Start

bool Start(int milliseconds = -1, bool oneShot = false)

(Re)starts the timer. If *milliseconds* parameter is -1 (value by default), the previous value is used. Returns `false` if the timer could not be started, `true` otherwise (in MS Windows timers are a limited resource).

If *oneShot* is `false` (the default), the *Notify* (p. 1298) function will be called repeatedly until the timer is stopped. If `true`, it will be called only once and the timer will stop automatically. To make your code more readable you may also use the following symbolic constants:

`wxTIMER_CONTINUOUS` Start a normal, continuously running, timer

`wxTIMER_ONE_SHOT` Start a one shot timer

If the timer was already running, it will be stopped by this method before restarting it.

wxTimer::Stop

void Stop()

Stops the timer.

wxTimerEvent

`wxTimerEvent` object is passed to the event handler of timer events.

For example:

```
class MyFrame : public wxFrame
{
public:
    ...
    void OnTimer(wxTimerEvent& event);

private:
    wxTimer m_timer;
};

BEGIN_EVENT_TABLE(MyFrame, wxFrame)
    EVT_TIMER(TIMER_ID, MyFrame::OnTimer)
END_EVENT_TABLE()

MyFrame::MyFrame()
    : m_timer(this, TIMER_ID)
{
    m_timer.Start(1000);    // 1 second interval
}

void MyFrame::OnTimer(wxTimerEvent& event)
{
    // do whatever you want to do every second here
}
```

Include files

<wx/timer.h>

See also

wxTimer (p. 1297)

wxTimerEvent::GetInterval

int GetInterval() const

Returns the interval of the timer which generated this event.

wxTimeSpan

wxTimeSpan class represents a time interval.

Derived from

No base class

Include files

<wx/datetime.h>

See also

Date classes overview (p. 1586), *wxDateTime* (p. 237)

Static functions

Seconds (p. 1305)

Second (p. 1305)

Minutes (p. 1304)

Minute (p. 1304)

Hours (p. 1303)

Hour (p. 1303)

Days (p. 1301)

Day (p. 1302)

Weeks (p. 1306)

Week (p. 1306)

Constructors

wxTimeSpan (p. 1306)

Accessors

GetSeconds (p. 1303)

GetMinutes (p. 1303)

GetHours (p. 1302)

GetDays (p. 1302)

GetWeeks (p. 1303)

GetValue (p. 1303)

Operations

Add (p. 1301)
Subtract (p. 1305)
Multiply (p. 1305)
Negate (p. 1305)
Neg (p. 1305)
Abs (p. 1301)

Tests

IsNull (p. 1304)
IsPositive (p. 1304)
IsNegative (p. 1304)
EqualTo (p. 1304)
LongerThan (p. 1304)
ShorterThan (p. 1304)

Formatting time spans

Format (p. 1302)

wxTimeSpan::Abs

wxTimeSpan Abs() const

Returns the absolute value of the timespan: does not modify the object.

wxTimeSpan::Add

wxTimeSpan Add(const wxTimeSpan& *diff*) const

wxTimeSpan& Add(const wxTimeSpan& *diff*)

wxTimeSpan& operator+=(const wxTimeSpan& *diff*)

Returns the sum of two timespans.

wxTimeSpan::Days

static wxTimeSpan Days(long *days*)

Returns the timespan for the given number of days.

wxTimeSpan::Day

static wxTimespan Day()

Returns the timespan for one day.

wxTimeSpan::Format

wxString Format(const wxChar * format = "%H:%M:%S")

Returns the string containing the formatted representation of the time span. The following format specifiers are allowed after %:

H	number of H ours
M	number of M inutes
S	number of S econds
I	number of milliseconds
D	number of D ays
E	number of w E eks
%	the percent character

Note that, for example, the number of hours in the description above is not well defined: it can be either the total number of hours (for example, for a time span of 50 hours this would be 50) or just the hour part of the time span, which would be 2 in this case as 50 hours is equal to 2 days and 2 hours.

wxTimeSpan resolves this ambiguity in the following way: if there had been, indeed, the %D format specified preceding the %H, then it is interpreted as 2. Otherwise, it is 50.

The same applies to all other format specifiers: if they follow a specifier of larger unit, only the rest part is taken, otherwise the full value is used.

wxTimeSpan::GetDays

int GetDays() const

Returns the difference in number of days.

wxTimeSpan::GetHours

int GetHours() const

Returns the difference in number of hours.

wxTimeSpan::GetMilliseconds

wxLongLong GetMilliseconds() const

Returns the difference in number of milliseconds.

wxTimeSpan::GetMinutes

int GetMinutes() const

Returns the difference in number of minutes.

wxTimeSpan::GetSeconds

wxLongLong GetSeconds() const

Returns the difference in number of seconds.

wxTimeSpan::GetValue

wxLongLong GetValue() const

Returns the internal representation of timespan.

wxTimeSpan::GetWeeks

int GetWeeks() const

Returns the difference in number of weeks.

wxTimeSpan::Hours

static wxTimespan Hours(long hours)

Returns the timespan for the given number of hours.

wxTimeSpan::Hour

static wxTimespan Hour()

Returns the timespan for one hour.

wxTimeSpan::IsEqualTo

bool IsEqualTo(const wxTimeSpan& ts) const

Returns `true` if two timespans are equal.

wxTimeSpan::IsLongerThan

bool IsLongerThan(const wxTimeSpan& ts) const

Compares two timespans: works with the absolute values, i.e. -2 hours is longer than 1 hour. Also, it will return `false` if the timespans are equal in absolute value.

wxTimeSpan::IsNegative

bool IsNegative() const

Returns `true` if the timespan is negative.

wxTimeSpan::IsNull

bool IsNull() const

Returns `true` if the timespan is empty.

wxTimeSpan::IsPositive

bool IsPositive() const

Returns `true` if the timespan is positive.

wxTimeSpan::IsShorterThan

bool IsShorterThan(const wxTimeSpan& ts) const

Compares two timespans: works with the absolute values, i.e. 1 hour is shorter than -2 hours. Also, it will return `false` if the timespans are equal in absolute value.

wxTimeSpan::Minutes

static wxTimeSpan Minutes(long min)

Returns the timespan for the given number of minutes.

wxTimeSpan::Minute

static wxTimespan Minute()

Returns the timespan for one minute.

wxTimespan::Multiply

wxTimespan Multiply(int *n*) const**wxTimespan& Multiply(int *n*)****wxTimespan& operator*=(int *n*)**

Multiplies timespan by a scalar.

wxTimespan::Negate

wxTimespan Negate() const

Returns timespan with inversed sign.

wxTimespan::Neg

wxTimespan& Neg()**wxTimespan& operator-()**

Negate the value of the timespan.

wxTimespan::Seconds

static wxTimespan Seconds(long *sec*)

Returns the timespan for the given number of seconds.

wxTimespan::Second

static wxTimespan Second()

Returns the timespan for one second.

wxTimespan::Subtract

wxTimespan Subtract(const wxTimespan& *diff*) const**wxTimespan& Subtract(const wxTimespan& *diff*)****wxTimespan& operator-=(const wxTimespan& *diff*)**

Returns the difference of two timespans.

wxTimeSpan::Weeks

static wxTimeSpan Weeks(long weeks)

Returns the timespan for the given number of weeks.

wxTimeSpan::Week

static wxTimeSpan Week()

Returns the timespan for one week.

wxTimeSpan::wxTimeSpan

wxTimeSpan()

Default constructor, constructs a zero timespan.

wxTimeSpan(long hours, long min, long sec, long msec)

Constructs timespan from separate values for each component, with the date set to 0. Hours are not restricted to 0..24 range, neither are minutes, seconds or milliseconds.

wxTipProvider

This is the class used together with *wxShowTip* (p. 1503) function. It must implement *GetTip* (p. 1307) function and return the current tip from it (different tip each time it is called).

You will never use this class yourself, but you need it to show startup tips with *wxShowTip*. Also, if you want to get the tips text from elsewhere than a simple text file, you will want to derive a new class from *wxTipProvider* and use it instead of the one returned by *wxCreateFileTipProvider* (p. 1495).

Derived from

None.

Include files

<wx/tipdlg.h>

See also

Startup tips overview (p. 1670), *::wxShowTip* (p. 1503)

wxTipProvider::wxTipProvider

wxTipProvider(size_t currentTip)

Constructor.

currentTip

The starting tip index.

wxTipProvider::GetTip

wxString GetTip()

Return the text of the current tip and pass to the next one. This function is pure virtual, it should be implemented in the derived classes.

wxTipProvider::PreprocessTip

virtual wxString PreProcessTip(const wxString&tip)

Returns a modified tip. This function will be called immediately after read, and before being check whether it is a comment, an empty string or a string to translate. You can optionally override this in your custom user-derived class to optionally to modify the tip as soon as it is read. You can return any modification to the string. If you return `wxEmptyString`, then this tip is skipped, and the next one is read.

wxCurrentTipProvider::GetCurrentTip

size_t GetCurrentTip() const

Returns the index of the current tip (i.e. the one which would be returned by `GetTip`).

The program usually remembers the value returned by this function after calling `wxShowTip` (p. 1503). Note that it is not the same as the value which was passed to `wxShowTip + 1` because the user might have pressed the "Next" button in the tip dialog.

wxTipWindow

Shows simple text in a popup tip window on creation. This is used by `wxSimpleHelpProvider` (p. 1102) to show popup help. The window automatically destroys itself when the user clicks on it or it loses the focus.

You may also use this class to emulate the tooltips when you need finer control over them than what the standard tooltips provide.

Derived from

`wxPopupTransientWindow`
`wxPopupWindow`
`wxWindow` (p. 1388)
`wxEvtHandler` (p. 445)
`wxObject` (p. 954)

Include files

`<wx/tipwin.h>`

`wxTipWindow::wxTipWindow`

`wxTipWindow(wxWindow* parent, const wxString& text, wxCoord maxLength = 100, wxTipWindow windowPtr)`**

Constructor. The tip is shown immediately the window is constructed.

Parameters

parent

The parent window, must be non `NULL`

text

The text to show, may contain the new line characters

windowPtr

Simply passed to *SetTipWindowPtr* (p. 1308) below, please see its documentation for the description of this parameter

rectBounds

If non `NULL`, passed to *SetBoundingRect* (p. 1308) below, please see its documentation for the description of this parameter

`wxTipWindow::SetTipWindowPtr`

`void SetTipWindowPtr(wxTipWindow windowPtr)`**

When the tip window closes itself (which may happen at any moment and unexpectedly to the caller) it may `NULL` out the pointer pointed to by *windowPtr*. This is helpful to avoid dereferencing the tip window which had been already closed and deleted.

`wxTipWindow::SetBoundingRect`

`void SetBoundingRect(const wxRect& rectBound)`

By default, the tip window disappears when the user clicks the mouse or presses a keyboard key or if it loses focus in any other way - for example because the user switched to another application window.

Additionally, if a non empty *rectBound* is provided, the tip window will also automatically close if the mouse leaves this area. This is useful to dismiss the tip mouse when the mouse leaves the object it is associated with.

Parameters

rectBound

The bounding rectangle for the mouse in the screen coordinates

wxToggleButton

wxToggleButton is a button that stays pressed when clicked by the user. In other words, it is similar to *wxCheckBox* (p. 121) in functionality but looks like a *wxButton* (p. 104).

You can see *wxToggleButton* in action in the sixth page of the *controls* (p. 1569) sample.

NB: This class is only available under *wxMSW*, *wxGTK* and *wxMotif* currently.

Derived from

wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/tglbtn.h>

Window styles

There are no special styles for *wxToggleButton*.

See also *window styles overview* (p. 1618).

Event handling

EVT_TOGGLEBUTTON(id, func) Handles button click event.

See also

wxCheckBox (p. 121), *wxButton* (p. 104)

wxToggleButton::wxToggleButton

wxToggleButton()

Default constructor.

wxToggleButton(wxWindow* parent, wxWindowID id, const wxString& label, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = 0, const wxValidator& val, const wxString& name = "checkBox")

Constructor, creating and showing a toggle button.

Parameters

parent

Parent window. Must not be `NULL`.

id

Toggle button identifier. A value of -1 indicates a default value.

label

Text to be displayed next to the toggle button.

pos

Toggle button position. If the position (-1, -1) is specified then a default position is chosen.

size

Toggle button size. If the default size (-1, -1) is specified then a default size is chosen.

style

Window style. See *wxToggleButton* (p. 1309).

validator

Window validator.

name

Window name.

See also

wxToggleButton::Create (p. 1311), *wxValidator* (p. 1360)

wxToggleButton::~~wxToggleButton

~wxToggleButton()

Destructor, destroying the toggle button.

wxToggleButton::Create

bool Create(wxWindow* *parent*, wxWindowID *id*, const wxString& *label*, const wxPoint& *pos* = wxDefaultPosition, const wxSize& *size* = wxDefaultSize, long *style* = 0, const wxValidator& *val*, const wxString& *name* = "checkBox")

Creates the toggle button for two-step construction. See *wxToggleButton::wxToggleButton* (p. 1309) for details.

wxToggleButton::GetValue

bool GetValue() const

Gets the state of the toggle button.

Return value

Returns `true` if it is pressed, `false` otherwise.

wxToggleButton::SetValue

void SetValue(const bool *state*)

Sets the toggle button to the given state. This does not cause a `EVT_TOGGLEBUTTON` event to be emitted.

Parameters

state

If `true`, the button is pressed.

wxToolBar

The name `wxToolBar` is defined to be a synonym for one of the following classes:

- **wxToolBar95** The native Windows 95 toolbar. Used on Windows 95, NT 4 and above.
- **wxToolBarMSW** A Windows implementation. Used on 16-bit Windows.
- **wxToolBarGTK** The GTK toolbar.
- **wxToolBarSimple** A simple implementation, with scrolling. Used on platforms with no native toolbar control, or where scrolling is required.

Note that the base class **wxToolBarBase** defines automatic scrolling management

functionality which is similar to *wxScrolledWindow* (p. 1085), so please refer to this class also. Not all toolbars support scrolling, but *wxToolBarSimple* does.

Derived from

wxToolBarBase
wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/toolbar.h> (to allow wxWidgets to select an appropriate toolbar class)
<wx/tbarbase.h> (the base class)
<wx/tbarmsw.h> (the non-Windows 95 Windows toolbar class)
<wx/tbar95.h> (the Windows 95/98 toolbar class)
<wx/tbarsmpl.h> (the generic simple toolbar class)

Remarks

You may also create a toolbar that is managed by the frame, by calling *wxFrame::CreateToolBar* (p. 537).

Due to the use of native toolbars on the various platforms, certain adaptations will often have to be made in order to get optimal look on all platforms as some platforms ignore the values for explicit placement and use their own layout and the meaning of a "separator" is a vertical line under Windows95 vs. simple space under GTK etc.

wxToolBar95: Note that this toolbar paints tools to reflect system-wide colours. If you use more than 16 colours in your tool bitmaps, you may wish to suppress this behaviour, otherwise system colours in your bitmaps will inadvertently be mapped to system colours. To do this, set the *msw.remap* system option before creating the toolbar:

```
wxSystemOptions::SetOption(wxT("msw.remap"), 0);
```

Window styles

wxTB_FLAT	Gives the toolbar a flat look (Windows and GTK only).
wxTB_DOCKABLE	Makes the toolbar floatable and dockable (GTK only).
wxTB_HORIZONTAL	Specifies horizontal layout (default).
wxTB_VERTICAL	Specifies vertical layout.
wxTB_TEXT	Shows the text in the toolbar buttons; by default only icons are shown.
wxTB_NOICONS	Specifies no icons in the toolbar buttons; by default they are shown.
wxTB_NODIVIDER	Specifies no divider (border) above the toolbar (Windows only).

wxBT_NOALIGN	Specifies no alignment with the parent window (Windows only, not very useful).
wxBT_HORZ_LAYOUT	Shows the text and the icons alongside, not vertically stacked (Windows and GTK 2 only). This style must be used with <code>wxBT_TEXT</code> .
wxBT_HORZ_TEXT	Combination of <code>wxBT_HORZ_LAYOUT</code> and <code>wxBT_TEXT</code> .

See also *window styles overview* (p. 1618). Note that the Win32 native toolbar ignores `wxBT_NOICONS` style. Also, toggling the `wxBT_TEXT` works only if the style was initially on.

Event handling

The toolbar class emits menu commands in the same way that a frame menubar does, so you can use one `EVT_MENU` macro for both a menu item and a toolbar button. The event handler functions take a `wxCommandEvent` argument. For most event macros, the identifier of the tool is passed, but for `EVT_TOOL_ENTER` the toolbar window identifier is passed and the tool identifier is retrieved from the `wxCommandEvent`. This is because the identifier may be -1 when the mouse moves off a tool, and -1 is not allowed as an identifier in the event system.

EVT_TOOL(id, func)	Process a <code>wxEVT_COMMAND_TOOL_CLICKED</code> event (a synonym for <code>wxEVT_COMMAND_MENU_SELECTED</code>). Pass the id of the tool.
EVT_MENU(id, func)	The same as <code>EVT_TOOL</code> .
EVT_TOOL_RANGE(id1, id2, func)	Process a <code>wxEVT_COMMAND_TOOL_CLICKED</code> event for a range of identifiers. Pass the ids of the tools.
EVT_MENU_RANGE(id1, id2, func)	The same as <code>EVT_TOOL_RANGE</code> .
EVT_TOOL_RCLICKED(id, func)	Process a <code>wxEVT_COMMAND_TOOL_RCLICKED</code> event. Pass the id of the tool.
EVT_TOOL_RCLICKED_RANGE(id1, id2, func)	Process a <code>wxEVT_COMMAND_TOOL_RCLICKED</code> event for a range of ids. Pass the ids of the tools.
EVT_TOOL_ENTER(id, func)	Process a <code>wxEVT_COMMAND_TOOL_ENTER</code> event. Pass the id of the toolbar itself. The value of <code>wxCommandEvent::GetSelection</code> is the tool id, or -1 if the mouse cursor has moved off a tool.

[See also](#)

ToolBar overview (p. 1664), *wxScrolledWindow* (p. 1085)

wxToolBar::wxToolBar

wxToolBar()

Default constructor.

wxToolBar(**wxWindow*** *parent*, **wxWindowID** *id*, **const wxPoint&** *pos* = *wxDefaultPosition*, **const wxSize&** *size* = *wxDefaultSize*, **long** *style* = *wxTB_HORIZONTAL* | *wxNO_BORDER*, **const wxString&** *name* = *wxPanelNameStr*)

Constructs a toolbar.

Parameters

parent

Pointer to a parent window.

id

Window identifier. If -1, will automatically create an identifier.

pos

Window position. *wxDefaultPosition* is (-1, -1) which indicates that *wxWidgets* should generate a default position for the window. If using the *wxWindow* class directly, supply an actual position.

size

Window size. *wxDefaultSize* is (-1, -1) which indicates that *wxWidgets* should generate a default size for the window.

style

Window style. See *wxToolBar* (p. 1311) for details.

name

Window name.

Remarks

After a toolbar is created, you use *wxToolBar::AddTool* (p. 1315) and perhaps *wxToolBar::AddSeparator* (p. 1315), and then you must call *wxToolBar::Realize* (p. 1324) to construct and display the toolbar tools.

You may also create a toolbar that is managed by the frame, by calling *wxFrame::CreateToolBar* (p. 537).

wxToolBar::~wxToolBar

void ~wxToolBar()

Toolbar destructor.

wxToolBar::AddControl

bool AddControl(wxControl* control)

Adds any control to the toolbar, typically e.g. a combobox.

control

The control to be added.

wxToolBar::AddSeparator

void AddSeparator()

Adds a separator for spacing groups of tools.

See also*wxToolBar::AddTool* (p. 1315), *wxToolBar::SetToolSeparation* (p. 1327)**wxToolBar::AddTool**

wxToolBarTool* AddTool(int toolId, const wxString& label, const wxBitmap& bitmap1, const wxString& shortHelpString = "", wxItemKind kind = wxITEM_NORMAL)**wxToolBarTool* AddTool(int toolId, const wxString& label, const wxBitmap& bitmap1, const wxBitmap& bitmap2 = wxNullBitmap, wxItemKind kind = wxITEM_NORMAL, const wxString& shortHelpString = "", const wxString& longHelpString = "", wxObject* clientData = NULL)****wxToolBarTool* AddTool(wxToolBarTool* tool)**

Adds a tool to the toolbar. The first (short and most commonly used) version has fewer parameters than the full version at the price of not being able to specify some of the more rarely used button features. The last version allows to add an existing tool.

Parameters*toolId*

An integer by which the tool may be identified in subsequent operations.

kind

May be wxITEM_NORMAL for a normal button (default), wxITEM_CHECK for a

checkable tool (such tool stays pressed after it had been toggled) or `wxITEM_RADIO` for a checkable tool which makes part of a radio group of tools each of which is automatically unchecked whenever another button in the group is checked

bitmap1

The primary tool bitmap for toggle and button tools.

bitmap2

The second bitmap specifies the on-state bitmap for a toggle tool. If this is `wxNullBitmap`, either an inverted version of the primary bitmap is used for the on-state of a toggle tool (monochrome displays) or a black border is drawn around the tool (colour displays) or the pixmap is shown as a pressed button (GTK).

shortHelpString

This string is used for the tools tooltip

longHelpString

This string is shown in the statusbar (if any) of the parent frame when the mouse pointer is inside the tool

clientData

An optional pointer to client data which can be retrieved later using `wxToolBar::GetToolClientData` (p. 1319).

tool

The tool to be added.

Remarks

After you have added tools to a toolbar, you must call `wxToolBar::Realize` (p. 1324) in order to have the tools appear.

See also

`wxToolBar::AddSeparator` (p. 1315), `wxToolBar::AddCheckTool` (p. 1316),
`wxToolBar::AddRadioTool` (p. 1317), `wxToolBar::InsertTool` (p. 1322),
`wxToolBar::DeleteTool` (p. 1317), `wxToolBar::Realize` (p. 1324)

wxToolBar::AddCheckTool

wxToolBarTool* AddCheckTool(int toolId, const wxString& label, const wxBitmap& bitmap1, const wxBitmap& bitmap2, const wxString& shortHelpString = "", const wxString& longHelpString = "", wxObject* clientData = NULL)

Adds a new check (or toggle) tool to the toolbar. The parameters are the same as in `wxToolBar::AddTool` (p. 1315).

See also

wxToolBar::AddTool (p. 1315)

wxToolBar::AddRadioTool

wxToolBarTool* AddRadioTool(int *toolId*, const wxString& *label*, const wxBitmap& *bitmap1*, const wxBitmap& *bitmap2*, const wxString& *shortHelpString* = "", const wxString& *longHelpString* = "", wxObject* *clientData* = NULL)

Adds a new radio tool to the toolbar. Consecutive radio tools form a radio group such that exactly one button in the group is pressed at any moment, in other words whenever a button in the group is pressed the previously pressed button is automatically released. You should avoid having the radio groups of only one element as it would be impossible for the user to use such button.

By default, the first button in the radio group is initially pressed, the others are not.

See also

wxToolBar::AddTool (p. 1315)

wxToolBar::DeleteTool

bool DeleteTool(int *toolId*)

Removes the specified tool from the toolbar and deletes it. If you don't want to delete the tool, but just to remove it from the toolbar (to possibly add it back later), you may use *RemoveTool* (p. 1324) instead.

Note that it is unnecessary to call *Realize* (p. 1324) for the change to take place, it will happen immediately.

Returns true if the tool was deleted, false otherwise.

See also

DeleteToolByPos (p. 1317)

wxToolBar::DeleteToolByPos

bool DeleteToolByPos(size_t *pos*)

This function behaves like *DeleteTool* (p. 1317) but it deletes the tool at the specified position and not the one with the given id.

wxToolBar::EnableTool

void EnableTool(int *toolId*, const bool *enable*)

Enables or disables the tool.

Parameters

toolId

Tool to enable or disable.

enable

If true, enables the tool, otherwise disables it.

NB: This function should only be called after *Realize* (p. 1324).

Remarks

For *wxToolBarSimple*, does nothing. Some other implementations will change the visible state of the tool to indicate that it is disabled.

See also

wxToolBar::GetToolEnabled (p. 1320), *wxToolBar::ToggleTool* (p. 1327)

wxToolBar::FindById

wxToolBarTool* FindById(int id)

Returns a pointer to the tool identified by *id* or NULL if no corresponding tool is found.

wxToolBar::FindControl

wxControl* FindControl(int id)

Returns a pointer to the control identified by *id* or NULL if no corresponding control is found.

wxToolBar::FindToolForPosition

wxToolBarTool* FindToolForPosition(const float x, const float y) const

Finds a tool for the given mouse position.

Parameters

x

X position.

y

Y position.

Return value

A pointer to a tool if a tool is found, or NULL otherwise.

Remarks

Used internally, and should not need to be used by the programmer.

wxToolBar::GetToolSize

wxSize GetToolSize()

Returns the size of a whole button, which is usually larger than a tool bitmap because of added 3D effects.

See also

wxToolBar::SetToolBitmapSize (p. 1325), *wxToolBar::GetToolBitmapSize* (p. 1319)

wxToolBar::GetToolBitmapSize

wxSize GetToolBitmapSize()

Returns the size of bitmap that the toolbar expects to have. The default bitmap size is 16 by 15 pixels.

Remarks

Note that this is the size of the bitmap you pass to *wxToolBar::AddTool* (p. 1315), and not the eventual size of the tool button.

See also

wxToolBar::SetToolBitmapSize (p. 1325), *wxToolBar::GetToolSize* (p. 1319)

wxToolBar::GetMargins

wxSize GetMargins() const

Returns the left/right and top/bottom margins, which are also used for inter-toolspacing.

See also

wxToolBar::SetMargins (p. 1325)

wxToolBar::GetToolClientData

wxObject* GetToolClientData(int toolId) const

Get any client data associated with the tool.

Parameters*toolId*

Id of the tool, as passed to *wxToolBar::AddTool* (p. 1315).

Return value

Client data, or NULL if there is none.

wxToolBar::GetToolEnabled

bool GetToolEnabled(int *toolId*) const

Called to determine whether a tool is enabled (responds to user input).

Parameters*toolId*

Id of the tool in question.

Return value

true if the tool is enabled, false otherwise.

See also

wxToolBar::EnableTool (p. 1317)

wxToolBar::GetToolLongHelp

wxString GetToolLongHelp(int *toolId*) const

Returns the long help for the given tool.

Parameters*toolId*

The tool in question.

See also

wxToolBar::SetToolLongHelp (p. 1326), *wxToolBar::SetToolShortHelp* (p. 1327)

wxToolBar::GetToolPacking

int GetToolPacking() const

Returns the value used for packing tools.

See also

wxToolBar::SetToolPacking (p. 1326)

wxToolBar::GetToolPos

int GetToolPos(int *toolId*) const

Returns the tool position in the toolbar, or `wxNOT_FOUND` if the tool is not found.

wxToolBar::GetToolSeparation

int GetToolSeparation() const

Returns the default separator size.

See also

wxToolBar::SetToolSeparation (p. 1327)

wxToolBar::GetToolShortHelp

wxString GetToolShortHelp(int *toolId*) const

Returns the short help for the given tool.

Parameters

toolId

The tool in question.

See also

wxToolBar::GetToolLongHelp (p. 1320), *wxToolBar::SetToolShortHelp* (p. 1327)

wxToolBar::GetToolState

bool GetToolState(int *toolId*) const

Gets the on/off state of a toggle tool.

Parameters

toolId

The tool in question.

Return value

true if the tool is toggled on, false otherwise.

See also

wxToolBar::ToggleTool (p. 1327)

wxToolBar::InsertControl

wxToolBarTool * InsertControl(size_t pos, wxControl *control)

Inserts the control into the toolbar at the given position.

You must call *Realize* (p. 1324) for the change to take place.

See also

AddControl (p. 1315),
InsertTool (p. 1322)

wxToolBar::InsertSeparator

wxToolBarTool * InsertSeparator(size_t pos)

Inserts the separator into the toolbar at the given position.

You must call *Realize* (p. 1324) for the change to take place.

See also

AddSeparator (p. 1315),
InsertTool (p. 1322)

wxToolBar::InsertTool

wxToolBarTool * InsertTool(size_t pos, int toolId, const wxBitmap& bitmap1, const wxBitmap& bitmap2 = wxNullBitmap, bool isToggle = false, wxObject* clientData = NULL, const wxString& shortHelpString = "", const wxString& longHelpString = "")

wxToolBarTool * InsertTool(size_t pos, wxToolBarTool* tool)

Inserts the tool with the specified attributes into the toolbar at the given position.

You must call *Realize* (p. 1324) for the change to take place.

See also

AddTool (p. 1315),
InsertControl (p. 1322),
InsertSeparator (p. 1322)

wxToolBar::OnLeftClick

bool OnLeftClick(int *toolId*, bool *toggleDown*)

Called when the user clicks on a tool with the left mouse button.

This is the old way of detecting tool clicks; although it will still work, you should use the EVT_MENU or EVT_TOOL macro instead.

Parameters

toolId

The identifier passed to *wxToolBar::AddTool* (p. 1315).

toggleDown

true if the tool is a toggle and the toggle is down, otherwise is false.

Return value

If the tool is a toggle and this function returns false, the toggle toggle state (internal and visual) will not be changed. This provides a way of specifying that toggle operations are not permitted in some circumstances.

See also

wxToolBar::OnMouseEnter (p. 1323), *wxToolBar::OnRightClick* (p. 1324)

wxToolBar::OnMouseEnter

void OnMouseEnter(int *toolId*)

This is called when the mouse cursor moves into a tool or out of the toolbar.

This is the old way of detecting mouse enter events; although it will still work, you should use the EVT_TOOL_ENTER macro instead.

Parameters

toolId

Greater than -1 if the mouse cursor has moved into the tool, or -1 if the mouse cursor has moved. The programmer can override this to provide extra information about the tool, such as a short description on the status line.

Remarks

With some derived toolbar classes, if the mouse moves quickly out of the toolbar, wxWidgets may not be able to detect it. Therefore this function may not always be called when expected.

wxToolBar::OnRightClick

void OnRightClick(int *toolId*, float *x*, float *y*)

Called when the user clicks on a tool with the right mouse button. The programmer should override this function to detect right tool clicks.

This is the old way of detecting tool right clicks; although it will still work, you should use the `EVT_TOOL_RCLICKED` macro instead.

Parameters

toolId

The identifier passed to *wxToolBar::AddTool* (p. 1315).

x

The x position of the mouse cursor.

y

The y position of the mouse cursor.

Remarks

A typical use of this member might be to pop up a menu.

See also

wxToolBar::OnMouseEnter (p. 1323), *wxToolBar::OnLeftClick* (p. 1323)

wxToolBar::Realize

bool Realize()

This function should be called after you have added tools.

wxToolBar::RemoveTool

wxToolBarTool * RemoveTool(int *id*)

Removes the given tool from the toolbar but doesn't delete it. This allows to insert/add this tool back to this (or another) toolbar later.

Note that it is unnecessary to call *Realize* (p. 1324) for the change to take place, it will happen immediately.

See also

DeleteTool (p. 1317)

wxToolBar::SetMargins

void SetMargins(const wxSize& size)

void SetMargins(int x, int y)

Set the values to be used as margins for the toolbar.

Parameters

size

Margin size.

x

Left margin, right margin and inter-tool separation value.

y

Top margin, bottom margin and inter-tool separation value.

Remarks

This must be called before the tools are added if absolute positioning is to be used, and the default (zero-size) margins are to be overridden.

See also

wxToolBar::GetMargins (p. 1319), *wxSize* (p. 1107)

wxToolBar::SetToolBitmapSize

void SetToolBitmapSize(const wxSize& size)

Sets the default size of each tool bitmap. The default bitmap size is 16 by 15 pixels.

Parameters

size

The size of the bitmaps in the toolbar.

Remarks

This should be called to tell the toolbar what the tool bitmap size is. Call it before you add tools.

Note that this is the size of the bitmap you pass to *wxToolBar::AddTool* (p. 1315), and not the eventual size of the tool button.

See also

wxToolBar::GetToolBitmapSize (p. 1319), *wxToolBar::GetToolSize* (p. 1319)

wxToolBar::SetToolClientData

void SetToolClientData(int *id*, wxObject* *clientData*)

Sets the client data associated with the tool.

wxToolBar::SetToolLongHelp

void SetToolLongHelp(int *toolId*, const wxString& *helpString*)

Sets the long help for the given tool.

Parameters*toolId*

The tool in question.

helpString

A string for the long help.

Remarks

You might use the long help for displaying the tool purpose on the status line.

See also

wxToolBar::GetToolLongHelp (p. 1320), *wxToolBar::SetToolShortHelp* (p. 1327),

wxToolBar::SetToolPacking

void SetToolPacking(int *packing*)

Sets the value used for spacing tools. The default value is 1.

Parameters*packing*

The value for packing.

Remarks

The packing is used for spacing in the vertical direction if the toolbar is horizontal, and for spacing in the horizontal direction if the toolbar is vertical.

See also

wxToolBar::GetToolPacking (p. 1320)

wxToolBar::SetToolShortHelp

void SetToolShortHelp(int *toolId*, const wxString& *helpString*)

Sets the short help for the given tool.

Parameters

toolId

The tool in question.

helpString

The string for the short help.

Remarks

An application might use short help for identifying the tool purpose in a tooltip.

See also

wxToolBar::GetToolShortHelp (p. 1321), *wxToolBar::SetToolLongHelp* (p. 1326)

wxToolBar::SetToolSeparation

void SetToolSeparation(int *separation*)

Sets the default separator size. The default value is 5.

Parameters

separation

The separator size.

See also

wxToolBar::AddSeparator (p. 1315)

wxToolBar::ToggleTool

void ToggleTool(int *toolId*, const bool *toggle*)

Toggles a tool on or off. This does not cause any event to get emitted.

Parameters

toolId

Tool in question.

toggle

If true, toggles the tool on, otherwise toggles it off.

Remarks

Only applies to a tool that has been specified as a toggle tool.

See also

wxToolBar::GetToolState (p. 1321)

wxToolTip

This class holds information about a tooltip associated with a window (see *wxWindow::SetToolTip* (p. 1436)).

The two static methods, *wxToolTip::Enable* (p. 1328) and *wxToolTip::SetDelay* (p. 1328) can be used to globally alter tooltips behaviour.

Derived from

wxObject (p. 954)

wxToolTip::Enable

static void Enable(bool *flag*)

Enable or disable tooltips globally.

wxToolTip::SetDelay

static void SetDelay(long *msecs*)

Set the delay after which the tooltip appears.

wxToolTip::wxToolTip

wxToolTip(const wxString& *tip*)

Constructor.

wxToolTip::SetTip

void SetTip(const wxString& *tip*)

Set the tooltip text.

wxToolTip::GetTip

wxString GetTip() const

Get the tooltip text.

wxToolTip::GetWindow

wxWindow* GetWindow() const

Get the associated window.

wxTreeCtrl

A tree control presents information as a hierarchy, with items that may be expanded to show further items. Items in a tree control are referenced by *wxTreeItemId* handles, which may be tested for validity by calling *wxTreeItemId::IsOk*.

To intercept events from a tree control, use the event table macros described in *wxTreeEvent* (p. 1347).

Derived from

wxControl (p. 199)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/treectrl.h>

Window styles

wxTR_EDIT_LABELS	Use this style if you wish the user to be able to edit labels in the tree control.
wxTR_NO_BUTTONS	For convenience to document that no buttons are to be drawn.
wxTR_HAS_BUTTONS	Use this style to show + and - buttons to the left of parent items.
wxTR_TWIST_BUTTONS	Use this style to show Mac-style twister buttons to the left of parent items. If both wxTR_HAS_BUTTONS and wxTR_TWIST_BUTTONS are given, twister buttons are generated. Generic only.
wxTR_NO_LINES	Use this style to hide vertical level connectors.
wxTR_FULL_ROW_HIGHLIGHT	Use this style to have the background colour and

	the selection highlight extend over the entire horizontal row of the tree control window. (This flag is ignored under Windows unless you specify <code>wxTR_NO_LINES</code> as well.)
wxTR_LINES_AT_ROOT	Use this style to show lines between root nodes. Only applicable if <code>wxTR_HIDE_ROOT</code> is set and <code>wxTR_NO_LINES</code> is not set.
wxTR_HIDE_ROOT	Use this style to suppress the display of the root node, effectively causing the first-level nodes to appear as a series of root nodes.
wxTR_ROW_LINES	Use this style to draw a contrasting border between displayed rows.
wxTR_HAS_VARIABLE_ROW_HEIGHT	Use this style to cause row heights to be just big enough to fit the content. If not set, all rows use the largest row height. The default is that this flag is unset. Generic only.
wxTR_SINGLE	For convenience to document that only one item may be selected at a time. Selecting another item causes the current selection, if any, to be deselected. This is the default.
wxTR_MULTIPLE	Use this style to allow a range of items to be selected. If a second range is selected, the current range, if any, is deselected.
wxTR_EXTENDED	Use this style to allow disjoint items to be selected. (Only partially implemented; may not work in all cases.)
wxTR_DEFAULT_STYLE	The set of flags that are closest to the defaults for the native control for a particular toolkit.

See also *window styles overview* (p. 1618).

Event handling

To process input from a tree control, use these event handler macros to direct input to member functions that take a *wxTreeEvent* (p. 1347) argument.

EVT_TREE_BEGIN_DRAG(id, func) Begin dragging with the left mouse button.

EVT_TREE_BEGIN_RDRAG(id, func) Begin dragging with the right mouse button.

EVT_TREE_BEGIN_LABEL_EDIT(id, func) Begin editing a label. This can be prevented by calling *Veto()* (p. 954).

EVT_TREE_END_LABEL_EDIT(id, func) Finish editing a label. This can be prevented by calling *Veto()* (p. 954).

EVT_TREE_DELETE_ITEM(id, func) Delete an item.

EVT_TREE_GET_INFO(id, func)	Request information from the application.
EVT_TREE_SET_INFO(id, func)	Information is being supplied.
EVT_TREE_ITEM_ACTIVATED(id, func)	The item has been activated, i.e. chosen by double clicking it with mouse or from keyboard
EVT_TREE_ITEM_COLLAPSED(id, func)	The item has been collapsed.
EVT_TREE_ITEM_COLLAPSING(id, func)	The item is being collapsed. This can be prevented by calling <i>Veto()</i> (p. 954).
EVT_TREE_ITEM_EXPANDED(id, func)	The item has been expanded.
EVT_TREE_ITEM_EXPANDING(id, func)	The item is being expanded. This can be prevented by calling <i>Veto()</i> (p. 954).
EVT_TREE_SEL_CHANGED(id, func)	Selection has changed.
EVT_TREE_SEL_CHANGING(id, func)	Selection is changing. This can be prevented by calling <i>Veto()</i> (p. 954).
EVT_TREE_KEY_DOWN(id, func)	A key has been pressed.
EVT_TREE_ITEM_GETTOOLTIP(id, func)	The opportunity to set the item tooltip is being given to the application (call <i>wxTreeEvent::SetToolTip</i>). Windows only.

See also

wxTreeItemData (p. 1350), *wxTreeCtrl* overview (p. 1653), *wxListBox* (p. 794), *wxListCtrl* (p. 799), *wxImageList* (p. 754), *wxTreeEvent* (p. 1347)

Win32 notes

wxTreeCtrl class uses the standard common treeview control under Win32 implemented in the system library *comctl32.dll*. Some versions of this library are known to have bugs with handling the tree control colours: the usual symptom is that the expanded items leave black (or otherwise incorrectly coloured) background behind them, especially for the controls using non default background colour. The recommended solution is to upgrade the *comctl32.dll* to a newer version: see <http://www.microsoft.com/msdownload/ieplatform/ie/comctrlx86.asp> (<http://www.microsoft.com/msdownload/ieplatform/ie/comctrlx86.asp>)

wxTreeCtrl::wxTreeCtrl

wxTreeCtrl()

Default constructor.

```
wxTreeCtrl(wxWindow* parent, wxWindowID id, const wxPoint& pos =  
wxDefaultPosition, const wxSize& size = wxDefaultSize, long style =  
wxTR_HAS_BUTTONS, const wxValidator& validator = wxDefaultValidator, const  
wxString& name = "listCtrl")
```

Constructor, creating and showing a tree control.

Parameters

parent

Parent window. Must not be `NULL`.

id

Window identifier. A value of -1 indicates a default value.

pos

Window position.

size

Window size. If the default size (-1, -1) is specified then the window is sized appropriately.

style

Window style. See *wxTreeCtrl* (p. 1329).

validator

Window validator.

name

Window name.

See also

wxTreeCtrl::Create (p. 1334), *wxValidator* (p. 1360)

wxTreeCtrl::~~wxTreeCtrl

```
void ~wxTreeCtrl()
```

Destructor, destroying the list control.

wxTreeCtrl::AddRoot

```
wxTreeItemId AddRoot(const wxString& text, int image = -1, int selImage = -1,  
wxTreeItemData* data = NULL)
```

Adds the root node to the tree, returning the new item.

The *image* and *sellImage* parameters are an index within the normal image list specifying the image to use for unselected and selected items, respectively. If *image* > -1 and *sellImage* is -1, the same image is used for both selected and unselected items.

wxTreeCtrl::AppendItem

wxTreeItemId AppendItem(const wxTreeItemId& parent, const wxString& text, int image = -1, int sellImage = -1, wxTreeItemData* data = NULL)

Appends an item to the end of the branch identified by *parent*, return a new item id.

The *image* and *sellImage* parameters are an index within the normal image list specifying the image to use for unselected and selected items, respectively. If *image* > -1 and *sellImage* is -1, the same image is used for both selected and unselected items.

wxTreeCtrl::AssignButtonsImageList

void AssignButtonsImageList(wxImageList* imageList)

Sets the buttons image list. The button images assigned with this method will be automatically deleted by wxTreeCtrl as appropriate (i.e. it takes ownership of the list).

Setting or assigning the button image list enables the display of image buttons. Once enabled, the only way to disable the display of button images is to set the button image list to `NULL`.

This function is only available in the generic version.

See also *SetButtonsImageList* (p. 1344).

wxTreeCtrl::AssignImageList

void AssignImageList(wxImageList* imageList)

Sets the normal image list. Image list assigned with this method will be automatically deleted by wxTreeCtrl as appropriate (i.e. it takes ownership of the list).

See also *SetImageList* (p. 1344).

wxTreeCtrl::AssignStateImageList

void AssignStateImageList(wxImageList* imageList)

Sets the state image list. Image list assigned with this method will be automatically deleted by wxTreeCtrl as appropriate (i.e. it takes ownership of the list).

See also *SetStateImageList* (p. 1346).

wxTreeCtrl::Collapse

void Collapse(const wxTreeItemId& item)

Collapses the given item.

wxTreeCtrl::CollapseAndReset

void CollapseAndReset(const wxTreeItemId& item)

Collapses the given item and removes all children.

wxTreeCtrl::Create

bool wxTreeCtrl(wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = wxTR_HAS_BUTTONS, const wxValidator& validator = wxDefaultValidator, const wxString& name = "listCtrl")

Creates the tree control. See *wxTreeCtrl::wxTreeCtrl* (p. 1331) for further details.

wxTreeCtrl::Delete

void Delete(const wxTreeItemId& item)

Deletes the specified item. A `EVT_TREE_DELETE_ITEM` event will be generated.

This function may cause a subsequent call to `GetNextChild` to fail.

wxTreeCtrl::DeleteAllItems

void DeleteAllItems()

Deletes all the items in the control. Note that this may not generate `EVT_TREE_DELETE_ITEM` events under some Windows versions although normally such event is generated for each removed item.

wxTreeCtrl::DeleteChildren

void DeleteChildren(const wxTreeItemId& item)

Deletes all children of the given item (but not the item itself). Note that this will **not** generate any events unlike *Delete* (p. 1334) method.

If you have called *wxTreeCtrl::SetItemHasChildren* (p. 1345), you may need to call it again since *DeleteChildren* does not automatically clear the setting.

wxTreeCtrl::EditLabel

void EditLabel(const wxTreeItemId& item)

Starts editing the label of the given item. This function generates a `EVT_TREE_BEGIN_LABEL_EDIT` event which can be vetoed so that no text control will appear for in-place editing.

If the user changed the label (i.e. s/he does not press ESC or leave the text control without changes, a `EVT_TREE_END_LABEL_EDIT` event will be sent which can be vetoed as well.

See also

wxTreeCtrl::EndEditLabel (p. 1335), *wxTreeEvent* (p. 1347)

wxTreeCtrl::EndEditLabel

void EndEditLabel(bool cancelEdit)

Ends label editing. If *cancelEdit* is `true`, the edit will be cancelled.

This function is currently supported under Windows only.

See also

wxTreeCtrl::EditLabel (p. 1335)

wxTreeCtrl::EnsureVisible

void EnsureVisible(const wxTreeItemId& item)

Scrolls and/or expands items to ensure that the given item is visible.

wxTreeCtrl::Expand

void Expand(const wxTreeItemId& item)

Expands the given item.

wxTreeCtrl::GetBoundingRect

bool GetBoundingRect(const wxTreeItemId& item, wxRect& rect, bool textOnly = false) const

Retrieves the rectangle bounding the *item*. If *textOnly* is `true`, only the rectangle around the item's label will be returned, otherwise the item's image is also taken into account.

The return value is `true` if the rectangle was successfully retrieved or `false` if it was not

(in this case *rect* is not changed) - for example, if the item is currently invisible.

wxPython note: The wxPython version of this method requires only the *item* and *textOnly* parameters. The return value is either *awxRect* object or *None*.

wxPerl note: In wxPerl this method only takes the parameters *item* and *textOnly*, and returns a *Wx::Rect* (or *undef*).

wxTreeCtrl::GetButtonsImageList

wxImageList* GetButtonsImageList() const

Returns the buttons image list (from which application-defined button images are taken).

This function is only available in the generic version.

wxTreeCtrl::GetChildrenCount

size_t GetChildrenCount(const wxTreeItemId& *item*, bool *recursively* = *true*) const

Returns the number of items in the branch. If *recursively* is *true*, returns the total number of descendants, otherwise only one level of children is counted.

wxTreeCtrl::GetCount

int GetCount() const

Returns the number of items in the control.

wxTreeCtrl::GetEditControl

wxTextCtrl * GetEditControl() const

Returns the edit control being currently used to edit a label. Returns *NULL* if no label is being edited.

NB: It is currently only implemented for wxMSW.

wxTreeCtrl::GetFirstChild

wxTreeItemId GetFirstChild(const wxTreeItemId& *item*, wxTreeItemIdValue & *cookie*) const

Returns the first child; call *wxTreeCtrl::GetNextChild* (p. 1339) for the next child.

For this enumeration function you must pass in a 'cookie' parameter which is opaque for the application but is necessary for the library to make these functions reentrant (i.e. allow more than one enumeration on one and the same object simultaneously). The

cookie passed to `GetFirstChild` and `GetNextChild` should be the same variable.

Returns an invalid tree item if there are no further children.

See also

wxTreeCtrl::GetNextChild (p. 1339), *wxTreeCtrl::GetNextSibling* (p. 1339)

wxPython note: In wxPython the returned `wxTreeItemId` and the new cookie value are both returned as a tuple containing the two values.

wxPerl note: In wxPerl this method only takes the `item` parameter, and returns a 2-element list (`item`, `cookie`).

wxTreeCtrl::GetFirstVisibleItem

wxTreeItemId GetFirstVisibleItem() const

Returns the first visible item.

wxTreeCtrl::GetImageList

wxImageList* GetImageList() const

Returns the normal image list.

wxTreeCtrl::GetIndent

int GetIndent() const

Returns the current tree control indentation.

wxTreeCtrl::GetItemBackgroundColour

wxColour GetItemBackgroundColour(const wxTreeItemId& *item*) const

Returns the background colour of the item.

wxTreeCtrl::GetItemData

wxTreeItemData* GetItemData(const wxTreeItemId& *item*) const

Returns the tree item data associated with the item.

See also

wxTreeItemData (p. 1350)

wxPython note: wxPython provides the following shortcut method:

GetPyData(item)	Returns the Python Object associated with the wxTreeItemData for the given item Id.
------------------------	---

wxPerl note: wxPerl provides the following shortcut method:**GetPIData(item)** Returns the Perl data associated with the Wx::TreeItemData. It is just the same as tree->GetItemData(item)->GetData().

wxTreeCtrl::GetItemFont

wxFont GetItemFont(const wxTreeItemId& item) const

Returns the font of the item label.

wxTreeCtrl::GetItemImage

int GetItemImage(const wxTreeItemId& item, wxTreeItemIcon which = wxTreeItemIcon_Normal) const

Gets the specified item image. The value of *which* may be:

- `_Normal` to get the normal item image
- `_Selected` to get the selected item image (i.e. the image which is shown when the item is currently selected)
- `_Expanded` to get the expanded image (this only makes sense for items which have children - then this image is shown when the item is expanded and the normal image is shown when it is collapsed)
- `_SelectedExpanded` to get the selected expanded image (which is shown when an expanded item is currently selected)

wxTreeCtrl::GetItemText

wxString GetItemText(const wxTreeItemId& item) const

Returns the item label.

wxTreeCtrl::GetItemTextColour

wxColour GetItemTextColour(const wxTreeItemId& item) const

Returns the colour of the item label.

wxTreeCtrl::GetLastChild

wxTreeItemId GetLastChild(const wxTreeItemId& item) const

Returns the last child of the item (or an invalid tree item if this item has no children).

See also

GetFirstChild (p. 1336), *wxTreeCtrl::GetNextSibling* (p. 1339), *GetLastChild* (p. 1339)

wxTreeCtrl::GetNextChild

wxTreeItemId GetNextChild(const wxTreeItemId& item, wxTreeItemIdValue & cookie) const

Returns the next child; call *wxTreeCtrl::GetFirstChild* (p. 1336) for the first child.

For this enumeration function you must pass in a 'cookie' parameter which is opaque for the application but is necessary for the library to make these functions reentrant (i.e. allow more than one enumeration on one and the same object simultaneously). The cookie passed to *GetFirstChild* and *GetNextChild* should be the same.

Returns an invalid tree item if there are no further children.

See also

wxTreeCtrl::GetFirstChild (p. 1336)

wxPython note: In wxPython the returned *wxTreeItemId* and the new cookie value are both returned as a tuple containing the two values.

wxPerl note: In wxPerl this method returns a 2-element list (*item*, *cookie*), instead of modifying its parameters.

wxTreeCtrl::GetNextSibling

wxTreeItemId GetNextSibling(const wxTreeItemId& item) const

Returns the next sibling of the specified item; call *wxTreeCtrl::GetPrevSibling* (p. 1340) for the previous sibling.

Returns an invalid tree item if there are no further siblings.

See also

wxTreeCtrl::GetPrevSibling (p. 1340)

wxTreeCtrl::GetNextVisible

wxTreeItemId GetNextVisible(const wxTreeItemId& *item*) const

Returns the next visible item.

wxTreeCtrl::GetItemParent

wxTreeItemId GetItemParent(const wxTreeItemId& *item*) const

Returns the item's parent.

wxTreeCtrl::GetParent

wxTreeItemId GetParent(const wxTreeItemId& *item*) const

NOTE: This function is deprecated and will only work if `WXWIN_COMPATIBILITY_2_2` is defined. Use `wxTreeCtrl::GetItemParent` (p. 1340) instead.

Returns the item's parent.

wxPython note: This method is named `GetItemParent` to avoid a name clash with `wxWindow::GetParent`.

wxTreeCtrl::GetPrevSibling

wxTreeItemId GetPrevSibling(const wxTreeItemId& *item*) const

Returns the previous sibling of the specified item; call `wxTreeCtrl::GetNextSibling` (p. 1339) for the next sibling.

Returns an invalid tree item if there are no further children.

See also

`wxTreeCtrl::GetNextSibling` (p. 1339)

wxTreeCtrl::GetPrevVisible

wxTreeItemId GetPrevVisible(const wxTreeItemId& *item*) const

Returns the previous visible item.

wxTreeCtrl::GetRootItem

wxTreeItemId GetRootItem() const

Returns the root item for the tree control.

wxTreeCtrl::GetItemSelectedImage

int GetItemSelectedImage(const wxTreeItemId& item) const

Gets the selected item image (this function is obsolete, use `GetItemImage(item, wxTreeItemIcon_Selected)` instead).

wxTreeCtrl::GetSelection

wxTreeItemId GetSelection() const

Returns the selection, or an invalid item if there is no selection. This function only works with the controls without `wxTR_MULTIPLE` style, use *GetSelections* (p. 1341) for the controls which do have this style.

wxTreeCtrl::GetSelections

size_t GetSelections(wxArrayTreeItemIds& selection) const

Fills the array of tree items passed in with the currently selected items. This function can be called only if the control has the `wxTR_MULTIPLE` style.

Returns the number of selected items.

wxPython note: The wxPython version of this method accepts no parameters and returns a Python list of `wxTreeItemIds`.

wxPerl note: In wxPerl this method takes no parameters and returns a list of `Wx::TreeItemIds`.

wxTreeCtrl::GetStateImageList

wxImageList* GetStateImageList() const

Returns the state image list (from which application-defined state images are taken).

wxTreeCtrl::HitTest

wxTreeItemId HitTest(const wxPoint& point, int& flags)

Calculates which (if any) item is under the given point, returning the tree item id at this point plus extra information *flags*. *flags* is a bitlist of the following:

`wxTREE_HITTEST_ABOVE` Above the client area.

`wxTREE_HITTEST_BELOW` Below the client area.

`wxTREE_HITTEST_NOWHERE` In the client area but below the last item.

`wxTREE_HITTEST_ONITEMBUTTON` On the button associated with an item.

`wxTREE_HITTEST_ONITEMICON` On the bitmap associated with an item.

`wxTREE_HITTEST_ONITEMINDENT` In the indentation associated with an item.

`wxTREE_HITTEST_ONITEMLABEL` On the label (string) associated with an item.

`wxTREE_HITTEST_ONITEMRIGHT` In the area to the right of an item.

`wxTREE_HITTEST_ONITEMSTATEICON` On the state icon for a tree view item that is in a user-defined state.

`wxTREE_HITTEST_TOLEFT` To the right of the client area.

`wxTREE_HITTEST_TORIGHT` To the left of the client area.

wxPython note: in wxPython both the `wxTreeItemId` and the flags are returned as a tuple.

wxPerl note: In wxPerl this method only takes the `point` parameter and returns a 2-element list (`item`, `flags`).

wxTreeCtrl::InsertItem

wxTreeItemId InsertItem(const wxTreeItemId& parent, const wxTreeItemId& previous, const wxString& text, int image = -1, int selImage = -1, wxTreeItemData* data = NULL)

wxTreeItemId InsertItem(const wxTreeItemId& parent, size_t before, const wxString& text, int image = -1, int selImage = -1, wxTreeItemData* data = NULL)

Inserts an item after a given one (*previous*) or before one identified by its position (*before*). *before* must be less than the number of children.

The *image* and *selImage* parameters are an index within the normal image list specifying the image to use for unselected and selected items, respectively. If *image* > -1 and *selImage* is -1, the same image is used for both selected and unselected items.

wxPython note: The second form of this method is called `InsertItemBefore` in wxPython.

wxTreeCtrl::IsBold

bool IsBold(const wxTreeItemId& item) const

Returns `true` if the given item is in bold state.

See also: *SetItemBold* (p. 1345)

wxTreeCtrl::IsExpanded

bool IsExpanded(const wxTreeItemId& *item*) const

Returns `true` if the item is expanded (only makes sense if it has children).

wxTreeCtrl::IsSelected

bool IsSelected(const wxTreeItemId& *item*) const

Returns `true` if the item is selected.

wxTreeCtrl::IsVisible

bool IsVisible(const wxTreeItemId& *item*) const

Returns `true` if the item is visible (it might be outside the view, or not expanded).

wxTreeCtrl::ItemHasChildren

bool ItemHasChildren(const wxTreeItemId& *item*) const

Returns `true` if the item has children.

wxTreeCtrl::OnCompareItems

int OnCompareItems(const wxTreeItemId& *item1*, const wxTreeItemId& *item2*)

Override this function in the derived class to change the sort order of the items in the tree control. The function should return a negative, zero or positive value if the first item is less than, equal to or greater than the second one.

The base class version compares items alphabetically.

See also: *SortChildren* (p. 1346)

wxTreeCtrl::PrependItem

wxTreeItemId PrependItem(const wxTreeItemId& *parent*, const wxString& *text*, int *image* = -1, int *selImage* = -1, wxTreeItemData* *data* = NULL)

Appends an item as the first child of *parent*, return a new item id.

The *image* and *selImage* parameters are an index within the normal image list specifying the image to use for unselected and selected items, respectively. If *image* > -1 and *selImage* is -1, the same image is used for both selected and unselected items.

wxTreeCtrl::ScrollTo

void ScrollTo(const wxTreeItemId& item)

Scrolls the specified item into view.

wxTreeCtrl::SelectItem

bool SelectItem(const wxTreeItemId& item, bool select = true)

Selects the given item. In multiple selection controls, can be also used to deselect a currently selected item if the value of *select* is false.

wxTreeCtrl::SetButtonsImageList

void SetButtonsImageList(wxImageList* imageList)

Sets the buttons image list (from which application-defined button images are taken). The button images assigned with this method will **not** be deleted by wxTreeCtrl's destructor, you must delete it yourself.

Setting or assigning the button image list enables the display of image buttons. Once enabled, the only way to disable the display of button images is to set the button image list to `NULL`.

This function is only available in the generic version.

See also *AssignButtonsImageList* (p. 1333).

wxTreeCtrl::SetIndent

void SetIndent(int indent)

Sets the indentation for the tree control.

wxTreeCtrl::SetImageList

void SetImageList(wxImageList* imageList)

Sets the normal image list. Image list assigned with this method will **not** be deleted by wxTreeCtrl's destructor, you must delete it yourself.

See also *AssignImageList* (p. 1333).

wxTreeCtrl::SetItemBackgroundColour

void SetItemBackgroundColour(const wxTreeItemId& item, const wxColour& col)

Sets the colour of the item's background.

wxTreeCtrl::SetItemBold

void SetItemBold(const wxTreeItemId& item, bool bold = true)

Makes item appear in bold font if *bold* parameter is `true` or resets it to the normal state.

See also: *IsBold* (p. 1342)

wxTreeCtrl::SetItemData

void SetItemData(const wxTreeItemId& item, wxTreeItemData* data)

Sets the item client data.

wxPython note: wxPython provides the following shortcut method:

SetPyData(item, obj)	Associate the given Python Object with the wxTreeItemData for the given item Id.
-----------------------------	--

wxPerl note: wxPerl provides the following shortcut method:**SetPIData(item, data)** Sets the Perl data associated with the Wx::TreeItemData. It is just the same as `tree->GetItemData(item)->SetData(data)`.

wxTreeCtrl::SetItemFont

void SetItemFont(const wxTreeItemId& item, const wxFont& font)

Sets the item's font. All items in the tree should have the same height to avoid text clipping, so the fonts height should be the same for all of them, although font attributes may vary.

See also

SetItemBold (p. 1345)

wxTreeCtrl::SetItemHasChildren

void SetItemHasChildren(const wxTreeItemId& item, bool hasChildren = true)

Force appearance of the button next to the item. This is useful to allow the user to expand the items which don't have any children now, but instead adding them only when needed, thus minimizing memory usage and loading time.

wxTreeCtrl::SetItemImage

void SetItemImage(const wxTreeItemId& item, int image, wxTreeItemIcon which = wxTreeItemIcon_Normal)

Sets the specified item image. See *GetItemImage* (p. 1338) for the description of the *which* parameter.

wxTreeCtrl::SetItemSelectedImage

void SetItemSelectedImage(const wxTreeItemId& item, int selImage)

Sets the selected item image (this function is obsolete, use `SetItemImage(item, wxTreeItemIcon_Selected)` instead).

wxTreeCtrl::SetItemText

void SetItemText(const wxTreeItemId& item, const wxString& text)

Sets the item label.

wxTreeCtrl::SetItemTextColour

void SetItemTextColour(const wxTreeItemId& item, const wxColour& col)

Sets the colour of the item's text.

wxTreeCtrl::SetStateImageList

void SetStateImageList(wxImageList* imageList)

Sets the state image list (from which application-defined state images are taken). Image list assigned with this method will **not** be deleted by `wxTreeCtrl`'s destructor, you must delete it yourself.

See also *AssignStateImageList* (p. 1333).

wxTreeCtrl::SetWindowStyle

void SetWindowStyle(long styles)

Sets the mode flags associated with the display of the tree control. The new mode takes effect immediately. (Generic only; MSW ignores changes.)

wxTreeCtrl::SortChildren

void SortChildren(const wxTreeItemId& item)

Sorts the children of the given item using *OnCompareItems* (p. 1343) method of *wxTreeCtrl*. You should override that method to change the sort order (the default is ascending case-sensitive alphabetical order).

[See also](#)

wxTreeItemData (p. 1350), *OnCompareItems* (p. 1343)

wxTreeCtrl::Toggle

void Toggle(const wxTreeItemId& item)

Toggles the given item between collapsed and expanded states.

wxTreeCtrl::ToggleItemSelection

void ToggleItemSelection(const wxTreeItemId& item)

Toggles the given item between selected and unselected states. For multiselection controls only.

wxTreeCtrl::Unselect

void Unselect()

Removes the selection from the currently selected item (if any).

wxTreeCtrl::UnselectAll

void UnselectAll()

This function either behaves the same as *Unselect* (p. 1347) if the control doesn't have *wxTR_MULTIPLE* style, or removes the selection from all items if it does have this style.

wxTreeCtrl::UnselectItem

void UnselectItem(const wxTreeItemId& item)

Unselects the given item. This works in multiselection controls only.

wxTreeEvent

A tree event holds information about events associated with *wxTreeCtrl* objects.

Derived from

wxNotifyEvent (p. 953)
wxCommandEvent (p. 165)
wxEvent (p. 441)
wxObject (p. 954)

Include files

<wx/treectrl.h>

Event table macros

To process input from a tree control, use these event handler macros to direct input to member functions that take a *wxTreeEvent* argument.

EVT_TREE_BEGIN_DRAG(id, func)	The user has started dragging an item with the left mouse button. The event handler must call wxTreeEvent::Allow() for the drag operation to continue.
EVT_TREE_BEGIN_RDRAG(id, func)	The user has started dragging an item with the right mouse button. The event handler must call wxTreeEvent::Allow() for the drag operation to continue.
EVT_TREE_BEGIN_LABEL_EDIT(id, func)	Begin editing a label. This can be prevented by calling <i>Veto()</i> (p. 954).
EVT_TREE_END_DRAG(id, func)	The user has released the mouse after dragging an item.
EVT_TREE_END_LABEL_EDIT(id, func)	The user has finished editing a label. This can be prevented by calling <i>Veto()</i> (p. 954).
EVT_TREE_DELETE_ITEM(id, func)	A tree item has been deleted.
EVT_TREE_ITEM_ACTIVATED(id, func)	An item has been activated (e.g. double clicked).
EVT_TREE_ITEM_COLLAPSED(id, func)	The item has been collapsed.
EVT_TREE_ITEM_COLLAPSING(id, func)	The item is being collapsed. This can be prevented by calling <i>Veto()</i> (p. 954).
EVT_TREE_ITEM_EXPANDED(id, func)	The item has been expanded.
EVT_TREE_ITEM_EXPANDING(id, func)	The item is being expanded. This can be prevented by calling <i>Veto()</i>

	(p. 954).
EVT_TREE_ITEM_RIGHT_CLICK(id, func)	The user has clicked the item with the right mouse button.
EVT_TREE_ITEM_MIDDLE_CLICK(id, func)	The user has clicked the item with the middle mouse button.
EVT_TREE_KEY_DOWN(id, func)	A key has been pressed.
EVT_TREE_SEL_CHANGED(id, func)	Selection has changed.
EVT_TREE_SEL_CHANGING(id, func)	Selection is changing. This can be prevented by calling <i>Veto()</i> (p. 954).
EVT_TREE_KEY_DOWN(id, func)	A key has been pressed.
EVT_TREE_ITEM_GETTOOLTIP(id, func)	The opportunity to set the item tooltip is being given to the application (call <i>wxTreeEvent::SetToolTip()</i> . Windows only.

See also

wxTreeCtrl (p. 1329)

wxTreeEvent::wxTreeEvent

wxTreeEvent(WXTYPE *commandType* = 0, int *id* = 0)

Constructor.

wxTreeEvent::GetKeyCode

int GetKeyCode() const

Returns the key code if the event was is a key event. Use *GetKeyEvent* (p. 1350) to get the values of the modifier keys for this event (i.e. Shift or Ctrl).

wxTreeEvent::GetItem

wxTreeItemId GetItem() const

Returns the item (valid for all events).

wxTreeEvent::GetKeyEvent

const wxKeyEvent& GetKeyEvent() const

Returns the key event for EVT_TREE_KEY_DOWN events.

wxTreeEvent::GetLabel

const wxString& GetLabel() const

Returns the label if the event was a begin or end edit label event.

wxTreeEvent::GetOldItem

wxTreeItemId GetOldItem() const

Returns the old item index (valid for EVT_TREE_ITEM_CHANGING and CHANGED events)

wxTreeEvent::GetPoint()

wxPoint GetPoint() const

Returns the position of the mouse pointer if the event is a drag event.

wxTreeEvent::IsEditCancelled()

bool IsEditCancelled() const

Returns true if the label edit was cancelled. This should be called from within an EVT_TREE_END_LABEL_EDIT handler.

wxTreeEvent::SetToolTip

void SetToolTip(const wxString& tooltip)

Set the tooltip for the item (valid for EVT_TREE_ITEM_GETTOOLTIP events). Windows only.

wxTreeItemData

wxTreeItemData is some (arbitrary) user class associated with some item. The main advantage of having this class is that wxTreeItemData objects are destroyed automatically by the tree and, as this class has virtual destructor, it means that the memory and any other resources associated with a tree item will be automatically freed

when it is deleted. Note that we don't use `wxObject` as the base class for `wxTreeItemData` because the size of this class is critical: in many applications, each tree leaf will have `wxTreeItemData` associated with it and number of leaves may be quite big.

Also please note that because the objects of this class are deleted by the tree using the operator `delete`, they must always be allocated on the heap using `new`.

Derived from

wxClientData (p. 134)

Include files

`<wx/treectrl.h>`

See also

wxTreeCtrl (p. 1329)

wxTreeItemData::wxTreeItemData

wxTreeItemData()

Default constructor.

wxPython note: The wxPython version of this constructor optionally accepts any Python object as a parameter. This object is then associated with the tree item using the `wxTreeItemData` as a container.

In addition, the following methods are added in wxPython for accessing the object:

GetData()	Returns a reference to the Python Object
SetData(obj)	Associates a new Python Object with the <code>wxTreeItemData</code>

wxPerl note: In wxPerl the constructor accepts as parameter an optional scalar, and stores it as client data. You may retrieve this data by calling **GetData()**, and set it by calling **SetData(data)**.

wxTreeItemData::~~wxTreeItemData

void ~wxTreeItemData()

Virtual destructor.

wxTreeItemData::GetId

const wxTreeItem& GetId()

Returns the item associated with this node.

wxTreeItemData::SetId

void SetId(const wxTreeItemId& id)

Sets the item associated with this node.

wxUpdateUIEvent

This class is used for pseudo-events which are called by wxWidgets to give an application the chance to update various user interface elements.

Derived from

wxCommandEvent (p. 165)

wxEvent (p. 441)

wxObject (p. 954)

Include files

<wx/event.h>

Event table macros

To process an update event, use these event handler macros to direct input to member functions that take a wxUpdateUIEvent argument.

EVT_UPDATE_UI(id, func) Process a wxEVT_UPDATE_UI event for the command with the given id.

EVT_UPDATE_UI_RANGE(id1, id2, func) Process a wxEVT_UPDATE_UI event for any command with id included in the given range.

Remarks

Without update UI events, an application has to work hard to check/uncheck, enable/disable, and set the text for elements such as menu items and toolbar buttons. The code for doing this has to be mixed up with the code that is invoked when an action is invoked for a menu item or button.

With update UI events, you define an event handler to look at the state of the application and change UI elements accordingly. wxWidgets will call your member functions in idle time, so you don't have to worry where to call this code. In addition to being a clearer and more declarative method, it also means you don't have to worry whether you're updating a toolbar or menubar identifier. The same handler can update a menu item and

toolbar button, if the identifier is the same.

Instead of directly manipulating the menu or button, you call functions in the event object, such as `wxUpdateUIEvent::Check` (p. 1355). `wxWidgets` will determine whether such a call has been made, and which UI element to update.

These events will work for popup menus as well as menubars. Just before a menu is popped up, `wxMenu::UpdateUI` (p. 898) is called to process any UI events for the window that owns the menu.

If you find that the overhead of UI update processing is affecting your application, you can do one or both of the following:

1. Call `wxUpdateUIEvent::SetMode` (p. 1356) with a value of `wxUPDATE_UI_PROCESS_SPECIFIED`, and set the extra style `wxWS_EX_PROCESS_UPDATE_EVENTS` for every window that should receive update events. No other windows will receive update events.
2. Call `wxUpdateUIEvent::SetUpdateInterval` (p. 1357) with a millisecond value to set the delay between updates. You may need to call `wxWindow::UpdateWindowUI` (p. 1440) at critical points, for example when a dialog is about to be shown, in case the user sees a slight delay before windows are updated.

Note that although events are sent in idle time, defining a `wxIdleEvent` handler for a window does not affect this because the events are sent from `wxWindow::OnInternalIdle` (p. 1416) which is **always** called in idle time.

`wxWidgets` tries to optimize update events on some platforms. On Windows and GTK+, events for menubar items are only sent when the menu is about to be shown, and not in idle time.

[See also](#)

Event handling overview (p. 1610)

wxUpdateUIEvent::wxUpdateUIEvent

`wxUpdateUIEvent(wxWindowID commandId = 0)`

Constructor.

wxUpdateUIEvent::m_checked

`bool m_checked`

true if the element should be checked, false otherwise.

wxUpdateUIEvent::m_enabled

bool m_checked

true if the element should be enabled, false otherwise.

wxUpdateUIEvent::m_setChecked

bool m_setChecked

true if the application has set the **m_checked** member.

wxUpdateUIEvent::m_setEnabled

bool m_setEnabled

true if the application has set the **m_enabled** member.

wxUpdateUIEvent::m_setText

bool m_setText

true if the application has set the **m_text** member.

wxUpdateUIEvent::m_text

wxString m_text

Holds the text with which the the application wishes to update the UI element.

wxUpdateUIEvent::CanUpdate

static bool CanUpdate(wxWindow* window)

Returns `true` if it is appropriate to update (send UI update events to) this window.

This function looks at the mode used (see *wxUpdateUIEvent::SetMode* (p. 1356)), the `wxWS_EX_PROCESS_UPDATE_EVENTS` flag in *window*, the time update events were last sent in idle time, and the update interval, to determine whether events should be sent to this window now. By default this will always return `true` because the update mode is initially `wxUPDATE_UI_PROCESS_ALL` and the interval is set to 0; so update events will be sent as often as possible. You can reduce the frequency that events are sent by changing the mode and/or setting an update interval.

[See also](#)

wxUpdateUIEvent::ResetUpdateTime (p. 1356), *wxUpdateUIEvent::SetUpdateInterval*

(p. 1357), *wxUpdateUIEvent::SetMode* (p. 1356)

wxUpdateUIEvent::Check

void Check(bool *check*)

Check or uncheck the UI element.

wxUpdateUIEvent::Enable

void Enable(bool *enable*)

Enable or disable the UI element.

wxUpdateUIEvent::GetChecked

bool GetChecked() const

Returns true if the UI element should be checked.

wxUpdateUIEvent::GetEnabled

bool GetEnabled() const

Returns true if the UI element should be enabled.

wxUpdateUIEvent::GetSetChecked

bool GetSetChecked() const

Returns true if the application has called **SetChecked**. For wxWidgets internal use only.

wxUpdateUIEvent::GetSetEnabled

bool GetSetEnabled() const

Returns true if the application has called **SetEnabled**. For wxWidgets internal use only.

wxUpdateUIEvent::GetSetText

bool GetSetText() const

Returns true if the application has called **SetText**. For wxWidgets internal use only.

wxUpdateUIEvent::GetText

wxString GetText() const

Returns the text that should be set for the UI element.

wxUpdateUIEvent::GetMode

static wxUpdateUIMode GetMode()

Static function returning a value specifying how wxWidgets will send update events: to all windows, or only to those which specify that they will process the events.

See *wxUpdateUIEvent::SetMode* (p. 1356).

wxUpdateUIEvent::GetUpdateInterval

static long GetUpdateInterval()

Returns the current interval between updates in milliseconds. -1 disables updates, 0 updates as frequently as possible.

See *wxUpdateUIEvent::SetUpdateInterval* (p. 1357).

wxUpdateUIEvent::ResetUpdateTime

static void ResetUpdateTime()

Used internally to reset the last-updated time to the current time. It is assumed that update events are normally sent in idle time, so this is called at the end of idle processing.

See also

wxUpdateUIEvent::CanUpdate (p. 1354), *wxUpdateUIEvent::SetUpdateInterval* (p. 1357), *wxUpdateUIEvent::SetMode* (p. 1356)

wxUpdateUIEvent::SetMode

static void SetMode(wxIdleMode mode)

Specify how wxWidgets will send update events: to all windows, or only to those which specify that they will process the events.

mode may be one of the following values. The default is `wxUPDATE_UI_PROCESS_ALL`.

```
enum wxUpdateUIMode
{
    // Send UI update events to all windows
```

```
    wxUPDATE_UI_PROCESS_ALL,  
    // Send UI update events to windows that have  
    // the wxWS_EX_PROCESS_UI_UPDATES flag specified  
    wxUPDATE_UI_PROCESS_SPECIFIED  
};
```

wxUpdateUIEvent::SetText

void SetText(const wxString& text)

Sets the text for this UI element.

wxUpdateUIEvent::SetUpdateInterval

static void SetUpdateInterval(long updateInterval)

Sets the interval between updates in milliseconds. Set to -1 to disable updates, or to 0 to update as frequently as possible. The default is 0.

Use this to reduce the overhead of UI update events if your application has a lot of windows. If you set the value to -1 or greater than 0, you may also need to call *wxWindow::UpdateWindowUI* (p. 1440) at appropriate points in your application, such as when a dialog is about to be shown.

wxURL

Derived from

wxObject (p. 954)

Include files

<wx/url.h>

See also

wxSocketBase (p. 1132), *wxProtocol* (p. 1027)

Example

```
wxURL url("http://a.host/a.dir/a.file");  
wxInputStream *in_stream;  
  
in_stream = url.GetInputStream();  
// Then, you can use all IO calls of in_stream (See wxStream)
```

wxURL::wxURL

wxURL(const wxString& url)

Constructs a URL object from the string. The URL must be valid according to RFC 1738. In particular, file URLs must be of the format 'file://hostname/path/to/file'. It is valid to leave out the hostname but slashes must remain in place-- i.e. a file URL without a hostname must contain three consecutive slashes.

Parameters

url

Url string to parse.

wxURL::~~wxURL

~wxURL()

Destroys the URL object.

wxURL::GetProtocolName

wxString GetProtocolName() const

Returns the name of the protocol which will be used to get the URL.

wxURL::GetProtocol

wxProtocol& GetProtocol()

Returns a reference to the protocol which will be used to get the URL.

wxURL::GetPath

wxString GetPath()

Returns the path of the file to fetch. This path was encoded in the URL.

wxURL::GetError

wxURLError GetError() const

Returns the last error. This error refers to the URL parsing or to the protocol. It can be one of these errors:

wxURL_NOERR No error.

wxURL_SNTAXERR Syntax error in the URL string.

wxURL_NOPROTO	Found no protocol which can get this URL.
wxURL_NOHOST	An host name is required for this protocol.
wxURL_NOPATH	A path is required for this protocol.
wxURL_CONNERR	Connection error.
wxURL_PROTOERR	An error occurred during negotiation.

wxURL::GetInputStream

wxInputStream * GetInputStream()

Creates a new input stream on the the specified URL. You can use all but seek functionality of wxStream. Seek isn't available on all stream. For example, http or ftp streams doesn't deal with it.

Return value

Returns the initialized stream. You will have to delete it yourself.

See also

wxInputStream (p. 762)

wxURL::SetDefaultProxy

static void SetDefaultProxy(const wxString& url_proxy)

Sets the default proxy server to use to get the URL. The string specifies the proxy like this: <hostname>:<port number>.

Parameters

url_proxy

Specifies the proxy to use

See also

wxURL::SetProxy (p. 1359)

wxURL::SetProxy

void SetProxy(const wxString& url_proxy)

Sets the proxy to use for this URL.

See also

wxURL::SetDefaultProxy (p. 1359)

wxURL::ConvertToValidURI

static wxString ConvertToValidURI(const wxString& uri)

It converts a non-standardized URI to a valid network URI. It encodes non standard characters.

wxValidator

wxValidator is the base class for a family of validator classes that mediate between a class of control, and application data.

A validator has three major roles:

1. to transfer data from a C++ variable or own storage to and from a control;
2. to validate data in a control, and show an appropriate error message;
3. to filter events (such as keystrokes), thereby changing the behaviour of the associated control.

Validators can be plugged into controls dynamically.

To specify a default, 'null' validator, use the symbol **wxDefaultValidator**.

For more information, please see *Validator overview* (p. 1621).

wxPython note: If you wish to create a validator class in wxPython you should derive the class from `wxPyValidator` in order to get Python-aware capabilities for the various virtual methods.

Derived from

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/validate.h>

See also

Validator overview (p. 1621), *wxTextValidator* (p. 1283), *wxGenericValidator* (p. 567),

wxValidator::wxValidator

wxValidator()

Constructor.

wxValidator::~~wxValidator

~wxValidator()

Destructor.

wxValidator::Clone

virtual wxObject* Clone() const

All validator classes must implement the **Clone** function, which returns an identical copy of itself. This is because validators are passed to control constructors as references which must be copied. Unlike objects such as pens and brushes, it does not make sense to have a reference counting scheme to do this cloning, because all validators should have separate data.

This base function returns NULL.

wxValidator::GetWindow

wxWindow* GetWindow() const

Returns the window associated with the validator.

wxValidator::SetBellOnError

wxvalidatorsetbellonerror

void SetBellOnError(bool dolt = true)

This functions switches on or turns off the error sound produced by the validators if an invalid key is pressed.

wxValidator::SetWindow

void SetWindow(wxWindow* window)

Associates a window with the validator.

wxValidator::TransferFromWindow

virtual bool TransferToWindow()

This overridable function is called when the value in the window must be transferred to

the validator. Return false if there is a problem.

wxValidator::TransferToWindow

virtual bool TransferToWindow()

This overridable function is called when the value associated with the validator must be transferred to the window. Return false if there is a problem.

wxValidator::Validate

virtual bool Validate(wxWindow* parent)

This overridable function is called when the value in the associated window must be validated. Return false if the value in the window is not valid; you may pop up an error dialog.

wxVariant

The **wxVariant** class represents a container for any type. A variant's value can be changed at run time, possibly to a different type of value.

As standard, wxVariant can store values of type bool, char, double, long, string, string list, time, date, void pointer, list of strings, and list of variants. However, an application can extend wxVariant's capabilities by deriving from the class *wxVariantData* (p. 1369) and using the wxVariantData form of the wxVariant constructor or assignment operator to assign this data to a variant. Actual values for user-defined types will need to be accessed via the wxVariantData object, unlike the case for basic data types where convenience functions such as GetLong can be used.

This class is useful for reducing the programming for certain tasks, such as an editor for different data types, or a remote procedure call protocol.

An optional name member is associated with a wxVariant. This might be used, for example, in CORBA or OLE automation classes, where named parameters are required.

Derived from

wxObject (p. 954)

Include files

<wx/variant.h>

See also

wxVariantData (p. 1369)

wxVariant::wxVariant

wxVariant()

Default constructor.

wxVariant(const wxVariant& *variant*)

Copy constructor.

wxVariant(const char* *value*, const wxString& *name* = "")**wxVariant(const wxString& *value*, const wxString& *name* = "")**

Construction from a string value.

wxVariant(char *value*, const wxString& *name* = "")

Construction from a character value.

wxVariant(long *value*, const wxString& *name* = "")

Construction from an integer value. You may need to cast to (long) to avoid confusion with other constructors (such as the bool constructor).

wxVariant(bool *value*, const wxString& *name* = "")

Construction from a boolean value.

wxVariant(double *value*, const wxString& *name* = "")

Construction from a double-precision floating point value.

wxVariant(const wxList& *value*, const wxString& *name* = "")Construction from a list of wxVariant objects. This constructor copies *value*, the application is still responsible for deleting *value* and its contents.**wxVariant(const wxStringList& *value*, const wxString& *name* = "")**Construction from a list of strings. This constructor copies *value*, the application is still responsible for deleting *value* and its contents.**wxVariant(void* *value*, const wxString& *name* = "")**

Construction from a void pointer.

wxVariant(wxObject* *value*, const wxString& *name* = "")

Construction from a wxObject pointer.

wxVariant(wxVariantData* *data*, const wxString& *name* = "")Construction from user-defined data. The variant holds on to the *data* pointer.

wxVariant::~~wxVariant

~wxVariant()

Destructor.

wxVariant::Append

void Append(const wxVariant& value)

Appends a value to the list.

wxVariant::ClearList

void ClearList()

Deletes the contents of the list.

wxVariant::GetCount

int GetCount() const

Returns the number of elements in the list.

wxVariant::Delete

bool Delete(int item)Deletes the zero-based *item* from the list.**wxVariant::GetBool**

bool GetBool() const

Returns the boolean value.

wxVariant::GetChar

char GetChar() const

Returns the character value.

wxVariant::GetData

wxVariantData* GetData() const

Returns a pointer to the internal variant data.

wxVariant::GetDouble

double GetDouble() const

Returns the floating point value.

wxVariant::GetLong

long GetLong() const

Returns the integer value.

wxVariant::GetName

const wxString& GetName() const

Returns a constant reference to the variant name.

wxVariant::GetString

wxString GetString() const

Gets the string value.

wxVariant::GetType

wxString GetType() const

Returns the value type as a string. The built-in types are: bool, char, date, double, list, long, string, stringlist, time, void*.

If the variant is null, the value type returned is the string "null" (not the empty string).

wxVariant::GetVoidPtr

void* GetVoidPtr() const

Gets the void pointer value.

wxVariant::GetWxObjectPtr

void* GetWxObjectPtr() const

Gets the wxObject pointer value.

wxVariant::Insert

void Insert(const wxVariant& value)

Inserts a value at the front of the list.

wxVariant::IsNull

bool IsNull() const

Returns true if there is no data associated with this variant, false if there is data.

wxVariant::IsType

bool IsType(const wxString& type) const

Returns true if *type* matches the type of the variant, false otherwise.

wxVariant::IsValueKindOf

bool IsValueKindOf(const wxClassInfo* type) const

Returns true if the data is derived from the class described by *type*, false otherwise.

wxVariant::MakeNull

void MakeNull()

Makes the variant null by deleting the internal data.

wxVariant::MakeString

wxString MakeString() const

Makes a string representation of the variant value (for any type).

wxVariant::Member

bool Member(const wxVariant& value) const

Returns true if *value* matches an element in the list.

wxVariant::NullList

void NullList()

Makes an empty list. This differs from a null variant which has no data; a null list is of type list, but the number of elements in the list is zero.

wxVariant::SetData

void SetData(wxVariantData* data)

Sets the internal variant data, deleting the existing data if there is any.

wxVariant::operator =

void operator =(const wxVariant& value)**void operator =(wxVariantData* value)****void operator =(const wxString& value)****void operator =(const char* value)****void operator =(char value)****void operator =(const long value)****void operator =(const bool value)****void operator =(const double value)****void operator =(void* value)****void operator =(const wxList& value)****void operator =(const wxStringList& value)**

Assignment operators.

wxVariant::operator ==

bool operator ==(const wxVariant& value)**bool operator ==(const wxString& value)****bool operator ==(const char* value)****bool operator ==(char value)****bool operator ==(const long value)**

```
bool operator ==(const bool value)  
bool operator ==(const double value)  
bool operator ==(void* value)  
bool operator ==(const wxList& value)  
bool operator ==(const wxStringList& value)
```

Equality test operators.

wxVariant::operator !=

```
bool operator !=(const wxVariant& value)  
bool operator !=(const wxString& value)  
bool operator !=(const char* value)  
bool operator !=(char value)  
bool operator !=(const long value)  
bool operator !=(const bool value)  
bool operator !=(const double value)  
bool operator !=(void* value)  
bool operator !=(const wxList& value)  
bool operator !=(const wxStringList& value)
```

Inequality test operators.

wxVariant::operator []

```
wxVariant operator [] (size_t idx) const
```

Returns the value at *idx* (zero-based).

```
wxVariant& operator [] (size_t idx)
```

Returns a reference to the value at *idx* (zero-based). This can be used to change the value at this index.

wxVariant::operator char

```
char operator char() const
```

Operator for implicit conversion to a char, using *wxVariant::GetChar* (p. 1364).

wxVariant::operator double

double operator double() const

Operator for implicit conversion to a double, using *wxVariant::GetDouble* (p. 1365).

long operator long() const

Operator for implicit conversion to a long, using *wxVariant::GetLong* (p. 1365).

wxVariant::operator wxString

wxString operator wxString() const

Operator for implicit conversion to a string, using *wxVariant::MakeString* (p. 1366).

wxVariant::operator void*

void* operator void*() const

Operator for implicit conversion to a pointer to a void, using *wxVariant::GetVoidPtr* (p. 1365).

wxVariantData

The **wxVariantData** is used to implement a new type for *wxVariant*. Derive from *wxVariantData*, and override the pure virtual functions.

Derived from

wxObject (p. 954)

Include files

<wx/variant.h>

See also

wxVariant (p. 1362)

wxVariantData::wxVariantData

wxVariantData()

Default constructor.

wxVariantData::Copy

void Copy(wxVariantData& data)

Copy the data from 'this' object to *data*.

wxVariantData::Eq

bool Eq(wxVariantData& data) const

Returns true if this object is equal to *data*.

wxVariantData::GetType

wxString GetType() const

Returns the string type of the data.

wxVariantData::GetValueClassInfo

wxClassInfo* GetValueClassInfo() const

If the data is a wxObject returns a pointer to the objects wxClassInfo structure, if the data isn't a wxObject the method returns NULL.

wxVariantData::Read

bool Read(ostream& stream)**bool Read(wxString& string)**

Reads the data from *stream* or *string*.

wxVariantData::Write

bool Write(ostream& stream) const**bool Write(wxString& string) const**

Writes the data to *stream* or *string*.

wxGetVariantCast

classname * wxGetVariantCast(wxVariant&, classname)

This macro returns the data stored in *variant* cast to the type *classname* * if the data is of

this type (the check is done during the run-time) or `NULL` otherwise.

See also

RTTI overview (p. 1579)
wxDynamicCast (p. 1525)

wxView

The view class can be used to model the viewing and editing component of an application's file-based data. It is part of the document/view framework supported by `wxWidgets`, and cooperates with the *wxDocument* (p. 415), *wxDocTemplate* (p. 410) and *wxDocManager* (p. 396) classes.

Derived from

wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/docview.h>

See also

wxView overview (p. 1660), *wxDocument* (p. 415), *wxDocTemplate* (p. 410),
wxDocManager (p. 396)

wxView::m_viewDocument

wxDocument* m_viewDocument

The document associated with this view. There may be more than one view per document, but there can never be more than one document for one view.

wxView::m_viewFrame

wxFrame* m_viewFrame

Frame associated with the view, if any.

wxView::m_viewTypeName

wxString m_viewTypeName

The view type name given to the *wxDocTemplate* constructor, copied to this variable when the view is created. Not currently used by the framework.

wxView::wxView

wxView()

Constructor. Define your own default constructor to initialize application-specific data.

wxView::~~wxView

~wxView()

Destructor. Removes itself from the document's list of views.

wxView::Activate

virtual void Activate(bool activate)

Call this from your view frame's `OnActivate` member to tell the framework which view is currently active. If your windowing system doesn't call `OnActivate`, you may need to call this function from `OnMenuCommand` or any place where you know the view must be active, and the framework will need to get the current view.

The prepackaged view frame `wxDocChildFrame` calls `wxView::Activate` from its `OnActivate` member and from its `OnMenuCommand` member.

This function calls `wxView::OnActivateView`.

wxView::Close

virtual bool Close(bool deleteWindow = true)

Closes the view by calling `OnClose`. If `deleteWindow` is true, this function should delete the window associated with the view.

wxView::GetDocument

wxDocument* GetDocument() const

Gets a pointer to the document associated with the view.

wxView::GetDocumentManager

wxDocumentManager* GetDocumentManager() const

Returns a pointer to the document manager instance associated with this view.

wxView::GetFrame

wxWindow * GetFrame()

Gets the frame associated with the view (if any). Note that this "frame" is not a wxFrame at all in the generic MDI implementation which uses the notebook pages instead of the frames and this is why this method returns a wxWindow and not a wxFrame.

wxView::GetViewName

wxString GetViewName() const

Gets the name associated with the view (passed to the wxDocTemplate constructor). Not currently used by the framework.

wxView::OnActivateView

virtual void OnActivateView(bool activate, wxView *activeView, wxView *deactiveView)

Called when a view is activated by means of wxView::Activate. The default implementation does nothing.

wxView::OnChangeFilename

virtual void OnChangeFilename()

Called when the filename has changed. The default implementation constructs a suitable title and sets the title of the view frame (if any).

wxView::OnClose

virtual bool OnClose(bool deleteWindow)

Implements closing behaviour. The default implementation calls wxDocument::Close to close the associated document. Does not delete the view. The application may wish to do some cleaning up operations in this function, *if* a call to wxDocument::Close succeeded. For example, if your application's all share the same window, you need to disassociate the window from the view and perhaps clear the window. If *deleteWindow* is true, delete the frame associated with the view.

wxView::OnClosingDocument

virtual void OnClosingDocument()

Override this to clean up the view when the document is being closed.

wxView::OnCreate

virtual bool OnCreate(wxDocument* doc, long flags)

wxDocManager or wxDocument creates a wxView via a wxDocTemplate. Just after the wxDocTemplate creates the wxView, it calls wxView::OnCreate. In its OnCreate member function, the wxView can create a wxDocChildFrame or a derived class. This wxDocChildFrame provides user interface elements to view and/or edit the contents of the wxDocument.

By default, simply returns true. If the function returns false, the view will be deleted.

wxView::OnCreatePrintout

virtual wxPrintout* OnCreatePrintout()

If the printing framework is enabled in the library, this function returns a *wxPrintout* (p. 1010) object for the purposes of printing. It should create a new object every time it is called; the framework will delete objects it creates.

By default, this function returns an instance of wxDocPrintout, which prints and previews one page by calling wxView::OnDraw.

Override to return an instance of a class other than wxDocPrintout.

wxView::OnUpdate

virtual void OnUpdate(wxView* sender, wxObject* hint)

Called when the view should be updated. *sender* is a pointer to the view that sent the update request, or NULL if no single view requested the update (for instance, when the document is opened). *hint* is as yet unused but may in future contain application-specific information for making updating more efficient.

wxView::SetDocument

void SetDocument(wxDocument* doc)

Associates the given document with the view. Normally called by the framework.

wxView::SetFrame

void SetFrame(wxWindow* frame)

Sets the frame associated with this view. The application should call this if possible, to tell the view about the frame.

See *GetFrame* (p. 1372) for the explanation about the mismatch between the "Frame" in

the method name and the type of its parameter.

wxView::SetViewName

void SetViewName(const wxString& name)

Sets the view type name. Should only be called by the framework.

wxVListBox

wxVListBox is a listbox-like control with the following two main differences from a regular listbox: it can have an arbitrarily huge number of items because it doesn't store them itself but uses *OnDrawItem()* (p. 1379) callback to draw them (so it is a **V**irtual listbox) and its items can have variable height as determined by *OnMeasureItem()* (p. 1379) (so it is also a listbox with the lines of **V**ariable height).

Also, as a consequence of its virtual nature, it doesn't have any methods to append or insert items in it as it isn't necessary to do it: you just have to call *SetItemCount()* (p. 1380) to tell the control how many items it should display. Of course, this also means that you will never use this class directly because it has pure virtual functions, but will need to derive your own class, such as *wxHtmlListBox* (p. 683), from it.

However it emits the same events as *wxListBox* (p. 794) and the same event macros may be used with it. **Derived from**

wxVScrolledWindow (p. 1382)

Include files

<wx/vlbox.h>

wxVListBox::wxVListBox

wxVListBox(wxWindow* parent, wxWindowID id = wxID_ANY, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, size_t countItems = 0, long style = 0, const wxString& name = wxVListBoxNameStr)

Normal constructor which calls *Create()* (p. 1376) internally.

wxVListBox()

Default constructor, you must call *Create()* (p. 1376) later.

wxVListBox::Clear

void Clear()

Deletes all items from the control.

wxVListBox::Create

bool Create(wxWindow* parent, wxWindowID id = wxID_ANY, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = 0, const wxString& name = wxVListBoxNameStr)

Creates the control. To finish creating it you also should call *SetItemCount()* (p. 1380) to let it know about the number of items it contains.

The only special style which may be used with *wxVListBox* is *wxLB_MULTIPLE* which indicates that the listbox should support multiple selection.

Returns *true* on success or *false* if the control couldn't be created

wxVListBox::DeselectAll

bool DeselectAll()

Deselects all the items in the listbox.

Returns *true* if any items were changed, i.e. if there had been any selected items before, or *false* if all the items were already deselected.

This method is only valid for multi selection listboxes.

[See also](#)

SelectAll (p. 1380), *Select* (p. 1380)

wxVListBox::GetFirstSelected

int GetFirstSelected(unsigned long& cookie) const

Returns the index of the first selected item in the listbox or *wxNOT_FOUND* if no items are currently selected.

cookie is an opaque parameter which should be passed to the subsequent calls to *GetNextSelected* (p. 1377). It is needed in order to allow parallel iterations over the selected items.

```
Here is a typical example of using these functions:
unsigned long cookie;
int item = hlbox->GetFirstSelected(cookie);
while ( item != wxNOT_FOUND )
{
    ... process item ...
    item = hlbox->GetNextSelected(cookie);
}
```

This method is only valid for multi selection listboxes.

wxVListBox::GetItemCount

size_t GetItemCount() const

Get the number of items in the control.

[See also](#)

SetItemCount() (p. 1380)

wxVListBox::GetMargins

wxPoint GetMargins() const

Returns the margins used by the control. The *x* field of the returned point is the horizontal margine and the *y* field is the vertical one.

[See also](#)

SetMargins (p. 1381)

wxVListBox::GetNextSelected

int GetNextSelected(unsigned long& cookie) const

Returns the index of the next selected item or `wxNOT_FOUND` if there are no more.

This method is only valid for multi selection listboxes.

[See also](#)

GetFirstSelected (p. 1376)

wxVListBox::GetSelectedCount

size_t GetSelectedCount() const

Returns the number of the items currently selected.

It is valid for both single and multi selection controls. In the former case it may only return 0 or 1 however.

[See also](#)

IsSelected (p. 1378),
GetFirstSelected (p. 1376),
GetNextSelected (p. 1377)

wxVListBox::GetSelection

int GetSelection() const

Get the currently selected item or -1 if there is no selection.

wxVListBox::GetSelectionBackground

const wxColour& GetSelectionBackground() const

Returns the background colour used for the selected cells. By default the standard system colour is used.

[See also](#)

wxSystemSettings::GetColour (p. 1232),
SetSelectionBackground (p. 1381)

wxVListBox::HasMultipleSelection

bool HasMultipleSelection() const

Returns `true` if the listbox was created with `wxLB_MULTIPLE` style and so supports multiple selection or `false` if it is a single selection listbox.

wxVListBox::IsCurrent

bool IsCurrent(size_t item) const

Returns `true` if this item is the current one, `false` otherwise.

Current item is always the same as selected one for the single selection listbox and in this case this method is equivalent to *IsSelected* (p. 1378) but they are different for multi selection listboxes where many items may be selected but only one (at most) is current.

wxVListBox::IsSelected

bool IsSelected(size_t item) const

Returns `true` if this item is selected, `false` otherwise.

wxVListBox::OnDrawBackground

void OnDrawBackground(wxDC& dc, const wxRect& rect, size_t n) const

This method is used to draw the items background and, maybe, a border around it.

The base class version implements a reasonable default behaviour which consists in

drawing the selected item with the standard background colour and drawing a border around the item if it is either selected or current.

wxVListBox::OnDrawItem

void OnDrawItem(wxDC& *dc*, const wxRect& *rect*, size_t *n*) const

The derived class must implement this function to actually draw the item with the given index on the provided DC.

Parameters

dc

The device context to use for drawing

rect

The bounding rectangle for the item being drawn (DC clipping region is set to this rectangle before calling this function)

n

The index of the item to be drawn

wxVListBox::OnDrawSeparator

void OnDrawSeparator(wxDC& *dc*, wxRect& *rect*, size_t *n*) const

This method may be used to draw separators between the lines. The rectangle passed to it may be modified, typically to deflate it a bit before passing to *OnDrawItem()* (p. 1379).

The base class version of this method doesn't do anything.

Parameters

dc

The device context to use for drawing

rect

The bounding rectangle for the item

n

The index of the item

wxVListBox::OnMeasureItem

wxCoord OnMeasureItem(size_t n) const

The derived class must implement this method to return the height of the specified item (in pixels).

wxVListBox::Select

bool Select(size_t item, bool select = true)

Selects or deselects the specified item which must be valid (i.e. not equal to `wxNOT_FOUND`).

Return `true` if the items selection status has changed or `false` otherwise.

This function is only valid for the multiple selection listboxes, use *SetSelection* (p. 1381) for the single selection ones.

wxVListBox::SelectAll

bool SelectAll()

Selects all the items in the listbox.

Returns `true` if any items were changed, i.e. if there had been any unselected items before, or `false` if all the items were already selected.

This method is only valid for multi selection listboxes.

See also

DeselectAll (p. 1376), *Select* (p. 1380)

wxVListBox::SelectRange

bool SelectRange(size_t from, size_t to)

Selects all items in the specified range which may be given in any order.

Return `true` if the items selection status has changed or `false` otherwise.

This method is only valid for multi selection listboxes.

See also

SelectAll (p. 1380), *Select* (p. 1380)

wxVListBox::SetItemCount

void SetItemCount(size_t count)

Set the number of items to be shown in the control.

This is just a synonym for `wxVScrolledWindow::SetLineCount()` (p. 1386).

wxVListBox::SetMargins

void SetMargins(const wxPoint& pt)

void SetMargins(wxCoord x, wxCoord y)

Set the margins: horizontal margin is the distance between the window border and the item contents while vertical margin is half of the distance between items.

By default both margins are 0.

wxVListBox::SetSelection

void SetSelection(int selection)

Set the selection to the specified item, if it is -1 the selection is unset. The selected item will be automatically scrolled into view if it isn't currently visible.

This method may be used both with single and multiple selection listboxes.

wxVListBox::SetSelectionBackground

void SetSelectionBackground(const wxColour& col)

Sets the colour to be used for the selected cells background. The background of the standard cells may be changed by simply calling *SetBackgroundColour* (p. 1423).

See also

GetSelectionBackground (p. 1378)

wxVListBox::Toggle

void Toggle(size_t item)

Toggles the state of the specified *item*, i.e. selects it if it was unselected and deselects it if it was selected.

This method is only valid for multi selection listboxes.

See also

Select (p. 1380)

wxVScrolledWindow

In the name of this class, "V" may stand for "variable" because it can be used for scrolling lines of variable heights; "virtual" because it is not necessary to know the heights of all lines in advance -- only those which are shown on the screen need to be measured; or, even, "vertical" because this class only supports scrolling in one direction currently (this could and probably will change in the future however).

In any case, this is a generalization of the *wxScrolledWindow* (p. 1085) class which can be only used when all lines have the same height. It lacks some other *wxScrolledWindow* features however, notably there is currently no support for horizontal scrolling; it can't scroll another window nor only a rectangle of the window and not its entire client area. To use this class, you need to derive from it and implement *OnGetLineHeight()* (p. 1384) pure virtual method. You also must call *SetLineCount* (p. 1386) to let the base class know how many lines it should display but from that moment on the scrolling is handled entirely by *wxVScrolledWindow*, you only need to draw the visible part of contents in your *OnPaint()* method as usual. You should use *GetFirstVisibleLine()* (p. 1384) and *GetLastVisibleLine()* (p. 1384) to select the lines to display. Note that the device context origin is not shifted so the first visible line always appears at the point (0, 0) in physical as well as logical coordinates.

Derived from

wxPanel (p. 972)

Include files

<wx/vscroll.h>

wxVScrolledWindow::wxVScrolledWindow

```
wxVScrolledWindow(wxWindow* parent, wxWindowID id = wxID_ANY, const
wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style =
0, const wxString& name = wxPanelNameStr)
```

This is the normal constructor, no need to call *Create()* after using this one.

Note that `wxVSCROLL` is always automatically added to our style, there is no need to specify it explicitly.

```
wxVScrolledWindow()
```

Default constructor, you must call *Create()* (p. 1383) later.

Parameters

parent

The parent window, must not be `NULL`

id

The identifier of this window, `wxID_ANY` by default

pos

The initial window position

size

The initial window size

style

The window style. There are no special style bits defined for this class.

name

The name for this window; usually not used

wxVScrolledWindow::Create

```
bool Create(wxWindow* parent, wxWindowID id = wxID_ANY, const wxPoint& pos =  
wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = 0, const  
wxString& name = wxPanelNameStr)
```

Same as the *non default ctor* (p. 1382) but returns status code: `true` if ok, `false` if the window couldn't have been created.

Just as with the ctor above, `wxVSCROLL` style is always used, there is no need to specify it explicitly.

wxVScrolledWindow::EstimateTotalHeight

```
virtual wxCoord EstimateTotalHeight() const
```

This protected function is used internally by `wxVScrolledWindow` to estimate the total height of the window when *SetLineCount* (p. 1386) is called. The default implementation uses the brute force approach if the number of the items in the control is small enough. Otherwise, it tries to find the average line height using some lines in the beginning, middle and the end.

If it is undesirable to access all these lines (some of which might be never shown) just for the total height calculation, you may override the function and provide your own guess better and/or faster.

Note that although returning a totally wrong value would still work, it risks to result in very strange scrollbar behaviour so this function should really try to make the best guess possible.

wxVScrolledWindow::GetFirstVisibleLine

size_t GetFirstVisibleLine() const

Returns the index of the first currently visible line.

wxVScrolledWindow::GetLastVisibleLine

size_t GetLastVisibleLine() const

Returns the index of the last currently visible line.

wxVScrolledWindow::GetLineCount

size_t GetLineCount() const

Get the number of lines this window contains (previously set by *SetLineCount()* (p. 1386))

wxVScrolledWindow::HitTest

int HitTest(wxCoord x, wxCoord y) const**int HitTest(const wxPoint& pt) const**

Return the item at the specified (in physical coordinates) position or `wxNOT_FOUND` if none, i.e. if it is below the last item.

wxVScrolledWindow::IsVisible

bool IsVisible(size_t line) const

Returns `true` if the given line is (at least partially) visible or `false` otherwise.

wxVScrolledWindow::OnGetLineHeight

wxCoord OnGetLineHeight(size_t n) const

This protected virtual function must be overridden in the derived class and it should return the height of the given line in pixels.

[See also](#)

OnGetLinesHint (p. 1384)

wxVScrolledWindow::OnGetLinesHint

void OnGetLinesHint(size_t lineMin, size_t lineMax) const

This function doesn't have to be overridden but it may be useful to do it if calculating the lines heights is a relatively expensive operation as it gives the user code a possibility to calculate several of them at once.

`OnGetLinesHint()` is normally called just before `OnGetLineHeight()` (p. 1384) but you shouldn't rely on the latter being called for all lines in the interval specified here. It is also possible that `OnGetLineHeight()` will be called for the lines outside of this interval, so this is really just a hint, not a promise.

Finally note that *lineMin* is inclusive, while *lineMax* is exclusive, as usual.

wxVScrolledWindow::RefreshLine

void RefreshLine(size_t line)

Refreshes the specified line -- it will be redrawn during the next main loop iteration.

[See also](#)

RefreshLines (p. 1385)

wxVScrolledWindow::RefreshLines

void RefreshLines(size_t from, size_t to)

Refreshes all lines between *from* and *to*, inclusive. *from* should be less than or equal to *to*.

[See also](#)

RefreshLine (p. 1385)

wxVScrolledWindow::RefreshAll

void RefreshAll()

This function completely refreshes the control, recalculating the number of items shown on screen and repainting them. It should be called when the values returned by *OnGetLineHeight* (p. 1384) change for some reason and the window must be updated to reflect this.

wxVScrolledWindow::ScrollLines

bool ScrollLines(int lines)

Scroll by the specified number of lines which may be positive (to scroll down) or negative (to scroll up).

Returns `true` if the window was scrolled, `false` otherwise (for example if we're trying to scroll down but we are already showing the last line).

See also

LineUp (p. 1414), *LineDown* (p. 1414)

wxVScrolledWindow::ScrollPages

bool ScrollPages(int pages)

Scroll by the specified number of pages which may be positive (to scroll down) or negative (to scroll up).

See also

ScrollLines (p. 1385),
PageUp (p. 1416), *PageDown* (p. 1416)

wxVScrolledWindow::ScrollToLine

bool ScrollToLine(size_t line)

Scroll to the specified line: it will become the first visible line in the window.

Return `true` if we scrolled the window, `false` if nothing was done.

wxVScrolledWindow::SetLineCount

void SetLineCount(size_t count)

Set the number of lines the window contains: the derived class must provide the heights for all lines with indices up to the one given here in its *OnGetLineHeight()* (p. 1384).

wxSound

This class represents a short sound (loaded from Windows WAV file), that can be stored in memory and played. Currently this class is implemented on Windows and Unix (and uses either Open Sound System (<http://www.opensound.com/oss.html>) or Simple DirectMedia Layer (<http://www.libsdl.org/>)).

Derived from

wxObject (p. 954)

Include files

<wx/sound.h>

wxSound::wxSound

wxSound()

Default constructor.

wxSound(const wxString& fileName, bool isResource = false)

Constructs a wave object from a file or resource. Call *wxSound::IsOk* (p. 1387) to determine whether this succeeded.

Parameters*fileName*

The filename or Windows resource.

isResource

true if *fileName* is a resource, false if it is a filename.

wxSound::~~wxSound

~wxSound()

Destroys the wxSound object.

wxSound::Create

bool Create(const wxString& fileName, bool isResource = false)

Constructs a wave object from a file or resource.

Parameters*fileName*

The filename or Windows resource.

isResource

true if *fileName* is a resource, false if it is a filename.

Return value

true if the call was successful, false otherwise.

wxSound::IsOk

bool IsOk() const

Returns `true` if the object contains a successfully loaded file or resource, `false` otherwise.

wxSound::IsPlaying

static bool IsPlaying() const

Returns `true` if a sound is played at the moment.

wxSound::Play

bool Play(unsigned flags = wxSOUND_ASYNC) const**static bool Play(const wxString& filename, unsigned flags = wxSOUND_ASYNC)**

Plays the sound file. If another sound is playing, it will be interrupted. Returns `true` on success, `false` otherwise.

The possible values for *flags* are:

<code>wxSOUND_SYNC</code>	<code>Play</code> will block and wait until the sound is replayed.
<code>wxSOUND_ASYNC</code>	Sound is played asynchronously, <code>Play</code> returns immediately
<code>wxSOUND_ASYNC wxSOUND_LOOP</code>	Sound is played asynchronously and loops until another sound is played, <code>wxSound::Stop</code> (p. 1388) is called or the program terminates.

The static form is shorthand for this code:

```
wxSound(filename).Play(flags);
```

wxSound::Stop

static void Stop()

If a sound is played, this function stops it.

wxWindow

`wxWindow` is the base class for all windows and represents any visible object on screen. All controls, top level windows and so on are windows. Sizers and device contexts are not, however, as they don't appear on screen themselves.

Please note that all children of the window will be deleted automatically by the destructor

before the window itself is deleted which means that you don't have to worry about deleting them manually. Please see the *window deletion overview* (p. 1619) for more information.

Also note that in this, and many others, wxWidgets classes some `GetXXX()` methods may be overloaded (as, for example, *GetSize* (p. 1409) or *GetClientSize* (p. 1403)). In this case, the overloads are non-virtual because having multiple virtual functions with the same name results in a virtual function name hiding at the derived class level (in English, this means that the derived class has to override all overloaded variants if it overrides any of them). To allow overriding them in the derived class, wxWidgets uses a unique protected virtual `DoGetXXX()` method and all `GetXXX()` ones are forwarded to it, so overriding the former changes the behaviour of the latter.

Derived from

wxEvtHandler (p. 445)

wxObject (p. 954)

Include files

<wx/window.h>

Window styles

The following styles can apply to all windows, although they will not always make sense for a particular window class or on all platforms.

wxSIMPLE_BORDER	Displays a thin border around the window. wxBORDER is the old name for this style.
wxDOUBLE_BORDER	Displays a double border. Windows and Mac only.
wxSUNKEN_BORDER	Displays a sunken border.
wxRAISED_BORDER	Displays a raised border.
wxSTATIC_BORDER	Displays a border suitable for a static control. Windows only.
wxNO_BORDER	Displays no border, overriding the default border style for the window.
wxTRANSPARENT_WINDOW	The window is transparent, that is, it will not receive paint events. Windows only.
wxTAB_TRAVERSAL	Use this to enable tab traversal for non-dialog windows.
wxWANTS_CHARS	Use this to indicate that the window wants to get all char/key events for all keys - even for keys like TAB or ENTER which are usually used for dialog navigation and which wouldn't be generated without this style. If you need to use this style in order to get the arrows or etc., but would still like to have normal keyboard navigation take place, you should create and send a <code>wxNavigationKeyEvent</code> in

response to the key events for Tab and Shift-Tab.

- wxNO_FULL_REPAINT_ON_RESIZE** Disables repainting the window completely when its size is changed - you will have to repaint the new window area manually if you use this style. Currently only has an effect for Windows.
- wxVSCROLL** Use this style to enable a vertical scrollbar.
- wxHSCROLL** Use this style to enable a horizontal scrollbar.
- wxALWAYS_SHOW_SB** If a window has scrollbars, disable them instead of hiding them when they are not needed (i.e. when the size of the window is big enough to not require the scrollbars to navigate it). This style is currently only implemented for wxMSW and wxUniversal and does nothing on the other platforms.
- wxCLIP_CHILDREN** Use this style to eliminate flicker caused by the background being repainted, then children being painted over them. Windows only.
- wxFULL_REPAINT_ON_RESIZE** Use this style to force a complete redraw of the window whenever it is resized instead of redrawing just the part of the window affected by resizing. Note that this was the behaviour by default before 2.5.1 release and that if you experience redraw problems with the code which previously used to work you may want to try this.

See also *window styles overview* (p. 1618).

Extra window styles

The following are extra styles, set using `wxWindow::SetExtraStyle` (p. 1427).

- wxWS_EX_VALIDATE_RECURSIVELY** By default, `Validate/TransferDataTo/FromWindow()` only work on direct children of the window (compatible behaviour). Set this flag to make them recursively descend into all subwindows.
- wxWS_EX_BLOCK_EVENTS** `wxCommandEvent`s and the objects of the derived classes are forwarded to the parent window and so on recursively by default. Using this flag for the given window allows to block this propagation at this window, i.e. prevent the events from being propagated further upwards. Dialogs have this flag on by default.
- wxWS_EX_TRANSIENT** Don't use this window as an implicit parent for the other windows: this must be used with transient windows as otherwise there is the risk of creating a dialog/frame with this window as a parent which would lead to a crash if the parent is destroyed before the child.

wxWS_EX_PROCESS_IDLE This window should always process idle events, even if the mode set by *wxIdleEvent::SetMode* (p. 728) is *wxIDLE_PROCESS_SPECIFIED*.

wxWS_EX_PROCESS_UI_UPDATES This window should always process UI update events, even if the mode set by *wxUpdateUIEvent::SetMode* (p. 1356) is *wxUPDATE_UI_PROCESS_SPECIFIED*.

See also

Event handling overview (p. 1610)

wxWindow::wxWindow

wxWindow()

Default constructor.

wxWindow(wxWindow* parent, wxWindowID id, const wxPoint& pos = wxDefaultPosition, const wxSize& size = wxDefaultSize, long style = 0, const wxString& name = wxPanelNameStr)

Constructs a window, which can be a child of a frame, dialog or any other non-control window.

Parameters

parent

Pointer to a parent window.

id

Window identifier. If -1, will automatically create an identifier.

pos

Window position. *wxDefaultPosition* is (-1, -1) which indicates that *wxWidgets* should generate a default position for the window. If using the *wxWindow* class directly, supply an actual position.

size

Window size. *wxDefaultSize* is (-1, -1) which indicates that *wxWidgets* should generate a default size for the window. If no suitable size can be found, the window will be sized to 20x20 pixels so that the window is visible but obviously not correctly sized.

style

Window style. For generic window styles, please see *wxWindow* (p. 1388).

name

Window name.

wxWindow::~~wxWindow

~wxWindow()

Destructor. Deletes all subwindows, then deletes itself. Instead of using the **delete** operator explicitly, you should normally use *wxWindow::Destroy* (p. 1397) so that *wxWidgets* can delete a window only when it is safe to do so, in idle time.

See also

Window deletion overview (p. 1619), *wxWindow::Destroy* (p. 1397), *wxCloseEvent* (p. 139)

wxWindow::AddChild

virtual void AddChild(wxWindow* child)

Adds a child window. This is called automatically by window creation functions so should not be required by the application programmer.

Notice that this function is mostly internal to *wxWidgets* and shouldn't be called by the user code.

Parameters

child

Child window to add.

wxWindow::CaptureMouse

virtual void CaptureMouse()

Directs all mouse input to this window. Call *wxWindow::ReleaseMouse* (p. 1419) to release the capture.

Note that *wxWidgets* maintains the stack of windows having captured the mouse and when the mouse is released the capture returns to the window which had had captured it previously and it is only really released if there were no previous window. In particular, this means that you must release the mouse as many times as you capture it.

See also

wxWindow::ReleaseMouse (p. 1419)

wxWindow::Center

void Center(int *direction*)

A synonym for *Centre* (p. 1393).

wxWindow::CenterOnParent

void CenterOnParent(int *direction*)

A synonym for *CentreOnParent* (p. 1393).

wxWindow::CenterOnScreen

void CenterOnScreen(int *direction*)

A synonym for *CentreOnScreen* (p. 1394).

wxWindow::Centre

void Centre(int *direction* = *wxBOTH*)

Centres the window.

Parameters*direction*

Specifies the direction for the centering. May be *wxHORIZONTAL*, *wxVERTICAL* or *wxBOTH*. It may also include *wxCENTRE_ON_SCREEN* flag if you want to center the window on the entire screen and not on its parent window.

The flag *wxCENTRE_FRAME* is obsolete and should not be used any longer (it has no effect).

Remarks

If the window is a top level one (i.e. doesn't have a parent), it will be centered relative to the screen anyhow.

See also

wxWindow::Center (p. 1393)

wxWindow::CentreOnParent

void CentreOnParent(int *direction* = *wxBOTH*)

Centres the window on its parent. This is a more readable synonym for *Centre* (p. 1393).

Parameters

direction

Specifies the direction for the centering. May be `wxHORIZONTAL`, `wxVERTICAL` or `wxBOTH`.

Remarks

This methods provides for a way to center top level windows over their parents instead of the entire screen. If there is no parent or if the window is not a top level window, then behaviour is the same as `wxWindow::Centre` (p. 1393).

See also

`wxWindow::CentreOnScreen` (p. 1393)

wxWindow::CentreOnScreen

void CentreOnScreen(int *direction* = `wxBOTH`)

Centres the window on screen. This only works for top level windows - otherwise, the window will still be centered on its parent.

Parameters

direction

Specifies the direction for the centering. May be `wxHORIZONTAL`, `wxVERTICAL` or `wxBOTH`.

See also

`wxWindow::CentreOnParent` (p. 1393)

wxWindow::ClearBackground

void ClearBackground()

Clears the window by filling it with the current background colour. Does not cause an erase background event to be generated.

wxWindow::ClientToScreen

virtual void ClientToScreen(int* *x*, int* *y*) const

wxPerl note: In wxPerl this method returns a 2-element list instead of modifying its parameters.

virtual wxPoint ClientToScreen(const wxPoint& *pt*) const

Converts to screen coordinates from coordinates relative to this window.

x

A pointer to a integer value for the x coordinate. Pass the client coordinate in, and a screen coordinate will be passed out.

y

A pointer to a integer value for the y coordinate. Pass the client coordinate in, and a screen coordinate will be passed out.

pt

The client position for the second form of the function.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

ClientToScreen(point)	Accepts and returns a wxPoint
ClientToScreenXY(x, y)	Returns a 2-tuple, (x, y)

wxWindow::Close

bool Close(bool *force* = *false*)

This function simply generates a *wxCloseEvent* (p. 139) whose handler usually tries to close the window. It doesn't close the window itself, however.

Parameters

force

false if the window's close handler should be able to veto the destruction of this window, *true* if it cannot.

Remarks

Close calls the *close handler* (p. 139) for the window, providing an opportunity for the window to choose whether to destroy the window. Usually it is only used with the top level windows (*wxFrame* and *wxDialog* classes) as the others are not supposed to have any special *OnClose()* logic.

The close handler should check whether the window is being deleted forcibly, using *wxCloseEvent::GetForce* (p. 141), in which case it should destroy the window using *wxWindow::Destroy* (p. 1397).

Note that calling Close does not guarantee that the window will be destroyed; but it provides a way to simulate a manual close of a window, which may or may not be implemented by destroying the window. The default implementation of *wxDialog::OnCloseWindow* does not necessarily delete the dialog, since it will simply

simulate an `wxID_CANCEL` event which is handled by the appropriate button event handler and may do anything at all.

To guarantee that the window will be destroyed, call `wxWindow::Destroy` (p. 1397) instead

See also

Window deletion overview (p. 1619), `wxWindow::Destroy` (p. 1397), `wxCloseEvent` (p. 139)

wxWindow::ConvertDialogToPixels

wxPoint `ConvertDialogToPixels(const wxPoint& pt)`

wxSize `ConvertDialogToPixels(const wxSize& sz)`

Converts a point or size from dialog units to pixels.

For the x dimension, the dialog units are multiplied by the average character width and then divided by 4.

For the y dimension, the dialog units are multiplied by the average character height and then divided by 8.

Remarks

Dialog units are used for maintaining a dialog's proportions even if the font changes.

You can also use these functions programmatically. A convenience macro is defined:

```
#define wxDLG_UNIT(parent, pt) parent->ConvertDialogToPixels(pt)
```

See also

`wxWindow::ConvertPixelsToDialog` (p. 1397)

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

ConvertDialogPointToPixels(point) Accepts and returns a `wxPoint`

ConvertDialogSizeToPixels(size) Accepts and returns a `wxSize`

Additionally, the following helper functions are defined:

wxDLG_PNT(win, point) Converts a `wxPoint` from dialog units to pixels

wxDLG_SZE(win, size) Converts a `wxSize` from dialog units to pixels

wxWindow::ConvertPixelsToDialog

wxPoint ConvertPixelsToDialog(const wxPoint& pt)

wxSize ConvertPixelsToDialog(const wxSize& sz)

Converts a point or size from pixels to dialog units.

For the x dimension, the pixels are multiplied by 4 and then divided by the average character width.

For the y dimension, the pixels are multiplied by 8 and then divided by the average character height.

Remarks

Dialog units are used for maintaining a dialog's proportions even if the font changes.

See also

wxWindow::ConvertDialogToPixels (p. 1396)

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

ConvertDialogPointToPixels(point) Accepts and returns a wxPoint

ConvertDialogSizeToPixels(size) Accepts and returns a wxSize

wxWindow::Destroy

virtual bool Destroy()

Destroys the window safely. Use this function instead of the delete operator, since different window classes can be destroyed differently. Frames and dialogs are not destroyed immediately when this function is called -- they are added to a list of windows to be deleted on idle time, when all the window's events have been processed. This prevents problems with events being sent to non-existent windows.

Return value

`true` if the window has either been successfully deleted, or it has been added to the list of windows pending real deletion.

wxWindow::DestroyChildren

virtual void DestroyChildren()

Destroys all children of a window. Called automatically by the destructor.

wxWindow::Disable

bool Disable()

Disables the window, same as *Enable(false)* (p. 1398).

Return value

Returns `true` if the window has been disabled, `false` if it had been already disabled before the call to this function.

wxWindow::DoUpdateWindowUI

virtual void DoUpdateWindowUI(wxUpdateUIEvent& event)

Does the window-specific updating after processing the update event. This function is called by *wxWindow::UpdateWindowUI* (p. 1440) in order to check return values in the *wxUpdateUIEvent* (p. 1352) and act appropriately. For example, to allow frame and dialog title updating, *wxWidgets* implements this function as follows:

```
// do the window-specific processing after processing the update event
void wxTopLevelWindowBase::DoUpdateWindowUI(wxUpdateUIEvent& event)
{
    if ( event.GetSetEnabled() )
        Enable(event.GetEnabled());

    if ( event.GetSetText() )
    {
        if ( event.GetText() != GetTitle() )
            SetTitle(event.GetText());
    }
}
```

wxWindow::DragAcceptFiles

virtual void DragAcceptFiles(bool accept)

Enables or disables eligibility for drop file events (*OnDropFiles*).

Parameters

accept

If `true`, the window is eligible for drop file events. If `false`, the window will not accept drop file events.

Remarks

Windows only.

wxWindow::Enable

virtual bool Enable(bool *enable* = *true*)

Enable or disable the window for user input. Note that when a parent window is disabled, all of its children are disabled as well and they are reenabled again when the parent is.

Parameters

enable

If *true*, enables the window for input. If *false*, disables the window.

Return value

Returns *true* if the window has been enabled or disabled, *false* if nothing was done, i.e. if the window had already been in the specified state.

See also

wxWindow::IsEnabled (p. 1413), *wxWindow::Disable* (p. 1398)

wxWindow::FindFocus

static wxWindow* FindFocus()

Finds the window or control which currently has the keyboard focus.

Remarks

Note that this is a static function, so it can be called without needing a *wxWindow* pointer.

See also

wxWindow::SetFocus (p. 1428)

wxWindow::FindWindow

wxWindow* FindWindow(long *id*)

Find a child of this window, by identifier.

wxWindow* FindWindow(const wxString& *name*)

Find a child of this window, by name.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

FindWindowById(*id*) Accepts an integer

FindWindowByName(*name*) Accepts a string

wxWindow::FindWindowById

static wxWindow* FindWindowById(long *id*, wxWindow* *parent* = NULL)

Find the first window with the given *id*.

If *parent* is NULL, the search will start from all top-level frames and dialog boxes; if non-NULL, the search will be limited to the given window hierarchy. The search is recursive in both cases.

[See also](#)

FindWindow (p. 1399)

wxWindow::FindWindowByName

static wxWindow* FindWindowByName(const wxString& *name*, wxWindow* *parent* = NULL)

Find a window by its name (as given in a window constructor or **Create** function call). If *parent* is NULL, the search will start from all top-level frames and dialog boxes; if non-NULL, the search will be limited to the given window hierarchy. The search is recursive in both cases.

If no window with such name is found, *FindWindowByLabel* (p. 1400) is called.

[See also](#)

FindWindow (p. 1399)

wxWindow::FindWindowByLabel

static wxWindow* FindWindowByLabel(const wxString& *label*, wxWindow* *parent* = NULL)

Find a window by its label. Depending on the type of window, the label may be a window title or panel item label. If *parent* is NULL, the search will start from all top-level frames and dialog boxes; if non-NULL, the search will be limited to the given window hierarchy. The search is recursive in both cases.

[See also](#)

FindWindow (p. 1399)

wxWindow::Fit

virtual void Fit()

Sizes the window so that it fits around its subwindows. This function won't do anything if there are no subwindows and will only really work correctly if the sizers are used for the

subwindows layout. Also, if the window has exactly one subwindow it is better (faster and the result is more precise as *Fit* adds some margin to account for fuzziness of its calculations) to call

```
window->SetClientSize(child->GetSize());
```

instead of calling *Fit*.

wxWindow::FitInside

virtual void FitInside()

Similar to *Fit* (p. 1400), but sizes the interior (virtual) size of a window. Mainly useful with scrolled windows to reset scrollbars after sizing changes that do not trigger a size event, and/or scrolled windows without an interior sizer. This function similarly won't do anything if there are no subwindows.

wxWindow::Freeze

virtual void Freeze()

Freezes the window or, in other words, prevents any updates from taking place on screen, the window is not redrawn at all. *Thaw* (p. 1438) must be called to reenable window redrawing. Calls to these two functions may be nested.

This method is useful for visual appearance optimization (for example, it is a good idea to use it before inserting large amount of text into a *wxTextCtrl* under *wxGTK*) but is not implemented on all platforms nor for all controls so it is mostly just a hint to *wxWidgets* and not a mandatory directive.

wxWindow::GetAcceleratorTable

wxAcceleratorTable* GetAcceleratorTable() const

Gets the accelerator table for this window. See *wxAcceleratorTable* (p. 19).

wxWindow::GetAccessible

wxAccessible* GetAccessible()

Returns the accessible object for this window, if any.

See also *wxAccessible* (p. 22).

wxWindow::GetAdjustedBestSize

wxSize GetAdjustedBestSize() const

This method is similar to *GetBestSize* (p. 1402), except in one thing. *GetBestSize* should return the minimum untruncated size of the window, while this method will return the largest of *BestSize* and any user specified minimum size. ie. it is the minimum size the window should currently be drawn at, not the minimal size it can possibly tolerate.

wxWindow::GetBackgroundColour

virtual wxColour GetBackgroundColour() const

Returns the background colour of the window.

[See also](#)

wxWindow::SetBackgroundColour (p. 1423), *wxWindow::SetForegroundColour* (p. 1429), *wxWindow::GetForegroundColour* (p. 1406)

wxWindow::GetBestSize

wxSize GetBestSize() const

This functions returns the best acceptable minimal size for the window. For example, for a static control, it will be the minimal size such that the control label is not truncated. For windows containing subwindows (typically *wxPanel* (p. 972)), the size returned by this function will be the same as the size the window would have had after calling *Fit* (p. 1400).

wxWindow::GetCaret

wxCaret * GetCaret() const

Returns the *caret* (p. 118) associated with the window.

wxWindow::GetCapture

static wxWindow * GetCapture()

Returns the currently captured window.

[See also](#)

wxWindow::HasCapture (p. 1412), *wxWindow::CaptureMouse* (p. 1392),
wxWindow::ReleaseMouse (p. 1419), *wxMouseCaptureChangedEvent* (p. 927)

wxWindow::GetCharHeight

virtual int GetCharHeight() const

Returns the character height for this window.

wxWindow::GetCharWidth

virtual int GetCharWidth() const

Returns the average character width for this window.

wxWindow::GetChildren

wxList& GetChildren()

Returns a reference to the list of the window's children.

wxControl::GetClassDefaultAttributes

static wxVisualAttributes GetClassDefaultAttributes(wxWindowVariant variant = wxWINDOW_VARIANT_NORMAL)

Returns the default font and colours which are used by the control. This is useful if you want to use the same font or colour in your own control as in a standard control -- which is a much better idea than hard coding specific colours or fonts which might look completely out of place on the users system, especially if it uses themes.

The *variant* parameter is only relevant under Mac currently and is ignore under other platforms. Under Mac, it will change the size of the returned font. See *wxWindow::SetWindowVariant* (p. 1437) for more about this.

This static method is "overridden" in many derived classes and so calling, for example, *wxButton* (p. 104)::GetClassDefaultAttributes() will typically return the values appropriate for a button which will be normally different from those returned by, say, *wxListCtrl* (p. 799)::GetClassDefaultAttributes().

The *wxVisualAttributes* structure has at least the fields *font*, *colFg* and *colBg*. All of them may be invalid if it was not possible to determine the default control appearance or, especially for the background colour, if the field doesn't make sense as is the case for *colBg* for the controls with themed background.

See also

InheritAttributes (p. 1412)

wxWindow::GetClientSize

void GetClientSize(int* width, int* height) const

wxPerl note: In wxPerl this method takes no parameter and returns a 2-element list (width, height).

wxSize GetClientSize() const

This gets the size of the window 'client area' in pixels. The client area is the area which may be drawn on by the programmer, excluding title bar, border, scrollbars, etc.

Parameters

width

Receives the client width in pixels.

height

Receives the client height in pixels.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

GetClientSizeTuple()	Returns a 2-tuple of (width, height)
GetClientSize()	Returns a wxSize object

See also

GetSize (p. 1409), *GetVirtualSize* (p. 1411)

wxWindow::GetConstraints

wxLayoutConstraints* GetConstraints() const

Returns a pointer to the window's layout constraints, or NULL if there are none.

wxWindow::GetContainingSizer

const wxSizer * GetContainingSizer() const

Return the sizer that this window is a member of, if any, otherwise NULL.

wxWindow::GetCursor

const wxCursor& GetCursor() const

Return the cursor associated with this window.

See also

wxWindow::SetCursor (p. 1425)

wxControl::GetDefaultAttributes

virtual wxVisualAttributes GetDefaultAttributes() const

Currently this is the same as calling *GetClassDefaultAttributes* (p. 1403)(*GetWindowVariant* (p. 1412)()).

One advantage of using this function compared to the static version is that the call is automatically dispatched to the correct class (as usual with virtual functions) and you don't have to specify the class name explicitly.

The other one is that in the future this function could return different results, for example it might return a different font for an "Ok" button than for a generic button if the users GUI is configured to show such buttons in bold font. Of course, the down side is that it is impossible to call this function without actually having an object to apply it to whereas the static version can be used without having to create an object first.

wxWindow::GetDropTarget

wxDropTarget* GetDropTarget() const

Returns the associated drop target, which may be NULL.

[See also](#)

wxWindow::SetDropTarget (p. 1426), *Drag and drop overview* (p. 1673)

wxWindow::GetEventHandler

wxEvtHandler* GetEventHandler() const

Returns the event handler for this window. By default, the window is its own event handler.

[See also](#)

wxWindow::SetEventHandler (p. 1427), *wxWindow::PushEventHandler* (p. 1417), *wxWindow::PopEventHandler* (p. 1417), *wxEvtHandler::ProcessEvent* (p. 450), *wxEvtHandler* (p. 445)

wxWindow::GetExtraStyle

long GetExtraStyle() const

Returns the extra style bits for the window.

wxWindow::GetFont

wxFont& GetFont() const

Returns a reference to the font for this window.

See also

wxWindow::SetFont (p. 1428)

wxWindow::GetForegroundColour

virtual wxColour GetForegroundColour()

Returns the foreground colour of the window.

Remarks

The interpretation of foreground colour is open to interpretation according to the window class; it may be the text colour or other colour, or it may not be used at all.

See also

wxWindow::SetForegroundColour (p. 1429), *wxWindow::SetBackgroundColour* (p. 1423), *wxWindow::GetBackgroundColour* (p. 1402)

wxWindow::GetGrandParent

wxWindow* GetGrandParent() const

Returns the grandparent of a window, or NULL if there isn't one.

wxWindow::GetHandle

void* GetHandle() const

Returns the platform-specific handle of the physical window. Cast it to an appropriate handle, such as **HWND** for Windows, **Widget** for Motif or **GtkWidget** for GTK.

wxPython note: This method will return an integer in wxPython.

wxPerl note: This method will return an integer in wxPerl.

wxWindow::GetHelpText

virtual wxString GetHelpText() const

Gets the help text to be used as context-sensitive help for this window.

Note that the text is actually stored by the current *wxHelpProvider* (p. 652) implementation, and not in the window object itself.

See also

SetHelpText (p. 1429), *wxHelpProvider* (p. 652)

wxWindow::GetId

int GetId() const

Returns the identifier of the window.

Remarks

Each window has an integer identifier. If the application has not provided one (or the default Id -1) an unique identifier with a negative value will be generated.

See also

wxWindow::SetId (p. 1429), *Window identifiers* (p. 1614)

wxWindow::GetLabel

virtual wxString GetLabel() const

Generic way of getting a label from any window, for identification purposes.

Remarks

The interpretation of this function differs from class to class. For frames and dialogs, the value returned is the title. For buttons or static text controls, it is the button text. This function can be useful for meta-programs (such as testing tools or special-needs access programs) which need to identify windows by name.

wxWindow::GetName

virtual wxString GetName() const

Returns the window's name.

Remarks

This name is not guaranteed to be unique; it is up to the programmer to supply an appropriate name in the window constructor or via *wxWindow::SetName* (p. 1430).

See also

wxWindow::SetName (p. 1430)

wxWindow::GetParent

virtual wxWindow* GetParent() const

Returns the parent of the window, or NULL if there is no parent.

wxWindow::GetPosition

virtual void GetPosition(int* x, int* y) const

wxPoint GetPosition() const

This gets the position of the window in pixels, relative to the parent window for the child windows or relative to the display origin for the top level windows.

Parameters

x

Receives the x position of the window.

y

Receives the y position of the window.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

GetPosition()	Returns a wxPoint
GetPositionTuple()	Returns a tuple (x, y)

wxPerl note: In wxPerl there are two methods instead of a single overloaded method:

GetPosition()	Returns a Wx::Point
GetPositionXY()	Returns a 2-element list (<i>x</i> , <i>y</i>)

wxWindow::GetRect

virtual wxRect GetRect() const

Returns the size and position of the window as a *wxRect* (p. 1042) object.

wxWindow::GetScrollThumb

virtual int GetScrollThumb(int *orientation*)

Returns the built-in scrollbar thumb size.

See also

wxWindow::SetScrollbar (p. 1430)

wxWindow::GetScrollPos

virtual int GetScrollPos(int orientation)

Returns the built-in scrollbar position.

See also

See *wxWindow::SetScrollbar* (p. 1430)

wxWindow::GetScrollRange

virtual int GetScrollRange(int orientation)

Returns the built-in scrollbar range.

See also

wxWindow::SetScrollbar (p. 1430)

wxWindow::GetSize

void GetSize(int* width, int* height) const

wxSize GetSize() const

This gets the size of the entire window in pixels, including title bar, border, scrollbars, etc.

Parameters

width

Receives the window width.

height

Receives the window height.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

GetSize()	Returns a wxSize
GetSizeTuple()	Returns a 2-tuple (width, height)

wxPerl note: In wxPerl there are two methods instead of a single overloaded method:

GetSize()	Returns a Wx::Size
GetSizeWH()	Returns a 2-element list (width, height)

See also

GetClientSize (p. 1403), *GetVirtualSize* (p. 1411)

wxWindow::GetSizer

wxSizer * GetSizer() const

Return the sizer associated with the window by a previous call to *SetSizer()* (p. 1434) or `NULL`.

wxWindow::GetTextExtent

virtual void GetTextExtent(const wxString& *string*, int* *x*, int* *y*, int* *descent* = `NULL`, int* *externalLeading* = `NULL`, const wxFont* *font* = `NULL`, bool *use16* = `false`) const

Gets the dimensions of the string as it would be drawn on the window with the currently selected font.

Parameters

string

String whose extent is to be measured.

x

Return value for width.

y

Return value for height.

descent

Return value for descent (optional).

externalLeading

Return value for external leading (optional).

font

Font to use instead of the current window font (optional).

use16

If `true`, *string* contains 16-bit characters. The default is `false`.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

GetTextExtent(string) Returns a 2-tuple, (width, height)

GetFullTextExtent(string, font=NULL) Returns a 4-tuple, (width, height,

descent, externalLeading)

wxPerl note: In wxPerl this method takes only the `string` and optionally `font` parameters, and returns a 4-element list (`x`, `y`, `descent`, `externalLeading`).

wxWindow::GetTitle

virtual wxString GetTitle()

Gets the window's title. Applicable only to frames and dialogs.

[See also](#)

wxWindow::SetTitle (p. 1435)

wxWindow::GetToolTip

wxToolTip* GetToolTip() const

Get the associated tooltip or NULL if none.

wxWindow::GetUpdateRegion

virtual wxRegion GetUpdateRegion() const

Returns the region specifying which parts of the window have been damaged. Should only be called within an *wxPaintEvent* (p. 967) handler.

[See also](#)

wxRegion (p. 1052), *wxRegionIterator* (p. 1057)

wxWindow::GetValidator

wxValidator* GetValidator() const

Returns a pointer to the current validator for the window, or NULL if there is none.

wxWindow::GetVirtualSize

void GetVirtualSize(int* width, int* height) const

wxSize GetVirtualSize() const

This gets the virtual size of the window in pixels.

[Parameters](#)

width

Receives the window virtual width.

height

Receives the window virtual height.

GetSize (p. 1409), *GetClientSize* (p. 1403)

wxWindow::GetWindowStyleFlag

long GetWindowStyleFlag() const

Gets the window style that was passed to the constructor or **Create** method. **GetWindowStyle()** is another name for the same function.

wxWindow::GetWindowVariant

wxWindowVariant GetWindowVariant() const

Returns the value previous passed to *wxWindow::SetWindowVariant* (p. 1437).

wxWindow::HasCapture

virtual bool HasCapture() const

Returns true if this window has the current mouse capture.

See also

wxWindow::CaptureMouse (p. 1392), *wxWindow::ReleaseMouse* (p. 1419),
wxMouseCaptureChangedEvent (p. 927)

wxWindow::Hide

bool Hide()

Equivalent to calling *Show* (p. 1438)(*false*).

wxWindow::InheritAttributes

void InheritAttributes()

This function is (or should be, in case of custom controls) called during window creation to intelligently set up the window visual attributes, that is the font and the foreground and background colours.

By "intelligently" the following is meant: by default, all windows use their own *default* (p. 1403) attributes. However if some of the parents attributes are explicitly (that is, using *SetFont* (p. 1428) and not *SetDefaultFont* (p. 1426)) changed *and* if the corresponding attribute hadn't been explicitly set for this window itself, then this window takes the same value as used by the parent. In addition, if the window overrides *ShouldInheritColours* (p. 1438) to return `false`, the colours will not be changed no matter what and only the font might.

This rather complicated logic is necessary in order to accomodate the different usage scenarius. The most common one is when all default attributes are used and in this case, nothing should be inherited as in modern GUIs different controls use different fonts (and colours) than their siblings so they can't inherit the same value from the parent. However it was also deemed desirable to allow to simply change the attributes of all children at once by just changing the font or colour of their common parent, hence in this case we do inherit the parents attributes.

wxWindow::InitDialog

void InitDialog()

Sends an `wxEVT_INIT_DIALOG` event, whose handler usually transfers data to the dialog via validators.

wxWindow::IsEnabled

virtual bool IsEnabled() const

Returns `true` if the window is enabled for input, `false` otherwise.

[See also](#)

wxWindow::Enable (p. 1398)

wxWindow::IsExposed

bool IsExposed(int x, int y) const

bool IsExposed(wxPoint &pt) const

bool IsExposed(int x, int y, int w, int h) const

bool IsExposed(wxRect &rect) const

Returns `true` if the given point or rectangle area has been exposed since the last repaint. Call this in an paint event handler to optimize redrawing by only redrawing those areas, which have been exposed.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

IsExposed(x,y, w=0,h=0)

IsExposedPoint(pt)

IsExposedRect(rect)

wxWindow::IsRetained

virtual bool IsRetained() const

Returns `true` if the window is retained, `false` otherwise.

Remarks

Retained windows are only available on X platforms.

wxWindow::IsShown

virtual bool IsShown() const

Returns `true` if the window is shown, `false` if it has been hidden.

wxWindow::IsTopLevel

bool IsTopLevel() const

Returns `true` if the given window is a top-level one. Currently all frames and dialogs are considered to be top-level windows (even if they have a parent window).

wxWindow::Layout

void Layout()

Invokes the constraint-based layout algorithm or the sizer-based algorithm for this window.

See *wxWindow::SetAutoLayout* (p. 1423): when auto layout is on, this function gets called automatically when the window is resized.

wxWindow::LineDown

This is just a wrapper for *ScrollLines()* (p. 1421)(1).

wxWindow::LineUp

This is just a wrapper for *ScrollLines()* (p. 1421)(-1).

wxWindow::Lower

void Lower()

Lowers the window to the bottom of the window hierarchy if it is a managed window (dialog or frame).

wxWindow::MakeModal

virtual void MakeModal(bool flag)

Disables all other windows in the application so that the user can only interact with this window.

Parameters

flag

If `true`, this call disables all other windows in the application so that the user can only interact with this window. If `false`, the effect is reversed.

wxWindow::Move

void Move(int x, int y)

void Move(const wxPoint& pt)

Moves the window to the given position.

Parameters

x

Required x position.

y

Required y position.

pt

wxPoint (p. 991) object representing the position.

Remarks

Implementations of *SetSize* can also implicitly implement the *wxWindow::Move* function, which is defined in the base *wxWindow* class as the call:

```
SetSize(x, y, -1, -1, wxSIZE_USE_EXISTING);
```

See also

wxWindow::SetSize (p. 1432)

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

Move(point)	Accepts a <i>wxPoint</i>
MoveXY(x, y)	Accepts a pair of integers

wxWindow::OnInternalIdle

virtual void OnInternalIdle()

This virtual function is normally only used internally, but sometimes an application may need it to implement functionality that should not be disabled by an application defining an *OnIdle* handler in a derived class.

This function may be used to do delayed painting, for example, and most implementations call *wxWindow::UpdateWindowUI* (p. 1440) in order to send update events to the window in idle time.

wxWindow::PageDown

This is just a wrapper for *ScrollPages()* (p. 1422)(1).

wxWindow::PageUp

This is just a wrapper for *ScrollPages()* (p. 1422)(-1).

wxWindow::PopEventHandler

wxEvtHandler* PopEventHandler(bool deleteHandler = false) const

Removes and returns the top-most event handler on the event handler stack.

Parameters*deleteHandler*

If this is `true`, the handler will be deleted after it is removed. The default value is `false`.

See also

wxWindow::SetEventHandler (p. 1427), *wxWindow::GetEventHandler* (p. 1405),

wxWindow::PushEventHandler (p. 1417), *wxEvtHandler::ProcessEvent* (p. 450),
wxEvtHandler (p. 445)

wxWindow::PopupMenu

bool PopupMenu(wxMenu* menu, const wxPoint& pos)

bool PopupMenu(wxMenu* menu, int x, int y)

Pops up the given menu at the specified coordinates, relative to this window, and returns control when the user has dismissed the menu. If a menu item is selected, the corresponding menu event is generated and will be processed as usually.

Parameters

menu

Menu to pop up.

pos

The position where the menu will appear.

x

Required x position for the menu to appear.

y

Required y position for the menu to appear.

See also

wxMenu (p. 885)

Remarks

Just before the menu is popped up, *wxMenu::UpdateUI* (p. 898) is called to ensure that the menu items are in the correct state. The menu does not get deleted by the window.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

PopupMenu(menu, point) Specifies position with a wxPoint

PopupMenuXY(menu, x, y) Specifies position with two integers (x, y)

wxWindow::PushEventHandler

void PushEventHandler(wxEvtHandler* handler)

Pushes this event handler onto the event stack for the window.

Parameters

handler

Specifies the handler to be pushed.

Remarks

An event handler is an object that is capable of processing the events sent to a window. By default, the window is its own event handler, but an application may wish to substitute another, for example to allow central implementation of event-handling for a variety of different window classes.

wxWindow::PushEventHandler (p. 1417) allows an application to set up a chain of event handlers, where an event not handled by one event handler is handed to the next one in the chain. Use *wxWindow::PopEventHandler* (p. 1416) to remove the event handler.

See also

wxWindow::SetEventHandler (p. 1427), *wxWindow::GetEventHandler* (p. 1405), *wxWindow::PopEventHandler* (p. 1417), *wxEvtHandler::ProcessEvent* (p. 450), *wxEvtHandler* (p. 445)

wxWindow::Raise

void Raise()

Raises the window to the top of the window hierarchy if it is a managed window (dialog or frame).

wxWindow::Refresh

virtual void Refresh(bool *eraseBackground* = *true*, const **wxRect*** *rect* = *NULL*)

Causes an event to be generated to repaint the window.

Parameters

eraseBackground

If *true*, the background will be erased.

rect

If non-NULL, only the given rectangle will be treated as damaged.

See also

wxWindow::RefreshRect (p. 1418)

wxWindow::RefreshRect

void RefreshRect(const wxRect& rect)

Redraws the contents of the given rectangle: the area inside it will be repainted.

This is the same as *Refresh* (p. 1418) but has a nicer syntax.

wxWindow::RegisterHotKey

bool RegisterHotKey(int hotkeyId, int modifiers, int virtualKeyCode)

Registers a system wide hotkey. Every time the user presses the hotkey registered here, this window will receive a hotkey event. It will receive the event even if the application is in the background and does not have the input focus because the user is working with some other application.

Parameters

hotkeyId

Numeric identifier of the hotkey. For applications this must be between 0 and 0xBFFF. If this function is called from a shared DLL, it must be a system wide unique identifier between 0xC000 and 0xFFFF. This is a MSW specific detail.

modifiers

A bitwise combination of wxMOD_SHIFT, wxMOD_CONTROL, wxMOD_ALT or wxMOD_WIN specifying the modifier keys that have to be pressed along with the key.

virtualKeyCode

The virtual key code of the hotkey.

Return value

`true` if the hotkey was registered successfully. `false` if some other application already registered a hotkey with this modifier/virtualKeyCode combination.

Remarks

Use EVT_HOTKEY(hotkeyId, fnc) in the event table to capture the event. This function is currently only implemented under MSW.

See also

wxWindow::UnregisterHotKey (p. 1439)

wxWindow::ReleaseMouse

virtual void ReleaseMouse()

Releases mouse input captured with *wxWindow::CaptureMouse* (p. 1392).

See also

wxWindow::CaptureMouse (p. 1392), *wxWindow::HasCapture* (p. 1412),
wxWindow::ReleaseMouse (p. 1419), *wxMouseCaptureChangedEvent* (p. 927)

wxWindow::RemoveChild

virtual void RemoveChild(*wxWindow* child*)

Removes a child window. This is called automatically by window deletion functions so should not be required by the application programmer.

Notice that this function is mostly internal to *wxWidgets* and shouldn't be called by the user code.

Parameters

child

Child window to remove.

wxWindow::RemoveEventHandler

bool RemoveEventHandler(*wxEvtHandler *handler*)

Find the given *handler* in the windows event handler chain and remove (but not delete) it from it.

Parameters

handler

The event handler to remove, must be non `NULL` and must be present in this windows event handlers chain

Return value

Returns `true` if it was found and `false` otherwise (this also results in an assert failure so this function should only be called when the handler is supposed to be there).

See also

PushEventHandler (p. 1417), *PopEventHandler* (p. 1416)

wxWindow::Reparent

virtual bool Reparent(*wxWindow* newParent*)

Reparents the window, i.e the window will be removed from its current parent window (e.g. a non-standard toolbar in a *wxFrame*) and then re-inserted into another. Available on Windows and GTK.

Parameters

newParent

New parent.

wxWindow::ScreenToClient

virtual void ScreenToClient(int* x, int* y) const

virtual wxPoint ScreenToClient(const wxPoint& pt) const

Converts from screen to client window coordinates.

Parameters

x

Stores the screen x coordinate and receives the client x coordinate.

y

Stores the screen x coordinate and receives the client x coordinate.

pt

The screen position for the second form of the function.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

ScreenToClient(point)	Accepts and returns a wxPoint
ScreenToClientXY(x, y)	Returns a 2-tuple, (x, y)

wxWindow::ScrollLines

virtual bool ScrollLines(int lines)

Scrolls the window by the given number of lines down (if *lines* is positive) or up.

Return value

Returns `true` if the window was scrolled, `false` if it was already on top/bottom and nothing was done.

Remarks

This function is currently only implemented under MSW and wxTextCtrl under wxGTK (it also works for wxScrolledWindow derived classes under all platforms).

See also

ScrollPages (p. 1422)

wxWindow::ScrollPages

virtual bool ScrollPages(int *pages*)

Scrolls the window by the given number of pages down (if *pages* is positive) or up.

Return value

Returns `true` if the window was scrolled, `false` if it was already on top/bottom and nothing was done.

Remarks

This function is currently only implemented under MSW and `wxTextCtrl` under `wxGTK` (it also works for `wxScrolledWindow` derived classes under all platforms).

See also

ScrollLines (p. 1421)

wxWindow::ScrollWindow

virtual void ScrollWindow(int *dx*, int *dy*, const **wxRect*** *rect* = `NULL`)

Physically scrolls the pixels in the window and move child windows accordingly.

Parameters

dx

Amount to scroll horizontally.

dy

Amount to scroll vertically.

rect

Rectangle to invalidate. If this is `NULL`, the whole window is invalidated. If you pass a rectangle corresponding to the area of the window exposed by the scroll, your painting handler can optimize painting by checking for the invalidated region. This parameter is ignored under `GTK`.

Remarks

Use this function to optimise your scrolling implementations, to minimise the area that must be redrawn. Note that it is rarely required to call this function from a user program.

wxWindow::SetAcceleratorTable

virtual void SetAcceleratorTable(const wxAcceleratorTable& accel)

Sets the accelerator table for this window. See *wxAcceleratorTable* (p. 19).

wxWindow::SetAccessible

void SetAccessible(wxAccessible* accessible)

Sets the accessible for this window. Any existing accessible for this window will be deleted first, if not identical to *accessible*.

See also *wxAccessible* (p. 22).

wxWindow::SetAutoLayout

void SetAutoLayout(bool autoLayout)

Determines whether the *wxWindow::Layout* (p. 1414) function will be called automatically when the window is resized. It is called implicitly by *wxWindow::SetSizer* (p. 1434) but if you use *wxWindow::SetConstraints* (p. 1425) you should call it manually or otherwise the window layout won't be correctly updated when its size changes.

Parameters

autoLayout

Set this to `true` if you wish the *Layout* function to be called from within *wxWindow::OnSize* functions.

See also

wxWindow::SetConstraints (p. 1425)

wxWindow::SetBackgroundColour

virtual void SetBackgroundColour(const wxColour& colour)

Sets the background colour of the window.

Please see *InheritAttributes* (p. 1412) for explanation of the difference between this method and *SetDefaultBackgroundColour* (p. 1426).

Parameters

colour

The colour to be used as the background colour.

Remarks

The background colour is usually painted by the default *wxEraseEvent* (p. 440) event

handler function under Windows and automatically under GTK.

Note that setting the background colour does not cause an immediate refresh, so you may wish to call `wxWindow::ClearBackground` (p. 1394) or `wxWindow::Refresh` (p. 1418) after calling this function.

Use this function with care under GTK+ as the new appearance of the window might not look equally well when used with "Themes", i.e. GTK+'s ability to change its look as the user wishes with run-time loadable modules.

See also

`wxWindow::GetBackgroundColour` (p. 1402), `wxWindow::SetForegroundColour` (p. 1429), `wxWindow::GetForegroundColour` (p. 1406), `wxWindow::ClearBackground` (p. 1394), `wxWindow::Refresh` (p. 1418), `wxEraseEvent` (p. 440)

wxWindow::SetCaret

void SetCaret(*wxCaret *caret*) const

Sets the *caret* (p. 118) associated with the window.

wxWindow::SetClientSize

virtual void SetClientSize(int *width*, int *height*)

virtual void SetClientSize(const wxSize& *size*)

This sets the size of the window client area in pixels. Using this function to size a window tends to be more device-independent than `wxWindow::SetSize` (p. 1432), since the application need not worry about what dimensions the border or title bar have when trying to fit the window around panel items, for example.

Parameters

width

The required client area width.

height

The required client area height.

size

The required client size.

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

SetClientSize(size)	Accepts a wxSize
----------------------------	------------------

SetClientSizeWH(width, height)

wxWindow::SetContainingSizer

void SetContainingSizer(wxSizer* sizer)

This normally does not need to be called by user code. It is called when a window is added to a sizer, and is used so the window can remove itself from the sizer when it is destroyed.

wxWindow::SetCursor

virtual void SetCursor(const wxCursor&cursor)

Sets the window's cursor. Notice that the window cursor also sets it for the children of the window implicitly.

The *cursor* may be `wxNullCursor` in which case the window cursor will be reset back to default.

Parameters*cursor*

Specifies the cursor that the window should normally display.

See also

::*wxSetCursor* (p. 1507), *wxCursor* (p. 211)

wxWindow::SetConstraints

void SetConstraints(wxLayoutConstraints* constraints)

Sets the window to have the given layout constraints. The window will then own the object, and will take care of its deletion. If an existing layout constraints object is already owned by the window, it will be deleted.

Parameters*constraints*

The constraints to set. Pass NULL to disassociate and delete the window's constraints.

Remarks

You must call *wxWindow::SetAutoLayout* (p. 1423) to tell a window to use the constraints automatically in *OnSize*; otherwise, you must override *OnSize* and call

Layout() explicitly. When setting both a `wxLayoutConstraints` and a `wxSizer` (p. 1110), only the sizer will have effect.

`wxWindow::SetDefaultBackgroundColour`

`void SetDefaultBackgroundColour(const wxColour& colour)`

Sets the background colour of the window but prevents it from being inherited by the children of this window.

See also

SetBackgroundColour (p. 1423), *InheritAttributes* (p. 1412)

`wxWindow::SetDefaultFont`

`void SetDefaultBackgroundColour(const wxColour& colour)`

Sets the font of the window but prevents it from being inherited by the children of this window.

See also

SetFont (p. 1428), *InheritAttributes* (p. 1412)

`wxWindow::SetDefaultForegroundColour`

`void SetDefaultForegroundColour(const wxColour& colour)`

Sets the foreground colour of the window but prevents it from being inherited by the children of this window.

See also

SetForegroundColour (p. 1429), *InheritAttributes* (p. 1412)

`wxWindow::SetDropTarget`

`void SetDropTarget(wxDropTarget* target)`

Associates a drop target with this window.

If the window already has a drop target, it is deleted.

See also

wxWindow::GetDropTarget (p. 1405), *Drag and drop overview* (p. 1673)

wxWindow::SetEventHandler

void SetEventHandler(wxEvtHandler* handler)

Sets the event handler for this window.

Parameters

handler

Specifies the handler to be set.

Remarks

An event handler is an object that is capable of processing the events sent to a window. By default, the window is its own event handler, but an application may wish to substitute another, for example to allow central implementation of event-handling for a variety of different window classes.

It is usually better to use *wxWindow::PushEventHandler* (p. 1417) since this sets up a chain of event handlers, where an event not handled by one event handler is handed to the next one in the chain.

See also

wxWindow::GetEventHandler (p. 1405), *wxWindow::PushEventHandler* (p. 1417), *wxWindow::PopEventHandler* (p. 1417), *wxEvtHandler::ProcessEvent* (p. 450), *wxEvtHandler* (p. 445)

wxWindow::SetExtraStyle

void SetExtraStyle(long exStyle)

Sets the extra style bits for the window. The currently defined extra style bits are:

wxWS_EX_VALIDATE_RECURSIVELY *TransferDataTo/FromWindow()* and *Validate()* methods will recursively descend into all children of the window if it has this style flag set.

wxWS_EX_BLOCK_EVENTS Normally, the command events are propagated upwards to the window parent recursively until a handler for them is found. Using this style allows to prevent them from being propagated beyond this window. Notice that *wxDialog* has this style on by default for the reasons explained in *theevent processing overview* (p. 1611).

wxWS_EX_TRANSIENT This can be used to prevent a window from being used as an implicit parent for the dialogs which were created without a parent. It is useful for the windows which can disappear at any moment as creating children of such windows results in fatal problems.

wxFRAME_EX_CONTEXTHELP Under Windows, puts a query button on the

caption. When pressed, Windows will go into a context-sensitive help mode and `wxWidgets` will send a `wxEVT_HELP` event if the user clicked on an application window. This style cannot be used together with `wxMAXIMIZE_BOX` or `wxMINIMIZE_BOX`, so you should use the style of `wxDEFAULT_FRAME_STYLE` & `(wxMINIMIZE_BOX | wxMAXIMIZE_BOX)` for the frames having this style (the dialogs don't have minimize nor maximize box by default)

`wxWS_EX_PROCESS_IDLE` This window should always process idle events, even if the mode set by `wxIdleEvent::SetMode` (p. 728) is `wxIDLE_PROCESS_SPECIFIED`.

`wxWS_EX_PROCESS_UI_UPDATES` This window should always process UI update events, even if the mode set by `wxUpdateUIEvent::SetMode` (p. 1356) is `wxUPDATE_UI_PROCESS_SPECIFIED`.

`wxWindow::SetFocus`

`virtual void SetFocus()`

This sets the window to receive keyboard input.

[See also](#)

`wxFocusEvent` (p. 512)

`wxWindow::SetFocusFromKbd`

`virtual void SetFocusFromKbd()`

This function is called by `wxWidgets` keyboard navigation code when the user gives the focus to this window from keyboard (e.g. using `TAB` key). By default this method simply calls `SetFocus` (p. 1428) but can be overridden to do something in addition to this in the derived classes.

`wxWindow::SetFont`

`void SetFont(const wxFont& font)`

Sets the font for this window. This function should not be called for the parent window if you don't want its font to be inherited by its children, use `SetDefaultFont` (p. 1426) instead in this case and see *InheritAttributes* (p. 1412) for more explanations.

Parameters

font

Font to associate with this window.

See also

wxWindow::GetFont (p. 1405),
InheritAttributes (p. 1412)

wxWindow::SetForegroundColour

virtual void SetForegroundColour(const wxColour& colour)

Sets the foreground colour of the window.

Please see *InheritAttributes* (p. 1412) for explanation of the difference between this method and *SetDefaultForegroundColour* (p. 1426).

Parameters

colour

The colour to be used as the foreground colour.

Remarks

The interpretation of foreground colour is open to interpretation according to the window class; it may be the text colour or other colour, or it may not be used at all.

Note that when using this functions under GTK, you will disable the so called "themes", i.e. the user chosen appearance of windows and controls, including the themes of their parent windows.

See also

wxWindow::GetForegroundColour (p. 1406), *wxWindow::SetBackgroundColour* (p. 1423), *wxWindow::GetBackgroundColour* (p. 1402), *wxWindow::ShouldInheritColours* (p. 1438)

wxWindow::SetHelpText

virtual void SetHelpText(const wxString& helpText)

Sets the help text to be used as context-sensitive help for this window.

Note that the text is actually stored by the current *wxHelpProvider* (p. 652) implementation, and not in the window object itself.

See also

GetHelpText (p. 1406), *wxHelpProvider* (p. 652)

wxWindow::SetId

void SetId(int *id*)

Sets the identifier of the window.

Remarks

Each window has an integer identifier. If the application has not provided one, an identifier will be generated. Normally, the identifier should be provided on creation and should not be modified subsequently.

See also

wxWindow::GetId (p. 1407), *Window identifiers* (p. 1614)

wxWindow::SetName

virtual void SetName(const wxString& *name*)

Sets the window's name.

Parameters

name

A name to set for the window.

See also

wxWindow::GetName (p. 1407)

wxWindow::SetPalette

virtual void SetPalette(wxPalette* *palette*)

Obsolete - use *wxDC::SetPalette* (p. 366) instead.

wxWindow::SetScrollbar

virtual void SetScrollbar(int *orientation*, int *position*, int *thumbSize*, int *range*, bool *refresh* = *true*)

Sets the scrollbar properties of a built-in scrollbar.

Parameters

orientation

Determines the scrollbar whose page size is to be set. May be *wxHORIZONTAL* or *wxVERTICAL*.

position

The position of the scrollbar in scroll units.

thumbSize

The size of the thumb, or visible portion of the scrollbar, in scroll units.

range

The maximum position of the scrollbar.

refresh

`true` to redraw the scrollbar, `false` otherwise.

Remarks

Let's say you wish to display 50 lines of text, using the same font. The window is sized so that you can only see 16 lines at a time.

You would use:

```
SetScrollbar(wxVERTICAL, 0, 16, 50);
```

Note that with the window at this size, the thumb position can never go above 50 minus 16, or 34.

You can determine how many lines are currently visible by dividing the current view size by the character height in pixels.

When defining your own scrollbar behaviour, you will always need to recalculate the scrollbar settings when the window size changes. You could therefore put your scrollbar calculations and `SetScrollbar` call into a function named `AdjustScrollbars`, which can be called initially and also from your `wxSizeEvent` (p. 1109) handler function.

See also

Scrolling overview (p. 1643), *wxScrollBar* (p. 1079), *wxScrolledWindow* (p. 1085)

wxWindow::SetScrollPos

virtual void SetScrollPos(*int orientation*, *int pos*, **bool refresh** = *true*)

Sets the position of one of the built-in scrollbars.

Parameters

orientation

Determines the scrollbar whose position is to be set. May be `wxHORIZONTAL` or `wxVERTICAL`.

pos

Position in scroll units.

refresh

`true` to redraw the scrollbar, `false` otherwise.

Remarks

This function does not directly affect the contents of the window: it is up to the application to take note of scrollbar attributes and redraw contents accordingly.

See also

`wxWindow::SetScrollbar` (p. 1430), `wxWindow::GetScrollPos` (p. 1431), `wxWindow::GetScrollThumb` (p. 1408), `wxScrollBar` (p. 1079), `wxScrolledWindow` (p. 1085)

wxWindow::SetSize

virtual void SetSize(int x, int y, int width, int height, int sizeFlags = wxSIZE_AUTO)

virtual void SetSize(const wxRect& rect)

Sets the size and position of the window in pixels.

virtual void SetSize(int width, int height)

virtual void SetSize(const wxSize& size)

Sets the size of the window in pixels.

Parameters

x

Required x position in pixels, or -1 to indicate that the existing value should be used.

y

Required y position in pixels, or -1 to indicate that the existing value should be used.

width

Required width in pixels, or -1 to indicate that the existing value should be used.

height

Required height position in pixels, or -1 to indicate that the existing value should be used.

size

`wxSize` (p. 1107) object for setting the size.

rect

`wxRect` (p. 1042) object for setting the position and size.

sizeFlags

Indicates the interpretation of other parameters. It is a bit list of the following:

wxSIZE_AUTO_WIDTH: a -1 width value is taken to indicate a wxWidgets-supplied default width.

wxSIZE_AUTO_HEIGHT: a -1 height value is taken to indicate a wxWidgets-supplied default width.

wxSIZE_AUTO: -1 size values are taken to indicate a wxWidgets-supplied default size.

wxSIZE_USE_EXISTING: existing dimensions should be used if -1 values are supplied.

wxSIZE_ALLOW_MINUS_ONE: allow dimensions of -1 and less to be interpreted as real dimensions, not default values.

Remarks

The second form is a convenience for calling the first form with default x and y parameters, and must be used with non-default width and height values.

The first form sets the position and optionally size, of the window. Parameters may be -1 to indicate either that a default should be supplied by wxWidgets, or that the current value of the dimension should be used.

See also

`wxWindow::Move` (p. 1415)

wxPython note: In place of a single overloaded method name, wxPython implements the following methods:

SetDimensions(x, y, width, height, sizeFlags=wxSIZE_AUTO)

SetSize(size)

SetPosition(point)

wxWindow::SetSizeHints

virtual void SetSizeHints(int minW=-1, int minH=-1, int maxW=-1, int maxH=-1, int incW=-1, int incH=-1)

void SetSizeHints(const wxSize& minSize, const wxSize& maxSize=wxDefaultSize, const wxSize& incSize=wxDefaultSize)

Allows specification of minimum and maximum window sizes, and window size

increments. If a pair of values is not set (or set to -1), the default values will be used.

Parameters

minW

Specifies the minimum width allowable.

minH

Specifies the minimum height allowable.

maxW

Specifies the maximum width allowable.

maxH

Specifies the maximum height allowable.

incW

Specifies the increment for sizing the width (Motif/Xt only).

incH

Specifies the increment for sizing the height (Motif/Xt only).

minSize

Minimum size.

maxSize

Maximum size.

incSize

Increment size (Motif/Xt only).

Remarks

If this function is called, the user will not be able to size the window outside the given bounds.

The resizing increments are only significant under Motif or Xt.

wxWindow::SetSizer

void SetSizer(wxSizer* sizer, bool deleteOld=true)

Sets the window to have the given layout sizer. The window will then own the object, and will take care of its deletion. If an existing layout constraints object is already owned by the window, it will be deleted if the deleteOld parameter is true.

Note that this function will also call *SetAutoLayout* (p. 1423) implicitly with `true` parameter if the *sizer* is non-NULL and `false` otherwise.

Parameters

sizer

The sizer to set. Pass NULL to disassociate and conditionally delete the window's sizer. See below.

deleteOld

If `true` (the default), this will delete any preexisting sizer. Pass `false` if you wish to handle deleting the old sizer yourself.

Remarks

SetSizer now enables and disables Layout automatically, but prior to wxWidgets 2.3.3 the following applied:

You must call *wxWindow::SetAutoLayout* (p. 1423) to tell a window to use the sizer automatically in *OnSize*; otherwise, you must override *OnSize* and call *Layout()* explicitly. When setting both a *wxSizer* and a *wxLayoutConstraints* (p. 785), only the sizer will have effect.

wxWindow::SetSizerAndFit

void SetSizerAndFit(wxSizer* sizer, bool deleteOld=true)

The same as *SetSizer* (p. 1434), except it also sets the size hints for the window based on the sizer's minimum size.

wxWindow::SetTitle

virtual void SetTitle(const wxString& title)

Sets the window's title. Applicable only to frames and dialogs.

Parameters

title

The window's title.

See also

wxWindow::GetTitle (p. 1411)

wxWindow::SetThemeEnabled

virtual void SetThemeEnabled(bool enable)

This function tells a window if it should use the system's "theme" code to draw the windows' background instead of its own background drawing code. This does not always have any effect since the underlying platform obviously needs to support the notion of themes in user defined windows. One such platform is GTK+ where windows can have (very colourful) backgrounds defined by a user's selected theme.

Dialogs, notebook pages and the status bar have this flag set to true by default so that the default look and feel is simulated best.

wxWindow::SetToolTip

void SetToolTip(const wxString& tip)

void SetToolTip(wxToolTip* tip)

Attach a tooltip to the window.

See also: *GetToolTip* (p. 1411), *wxToolTip* (p. 1328)

wxWindow::SetValidator

virtual void SetValidator(const wxValidator& validator)

Deletes the current validator (if any) and sets the window validator, having called `wxValidator::Clone` to create a new validator of this type.

wxWindow::SetVirtualSize

void SetVirtualSize(int width, int height)

void SetVirtualSize(const wxSize& size)

Sets the virtual size of the window in pixels.

wxWindow::SetVirtualSizeHints

virtual void SetVirtualSizeHints(int minW, int minH, int maxW=-1, int maxH=-1)

void SetVirtualSizeHints(const wxSize& minSize=wxDefaultSize, const wxSize& maxSize=wxDefaultSize)

Allows specification of minimum and maximum virtual window sizes. If a pair of values is not set (or set to -1), the default values will be used.

Parameters

minW

Specifies the minimum width allowable.

minH

Specifies the minimum height allowable.

maxW

Specifies the maximum width allowable.

maxH

Specifies the maximum height allowable.

minSize

Minimum size.

maxSize

Maximum size.

Remarks

If this function is called, the user will not be able to size the virtual area of the window outside the given bounds.

wxWindow::SetWindowStyle

void SetWindowStyle(long style)

Identical to *SetWindowStyleFlag* (p. 1437).

wxWindow::SetWindowStyleFlag

virtual void SetWindowStyleFlag(long style)

Sets the style of the window. Please note that some styles cannot be changed after the window creation and that *Refresh()* (p. 1418) might be called after changing the others for the change to take place immediately.

See *Window styles* (p. 1618) for more information about flags.

See also

GetWindowStyleFlag (p. 1412)

wxWindow::SetWindowVariant

void SetWindowVariant(wxWindowVariant variant)

This function can be called under all platforms but only does anything under Mac OS X 10.3+ currently. Under this system, each of the standard control can exist in several sizes which correspond to the elements of

```
wxWindowVariant enum:enum wxWindowVariant
{
    wxWINDOW_VARIANT_NORMAL,          // Normal size
    wxWINDOW_VARIANT_SMALL,          // Smaller size (about 25 % smaller
    than normal )
    wxWINDOW_VARIANT_MINI,           // Mini size (about 33 % smaller than
    normal )
    wxWINDOW_VARIANT_LARGE,          // Large size (about 25 % larger than
    normal )
};
```

By default the controls use the normal size, of course, but this function can be used to change this.

wxWindow::ShouldInheritColours

virtual bool ShouldInheritColours()

Return `true` from here to allow the colours of this window to be changed by *InheritAttributes* (p. 1412), returning `false` forbids inheriting them from the parent window.

The base class version returns `false`, but this method is overridden in *wxControl* (p. 199) where it returns `true`.

wxWindow::Show

virtual bool Show(bool show = true)

Shows or hides the window. You may need to call *Raise* (p. 1418) for a top level window if you want to bring it to top, although this is not needed if *Show()* is called immediately after the frame creation.

Parameters

show

If `true` displays the window. Otherwise, hides it.

Return value

`true` if the window has been shown or hidden or `false` if nothing was done because it already was in the requested state.

See also

wxWindow::IsShown (p. 1414)

wxWindow::Thaw

virtual void Thaw()

Reenables window updating after a previous call to *Freeze* (p. 1401). To really thaw the

control, it must be called exactly the same number of times as *Freeze* (p. 1401).

wxWindow::TransferDataFromWindow

virtual bool TransferDataFromWindow()

Transfers values from child controls to data areas specified by their validators. Returns `false` if a transfer failed.

If the window has `wxWS_EX_VALIDATE_RECURSIVELY` extra style flag set, the method will also call `TransferDataFromWindow()` of all child windows.

See also

wxWindow::TransferDataToWindow (p. 1439), *wxValidator* (p. 1360),
wxWindow::Validate (p. 1441)

wxWindow::TransferDataToWindow

virtual bool TransferDataToWindow()

Transfers values to child controls from data areas specified by their validators.

If the window has `wxWS_EX_VALIDATE_RECURSIVELY` extra style flag set, the method will also call `TransferDataToWindow()` of all child windows.

Return value

Returns `false` if a transfer failed.

See also

wxWindow::TransferDataFromWindow (p. 1439), *wxValidator* (p. 1360),
wxWindow::Validate (p. 1441)

wxWindow::UnregisterHotKey

bool UnregisterHotKey(int hotkeyId)

Unregisters a system wide hotkey.

Parameters

hotkeyId

Numeric identifier of the hotkey. Must be the same id that was passed to `RegisterHotKey`.

Return value

`true` if the hotkey was unregistered successfully, `false` if the id was invalid.

Remarks

This function is currently only implemented under MSW.

See also

wxWindow::RegisterHotKey (p. 1419)

wxWindow::Update

virtual void Update()

Calling this method immediately repaints the invalidated area of the window while this would usually only happen when the flow of control returns to the event loop. Notice that this function doesn't refresh the window and does nothing if the window hadn't been already repainted. Use *Refresh* (p. 1418) first if you want to immediately redraw the window unconditionally.

wxWindow::UpdateWindowUI

virtual void UpdateWindowUI(long flags = wxUPDATE_UI_NONE)

This function sends *wxUpdateUIEvents* (p. 1352) to the window. The particular implementation depends on the window; for example a *wxToolBar* will send an update UI event for each toolbar button, and a *wxFrame* will send an update UI event for each menubar menu item. You can call this function from your application to ensure that your UI is up-to-date at this point (as far as your *wxUpdateUIEvent* handlers are concerned). This may be necessary if you have called *wxUpdateUIEvent::SetMode* (p. 1356) or *wxUpdateUIEvent::SetUpdateInterval* (p. 1357) to limit the overhead that *wxWidgets* incurs by sending update UI events in idle time.

flags should be a bitlist of one or more of the following values.

```
enum wxUpdateUI
{
    wxUPDATE_UI_NONE           = 0x0000, // No particular value
    wxUPDATE_UI_RECURSE       = 0x0001, // Call the function for
    descendants
    wxUPDATE_UI_FROMIDLE      = 0x0002  // Invoked from On(Internal)Idle
};
```

If you are calling this function from an *OnInternalIdle* or *OnIdle* function, make sure you pass the *wxUPDATE_UI_FROMIDLE* flag, since this tells the window to only update the UI elements that need to be updated in idle time. Some windows update their elements only when necessary, for example when a menu is about to be shown. The following is an example of how to call *UpdateWindowUI* from an idle function.

```
void MyWindow::OnInternalIdle()
{
    if (wxUpdateUIEvent::CanUpdate(this))
        UpdateWindowUI(wxUPDATE_UI_FROMIDLE);
}
```

See also

wxUpdateUIEvent (p. 1352), *wxWindow::DoUpdateWindowUI* (p. 1398),
wxWindow::OnInternalIdle (p. 1416)

wxWindow::Validate

virtual bool Validate()

Validates the current values of the child controls using their validators.

If the window has `wxWS_EX_VALIDATE_RECURSIVELY` extra style flag set, the method will also call `Validate()` of all child windows.

Return value

Returns `false` if any of the validations failed.

See also

wxWindow::TransferDataFromWindow (p. 1439), *wxWindow::TransferDataFromWindow* (p. 1439), *wxValidator* (p. 1360)

wxWindow::WarpPointer

void WarpPointer(int x, int y)

Moves the pointer to the given position on the window.

NB: This function is not supported under Mac because Apple Human Interface Guidelines forbid moving the mouse cursor programmatically.

Parameters

x

The new x position for the cursor.

y

The new y position for the cursor.

wxWindowDC

A `wxWindowDC` must be constructed if an application wishes to paint on the whole area of a window (client and decorations). This should normally be constructed as a temporary stack object; don't store a `wxWindowDC` object.

To draw on a window from inside **OnPaint**, construct a *wxPaintDC* (p. 966) object.

To draw on the client area of a window from outside **OnPaint**, construct a *wxClientDC* (p. 134) object.

To draw on the whole window including decorations, construct a *wxWindowDC* (p. 1441) object (Windows only).

Derived from

wxDC (p. 349)

Include files

<wx/dcclient.h>

See also

wxDC (p. 349), *wxMemoryDC* (p. 881), *wxPaintDC* (p. 966), *wxClientDC* (p. 134), *wxScreenDC* (p. 1073)

wxWindowDC::wxWindowDC

wxWindowDC(*wxWindow* window*)

Constructor. Pass a pointer to the window on which you wish to paint.

wxWindowDisabler

This class disables all windows of the application (may be with the exception of one of them) in its constructor and enables them back in its destructor. This comes in handy when you want to indicate to the user that the application is currently busy and cannot respond to user input.

Derived from

None

Include files

<wx/utils.h>

See also

wxBusyCursor (p. 102)

wxWindowDisabler::wxWindowDisabler

wxWindowDisabler(*wxWindow *winToSkip = NULL*)

Disables all top level windows of the applications with the exception of *winToSkip* if it is not `NULL`.

wxWindowDisabler::~wxWindowDisabler

~wxWindowDisabler()

Reenables back the windows disabled by the constructor.

wxWizard

`wxWizard` is the central class for implementing 'wizard-like' dialogs. These dialogs are mostly familiar to Windows users and are nothing else but a sequence of 'pages' each of them displayed inside a dialog which has the buttons to pass to the next (and previous) pages.

The wizards are typically used to decompose a complex dialog into several simple steps and are mainly useful to the novice users, hence it is important to keep them as simple as possible.

To show a wizard dialog, you must first create an object of `wxWizard` class using either the non default constructor or a default one followed by call to *Create* (p. 1445) function. Then you should add all pages you want the wizard to show and call *RunWizard* (p. 1447). Finally, don't forget to call `wizard->Destroy()`.

Derived from

`wxDialog` (p. 369)
`wxPanel` (p. 972)
`wxWindow` (p. 1388)
`wxEvtHandler` (p. 445)
`wxObject` (p. 954)

Include files

<wx/wizard.h>

Event table macros

To process input from a wizard dialog, use these event handler macros to direct input to member functions that take a `wxWizardEvent` (p. 1448) argument. For some events, *Veto()* (p. 954) can be called to prevent the event from happening.

EVT_WIZARD_PAGE_CHANGED(id, func) The page has been just changed
(this event can not be vetoed).

EVT_WIZARD_PAGE_CHANGING(id, func) The page is being changed (this
event can be vetoed).

EVT_WIZARD_CANCEL(id, func) The user attempted to cancel the wizard (this
event may also be vetoed).

EVT_WIZARD_HELP(id, func) The wizard help button was pressed.

EVT_WIZARD_FINISHED(id, func) The wizard finished button was pressed.

Extended styles

Use the `wxWindow::SetExtraStyle` (p. 1427) function to set the following style. You will need to use two-step construction (use the default constructor, call **SetExtraStyle**, then call **Create**).

wxWIZARD_EX_HELPBUTTON Shows a Help button using `wxID_HELP`.

See also `wxDialog` (p. 369) for other extended styles.

See also

`wxWizardEvent` (p. 1448), `wxWizardPage` (p. 1449), `wxWizard` sample (p. 1577)

wxWizard::wxWizard

wxWizard()

Default constructor. Use this if you wish to derive from `wxWizard` and then call *Create* (p. 1445), for example if you wish to set an extra style with `wxWindow::SetExtraStyle` (p. 1427) between the two calls.

wxWizard(wxWindow* parent, int id = -1, const wxString& title = wxEmptyString, const wxBitmap& bitmap = wxNullBitmap, const wxPoint& pos = wxDefaultPosition, long style = wxDEFAULT_DIALOG_STYLE)

Constructor which really creates the wizard -- if you use this constructor, you shouldn't call *Create* (p. 1445).

Notice that unlike almost all other `wxWidgets` classes, there is no *size* parameter in `wxWizard` constructor because the wizard will have a predefined default size by default. If you want to change this, you should use the *GetPageAreaSizer* (p. 1446) function.

Parameters

parent

The parent window, may be `NULL`.

id

The id of the dialog, will usually be just -1.

title

The title of the dialog.

bitmap

The default bitmap used in the left side of the wizard. See also *GetBitmap* (p. 1451).

pos

The position of the dialog, it will be centered on the screen by default.

style

Window style is passed to `wxDialog`.

wxWizard::Create

bool Create(wxWindow* parent, int id = -1, const wxString& title = wxEmptyString, const wxBitmap& bitmap = wxNullBitmap, const wxPoint& pos = wxDefaultPosition, long style = wxDEFAULT_DIALOG_STYLE)

Creates the wizard dialog. Must be called if the default constructor had been used to create the object.

Notice that unlike almost all other `wxWidgets` classes, there is no *size* parameter in `wxWizard` constructor because the wizard will have a predefined default size by default. If you want to change this, you should use the *GetPageAreaSizer* (p. 1446) function.

Parameters

parent

The parent window, may be NULL.

id

The id of the dialog, will usually be just -1.

title

The title of the dialog.

bitmap

The default bitmap used in the left side of the wizard. See also *GetBitmap* (p. 1451).

pos

The position of the dialog, it will be centered on the screen by default.

style

Window style is passed to `wxDialog`.

wxWizard::FitToPage

void FitToPage(const wxWizardPage* firstPage)

This method is obsolete, use *GetPageAreaSizer* (p. 1446) instead.

Sets the page size to be big enough for all the pages accessible via the given *firstPage*, i.e. this page, its next page and so on.

This method may be called more than once and it will only change the page size if the size required by the new page is bigger than the previously set one. This is useful if the decision about which pages to show is taken during the run-time as in this case, the wizard won't be able to get to all pages starting from a single one and you should call *Fit* separately for the others.

wxWizard::GetCurrentPage

wxWizardPage* GetCurrentPage() const

Get the current page while the wizard is running. `NULL` is returned if *RunWizard()* (p. 1447) is not being executed now.

wxWizard::GetPageAreaSizer

virtual wxSizer* GetPageAreaSizer() const

Returns pointer to page area sizer. Wizard is laid out using sizers and page area sizer is the place holder for the pages. All pages are resized before being shown to match the wizard page area.

Page area sizer has minimal size that is maximum of several values. First, all pages (or other objects) added to the sizer. Second, all pages reachable by repeatedly applying *wxWizardPage::GetNext* (p. 1450) to any page inserted into the sizer. Third, minimal size specified using *SetPageSize* (p. 1447) and *FitToPage* (p. 1445). Fourth, the total wizard height may be increased to accomodate the bitmap height. Fifth and finally, wizards are never smaller some built-in minimal size to avoid too small wizards.

Caller can use *wxSizer::SetMinSize* (p. 1116) to enlarge it beyond minimal size. If `wxRESIZE_BORDER` was passed to constructor, user can resize wizard and consequently page area (but not make it smaller than the minimal size).

It is recommended to add first page to page area sizer. For simple wizards, this will enlarge the wizard to fit biggest page. For non-linear wizards, first page of every separate chain should be added. Caller-specified size can be accomplished using *wxSizer::SetMinSize* (p. 1116).

Adding pages to page area sizer affects default border width around page area that can be altered with *SetBorder* (p. 1447).

wxWizard::GetPageSize

wxSize GetPageSize() const

Returns the size available for the pages.

wxWizard::HasNextPage

virtual bool HasNextPage(wxWizardPage *page)

Return `true` if this page is not the last one in the wizard. The base class version implements this by calling `page->GetNext` (p. 1450) but this could be undesirable if, for example, the pages are created on demand only.

[See also](#)

HasPrevPage (p. 1447)

wxWizard::HasPrevPage

virtual bool HasPrevPage(wxWizardPage *page)

Return `true` if this page is not the last one in the wizard. The base class version implements this by calling `page->GetPrev` (p. 1450) but this could be undesirable if, for example, the pages are created on demand only.

[See also](#)

HasNextPage (p. 1447)

wxWizard::RunWizard

bool RunWizard(wxWizardPage* firstPage)

Executes the wizard starting from the given page, returns `true` if it was successfully finished or `false` if user cancelled it. The *firstPage* can not be `NULL`.

wxWizard::SetPageSize

void SetPageSize(const wxSize& sizePage)

This method is obsolete, use *GetPageAreaSizer* (p. 1446) instead.

Sets the minimal size to be made available for the wizard pages. The wizard will take into account the size of the bitmap (if any) itself. Also, the wizard will never be smaller than the default size.

The recommended way to use this function is to layout all wizard pages using the sizers (even though the wizard is not resizable) and then use *wxSizer::CalcMin* (p. 1113) in a loop to calculate the maximum of minimal sizes of the pages and pass it to *SetPageSize()*.

wxWizard::SetBorder

void SetBorder(int border)

Sets width of border around page area. Default is zero. For backward compatibility, if there are no pages in *GetPageAreaSizer* (p. 1446), default is 5 pixels.

If there is five point border around all controls in a page and border around page area is left zero, five point white space along all dialog borders will be added to control border to space page controls ten points from dialog border and non-page controls.

wxWizardEvent

wxWizardEvent class represents an event generated by the *wizard* (p. 1443): this event is first sent to the page itself and, if not processed there, goes up the window hierarchy as usual.

Derived from

wxNotifyEvent (p. 953)
wxCommandEvent (p. 165)
wxEvent (p. 441)
wxObject (p. 954)

Include files

<wx/wizard.h>

Event table macros

To process input from a wizard dialog, use these event handler macros to direct input to member functions that take a *wxWizardEvent* argument.

EVT_WIZARD_PAGE_CHANGED(id, func) The page has been just changed
(this event can not be vetoed).

EVT_WIZARD_PAGE_CHANGING(id, func) The page is being changed (this
event can be vetoed).

EVT_WIZARD_CANCEL(id, func) The user attempted to cancel the wizard (this
event may also be vetoed).

EVT_WIZARD_HELP(id, func) The wizard help button was pressed.

EVT_WIZARD_FINISHED(id, func) The wizard finished button was pressed.

See also

wxWizard (p. 1443), *wxWizard sample* (p. 1577)

wxWizardEvent::wxWizardEvent

wxWizardEvent(wxEventType type = wxEVT_NULL, int id = -1, bool direction = true)

Constructor. It is not normally used by the user code as the objects of this type are constructed by `wxWizard`.

wxWizardEvent::GetDirection

bool GetDirection() const

Return the direction in which the page is changing: for `EVT_WIZARD_PAGE_CHANGING`, return `true` if we're going forward or `false` otherwise and for `EVT_WIZARD_PAGE_CHANGED` return `true` if we came from the previous page and `false` if we returned from the next one.

wxWizardEvent::GetPage

wxWizardPage* GetPage() const

Returns the *wxWizardPage* (p. 1449) which was active when this event was generated.

wxWizardPage

wxWizardPage is one of the screens in *wxWizard* (p. 1443): it must know what are the following and preceding pages (which may be `NULL` for the first/last page). Except for this extra knowledge, *wxWizardPage* is just a panel, so the controls may be placed directly on it in the usual way.

This class allows the programmer to decide the order of pages in the wizard dynamically (during run-time) and so provides maximal flexibility. Usually, however, the order of pages is known in advance in which case *wxWizardPageSimple* (p. 1451) class is enough and it is simpler to use.

Virtual functions to override

To use this class, you must override *GetPrev* (p. 1450) and *GetNext* (p. 1450) pure virtual functions (or you may use *wxWizardPageSimple* (p. 1451) instead).

GetBitmap (p. 1451) can also be overridden, but this should be very rarely needed.

Derived from

wxPanel (p. 972)
wxWindow (p. 1388)
wxEvtHandler (p. 445)
wxObject (p. 954)

Include files

<wx/wizard.h>

See also

wxWizard (p. 1443), *wxWizard sample* (p. 1577)

wxWizardPage::wxWizardPage

wxWizardPage(wxWizard* parent, const wxBitmap& bitmap = wxNullBitmap, const wxChar *resource = NULL)

Constructor accepts an optional bitmap which will be used for this page instead of the default one for this wizard (note that all bitmaps used should be of the same size). Notice that no other parameters are needed because the wizard will resize and reposition the page anyhow.

Parameters

parent

The parent wizard

bitmap

The page-specific bitmap if different from the global one

resource

Load the page from the specified resource if non NULL

wxWizardPage::GetPrev

wxWizardPage* GetPrev() const

Get the page which should be shown when the user chooses the "Back" button: if NULL is returned, this button will be disabled. The first page of the wizard will usually return NULL from here, but the others will not.

See also

GetNext (p. 1450)

wxWizardPage::GetNext

wxWizardPage* GetNext() const

Get the page which should be shown when the user chooses the "Next" button: if NULL is returned, this button will be disabled. The last page of the wizard will usually return NULL from here, but the others will not.

See also

GetPrev (p. 1450)

wxWizardPage::GetBitmap

wxBitmap GetBitmap() const

This method is called by `wxWizard` to get the bitmap to display alongside the page. By default, `m_bitmap` member variable which was set in the *constructor* (p. 1450).

If the bitmap was not explicitly set (i.e. if `wxNullBitmap` is returned), the default bitmap for the wizard should be used.

The only cases when you would want to override this function is if the page bitmap depends dynamically on the user choices, i.e. almost never.

wxWizardPageSimple

`wxWizardPageSimple` is the simplest possible `wxWizardPage` (p. 1449) implementation: it just returns the pointers given to its constructor from `GetNext()` and `GetPrev()` functions.

This makes it very easy to use the objects of this class in the wizards where the pages order is known statically - on the other hand, if this is not the case you must derive your own class from `wxWizardPage` (p. 1449) instead.

Derived from

`wxWizardPage` (p. 1449)
`wxPanel` (p. 972)
`wxWindow` (p. 1388)
`wxEvtHandler` (p. 445)
`wxObject` (p. 954)

Include files

<wx/wizard.h>

See also

`wxWizard` (p. 1443), `wxWizard sample` (p. 1577)

wxWizardPageSimple::wxWizardPageSimple

wxWizardPageSimple(`wxWizard*` *parent* = `NULL`, `wxWizardPage*` *prev* = `NULL`, `wxWizardPage*` *next* = `NULL`, `const wxBitmap&` *bitmap* = `wxNullBitmap`)

Constructor takes the previous and next pages. They may be modified later by `SetPrev()` (p. 1452) or `SetNext()` (p. 1452).

wxWizardPageSimple::SetPrev

void SetPrev(wxWizardPage* prev)

Sets the previous page.

wxWizardPageSimple::SetNext

void SetNext(wxWizardPage* next)

Sets the next page.

wxWizardPageSimple::Chain

static void Chain(wxWizardPageSimple* first, wxWizardPageSimple* second)

A convenience function to make the pages follow each other.

Example:

```
wxRadioboxPage *page3 = new wxRadioboxPage(wizard);  
wxValidationPage *page4 = new wxValidationPage(wizard);  
  
wxWizardPageSimple::Chain(page3, page4);
```

wxXmlResource

This is the main class for interacting with the XML-based resource system.

The class holds XML resources from one or more .xml files, binary files or zip archive files.

See *XML-based resource system overview* (p. 1634) for details.

NOTE: XRC is not yet a part of the core wxWidgets library, so please see the overview for how to compile and link it. Otherwise if you try to use it, you will get link errors.

Derived from

wxObject (p. 954)

Include files

<wx/xrc/xmlres.h>

Data structures

```
enum wxXmlResourceFlags  
{  
    wxXRC_USE_LOCALE      = 1,  
    wxXRC_NO_SUBCLASSING = 2  
};
```

wxXmlResource::wxXmlResource

wxXmlResource(const wxString& *filemask*, int *flags* = wxXRC_USE_LOCALE)

Constructor.

filemask

The XRC file, archive file, or wildcard specification that will be used to load all resource files inside a zip archive.

flags

wxXRC_USE_LOCALE: translatable strings will be translated via _().
wxXRC_NO_SUBCLASSING: subclass property of object nodes will be ignored (useful for previews in XRC editors).

wxXmlResource(int *flags* = wxXRC_USE_LOCALE)

Constructor.

flags

wxXRC_USE_LOCALE: translatable strings will be translated via _().
wxXRC_NO_SUBCLASSING: subclass property of object nodes will be ignored (useful for previews in XRC editors).

wxXmlResource::~~wxXmlResource

~wxXmlResource()

Destructor.

wxXmlResource::AddHandler

void AddHandler(wxXmlResourceHandler* *handler*)

Initializes only a specific handler (or custom handler). Convention says that the handler name is equal to the control's name plus 'XmlHandler', for example wxTextCtrlXmlHandler, wxHtmlWindowXmlHandler. The XML resource compiler (wxsrc) can create include file that contains initialization code for all controls used within the resource.

wxXmlResource::AttachUnknownControl

bool AttachUnknownControl(const wxString& *name*, wxWindow* *control*,

wxWindow* *parent* = *NULL*)

Attaches an unknown control to the given panel/window/dialog. Unknown controls are used in conjunction with `<object class="unknown">`.

wxXmlResource::ClearHandlers

void **ClearHandlers()**

Removes all handlers.

wxXmlResource::CompareVersion

int **CompareVersion**(*int major*, *int minor*, *int release*, *int revision*) **const**

Compares the XRC version to the argument. Returns -1 if the XRC version is less than the argument, +1 if greater, and 0 if they equal.

wxXmlResource::CreateResFromNode

wxObject* **CreateResFromNode**(*wxXmlNode* node*, *wxObject* parent*, *wxObject* instance* = *NULL*)

Creates a resource from information in the given node.

wxXmlResource::DoFindResource

wxXmlNode* **DoFindResource**(*wxXmlNode* parent*, **const wxString&** *name*, **const wxString&** *classname*, **bool** *recursive*)

Helper function: finds a resource (calls `UpdateResources`) and returns a node containing it.

wxXmlResource::FindResource

wxXmlNode* **FindResource**(**const wxString&** *name*, **const wxString&** *classname*, **bool** *recursive* = *false*)

Finds a resource (calls `UpdateResources`) and returns a node containing it.

wxXmlResource::Get

wxXmlResource* **Get()**

Gets the global resources object or creates one if none exists.

wxXmlResource::GetFlags

int GetFlags()

Returns flags, which may be a bitlist of wxXRC_USE_LOCALE and wxXRC_NO_SUBCLASSING.

wxXmlResource::GetVersion

long GetVersion() const

Returns version information ($a.b.c.d = d + 256*c + 2562*b + 2563*a$).

wxXmlResource::GetXRCID

int GetXRCID(const wxChar* str_id)

Returns a numeric ID that is equivalent to the string ID used in an XML resource. To be used in event tables. The macro `XRCID(name)` is provided for convenience.

wxXmlResource::InitAllHandlers

void InitAllHandlers()

Initializes handlers for all supported controls/windows. This will make the executable quite big because it forces linking against most of the wxWidgets library.

wxXmlResource::Load

bool Load(const wxString& filemask)

Loads resources from XML files that match given filemask. This method understands VFS (see `fileys.h`).

wxXmlResource::LoadBitmap

wxBitmap LoadBitmap(const wxString& name)

Loads a bitmap resource from a file.

wxXmlResource::LoadDialog

wxDialog* LoadDialog(wxWindow* parent, const wxString& name)

Loads a dialog. *dlg* points to a parent window (if any).

bool LoadDialog(wxDialog* *dlg*, wxWindow* *parent*, const wxString& *name*)

Loads a dialog. *dlg* points to parent window (if any).

This form is used to finish creation of an already existing instance (the main reason for this is that you may want to use derived class with a new event table).

Example:

```
MyDialog dlg;  
wxTheXmlResource->LoadDialog(&dlg, mainFrame, "my_dialog");  
dlg->ShowModal();
```

wxXmlResource::LoadFrame

bool LoadFrame(wxFrame* *frame*, wxWindow* *parent*, const wxString& *name*)

Loads a frame.

wxXmlResource::LoadIcon

wxIcon LoadIcon(const wxString& *name*)

Loads an icon resource from a file.

wxXmlResource::LoadMenu

wxMenu* LoadMenu(const wxString& *name*)

Loads menu from resource. Returns NULL on failure.

wxXmlResource::LoadMenuBar

wxMenuBar* LoadMenuBar(wxWindow* *parent*, const wxString& *name*)

Loads a menubar from resource. Returns NULL on failure.

wxMenuBar* LoadMenuBar(const wxString& *name*)

Loads a menubar from resource. Returns NULL on failure.

wxXmlResource::LoadPanel

wxPanel* LoadPanel(wxWindow* *parent*, const wxString& *name*)

Loads a panel. *panel* points to parent window (if any).

bool LoadPanel(wxPanel* *panel*, wxWindow* *parent*, const wxString& *name*)

Loads a panel. *panel* points to parent window (if any). This form is used to finish creation of an already existing instance.

wxXmlResource::LoadToolBar

wxToolBar* LoadToolBar(wxWindow* parent, const wxString& name)

Loads a toolbar.

wxXmlResource::Set

wxXmlResource* Set(wxXmlResource* res)

Sets the global resources object and returns a pointer to the previous one (may be NULL).

wxXmlResource::SetFlags

int SetFlags()

Sets flags (bitlist of wxXRC_USE_LOCALE and wxXRC_NO_SUBCLASSING).

wxXmlResource::UpdateResources

void UpdateResources()

Scans the resources list for unloaded files and loads them. Also reloads files that have been modified since the last load.

wxXmlResourceHandler

wxXmlResourceHandler is an abstract base class for resource handlers capable of creating a control from an XML node.

See *XML-based resource system overview* (p. 1634) for details.

NOTE: XRC is not yet a part of the core wxWidgets library, so please see the overview for how to compile and link it. Otherwise if you try to use it, you will get link errors.

Derived from

wxObject (p. 954)

Include files

<wx/xrc/xmlres.h>

wxXmlResourceHandler::wxXmlResourceHandler

wxXmlResourceHandler()

Default constructor.

wxXmlResourceHandler::~~wxXmlResourceHandler

~wxXmlResourceHandler()

Destructor.

wxXmlResourceHandler::AddStyle

void AddStyle(const wxString& name, int value)

Add a style flag (e.g. wxMB_DOCKABLE) to the list of flags understood by this handler.

wxXmlResourceHandler::AddWindowStyles

void AddWindowStyles()

Add styles common to all wxWindow-derived classes.

wxXmlResourceHandler::CanHandle

bool CanHandle(wxXmlNode* node)

Returns true if it understands this node and can create a resource from it, false otherwise.

Note

You must **not** call any wxXmlResourceHandler methods except *IsOfClass* (p. 1462) from this method! The instance is not yet initialized with node data at the time CanHandle is called and it is only safe to operate on *node* directly or to call *IsOfClass*.

wxXmlResourceHandler::CreateChildren

void CreateChildren(wxObject* parent, bool this_hnd_only = false)

Creates children.

wxXmlResourceHandler::CreateChildrenPrivately

void CreateChildrenPrivately(wxObject* *parent*, wxXmlNode* *rootnode* = NULL)

Helper function.

wxXmlResourceHandler::CreateResFromNode

wxObject* CreateResFromNode(wxXmlNode* *node*, wxObject* *parent*, wxObject* *instance* = NULL)

Creates a resource from a node.

wxXmlResourceHandler::CreateResource

wxObject* CreateResource(wxXmlNode* *node*, wxObject* *parent*, wxObject* *instance*)

Creates an object (menu, dialog, control, ...) from an XML node. Should check for validity. *parent* is a higher-level object (usually window, dialog or panel) that is often necessary to create the resource. If **instance** is non-NULL it should not create a new instance via 'new' but should rather use this one, and call its Create method.

wxXmlResourceHandler::DoCreateResource

wxObject* DoCreateResource()

Called from CreateResource after variables were filled.

wxXmlResourceHandler::GetBitmap

wxBitmap GetBitmap(const wxString& *param* = wxT("bitmap"), wxSize *size* = wxDefaultSize)

Gets a bitmap.

wxXmlResourceHandler::GetBool

bool GetBool(const wxString& *param*, bool *defaultv* = false)

Gets a bool flag (1, t, yes, on, true are true, everything else is false).

wxXmlResourceHandler::GetColour

wxColour GetColour(const wxString& *param*)

Gets colour in HTML syntax (#RRGGBB).

wxXmlResourceHandler::GetCurFileSystem

wxFileSystem& GetCurFileSystem()

Returns the current file system.

wxXmlResourceHandler::GetDimension

wxCoord GetDimension(const wxString& param, wxCoord defaultv = 0)

Gets a dimension (may be in dialog units).

wxXmlResourceHandler::GetFont

wxFont GetFont(const wxString& param = wxT("font"))

Gets a font.

wxXmlResourceHandler::GetID

int GetID()

Returns the XRCID.

wxXmlResourceHandler::GetIcon

wxIcon GetIcon(const wxString& param = wxT("icon"), wxSize size = wxDefaultSize)

Returns an icon.

wxXmlResourceHandler::GetLong

long GetLong(const wxString& param, long defaultv = 0)

Gets the integer value from the parameter.

wxXmlResourceHandler::GetName

wxString GetName()

Returns the resource name.

wxXmlResourceHandler::GetNodeContent

wxString GetNodeContent(wxXmlNode* node)

Gets node content from wxXML_ENTITY_NODE.

wxXmlResourceHandler::GetParamNode

wxXmlNode* GetParamNode(const wxString& param)

Finds the node or returns NULL.

wxXmlResourceHandler::GetParamValue

wxString GetParamValue(const wxString& param)

Finds the parameter value or returns the empty string.

wxXmlResourceHandler::GetPosition

wxPoint GetPosition(const wxString& param = wxT("pos"))

Gets the position (may be in dialog units).

wxXmlResourceHandler::GetSize

wxSize GetSize(const wxString& param = wxT("size"))

Gets the size (may be in dialog units).

wxXmlResourceHandler::GetStyle

int GetStyle(const wxString& param = wxT("style"), int defaults = 0)

Gets style flags from text in form "flag | flag2| flag3 |..." Only understands flags added with AddStyle.

wxXmlResourceHandler::GetText

wxString GetText(const wxString& param)

Gets text from param and does some conversions:

- replaces \n, \r, \t by respective characters (according to C syntax)
- replaces \$ by & and \$\$ by \$ (needed for _File to &Filetranslation because of

XML syntax)

- calls `wxGetTranslations` (unless disabled in `wxXmlResource`)

wxXmlResourceHandler::HasParam

bool HasParam(const wxString& param)

Check to see if a parameter exists.

wxXmlResourceHandler::IsOfClass

bool IsOfClass(wxXmlNode* node, const wxString& classname)

Convenience function. Returns true if the node has a property class equal to classname, e.g. `<object class="wxDialog">`.

wxXmlResourceHandler::SetParentResource

void SetParentResource(wxXmlResource* res)

Sets the parent resource.

wxXmlResourceHandler::SetupWindow

void SetupWindow(wxWindow* wnd)

Sets common window options.

wxZipInputStream

This class is input stream from ZIP archive. The archive must be local file (accessible via FILE*). It has all features including `GetSize` and seeking.

Note

If you need to enumerate files in ZIP archive, you can use *wxFileSystem* (p. 494) together with *wxZipFSHandler* (see *the overview* (p. 1608)).

Derived from

wxInputStream (p. 762)

Include files

`<wx/zipstrm.h>`

wxZipInputStream::wxZipInputStream

wxZipInputStream(const wxString& archive, const wxString& file)

Constructor.

Parameters

archive

name of ZIP file

file

name of file stored in the archive

wxZlibInputStream

This filter stream decompresses a stream that is in zlib or gzip format. Note that reading the gzip format requires zlib version 1.2.1 or greater, (the builtin version does support gzips).

The stream is not seekable, *SeekI()* (p. 764) returns *wxInvalidOffset*. Also *GetSize()* (p. 1194) is not supported, it always returns 0.

Derived from

wxFilterInputStream (p. 503)

Include files

<wx/zstream.h>

See also

wxInputStream (p. 762), *wxZlibOutputStream* (p. 1464).

wxZlibInputStream::wxZlibInputStream

wxZlibInputStream(wxInputStream& stream, int flags = wxZLIB_AUTO)

The *flags* *wxZLIB_ZLIB* and *wxZLIB_GZIP* specify whether the input data is in zlib or gzip format. If *wxZLIB_AUTO* is used, then zlib will autodetect the stream type, this is the default.

If *flags* is *wxZLIB_NO_HEADER*, then the data is assumed to be a raw deflate stream without either zlib or gzip headers. This is a lower level mode, which is not usually used directly. It can be used to read a raw deflate stream embedded in a higher level protocol.

This version is not by default compatible with the output produced by the version of

wxZlibOutputStream in wxWidgets 2.4.x. However, there is a compatibility mode, which is switched on by passing `wxZLIB_24COMPATIBLE` for flags. Note that in when operating in compatibility mode error checking is very much reduced. The following symbols can be use for the flags:

```
// Flags
enum {
    #if WXWIN_COMPATIBILITY_2_4
        wxZLIB_24COMPATIBLE = 4, // read v2.4.x data without error
    #endif
    wxZLIB_NO_HEADER = 0, // raw deflate stream, no header or checksum
    wxZLIB_ZLIB = 1, // zlib header and checksum
    wxZLIB_GZIP = 2, // gzip header and checksum, requires zlib
    1.2.1+
    wxZLIB_AUTO = 3 // autodetect header zlib or gzip
};
```

wxZlibInputStream::CanHandleGZip

static bool CanHandleGZip()

Returns true if zlib library in use can handle gzip compressed data.

wxZlibOutputStream

This stream compresses all data written to it. The compressed output can be in zlib or gzip format. Note that writing the gzip format requires zlib version 1.2.1 or greater (the builtin version does support gzips).

The stream is not seekable, *SeekO()* (p. 959) returns *wxInvalidOffset*.

Derived from

wxFilterOutputStream (p. 504)

Include files

<wx/zstream.h>

See also

wxOutputStream (p. 958), *wxZlibInputStream* (p. 1463)

wxZlibOutputStream::wxZlibOutputStream

wxZlibOutputStream(wxOutputStream& stream, int level = -1, int flags = wxZLIB_ZLIB)

Creates a new write-only compressed stream. *level* means level of compression. It is number between 0 and 9 (including these values) where 0 means no compression and 9

best but slowest compression. -1 is default value (currently equivalent to 6).

The *flags* wxZLIB_ZLIB and wxZLIB_GZIP specify whether the output data will be in zlib or gzip format. wxZLIB_ZLIB is the default.

If *flags* is wxZLIB_NO_HEADER, then a raw deflate stream is output without either zlib or gzip headers. This is a lower level mode, which is not usually used directly. It can be used to embed a raw deflate stream in a higher level protocol.

The following symbols can be use for the compression level and flags:

```
// Compression level
enum {
    wxZ_DEFAULT_COMPRESSION = -1,
    wxZ_NO_COMPRESSION = 0,
    wxZ_BEST_SPEED = 1,
    wxZ_BEST_COMPRESSION = 9
};

// Flags
enum {
    wxZLIB_NO_HEADER = 0,    // raw deflate stream, no header or checksum
    wxZLIB_ZLIB = 1,        // zlib header and checksum
    wxZLIB_GZIP = 2         // gzip header and checksum, requires zlib
1.2.1+
};
```

wxZlibOutputStream::CanHandleGZip

static bool CanHandleGZip()

Returns true if zlib library in use can handle gzip compressed data.

Chapter 8 Functions

The functions and macros defined in wxWidgets are described here: you can either look up a function using the alphabetical listing of them or find it in the corresponding topic.

Alphabetical functions and macros list

CLASSINFO (p. 1521)
copystring (p. 1490)
DECLARE_ABSTRACT_CLASS (p. 1521)
DECLARE_APP (p. 1522)
DECLARE_CLASS (p. 1522)
DECLARE_DYNAMIC_CLASS (p. 1522)
IMPLEMENT_ABSTRACT_CLASS2 (p. 1523)
IMPLEMENT_ABSTRACT_CLASS (p. 1523)
IMPLEMENT_APP (p. 1523)
IMPLEMENT_CLASS2 (p. 1524)
IMPLEMENT_CLASS (p. 1524)
IMPLEMENT_DYNAMIC_CLASS2 (p. 1524)
IMPLEMENT_DYNAMIC_CLASS (p. 1524)
ngettext (p. 1491)
wxCONCAT (p. 1511)
WXDEBUG_NEW (p. 1525)
WXTRACELEVEL (p. 1532)
WXTRACE (p. 1532)
wxASSERT_MIN_BITSIZE (p. 1536)
wxASSERT_MSG (p. 1536)
wxASSERT (p. 1536)
wxBITMAP (p. 1504)
wxBeginBusyCursor (p. 1495)
wxBell (p. 1495)
wxCHECK (p. 1538)
wxCHECK2_MSG (p. 1538)
wxCHECK2 (p. 1538)
wxCHECK_GCC_VERSION (p. 1471)
wxCHECK_MSG (p. 1538)
wxCHECK_RET (p. 1538)
wxCHECK_VERSION (p. 1471)
wxCHECK_W32API_VERSION (p. 1471)
wxClientDisplayRect (p. 1505)
wxClipboardOpen (p. 1509)
wxCloseClipboard (p. 1510)
wxColourDisplay (p. 1505)
wxCOMPILE_TIME_ASSERT (p. 1537)

`wxCOMPILE_TIME_ASSERT2` (p. 1537)
`wxConcatFiles` (p. 1484)
`wxConstCast` (p. 1525)
`wxCopyFile` (p. 1484)
`wxCreateDynamicObject` (p. 1525)
`wxCreateFileTipProvider` (p. 1495)
`wxCRT_SECT_DECLARE` (p. 1479)
`wxCRT_SECT_DECLARE_MEMBER` (p. 1479)
`wxCRT_SECT_LOCKER` (p. 1479)
`wxCRTITICAL_SECTION` (p. 1479)
`wxDDECleanUp` (p. 1513)
`wxDDEInitialize` (p. 1514)
`wxDROP_ICON` (p. 1505)
`wxDebugMsg` (p. 1527)
`wxDirExists` (p. 1481)
`wxDirSelector` (p. 1496)
`wxDisplayDepth` (p. 1505)
`wxDisplaySize` (p. 1505)
`wxDisplaySizeMM` (p. 1505)
`wxDos2UnixFilename` (p. 1481)
`wxDynamicCastThis` (p. 1526)
`wxDynamicCast` (p. 1525)
`wxDYNLIB_FUNCTION` (p. 1512)
`wxEmptyClipboard` (p. 1510)
`wxEnableTopLevelWindows` (p. 1514)
`wxEndBusyCursor` (p. 1497)
`wxENTER_CRIT_SECT` (p. 1480)
`wxEntry` (p. 1472)
`wxEnumClipboardFormats` (p. 1510)
`wxError` (p. 1528)
`wxExecute` (p. 1475)
`wxExit` (p. 1477)
`wxEXPLICIT` (p. 1512)
`wxFAIL_MSG` (p. 1537)
`wxFAIL` (p. 1537)
`wxFatalError` (p. 1528)
`wxFileExists` (p. 1482)
`wxFileModificationTime` (p. 1482)
`wxFileNameFromPath` (p. 1482)
`wxFileSelector` (p. 1496)
`wxFindFirstFile` (p. 1482)
`wxFindMenuItemId` (p. 1514)
`wxFindNextFile` (p. 1482)
`wxFindWindowAtPointer` (p. 1515)
`wxFindWindowAtPoint` (p. 1515)
`wxFindWindowByLabel` (p. 1514)
`wxFindWindowByName` (p. 1515)
`wxFinite` (p. 1504)
`wxGetActiveWindow` (p. 1515)
`wxGetApp` (p. 1472)
`wxGetClipboardData` (p. 1510)

wxGetClipboardFormatName (p. 1510)
wxGetColourFromUser (p. 1497)
wxGetCwd (p. 1484)
wxGetDiskSpace (p. 1483)
wxGetDisplayName (p. 1516)
wxGetElapsedTime (p. 1533)
wxGetEmailAddress (p. 1487)
wxGetEnv (p. 1540)
wxGetFontFromUser (p. 1498)
wxGetFreeMemory (p. 1487)
wxGetFullHostName (p. 1487)
wxGetHomeDir (p. 1487)
wxGetHostName (p. 1488)
wxGetLocalTimeMillis (p. 1534)
wxGetLocalTime (p. 1534)
wxGetMousePosition (p. 1516)
wxGetMultipleChoices (p. 1498)
wxGetMultipleChoice (p. 1500)
wxGetNumberFromUser (p. 1499)
wxGetOSDirectory (p. 1483)
wxGetOsDescription (p. 1488)
wxGetOsVersion (p. 1489)
wxGetPasswordFromUser (p. 1499)
wxGetPrinterCommand (p. 1507)
wxGetPrinterFile (p. 1507)
wxGetPrinterMode (p. 1507)
wxGetPrinterOptions (p. 1507)
wxGetPrinterOrientation (p. 1507)
wxGetPrinterPreviewCommand (p. 1508)
wxGetPrinterScaling (p. 1508)
wxGetPrinterTranslation (p. 1508)
wxGetProcessId (p. 1478)
wxGetResource (p. 1516)
wxGetSingleChoiceData (p. 1501)
wxGetSingleChoiceIndex (p. 1501)
wxGetSingleChoice (p. 1500)
wxGetTempFileName (p. 1484)
wxGetTextFromUser (p. 1499)
wxGetTopLevelParent (p. 1517)
wxGetTranslation (p. 1491)
wxGetUTCTime (p. 1534)
wxGetUserHome (p. 1490)
wxGetUserId (p. 1488)
wxGetUserName (p. 1490)
wxGetWorkingDirectory (p. 1484)
wxGetenv (p. 1539)
wxHandleFatalExceptions (p. 1473)
wxICON (p. 1506)
wxINTXX_SWAP_ALWAYS (p. 1520)
wxINTXX_SWAP_ON_BE (p. 1520)
wxINTXX_SWAP_ON_LE (p. 1520)

wxInitAllImageHandlers (p. 1473)
wxInitialize (p. 1473)
wxIsAbsolutePath (p. 1483)
wxIsBusy (p. 1502)
wxIsClipboardFormatAvailable (p. 1511)
wxIsDebuggerRunning (p. 1539)
wxIsEmpty (p. 1491)
wxIsMainThread (p. 1480)
wxIsNaN (p. 1504)
wxIsWild (p. 1484)
wxKill (p. 1477)
wxLEAVE_CRIT_SECT (p. 1480)
wxLoadUserResource (p. 1517)
wxLogDebug (p. 1530)
wxLogError (p. 1528)
wxLogFatalError (p. 1528)
wxLogMessage (p. 1529)
wxLogStatus (p. 1529)
wxLogSysError (p. 1529)
wxLogTrace (p. 1530)
wxLogVerbose (p. 1529)
wxLogWarning (p. 1528)
wxLL (p. 1512)
wxLongLongFmtSpec (p. 1513)
wxMakeMetafilePlaceable (p. 1506)
wxMatchWild (p. 1485)
wxMessageBox (p. 1502)
wxMkdir (p. 1485)
wxMutexGuiEnter (p. 1480)
wxMutexGuiLeave (p. 1481)
wxNewId (p. 1513)
wxNow (p. 1534)
wxOnAssert (p. 1536)
wxOpenClipboard (p. 1511)
wxPathOnly (p. 1483)
wxPostDelete (p. 1517)
wxPostEvent (p. 1518)
wxRegisterClipboardFormat (p. 1511)
wxRegisterId (p. 1513)
wxRemoveFile (p. 1485)
wxRenameFile (p. 1485)
wxRmdir (p. 1485)
wxSafeShowMessage (p. 1531)
wxSafeYield (p. 1473)
wxSetClipboardData (p. 1511)
wxSetCursor (p. 1507)
wxSetDisplayName (p. 1518)
wxSetEnv (p. 1540)
wxSetPrinterCommand (p. 1508)
wxSetPrinterFile (p. 1508)
wxSetPrinterMode (p. 1508)

wxSetPrinterOptions (p. 1508)
wxSetPrinterOrientation (p. 1509)
wxSetPrinterPreviewCommand (p. 1509)
wxSetPrinterScaling (p. 1509)
wxSetPrinterTranslation (p. 1509)
wxSetWorkingDirectory (p. 1485)
wxShell (p. 1478)
wxShowTip (p. 1503)
wxShutdown (p. 1478)
wxSleep (p. 1535)
wxSnprintf (p. 1493)
wxSplitPath (p. 1486)
wxStartTimer (p. 1535)
wxStaticCast (p. 1526)
wxStrcmp (p. 1492)
wxStricmp (p. 1492)
wxStringEq (p. 1492)
wxStringMatch (p. 1492)
wxStripMenuCodes (p. 1518)
wxStrlen (p. 1492)
wxSysErrorCode (p. 1531)
wxSysErrorMsg (p. 1532)
wxT (p. 1493)
wxTraceLevel (p. 1533)
wxTrace (p. 1533)
wxTransferFileToStream (p. 1486)
wxTransferStreamToFile (p. 1486)
wxTrap (p. 1539)
wxULL (p. 1519)
wxUninitialize (p. 1474)
wxUnix2DosFilename (p. 1483)
wxUnsetEnv (p. 1540)
wxUsleep (p. 1535)
wxVsnprintf (p. 1494)
wxWakeUpIdle (p. 1474)
wxWriteResource (p. 1519)
wxYield (p. 1474)
wx_const_cast (p. 1526)
wx_static_cast (p. 1527)
_ (p. 1494)
_T (p. 1494)

Version macros

The following constants are defined in `wxWidgets`:

- `wxMAJOR_VERSION` is the major version of `wxWidgets`
- `wxMINOR_VERSION` is the minor version of `wxWidgets`

- `wxRELEASE_NUMBER` is the release number

For example, the values of these constants for wxWidgets 2.1.15 are 2, 1 and 15.

Additionally, `wxVERSION_STRING` is a user-readable string containing the full wxWidgets version and `wxVERSION_NUMBER` is a combination of the three version numbers above: for 2.1.15, it is 2115 and it is 2200 for wxWidgets 2.2.

Include files

`<wx/version.h>` or `<wx/defs.h>`

wxCHECK_VERSION

bool wxCHECK_VERSION(*major, minor, release*)

This is a macro which evaluates to true if the current wxWidgets version is at least *major.minor.release*.

For example, to test if the program is compiled with wxWidgets 2.2 or higher, the following can be done:

```
wxString s;
#if wxCHECK_VERSION(2, 2, 0)
    if ( s.StartsWith("foo") )
#else // replacement code for old version
    if ( strcmp(s, "foo", 3) == 0 )
#endif
{
    ...
}
```

wxCHECK_GCC_VERSION

bool wxCHECK_GCC_VERSION(*major, minor, release*)

Returns 1 if the compiler being used to compile the code is GNU C++ compiler (g++) version *major.minor.release* or greater. Otherwise, and also if the compiler is not GNU C++ at all, returns 0.

wxCHECK_W32API_VERSION

bool wxCHECK_GCC_VERSION(*major, minor, release*)

Returns 1 if the version of w32api headers used is *major.minor.release* or greater. Otherwise, and also if we are not compiling with mingw32/cygwin under Win32 at all, returns 0.

Application initialization and termination

The functions in this section are used on application startup/shutdown and also to control the behaviour of the main event loop of the GUI programs.

::wxEntry

This initializes wxWidgets in a platform-dependent way. Use this if you are not using the default wxWidgets entry code (e.g. `main` or `WinMain`). For example, you can initialize wxWidgets from an Microsoft Foundation Classes application using this function.

void wxEntry(HANDLE hInstance, HANDLE hPrevInstance, const wxString& commandLine, int cmdShow, bool enterLoop = true)

wxWidgets initialization under Windows (non-DLL). If *enterLoop* is false, the function will return immediately after calling `wxApp::OnInit`. Otherwise, the wxWidgets message loop will be entered.

void wxEntry(HANDLE hInstance, HANDLE hPrevInstance, WORD wDataSegment, WORD wHeapSize, const wxString& commandLine)

wxWidgets initialization under Windows (for applications constructed as a DLL).

int wxEntry(int argc, const wxString& *argv)

wxWidgets initialization under Unix.

Remarks

To clean up wxWidgets, call `wxApp::OnExit` followed by the static function `wxApp::CleanUp`. For example, if exiting from an MFC application that also uses wxWidgets:

```
int CTheApp::ExitInstance()  
{  
    // OnExit isn't called by CleanUp so must be called explicitly.  
    wxTheApp->OnExit();  
    wxApp::CleanUp();  
  
    return CWinApp::ExitInstance();  
}
```

Include files

<wx/app.h>

::wxGetApp

wxAppDerivedClass& wxGetApp()

This function doesn't exist in wxWidgets but it is created by using the *IMPLEMENT_APP* (p. 1523) macro. Thus, before using it anywhere but in the same module where this macro is used, you must make it available using *DECLARE_APP* (p. 1522).

The advantage of using this function compared to directly using the global `wxTheApp`

pointer is that the latter is of type `wxApp *` and so wouldn't allow you to access the functions specific to your application class but not present in `wxApp` while `wxGetApp()` returns the object of the right type.

::wxHandleFatalExceptions

bool wxHandleFatalExceptions(bool *dolt* = true)

If *dolt* is true, the fatal exceptions (also known as general protection faults under Windows or segmentation violations in the Unix world) will be caught and passed to `wxApp::OnFatalException` (p. 36). By default, i.e. before this function is called, they will be handled in the normal way which usually just means that the application will be terminated. Calling `wxHandleFatalExceptions()` with *dolt* equal to false will restore this default behaviour.

::wxInitAllImageHandlers

void wxInitAllImageHandlers()

Initializes all available image handlers. For a list of available handlers, see `wxImage` (p. 728).

See also

`wxImage` (p. 728), `wxImageHandler` (p. 750)

Include files

<wx/image.h>

::wxInitialize

bool wxInitialize()

This function is used in `wxBase` only and only if you don't create `wxApp` (p. 31) object at all. In this case you must call it from your `main()` function before calling any other `wxWidgets` functions.

If the function returns `false` the initialization could not be performed, in this case the library cannot be used and `wxUninitialize` (p. 1474) shouldn't be called neither.

This function may be called several times but `wxUninitialize` (p. 1474) must be called for each successful call to this function.

Include files

<wx/app.h>

::wxSafeYield

bool wxSafeYield(wxWindow* win = NULL, bool onlyIfNeeded = false)

This function is similar to `wxYield`, except that it disables the user input to all program windows before calling `wxYield` and re-enables it again afterwards. If `win` is not `NULL`, this window will remain enabled, allowing the implementation of some limited user interaction.

Returns the result of the call to `::wxYield` (p. 1474).

Include files

<wx/utils.h>

::wxUninitialize

void wxUninitialize()

This function is for use in console (`wxBase`) programs only. It must be called once for each previous successful call to `wxInitialize` (p. 1473).

Include files

<wx/app.h>

::wxYield

bool wxYield()

Calls `wxApp::Yield` (p. 42).

This function is kept only for backwards compatibility. Please use the `wxApp::Yield` (p. 42) method instead in any new code.

Include files

<wx/app.h> or <wx/utils.h>

::wxWakeUpIdle

void wxWakeUpIdle()

This functions wakes up the (internal and platform dependent) idle system, i.e. it will force the system to send an idle event even if the system currently *is* idle and thus would not send any idle event until after some other event would get sent. This is also useful for sending events between two threads and is used by the corresponding functions `::wxPostEvent` (p. 1518) and `wxEvtHandler::AddPendingEvent` (p. 446).

Include files

<wx/event.h>

Process control functions

The functions in this section are used to launch or terminate the other processes.

::wxExecute

long wxExecute(const wxString& command, int sync = wxEXEC_ASYNC, wxProcess *callback = NULL)

wxPerl note: In wxPerl this function is called `Wx::ExecuteCommand`

long wxExecute(char **argv, int flags = wxEXEC_ASYNC, wxProcess *callback = NULL)

wxPerl note: In wxPerl this function is called `Wx::ExecuteArgs`

long wxExecute(const wxString& command, wxArrayString& output)

wxPerl note: In wxPerl this function is called `Wx::ExecuteStdout` and it only takes the `command` argument, and returns a 2-element list (`status`, `output`), where `output` is an array reference.

long wxExecute(const wxString& command, wxArrayString& output, wxArrayString& errors)

wxPerl note: In wxPerl this function is called `Wx::ExecuteStdoutStderr` and it only takes the `command` argument, and returns a 3-element list (`status`, `output`, `errors`), where `output` and `errors` are array references.

Executes another program in Unix or Windows.

The first form takes a command string, such as "emacs file.txt".

The second form takes an array of values: a command, any number of arguments, terminated by NULL.

The semantics of the third and fourth versions is different from the first two and is described in more details below.

If *flags* parameter contains `wxEXEC_ASYNC` flag (the default), flow of control immediately returns. If it contains `wxEXEC_SYNC`, the current application waits until the other program has terminated.

In the case of synchronous execution, the return value is the exit code of the process (which terminates by the moment the function returns) and will be -1 if the process couldn't be started and typically 0 if the process terminated successfully. Also, while waiting for the process to terminate, `wxExecute` will call `wxYield` (p. 1474). The caller should ensure that this can cause no recursion, in the simplest case by calling `wxEnableTopLevelWindows(false)` (p. 1514).

For asynchronous execution, however, the return value is the process id and zero value indicates that the command could not be executed. As an added complication, the return

value of -1 in this case indicates that we didn't launch a new process, but connected to the running one (this can only happen in case of using DDE under Windows for command execution). In particular, in this, and only this, case the calling code will not get the notification about process termination.

If callback isn't NULL and if execution is asynchronous, `wxProcess::OnTerminate` (p. 1023) will be called when the process finishes. Specifying this parameter also allows you to redirect the standard input and/or output of the process being launched by calling `Redirect` (p. 1024). If the child process IO is redirected, under Windows the process window is not shown by default (this avoids having to flush an unnecessary console for the processes which don't create any windows anyhow) but a `wxEXEC_NOHIDE` flag can be used to prevent this from happening, i.e. with this flag the child process window will be shown normally.

Under Unix the flag `wxEXEC_MAKE_GROUP_LEADER` may be used to ensure that the new process is a group leader (this will create a new session if needed). Calling `wxKill` (p. 1477) with the argument of -pid where pid is the process ID of the new process will kill this process as well as all of its children (except those which have started their own session).

Finally, you may use the third overloaded version of this function to execute a process (always synchronously) and capture its output in the array `output`. The fourth version adds the possibility to additionally capture the messages from standard error output in the `errors` array.

NB: Currently `wxExecute()` can only be used from the main thread, calling this function from another thread will result in an assert failure in debug build and won't work.

See also

`wxShell` (p. 1478), `wxProcess` (p. 1019), *Exec sample* (p. 1572).

Parameters

command

The command to execute and any parameters to pass to it as a single string.

argv

The command to execute should be the first element of this array, any additional ones are the command parameters and the array must be terminated with a NULL pointer.

flags

Combination of bit masks `wxEXEC_ASYNC`, `wxEXEC_SYNC` and `wxEXEC_NOHIDE`

callback

An optional pointer to `wxProcess` (p. 1019)

Include files

<wx/utils.h>

::wxExit

void wxExit()

Exits application after calling *wxApp::OnExit* (p. 36). Should only be used in an emergency: normally the top-level frame should be deleted (after deleting all other frames) to terminate the application. See *wxCloseEvent* (p. 139) and *wxApp* (p. 31).

Include files

<wx/app.h>

::wxKill

int wxKill(long pid, int sig = wxSIGTERM, wxKillError *rc = NULL)

Equivalent to the Unix kill function: send the given signal *sig* to the process with PID *pid*. The valid signal values are

```
enum wxSignal
{
    wxSIGNONE = 0,    // verify if the process exists under Unix
    wxSIGHUP,
    wxSIGINT,
    wxSIGQUIT,
    wxSIGILL,
    wxSIGTRAP,
    wxSIGABRT,
    wxSIGEMT,
    wxSIGFPE,
    wxSIGKILL,        // forcefully kill, dangerous!
    wxSIGBUS,
    wxSIGSEGV,
    wxSIGSYS,
    wxSIGPIPE,
    wxSIGALRM,
    wxSIGTERM         // terminate the process gently
};
```

wxSIGNONE, *wxSIGKILL* and *wxSIGTERM* have the same meaning under both Unix and Windows but all the other signals are equivalent to *wxSIGTERM* under Windows.

Returns 0 on success, -1 on failure. If *rc* parameter is not NULL, it will be filled with an element of *wxKillError* enum:

```
enum wxKillError
{
    wxKILL_OK,                // no error
    wxKILL_BAD_SIGNAL,        // no such signal
    wxKILL_ACCESS_DENIED,     // permission denied
    wxKILL_NO_PROCESS,        // no such process
    wxKILL_ERROR              // another, unspecified error
};
```

See also

wxProcess::Kill (p. 1022), *wxProcess::Exists* (p. 1022), *Exec sample* (p. 1572)

Include files

<wx/utils.h>

::wxGetProcessId

unsigned long wxGetProcessId()

Returns the number uniquely identifying the current process in the system.

If an error occurs, 0 is returned.

Include files

<wx/utils.h>

::wxShell

bool wxShell(const wxString& *command* = NULL)

Executes a command in an interactive shell window. If no command is specified, then just the shell is spawned.

See also *wxExecute* (p. 1475), *Exec sample* (p. 1572).

Include files

<wx/utils.h>

::wxShutdown

bool wxShutdown(wxShutdownFlags *flags*)

This function shuts down or reboots the computer depending on the value of the *flags*. Please notice that doing this requires the corresponding access rights (superuser under Unix, SE_SHUTDOWN privilege under Windows NT) and that this function is only implemented under Unix and Win32.

Parameters

flags

Either `wxSHUTDOWN_POWEROFF` or `wxSHUTDOWN_REBOOT`

Returns

`true` on success, `false` if an error occurred.

Include files

<wx/utils.h>

Thread functions

The functions and macros here mainly exist to make it writing the code which may be compiled in multi thread build (`wxUSE_THREADS = 1`) as well as in single thread configuration (`wxUSE_THREADS = 0`).

For example, a static variable must be protected against simultaneous access by multiple threads in the former configuration but in the latter the extra overhead of using the critical section is not needed. To solve this problem, the `wxCriticalSection` (p. 1479) macro may be used to create and use the critical section only when needed.

Include files

<wx/thread.h>

See also

wxThread (p. 1286), *wxMutex* (p. 938), *Multithreading overview* (p. 1672)

wxCriticalSectionDeclare

wxCriticalSectionDeclare(*cs*)

This macro declares a (static) critical section object named *cs* if `wxUSE_THREADS` is 1 and does nothing if it is 0.

wxCriticalSectionDeclareMember

wxCriticalSectionDeclareMember(*cs*)

This macro declares a critical section object named *cs* if `wxUSE_THREADS` is 1 and does nothing if it is 0. As it doesn't include the `static` keyword (unlike `wxCriticalSectionDeclare` (p. 1479)), it can be used to declare a class or struct member which explains its name.

wxCriticalSectionLocker

wxCriticalSectionLocker(*name*, *cs*)

This macro creates a *critical section lock* (p. 209) object named *name* and associated with the critical section *cs* if `wxUSE_THREADS` is 1 and does nothing if it is 0.

wxCriticalSection

wxCriticalSection(*name*)

This macro combines `wxCRT_SECT_DECLARE` (p. 1479) and `wxCRT_SECT_LOCKER` (p. 1479): it creates a static critical section object and also the lock object associated with it. Because of this, it can be only used inside a function, not at global scope. For example:

```
int IncCount()
{
    static int s_counter = 0;

    wxCRITICAL_SECTION(counter);

    return ++s_counter;
}
```

(note that we suppose that the function is called the first time from the main thread so that the critical section object is initialized correctly by the time other threads start calling it, if this is not the case this approach can **not** be used and the critical section must be made a global instead).

wxENTER_CRIT_SECT

wxENTER_CRIT_SECT(wxCriticalSection& cs)

This macro is equivalent to `cs.Enter()` (p. 208) if `wxUSE_THREADS` is 1 and does nothing if it is 0.

::wxIsMainThread

bool wxIsMainThread()

Returns `true` if this thread is the main one. Always returns `true` if `wxUSE_THREADS` is 0.

wxLEAVE_CRIT_SECT

wxLEAVE_CRIT_SECT(wxCriticalSection& cs)

This macro is equivalent to `cs.Leave()` (p. 208) if `wxUSE_THREADS` is 1 and does nothing if it is 0.

::wxMutexGuiEnter

void wxMutexGuiEnter()

This function must be called when any thread other than the main GUI thread wants to get access to the GUI library. This function will block the execution of the calling thread until the main thread (or any other thread holding the main GUI lock) leaves the GUI library and no other thread will enter the GUI library until the calling thread calls `::wxMutexGuiLeave()` (p. 1481).

Typically, these functions are used like this:

```
void MyThread::Foo(void)
{
    // before doing any GUI calls we must ensure that this thread is the
    // only
    // one doing it!

    wxMutexGuiEnter();

    // Call GUI here:
    my_window->DrawSomething();

    wxMutexGuiLeave();
}
```

Note that under GTK, no creation of top-level windows is allowed in any thread but the main one.

This function is only defined on platforms which support preemptive threads.

::wxMutexGuiLeave

void wxMutexGuiLeave()

See *::wxMutexGuiEnter()* (p. 1480).

This function is only defined on platforms which support preemptive threads.

File functions

Include files

<wx/utils.h>

See also

wxPathList (p. 975)

wxDir (p. 383)

wxFile (p. 461)

wxFileName (p. 478)

::wxDirExists

bool wxDirExists(const wxString& dirname)

Returns true if the directory exists.

::wxDos2UnixFilename

void wxDos2UnixFilename(wxChar *s)

Converts a DOS to a Unix filename by replacing backslashes with forward slashes.

::wxFileExists

bool wxFileExists(const wxString& filename)

Returns true if the file exists and is a plain file.

::wxFileModificationTime

time_t wxFileModificationTime(const wxString& filename)

Returns time of last modification of given file.

::wxFileNameFromPath

wxString wxFileNameFromPath(const wxString& path)

char * wxFileNameFromPath(char *path)

NB: This function is obsolete, please use `wxFileName::SplitPath` (p. 491) instead.

Returns the filename for a full path. The second form returns a pointer to temporary storage that should not be deallocated.

::wxFindFirstFile

wxString wxFindFirstFile(const char *spec, int flags = 0)

This function does directory searching; returns the first file that matches the path *spec*, or the empty string. Use `wxFindNextFile` (p. 1482) to get the next matching file. Neither will report the current directory "." or the parent directory "..".

spec may contain wildcards.

flags may be `wxDIR` for restricting the query to directories, `wxFILE` for files or zero for either.

For example:

```
wxString f = wxFindFirstFile("/home/project/*.");
while ( !f.IsEmpty() )
{
    ...
    f = wxFindNextFile();
}
```

::wxFindNextFile

wxString wxFindNextFile()

Returns the next file that matches the path passed to *wxFindFirstFile* (p. 1482).

See *wxFindFirstFile* (p. 1482) for an example.

::wxGetDiskSpace

bool wxGetDiskSpace(const wxString& path, wxLongLong *total = NULL, wxLongLong *free = NULL)

This function returns the total number of bytes and number of free bytes on the disk containing the directory *path* (it should exist). Both *total* and *free* parameters may be NULL if the corresponding information is not needed.

Returns

true on success, false if an error occurred (for example, the directory doesn't exist).

Portability

This function is implemented for Win32, Mac OS and generic Unix provided the system has `statfs()` function.

This function first appeared in wxWidgets 2.3.2.

::wxGetOSDirectory

wxString wxGetOSDirectory()

Returns the Windows directory under Windows; on other platforms returns the empty string.

::wxIsAbsolutePath

bool wxIsAbsolutePath(const wxString& filename)

Returns true if the argument is an absolute filename, i.e. with a slash or drive name at the beginning.

::wxPathOnly

wxString wxPathOnly(const wxString& path)

Returns the directory part of the filename.

::wxUnix2DosFilename

void wxUnix2DosFilename(const wxString& s)

Converts a Unix to a DOS filename by replacing forward slashes with backslashes.

::wxConcatFiles

bool wxConcatFiles(const wxString& file1, const wxString& file2, const wxString& file3)

Concatenates *file1* and *file2* to *file3*, returning true if successful.

::wxCopyFile

bool wxCopyFile(const wxString& file1, const wxString& file2, bool overwrite = true)

Copies *file1* to *file2*, returning true if successful. If *overwrite* parameter is true (default), the destination file is overwritten if it exists, but if *overwrite* is false, the function fails in this case.

::wxGetCwd

wxString wxGetCwd()

Returns a string containing the current (or working) directory.

::wxGetWorkingDirectory

wxString wxGetWorkingDirectory(char *buf=NULL, int sz=1000)

NB: This function is obsolete: use *wxGetCwd* (p. 1484) instead.

Copies the current working directory into the buffer if supplied, or copies the working directory into new storage (which you *must* delete yourself) if the buffer is NULL.

sz is the size of the buffer if supplied.

::wxGetTempFileName

char * wxGetTempFileName(const wxString& prefix, char *buf=NULL)

bool wxGetTempFileName(const wxString& prefix, wxString& buf)

NB: These functions are obsolete, please use *wxFileName::CreateTempFileName* (p. 482) instead.

::wxIsWild

bool wxIsWild(const wxString& *pattern*)

Returns true if the pattern contains wildcards. See *wxMatchWild* (p. 1485).

::wxMatchWild

bool wxMatchWild(const wxString& *pattern*, const wxString& *text*, bool *dot_special*)

Returns true if the *pattern* matches the *text*; if *dot_special* is true, filenames beginning with a dot are not matched with wildcard characters. See *wxIsWild* (p. 1484).

::wxMkdir

bool wxMkdir(const wxString& *dir*, int *perm* = 0777)

Makes the directory *dir*, returning true if successful.

perm is the access mask for the directory for the systems on which it is supported (Unix) and doesn't have effect for the other ones.

::wxRemoveFile

bool wxRemoveFile(const wxString& *file*)

Removes *file*, returning true if successful.

::wxRenameFile

bool wxRenameFile(const wxString& *file1*, const wxString& *file2*)

Renames *file1* to *file2*, returning true if successful.

::wxRmdir

bool wxRmdir(const wxString& *dir*, int *flags*=0)

Removes the directory *dir*, returning true if successful. Does not work under VMS.

The *flags* parameter is reserved for future use.

::wxSetWorkingDirectory

bool wxSetWorkingDirectory(const wxString& *dir*)

Sets the current working directory, returning true if the operation succeeded. Under MS Windows, the current drive is also changed if *dir* contains a drive specification.

::wxSplitPath

void wxSplitPath(const char * fullname, wxString * path, wxString * name, wxString * ext)

NB: This function is obsolete, please use `wxFileName::SplitPath` (p. 491) instead.

This function splits a full file name into components: the path (including possible disk/drive specification under Windows), the base name and the extension. Any of the output parameters (*path*, *name* or *ext*) may be NULL if you are not interested in the value of a particular component.

`wxSplitPath()` will correctly handle filenames with both DOS and Unix path separators under Windows, however it will not consider backslashes as path separators under Unix (where backslash is a valid character in a filename).

On entry, *fullname* should be non-NULL (it may be empty though).

On return, *path* contains the file path (without the trailing separator), *name* contains the file name and *ext* contains the file extension without leading dot. All three of them may be empty if the corresponding component is. The old contents of the strings pointed to by these parameters will be overwritten in any case (if the pointers are not NULL).

::wxTransferFileToStream

bool wxTransferFileToStream(const wxString& filename, ostream& stream)

Copies the given file to *stream*. Useful when converting an old application to use streams (within the document/view framework, for example).

Include files

<wx/docview.h>

::wxTransferStreamToFile

bool wxTransferStreamToFile(istream& stream const wxString& filename)

Copies the given stream to the file *filename*. Useful when converting an old application to use streams (within the document/view framework, for example).

Include files

<wx/docview.h>

Network, user and OS functions

The functions in this section are used to retrieve information about the current computer and/or user characteristics.

::wxGetFreeMemory

long wxGetFreeMemory()

Returns the amount of free memory in bytes under environments which support it, and -1 if not supported. Currently, it is supported only under Windows, Linux and Solaris.

Include files

<wx/utils.h>

::wxGetFullHostName

wxString wxGetFullHostName()

Returns the FQDN (fully qualified domain host name) or an empty string on error.

See also

wxGetHostName (p. 1488)

Include files

<wx/utils.h>

::wxGetEmailAddress

bool wxGetEmailAddress(const wxString& buf, int sz)

Copies the user's email address into the supplied buffer, by concatenating the values returned by *wxGetFullHostName* (p. 1487) and *wxGetUserId* (p. 1488).

Returns true if successful, false otherwise.

Include files

<wx/utils.h>

::wxGetHomeDir

wxString wxGetHomeDir()

Return the (current) user's home directory.

See also

wxGetUserHome (p. 1490)

Include files

<wx/utils.h>

::wxGetHostName

wxString wxGetHostName()**bool wxGetHostName(char * buf, int sz)**

Copies the current host machine's name into the supplied buffer. Please note that the returned name is *not* fully qualified, i.e. it does not include the domain name.

Under Windows or NT, this function first looks in the environment variable `SYSTEM_NAME`; if this is not found, the entry **HostName** in the **wxWidgets** section of the WIN.INI file is tried.

The first variant of this function returns the hostname if successful or an empty string otherwise. The second (deprecated) function returns true if successful, false otherwise.

See also

wxGetFullHostName (p. 1487)

Include files

<wx/utils.h>

::wxGetUserId

wxString wxGetUserId()**bool wxGetUserId(char * buf, int sz)**

This function returns the "user id" also known as "login name" under Unix i.e. something like "jsmith". It uniquely identifies the current user (on this system).

Under Windows or NT, this function first looks in the environment variables `USER` and `LOGNAME`; if neither of these is found, the entry **UserId** in the **wxWidgets** section of the WIN.INI file is tried.

The first variant of this function returns the login name if successful or an empty string otherwise. The second (deprecated) function returns true if successful, false otherwise.

See also

wxGetUserName (p. 1490)

Include files

<wx/utils.h>

::wxGetOsDescription

wxString wxGetOsDescription()

Returns the string containing the description of the current platform in a user-readable form. For example, this function may return strings like `Windows NT Version 4.0` or `Linux 2.2.2 i386`.

See also

`::wxGetOsVersion` (p. 1489)

Include files

`<wx/utils.h>`

`::wxGetOsVersion`

`int wxGetOsVersion(int *major = NULL, int *minor = NULL)`

Gets operating system version information.

Platform	Return types
Mac OS	Return value is <code>wxMAC</code> when compiled with CodeWarrior under Mac OS 8.x/9.x and Mac OS X, <code>wxMAC_DARWIN</code> when compiled with the Apple Developer Tools under Mac OS X. Both <i>major</i> and <i>minor</i> have to be looked at as hexadecimal numbers. So System 10.2.4 returns 0x10, resp 16 for <i>major</i> and 0x24, resp 36 for <i>minor</i> .
GTK	Return value is <code>wxGTK</code> , For GTK 1.0, <i>major</i> is 1, <i>minor</i> is 0.
Motif	Return value is <code>wxMOTIF_X</code> , <i>major</i> is X version, <i>minor</i> is X revision.
OS/2	Return value is <code>wxOS2_PM</code> .
Windows 3.1	Return value is <code>wxWINDOWS</code> , <i>major</i> is 3, <i>minor</i> is 1.
Windows NT/2000	Return value is <code>wxWINDOWS_NT</code> , version is returned in <i>major</i> and <i>minor</i>
Windows 98	Return value is <code>wxWIN95</code> , <i>major</i> is 4, <i>minor</i> is 1 or greater.
Windows 95	Return value is <code>wxWIN95</code> , <i>major</i> is 4, <i>minor</i> is 0.
Win32s (Windows 3.1)	Return value is <code>wxWIN32S</code> , <i>major</i> is 3, <i>minor</i> is 1.

Watcom C++ 386 supervisor mode (Windows 3.1) Return value is wxWIN386, *major* is 3, *minor* is 1.

See also

`::wxGetOsDescription` (p. 1488)

Include files

<wx/utils.h>

::wxGetUserHome

const wxChar * wxGetUserHome(const wxString& user = "")

Returns the home directory for the given user. If the username is empty (default value), this function behaves like `wxGetHomeDir` (p. 1487).

Include files

<wx/utils.h>

::wxGetUserName

wxString wxGetUserName()

bool wxGetUserName(char * buf, int sz)

This function returns the full user name (something like "Mr. John Smith").

Under Windows or NT, this function looks for the entry **UserName** in the **wxWidgets** section of the WIN.INI file. If PenWindows is running, the entry **Current** in the section **User** of the PENWIN.INI file is used.

The first variant of this function returns the user name if successful or an empty string otherwise. The second (deprecated) function returns `true` if successful, `false` otherwise.

See also

`wxGetUserId` (p. 1488)

Include files

<wx/utils.h>

String functions

::copystring

char * copystring(const char *s)

Makes a copy of the string *s* using the C++ new operator, so it can be deleted with the *delete* operator.

This function is deprecated, use *wxString* (p. 1201) class instead.

ngettext

const wxChar * ngettext(const char *str, const char *strPlural, size_t n)

This macro expands into a call to plural form version of *wxGetTranslation* (p. 1491) function, so it marks the message for the extraction by *xgettext* just as *wxTRANSLATE* (p. 1493) does, but also returns the translation of the string for the current locale during execution, either singular or plural form depending on the value of *n*.

See also

_ (p. 1494)

::wxGetTranslation

const char * wxGetTranslation(const char * str)

const char * wxGetTranslation(const char * str, const char * strPlural, size_t n)

This function returns the translation of string *str* in the current *locale* (p. 828). If the string is not found in any of the loaded message catalogs (see *internationalization overview* (p. 1596)), the original string is returned. In debug build, an error message is logged -- this should help to find the strings which were not yet translated. As this function is used very often, an alternative (and also common in Unix world) syntax is provided: the *_()* (p. 1494) macro is defined to do the same thing as *wxGetTranslation*.

The second form is used when retrieving translation of string that has different singular and plural form in English or different plural forms in some other language. It takes two extra arguments: *str* parameter must contain the singular form of the string to be converted. It is also used as the key for the search in the catalog. The *strPlural* parameter is the plural form (in English). The parameter *n* is used to determine the plural form. If no message catalog is found *str* is returned if '*n* == 1', otherwise *strPlural*. The *ngettext* (p. 1491) macro is defined to do the same thing. See GNU *gettext* manual (http://www.gnu.org/manual/gettext/html_chapter/gettext_10.html#SEC150) for additional information on plural forms handling.

::wxIsEmpty

bool wxIsEmpty(const char * p)

Returns *true* if the pointer is either *NULL* or points to an empty string, *false* otherwise.

::wxStrcmp

int wxStrcmp(const char *p1, const char *p2)

Returns a negative value, 0, or positive value if *p1* is less than, equal to or greater than *p2*. The comparison is case-sensitive.

This function complements the standard C function *strcmp()* which performs case-insensitive comparison.

::wxStricmp

int wxStricmp(const char *p1, const char *p2)

Returns a negative value, 0, or positive value if *p1* is less than, equal to or greater than *p2*. The comparison is case-insensitive.

This function complements the standard C function *stricmp()* which performs case-sensitive comparison.

::wxStringMatch

**bool wxStringMatch(const wxString& s1, const wxString& s2,
bool subString = true, bool exact = false)**

NB: This function is obsolete, use *wxString::Find* (p. 1211) instead.

Returns `true` if the substring *s1* is found within *s2*, ignoring case if *exact* is false. If *subString* is false, no substring matching is done.

::wxStringEq

bool wxStringEq(const wxString& s1, const wxString& s2)

NB: This function is obsolete, use *wxString* (p. 1201) instead.

A macro defined as:

```
#define wxStringEq(s1, s2) (s1 && s2 && (strcmp(s1, s2) == 0))
```

::wxStrlen

size_t wxStrlen(const char *p)

This is a safe version of standard function *strlen()*: it does exactly the same thing (i.e. returns the length of the string) except that it returns 0 if *p* is the `NULL` pointer.

::wxSnprintf

int wxSnprintf(wxChar *buf, size_t len, const wxChar *format, ...)

This function replaces the dangerous standard function `sprintf()` and is like `snprintf()` available on some platforms. The only difference with `sprintf()` is that an additional argument - buffer size - is taken and the buffer is never overflowed.

Returns the number of characters copied to the buffer or -1 if there is not enough space.

[See also](#)

wxVsnprintf (p. 1494), *wxString::Printf* (p. 1216)

wxT

wxChar wxT(char ch)

const wxChar * wxT(const char *s)

`wxT()` is a macro which can be used with character and string literals (in other words, `'x'` or `"foo"`) to automatically convert them to Unicode in Unicode build configuration. Please see the *Unicode overview* (p. 1590) for more information.

```
This macro is simply returns the value passed to it without changes in
ASCII build. In fact, its definition is:#ifndef UNICODE
#define wxT(x) L ## x
#else // !Unicode
#define wxT(x) x
#endif
```

wxTRANSLATE

const wxChar * wxTRANSLATE(const char *s)

This macro doesn't do anything in the program code -- it simply expands to the value of its argument (expand in Unicode build where it is equivalent to `wxT` (p. 1493) which makes it unnecessary to use both `wxTRANSLATE` and `wxT` with the same string which would be really unreadable).

However it does have a purpose and it is to mark the literal strings for the extraction into the message catalog created by `xgettext` program. Usually this is achieved using `__()` (p. 1494) but that macro not only marks the string for extraction but also expands into *wxGetTranslation* (p. 1491) function call which means that it cannot be used in some situations, notably for the static arrays initialization.

Here is an example which should make it more clear: suppose that you have a static array of strings containing the weekday names and which have to be translated (note that it is a bad example, really, *aswxDateTime* (p. 237) already can be used to get the localized week day names already). If you write

```
static const wxChar * const weekdays[] = { __("Mon"), ..., __("Sun") };
...
```

```
// use weekdays[n] as usual
```

the code wouldn't compile because the function calls are forbidden in the array initializer. So instead you should do

```
static const wxChar * const weekdays[] = { wxTRANSLATE("Mon"), ...,
wxTRANSLATE("Sun") };
...
// use wxGetTranslation(weekdays[n])
```

here.

Note that although the code **would** compile if you simply omit `wxTRANSLATE()` in the above, it wouldn't work as expected because there would be no translations for the weekday names in the program message catalog and `wxGetTranslation` wouldn't find them.

::wxVsnprintf

int wxVsnprintf(wxChar *buf, size_t len, const wxChar *format, va_list argPtr)

The same as *wxSnprintf* (p. 1493) but takes a `va_list` argument instead of arbitrary number of parameters.

See also

wxSnprintf (p. 1493), *wxString::PrintfV* (p. 1216)

const wxChar * _(const char *s)

This macro expands into a call to *wxGetTranslation* (p. 1491) function, so it marks the message for the extraction by `xgettext` just as *wxTRANSLATE* (p. 1493) does, but also returns the translation of the string for the current locale during execution.

Don't confuse this macro with `_T()` (p. 1494)!

See also

ngettext (p. 1491)

_T

wxChar _T(char ch)

const wxChar * _T(const wxChar ch)

This macro is exactly the same as *wxT* (p. 1493) and is defined in *wxWidgets* simply because it may be more intuitive for Windows programmers as the standard Win32 headers also define it (as well as yet another name for the same macro which is

`_TEXT()`).

Don't confuse this macro with `_()` (p. 1494)!

Dialog functions

Below are a number of convenience functions for getting input from the user or displaying messages. Note that in these functions the last three parameters are optional. However, it is recommended to pass a parent frame parameter, or (in MS Windows or Motif) the wrong window frame may be brought to the front when the dialog box is popped up.

::wxBeginBusyCursor

void wxBeginBusyCursor(wxCursor *cursor = wxHOURLASS_CURSOR)

Changes the cursor to the given cursor for all windows in the application. Use *wxEndBusyCursor* (p. 1497) to revert the cursor back to its previous state. These two calls can be nested, and a counter ensures that only the outer calls take effect.

See also *wxIsBusy* (p. 1502), *wxBusyCursor* (p. 102).

Include files

<wx/utils.h>

::wxBell

void wxBell()

Ring the system bell.

Include files

<wx/utils.h>

::wxCreateFileTipProvider

wxTipProvider * wxCreateFileTipProvider(const wxString& filename, size_t currentTip)

This function creates a *wxTipProvider* (p. 1306) which may be used with *wxShowTip* (p. 1503).

filename

The name of the file containing the tips, one per line

currentTip

The index of the first tip to show - normally this index is remembered between the 2 program runs.

See also

Tips overview (p. 1670)

Include files

<wx/tipdlg.h>

::wxDirSelector

```
wxString wxDirSelector(const wxString& message = wxDirSelectorPromptStr,  
    const wxString& default_path = "",  
    long style = 0, const wxPoint& pos = wxDefaultPosition,  
    wxWindow *parent = NULL)
```

Pops up a directory selector dialog. The arguments have the same meaning as those of `wxDirDialog::wxDirDialog()`. The message is displayed at the top, and the `default_path`, if specified, is set as the initial selection.

The application must check for an empty return value (if the user pressed Cancel). For example:

```
const wxString& dir = wxDirSelector("Choose a folder");  
if ( !dir.empty() )  
{  
    ...  
}
```

Include files

<wx/dirdlg.h>

::wxFileSelector

```
wxString wxFileSelector(const wxString& message, const wxString& default_path =  
    "",  
    const wxString& default_filename = "", const wxString& default_extension = "",  
    const wxString& wildcard = "*.***", int flags = 0, wxWindow *parent = "",  
    int x = -1, int y = -1)
```

Pops up a file selector box. In Windows, this is the common file selector dialog. In X, this is a file selector box with the same functionality. The path and filename are distinct elements of a full file pathname. If path is empty, the current directory will be used. If filename is empty, no default filename will be supplied. The wildcard determines what files are displayed in the file selector, and file extension supplies a type extension for the required filename. Flags may be a combination of `wxOPEN`, `wxSAVE`, `wxOVERWRITE_PROMPT`, `wxHIDE_READONLY`, `wxFILE_MUST_EXIST`, `wxMULTIPLE` or 0.

Both the Unix and Windows versions implement a wildcard filter. Typing a filename containing wildcards (*, ?) in the filename text item, and clicking on Ok, will result in only those files matching the pattern being displayed.

The wildcard may be a specification for multiple types of file with a description for each, such as:

```
"BMP files (*.bmp)|*.bmp|GIF files (*.gif)|*.gif"
```

The application must check for an empty return value (the user pressed Cancel). For example:

```
wxString filename = wxFileSelector("Choose a file to open");
if ( !filename.empty() )
{
    // work with the file
    ...
}
//else: cancelled by user
```

Include files

<wx/filedlg.h>

::wxEndBusyCursor

void wxEndBusyCursor()

Changes the cursor back to the original cursor, for all windows in the application. Use with *wxBeginBusyCursor* (p. 1495).

See also *wxIsBusy* (p. 1502), *wxBusyCursor* (p. 102).

Include files

<wx/utils.h>

::wxGetColourFromUser

wxColour wxGetColourFromUser(wxWindow *parent, const wxColour& collnit)

Shows the colour selection dialog and returns the colour selected by user or invalid colour (use *wxColour::Ok* (p. 153) to test whether a colour is valid) if the dialog was cancelled.

Parameters

parent

The parent window for the colour selection dialog

collnit

If given, this will be the colour initially selected in the dialog.

Include files

<wx/colordlg.h>

::wxGetFontFromUser

wxFont wxGetFontFromUser(wxWindow *parent, const wxFont& fontInit)

Shows the font selection dialog and returns the font selected by user or invalid font (use *wxFont::Ok* (p. 518) to test whether a font is valid) if the dialog was cancelled.

Parameters

parent

The parent window for the font selection dialog

fontInit

If given, this will be the font initially selected in the dialog.

Include files

<wx/fontdlg.h>

::wxGetMultipleChoices

**size_t wxGetMultipleChoices(
wxArrayInt& selections,
const wxString& message,
const wxString& caption,
const wxString& aChoices,
wxWindow *parent = NULL,
int x = -1, int y = -1,
bool centre = true,
int width=150, int height=200)**

**size_t wxGetMultipleChoices(
wxArrayInt& selections,
const wxString& message,
const wxString& caption,
int n, const wxString& choices[],
wxWindow *parent = NULL,
int x = -1, int y = -1,
bool centre = true,
int width=150, int height=200)**

Pops up a dialog box containing a message, OK/Cancel buttons and a multiple-selection listbox. The user may choose an arbitrary (including 0) number of items in the listbox whose indices will be returned in *selection* array. The initial contents of this array will be used to select the items when the dialog is shown.

You may pass the list of strings to choose from either using *choices* which is an array of *n* strings for the listbox or by using a single *aChoices* parameter of type *wxArrayString* (p. 54).

If *centre* is true, the message text (which may include new line characters) is centred; if false, the message is left-justified.

Include files

<wx/choicdlg.h>

wxPerl note: In wxPerl there is just an array reference in place of *n* and *choices*, and no *selections* parameter; the function returns an array containing the user selections.

::wxGetNumberFromUser

long wxGetNumberFromUser(const wxString& message, const wxString& prompt, const wxString& caption, long value, long min = 0, long max = 100, wxWindow *parent = NULL, const wxPoint& pos = wxDefaultPosition)

Shows a dialog asking the user for numeric input. The dialog's title is set to *caption*, it contains a (possibly) multiline *message* above the single line *prompt* and the zone for entering the number.

The number entered must be in the range *min..max* (both of which should be positive) and *value* is the initial value of it. If the user enters an invalid value or cancels the dialog, the function will return -1.

Dialog is centered on its *parent* unless an explicit position is given in *pos*.

Include files

<wx/numdlg.h>

::wxGetPasswordFromUser

wxString wxGetTextFromUser(const wxString& message, const wxString& caption = "Input text", const wxString& default_value = "", wxWindow *parent = NULL)

Similar to *wxGetTextFromUser* (p. 1499) but the text entered in the dialog is not shown on screen but replaced with stars. This is intended to be used for entering passwords as the function name implies.

Include files

<wx/textdlg.h>

::wxGetTextFromUser

```
wxString wxGetTextFromUser(const wxString& message, const wxString& caption
= "Input text",
const wxString& default_value = "", wxWindow *parent = NULL,
int x = -1, int y = -1, bool centre = true)
```

Pop up a dialog box with title set to *caption*, *message*, and a *default_value*. The user may type in text and press OK to return this text, or press Cancel to return the empty string.

If *centre* is true, the message text (which may include new line characters) is centred; if false, the message is left-justified.

Include files

<wx/textdlg.h>

::wxGetMultipleChoice

```
int wxGetMultipleChoice(const wxString& message, const wxString& caption, int n,
const wxString& choices[],
int nSel, int *selection, wxWindow *parent = NULL, int x = -1, int y = -1,
bool centre = true, int width=150, int height=200)
```

Pops up a dialog box containing a message, OK/Cancel buttons and a multiple-selection listbox. The user may choose one or more item(s) and press OK or Cancel.

The number of initially selected choices, and array of the selected indices, are passed in; this array will contain the user selections on exit, with the function returning the number of selections. *selection* must be as big as the number of choices, in case all are selected.

If Cancel is pressed, -1 is returned.

choices is an array of *n* strings for the listbox.

If *centre* is true, the message text (which may include new line characters) is centred; if false, the message is left-justified.

Include files

<wx/choicdlg.h>

::wxGetSingleChoice

```
wxString wxGetSingleChoice(const wxString& message,
const wxString& caption,
const wxArrayString& aChoices,
wxWindow *parent = NULL,
int x = -1, int y = -1,
bool centre = true,
int width=150, int height=200)
```

```
wxString wxGetSingleChoice(const wxString& message,  
    const wxString& caption,  
    int n, const wxString& choices[],  
    wxWindow *parent = NULL,  
    int x = -1, int y = -1,  
    bool centre = true,  
    int width=150, int height=200)
```

Pops up a dialog box containing a message, OK/Cancel buttons and a single-selection listbox. The user may choose an item and press OK to return a string or Cancel to return the empty string. Use `wxGetSingleChoiceIndex` (p. 1501) if empty string is a valid choice and if you want to be able to detect pressing Cancel reliably.

You may pass the list of strings to choose from either using *choices* which is an array of *n* strings for the listbox or by using a single *aChoices* parameter of type *wxArrayString* (p. 54).

If *centre* is true, the message text (which may include new line characters) is centred; if false, the message is left-justified.

Include files

<wx/choicdlg.h>

wxPerl note: In wxPerl there is just an array reference in place of `n` and *choices*.

::wxGetSingleChoiceIndex

```
int wxGetSingleChoiceIndex(const wxString& message,  
    const wxString& caption,  
    const wxArrayString& aChoices,  
    wxWindow *parent = NULL, int x = -1, int y = -1,  
    bool centre = true, int width=150, int height=200)
```

```
int wxGetSingleChoiceIndex(const wxString& message,  
    const wxString& caption,  
    int n, const wxString& choices[],  
    wxWindow *parent = NULL, int x = -1, int y = -1,  
    bool centre = true, int width=150, int height=200)
```

As `wxGetSingleChoice` but returns the index representing the selected string. If the user pressed cancel, -1 is returned.

Include files

<wx/choicdlg.h>

wxPerl note: In wxPerl there is just an array reference in place of `n` and *choices*.

::wxGetSingleChoiceData

```
wxString wxGetSingleChoiceData(const wxString& message,  
    const wxString& caption,  
    const wxArrayString& aChoices,  
    const wxString& client_data[],  
    wxWindow *parent = NULL,  
    int x = -1, int y = -1,  
    bool centre = true, int width=150, int height=200)
```

```
wxString wxGetSingleChoiceData(const wxString& message,  
    const wxString& caption,  
    int n, const wxString& choices[],  
    const wxString& client_data[],  
    wxWindow *parent = NULL,  
    int x = -1, int y = -1,  
    bool centre = true, int width=150, int height=200)
```

As **wxGetSingleChoice** but takes an array of client data pointers corresponding to the strings, and returns one of these pointers or *NULL* if Cancel was pressed. The *client_data* array must have the same number of elements as *choices* or *aChoices*!

Include files

<wx/choicdlg.h>

wxPerl note: In wxPerl there is just an array reference in place of *n* and *choices*, and the client data array must have the same length as the choices array.

::wxIsBusy

```
bool wxIsBusy()
```

Returns true if between two *wxBeginBusyCursor* (p. 1495) and *wxEndBusyCursor* (p. 1497) calls.

See also *wxBusyCursor* (p. 102).

Include files

<wx/utils.h>

::wxMessageBox

```
int wxMessageBox(const wxString& message, const wxString& caption =  
    "Message", int style = wxOK,  
    wxWindow *parent = NULL, int x = -1, int y = -1)
```

General purpose message dialog. *style* may be a bit list of the following identifiers:

wxYES_NO	Puts Yes and No buttons on the message box. May be combined with wxCANCEL .
-----------------	---

<code>wxCANCEL</code>	Puts a Cancel button on the message box. May be combined with <code>wxYES_NO</code> or <code>wxOK</code> .
<code>wxOK</code>	Puts an Ok button on the message box. May be combined with <code>wxCANCEL</code> .
<code>wxICON_EXCLAMATION</code>	Displays an exclamation mark symbol.
<code>wxICON_HAND</code>	Displays an error symbol.
<code>wxICON_ERROR</code>	Displays an error symbol - the same as <code>wxICON_HAND</code> .
<code>wxICON_QUESTION</code>	Displays a question mark symbol.
<code>wxICON_INFORMATION</code>	Displays an information symbol.

The return value is one of: `wxYES`, `wxNO`, `wxCANCEL`, `wxOK`.

For example:

```
...
int answer = wxMessageBox("Quit program?", "Confirm",
                          wxYES_NO | wxCANCEL, main_frame);
if (answer == wxYES)
    main_frame->Close();
...
```

message may contain newline characters, in which case the message will be split into separate lines, to cater for large messages.

Include files

<wx/msgdlg.h>

::wxShowTip

bool wxShowTip(wxWindow *parent, wxTipProvider *tipProvider, bool showAtStartup = true)

This function shows a "startup tip" to the user. The return value is the state of the "Show tips at startup" checkbox.

parent

The parent window for the modal dialog

tipProvider

An object which is used to get the text of the tips. It may be created with the *wxCreateFileTipProvider* (p. 1495) function.

showAtStartup

Should be true if startup tips are shown, false otherwise. This is used as the initial

value for "Show tips at startup" checkbox which is shown in the tips dialog.

See also

Tips overview (p. 1670)

Include files

<wx/tipdlg.h>

Math functions

Include files

<wx/math.h>

wxFinite

int wxFinite(double x)

Returns a non-zero value if x is neither infinite or NaN (not a number), returns 0 otherwise.

wxIsNaN

bool wxIsNaN(double x)

Returns a non-zero value if x is NaN (not a number), returns 0 otherwise.

GDI functions

The following are relevant to the GDI (Graphics Device Interface).

Include files

<wx/gdicmn.h>

wxBITMAP

wxBITMAP(bitmapName)

This macro loads a bitmap from either application resources (on the platforms for which they exist, i.e. Windows and OS2) or from an XPM file. It allows to avoid using `#ifdefs` when creating bitmaps.

See also

Bitmaps and icons overview (p. 1645), *wx/ICON* (p. 1506)

Include files

<wx/gdicmn.h>

::wxClientDisplayRect

void wxClientDisplayRect(int *x, int *y, int *width, int *height)

wxRect wxGetClientDisplayRect()

Returns the dimensions of the work area on the display. On Windows this means the area not covered by the taskbar, etc. Other platforms are currently defaulting to the whole display until a way is found to provide this info for all window managers, etc.

::wxColourDisplay

bool wxColourDisplay()

Returns true if the display is colour, false otherwise.

::wxDisplayDepth

int wxDisplayDepth()

Returns the depth of the display (a value of 1 denotes a monochrome display).

::wxDisplaySize

void wxDisplaySize(int *width, int *height)

wxSize wxGetDisplaySize()

Returns the display size in pixels.

::wxDisplaySizeMM

void wxDisplaySizeMM(int *width, int *height)

wxSize wxGetDisplaySizeMM()

Returns the display size in millimeters.

::wxDROP_ICON

wxIconOrCursor wxDROP_ICON(const char *name)

This macro creates either a cursor (MSW) or an icon (elsewhere) with the given name. Under MSW, the cursor is loaded from the resource file and the icon is loaded from XPM file under other platforms.

This macro should be used with *wxDropSource constructor* (p. 430).

Include files

<wx/dnd.h>

wxICON**wxICON(iconName)**

This macro loads an icon from either application resources (on the platforms for which they exist, i.e. Windows and OS2) or from an XPM file. It allows to avoid using `#ifdefs` when creating icons.

See also

Bitmaps and icons overview (p. 1645), *wxBITMAP* (p. 1504)

Include files

<wx/gdicmn.h>

::wxMakeMetafilePlaceable**bool wxMakeMetafilePlaceable(const wxString& filename, int minX, int minY, int maxX, int maxY, float scale=1.0)**

Given a filename for an existing, valid metafile (as constructed using *wxMetafileDC* (p. 917)) makes it into a placeable metafile by prepending a header containing the given bounding box. The bounding box may be obtained from a device context after drawing into it, using the functions `wxDC::MinX`, `wxDC::MinY`, `wxDC::MaxX` and `wxDC::MaxY`.

In addition to adding the placeable metafile header, this function adds the equivalent of the following code to the start of the metafile data:

```
SetMapMode(dc, MM_ANISOTROPIC);
SetWindowOrg(dc, minX, minY);
SetWindowExt(dc, maxX - minX, maxY - minY);
```

This simulates the `wxMM_TEXT` mapping mode, which `wxWidgets` assumes.

Placeable metafiles may be imported by many Windows applications, and can be used in RTF (Rich Text Format) files.

scale allows the specification of scale for the metafile.

This function is only available under Windows.

::wxSetCursor

void wxSetCursor(wxCursor *cursor)

Globally sets the cursor; only has an effect in Windows and GTK. See also *wxCursor* (p. 211), *wxWindow::SetCursor* (p. 1425).

Printer settings

NB: These routines are obsolete and should no longer be used!

The following functions are used to control PostScript printing. Under Windows, PostScript output can only be sent to a file.

Include files

<wx/dcps.h>

::wxGetPrinterCommand

wxString wxGetPrinterCommand()

Gets the printer command used to print a file. The default is `lpr`.

::wxGetPrinterFile

wxString wxGetPrinterFile()

Gets the PostScript output filename.

::wxGetPrinterMode

int wxGetPrinterMode()

Gets the printing mode controlling where output is sent (`PS_PREVIEW`, `PS_FILE` or `PS_PRINTER`). The default is `PS_PREVIEW`.

::wxGetPrinterOptions

wxString wxGetPrinterOptions()

Gets the additional options for the print command (e.g. specific printer). The default is nothing.

::wxGetPrinterOrientation

int wxGetPrinterOrientation()

Gets the orientation (PS_PORTRAIT or PS_LANDSCAPE). The default is PS_PORTRAIT.

::wxGetPrinterPreviewCommand

wxString wxGetPrinterPreviewCommand()

Gets the command used to view a PostScript file. The default depends on the platform.

::wxGetPrinterScaling

void wxGetPrinterScaling(float *x, float *y)

Gets the scaling factor for PostScript output. The default is 1.0, 1.0.

::wxGetPrinterTranslation

void wxGetPrinterTranslation(float *x, float *y)

Gets the translation (from the top left corner) for PostScript output. The default is 0.0, 0.0.

::wxSetPrinterCommand

void wxSetPrinterCommand(const wxString& *command*)

Sets the printer command used to print a file. The default is `lpr`.

::wxSetPrinterFile

void wxSetPrinterFile(const wxString& *filename*)

Sets the PostScript output filename.

::wxSetPrinterMode

void wxSetPrinterMode(int *mode*)

Sets the printing mode controlling where output is sent (PS_PREVIEW, PS_FILE or PS_PRINTER). The default is PS_PREVIEW.

::wxSetPrinterOptions

void wxSetPrinterOptions(const wxString& options)

Sets the additional options for the print command (e.g. specific printer). The default is nothing.

::wxSetPrinterOrientation

void wxSetPrinterOrientation(int orientation)

Sets the orientation (PS_PORTRAIT or PS_LANDSCAPE). The default is PS_PORTRAIT.

::wxSetPrinterPreviewCommand

void wxSetPrinterPreviewCommand(const wxString& command)

Sets the command used to view a PostScript file. The default depends on the platform.

::wxSetPrinterScaling

void wxSetPrinterScaling(float x, float y)

Sets the scaling factor for PostScript output. The default is 1.0, 1.0.

::wxSetPrinterTranslation

void wxSetPrinterTranslation(float x, float y)

Sets the translation (from the top left corner) for PostScript output. The default is 0.0, 0.0.

Clipboard functions

These clipboard functions are implemented for Windows only. The use of these functions is deprecated and the code is no longer maintained. Use the *wxClipboard* (p. 136) class instead.

Include files

<wx/clipbrd.h>

::wxClipboardOpen

bool wxClipboardOpen()

Returns true if this application has already opened the clipboard.

::wxCloseClipboard

bool wxCloseClipboard()

Closes the clipboard to allow other applications to use it.

::wxEmptyClipboard

bool wxEmptyClipboard()

Empties the clipboard.

::wxEnumClipboardFormats

int wxEnumClipboardFormats(int *dataFormat*)

Enumerates the formats found in a list of available formats that belong to the clipboard. Each call to this function specifies a known available format; the function returns the format that appears next in the list.

dataFormat specifies a known format. If this parameter is zero, the function returns the first format in the list.

The return value specifies the next known clipboard data format if the function is successful. It is zero if the *dataFormat* parameter specifies the last format in the list of available formats, or if the clipboard is not open.

Before it enumerates the formats function, an application must open the clipboard by using the `wxOpenClipboard` function.

::wxGetClipboardData

wxObject * wxGetClipboardData(int *dataFormat*)

Gets data from the clipboard.

dataFormat may be one of:

- `wxCF_TEXT` or `wxCF_OEMTEXT`: returns a pointer to new memory containing a null-terminated text string.
- `wxCF_BITMAP`: returns a new `wxBitmap`.

The clipboard must have previously been opened for this call to succeed.

::wxGetClipboardFormatName

bool wxGetClipboardFormatName(int *dataFormat*, const wxString& *formatName*, int *maxCount*)

Gets the name of a registered clipboard format, and puts it into the buffer *formatName* which is of maximum length *maxCount*. *dataFormat* must not specify a predefined clipboard format.

::wxIsClipboardFormatAvailable

bool wxIsClipboardFormatAvailable(int dataFormat)

Returns true if the given data format is available on the clipboard.

::wxOpenClipboard

bool wxOpenClipboard()

Opens the clipboard for passing data to it or getting data from it.

::wxRegisterClipboardFormat

int wxRegisterClipboardFormat(const wxString& formatName)

Registers the clipboard data format name and returns an identifier.

::wxSetClipboardData

bool wxSetClipboardData(int dataFormat, wxObject *data, int width, int height)

Passes data to the clipboard.

dataFormat may be one of:

- `wxCF_TEXT` or `wxCF_OEMTEXT`: *data* is a null-terminated text string.
- `wxCF_BITMAP`: *data* is a `wxBitmap`.
- `wxCF_DIB`: *data* is a `wxBitmap`. The bitmap is converted to a DIB (device independent bitmap).
- `wxCF_METAFILE`: *data* is a `wxMetafile`. *width* and *height* are used to give recommended dimensions.

The clipboard must have previously been opened for this call to succeed.

Miscellaneous functions

wxCONCAT

wxCONCAT(x, y)

This macro returns the concatenation of two tokens *x* and *y*.

wxDYNLIB_FUNCTION

wxDYNLIB_FUNCTION(*type*, *name*, *dynlib*)

When loading a function from a DLL you always have to cast the returned `void *` pointer to the correct type and, even more annoyingly, you have to repeat this type twice if you want to declare and define a function pointer all in one line

This macro makes this slightly less painful by allowing you to specify the type only once, as the first parameter, and creating a variable of this type named after the function but with `pfn` prefix and initialized with the function *name* from the *wxDynamicLibrary* (p. 435) *dynlib*.

Parameters

type

the type of the function

name

the name of the function to load, not a string (without quotes, it is quoted automatically by the macro)

dynlib

the library to load the function from

wxEXPLICIT

`wxEXPLICIT` is a macro which expands to the C++ `explicit` keyword if the compiler supports it or nothing otherwise. Thus, it can be used even in the code which might have to be compiled with an old compiler without support for this language feature but still take advantage of it when it is available.

wxLL

wxLongLong_t wxLL(*number*)

This macro is defined for the platforms with a native 64 bit integer type and allows to define 64 bit compile time constants:

```
#ifdef wxLongLong_t
    wxLongLong_t ll = wxLL(0x1234567890abcdef);
#endif
```

Include files

<wx/longlong.h>

See also

wxULL (p. 1519), *wxLongLong* (p. 857)

wxLongLongFmtSpec

This macro is defined to contain the `printf()` format specifier using which 64 bit integer numbers (i.e. those of type `wxLongLong_t`) can be printed. Example of using it:

```
#ifdef wxLongLong_t
    wxLongLong_t ll = wxLL(0x1234567890abcdef);
    printf("Long long = %" wxLongLongFmtSpec "x\n", ll);
#endif
```

See also

wxLL (p. 1512)

Include files

<wx/longlong.h>

::wxNewId

long wxNewId()

Generates an integer identifier unique to this run of the program.

Include files

<wx/utils.h>

::wxRegisterId

void wxRegisterId(long id)

Ensures that ids subsequently generated by **NewId** do not clash with the given **id**.

Include files

<wx/utils.h>

::wxDDECleanUp

void wxDDECleanUp()

Called when `wxWidgets` exits, to clean up the DDE system. This no longer needs to be called by the application.

See also *wxDDEInitialize* (p. 1514).

Include files

<wx/dde.h>

::wxDDEInitialize

void wxDDEInitialize()

Initializes the DDE system. May be called multiple times without harm.

This no longer needs to be called by the application: it will be called by wxWidgets if necessary.

See also *wxDDEServer* (p. 1101), *wxDDEClient* (p. 132), *wxDDEConnection* (p. 192), *wxDDECleanUp* (p. 1513).

Include files

<wx/dde.h>

::wxEnableTopLevelWindows

void wxEnableTopLevelWindow(bool enable = true)

This function enables or disables all top level windows. It is used by *::wxSafeYield* (p. 1473).

Include files

<wx/utils.h>

::wxFindMenuItemId

int wxFindMenuItemId(wxFrame *frame, const wxString& menuString, const wxString& itemString)

Find a menu item identifier associated with the given frame's menu bar.

Include files

<wx/utils.h>

::wxFindWindowByLabel

wxWindow * wxFindWindowByLabel(const wxString& label, wxWindow *parent=NULL)

NB: This function is obsolete, please use `wxWindow::FindWindowByLabel` (p. 1400) instead.

Find a window by its label. Depending on the type of window, the label may be a window title or panel item label. If *parent* is NULL, the search will start from all top-level frames and dialog boxes; if non-NULL, the search will be limited to the given window hierarchy. The search is recursive in both cases.

Include files

<wx/utils.h>

::wxFindWindowByName

wxWindow * wxFindWindowByName(const wxString& name, wxWindow *parent=NULL)

NB: This function is obsolete, please use `wxWindow::FindWindowByName` (p. 1400) instead.

Find a window by its name (as given in a window constructor or **Create** function call). If *parent* is NULL, the search will start from all top-level frames and dialog boxes; if non-NULL, the search will be limited to the given window hierarchy. The search is recursive in both cases.

If no such named window is found, **wxFindWindowByLabel** is called.

Include files

<wx/utils.h>

::wxFindWindowAtPoint

wxWindow * wxFindWindowAtPoint(const wxPoint& pt)

Find the deepest window at the given mouse position in screen coordinates, returning the window if found, or NULL if not.

::wxFindWindowAtPointer

wxWindow * wxFindWindowAtPointer(wxPoint& pt)

Find the deepest window at the mouse pointer position, returning the window and current pointer position in screen coordinates.

::wxGetActiveWindow

wxWindow * wxGetActiveWindow()

Gets the currently active window (Windows only).

Include files

<wx/windows.h>

::wxGetDisplayName

wxString wxGetDisplayName()

Under X only, returns the current display name. See also *wxSetDisplayName* (p. 1518).

Include files

<wx/utils.h>

::wxGetMousePosition

wxPoint wxGetMousePosition()

Returns the mouse position in screen coordinates.

Include files

<wx/utils.h>

::wxGetResource

bool wxGetResource(const wxString& section, const wxString& entry, const wxString& *value, const wxString& file = NULL)

bool wxGetResource(const wxString& section, const wxString& entry, float *value, const wxString& file = NULL)

bool wxGetResource(const wxString& section, const wxString& entry, long *value, const wxString& file = NULL)

bool wxGetResource(const wxString& section, const wxString& entry, int *value, const wxString& file = NULL)

Gets a resource value from the resource database (for example, WIN.INI, or .Xdefaults). If *file* is NULL, WIN.INI or .Xdefaults is used, otherwise the specified file is used.

Under X, if an application class (*wxApp::GetClassName*) has been defined, it is appended to the string `/usr/lib/X11/app-defaults/` to try to find an applications default file when merging all resource databases.

The reason for passing the result in an argument is that it can be convenient to define a default value, which gets overridden if the value exists in the resource file. It saves a separate test for that resource's existence, and it also allows the overloading of the

function for different types.

See also *wxWriteResource* (p. 1519), *wxConfigBase* (p. 178).

Include files

<wx/utils.h>

::wxGetTopLevelParent

wxWindow * wxGetTopLevelParent(wxWindow *win)

Returns the first top level parent of the given window, or in other words, the frame or dialog containing it, or `NULL`.

Include files

<wx/window.h>

::wxLoadUserResource

wxString wxLoadUserResource(const wxString& resourceName, const wxString& resourceType="TEXT")

Loads a user-defined Windows resource as a string. If the resource is found, the function creates a new character array and copies the data into it. A pointer to this data is returned. If unsuccessful, `NULL` is returned.

The resource must be defined in the `.rc` file using the following syntax:

```
myResource TEXT file.ext
```

where `file.ext` is a file that the resource compiler can find.

This function is available under Windows only.

Include files

<wx/utils.h>

::wxPostDelete

void wxPostDelete(wxObject *object)

Tells the system to delete the specified object when all other events have been processed. In some environments, it is necessary to use this instead of deleting a frame directly with the delete operator, because some GUIs will still send events to a deleted window.

Now obsolete: use *wxWindow::Close* (p. 1395) instead.

Include files

<wx/utils.h>

::wxPostEvent

void wxPostEvent(wxEvtHandler *dest, wxEvent& event)

In a GUI application, this function posts *event* to the specified *dest* object using *wxEvtHandler::AddPendingEvent* (p. 446). Otherwise, it dispatches *event* immediately using *wxEvtHandler::ProcessEvent* (p. 450). See the respective documentation for details (and caveats).

Include files

<wx/app.h>

::wxSetDisplayName

void wxSetDisplayName(const wxString& displayName)

Under X only, sets the current display name. This is the X host and display name such as "colonsay:0.0", and the function indicates which display should be used for creating windows from this point on. Setting the display within an application allows multiple displays to be used.

See also *wxGetDisplayName* (p. 1516).

Include files

<wx/utils.h>

::wxStripMenuCodes

wxString wxStripMenuCodes(const wxString& in)

void wxStripMenuCodes(char *in, char *out)

NB: This function is obsolete, please use *wxMenuItem::GetLabelFromText* (p. 911) instead.

Strips any menu codes from *in* and places the result in *out* (or returns the new string, in the first form).

Menu codes include & (mark the next character with an underline as a keyboard shortcut in Windows and Motif) and \t (tab in Windows).

Include files

<wx/utils.h>

wxULL

wxLongLong_t wxULL(*number*)

This macro is defined for the platforms with a native 64 bit integer type and allows to define unsigned 64 bit compile time constants:

```
#ifdef wxLongLong_t
    unsigned wxLongLong_t ll = wxULL(0x1234567890abcdef);
#endif
```

Include files

<wx/longlong.h>

See also

wxLL (p. 1512), *wxLongLong* (p. 857)

::wxWriteResource

bool wxWriteResource(const wxString& *section*, const wxString& *entry*, const wxString& *value*, const wxString& *file* = NULL)

bool wxWriteResource(const wxString& *section*, const wxString& *entry*, float *value*, const wxString& *file* = NULL)

bool wxWriteResource(const wxString& *section*, const wxString& *entry*, long *value*, const wxString& *file* = NULL)

bool wxWriteResource(const wxString& *section*, const wxString& *entry*, int *value*, const wxString& *file* = NULL)

Writes a resource value into the resource database (for example, WIN.INI, or .Xdefaults). If *file* is NULL, WIN.INI or .Xdefaults is used, otherwise the specified file is used.

Under X, the resource databases are cached until the internal function **wxFlushResources** is called automatically on exit, when all updated resource databases are written to their files.

Note that it is considered bad manners to write to the .Xdefaults file under Unix, although the WIN.INI file is fair game under Windows.

See also *wxGetResource* (p. 1516), *wxConfigBase* (p. 178).

Include files

<wx/utils.h>

Byte order macros

The endian-ness issues (that is the difference between big-endian and little-endian architectures) are important for the portable programs working with the external binary data (for example, data files or data coming from network) which is usually in some fixed, platform-independent format. The macros are helpful for transforming the data to the correct format.

wxINTXX_SWAP_ALWAYS

wxInt32 wxINT32_SWAP_ALWAYS(wxInt32 *value*)

wxUInt32 wxUINT32_SWAP_ALWAYS(wxUInt32 *value*)

wxInt16 wxINT16_SWAP_ALWAYS(wxInt16 *value*)

wxUInt16 wxUINT16_SWAP_ALWAYS(wxUInt16 *value*)

These macros will swap the bytes of the *value* variable from little endian to big endian or vice versa unconditionally, i.e. independently of the current platform.

wxINTXX_SWAP_ON_BE

wxInt32 wxINT32_SWAP_ON_BE(wxInt32 *value*)

wxUInt32 wxUINT32_SWAP_ON_BE(wxUInt32 *value*)

wxInt16 wxINT16_SWAP_ON_BE(wxInt16 *value*)

wxUInt16 wxUINT16_SWAP_ON_BE(wxUInt16 *value*)

This macro will swap the bytes of the *value* variable from little endian to big endian or vice versa if the program is compiled on a big-endian architecture (such as Sun work stations). If the program has been compiled on a little-endian architecture, the value will be unchanged.

Use these macros to read data from and write data to a file that stores data in little-endian (for example Intel i386) format.

wxINTXX_SWAP_ON_LE

wxInt32 wxINT32_SWAP_ON_LE(wxInt32 *value*)

wxUInt32 wxUINT32_SWAP_ON_LE(wxUInt32 *value*)

wxInt16 wxINT16_SWAP_ON_LE(wxInt16 *value*)

wxUInt16 wxUINT16_SWAP_ON_LE(wxUInt16 *value*)

This macro will swap the bytes of the *value* variable from little endian to big endian or vice versa if the program is compiled on a little-endian architecture (such as Intel PCs). If the program has been compiled on a big-endian architecture, the value will be

unchanged.

Use these macros to read data from and write data to a file that stores data in big-endian format.

RTTI functions

wxWidgets uses its own RTTI ("run-time type identification") system which predates the current standard C++ RTTI and so is kept for backwards compatibility reasons but also because it allows some things which the standard RTTI doesn't directly support (such as creating a class from its name).

The standard C++ RTTI can be used in the user code without any problems and in general you shouldn't need to use the functions and the macros in this section unless you are thinking of modifying or adding any wxWidgets classes.

See also

RTTI overview (p. 1579)

CLASSINFO

wxClassInfo * CLASSINFO(className)

Returns a pointer to the wxClassInfo object associated with this class.

Include files

<wx/object.h>

DECLARE_ABSTRACT_CLASS

DECLARE_ABSTRACT_CLASS(className)

Used inside a class declaration to declare that the class should be made known to the class hierarchy, but objects of this class cannot be created dynamically. The same as DECLARE_CLASS.

Example:

```
class wxCommand: public wxObject
{
    DECLARE_ABSTRACT_CLASS(wxCommand)

    private:
        ...
    public:
        ...
};
```

Include files

<wx/object.h>

DECLARE_APP

DECLARE_APP(className)

This is used in headers to create a forward declaration of the *wxGetApp* (p. 1472) function implemented by *IMPLEMENT_APP* (p. 1523). It creates the declaration `className& wxGetApp(void)`.

Example:

```
DECLARE_APP(MyApp)
```

Include files

<wx/app.h>

DECLARE_CLASS

DECLARE_CLASS(className)

Used inside a class declaration to declare that the class should be made known to the class hierarchy, but objects of this class cannot be created dynamically. The same as `DECLARE_ABSTRACT_CLASS`.

Include files

<wx/object.h>

DECLARE_DYNAMIC_CLASS

DECLARE_DYNAMIC_CLASS(className)

Used inside a class declaration to declare that the objects of this class should be dynamically creatable from run-time type information.

Example:

```
class wxFrame: public wxWindow
{
    DECLARE_DYNAMIC_CLASS(wxFrame)

private:
    const wxString& frameTitle;
public:
    ...
};
```

Include files

<wx/object.h>

IMPLEMENT_ABSTRACT_CLASS

IMPLEMENT_ABSTRACT_CLASS(className, baseClassName)

Used in a C++ implementation file to complete the declaration of a class that has run-time type information. The same as `IMPLEMENT_CLASS`.

Example:

```
IMPLEMENT_ABSTRACT_CLASS(wxCommand, wxObject)

wxCommand::wxCommand(void)
{
    ...
}
```

Include files

<wx/object.h>

IMPLEMENT_ABSTRACT_CLASS2

IMPLEMENT_ABSTRACT_CLASS2(className, baseClassName1, baseClassName2)

Used in a C++ implementation file to complete the declaration of a class that has run-time type information and two base classes. The same as `IMPLEMENT_CLASS2`.

Include files

<wx/object.h>

IMPLEMENT_APP

IMPLEMENT_APP(className)

This is used in the application class implementation file to make the application class known to wxWidgets for dynamic construction. You use this instead of

Old form:

```
MyApp myApp;
```

New form:

```
IMPLEMENT_APP(MyApp)
```

See also *DECLARE_APP* (p. 1522).

Include files

<wx/app.h>

IMPLEMENT_CLASS

IMPLEMENT_CLASS(className, baseClassName)

Used in a C++ implementation file to complete the declaration of a class that has run-time type information. The same as IMPLEMENT_ABSTRACT_CLASS.

Include files

<wx/object.h>

IMPLEMENT_CLASS2

IMPLEMENT_CLASS2(className, baseClassName1, baseClassName2)

Used in a C++ implementation file to complete the declaration of a class that has run-time type information and two base classes. The same as IMPLEMENT_ABSTRACT_CLASS2.

Include files

<wx/object.h>

IMPLEMENT_DYNAMIC_CLASS

IMPLEMENT_DYNAMIC_CLASS(className, baseClassName)

Used in a C++ implementation file to complete the declaration of a class that has run-time type information, and whose instances can be created dynamically.

Example:

```
IMPLEMENT_DYNAMIC_CLASS(wxFFrame, wxWindow)

wxFFrame::wxFFrame(void)
{
    ...
}
```

Include files

<wx/object.h>

IMPLEMENT_DYNAMIC_CLASS2

IMPLEMENT_DYNAMIC_CLASS2(className, baseClassName1, baseClassName2)

Used in a C++ implementation file to complete the declaration of a class that has run-time type information, and whose instances can be created dynamically. Use this for classes derived from two base classes.

Include files

<wx/object.h>

wxConstCast

classname * wxConstCast(ptr, classname)

This macro expands into `const_cast<classname *>(ptr)` if the compiler supports `const_cast` or into an old, C-style cast, otherwise.

See also

wx_const_cast (p. 1526)

wxDynamicCast (p. 1525)

wxStaticCast (p. 1526)

::wxCreateDynamicObject

wxObject * wxCreateDynamicObject(const wxString& className)

Creates and returns an object of the given class, if the class has been registered with the dynamic class system using `DECLARE...` and `IMPLEMENT...` macros.

WXDEBUG_NEW

WXDEBUG_NEW(arg)

This is defined in debug mode to be call the redefined new operator with filename and line number arguments. The definition is:

```
#define WXDEBUG_NEW new(__FILE__, __LINE__)
```

In non-debug mode, this is defined as the normal new operator.

Include files

<wx/object.h>

wxDynamicCast

classname * wxDynamicCast(ptr, classname)

This macro returns the pointer *ptr* cast to the type *classname ** if the pointer is of this type (the check is done during the run-time) or `NULL` otherwise. Usage of this macro is preferred over obsoleted `wxObject::IsKindOf()` function.

The *ptr* argument may be `NULL`, in which case `NULL` will be returned.

Example:

```
wxWindow *win = wxWindow::FindFocus();
```

```
wxTextCtrl *text = wxDynamicCast(win, wxTextCtrl);
if ( text )
{
    // a text control has the focus...
}
else
{
    // no window has the focus or it is not a text control
}
```

See also

RTTI overview (p. 1579)
wxDynamicCastThis (p. 1526)
wxConstCast (p. 1525)
wxStaticCast (p. 1526)

wxDynamicCastThis

classname * wxDynamicCastThis(classname)

This macro is equivalent to `wxDynamicCast(this, classname)` but the latter provokes spurious compilation warnings from some compilers (because it tests whether `this` pointer is non `NULL` which is always true), so this macro should be used to avoid them.

See also

wxDynamicCast (p. 1525)

wxStaticCast

classname * wxStaticCast(ptr, classname)

This macro checks that the cast is valid in debug mode (an assert failure will result if `wxDynamicCast(ptr, classname) == NULL`) and then returns the result of executing an equivalent of `static_cast<classname *>(ptr)`.

See also

wx_static_cast (p. 1527)
wxDynamicCast (p. 1525)
wxConstCast (p. 1525)

wx_const_cast

T wx_const_cast(T, x)

Same as `const_cast<T>(x)` if the compiler supports const cast or `(T)x` for old compilers. Unlike *wxConstCast* (p. 1525), the cast is to the type *T* and not to *T ** and also the order of arguments is the same as for the standard cast.

See also

`wx_static_cast` (p. 1527)

wx_static_cast

T `wx_static_cast`(T, x)

Same as `static_cast<T>(x)` if the compiler supports static cast or `(T)x` for old compilers. Unlike `wxStaticCast` (p. 1526), there are no checks being done and the meaning of the macro arguments is exactly the same as for the standard static cast, i.e. *T* is the full type name and star is not appended to it.

See also

`wx_const_cast` (p. 1526)

Log functions

These functions provide a variety of logging functions: see *Log classes overview* (p. 1602) for further information. The functions use (implicitly) the currently active log target, so their descriptions here may not apply if the log target is not the standard one (installed by `wxWidgets` in the beginning of the program).

Include files

<wx/log.h>

::wxDebugMsg

void `wxDebugMsg`(const `wxString&` *fmt*, ...)

NB: This function is now obsolete, replaced by *Log functions* (p. 1527) and `wxLogDebug` (p. 1530) in particular.

Display a debugging message; under Windows, this will appear on the debugger command window, and under Unix, it will be written to standard error.

The syntax is identical to **printf**: pass a format string and a variable list of arguments.

Tip: under Windows, if your application crashes before the message appears in the debugging window, put a `wxYield` call after each `wxDebugMsg` call. `wxDebugMsg` seems to be broken under WIN32s (at least for Watcom C++): preformat your messages and use `OutputDebugString` instead.

Include files

<wx/utils.h>

::wxError

void wxError(const wxString& msg, const wxString& title = "wxWidgets Internal Error")

NB: This function is now obsolete, please use *wxLogError* (p. 1528) instead.

Displays *msg* and continues. This writes to standard error under Unix, and pops up a message box under Windows. Used for internal wxWidgets errors. See also *wxFatalError* (p. 1528).

Include files

<wx/utils.h>

::wxFatalError

void wxFatalError(const wxString& msg, const wxString& title = "wxWidgets Fatal Error")

NB: This function is now obsolete, please use *wxLogFatalError* (p. 1528) instead.

Displays *msg* and exits. This writes to standard error under Unix, and pops up a message box under Windows. Used for fatal internal wxWidgets errors. See also *wxError* (p. 1528).

Include files

<wx/utils.h>

::wxLogError

void wxLogError(const char *formatString, ...)

void wxVLogError(const char *formatString, va_list argPtr)

The functions to use for error messages, i.e. the messages that must be shown to the user. The default processing is to pop up a message box to inform the user about it.

::wxLogFatalError

void wxLogFatalError(const char *formatString, ...)

void wxVLogFatalError(const char *formatString, va_list argPtr)

Like *wxLogError* (p. 1528), but also terminates the program with the exit code 3. Using *abort()* standard function also terminates the program with this exit code.

::wxLogWarning

```
void wxLogWarning(const char *formatString, ...)
```

```
void wxVLogWarning(const char *formatString, va_list argPtr)
```

For warnings - they are also normally shown to the user, but don't interrupt the program work.

::wxLogMessage

```
void wxLogMessage(const char *formatString, ...)
```

```
void wxVLogMessage(const char *formatString, va_list argPtr)
```

For all normal, informational messages. They also appear in a message box by default (but it can be changed). Notice that the standard behaviour is to not show informational messages if there are any errors later - the logic being that the later error messages make the informational messages preceding them meaningless.

::wxLogVerbose

```
void wxLogVerbose(const char *formatString, ...)
```

```
void wxVLogVerbose(const char *formatString, va_list argPtr)
```

For verbose output. Normally, it is suppressed, but might be activated if the user wishes to know more details about the program progress (another, but possibly confusing name for the same function is **wxLogInfo**).

::wxLogStatus

```
void wxLogStatus(wxFrame *frame, const char *formatString, ...)
```

```
void wxVLogStatus(wxFrame *frame, const char *formatString, va_list argPtr)
```

```
void wxLogStatus(const char *formatString, ...)
```

```
void wxVLogStatus(const char *formatString, va_list argPtr)
```

Messages logged by these functions will appear in the statusbar of the *frame* or of the top level application window by default (i.e. when using the second version of the functions).

If the target frame doesn't have a statusbar, the message will be lost.

::wxLogSysError

```
void wxLogSysError(const char *formatString, ...)
```

```
void wxVLogSysError(const char *formatString, va_list argPtr)
```

Mostly used by wxWidgets itself, but might be handy for logging errors after system call (API function) failure. It logs the specified message text as well as the last system error code (*errno* or *::GetLastError()* depending on the platform) and the corresponding error message. The second form of this function takes the error code explicitly as the first argument.

See also

wxSysErrorCode (p. 1531), *wxSysErrorMsg* (p. 1532)

::wxLogDebug

void wxLogDebug(const char *formatString, ...)

void wxVLogDebug(const char *formatString, va_list argPtr)

The right functions for debug output. They only do something in debug mode (when the preprocessor symbol `__WXDEBUG__` is defined) and expand to nothing in release mode (otherwise).

::wxLogTrace

void wxLogTrace(const char *formatString, ...)

void wxVLogTrace(const char *formatString, va_list argPtr)

void wxLogTrace(const char *mask, const char *formatString, ...)

void wxVLogTrace(const char *mask, const char *formatString, va_list argPtr)

void wxLogTrace(wxTraceMask mask, const char *formatString, ...)

void wxVLogTrace(wxTraceMask mask, const char *formatString, va_list argPtr)

As **wxLogDebug**, trace functions only do something in debug build and expand to nothing in the release one. The reason for making it a separate function from it is that usually there are a lot of trace messages, so it might make sense to separate them from other debug messages.

The trace messages also usually can be separated into different categories and the second and third versions of this function only log the message if the *mask* which it has is currently enabled in *wxLog* (p. 844). This allows to selectively trace only some operations and not others by changing the value of the trace mask (possible during the run-time).

For the second function (taking a string mask), the message is logged only if the mask has been previously enabled by the call to *AddTraceMask* (p. 846) or by setting *WXTRACE environment variable* (p. 1708). The predefined string trace masks used by wxWidgets are:

- `wxTRACE_MemAlloc`: trace memory allocation (new/delete)

- `wxTRACE_Messages`: trace window messages/X callbacks
- `wxTRACE_ResAlloc`: trace GDI resource allocation
- `wxTRACE_RefCount`: trace various ref counting operations
- `wxTRACE_OleCalls`: trace OLE method calls (Win32 only)

The third version of the function only logs the message if all the bit corresponding to the *mask* are set in the `wxLog` trace mask which can be set by *SetTraceMask* (p. 850). This version is less flexible than the previous one because it doesn't allow defining the user trace masks easily - this is why it is deprecated in favour of using string trace masks.

- `wxTraceMemAlloc`: trace memory allocation (new/delete)
- `wxTraceMessages`: trace window messages/X callbacks
- `wxTraceResAlloc`: trace GDI resource allocation
- `wxTraceRefCount`: trace various ref counting operations
- `wxTraceOleCalls`: trace OLE method calls (Win32 only)

::wxSafeShowMessage

`void wxSafeShowMessage(const wxString& title, const wxString& text)`

This function shows a message to the user in a safe way and should be safe to call even before the application has been initialized or if it is currently in some other strange state (for example, about to crash). Under Windows this function shows a message box using a native dialog instead of *wxMessageBox* (p. 1502) (which might be unsafe to call), elsewhere it simply prints the message to the standard output using the title as prefix.

Parameters

title

The title of the message box shown to the user or the prefix of the message string

text

The text to show to the user

See also

wxLogFatalError (p. 1528)

Include files

<wx/log.h>

::wxSysErrorCode

unsigned long wxSysErrorCode()

Returns the error code from the last system call. This function uses `errno` on Unix platforms and `GetLastError` under Win32.

See also

`wxSysErrorMsg` (p. 1532), `wxLogSysError` (p. 1529)

::wxSysErrorMsg

const wxChar * wxSysErrorMsg(unsigned long errCode = 0)

Returns the error message corresponding to the given system error code. If `errCode` is 0 (default), the last error code (as returned by `wxSysErrorCode` (p. 1531)) is used.

See also

`wxSysErrorCode` (p. 1531), `wxLogSysError` (p. 1529)

WXTRACE

Include files

<wx/object.h>

WXTRACE(formatString, ...)

NB: This macro is now obsolete, replaced by *Log functions* (p. 1527).

Calls `wxTrace` with printf-style variable argument syntax. Output is directed to the current output stream (see `wxDebugContext` (p. 1606)).

Include files

<wx/memory.h>

WXTRACELEVEL

WXTRACELEVEL(level, formatString, ...)

NB: This function is now obsolete, replaced by *Log functions* (p. 1527).

Calls `wxTraceLevel` with printf-style variable argument syntax. Output is directed to the current output stream (see `wxDebugContext` (p. 1606)). The first argument should be the level at which this information is appropriate. It will only be output if the level returned by `wxDebugContext::GetLevel` is equal to or greater than this value.

Include files

<wx/memory.h>

::wxTrace

void wxTrace(const wxString& *fmt*, ...)

NB: This function is now obsolete, replaced by *Log functions* (p. 1527).

Takes printf-style variable argument syntax. Output is directed to the current output stream (see *wxDebugContext* (p. 1606)).

Include files

<wx/memory.h>

::wxTraceLevel

void wxTraceLevel(int *level*, const wxString& *fmt*, ...)

NB: This function is now obsolete, replaced by *Log functions* (p. 1527).

Takes printf-style variable argument syntax. Output is directed to the current output stream (see *wxDebugContext* (p. 1606)). The first argument should be the level at which this information is appropriate. It will only be output if the level returned by *wxDebugContext::GetLevel* is equal to or greater than this value.

Include files

<wx/memory.h>

Time functions

The functions in this section deal with getting the current time and starting/stopping the global timers. Please note that the timer functions are deprecated because they work with one global timer only and *wxTimer* (p. 1297) and/or *wxStopWatch* (p. 1191) classes should be used instead. For retrieving the current time, you may also use *wxDateTime::Now* (p. 247) or *wxDateTime::UNow* (p. 248) methods.

::wxGetElapsedTime

long wxGetElapsedTime(bool *resetTimer* = true)

Gets the time in milliseconds since the last *::wxStartTimer* (p. 1535).

If *resetTimer* is true (the default), the timer is reset to zero by this call.

See also *wxTimer* (p. 1297).

Include files

<wx/timer.h>

::wxGetLocalTime

long wxGetLocalTime()

Returns the number of seconds since local time 00:00:00 Jan 1st 1970.

See also

wxDateTime::Now (p. 247)

Include files

<wx/timer.h>

::wxGetLocalTimeMillis

wxLongLong wxGetLocalTimeMillis()

Returns the number of milliseconds since local time 00:00:00 Jan 1st 1970.

See also

wxDateTime::Now (p. 247),
wxLongLong (p. 857)

Include files

<wx/timer.h>

::wxGetUTCTime

long wxGetUTCTime()

Returns the number of seconds since GMT 00:00:00 Jan 1st 1970.

See also

wxDateTime::Now (p. 247)

Include files

<wx/timer.h>

::wxNow

wxString wxNow()

Returns a string representing the current date and time.

Include files

<wx/utils.h>

::wxSleep

void wxSleep(int secs)

Sleeps for the specified number of seconds.

Include files

<wx/utils.h>

::wxStartTimer

void wxStartTimer()

Starts a stopwatch; use *::wxGetElapsedTime* (p. 1533) to get the elapsed time.

See also *wxTimer* (p. 1297).

Include files

<wx/timer.h>

::wxUsleep

void wxUsleep(unsigned long *milliseconds*)

Sleeps for the specified number of milliseconds. Notice that usage of this function is encouraged instead of calling *usleep(3)* directly because the standard *usleep()* function is not MT safe.

Include files

<wx/utils.h>

Debugging macros and functions

Useful macros and functions for error checking and defensive programming. *wxWidgets* defines three families of the assert-like macros: the *wxASSERT* and *wxFail* macros only do anything if *__WXDEBUG__* is defined (in other words, in the debug build) but disappear completely in the release build. On the other hand, the *wxCHECK* macros stay even in release builds but a check failure doesn't generate any user-visible effects then. Finally, the compile time assertions don't happen during the run-time but result in the compilation error messages if the condition they check fail.

Include files

<wx/debug.h>

::wxOnAssert

void wxOnAssert(const char *fileName, int lineNumber, const char *cond, const char *msg = NULL)

This function is called whenever one of debugging macros fails (i.e. condition is false in an assertion). It is only defined in the debug mode, in release builds the `wxCHECK` (p. 1538) failures don't result in anything.

To override the default behaviour in the debug builds which is to show the user a dialog asking whether he wants to abort the program, continue or continue ignoring any subsequent assert failures, you may override `wxApp::OnAssert` (p. 34) which is called by this function if the global application object exists.

wxASSERT

wxASSERT(condition)

Assert macro. An error message will be generated if the condition is false in debug mode, but nothing will be done in the release build.

Please note that the condition in `wxASSERT()` should have no side effects because it will not be executed in release mode at all.

[See also](#)

`wxASSERT_MSG` (p. 1536),
`wxCOMPILE_TIME_ASSERT` (p. 1537)

wxASSERT_MIN_BITSIZE

wxASSERT_MIN_BITSIZE(type, size)

This macro results in a *compile time assertion failure* (p. 1537) if the size of the given type `type` is less than `size` bits.

You may use it like this, for example:

```
// we rely on the int being able to hold values up to 2^32
wxASSERT_MIN_BITSIZE(int, 32);

// can't work with the platforms using UTF-8 for wchar_t
wxASSERT_MIN_BITSIZE(wchar_t, 16);
```

wxASSERT_MSG

wxASSERT_MSG(condition, msg)

Assert macro with message. An error message will be generated if the condition is false.

[See also](#)

`wxASSERT` (p. 1536),
`wxCOMPILE_TIME_ASSERT` (p. 1537)

wxCOMPILE_TIME_ASSERT

wxCOMPILE_TIME_ASSERT(*condition*, *msg*)

Using `wxCOMPILE_TIME_ASSERT` results in a compilation error if the specified *condition* is false. The compiler error message should include the *msg* identifier - please note that it must be a valid C++ identifier and not a string unlike in the other cases.

This macro is mostly useful for testing the expressions involving the `sizeof` operator as they can't be tested by the preprocessor but it is sometimes desirable to test them at the compile time.

Note that this macro internally declares a struct whose name it tries to make unique by using the `__LINE__` in it but it may still not work if you use it on the same line in two different source files. In this case you may either change the line in which either of them appears on or use the `wxCOMPILE_TIME_ASSERT2` (p. 1537) macro.

Also note that Microsoft Visual C++ has a bug which results in compiler errors if you use this macro with "Program Database For Edit And Continue" (`/ZI`) option, so you shouldn't use it ("Program Database" (`/Zi`) is ok though) for the code making use of this macro.

See also

`wxASSERT_MSG` (p. 1536),
`wxASSERT_MIN_BITSIZE` (p. 1536)

wxCOMPILE_TIME_ASSERT2

wxCOMPILE_TIME_ASSERT2(*condition*, *msg*, *name*)

This macro is identical to `wxCOMPILE_TIME_ASSERT2` (p. 1537) except that it allows you to specify a unique *name* for the struct internally defined by this macro to avoid getting the compilation errors described *above* (p. 1537).

wxFAIL

wxFAIL()

Will always generate an assert error if this code is reached (in debug mode).

See also: `wxFAIL_MSG` (p. 1537)

wxFAIL_MSG

wxFail_Msg(msg)

Will always generate an assert error with specified message if this code is reached (in debug mode).

This macro is useful for marking unreachable" code areas, for example it may be used in the "default:" branch of a switch statement if all possible cases are processed above.

See also

wxFail (p. 1537)

wxCheck

wxCheck(condition, retValue)

Checks that the condition is true, returns with the given return value if not (FAILs in debug mode). This check is done even in release mode.

wxCheck_Msg

wxCheck_Msg(condition, retValue, msg)

Checks that the condition is true, returns with the given return value if not (FAILs in debug mode). This check is done even in release mode.

This macro may be only used in non void functions, see also `wxCheck_Ret` (p. 1538).

wxCheck_Ret

wxCheck_Ret(condition, msg)

Checks that the condition is true, and returns if not (FAILs with given error message in debug mode). This check is done even in release mode.

This macro should be used in void functions instead of `wxCheck_Msg` (p. 1538).

wxCheck2

wxCheck2(condition, operation)

Checks that the condition is true and `wxFail` (p. 1537) and execute *operation* if it is not. This is a generalisation of `wxCheck` (p. 1538) and may be used when something else than just returning from the function must be done when the *condition* is false.

This check is done even in release mode.

wxCheck2_Msg

wxCHECK2(*condition*, *operation*, *msg*)

This is the same as *wxCHECK2* (p. 1538), but *wxFail_Msg* (p. 1537) with the specified *msg* is called instead of *wxFail()* if the *condition* is false.

::wxTrap

void wxTrap()

In debug mode (when `__WXDEBUG__` is defined) this function generates a debugger exception meaning that the control is passed to the debugger if one is attached to the process. Otherwise the program just terminates abnormally.

In release mode this function does nothing.

Include files

<wx/debug.h>

::wxIsDebuggerRunning

bool wxIsDebuggerRunning()

Returns `true` if the program is running under debugger, `false` otherwise.

Please note that this function is currently only implemented for Mac builds using CodeWarrior and always returns `false` elsewhere.

Environment access functions

The functions in this section allow to access (get) or change value of environment variables in a portable way. They are currently implemented under Win32 and POSIX-like systems (Unix).

Include files

<wx/utils.h>

wxGetenv

wxChar * wxGetEnv(const wxString& var)

This is a macro defined as `getenv()` or its wide char version in Unicode mode.

Note that under Win32 it may not return correct value for the variables set with *wxSetEnv* (p. 1540), use *wxGetEnv* (p. 1540) function instead.

wxGetEnv

bool wxGetEnv(const wxString& var, wxString *value)

Returns the current value of the environment variable *var* in *value*. *value* may be `NULL` if you just want to know if the variable exists and are not interested in its value.

Returns `true` if the variable exists, `false` otherwise.

wxSetEnv

bool wxSetEnv(const wxString& var, const wxChar *value)

Sets the value of the environment variable *var* (adding it if necessary) to *value*.

Returns `true` on success.

wxUnsetEnv

bool wxUnsetEnv(const wxString& var)

Removes the variable *var* from the environment. *wxGetEnv* (p. 1540) will return `NULL` after the call to this function.

Returns `true` on success.

Chapter 9 Constants

This chapter describes the constants defined by wxWidgets.

Preprocessor symbols defined by wxWidgets

Here is the list of preprocessor symbols used in the wxWidgets source grouped by category (and sorted by alphabetical order inside each category).

GUI system

<code>__WINDOWS__</code>	any Windows, you may also use <code>__WXMSW__</code>
<code>__WIN16__</code>	Win16 API (not supported since wxWidgets 2.6)
<code>__WIN32__</code>	Win32 API
<code>__WIN95__</code>	Windows 95 or NT 4.0 and above system (not NT 3.5x)
<code>__WXBASE__</code>	Only wxBase, no GUI features
<code>__WXWINCE__</code>	Windows CE
<code>__WXGTK__</code>	GTK+
<code>__WXGTK12__</code>	GTK+ 1.2 or higher
<code>__WXGTK20__</code>	GTK+ 2.0 or higher
<code>__WXMOTIF__</code>	Motif
<code>__WXMOTIF20__</code>	Motif 2.0 or higher
<code>__WXMAC__</code>	Mac OS whether Classic (Mac OS 8/9 <code>TARGET_CARBON == 0</code>) or Carbon (including Mac OS X <code>TARGET_CARBON == 1</code>)
<code>__WXMGL__</code>	SciTech Soft MGL (<code>__WXUNIVERSAL__</code> will be also defined)
<code>__WXMSW__</code>	Any Windows
<code>__WXOS2__</code>	Identical to <code>__WXPM__</code>

<code>__WXPM__</code>	OS/2 native Presentation Manager
<code>__WXSTUBS__</code>	Stubbed version ('template' wxWin implementation)
<code>__WXXT__</code>	Xt; mutually exclusive with <code>WX_MOTIF</code> , not implemented in wxWidgets 2.x
<code>__WXX11__</code>	wxX11 (<code>__WXUNIVERSAL__</code> will be also defined)
<code>__WXWINE__</code>	WINE (i.e. WIN32 on Unix)
<code>__WXUNIVERSAL__</code>	wxUniversal port, always defined in addition to one of the symbols above so this should be tested first.
<code>__X__</code>	any X11-based GUI toolkit except GTK+

In fact, they should better all start with `__WX` instead of `__` only, so please start any new defines with `__WX`.

Operating systems

<code>__APPLE__</code>	any Mac OS version
<code>__AIX__</code>	AIX
<code>__BSD__</code>	Any *BSD system
<code>__CYGWIN__</code>	Cygwin: Unix on Win32
<code>__DARWIN__</code>	Mac OS X using the BSD Unix C library (as opposed to using the Metrowerks MSL C/C++ library)
<code>__DATA_GENERAL__</code>	DG-UX
<code>__DOS_GENERAL__</code>	DOS (used with wxMGL only)
<code>__FREEBSD__</code>	FreeBSD
<code>__HPUX__</code>	HP-UX (Unix)
<code>__GNU__</code>	GNU Hurd
<code>__LINUX__</code>	Linux
<code>__MACH__</code>	Mach-O Architecture (Mac OS X only builds)
<code>__OSF__</code>	OSF/1
<code>__SGI__</code>	IRIX

<code>__SOLARIS__</code>	Solaris
<code>__SUN__</code>	Any Sun
<code>__SUNOS__</code>	Sun OS
<code>__SVR4__</code>	SystemV R4
<code>__SYSV__</code>	SystemV generic
<code>__ULTRIX__</code>	Ultrix
<code>__UNIX__</code>	any Unix
<code>__UNIX_LIKE__</code>	Unix, BeOS or VMS
<code>__VMS__</code>	VMS
<code>__WINDOWS__</code>	any Windows

Hardware architectures

Note that not all of these symbols are always defined, it depends on the compiler used.

<code>__ALPHA__</code>	DEC Alpha architecture
<code>__INTEL__</code>	Intel i386 or compatible
<code>__POWERPC__</code>	Motorola Power PC

Compilers

<code>__BORLANDC__</code>	Borland C++. The value of the macro corresponds to the compiler version: 500 is 5.0.
<code>__DJGPP__</code>	DJGPP
<code>__DIGITALMARS__</code>	Digital Mars
<code>__GNUG__</code>	Gnu C++ on any platform, see also <code>wxCHECK_GCC_VERSION</code> (p. 1471)
<code>__GNUWIN32__</code>	Gnu-Win32 compiler, see also <code>wxCHECK_W32API_VERSION</code> (p. 1471)
<code>__MINGW32__</code>	MinGW
<code>__MWERKS__</code>	CodeWarrior MetroWerks compiler
<code>__SUNCC__</code>	Sun CC
<code>__SYMANTECC__</code>	Symantec C++

<code>__VISAGECPP__</code>	IBM Visual Age (OS/2)
<code>__VISUALC__</code>	Microsoft Visual C++. The value of this macro corresponds to the compiler version: 1020 for 4.2 (the first supported version), 1100 for 5.0, 1200 for 6.0 and so on
<code>__XLC__</code>	AIX compiler
<code>__WATCOMC__</code>	Watcom C++. The value of this macro corresponds to the compiler version, 1100 is 11.0 and 1200 is OpenWatcom.
<code>_WIN32_WCE</code>	Windows CE version

Miscellaneous

<code>__WXWINDOWS__</code>	always defined in wxWidgets applications, see also <i>wxCHECK_VERSION</i> (p. 1471)
<code>__WXDEBUG__</code>	defined in debug mode, undefined in release mode
<code>wxUSE_XXX</code>	if defined as 1, feature XXX is active (the symbols of this form are always defined, use <code>#if</code> and not <code>#ifdef</code> to test for them)
<code>wxUSE_GUI</code>	this particular feature test macro is defined to 1 when compiling or using the library with the GUI features activated, if it is defined as 0, only wxBase is available.
<code>wxUSE_BASE</code>	only used by wxWidgets internally (defined as 1 when building wxBase code, either as a standalone library or as part of the monolithic wxWidgets library, defined as 0 when building GUI library only)

Standard event identifiers

wxWidgets defines a special identifier value `wxID_ANY` which is used in the following two situations:

- when creating a new window you may specify `wxID_ANY` to let wxWidgets assign an unused identifier to it automatically
- when installing an event handler using either the event table macros or *wxEvtHandler::Connect* (p. 447), you may use it to indicate that you want to handle the events coming from any control, regardless of its identifier

wxWidgets also defines a few standard command identifiers which may be used by the user code and also are sometimes used by wxWidgets itself. These reserved identifiers are all in the range between `wxID_LOWEST` and `wxID_HIGHEST` and, accordingly, the user code should avoid defining its own constants in this range.

```
wxID_LOWEST = 4999,

wxID_OPEN,
wxID_CLOSE,
wxID_NEW,
wxID_SAVE,
wxID_SAVEAS,
wxID_REVERT,
wxID_EXIT,
wxID_UNDO,
wxID_REDO,
wxID_HELP,
wxID_PRINT,
wxID_PRINT_SETUP,
wxID_PREVIEW,
wxID_ABOUT,
wxID_HELP_CONTENTS,
wxID_HELP_COMMANDS,
wxID_HELP_PROCEDURES,
wxID_HELP_CONTEXT,
wxID_CLOSE_ALL,

wxID_CUT = 5030,
wxID_COPY,
wxID_PASTE,
wxID_CLEAR,
wxID_FIND,
wxID_DUPLICATE,
wxID_SELECTALL,

wxID_FILE1 = 5050,
wxID_FILE2,
wxID_FILE3,
wxID_FILE4,
wxID_FILE5,
wxID_FILE6,
wxID_FILE7,
wxID_FILE8,
wxID_FILE9,

// Standard button IDs
wxID_OK = 5100,
wxID_CANCEL,
wxID_APPLY,
wxID_YES,
wxID_NO,
wxID_STATIC,
wxID_FORWARD,
wxID_BACKWARD,
wxID_DEFAULT,
wxID_MORE,
wxID_SETUP,
wxID_RESET,
wxID_CONTEXT_HELP,
wxID_YESTOALL,
wxID_NOTOALL,
wxID_ABORT,
wxID_RETRY,
wxID_IGNORE,

// System menu IDs (used by wxUniv):
wxID_SYSTEM_MENU = 5200,
wxID_CLOSE_FRAME,
wxID_MOVE_FRAME,
wxID_RESIZE_FRAME,
```

```
wxID_MAXIMIZE_FRAME,  
wxID_ICONIZE_FRAME,  
wxID_RESTORE_FRAME,  
  
// IDs used by generic file dialog (13 consecutive starting from this  
value)  
wxID_FILEDLGG = 5900,  
  
wxID_HIGHEST = 5999
```

Keycodes

Keypresses are represented by an enumerated type, `wxKeyCode`. The possible values are the ASCII character codes, plus the following:

```
WXX_BACK      = 8  
WXX_TAB       = 9  
WXX_RETURN    = 13  
WXX_ESCAPE    = 27  
WXX_SPACE     = 32  
WXX_DELETE    = 127  
  
WXX_START     = 300  
WXX_LBUTTON  
WXX_RBUTTON  
WXX_CANCEL  
WXX_MBUTTON  
WXX_CLEAR  
WXX_SHIFT  
WXX_CONTROL  
WXX_MENU  
WXX_PAUSE  
WXX_CAPITAL  
WXX_PRIOR  
WXX_NEXT  
WXX_END  
WXX_HOME  
WXX_LEFT  
WXX_UP  
WXX_RIGHT  
WXX_DOWN  
WXX_SELECT  
WXX_PRINT  
WXX_EXECUTE  
WXX_SNAPSHOT  
WXX_INSERT  
WXX_HELP  
WXX_NUMPAD0  
WXX_NUMPAD1  
WXX_NUMPAD2  
WXX_NUMPAD3  
WXX_NUMPAD4  
WXX_NUMPAD5  
WXX_NUMPAD6  
WXX_NUMPAD7  
WXX_NUMPAD8  
WXX_NUMPAD9  
WXX_MULTIPLY  
WXX_ADD  
WXX_SEPARATOR  
WXX_SUBTRACT  
WXX_DECIMAL  
WXX_DIVIDE  
WXX_F1  
WXX_F2  
WXX_F3  
WXX_F4
```

```
WXX_F5
WXX_F6
WXX_F7
WXX_F8
WXX_F9
WXX_F10
WXX_F11
WXX_F12
WXX_F13
WXX_F14
WXX_F15
WXX_F16
WXX_F17
WXX_F18
WXX_F19
WXX_F20
WXX_F21
WXX_F22
WXX_F23
WXX_F24
WXX_NUMLOCK
WXX_SCROLL
WXX_PAGEUP,
WXX_PAGEDOWN,

WXX_NUMPAD_SPACE,
WXX_NUMPAD_TAB,
WXX_NUMPAD_ENTER,
WXX_NUMPAD_F1,
WXX_NUMPAD_F2,
WXX_NUMPAD_F3,
WXX_NUMPAD_F4,
WXX_NUMPAD_HOME,
WXX_NUMPAD_LEFT,
WXX_NUMPAD_UP,
WXX_NUMPAD_RIGHT,
WXX_NUMPAD_DOWN,
WXX_NUMPAD_PRIOR,
WXX_NUMPAD_PAGEUP,
WXX_NUMPAD_NEXT,
WXX_NUMPAD_PAGEDOWN,
WXX_NUMPAD_END,
WXX_NUMPAD_BEGIN,
WXX_NUMPAD_INSERT,
WXX_NUMPAD_DELETE,
WXX_NUMPAD_EQUAL,
WXX_NUMPAD_MULTIPLY,
WXX_NUMPAD_ADD,
WXX_NUMPAD_SEPARATOR,
WXX_NUMPAD_SUBTRACT,
WXX_NUMPAD_DECIMAL,
WXX_NUMPAD_DIVIDE,

// the following key codes are only generated under Windows currently
WXX_WINDOWS_LEFT,
WXX_WINDOWS_RIGHT,
WXX_WINDOWS_MENU
```

Chapter 10 Classes by category

A classification of wxWidgets classes by category.

Managed windows

There are several types of window that are directly controlled by the window manager (such as MS Windows, or the Motif Window Manager). Frames may contain windows, and dialog boxes may directly contain controls.

<i>wxDialog</i> (p. 369)	Dialog box
<i>wxFrame</i> (p. 532)	Normal frame
<i>wxMDIChildFrame</i> (p. 870)	MDI child frame
<i>wxMDIParentFrame</i> (p. 874)	MDI parent frame
<i>wxMiniFrame</i> (p. 921)	A frame with a small title bar
<i>wxSplashScreen</i> (p. 1163)	Splash screen class
<i>wxTipWindow</i> (p. 1307)	Shows text in a small window
<i>wxWizard</i> (p. 1443)	A wizard dialog

See also **Common dialogs**.

Miscellaneous windows

The following are a variety of classes that are derived from wxWindow.

<i>wxPanel</i> (p. 972)	A window whose colour changes according to current user settings
<i>wxScrolledWindow</i> (p. 1085)	Window with automatically managed scrollbars
<i>wxGrid</i> (p. 572)	A grid (table) window
<i>wxSplitterWindow</i> (p. 1167)	Window which can be split vertically or horizontally
<i>wxStatusBar</i> (p. 1186)	Implements the status bar on a frame
<i>wxToolBar</i> (p. 1311)	Toolbar class
<i>wxNotebook</i> (p. 943)	Notebook class
<i>wxListbook</i> (p. 793)	Similar to notebook but using list control
<i>wxPlotWindow</i> (p. 987)	A class to display data.

<i>wxSashWindow</i> (p. 1068)	Window with four optional sashes that can be dragged
<i>wxSashLayoutWindow</i> (p. 1065)	Window that can be involved in an IDE-like layout arrangement
<i>wxVScrolledWindow</i> (p. 1382)	As <i>wxScrolledWindow</i> but supports lines of variable height
<i>wxWizardPage</i> (p. 1449)	A base class for the page in wizard dialog.
<i>wxWizardPageSimple</i> (p. 1451)	A page in wizard dialog.

Common dialogs

Overview (p. 1654)

Common dialogs are ready-made dialog classes which are frequently used in an application.

<i>wxDialog</i> (p. 369)	Base class for common dialogs
<i>wxColourDialog</i> (p. 157)	Colour chooser dialog
<i>wxDirDialog</i> (p. 386)	Directory selector dialog
<i>wxFileDialog</i> (p. 468)	File selector dialog
<i>wxFindReplaceDialog</i> (p. 508)	Text search/replace dialog
<i>wxMultiChoiceDialog</i> (p. 938)	Dialog to get one or more selections from a list
<i>wxSingleChoiceDialog</i> (p. 1102)	Dialog to get a single selection from a list and return the string
<i>wxTextEntryDialog</i> (p. 1271)	Dialog to get a single line of text from the user
<i>wxFontDialog</i> (p. 524)	Font chooser dialog
<i>wxPageSetupDialog</i> (p. 960)	Standard page setup dialog
<i>wxPrintDialog</i> (p. 1002)	Standard print dialog
<i>wxMessageDialog</i> (p. 914)	Simple message box dialog
<i>wxWizard</i> (p. 1443)	A wizard dialog.

Controls

Typically, these are small windows which provide interaction with the user. Controls that are not static can have *validators* (p. 1360) associated with them.

<i>wxControl</i> (p. 199)	The base class for controls
<i>wxButton</i> (p. 104)	Push button control, displaying text

<code>wxBitmapButton</code> (p. 80)	Push button control, displaying a bitmap
<code>wxToggleButton</code> (p. 1309)	A button which stays pressed when clicked by user.
<code>wxCalendarCtrl</code> (p. 109)	Date picker control
<code>wxCheckBox</code> (p. 121)	Checkbox control
<code>wxCheckListBox</code> (p. 125)	A listbox with a checkbox to the left of each item
<code>wxChoice</code> (p. 127)	Choice control (a combobox without the editable area)
<code>wxComboBox</code> (p. 158)	A choice with an editable area
<code>wxGauge</code> (p. 554)	A control to represent a varying quantity, such as time remaining
<code>wxGenericDirCtrl</code> (p. 563)	A control for displaying a directory tree
<code>wxHtmlListBox</code> (p. 683)	A listbox showing HTML content
<code>wxStaticBox</code> (p. 1180)	A static, or group box for visually grouping related controls
<code>wxListBox</code> (p. 794)	A list of strings for single or multiple selection
<code>wxListCtrl</code> (p. 799)	A control for displaying lists of strings and/or icons, plus a multicolumn report view
<code>wxListView</code> (p. 826)	A simpler interface (<i>façade</i> for <code>wxListCtrl</code> in report mode)
<code>wxTabCtrl</code> (p. 1235)	Manages several tabs
<code>wxTextCtrl</code> (p. 1250)	Single or multiline text editing control
<code>wxTreeCtrl</code> (p. 1329)	Tree (hierarchy) control
<code>wxScrollBar</code> (p. 1079)	Scrollbar control
<code>wxSpinButton</code> (p. 1155)	A spin or 'up-down' control
<code>wxSpinCtrl</code> (p. 1159)	A spin control - i.e. spin button and text control
<code>wxStaticText</code> (p. 1184)	One or more lines of non-editable text
<code>wxStaticBitmap</code> (p. 1178)	A control to display a bitmap
<code>wxRadioBox</code> (p. 1033)	A group of radio buttons
<code>wxRadioButton</code> (p. 1039)	A round button to be used with others in a mutually exclusive way
<code>wxSlider</code> (p. 1122)	A slider that can be dragged by the user

wxVListBox (p. 1375) A listbox supporting variable height rows

Menus

wxMenu (p. 885) Displays a series of menu items for selection

wxMenuBar (p. 899) Contains a series of menus for use with a frame

wxMenuItem (p. 909) Represents a single menu item

Window layout

There are two different systems for laying out windows (and dialogs in particular). One is based upon so-called sizers and it requires less typing, thinking and calculating and will in almost all cases produce dialogs looking equally well on all platforms, the other is based on so-called constraints and is deprecated, though still available.

Sizer overview (p. 1627) describes sizer-based layout.

These are the classes relevant to sizer-based layout.

wxSizer (p. 1110) Abstract base class

wxGridSizer (p. 636) A sizer for laying out windows in a grid with all fields having the same size

wxFlexGridSizer (p. 509) A sizer for laying out windows in a flexible grid

wxGridBagSizer (p. 612) Another grid sizer that lets you specify the cell an item is in, and items can span rows and/or columns.

wxBoxSizer (p. 90) A sizer for laying out windows in a row or column

wxStaticBoxSizer (p. 1182) Same as *wxBoxSizer*, but with a surrounding static box

wxNotebookSizer (p. 952) Sizer to use with the *wxNotebook* control

Constraints overview (p. 1624) describes constraints-based layout.

These are the classes relevant to constraints-based window layout.

wxIndividualLayoutConstraint (p. 758) Represents a single constraint dimension

wxLayoutConstraints (p. 785) Represents the constraints for a window class

Device contexts

Overview (p. 1648)

Device contexts are surfaces that may be drawn on, and provide an abstraction that allows parameterisation of your drawing code by passing different device contexts.

wxBufferedDC (p. 99) A helper device context for double buffered drawing.

<i>wxBufferedPaintDC</i> (p. 100)	A helper device context for double buffered drawing inside OnPaint .
<i>wxClientDC</i> (p. 134)	A device context to access the client area outside OnPaint events
<i>wxPaintDC</i> (p. 966)	A device context to access the client area inside OnPaint events
<i>wxWindowDC</i> (p. 1441)	A device context to access the non-client area
<i>wxScreenDC</i> (p. 1073)	A device context to access the entire screen
<i>wxDC</i> (p. 349)	The device context base class
<i>wxMemoryDC</i> (p. 881)	A device context for drawing into bitmaps
<i>wxMetafileDC</i> (p. 917)	A device context for drawing into metafiles
<i>wxMirrorDC</i> (p. 924)	A proxy device context allowing for simple mirroring.
<i>wxPostScriptDC</i> (p. 991)	A device context for drawing into PostScript files
<i>wxPrinterDC</i> (p. 1010)	A device context for drawing to printers

Graphics device interface

Bitmaps overview (p. 1645)

These classes are related to drawing on device contexts and windows.

<i>wxColour</i> (p. 150)	Represents the red, blue and green elements of a colour
<i>wxDCClipper</i> (p. 369)	Wraps the operations of setting and destroying the clipping region
<i>wxBitmap</i> (p. 67)	Represents a bitmap
<i>wxBrush</i> (p. 91)	Used for filling areas on a device context
<i>wxBrushList</i> (p. 97)	The list of previously-created brushes
<i>wxCursor</i> (p. 211)	A small, transparent bitmap representing the cursor
<i>wxFont</i> (p. 512)	Represents fonts
<i>wxFontList</i> (p. 527)	The list of previously-created fonts
<i>wxIcon</i> (p. 716)	A small, transparent bitmap for assigning to frames and drawing on device contexts
<i>wxImage</i> (p. 728)	A platform-independent image class
<i>wxImageList</i> (p. 754)	A list of images, used with some controls

<i>wxMask</i> (p. 860)	Represents a mask to be used with a bitmap for transparent drawing
<i>wxPen</i> (p. 976)	Used for drawing lines on a device context
<i>wxPenList</i> (p. 983)	The list of previously-created pens
<i>wxPalette</i> (p. 968)	Represents a table of indices into RGB values
<i>wxRegion</i> (p. 1052)	Represents a simple or complex region on a window or device context
<i>wxRendererNative</i> (p. 1059)	Abstracts high-level drawing primitives

Events

Overview (p. 1610)

An event object contains information about a specific event. Event handlers (usually member functions) have a single, event argument.

<i>wxActivateEvent</i> (p. 29)	A window or application activation event
<i>wxCalendarEvent</i> (p. 117)	Used with <i>wxCalendarCtrl</i> (p. 109)
<i>wxCalculateLayoutEvent</i> (p. 107)	Used to calculate window layout
<i>wxCloseEvent</i> (p. 139)	A close window or end session event
<i>wxCommandEvent</i> (p. 165)	An event from a variety of standard controls
<i>wxDialUpEvent</i> (p. 378)	Event send by <i>wxDialUpManager</i> (p. 379)
<i>wxDropFilesEvent</i> (p. 427)	A drop files event
<i>wxEraseEvent</i> (p. 440)	An erase background event
<i>wxEvent</i> (p. 441)	The event base class
<i>wxFindDialogEvent</i> (p. 504)	Event sent by <i>wxFindReplaceDialog</i> (p. 508)
<i>wxFocusEvent</i> (p. 512)	A window focus event
<i>wxKeyEvent</i> (p. 778)	A keypress event
<i>wxIconizeEvent</i> (p. 725)	An iconize/restore event
<i>wxIdleEvent</i> (p. 726)	An idle event
<i>wxInitDialogEvent</i> (p. 761)	A dialog initialisation event
<i>wxJoystickEvent</i> (p. 775)	A joystick event
<i>wxListEvent</i> (p. 818)	A list control event
<i>wxMaximizeEvent</i> (p. 862)	A maximize event

<i>wxMenuEvent</i> (p. 907)	A menu event
<i>wxMouseCaptureChangedEvent</i> (p. 927)	A mouse capture changed event
<i>wxMouseEvent</i> (p. 928)	A mouse event
<i>wxMoveEvent</i> (p. 937)	A move event
<i>wxNotebookEvent</i> (p. 950)	A notebook control event
<i>wxNotifyEvent</i> (p. 953)	A notification event, which can be vetoed
<i>wxPaintEvent</i> (p. 967)	A paint event
<i>wxProcessEvent</i> (p. 1024)	A process ending event
<i>wxQueryLayoutInfoEvent</i> (p. 1030)	Used to query layout information
<i>wxScrollEvent</i> (p. 1094)	A scroll event from sliders, stand-alone scrollbars and spin buttons
<i>wxScrollWinEvent</i> (p. 1097)	A scroll event from scrolled windows
<i>wxSizeEvent</i> (p. 1109)	A size event
<i>wxSocketEvent</i> (p. 1151)	A socket event
<i>wxSpinEvent</i> (p. 1162)	An event from <i>wxSpinButton</i> (p. 1155)
<i>wxSysColourChangedEvent</i> (p. 1228)	A system colour change event
<i>wxTabEvent</i> (p. 1241)	A tab control event
<i>wxTimerEvent</i> (p. 1299)	A timer expiration event
<i>wxTreeEvent</i> (p. 1347)	A tree control event
<i>wxUpdateUIEvent</i> (p. 1352)	A user interface update event
<i>wxWizardEvent</i> (p. 1448)	A wizard event

Validators

Overview (p. 1621)

These are the window validators, used for filtering and validating user input.

<i>wxValidator</i> (p. 1360)	Base validator class
<i>wxTextValidator</i> (p. 1283)	Text control validator class
<i>wxGenericValidator</i> (p. 567)	Generic control validator class

Data structures

These are the data structure classes supported by *wxWidgets*.

<i>wxCmdLineParser</i> (p. 142)	Command line parser class
<i>wxDateSpan</i> (p. 232)	A logical time interval.
<i>wxDateTime</i> (p. 237)	A class for date/time manipulations
<i>wxHashMap</i> (p. 638)	A simple hash map implementation
<i>wxHashTable</i> (p. 642)	A simple hash table implementation (deprecated, use <i>wxHashMap</i>)
<i>wxList</i> (p. 787)	A simple linked list implementation
<i>wxLongLong</i> (p. 857)	A portable 64 bit integer type
<i>wxNode</i> (p. 942)	Represents a node in the <i>wxList</i> implementation
<i>wxObject</i> (p. 954)	The root class for most <i>wxWidgets</i> classes
<i>wxPathList</i> (p. 975)	A class to help search multiple paths
<i>wxPoint</i> (p. 991)	Representation of a point
<i>wxRect</i> (p. 1042)	A class representing a rectangle
<i>wxRegEx</i> (p. 1049)	Regular expression support
<i>wxRegion</i> (p. 1052)	A class representing a region
<i>wxString</i> (p. 1201)	A string class
<i>wxStringList</i> (p. 1224)	A class representing a list of strings
<i>wxStringTokenizer</i> (p. 1226)	A class for interpreting a string as a list of tokens or words
<i>wxRealPoint</i> (p. 1041)	Representation of a point using floating point numbers
<i>wxSize</i> (p. 1107)	Representation of a size
<i>wxTimeSpan</i> (p. 1300)	A time interval.
<i>wxVariant</i> (p. 1362)	A class for storing arbitrary types that may change at run-time

Run-time class information system

Overview (p. 1579)

wxWidgets supports run-time manipulation of class information, and dynamic creation of objects given class names.

<i>wxClassInfo</i> (p. 130)	Holds run-time class information
<i>wxObject</i> (p. 954)	Root class for classes with run-time information

RTTI macros (p. 1521) Macros for manipulating run-time information

Logging features

Overview (p. 1602)

wxWidgets provides several classes and functions for message logging. Please see the *wxLog overview* (p. 1602) for more details.

<i>wxLog</i> (p. 844)	The base log class
<i>wxLogStderr</i> (p. 854)	Log messages to a C STDIO stream
<i>wxLogStream</i> (p. 854)	Log messages to a C++ iostream
<i>wxLogTextCtrl</i> (p. 855)	Log messages to a <i>wxTextCtrl</i> (p. 1250)
<i>wxLogWindow</i> (p. 855)	Log messages to a log frame
<i>wxLogGui</i> (p. 852)	Default log target for GUI programs
<i>wxLogNull</i> (p. 852)	Temporarily suppress message logging
<i>wxLogChain</i> (p. 850)	Allows to chain two log targets
<i>wxLogPassThrough</i> (p. 853)	Allows to filter the log messages
<i>wxStreamToTextRedirector</i> (p. 1200)	Allows to redirect output sent to <code>cout</code> to a <i>wxTextCtrl</i> (p. 1250)
<i>Log functions</i> (p. 1527)	Error and warning logging functions

Debugging features

Overview (p. 1605)

wxWidgets supports some aspects of debugging an application through classes, functions and macros.

<i>wxDebugContext</i> (p. 342)	Provides memory-checking facilities
<i>Debugging macros</i> (p. 1535)	Debug macros for assertion and checking
<i>WXDEBUG_NEW</i> (p. 1525)	Use this macro to give further debugging information

Networking classes

wxWidgets provides its own classes for socket based networking.

<i>wxDialUpManager</i> (p. 379)	Provides functions to check the status of network connection and to establish one
<i>wxIPv4address</i> (p. 767)	Represents an Internet address
<i>wxIPaddress</i> (p. 764)	Represents an Internet address

<i>wxSocketBase</i> (p. 1132)	Represents a socket base object
<i>wxSocketClient</i> (p. 1149)	Represents a socket client
<i>wxSocketServer</i> (p. 1153)	Represents a socket server
<i>wxSocketEvent</i> (p. 1151)	A socket event
<i>wxFTP</i> (p. 548)	FTP protocol class
<i>wxHTTP</i> (p. 715)	HTTP protocol class
<i>wxURL</i> (p. 1357)	Represents a Universal Resource Locator

Interprocess communication

Overview (p. 1696)

wxWidgets provides simple interprocess communications facilities based on Windows DDE, but available on most platforms using TCP.

<i>wxClient</i> (p. 132)	Represents a client
<i>wxConnection</i> (p. 192)	Represents the connection between a client and a server
<i>wxServer</i> (p. 1101)	Represents a server

Document/view framework

Overview (p. 1658)

wxWidgets supports a document/view framework which provides housekeeping for a document-centric application.

<i>wxDocument</i> (p. 415)	Represents a document
<i>wxView</i> (p. 1371)	Represents a view
<i>wxDocTemplate</i> (p. 410)	Manages the relationship between a document class and a view class
<i>wxDocManager</i> (p. 396)	Manages the documents and views in an application
<i>wxDocChildFrame</i> (p. 394)	A child frame for showing a document view
<i>wxDocParentFrame</i> (p. 409)	A parent frame to contain views

Printing framework

Overview (p. 1671)

A printing and previewing framework is implemented to make it relatively straightforward to provide document printing facilities.

<i>wxPreviewFrame</i> (p. 995)	Frame for displaying a print preview
<i>wxPreviewCanvas</i> (p. 992)	Canvas for displaying a print preview
<i>wxPreviewControlBar</i> (p. 993)	Standard control bar for a print preview
<i>wxPrintDialog</i> (p. 1002)	Standard print dialog
<i>wxPageSetupDialog</i> (p. 960)	Standard page setup dialog
<i>wxPrinter</i> (p. 1007)	Class representing the printer
<i>wxPrinterDC</i> (p. 1010)	Printer device context
<i>wxPrintout</i> (p. 1010)	Class representing a particular printout
<i>wxPrintPreview</i> (p. 1014)	Class representing a print preview
<i>wxPrintData</i> (p. 996)	Represents information about the document being printed
<i>wxPrintDialogData</i> (p. 1003)	Represents information about the print dialog
<i>wxPageSetupDialogData</i> (p. 961)	Represents information about the page setup dialog

Drag and drop and clipboard classes

Drag and drop and clipboard overview (p. 1673)

<i>wxDataObject</i> (p. 223)	Data object class
<i>wxDataFormat</i> (p. 218)	Represents a data format
<i>wxTextDataObject</i> (p. 1268)	Text data object class
<i>wxFileDataObject</i> (p. 1268)	File data object class
<i>wxBitmapDataObject</i> (p. 85)	Bitmap data object class
<i>wxCustomDataObject</i> (p. 216)	Custom data object class
<i>wxClipboard</i> (p. 136)	Clipboard class
<i>wxDropTarget</i> (p. 432)	Drop target class
<i>wxFileDropTarget</i> (p. 473)	File drop target class
<i>wxTextDropTarget</i> (p. 1270)	Text drop target class
<i>wxDropSource</i> (p. 429)	Drop source class

File related classes

wxWidgets has several small classes to work with disk files, see *file classes overview* (p. 1600) for more details.

<i>wxFileName</i> (p. 478)	Operations with the file name and attributes
<i>wxDir</i> (p. 383)	Class for enumerating files/subdirectories.
<i>wxDirTraverser</i> (p. 388)	Class used together with <i>wxDir</i> for recursively enumerating the files/subdirectories
<i>wxFile</i> (p. 461)	Low-level file input/output class.
<i>wxFFile</i> (p. 453)	Another low-level file input/output class.
<i>wxTempFile</i> (p. 1243)	Class to safely replace an existing file
<i>wxTextFile</i> (p. 1273)	Class for working with text files as with arrays of lines

Stream classes

wxWidgets has its own set of stream classes, as an alternative to often buggy standard stream libraries, and to provide enhanced functionality.

<i>wxStreamBase</i> (p. 1192)	Stream base class
<i>wxStreamBuffer</i> (p. 1194)	Stream buffer class
<i>wxInputStream</i> (p. 762)	Input stream class
<i>wxOutputStream</i> (p. 958)	Output stream class
<i>wxCountingOutputStream</i> (p. 207)	Stream class for querying what size a stream would have.
<i>wxFilterInputStream</i> (p. 503)	Filtered input stream class
<i>wxFilterOutputStream</i> (p. 504)	Filtered output stream class
<i>wxBufferedInputStream</i> (p. 101)	Buffered input stream class
<i>wxBufferedOutputStream</i> (p. 101)	Buffered output stream class
<i>wxMemoryInputStream</i> (p. 884)	Memory input stream class
<i>wxMemoryOutputStream</i> (p. 884)	Memory output stream class
<i>wxDatInputStream</i> (p. 220)	Platform-independent binary data input stream class
<i>wxDatOutputStream</i> (p. 229)	Platform-independent binary data output stream class
<i>wxTextInputStream</i> (p. 1278)	Platform-independent text data input stream class
<i>wxTextOutputStream</i> (p. 1282)	Platform-independent text data output stream class
<i>wxFileInputStream</i> (p. 477)	File input stream class
<i>wxFileOutputStream</i> (p. 493)	File output stream class

<i>wxFFileInputStream</i> (p. 458)	Another file input stream class
<i>wxFFileOutputStream</i> (p. 459)	Another file output stream class
<i>wxZlibInputStream</i> (p. 1463)	Zlib (compression) input stream class
<i>wxZlibOutputStream</i> (p. 1464)	Zlib (compression) output stream class
<i>wxZipInputStream</i> (p. 1462)	Input stream for reading from ZIP archives
<i>wxSocketInputStream</i> (p. 1152)	Socket input stream class
<i>wxSocketOutputStream</i> (p. 1153)	Socket output stream class

Threading classes

Multithreading overview (p. 1672)

wxWidgets provides a set of classes to make use of the native thread capabilities of the various platforms.

<i>wxThread</i> (p. 1286)	Thread class
<i>wxThreadHelper</i> (p. 1293)	Manages background threads easily
<i>wxMutex</i> (p. 938)	Mutex class
<i>wxMutexLocker</i> (p. 941)	Mutex locker utility class
<i>wxCriticalSection</i> (p. 207)	Critical section class
<i>wxCriticalSectionLocker</i> (p. 209)	Critical section locker utility class
<i>wxCondition</i> (p. 174)	Condition class
<i>wxSemaphore</i> (p. 1099)	Semaphore class

HTML classes

wxWidgets provides a set of classes to display text in HTML format. These class include a help system based on the HTML widget.

<i>wxHtmlHelpController</i> (p. 672)	HTML help controller class
<i>wxHtmlWindow</i> (p. 699)	HTML window class
<i>wxHtmlEasyPrinting</i> (p. 668)	Simple class for printing HTML
<i>wxHtmlPrintout</i> (p. 690)	Generic HTML wxPrintout class
<i>wxHtmlParser</i> (p. 685)	Generic HTML parser class
<i>wxHtmlTagHandler</i> (p. 696)	HTML tag handler, pluginable into wxHtmlParser
<i>wxHtmlWinParser</i> (p. 708)	HTML parser class for wxHtmlWindow

wxHtmlWinTagHandler (p. 714) HTML tag handler, pluginable into *wxHtmlWinParser*

Virtual file system classes

wxWidgets provides a set of classes that implement an extensible virtual file system, used internally by the HTML classes.

wxFsFile (p. 545) Represents a file in the virtual file system

wxFileSystem (p. 494) Main interface for the virtual file system

wxFileSystemHandler (p. 496) Class used to announce file system type

XML-based resource system classes

XML-based resource system overview (p. 1634)

Resources allow your application to create controls and other user interface elements from specifications stored in an XML format.

wxXmlResource (p. 1452) The main class for working with resources.

wxXmlResourceHandler (p. 1457) The base class for XML resource handlers.

Online help

wxHelpController (p. 644) Family of classes for controlling help windows

wxHtmlHelpController (p. 672) HTML help controller class

wxContextHelp (p. 196) Class to put application into context-sensitive help mode

wxContextHelpButton (p. 198) Button class for putting application into context-sensitive help mode

wxHelpProvider (p. 652) Abstract class for context-sensitive help provision

wxSimpleHelpProvider (p. 1102) Class for simple context-sensitive help provision

wxHelpControllerHelpProvider (p. 649) Class for context-sensitive help provision via a help controller

wxToolTip (p. 1328) Class implementing tooltips

Database classes

Database classes overview (p. 1675)

wxWidgets provides a set of classes for accessing Microsoft's ODBC (Open Database Connectivity) product, donated by Remstar. This is known as *wxODBC*.

wxDb (p. 264) ODBC database connection

wxDbTable (p. 302) Provides access to a database table

wxDblInf (p. 302)

wxDbTableInf (p. 337)

wxDbColDef (p. 294)

wxDbColInf (p. 295)

wxDbColDataPtr (p. 293)

wxDbColFor (p. 294)

wxDbConnectInf (p. 296)

wxDblIdxDef (p. 301)

Miscellaneous

wxApp (p. 31)

Application class

wxCaret (p. 118)

A caret (cursor) object

wxCmdLineParser (p. 142)

Command line parser class

wxConfig (p. 178)

Classes for configuration reading/writing (using either INI files or registry)

wxDllLoader (p. 392)

Class to work with shared libraries.

wxLayoutAlgorithm (p. 782)

An alternative window layout facility

wxProcess (p. 1019)

Process class

wxTimer (p. 1297)

Timer class

wxStopWatch (p. 1191)

Stop watch class

wxMimeTypesManager (p. 918)

MIME-types manager class

wxSystemSettings (p. 1231)

System settings class for obtaining various global parameters

wxSystemOptions (p. 1229)

System options class for run-time configuration

wxAcceleratorTable (p. 19)

Accelerator table

wxAutomationObject (p. 63)

OLE automation class

wxFontMapper (p. 528)

Font mapping, finding suitable font for given encoding

wxEncodingConverter (p. 437)

Encoding conversions

wxCalendarDateAttr (p. 114)

Used with *wxCalendarCtrl* (p. 109)

wxQuantize (p. 1029)

Class to perform quantization, or colour reduction

wxSingleInstanceChecker (p. 1105) Check that only single program instance is running

Chapter 11 Topic overviews

This chapter contains a selection of topic overviews, first things first:

Notes on using the reference

In the descriptions of the `wxWidgets` classes and their member functions, note that descriptions of inherited member functions are not duplicated in derived classes unless their behaviour is different. So in using a class such as `wxScrolledWindow`, be aware that `wxWindow` functions may be relevant.

Note also that arguments with default values may be omitted from a function call, for brevity. Size and position arguments may usually be given a value of -1 (the default), in which case `wxWidgets` will choose a suitable value.

Most strings are returned as `wxString` objects. However, for remaining `char *` return values, the strings are allocated and deallocated by `wxWidgets`. Therefore, return values should always be copied for long-term use, especially since the same buffer is often used by `wxWidgets`.

The member functions are given in alphabetical order except for constructors and destructors which appear first.

Writing a `wxWidgets` application: a rough guide

To set a `wxWidgets` application going, you will need to derive a `wxApp` (p. 31) class and override `wxApp::OnInit` (p. 37).

An application must have a top-level `wxFrame` (p. 532) or `wxDialog` (p. 369) window. Each frame may contain one or more instances of classes such as `wxPanel` (p. 972), `wxSplitterWindow` (p. 1167) or other windows and controls.

A frame can have a `wxMenuBar` (p. 899), a `wxToolBar` (p. 1311), a status line, and a `wxIcon` (p. 716) for when the frame is iconized.

A `wxPanel` (p. 972) is used to place controls (classes derived from `wxControl` (p. 199)) which are used for user interaction. Examples of controls are `wxButton` (p. 104), `wxCheckBox` (p. 121), `wxChoice` (p. 127), `wxListBox` (p. 794), `wxRadioBox` (p. 1033), `wxSlider` (p. 1122).

Instances of `wxDialog` (p. 369) can also be used for controls and they have the advantage of not requiring a separate frame.

Instead of creating a dialog box and populating it with items, it is possible to choose one of the convenient common dialog classes, such as `wxMessageDialog` (p. 914) and `wxFileDialog` (p. 468).

You never draw directly onto a window - you use a *device context* (DC). `wxDC` (p. 349) is the base for `wxClientDC` (p. 134), `wxPaintDC` (p. 966), `wxMemoryDC` (p. 881), `wxPostScriptDC` (p. 991), `wxMemoryDC` (p. 881), `wxMetafileDC` (p. 917) and `wxPrinterDC` (p. 1010). If your drawing functions have **wxDC** as a parameter, you can pass any of these DCs to the function, and thus use the same code to draw to several different devices. You can draw using the member functions of **wxDC**, such as `wxDC::DrawLine` (p. 355) and `wxDC::DrawText` (p. 357). Control colour on a window (`wxColour` (p. 150)) with brushes (`wxBrush` (p. 91)) and pens (`wxPen` (p. 976)).

To intercept events, you add a `DECLARE_EVENT_TABLE` macro to the window class declaration, and put a `BEGIN_EVENT_TABLE ... END_EVENT_TABLE` block in the implementation file. Between these macros, you add event macros which map the event (such as a mouse click) to a member function. These might override predefined event handlers such as for `wxKeyEvent` (p. 778) and `wxMouseEvent` (p. 928).

Most modern applications will have an on-line, hypertext help system; for this, you need `wxHelp` and the `wxHelpController` (p. 644) class to control `wxHelp`.

GUI applications aren't all graphical wizardry. List and hash table needs are catered for by `wxList` (p. 787), `wxStringList` (p. 1224) and `wxHashMap` (p. 638). You will undoubtedly need some platform-independent *file functions* (p. 1481), and you may find it handy to maintain and search a list of paths using `wxPathList` (p. 975). There's a *miscellany* (p. 1511) of operating system and other functions.

See also *Classes by Category* (p. 1548) for a list of classes.

wxWidgets Hello World sample

As many people have requested a mini-sample to be published here so that some quick judgment concerning syntax and basic principles can be made, you can now look at wxWidgets' "Hello World":

You have to include wxWidgets' header files, of course. This can be done on a file by file basis (such as `#include "wx/window.h"`) or using one global include (`#include "wx/wx.h"`). This is also useful on platforms which support precompiled headers such as all major compilers on the Windows platform.

```
//
// file name: hworld.cpp
//
// purpose: wxWidgets "Hello world"
//

// For compilers that support precompilation, includes "wx/wx.h".
#include "wx/wxprec.h"

#ifdef __BORLANDC__
    #pragma hdrstop
#endif

#ifdef WX_PRECOMP
    #include "wx/wx.h"
#endif
```

Practically every app should define a new class derived from `wxApp`. By overriding

wxApp's OnInit() the program can be initialized, e.g. by creating a new main window.

```
class MyApp: public wxApp
{
    virtual bool OnInit();
};
```

The main window is created by deriving a class from wxFrame and giving it a menu and a status bar in its constructor. Also, any class that wishes to respond to any "event" (such as mouse clicks or messages from the menu or a button) must declare an event table using the macro below. Finally, the way to react to such events must be done in "handlers". In our sample, we react to two menu items, one for "Quit" and one for displaying an "About" window. These handlers should not be virtual.

```
class MyFrame: public wxFrame
{
public:
    MyFrame(const wxString& title, const wxPoint& pos, const wxSize& size);

    void OnQuit(wxCommandEvent& event);
    void OnAbout(wxCommandEvent& event);

private:
    DECLARE_EVENT_TABLE()
};
```

In order to be able to react to a menu command, it must be given a unique identifier such as a const or an enum.

```
enum
{
    ID_Quit = 1,
    ID_About,
};
```

We then proceed to actually implement an event table in which the events are routed to their respective handler functions in the class MyFrame. There are predefined macros for routing all common events, ranging from the selection of a list box entry to a resize event when a user resizes a window on the screen. If -1 is given as the ID, the given handler will be invoked for any event of the specified type, so that you could add just one entry in the event table for all menu commands or all button commands etc. The origin of the event can still be distinguished in the event handler as the (only) parameter in an event handler is a reference to a wxEvent object, which holds various information about the event (such as the ID of and a pointer to the class, which emitted the event).

```
BEGIN_EVENT_TABLE(MyFrame, wxFrame)
    EVT_MENU(ID_Quit, MyFrame::OnQuit)
    EVT_MENU(ID_About, MyFrame::OnAbout)
END_EVENT_TABLE()
```

As in all programs there must be a "main" function. Under wxWidgets main is implemented using this macro, which creates an application instance and starts the program.

```
IMPLEMENT_APP(MyApp)
```

As mentioned above, wxApp::OnInit() is called upon startup and should be used to initialize the program, maybe showing a "splash screen" and creating the main window

(or several). The frame should get a title bar text ("Hello World") and a position and start-up size. One frame can also be declared to be the top window. Returning true indicates a successful initialization.

```
bool MyApp::OnInit()
{
    MyFrame *frame = new MyFrame( "Hello World", wxPoint(50,50),
    wxSize(450,340) );
    frame->Show( true );
    SetTopWindow( frame );
    return true;
}
```

In the constructor of the main window (or later on) we create a menu with two menu items as well as a status bar to be shown at the bottom of the main window. Both have to be "announced" to the frame with respective calls.

```
MyFrame::MyFrame(const wxString& title, const wxPoint& pos, const wxSize&
size)
    : wxFrame((wxFrame *)NULL, -1, title, pos, size)
{
    wxMenu *menuFile = new wxMenu;

    menuFile->Append( ID_About, "&About..." );
    menuFile->AppendSeparator();
    menuFile->Append( ID_Quit, "E&xit" );

    wxMenuBar *menuBar = new wxMenuBar;
    menuBar->Append( menuFile, "&File" );

    SetMenuBar( menuBar );

    CreateStatusBar();
    SetStatusText( "Welcome to wxWidgets!" );
}
```

Here are the actual event handlers. `MyFrame::OnQuit()` closes the main window by calling `Close()`. The parameter true indicates that other windows have no veto power such as after asking "Do you really want to close?". If there is no other main window left, the application will quit.

```
void MyFrame::OnQuit(wxCommandEvent& WXUNUSED(event))
{
    Close( true );
}
```

`MyFrame::OnAbout()` will display a small window with some text in it. In this case a typical "About" window with information about the program.

```
void MyFrame::OnAbout(wxCommandEvent& WXUNUSED(event))
{
    wxMessageBox( "This is a wxWidgets' Hello world sample",
                  "About Hello World", wxOK | wxICON_INFORMATION );
}
```

wxWidgets samples

Probably the best way to learn wxWidgets is by reading the source of some 50+ samples provided with it. Many aspects of wxWidgets programming can be learnt from them, but sometimes it is not simple to just choose the right sample to look at. This overview aims

at describing what each sample does/demonstrates to make it easier to find the relevant one if a simple grep through all sources didn't help. They also provide some notes about using the samples and what features of wxWidgets are they supposed to test.

There are currently more than 50 different samples as part of wxWidgets and this list is not complete. You should start your tour of wxWidgets with the *minimal sample* (p. 1568) which is the wxWidgets version of "Hello, world!". It shows the basic structure of wxWidgets program and is the most commented sample of all - looking at its source code is recommended.

The next most useful sample is probably the *controls* (p. 1569) one which shows many of wxWidgets standard controls, such as buttons, listboxes, checkboxes, comboboxes etc.

Other, more complicated controls, have their own samples. In this category you may find the following samples showing the corresponding controls:

<i>wxCalendarCtrl</i> (p. 1568)	Calendar a.k.a. date picker control
<i>wxListCtrl</i> (p. 1573)	List view control
<i>wxTreeCtrl</i> (p. 1577)	Tree view control
<i>wxGrid</i> (p. 1572)	Grid control

Finally, it might be helpful to do a search in the entire sample directory if you can't find the sample you showing the control you are interested in by name. Most of wxWidgets classes, occur in at least one of the samples.

Minimal sample

The minimal sample is what most people will know under the term Hello World, i.e. a minimal program that doesn't demonstrate anything apart from what is needed to write a program that will display a "hello" dialog. This is usually a good starting point for learning how to use wxWidgets.

Art provider sample

The `artprov` sample shows how you can customize the look of standard wxWidgets dialogs by replacing default bitmaps/icons with your own versions. It also shows how you can use `wxArtProvider` to get stock bitmaps for use in your application.

Calendar sample

This font shows the *calendar control* (p. 109) in action. It shows how to configure the control (see the different options in the calendar menu) and also how to process the notifications from it.

Checklist sample

This sample demonstrates the use of the *wxCheckListBox* (p. 125) class intercepting check, select and double click events. It also tests the use of various methods modifying the control, such as by deleting items from it or inserting new ones (these functions are actually implemented in the parent class *wxListBox* (p. 794) so the sample tests that class as well). The layout of the dialog is created using a *wxBoxSizer* (p. 90) demonstrating a simple dynamic layout.

Config sample

This sample demonstrates the *wxConfig* (p. 178) classes in a platform independent way, i.e. it uses text based files to store a given configuration under Unix and uses the Registry under Windows.

See *wxConfig overview* (p. 1607) for the descriptions of all features of this class.

Controls sample

The controls sample is the main test program for most simple controls used in *wxWidgets*. The sample tests their basic functionality, events, placement, modification in terms of colour and font as well as the possibility to change the controls programmatically, such as adding item to a list box etc. Apart from that, the sample uses a *wxNotebook* (p. 943) and tests most features of this special control (using bitmap in the tabs, using *wxSizers* (p. 1110) and *constraints* (p. 785) within notebook pages, advancing pages programmatically and vetoing a page change by intercepting the *wxNotebookEvent* (p. 950).

The various controls tested are listed here:

<i>wxButton</i> (p. 104)	Push button control, displaying text
<i>wxBitmapButton</i> (p. 80)	Push button control, displaying a bitmap
<i>wxCheckBox</i> (p. 121)	Checkbox control
<i>wxChoice</i> (p. 127)	Choice control (a combobox without the editable area)
<i>wxComboBox</i> (p. 158)	A choice with an editable area
<i>wxGauge</i> (p. 554)	A control to represent a varying quantity, such as time remaining
<i>wxStaticBox</i> (p. 1180)	A static, or group box for visually grouping related controls
<i>wxListBox</i> (p. 794)	A list of strings for single or multiple selection
<i>wxSpinCtrl</i>	A spin ctrl with a text field and a 'up-down' control

<i>wxSpinButton</i> (p. 1155)	A spin or 'up-down' control
<i>wxStaticText</i> (p. 1184)	One or more lines of non-editable text
<i>wxStaticBitmap</i> (p. 1178)	A control to display a bitmap
<i>wxRadioBox</i> (p. 1033)	A group of radio buttons
<i>wxRadioButton</i> (p. 1039)	A round button to be used with others in a mutually exclusive way
<i>wxSlider</i> (p. 1122)	A slider that can be dragged by the user

Database sample

The database sample is a small test program showing how to use the ODBC classes written by Remstar Intl. Obviously, this sample requires a database with ODBC support to be correctly installed on your system.

Dialogs sample

This sample shows how to use the common dialogs available from wxWidgets. These dialogs are described in details in the *Common dialogs overview* (p. 1654).

Dialup sample

This sample shows *wxDialUpManager* (p. 379) class. It displays in the status bar the information gathered through its interface: in particular, the current connection status (online or offline) and whether the connection is permanent (in which case a string 'LAN' appears in the third status bar field - but note that you may have be on a LAN not connected to the Internet, in which case you will not see this) or not.

Using the menu entries, you may also dial or hang up the line if you have a modem attached and (this only makes sense for Windows) list the available connections.

DnD sample

This sample shows both clipboard and drag and drop in action. It is quite non trivial and may be safely used as a basis for implementing the clipboard and drag and drop operations in a real-life program.

When you run the sample, its screen is split in several parts. On the top, there are two listboxes which show the standard derivations of *wxDropTarget* (p. 432): *wxTextDropTarget* (p. 1270) and *wxFileDropTarget* (p. 473).

The middle of the sample window is taken by the log window which shows what is going on (of course, this only works in debug builds) and may be helpful to see the sequence of steps of data transfer.

Finally, the last part is used for dragging text from it to either one of the listboxes (only one will accept it) or another application. The last functionality available from the main frame is to paste a bitmap from the clipboard (or, in the case of Windows version, also a metafile) - it will be shown in a new frame.

So far, everything we mentioned was implemented with minimal amount of code using standard `wxWidgets` classes. The more advanced features are demonstrated if you create a shape frame from the main frame menu. A shape is a geometric object which has a position, size and color. It models some application-specific data in this sample. A shape object supports its own private *`wxDataFormat`* (p. 218) which means that you may cut and paste it or drag and drop (between one and the same or different shapes) from one sample instance to another (or the same). However, chances are that no other program supports this format and so shapes can also be rendered as bitmaps which allows them to be pasted/dropped in many other applications (and, under Windows, also as metafiles which are supported by most of Windows programs as well - try Write/Wordpad, for example).

Take a look at `DnDShapeDataObject` class to see how you may use *`wxDataObject`* (p. 223) to achieve this.

Dynamic sample

This sample is a very small sample that demonstrates the use of the *`wxEvtHandler::Connect`* (p. 447) method. This method should be used whenever it is not known at compile time, which control will receive which event or which controls are actually going to be in a dialog or frame. This is most typically the case for any scripting language that would work as a wrapper for `wxWidgets` or programs where forms or similar datagrams can be created by the users.

See also the *event sample* (p. 1571)

Event sample

The event sample demonstrates various features of the `wxWidgets` events. It shows using dynamic events and connecting/disconnecting the event handlers during the run time and also using *`PushEventHandler()`* (p. 1417) and *`PopEventHandler()`* (p. 1416).

It replaces the old dynamic sample.

Except(ions) sample

This very simple sample shows how to use C++ exceptions in `wxWidgets` programs, i.e. where to catch the exception which may be thrown by the program code. It doesn't do anything very exciting by itself, you need to study its code to understand what goes on.

You need to build the library with `wxUSE_EXCEPTIONS` being set to 1 and compile your code with the C++ exceptions support to be able to build this sample.

Exec sample

The exec sample demonstrates the *wxExecute* (p. 1475) and *wxShell* (p. 1478) functions. Both of them are used to execute the external programs and the sample shows how to do this synchronously (waiting until the program terminates) or asynchronously (notification will come later).

It also shows how to capture the output of the child process in both synchronous and asynchronous cases and how to kill the processes with *wxProcess::Kill* (p. 1022) and test for their existence with *wxProcess::Exists* (p. 1022).

Font sample

The font sample demonstrates *wxFont* (p. 512), *wxFontEnumerator* (p. 526) and *wxFontMapper* (p. 528) classes. It allows you to see the fonts available (to wxWidgets) on the computer and shows all characters of the chosen font as well.

Grid sample

TODO.

HTML samples

Eight HTML samples (you can find them in directory `samples/html`) cover all features of HTML sub-library.

Test demonstrates how to create *wxHtmlWindow* (p. 699) and also shows most of supported HTML tags.

Widget shows how you can embed ordinary controls or windows within HTML page. It also nicely explains how to write new tag handlers and extend the library to work with unsupported tags.

About may give you an idea how to write good-looking about boxes.

Zip demonstrates use of virtual file systems in wxHTML. The zip archives handler (ships with wxWidgets) allows you to access HTML pages stored in compressed archive as if they were ordinary files.

Virtual is yet another virtual file systems demo. This one generates pages at run-time. You may find it useful if you need to display some reports in your application.

Printing explains use of *wxHtmlEasyPrinting* (p. 668) class which serves as as-simple-as-possible interface for printing HTML documents without much work. In fact, only few function calls are sufficient.

Help and **Helpview** are variations on displaying HTML help (compatible with MS HTML Help Workshop). *Help* shows how to embed *wxHtmlHelpController* (p. 672) in your application while *Helpview* is simple tool that only pops up help window and displays

help books given at command line.

Image sample

The image sample demonstrates the use of the *wxImage* (p. 728) class and shows how to download images in a variety of formats, currently PNG, GIF, TIFF, JPEG, BMP, PNM and PCX. The top of the sample shows two rectangles, one of which is drawn directly in the window, the other one is drawn into a *wxBitmap* (p. 67), converted to a *wxImage*, saved as a PNG image and then reloaded from the PNG file again so that conversions between *wxImage* and *wxBitmap* as well as loading and save PNG files are tested.

At the bottom of the main frame is a test for using a monochrome bitmap by drawing into a *wxMemoryDC* (p. 881). The bitmap is then drawn specifying the foreground and background colours with *wxDC::SetTextForeground* (p. 368) and *wxDC::SetTextBackground* (p. 368) (on the left). The bitmap is then converted to a *wxImage* and the foreground colour (black) is replaced with red using *wxImage::Replace* (p. 744).

Internat(ionalization) sample

The not very clearly named internat sample demonstrates the *wxWidgets* internationalization (i18n for short from now on) features. To be more precise, it only shows localization support, i.e. support for translating the program messages in another language while true i18n would also involve changing the other aspects of the programs behaviour.

More information about this sample can be found in the `readme.txt` file in its directory. Please see also *i18n overview* (p. 1596).

Layout sample

The layout sample demonstrates the two different layout systems offered by *wxWidgets*. When starting the program, you will see a frame with some controls and some graphics. The controls will change their size whenever you resize the entire frame and the exact behaviour of the size changes is determined using the *wxLayoutConstraints* (p. 785) class. See also the *overview* (p. 1624) and the *wxIndividualLayoutConstraint* (p. 758) class for further information.

The menu in this sample offers two more tests, one showing how to use a *wxBoxSizer* (p. 90) in a simple dialog and the other one showing how to use sizers in connection with a *wxNotebook* (p. 943) class. See also *wxNotebookSizer* (p. 952) and *wxSizer* (p. 1110).

Listctrl sample

This sample shows *wxListCtrl* (p. 799) control. Different modes supported by the control (list, icons, small icons, report) may be chosen from the menu.

The sample also provides some timings for adding/deleting/sorting a lot of (several thousands) items into the control.

Notebook sample

This samples shows two controls at once: although initially it was written to demonstrate *wxNotebook* (p. 943) only, it can now be also used to see *wxListbook* (p. 793) in action. To switch between the two controls you need to manually change `TEST_LISTBOOK` definition in the file `notebook.h` and rebuild the sample.

Render sample

This sample shows how to replace the default *wxWidgets* *renderer* (p. 1059) and also how to write a shared library (DLL) implementing a renderer and load and unload it during the run-time.

Rotate sample

This is a simple example which demonstrates how to rotate an image with the *wxImage::Rotate* (p. 744) method. The rotation can be done without interpolation (left mouse button) which will be faster, or with interpolation (right mouse button) which is slower but gives better results.

Scroll subwindow sample

This sample demonstrates the use of the *wxScrolledWindow* (p. 1085) class including placing subwindows into it and drawing simple graphics. It uses the *SetTargetWindow* (p. 1094) method and thus the effect of scrolling does not show in the scrolled window itself, but in one of its subwindows.

Additionally, this samples demonstrates how to optimize drawing operations in *wxWidgets*, in particular using the *wxWindow::IsExposed* (p. 1413) method with the aim to prevent unnecessary drawing in the window and thus reducing or removing flicker on screen.

Sockets sample

The sockets sample demonstrates how to use the communication facilities provided by *wxSocket* (p. 1132). There are two different applications in this sample: a server, which is implemented using a *wxSocketServer* (p. 1153) object, and a client, which is implemented as a *wxSocketClient* (p. 1149).

The server binds to the local address, using TCP port number 3000, sets up an event handler to be notified of incoming connection requests (**wxSOCKET_CONNECTION** events), and stands there, waiting for clients (*listening* in the socket parlance). For each accepted connection, a new *wxSocketBase* (p. 1132) object is created. These socket

objects are independent from the server that created them, so they set up their own event handler, and then request to be notified of **wxSOCKET_INPUT** (incoming data) or **wxSOCKET_LOST** (connection closed at the remote end) events. In the sample, the event handler is the same for all connections; to find out which socket the event is addressed to, the *GetSocket* (p. 1152) function is used.

Although it might take some time to get used to the event-oriented system upon which *wxSocket* is built, the benefits are many. See, for example, that the server application, while being single-threaded (and of course without using *fork()* or ugly *select()* loops) can handle an arbitrary number of connections.

The client starts up unconnected, so you can use the *Connect...* option to specify the address of the server you are going to connect to (the TCP port number is hard-coded as 3000). Once connected, a number of tests are possible. Currently, three tests are implemented. They show how to use the basic IO calls in *wxSocketBase* (p. 1132), such as *Read* (p. 1143), *Write* (p. 1147), *ReadMsg* (p. 1144) and *WriteMsg* (p. 1148), and how to set up the correct IO flags depending on what you are going to do. See the comments in the code for more information. Note that because both clients and connection objects in the server set up an event handler to catch **wxSOCKET_LOST** events, each one is immediately notified if the other end closes the connection.

There is also an URL test which shows how to use the *wxURL* (p. 1357) class to fetch data from a given URL.

The sockets sample is work in progress. Some things to do:

- More tests for basic socket functionality.
- More tests for protocol classes (*wxProtocol* and its descendants).
- Tests for the recently added (and still in alpha stage) datagram sockets.
- New samples which actually do something useful (suggestions accepted).

Sound sample

The *sound* sample shows how to use *wxSound* (p. 1386) for simple audio output (e.g. notifications).

Statbar sample

This sample shows how to create and use *wxStatusBar*. Although most of the samples have a statusbar, they usually only create a default one and only do it once.

Here you can see how to recreate the statusbar (with possibly different number of fields) and how to use it to show icons/bitmaps and/or put arbitrary controls into it.

Text sample

This sample demonstrates four features: firstly the use and many variants of the *wxTextCtrl* (p. 1250) class (single line, multi line, read only, password, ignoring TAB, ignoring ENTER).

Secondly it shows how to intercept a *wxKeyEvent* (p. 778) in both the raw form using the `EVT_KEY_UP` and `EVT_KEY_DOWN` macros and the higher level from using the `EVT_CHAR` macro. All characters will be logged in a log window at the bottom of the main window. By pressing some of the function keys, you can test some actions in the text ctrl as well as get statistics on the text ctrls, which is useful for testing if these statistics actually are correct.

Thirdly, on platforms which support it, the sample will offer to copy text to the *wxClipboard* (p. 136) and to paste text from it. The GTK version will use the so called PRIMARY SELECTION, which is the pseudo clipboard under X and best known from pasting text to the XTerm program.

Last not least: some of the text controls have tooltips and the sample also shows how tooltips can be centrally disabled and their latency controlled.

Thread sample

This sample demonstrates the use of threads in connection with GUI programs. There are two fundamentally different ways to use threads in GUI programs and either way has to take care of the fact that the GUI library itself usually is not multi-threading safe, i.e. that it might crash if two threads try to access the GUI class simultaneously. One way to prevent that is have a normal GUI program in the main thread and some worker threads which work in the background. In order to make communication between the main thread and the worker threads possible, *wxWidgets* offers the *wxPostEvent* (p. 1518) function and this sample makes use of this function.

The other way to use a so called Mutex (such as those offered in the *wxMutex* (p. 938) class) that prevent threads from accessing the GUI classes as long as any other thread accesses them. For this, *wxWidgets* has the *wxMutexGuiEnter* (p. 1480) and *wxMutexGuiLeave* (p. 1481) functions, both of which are used and tested in the sample as well.

See also *Multithreading overview* (p. 1672) and *wxThread* (p. 1286).

Toolbar sample

The toolbar sample shows the *wxToolBar* (p. 1311) class in action.

The following things are demonstrated:

- Creating the toolbar using *wxToolBar::AddTool* (p. 1315) and *wxToolBar::AddControl* (p. 1315): see *MyApp::InitToolbar* in the sample.
- Using `EVT_UPDATE_UI` handler for automatically enabling/disabling toolbar buttons without having to explicitly call *EnableTool*. This is done in *MyFrame::OnUpdateCopyAndCut*.

- Using *wxToolBar::DeleteTool* (p. 1317) and *wxToolBar::InsertTool* (p. 1322) to dynamically update the toolbar.

Some buttons in the main toolbar are check buttons, i.e. they stay checked when pressed. On the platforms which support it, the sample also add a combobox to the toolbar showing how you can use arbitrary controls and not only buttons in it.

If you toggle another toolbar in the sample (using `Ctrl-A`) you will also see the radio toolbar buttons in action: the first three buttons form a radio group, that is checking any of them automatically unchecks the previously checked one.

Treectrl sample

This sample demonstrates using *wxTreeCtrl* (p. 1329) class. Here you may see how to process various notification messages sent by this control and also when they occur (by looking at the messages in the text control in the bottom part of the frame).

Adding, inserting and deleting items and branches from the tree as well as sorting (in default alphabetical order as well as in custom one) is demonstrated here as well - try the corresponding menu entries.

Wizard sample

This sample shows so-called wizard dialog (implemented using *wxWizard* (p. 1443) and related classes). It shows almost all features supported:

- Using bitmaps with the wizard and changing them depending on the page shown (notice that *wxValidationPage* in the sample has a different image from the other ones)
- Using *TransferDataFromWindow* (p. 1439) to verify that the data entered is correct before passing to the next page (done in *wxValidationPage* which forces the user to check a checkbox before continuing).
- Using more elaborated techniques to allow returning to the previous page, but not continuing to the next one or vice versa (in *wxRadioboxPage*)
- This (*wxRadioboxPage*) page also shows how the page may process `Cancel` button itself instead of relying on the wizard parent to do it.
- Normally, the order of the pages in the wizard is known at compile-time, but sometimes it depends on the user choices: *wxCheckboxPage* shows how to dynamically decide which page to display next (see also *wxWizardPage* (p. 1449))

wxApp overview

Classes: *wxApp* (p. 31)

A wxWidgets application does not have a *main* procedure; the equivalent is the *OnInit* (p. 37) member defined for a class derived from *wxApp*. *OnInit* will usually create a top window as a bare minimum.

Unlike in earlier versions of wxWidgets, *OnInit* does not return a frame. Instead it returns a boolean value which indicates whether processing should continue (true) or not (false). You call *wxApp::SetTopWindow* (p. 41) to let wxWidgets know about the top window.

Note that the program's command line arguments, represented by *argc* and *argv*, are available from within *wxApp* member functions.

An application closes by destroying all windows. Because all frames must be destroyed for the application to exit, it is advisable to use parent frames wherever possible when creating new frames, so that deleting the top level frame will automatically delete child frames. The alternative is to explicitly delete child frames in the top-level frame's *wxCloseEvent* (p. 139) handler.

In emergencies the *wxExit* (p. 1477) function can be called to kill the application however normally the applications shuts down automatically, *see below* (p. 1578).

An example of defining an application follows:

```
class DerivedApp : public wxApp
{
public:
    virtual bool OnInit();
};

IMPLEMENT_APP(DerivedApp)

bool DerivedApp::OnInit()
{
    wxFrame *the_frame = new wxFrame(NULL, ID_MYFRAME, argv[0]);
    ...
    the_frame->Show(true);
    SetTopWindow(the_frame);

    return true;
}
```

Note the use of *IMPLEMENT_APP(appClass)*, which allows wxWidgets to dynamically create an instance of the application object at the appropriate point in wxWidgets initialization. Previous versions of wxWidgets used to rely on the creation of a global application object, but this is no longer recommended, because required global initialization may not have been performed at application object construction time.

You can also use *DECLARE_APP(appClass)* in a header file to declare the *wxGetApp* function which returns a reference to the application object. Otherwise you can only use the global *wxTheApp* pointer which is of type *wxApp **.

Application shutdown

The application normally shuts down when the last of its top level windows is closed. This is normally the expected behaviour and means that it is enough to call *Close()* (p. 1395) in response to the "Exit" menu command if your program has a single top level window. If this behaviour is not desirable *wxApp::SetExitOnFrameDelete* (p. 40) can be

called to change it. Note that starting from wxWidgets 2.3.3 such logic doesn't apply for the windows shown before the program enters the main loop: in other words, you can safely show a dialog from *wxApp::OnInit* (p. 37) and not be afraid that your application terminates when this dialog -- which is the last top level window for the moment -- is closed.

Another aspect of the application shutdown is the *OnExit* (p. 36) which is called when the application exits but *before* wxWidgets cleans up its internal structures. You should delete all wxWidgets object that your created by the time OnExit finishes. In particular, do **not** destroy them from application class' destructor!

For example, this code may crash:

```
class MyApp : public wxApp
{
public:
    wxCHMHelpController m_helpCtrl;
    ...
};
```

The reason for that is that *m_helpCtrl* is a member object and is thus destroyed from *MyApp* destructor. But *MyApp* object is deleted after wxWidgets structures that *wxCHMHelpController* depends on were uninitialized! The solution is to destroy *HelpCtrl* in *OnExit*:

```
class MyApp : public wxApp
{
public:
    wxCHMHelpController *m_helpCtrl;
    ...
};

bool MyApp::OnInit()
{
    ...
    m_helpCtrl = new wxCHMHelpController;
    ...
}

int MyApp::OnExit()
{
    delete m_helpCtrl;
    return 0;
}
```

Run time class information overview

Classes: *wxObject* (p. 954), *wxClassInfo* (p. 130).

One of the failings of C++ used to be that no run-time information was provided about a class and its position in the inheritance hierarchy. Another, which still persists, is that instances of a class cannot be created just by knowing the name of a class, which makes facilities such as persistent storage hard to implement.

Most C++ GUI frameworks overcome these limitations by means of a set of macros and functions and wxWidgets is no exception. As it originated before the addition of RTTI to the standard C++ and as support for it still missing from some (albeit old) compilers,

`wxWidgets` doesn't (yet) use it, but provides its own macro-based RTTI system.

In the future, the standard C++ RTTI will be used though and you're encouraged to use whenever possible `wxDynamicCast()` (p. 1525) macro which, for the implementations that support it, is defined just as `dynamic_cast<>` and uses `wxWidgets` RTTI for all the others. This macro is limited to `wxWidgets` classes only and only works with pointers (unlike the real `dynamic_cast<>` which also accepts references).

Each class that you wish to be known the type system should have a macro such as `DECLARE_DYNAMIC_CLASS` just inside the class declaration. The macro `IMPLEMENT_DYNAMIC_CLASS` should be in the implementation file. Note that these are entirely optional; use them if you wish to check object types, or create instances of classes using the class name. However, it is good to get into the habit of adding these macros for all classes.

Variations on these *macros* (p. 1521) are used for multiple inheritance, and abstract classes that cannot be instantiated dynamically or otherwise.

`DECLARE_DYNAMIC_CLASS` inserts a static `wxClassInfo` declaration into the class, initialized by `IMPLEMENT_DYNAMIC_CLASS`. When initialized, the `wxClassInfo` object inserts itself into a linked list (accessed through `wxClassInfo::first` and `wxClassInfo::next` pointers). The linked list is fully created by the time all global initialisation is done.

`IMPLEMENT_DYNAMIC_CLASS` is a macro that not only initialises the static `wxClassInfo` member, but defines a global function capable of creating a dynamic object of the class in question. A pointer to this function is stored in `wxClassInfo`, and is used when an object should be created dynamically.

`wxObject::IsKindOf` (p. 956) uses the linked list of `wxClassInfo`. It takes a `wxClassInfo` argument, so use `CLASSINFO(className)` to return an appropriate `wxClassInfo` pointer to use in this function.

The function `wxCreateDynamicObject` (p. 1525) can be used to construct a new object of a given type, by supplying a string name. If you have a pointer to the `wxClassInfo` object instead, then you can simply call `wxClassInfo::CreateObject`.

wxClassInfo

Run time class information overview (p. 1579)

Class: `wxClassInfo` (p. 130)

This class stores meta-information about classes. An application may use macros such as `DECLARE_DYNAMIC_CLASS` and `IMPLEMENT_DYNAMIC_CLASS` to record run-time information about a class, including:

- its position in the inheritance hierarchy;
- the base class name(s) (up to two base classes are permitted);
- a string representation of the class name;

- a function that can be called to construct an instance of this class.

The `DECLARE_...` macros declare a static `wxClassInfo` variable in a class, which is initialized by macros of the form `IMPLEMENT_...` in the implementation C++ file. Classes whose instances may be constructed dynamically are given a global constructor function which returns a new object.

You can get the `wxClassInfo` for a class by using the `CLASSINFO` macro, e.g. `CLASSINFO(wxFrame)`. You can get the `wxClassInfo` for an object using `wxObject::GetClassInfo`.

See also *wxObject* (p. 954) and *wxCreateDynamicObject* (p. 1525).

Example

In a header file `frame.h`:

```
class wxFrame : public wxWindow
{
    DECLARE_DYNAMIC_CLASS(wxFrame)

private:
    wxString m_title;

public:
    ...
};
```

In a C++ file `frame.cpp`:

```
IMPLEMENT_DYNAMIC_CLASS(wxFrame, wxWindow)

wxFrame::wxFrame( )
{
    ...
}
```

wxString overview

Classes: *wxString* (p. 1201), *wxArrayString* (p. 54), *wxStringTokenizer* (p. 1226)

Introduction

`wxString` is a class which represents a character string of arbitrary length (limited by `MAX_INT` which is usually 2147483647 on 32 bit machines) and containing arbitrary characters. The ASCII NUL character is allowed, but be aware that in the current string implementation some methods might not work correctly in this case.

`wxString` works with both ASCII (traditional, 7 or 8 bit, characters) as well as Unicode (wide characters) strings.

This class has all the standard operations you can expect to find in a string class: dynamic memory management (string extends to accommodate new characters),

construction from other strings, C strings and characters, assignment operators, access to individual characters, string concatenation and comparison, substring extraction, case conversion, trimming and padding (with spaces), searching and replacing and both C-like *Printf()* (p. 1216) and stream-like insertion functions as well as much more - see *wxString* (p. 1201) for a list of all functions.

Comparison of wxString to other string classes

The advantages of using a special string class instead of working directly with C strings are so obvious that there is a huge number of such classes available. The most important advantage is the need to always remember to allocate/free memory for C strings; working with fixed size buffers almost inevitably leads to buffer overflows. At last, C++ has a standard string class (`std::string`). So why the need for *wxString*?

There are several advantages:

1. **Efficiency** This class was made to be as efficient as possible: both in terms of size (each *wxString* objects takes exactly the same space as a *char ** pointer, sing *reference counting* (p. 1584)) and speed. It also provides performance *statistics gathering code* (p. 1585) which may be enabled to fine tune the memory allocation strategy for your particular application - and the gain might be quite big.
2. **Compatibility** This class tries to combine almost full compatibility with the old *wxWidgets* 1.xx *wxString* class, some reminiscence to MFC *CString* class and 90% of the functionality of `std::string` class.
3. **Rich set of functions** Some of the functions present in *wxString* are very useful but don't exist in most of other string classes: for example, *AfterFirst* (p. 1209), *BeforeLast* (p. 1210), *operator<<* (p. 1222) or *Printf* (p. 1216). Of course, all the standard string operations are supported as well.
4. **Unicode** *wxString* is Unicode friendly: it allows to easily convert to and from ANSI and Unicode strings in any build mode (see the *Unicode overview* (p. 1590) for more details) and maps to either `string` or `wstring` transparently depending on the current mode.
5. **Used by wxWidgets** And, of course, this class is used everywhere inside *wxWidgets* so there is no performance loss which would result from conversions of objects of any other string class (including `std::string`) to *wxString* internally by *wxWidgets*.

However, there are several problems as well. The most important one is probably that there are often several functions to do exactly the same thing: for example, to get the length of the string either one of `length()`, *Len()* (p. 1215) or *Length()* (p. 1215) may be used. The first function, as almost all the other functions in lowercase, is `std::string` compatible. The second one is "native" *wxString* version and the last one is *wxWidgets* 1.xx way. So the question is: which one is better to use? And the answer is that:

The usage of `std::string` compatible functions is strongly advised! It will both make your code more familiar to other C++ programmers (who are supposed to have

knowledge of `std::string` but not of `wxString`), let you reuse the same code in both `wxWidgets` and other programs (by just typedefing `wxString` as `std::string` when used outside `wxWidgets`) and by staying compatible with future versions of `wxWidgets` which will probably start using `std::string` sooner or later too.

In the situations where there is no corresponding `std::string` function, please try to use the new `wxString` methods and not the old `wxWidgets 1.xx` variants which are deprecated and may disappear in future versions.

Some advice about using `wxString`

Probably the main trap with using this class is the implicit conversion operator to `const char *`. It is advised that you use `c_str()` (p. 1210) instead to clearly indicate when the conversion is done. Specifically, the danger of this implicit conversion may be seen in the following code fragment:

```
// this function converts the input string to uppercase, output it to the
screen
// and returns the result
const char *SayHELLO(const wxString& input)
{
    wxString output = input.Upper();

    printf("Hello, %s!\n", output);

    return output;
}
```

There are two nasty bugs in these three lines. First of them is in the call to the `printf()` function. Although the implicit conversion to C strings is applied automatically by the compiler in the case of

```
puts(output);
```

because the argument of `puts()` is known to be of the type `const char *`, this is **not** done for `printf()` which is a function with variable number of arguments (and whose arguments are of unknown types). So this call may do anything at all (including displaying the correct string on screen), although the most likely result is a program crash. The solution is to use `c_str()` (p. 1210): just replace this line with

```
printf("Hello, %s!\n", output.c_str());
```

The second bug is that returning `output` doesn't work. The implicit cast is used again, so the code compiles, but as it returns a pointer to a buffer belonging to a local variable which is deleted as soon as the function exits, its contents is totally arbitrary. The solution to this problem is also easy: just make the function return `wxString` instead of a C string.

This leads us to the following general advice: all functions taking string arguments should take `const wxString&` (this makes assignment to the strings inside the function faster because of *reference counting* (p. 1584)) and all functions returning strings should return `wxString` - this makes it safe to return local variables.

Other string related functions and classes

As most programs use character strings, the standard C library provides quite a few functions to work with them. Unfortunately, some of them have rather counter-intuitive behaviour (like `strncpy()` which doesn't always terminate the resulting string with a `NULL`) and are in general not very safe (passing `NULL` to them will probably lead to program crash). Moreover, some very useful functions are not standard at all. This is why in addition to all `wxString` functions, there are also a few global string functions which try to correct these problems: `wxIsEmpty()` (p. 1491) verifies whether the string is empty (returning `true` for `NULL` pointers), `wxStrlen()` (p. 1492) also handles `NULL`s correctly and returns 0 for them and `wxStricmp()` (p. 1492) is just a platform-independent version of case-insensitive string comparison function known either as `stricmp()` or `strcasecmp()` on different platforms.

The `<wx/string.h>` header also defines `wxSnprintf` (p. 1493) and `wxVsnprintf` (p. 1494) functions which should be used instead of the inherently dangerous standard `sprintf()` and which use `snprintf()` instead which does buffer size checks whenever possible. Of course, you may also use `wxString::Printf` (p. 1216) which is also safe.

There is another class which might be useful when working with `wxString`: `wxStringTokenizer` (p. 1226). It is helpful when a string must be broken into tokens and replaces the standard C library `strtok()` function.

And the very last string-related class is `wxArrayString` (p. 54): it is just a version of the "template" dynamic array class which is specialized to work with strings. Please note that this class is specially optimized (using its knowledge of the internal structure of `wxString`) for storing strings and so it is vastly better from a performance point of view than a `wxObjectArray` of `wxStrings`.

Reference counting and why you shouldn't care about it

`wxString` objects use a technique known as *copy on write* (COW). This means that when a string is assigned to another, no copying really takes place: only the reference count on the shared string data is incremented and both strings share the same data.

But as soon as one of the two (or more) strings is modified, the data has to be copied because the changes to one of the strings shouldn't be seen in the others. As data copying only happens when the string is written to, this is known as COW.

What is important to understand is that all this happens absolutely transparently to the class users and that whether a string is shared or not is not seen from the outside of the class - in any case, the result of any operation on it is the same.

Probably the unique case when you might want to think about reference counting is when a string character is taken from a string which is not a constant (or a constant reference). In this case, due to C++ rules, the "read-only" `operator[]` (which is the same as `GetChar()` (p. 1212)) cannot be chosen and the "read/write" `operator[]` (the same as `GetWritableChar()` (p. 1213)) is used instead. As the call to this operator may modify the string, its data is unshared (COW is done) and so if the string was really shared there is some performance loss (both in terms of speed and memory consumption). In the rare

cases when this may be important, you might prefer using *GetChar()* (p. 1212) instead of the array subscript operator for this reasons. Please note that *at()* (p. 1206) method has the same problem as the subscript operator in this situation and so using it is not really better. Also note that if all string arguments to your functions are passed as *const wxString&* (see the section *Some advice* (p. 1583)) this situation will almost never arise because for constant references the correct operator is called automatically.

Tuning wxString for your application

Note: this section is strictly about performance issues and is absolutely not necessary to read for using *wxString* class. Please skip it unless you feel familiar with profilers and relative tools. If you do read it, please also read the preceding section about *reference counting* (p. 1584).

For the performance reasons *wxString* doesn't allocate exactly the amount of memory needed for each string. Instead, it adds a small amount of space to each allocated block which allows it to not reallocate memory (a relatively expensive operation) too often as when, for example, a string is constructed by subsequently adding one character at a time to it, as for example in:

```
// delete all vowels from the string
wxString DeleteAllVowels(const wxString& original)
{
    wxString result;

    size_t len = original.length();
    for ( size_t n = 0; n < len; n++ )
    {
        if ( strchr("aeuio", tolower(original[n])) == NULL )
            result += original[n];
    }

    return result;
}
```

This is quite a common situation and not allocating extra memory at all would lead to very bad performance in this case because there would be as many memory (re)allocations as there are consonants in the original string. Allocating too much extra memory would help to improve the speed in this situation, but due to a great number of *wxString* objects typically used in a program would also increase the memory consumption too much.

The very best solution in precisely this case would be to use *Alloc()* (p. 1209) function to preallocate, for example, *len* bytes from the beginning - this will lead to exactly one memory allocation being performed (because the result is at most as long as the original string).

However, using *Alloc()* is tedious and so *wxString* tries to do its best. The default algorithm assumes that memory allocation is done in granularity of at least 16 bytes (which is the case on almost all of wide-spread platforms) and so nothing is lost if the amount of memory to allocate is rounded up to the next multiple of 16. Like this, no memory is lost and 15 iterations from 16 in the example above won't allocate memory but use the already allocated pool.

The default approach is quite conservative. Allocating more memory may bring important

performance benefits for programs using (relatively) few very long strings. The amount of memory allocated is configured by the setting of *EXTRA_ALLOC* in the file *string.cpp* during compilation (be sure to understand why its default value is what it is before modifying it!). You may try setting it to greater amount (say twice *nLen*) or to 0 (to see performance degradation which will follow) and analyse the impact of it on your program. If you do it, you will probably find it helpful to also define *WXSTRING_STATISTICS* symbol which tells the *wxString* class to collect performance statistics and to show them on *stderr* on program termination. This will show you the average length of strings your program manipulates, their average initial length and also the percent of times when memory wasn't reallocated when string concatenation was done but the already preallocated memory was used (this value should be about 98% for the default allocation policy, if it is less than 90% you should really consider fine tuning *wxString* for your application).

It goes without saying that a profiler should be used to measure the precise difference the change to *EXTRA_ALLOC* makes to your program.

Date and time classes overview

Classes: *wxDateTime* (p. 237), *wxDateSpan* (p. 232), *wxTimeSpan* (p. 1300), *wxCalendarCtrl* (p. 109)

Introduction

wxWidgets provides a set of powerful classes to work with dates and times. Some of the supported features of *wxDateTime* (p. 237) class are:

Wide range	The range of supported dates goes from about 4714 B.C. to some 480 million years in the future.
Precision	Not using floating point calculations anywhere ensures that the date calculations don't suffer from rounding errors.
Many features	Not only all usual calculations with dates are supported, but also more exotic week and year day calculations, work day testing, standard astronomical functions, conversion to and from strings in either strict or free format.
Efficiency	Objects of <i>wxDateTime</i> are small (8 bytes) and working with them is fast

All date/time classes at a glance

There are 3 main classes declared in `<wx/datetime.h>`: except *wxDateTime* (p. 237) itself which represents an absolute moment in time, there are also two classes -

wxTimeSpan (p. 1300) and *wxDateSpan* (p. 232) which represent the intervals of time.

There are also helper classes which are used together with *wxDateTime*:

wxDateTimeHolidayAuthority (p. 264) which is used to determine whether a given date is a holiday or not and *wxDateTimeWorkDays* (p. 264) which is a derivation of this class for which (only) Saturdays and Sundays are the holidays. See more about these classes in the discussion of the *holidays* (p. 1589).

Finally, in other parts of this manual you may find mentions of *wxDate* and *wxTime* classes. *These classes* (p. 1590) are obsolete and superseded by *wxDateTime*.

wxDateTime characteristics

wxDateTime (p. 237) stores the time as a signed number of milliseconds since the Epoch which is fixed, by convention, to Jan 1, 1970 - however this is not visible to the class users (in particular, dates prior to the Epoch are handled just as well (or as bad) as the dates after it). But it does mean that the best resolution which can be achieved with this class is 1 millisecond.

The size of *wxDateTime* object is 8 bytes because it is represented as a 64 bit integer. The resulting range of supported dates is thus approximatively 580 million years, but due to the current limitations in the Gregorian calendar support, only dates from Nov 24, 4714BC are supported (this is subject to change if there is sufficient interest in doing it).

Finally, the internal representation is time zone independent (always in GMT) and the time zones only come into play when a date is broken into year/month/day components. See more about *timezones* (p. 1588) below.

Currently, the only supported calendar is Gregorian one (which is used even for the dates prior to the historic introduction of this calendar which was first done on Oct 15, 1582 but is, generally speaking, country, and even region, dependent). Future versions will probably have Julian calendar support as well and support for other calendars (Maya, Hebrew, Chinese...) is not ruled out.

Difference between wxDateSpan and wxTimeSpan

While there is only one logical way to represent an absolute moment in the time (and hence only one *wxDateTime* class), there are at least two methods to describe a time interval.

First, there is the direct and self-explaining way implemented by *wxTimeSpan* (p. 1300): it is just a difference in milliseconds between two moments in time. Adding or subtracting such an interval to *wxDateTime* is always well-defined and is a fast operation.

But in the daily life other, calendar-dependent time interval specifications are used. For example, 'one month later' is commonly used. However, it is clear that this is not the same as *wxTimeSpan* of 60*60*24*31 seconds because 'one month later' Feb 15 is Mar 15 and not Mar 17 or Mar 16 (depending on whether the year is leap or not).

This is why there is another class for representing such intervals called *wxDateSpan* (p.

232). It handles these sort of operations in the most natural way possible, but note that manipulating with intervals of this kind is not always well-defined. Consider, for example, Jan 31 + '1 month': this will give Feb 28 (or 29), i.e. the last day of February and not the non-existent Feb 31. Of course, this is what is usually wanted, but you still might be surprised to notice that now subtracting back the same interval from Feb 28 will result in Jan 28 and **not** Jan 31 we started with!

So, unless you plan to implement some kind of natural language parsing in the program, you should probably use `wxTimeSpan` instead of `wxDateSpan` (which is also more efficient). However, `wxDateSpan` may be very useful in situations when you do need to understand what 'in a month' means (of course, it is just `wxDateTime::Now() + wxDateSpan::Month()`).

Date arithmetics

Many different operations may be performed with the dates, however not all of them make sense. For example, multiplying a date by a number is an invalid operation, even though multiplying either of the time span classes by a number is perfectly valid.

Here is what can be done:

Addition	a <code>wxTimeSpan</code> or <code>wxDateSpan</code> can be added to <code>wxDateTime</code> resulting in a new <code>wxDateTime</code> object and also 2 objects of the same span class can be added together giving another object of the same class.
Subtraction	the same types of operations as above are allowed and, additionally, a difference between two <code>wxDateTime</code> objects can be taken and this will yield <code>wxTimeSpan</code> .
Multiplication	a <code>wxTimeSpan</code> or <code>wxDateSpan</code> object can be multiplied by an integer number resulting in an object of the same type.
Unary minus	a <code>wxTimeSpan</code> or <code>wxDateSpan</code> object may finally be negated giving an interval of the same magnitude but of opposite time direction.

For all these operations there are corresponding global (overloaded) operators and also member functions which are synonyms for them: `Add()`, `Subtract()` and `Multiply()`. Unary minus as well as composite assignment operations (like `+=`) are only implemented as members and `Neg()` is the synonym for unary minus.

Time zone considerations

Although the time is always stored internally in GMT, you will usually work in the local time zone. Because of this, all `wxDateTime` constructors and setters which take the broken down date assume that these values are for the local time zone. Thus,

`wxDateTime(1, wxDateTime::Jan, 1970)` will not correspond to the `wxDateTime` Epoch unless you happen to live in the UK.

All methods returning the date components (year, month, day, hour, minute, second...) will also return the correct values for the local time zone by default, so, generally, doing the natural things will lead to natural and correct results.

If you only want to do this, you may safely skip the rest of this section. However, if you want to work with different time zones, you should read it to the end.

In this (rare) case, you are still limited to the local time zone when constructing `wxDateTime` objects, i.e. there is no way to construct a `wxDateTime` corresponding to the given date in, say, Pacific Standard Time. To do it, you will need to call *ToTimezone* (p. 263) or *MakeTimezone* (p. 263) methods to adjust the date for the target time zone. There are also special versions of these functions *ToGMT* (p. 263) and *MakeGMT* (p. 263) for the most common case - when the date should be constructed in GMT.

You also can just retrieve the value for some time zone without converting the object to it first. For this you may pass `TimeZone` argument to any of the methods which are affected by the time zone (all methods getting date components and the date formatting ones, for example). In particular, the `Format()` family of methods accepts a `TimeZone` parameter and this allows to simply print time in any time zone.

To see how to do it, the last issue to address is how to construct a `TimeZone` object which must be passed to all these methods. First of all, you may construct it manually by specifying the time zone offset in seconds from GMT, but usually you will just use one of the *symbolic time zone names* (p. 237) and let the conversion constructor do the job. I.e. you would just write

```
wxDateTime dt(...whatever...);
printf("The time is %s in local time zone", dt.FormatTime().c_str());
printf("The time is %s in GMT", dt.FormatTime(wxDateTime::GMT).c_str());
```

Daylight saving time (DST)

DST (a.k.a. 'summer time') handling is always a delicate task which is better left to the operating system which is supposed to be configured by the administrator to behave correctly. Unfortunately, when doing calculations with date outside of the range supported by the standard library, we are forced to deal with these issues ourselves.

Several functions are provided to calculate the beginning and end of DST in the given year and to determine whether it is in effect at the given moment or not, but they should not be considered as absolutely correct because, first of all, they only work more or less correctly for only a handful of countries (any information about other ones appreciated!) and even for them the rules may perfectly well change in the future.

The time zone handling *methods* (p. 1588) use these functions too, so they are subject to the same limitations.

wxDateTime and Holidays

TODO.

Compatibility

The old classes for date/time manipulations ported from wxWidgets version 1.xx are still included but are reimplemented in terms of wxDateTime. However, using them is strongly discouraged because they have a few quirks/bugs and were not 'Y2K' compatible.

Unicode support in wxWidgets

This section briefly describes the state of the Unicode support in wxWidgets. Read it if you want to know more about how to write programs able to work with characters from languages other than English.

What is Unicode?

Starting with release 2.1 wxWidgets has support for compiling in Unicode mode on the platforms which support it. Unicode is a standard for character encoding which addresses the shortcomings of the previous, 8 bit standards, by using at least 16 (and possibly 32) bits for encoding each character. This allows to have at least 65536 characters (what is called the BMP, or basic multilingual plane) and possible 2^{32} of them instead of the usual 256 and is sufficient to encode all of the world languages at once. More details about Unicode may be found at www.unicode.org.

As this solution is obviously preferable to the previous ones (think of incompatible encodings for the same language, locale chaos and so on), many modern operating systems support it. The probably first example is Windows NT which uses only Unicode internally since its very first version.

Writing internationalized programs is much easier with Unicode and, as the support for it improves, it should become more and more so. Moreover, in the Windows NT/2000 case, even the program which uses only standard ASCII can profit from using Unicode because they will work more efficiently - there will be no need for the system to convert all strings the program uses to/from Unicode each time a system call is made.

Unicode and ANSI modes

As not all platforms supported by wxWidgets support Unicode (fully) yet, in many cases it is unwise to write a program which can only work in Unicode environment. A better solution is to write programs in such way that they may be compiled either in ANSI (traditional) mode or in the Unicode one.

This can be achieved quite simply by using the means provided by wxWidgets. Basically, there are only a few things to watch out for:

- Character type (`char` or `wchar_t`)

- Literal strings (i.e. "Hello, world!" or ' *')
- String functions (`strlen()`, `strcpy()`, ...)
- Special preprocessor tokens (`__FILE__`, `__DATE__` and `__TIME__`)

Let's look at them in order. First of all, each character in an Unicode program takes 2 bytes instead of usual one, so another type should be used to store the characters (`char` only holds 1 byte usually). This type is called `wchar_t` which stands for *wide-character type*.

Also, the string and character constants should be encoded using wide characters (`wchar_t` type) which typically take 2 or 4 bytes instead of `char` which only takes one. This is achieved by using the standard C (and C++) way: just put the letter 'L' after any string constant and it becomes a *long* constant, i.e. a wide character one. To make things a bit more readable, you are also allowed to prefix the constant with 'L' instead of putting it after it.

Of course, the usual standard C functions don't work with `wchar_t` strings, so another set of functions exists which do the same thing but accept `wchar_t *` instead of `char *`. For example, a function to get the length of a wide-character string is called `wcslen()` (compare with `strlen()` - you see that the only difference is that the "str" prefix standing for "string" has been replaced with "wcs" standing for "wide-character string").

And finally, the standard preprocessor tokens enumerated above expand to ANSI strings but it is more likely that Unicode strings are wanted in the Unicode build. `wxWidgets` provides the macros `__TFILE__`, `__TDATE__` and `__TTIME__` which behave exactly as the standard ones except that they produce ANSI strings in ANSI build and Unicode ones in the Unicode build.

To summarize, here is a brief example of how a program which can be compiled in both ANSI and Unicode modes could look like:

```
#ifdef __UNICODE__
    wchar_t wch = L' *';
    const wchar_t *ws = L"Hello, world!";
    int len = wcslen(ws);

    wprintf(L"Compiled at %s\n", __TDATE__);
#else // ANSI
    char ch = ' *';
    const char *s = "Hello, world!";
    int len = strlen(s);

    printf("Compiled at %s\n", __DATE__);
#endif // Unicode/ANSI
```

Of course, it would be nearly impossible to write such programs if it had to be done this way (try to imagine the number of `#ifdef UNICODE` an average program would have had!). Luckily, there is another way - see the next section.

Unicode support in `wxWidgets`

In `wxWidgets`, the code fragment from above should be written instead:

```
wxChar ch = wxT('*');  
wxString s = wxT("Hello, world!");  
int len = s.Len();
```

What happens here? First of all, you see that there are no more `#ifdefs` at all. Instead, we define some types and macros which behave differently in the Unicode and ANSI builds and allows us to avoid using conditional compilation in the program itself.

We have a `wxChar` type which maps either on `char` or `wchar_t` depending on the mode in which program is being compiled. There is no need for a separate type for strings though, because the standard `wxString` (p. 1201) supports Unicode, i.e. it stores either ANSI or Unicode strings depending on the compile mode.

Finally, there is a special `wxT()` (p. 1493) macro which should enclose all literal strings in the program. As it is easy to see comparing the last fragment with the one above, this macro expands to nothing in the (usual) ANSI mode and prefixes `'L'` to its argument in the Unicode mode.

The important conclusion is that if you use `wxChar` instead of `char`, avoid using C style strings and use `wxString` instead and don't forget to enclose all string literals inside `wxT()` (p. 1493) macro, your program automatically becomes (almost) Unicode compliant!

Just let us state once again the rules:

- Always use `wxChar` instead of `char`
- Always enclose literal string constants in `wxT()` (p. 1493) macro unless they're already converted to the right representation (another standard `wxWidgets` macro `__()` (p. 1494) does it, for example, so there is no need for `wxT()` in this case) or you intend to pass the constant directly to an external function which doesn't accept wide-character strings.
- Use `wxString` instead of C style strings.

Unicode and the outside world

We have seen that it was easy to write Unicode programs using `wxWidgets` types and macros, but it has been also mentioned that it isn't quite enough. Although everything works fine inside the program, things can get nasty when it tries to communicate with the outside world which, sadly, often expects ANSI strings (a notable exception is the entire Win32 API which accepts either Unicode or ANSI strings and which thus makes it unnecessary to ever perform any conversions in the program). GTK 2.0 only accepts UTF-8 strings.

To get a ANSI string from a `wxString`, you may use the `mb_str()` function which always returns an ANSI string (independently of the mode - while the usual `c_str()` (p. 1210) returns a pointer to the internal representation which is either ASCII or Unicode). More rarely used, but still useful, is `wc_str()` function which always returns the Unicode string.

Unicode-related compilation settings

You should define `wxUSE_UNICODE` to 1 to compile your program in Unicode mode. Note that it currently only works in Win32 and GTK 2.0 and that some parts of `wxWidgets` are not Unicode-compliant yet (ODBC classes, for example). If you compile your program in ANSI mode you can still define `wxUSE_WCHAR_T` to get some limited support for `wchar_t` type.

This will allow your program to perform conversions between Unicode strings and ANSI ones (using *wxMBConv* classes (p. 1593)) and construct `wxString` objects from Unicode strings (presumably read from some external file or elsewhere).

wxMBConv classes overview

Classes: *wxMBConv* (p. 863), *wxMBConvLibc*, *wxMBConvUTF7* (p. 866), *wxMBConvUTF8* (p. 867), *wxCSCnv* (p. 210), *wxMBConvUTF16* (p. 868), *wxMBConvUTF32* (p. 869)

The `wxMBConv` classes in `wxWidgets` enables an Unicode-aware application to easily convert between Unicode and the variety of 8-bit encoding systems still in use.

Background: The need for conversion

As programs are becoming more and more globalized, and users exchange documents across country boundaries as never before, applications increasingly need to take into account all the different character sets in use around the world. It is no longer enough to just depend on the default byte-sized character set that computers have traditionally used.

A few years ago, a solution was proposed: the Unicode standard. Able to contain the complete set of characters in use in one unified global coding system, it would resolve the character set problems once and for all.

But it hasn't happened yet, and the migration towards Unicode has created new challenges, resulting in "compatibility encodings" such as UTF-8. A large number of systems out there still depends on the old 8-bit encodings, hampered by the huge amounts of legacy code still widely deployed. Even sending Unicode data from one Unicode-aware system to another may need encoding to an 8-bit multibyte encoding (UTF-7 or UTF-8 is typically used for this purpose), to pass unhindered through any traditional transport channels.

Background: The wxString class

If you have compiled `wxWidgets` in Unicode mode, the `wxChar` type will become identical to `wchar_t` rather than `char`, and a `wxString` stores `wxChars`. Hence, all `wxString` manipulation in your application will then operate on Unicode strings, and almost as easily as working with ordinary `char` strings (you just need to remember to use the `wxT()` macro to encapsulate any string literals).

But often, your environment doesn't want Unicode strings. You could be sending data

over a network, or processing a text file for some other application. You need a way to quickly convert your easily-handled Unicode data to and from a traditional 8-bit-encoding. And this is what the `wxMBConv` classes do.

wxMBConv classes

The base class for all these conversions is the `wxMBConv` class (which itself implements standard libc locale conversion). Derived classes include `wxMBConvLibc`, several different `wxMBConvUTFxxx` classes, and `wxCSCConv`, which implement different kinds of conversions. You can also derive your own class for your own custom encoding and use it, should you need it. All you need to do is override the `MB2WC` and `WC2MB` methods.

wxMBConv objects

Several of the wxWidgets-provided `wxMBConv` classes have predefined instances (`wxConvLibc`, `wxConvFile`, `wxConvUTF7`, `wxConvUTF8`, `wxConvLocal`). You can use these predefined objects directly, or you can instantiate your own objects.

A variable, `wxConvCurrent`, points to the conversion object that the user interface is supposed to use, in the case that the user interface is not Unicode-based (like with GTK+ 1.2). By default, it points to `wxConvLibc` or `wxConvLocal`, depending on which works best on the current platform.

wxCSCConv

The `wxCSCConv` class is special because when it is instantiated, you can tell it which character set it should use, which makes it meaningful to keep many instances of them around, each with a different character set (or you can create a `wxCSCConv` instance on the fly).

The predefined `wxCSCConv` instance, `wxConvLocal`, is preset to use the default user character set, but you should rarely need to use it directly, it is better to go through `wxConvCurrent`.

Converting strings

Once you have chosen which object you want to use to convert your text, here is how you would use them with `wxString`. These examples all assume that you are using a Unicode build of wxWidgets, although they will still compile in a non-Unicode build (they just won't convert anything).

Example 1: Constructing a `wxString` from input in current encoding.

```
wxString str(input_data, *wxConvCurrent);
```

Example 2: Input in UTF-8 encoding.

```
wxString str(input_data, wxConvUTF8);
```

Example 3: Input in KOI8-R. Construction of wxCSConv instance on the fly.

```
wxString str(input_data, wxCSConv(wxT("koi8-r")));
```

Example 4: Printing a wxString to stdout in UTF-8 encoding.

```
puts(str.mb_str(wxConvUTF8));
```

Example 5: Printing a wxString to stdout in custom encoding. Using preconstructed wxCSConv instance.

```
wxCSConv cust(user_encoding);  
printf("Data: %s\n", (const char*) str.mb_str(cust));
```

Note: Since mb_str() returns a temporary wxCharBuffer to hold the result of the conversion, you need to explicitly cast it to const char* if you use it in a vararg context (like with printf).

Converting buffers

If you have specialized needs, or just don't want to use wxString, you can also use the conversion methods of the conversion objects directly. This can even be useful if you need to do conversion in a non-Unicode build of wxWidgets; converting a string from UTF-8 to the current encoding should be possible by doing this:

```
wxString str(wxConvUTF8.cMB2WC(input_data), *wxConvCurrent);
```

Here, cMB2WC of the UTF8 object returns a wxWCharBuffer containing a Unicode string. The wxString constructor then converts it back to an 8-bit character set using the passed conversion object, *wxConvCurrent. (In a Unicode build of wxWidgets, the constructor ignores the passed conversion object and retains the Unicode data.)

This could also be done by first making a wxString of the original data:

```
wxString input_str(input_data);  
wxString str(input_str.wc_str(wxConvUTF8), *wxConvCurrent);
```

To print a wxChar buffer to a non-Unicode stdout:

```
printf("Data: %s\n", (const char*) wxConvCurrent->cWX2MB(unicode_data));
```

If you need to do more complex processing on the converted data, you may want to store the temporary buffer in a local variable:

```
const wxWX2MBbuf tmp_buf = wxConvCurrent->cWX2MB(unicode_data);  
const char *tmp_str = (const char*) tmp_buf;  
printf("Data: %s\n", tmp_str);  
process_data(tmp_str);
```

If a conversion had taken place in cWX2MB (i.e. in a Unicode build), the buffer will be deallocated as soon as tmp_buf goes out of scope. (The macro wxWX2MBbuf reflects the correct return value of cWX2MB (either char* or wxCharBuffer), except for the const.)

Internationalization

Although internationalization of an application (i18n for short) involves far more than just translating its text messages to another message -- date, time and currency formats need changing too, some languages are written left to right and others right to left, character encoding may differ and many other things may need changing too -- it is a necessary first step. wxWidgets provides facilities for message translation with its *wxLocale* (p. 828) class and is itself fully translated into several languages. Please consult wxWidgets home page for the most up-to-date translations - and if you translate it into one of the languages not done yet, your translations would be gratefully accepted for inclusion into the future versions of the library!

The wxWidgets approach to i18n closely follows GNU gettext package. wxWidgets uses the message catalogs which are binary compatible with gettext catalogs and this allows to use all of the programs in this package to work with them. But note that no additional libraries are needed during the run-time, however, so you have only the message catalogs to distribute and nothing else.

During program development you will need the gettext package for working with message catalogs. **Warning:** gettext versions < 0.10 are known to be buggy, so you should find a later version of it!

There are two kinds of message catalogs: source catalogs which are text files with extension .po and binary catalogs which are created from the source ones with *msgfmt* program (part of gettext package) and have the extension .mo. Only the binary files are needed during program execution.

The program i18n involves several steps:

1. Translating the strings in the program text using *wxGetTranslation* (p. 1491) or equivalently the `_()` (p. 1494) and *ngettext* (p. 1491) macros.
2. Extracting the strings to be translated from the program: this uses the work done in the previous step because *xgettext* program used for string extraction recognises the standard `_()` as well as (using its `-k` option) our *wxGetTranslation* and extracts all strings inside the calls to these functions. Alternatively, you may use `-a` option to extract all the strings, but it will usually result in many strings being found which don't have to be translated at all. This will create a text message catalog -- a .po file.
3. Translating the strings extracted in the previous step to other language(s). It involves editing the .po file.
4. Compiling the .po file into .mo file to be used by the program.
5. Setting the appropriate locale in your program to use the strings for the given language: see *wxLocale* (p. 828).

See also the GNU gettext documentation linked from `docs/html/index.htm` in your wxWidgets distribution.

See also *Writing non-English applications* (p. 1597). It focuses on handling charsets related problems.

Finally, take a look at the *i18n sample* (p. 1573) which shows to you how all this looks in practice.

Writing non-English applications

This article describes how to write applications that communicate with user in language other than English. Unfortunately many languages use different charsets under Unix and Windows (and other platforms, to make situation even more complicated). These charsets usually differ in so many characters it is impossible to use same texts under all platforms.

wxWidgets library provides mechanism that helps you avoid distributing many identical, only differently encoded, packages with your application (e.g. help files and menu items in iso8859-13 and windows-1257). Thanks to this mechanism you can, for example, distribute only iso8859-13 data and it will be handled transparently under all systems.

Please read *Internationalization* (p. 1596) which describes the locales concept.

In the following text, wherever *iso8859-2* and *windows-1250* are used, any encodings are meant and any encodings may be substituted there.

Locales

The best way to ensure correctly displayed texts in a GUI across platforms is to use locales. Write your in-code messages in English or without diacritics and put real messages into the message catalog (see *Internationalization* (p. 1596)).

A standard .po file begins with a header like this:

```
# SOME DESCRIPTIVE TITLE.
# Copyright (C) YEAR Free Software Foundation, Inc.
# FIRST AUTHOR <EMAIL@ADDRESS>, YEAR.
#
msgid ""
msgstr ""
"Project-Id-Version: PACKAGE VERSION\n"
"POT-Creation-Date: 1999-02-19 16:03+0100\n"
"PO-Revision-Date: YEAR-MO-DA HO:MI+ZONE\n"
"Last-Translator: FULL NAME <EMAIL@ADDRESS>\n"
"Language-Team: LANGUAGE <LL@li.org>\n"
"MIME-Version: 1.0\n"
"Content-Type: text/plain; charset=CHARSET\n"
"Content-Transfer-Encoding: ENCODING\n"
```

Note this particular line:

```
"Content-Type: text/plain; charset=CHARSET\n"
```

It specifies the charset used by the catalog. All strings in the catalog are encoded using this charset.

You have to fill in proper charset information. Your .po file may look like this after doing so:

```
# SOME DESCRIPTIVE TITLE.
# Copyright (C) YEAR Free Software Foundation, Inc.
# FIRST AUTHOR <EMAIL@ADDRESS>, YEAR.
```

```
#
msgid ""
msgstr ""
"Project-Id-Version: PACKAGE VERSION\n"
"POT-Creation-Date: 1999-02-19 16:03+0100\n"
"PO-Revision-Date: YEAR-MO-DA HO:MI+ZONE\n"
"Last-Translator: FULL NAME <EMAIL@ADDRESS>\n"
"Language-Team: LANGUAGE <LL@li.org>\n"
"MIME-Version: 1.0\n"
"Content-Type: text/plain; charset=iso8859-2\n"
"Content-Transfer-Encoding: 8bit\n"
```

(Make sure that the header is **not** marked as *fuzzy*.)

`wxWidgets` is able to use this catalog under any supported platform (although `iso8859-2` is a Unix encoding and is normally not understood by Windows).

How is this done? When you tell the `wxLocale` class to load a message catalog that contains correct header, it checks the charset. The catalog is then converted to the charset used (see `wxLocale::GetSystemEncoding` (p. 841) and `wxLocale::GetSystemEncodingName` (p. 842)) by user's operating system. This is default behaviour of the `wxLocale` (p. 828) class; you can disable it by **not** passing `wxLOCALE_CONV_ENCODING` to `wxLocale::Init` (p. 842).

Font mapping

You can use `wxMBConv` classes (p. 1593) and `wxFontMapper` (p. 528) to display text:

```
if (!wxFontMapper::Get()->IsEncodingAvailable(enc, facename))
{
    wxFontEncoding alternative;
    if (wxFontMapper::Get()->GetAltForEncoding(enc, &alternative,
                                                facename, false))
    {
        wxCSConv convFrom(wxFontMapper::Get()->GetEncodingName(enc));
        wxCSConv convTo(wxFontMapper::Get()->GetEncodingName(alternative));
        text = wxString(text.mb_str(convFrom), convTo);
    }
    else
        ...failure (or we may try iso8859-1/7bit ASCII)...
}
...display text...
```

Converting data

You may want to store all program data (created documents etc.) in the same encoding, let's say `utf-8`. You can use `wxCSCConv` (p. 210) class to convert data to encoding used by the system your application is running on (see `wxLocale::GetSystemEncoding` (p. 841)).

Help files

If you're using `wxHtmlHelpController` (p. 672) there is no problem at all. You must only make sure that all the HTML files contain the META tag, e.g.

```
<meta http-equiv="Content-Type" content="text/html; charset=iso8859-2">
```

and that the `hhp` project file contains one additional line in the `OPTIONS` section:

```
Charset=iso8859-2
```

This additional entry tells the HTML help controller what encoding is used in contents and index tables.

Container classes overview

Classes: *wxList* (p. 787), *wxArray* (p. 42)

wxWidgets uses itself several container classes including doubly-linked lists and dynamic arrays (i.e. arrays which expand automatically when they become full). For both historical and portability reasons *wxWidgets* does not use STL which provides the standard implementation of many container classes in C++. First of all, *wxWidgets* has existed since well before STL was written, and secondly we don't believe that today compilers can deal really well with all of STL classes (this is especially true for some less common platforms). Of course, the compilers are evolving quite rapidly and hopefully their progress will allow to base future versions of *wxWidgets* on STL - but this is not yet the case.

wxWidgets container classes don't pretend to be as powerful or full as STL ones, but they are quite useful and may be compiled with absolutely any C++ compiler. They're used internally by *wxWidgets*, but may, of course, be used in your programs as well if you wish.

The list classes in *wxWidgets* are doubly-linked lists which may either own the objects they contain (meaning that the list deletes the object when it is removed from the list or the list itself is destroyed) or just store the pointers depending on whether you called or not *wxList::DeleteContents* (p. 790) method.

Dynamic arrays resemble C arrays but with two important differences: they provide run-time range checking in debug builds and they expand automatically the allocated memory when there is no more space for new items. They come in two sorts: the "plain" arrays which store either built-in types such as "char", "int" or "bool" or the pointers to arbitrary objects, or "object arrays" which own the object pointers to which they store.

For the same portability reasons, the container classes implementation in *wxWidgets* does not use templates, but is rather based on C preprocessor i.e. is done with the macros: *WX_DECLARE_LIST* and *WX_DEFINE_LIST* for the linked lists and *WX_DECLARE_ARRAY*, *WX_DECLARE_OBJARRAY* and *WX_DEFINE_OBJARRAY* for the dynamic arrays. The "DECLARE" macro declares a new container class containing the elements of given type and is needed for all three types of container classes: lists, arrays and objarrays. The "DEFINE" classes must be inserted in your program in a place where the **full declaration of container element class is in scope** (i.e. not just forward declaration), otherwise destructors of the container elements will not be called! As array classes never delete the items they contain anyhow, there is no *WX_DEFINE_ARRAY* macro for them.

Examples of usage of these macros may be found in *wxList* (p. 787) and *wxArray* (p. 42) documentation.

Finally, *wxWidgets* predefines several commonly used container classes. *wxList* is defined for compatibility with previous versions as a list containing *wxObjects* and *wxStringList* as a list of C-style strings (char *), both of these classes are deprecated and

should not be used in new programs. The following array classes are defined: `wxArrayInt`, `wxArrayLong`, `wxArrayPtrVoid` and `wxArrayString`. The first three store elements of corresponding types, but `wxArrayString` is somewhat special: it is an optimized version of `wxArray` which uses its knowledge about `wxString` (p. 1201) reference counting schema.

File classes and functions overview

Classes: `wxFile` (p. 461), `wxDir` (p. 383), `wxTempFile` (p. 1243), `wxTextFile` (p. 1273)

Functions: see *file functions* (p. 1481).

`wxWidgets` provides some functions and classes to facilitate working with files. As usual, the accent is put on cross-platform features which explains, for example, the `wxTextFile` (p. 1273) class which may be used to convert between different types of text files (DOS/Unix/Mac).

`wxFile` may be used for low-level IO. It contains all the usual functions to work with files (opening/closing, reading/writing, seeking, and so on) but compared with using standard C functions, has error checking (in case of an error a message is logged using `wxLog` (p. 844) facilities) and closes the file automatically in the destructor which may be quite convenient.

`wxTempFile` is a very small file designed to make replacing the files contents safer - see its *documentation* (p. 1243) for more details.

`wxTextFile` is a general purpose class for working with small text files on line by line basis. It is especially well suited for working with configuration files and program source files. It can be also used to work with files with "non native" line termination characters and write them as "native" files if needed (in fact, the files may be written in any format).

`wxDir` is a helper class for enumerating the files or subdirectories of a directory. It may be used to enumerate all files, only files satisfying the given template mask or only non-hidden files.

wxStreams overview

Classes: `wxStreamBase` (p. 1192), `wxStreamBuffer` (p. 1194), `wxInputStream` (p. 762), `wxOutputStream` (p. 958), `wxFilterInputStream` (p. 503), `wxFilterOutputStream` (p. 504)

Purpose of wxStream

We had troubles with standard C++ streams on several platforms: they react quite well in most cases, but in the multi-threaded case, for example, they have many problems. Some Borland Compilers refuse to work at all with them and using iostreams on Linux makes writing programs, that are binary compatible across different Linux distributions, impossible.

Therefore, `wxStreams` have been added to `wxWidgets` because an application should compile and run on all supported platforms and we don't want users to depend on

release X.XX of libg++ or some other compiler to run the program.

wxStreams is divided in two main parts:

1. the core: wxStreamBase, wxStreamBuffer, wxInputStream, wxOutputStream, wxFilterIn/OutputStream
2. the "IO" classes: wxSocketIn/OutputStream, wxDataIn/OutputStream, wxFileIn/OutputStream, ...

wxStreamBase is the base definition of a stream. It defines, for example, the API of OnSysRead, OnSysWrite, OnSysSeek and OnSysTell. These functions are really implemented by the "IO" classes. wxInputStream and wxOutputStream inherit from it.

wxStreamBuffer is a cache manager for wxStreamBase (it manages a stream buffer linked to a stream). One stream can have multiple stream buffers but one stream have always one autoinitialized stream buffer.

wxInputStream is the base class for read-only streams. It implements Read, SeekI (I for Input), and all read or IO generic related functions. wxOutputStream does the same thing but it is for write-only streams.

wxFilterIn/OutputStream is the base class definition for stream filtering. Stream filtering means a stream which does no syscall but filters data which are passed to it and then pass them to another stream. For example, wxZLibInputStream is an inline stream decompressor.

The "IO" classes implements the specific parts of the stream. This could be nothing in the case of wxMemoryIn/OutputStream which bases itself on wxStreamBuffer. This could also be a simple link to the a true syscall (for example read(...), write(...)).

Generic usage: an example

Usage is simple. We can take the example of wxFileInputStream and here is some sample code:

```
...
// The constructor initializes the stream buffer and open the file
descriptor
// associated to the name of the file.
wxFileInputStream in_stream("the_file_to_be_read");

// Ok, read some bytes ... nb_datas is expressed in bytes.
in_stream.Read(data, nb_datas);
if (in_stream.LastError() != wxSTREAM_NOERROR) {
    // Oh oh, something bad happens.
    // For a complete list, look into the documentation at wxStreamBase.
}

// You can also inline all like this.
if (in_stream.Read(data, nb_datas).LastError() != wxSTREAM_NOERROR) {
    // Do something.
}

// You can also get the last number of bytes REALLY put into the buffer.
size_t really_read = in_stream.LastRead();

// Ok, moves to the beginning of the stream. SeekI returns the last
position
// in the stream counted from the beginning.
```

```
off_t old_position = in_stream.SeekI(0, wxFromBeginning);

// What is my current position ?
off_t position = in_stream.TellI();

// wxFileInputStream will close the file descriptor on the destruction.
```

Compatibility with C++ streams

As I said previously, we could add a filter stream so it takes an istream argument and builds a wxInputStream from it: I don't think it should be difficult to implement it and it may be available in the fix of wxWidgets 2.0.

wxLog classes overview

Classes: *wxLog* (p. 844),
wxLogStderr (p. 854),
wxLogStream (p. 854),
wxLogTextCtrl (p. 855),
wxLogWindow (p. 855),
wxLogGui (p. 852),
wxLogNull (p. 852),
wxLogChain (p. 850),
wxLogPassThrough (p. 853),
wxStreamToTextRedirector (p. 1200)

This is a general overview of logging classes provided by wxWidgets. The word logging here has a broad sense, including all of the program output, not only non interactive messages. The logging facilities included in wxWidgets provide the base *wxLog* class which defines the standard interface for a *log target* as well as several standard implementations of it and a family of functions to use with them.

First of all, no knowledge of *wxLog* classes is needed to use them. For this, you should only know about *wxLogXXX()* functions. All of them have the same syntax as *printf()* or *vprintf()*, i.e. they take the format string as the first argument and respectively a variable number of arguments or a variable argument list pointer. Here are all of them:

- **wxLogFatalError** which is like *wxLogError*, but also terminates the program with the exit code 3 (using *abort()* standard function). Unlike for all the other logging functions, this function can't be overridden by a log target.
- **wxLogError** is the function to use for error messages, i.e. the messages that must be shown to the user. The default processing is to pop up a message box to inform the user about it.
- **wxLogWarning** for warnings - they are also normally shown to the user, but don't interrupt the program work.
- **wxLogMessage** is for all normal, informational messages. They also appear in a message box by default (but it can be changed, see below). Notice that the standard behaviour is to not show informational messages if there are any errors later - the logic being that the later error messages make the informational

messages preceding them meaningless.

- **wxLogVerbose** is for verbose output. Normally, it is suppressed, but might be activated if the user wishes to know more details about the program progress (another, but possibly confusing name for the same function is **wxLogInfo**).
- **wxLogStatus** is for status messages - they will go into the status bar of the active or specified (as the first argument) *wxFrame* (p. 532) if it has one.
- **wxLogSysError** is mostly used by *wxWidgets* itself, but might be handy for logging errors after system call (API function) failure. It logs the specified message text as well as the last system error code (*errno* or *::GetLastError()* depending on the platform) and the corresponding error message. The second form of this function takes the error code explicitly as the first argument.
- **wxLogDebug** is the right function for debug output. It only does anything at all in the debug mode (when the preprocessor symbol `__WXDEBUG__` is defined) and expands to nothing in release mode (otherwise). **Tip:** under Windows, you must either run the program under debugger or use a 3rd party program such as *DbgView* (<http://www.sysinternals.com>) to actually see the debug output.
- **wxLogTrace** as **wxLogDebug** only does something in debug build. The reason for making it a separate function from it is that usually there are a lot of trace messages, so it might make sense to separate them from other debug messages which would be flooded in them. Moreover, the second version of this function takes a trace mask as the first argument which allows to further restrict the amount of messages generated.

The usage of these functions should be fairly straightforward, however it may be asked why not use the other logging facilities, such as C standard `stdio` functions or C++ streams. The short answer is that they're all very good generic mechanisms, but are not really adapted for *wxWidgets*, while the log classes are. Some of advantages in using *wxWidgets* log functions are:

- **Portability** It is a common practice to use *printf()* statements or `cout/cerr` C++ streams for writing out some (debug or otherwise) information. Although it works just fine under Unix, these messages go strictly nowhere under Windows where the `stdout` of GUI programs is not assigned to anything. Thus, you might view *wxLogMessage()* as a simple substitute for *printf()*.

```
You can also redirect the wxLogXXX calls to cout by just writing:  wxLog
*logger=new wxLogStream(&cout);
wxLog::SetActiveTarget(logger);
```

Finally, there is also a possibility to redirect the output sent to *cout* to a *wxTextCtrl* (p. 1250) by using the *wxStreamToTextRedirector* (p. 1200) class.

- **Flexibility** The output of *wxLog* functions can be redirected or suppressed entirely based on their importance, which is either impossible or difficult to do with traditional methods. For example, only error messages, or only error

messages and warnings might be logged, filtering out all informational messages.

- **Completeness** Usually, an error message should be presented to the user when some operation fails. Let's take a quite simple but common case of a file error: suppose that you're writing your data file on disk and there is not enough space. The actual error might have been detected inside wxWidgets code (say, in `wxFile::Write`), so the calling function doesn't really know the exact reason of the failure, it only knows that the data file couldn't be written to the disk. However, as wxWidgets uses `wxLogError()` in this situation, the exact error code (and the corresponding error message) will be given to the user together with "high level" message about data file writing error.

After having enumerated all the functions which are normally used to log the messages, and why would you want to use them we now describe how all this works.

wxWidgets has the notion of a *log target*: it is just a class deriving from `wxLog` (p. 844). As such, it implements the virtual functions of the base class which are called when a message is logged. Only one log target is *active* at any moment, this is the one used by `wxLogXXX()` functions. The normal usage of a log object (i.e. object of a class derived from `wxLog`) is to install it as the active target with a call to `SetActiveTarget()` and it will be used automatically by all subsequent calls to `wxLogXXX()` functions.

To create a new log target class you only need to derive it from `wxLog` and implement one (or both) of `DoLog()` and `DoLogString()` in it. The second one is enough if you're happy with the standard wxLog message formatting (prepending "Error:" or "Warning:", timestamping &c) but just want to send the messages somewhere else. The first one may be overridden to do whatever you want but you have to distinguish between the different message types yourself.

There are some predefined classes deriving from `wxLog` and which might be helpful to see how you can create a new log target class and, of course, may also be used without any change. There are:

- **wxLogStderr** This class logs messages to a *FILE **, using stderr by default as its name suggests.
- **wxLogStream** This class has the same functionality as `wxLogStderr`, but uses *ostream* and *cerr* instead of *FILE ** and stderr.
- **wxLogGui** This is the standard log target for wxWidgets applications (it is used by default if you don't do anything) and provides the most reasonable handling of all types of messages for given platform.
- **wxLogWindow** This log target provides a "log console" which collects all messages generated by the application and also passes them to the previous active log target. The log window frame has a menu allowing user to clear the log, close it completely or save all messages to file.
- **wxLogNull** The last log class is quite particular: it doesn't do anything. The objects of this class may be instantiated to (temporarily) suppress output of `wxLogXXX()` functions. As an example, trying to open a non-existing file will

usually provoke an error message, but if for some reasons it is unwanted, just use this construction:

```
wxFile file;

// wxFile.Open() normally complains if file can't be opened, we don't
want it
{
    wxLogNull logNo;
    if ( !file.Open("bar") )
        ... process error ourselves ...
} // ~wxLogNull called, old log sink restored

wxLogMessage("..."); // ok
```

The log targets can also be combined: for example you may wish to redirect the messages somewhere else (for example, to a log file) but also process them as normally. For this the *wxLogChain* (p. 850) and *wxLogPassThrough* (p. 853) can be used.

Debugging overview

Classes, functions and macros: *wxDebugContext* (p. 342), *wxObject* (p. 954), *wxLog* (p. 844), *Log functions* (p. 1527), *Debug macros* (p. 1535)

Various classes, functions and macros are provided in *wxWidgets* to help you debug your application. Most of these are only available if you compile both *wxWidgets*, your application and *all* libraries that use *wxWidgets* with the `__WXDEBUG__` symbol defined. You can also test the `__WXDEBUG__` symbol in your own applications to execute code that should be active only in debug mode.

wxDebugContext

wxDebugContext (p. 342) is a class that never gets instantiated, but ties together various static functions and variables. It allows you to dump all objects to that stream, write statistics about object allocation, and check memory for errors.

It is good practice to define a *wxObject::Dump* (p. 955) member function for each class you derive from a *wxWidgets* class, so that *wxDebugContext::Dump* (p. 343) can call it and give valuable information about the state of the application.

If you have difficulty tracking down a memory leak, recompile in debugging mode and call *wxDebugContext::Dump* (p. 343) and *wxDebugContext::PrintStatistics* (p. 345) at appropriate places. They will tell you what objects have not yet been deleted, and what kinds of object they are. In fact, in debug mode *wxWidgets* will automatically detect memory leaks when your application is about to exit, and if there are any leaks, will give you information about the problem. (How much information depends on the operating system and compiler -- some systems don't allow all memory logging to be enabled). See the memcheck sample for example of usage.

For *wxDebugContext* to do its work, the *new* and *delete* operators for *wxObject* have been redefined to store extra information about dynamically allocated objects (but not

statically declared objects). This slows down a debugging version of an application, but can find difficult-to-detect memory leaks (objects are not deallocated), overwrites (writing past the end of your object) and underwrites (writing to memory in front of the object).

If debugging mode is on and the symbols `wxUSE_GLOBAL_MEMORY_OPERATORS` and `wxUSE_DEBUG_NEW_ALWAYS` are set to 1 in `setup.h`, 'new' is defined to be:

```
#define new new(__FILE__, __LINE__)
```

All occurrences of 'new' in `wxWidgets` and your own application will use the overridden form of the operator with two extra arguments. This means that the debugging output (and error messages reporting memory problems) will tell you what file and on what line you allocated the object. Unfortunately not all compilers allow this definition to work properly, but most do.

Debug macros

You should also use *debug macros* (p. 1535) as part of a 'defensive programming' strategy, scattering `wxASSERT`s liberally to test for problems in your code as early as possible. Forward thinking will save a surprising amount of time in the long run.

`wxASSERT` (p. 1536) is used to pop up an error message box when a condition is not true. You can also use `wxASSERT_MSG` (p. 1536) to supply your own helpful error message. For example:

```
void MyClass::MyFunction(wxObject* object)
{
    wxASSERT_MSG( (object != NULL), "object should not be NULL in
MyFunction!" );

    ...
};
```

The message box allows you to continue execution or abort the program. If you are running the application inside a debugger, you will be able to see exactly where the problem was.

Logging functions

You can use the `wxLogDebug` (p. 1530) and `wxLogTrace` (p. 1530) functions to output debugging information in debug mode; it will do nothing for non-debugging code.

wxDebugContext overview

Debugging overview (p. 1605)

Class: `wxDebugContext` (p. 342)

`wxDebugContext` is a class for performing various debugging and memory tracing operations.

This class has only static data and function members, and there should be no instances.

Probably the most useful members are `SetFile` (for directing output to a file, instead of the default standard error or debugger output); `Dump` (for dumping the dynamically allocated objects) and `PrintStatistics` (for dumping information about allocation of objects). You can also call `Check` to check memory blocks for integrity.

Here's an example of use. The `SetCheckpoint` ensures that only the allocations done after the checkpoint will be dumped.

```
wxDebugContext::SetCheckpoint();  
  
wxDebugContext::SetFile("c:\\temp\\debug.log");  
  
wxString *thing = new wxString;  
  
char *ordinaryNonObject = new char[1000];  
  
wxDebugContext::Dump();  
wxDebugContext::PrintStatistics();
```

You can use `wxDebugContext` if `__WXDEBUG__` is defined, or you can use it at any other time (if `wxUSE_DEBUG_CONTEXT` is set to 1 in `setup.h`). It is not disabled in non-debug mode because you may not wish to recompile `wxWidgets` and your entire application just to make use of the error logging facility.

Note: `wxDebugContext::SetFile` has a problem at present, so use the default stream instead. Eventually the logging will be done through the `wxLog` facilities instead.

wxConfig classes overview

Classes: *wxConfig* (p. 178)

This overview briefly describes what the config classes are and what they are for. All the details about how to use them may be found in the description of the *wxConfigBase* (p. 178) class and the documentation of the file, registry and INI file based implementations mentions all the features/limitations specific to each one of these versions.

The config classes provide a way to store some application configuration information. They were especially designed for this usage and, although may probably be used for many other things as well, should be limited to it. It means that this information should be:

1. Typed, i.e. strings or numbers for the moment. You can not store binary data, for example.
2. Small. For instance, it is not recommended to use the Windows registry for amounts of data more than a couple of kilobytes.
3. Not performance critical, neither from speed nor from a memory consumption point of view.

On the other hand, the features provided make them very useful for storing all kinds of small to medium volumes of hierarchically-organized, heterogeneous data. In short, this is a place where you can conveniently stuff all your data (numbers and strings) organizing it in a tree where you use the filesystem-like paths to specify the location of a

piece of data. In particular, these classes were designed to be as easy to use as possible.

From another point of view, they provide an interface which hides the differences between the Windows registry and the standard Unix text format configuration files. Other (future) implementations of `wxConfigBase` might also understand GTK resource files or their analogues on the KDE side.

In any case, each implementation of `wxConfigBase` does its best to make the data look the same way everywhere. Due to the limitations of the underlying physical storage as in the case of `wxIniConfig`, it may not implement 100% of the base class functionality.

There are groups of entries and the entries themselves. Each entry contains either a string or a number (or a boolean value; support for other types of data such as dates or timestamps is planned) and is identified by the full path to it: something like `/MyApp/UserPreferences/Colors/Foreground`. The previous elements in the path are the group names, and each name may contain an arbitrary number of entries and subgroups. The path components are **always** separated with a slash, even though some implementations use the backslash internally. Further details (including how to read/write these entries) may be found in the documentation for *wxConfigBase* (p. 178).

wxFileSystem

The `wxHTML` library uses a **virtual file systems** mechanism similar to the one used in Midnight Commander, Dos Navigator, FAR or almost any modern file manager. It allows the user to access data stored in archives as if they were ordinary files. On-the-fly generated files that exist only in memory are also supported.

Classes

Three classes are used in order to provide virtual file systems mechanism:

- The *wxFsFile* (p. 545) class provides information about opened file (name, input stream, mime type and anchor).
- The *wxFileSystem* (p. 494) class is the interface. Its main methods are `ChangePathTo()` and `OpenFile()`. This class is most often used by the end user.
- The *wxFileSystemHandler* (p. 496) is the core of virtual file systems mechanism. You can derive your own handler and pass it to of the VFS mechanism. You can derive your own handler and pass it to `wxFileSystem`'s `AddHandler()` method. In the new handler you only need to override the `OpenFile()` and `CanOpen()` methods.

Locations

Locations (aka filenames aka addresses) are constructed from four parts:

- **protocol** - handler can recognize if it is able to open a file by checking its protocol. Examples are "http", "file" or "ftp".

- **right location** - is the name of file within the protocol. In "http://www.wxwidgets.org/index.html" the right location is "//www.wxwidgets.org/index.html".
- **anchor** - an anchor is optional and is usually not present. In "index.htm#chapter2" the anchor is "chapter2".
- **left location** - this is usually an empty string. It is used by 'local' protocols such as ZIP. See Combined Protocols paragraph for details.

Combined Protocols

The left location precedes the protocol in the URL string. It is not used by global protocols like HTTP but it becomes handy when nesting protocols - for example you may want to access files in a ZIP archive:

file:archives/cpp_doc.zip#zip:reference/fopen.htm#syntax

In this example, the protocol is "zip", right location is "reference/fopen.htm", anchor is "syntax" and left location is "file:archives/cpp_doc.zip".

There are **two** protocols used in this example: "zip" and "file".

File Systems Included in wxHTML

The following virtual file system handlers are part of wxWidgets so far:

wxInternetFSHandler	A handler for accessing documents via HTTP or FTP protocols. Include file is <wx/fs_inet.h>.
wxZipFSHandler	A handler for ZIP archives. Include file is <wx/fs_zip.h>. URL is in form "archive.zip#zip:filename".
wxMemoryFSHandler	This handler allows you to access data stored in memory (such as bitmaps) as if they were regular files. See <i>wxMemoryFSHandler documentation</i> (p. 882) for details. Include file is <wx/fs_mem.h>. URL is prefixed with memory:, e.g. "memory:myfile.htm"

In addition, wxFileSystem itself can access local files.

Initializing file system handlers

Use `wxFileSystem::AddHandler` (p. 495) to initialize a handler, for example:

```
#include <wx/fs_mem.h>

...

bool MyApp::OnInit()
{
    wxFileSystem::AddHandler(new wxMemoryFSHandler);
    ...
}
```

Event handling overview

Classes: *wxEvtHandler* (p. 445), *wxWindow* (p. 1388), *wxEvent* (p. 441)

Introduction

Before version 2.0 of wxWidgets, events were handled by the application either by supplying callback functions, or by overriding virtual member functions such as **OnSize**.

From wxWidgets 2.0, *event tables* are used instead, with a few exceptions.

An event table is placed in an implementation file to tell wxWidgets how to map events to member functions. These member functions are not virtual functions, but they are all similar in form: they take a single wxEvent-derived argument, and have a void return type.

Here's an example of an event table.

```
BEGIN_EVENT_TABLE(MyFrame, wxFrame)
    EVT_MENU      (wxID_EXIT, MyFrame::OnExit)
    EVT_MENU      (DO_TEST,  MyFrame::DoTest)
    EVT_SIZE      (          MyFrame::OnSize)
    EVT_BUTTON    (BUTTON1,  MyFrame::OnButton1)
END_EVENT_TABLE()
```

The first two entries map menu commands to two different member functions. The EVT_SIZE macro doesn't need a window identifier, since normally you are only interested in the current window's size events.

The EVT_BUTTON macro demonstrates that the originating event does not have to come from the window class implementing the event table -- if the event source is a button within a panel within a frame, this will still work, because event tables are searched up through the hierarchy of windows for the command events. In this case, the button's event table will be searched, then the parent panel's, then the frame's.

As mentioned before, the member functions that handle events do not have to be virtual. Indeed, the member functions should not be virtual as the event handler ignores that the functions are virtual, i.e. overriding a virtual member function in a derived class will not have any effect. These member functions take an event argument, and the class of event differs according to the type of event and the class of the originating window. For size events, *wxSizeEvent* (p. 1109) is used. For menu commands and most control commands (such as button presses), *wxCommandEvent* (p. 165) is used. When controls get more complicated, then specific event classes are used, such as *wxTreeEvent* (p. 1347) for events from *wxTreeCtrl* (p. 1329) windows.

As well as the event table in the implementation file, there must also be a DECLARE_EVENT_TABLE macro somewhere in the class declaration. For example:

```
class MyFrame : public wxFrame
{
public:
    ...
    void OnExit(wxCommandEvent& event);
}
```

```
void OnSize(wxSizeEvent& event);

protected:
    int      m_count;
    ...

    DECLARE_EVENT_TABLE()
};
```

Note that this macro may occur in any section of the class (public, protected or private) but that it is probably better to insert it at the end, as shown, because this macro implicitly changes the access to protected which may be quite unexpected if there is anything following it.

Finally, if you don't like using macros for static initialization of the event tables you may also use *wxEvtHandler::Connect* (p. 447) to connect the events to the handlers dynamically, during run-time. See *theevent sample* (p. 1571) for an example of doing it.

How events are processed

When an event is received from the windowing system, *wxWidgets* calls *wxEvtHandler::ProcessEvent* (p. 450) on the first event handler object belonging to the window generating the event.

It may be noted that *wxWidgets*' event processing system implements something very close to virtual methods in normal C++, i.e. it is possible to alter the behaviour of a class by overriding its event handling functions. In many cases this works even for changing the behaviour of native controls. For example it is possible to filter out a number of key events sent by the system to a native text control by overriding *wxTextCtrl* and defining a handler for key events using *EVT_KEY_DOWN*. This would indeed prevent any key events from being sent to the native control - which might not be what is desired. In this case the event handler function has to call *Skip()* so as to indicate that the search for the event handler should continue.

To summarize, instead of explicitly calling the base class version as you would have done with C++ virtual functions (i.e. *wxTextCtrl::OnChar()*), you should instead call *Skip* (p. 445).

In practice, this would look like this if the derived text control only accepts 'a' to 'z' and 'A' to 'Z':

```
void MyTextCtrl::OnChar(wxKeyEvent& event)
{
    if ( isalpha( event.KeyCode() ) )
    {
        // key code is within legal range. we call event.Skip() so the
        // event can be processed either in the base wxWidgets class
        // or the native control.

        event.Skip();
    }
    else
    {
        // illegal key hit. we don't call event.Skip() so the
        // event is not processed anywhere else.

        wxBell();
    }
}
```

```
}
```

The normal order of event table searching by `ProcessEvent` is as follows:

1. If the object is disabled (via a call to `wxEvtHandler::SetEvtHandlerEnabled` (p. 452)) the function skips to step (6).
2. If the object is a `wxWindow`, **`ProcessEvent`** is recursively called on the window's `wxValidator` (p. 1360). If this returns true, the function exits.
3. **`SearchEventTable`** is called for this event handler. If this fails, the base class table is tried, and so on until no more tables exist or an appropriate function was found, in which case the function exits.
4. The search is applied down the entire chain of event handlers (usually the chain has a length of one). If this succeeds, the function exits.
5. If the object is a `wxWindow` and the event is set to propagate (in the library only `wxCommandEvent` based events are set to propagate), **`ProcessEvent`** is recursively applied to the parent window's event handler. If this returns true, the function exits.
6. Finally, **`ProcessEvent`** is called on the `wxApp` object.

Pay close attention to Step 5. People often overlook or get confused by this powerful feature of the `wxWidgets` event processing system. To put it a different way, events set to propagate (See: `wxEvent::ShouldPropagate` (p. 445)) (most likely derived either directly or indirectly from `wxCommandEvent`) will travel up the containment hierarchy from child to parent until the maximal propagation level is reached or an event handler is found that doesn't call `event.Skip()` (p. 445).

Finally, there is another additional complication (which, in fact, simplifies life of `wxWidgets` programmers significantly): when propagating the command events upwards to the parent window, the event propagation stops when it reaches the parent dialog, if any. This means that you don't risk to get unexpected events from the dialog controls (which might be left unprocessed by the dialog itself because it doesn't care about them) when a modal dialog is popped up. The events do propagate beyond the frames, however. The rationale for this choice is that there are only a few frames in a typical application and their parent-child relation are well understood by the programmer while it may be very difficult, if not impossible, to track down all the dialogs which may be popped up in a complex program (remember that some are created automatically by `wxWidgets`). If you need to specify a different behaviour for some reason, you can use `SetExtraStyle(wxWS_EX_BLOCK_EVENTS)` (p. 1427) explicitly to prevent the events from being propagated beyond the given window or unset this flag for the dialogs which have it on by default.

Typically events that deal with a window as a window (size, motion, paint, mouse, keyboard, etc.) are sent only to the window. Events that have a higher level of meaning and/or are generated by the window itself, (button click, menu select, tree expand, etc.) are command events and are sent up to the parent to see if it is interested in the event.

Note that your application may wish to override `ProcessEvent` to redirect processing of events. This is done in the document/view framework, for example, to allow event

handlers to be defined in the document or view. To test for command events (which will probably be the only events you wish to redirect), you may use *wxEvt::IsCommandEvent* (p. 444) for efficiency, instead of using the slower run-time type system.

As mentioned above, only command events are recursively applied to the parents event handler in the library itself. As this quite often causes confusion for users, here is a list of system events which will NOT get sent to the parent's event handler:

<i>wxEvt</i> (p. 441)	The event base class
<i>wxActivateEvent</i> (p. 29)	A window or application activation event
<i>wxCloseEvent</i> (p. 139)	A close window or end session event
<i>wxEraseEvent</i> (p. 440)	An erase background event
<i>wxFocusEvent</i> (p. 512)	A window focus event
<i>wxKeyEvent</i> (p. 778)	A keypress event
<i>wxIdleEvent</i> (p. 726)	An idle event
<i>wxInitDialogEvent</i> (p. 761)	A dialog initialisation event
<i>wxJoystickEvent</i> (p. 775)	A joystick event
<i>wxMenuEvent</i> (p. 907)	A menu event
<i>wxMouseEvent</i> (p. 928)	A mouse event
<i>wxMoveEvent</i> (p. 937)	A move event
<i>wxPaintEvent</i> (p. 967)	A paint event
<i>wxQueryLayoutInfoEvent</i> (p. 1030)	Used to query layout information
<i>wxSizeEvent</i> (p. 1109)	A size event
<i>wxScrollWinEvent</i> (p. 1097)	A scroll event sent by a scrolled window (not a scroll bar)
<i>wxSysColourChangedEvent</i> (p. 1228)	A system colour change event
<i>wxUpdateUIEvent</i> (p. 1352)	A user interface update event

In some cases, it might be desired by the programmer to get a certain number of system events in a parent window, for example all key events sent to, but not used by, the native controls in a dialog. In this case, a special event handler will have to be written that will override *ProcessEvent()* in order to pass all events (or any selection of them) to the parent window.

Pluggable event handlers

In fact, you don't have to derive a new class from a window class if you don't want to. You can derive a new class from `wxEvtHandler` instead, defining the appropriate event table, and then call `wxWindow::SetEventHandler` (p. 1427) (or, preferably, `wxWindow::PushEventHandler` (p. 1417)) to make this event handler the object that responds to events. This way, you can avoid a lot of class derivation, and use the same event handler object to handle events from instances of different classes. If you ever have to call a window's event handler manually, use the `GetEventHandler` function to retrieve the window's event handler and use that to call the member function. By default, `GetEventHandler` returns a pointer to the window itself unless an application has redirected event handling using `SetEventHandler` or `PushEventHandler`.

One use of `PushEventHandler` is to temporarily or permanently change the behaviour of the GUI. For example, you might want to invoke a dialog editor in your application that changes aspects of dialog boxes. You can grab all the input for an existing dialog box, and edit it 'in situ', before restoring its behaviour to normal. So even if the application has derived new classes to customize behaviour, your utility can indulge in a spot of body-snatching. It could be a useful technique for on-line tutorials, too, where you take a user through a series of steps and don't want them to diverge from the lesson. Here, you can examine the events coming from buttons and windows, and if acceptable, pass them through to the original event handler. Use `PushEventHandler/PopEventHandler` to form a chain of event handlers, where each handler processes a different range of events independently from the other handlers.

Window identifiers

Window identifiers are integers, and are used to uniquely determine window identity in the event system (though you can use it for other purposes). In fact, identifiers do not need to be unique across your entire application just so long as they are unique within a particular context you're interested in, such as a frame and its children. You may use the `wxID_OK` identifier, for example, on any number of dialogs so long as you don't have several within the same dialog.

If you pass `wxID_ANY` to a window constructor, an identifier will be generated for you automatically by `wxWidgets`. This is useful when you don't care about the exact identifier either because you're not going to process the events from the control being created at all or because you process the events from all controls in one place (in which case you should specify `wxID_ANY` in the event table or `wxEvtHandler::Connect` (p. 447) call as well. The automatically generated identifiers are always negative and so will never conflict with the user-specified identifiers which must be always positive.

The following standard identifiers are supplied. You can use `wxID_HIGHEST` to determine the number above which it is safe to define your own identifiers. Or, you can use identifiers below `wxID_LOWEST`.

```
#define wxID_ANY          -1
#define wxID_LOWEST      4999
#define wxID_OPEN        5000
#define wxID_CLOSE       5001
#define wxID_NEW         5002
#define wxID_SAVE        5003
#define wxID_SAVEAS      5004
```

```
#define wxID_REVERT          5005
#define wxID_EXIT           5006
#define wxID_UNDO           5007
#define wxID_REDO           5008
#define wxID_HELP           5009
#define wxID_PRINT          5010
#define wxID_PRINT_SETUP    5011
#define wxID_PREVIEW        5012
#define wxID_ABOUT          5013
#define wxID_HELP_CONTENTS  5014
#define wxID_HELP_COMMANDS  5015
#define wxID_HELP_PROCEDURES 5016
#define wxID_HELP_CONTEXT   5017

#define wxID_CUT             5030
#define wxID_COPY            5031
#define wxID_PASTE          5032
#define wxID_CLEAR          5033
#define wxID_FIND           5034
#define wxID_DUPLICATE      5035
#define wxID_SELECTALL      5036
#define wxID_DELETE         5037
#define wxID_REPLACE        5038
#define wxID_REPLACE_ALL    5039
#define wxID_PROPERTIES     5040

#define wxID_VIEW_DETAILS   5041
#define wxID_VIEW_LARGEICONS 5042
#define wxID_VIEW_SMALLICONS 5043
#define wxID_VIEW_LIST      5044
#define wxID_VIEW_SORTDATE  5045
#define wxID_VIEW_SORTNAME  5046
#define wxID_VIEW_SORTSIZE  5047
#define wxID_VIEW_SORTTYPE  5048

#define wxID_FILE1          5050
#define wxID_FILE2          5051
#define wxID_FILE3          5052
#define wxID_FILE4          5053
#define wxID_FILE5          5054
#define wxID_FILE6          5055
#define wxID_FILE7          5056
#define wxID_FILE8          5057
#define wxID_FILE9          5058

#define wxID_OK              5100
#define wxID_CANCEL         5101
#define wxID_APPLY          5102
#define wxID_YES            5103
#define wxID_NO             5104
#define wxID_STATIC         5105

#define wxID_HIGHEST        5999
```

Event macros summary

Generic event table macros

EVT_CUSTOM(event, id, func) Allows you to add a custom event table entry by specifying the event identifier (such as `wxEVT_SIZE`), the window identifier, and a member function to call.

EVT_CUSTOM_RANGE(event, id1, id2, func) The same as `EVT_CUSTOM`, but responds to a range of window

identifiers.

EVT_COMMAND(id, event, func)

The same as EVT_CUSTOM, but expects a member function with a wxCommandEvent argument.

EVT_COMMAND_RANGE(id1, id2, event, func)

The same as EVT_CUSTOM_RANGE, but expects a member function with a wxCommandEvent argument.

Macros listed by event class

The documentation for specific event macros is organised by event class. Please refer to these sections for details.

wxActivateEvent (p. 29)

The EVT_ACTIVATE and EVT_ACTIVATE_APP macros intercept activation and deactivation events.

wxCommandEvent (p. 165)

A range of commonly-used control events.

wxCloseEvent (p. 139)

The EVT_CLOSE macro handles window closure called via *wxWindow::Close* (p. 1395).

wxDropFilesEvent (p. 427)

The EVT_DROP_FILES macros handles file drop events.

wxEraseEvent (p. 440)

The EVT_ERASE_BACKGROUND macro is used to handle window erase requests.

wxFocusEvent (p. 512)

The EVT_SET_FOCUS and EVT_KILL_FOCUS macros are used to handle keyboard focus events.

wxKeyEvent (p. 778)

EVT_CHAR, EVT_KEY_DOWN and EVT_KEY_UP macros handle keyboard input for any window.

wxIdleEvent (p. 726)

The EVT_IDLE macro handle application idle events (to process background tasks, for example).

wxInitDialogEvent (p. 761)

The EVT_INIT_DIALOG macro is used to handle dialog initialisation.

wxListEvent (p. 818)

These macros handle *wxListCtrl* (p. 799) events.

wxMenuEvent (p. 907)

These macros handle special menu events (not menu commands).

<i>wxMouseEvent</i> (p. 928)	Mouse event macros can handle either individual mouse events or all mouse events.
<i>wxMoveEvent</i> (p. 937)	The EVT_MOVE macro is used to handle a window move.
<i>wxPaintEvent</i> (p. 967)	The EVT_PAINT macro is used to handle window paint requests.
<i>wxScrollEvent</i> (p. 1094)	These macros are used to handle scroll events from <i>wxScrollBar</i> (p. 1079), <i>wxSlider</i> (p. 1122), and <i>wxSpinButton</i> (p. 1155).
<i>wxSizeEvent</i> (p. 1109)	The EVT_SIZE macro is used to handle a window resize.
<i>wxSplitterEvent</i> (p. 1165)	The EVT_SPLITTER_SASH_POS_CHANGED, EVT_SPLITTER_UNSPLOT and EVT_SPLITTER_DCLICK macros are used to handle the various splitter window events.
<i>wxSysColourChangedEvent</i> (p. 1228)	The EVT_SYS_COLOUR_CHANGED macro is used to handle events informing the application that the user has changed the system colours (Windows only).
<i>wxTreeEvent</i> (p. 1347)	These macros handle <i>wxTreeCtrl</i> (p. 1329) events.
<i>wxUpdateUIEvent</i> (p. 1352)	The EVT_UPDATE_UI macro is used to handle user interface update pseudo-events, which are generated to give the application the chance to update the visual state of menus, toolbars and controls.

C++ exceptions overview

Introduction

wxWidgets had been started long before the exceptions were introduced in C++ so it is not very surprising that it is not built around using them as some more modern C++ libraries are. For instance, the library doesn't throw exceptions to signal about the errors. Moreover, up to (and including) the version 2.4 of *wxWidgets*, even using the exceptions in the user code was dangerous because the library code wasn't exception-safe and so an exception propagating through it could result in memory and/or resource leaks, and

also not very convenient.

Starting from the version 2.5.1 wxWidgets becomes more exception-friendly. It still doesn't use the exceptions by itself but it should be now safe to use the exceptions in the user code and the library tries to help you with this. Please note that making the library exception-safe is still work in progress.

Strategies for exceptions handling

There are several choice for using the exceptions in wxWidgets programs. First of all, you may not use them at all. As stated above, the library doesn't throw any exceptions by itself and so you don't have to worry about exceptions at all unless your own code throws them. This is, of course, the simplest solution but may be not the best one to deal with all possible errors.

Another strategy is to use exceptions only to signal truly fatal errors. In this case you probably don't expect to recover from them and the default behaviour -- to simply terminate the program -- may be appropriate. If it is not, you may override *OnUnhandledException()* (p. 38) in your wxApp-derived class to perform any clean up tasks. Note, however, that any information about the exact exception type is lost when this function is called, so if you need you should override *OnRun()* (p. 38) and add a try/catch clause around the call of the base class version. This would allow you to catch any exceptions generated during the execution of the main event loop. To deal with the exceptions which may arise during the program startup and/or shutdown you should insert try/catch clauses in *OnInit()* (p. 37) and/or *OnExit()* (p. 36) as well.

Finally, you may also want to continue running even when certain exceptions occur. If all of your exceptions may happen only in the event handlers of a single class (or only in the classes derived from it), you may centralize your exception handling code in *ProcessEvent* (p. 450) method of this class. If this is impractical, you may also consider overriding the *wxApp::HandleEvent()* (p. 42) which allows you to handle all the exceptions thrown by any event handler.

Technicalities

To use any kind of exception support in the library you need to build it with `wxUSE_EXCEPTIONS` set to 1. This should be the case by default but if it isn't, you should edit the `include/wx/msw/setup.h` file under Windows or run `configure` with `--enable-exceptions` argument under Unix.

On the other hand, if you do *not* plan to use exceptions, setting this flag to 0 or using `--disable-exceptions` could result in a leaner and slightly faster library.

As for any other library feature, there is a *sample* (p. 1571) showing how to use it. Please look at its sources for further information.

Window styles

Window styles are used to specify alternative behaviour and appearances for windows, when they are created. The symbols are defined in such a way that they can be combined in a 'bit-list' using the C++ *bitwise-or* operator. For example:

```
wxCAPTION | wxMINIMIZE_BOX | wxMAXIMIZE_BOX | wxTHICK_FRAME
```

For the window styles specific to each window class, please see the documentation for the window. Most windows can use the generic styles listed for *wxWindow* (p. 1388) in addition to their own styles.

Window deletion overview

Classes: *wxCloseEvent* (p. 139), *wxWindow* (p. 1388)

Window deletion can be a confusing subject, so this overview is provided to help make it clear when and how you delete windows, or respond to user requests to close windows.

What is the sequence of events in a window deletion?

When the user clicks on the system close button or system close command, in a frame or a dialog, *wxWidgets* calls *wxWindow::Close* (p. 1395). This in turn generates an EVT_CLOSE event: see *wxCloseEvent* (p. 139).

It is the duty of the application to define a suitable event handler, and decide whether or not to destroy the window. If the application is for some reason forcing the application to close (*wxCloseEvent::CanVeto* (p. 140) returns false), the window should always be destroyed, otherwise there is the option to ignore the request, or maybe wait until the user has answered a question before deciding whether it is safe to close. The handler for EVT_CLOSE should signal to the calling code if it does not destroy the window, by calling *wxCloseEvent::Veto* (p. 141). Calling this provides useful information to the calling code.

The *wxCloseEvent* handler should only call *wxWindow::Destroy* (p. 1397) to delete the window, and not use the **delete** operator. This is because for some window classes, *wxWidgets* delays actual deletion of the window until all events have been processed, since otherwise there is the danger that events will be sent to a non-existent window.

As reinforced in the next section, calling *Close* does not guarantee that the window will be destroyed. Call *wxWindow::Destroy* (p. 1397) if you want to be certain that the window is destroyed.

How can the application close a window itself?

Your application can either use *wxWindow::Close* (p. 1395) event just as the framework does, or it can call *wxWindow::Destroy* (p. 1397) directly. If using *Close()*, you can pass a true argument to this function to tell the event handler that we definitely want to delete the frame and it cannot be vetoed.

The advantage of using *Close* instead of *Destroy* is that it will call any clean-up code defined by the EVT_CLOSE handler; for example it may close a document contained in a window after first asking the user whether the work should be saved. *Close* can be vetoed by this process (return false), whereas *Destroy* definitely destroys the window.

What is the default behaviour?

The default close event handler for `wxDialog` simulates a Cancel command, generating a `wxID_CANCEL` event. Since the handler for this cancel event might itself call **Close**, there is a check for infinite looping. The default handler for `wxID_CANCEL` hides the dialog (if modeless) or calls `EndModal(wxID_CANCEL)` (if modal). In other words, by default, the dialog *is not destroyed* (it might have been created on the stack, so the assumption of dynamic creation cannot be made).

The default close event handler for `wxFrame` destroys the frame using `Destroy()`. **What should I do when the user calls up Exit from a menu?**

You can simply call `wxWindow::Close` (p. 1395) on the frame. This will invoke your own close event handler which may destroy the frame.

You can do checking to see if your application can be safely exited at this point, either from within your close event handler, or from within your exit menu command handler. For example, you may wish to check that all files have been saved. Give the user a chance to save and quit, to not save but quit anyway, or to cancel the exit command altogether.

What should I do to upgrade my 1.xx OnClose to 2.0?

In `wxWidgets 1.xx`, the **OnClose** function did not actually delete 'this', but signaled to the calling function (either **Close**, or the `wxWidgets` framework) to delete or not delete the window.

To update your code, you should provide an event table entry in your frame or dialog, using the `EVT_CLOSE` macro. The event handler function might look like this:

```
void MyFrame::OnCloseWindow(wxCloseEvent& event)
{
    if (MyDataHasBeenModified())
    {
        wxMessageDialog* dialog = new wxMessageDialog(this,
            "Save changed data?", "My app", wxYES_NO|wxCANCEL);

        int ans = dialog->ShowModal();
        dialog->Destroy();

        switch (ans)
        {
            case wxID_YES:          // Save, then destroy, quitting app
                SaveMyData();
                this->Destroy();
                break;
            case wxID_NO:           // Don't save; just destroy, quitting app
                this->Destroy();
                break;
            case wxID_CANCEL:       // Do nothing - so don't quit app.
            default:
                if (!event.CanVeto()) // Test if we can veto this deletion
                    this->Destroy(); // If not, destroy the window anyway.
                else
                    event.Veto();    // Notify the calling code that we didn't
delete the frame.
                break;
        }
    }
}
```

How do I exit the application gracefully?

A wxWidgets application automatically exits when the designated top window, or the last frame or dialog, is destroyed. Put any application-wide cleanup code in *wxApp::OnExit* (p. 36) (this is a virtual function, not an event handler).

Do child windows get deleted automatically?

Yes, child windows are deleted from within the parent destructor. This includes any children that are themselves frames or dialogs, so you may wish to close these child frame or dialog windows explicitly from within the parent close handler.

What about other kinds of window?

So far we've been talking about 'managed' windows, i.e. frames and dialogs. Windows with parents, such as controls, don't have delayed destruction and don't usually have close event handlers, though you can implement them if you wish. For consistency, continue to use the *wxWindow::Destroy* (p. 1397) function instead of the **delete** operator when deleting these kinds of windows explicitly.

wxDialog overview

Classes: *wxDialog* (p. 369)

A dialog box is similar to a panel, in that it is a window which can be used for placing controls, with the following exceptions:

1. A surrounding frame is implicitly created.
2. Extra functionality is automatically given to the dialog box, such as tabbing between items (currently Windows only).
3. If the dialog box is *modal*, the calling program is blocked until the dialog box is dismissed.

Under Windows 3, modal dialogs have to be emulated using modeless dialogs and a message loop. This is because Windows 3 expects the contents of a modal dialog to be loaded from a resource file or created on receipt of a dialog initialization message. This is too restrictive for wxWidgets, where any window may be created and displayed before its contents are created.

For a set of dialog convenience functions, including file selection, see *Dialog functions* (p. 1495).

See also *wxPanel* (p. 972) and *wxWindow* (p. 1388) for inherited member functions. Validation of data in controls is covered in *Validator overview* (p. 1621).

wxValidator overview

Classes: *wxValidator* (p. 1360), *wxTextValidator* (p. 1283), *wxGenericValidator* (p. 567)

The aim of the validator concept is to make dialogs very much easier to write. A validator is an object that can be plugged into a control (such as a `wxTextCtrl`), and mediates between C++ data and the control, transferring the data in either direction and validating it. It also is able to intercept events generated by the control, providing filtering behaviour without the need to derive a new control class.

You can use a stock validator, such as `wxTextValidator` (p. 1283) (which does text control data transfer, validation and filtering) and `wxGenericValidator` (p. 567) (which does data transfer for a range of controls); or you can write your own.

Example

Here is an example of `wxTextValidator` usage.

```
wxTextCtrl *txt1 = new wxTextCtrl(this, -1, wxT(""),
    wxPoint(10, 10), wxSize(100, 80), 0,
    wxTextValidator(wxFILTER_ALPHA, &g_data.m_string));
```

In this example, the text validator object provides the following functionality:

1. It transfers the value of `g_data.m_string` (a `wxString` variable) to the `wxTextCtrl` when the dialog is initialised.
2. It transfers the `wxTextCtrl` data back to this variable when the dialog is dismissed.
3. It filters input characters so that only alphabetic characters are allowed.

The validation and filtering of input is accomplished in two ways. When a character is input, `wxTextValidator` checks the character against the allowed filter flag (`wxFILTER_ALPHA` in this case). If the character is inappropriate, it is vetoed (does not appear) and a warning beep sounds. The second type of validation is performed when the dialog is about to be dismissed, so if the default string contained invalid characters already, a dialog box is shown giving the error, and the dialog is not dismissed.

Anatomy of a validator

A programmer creating a new validator class should provide the following functionality.

A validator constructor is responsible for allowing the programmer to specify the kind of validation required, and perhaps a pointer to a C++ variable that is used for storing the data for the control. If such a variable address is not supplied by the user, then the validator should store the data internally.

The `wxValidator::Validate` (p. 1362) member function should return true if the data in the control (not the C++ variable) is valid. It should also show an appropriate message if data was not valid.

The `wxValidator::TransferToWindow` (p. 1362) member function should transfer the data from the validator or associated C++ variable to the control.

The `wxValidator::TransferFromWindow` (p. 1361) member function should transfer the data from the control to the validator or associated C++ variable.

There should be a copy constructor, and a `wxValidator::Clone` (p. 1361) function which

returns a copy of the validator object. This is important because validators are passed by reference to window constructors, and must therefore be cloned internally.

You can optionally define event handlers for the validator, to implement filtering. These handlers will capture events before the control itself does.

For an example implementation, see the `valtext.h` and `valtext.cpp` files in the `wxWidgets` library.

How validators interact with dialogs

For validators to work correctly, validator functions must be called at the right times during dialog initialisation and dismissal.

When a `wxDialog::Show` (p. 377) is called (for a modeless dialog) or `wxDialog::ShowModal` (p. 378) is called (for a modal dialog), the function `wxWindow::InitDialog` (p. 1413) is automatically called. This in turn sends an initialisation event to the dialog. The default handler for the `wxEVT_INIT_DIALOG` event is defined in the `wxWindow` class to simply call the function `wxWindow::TransferDataToWindow` (p. 1439). This function finds all the validators in the window's children and calls the `TransferToWindow` function for each. Thus, data is transferred from C++ variables to the dialog just as the dialog is being shown.

If you are using a window or panel instead of a dialog, you will need to call `wxWindow::InitDialog` (p. 1413) explicitly before showing the window.

When the user clicks on a button, for example the OK button, the application should first call `wxWindow::Validate` (p. 1441), which returns false if any of the child window validators failed to validate the window data. The button handler should return immediately if validation failed. Secondly, the application should call `wxWindow::TransferDataFromWindow` (p. 1439) and return if this failed. It is then safe to end the dialog by calling `EndModal` (if modal) or `Show` (if modeless).

In fact, `wxDialog` contains a default command event handler for the `wxID_OK` button. It goes like this:

```
void wxDialog::OnOK(wxCommandEvent& event)
{
    if ( Validate() && TransferDataFromWindow() )
    {
        if ( IsModal() )
            EndModal(wxID_OK);
        else
        {
            SetReturnCode(wxID_OK);
            this->Show(false);
        }
    }
}
```

So if using validators and a normal OK button, you may not even need to write any code for handling dialog dismissal.

If you load your dialog from a resource file, you will need to iterate through the controls setting validators, since validators can't be specified in a dialog resource.

Constraints overview

Classes: *wxLayoutConstraints* (p. 785), *wxIndividualLayoutConstraint* (p. 758).

Note: constraints are now deprecated and you should use *sizers* (p. 1627) instead.

Objects of class *wxLayoutConstraint* can be associated with a window to define the way it is laid out, with respect to its siblings or the parent.

The class consists of the following eight constraints of class *wxIndividualLayoutConstraint*, some or all of which should be accessed directly to set the appropriate constraints.

- **left:** represents the left hand edge of the window
- **right:** represents the right hand edge of the window
- **top:** represents the top edge of the window
- **bottom:** represents the bottom edge of the window
- **width:** represents the width of the window
- **height:** represents the height of the window
- **centreX:** represents the horizontal centre point of the window
- **centreY:** represents the vertical centre point of the window

The constraints are initially set to have the relationship *wxUnconstrained*, which means that their values should be calculated by looking at known constraints. To calculate the position and size of the control, the layout algorithm needs to know exactly 4 constraints (as it has 4 numbers to calculate from them), so you should always set exactly 4 of the constraints from the above table.

If you want the controls height or width to have the default value, you may use a special value for the constraint: *wxAsIs*. If the constraint is *wxAsIs*, the dimension will not be changed which is useful for the dialog controls which often have the default size (e.g. the buttons whose size is determined by their label).

The constraints calculation is done in *wxWindow::Layout* (p. 1414) function which evaluates constraints. To call it you can either call *wxWindow::SetAutoLayout* (p. 1423) if the parent window is a frame, panel or a dialog to tell default *OnSize* handlers to call *Layout* automatically whenever the window size changes, or override *OnSize* and call *Layout* yourself (note that you do have to call *Layout* (p. 1414) yourself if the parent window is not a frame, panel or dialog).

Constraint layout: more detail

By default, windows do not have a *wxLayoutConstraints* object. In this case, much layout must be done explicitly, by performing calculations in *OnSize* members, except for the case of frames that have exactly one subwindow (not counting toolbar and statusbar

which are also positioned by the frame automatically), where `wxFrame::OnSize` takes care of resizing the child to always fill the frame.

To avoid the need for these rather awkward calculations, the user can create a `wxLayoutConstraints` object and associate it with a window with `wxWindow::SetConstraints`. This object contains a constraint for each of the window edges, two for the centre point, and two for the window size. By setting some or all of these constraints appropriately, the user can achieve quite complex layout by defining relationships between windows.

In `wxWidgets`, each window can be constrained relative to either its *siblings* on the same window, or the *parent*. The layout algorithm therefore operates in a top-down manner, finding the correct layout for the children of a window, then the layout for the grandchildren, and so on. Note that this differs markedly from native Motif layout, where constraints can ripple upwards and can eventually change the frame window or dialog box size. We assume in `wxWidgets` that the *user* is always 'boss' and specifies the size of the outer window, to which subwindows must conform. Obviously, this might be a limitation in some circumstances, but it suffices for most situations, and the simplification avoids some of the nightmarish problems associated with programming Motif.

When the user sets constraints, many of the constraints for windows edges and dimensions remain unconstrained. For a given window, the `wxWindow::Layout` algorithm first resets all constraints in all children to have unknown edge or dimension values, and then iterates through the constraints, evaluating them. For unconstrained edges and dimensions, it tries to find the value using known relationships that always hold. For example, an unconstrained *width* may be calculated from the *left* and *right edges*, if both are currently known. For edges and dimensions with user-supplied constraints, these constraints are evaluated if the inputs of the constraint are known.

The algorithm stops when all child edges and dimension are known (success), or there are unknown edges or dimensions but there has been no change in this cycle (failure).

It then sets all the window positions and sizes according to the values it has found.

Because the algorithm is iterative, the order in which constraints are considered is irrelevant, however you may reduce the number of iterations (and thus speed up the layout calculations) by creating the controls in such order that as many constraints as possible can be calculated during the first iteration. For example, if you have 2 buttons which you'd like to position in the lower right corner, it is slightly more efficient to first create the second button and specify that its right border `IsSameAs(parent, wxRight)` and then create the first one by specifying that it should be `LeftOf()` the second one than to do in a more natural left-to-right order.

Window layout examples

Example 1: subwindow layout

This example specifies a panel and a window side by side, with a text subwindow below it.

```
frame->panel = new wxPanel(frame, -1, wxPoint(0, 0), wxSize(1000, 500),
0);
```

```

    frame->scrollWindow = new MyScrolledWindow(frame, -1, wxPoint(0, 0),
wxSize(400, 400), wxRETAINED);
    frame->text_window = new MyTextWindow(frame, -1, wxPoint(0, 250),
wxSize(400, 250));

    // Set constraints for panel subwindow
    wxLayoutConstraints *c1 = new wxLayoutConstraints;

    c1->left.SameAs      (frame, wxLeft);
    c1->top.SameAs        (frame, wxTop);
    c1->right.PercentOf  (frame, wxWidth, 50);
    c1->height.PercentOf  (frame, wxHeight, 50);

    frame->panel->SetConstraints(c1);

    // Set constraints for scrollWindow subwindow
    wxLayoutConstraints *c2 = new wxLayoutConstraints;

    c2->left.SameAs      (frame->panel, wxRight);
    c2->top.SameAs        (frame, wxTop);
    c2->right.SameAs      (frame, wxRight);
    c2->height.PercentOf  (frame, wxHeight, 50);

    frame->scrollWindow->SetConstraints(c2);

    // Set constraints for text subwindow
    wxLayoutConstraints *c3 = new wxLayoutConstraints;
    c3->left.SameAs      (frame, wxLeft);
    c3->top.Below         (frame->panel);
    c3->right.SameAs      (frame, wxRight);
    c3->bottom.SameAs     (frame, wxBottom);

    frame->text_window->SetConstraints(c3);

```

Example 2: panel item layout

This example sizes a button width to 80 percent of the panel width, and centres it horizontally. A listbox and multitext item are placed below it. The listbox takes up 40 percent of the panel width, and the multitext item takes up the remainder of the width. Margins of 5 pixels are used.

```

// Create some panel items
wxButton *btn1 = new wxButton(frame->panel, -1, "A button" );

wxLayoutConstraints *b1 = new wxLayoutConstraints;
b1->centreX.SameAs      (frame->panel, wxCentreX);
b1->top.SameAs           (frame->panel, wxTop, 5);
b1->width.PercentOf      (frame->panel, wxWidth, 80);
b1->height.PercentOf     (frame->panel, wxHeight, 10);
btn1->SetConstraints(b1);

wxListBox *list = new wxListBox(frame->panel, -1, "A list",
                                wxPoint(-1, -1), wxSize(200, 100));

wxLayoutConstraints *b2 = new wxLayoutConstraints;
b2->top.Below            (btn1, 5);
b2->left.SameAs           (frame->panel, wxLeft, 5);
b2->width.PercentOf       (frame->panel, wxWidth, 40);
b2->bottom.SameAs         (frame->panel, wxBottom, 5);
list->SetConstraints(b2);

wxTextCtrl *mtext = new wxTextCtrl(frame->panel, -1, "Multiline text",
"Some text",
                                wxPoint(-1, -1), wxSize(150, 100),
wxTE_MULTILINE);

wxLayoutConstraints *b3 = new wxLayoutConstraints;
b3->top.Below            (btn1, 5);
b3->left.RightOf         (list, 5);

```

```
b3->right.SameAs      (frame->panel, wxRight, 5);  
b3->bottom.SameAs     (frame->panel, wxBottom, 5);  
mtext->SetConstraints(b3);
```

Sizer overview

Classes: *wxSizer* (p. 1110), *wxGridSizer* (p. 636), *wxFlexGridSizer* (p. 509), *wxBoxSizer* (p. 90), *wxStaticBoxSizer* (p. 1182), *wxNotebookSizer* (p. 952), *CreateButtonSizer* (p. 1634)

Sizers, as represented by the *wxSizer* class and its descendants in the *wxWidgets* class hierarchy, have become the method of choice to define the layout of controls in dialogs in *wxWidgets* because of their ability to create visually appealing dialogs independent of the platform, taking into account the differences in size and style of the individual controls. Unlike the original *wxWidgets* Dialog Editor, editors such as *wxDesigner*, *DialogBlocks*, *wxrcedit*, *XRCed* and *wxWorkshop* create dialogs based exclusively on sizers, practically forcing the user to create platform independent layouts without compromises.

The next section describes and shows what can be done with sizers. The following sections briefly describe how to program with individual sizer classes.

For information about the new *wxWidgets* resource system, which can describe sizer-based dialogs, see the *XML-based resource system overview* (p. 1634).

The idea behind sizers

The layout algorithm used by sizers in *wxWidgets* is closely related to layout systems in other GUI toolkits, such as Java's AWT, the GTK toolkit or the Qt toolkit. It is based upon the idea of individual subwindows reporting their minimal required size and their ability to get stretched if the size of the parent window has changed. This will most often mean that the programmer does not set the start-up size of a dialog, the dialog will rather be assigned a sizer and this sizer will be queried about the recommended size. This sizer in turn will query its children (which can be normal windows, empty space or other sizers) so that a hierarchy of sizers can be constructed. Note that *wxSizer* does not derive from *wxWindow* and thus does not interfere with tab ordering and requires very few resources compared to a real window on screen.

What makes sizers so well fitted for use in *wxWidgets* is the fact that every control reports its own minimal size and the algorithm can handle differences in font sizes or different window (dialog item) sizes on different platforms without problems. For example, if the standard font as well as the overall design of Linux/GTK widgets requires more space than on Windows, the initial dialog size will automatically be bigger on Linux/GTK than on Windows.

There are currently five different kinds of sizers available in *wxWidgets*. Each represents either a certain way to lay out dialog items in a dialog or it fulfils a special task such as wrapping a static box around a dialog item (or another sizer). These sizers will be discussed one by one in the text below. For more detailed information on how to use sizers programmatically, please refer to the section *Programming with Sizers* (p. 1631).

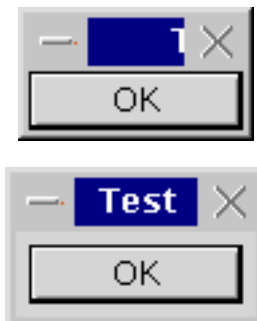
Common features

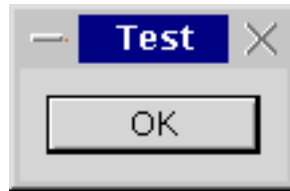
All sizers are containers, that is, they are used to lay out one dialog item (or several dialog items), which they contain. Such items are sometimes referred to as the children of the sizer. Independent of how the individual sizers lay out their children, all children have certain features in common:

A minimal size: This minimal size is usually identical to the initial size of the controls and may either be set explicitly in the `wxSize` field of the control constructor or may be calculated by `wxWidgets`, typically by setting the height and/or the width of the item to `-1`. Note that only some controls can calculate their size (such as a checkbox) whereas others (such as a listbox) don't have any natural width or height and thus require an explicit size. Some controls can calculate their height, but not their width (e.g. a single line text control):

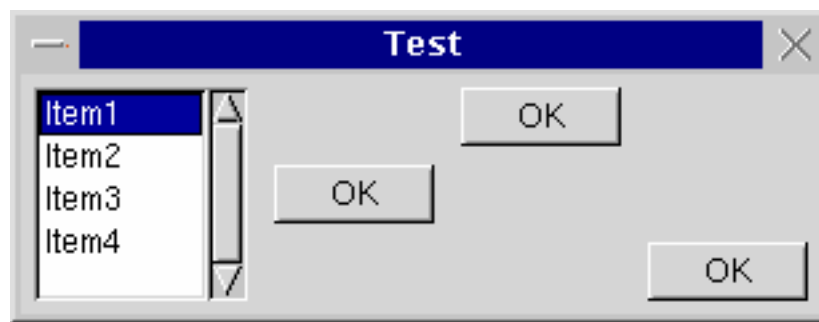


A border: The border is just empty space and is used to separate dialog items in a dialog. This border can either be all around, or at any combination of sides such as only above and below the control. The thickness of this border must be set explicitly, typically 5 points. The following samples show dialogs with only one dialog item (a button) and a border of 0, 5, and 10 pixels around the button:

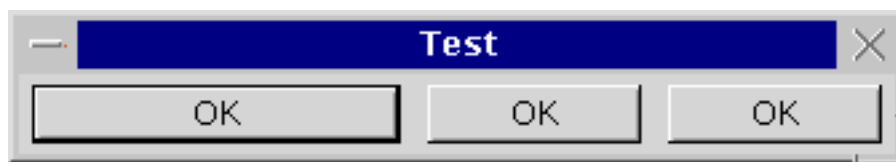




An alignment: Often, a dialog item is given more space than its minimal size plus its border. Depending on what flags are used for the respective dialog item, the dialog item can be made to fill out the available space entirely, i.e. it will grow to a size larger than the minimal size, or it will be moved to either the centre of the available space or to either side of the space. The following sample shows a listbox and three buttons in a horizontal box sizer; one button is centred, one is aligned at the top, one is aligned at the bottom:



A stretch factor: If a sizer contains more than one child and it is offered more space than its children and their borders need, the question arises how to distribute the surplus space among the children. For this purpose, a stretch factor may be assigned to each child, where the default value of 0 indicates that the child will not get more space than its requested minimum size. A value of more than zero is interpreted in relation to the sum of all stretch factors in the children of the respective sizer, i.e. if two children get a stretch factor of 1, they will get half the extra space each *independent of whether one control has a minimal sizer inferior to the other or not*. The following sample shows a dialog with three buttons, the first one has a stretch factor of 1 and thus gets stretched, whereas the other two buttons have a stretch factor of zero and keep their initial width:



Within wxDesigner, this stretch factor gets set from the *Option* menu.

Hiding controls using sizers

You can hide controls contained in sizers the same way you would hide any control, using the `wxWindow::Show` (p. 1438) method.

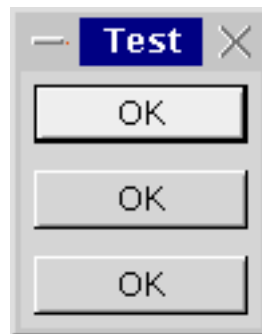
However, `wxSizer` also offers a separate method which can tell the sizer not to consider that control in its size calculations. To hide a window using the sizer, call `wxSizer::Show` (p. 1117). You must then call `Layout` on the sizer to force an update.

This is useful when hiding parts of the interface, since you can avoid removing the controls from the sizer and having to add them back later.

Note: This is supported only by `wxBoxSizer` and `wxFlexGridSizer`.

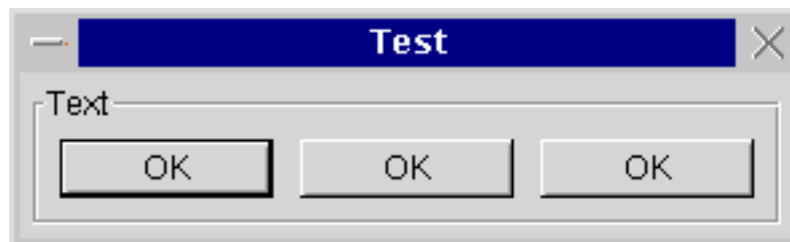
wxBoxSizer

`wxBoxSizer` (p. 90) can lay out its children either vertically or horizontally, depending on what flag is being used in its constructor. When using a vertical sizer, each child can be centered, aligned to the right or aligned to the left. Correspondingly, when using a horizontal sizer, each child can be centered, aligned at the bottom or aligned at the top. The stretch factor described in the last paragraph is used for the main orientation, i.e. when using a horizontal box sizer, the stretch factor determines how much the child can be stretched horizontally. The following sample shows the same dialog as in the last sample, only the box sizer is a vertical box sizer now:



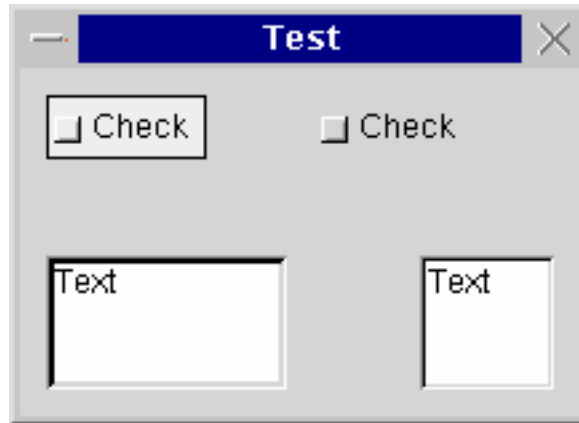
wxStaticBoxSizer

`wxStaticBoxSizer` (p. 1182) is the same as a `wxBoxSizer`, but surrounded by a static box. Here is a sample:



wxGridSizer

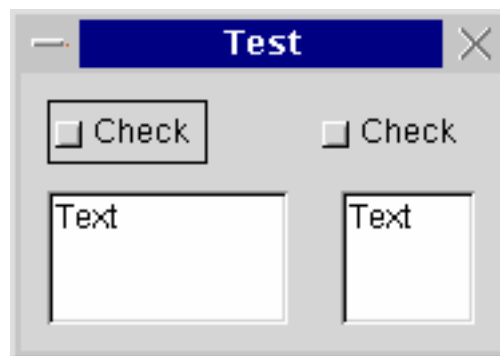
`wxGridSizer` (p. 636) is a two-dimensional sizer. All children are given the same size, which is the minimal size required by the biggest child, in this case the text control in the left bottom border. Either the number of columns or the number of rows is fixed and the grid sizer will grow in the respectively other orientation if new children are added:



For programming information, see *wxGridSizer* (p. 636).

wxFlexGridSizer

Another two-dimensional sizer derived from *wxGridSizer*. The width of each column and the height of each row are calculated individually according to the minimal requirements from the respectively biggest child. Additionally, columns and rows can be declared to be stretchable if the sizer is assigned a size different from that which it requested. The following sample shows the same dialog as the one above, but using a flex grid sizer:



wxNotebookSizer

wxNotebookSizer (p. 952) can be used with notebooks. It calculates the size of each notebook page and sets the size of the notebook to the size of the biggest page plus some extra space required for the notebook tabs and decorations.

Programming with wxBoxSizer

The basic idea behind a *wxBoxSizer* (p. 90) is that windows will most often be laid out in rather simple basic geometry, typically in a row or a column or several hierarchies of either.

As an example, we will construct a dialog that will contain a text field at the top and two buttons at the bottom. This can be seen as a top-hierarchy column with the text at the top and buttons at the bottom and a low-hierarchy row with an OK button to the left and a Cancel button to the right. In many cases (particularly dialogs under Unix and normal

frames) the main window will be resizable by the user and this change of size will have to get propagated to its children. In our case, we want the text area to grow with the dialog, whereas the button shall have a fixed size. In addition, there will be a thin border around all controls to make the dialog look nice and - to make matter worse - the buttons shall be centred as the width of the dialog changes.

It is the unique feature of a box sizer, that it can grow in both directions (height and width) but can distribute its growth in the main direction (horizontal for a row) *unevenly* among its children. In our example case, the vertical sizer is supposed to propagate all its height changes to only the text area, not to the button area. This is determined by the *proportion* parameter when adding a window (or another sizer) to a sizer. It is interpreted as a weight factor, i.e. it can be zero, indicating that the window may not be resized at all, or above zero. If several windows have a value above zero, the value is interpreted relative to the sum of all weight factors of the sizer, so when adding two windows with a value of 1, they will both get resized equally much and each half as much as the sizer owning them. Then what do we do when a column sizer changes its width? This behaviour is controlled by *flags* (the second parameter of the Add() function): Zero or no flag indicates that the window will preserve its original size, wxGROW flag (same as wxEXPAND) forces the window to grow with the sizer, and wxSHAPED flag tells the window to change its size proportionally, preserving original aspect ratio. When wxGROW flag is not used, the item can be aligned within available space. wxALIGN_LEFT, wxALIGN_TOP, wxALIGN_RIGHT, wxALIGN_BOTTOM, wxALIGN_CENTER_HORIZONTAL and wxALIGN_CENTER_VERTICAL do what they say. wxALIGN_CENTRE (same as wxALIGN_CENTER) is defined as (wxALIGN_CENTER_HORIZONTAL | wxALIGN_CENTER_VERTICAL). Default alignment is wxALIGN_LEFT | wxALIGN_TOP.

As mentioned above, any window belonging to a sizer may have border, and it can be specified which of the four sides may have this border, using the wxTOP, wxLEFT, wxRIGHT and wxBOTTOM constants or wxALL for all directions (and you may also use wxNORTH, wxWEST etc instead). These flags can be used in combination with the alignment flags above as the second parameter of the Add() method using the binary or operator |. The size of the border also must be made known, and it is the third parameter in the Add() method. This means, that the entire behaviour of a sizer and its children can be controlled by the three parameters of the Add() method.

```
// we want to get a dialog that is stretchable because it
// has a text ctrl at the top and two buttons at the bottom

MyDialog::MyDialog(wxFrame *parent, wxWindowID id, const wxString &title )
    : wxDialog(parent, id, title, wxDefaultPosition, wxDefaultSize,
               wxDEFAULT_DIALOG_STYLE | wxRESIZE_BORDER)
{
    wxBoxSizer *topSizer = new wxBoxSizer( wxVERTICAL );

    // create text ctrl with minimal size 100x60
    topSizer->Add(
        new wxTextCtrl( this, -1, "My text.", wxDefaultPosition,
            wxSize(100,60), wxTE_MULTILINE),
        1, // make vertically stretchable
        wxEXPAND | // make horizontally stretchable
        wxALL, // and make border all around
        10 ); // set border width to 10

    wxBoxSizer *button_sizer = new wxBoxSizer( wxHORIZONTAL );
    button_sizer->Add(
        new wxButton( this, wxID_OK, "OK" ),
```

```
        0,                // make horizontally unstretchable
        wxALL,           // make border all around (implicit top alignment)
        10 );            // set border width to 10
button_sizer->Add(
    new wxButton( this, wxID_CANCEL, "Cancel" ),
    0,                // make horizontally unstretchable
    wxALL,           // make border all around (implicit top alignment)
    10 );            // set border width to 10

topSizer->Add(
    button_sizer,
    0,                // make vertically unstretchable
    wxALIGN_CENTER ); // no border and centre horizontally

SetSizer( topSizer );    // use the sizer for layout

topSizer->SetSizeHints( this ); // set size hints to honour minimum
size
}
```

Programming with wxGridSizer

wxGridSizer (p. 636) is a sizer which lays out its children in a two-dimensional table with all table fields having the same size, i.e. the width of each field is the width of the widest child, the height of each field is the height of the tallest child.

Programming with wxFlexGridSizer

wxFlexGridSizer (p. 509) is a sizer which lays out its children in a two-dimensional table with all table fields in one row having the same height and all fields in one column having the same width, but all rows or all columns are not necessarily the same height or width as in the *wxGridSizer* (p. 636).

Programming with wxNotebookSizer

wxNotebookSizer (p. 952) is a specialized sizer to make sizers work in connection with using notebooks. This sizer is different from any other sizer as you must not add any children to it - instead, it queries the notebook class itself. The only thing this sizer does is to determine the size of the biggest page of the notebook and report an adjusted minimal size to a more toplevel sizer.

In order to query the size of notebook page, this page needs to have its own sizer, otherwise the *wxNotebookSizer* will ignore it. Notebook pages get their sizer by assigning one to them using *wxWindow::SetSizer* (p. 1434) and setting the auto-layout option to true using *wxWindow::SetAutoLayout* (p. 1423). Here is one example showing how to add a notebook page that the notebook sizer is aware of:

```
wxNotebook *notebook = new wxNotebook( &dialog, -1 );
wxNotebookSizer *nbs = new wxNotebookSizer( notebook );

// Add panel as notebook page
wxPanel *panel = new wxPanel( notebook, -1 );
notebook->AddPage( panel, "My Notebook Page" );

wxBoxSizer *panelsizer = new wxBoxSizer( wxVERTICAL );
```

```
// Add controls to panel and panelsizer here...

panel->SetAutoLayout( true );
panel->SetSizer( panelsizer );
```

Programming with wxStaticBoxSizer

wxStaticBoxSizer (p. 1182) is a sizer derived from *wxBoxSizer* but adds a static box around the sizer. Note that this static box has to be created separately.

CreateButtonSizer

As a convenience, *CreateButtonSizer* (long flags) can be used to create a standard button sizer in which standard buttons are displayed. The following flags can be passed to this function:

```
wxYES_NO // Add Yes/No subpanel
wxYES    // return wxID_YES
wxNO     // return wxID_NO
wxNO_DEFAULT // make the wxNO button the default, otherwise wxYES or
wxOK button will be default

wxOK      // return wxID_OK
wxCANCEL  // return wxID_CANCEL
wxHELP    // return wxID_HELP

wxFORWARD // return wxID_FORWARD
wxBACKWARD // return wxID_BACKWARD
wxSETUP   // return wxID_SETUP
wxMORE    // return wxID_MORE
```

XML-based resource system overview

Classes: *wxXmlResource* (p. 1452), *wxXmlResourceHandler* (p. 1457)

IMPORTANT NOTE: XRC is not yet a part of the core *wxWidgets* library, so please see the next section for how to compile and link it. Otherwise if you try to use it, you will get link errors.

The XML-based resource system, known as XRC, allows user interface elements such as dialogs, menu bars and toolbars, to be stored in text files and loaded into the application at run-time. XRC files can also be compiled into binary XRS files or C++ code (the former makes it possible to store all resources in a single file and the latter is useful when you want to embed the resources into the executable).

There are several advantages to using XRC resources.

- Recompiling and linking an application is not necessary if the resources change.
- If you use a dialog designer that generates C++ code, it can be hard to reintegrate this into existing C++ code. Separation of resources and code is a more elegant solution.

- You can choose between different alternative resource files at run time, if necessary.
- The XRC format uses sizers for flexibility, allowing dialogs to be resizable and highly portable.
- The XRC format is a wxWidgets standard, and can be generated or postprocessed by any program that understands it. As it is based on the XML standard, existing XML editors can be used for simple editing purposes.

XRC was written by Vaclav Slavik.

Compiling and using XRC

XRC can be found under the 'contrib' hierarchy, in the following directories:

```
contrib/src/xrc           ; XRC source
contrib/include/wx/xrc    ; XRC headers
contrib/samples/xrc       ; XRC sample
contrib/utils/wxrc        ; XRC resource compiler
contrib/utils/wxrcredit   ; XRC editor (in progress)
```

To compile XRC:

- Under Windows using VC++, open the contrib/src/xrc/XrcVC.dsw project and compile. Also compile contrib/utils/wxrc using wxBase if you wish to compile resource files.
- Under Unix, XRC should be configured when you configured wxWidgets. Make XRC by changing directory to contrib/src/xrc and type 'make'. Similarly compile contrib/utils/wxrc using wxBase if you wish to compile resource files. **Note:** there is currently a problem with the wxWidgets build system that means that only the static version of library can be built at present.

To use XRC:

- Under Windows using VC++, link with wxsrc[d].lib.
- Under Unix, link with libwxsrc[d].a.

XRC concepts

These are the typical steps for using XRC files in your application.

- Include the appropriate headers: normally "wx/xrc/xmlres.h" will suffice;
- If you are going to use *XRS files* (p. 1636), install wxFileSystem ZIP handler first with `wxFileSystem::AddHandler(new wxZipFSHandler);`
- call `wxXmlResource::Get()->InitAllHandlers()` from your `wxApp::OnInit` function, and then call `wxXmlResource::Get()->Load("myfile.xrc")` to load the resource file;

- to create a dialog from a resource, create it using the default constructor, and then load using for example `wxXmlResource::Get()->LoadDialog(&dlg, this, "dlg1");`
- set up event tables as usual but use the `XRCID(str)` macro to translate from XRC string names to a suitable integer identifier, for example `EVT_MENU(XRCID("quit"), MyFrame::OnQuit).`

To create an XRC file, you can use one of the following methods.

- Create the file by hand;
- use `wxDesigner` (<http://www.roebling.de>), a commercial dialog designer/RAD tool;
- use `DialogBlocks` (<http://www.anthemion.co.uk/dialogblocks>), a commercial dialog editor;
- use `XRCed` (<http://xrced.sf.net>), a wxPython-based dialog editor that you can find in the `wxPython/tools` subdirectory of the wxWidgets CVS archive;
- use `Glade` (<http://wxglade.sf.net>), a GUI designer written in wxPython. At the moment it can generate Python, C++ and XRC;
- use `wxrcedit` (`utils/contrib/wxrcedit`) (under development);
- convert WIN32 RC files to XRC with the tool in `contrib/utils/convertrc`.

A complete list of third-party tools that write to XRC can be found at www.wxwidgets.org/lnk_tool.htm (http://www.wxwidgets.org/lnk_tool.in).

It is highly recommended that you use a resource editing tool, since it's fiddly writing XRC files by hand.

You can use `wxXmlResource::Load` (p. 1455) in a number of ways. You can pass an XRC file (XML-based text resource file) or a *zip-compressed file* (p. 1636) (extension ZIP or XRS) containing other XRC.

You can also use *embedded C++ resources* (p. 1637)

Using binary resource files

To compile binary resource files, use the command-line `wxrc` utility. It takes one or more file parameters (the input XRC files) and the following switches and options:

- `-h` (`--help`): show a help message
- `-v` (`--verbose`): show verbose logging information
- `-c` (`--cpp-code`): write C++ source rather than a XRS file
- `-e` (`--extra-cpp-code`): if used together with `-c`, generates C++ header file

containing class definitions for the windows defined by the XRC file (see special subsection)

- `-u (--uncompressed)`: do not compress XML files (C++ only)
- `-g (--gettext)`: output .po catalog (to stdout, or a file if `-o` is used)
- `-n (--function) <name>`: specify C++ function name (use with `-c`)
- `-o (--output) <filename>`: specify the output file, such as `resource.xrs` or `resource.cpp`
- `-l (--list-of-handlers) <filename>`: output a list of necessary handlers to this file

```
For example: % wxrc resource.wrc
% wxrc resource.wrc -o resource.wrs
% wxrc resource.wrc -v -c -o resource.cpp
```

Note

XRS file is essentially a renamed ZIP archive which means that you can manipulate it with standard ZIP tools. Note that if you are using XRS files, you have to initialize `wxFileSystem` (p. 494) ZIP handler first! It is a simple thing to do:

```
#include <wx/filesys.h>
#include <wx/fs_zip.h>
...
wxFileSystem::AddHandler(new wxZipFSHandler);
```

Using embedded resources

It is sometimes useful to embed resources in the executable itself instead of loading external file (e.g. when your app is small and consists only of one exe file). XRC provides means to convert resources into regular C++ file that can be compiled and included in the executable.

Use the `-c` switch to `wxrc` utility to produce C++ file with embedded resources. This file will contain a function called `InitXmlResource` (unless you override this with a command line switch). Use it to load the resource:

```
extern void InitXMLResource(); // defined in generated file
...
wxXmlResource::Get()->InitAllHandlers();
InitXmlResource();
...
```

XRC C++ sample

This is the C++ source file (`xrcdemo.cpp`) for the XRC sample.

```
#include "wx/wx.h"
#include "wx/image.h"
#include "wx/xrc/xmlres.h"

// the application icon
```

```

#if defined(__WXGTK__) || defined(__WXMOTIF__) || defined(__WXMAC__)
#include "rc/appicon.xpm"
#endif

// -----
// private classes
// -----

// Define a new application type, each program should derive a class from
wxApp
class MyApp : public wxApp
{
public:
    // override base class virtuals
    // -----

    // this one is called on application startup and is a good place for
the app
    // initialization (doing it here and not in the ctor allows to have an
error
    // return: if OnInit() returns false, the application terminates)
    virtual bool OnInit();
};

// Define a new frame type: this is going to be our main frame
class MyFrame : public wxFrame
{
public:
    // ctor(s)
    MyFrame(const wxString& title, const wxPoint& pos, const wxSize&
size);

    // event handlers (these functions should _not_ be virtual)
    void OnQuit(wxCommandEvent& event);
    void OnAbout(wxCommandEvent& event);
    void OnDlgl1(wxCommandEvent& event);
    void OnDlgl2(wxCommandEvent& event);

private:
    // any class wishing to process wxWidgets events must use this macro
    DECLARE_EVENT_TABLE()
};

// -----
// event tables and other macros for wxWidgets
// -----

BEGIN_EVENT_TABLE(MyFrame, wxFrame)
    EVT_MENU(XRCID("menu_quit"), MyFrame::OnQuit)
    EVT_MENU(XRCID("menu_about"), MyFrame::OnAbout)
    EVT_MENU(XRCID("menu_dlg1"), MyFrame::OnDlgl1)
    EVT_MENU(XRCID("menu_dlg2"), MyFrame::OnDlgl2)
END_EVENT_TABLE()

IMPLEMENT_APP(MyApp)

// -----
// the application class
// -----

// 'Main program' equivalent: the program execution "starts" here
bool MyApp::OnInit()
{
    wxImage::AddHandler(new wxGIFHandler);
    wxXmlResource::Get()->InitAllHandlers();
    wxXmlResource::Get()->Load("rc/resource.xrc");
}

```

```

        MyFrame *frame = new MyFrame("XML resources demo",
                                     wxPoint(50, 50), wxSize(450, 340));
        frame->Show(true);
        return true;
    }

    // -----
    // main frame
    // -----

    // frame constructor
    MyFrame::MyFrame(const wxString& title, const wxPoint& pos, const wxSize&
                    size)
        : wxFrame((wxFrame *)NULL, -1, title, pos, size)
    {
        SetIcon(wxICON(appicon));

        SetMenuBar(wxXmlResource::Get()->LoadMenuBar("mainmenu"));
        SetToolBar(wxXmlResource::Get()->LoadToolBar(this, "toolbar"));
    }

    // event handlers
    void MyFrame::OnQuit(wxCommandEvent& WXUNUSED(event))
    {
        // true is to force the frame to close
        Close(true);
    }

    void MyFrame::OnAbout(wxCommandEvent& WXUNUSED(event))
    {
        wxString msg;
        msg.Printf( _T("This is the about dialog of XML resources demo.\n")
                  _T("Welcome to %s"), wxVERSION_STRING);

        wxMessageBox(msg, "About XML resources demo", wxOK |
                    wxICON_INFORMATION, this);
    }

    void MyFrame::OnDlg1(wxCommandEvent& WXUNUSED(event))
    {
        wxDialog dlg;
        wxXmlResource::Get()->LoadDialog(&dlg, this, "dlg1");
        dlg.ShowModal();
    }

    void MyFrame::OnDlg2(wxCommandEvent& WXUNUSED(event))
    {
        wxDialog dlg;
        wxXmlResource::Get()->LoadDialog(&dlg, this, "dlg2");
        dlg.ShowModal();
    }

```

XRC resource file sample

This is the XML file (resource.xrc) for the XRC sample.

```

<?xml version="1.0"?>
<resource version="2.3.0.1">
  <object class="wxMenuBar" name="mainmenu">
    <style>wxMB_DOCKABLE</style>
    <object class="wxMenu" name="menu_file">
      <label>_File</label>
      <style>wxMENU_TEAROFF</style>
      <object class="wxMenuItem" name="menu_about">
        <label>_About...</label>

```

```

        <bitmap>filesave.gif</bitmap>
    </object>
    <object class="separator"/>
    <object class="wxMenuItem" name="menu_dlg1">
        <label>Dialog 1</label>
    </object>
    <object class="wxMenuItem" name="menu_dlg2">
        <label>Dialog 2</label>
    </object>
    <object class="separator"/>
    <object class="wxMenuItem" name="menu_quit">
        <label>E_xit\tAlt-X</label>
    </object>
</object>
<object class="wxToolBar" name="toolbar">
    <style>wxTB_FLAT|wxTB_DOCKABLE</style>
    <margins>2,2</margins>
    <object class="tool" name="menu_open">
        <bitmap>fileopen.gif</bitmap>
        <tooltip>Open catalog</tooltip>
    </object>
    <object class="tool" name="menu_save">
        <bitmap>filesave.gif</bitmap>
        <tooltip>Save catalog</tooltip>
    </object>
    <object class="tool" name="menu_update">
        <bitmap>update.gif</bitmap>
        <tooltip>Update catalog - synchronize it with sources</tooltip>
    </object>
    <separator/>
    <object class="tool" name="menu_quotes">
        <bitmap>quotes.gif</bitmap>
        <toggle>1</toggle>
        <tooltip>Display quotes around the string?</tooltip>
    </object>
    <object class="separator"/>
    <object class="tool" name="menu_fuzzy">
        <bitmap>fuzzy.gif</bitmap>
        <tooltip>Toggled if selected string is fuzzy translation</tooltip>
        <toggle>1</toggle>
    </object>
</object>
<object class="wxDialog" name="dlg1">
    <object class="wxBoxSizer">
        <object class="sizeritem">
            <object class="wxBitmapButton">
                <bitmap>fuzzy.gif</bitmap>
                <focus>fileopen.gif</focus>
            </object>
        </object>
        <object class="sizeritem">
            <object class="wxPanel">
                <object class="wxStaticText">
                    <label>fdgdfgdfgdfg</label>
                </object>
                <style>wxSUNKEN_BORDER</style>
            </object>
            <flag>wxALIGN_CENTER</flag>
        </object>
        <object class="sizeritem">
            <object class="wxButton">
                <label>Buttonek</label>
            </object>
            <border>10d</border>
            <flag>wxALL</flag>
        </object>
        <object class="sizeritem">
            <object class="wxHtmlWindow">
                <htmlcode>&lt;h1&gt;Hi,&lt;/h1&gt;man</htmlcode>
                <size>100,45d</size>
            </object>

```

```

</object>
<object class="sizeritem">
  <object class="wxNotebook">
    <object class="notebookpage">
      <object class="wxPanel">
        <object class="wxBoxSizer">
          <object class="sizeritem">
            <object class="wxHtmlWindow">
              <htmlcode>Hello, we are inside a
&lt;u&gt;NOTEBOOK&lt;/u&gt;...</htmlcode>
              <size>50,50d</size>
            </object>
            <option>1</option>
          </object>
        </object>
      </object>
    <label>Page</label>
  </object>
  <object class="notebookpage">
    <object class="wxPanel">
      <object class="wxBoxSizer">
        <object class="sizeritem">
          <object class="wxHtmlWindow">
            <htmlcode>Hello, we are inside a
&lt;u&gt;NOTEBOOK&lt;/u&gt;...</htmlcode>
            <size>50,50d</size>
          </object>
        </object>
      </object>
    </object>
    <label>Page 2</label>
  </object>
  <usenotebooksizer>1</usenotebooksizer>
</object>
<flag>wxEXPAND</flag>
</object>
<orient>wxVERTICAL</orient>
</object>
<object>
  <object class="wxDialog" name="dlg2">
    <object class="wxBoxSizer">
      <orient>wxVERTICAL</orient>
      <object class="sizeritem" name="dfgdfg">
        <object class="wxTextCtrl">
          <size>200,200d</size>
          <style>wxTE_MULTILINE|wxSUNKEN_BORDER</style>
          <value>Hello, this is an ordinary multiline\n
textctrl....</value>
        </object>
        <option>1</option>
      <flag>wxEXPAND|wxALL</flag>
      <border>10</border>
    </object>
    <object class="sizeritem">
      <object class="wxBoxSizer">
        <object class="sizeritem">
          <object class="wxButton" name="wxID_OK">
            <label>Ok</label>
            <default>1</default>
          </object>
        </object>
        <object class="sizeritem">
          <object class="wxButton" name="wxID_CANCEL">
            <label>Cancel</label>
          </object>
          <border>10</border>
          <flag>wxLEFT</flag>
        </object>
      </object>
      <flag>wxLEFT|wxRIGHT|wxBOTTOM|wxALIGN_RIGHT</flag>
      <border>10</border>
    </object>
  </object>

```

```
    </object>
    <title>Second testing dialog</title>
  </object>
</resource>
```

XRC file format

Please see Technical Note 14 (docs/tech/tn0014.txt) in your wxWidgets distribution.

C++ header file generation

Using the `-e` switch together with `-c`, a C++ header file is written containing class definitions for the GUI windows defined in the XRC file. This code generation can make it easier to use XRC and automate program development. The classes can be used as basis for development, freeing the programmer from dealing with most of the XRC specifics (e.g. `XRCCTRL`).

For each top level window defined in the XRC file a C++ class definition is generated, containing as class members the named widgets of the window. A default constructor for each class is also generated. Inside the constructor all XRC loading is done and all class members representing widgets are initialized.

A simple example will help understand how the scheme works. Suppose you have a XRC file defining a top level window `TestWnd_Base`, which subclasses `wxFrame` (any other class like `wxDialog` will do also), and has subwidgets `wxTextCtrl` A and `wxButton` B. The XRC file and corresponding class definition in the header file will be something like:

```
<?xml version="1.0"?>
<resource version="2.3.0.1">
  <object class="wxFrame" name="TestWnd_Base">
    <size>-1,-1</size>
    <title>Test</title>
    <object class="wxBoxSizer">
      <orient>wxHORIZONTAL</orient>
      <object class="sizeritem">
        <object class="wxTextCtrl" name="A">
          <label>Test label</label>
        </object>
      </object>
      <object class="sizeritem">
        <object class="wxButton" name="B">
          <label>Test button</label>
        </object>
      </object>
    </object>
  </object>
</resource>

class TestWnd_Base : public wxFrame {
protected:
    wxTextCtrl* A;
    wxButton* B;

private:
    void InitWidgetsFromXRC(){
        wxXmlResource::Get()->LoadObject(this,NULL,"TestWnd","wxFrame");
        A = XRCCTRL(*this,"A",wxTextCtrl);
```

```
        B = XRCCTRL(*this, "B", wxButton);
    }
public:
    TestWnd::TestWnd() {
        InitWidgetsFromXRC();
    }
};
```

The generated window class can be used as basis for the full window class. The class members which represent widgets may be accessed by name instead of using `XRCCTRL` every time you wish to reference them (note that they are `protected` class members), though you must still use `XRCID` to refer to widget ids in the event table.

Example:

```
#include "resource.h"

class TestWnd : public TestWnd_Base {
public:
    TestWnd() {
        // A, B already initialised at this point
        A->SetValue("Updated in TestWnd::TestWnd");
        B->SetValue("Nice :)");
    }
    void OnBPressed(wxEvent& event) {
        Close();
    }
    DECLARE_EVENT_TABLE();
};

BEGIN_EVENT_TABLE(TestWnd, TestWnd_Base)
    EVT_BUTTON(XRCID("B"), TestWnd::OnBPressed)
END_EVENT_TABLE()
```

Adding new resource handlers

Coming soon.

Scrolling overview

Classes: *wxWindow* (p. 1388), *wxScrolledWindow* (p. 1085), *wxIcon* (p. 716), *wxScrollBar* (p. 1079).

Scrollbars come in various guises in *wxWidgets*. All windows have the potential to show a vertical scrollbar and/or a horizontal scrollbar: it is a basic capability of a window. However, in practice, not all windows do make use of scrollbars, such as a single-line *wxTextCtrl*.

Because any class derived from *wxWindow* (p. 1388) may have scrollbars, there are functions to manipulate the scrollbars and event handlers to intercept scroll events. But just because a window generates a scroll event, doesn't mean that the window necessarily handles it and physically scrolls the window. The base class *wxWindow* in fact doesn't have any default functionality to handle scroll events. If you created a *wxWindow* object with scrollbars, and then clicked on the scrollbars, nothing at all would happen. This is deliberate, because the *interpretation* of scroll events varies from one

window class to another.

wxScrolledWindow (p. 1085) (formerly *wxCanvas*) is an example of a window that adds functionality to make scrolling really work. It assumes that scrolling happens in consistent units, not different-sized jumps, and that page size is represented by the visible portion of the window. It is suited to drawing applications, but perhaps not so suitable for a sophisticated editor in which the amount scrolled may vary according to the size of text on a given line. For this, you would derive from *wxWindow* and implement scrolling yourself. *wxGrid* (p. 572) is an example of a class that implements its own scrolling, largely because columns and rows can vary in size.

The scrollbar model

The function *wxWindow::SetScrollbar* (p. 1430) gives a clue about the way a scrollbar is modeled. This function takes the following arguments:

orientation	Which scrollbar: <i>wxVERTICAL</i> or <i>wxHORIZONTAL</i> .
position	The position of the scrollbar in scroll units.
visible	The size of the visible portion of the scrollbar, in scroll units.
range	The maximum position of the scrollbar.
refresh	Whether the scrollbar should be repainted.

orientation determines whether we're talking about the built-in horizontal or vertical scrollbar.

position is simply the position of the 'thumb' (the bit you drag to scroll around). It is given in scroll units, and so is relative to the total range of the scrollbar.

visible gives the number of scroll units that represents the portion of the window currently visible. Normally, a scrollbar is capable of indicating this visually by showing a different length of thumb.

range is the maximum value of the scrollbar, where zero is the start position. You choose the units that suit you, so if you wanted to display text that has 100 lines, you would set this to 100. Note that this doesn't have to correspond to the number of pixels scrolled - it is up to you how you actually show the contents of the window.

refresh just indicates whether the scrollbar should be repainted immediately or not.

An example

Let's say you wish to display 50 lines of text, using the same font. The window is sized so that you can only see 16 lines at a time.

You would use:

```
SetScrollbar(wxVERTICAL, 0, 16, 50);
```

Note that with the window at this size, the thumb position can never go above 50 minus

16, or 34.

You can determine how many lines are currently visible by dividing the current view size by the character height in pixels.

When defining your own scrollbar behaviour, you will always need to recalculate the scrollbar settings when the window size changes. You could therefore put your scrollbar calculations and `SetScrollbar` call into a function named `AdjustScrollbars`, which can be called initially and also from your `wxSizeEvent` (p. 1109) handler function.

Bitmaps and icons overview

Classes: `wxBitmap` (p. 67), `wxBitmapHandler` (p. 86), `wxIcon` (p. 716), `wxCursor` (p. 211).

The `wxBitmap` class encapsulates the concept of a platform-dependent bitmap, either monochrome or colour. Platform-specific methods for creating a `wxBitmap` object from an existing file are catered for, and this is an occasion where conditional compilation will sometimes be required.

A bitmap created dynamically or loaded from a file can be selected into a memory device context (instance of `wxMemoryDC` (p. 881)). This enables the bitmap to be copied to a window or memory device context using `wxDC::Blit` (p. 350), or to be used as a drawing surface. The **`wxToolBarSimple`** class is implemented using bitmaps, and the toolbar demo shows one of the toolbar bitmaps being used for drawing a miniature version of the graphic which appears on the main window.

See `wxMemoryDC` (p. 881) for an example of drawing onto a bitmap.

All `wxWidgets` platforms support XPMs for small bitmaps and icons. You may include the XPM inline as below, since it's C code, or you can load it at run-time.

```
#include "mondrian.xpm"
```

Sometimes you wish to use a `.ico` resource on Windows, and XPMs on other platforms (for example to take advantage of Windows' support for multiple icon resolutions). A macro, `wx/CON` (p. 1506), is available which creates an icon using an XPM on the appropriate platform, or an icon resource on Windows.

```
wxIcon icon(wxICON(mondrian));  
  
// Equivalent to:  
  
#if defined(__WXGTK__) || defined(__WXMOTIF__)  
wxIcon icon(mondrian_xpm);  
#endif  
  
#if defined(__WXMSW__)  
wxIcon icon("mondrian");  
#endif
```

There is also a corresponding `wxBITMAP` (p. 1504) macro which allows to create the bitmaps in much the same way as `wx/CON` (p. 1506) creates icons. It assumes that bitmaps live in resources under Windows or OS2 and XPM files under all other platforms

(for XPMs, the corresponding file must be included before this macro is used, of course, and the name of the bitmap should be the same as the resource name under Windows with `_xpm` suffix). For example:

```
// an easy and portable way to create a bitmap
wxBitmap bmp(wxBITMAP(bmpname));

// which is roughly equivalent to the following
#ifdef __WXMSW__ || defined(__WXPX__)
    wxBitmap bmp("bmpname", wxBITMAP_TYPE_RESOURCE);
#else // Unix
    wxBitmap bmp(bmpname_xpm, wxBITMAP_TYPE_XPM);
#endif
```

You should always use `wxICON` and `wxBITMAP` macros because they work for any platform (unlike the code above which doesn't deal with `wxMac`, `wxX11`, ...) and are more short and clear than versions with `#ifdef`s. Even better, use the same XPMs on all platforms.

Supported bitmap file formats

The following lists the formats handled on different platforms. Note that missing or partially-implemented formats are automatically supplemented by the *wxImage* (p. 728) to load the data, and then converting it to `wxBitmap` form. Note that using *wxImage* is the preferred way to load images in `wxWidgets`, with the exception of resources (XPM-files or native Windows resources). Writing an image format handler for *wxImage* is also far easier than writing one for `wxBitmap`, because *wxImage* has exactly one format on all platforms whereas `wxBitmap` can store pixel data very differently, depending on colour depths and platform.

wxBitmap

Under Windows, `wxBitmap` may load the following formats:

- Windows bitmap resource (`wxBITMAP_TYPE_BMP_RESOURCE`)
- Windows bitmap file (`wxBITMAP_TYPE_BMP`)
- XPM data and file (`wxBITMAP_TYPE_XPM`)
- All formats that are supported by the *wxImage* (p. 728) class.

Under `wxGTK`, `wxBitmap` may load the following formats:

- XPM data and file (`wxBITMAP_TYPE_XPM`)
- All formats that are supported by the *wxImage* (p. 728) class.

Under `wxMotif` and `wxX11`, `wxBitmap` may load the following formats:

- XBM data and file (`wxBITMAP_TYPE_XBM`)
- XPM data and file (`wxBITMAP_TYPE_XPM`)
- All formats that are supported by the *wxImage* (p. 728) class.

wxIcon

Under Windows, wxIcon may load the following formats:

- Windows icon resource (wxBITMAP_TYPE_ICO_RESOURCE)
- Windows icon file (wxBITMAP_TYPE_ICO)
- XPM data and file (wxBITMAP_TYPE_XPM)

Under wxGTK, wxIcon may load the following formats:

- XPM data and file (wxBITMAP_TYPE_XPM)
- All formats that are supported by the *wxImage* (p. 728) class.

Under wxMotif and wxX11, wxIcon may load the following formats:

- XBM data and file (wxBITMAP_TYPE_XBM)
- XPM data and file (wxBITMAP_TYPE_XPM)
- All formats that are supported by the *wxImage* (p. 728) class.

wxCursor

Under Windows, wxCursor may load the following formats:

- Windows cursor resource (wxBITMAP_TYPE_CUR_RESOURCE)
- Windows cursor file (wxBITMAP_TYPE_CUR)
- Windows icon file (wxBITMAP_TYPE_ICO)
- Windows bitmap file (wxBITMAP_TYPE_BMP)

Under wxGTK, wxCursor may load the following formats (in addition to stock cursors):

- None (stock cursors only).

Under wxMotif and wxX11, wxCursor may load the following formats:

- XBM data and file (wxBITMAP_TYPE_XBM)

Bitmap format handlers

To provide extensibility, the functionality for loading and saving bitmap formats is not implemented in the *wxBitmap* class, but in a number of handler classes, derived from *wxBitmapHandler*. There is a static list of handlers which *wxBitmap* examines when a file load/save operation is requested. Some handlers are provided as standard, but if you have special requirements, you may wish to initialise the *wxBitmap* class with some extra handlers which you write yourself or receive from a third party.

To add a handler object to `wxBitmap`, your application needs to include the header which implements it, and then call the static function `wxBitmap::AddHandler` (p. 71).

Note: bitmap handlers are not implemented on all platforms, and new ones rarely need to be implemented since `wxImage` can be used for loading most formats, as noted earlier.

Device context overview

Classes: `wxBufferedDC` (p. 99), `wxBufferedPaintDC` (p. 100), `wxDC` (p. 349), `wxPostScriptDC` (p. 991), `wxMetafileDC` (p. 917), `wxMemoryDC` (p. 881), `wxPrinterDC` (p. 1010), `wxScreenDC` (p. 1073), `wxClientDC` (p. 134), `wxPaintDC` (p. 966), `wxWindowDC` (p. 1441).

A `wxDC` is a *device context* onto which graphics and text can be drawn. The device context is intended to represent a number of output devices in a generic way, with the same API being used throughout.

Some device contexts are created temporarily in order to draw on a window. This is true of `wxScreenDC` (p. 1073), `wxClientDC` (p. 134), `wxPaintDC` (p. 966), and `wxWindowDC` (p. 1441). The following describes the differences between these device contexts and when you should use them.

- **wxScreenDC.** Use this to paint on the screen, as opposed to an individual window.
- **wxClientDC.** Use this to paint on the client area of window (the part without borders and other decorations), but do not use it from within an `wxPaintEvent` (p. 967).
- **wxPaintDC.** Use this to paint on the client area of a window, but *only* from within a `wxPaintEvent` (p. 967).
- **wxWindowDC.** Use this to paint on the whole area of a window, including decorations. This may not be available on non-Windows platforms.

To use a client, paint or window device context, create an object on the stack with the window as argument, for example:

```
void MyWindow::OnMyCmd(wxCommandEvent& event)
{
    wxClientDC dc(window);
    DrawMyPicture(dc);
}
```

Try to write code so it is parameterised by `wxDC` - if you do this, the same piece of code may write to a number of different devices, by passing a different device context. This doesn't work for everything (for example not all device contexts support bitmap drawing) but will work most of the time.

wxFont overview

Class: *wxFont* (p. 512), *wxFontDialog* (p. 524)

A font is an object which determines the appearance of text, primarily when drawing text to a window or device context. A font is determined by the following parameters (not all of them have to be specified, of course):

Point size	This is the standard way of referring to text size.
Family	Supported families are: wxDEFAULT , wxDECORATIVE , wxROMAN , wxSCRIPT , wxSWISS , wxMODERN . wxMODERN is a fixed pitch font; the others are either fixed or variable pitch.
Style	The value can be wxNORMAL , wxSLANT or wxITALIC .
Weight	The value can be wxNORMAL , wxLIGHT or wxBOLD .
Underlining	The value can be true or false.
Face name	An optional string specifying the actual typeface to be used. If NULL, a default typeface will chosen based on the family.
Encoding	The font encoding (see wxFONTENCODING_XXX constants and the <i>font overview</i> (p. 1650) for more details)

Specifying a family, rather than a specific typeface name, ensures a degree of portability across platforms because a suitable font will be chosen for the given font family, however it doesn't allow to choose a font precisely as the parameters above don't suffice, in general, to identify all the available fonts and this is where using the native font descriptions may be helpful - see below.

Under Windows, the face name can be one of the installed fonts on the user's system. Since the choice of fonts differs from system to system, either choose standard Windows fonts, or if allowing the user to specify a face name, store the family name with any file that might be transported to a different Windows machine or other platform.

Note: There is currently a difference between the appearance of fonts on the two platforms, if the mapping mode is anything other than `wxMM_TEXT`. Under X, font size is always specified in points. Under MS Windows, the unit for text is points but the text is scaled according to the current mapping mode. However, user scaling on a device context will also scale fonts under both environments.

Native font information

An alternative way of choosing fonts is to use the native font description. This is the only acceptable solution if the user is allowed to choose the font using the *wxFontDialog* (p. 524) because the selected font cannot be described using only the family name and so, if only family name is stored permanently, the user would almost surely see a different font in the program later.

Instead, you should store the value returned by `wxFont::GetNativeFontInfoDesc` (p. 517) and pass it to `wxFont::SetNativeFontInfo` (p. 519) later to recreate exactly the same font.

Note that the contents of this string depends on the platform and shouldn't be used for any other purpose (in particular, it is not meant to be shown to the user). Also please note that although the native font information is currently implemented for Windows and Unix (GTK+ and Motif) ports only, all the methods are available for all the ports and should be used to make your program work correctly when they are implemented later.

Font encoding overview

`wxWidgets` has support for multiple font encodings starting from release 2.2. By encoding we mean here the mapping between the character codes and the letters. Probably the most well-known encoding is (7 bit) ASCII one which is used almost universally now to represent the letters of the English alphabet and some other common characters. However, it is not enough to represent the letters of foreign alphabets and here other encodings come into play. Please note that we will only discuss 8-bit fonts here and not *Unicode* (p. 1590).

Font encoding support is assured by several classes: `wxFont` (p. 512) itself, but also `wxFontEnumerator` (p. 526) and `wxFontMapper` (p. 528). `wxFont` encoding support is reflected by a (new) constructor parameter *encoding* which takes one of the following values (elements of enumeration type `wxFontEncoding`):

- | | |
|---|---|
| <code>wxFONTENCODING_SYSTEM</code> | The default encoding of the underlying operating system (notice that this might be a "foreign" encoding for foreign versions of Windows 9x/NT). |
| <code>wxFONTENCODING_DEFAULT</code> | The applications default encoding as returned by <code>wxFont::GetDefaultEncoding</code> (p. 516). On program startup, the applications default encoding is the same as <code>wxFONTENCODING_SYSTEM</code> , but may be changed to make all the fonts created later to use it (by default). |
| <code>wxFONTENCODING_ISO8859_1..15</code> | ISO8859 family encodings which are usually used by all non-Microsoft operating systems |
| <code>wxFONTENCODING_KOI8</code> | Standard Cyrillic encoding for the Internet (but see also <code>wxFONTENCODING_ISO8859_5</code> and <code>wxFONTENCODING_CP1251</code>) |
| <code>wxFONTENCODING_CP1250</code> | Microsoft analogue of ISO8859-2 |
| <code>wxFONTENCODING_CP1251</code> | Microsoft analogue of ISO8859-5 |
| <code>wxFONTENCODING_CP1252</code> | Microsoft analogue of ISO8859-1 |

As you may see, Microsoft's encoding partly mirror the standard ISO8859 ones, but there are (minor) differences even between ISO8859-1 (Latin1, ISO encoding for Western Europe) and CP1251 (WinLatin1, standard code page for English versions of Windows) and there are more of them for other encodings.

The situation is particularly complicated with Cyrillic encodings for which (more than) three incompatible encodings exist: KOI8 (the old standard, widely used on the Internet), ISO8859-5 (ISO standard for Cyrillic) and CP1251 (WinCyrillic).

This abundance of (incompatible) encodings should make it clear that using encodings is less easy than it might seem. The problems arise both from the fact that the standard encodings for the given language (say Russian, which is written in Cyrillic) are different on different platforms and because the fonts in the given encoding might just not be installed (this is especially a problem with Unix, or, in general, non-Win32 systems).

To clarify, the *wxFontEnumerator* (p. 526) class may be used to enumerate both all available encodings and to find the facename(s) in which the given encoding exists. If you can find the font in the correct encoding with *wxFontEnumerator* then your troubles are over, but, unfortunately, sometimes this is not enough. For example, there is no standard way (that I know of, please tell me if you do!) to find a font on a Windows system for KOI8 encoding (only for WinCyrillic one which is quite different), so *wxFontEnumerator* (p. 526) will never return one, even if the user has installed a KOI8 font on his system.

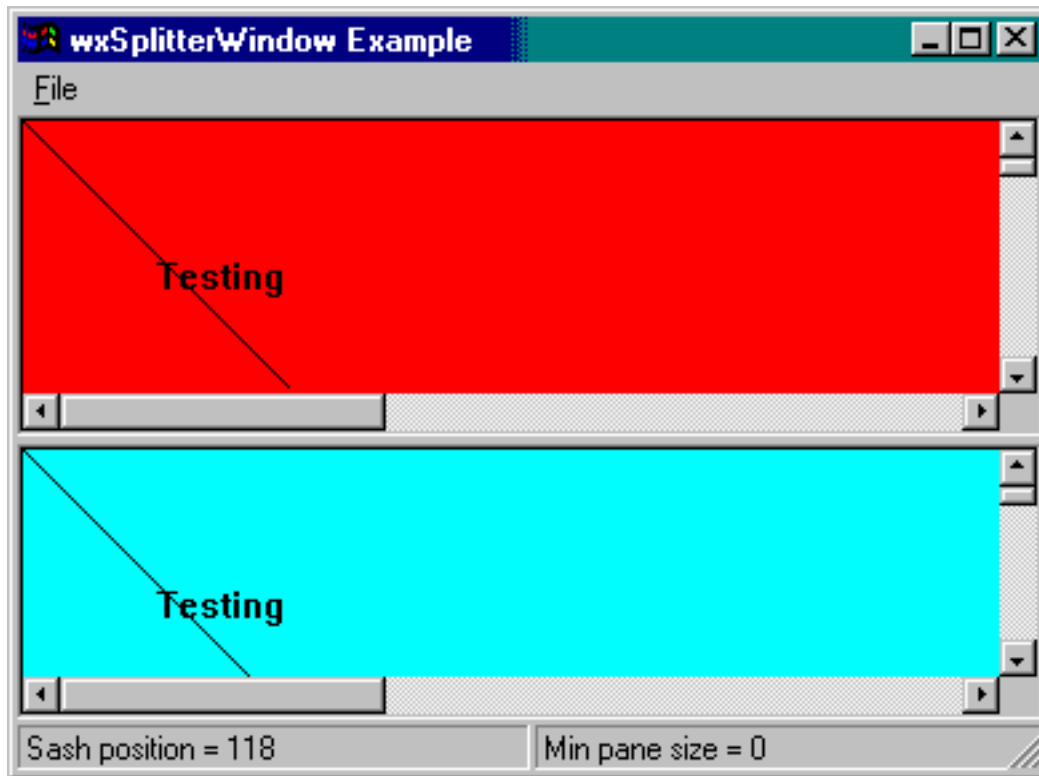
To solve this problem, a *wxFontMapper* (p. 528) class is provided. This class stores the mapping between the encodings and the font face names which support them in *wxConfig* (p. 1607) object. Of course, it would be fairly useless if it tried to determine these mappings by itself, so, instead, it (optionally) ask the user and remember his answers so that the next time the program will automatically choose the correct font.

All these topics are illustrated by the *font sample* (p. 1572); please refer to it and the documentation of the classes mentioned here for further explanations.

wxSplitterWindow overview

Classes: *wxSplitterWindow* (p. 1167)

The following screenshot shows the appearance of a splitter window with a vertical split.



The style `wxSP_3D` has been used to show a 3D border and 3D sash.

Example

The following fragment shows how to create a splitter window, creating two subwindows and hiding one of them.

```

    splitter = new wxSplitterWindow(this, -1, wxPoint(0, 0), wxSize(400,
400), wxSP_3D);

    leftWindow = new MyWindow(splitter);
    leftWindow->SetScrollbars(20, 20, 50, 50);

    rightWindow = new MyWindow(splitter);
    rightWindow->SetScrollbars(20, 20, 50, 50);
    rightWindow->Show(false);

    splitter->Initialize(leftWindow);

    // Set this to prevent unsplitting
    //    splitter->SetMinimumPaneSize(20);

```

The next fragment shows how the splitter window can be manipulated after creation.

```

void MyFrame::OnSplitVertical(wxCommandEvent& event)
{
    if ( splitter->IsSplit() )
        splitter->Unsplit();
    leftWindow->Show(true);
    rightWindow->Show(true);
    splitter->SplitVertically( leftWindow, rightWindow );
}

```

```
}

void MyFrame::OnSplitHorizontal(wxCommandEvent& event)
{
    if ( splitter->IsSplit() )
        splitter->Unsplit();
    leftWindow->Show(true);
    rightWindow->Show(true);
    splitter->SplitHorizontally( leftWindow, rightWindow );
}

void MyFrame::OnUnsplit(wxCommandEvent& event)
{
    if ( splitter->IsSplit() )
        splitter->Unsplit();
}
```

wxTreeCtrl overview

Classes: *wxTreeCtrl* (p. 1329), *wxImageList* (p. 754)

The tree control displays its items in a tree like structure. Each item has its own (optional) icon and a label. An item may be either collapsed (meaning that its children are not visible) or expanded (meaning that its children are shown). Each item in the tree is identified by its *itemId* which is of opaque data type *wxTreeItemId*. You can test whether an item is valid by calling *wxTreeItemId::IsOk*.

The items text and image may be retrieved and changed with *GetItemText* (p. 1338)/*SetItemText* (p. 1346) and *GetItemImage* (p. 1338)/*SetItemImage* (p. 1346). In fact, an item may even have two images associated with it: the normal one and another one for selected state which is set/retrieved with *SetItemSelectedImage* (p. 1346)/*GetItemSelectedImage* (p. 1341) functions, but this functionality might be unavailable on some platforms.

Tree items have several attributes: an item may be selected or not, visible or not, bold or not. It may also be expanded or collapsed. All these attributes may be retrieved with the corresponding functions: *IsSelected* (p. 1343), *IsVisible* (p. 1343), *IsBold* (p. 1342) and *IsExpanded* (p. 1343). Only one item at a time may be selected, selecting another one (with *SelectItem* (p. 1344)) automatically unselects the previously selected one.

In addition to its icon and label, a user-specific data structure may be associated with all tree items. If you wish to do it, you should derive a class from *wxTreeItemData* which is a very simple class having only one function *GetId()* which returns the id of the item this data is associated with. This data will be freed by the control itself when the associated item is deleted (all items are deleted when the control is destroyed), so you shouldn't delete it yourself (if you do it, you should call *SetItemData(NULL)* (p. 1345) to prevent the tree from deleting the pointer second time). The associated data may be retrieved with *GetItemData()* (p. 1337) function.

Working with trees is relatively straightforward if all the items are added to the tree at the moment of its creation. However, for large trees it may be very inefficient. To improve the performance you may want to delay adding the items to the tree until the branch containing the items is expanded: so, in the beginning, only the root item is created (with

AddRoot (p. 1332)). Other items are added when `EVT_TREE_ITEM_EXPANDING` event is received: then all items lying immediately under the item being expanded should be added, but, of course, only when this event is received for the first time for this item - otherwise, the items would be added twice if the user expands/collapses/re-expands the branch.

The tree control provides functions for enumerating its items. There are 3 groups of enumeration functions: for the children of a given item, for the sibling of the given item and for the visible items (those which are currently shown to the user: an item may be invisible either because its branch is collapsed or because it is scrolled out of view). Child enumeration functions require the caller to give them a *cookie* parameter: it is a number which is opaque to the caller but is used by the tree control itself to allow multiple enumerations to run simultaneously (this is explicitly allowed). The only thing to remember is that the *cookie* passed to *GetFirstChild* (p. 1336) and to *GetNextChild* (p. 1339) should be the same variable (and that nothing should be done with it by the user code).

Among other features of the tree control are: item sorting with *SortChildren* (p. 1346) which uses the user-defined comparison function *OnCompareItems* (p. 1343) (by default the comparison is the alphabetic comparison of tree labels), hit testing (determining to which portion of the control the given point belongs, useful for implementing drag-and-drop in the tree) with *HitTest* (p. 1341) and editing of the tree item labels in place (see *EditLabel* (p. 1335)).

Finally, the tree control has a keyboard interface: the cursor navigation (arrow) keys may be used to change the current selection. `<HOME>` and `<END>` are used to go to the first/last sibling of the current item. `'+'`, `'-'` and `'*'` expand, collapse and toggle the current branch. Note, however, that `` and `<INS>` keys do nothing by default, but it is usual to associate them with deleting item from a tree and inserting a new one into it.

wxListCtrl overview

Classes: *wxListCtrl* (p. 799), *wxImageList* (p. 754)

Sorry, this topic has yet to be written.

wxImageList overview

Classes: *wxImageList* (p. 754)

An image list is a list of images that may have transparent areas. The class helps an application organise a collection of images so that they can be referenced by integer index instead of by pointer.

Image lists are used in *wxNotebook* (p. 943), *wxListCtrl* (p. 799), *wxTreeCtrl* (p. 799) and some other control classes.

Common dialogs overview

Classes: *wxColourDialog* (p. 157), *wxFontDialog* (p. 524), *wxPrintDialog* (p. 1002), *wxFileDialog* (p. 468), *wxDirDialog* (p. 386), *wxTextEntryDialog* (p. 1271), *wxMessageDialog* (p. 914), *wxSingleChoiceDialog* (p. 1102), *wxMultiChoiceDialog* (p. 938)

Common dialog classes and functions encapsulate commonly-needed dialog box requirements. They are all 'modal', grabbing the flow of control until the user dismisses the dialog, to make them easy to use within an application.

Some dialogs have both platform-dependent and platform-independent implementations, so that if underlying windowing systems that do not provide the required functionality, the generic classes and functions can stand in. For example, under MS Windows, *wxColourDialog* uses the standard colour selector. There is also an equivalent called *wxGenericColourDialog* for other platforms, and a macro defines *wxColourDialog* to be the same as *wxGenericColourDialog* on non-MS Windows platforms. However, under MS Windows, the generic dialog can also be used, for testing or other purposes.

wxColourDialog overview

Classes: *wxColourDialog* (p. 157), *wxColourData* (p. 154)

The *wxColourDialog* presents a colour selector to the user, and returns with colour information.

The MS Windows colour selector

Under Windows, the native colour selector common dialog is used. This presents a dialog box with three main regions: at the top left, a palette of 48 commonly-used colours is shown. Under this, there is a palette of 16 'custom colours' which can be set by the application if desired. Additionally, the user may open up the dialog box to show a right-hand panel containing controls to select a precise colour, and add it to the custom colour palette.

The generic colour selector

Under non-MS Windows platforms, the colour selector is a simulation of most of the features of the MS Windows selector. Two palettes of 48 standard and 16 custom colours are presented, with the right-hand area containing three sliders for the user to select a colour from red, green and blue components. This colour may be added to the custom colour palette, and will replace either the currently selected custom colour, or the first one in the palette if none is selected. The RGB colour sliders are not optional in the generic colour selector. The generic colour selector is also available under MS Windows; use the name *wxGenericColourDialog*.

Example

In the `samples/dialogs` directory, there is an example of using the *wxColourDialog* class. Here is an excerpt, which sets various parameters of a *wxColourData* object, including a grey scale for the custom colours. If the user did not cancel the dialog, the application retrieves the selected colour and uses it to set the background of a window.

```
wxColourData data;
```

```
data.SetChooseFull(true);
for (int i = 0; i < 16; i++)
{
    wxColour colour(i*16, i*16, i*16);
    data.SetCustomColour(i, colour);
}

wxColourDialog dialog(this, &data);
if (dialog.ShowModal() == wxID_OK)
{
    wxColourData retData = dialog.GetColourData();
    wxColour col = retData.GetColour();
    wxBrush brush(col, wxSOLID);
    myWindow->SetBackground(brush);
    myWindow->Clear();
    myWindow->Refresh();
}
```

wxFontDialog overview

Classes: *wxFontDialog* (p. 524), *wxFontData* (p. 521)

The *wxFontDialog* presents a font selector to the user, and returns with font and colour information.

The MS Windows font selector

Under Windows, the native font selector common dialog is used. This presents a dialog box with controls for font name, point size, style, weight, underlining, strikethrough and text foreground colour. A sample of the font is shown on a white area of the dialog box. Note that in the translation from full MS Windows fonts to *wxWidgets* font conventions, strikethrough is ignored and a font family (such as Swiss or Modern) is deduced from the actual font name (such as Arial or Courier).

The generic font selector

Under non-MS Windows platforms, the font selector is simpler. Controls for font family, point size, style, weight, underlining and text foreground colour are provided, and a sample is shown upon a white background. The generic font selector is also available under MS Windows; use the name *wxGenericFontDialog*.

Example

In the *samples/dialogs* directory, there is an example of using the *wxFontDialog* class. The application uses the returned font and colour for drawing text on a canvas. Here is an excerpt:

```
wxFontData data;
data.SetInitialFont(canvasFont);
data.SetColour(canvasTextColour);

wxFontDialog dialog(this, &data);
if (dialog.ShowModal() == wxID_OK)
{
    wxFontData retData = dialog.GetFontData();
    canvasFont = retData.GetChosenFont();
    canvasTextColour = retData.GetColour();
    myWindow->Refresh();
}
```

wxPrintDialog overview

Classes: *wxPrintDialog* (p. 1002), *wxPrintData* (p. 996)

This class represents the print and print setup common dialogs. You may obtain a *wxPrinterDC* (p. 1010) device context from a successfully dismissed print dialog.

The samples/printing example shows how to use it: see *Printing overview* (p. 1671) for an excerpt from this example.

wxFileDialog overview

Classes: *wxFileDialog* (p. 468)

Pops up a file selector box. In Windows, this is the common file selector dialog. In X, this is a file selector box with somewhat less functionality. The path and filename are distinct elements of a full file pathname. If path is "", the current directory will be used. If filename is "", no default filename will be supplied. The wildcard determines what files are displayed in the file selector, and file extension supplies a type extension for the required filename. Flags may be a combination of *wxOPEN*, *wxSAVE*, *wxOVERWRITE_PROMPT*, *wxHIDE_READONLY*, *wxFILE_MUST_EXIST* or 0.

Both the X and Windows versions implement a wildcard filter. Typing a filename containing wildcards (*, ?) in the filename text item, and clicking on Ok, will result in only those files matching the pattern being displayed. In the X version, supplying no default name will result in the wildcard filter being inserted in the filename text item; the filter is ignored if a default name is supplied.

The wildcard may be a specification for multiple types of file with a description for each, such as:

```
"BMP files (*.bmp)|*.bmp|GIF files (*.gif)|*.gif"
```

wxDirDialog overview

Classes: *wxDirDialog* (p. 386)

This dialog shows a directory selector dialog, allowing the user to select a single directory.

wxTextEntryDialog overview

Classes: *wxTextEntryDialog* (p. 1271)

This is a dialog with a text entry field. The value that the user entered is obtained using *wxTextEntryDialog::GetValue* (p. 1272).

wxMessageDialog overview

Classes: *wxMessageDialog* (p. 914)

This dialog shows a message, plus buttons that can be chosen from OK, Cancel, Yes, and No. Under Windows, an optional icon can be shown, such as an exclamation mark or question mark.

The return value of *wxMessageDialog::ShowModal* (p. 916) indicates which button the user pressed.

wxSingleChoiceDialog overview

Classes: *wxSingleChoiceDialog* (p. 1102)

This dialog shows a list of choices, plus OK and (optionally) Cancel. The user can select one of them. The selection can be obtained from the dialog as an index, a string or client data.

wxMultiChoiceDialog overview

Classes: *wxMultiChoiceDialog* (p. 938)

This dialog shows a list of choices, plus OK and (optionally) Cancel. The user can select one or more of them.

Document/view overview

Classes: *wxDocument* (p. 415), *wxView* (p. 1371), *wxDocTemplate* (p. 410), *wxDocManager* (p. 396), *wxDocParentFrame* (p. 409), *wxDocChildFrame* (p. 394), *wxDocMDIParentFrame* (p. 407), *wxDocMDIChildFrame* (p. 405), *wxCommand* (p. 164), *wxCommandProcessor* (p. 171)

The document/view framework is found in most application frameworks, because it can dramatically simplify the code required to build many kinds of application.

The idea is that you can model your application primarily in terms of *documents* to store data and provide interface-independent operations upon it, and *views* to visualise and manipulate the data. Documents know how to do input and output given stream objects, and views are responsible for taking input from physical windows and performing the manipulation on the document data. If a document's data changes, all views should be updated to reflect the change.

The framework can provide many user-interface elements based on this model. Once you have defined your own classes and the relationships between them, the framework takes care of popping up file selectors, opening and closing files, asking the user to save modifications, routing menu commands to appropriate (possibly default) code, even some default print/preview functionality and support for command undo/redo. The framework is highly modular, allowing overriding and replacement of functionality and

objects to achieve more than the default behaviour.

These are the overall steps involved in creating an application based on the document/view framework:

1. Define your own document and view classes, overriding a minimal set of member functions e.g. for input/output, drawing and initialization.
2. Define any subwindows (such as a scrolled window) that are needed for the view(s). You may need to route some events to views or documents, for example `OnPaint` needs to be routed to `wxView::OnDraw`.
3. Decide what style of interface you will use: Microsoft's MDI (multiple document child frames surrounded by an overall frame), SDI (a separate, unconstrained frame for each document), or single-window (one document open at a time, as in Windows Write).
4. Use the appropriate `wxDocParentFrame` and `wxDocChildFrame` classes. Construct an instance of `wxDocParentFrame` in your `wxApp::OnInit`, and a `wxDocChildFrame` (if not single-window) when you initialize a view. Create menus using standard menu ids (such as `wxID_OPEN`, `wxID_PRINT`), routing non-application-specific identifiers to the base frame's `OnMenuCommand`.
5. Construct a single `wxDocManager` instance at the beginning of your `wxApp::OnInit`, and then as many `wxDocTemplate` instances as necessary to define relationships between documents and views. For a simple application, there will be just one `wxDocTemplate`.

If you wish to implement Undo/Redo, you need to derive your own class(es) from `wxCommand` and use `wxCommandProcessor::Submit` instead of directly executing code. The framework will take care of calling `Undo` and `Do` functions as appropriate, so long as the `wxID_UNDO` and `wxID_REDO` menu items are defined in the view menu.

Here are a few examples of the tailoring you can do to go beyond the default framework behaviour:

- Override `wxDocument::OnCreateCommandProcessor` to define a different Do/Undo strategy, or a command history editor.
- Override `wxView::OnCreatePrintout` to create an instance of a derived *wxPrintout* (p. 1010) class, to provide multi-page document facilities.
- Override `wxDocManager::SelectDocumentPath` to provide a different file selector.
- Limit the maximum number of open documents and the maximum number of undo commands.

Note that to activate framework functionality, you need to use some or all of the *wxWidgets predefined command identifiers* (p. 1664) in your menus.

wxPerl note: The document/view framework is available in wxPerl. To use it, you will need the following statements in your application code:

```
use Wx::DocView;  
use Wx ':docview'; # import constants (optional)
```

wxDocument overview

Document/view framework overview (p. 1658)

Class: *wxDocument* (p. 415)

The *wxDocument* class can be used to model an application's file-based data. It is part of the document/view framework supported by *wxWidgets*, and cooperates with the *wxView* (p. 1371), *wxDocTemplate* (p. 410) and *wxDocManager* (p. 396) classes.

Using this framework can save a lot of routine user-interface programming, since a range of menu commands -- such as open, save, save as -- are supported automatically. The programmer just needs to define a minimal set of classes and member functions for the framework to call when necessary. Data, and the means to view and edit the data, are explicitly separated out in this model, and the concept of multiple *views* onto the same data is supported.

Note that the document/view model will suit many but not all styles of application. For example, it would be overkill for a simple file conversion utility, where there may be no call for *views* on *documents* or the ability to open, edit and save files. But probably the majority of applications are document-based.

See the example application in `samples/docview`.

To use the abstract *wxDocument* class, you need to derive a new class and override at least the member functions *SaveObject* and *LoadObject*. *SaveObject* and *LoadObject* will be called by the framework when the document needs to be saved or loaded.

Use the macros `DECLARE_DYNAMIC_CLASS` and `IMPLEMENT_DYNAMIC_CLASS` in order to allow the framework to create document objects on demand. When you create a *wxDocTemplate* (p. 410) object on application initialization, you should pass `CLASSINFO(YourDocumentClass)` to the *wxDocTemplate* constructor so that it knows how to create an instance of this class.

If you do not wish to use the *wxWidgets* method of creating document objects dynamically, you must override *wxDocTemplate::CreateDocument* to return an instance of the appropriate class.

wxView overview

Document/view framework overview (p. 1658)

Class: *wxView* (p. 1371)

The *wxView* class can be used to model the viewing and editing component of an application's file-based data. It is part of the document/view framework supported by

`wxWidgets`, and cooperates with the *wxDocument* (p. 415), *wxDocTemplate* (p. 410) and *wxDocManager* (p. 396) classes.

See the example application in `samples/docview`.

To use the abstract `wxView` class, you need to derive a new class and override at least the member functions `OnCreate`, `OnDraw`, `OnUpdate` and `OnClose`. You will probably want to override `OnMenuCommand` to respond to menu commands from the frame containing the view.

Use the macros `DECLARE_DYNAMIC_CLASS` and `IMPLEMENT_DYNAMIC_CLASS` in order to allow the framework to create view objects on demand. When you create a *wxDocTemplate* (p. 410) object on application initialization, you should pass `CLASSINFO(YourViewClass)` to the *wxDocTemplate* constructor so that it knows how to create an instance of this class.

If you do not wish to use the `wxWidgets` method of creating view objects dynamically, you must override `wxDocTemplate::CreateView` to return an instance of the appropriate class.

wxDocTemplate overview

Document/view framework overview (p. 1658)

Class: *wxDocTemplate* (p. 410)

The *wxDocTemplate* class is used to model the relationship between a document class and a view class. The application creates a document template object for each document/view pair. The list of document templates managed by the *wxDocManager* instance is used to create documents and views. Each document template knows what file filters and default extension are appropriate for a document/view combination, and how to create a document or view.

For example, you might write a small doodling application that can load and save lists of line segments. If you had two views of the data -- graphical, and a list of the segments -- then you would create one document class *DoodleDocument*, and two view classes (*DoodleGraphicView* and *DoodleListView*). You would also need two document templates, one for the graphical view and another for the list view. You would pass the same document class and default file extension to both document templates, but each would be passed a different view class. When the user clicks on the Open menu item, the file selector is displayed with a list of possible file filters -- one for each *wxDocTemplate*. Selecting the filter selects the *wxDocTemplate*, and when a file is selected, that template will be used for creating a document and view. Under non-Windows platforms, the user will be prompted for a list of templates before the file selector is shown, since most file selectors do not allow a choice of file filters.

For the case where an application has one document type and one view type, a single document template is constructed, and dialogs will be appropriately simplified.

wxDocTemplate is part of the document/view framework supported by `wxWidgets`, and cooperates with the *wxView* (p. 1371), *wxDocument* (p. 415) and *wxDocManager* (p. 396) classes.

See the example application in `samples/docview`.

To use the `wxDocTemplate` class, you do not need to derive a new class. Just pass relevant information to the constructor including `CLASSINFO(YourDocumentClass)` and `CLASSINFO(YourViewClass)` to allow dynamic instance creation. If you do not wish to use the `wxWidgets` method of creating document objects dynamically, you must override `wxDocTemplate::CreateDocument` and `wxDocTemplate::CreateView` to return instances of the appropriate class.

NOTE: the document template has nothing to do with the C++ template construct. C++ templates are not used anywhere in `wxWidgets`.

wxDocManager overview

Document/view framework overview (p. 1658)

Class: *wxDocManager* (p. 396)

The `wxDocManager` class is part of the document/view framework supported by `wxWidgets`, and cooperates with the *wxView* (p. 1371), *wxDocument* (p. 415) and *wxDocTemplate* (p. 410) classes.

A `wxDocManager` instance coordinates documents, views and document templates. It keeps a list of document and template instances, and much functionality is routed through this object, such as providing selection and file dialogs. The application can use this class 'as is' or derive a class and override some members to extend or change the functionality. Create an instance of this class near the beginning of your application initialization, before any documents, views or templates are manipulated.

There may be multiple `wxDocManager` instances in an application.

See the example application in `samples/docview`.

wxCommand overview

Document/view framework overview (p. 1658)

Classes: *wxCommand* (p. 164), *wxCommandProcessor* (p. 171)

`wxCommand` is a base class for modelling an application command, which is an action usually performed by selecting a menu item, pressing a toolbar button or any other means provided by the application to change the data or view.

Instead of the application functionality being scattered around switch statements and functions in a way that may be hard to read and maintain, the functionality for a command is explicitly represented as an object which can be manipulated by a framework or application. When a user interface event occurs, the application *submits* a command to a *wxCommandProcessor* (p. 1663) object to execute and store.

The `wxWidgets` document/view framework handles Undo and Redo by use of `wxCommand` and `wxCommandProcessor` objects. You might find further uses for

`wxCommand`, such as implementing a macro facility that stores, loads and replays commands.

An application can derive a new class for every command, or, more likely, use one class parameterized with an integer or string command identifier.

wxCommandProcessor overview

Document/view framework overview (p. 1658)

Classes: `wxCommandProcessor` (p. 171), `wxCommand` (p. 164)

`wxCommandProcessor` is a class that maintains a history of `wxCommand` instances, with undo/redo functionality built-in. Derive a new class from this if you want different behaviour.

wxFileHistory overview

Document/view framework overview (p. 1658)

Classes: `wxFileHistory` (p. 474), `wxDocManager` (p. 396)

`wxFileHistory` encapsulates functionality to record the last few files visited, and to allow the user to quickly load these files using the list appended to the File menu.

Although `wxFileHistory` is used by `wxDocManager`, it can be used independently. You may wish to derive from it to allow different behaviour, such as popping up a scrolling list of files.

By calling `wxFileHistory::FileHistoryUseMenu` you can associate a file menu with the file history, that will be used for appending the filenames. They are appended using menu identifiers in the range `wxID_FILE1` to `wxID_FILE9`.

In order to respond to a file load command from one of these identifiers, you need to handle them using an event handler, for example:

```
BEGIN_EVENT_TABLE(wxDocParentFrame, wxFrame)
    EVT_MENU(wxID_EXIT, wxDocParentFrame::OnExit)
    EVT_MENU_RANGE(wxID_FILE1, wxID_FILE9, wxDocParentFrame::OnMRUFile)
END_EVENT_TABLE()

void wxDocParentFrame::OnExit(wxCommandEvent& WXUNUSED(event))
{
    Close();
}

void wxDocParentFrame::OnMRUFile(wxCommandEvent& event)
{
    wxString f(m_docManager->GetHistoryFile(event.GetId() -
wxID_FILE1));
    if (f != "")
        (void)m_docManager->CreateDocument(f, wxDOC_SILENT);
}
```

wxWidgets predefined command identifiers

To allow communication between the application's menus and the document/view framework, several command identifiers are predefined for you to use in menus. The framework recognizes them and processes them if you forward commands from `wxFrame::OnMenuCommand` (or perhaps from toolbars and other user interface constructs).

- `wxID_OPEN` (5000)
- `wxID_CLOSE` (5001)
- `wxID_NEW` (5002)
- `wxID_SAVE` (5003)
- `wxID_SAVEAS` (5004)
- `wxID_REVERT` (5005)
- `wxID_EXIT` (5006)
- `wxID_UNDO` (5007)
- `wxID_REDO` (5008)
- `wxID_HELP` (5009)
- `wxID_PRINT` (5010)
- `wxID_PRINT_SETUP` (5011)
- `wxID_PREVIEW` (5012)

Toolbar overview

Classes: *wxToolBar* (p. 1311)

The toolbar family of classes allows an application to use toolbars in a variety of configurations and styles.

The toolbar is a popular user interface component and contains a set of bitmap buttons or toggles. A toolbar gives faster access to an application's facilities than menus, which have to be popped up and selected rather laboriously.

Instead of supplying one toolbar class with a number of different implementations depending on platform, wxWidgets separates out the classes. This is because there are a number of different toolbar styles that you may wish to use simultaneously, and also, future toolbar implementations will emerge which cannot all be shoe-horned into the one class.

For each platform, the symbol **wxToolBar** is defined to be one of the specific toolbar

classes.

The following is a summary of the toolbar classes and their differences.

- **wxToolBarBase.** This is a base class with pure virtual functions, and should not be used directly.
- **wxToolBarSimple.** A simple toolbar class written entirely with generic wxWidgets functionality. A simple 3D effect for buttons is possible, but it is not consistent with the Windows look and feel. This toolbar can scroll, and you can have arbitrary numbers of rows and columns.
- **wxToolBarMSW.** This class implements an old-style Windows toolbar, only on Windows. There are small, three-dimensional buttons, which do not (currently) reflect the current Windows colour settings: the buttons are grey. This is the default wxToolBar on 16-bit windows.
- **wxToolBar95.** Uses the native Windows 95 toolbar class. It dynamically adjusts its background and button colours according to user colour settings. `CreateTools` must be called after the tools have been added. No absolute positioning is supported but you can specify the number of rows, and add tool separators with **AddSeparator**. Tooltips are supported. **OnRightClick** is not supported. This is the default wxToolBar on Windows 95, Windows NT 4 and above. With the style `wxTB_FLAT`, the flat toolbar look is used, with a border that is highlighted when the cursor moves over the buttons.

A toolbar might appear as a single row of images under the menubar, or it might be in a separate frame layout in several rows and columns. The class handles the layout of the images, unless explicit positioning is requested.

A tool is a bitmap which can either be a button (there is no 'state', it just generates an event when clicked) or it can be a toggle. If a toggle, a second bitmap can be provided to depict the 'on' state; if the second bitmap is omitted, either the inverse of the first bitmap will be used (for monochrome displays) or a thick border is drawn around the bitmap (for colour displays where inverting will not have the desired result).

The Windows-specific toolbar classes expect 16-colour bitmaps that are 16 pixels wide and 15 pixels high. If you want to use a different size, call **SetToolBitmapSize** as the demo shows, before adding tools to the button bar. Don't supply more than one bitmap for each tool, because the toolbar generates all three images (normal, depressed and checked) from the single bitmap you give it.

Using the toolbar library

Include `"wx/toolbar.h"`, or if using a class directly, one of:

- `"wx/msw/tbarmsw.h"` for `wxToolBarMSW`
- `"wx/msw/tbar95.h"` for `wxToolBar95`
- `"wx/tbarsmpl.h"` for `wxToolBarSimple`

Example of toolbar use are given in the sample program "toolbar". The source is given below. In fact it is out of date because recommended practise is to use event handlers (using EVT_MENU or EVT_TOOL) instead of overriding OnLeftClick.

```

////////////////////////////////////
//
// Name:      test.cpp
// Purpose:    wxToolBar sample
// Author:     Julian Smart
// Modified by:
// Created:    04/01/98
// RCS-ID:     $Id: ttoolbar.tex,v 1.9 2004/05/04 08:25:50 JS Exp $
// Copyright:  (c) Julian Smart
// License:    wxWidgets license
////////////////////////////////////
//

// For compilers that support precompilation, includes "wx/wx.h".
#include "wx/wxprec.h"

#ifdef __BORLANDC__
#pragma hdrstop
#endif

#ifndef WX_PRECOMP
#include "wx/wx.h"
#endif

#include "wx/toolbar.h"
#include <wx/log.h>

#include "test.h"

#if defined(__WXGTK__) || defined(__WXMOTIF__)
#include "mondrian.xpm"
#include "bitmaps/new.xpm"
#include "bitmaps/open.xpm"
#include "bitmaps/save.xpm"
#include "bitmaps/copy.xpm"
#include "bitmaps/cut.xpm"
#include "bitmaps/print.xpm"
#include "bitmaps/preview.xpm"
#include "bitmaps/help.xpm"
#endif

IMPLEMENT_APP(MyApp)

// The 'main program' equivalent, creating the windows and returning the
// main frame
bool MyApp::OnInit(void)
{
    // Create the main frame window
    MyFrame* frame = new MyFrame((wxFrame *) NULL, -1, (const wxString)
    "wxToolBar Sample",
        wxPoint(100, 100), wxSize(450, 300));

    // Give it a status line
    frame->CreateStatusBar();

    // Give it an icon
    frame->SetIcon(wxICON(mondrian));

    // Make a menubar
    wxMenu *fileMenu = new wxMenu;
    fileMenu->Append(wxID_EXIT, "E&xit", "Quit toolbar sample");

    wxMenu *helpMenu = new wxMenu;
    helpMenu->Append(wxID_HELP, "&About", "About toolbar sample");

    wxMenuBar* menuBar = new wxMenuBar;

```

```

menuBar->Append(fileMenu, "&File");
menuBar->Append(helpMenu, "&Help");

// Associate the menu bar with the frame
frame->SetMenuBar(menuBar);

// Create the toolbar
frame->CreateToolBar(wxNO_BORDER|wxHORIZONTAL|wxTB_FLAT, ID_TOOLBAR);

frame->GetToolBar()->SetMargins( 2, 2 );

InitToolbar(frame->GetToolBar());

// Force a resize. This should probably be replaced by a call to a
wxFrame
// function that lays out default decorations and the remaining content
window.
wxSizeEvent event(wxSize(-1, -1), frame->GetId());
frame->OnSize(event);
frame->Show(true);

frame->SetStatusText("Hello, wxWidgets");

SetTopWindow(frame);

return true;
}

bool MyApp::InitToolbar(wxToolBar* toolBar)
{
    // Set up toolbar
    wxBitmap* toolBarBitmaps[8];

#ifdef __WXMSW__
    toolBarBitmaps[0] = new wxBitmap("icon1");
    toolBarBitmaps[1] = new wxBitmap("icon2");
    toolBarBitmaps[2] = new wxBitmap("icon3");
    toolBarBitmaps[3] = new wxBitmap("icon4");
    toolBarBitmaps[4] = new wxBitmap("icon5");
    toolBarBitmaps[5] = new wxBitmap("icon6");
    toolBarBitmaps[6] = new wxBitmap("icon7");
    toolBarBitmaps[7] = new wxBitmap("icon8");
#else
    toolBarBitmaps[0] = new wxBitmap( new_xpm );
    toolBarBitmaps[1] = new wxBitmap( open_xpm );
    toolBarBitmaps[2] = new wxBitmap( save_xpm );
    toolBarBitmaps[3] = new wxBitmap( copy_xpm );
    toolBarBitmaps[4] = new wxBitmap( cut_xpm );
    toolBarBitmaps[5] = new wxBitmap( preview_xpm );
    toolBarBitmaps[6] = new wxBitmap( print_xpm );
    toolBarBitmaps[7] = new wxBitmap( help_xpm );
#endif

#ifdef __WXMSW__
    int width = 24;
#else
    int width = 16;
#endif
    int currentX = 5;

    toolBar->AddTool(wxID_NEW, *(toolBarBitmaps[0]), wxNullBitmap, false,
currentX, -1, (wxObject *) NULL, "New file");
    currentX += width + 5;
    toolBar->AddTool(wxID_OPEN, *(toolBarBitmaps[1]), wxNullBitmap, false,
currentX, -1, (wxObject *) NULL, "Open file");
    currentX += width + 5;
    toolBar->AddTool(wxID_SAVE, *(toolBarBitmaps[2]), wxNullBitmap, false,
currentX, -1, (wxObject *) NULL, "Save file");
    currentX += width + 5;
    toolBar->AddSeparator();
    toolBar->AddTool(wxID_COPY, *(toolBarBitmaps[3]), wxNullBitmap, false,

```

```

currentX, -1, (wxObject *) NULL, "Copy");
    currentX += width + 5;
    toolbar->AddTool(wxID_CUT, *(toolbarBitmaps[4]), wxNullBitmap, false,
currentX, -1, (wxObject *) NULL, "Cut");
    currentX += width + 5;
    toolbar->AddTool(wxID_PASTE, *(toolbarBitmaps[5]), wxNullBitmap, false,
currentX, -1, (wxObject *) NULL, "Paste");
    currentX += width + 5;
    toolbar->AddSeparator();
    toolbar->AddTool(wxID_PRINT, *(toolbarBitmaps[6]), wxNullBitmap, false,
currentX, -1, (wxObject *) NULL, "Print");
    currentX += width + 5;
    toolbar->AddSeparator();
    toolbar->AddTool(wxID_HELP, *(toolbarBitmaps[7]), wxNullBitmap, false,
currentX, -1, (wxObject *) NULL, "Help");

    toolbar->Realize();

    // Can delete the bitmaps since they're reference counted
    int i;
    for (i = 0; i < 8; i++)
        delete toolbarBitmaps[i];

    return true;
}

// wxID_HELP will be processed for the 'About' menu and the toolbar help
// button.

BEGIN_EVENT_TABLE(MyFrame, wxFrame)
    EVT_MENU(wxID_EXIT, MyFrame::OnQuit)
    EVT_MENU(wxID_HELP, MyFrame::OnAbout)
    EVT_CLOSE(MyFrame::OnCloseWindow)
    EVT_TOOL_RANGE(wxID_OPEN, wxID_PASTE, MyFrame::OnToolLeftClick)
    EVT_TOOL_ENTER(wxID_OPEN, MyFrame::OnToolEnter)
END_EVENT_TABLE()

// Define my frame constructor
MyFrame::MyFrame(wxFrame* parent, wxWindowID id, const wxString& title,
const wxPoint& pos,
    const wxSize& size, long style):
    wxFrame(parent, id, title, pos, size, style)
{
    m_textWindow = new wxTextCtrl(this, -1, "", wxPoint(0, 0), wxSize(-1, -
1), wxTE_MULTILINE);
}

void MyFrame::OnQuit(wxCommandEvent& WXUNUSED(event))
{
    Close(true);
}

void MyFrame::OnAbout(wxCommandEvent& WXUNUSED(event))
{
    (void)wxMessageBox("wxWidgets toolbar sample", "About wxToolBar");
}

// Define the behaviour for the frame closing
// - must delete all frames except for the main one.
void MyFrame::OnCloseWindow(wxCloseEvent& WXUNUSED(event))
{
    Destroy();
}

void MyFrame::OnToolLeftClick(wxCommandEvent& event)
{
    wxString str;
    str.Printf("Clicked on tool %d", event.GetId());
    SetStatusText(str);
}

void MyFrame::OnToolEnter(wxCommandEvent& event)

```

```
{
    if (event.GetSelection() > -1)
    {
        wxString str;
        str.Printf("This is tool number %d", event.GetSelection());
        SetStatusText(str);
    }
    else
        SetStatusText("");
}
```

wxGrid classes overview

Classes: *wxGrid* (p. 572)

Introduction

wxGrid and its related classes are used for displaying and editing tabular data.

Getting started: a simple example

For simple applications you need only refer to the *wxGrid* class in your code. This example shows how you might create a grid in a frame or dialog constructor and illustrates some of the formatting functions.

```
// Create a wxGrid object

grid = new wxGrid( this,
                  -1,
                  wxPoint( 0, 0 ),
                  wxSize( 400, 300 ) );

// Then we call CreateGrid to set the dimensions of the grid
// (100 rows and 10 columns in this example)
grid->CreateGrid( 100, 10 );

// We can set the sizes of individual rows and columns
// in pixels
grid->SetRowSize( 0, 60 );
grid->SetColSize( 0, 120 );

// And set grid cell contents as strings
grid->SetCellValue( 0, 0, "wxGrid is good" );

// We can specify that some cells are read-only
grid->SetCellValue( 0, 3, "This is read-only" );
grid->SetReadOnly( 0, 3 );

// Colours can be specified for grid cell contents
grid->SetCellValue(3, 3, "green on grey");
grid->SetCellTextColour(3, 3, *wxGREEN);
grid->SetCellBackgroundColour(3, 3, *wxLIGHT_GREY);

// We can specify the some cells will store numeric
// values rather than strings. Here we set grid column 5
// to hold floating point values displayed with width of 6
// and precision of 2
grid->SetColFormatFloat(5, 6, 2);
```

```
grid->SetCellValue(0, 6, "3.1415");
```

A more complex example

Yet to be written

How the wxGrid classes relate to each other

Yet to be written

Keyboard and mouse actions

Yet to be written

wxTipProvider overview

Many "modern" Windows programs have a feature (some would say annoyance) of presenting the user tips at program startup. While this is probably useless to the advanced users of the program, the experience shows that the tips may be quite helpful for the novices and so more and more programs now do this.

For a wxWidgets programmer, implementing this feature is extremely easy. To show a tip, it is enough to just call *wxShowTip* (p. 1503) function like this:

```
if ( ...show tips at startup?... )
{
    wxTipProvider *tipProvider = wxCreateFileTipProvider("tips.txt",
0);
    wxShowTip(windowParent, tipProvider);
    delete tipProvider;
}
```

Of course, you need to get the text of the tips from somewhere - in the example above, the text is supposed to be in the file *tips.txt* from where it is read by the *tip provider*. The tip provider is just an object of a class deriving from *wxTipProvider* (p. 1306). It has to implement one pure virtual function of the base class: *GetTip* (p. 1307). In the case of the tip provider created by *wxCreateFileTipProvider* (p. 1495), the tips are just the lines of the text file.

If you want to implement your own tip provider (for example, if you wish to hardcode the tips inside your program), you just have to derive another class from *wxTipProvider* and pass a pointer to the object of this class to *wxShowTip* - then you don't need *wxCreateFileTipProvider* at all.

You will probably want to save somewhere the index of the tip last shown - so that the program doesn't always show the same tip on startup. As you also need to remember whether to show tips or not (you shouldn't do it if the user unchecked "Show tips on startup" checkbox in the dialog), you will probably want to store both the index of the last

shown tip (as returned by `wxTipProvider::GetCurrentTip` (p. 1307) and the flag telling whether to show the tips at startup at all.

In a `tips.txt` file, lines that begin with a `#` character are considered comments and are automatically skipped. Blank lines and lines only having spaces are also skipped.

You can easily add runtime-translation capacity by placing each line of the `tips.txt` file inside the usual translation macro. For example, your `tips.txt` file would look like this:

```
_("This is my first tip")
_("This is my second tip")
```

Now add your `tips.txt` file into the list of files that `gettext` searches for translatable strings. The tips will thus get included into your generated `.po` file catalog and be translated at runtime along with the rest of your application's translatable strings. Note1: Each line in the `tips.txt` file needs to strictly begin with exactly the 3 characters of underscore-parenthesis-doublequote, and end with doublequote-parenthesis, as shown above. Note2: Remember to escape any doublequote characters within the tip string with a backslash-doublequote.

See the `dialogs` program in your `samples` folder for a working example inside a program.

Printing overview

Classes: `wxPrintout` (p. 1010), `wxPrinter` (p. 1007), `wxPrintPreview` (p. 1014), `wxPrinterDC` (p. 1010), `wxPrintDialog` (p. 1002), `wxPrintData` (p. 996), `wxPrintDialogData` (p. 1003), `wxPageSetupDialog` (p. 960), `wxPageSetupDialogData` (p. 961)

The printing framework relies on the application to provide classes whose member functions can respond to particular requests, such as 'print this page' or 'does this page exist in the document?'. This method allows `wxWidgets` to take over the housekeeping duties of turning preview pages, calling the print dialog box, creating the printer device context, and so on: the application can concentrate on the rendering of the information onto a device context.

The *document/view framework* (p. 1658) creates a default `wxPrintout` object for every view, calling `wxView::OnDraw` to achieve a prepackaged print/preview facility.

A document's printing ability is represented in an application by a derived `wxPrintout` class. This class prints a page on request, and can be passed to the `Print` function of a `wxPrinter` object to actually print the document, or can be passed to a `wxPrintPreview` object to initiate previewing. The following code (from the printing sample) shows how easy it is to initiate printing, previewing and the print setup dialog, once the `wxPrintout` functionality has been defined. Notice the use of `MyPrintout` for both printing and previewing. All the preview user interface functionality is taken care of by `wxWidgets`. For details on how `MyPrintout` is defined, please look at the `printout` sample code.

```
case WXPRINT_PRINT:
{
    wxPrinter printer;
    MyPrintout printout("My printout");
```

```
        printer.Print(this, &printout, true);
        break;
    }
    case WXPRINT_PREVIEW:
    {
        // Pass two printout objects: for preview, and possible printing.
        wxPrintPreview *preview = new wxPrintPreview(new MyPrintout, new
MyPrintout);
        wxPreviewFrame *frame = new wxPreviewFrame(preview, this, "Demo
Print Preview", 100, 100, 600, 650);
        frame->Centre(wxBOTH);
        frame->Initialize();
        frame->Show(true);
        break;
    }
    case WXPRINT_PRINT_SETUP:
    {
        wxPrintDialog printerDialog(this);
        printerDialog.GetPrintData().SetSetupDialog(true);
        printerDialog.Show(true);
        break;
    }
}
```

Multithreading overview

Classes: *wxThread* (p. 1286), *wxMutex* (p. 938), *wxCriticalSection* (p. 207), *wxCondition* (p. 174)

wxWidgets provides a complete set of classes encapsulating objects necessary in multithreaded (MT) programs: the *thread* (p. 1286) class itself and different synchronization objects: *mutexes* (p. 938) and *critical sections* (p. 207) with *conditions* (p. 174). The thread API in *wxWidgets* resembles to POSIX1.c threads API (a.k.a. pthreads), although several functions have different names and some features inspired by Win32 thread API are there as well.

These classes will hopefully make writing MT programs easier and they also provide some extra error checking (compared to the native (be it Win32 or Posix) thread API), however it is still an non-trivial undertaking especially for large projects. Before starting an MT application (or starting to add MT features to an existing one) it is worth asking oneself if there is no easier and safer way to implement the same functionality. Of course, in some situations threads really make sense (classical example is a server application which launches a new thread for each new client), but in others it might be a very poor choice (example: launching a separate thread when doing a long computation to show a progress dialog). Other implementation choices are available: for the progress dialog example it is far better to do the calculations in the *idle handler* (p. 726) or call *wxYield()* (p. 1474) periodically to update the screen.

If you do decide to use threads in your application, it is strongly recommended that no more than one thread calls GUI functions. The thread sample shows that it is possible for many different threads to call GUI functions at once (all the threads created in the sample access GUI), but it is a very poor design choice for anything except an example. The design which uses one GUI thread and several worker threads which communicate with the main one using events is much more robust and will undoubtedly save you countless problems (example: under Win32 a thread can only access GDI objects such as pens, brushes, &c created by itself and not by the other threads).

For communication between threads, use `wxEvtHandler::AddPendingEvent` (p. 446) or its short version `wxPostEvent` (p. 1518). These functions have thread safe implementation so that they can be used as they are for sending event from one thread to another.

Drag and drop overview

Classes: `wxDataObject` (p. 223), `wxTextDataObject` (p. 1268), `wxDropSource` (p. 429), `wxDropTarget` (p. 432), `wxTextDropTarget` (p. 1270), `wxFileDropTarget` (p. 473)

Note that `wxUSE_DRAG_AND_DROP` must be defined in `setup.h` in order to use drag and drop in `wxWidgets`.

See also: *wxDataObject overview* (p. 1674) and *DnD sample* (p. 1570)

It may be noted that data transfer to and from the clipboard is quite similar to data transfer with drag and drop and the code to implement these two types is almost the same. In particular, both data transfer mechanisms store data in some kind of `wxDataObject` (p. 223) and identify its format(s) using the `wxDataFormat` (p. 218) class.

To be a *drag source*, i.e. to provide the data which may be dragged by the user elsewhere, you should implement the following steps:

- **Preparation:** First of all, a data object must be created and initialized with the data you wish to drag. For example:

```
wxTextDataObject my_data("This text will be dragged.");
```

- **Drag start:** To start the dragging process (typically in response to a mouse click) you must call `wxDropSource::DoDragDrop` (p. 431) like this:

```
wxDropSource dragSource( this );
dragSource.SetData( my_data );
wxDragResult result = dragSource.DoDragDrop( TRUE );
```

- **Dragging:** The call to `DoDragDrop()` blocks the program until the user releases the mouse button (unless you override the *GiveFeedback* (p. 431) function to do something special). When the mouse moves in a window of a program which understands the same drag-and-drop protocol (any program under Windows or any program supporting the XDnD protocol under X Windows), the corresponding `wxDropTarget` (p. 432) methods are called - see below.
- **Processing the result:** `DoDragDrop()` returns an *effect code* which is one of the values of `wxDragResult` enum (explained *here* (p. 432)):

```
switch (result)
{
    case wxDragCopy: /* copy the data */ break;
    case wxDragMove: /* move the data */ break;
    default:         /* do nothing */ break;
}
```

To be a *drop target*, i.e. to receive the data dropped by the user you should follow the instructions below:

- **Initialization:** For a window to be a drop target, it needs to have an associated *wxDropTarget* (p. 432) object. Normally, you will call *wxWindow::SetDropTarget* (p. 1426) during window creation associating your drop target with it. You must derive a class from *wxDropTarget* and override its pure virtual methods. Alternatively, you may derive from *wxTextDropTarget* (p. 1270) or *wxFileDropTarget* (p. 473) and override their *OnDropText()* or *OnDropFiles()* method.
- **Drop:** When the user releases the mouse over a window, *wxWidgets* asks the associated *wxDropTarget* object if it accepts the data. For this, a *wxDataObject* (p. 223) must be associated with the drop target and this data object will be responsible for the format negotiation between the drag source and the drop target. If all goes well, then *OnData* (p. 433) will get called and the *wxDataObject* belonging to the drop target can get filled with data.
- **The end:** After processing the data, *DoDragDrop()* returns either *wxDragCopy* or *wxDragMove* depending on the state of the keys <Ctrl>, <Shift> and <Alt> at the moment of the drop. There is currently no way for the drop target to change this return code.

wxDataObject overview

Classes: *wxDataObject* (p. 223), *wxClipboard* (p. 136), *wxDataFormat* (p. 218), *wxDropSource* (p. 429), *wxDropTarget* (p. 432)

See also: *Drag and drop overview* (p. 1673) and *DnD sample* (p. 1570)

This overview discusses data transfer through clipboard or drag and drop. In *wxWidgets*, these two ways to transfer data (either between different applications or inside one and the same) are very similar which allows to implement both of them using almost the same code - or, in other words, if you implement drag and drop support for your application, you get clipboard support for free and vice versa.

At the heart of both clipboard and drag and drop operations lies the *wxDataObject* (p. 223) class. The objects of this class (or, to be precise, classes derived from it) represent the data which is being carried by the mouse during drag and drop operation or copied to or pasted from the clipboard. *wxDataObject* is a "smart" piece of data because it knows which formats it supports (see *GetFormatCount* and *GetAllFormats*) and knows how to render itself in any of them (see *GetDataHere*). It can also receive its value from the outside in a format it supports if it implements the *SetData* method. Please see the documentation of this class for more details.

Both clipboard and drag and drop operations have two sides: the source and target, the data provider and the data receiver. These which may be in the same application and even the same window when, for example, you drag some text from one position to

another in a word processor. Let us describe what each of them should do.

The data provider (source) duties

The data provider is responsible for creating a *wxDataObject* (p. 223) containing the data to be transferred. Then it should either pass it to the clipboard using *SetData* (p. 139) function or to *wxDropSource* (p. 429) and call *DoDragDrop* (p. 431) function.

The only (but important) difference is that the object for the clipboard transfer must always be created on the heap (i.e. using `new`) and it will be freed by the clipboard when it is no longer needed (indeed, it is not known in advance when, if ever, the data will be pasted from the clipboard). On the other hand, the object for drag and drop operation must only exist while *DoDragDrop* (p. 431) executes and may be safely deleted afterwards and so can be created either on heap or on stack (i.e. as a local variable).

Another small difference is that in the case of clipboard operation, the application usually knows in advance whether it copies or cuts (i.e. copies and deletes) data - in fact, this usually depends on which menu item the user chose. But for drag and drop it can only know it after *DoDragDrop* (p. 431) returns (from its return value).

The data receiver (target) duties

To receive (paste in usual terminology) data from the clipboard, you should create a *wxDataObject* (p. 223) derived class which supports the data formats you need and pass it as argument to *wxClipboard::GetData* (p. 138). If it returns `false`, no data in (any of) the supported format(s) is available. If it returns `true`, the data has been successfully transferred to *wxDataObject*.

For drag and drop case, the *wxDropTarget::OnData* (p. 433) virtual function will be called when a data object is dropped, from which the data itself may be requested by calling *wxDropTarget::GetData* (p. 432) method which fills the data object.

Database classes overview

Following is a detailed overview of how to use the wxWidgets ODBC classes - *wxDb* (p. 264) and *wxDbTable* (p. 302) and their associated functions. These are the ODBC classes donated by Remstar International, and are collectively referred to herein as the wxODBC classes.

wxDb/wxDbTable wxODBC Overview

Classes: *wxDb* (p. 264), *wxDbTable* (p. 302)

The wxODBC classes were designed for database independence. Although SQL and ODBC both have standards which define the minimum requirements they must support to be in compliance with specifications, different database vendors may implement things slightly differently. One example of this is that Oracle requires all user names for

the datasources to be supplied in uppercase characters. In situations like this, the wxODBC classes have been written to make this transparent to the programmer when using functions that require database-specific syntax.

Currently several major databases, along with other widely used databases, have been tested and supported through the wxODBC classes. The list of supported databases is certain to grow as more users start implementing software with these classes, but at the time of the writing of this document, users have successfully used the classes with the following datasources:

- Oracle (v7, v8, v8i)
- Sybase (ASA and ASE)
- MS SQL Server (v7 - minimal testing)
- MS Access (97 and 2000)
- MySQL
- dBase (IV, V)**
- PostgreSQL
- INFORMIX
- VIRTUOSO
- DB2
- Interbase
- Pervasive SQL

An up-to-date list can be obtained by looking in the comments of the function `wxDb::Dbms` (p. 274) in `db.cpp`, or in the enumerated type `wxDBMS` (p. 265) in `db.h`.

**dBase is not truly an ODBC datasource, but there are drivers which can emulate much of the functionality of an ODBC connection to a dBase table. See the *wxODBC Known Issues* (p. 1689) section of this overview for details.

wxODBC Where To Start

First, if you are not familiar with SQL and ODBC, go to your local bookstore and pick up a good book on each. This documentation is not meant to teach you many details about SQL or ODBC, though you may learn some just from immersion in the subject.

If you have worked with non-SQL/ODBC datasources before, there are some things you will need to un-learn. First some terminology as these phrases will be used heavily in this section of the manual.

Datasource (usually a database) that contains the data that will be

	accessed by the wxODBC classes.
Data table	The section of the datasource that contains the rows and columns of data.
ODBC driver	The middle-ware software that interprets the ODBC commands sent by your application and converts them to the SQL format expected by the target datasource.
Datasource connection	An open pipe between your application and the ODBC driver which in turn has a connection to the target datasource. Datasource connections can have a virtually unlimited number of wxDbTable instances using the same connect (dependent on the ODBC driver). A separate connection is not needed for each table (the exception is for isolating commits/rollbacks on different tables from affecting more than the desired table. See the class documentation on <i>wxDb::CommitTrans</i> (p. 272) and <i>wxDb::RollbackTrans</i> (p. 288).)
Rows	Similar to records in old relational databases, a row is a collection of one instance of each column of the data table that are all associated with each other.
Columns	Individual fields associated with each row of a data table.
Query	Request from the client to the datasource asking for the data that matches the requirements specified in the users request. When a query is performed, the datasource performs the lookup of the rows with satisfy the query, and creates a result set.
Result set	The data which matches the requirements specified in a query sent to the datasource. Dependent on drivers, a result set typically remains at the datasource (no data is transmitted to the ODBC driver) until the client actually instructs the ODBC driver to retrieve it.
Cursor	A logical pointer into the result set that a query generates, indicating the next record that will be returned to the client when a request for the next record is made.
Scrolling cursors	Scrolling refers to the movement of cursors through the result set. Cursors can always scroll forward sequentially in the result set (FORWARD ONLY scrolling cursors). With Forward only scrolling cursors, once a row in the result set has been returned to the ODBC driver and on to the client, there is no way to have the cursor move backward in the result set to look at the row that is previous to the current row in the result set. If BACKWARD scrolling cursors are supported by both the ODBC driver and the datasource that are being used, then backward scrolling cursor functions may be used (<i>wxDbTable::GetPrev</i> (p. 319),

wxDdbTable::GetFirst (p. 317), and *wxDdbTable::GetLast* (p. 318)). If the datasource or the ODBC driver only support forward scrolling cursors, your program and logic must take this in to account.

Commit/Rollback	Commit will physically save insertions/deletions/updates, while rollback basically does an undo of everything done against the datasource connection that has not been previously committed. Note that Commit and Rollbacks are done on a connection, not on individual tables. All tables which use a shared connection to the datasource are all committed/rolled back at the same time when a call to <i>wxDdb::CommitTrans</i> (p. 272) or <i>wxDdb::RollbackTrans</i> (p. 288) is made.
Index	Indexes are datasource-maintained lookup structures that allow the datasource to quickly locate data rows based on the values of certain columns. Without indexes, the datasource would need to do a sequential search of a table every time a query request is made. Proper unique key index construction can make datasource queries nearly instantaneous.

Before you are able to read data from a data table in a datasource, you must have a connection to the datasource. Each datasource connection may be used to open multiple tables all on the same connection (number of tables open are dependent on the driver, datasource configuration and the amount of memory on the client workstation). Multiple connections can be opened to the same datasource by the same client (number of concurrent connections is dependent on the driver and datasource configuration).

When a query is performed, the client passes the query to the ODBC driver, and the driver then translates it and passes it along to the datasource. The database engine (in most cases - exceptions are text and dBase files) running on the machine hosting the database does all the work of performing the search for the requested data. The client simply waits for a status to come back through the ODBC driver from the datasource.

Depending on the ODBC driver, the result set either remains "queued" on the database server side, or is transferred to the machine that the driver is queued on. The client does not receive this data. The client must request some or all of the result set to be returned before any data rows are returned to the client application.

Result sets do not need to include all columns of every row matching the query. In fact, result sets can actually be joinings of columns from two or more data tables, may have derived column values, or calculated values returned.

For each result set, a cursor is maintained (typically by the database) which keeps track of where in the result set the user currently is. Depending on the database, ODBC driver, and how you configured the wxWidgets ODBC settings in *setup.h* (see *wxODBC - Compiling* (p. 1680)), cursors can be either forward or backward scrolling. At a minimum, cursors must scroll forward. For example, if a query resulted in a result set with 100 rows, as the data is read by the client application, it will read row 1, then 2,

then 3, etc. With forward only cursors, once the cursor has moved to the next row, the previous row cannot be accessed again without re-querying the datasource for the result set over again. Backward scrolling cursors allow you to request the previous row from the result set, actually scrolling the cursor backward.

Backward scrolling cursors are not supported on all database/driver combinations. For this reason, forward-only cursors are the default in the wxODBC classes. If your datasource does support backward scrolling cursors and you wish to use them, make the appropriate changes in `setup.h` to enable them (see *wxODBC - Compiling* (p. 1680)). For greatest portability between datasources, writing your program in such a way that it only requires forward scrolling cursors is your best bet. On the other hand, if you are focusing on using only datasources that support backward scrolling cursors, potentially large performance benefits can be gained from using them.

There is a limit to the number of cursors that can be open on each connection to the datasource, and usually a maximum number of cursors for the datasource itself. This is all dependent on the database. Each connection that is opened (each instance of a `wxDb`) opens a minimum of 5 cursors on creation that are required for things such as updates/deletions/rollbacks/queries. Cursors are a limited resource, so use care in creating large numbers of cursors.

Additional cursors can be created if necessary with the `wxDbTable::GetNewCursor` (p. 318) function. One example use for additional cursors is to track multiple scroll points in result sets. By creating a new cursor, a program could request a second result set from the datasource while still maintaining the original cursor position in the first result set.

Different than non-SQL/ODBC datasources, when a program performs an insertion, deletion, or update (or other SQL functions like altering tables, etc) through ODBC, the program must issue a "commit" to the datasource to tell the datasource that the action(s) it has been told to perform are to be recorded as permanent. Until a commit is performed, any other programs that query the datasource will not see the changes that have been made (although there are databases that can be configured to auto-commit). NOTE: With most datasources, until the commit is performed, any cursor that is open on that same datasource connection will be able to see the changes that are uncommitted. Check your database's documentation/configuration to verify this before relying on it though.

A rollback is basically an UNDO command on the datasource connection. When a rollback is issued, the datasource will flush all commands it has been told to do since the last commit that was performed.

NOTE: Commits/Rollbacks are done on datasource connections (`wxDb` instances) not on the `wxDbTable` instances. This means that if more than one table shares the same connection, and a commit or rollback is done on that connection, all pending changes for ALL tables using that connection are committed/rolled back.

wxODBC - Configuring your system for ODBC use

Before you are able to access a datasource, you must have installed and configured an ODBC driver. Doing this is system specific, so it will not be covered in detail here. But here are a few details to get you started.

Most database vendors provide at least a minimal ODBC driver with their database product. In practice, many of these drivers have proven to be slow and/or incomplete. Rumour has it that this is because the vendors do not want you using the ODBC interface to their products; they want you to use their applications to access the data.

Whatever the reason, for database-intensive applications, you may want to consider using a third-party ODBC driver for your needs. One example of a third-party set of ODBC drivers that has been heavily tested and used is Rogue Wave's drivers. Rogue Wave has drivers available for many different platforms and databases. Under Microsoft Windows, install the ODBC driver you are planning to use. You will then use the ODBC Administrator in the Control Panel to configure an instance of the driver for your intended datasource. Note that with all flavors of NT, this configuration can be set up as a System or User DSN (datasource name). Configuring it as a system resource will make it available to all users (if you are logged in as 'administrator'), otherwise the datasource will only be available to the user who configured the DSN.

Under Unix, iODBC is used for implementation of the ODBC API. To compile the wxODBC classes, you must first obtain iODBC from <http://www.iodbc.org> (www.iodbc.org) and install it. (Note: wxWidgets currently includes a version of iODBC.) Then you must create the file "`~/odbc.ini`" (or optionally create "`/etc/odbc.ini`" for access for all users on the system). This file contains the settings for your system/datasource. Below is an example section of a `odbc.ini` file for use with the "samples/db" sample program using MySQL:

```
[contacts]
Trace      = Off
TraceFile= stderr
Driver     = /usr/local/lib/libmyodbc.so
DSN        = contacts
SERVER     = 192.168.1.13
USER       = qet
PASSWORD   =
PORT       = 3306
```

wxODBC - Compiling

The wxWidgets `setup.h` file has several settings in it pertaining to compiling the wxODBC classes.

wxUSE_ODBC This must be set to 1 in order for the compiler to compile the wxODBC classes. Without setting this to 1, there will be no access to any of the wxODBC classes. The default is 0.

wxODBC_FWD_ONLY_CURSORS When a new database connection is requested, this setting controls the default of whether the connection allows only forward scrolling cursors, or forward and backward scrolling cursors (see the section in "WHERE TO START" on cursors for more information on cursors). This default can be overridden by passing a second parameter to either the *wxDbGetConnection* (p. 268) or *wxDb constructor* (p. 270). The default is 1.

wxODBC_BACKWARD_COMPATABILITY Between v2.0 and 2.2, massive renaming

efforts were done to the ODBC classes to get naming conventions similar to those used throughout wxWidgets, as well as to preface all wxODBC classes names and functions with a wxDb preface. Because this renaming would affect applications written using the v2.0 names, this compile-time directive was added to allow those programs written for v2.0 to still compile using the old naming conventions. These deprecated names are all #define'd to their corresponding new function names at the end of the db.cpp/dbtable.cpp source files. These deprecated class/function names should not be used in future development, as at some point in the future they will be removed. The default is 0.

Under MS Windows

You are required to include the "odbc32.lib" provided by your compiler vendor in the list of external libraries to be linked in. If using the makefiles supplied with wxWidgets, this library should already be included for use with makefile.b32, makefile.vc, and makefile.g95.

MORE TO COME

Under Unix--with-odbc flag for configure

MORE TO COME

wxODBC - Basic Step-By-Step Guide

To use the classes in an application, there are eight basic steps:

- Define datasource connection information
- Get a datasource connection
- Create table definition
- Open the table
- Use the table
- Close the table
- Close the datasource connection
- Release the ODBC environment handle

Following each of these steps is detailed to explain the step, and to hopefully mention as many of the pitfalls that beginning users fall in to when first starting to use the classes. Throughout the steps, small snippets of code are provided to show the syntax of performing the step. A complete code snippet is provided at the end of this overview that shows a complete working flow of all these steps (see *wxODBC - Sample Code* (p.

1691)).

Define datasource connection information

To be able to connect to a datasource through the ODBC driver, a program must supply a minimum of three pieces of information: Datasource name, User ID, and Authorization string (password). A fourth piece of information, a default directory indicating where the data file is stored, is required for Text and dBase drivers for ODBC.

The wxWidgets data class wxDbConnectInf exists for holding all of these values, plus some others that may be desired.

The 'Henv' member is the environment handle used to access memory for use by the ODBC driver. Use of this member is described below in the "Getting a Connection to the Datasource" section.

The 'Dsn' must exactly match the datasource name used to configure the ODBC datasource (in the ODBC Administrator (MSW only) or in the .odbc.ini file).

The 'Uid' is the User ID that is to be used to log in to the datasource. This User ID must already have been created and assigned rights within the datasource to which you are connecting. The user that the connection is established by will determine what rights and privileges the datasource connection will allow the program to have when using the connection that this connection information was used to establish. Some datasources are case sensitive for User IDs, and though the wxODBC classes attempt to hide this from you by manipulating whatever data you pass in to match the datasource's needs, it is always best to pass the 'Uid' in the case that the datasource requires.

The 'AuthStr' is the password for the User ID specified in the 'Uid' member. As with the 'Uid', some datasources are case sensitive (in fact most are). The wxODBC classes do NOT try to manage the case of the 'AuthStr' at all. It is passed verbatim to the datasource, so you must use the case that the datasource is expecting.

The 'defaultDir' member is used with file based datasources (i.e. dBase, FoxPro, text files). It contains a full path to the location where the data table or file is located. When setting this value, use forward slashes '/' rather than backslashes ' ' avoid compatibility differences between ODBC drivers.

The other fields are currently unused. The intent of these fields are that they will be used to write our own ODBC Administrator type program that will work on both MSW and Un*x systems, regardless of the datasource. Very little work has been done on this to date.

Get a Datasource Connection

There are two methods of establishing a connection to a datasource. You may either manually create your own wxDb instance and open the connection, or you may use the caching functions provided with the wxODBC classes to create/maintain/delete the connections.

Regardless of which method you use, you must first have a fully populated wxDbConnectInf object. In the wxDbConnectInf instance, provide a valid Dns, Uid, and AuthStr (along with a 'defaultDir' if necessary). Before using this though, you must

allocate an environment handle to the 'Henv' member.

```
wxDbConnectInf DbConnectInf;  
DbConnectInf.SetDsn("MyDSN");  
DbConnectInf.SetUserID("MyUserName");  
DbConnectInf.SetPassword("MyPassword");  
DbConnectInf.SetDefaultDir("");
```

To allocate an environment handle for the ODBC connection to use, the `wxDbConnectInf` class has a datasource independent method for creating the necessary handle:

```
if (DbConnectInf.AllocHenv())  
{  
    wxMessageBox("Unable to allocate an ODBC environment handle",  
                 "DB CONNECTION ERROR", wxOK | wxICON_EXCLAMATION);  
    return;  
}
```

When the `wxDbConnectInf::AllocHenv()` function is called successfully, a value of true will be returned. A value of false means allocation failed, and the handle will be undefined.

A shorter form of doing the above steps is encapsulated into the long form of the constructor for `wxDbConnectInf`.

```
wxDbConnectInf *DbConnectInf;  
  
DbConnectInf = new wxDbConnectInf(NULL, "MyDSN", "MyUserName",  
                                   "MyPassword", "");
```

This shorthand form of initializing the constructor passes a NULL for the SQL environment handle, telling the constructor to allocate a handle during construction. This handle is also managed for the life of `wxDbConnectInf` instance, and is freed automatically upon destruction of the instance.

Once the `wxDbConnectInf` instance is initialized, you are ready to connect to the datasource.

To manually create datasource connections, you must create a `wxDb` instance, and then open it.

```
wxDb *db = new wxDb(DbConnectInf->GetHenv());  
  
opened = db->Open(DbConnectInf);
```

The first line does the house keeping needed to initialize all the members of the `wxDb` class. The second line actually sends the request to the ODBC driver to open a connection to its associated datasource using the parameters supplied in the call to `wxDb::Open` (p. 286).

A more advanced form of opening a connection is to use the connection caching functions that are included with the `wxODBC` classes. The caching mechanisms perform the same functions as the manual approach to opening a connection, but they also manage each connection they have created, re-using them and cleaning them up when they are closed, without you needing to do the coding.

To use the caching function `wxDbGetConnection` (p. 268) to get a connection to a

datasource, simply call it with a single parameter of the type `wxDbConnectInf`:

```
db = wxDbGetConnection(DbConnectInf);
```

The `wxDb` pointer that is returned is both initialized and opened. If something failed in creating or opening the connection, the return value from *wxDbGetConnection* (p. 268) will be `NULL`.

The connection that is returned is either a new connection, or it is a "free" connection from the cache of connections that the class maintains that was no longer in use. Any `wxDb` instance created with a call to *wxDbGetConnection* (p. 268) is recorded in a linked list of established connections. When a program is finished with a connection, a call to *wxDbFreeConnection* (p. 268) is made, and the datasource connection will then be tagged as `FREE`, making it available for the next call to *wxDbGetConnection* (p. 268) that needs a connection using the same connection information (`Dsn`, `Uid`, `AuthStr`). The cached connections remain cached until a call to *wxDbCloseConnections* (p. 268) is made, at which time all cached connections are closed and deleted.

Besides the obvious advantage of using the single command caching routine to obtain a datasource connection, using cached connections can be quite a performance boost as well. Each time that a new connection is created (not retrieved from the cache of free connections), the `wxODBC` classes perform many queries against the datasource to determine the datasource's datatypes and other fundamental behaviours. Depending on the hardware, network bandwidth, and datasource speed, this can in some cases take a few seconds to establish the new connection (with well-balanced systems, it should only be a fraction of a second). Re-using already established datasource connections rather than creating/deleting, creating/deleting connections can be quite a time-saver.

Another time-saver is the "copy connection" features of both *wxDb::Open* (p. 286) and *wxDbGetConnection* (p. 268). If manually creating a `wxDb` instance and opening it, you must pass an existing connection to the *wxDb::Open* (p. 286) function yourself to gain the performance benefit of copying existing connection settings. The *wxDbGetConnection* (p. 268) function automatically does this for you, checking the `Dsn`, `Uid`, and `AuthStr` parameters when you request a connection for any existing connections that use those same settings. If one is found, *wxDbGetConnection* (p. 268) copies the datasource settings for datatypes and other datasource specific information that was previously queried, rather than re-querying the datasource for all those same settings.

One final note on creating a connection. When a connection is created, it will default to only allowing cursor scrolling to be either forward only, or both backward and forward scrolling. The default behavior is determined by the setting `wxODBC_FWD_ONLY_CURSORS` in `setup.h` when you compile the `wxWidgets` library. The library default is to only support forward scrolling cursors only, though this can be overridden by parameters for *wxDb()* constructor or the *wxDbGetConnection* (p. 268) function. All datasources and ODBC drivers must support forward scrolling cursors. Many datasources support backward scrolling cursors, and many ODBC drivers support backward scrolling cursors. Before planning on using backward scrolling cursors, you must be certain that both your datasource and ODBC driver fully support backward scrolling cursors. See the small blurb about "Scrolling cursors" in the definitions at the beginning of this overview, or other details of setting the cursor behavior in the `wxDb` class documentation.

Create Table Definition

Data can be accessed in a datasource's tables directly through various functions of the `wxDb` class (see `wxDb::GetData` (p. 279)). But to make life much simpler, the `wxDbTable` class encapsulates all of the SQL specific API calls that would be necessary to do this, wrapping it in an intuitive class of APIs.

The first step in accessing data in a datasource's tables via the `wxDbTable` class is to create a `wxDbTable` instance.

```
table = new wxDbTable(db, tableName, numTableColumns, "",
                     !wxDB_QUERY_ONLY, "");
```

When you create the instance, you indicate the previously established datasource connection to be used to access the table, the name of the primary table that is to be accessed with the datasource's tables, how many columns of each row are going to be returned, the name of the view of the table that will actually be used to query against (works with Oracle only at this time), whether the data returned is for query purposes only, and finally the path to the table, if different than the path specified when connecting to the datasource.

Each of the above parameters are described in detail in the `wxDbTable` class' description, but one special note here about the fifth parameter - the `queryOnly` setting. If a `wxDbTable` instance is created as `wxDB_QUERY_ONLY`, then no inserts/deletes/updates can be performed using this instance of the `wxDbTable`. Any calls to `wxDb::CommitTrans` (p. 272) or `wxDb::RollbackTrans` (p. 288) against the datasource connection used by this `wxDbTable` instance are ignored by this instance. If the `wxDbTable` instance is created with `!wxDB_QUERY_ONLY` as shown above, then all the cursors and other overhead associated with being able to insert/update/delete data in the table are created, and thereby those operations can then be performed against the associated table with this `wxDbTable` instance.

If a table is to be accessed via a `wxDbTable` instance, and the table will only be read from, not written to, there is a performance benefit (not as many cursors need to be maintained/updated, hence speeding up access times), as well as a resource savings due to fewer cursors being created for the `wxDbTable` instance. Also, with some datasources, the number of simultaneous cursors is limited.

When defining the columns to be retrievable by the `wxDbTable` instance, you can specify anywhere from one column up to all columns in the table.

```
table->SetColDefs(0, "FIRST_NAME", DB_DATA_TYPE_VARCHAR, FirstName,
                  SQL_C_CHAR, sizeof(FirstName), true, true);
table->SetColDefs(1, "LAST_NAME", DB_DATA_TYPE_VARCHAR, LastName,
                  SQL_C_CHAR, sizeof(LastName), true, true);
```

Notice that column definitions start at index 0 and go up to one less than the number of columns specified when the `wxDbTable` instance was created (in this example, two columns - one with index 0, one with index 1).

The above lines of code "bind" the datasource columns specified to the memory variables in the client application. So when the application makes a call to `wxDbTable::GetNext` (p. 319) (or any other function that retrieves data from the result set), the variables that are bound to the columns will have the column value stored into

them. See the *wxDdbTable::SetColDefs* (p. 329) class documentation for more details on all the parameters for this function.

The bound memory variables have undefined data in them until a call to a function that retrieves data from a result set is made (e.g. *wxDdbTable::GetNext* (p. 319), *wxDdbTable::GetPrev* (p. 319), etc). The variables are not initialized to any data by the wxODBC classes, and they still contain undefined data after a call to *wxDdbTable::Query* (p. 324). Only after a successful call to one of the *::GetXxxx()* functions is made do the variables contain valid data.

It is not necessary to define column definitions for columns whose data is not going to be returned to the client. For example, if you want to query the datasource for all users with a first name of 'GEORGE', but you only want the list of last names associated with those rows (why return the *FIRST_NAME* column every time when you already know it is 'GEORGE'), you would only have needed to define one column above.

You may have as many *wxDdbTable* instances accessing the same table using the same *wxDdb* instance as you desire. There is no limit imposed by the classes on this. All datasources supported (so far) also have no limitations on this.

Open the table

Opening the table is not technically doing anything with the datasource itself. Calling *wxDdbTable::Open* (p. 323) simply does all the housekeeping of checking that the specified table exists, that the current connected user has at least *SELECT* privileges for accessing the table, setting up the requisite cursors, binding columns and cursors, and constructing the default *INSERT* statement that is used when a new row is inserted into the table (non-wxDB_QUERY_ONLY tables only).

```
if (!table->Open())
{
    // An error occurred opening (setting up) the table
}
```

The only reason that a call to *wxDdbTable::Open* (p. 323) is likely to fail is if the user has insufficient privileges to even *SELECT* the table. Other problems could occur, such as being unable to bind columns, but these other reasons point to some lack of resource (like memory). Any errors generated internally in the *wxDdbTable::Open* (p. 323) function are logged to the error log if SQL logging is turned on for the classes.

Use the table

To use the table and the definitions that are now set up, we must first define what data we want the datasource to collect in to a result set, tell it where to get the data from, and in what sequence we want the data returned.

```
// the WHERE clause limits/specifies which rows in the table
// are to be returned in the result set
table->SetWhereClause("FIRST_NAME = 'GEORGE'");

// Result set will be sorted in ascending alphabetical
// order on the data in the 'LAST_NAME' column of each row
// If the same last name is in the table for two rows,
// sub-sort on the 'AGE' column
table->SetOrderByClause("LAST_NAME, AGE");

// No other tables (joins) are used for this query
```

```
table->SetFromClause("");
```

The above lines will be used to tell the datasource to return in the result all the rows in the table whose column "FIRST_NAME" contains the name 'GEORGE' (note the required use of the single quote around the string literal) and that the result set will return the rows sorted by ascending last names (ascending is the default, and can be overridden with the "DESC" keyword for datasources that support it - "LAST_NAME DESC").

Specifying a blank WHERE clause will result in the result set containing all rows in the datasource.

Specifying a blank ORDERBY clause means that the datasource will return the result set in whatever sequence it encounters rows which match the selection criteria. What this sequence is can be hard to determine. Typically it depends on the index that the datasource used to find the rows which match the WHERE criteria. BEWARE - relying on the datasource to return data in a certain sequence when you have not provided an ORDERBY clause will eventually cause a problem for your program. Databases can be tuned to be COST-based, SPEED-based, or some other basis for how it gets your result set. In short, if you need your result set returned in a specific sequence, ask for it that way by providing an ORDERBY clause.

Using an ORDERBY clause can be a performance hit, as the database must sort the items before making the result set available to the client. Creating efficient indexes that cause the data to be "found" in the correct ORDERBY sequence can be a big performance benefit. Also, in the large majority of cases, the database will be able to sort the records faster than your application can read all the records in (unsorted) and then sort them. Let the database do the work for you!

Notice in the example above, a column that is not included in the bound data columns ('AGE') will be used to sub-sort the result set.

The FROM clause in this example is blanked, as we are not going to be performing any table joins with this simple query. When the FROM clause is blank, it is assumed that all columns referenced are coming from the default table for the wxDbTable instance.

After the selection criteria have been specified, the program can now ask the datasource to perform the search and create a result set that can be retrieved:

```
// Instruct the datasource to perform a query based on the
// criteria specified above in the where/orderby/from clauses.
if (!table->Query())
{
    // An error occurred performing the query
}
```

Typically, when an error occurs when calling *wxDbTable::Query* (p. 324), it is a syntax problem in the WHERE clause that was specified. The exact SQL (datasource-specific) reason for what caused the failure of *wxDbTable::Query* (p. 324) (and all other operations against the datasource can be found by parsing the table's database connection's "errorList[]" array member for the stored text of the error.

When the *wxDbTable::Query* (p. 324) returns true, the database was able to successfully complete the requested query using the provided criteria. This does not

mean that there are any rows in the result set, it just mean that the query was successful.

IMPORTANT: The result created by the call to `wxDbTable::Query` (p. 324) can take one of two forms. It is either a snapshot of the data at the exact moment that the database determined the record matched the search criteria, or it is a pointer to the row that matched the selection criteria. Which form of behavior is datasource dependent. If it is a snapshot, the data may have changed since the result set was constructed, so beware if your datasource uses snapshots and call `wxDbTable::Refresh` (p. 329). Most larger brand databases do not use snapshots, but it is important to mention so that your application can handle it properly if your datasource does.

To retrieve the data, one of the data fetching routines must be used to request a row from the result set, and to store the data from the result set into the bound memory variables. After `wxDbTable::Query` (p. 324) has completed successfully, the default/current cursor is placed so it is pointing just before the first record in the result set. If the result set is empty (no rows matched the criteria), then any calls to retrieve data from the result set will return false.

```
wxString msg;

while (table->GetNext())
{
    msg.Printf("Row #%lu -- First Name : %s Last Name is %s",
               table->GetRowNum(), FirstName, LastName);
    wxMessageBox(msg, "Data", wxOK | wxICON_INFORMATION, NULL);
}
```

The sample code above will read the next record in the result set repeatedly until the end of the result set has been reached. The first time that `wxDbTable::GetNext` (p. 319) is called right after the successful call to `wxDbTable::Query` (p. 324), it actually returns the first record in the result set.

When `wxDbTable::GetNext` (p. 319) is called and there are no rows remaining in the result set after the current cursor position, `wxDbTable::GetNext` (p. 319) (as well as all the other `wxDbTable::GetXxxx()` functions) will return false.

Close the table

When the program is done using a `wxDbTable` instance, it is as simple as deleting the table pointer (or if declared statically, letting the variable go out of scope). Typically the default destructor will take care of all that is required for cleaning up the `wxDbTable` instance.

```
if (table)
{
    delete table;
    table = NULL;
}
```

Deleting a `wxDbTable` instance releases all of its cursors, deletes the column definitions and frees the SQL environment handles used by the table (but not the environment handle used by the datasource connection that the `wxDbTable` instance was using).

Close the datasource connection

After all tables that have been using a datasource connection have been closed (this can be verified by calling *wxDdb::GetTableCount* (p. 282) and checking that it returns 0), then you may close the datasource connection. The method of doing this is dependent on whether the non-caching or caching method was used to obtain the datasource connection.

If the datasource connection was created manually (non-cached), closing the connection is done like this:

```
if (db)
{
    db->Close();
    delete db;
    db = NULL;
}
```

If the program used the *wxDdbGetConnection* (p. 268) function to get a datasource connection, the following is the code that should be used to free the connection(s):

```
if (db)
{
    wxDbFreeConnection(db);
    db = NULL;
}
```

Note that the above code just frees the connection so that it can be re-used on the next call the *wxDdbGetConnection* (p. 268). To actually dispose of the connection, releasing all of its resources (other than the environment handle), do the following:

```
wxDdbCloseConnections();
```

Release the ODBC environment handle

Once all of the connections that used the ODBC environment handle (in this example it was stored in "DbConnectInf.Henv") have been closed, then it is safe to release the environment handle:

```
DbConnectInf->FreeHenv();
```

Or, if the long form of the constructor was used and the constructor was allowed to allocate its own SQL environment handle, leaving scope or destruction of the *wxDdbConnectInf* will free the handle automatically.

```
delete DbConnectInf;
```

Remember to never release this environment handle if there are any connections still using the handle.

wxODBC - Known Issues

As with creating *wxWidgets*, writing the *wxODBC* classes was not the simple task of writing an application to run on a single type of computer system. The classes need to be cross-platform for different operating systems, and they also needed to take in to account different database manufacturers and different ODBC driver manufacturers. Because of all the possible combinations of OS/database/drivers, it is impossible to say

that these classes will work perfectly with datasource ABC, ODBC driver XYZ, on platform LMN. You may run in to some incompatibilities or unsupported features when moving your application from one environment to another. But that is what makes cross-platform programming fun. It also pinpoints one of the great things about open source software. It can evolve!

The most common difference between different database/ODBC driver manufacturers in regards to these wxODBC classes is the lack of standard error codes being returned to the calling program. Sometimes manufacturers have even changed the error codes between versions of their databases/drivers.

In all the tested databases, every effort has been made to determine the correct error codes and handle them in the class members that need to check for specific error codes (such as TABLE DOES NOT EXIST when you try to open a table that has not been created yet). Adding support for additional databases in the future requires adding an entry for the database in the *wxDdb::Dbms* (p. 274) function, and then handling any error codes returned by the datasource that do not match the expected values.

Databases

Following is a list of known issues and incompatibilities that the wxODBC classes have between different datasources. An up to date listing of known issues can be seen in the comments of the source for *wxDdb::Dbms* (p. 274).

ORACLE

- Currently the only database supported by the wxODBC classes to support VIEWS

DBASE

NOTE: dBase is not a true ODBC datasource. You only have access to as much functionality as the driver can emulate.

- Does not support the SQL_TIMESTAMP structure
- Supports only one cursor and one connect (apparently? with Microsoft driver only?)
- Does not automatically create the primary index if the 'keyField' param of SetColDef is true. The user must create ALL indexes from their program with calls to *wxDdbTable::CreateIndex* (p. 310)
- Table names can only be 8 characters long
- Column names can only be 10 characters long
- Currently cannot CREATE a dBase table - bug or limitation of the drivers used??
- Currently cannot insert rows that have integer columns - bug??

SYBASE (all)

- To lock a record during QUERY functions, the reserved word 'HOLDLOCK' must

be added after every table name involved in the query/join if that table's matching record(s) are to be locked

- Ignores the keywords 'FOR UPDATE'. Use the HOLDLOCK functionality described above

SYBASE (Enterprise)

- If a column is part of the Primary Key, the column cannot be NULL
- Maximum row size is somewhere in the neighborhood of 1920 bytes

mySQL

- If a column is part of the Primary Key, the column cannot be NULL.
- Cannot support selecting for update [*wxDATABASE::CanSelectForUpdate* (p. 307)]. Always returns false.
- Columns that are part of primary or secondary keys must be defined as being NOT NULL when they are created. Some code is added in *wxDATABASE::CreateIndex* (p. 310) to try to adjust the column definition if it is not defined correctly, but it is experimental (as of wxWidgets v2.2.1)
- Does not support sub-queries in SQL statements

POSTGRES

- Does not support the keywords 'ASC' or 'DESC' as of release v6.5.0
- Does not support sub-queries in SQL statements

DB2

- Columns which are part of a primary key must be declared as NOT NULL

UNICODE with wxODBC classes

The ODBC classes support for Unicode is yet in early experimental stage and hasn't been tested extensively. It might work for you or it might not: please report the bugs/problems you have encountered in the latter case.

wxODBC - Sample Code

Simplest example of establishing/opening a connection to an ODBC datasource, binding variables to the columns for read/write usage, opening an existing table in the datasource, inserting a record, setting query parameters (where/order by/from), querying the datasource, reading each row of the result set, deleting a record, releasing the connection, then cleaning up.

NOTE: Very basic error handling is shown here, to reduce the size of the code and to make it more easily readable. The `HandleError()` function uses the `wxDATABASE::LogExtendedErrorMsg()` function for retrieving database error messages.

```

// -----
// HEADERS
// -----
#include "wx/log.h"          // #included to enable output of messages only
#include "wx/dbtable.h"

// -----
// FUNCTION USED FOR HANDLING/DISPLAYING ERRORS
// -----
// Very generic error handling function.
// If a connection to the database is passed in, then we retrieve all the
// database errors for the connection and add them to the displayed
// message
int HandleError(wxString errmsg, wxDb *pDb=NULL)
{
    // Retrieve all the error message for the errors that occurred
    wxString allErrors;
    if (!pDb == NULL)
        // Get the database errors and append them to the error message
        allErrors = wxDbLogExtendedErrorMsg(errmsg.c_str(), pDb, 0, 0);
    else
        allErrors = errmsg;

    // Do whatever you wish with the error message here
    // wxLogDebug() is called inside wxDbLogExtendedErrorMsg() so this
    // console program will show the errors in the console window,
    // but these lines will show the errors in RELEASE builds also
    wxFprintf(stderr, wxT("\n%s\n"), allErrors.c_str());
    fflush(stderr);

    return 1;
}

// -----
// entry point
// -----
int main(int argc, char **argv)
{
    wxDbConnectInf *DbConnectInf = NULL;    // DB connection information

    wxDb *db = NULL;    // Database connection

    wxDbTable *table = NULL;    // Data table to access
    const wxChar tableName[] = wxT("USERS"); // Name of database table
    const UWORD numTableColumns = 2;    // Number table columns
    wxChar FirstName[50+1];    // column data: "FIRST_NAME"
    wxChar LastName[50+1];    // column data: "LAST_NAME"

    wxString msg;    // Used for display messages

    // -----
    // DEFINE THE CONNECTION HANDLE FOR THE DATABASE
    // -----
    DbConnectInf = new wxDbConnectInf(NULL,
                                      wxT("CONTACTS-SqlServer"),
                                      wxT("sa"),
                                      wxT("abk"));

    // Error checking....
    if (!DbConnectInf || !DbConnectInf->GetHenv())
    {
        return HandleError(wxT("DB ENV ERROR: Cannot allocate ODBC env
handle"));
    }
}

```

```

// -----
// GET A DATABASE CONNECTION
// -----
db = wxDbGetConnection(DbConnectInf);

if (!db)
{
    return HandleError(wxT("CONNECTION ERROR - Cannot get DB
connection"));
}

// -----
// DEFINE THE TABLE, AND THE COLUMNS THAT WILL BE ACCESSED
// -----
table = new wxDbTable(db, tableName, numTableColumns, wxT(""),
    !wxDB_QUERY_ONLY, wxT(""));
//
// Bind the columns that you wish to retrieve. Note that there must be
// 'numTableColumns' calls to SetColDefs(), to match the wxDbTable def
//
// Not all columns need to be bound, only columns whose values are to be
// returned back to the client.
//
table->SetColDefs(0, wxT("FIRST_NAME"), DB_DATA_TYPE_VARCHAR, FirstName,
    SQL_C_CHAR, sizeof(FirstName), true, true);
table->SetColDefs(1, wxT("LAST_NAME"), DB_DATA_TYPE_VARCHAR, LastName,
    SQL_C_CHAR, sizeof(LastName), true, true);

// -----
// CREATE (or RECREATE) THE TABLE IN THE DATABASE
// -----
if (!table->CreateTable(true)) //NOTE: No CommitTrans is required
{
    return HandleError(wxT("TABLE CREATION ERROR: "), table->GetDb());
}

// -----
// OPEN THE TABLE FOR ACCESS
// -----
if (!table->Open())
{
    return HandleError(wxT("TABLE OPEN ERROR: "), table->GetDb());
}

// -----
// INSERT A NEW ROW INTO THE TABLE
// -----
wxStrcpy(FirstName, wxT("JULIAN"));
wxStrcpy(LastName, wxT("SMART"));
if (!table->Insert())
{
    return HandleError(wxT("INSERTION ERROR: "), table->GetDb());
}

// Must commit the insert to write the data to the DB
table->GetDb()->CommitTrans();

// -----
// RETRIEVE ROWS FROM THE TABLE BASED ON SUPPLIED CRITERIA
// -----
// Set the WHERE clause to limit the result set to return
// all rows that have a value of 'JULIAN' in the FIRST_NAME
// column of the table.
table->SetWhereClause(wxT("FIRST_NAME = 'JULIAN'"));

// Result set will be sorted in ascending alphabetical

```

```

// order on the data in the 'LAST_NAME' column of each row
table->SetOrderByClause(wxT("LAST_NAME"));

// No other tables (joins) are used for this query
table->SetFromClause(wxT(""));

// Instruct the datasource to perform a query based on the
// criteria specified above in the where/order by/from clauses.
if (!table->Query())
{
    return HandleError(wxT("QUERY ERROR: "), table->GetDb());
}

// Loop through all rows matching the query criteria until
// there are no more records to read
while (table->GetNext())
{
    msg.Printf(wxT("Row #%lu -- First Name : %s Last Name is %s"),
               table->GetRowNum(), FirstName, LastName);

    // Code to display 'msg' here
    wxLogMessage(wxT("\n%s\n"), msg.c_str());
}

// -----
// DELETE A ROW FROM THE TABLE
// -----
// Select the row which has FIRST_NAME of 'JULIAN' and LAST_NAME
// of 'SMART', then delete the retrieved row
//
if (!table->DeleteWhere(wxT("FIRST_NAME = 'JULIAN' and LAST_NAME =
'SMART'")))
{
    return HandleError(wxT("DELETION ERROR: "), table->GetDb());
}

// Must commit the deletion to the database
table->GetDb()->CommitTrans();

// -----
// TAKE CARE OF THE ODBC CLASS INSTANCES THAT WERE BEING USED
// -----
// If the wxDbTable instance was successfully created
// then delete it as we are done with it now.
wxDELETE(table);

// Free the cached connection
// (meaning release it back in to the cache of datasource
// connections) for the next time a call to wxDbGetConnection()
// is made.
wxDbFreeConnection(db);
db = NULL;

// -----
// CLEANUP BEFORE EXITING APP
// -----
// The program is now ending, so we need to close
// any cached connections that are still being
// maintained.
wxDbCloseConnections();

// Release the environment handle that was created
// for use with the ODBC datasource connections
wxDELETE(DbConnectInf);

wxUnusedVar(argc); // Here just to prevent compiler warnings
wxUnusedVar(argv); // Here just to prevent compiler warnings

return 0;

```

```
}
```

A selection of SQL commands

The following is a very brief description of some common SQL commands, with examples.

See also

Database classes overview (p. 1675)

Create

Creates a table.

Example:

```
CREATE TABLE Book
  (BookNumber      INTEGER      PRIMARY KEY
  , CategoryCode   CHAR(2)      DEFAULT 'RO' NOT NULL
  , Title          VARCHAR(100) UNIQUE
  , NumberOfPages  SMALLINT
  , RetailPriceAmount NUMERIC(5,2)
  )
```

Insert

Inserts records into a table.

Example:

```
INSERT INTO Book
  (BookNumber, CategoryCode, Title)
VALUES(5, 'HR', 'The Lark Ascending')
```

Select

The Select operation retrieves rows and columns from a table. The criteria for selection and the columns returned may be specified.

Examples:

```
SELECT * FROM Book
```

Selects all rows and columns from table Book.

```
SELECT Title, RetailPriceAmount FROM Book WHERE RetailPriceAmount
> 20.0
```

Selects columns Title and RetailPriceAmount from table Book, returning only the rows that match the WHERE clause.

```
SELECT * FROM Book WHERE CatCode = 'LL' OR CatCode = 'RR'
```

Selects all columns from table Book, returning only the rows that match the WHERE clause.

```
SELECT * FROM Book WHERE CatCode IS NULL
```

Selects all columns from table Book, returning only rows where the CatCode column is NULL.

```
SELECT * FROM Book ORDER BY Title
```

Selects all columns from table Book, ordering by Title, in ascending order. To specify descending order, add DESC after the ORDER BY Title clause.

```
SELECT Title FROM Book WHERE RetailPriceAmount >= 20.0 AND  
RetailPriceAmount <= 35.0
```

Selects records where RetailPriceAmount conforms to the WHERE expression.

Update

Updates records in a table.

Example:

```
UPDATE Incident SET X = 123 WHERE ASSET = 'BD34'
```

This example sets a field in column 'X' to the number 123, for the record where the column ASSET has the value 'BD34'.

Interprocess communication overview

Classes: *wxServer* (p. 1101), *wxConnection* (p. 192), *wxClient* (p. 132) *wxWidgets* has a number of different classes to help with interprocess communication and network programming. This section only discusses one family of classes -- the DDE-like protocol -- but here's a list of other useful classes:

- *wxSocketEvent* (p. 1151), *wxSocketBase* (p. 1132), *wxSocketClient* (p. 1149), *wxSocketServer* (p. 1153): classes for the low-level TCP/IP API.
- *wxProtocol* (p. 1027), *wxURL* (p. 1357), *wxFTP* (p. 548), *wxHTTP* (p. 715): classes for programming popular Internet protocols.

wxWidgets' DDE-like protocol is a high-level protocol based on Windows DDE. There are two implementations of this DDE-like protocol: one using real DDE running on Windows only, and another using TCP/IP (sockets) that runs on most platforms. Since the API and virtually all of the behaviour is the same apart from the names of the classes, you should find it easy to switch between the two implementations.

Notice that by including `<wx/ipc.h>` you may define convenient synonyms for the IPC classes: *wxServer* for either *wxDDEServer* or *wxTCPServer* depending on whether DDE-based or socket-based implementation is used and the same thing for *wxClient* and *wxConnection*.

By default, DDE implementation is used under Windows. DDE works only within one computer. If you want to use IPC between different workstations you should define `wxUSE_DDE_FOR_IPC` as 0 before including this header -- this will force using TCP/IP

implementation even under Windows.

The following description refers to wx... but remember that the equivalent wxTCP... and wxDDE... classes can be used in much the same way.

Three classes are central to the DDE-like API:

1. `wxCient`. This represents the client application, and is used only within a client program.
2. `wxServer`. This represents the server application, and is used only within a server program.
3. `wxConnection`. This represents the connection from the client to the server - both the client and the server use an instance of this class, one per connection. Most DDE transactions operate on this object.

Messages between applications are usually identified by three variables: connection object, topic name and item name. A data string is a fourth element of some messages. To create a connection (a conversation in Windows parlance), the client application uses `wxCient::MakeConnection` to send a message to the server object, with a string service name to identify the server and a topic name to identify the topic for the duration of the connection. Under Unix, the service name may be either an integer port identifier in which case an Internet domain socket will be used for the communications or a valid file name (which shouldn't exist and will be deleted afterwards) in which case a Unix domain socket is created.

SECURITY NOTE: Using Internet domain sockets is extremely insecure for IPC as there is absolutely no access control for them, use Unix domain sockets whenever possible!

The server then responds and either vetoes the connection or allows it. If allowed, both the server and client objects create `wxConnection` objects which persist until the connection is closed. The connection object is then used for sending and receiving subsequent messages between client and server - overriding virtual functions in your class derived from `wxConnection` allows you to handle the DDE messages.

To create a working server, the programmer must:

1. Derive a class from `wxConnection`, providing handlers for various messages sent to the server side of a `wxConnection` (e.g. `OnExecute`, `OnRequest`, `OnPoke`). Only the handlers actually required by the application need to be overridden.
2. Derive a class from `wxServer`, overriding `OnAcceptConnection` to accept or reject a connection on the basis of the topic argument. This member must create and return an instance of the derived connection class if the connection is accepted.
3. Create an instance of your server object and call `Create` to activate it, giving it a service name.

To create a working client, the programmer must:

1. Derive a class from `wxConnection`, providing handlers for various messages

sent to the client side of a `wxConnection` (e.g. `OnAdvise`). Only the handlers actually required by the application need to be overridden.

2. Derive a class from `wxClient`, overriding `OnMakeConnection` to create and return an instance of the derived connection class.
3. Create an instance of your client object.
4. When appropriate, create a new connection using `wxClient::MakeConnection` (p. 133), with arguments host name (processed in Unix only, use 'localhost' for local computer), service name, and topic name for this connection. The client object will call `OnMakeConnection` (p. 133) to create a connection object of the derived class if the connection is successful.
5. Use the `wxConnection` member functions to send messages to the server.

Data transfer

These are the ways that data can be transferred from one application to another. These are methods of `wxConnection`.

- **Execute:** the client calls the server with a data string representing a command to be executed. This succeeds or fails, depending on the server's willingness to answer. If the client wants to find the result of the Execute command other than success or failure, it has to explicitly call Request.
- **Request:** the client asks the server for a particular data string associated with a given item string. If the server is unwilling to reply, the return value is `NULL`. Otherwise, the return value is a string (actually a pointer to the connection buffer, so it should not be deallocated by the application).
- **Poke:** The client sends a data string associated with an item string directly to the server. This succeeds or fails.
- **Advise:** The client asks to be advised of any change in data associated with a particular item. If the server agrees, the server will send an `OnAdvise` message to the client along with the item and data.

The default data type is `wxCF_TEXT` (ASCII text), and the default data size is the length of the null-terminated string. Windows-specific data types could also be used on the PC.

Examples

See the sample programs *server* and *client* in the IPC samples directory. Run the server, then the client. This demonstrates using the Execute, Request, and Poke commands from the client, together with an Advise loop: selecting an item in the server list box causes that item to be highlighted in the client list box.

More DDE details

A `wxClient` object initiates the client part of a client-server DDE-like (Dynamic Data Exchange) conversation (available in both Windows and Unix).

To create a client which can communicate with a suitable server, you need to derive a class from `wxConnection` and another from `wxClient`. The custom `wxConnection` class will receive communications in a 'conversation' with a server. and the custom `wxServer` is required so that a user-overridden `wxDDEClient::OnMakeConnection` (p. 133) member can return a `wxDDEConnection` of the required class, when a connection is made.

For example:

```
class MyConnection: public wxConnection {
public:
    MyConnection(void)::wxConnection() {}
    ~MyConnection(void) {}
    bool OnAdvise(const wxString& topic, const wxString& item, char *data,
int size, wxIPCFormat format)
    { wxMessageBox(topic, data); }
};

class MyClient: public wxClient {
public:
    MyClient(void) {}
    wxConnectionBase *OnMakeConnection(void) { return new MyConnection; }
};
```

Here, **MyConnection** will respond to `OnAdvise` (p. 194) messages sent by the server by displaying a message box.

When the client application starts, it must create an instance of the derived `wxClient`. In the following, command line arguments are used to pass the host name (the name of the machine the server is running on) and the server name (identifying the server process). Calling `wxDDEClient::MakeConnection` (p. 133) implicitly creates an instance of **MyConnection** if the request for a connection is accepted, and the client then requests an `Advise` loop from the server (an `Advise` loop is where the server calls the client when data has changed).

```
wxString server = "4242";
wxString hostName;
wxGetHostName(hostName);

// Create a new client
MyClient *client = new MyClient;
connection = (MyConnection *)client->MakeConnection(hostName, server,
"IPC TEST");

if (!connection)
{
    wxMessageBox("Failed to make connection to server", "Client Demo
Error");
    return NULL;
}
connection->StartAdvise("Item");
```

Note that it is no longer necessary to call `wxDDEInitialize` or `wxDDECleanUp`, since `wxWidgets` will do this itself if necessary.

wxHTML overview

This topic was written by Vaclav Slavik, the author of the wxHTML library.

The wxHTML library provides classes for parsing and displaying HTML.

It is not intended to be a high-end HTML browser. If you are looking for something like that try <http://www.mozilla.org> (<http://www.mozilla.org>).

wxHTML can be used as a generic rich text viewer - for example to display a nice About Box (like those of GNOME apps) or to display the result of database searching. There is a *wxFileSystem* (p. 494) class which allows you to use your own virtual file systems.

wxHtmlWindow supports tag handlers. This means that you can easily extend wxHtml library with new, unsupported tags. Not only that, you can even use your own application-specific tags! See `src/html/m_*.cpp` files for details.

There is a generic wxHtmlParser class, independent of wxHtmlWindow.

wxHTML quick start

Displaying HTML

First of all, you must include `<wx/wxhtml.h>`.

Class *wxHtmlWindow* (p. 699) (derived from *wxScrolledWindow*) is used to display HTML documents. It has two important methods: *LoadPage* (p. 702) and *SetPage* (p. 707). *LoadPage* loads and displays HTML file while *SetPage* displays directly the passed **string**. See the example:

```
mywin -> LoadPage("test.htm");
mywin -> SetPage("<html><body>"
               "<h1>Error</h1>"
               "Some error occurred :-H)"
               "</body></html>");
```

I think the difference is quite clear.

Displaying Help

See *wxHtmlHelpController* (p. 672).

Setting up wxHtmlWindow

Because *wxHtmlWindow* is derived from *wxScrolledWindow* and not from *wxFrame*, it doesn't have visible frame. But the user usually want to see the title of HTML page displayed somewhere and frame's titlebar is ideal place for it.

wxHtmlWindow provides 2 methods in order to handle this: *SetRelatedFrame* (p. 707) and *SetRelatedStatusBar* (p. 707). See the example:

```
html = new wxHtmlWindow(this);
html -> SetRelatedFrame(this, "HTML : %s");
html -> SetRelatedStatusBar(0);
```

The first command associates html object with it is parent frame (this points to *wxFrame* object there) and sets format of title. Page title "Hello, world!" will be displayed as "HTML

: Hello, world!" in this example.

The second command sets which frame's status bar should be used to display browser's messages (such as "Loading..." or "Done" or hypertext links).

Customizing wxHtmlWindow

You can customize wxHtmlWindow by setting font size, font face and borders (space between border of window and displayed HTML). Related functions:

- *SetFont* (p. 706)
- *SetBorders* (p. 706)
- *ReadCustomization* (p. 705)
- *WriteCustomization* (p. 708)

The last two functions are used to store user customization info wxConfig stuff (for example in the registry under Windows, or in a dotfile under Unix).

HTML Printing

The wxHTML library provides printing facilities with several levels of complexity.

The easiest way to print an HTML document is to use *wxHtmlEasyPrinting class* (p. 668). It lets you print HTML documents with only one command and you don't have to worry about deriving from the wxPrintout class at all. It is only a simple wrapper around the *wxHtmlPrintout* (p. 690), normal wxWidgets printout class.

And finally there is the low level class *wxHtmlDCRenderer* (p. 665) which you can use to render HTML into a rectangular area on any DC. It supports rendering into multiple rectangles with the same width. (The most common use of this is placing one rectangle on each page or printing into two columns.)

Help Files Format

wxHTML library uses a reduced version of MS HTML Workshop format. Tex2RTF can produce these files when generating HTML, if you set **htmlWorkshopFiles** to **true** in your tex2rtf.ini file.

(See *wxHtmlHelpController* (p. 672) for help controller description.)

A **book** consists of three files: header file, contents file and index file. You can make a regular zip archive of these files, plus the HTML and any image files, for wxHTML (or helpview) to read; and the .zip file can optionally be renamed to .htb.

Header file (.hhp)

Header file must contain these lines (and may contain additional lines which are ignored):

```
Contents file=<filename.hhc>
Index file=<filename.hhk>
Title=<title of your book>
Default topic=<default page to be displayed.htm>
```

All filenames (including the Default topic) are relative to the location of .hhp file.

Localization note: In addition, .hhp file may contain line

```
Charset=<rfc_charset>
```

which specifies what charset (e.g. "iso8859_1") was used in contents and index files. Please note that this line is incompatible with MS HTML Help Workshop and it would either silently remove it or complain with some error. See also *Writing non-English applications* (p. 1597).

Contents file (.hhc)

Contents file has HTML syntax and it can be parsed by regular HTML parser. It contains exactly one list (.... statement):

```
<ul>
  <li> <object type="text/sitemap">
    <param name="Name" value="@topic name@">
    <param name="ID" value=@numeric_id@>
    <param name="Local" value="@filename.htm@">
  </object>
  <li> <object type="text/sitemap">
    <param name="Name" value="@topic name@">
    <param name="ID" value=@numeric_id@>
    <param name="Local" value="@filename.htm@">
  </object>
  ...
</ul>
```

You can modify value attributes of param tags. *topic name* is name of chapter/topic as is displayed in contents, *filename.htm* is HTML page name (relative to .hhp file) and *numeric_id* is optional - it is used only when you use *wxHtmlHelpController::Display(int)* (p. 675)

Items in the list may be nested - one statement may contain a sub-statement:

```
<ul>
  <li> <object type="text/sitemap">
    <param name="Name" value="Top node">
    <param name="Local" value="top.htm">
  </object>
  <ul>
    <li> <object type="text/sitemap">
      <param name="Name" value="subnode in topnode">
      <param name="Local" value="subnode1.htm">
    </object>
    ...
  </ul>
  <li> <object type="text/sitemap">
    <param name="Name" value="Another Top">
    <param name="Local" value="top2.htm">
  </object>
```

```
...  
</ul>
```

Index file (.hhk)

Index files have same format as contents file except that ID params are ignored and sublists are **not** allowed.

Input Filters

The wxHTML library provides a mechanism for reading and displaying files of many different file formats.

wxHtmlWindow::LoadPage (p. 702) can load not only HTML files but any known file. To make a file type known to *wxHtmlWindow* you must create a *wxHtmlFilter* (p. 671) filter and register it using *wxHtmlWindow::AddFilter* (p. 700).

Cells and Containers

This article describes mechanism used by *wxHtmlWinParser* (p. 708) and *wxHtmlWindow* (p. 699) to parse and display HTML documents.

Cells

You can divide any text (or HTML) into small fragments. Let's call these fragments **cells**. Cell is for example one word, horizontal line, image or any other part of document. Each cell has width and height (except special "magic" cells with zero dimensions - e.g. colour changers or font changers).

See *wxHtmlCell* (p. 653).

Containers

Container is kind of cell that may contain sub-cells. Its size depends on number and sizes of its sub-cells (and also depends on width of window).

See *wxHtmlContainerCell* (p. 659), *wxHtmlCell::Layout* (p. 657).

Using Containers in Tag Handler

wxHtmlWinParser (p. 708) provides a user-friendly way of managing containers. It is based on the idea of opening and closing containers.

Use *OpenContainer* (p. 712) to open new a container *within an already opened container*. This new container is a *sub-container* of the old one. (If you want to create a new container with the same depth level you can call `CloseContainer()` ; `OpenContainer()` ;.)

Use *CloseContainer* (p. 709) to close the container. This doesn't create a new container with same depth level but it returns "control" to the parent container.

It is clear there must be same number of calls to `OpenContainer` as to `CloseContainer`...

Example

This code creates a new paragraph (container at same depth level) with "Hello, world!":

```
m_WParser -> CloseContainer();
c = m_WParser -> OpenContainer();

m_WParser -> AddWord("Hello, ");
m_WParser -> AddWord("world!");

m_WParser -> CloseContainer();
m_WParser -> OpenContainer();
```

You can see that there was opened container before running the code. We closed it, created our own container, then closed our container and opened new container. The result was that we had *same depth level* after executing. This is general rule that should be followed by tag handlers: leave depth level of containers unmodified (in other words, number of `OpenContainer` and `CloseContainer` calls should be same within *HandleTag* (p. 697)'s body).

Tag Handlers

The `wxHTML` library provides architecture of pluggable *tag handlers*. Tag handler is class that understands particular HTML tag (or tags) and is able to interpret it.

`wxHtmlWinParser` (p. 708) has static table of **modules**. Each module contains one or more tag handlers. Each time a new `wxHtmlWinParser` object is constructed all modules are scanned and handlers are added to `wxHtmlParser`'s list of available handlers (note: `wxHtmlParser`'s list is non-static).

How it works

Common tag handler's *HandleTag* (p. 697) method works in four steps:

1. Save state of parent parser into local variables
2. Change parser state according to tag's params
3. Parse text between the tag and paired ending tag (if present)
4. Restore original parser state

See `wxHtmlWinParser` (p. 708) for methods for modifying parser's state. In general you can do things like opening/closing containers, changing colors, fonts etc.

Providing own tag handlers

You should create new `.cpp` file and place following lines into it:

```
#include <mod_tmpl.h>
#include <forcelink.h>
FORCE_LINK_ME(yourmodulefilenamewithoutcpp)
```

Then you must define handlers and one module.

Tag handlers

The handler is derived from *wxHtmlWinTagHandler* (p. 714)(or directly from *wxHtmlTagHandler* (p. 696))

You can use set of macros to define the handler (see *src/html/m_*.cpp* files for details). Handler definition must start with **TAG_HANDLER_BEGIN** macro and end with **TAG_HANDLER_END** macro. I strongly recommend to have a look at *include/wxhtml/mod_tmpl.h* file. Otherwise you won't understand the structure of macros. See macros reference:

TAG_HANDLER_BEGIN(*name*, *tags*)

Starts handler definition. *name* is handler identifier (in fact part of class name), *tags* is string containing list of tags supported by this handler (in uppercase). This macro derives new class from *wxHtmlWinTagHandler* and implements it is *GetSupportedTags* (p. 697) method.

Example: **TAG_HANDLER_BEGIN**(FONTS, "B,I,U,T")

TAG_HANDLER_VARS

This macro starts block of variables definitions. (Variables are identical to class attributes.) Example:

```
TAG_HANDLER_BEGIN(VARS_ONLY, "CRAZYTAG")
TAG_HANDLER_VARS
    int my_int_var;
    wxString something_else;
TAG_HANDLER_END(VARS_ONLY)
```

This macro is used only in rare cases.

TAG_HANDLER_CONSTR(*name*)

This macro supplies object constructor. *name* is same name as the one from **TAG_HANDLER_BEGIN** macro. Body of constructor follow after this macro (you must use `and` `)`. Example:

```
TAG_HANDLER_BEGIN(VARS2, "CRAZYTAG")
TAG_HANDLER_VARS
    int my_int_var;
TAG_HANDLER_CONSTR(vars2)
{ // !!!!!
    my_int_var = 666;
} // !!!!!
TAG_HANDLER_END(VARS2)
```

Never used in wxHTML :-)

TAG_HANDLER_PROC(*varib*)

This is very important macro. It defines *HandleTag* (p. 697)method. *varib* is name of parameter passed to the method, usually *tag*. Body of method follows after this macro. Note than you must use `and` `!` Example:

```
TAG_HANDLER_BEGIN(TITLE, "TITLE")
TAG_HANDLER_PROC(tag)
```

```
        {  
            printf("TITLE found...\n");  
        }  
TAG_HANDLER_END(TITLE)
```

TAG_HANDLER_END(*name*)

Ends definition of tag handler *name*.

Tags Modules

You can use set of 3 macros TAGS_MODULE_BEGIN, TAGS_MODULE_ADD and TAGS_MODULE_END to inherit new module from *wxHtmlTagsModule* (p. 697) and to create instance of it. See macros reference:

TAGS_MODULE_BEGIN(*modname*)

Begins module definition. *modname* is part of class name and must be unique.

TAGS_MODULE_ADD(*name*)

Adds the handler to this module. *name* is the identifier from TAG_HANDLER_BEGIN.

TAGS_MODULE_END(*modname*)

Ends the definition of module.

Example:

```
TAGS_MODULE_BEGIN(Examples)  
    TAGS_MODULE_ADD(VARS_ONLY)  
    TAGS_MODULE_ADD(VARS2)  
    TAGS_MODULE_ADD(TITLE)  
TAGS_MODULE_END(Examples)
```

Tags supported by wxHTML

wxHTML is not full implementation of HTML standard. Instead, it supports most common tags so that it is possible to display *simple* HTML documents with it. (For example it works fine with pages created in Netscape Composer or generated by tex2rtf).

Following tables list all tags known to wxHTML, together with supported parameters. A tag has general form of <tagname param_1 param_2 ... param_n> where param_i is either paramname="paramvalue" or paramname=paramvalue - these two are equivalent. Unless stated otherwise, wxHTML is case-insensitive.

Table of common parameter values

We will use these substitutions in tags descriptions:

[alignment]	CENTER
	LEFT
	RIGHT
	JUSTIFY
[v_alignment]	TOP
	BOTTOM

	CENTER
[color]	HTML 4.0-compliant colour specification
[fontsize]	-2 -1 +0 +1 +2 +3 +4 1 2 3 4 5 6 7
[pixels]	integer value that represents dimension in pixels
[percent]	i% where i is integer
[url]	an URL
[string]	text string
[coords]	c(1),c(2),c(3),...,c(n) where c(i) is integer

List of supported tags

A	NAME=[string] HREF=[url] TARGET=[target window spec]
ADDRESS	
AREA	SHAPE=POLY SHAPE=CIRCLE SHAPE=RECT COORDS=[coords] HREF=[url]
B	
BIG	
BLOCKQUOTE	
BODY	TEXT=[color] LINK=[color] BGCOLOR=[color] ALIGN=[alignment]
BR	
CENTER	
CITE	
CODE	
DD	
DIV	ALIGN=[alignment]
DL	
DT	
EM	
FONT	COLOR=[color] SIZE=[fontsize] FACE=[comma-separated list of facenames] ALIGN=[alignment] SIZE=[pixels] WIDTH=[percent pixels] NOSHADE
HR	
H1	
H2	
H3	
H4	
H5	
H6	

I	
IMG	SRC=[url] WIDTH=[pixels] HEIGHT=[pixels] ALIGN=TEXTTOP ALIGN=CENTER ALIGN=ABSCENTER ALIGN=BOTTOM USEMAP=[url]
KBD	
LI	
MAP	NAME=[string]
META	HTTP-EQUIV="Content-Type" CONTENT=[string]
OL	
P	ALIGN=[alignment]
PRE	
SAMP	
SMALL	
STRIKE	
STRONG	
TABLE	ALIGN=[alignment] WIDTH=[percent pixels] BORDER=[pixels] VALIGN=[v_alignment] BGCOLOR=[color] CELLSPACING=[pixels] CELLPADDING=[pixels]
TD	ALIGN=[alignment] VALIGN=[v_alignment] BGCOLOR=[color] WIDTH=[percent pixels] COLSPAN=[pixels] ROWSPAN=[pixels] NOWRAP
TH	ALIGN=[alignment] VALIGN=[v_alignment] BGCOLOR=[color] WIDTH=[percent pixels] COLSPAN=[pixels] ROWSPAN=[pixels]
TITLE	
TR	ALIGN=[alignment] VALIGN=[v_alignment] BGCOLOR=[color]
TT	
U	
UL	

Environment variables

This section describes all environment variables that affect execution of wxWidgets programs.

WXTRACE	(Debug build only.) This variable can be set to comma-separated list of trace masks used in <code>wxLogTrace</code> (p. 1530) calls; <code>wxLog::AddTraceMask</code> (p. 846) is called for every mask in the list during wxWidgets initialization.
WXPREFIX	(Unix only.) Overrides installation prefix. Normally, the prefix is hard-coded and is same as the value passed to <code>configure</code> via the <code>--prefix</code> switch when compiling the

library (typically `/usr/local` or `/usr`). You can set `WXPREFIX` if you are for example distributing binary version of an application and you don't know in advance where it will be installed.

`WXMODE` (wxMGL only.) Sets MGL video mode. The value must be in form *widthxheight-depth*. The default is `640x480-16`.

`WXSTDERR` (wxMGL only.) Redirects stderr output to a file.

wxPython overview

This topic was written by Robin Dunn, author of the wxPython wrapper.

What is wxPython?

wxPython is a blending of the wxWidgets GUI classes and the Python (<http://www.python.org/>) programming language.

Python

So what is Python? Go to <http://www.python.org> (<http://www.python.org>) to learn more, but in a nutshell Python is an interpreted, interactive, object-oriented programming language. It is often compared to Tcl, Perl, Scheme or Java.

Python combines remarkable power with very clear syntax. It has modules, classes, exceptions, very high level dynamic data types, and dynamic typing. There are interfaces to many system calls and libraries, and new built-in modules are easily written in C or C++. Python is also usable as an extension language for applications that need a programmable interface.

Python is copyrighted but freely usable and distributable, even for commercial use.

wxPython

wxPython is a Python package that can be imported at runtime that includes a collection of Python modules and an extension module (native code). It provides a series of Python classes that mirror (or shadow) many of the wxWidgets GUI classes. This extension module attempts to mirror the class hierarchy of wxWidgets as closely as possible. This means that there is a `wxFrame` class in wxPython that looks, smells, tastes and acts almost the same as the `wxFrame` class in the C++ version.

wxPython is very versatile. It can be used to create standalone GUI applications, or in situations where Python is embedded in a C++ application as an internal scripting or macro language.

Currently wxPython is available for Win32 platforms and the GTK toolkit (wxGTK) on most Unix/X-windows platforms. See the wxPython website <http://wxPython.org/> (<http://wxPython.org/>) for details about getting wxPython working for you.

Why use wxPython?

So why would you want to use wxPython over just C++ and wxWidgets? Personally I prefer using Python for everything. I only use C++ when I absolutely have to eke more performance out of an algorithm, and even then I usually code it as an extension module and leave the majority of the program in Python.

Another good thing to use wxPython for is quick prototyping of your wxWidgets apps. With C++ you have to continuously go through the edit-compile-link-run cycle, which can be quite time consuming. With Python it is only an edit-run cycle. You can easily build an application in a few hours with Python that would normally take a few days or longer with C++. Converting a wxPython app to a C++/wxWidgets app should be a straight forward task.

Other Python GUIs

There are other GUI solutions out there for Python.

Tkinter

Tkinter is the de facto standard GUI for Python. It is available on nearly every platform that Python and Tcl/Tk are. Why Tcl/Tk? Well because Tkinter is just a wrapper around Tcl's GUI toolkit, Tk. This has its upsides and its downsides...

The upside is that Tk is a pretty versatile toolkit. It can be made to do a lot of things in a lot of different environments. It is fairly easy to create new widgets and use them interchangeably in your programs.

The downside is Tcl. When using Tkinter you actually have two separate language interpreters running, the Python interpreter and the Tcl interpreter for the GUI. Since the guts of Tcl is mostly about string processing, it is fairly slow as well. (Not too bad on a fast Pentium II, but you really notice the difference on slower machines.)

It wasn't until the latest version of Tcl/Tk that native Look and Feel was possible on non-Motif platforms. This is because Tk usually implements its own widgets (controls) even when there are native controls available.

Tkinter is a pretty low-level toolkit. You have to do a lot of work (verbose program code) to do things that would be much simpler with a higher level of abstraction.

PythonWin

PythonWin is an add-on package for Python for the Win32 platform. It includes wrappers for MFC as well as much of the Win32 API. Because of its foundation, it is very familiar for programmers who have experience with MFC and the Win32 API. It is obviously not compatible with other platforms and toolkits. PythonWin is organized as separate packages and modules so you can use the pieces you need without having to use the GUI portions.

Others

There are quite a few other GUI modules available for Python, some in active use, some

that haven't been updated for ages. Most are simple wrappers around some C or C++ toolkit or another, and most are not cross-platform compatible. See this link (<http://www.python.org/download/Contributed.html#Graphics>) for a listing of a few of them.

Using wxPython

First things first...

I'm not going to try and teach the Python language here. You can do that at the Python Tutorial (<http://www.python.org/doc/tut/tut.html>). I'm also going to assume that you know a bit about wxWidgets already, enough to notice the similarities in the classes used.

Take a look at the following wxPython program. You can find a similar program in the wxPython/demo directory, named `DialogUnits.py`. If your Python and wxPython are properly installed, you should be able to run it by issuing this command:

python DialogUnits.py

```
001: ## import all of the wxPython GUI package
002: from wxPython.wx import *
003:
004: ## Create a new frame class, derived from the wxPython Frame.
005: class MyFrame(wxFrame):
006:
007:     def __init__(self, parent, id, title):
008:         # First, call the base class' __init__ method to create the
frame
009:         wxFrame.__init__(self, parent, id, title,
010:                           wxPoint(100, 100), wxSize(160, 100))
011:
012:         # Associate some events with methods of this class
013:         EVT_SIZE(self, self.OnSize)
014:         EVT_MOVE(self, self.OnMove)
015:
016:         # Add a panel and some controls to display the size and
position
017:         panel = wxPanel(self, -1)
018:         wxStaticText(panel, -1, "Size:",
019:                      wxDLG_PNT(panel, wxPoint(4, 4)), wxDefaultSize)
020:         wxStaticText(panel, -1, "Pos:",
021:                      wxDLG_PNT(panel, wxPoint(4, 14)), wxDefaultSize)
022:         self.sizeCtrl = wxTextCtrl(panel, -1, "",
023:                                    wxDLG_PNT(panel, wxPoint(24, 4)),
024:                                    wxDLG_SZE(panel, wxSize(36, -1)),
025:                                    wxTE_READONLY)
026:         self.posCtrl = wxTextCtrl(panel, -1, "",
027:                                    wxDLG_PNT(panel, wxPoint(24, 14)),
028:                                    wxDLG_SZE(panel, wxSize(36, -1)),
029:                                    wxTE_READONLY)
030:
031:
032:         # This method is called automatically when the CLOSE event is
033:         # sent to this window
034:         def OnCloseWindow(self, event):
035:             # tell the window to kill itself
036:             self.Destroy()
037:
038:         # This method is called by the system when the window is resized,
```

```
039:         # because of the association above.
040:     def OnSize(self, event):
041:         size = event.GetSize()
042:         self.sizeCtrl.SetValue("%s, %s" % (size.width, size.height))
043:
044:         # tell the event system to continue looking for an event
handler,
045:         # so the default handler will get called.
046:         event.Skip()
047:
048:         # This method is called by the system when the window is moved,
049:         # because of the association above.
050:     def OnMove(self, event):
051:         pos = event.GetPosition()
052:         self.posCtrl.SetValue("%s, %s" % (pos.x, pos.y))
053:
054:
055: # Every wxWidgets application must have a class derived from wxApp
056: class MyApp(wxApp):
057:
058:     # wxWidgets calls this method to initialize the application
059:     def OnInit(self):
060:
061:         # Create an instance of our customized Frame class
062:         frame = MyFrame(NULL, -1, "This is a test")
063:         frame.Show(true)
064:
065:         # Tell wxWidgets that this is our main window
066:         self.SetTopWindow(frame)
067:
068:         # Return a success flag
069:         return true
070:
071:
072: app = MyApp(0)         # Create an instance of the application class
073: app.MainLoop()         # Tell it to start processing events
074:
```

Things to notice

1. At line 2 the wxPython classes, constants, and etc. are imported into the current module's namespace. If you prefer to reduce namespace pollution you can use "from wxPython import wx" and then access all the wxPython identifiers through the wx module, for example, "wx.wxFrame".
2. At line 13 the frame's sizing and moving events are connected to methods of the class. These helper functions are intended to be like the event table macros that wxWidgets employs. But since static event tables are impossible with wxPython, we use helpers that are named the same to dynamically build the table. The only real difference is that the first argument to the event helpers is always the window that the event table entry should be added to.
3. Notice the use of wxDLG_PNT and wxDLG_SZE in lines 19 - 29 to convert from dialog units to pixels. These helpers are unique to wxPython since Python can't do method overloading like C++.
4. There is an OnCloseWindow method at line 34 but no call to EVT_CLOSE to attach the event to the method. Does it really get called? The answer is, yes it does. This is because many of the *standard* events are attached to windows that have the associated *standard* method names. I have tried to follow the lead of

the C++ classes in this area to determine what is *standard* but since that changes from time to time I can make no guarantees, nor will it be fully documented. When in doubt, use an `EVT_***` function.

5. At lines 17 to 21 notice that there are no saved references to the panel or the static text items that are created. Those of you who know Python might be wondering what happens when Python deletes these objects when they go out of scope. Do they disappear from the GUI? They don't. Remember that in wxPython the Python objects are just shadows of the corresponding C++ objects. Once the C++ windows and controls are attached to their parents, the parents manage them and delete them when necessary. For this reason, most wxPython objects do not need to have a `__del__` method that explicitly causes the C++ object to be deleted. If you ever have the need to forcibly delete a window, use the `Destroy()` method as shown on line 36.
6. Just like wxWidgets in C++, wxPython apps need to create a class derived from `wxApp` (line 56) that implements a method named `OnInit`, (line 59.) This method should create the application's main window (line 62) and use `wxApp.SetTopWindow()` (line 66) to inform wxWidgets about it.
7. And finally, at line 72 an instance of the application class is created. At this point wxPython finishes initializing itself, and calls the `OnInit` method to get things started. (The zero parameter here is a flag for functionality that isn't quite implemented yet. Just ignore it for now.) The call to `MainLoop` at line 73 starts the event loop which continues until the application terminates or all the top level windows are closed.

wxWidgets classes implemented in wxPython

The following classes are supported in wxPython. Most provide nearly full implementations of the public interfaces specified in the C++ documentation, others are less so. They will all be brought as close as possible to the C++ spec over time.

- `wxAcceleratorEntry` (p. 18)
- `wxAcceleratorTable` (p. 19)
- `wxActivateEvent` (p. 29)
- `wxBitmap` (p. 67)
- `wxBitmapButton` (p. 80)
- `wxBitmapDataObject` (p. 85)
- `wxBMPHandler`
- `wxBoxSizer` (p. 90)
- `wxBrush` (p. 91)
- `wxBusyInfo` (p. 103)

- *wxBusyCursor* (p. 102)
- *wxButton* (p. 104)
- *wxCalculateLayoutEvent* (p. 107)
- *wxCalendarCtrl* (p. 109)
- *wxCaret*
- *wxCheckBox* (p. 121)
- *wxCheckListBox* (p. 125)
- *wxChoice* (p. 127)
- *wxClientDC* (p. 134)
- *wxClipboard* (p. 136)
- *wxCloseEvent* (p. 139)
- *wxColourData* (p. 154)
- *wxColourDialog* (p. 157)
- *wxColour* (p. 150)
- *wxComboBox* (p. 158)
- *wxCommandEvent* (p. 165)
- *wxConfig* (p. 178)
- *wxControl* (p. 199)
- *wxCursor* (p. 211)
- *wxCustomDataObject* (p. 216)
- *wxDataFormat* (p. 218)
- *wxDataObject* (p. 223)
- *wxDataObjectComposite* (p. 227)
- *wxDataObjectSimple* (p. 227)
- *wxDateTime* (p. 237)
- *wxDateSpan* (p. 232)
- *wxDC* (p. 349)
- *wxDialog* (p. 369)

- *wxDirDialog* (p. 386)
- *wxDragImage* (p. 423)
- *wxDropFilesEvent* (p. 427)
- *wxDropSource* (p. 429)
- *wxDropTarget* (p. 432)
- *wxEraseEvent* (p. 440)
- *wxEvent* (p. 441)
- *wxEvtHandler* (p. 445)
- *wxFileConfig*
- *wxFileDataObject* (p. 467)
- *wxFileDialog* (p. 468)
- *wxFileDropTarget* (p. 473)
- *wxFileSystem* (p. 494)
- *wxFileSystemHandler* (p. 496)
- *wxFocusEvent* (p. 512)
- *wxFontData* (p. 521)
- *wxFontDialog* (p. 524)
- *wxFont* (p. 512)
- *wxFrame* (p. 532)
- *wxFSFile* (p. 545)
- *wxGauge* (p. 554)
- *wxGIFHandler*
- *wxGLCanvas*
- *wxHtmlCell* (p. 653)
- *wxHtmlContainerCell* (p. 659)
- *wxHtmlDCRenderer* (p. 665)
- *wxHtmlEasyPrinting* (p. 668)
- *wxHtmlParser* (p. 685)

- *wxHtmlTagHandler* (p. 696)
- *wxHtmlTag* (p. 692)
- *wxHtmlWinParser* (p. 708)
- *wxHtmlPrintout* (p. 690)
- *wxHtmlWinTagHandler* (p. 714)
- *wxHtmlWindow* (p. 699)
- *wxIconizeEvent*
- *wxIcon* (p. 716)
- *wxIdleEvent* (p. 726)
- *wxImage* (p. 728)
- *wxImageHandler* (p. 750)
- *wxImageList* (p. 754)
- *wxIndividualLayoutConstraint* (p. 758)
- *wxInitDialogEvent* (p. 761)
- *wxInputStream* (p. 762)
- *wxInternetFSHandler* (p. 1608)
- *wxJoystickEvent* (p. 775)
- *wxJPEGHandler*
- *wxKeyEvent* (p. 778)
- *wxLayoutAlgorithm* (p. 782)
- *wxLayoutConstraints* (p. 785)
- *wxListBox* (p. 794)
- *wxListCtrl* (p. 799)
- *wxListEvent* (p. 818)
- *wxListItem* (p. 814)
- *wxMask* (p. 860)
- *wxMaximizeEvent*
- *wxMDIChildFrame* (p. 870)

- *wxMDIClientWindow* (p. 873)
- *wxMDIParentFrame* (p. 874)
- *wxMemoryDC* (p. 881)
- *wxMemoryFSHandler* (p. 882)
- *wxMenuBar* (p. 899)
- *wxMenuEvent* (p. 907)
- *wxMenuItem* (p. 909)
- *wxMenu* (p. 885)
- *wxMessageDialog* (p. 914)
- *wxMetaFileDC* (p. 917)
- *wxMiniFrame* (p. 921)
- *wxMouseEvent* (p. 928)
- *wxMoveEvent* (p. 937)
- *wxNotebookEvent* (p. 950)
- *wxNotebook* (p. 943)
- *wxPageSetupDialogData* (p. 961)
- *wxPageSetupDialog* (p. 960)
- *wxPaintDC* (p. 966)
- *wxPaintEvent* (p. 967)
- *wxPalette* (p. 968)
- *wxPanel* (p. 972)
- *wxPen* (p. 976)
- *wxPNGHandler*
- *wxPoint* (p. 991)
- *wxPostScriptDC* (p. 991)
- *wxPreviewFrame* (p. 995)
- *wxPrintData* (p. 996)
- *wxPrintDialogData* (p. 1003)

- *wxPrintDialog* (p. 1002)
- *wxPrinter* (p. 1007)
- *wxPrintPreview* (p. 1014)
- *wxPrinterDC* (p. 1010)
- *wxPrintout* (p. 1010)
- *wxProcess* (p. 1019)
- *wxQueryLayoutInfoEvent* (p. 1030)
- *wxRadioBox* (p. 1033)
- *wxRadioButton* (p. 1039)
- *wxRealPoint* (p. 1041)
- *wxRect* (p. 1042)
- *wxRegionIterator* (p. 1057)
- *wxRegion* (p. 1052)
- *wxSashEvent* (p. 1063)
- *wxSashLayoutWindow* (p. 1065)
- *wxSashWindow* (p. 1068)
- *wxScreenDC* (p. 1073)
- *wxScrollBar* (p. 1079)
- *wxScrollEvent* (p. 1094)
- *wxScrolledWindow* (p. 1085)
- *wxScrollWinEvent* (p. 1097)
- *wxShowEvent*
- *wxSingleChoiceDialog* (p. 1102)
- *wxSizeEvent* (p. 1109)
- *wxSize* (p. 1107)
- *wxSizer* (p. 1110)
- *wxSizerItem*
- *wxSlider* (p. 1122)

- *wxSpinButton* (p. 1155)
- *wxSpinEvent*
- *wxSplitterWindow* (p. 1167)
- *wxStaticBitmap* (p. 1178)
- *wxStaticBox* (p. 1180)
- *wxStaticBoxSizer* (p. 1182)
- *wxStaticLine* (p. 1182)
- *wxStaticText* (p. 1184)
- *wxStatusBar* (p. 1186)
- *wxSysColourChangedEvent* (p. 1228)
- *wxTaskBarIcon* (p. 1242)
- *wxTextCtrl* (p. 1250)
- *wxTextDataObject* (p. 1268)
- *wxTextDropTarget* (p. 1270)
- *wxTextEntryDialog* (p. 1271)
- *wxTimer* (p. 1297)
- *wxTimerEvent* (p. 1299)
- *wxTimeSpan* (p. 1300)
- *wxTipProvider* (p. 1306)
- *wxToolBarTool*
- *wxToolBar* (p. 1311)
- *wxToolTip*
- *wxTreeCtrl* (p. 1329)
- *wxTreeEvent* (p. 1347)
- *wxTreeItemData* (p. 1350)
- *wxTreeItemId*
- *wxUpdateUIEvent* (p. 1352)
- *wxValidator* (p. 1360)

- `wxWindowDC` (p. 1441)
- `wxWindow` (p. 1388)
- `wxZipFSHandler` (p. 1608)

Where to go for help

Since wxPython is a blending of multiple technologies, help comes from multiple sources. See <http://wxpython.org/> (<http://wxpython.org/>) for details on various sources of help, but probably the best source is the wxPython-users mail list. You can view the archive or subscribe by going to

<http://lists.wxwindows.org/mailman/listinfo/wxpython-users>
(<http://lists.wxwindows.org/mailman/listinfo/wxpython-users>)

Or you can send mail directly to the list using this address:

wxpython-users@lists.wxwindows.org

Syntax of the builtin regular expression library

A *regular expression* describes strings of characters. It's a pattern that matches certain strings and doesn't match others.

See also

`wxRegEx` (p. 1049)

Different Flavors of REs

Syntax of the builtin regular expression library (p. 1720)

Regular expressions ("RE"s), as defined by POSIX, come in two flavors: *extended* REs ("EREs") and *basic* REs ("BREs"). EREs are roughly those of the traditional *egrep*, while BREs are roughly those of the traditional *ed*. This implementation adds a third flavor, *advanced* REs ("AREs"), basically EREs with some significant extensions.

This manual page primarily describes AREs. BREs mostly exist for backward compatibility in some old programs; they will be discussed at the *end* (p. 1729). POSIX EREs are almost an exact subset of AREs. Features of AREs that are not present in EREs will be indicated.

Regular Expression Syntax

Syntax of the builtin regular expression library (p. 1720)

These regular expressions are implemented using the package written by Henry

Spencer, based on the 1003.2 spec and some (not quite all) of the Perl5 extensions (thanks, Henry!). Much of the description of regular expressions below is copied verbatim from his manual entry.

An ARE is one or more *branches*, separated by '|', matching anything that matches any of the branches.

A branch is zero or more *constraints* or *quantified atoms*, concatenated. It matches a match for the first, followed by a match for the second, etc; an empty branch matches the empty string.

A quantified atom is an *atom* possibly followed by a single *quantifier*. Without a quantifier, it matches a match for the atom. The quantifiers, and what a so-quantified atom matches, are:

*	a sequence of 0 or more matches of the atom
+	a sequence of 1 or more matches of the atom
?	a sequence of 0 or 1 matches of the atom
{m}	a sequence of exactly <i>m</i> matches of the atom
{m,}	a sequence of <i>m</i> or more matches of the atom
{m,n}	a sequence of <i>m</i> through <i>n</i> (inclusive) matches of the atom; <i>m</i> may not exceed <i>n</i>
*? +? ?? {m}? {m,}? {m,n}?	<i>non-greedy</i> quantifiers, which match the same possibilities, but prefer the smallest number rather than the largest number of matches (see <i>Matching</i> (p. 1727))

The forms using { and } are known as *bounds*. The numbers *m* and *n* are unsigned decimal integers with permissible values from 0 to 255 inclusive. An atom is one of:

(re)	(where <i>re</i> is any regular expression) matches a match for <i>re</i> , with the match noted for possible reporting
(?:re)	as previous, but does no reporting (a "non-capturing" set of parentheses)
()	matches an empty string, noted for possible reporting
(?:)	matches an empty string, without reporting
[chars]	a <i>bracket expression</i> , matching any one of the <i>chars</i> (see <i>Bracket Expressions</i> (p. 1722) for more detail)
.	matches any single character
\k	(where <i>k</i> is a non-alphanumeric character) matches that character taken as an ordinary character, e.g. \\ matches a backslash character
\c	where <i>c</i> is alphanumeric (possibly followed by other characters),

	an <i>escape</i> (AREs only), see <i>Escapes</i> (p. 1724) below
{	when followed by a character other than a digit, matches the left-brace character '{'; when followed by a digit, it is the beginning of a <i>bound</i> (see above)
x	where x is a single character with no other significance, matches that character.

A *constraint* matches an empty string when specific conditions are met. A constraint may not be followed by a quantifier. The simple constraints are as follows; some more constraints are described later, under *Escapes* (p. 1724).

^	matches at the beginning of a line
\$	matches at the end of a line
(?=re)	<i>positive lookahead</i> (AREs only), matches at any point where a substring matching <i>re</i> begins
(?!re)	<i>negative lookahead</i> (AREs only), matches at any point where no substring matching <i>re</i> begins

The lookahead constraints may not contain back references (see later), and all parentheses within them are considered non-capturing.

An RE may not end with '\.

Bracket Expressions

Syntax of the builtin regular expression library (p. 1720)

A *bracket expression* is a list of characters enclosed in '['. It normally matches any single character from the list (but see below). If the list begins with '^', it matches any single character (but see below) *not* from the rest of the list.

If two characters in the list are separated by '-', this is shorthand for the full *range* of characters between those two (inclusive) in the collating sequence, e.g. **[0-9]** in ASCII matches any decimal digit. Two ranges may not share an endpoint, so e.g. **a-c-e** is illegal. Ranges are very collating-sequence-dependent, and portable programs should avoid relying on them.

To include a literal **]** or **-** in the list, the simplest method is to enclose it in **[.** and **.]** to make it a collating element (see below). Alternatively, make it the first character (following a possible '^'), or (AREs only) precede it with '\'. Alternatively, for '-', make it the last character, or the second endpoint of a range. To use a literal **-** as the first endpoint of a range, make it a collating element or (AREs only) precede it with '\'. With the exception of these, some combinations using **[** (see next paragraphs), and escapes, all other special characters lose their special significance within a bracket expression.

Within a bracket expression, a collating element (a character, a multi-character sequence that collates as if it were a single character, or a collating-sequence name for

either) enclosed in `[. and .]` stands for the sequence of characters of that collating element.

wxWidgets: Currently no multi-character collating elements are defined. So in `[.X.]`, *X* can either be a single character literal or the name of a character. For example, the following are both identical `[[.0.]-[.9.]]` and `[[.zero.]-[.nine.]]` and mean the same as `[0-9]`. See *Character Names* (p. 1730).

Within a bracket expression, a collating element enclosed in `[= and =]` is an equivalence class, standing for the sequences of characters of all collating elements equivalent to that one, including itself. An equivalence class may not be an endpoint of a range.

wxWidgets: Currently no equivalence classes are defined, so `[=X=]` stands for just the single character *X*. *X* can either be a single character literal or the name of a character, see *Character Names* (p. 1730).

Within a bracket expression, the name of a *character class* enclosed in `[: and :]` stands for the list of all characters (not all collating elements!) belonging to that class. Standard character classes are:

alpha	A letter.
upper	An upper-case letter.
lower	A lower-case letter.
digit	A decimal digit.
xdigit	A hexadecimal digit.
alnum	An alphanumeric (letter or digit).
print	An alphanumeric (same as <i>alnum</i>).
blank	A space or tab character.
space	A character producing white space in displayed text.
punct	A punctuation character.
graph	A character with a visible representation.
cntrl	A control character.

A character class may not be used as an endpoint of a range.

wxWidgets: In a non-Unicode build, these character classifications depend on the current locale, and correspond to the values return by the ANSI C 'is' functions: *isalpha*, *isupper*, etc. In Unicode mode they are based on Unicode classifications, and are not affected by the current locale.

There are two special cases of bracket expressions: the bracket expressions `[[:<:]]` and `[[:>:]]` are constraints, matching empty strings at the beginning and end of a word respectively. A word is defined as a sequence of word characters that is neither preceded nor followed by word characters. A word character is an *alnum* character or an

underscore (`_`). These special bracket expressions are deprecated; users of AREGs should use constraint escapes instead (see *Escapes* (p. 1724) below).

Escapes

Syntax of the builtin regular expression library (p. 1720)

Escapes (AREs only), which begin with a `\` followed by an alphanumeric character, come in several varieties: character entry, class shorthands, constraint escapes, and back references. A `\` followed by an alphanumeric character but not constituting a valid escape is illegal in AREs. In EREGs, there are no escapes: outside a bracket expression, a `\` followed by an alphanumeric character merely stands for that character as an ordinary character, and inside a bracket expression, `\` is an ordinary character. (The latter is the one actual incompatibility between EREGs and AREs.)

Character-entry escapes (AREs only) exist to make it easier to specify non-printing and otherwise inconvenient characters in REGs:

<code>\a</code>	alert (bell) character, as in C
<code>\b</code>	backspace, as in C
<code>\B</code>	synonym for <code>\</code> to help reduce backslash doubling in some applications where there are multiple levels of backslash processing
<code>\cX</code>	(where <i>X</i> is any character) the character whose low-order 5 bits are the same as those of <i>X</i> , and whose other bits are all zero
<code>\e</code>	the character whose collating-sequence name is 'ESC' , or failing that, the character with octal value 033
<code>\f</code>	formfeed, as in C
<code>\n</code>	newline, as in C
<code>\r</code>	carriage return, as in C
<code>\t</code>	horizontal tab, as in C
<code>\uwxyz</code>	(where <i>wxyz</i> is exactly four hexadecimal digits) the Unicode character U+wxyz in the local byte ordering
<code>\Ustuvwxyz</code>	(where <i>stuvwxyz</i> is exactly eight hexadecimal digits) reserved for a somewhat-hypothetical Unicode extension to 32 bits
<code>\v</code>	vertical tab, as in C are all available.
<code>\xhhh</code>	(where <i>hhh</i> is any sequence of hexadecimal digits) the character whose hexadecimal value is 0xhhh (a single character no matter how many hexadecimal digits are used).
<code>\0</code>	the character whose value is 0

\xy (where *xy* is exactly two octal digits, and is not a *back reference* (see below)) the character whose octal value is **0xy**

\xyz (where *xyz* is exactly three octal digits, and is not a back reference (see below)) the character whose octal value is **0xyz**

Hexadecimal digits are '**0**'-'**9**', '**a**'-'**f**', and '**A**'-'**F**'. Octal digits are '**0**'-'**7**'.

The character-entry escapes are always taken as ordinary characters. For example, **\135** is **]** in ASCII, but **\135** does not terminate a bracket expression. Beware, however, that some applications (e.g., C compilers) interpret such sequences themselves before the regular-expression package gets to see them, which may require doubling (quadrupling, etc.) the ****.

Class-shorthand escapes (AREs only) provide shorthands for certain commonly-used character classes:

\d	[[:digit:]]
\s	[[:space:]]
\w	[[:alnum:]]_ (note underscore)
\D	[^[:digit:]]
\S	[^[:space:]]
\W	[^[:alnum:]]_ (note underscore)

Within bracket expressions, **\d**, **\s**, and **\w** lose their outer brackets, and **\D**, **\S**, and **\W** are illegal. (So, for example, **[a-c\d]** is equivalent to **[a-c[:digit:]]**. Also, **[a-c\D]**, which is equivalent to **[a-c^[:digit:]]**, is illegal.)

A constraint escape (AREs only) is a constraint, matching the empty string if specific conditions are met, written as an escape:

\A	matches only at the beginning of the string (see <i>Matching</i> (p. 1727), below, for how this differs from ^)
\m	matches only at the beginning of a word
\M	matches only at the end of a word
\y	matches only at the beginning or end of a word
\Y	matches only at a point that is not the beginning or end of a word
\Z	matches only at the end of the string (see <i>Matching</i> (p. 1727), below, for how this differs from \$)
\m	(where <i>m</i> is a nonzero digit) a <i>back reference</i> , see below
\mnn	(where <i>m</i> is a nonzero digit, and <i>nn</i> is some more digits, and the decimal value <i>mnn</i> is not greater than the number of closing capturing parentheses seen so far) a <i>back reference</i> , see below

A word is defined as in the specification of `[[:<:]]` and `[[:>:]]` above. Constraint escapes are illegal within bracket expressions.

A back reference (AREs only) matches the same string matched by the parenthesized subexpression specified by the number, so that (e.g.) `([bc])\1` matches `bb` or `cc` but not `'bc'`. The subexpression must entirely precede the back reference in the RE.

Subexpressions are numbered in the order of their leading parentheses. Non-capturing parentheses do not define subexpressions.

There is an inherent historical ambiguity between octal character-entry escapes and back references, which is resolved by heuristics, as hinted at above. A leading zero always indicates an octal escape. A single non-zero digit, not followed by another digit, is always taken as a back reference. A multi-digit sequence not starting with a zero is taken as a back reference if it comes after a suitable subexpression (i.e. the number is in the legal range for a back reference), and otherwise is taken as octal.

Metasyntax

Syntax of the builtin regular expression library (p. 1720)

In addition to the main syntax described above, there are some special forms and miscellaneous syntactic facilities available.

Normally the flavor of RE being used is specified by application-dependent means. However, this can be overridden by a *director*. If an RE of any flavor begins with `'***:'`, the rest of the RE is an ARE. If an RE of any flavor begins with `'***='`, the rest of the RE is taken to be a literal string, with all characters considered ordinary characters.

An ARE may begin with *embedded options*: a sequence `(?xyz)` (where `xyz` is one or more alphabetic characters) specifies options affecting the rest of the RE. These supplement, and can override, any options specified by the application. The available option letters are:

b	rest of RE is a BRE
c	case-sensitive matching (usual default)
e	rest of RE is an ERE
i	case-insensitive matching (see <i>Matching</i> (p. 1727), below)
m	historical synonym for n
n	newline-sensitive matching (see <i>Matching</i> (p. 1727), below)
p	partial newline-sensitive matching (see <i>Matching</i> (p. 1727), below)
q	rest of RE is a literal ("quoted") string, all ordinary characters
s	non-newline-sensitive matching (usual default)
t	tight syntax (usual default; see below)

- w** inverse partial newline-sensitive ("weird") matching (see *Matching* (p. 1727), below)
- x** expanded syntax (see below)

Embedded options take effect at the `)` terminating the sequence. They are available only at the start of an ARE, and may not be used later within it.

In addition to the usual (*tight*) RE syntax, in which all characters are significant, there is an *expanded* syntax, available in AREs with the embedded `x` option. In the expanded syntax, white-space characters are ignored and all characters between a `#` and the following newline (or the end of the RE) are ignored, permitting paragraphing and commenting a complex RE. There are three exceptions to that basic rule:

- white-space character or `#` preceded by `\` is retained
- space or `#` within a bracket expression is retained
- space and comments are illegal within multi-character symbols like the ARE `'(?:'` or the BRE `'\('` Expanded-syntax white-space characters are blank, tab, newline, and any character that belongs to the *space* character class.

Finally, in an ARE, outside bracket expressions, the sequence `'(?#ttt)'` (where *ttt* is any text not containing a `)`) is a comment, completely ignored. Again, this is not allowed between the characters of multi-character symbols like `'(?:'`. Such comments are more a historical artifact than a useful facility, and their use is deprecated; use the expanded syntax instead.

None of these metasyntax extensions is available if the application (or an initial `***=director`) has specified that the user's input be treated as a literal string rather than as an RE.

Matching

Syntax of the builtin regular expression library (p. 1720)

In the event that an RE could match more than one substring of a given string, the RE matches the one starting earliest in the string. If the RE could match more than one substring starting at that point, its choice is determined by its *preference*: either the longest substring, or the shortest.

Most atoms, and all constraints, have no preference. A parenthesized RE has the same preference (possibly none) as the RE. A quantified atom with quantifier `{m}` or `{m}?` has the same preference (possibly none) as the atom itself. A quantified atom with other normal quantifiers (including `{m,n}` with *m* equal to *n*) prefers longest match. A quantified atom with other non-greedy quantifiers (including `{m,n}?` with *m* equal to *n*) prefers shortest match. A branch has the same preference as the first quantified atom in it which has a preference. An RE consisting of two or more branches connected by the `|` operator prefers longest match.

Subject to the constraints imposed by the rules for matching the whole RE, subexpressions also match the longest or shortest possible substrings, based on their

preferences, with subexpressions starting earlier in the RE taking priority over ones starting later. Note that outer subexpressions thus take priority over their component subexpressions.

Note that the quantifiers `{1,1}` and `{1,1}?` can be used to force longest and shortest preference, respectively, on a subexpression or a whole RE.

Match lengths are measured in characters, not collating elements. An empty string is considered longer than no match at all. For example, `bb*` matches the three middle characters of `'abbbc'`, `(week|wee)(night|knights)` matches all ten characters of `'weeknights'`, when `(.)*.` is matched against `abc` the parenthesized subexpression matches all three characters, and when `(a*)*` is matched against `bc` both the whole RE and the parenthesized subexpression match an empty string.

If case-independent matching is specified, the effect is much as if all case distinctions had vanished from the alphabet. When an alphabetic character exists in multiple cases appears as an ordinary character outside a bracket expression, it is effectively transformed into a bracket expression containing both cases, so that `x` becomes `'[xX]'`. When it appears inside a bracket expression, all case counterparts of it are added to the bracket expression, so that `[x]` becomes `[xX]` and `^[x]` becomes `^[^xX]`.

If newline-sensitive matching is specified, `.` and bracket expressions using `^` will never match the newline character (so that matches will never cross newlines unless the RE explicitly arranges it) and `^` and `$` will match the empty string after and before a newline respectively, in addition to matching at beginning and end of string respectively. ARE `\A` and `\Z` continue to match beginning or end of string *only*.

If partial newline-sensitive matching is specified, this affects `.` and bracket expressions as with newline-sensitive matching, but not `^` and `$`.

If inverse partial newline-sensitive matching is specified, this affects `^` and `$` as with newline-sensitive matching, but not `.` and bracket expressions. This isn't very useful but is provided for symmetry.

Limits And Compatibility

Syntax of the builtin regular expression library (p. 1720)

No particular limit is imposed on the length of REs. Programs intended to be highly portable should not employ REs longer than 256 bytes, as a POSIX-compliant implementation can refuse to accept such REs.

The only feature of AREs that is actually incompatible with POSIX EREs is that `\` does not lose its special significance inside bracket expressions. All other ARE features use syntax which is illegal or has undefined or unspecified effects in POSIX EREs; the `***` syntax of directors likewise is outside the POSIX syntax for both BREs and EREs.

Many of the ARE extensions are borrowed from Perl, but some have been changed to clean them up, and a few Perl extensions are not present. Incompatibilities of note include `'\b'`, `'\B'`, the lack of special treatment for a trailing newline, the addition of complemented bracket expressions to the things affected by newline-sensitive matching, the restrictions on parentheses and back references in lookahead constraints, and the

longest/shortest-match (rather than first-match) matching semantics.

The matching rules for REs containing both normal and non-greedy quantifiers have changed since early beta-test versions of this package. (The new rules are much simpler and cleaner, but don't work as hard at guessing the user's real intentions.)

Henry Spencer's original 1986 *regexp* package, still in widespread use, implemented an early version of today's EREs. There are four incompatibilities between *regexp*'s near-EREs ('RREs' for short) and AREs. In roughly increasing order of significance:

- In AREs, `\` followed by an alphanumeric character is either an escape or an error, while in RREs, it was just another way of writing the alphanumeric. This should not be a problem because there was no reason to write such a sequence in RREs.
- `{` followed by a digit in an ARE is the beginning of a bound, while in RREs, `{` was always an ordinary character. Such sequences should be rare, and will often result in an error because following characters will not look like a valid bound.
- In AREs, `\` remains a special character within `[]`, so a literal `\` within `[]` must be written `\\`. `\\` also gives a literal `\` within `[]` in RREs, but only truly paranoid programmers routinely doubled the backslash.
- AREs report the longest/shortest match for the RE, rather than the first found in a specified search order. This may affect some RREs which were written in the expectation that the first match would be reported. (The careful crafting of RREs to optimize the search order for fast matching is obsolete (AREs examine all possible matches in parallel, and their performance is largely insensitive to their complexity) but cases where the search order was exploited to deliberately find a match which was *not* the longest/shortest will need rewriting.)

Basic Regular Expressions

Syntax of the builtin regular expression library (p. 1720)

BREs differ from EREs in several respects. `|`, `+`, and `?` are ordinary characters and there is no equivalent for their functionality. The delimiters for bounds are `{` and `}`, with `{` and `}` by themselves ordinary characters. The parentheses for nested subexpressions are `(` and `)`, with `(` and `)` by themselves ordinary characters. `^` is an ordinary character except at the beginning of the RE or the beginning of a parenthesized subexpression, `$` is an ordinary character except at the end of the RE or the end of a parenthesized subexpression, and `*` is an ordinary character if it appears at the beginning of the RE or the beginning of a parenthesized subexpression (after a possible leading `^`). Finally, single-digit back references are available, and `<` and `>` are synonyms for `[:<:]` and `[:>:]` respectively; no other escapes are available.

Regular Expression Character Names

Syntax of the builtin regular expression library (p. 1720)

Note that the character names are case sensitive.

NUL	'\0'
SOH	'\001'
STX	'\002'
ETX	'\003'
EOT	'\004'
ENQ	'\005'
ACK	'\006'
BEL	'\007'
alert	'\007'
BS	'\010'
backspace	'\b'
HT	'\011'
tab	'\t'
LF	'\012'
newline	'\n'
VT	'\013'
vertical-tab	'\v'
FF	'\014'
form-feed	'\f'
CR	'\015'
carriage-return	'\r'
SO	'\016'
SI	'\017'
DLE	'\020'
DC1	'\021'

DC2	'\022'
DC3	'\023'
DC4	'\024'
NAK	'\025'
SYN	'\026'
ETB	'\027'
CAN	'\030'
EM	'\031'
SUB	'\032'
ESC	'\033'
IS4	'\034'
FS	'\034'
IS3	'\035'
GS	'\035'
IS2	'\036'
RS	'\036'
IS1	'\037'
US	'\037'
space	' '
exclamation-mark	'!'
quotation-mark	'\"'
number-sign	'#'
dollar-sign	'\$'
percent-sign	'%'
ampersand	'&'
apostrophe	'\''
left-parenthesis	'('
right-parenthesis	')'
asterisk	'*'

plus-sign	'+'
comma	','
hyphen	'-'
hyphen-minus	'-'
period	'.'
full-stop	'.'
slash	'/'
solidus	'/'
zero	'0'
one	'1'
two	'2'
three	'3'
four	'4'
five	'5'
six	'6'
seven	'7'
eight	'8'
nine	'9'
colon	':'
semicolon	';'
less-than-sign	'<'
equals-sign	'='
greater-than-sign	'>'
question-mark	'?'
commercial-at	'@'
left-square-bracket	'['
backslash	'\'
reverse-solidus	'\'
right-square-bracket	']'

circumflex	'^'
circumflex-accent	'^'
underscore	'_'
low-line	'_'
grave-accent	'`'
left-brace	'{'
left-curly-bracket	'{'
vertical-line	' '
right-brace	'}'
right-curly-bracket	'}'
tilde	'~'
DEL	'\177'

Chapter 12 Port notes

This chapter contains port specific notes.

wxGTK port

wxGTK is a port of wxWidgets using the GTK+ library available from www.gtk.org. It makes use of GTK+'s native widgets wherever possible and uses wxWidgets' generic controls when needed. GTK+ itself has been ported to a number of systems, but so far only the original X11 version is supported. Support for the recently released GTK+ 2.0 including Unicode support is work in progress.

You will need GTK+ 1.2.3 or higher which is available from:

<http://www.gtk.org> (<http://www.gtk.org>)

In order to configure wxWidgets to compile wxGTK you will need to type:

```
configure --with-gtk
```

For further information, please see the files in docs/gtk in the distribution.

wxMSW port

wxMSW is a port of wxWidgets for the Windows platforms including Windows 95, 98, ME, 2000, NT, XP in ANSI and Unicode mode (for Windows 95 through the MSLU extension library). wxMSW ensures native look and feel for XP as well when using wxWidgets version 2.3.3 or higher. wxMSW can be compile with a great variety of compilers including MS VC++, Borland 5.5, MinGW32, Cygwin and Watcom as well as cross-compilation with a Linux hosted MinGW32 tool chain.

For further information, please see the files in docs/msw in the distribution.

wxMac port

wxMac is a port of wxWidgets for the Macintosh OS platform. Currently MacOS 8.6 or higher, MacOS 9.0 or higher and MacOS X 10.0 or higher are supported, although most development effort goes into MacOS X support. wxMac can be compiled both using Apple's developer tools and MetroWerks CodeWarrior in different versions. Support for MacOS 8.X and MacOS 9.X is only available through CodeWarrior. wxMac uses the Carbon API (and optionally the Classic API under MacOS 8.X). You will need wxWidgets version 2.3.3 or higher for a stable version of wxMac.

For further information, please see the files in docs/mac in the distribution.

wxOS2 port

wxOS2 is a port of wxWidgets for the IBM OS/2 platform. It is currently under construction.

wxMGL port

wxMGL is a port of wxWidgets using the MGL library available from SciTech as the underlying graphics backend. wxMGL draws its widgets using the wxUniversal widget set which is now part of wxWidgets. MGL itself runs on a variety of platforms including DOS, Linux hardware (similar to the Linux framebuffer) and various graphics systems such as Win32, X11 and OS/2. Note that currently MGL for Linux runs only on x86-based systems.

You will need wxWidgets 2.3.3 or higher and MGL 5.0 or higher. The latter is available from

http://www.scitechsoft.com/products/product_download.html
(http://www.scitechsoft.com/products/product_download.html)

In order to configure wxWidgets to compile wxMGL you will need to type:

```
configure --with-mgl --with-universal
```

Under DOS, wxMGL uses a dmake based make system.

For further information, please see the files in docs/mgl in the distribution.

wxX11 port

wxX11 is a port of wxWidgets using X11 (The X Window System) as the underlying graphics backend. wxX11 draws its widgets using the wxUniversal widget set which is now part of wxWidgets. wxX11 is well-suited for a number of special applications such as those running on systems with few resources (PDAs) or for applications which need to use a special themed look. You will need wxWidgets 2.3.2 or higher.

In order to configure wxWidgets to compile wxX11 you will need to type:

```
configure --with-x11 --with-universal
```

For further information, please see the files in docs/x11 in the distribution. There is also a page on the use of wxWidgets for embedded applications on the wxWidgets web site.

Chapter 13 Index

—❖—

`::copystring`, 1437
`::wxBeginBusyCursor`, 1441
`::wxBell`, 1441
`::wxClientDisplayRect`, 1451
`::wxClipboardOpen`, 1455
`::wxCloseClipboard`, 1455
`::wxColourDisplay`, 1451
`::wxConcatFiles`, 1430
`::wxCopyFile`, 1430
`::wxCreateDynamicObject`, 1470
`::wxCreateFileTipProvider`, 1441
`::wxDDECleanUp`, 1459
`::wxDDEInitialize`, 1459
`::wxDebugMsg`, 1472
`::wxDirExists`, 1428
`::wxDirSelector`, 1442
`::wxDisplayDepth`, 1451
`::wxDisplaySize`, 1451
`::wxDisplaySizeMM`, 1451
`::wxDos2UnixFilename`, 1428
`::wxDROP_ICON`, 1451
`::wxEmptyClipboard`, 1455
`::wxEnableTopLevelWindows`, 1459
`::wxEndBusyCursor`, 1443
`::wxEntry`, 1419
`::wxEnumClipboardFormats`, 1455
`::wxError`, 1473
`::wxExecute`, 1421
`::wxExit`, 1423
`::wxFatalError`, 1473
`::wxFileExists`, 1428
`::wxFileModificationTime`, 1428
`::wxFileNameFromPath`, 1429
`::wxFileSelector`, 1442
`::wxFindFirstFile`, 1429
`::wxFindMenuItemId`, 1460
`::wxFindNextFile`, 1429
`::wxFindWindowAtPoint`, 1461
`::wxFindWindowAtPointer`, 1461
`::wxFindWindowByLabel`, 1460
`::wxFindWindowByName`, 1460
`::wxGetActiveWindow`, 1461
`::wxGetApp`, 1419
`::wxGetClipboardData`, 1456
`::wxGetClipboardFormatName`, 1456
`::wxGetColourFromUser`, 1443
`::wxGetCwd`, 1431
`::wxGetDiskSpace`, 1429
`::wxGetDisplayName`, 1461
`::wxGetElapsedTime`, 1478
`::wxGetEmailAddress`, 1433
`::wxGetFontFromUser`, 1444
`::wxGetFreeMemory`, 1433
`::wxGetFullHostName`, 1433
`::wxGetHomeDir`, 1434
`::wxGetHostName`, 1434
`::wxGetLocalTime`, 1478
`::wxGetLocalTimeMillis`, 1479
`::wxGetMousePosition`, 1461
`::wxGetMultipleChoice`, 1446
`::wxGetMultipleChoices`, 1444
`::wxGetNumberFromUser`, 1445
`::wxGetOsDescription`, 1435
`::wxGetOSDirectory`, 1430
`::wxGetOsVersion`, 1435
`::wxGetPasswordFromUser`, 1445
`::wxGetPrinterCommand`, 1453
`::wxGetPrinterFile`, 1453
`::wxGetPrinterMode`, 1453
`::wxGetPrinterOptions`, 1453
`::wxGetPrinterOrientation`, 1453
`::wxGetPrinterPreviewCommand`, 1453
`::wxGetPrinterScaling`, 1454
`::wxGetPrinterTranslation`, 1454
`::wxGetProcessId`, 1425
`::wxGetResource`, 1461
`::wxGetSingleChoice`, 1446
`::wxGetSingleChoiceData`, 1448
`::wxGetSingleChoiceIndex`, 1447
`::wxGetTempFileName`, 1431
`::wxGetTextFromUser`, 1446
`::wxGetTopLevelParent`, 1462
`::wxGetTranslation`, 1437
`::wxGetUserHome`, 1436
`::wxGetUserId`, 1434
`::wxGetUserName`, 1436
`::wxGetUTCTime`, 1479
`::wxGetWorkingDirectory`, 1431
`::wxHandleFatalExceptions`, 1420
`::wxInitAllImageHandlers`, 1420
`::wxInitialize`, 1420
`::wxIsAbsolutePath`, 1430
`::wxIsBusy`, 1448
`::wxIsClipboardFormatAvailable`, 1456
`::wxIsDebuggerRunning`, 1484
`::wxIsEmpty`, 1438
`::wxIsMainThread`, 1427
`::wxIsWild`, 1431
`::wxKill`, 1424
`::wxLoadUserResource`, 1462
`::wxLogDebug`, 1475
`::wxLogError`, 1473
`::wxLogFatalError`, 1473

::wxLogMessage, 1474
 ::wxLogStatus, 1474
 ::wxLogSysError, 1474
 ::wxLogTrace, 1475
 ::wxLogVerbose, 1474
 ::wxLogWarning, 1473
 ::wxMakeMetafilePlaceable, 1452
 ::wxMatchWild, 1431
 ::wxMessageBox, 1448
 ::wxMkdir, 1431
 ::wxMutexGuiEnter, 1427
 ::wxMutexGuiLeave, 1428
 ::wxNewId, 1459
 ::wxNow, 1479
 ::wxOnAssert, 1480
 ::wxOpenClipboard, 1456
 ::wxPathOnly, 1430
 ::wxPostDelete, 1463
 ::wxPostEvent, 1463
 ::wxRegisterClipboardFormat, 1456
 ::wxRegisterId, 1459
 ::wxRemoveFile, 1432
 ::wxRenameFile, 1432
 ::wxRmdir, 1432
 ::wxSafeShowMessage, 1476
 ::wxSafeYield, 1420
 ::wxSetClipboardData, 1457
 ::wxSetCursor, 1452
 ::wxSetDisplayName, 1463
 ::wxSetPrinterCommand, 1454
 ::wxSetPrinterFile, 1454
 ::wxSetPrinterMode, 1454
 ::wxSetPrinterOptions, 1454
 ::wxSetPrinterOrientation, 1454
 ::wxSetPrinterPreviewCommand, 1454
 ::wxSetPrinterScaling, 1455
 ::wxSetPrinterTranslation, 1455
 ::wxSetWorkingDirectory, 1432
 ::wxShell, 1425
 ::wxShowTip, 1449
 ::wxShutdown, 1425
 ::wxSleep, 1479
 ::wxSnprintf, 1439
 ::wxSplitPath, 1432
 ::wxStartTimer, 1480
 ::wxStrcmp, 1438
 ::wxStricmp, 1438
 ::wxStringEq, 1438
 ::wxStringMatch, 1438
 ::wxStripMenuCodes, 1463
 ::wxStrlen, 1439
 ::wxSysErrorCode, 1476
 ::wxSysErrorMsg, 1477
 ::wxTrace, 1477
 ::wxTraceLevel, 1478
 ::wxTransferFileToStream, 1432
 ::wxTransferStreamToFile, 1433
 ::wxTrap, 1483
 ::wxUninitialize, 1421
 ::wxUnix2DosFilename, 1430
 ::wxUsleep, 1480
 ::wxVsnprintf, 1440
 ::wxWakeUpIdle, 1421
 ::wxWriteResource, 1464
 ::wxYield, 1421

— —
 _ , 1440
 _T, 1441
 — ~ —

~wxAcceleratorTable, 21
 ~wxAccessible, 26
 ~wxApp, 31
 ~wxArray, 49
 ~wxArrayString, 54
 ~wxAutomationObject, 63
 ~wxBitmap, 70
 ~wxBitmapButton, 81
 ~wxBitmapHandler, 85
 ~wxBrush, 91
 ~wxBufferedOutputStream, 99
 ~wxBusyCursor, 100
 ~wxBusyInfo, 102
 ~wxButton, 104
 ~wxCalendarCtrl, 108
 ~wxCheckBox, 120
 ~wxCheckBoxList, 123
 ~wxChoice, 126
 ~wxClientData, 131
 ~wxClientDataContainer, 132
 ~wxClipboard, 134
 ~wxCmdLineParser, 143
 ~wxColourData, 150
 ~wxColourDialog, 153
 ~wxComboBox, 156
 ~wxCommand, 159
 ~wxCommandProcessor, 166
 ~wxCondition, 171
 ~wxConfigBase, 180
 ~wxContextHelp, 191
 ~wxCountingOutputStream, 201
 ~wxCriticalSection, 202
 ~wxCriticalSectionLocker, 203
 ~wxCSConv, 204
 ~wxCursor, 209
 ~wxCustomDataObject, 211
 ~wxDataInputStream, 215
 ~wxDataObject, 219
 ~wxDataOutputStream, 223
 ~wxDbConnectInf, 292
 ~wxDbGridColumnInfo, 334
 ~wxDbTable, 299
 ~wxDC, 344
 ~wxDCClipper, 363
 ~wxDialog, 366
 ~wxDialUpManager, 373
 ~wxDir, 377
 ~wxDirDialog, 381
 ~wxDisplay, 384
 ~wxDocChildFrame, 389
 ~wxDocManager, 391

- ~wxDocMDIChildFrame, 399
- ~wxDocMDIParentFrame, 400
- ~wxDocParentFrame, 402
- ~wxDocTemplate, 405
- ~wxDocument, 409
- ~wxDropSource, 422
- ~wxDropTarget, 424
- ~wxEvtHandler, 436
- ~wxFFFile, 445
- ~wxFFFileInputStream, 449
- ~wxFFFileOutputStream, 450
- ~wxFile, 453
- ~wxFileDialog, 460
- ~wxFileHistory, 464
- ~wxFileInputStream, 467
- ~wxFileOutputStream, 482
- ~wxFileType, 489
- ~wxFindReplaceDialog, 496
- ~wxFont, 504
- ~wxFontData, 509
- ~wxFontDialog, 512
- ~wxFontMapper, 517
- ~wxFrame, 522
- ~wxFTP, 536
- ~wxGauge, 542
- ~wxGenericDirCtrl, 551
- ~wxGenericValidator, 554
- ~wxGrid, 560
- ~wxGridCellEditor, 600
- ~wxGridTableBase, 612
- ~wxHashTable, 623
- ~wxHelpController, 626
- ~wxHelpProvider, 632
- ~wxHtmlListBox, 662
- ~wxIcon, 697
- ~wxIconBundle, 701
- ~wxImage, 709
- ~wxImageHandler, 727
- ~wxInputStream, 738
- ~wxJoystick, 744
- ~wxLayoutAlgorithm, 758
- ~wxList, 764
- ~wxListBox, 770
- ~wxListCtrl, 776
- ~wxLocale, 811
- ~wxLogChain, 823
- ~wxMask, 833
- ~wxMDIChildFrame, 843
- ~wxMDIClientWindow, 845
- ~wxMDIParentFrame, 848
- ~wxMemoryInputStream, 855
- ~wxMemoryOutputStream, 856
- ~wxMenu, 858
- ~wxMenuBar, 870
- ~wxMenuItem, 880
- ~wxMessageDialog, 885, 991
- ~wxMetafile, 886
- ~wxMetafileDC, 887
- ~wxMimeTypeManager, 890
- ~wxMiniFrame, 893
- ~wxModule, 895
- ~wxMutex, 908
- ~wxMutexLocker, 910
- ~wxNotebook, 913
- ~wxObjArray, 49
- ~wxOutputStream, 926
- ~wxPageSetupDialog, 928
- ~wxPageSetupDialogData, 929
- ~wxPalette, 937
- ~wxPanel, 941
- ~wxPen, 946
- ~wxPlotWindow, 954
- ~wxPreviewCanvas, 959
- ~wxPreviewControlBar, 960
- ~wxPreviewFrame, 961
- ~wxPrintData, 963
- ~wxPrintDialog, 969
- ~wxPrintDialogData, 970
- ~wxPrinter, 974, 981
- ~wxPrintout, 977
- ~wxProcess, 985
- ~wxRadioBox, 999
- ~wxRadioButton, 1005
- ~wxRecursionGuard, 1012
- ~wxRegEx, 1015
- ~wxRegion, 1018
- ~wxRendererNative, 1024
- ~wxSashLayoutWindow, 1030
- ~wxSashWindow, 1034
- ~wxScopedPtr, 1041
- ~wxScopedTiedPtr, 1042
- ~wxScrollBar, 1046
- ~wxScrolledWindow, 1051
- ~wxSemaphore, 1062
- ~wxSingleChoiceDialog, 1067
- ~wxSingleInstanceChecker, 1069
- ~wxSizer, 1073
- ~wxSizerItem, 1080
- ~wxSlider, 1087
- ~wxSocketAddress, 1093
- ~wxSocketBase, 1097
- ~wxSocketClient, 1110
- ~wxSocketServer, 1115
- ~wxSortedArray, 49
- ~wxSound, 1337
- ~wxSpinButton, 1118
- ~wxSplashScreen, 1124
- ~wxSplitterWindow, 1130
- ~wxStaticBox, 1141
- ~wxStatusBar, 1147
- ~wxStreamBase, 1152
- ~wxStreamToTextRedirector, 1160
- ~wxString, 1168
- ~wxStringBuffer, 1182
- ~wxStringList, 1184
- ~wxTabCtrl, 1195
- ~wxTaskBarIcon, 1200
- ~wxTempFile, 1203
- ~wxTextCtrl, 1212
- ~wxTextEntryDialog, 1228
- ~wxTextFile, 1230
- ~wxTextInputStream, 1236
- ~wxTextOutputStream, 1238
- ~wxTextValidator, 1241

~wxThread, 1243
 ~wxThreadHelper, 1250
 ~wxTimer, 1253
 ~wxToggleButton, 1265
 ~wxToolBar, 1269
 ~wxTreeCtrl, 1286
 ~wxTreeItemData, 1304
 ~wxURL, 1310
 ~wxValidator, 1313
 ~wxVariant, 1316
 ~wxView, 1323
 ~wxWindow, 1342
 ~wxWindowDisabler, 1391
 ~wxXmlResource, 1401
 ~wxXmlResourceHandler, 1406

—A—

A more complex example, 1618
 A selection of SQL commands, 1645
 Abort, 536, 974, 993
 Above, 735
 Abs, 830, 1256
 Absolute, 735
 Accept, 1115
 AcceptWith, 1115
 Access, 453
 Accessors, 234, 1256
 Activate, 843, 1323
 ActivateNext, 848
 ActivatePrevious, 848
 ActivateView, 391
 Add, 49, 55, 220, 226, 248, 594, 730, 731, 943, 955, 1074, 1184, 1256
 AddBook, 653, 656
 AddBrush, 96
 AddCatalog, 811
 AddCatalogLookupPathPrefix, 811
 AddCheckTool, 1271
 AddChild, 1342
 AddColumnInfo, 334
 AddColour, 152
 AddControl, 1269
 AddData, 134
 AddDocument, 391
 AddEnvList, 943
 AddFallbacks, 890
 AddFile, 457, 854
 AddFilesToMenu, 465
 AddFileToHistory, 391, 464
 AddFilter, 669, 678
 AddFont, 515
 AddGrowableCol, 497
 AddGrowableRow, 497
 AddHandler, 71, 483, 709, 1401
 AddHelp, 632, 633
 AddIcon, 701
 Adding items, 46
 Adding new resource handlers, 1590
 AddLanguage, 811
 AddLine, 1231
 AddModule, 686
 AddOption, 144
 AddPage, 913
 AddParam, 145
 AddPen, 951
 AddPendingEvent, 437
 AddRadioTool, 1271
 AddRoot, 1286
 AddSeparator, 1269
 AddStyle, 1406
 AddSwitch, 144
 AddTag, 665
 AddTagHandler, 665
 AddTool, 1270
 AddToolBarButtons, 661
 AddTraceMask, 818
 AddView, 409
 AddWindowStyles, 1406
 AddWord, 665
 AdjustPagebreak, 634
 AdvanceSelection, 914
 Advise, 188
 AfterFirst, 1169
 AfterLast, 1169
 age, 1027
 All date/time classes at a glance, 1531
 Alloc, 50, 55, 211, 1168
 AllocHenv, 293
 Allow, 921
 AltDown, 605, 606, 608, 754, 900
 AnyAddress, 741, 743
 Append, 194, 195, 764, 858, 870, 1169, 1316
 AppendCheckItem, 860
 AppendCols, 560, 615
 AppendDir, 470
 AppendItem, 1287
 AppendRadioItem, 860
 AppendRows, 560, 614
 AppendSeparator, 861
 AppendText, 1212
 AppendToPage, 678
 Application shutdown, 1523
 AreLongOptionsEnabled, 143
 argc, 32
 argv, 32
 Arrange, 777
 ArrangeIcons, 848
 Art provider sample, 1513
 AsIs, 735
 Assign, 470, 830
 AssignButtonsImageList, 1287
 AssignCwd, 470
 AssignDbTable, 337
 AssignDir, 470
 AssignHomeDir, 470
 AssignImageList, 777, 914, 1287
 AssignStateImageList, 1287
 AssignTempFileName, 471
 Associated non-class functions, 262
 AssociateTemplate, 392
 Astronomical/historical functions, 237
 Attach, 445, 453
 AttachUnknownControl, 1402

AutoSize, 561
 AutoSizeColOrRow, 590
 AutoSizeColumn, 561
 AutoSizeColumns, 561
 AutoSizeRow, 561
 AutoSizeRows, 562

—B—

Background: The need for conversion, 1538
 Background: The wxString class, 1538
 Basic IO, 1096
 Basic Regular Expressions, 1680
 BeforeFirst, 1169
 BeforeLast, 1169
 begin, 621
 BeginBatch, 562
 BeginContextHelp, 191
 BeginDrag, 416, 417
 BeginDrawing, 344
 BeginEdit, 599
 BeginFind, 623
 Below, 736
 BigEndianOrdered, 215, 223
 Bitmap format handlers, 1595
 Blit, 345
 BlockToDeviceRect, 584
 Blue, 148
 border, 1137
 bottom, 760
 Bracket Expressions, 1673
 Break, 861
 Broadcast, 171
 BuildDeleteStmt, 299
 BuildSelectStmt, 299, 301
 BuildUpdateStmt, 300
 Button, 900
 ButtonDClick, 901
 ButtonDown, 750, 901
 ButtonIsDown, 751
 ButtonUp, 751, 901

—C—

c_str, 1169
 C++ header file generation, 1589
 CalcBoundingBox, 347
 CalcMin, 89, 595, 1076, 1080
 CalcScrolledPosition, 1051
 CalcUnscrolledPosition, 1052
 Calendar calculations, 236
 Calendar sample, 1514
 Callback, 1097
 CallbackData, 1097
 CallEntry, 1251
 CallMethod, 63
 CancelDialing, 374
 CanConvert, 429
 CanCopy, 1213
 CanCut, 1213
 CanDragColSize, 562
 CanDragGridSize, 562

CanDragRowSize, 562
 CanEnableCellControl, 562
 CanGetValueAs, 613
 CanHandle, 1406
 CanHandleGZip, 1411, 1412
 CanHaveAttributes, 591, 615
 CanonicalizeName, 426
 CanonicalizePluginName, 426
 CanOpen, 485
 CanPaste, 1213
 CanRead, 651, 710
 CanRedo, 1213
 CanSelectForUpdate, 302
 CanSend, 704
 CanSetValueAs, 613
 CanUndo, 159, 166, 1213
 CanUpdate, 1307
 CanUpdateByROWID, 302
 CanVeto, 136
 CaptureMouse, 1343
 Cascade, 849
 Case conversion, 1162
 Catalog, 265
 Cells and Containers, 1653
 CellToRect, 563
 Center, 1343
 CenterOnParent, 1343
 CenterOnScreen, 1343
 Centre, 366, 523, 1343
 CentreOnParent, 1344
 CentreOnScreen, 1344
 centreX, 760
 centreY, 760
 Chain, 1400
 ChangePathTo, 483
 Character access, 1161
 CharsetToEncoding, 517
 ChDir, 537
 Check, 123, 338, 861, 871, 880, 1307
 CheckCommand, 536
 Checked, 164
 CheckForIntersection, 595
 Checklist sample, 1514
 CLASSINFO, 1466
 CleanupHandlers, 71, 710
 CleanupModules, 895
 clear, 621
 Clear, 50, 56, 134, 195, 347, 471, 614, 623, 764, 795, 1018, 1093, 1169, 1184, 1213, 1234, 1327
 ClearAll, 777
 ClearBackground, 1344
 ClearColumnImage, 799
 ClearCommands, 167
 ClearGrid, 563
 ClearHandlers, 1402
 ClearList, 1316
 ClearMemberVar, 303
 ClearMemberVars, 303
 ClearSel, 1088
 ClearSelection, 563
 ClearTicks, 1088

-
- ClearTraceMasks, 819
 - Clients, 60
 - ClientToScreen, 1345
 - Clone, 434, 554, 591, 600, 612, 1241, 1313
 - Close, 134, 266, 409, 445, 453, 888, 1098, 1231, 1323, 1345
 - CloseContainer, 687
 - CloseCursor, 304
 - CloseDocuments, 392
 - CloseOutput, 985
 - cMB2WC, 836
 - cMB2WX, 836
 - Cmp, 1170
 - CmpNoCase, 1170
 - Collapse, 1287
 - CollapseAndReset, 1288
 - Command, 193, 523
 - Commit, 1203
 - CommitTrans, 266
 - Common features, 1573
 - CompareTo, 1170
 - CompareVersion, 1402
 - Comparison, 1162
 - Comparison of wxString to other string classes, 1526
 - Comparison operators, 1181
 - Compatibility, 1534
 - Compile, 1015
 - Compilers, 1488
 - Compiling and using XRC, 1581
 - ComputeHistogram, 710
 - Concatenation, 1161
 - Config sample, 1514
 - Connect, 437, 1110
 - Constraint layout: more detail, 1570
 - Construction, 140
 - Construction and destruction, 1095
 - Constructor and destructor, 174, 889
 - Constructors, 1255
 - Constructors and assignment operators, 1161
 - Constructors and destructors, 45
 - Constructors and initialization, 559
 - Constructors, assignment operators and setters, 234
 - Contains, 1018, 1170
 - ControlDown, 605, 606, 608, 754, 901
 - Controls sample, 1514
 - Conversion to numbers, 1163
 - Convert, 429, 430
 - ConvertDialogToPixels, 1346
 - Converting buffers, 1540
 - Converting strings, 1539
 - ConvertPixelsToDialog, 1347
 - ConvertStringToArgs, 142
 - ConvertToBitmap, 710, 1018
 - ConvertToImage, 71
 - ConvertToMono, 711
 - ConvertToValidURI, 1312
 - ConvertYearToBC, 237
 - Copy, 156, 711, 1213, 1321
 - CopyFromBitmap, 697
 - CopyFromIcon, 71
 - copysting, 1437
 - CopyTo, 856
 - count, 621
 - Count, 50, 56, 304
 - CountTokens, 1186
 - Create, 71, 81, 85, 104, 108, 116, 120, 126, 153, 156, 180, 366, 373, 453, 496, 512, 523, 542, 551, 598, 658, 663, 711, 731, 770, 777, 833, 843, 849, 893, 914, 937, 941, 1000, 1005, 1046, 1052, 1064, 1069, 1088, 1118, 1121, 1130, 1139, 1141, 1143, 1145, 1147, 1195, 1214, 1231, 1244, 1250, 1265, 1327, 1334, 1338, 1393, 1645
 - CreateAbortWindow, 974
 - CreateBitmap, 61
 - CreateButtons, 960
 - CreateButtonSizer, 1580
 - CreateCanvas, 962
 - CreateChildren, 1406
 - CreateChildrenPrivately, 1406
 - CreateClient, 845
 - CreateContents, 659
 - CreateControlBar, 962
 - CreateCurrentFont, 687
 - CreateDocument, 392, 405
 - CreateGrid, 563
 - CreateHelpFrame, 654
 - CreateIndex, 305, 659
 - CreateInstance, 64
 - CreateLogTarget, 32
 - CreateObject, 127
 - CreateResFromNode, 1402, 1406
 - CreateResource, 1407
 - CreateSearch, 659
 - CreateStatusBar, 523
 - CreateTable, 307
 - CreateTempFileName, 471
 - CreateToolBar, 524
 - CreateView, 267, 392, 405
 - CrossHair, 347
 - Customization, 140, 817
 - Cut, 156, 1214
 - cWC2MB, 836
 - cWC2WX, 836, 837
 - cWX2MB, 836
 - cWX2WC, 837
- D—
- Data transfer, 1648
 - Database sample, 1515
 - Date arithmetics, 235, 1533
 - Date comparison, 235
 - Day, 226, 1257
 - Daylight saving time (DST), 1534
 - Days, 226, 1257
 - DB_STATUS, 307
 - Dbms, 268
 - DECLARE_ABSTRACT_CLASS, 1466
 - DECLARE_APP, 1467
 - DECLARE_CLASS, 1467
 - DECLARE_DYNAMIC_CLASS, 1467
-

-
- DecRef, 592
 - DecTo, 1070
 - Default constructors, 48
 - Deflate, 1008
 - delete, 925
 - Delete, 126, 195, 307, 624, 861, 955, 1184, 1244, 1288, 1316
 - Delete entries/groups, 178
 - DeleteAll, 180
 - DeleteAllItems, 777, 1195, 1288
 - DeleteAllPages, 914
 - DeleteAllViews, 409
 - DeleteChildren, 1288
 - DeleteCols, 563, 615
 - DeleteColumn, 778
 - DeleteContents, 624, 764
 - DeleteCursor, 308
 - DeleteEntry, 180
 - DeleteGroup, 180
 - DeleteItem, 778, 1195
 - DeleteMatching, 308
 - DeleteNode, 764
 - DeleteObject, 764
 - DeletePage, 915
 - DeleteRows, 564, 614
 - DeleteTool, 1271
 - DeleteToolByPos, 1272
 - DeleteWhere, 309
 - DeleteWindows, 1080
 - Deselect, 771
 - DeselectAll, 1327
 - Destroy, 600, 711, 862, 1098, 1347
 - DestroyChildren, 1348
 - DestroyClippingRegion, 347
 - Detach, 50, 427, 445, 453, 986, 1076
 - DetachSizer, 1080
 - DeviceToLogicalX, 347
 - DeviceToLogicalXRel, 347
 - DeviceToLogicalY, 347
 - DeviceToLogicalYRel, 348
 - Dial, 374
 - Dialogs sample, 1515
 - Dialup sample, 1515
 - Difference between wxDateSpan and wxTimeSpan, 1532
 - Different Flavors of REs, 1671
 - DirExists, 471, 472
 - DirName, 472
 - Disable, 1348
 - DisableAutoCheckOnlineStatus, 375
 - DisableCellEditControl, 564
 - DisableDragColSize, 564
 - DisableDragGridSize, 564
 - DisableDragRowSize, 564
 - DisableLongOptions, 143
 - DisassociateTemplate, 392
 - Discard, 1098, 1203
 - DiscardEdits, 1214
 - Disconnect, 188, 438
 - DispAllErrors, 268
 - Dispatch, 32
 - Display, 654, 659
 - Display format, 560
 - DisplayBlock, 627
 - DisplayContents, 627, 654, 659
 - DisplayContextPopup, 627
 - DisplayIndex, 654, 659
 - DisplaySection, 627
 - DisplayTextPopup, 628
 - DispNextError, 269
 - DnD sample, 1515
 - Do, 159
 - DoCreateResource, 1407
 - DoDefaultAction, 27
 - DoDragDrop, 422
 - DoDrawImage, 417
 - DoFindResource, 1402
 - DoGetBestSize, 589
 - DoLog, 820
 - DoLogString, 820
 - DoneParser, 665
 - DontCreateOnDemand, 180, 820
 - DoParsing, 665
 - DoQuantize, 995
 - DoUpdateWindowUI, 1348
 - DragAcceptFiles, 1348
 - Dragging, 901
 - Draw, 611, 634, 732
 - DrawArc, 348
 - DrawBitmap, 348
 - DrawBlankPage, 981
 - DrawCheckMark, 348
 - DrawCircle, 348
 - DrawEllipse, 349
 - DrawEllipticArc, 349
 - DrawHeaderButton, 1025
 - DrawIcon, 349
 - DrawInvisible, 634
 - DrawLine, 349
 - DrawLines, 349
 - DrawPoint, 351
 - DrawPolygon, 350
 - DrawPolyPolygon, 350
 - DrawRectangle, 351
 - DrawRotatedText, 351
 - DrawRoundedRectangle, 351
 - DrawSpline, 352
 - DrawSplitterBorder, 1025
 - DrawSplitterSash, 1025
 - DrawText, 352
 - DrawTreeItemButton, 1025
 - DrawXXX, 344
 - DropIndex, 310
 - DropTable, 310
 - DropView, 270
 - Dump, 338, 923
 - Dynamic sample, 1516
- E—**
- Edges and relationships, 734
 - EditLabel, 778, 1288
 - empty, 621
 - Empty, 50, 56, 1170
-

EmulateKeyPress, 1214
 Enable, 862, 871, 880, 1000, 1282, 1307, 1349
 EnableAutoCheckOnlineStatus, 375
 EnableCellEditControl, 564
 EnableDragColSize, 564
 EnableDragGridSize, 565
 EnableDragRowSize, 565
 EnableEditing, 565
 EnableEffects, 509
 EnableGridLines, 565
 EnableHelp, 929, 970
 EnableHolidayDisplay, 109
 EnableLongOptions, 143
 EnableMargins, 929
 EnableMonthChange, 109
 EnableOrientation, 930
 EnablePageNumbers, 970
 EnablePaper, 930
 EnablePrinter, 930
 EnablePrintToFile, 970
 EnableScrolling, 1052
 EnableSelection, 971
 EnableTool, 1272
 EnableTop, 872
 EnableYearChange, 109
 end, 621
 EndBatch, 565
 EndContextHelp, 192
 EndDoc, 352
 EndDrag, 418
 EndDrawing, 352
 EndDrawingOnTop, 1037
 EndEdit, 599
 EndEditLabel, 1289
 EndModal, 367
 EndPage, 353
 Enlarge, 955
 EnsureFileAccessible, 943
 EnsureVisible, 778, 1289
 Enter, 202
 Entering, 901
 Entry, 1244, 1250, 1251
 Enumerated types, 257
 EnumerateEncodings, 514
 EnumerateFacenames, 514
 Enumeration, 176
 Eof, 445, 454, 738, 1232
 Eq, 1321
 erase, 621
 Error, 1099
 Escapes, 1675
 EstimateTotalHeight, 1334
 Event macros summary, 1561
 Event sample, 1516
 EVT_COMMAND(id, event, func), 1561
 EVT_COMMAND_RANGE(id1, id2, event, func), 1561
 EVT_CUSTOM(event, id, func), 1561
 EVT_CUSTOM_RANGE(event, id1, id2, func), 1561
 Example, 1526, 1599
 Example 1: subwindow layout, 1571

Example 2: panel item layout, 1572
 Examples, 1648
 Except(ions) sample, 1516
 Exec sample, 1517
 ExecSql, 270
 Execute, 188
 Exists, 180, 377, 454, 988, 1231
 Exit, 895, 1245
 ExitMainLoop, 34
 Expand, 1289
 ExpandCommand, 491
 ExpandPath, 551
 explicit wxScopedPtr, 1041

—F—

fd, 454
 File name components, 468
 File name construction, 468
 File name format, 467
 File tests, 468
 FileExists, 472, 538
 FileHistoryAddFilesToMenu, 392, 393
 FileHistoryLoad, 393
 FileHistoryRemoveMenu, 393
 FileHistorySave, 393
 FileHistoryUseMenu, 393
 FileName, 472
 FileNameToURL, 484
 FillBuffer, 1158
 FillHandlersTable, 676
 FilterEvent, 32
 find, 622
 Find, 635, 765, 1171
 FindAbsoluteValidPath, 943
 FindById, 1272
 FindClass, 128
 FindColour, 152
 FindControl, 1273
 FindFirst, 484, 486
 FindFirstUnusedColour, 711
 FindFocus, 1349
 FindHandler, 72, 712
 FindHandlerMime, 712
 FindItem, 595, 778, 863, 873
 FindItemAtPoint, 595
 FindItemAtPosition, 595
 FindItemByPosition, 863
 FindItemWithData, 595
 FindLanguageInfo, 812
 FindMenu, 872
 FindMenuItem, 872
 FindName, 152
 FindNext, 484, 487
 FindOrCreateBrush, 96
 FindOrCreateFont, 515
 FindOrCreatePen, 951
 FindPageById, 656
 FindPageByName, 656
 FindResource, 1402
 FindString, 196, 1000
 FindTemplateForPath, 393

FindToolForPosition, 1273
 FindValidPath, 943
 FindWindow, 1349
 FindWindowById, 1350
 FindWindowByLabel, 1350
 FindWindowByName, 1350
 First, 1171
 Fit, 589, 1076, 1351
 FitInside, 1076, 1351
 FitToPage, 1394
 Fixed, 1158
 FloodFill, 353
 Flush, 134, 181, 446, 454, 820
 Flushable, 1158
 FlushActive, 821
 FlushBuffer, 1158
 Focus, 799
 Font sample, 1517
 ForceRefresh, 565
 Format, 250, 290, 1171, 1257
 FormatDate, 251
 FormatISODate, 251
 FormatISOTime, 251
 FormatTime, 251
 Formatting time spans, 1256
 Found, 145, 146
 fp, 445
 Free, 211
 FreeHenv, 293
 Freeze, 1351
 Freq, 1171
 From, 311
 FromAscii, 1171, 1172

—G—

get, 1039, 1041
 Get, 181, 517, 624, 632, 1025, 1403
 Get3StateValue, 120
 GetAcceleratorTable, 1351
 GetAccessible, 1351
 GetActive, 31
 GetActiveChild, 850
 GetActiveTarget, 819
 GetActualColor, 687
 GetAdjustedBestSize, 1352
 GetAlign, 687, 795
 GetAlignHor, 639
 GetAlignment, 593, 996, 1031, 1205
 GetAlignVer, 639
 GetAllEquivalents, 431
 GetAllFiles, 378
 GetAllFormats, 219
 GetAllowSymbols, 510
 GetAllPages, 971
 GetAllParams, 671
 GetAlpha, 713
 GetAltForEncoding, 517
 GetAmPmStrings, 238
 GetAnchor, 486, 533
 GetAppName, 32, 181
 GetAsDOS, 247

GetAt, 955
 GetAttr, 111, 616
 GetAttrProvider, 615
 GetAuthStr, 293
 GetAuto3D, 33
 GetBackground, 353
 GetBackgroundColour, 114, 593, 640, 795, 880, 1205, 1352
 GetBackgroundMode, 353
 GetBaseClassName1, 128
 GetBaseClassName2, 128
 GetBatchCount, 565
 GetBeginDST, 238
 GetBeginPos, 671
 GetBestSize, 612, 1352
 GetBezelFace, 542
 GetBitmap, 62, 84, 880, 1139, 1399, 1407
 GetBitmapDisabled, 81
 GetBitmapFocus, 81
 GetBitmapLabel, 82
 GetBitmapSelected, 82
 GetBlinkTime, 116
 GetBlue, 713
 GetBookRecArray, 657
 GetBool, 1316, 1407
 GetBorder, 114, 1081
 GetBorderColour, 114
 GetBottom, 1008
 GetBottomRight, 1009
 GetBottomRightCoords, 606
 GetBottomRow, 607
 GetBoundingRect, 1289
 GetBox, 1018, 1019
 GetBrush, 353
 GetBufferEnd, 1157
 GetBufferPos, 1157
 GetBufferStart, 1157
 GetButton, 901
 GetButtonChange, 751
 GetButtonsImageList, 1289
 GetButtonState, 744, 751
 GetC, 738
 GetCacheFrom, 793
 GetCacheTo, 793
 GetCanvas, 981
 GetCap, 947
 GetCapture, 1352
 GetCapturedWindow, 897
 GetCaret, 1352
 GetCatalog, 271
 GetCellAlignment, 566
 GetCellBackgroundColour, 566
 GetCellEditor, 566
 GetCellFont, 566
 GetCellRenderer, 566
 GetCellSize, 596
 GetCellTextColour, 566
 GetCellTextFont, 588
 GetCellValue, 567
 GetCentury, 239
 GetChar, 1155, 1172, 1316
 GetCharHeight, 354, 687, 1352

GetCharWidth, 354, 687, 1353
GetChecked, 1307
GetCheckPrevious, 338
GetChild, 27
GetChildCount, 27
GetChildren, 1353
GetChildrenCount, 1290
GetChooseFull, 150
GetChosenFont, 510
GetClassDefaultAttributes, 1353
GetClassInfo, 923
GetClassName, 33, 128
GetClientAreaOrigin, 525
GetClientData, 132, 164, 196, 439, 1099, 1113
GetClientObject, 132, 164, 196, 439
GetClientSize, 849, 1353
GetClientWindow, 850
GetClippingBox, 354
GetCol, 545, 603, 605
GetColDefs, 311
GetColLabelAlignment, 567
GetColLabelSize, 567
GetColLabelValue, 567, 615
GetCollate, 963, 971
GetColLeft, 590
GetColMinimalAcceptableWidth, 579
GetColMinimalWidth, 591
GetColour, 92, 150, 510, 947, 964, 1190, 1407
GetColourData, 153
GetColRight, 590
GetCols, 586, 617
GetColSize, 567
GetColspan, 548
GetColumn, 779, 793, 795
GetColumnCount, 272, 779
GetColumns, 126, 272
GetColumnWidth, 587, 779
GetColWidth, 590
GetCommand, 18
GetCommandProcessor, 409
GetCommands, 167
GetConstraints, 1354
GetContainer, 687
GetContainingSizer, 1354
GetContents, 657
GetContentsCnt, 657
GetContentType, 994
GetControl, 603
GetCount, 51, 56, 197, 384, 625, 765, 955, 1001, 1290, 1316
GetCountPerPage, 779
GetCountry, 238
GetCPUCount, 1245
GetCurFileSystem, 1407
GetCurFocus, 1195
GetCurrentCurve, 955
GetCurrentDocument, 394
GetCurrentId, 1245
GetCurrentLine, 1232
GetCurrentMonth, 238
GetCurrentPage, 981, 1394
GetCurrentTip, 1262
GetCurrentView, 394
GetCurrentYear, 238
GetCursor, 312, 1354
GetCursorColumn, 586
GetCursorRow, 586
GetCustomColour, 150
GetCwd, 472
GetDashes, 947
GetData, 134, 211, 273, 424, 496, 660, 713, 794, 795, 911, 1172, 1183, 1316
GetDatabaseName, 275
GetDataHere, 219, 222
GetDataLeft, 1159
GetDataSize, 219, 222
GetDatasourceName, 275
GetDate, 109, 114
GetDay, 245
GetDayOfYear, 246
GetDays, 226, 1257
GetDb, 312
GetDC, 432, 688, 977
GetDebugMode, 339
GetDefault, 1025
GetDefaultAction, 27
GetDefaultAttributes, 1354
GetDefaultCellAlignment, 568
GetDefaultCellBackgroundColour, 568
GetDefaultCellFont, 568
GetDefaultCellTextColour, 568
GetDefaultColLabelSize, 568
GetDefaultColSize, 568
GetDefaultDir, 293
GetDefaultEditor, 568
GetDefaultEditorForCell, 585
GetDefaultEditorForType, 585
GetDefaultEncoding, 504
GetDefaultExtension, 405
GetDefaultInfo, 931
GetDefaultItem, 941
GetDefaultMinMargins, 930
GetDefaultPath, 551
GetDefaultRenderer, 569
GetDefaultRendererForCell, 585
GetDefaultRendererForType, 586
GetDefaultRowLabelSize, 569
GetDefaultRowSize, 569
GetDefaultSize, 104, 1144
GetDefaultStyle, 1214
GetDepth, 73, 384, 697
GetDescent, 635
GetDescription, 27, 294, 406, 490
GetDialog, 494
GetDimension, 1407
GetDirCount, 472
GetDirection, 1397
GetDirectory, 406, 460
GetDirList, 539
GetDirs, 473
GetDispatchPtr, 64
GetDividerPen, 589
GetDllExt, 386
GetDocument, 389, 399, 1324

GetDocumentManager, 406, 410, 1324
GetDocumentName, 406, 410
GetDocuments, 394
GetDocumentTemplate, 410
GetDocumentWindow, 410
GetDouble, 1317
GetDragRect, 1029
GetDragStatus, 1029
GetDropTarget, 1355
GetDsn, 294
GetDuplex, 964
GetEdge, 1028
GetEditable, 588
GetEditControl, 779, 1290
GetEditInPlace, 589
GetEditMenu, 167
GetEditor, 594
GetEmptyCellSize, 596
GetEnabled, 1307
GetEnableEffects, 510
GetEnableHelp, 931
GetEnableMargins, 930
GetEnableOrientation, 930
GetEnablePaper, 930
GetEnablePrinter, 930
GetEncoding, 518
GetEncodingConverter, 688
GetEncodingDescription, 518
GetEncodingFromName, 518
GetEncodingName, 518
GetEncodings, 514
GetEndDST, 239
GetEndPos, 546
GetEndPos1, 671
GetEndPos2, 672
GetEndX, 952
GetEndY, 952
GetEntryType, 181
GetEOL, 1232
GetError, 993, 1311
GetErrorStream, 986
GetEvent, 661
GetEventHandler, 1355
GetEventObject, 434
GetEventType, 434
GetEvtHandlerEnabled, 439
GetExcludeList, 1241
GetExitCode, 990
GetExitOnFrameDelete, 33
GetExt, 473
GetExtension, 86, 727
GetExtensions, 490
GetExtraLong, 164
GetExtraStyle, 1355
GetFaceName, 504
GetFacenames, 514
GetFamily, 505
GetFieldRect, 1148
GetFieldsCount, 1148
GetFileFilter, 406
GetFileHistory, 394
GetFilename, 410, 460
GetFileNames, 457, 460
GetFilePath, 551
GetFiles, 420
GetFileSize, 538
GetFilesList, 539
GetFileSystem, 663
GetFileType, 294
GetFileTypeFromExtension, 890
GetFileTypeFromMimeType, 890
GetFilter, 552
GetFilterIndex, 460, 552
GetFilterListCtrl, 552
GetFindString, 493, 495
GetFirst, 312, 378, 765
GetFirstCell, 640
GetFirstChild, 1290
GetFirstEntry, 182
GetFirstGroup, 181
GetFirstLine, 1232
GetFirstSelected, 799, 1327
GetFirstView, 410
GetFirstVisibleItem, 1290
GetFirstVisibleLine, 1334
GetFlag, 1081
GetFlags, 19, 106, 406, 493, 495, 996, 1099, 1206, 1403
GetFlexibleDirections, 498
GetFocus, 27
GetFocusedItem, 799
GetFont, 114, 354, 593, 795, 881, 1191, 1205, 1355, 1407
GetFontBold, 688
GetFontData, 513
GetFontFace, 688
GetFontFixed, 688
GetFontItalic, 688
GetFontSize, 688
GetFontUnderlined, 688
GetForbiddenChars, 473
GetForce, 137
GetForegroundColour, 1355
GetFormat, 221, 473
GetFormatCount, 219
GetFrame, 828, 981, 1324
GetFrameParameters, 628
GetFromClause, 312
GetFromPage, 971
GetFromPoint, 384
GetFS, 665
GetFullName, 473
GetFullPath, 473
GetGeneric, 1025
GetGeometry, 384
GetGrandParent, 1356
GetGreen, 714
GetGridCursorCol, 569
GetGridCursorRow, 569
GetGridLineColour, 569
GetH, 1022
GetHandle, 1356
GetHandlers, 73, 715
GetHDBC, 275

GetHeader, 693
GetHeaderColourBg, 109
GetHeaderColourFg, 109
GetHeight, 73, 636, 697, 715, 1008, 1071
GetHelp, 632, 881
GetHelpController, 630
GetHelpString, 864, 873
GetHelpText, 27, 1356
GetHenv, 294
GetHENV, 275
GetHGap, 617
GetHi, 830
GetHighlightColourBg, 110
GetHighlightColourFg, 110
GetHistoryFile, 465
GetHistoryFilesCount, 394
GetHolidayColourBg, 110
GetHolidayColourFg, 110
GetHomeDir, 473
GetHour, 245
GetHours, 1258
GetHref, 662
GetHSTMT, 275
GetHtmlCell, 661
GetIcon, 62, 490, 701, 1408
GetId, 213, 434, 636, 795, 881, 984, 1245, 1304, 1356
GetID, 1408
GetImage, 794, 796
GetImageCount, 714, 727, 732
GetImageExtWildcard, 713
GetImageList, 780, 915, 1195, 1291
GetImageRect, 418
GetIncludeList, 1241
GetIndent, 640, 1291
GetIndentUnits, 640
GetIndex, 657, 793
GetIndexCnt, 657
GetInitialFont, 510
GetInputEncoding, 689
GetInputStream, 540, 692, 986, 992, 1311
GetInsertionPoint, 156, 1214
GetInstance, 64
GetInt, 164
GetInternalRepresentation, 678
GetInterval, 1253, 1255
GetIntPosition, 1158
GetISPNames, 373
GetItem, 780, 794, 1302
GetItemBackgroundColour, 780, 1291
GetItemCount, 780, 1195, 1328
GetItemData, 780, 1196, 1291
GetItemFont, 1291
GetItemImage, 1196, 1292
GetItemParent, 1293
GetItemPosition, 596, 781
GetItemRect, 781, 1196
GetItemSelectedImage, 1294
GetItemSpacing, 781
GetItemSpan, 596
GetItemState, 781
GetItemText, 781, 1196, 1292
GetItemTextColour, 781, 1292
GetJDN, 254
GetJoin, 947
GetJoystick, 751
GetJulianDayNumber, 254
GetKeyboardShortcut, 28
GetKeyCode, 19, 755, 793, 1302
GetKeyEvent, 1302
GetKeyFields, 275
GetKind, 881
GetLabel, 104, 194, 793, 864, 873, 881, 1001, 1146, 1303, 1357
GetLabelAlignment, 588
GetLabelBackgroundColour, 569
GetLabelFont, 570
GetLabelFromText, 881
GetLabelSize, 588
GetLabelTextColour, 570
GetLabelTop, 874
GetLabelValue, 588
GetLanguage, 812
GetLanguageInfo, 812
GetLanguageName, 813
GetLast, 313, 765
GetLastAccess, 1158
GetLastChild, 1292
GetLastDirectory, 394
GetLastError, 974, 1152
GetLastLine, 1233
GetLastMonthDay, 253
GetLastPosition, 156, 1215
GetLastResult, 536
GetLastVisibleLine, 1334
GetLastWeekDay, 253
GetLeft, 1008
GetLeftCol, 607
GetLeftIndent, 1205
GetLeftLocation, 486
GetLeftSubIndent, 1205
GetLevel, 339
GetLine, 1231
GetLineCount, 1231, 1334
GetLineLength, 1215
GetLineSize, 1088
GetLinesPerAction, 902
GetLineText, 1215
GetLineType, 1233
GetLink, 636, 689
GetLinkColor, 689
GetLo, 831
GetLocal, 1099
GetLocale, 813
GetLocation, 28, 534
GetLoggingOff, 137
GetLogicalFunction, 354
GetLogicalPosition, 902
GetLogLevel, 821
GetLong, 1317, 1408
GetLongPath, 473
GetManufacturerId, 744
GetMapMode, 354
GetMarginBottomRight, 931

GetMargins, 1274, 1328
GetMarginTopLeft, 931
GetMarginWidth, 882
GetMask, 73, 794, 796
GetMaskBlue, 715
GetMaskGreen, 715
GetMaskRed, 715
GetMatch, 1015
GetMatchCount, 1015
GetMax, 1088, 1118, 1122
GetMaxCommands, 167
GetMaxDocsOpen, 394
GetMaxFiles, 465
GetMaximumSizeX, 1034
GetMaximumSizeY, 1034
GetMaxPage, 971, 982
GetMenu, 874
GetMenuBar, 525
GetMenuCount, 874
GetMenuId, 879
GetMenuItemCount, 864
GetMenuItems, 864
GetMessage, 381, 460
GetMetric, 1192
GetMillisecond, 245
GetMilliseconds, 1258
GetMimeType, 489, 490, 534, 727
GetMimeTypeFromExt, 486
GetMin, 1088, 1118, 1122
GetMinimumPaneSize, 1131
GetMinimumSizeX, 1034
GetMinimumSizeY, 1034
GetMinMarginBottomRight, 931
GetMinMarginTopLeft, 931
GetMinPage, 971, 982
GetMinSize, 1077, 1081
GetMinute, 245
GetMinutes, 1258
GetMJD, 254
GetMode, 704, 1308
GetModificationTime, 474, 534
GetModifiedJulianDayNumber, 254
GetMonth, 245
GetMonthName, 239
GetMonths, 226
GetMovementThreshold, 744
GetName, 28, 86, 160, 378, 385, 474, 672, 727, 813, 882, 1234, 1317, 1357, 1408
GetNativeFontInfoDesc, 505
GetNewCursor, 313
GetNext, 276, 313, 378, 636, 911, 1399
GetNextChild, 1292
GetNextEntry, 182
GetNextError, 276
GetNextGroup, 182
GetNextHandler, 440
GetNextItem, 782
GetNextLine, 1233
GetNextSelected, 800, 1328
GetNextSibling, 1293
GetNextToken, 1186
GetNextVisible, 1293
GetNextWeekDay, 252
GetNoCopies, 964, 971
GetNodeContent, 1408
GetNoHistoryFiles, 465
GetNonFlexibleGrowMode, 498
GetNotebook, 921
GetNumberAxes, 745
GetNumberButtons, 745
GetNumberCols, 570, 613
GetNumberJoysticks, 745
GetNumberOfColumns, 314
GetNumberOfDays, 239
GetNumberOfEntries, 182
GetNumberOfFiles, 420
GetNumberOfGroups, 182
GetNumberOfLines, 1216
GetNumberRows, 570, 613
GetObject, 64
GetOffsetY, 952
GetOldItem, 1303
GetOldLog, 823
GetOldSelection, 919
GetOpenCommand, 490
GetOpenedAnchor, 679
GetOpenedPage, 679
GetOpenedPageTitle, 679
GetOptimization, 354
GetOption, 716, 1188
GetOptionInt, 717, 1188
GetOrCreateCellAttr, 591
GetOrderByClause, 314
GetOrientation, 89, 964, 996, 1031, 1060, 1061
GetOutputEncoding, 689
GetOutputStream, 539, 986
GetPage, 915, 1397
GetPageAreaSizer, 1394
GetPageCount, 915
GetPageImage, 915
GetPageInfo, 977
GetPageSetupData, 650, 928
GetPageSize, 1047, 1089, 1395
GetPageSizeMM, 978
GetPageSizePixels, 978
GetPageText, 915
GetPalette, 73, 715
GetPaperId, 931, 964
GetPaperSize, 931
GetParam, 146, 672
GetParamAsColour, 673
GetParamAsInt, 673
GetParamCount, 146
GetParamNode, 1408
GetParamValue, 1408
GetParent, 28, 636, 1293, 1357
GetPartialTextExtents, 355
GetPassword, 277, 294
GetPath, 182, 381, 460, 474, 484, 551, 1310
GetPaths, 461
GetPathSeparator, 474
GetPathSeparators, 474
GetPeer, 1099
GetPen, 355

GetPid, 990
GetPixel, 148, 355, 938
GetPlatformEquivalents, 430
GetPoint, 793, 1303
GetPointSize, 505
GetPollingMax, 745
GetPollingMin, 745
GetPos, 546
GetPosition, 116, 420, 605, 608, 631, 745, 751, 756, 902, 906, 1008, 1060, 1061, 1077, 1081, 1123, 1186, 1357, 1408
GetPosX, 636
GetPosY, 636
GetPOVCTSPosition, 746
GetPOVPosition, 746
GetPPI, 355
GetPPIPrinter, 978
GetPPIScreen, 978
GetPrecision, 610
GetPreferredFormat, 219
GetPrev, 314, 1398
GetPrevious, 911
GetPreviousHandler, 440
GetPrevLine, 1233
GetPrevSibling, 1293
GetPrevVisible, 1294
GetPrevWeekDay, 252
GetPrintableName, 410
GetPrintCommand, 491
GetPrintData, 650, 932, 971, 982
GetPrintDC, 969
GetPrintDialogData, 969, 975
GetPrinterName, 964
GetPrintout, 982
GetPrintoutForPrinting, 982
GetPrintPreview, 960
GetPrintToFile, 972
GetPriority, 1245
GetProduct, 666
GetProductId, 745
GetProductName, 745
GetProgramHandle, 387
GetProperty, 65
GetProportion, 1081
GetProtocol, 486, 1310
GetProtocolName, 1310
GetQuality, 964
GetQueryTableName, 315
GetRange, 543, 1047, 1216
GetRataDie, 254
GetRatio, 1081
GetRawKeyCode, 755
GetRawKeyFlags, 755
GetRect, 106, 1022, 1358
GetRed, 716
GetRedoAccelerator, 167
GetRedoMenuLabel, 167
GetRefData, 923
GetRelatedFrame, 679
GetRenderer, 593
GetReplaceString, 493, 495
GetRequestedLength, 996
GetResolution, 958
GetResponse, 692
GetReturnCode, 367
GetRight, 1009
GetRightCol, 607
GetRightIndent, 1205
GetRightLocation, 486
GetRole, 28
GetRootId, 552
GetRootItem, 1294
GetRow, 545, 603, 605
GetRowBottom, 590
GetRowCount, 915, 1196
GetRowHeight, 590
GetRowLabelAlignment, 570
GetRowLabelSize, 570
GetRowLabelValue, 570, 615
GetRowMinimalAcceptableHeight, 583
GetRowMinimalHeight, 591
GetRowNum, 315
GetRowOrCol, 609
GetRows, 586, 617
GetRowSize, 571
GetRowspan, 548
GetRowTop, 590
GetRudderMax, 746
GetRudderMin, 746
GetRudderPosition, 746
GetSashPosition, 1126, 1131
GetSashVisible, 1034
GetScrollPixelsPerUnit, 1053
GetScrollPos, 1358
GetScrollPosX, 586
GetScrollPosY, 587
GetScrollRange, 1358
GetScrollThumb, 1358
GetSecond, 245
GetSeconds, 1258
GetSelectedCells, 571
GetSelectedCols, 571
GetSelectedCount, 1328
GetSelectedItemCount, 783
GetSelectedRows, 571
GetSelectedTextBgColour, 663
GetSelectedTextColour, 663
GetSelection, 165, 197, 915, 920, 972, 1001, 1067, 1196, 1216, 1294, 1329
GetSelectionBackground, 585, 1329
GetSelectionBlockBottomRight, 571
GetSelectionBlockTopLeft, 571
GetSelectionClientData, 1067
GetSelectionForeground, 585
GetSelectionMode, 571
GetSelections, 28, 771, 1294
GetSelEnd, 1089
GetSelStart, 1089
GetSessionEnding, 137
GetSetChecked, 1308
GetSetEnabled, 1308
GetSetText, 1308
GetShadowWidth, 543
GetShortPath, 475

GetShowHelp, 510
GetSize, 116, 128, 201, 211, 355, 732, 997,
1009, 1072, 1076, 1081, 1153, 1359, 1409
GetSizeMM, 356
GetSizer, 1081, 1359
GetSkipped, 434
GetSocket, 1113
GetSocketEvent, 1113
GetSource, 666
GetSpacer, 1081
GetSpan, 546, 547
GetSplashStyle, 1125
GetSplashWindow, 1125
GetSplitMode, 1131
GetSplitterParams, 1026
GetStartX, 953
GetStartY, 953
GetState, 29, 796
GetStateImageList, 1295
GetStaticBox, 1142
GetStatusBar, 525
GetStatusBarPane, 525
GetStatusText, 1148
GetStipple, 92, 947
GetStream, 339, 534
GetStreamBuf, 339
GetString, 165, 197, 601, 813, 1002, 1186, 1317
GetStringSelection, 197, 1001, 1067, 1217
GetStyle, 92, 381, 461, 505, 948, 1217, 1241,
1409
GetSubBitmap, 74
GetSubImage, 716
GetSubMenu, 882
GetSupportedEncodingsCount, 518
GetSupportedTags, 675
GetSymbol, 387, 427
GetSysName, 812, 814
GetSystemEncoding, 814
GetSystemEncodingName, 814
GetSystemLanguage, 814
GetTable, 572
GetTableCount, 277
GetTableName, 315
GetTablePath, 315
GetTabs, 1205
GetTarget, 662
GetText, 794, 796, 882, 1226, 1308, 1409
GetTextBackground, 356
GetTextColour, 114, 593, 783, 796, 882, 1206
GetTextExtent, 356, 1359
GetTextForeground, 357
GetTextLength, 1226
GetThread, 1250
GetThumbLength, 1089
GetThumbPosition, 1047
GetThumbSize, 1047
GetTickFreq, 1090
GetTicks, 244
GetTimeout, 1125
GetTimes, 475
GetTimestamp, 434, 822
Getting results, 141
Getting started: a simple example, 1617
GetTip, 1261, 1283
GetTitle, 367, 411, 525, 865, 979, 1360
GetTm, 244
GetToolBar, 526, 850
GetToolBitmapSize, 1273
GetToolClientData, 1274
GetToolEnabled, 1274
GetToolLongHelp, 1274
GetToolPacking, 1275
GetToolPos, 1275
GetToolSeparation, 1275
GetToolShortHelp, 1275
GetToolSize, 1273
GetToolState, 1276
GetToolTip, 1360
GetTop, 1009
GetToPage, 972
GetTopItem, 783
GetTopLeft, 1008
GetTopLeftCoords, 607
GetTopRow, 607
GetTopWindow, 33
GetTotalDays, 226
GetTotalHeight, 647
GetTraceMasks, 819
GetTreeCtrl, 552
GetType, 86, 213, 727, 1317, 1321
GetTypeName, 613
GetUid, 294
GetUMax, 746
GetUMin, 746
GetUnderlined, 505
GetUndoAccelerator, 167
GetUndoMenuLabel, 168
GetUnitsPerValue, 956
GetUpdateInterval, 1308
GetUpdateRegion, 1361
GetUPosition, 746
GetUseBestVisual, 34
GetUserData, 1082
GetUserID, 294
GetUsername, 277
GetUserScale, 357
GetValidator, 1361
GetValue, 29, 120, 157, 543, 613, 831, 1005,
1090, 1119, 1122, 1217, 1229, 1258, 1265
GetValueAsBool, 613
GetValueAsCustom, 614
GetValueAsDouble, 613
GetValueAsLong, 613
GetValueClassInfo, 1321
GetVendorName, 34, 183
GetVerbose, 821
GetVersion, 1026, 1403
GetVGap, 617
GetView, 389, 399, 614
GetViewHeight, 587
GetViewName, 406, 1324
GetViewRect, 783
GetViews, 411
GetViewStart, 1053

GetViewWidth, 587
GetVirtualSize, 1054, 1361
GetVMax, 747
GetVMin, 747
GetVoidPtr, 1317
GetVolume, 475
GetVolumeSeparator, 475
GetVPosition, 747
GetW, 1022
GetWeek, 253
GetWeekDay, 115, 245, 252
GetWeekDayInSameWeek, 251
GetWeekDayName, 239
GetWeekOfMonth, 246
GetWeekOfYear, 246
GetWeeks, 227, 1258
GetWeight, 506
GetWheelDelta, 902
GetWheelRotation, 902
GetWhereClause, 316
GetWidth, 74, 610, 637, 697, 716, 797, 948,
1009, 1022, 1070
GetWildcard, 461
GetWindow, 29, 117, 689, 1082, 1283, 1313
GetWindow1, 1131
GetWindow2, 1131
GetWindowBeingRemoved, 1127
GetWindowMenu, 850
GetWindowStyleFlag, 1361
GetWindowVariant, 1361
GetWritableChar, 1172
GetWriteBuf, 1172
GetWxObjectPtr, 1317
GetX, 755, 903, 1009, 1022, 1127
GetXMax, 747
GetXMin, 747, 748
GetXRCID, 1403
GetY, 755, 903, 952, 1009, 1022, 1127
GetYear, 245
GetYearDay, 254
GetYears, 227
GetYMax, 747
GetYMin, 747
GetZMax, 747
GetZoom, 956
GetZoomControl, 961
GetZPosition, 748, 752
GiveFeedback, 422
GoToLine, 1232
Grant, 277
Green, 148
Grid sample, 1517
GridLinesEnabled, 569
GuessType, 1233
GUI system, 1486

—H—

HandleEvent, 41
HandleReturn, 600
HandleTag, 675
Handling socket events, 1096

HangUp, 375
Hardware architectures, 1488
HasAlignment, 593
HasAlpha, 716
HasBackgroundColour, 113, 593, 1206
HasBorder, 113, 1034
HasBorderColour, 113
HasCapture, 1362
HasEditor, 593
HasEnding, 673
HasEntry, 183
HasExt, 475
HasFiles, 378
HasFont, 113, 593, 1206
HasGroup, 183
HasMask, 716
HasModifiers, 756
HasMoreTokens, 1186
HasMultipleSelection, 1329
HasName, 475
HasNextPage, 1395
HasOption, 717, 1189
HasPage, 979
HasParam, 673, 1409
HasPOV, 748
HasPOV4Dir, 748
HasPOVCTS, 748
HasPrevPage, 1395
HasRange, 601
HasRenderer, 593
HasRudder, 748
HasStream, 340
HasSubDirs, 378
HasTextColour, 113, 593, 1206
HasU, 748
HasV, 748
HasVolume, 476
HasZ, 748
HaveRects, 1022
height, 760, 1007
Help Files Format, 1651
Helper functions, 889
Hide, 117, 418, 1362
HideCellEditControl, 572
Hiding controls using sizers, 1575
HistoryBack, 679
HistoryCanBack, 679
HistoryCanForward, 679
HistoryClear, 680
HistoryForward, 680
HitTest, 29, 111, 783, 916, 1196, 1217, 1295,
1335
Hostname, 740, 742
Hour, 1258
Hours, 1258
How events are processed, 1556
How the wxGrid classes relate to each other,
1618
HTML Printing, 1651
HTML samples, 1517



- Iconize, 367, 526
- Iconized, 703
- identifiers, 1559
- Identifying art resources, 59
- Image sample, 1518
- IMPLEMENT_ABSTRACT_CLASS, 1468
- IMPLEMENT_ABSTRACT_CLASS2, 1468
- IMPLEMENT_APP, 1468
- IMPLEMENT_CLASS, 1469
- IMPLEMENT_CLASS2, 1469
- IMPLEMENT_DYNAMIC_CLASS, 1469
- IMPLEMENT_DYNAMIC_CLASS2, 1469
- IncRef, 592
- IncTo, 1071
- Index, 51, 56, 1172
- IndexOf, 765, 911
- Inflate, 1009
- InheritAttributes, 1362
- Init, 98, 428, 551, 814, 895
- InitAllHandlers, 1403
- InitColWidths, 590
- InitDialog, 941, 1362
- Initialization functions, 889
- Initialize, 168, 394, 626, 962, 1131
- InitializeClasses, 128
- InitializeModules, 895
- InitParser, 666
- InitRowHeights, 589
- InitStandardHandlers, 74, 717
- Input Filters, 1653
- insert, 622
- Insert, 51, 56, 198, 316, 765, 865, 874, 1077, 1317, 1645
- InsertCell, 640
- InsertCheckItem, 865
- InsertCols, 572, 615
- InsertColumn, 784
- InsertControl, 1276
- InsertDir, 476
- InsertHandler, 74, 717
- InsertItem, 784, 1197, 1295
- InsertItems, 771
- InsertLine, 1234
- InsertPage, 916
- InsertRadioItem, 865
- InsertRows, 572, 614
- InsertSeparator, 865, 1276
- InsertTool, 1276
- Inside, 1010
- Internat(ionalization) sample, 1518
- InterruptWait, 1099
- Intersect, 1019
- Intersects, 547, 1010
- Introduction, 1526, 1531, 1555, 1563, 1617
- Invoke, 65
- IPAddress, 741, 742
- Is3rdStateAllowedForUser, 120
- Is3State, 121
- IsAbsolute, 476
- IsAlive, 1246
- IsAllowed, 922
- IsAllowedTraceMask, 822
- IsAlwaysOnline, 375
- IsAnotherRunning, 1069
- IsAscii, 1173
- IsBetween, 247
- IsBold, 1296
- IsButton, 752, 903
- IsCaseSensitive, 476
- IsCellEditControlEnabled, 572
- IsCheckable, 882
- IsChecked, 121, 124, 165, 866, 875, 882
- IsColNull, 317
- IsColor, 385
- IsColour, 385
- IsCommandEvent, 435
- IsCompatible, 1027
- IsConnected, 1100
- IsConnectedEvent, 372
- IsCreated, 598
- IsCurrent, 1329
- IsCurrentCellReadOnly, 572
- IsCursorClosedOnCommit, 317
- IsData, 1100
- IsDefault, 1206
- IsDetached, 1246
- IsDialing, 374
- IsDir, 476
- IsDisconnected, 1100
- IsDST, 255
- IsDSTApplicable, 240
- IsEarlierThan, 247
- IsEditable, 573, 1218
- IsEditCancelled, 794, 1303
- IsEmpty, 51, 57, 198, 766, 1019, 1173
- IsEmptyCell, 613
- IsEnabled, 866, 875, 882, 1362
- IsEncodingAvailable, 519
- IsEnding, 674
- IsEqualTo, 247, 1258
- IsEqualUpTo, 248
- IsErrorAvailable, 986
- IsExpanded, 1296
- IsExpandingEnvVars, 183
- IsExposed, 1363
- IsFixedWidth, 504
- IsFullScreen, 526
- IsFullySpecified, 1070
- IsFwdOnlyCursors, 271, 278
- IsGregorianDate, 246
- IsHoliday, 113
- isHotSensitive, 1137
- IsIconInstalled, 1200
- IsIconized, 368, 526
- IsInputAvailable, 987
- IsInputOpened, 987
- IsInSelection, 573
- IsInside, 1012
- IsKindOf, 128, 924
- IsLaterThan, 247
- IsLeapYear, 240
- IsLoaded, 427, 816

IsLocalHost, 742
 IsLongerThan, 1259
 IsMain, 1246
 IsMaximized, 526
 IsModal, 368
 IsModified, 411, 1218
 IsMove, 752
 IsMultiLine, 1218
 IsNegative, 1259
 IsNull, 1173, 1259, 1318
 IsNumber, 1173
 IsOfClass, 1409
 IsOfType, 890
 IsOk, 117, 171, 373, 476, 702, 749, 816, 910,
 1152, 1200, 1338
 IsOneShot, 1253
 IsOnline, 375
 IsOpen, 279
 IsOpened, 134, 379, 446, 454, 1202, 1231
 IsOwnEvent, 372
 IsPageScroll, 903
 IsPassingMessages, 823
 IsPathSeparator, 476
 IsPaused, 1246
 IsPlaying, 1338
 IsPopup, 879
 IsPositive, 1259
 IsPreview, 979
 IsPrimary, 385
 IsQueryOnly, 317
 IsReadOnly, 573, 594
 IsRecordingDefaults, 183
 IsRelative, 476
 IsRetained, 1055, 1363
 IsRunning, 1246, 1253
 IsSameAs, 1173
 IsSameDate, 247
 IsSameTime, 248
 IsSelected, 800, 1296, 1329
 IsSelection, 165, 573
 IsSeparator, 883
 IsShorterThan, 1259
 IsShown, 1082, 1363
 IsSingleLine, 1218
 IsSizer, 1082
 IsSpacer, 1082
 IsSplit, 1132
 IsStrictlyBetween, 247
 IsSupported, 135
 IsTopLevel, 1363
 IsType, 1318
 IsValid, 244, 1015
 IsValueKindOf, 1318
 IsVertical, 543, 1144
 IsVisible, 117, 406, 573, 1296, 1335
 IsWestEuropeanCountry, 240
 IsWindow, 1082
 IsWord, 1173
 IsWorkDay, 246
 IsZMove, 752
 Item, 52, 57, 766
 ItemHasChildren, 1296

—K—

Key access, 177
 Keyboard and mouse actions, 1618
 KeywordSearch, 628, 655, 660
 Kill, 987, 1246

—L—

Last, 52, 57, 1174
 LastCount, 1100
 LastError, 1100
 LastRead, 738
 LastWrite, 926
 Layout, 637, 1077, 1364
 Layout sample, 1518
 LayoutFrame, 758
 LayoutMDIFrame, 758
 LayoutWindow, 759
 Leave, 202
 Leaving, 903
 left, 760
 Left, 1174
 LeftDClick, 903
 LeftDown, 903
 LeftIsDown, 903
 LeftOf, 736
 LeftUp, 904
 Len, 1174
 Length, 446, 454, 1174
 Limits And Compatibility, 1679
 Listctrl sample, 1518
 ListToArray, 1184
 Load, 427, 465, 1026, 1403
 LoadBitmap, 1403
 LoadDialog, 1403, 1404
 LoadFile, 74, 86, 629, 680, 698, 717, 718, 727,
 1218
 LoadFrame, 1404
 LoadIcon, 1404
 LoadLibrary, 387
 LoadMenu, 1404
 LoadMenuBar, 1404
 LoadObject, 411
 LoadPage, 680
 LoadPanel, 1404
 LoadToolBar, 1405
 LocalHost, 741, 743
 Lock, 908
 LogError, 279
 Logging functions, 817
 LogicalToDeviceX, 357
 LogicalToDeviceXRel, 357
 LogicalToDeviceY, 357
 LogicalToDeviceYRel, 357
 Lower, 1174, 1364
 LowerCase, 1174

—M—

m_active, 30
 m_altDown, 753, 898

- m_checked, 1306
- m_childDocument, 388, 398
- m_childView, 388, 399
- m_clientData, 163
- m_commandInt, 163
- m_commandProcessor, 408
- m_commandString, 164
- m_controlDown, 754, 898
- m_count, 925
- m_currentView, 390
- m_dc, 432
- m_defaultDocumentNameCounter, 390
- m_defaultExt, 403
- m_description, 403
- m_directory, 403
- m_docClassInfo, 403
- m_docs, 390
- m_docTypeName, 403
- m_documentFile, 408
- m_documentManager, 403
- m_documentModified, 408
- m_documentTemplate, 408
- m_documentTitle, 408
- m_documentTypeName, 408
- m_documentViews, 409
- m_eventObject, 433
- m_eventType, 433
- m_extraLong, 164
- m_fileFilter, 403
- m_fileHistory, 390, 391, 464
- m_fileHistoryN, 464
- m_fileMaxFiles, 464
- m_fileMenu, 464
- m_files, 419
- m_flags, 390, 403
- m_id, 433
- m_keyCode, 754
- m_leftDown, 898
- m_linesPerAction, 899
- m_maxDocsOpen, 390
- m_menuId, 878
- m_metaDown, 754, 899
- m_middleDown, 898
- m_noFiles, 420
- m_owner, 1251
- m_pos, 420
- m_propagationLevel, 433
- m_refData, 923
- m_rightDown, 899
- m_setChecked, 1306
- m_setEnabled, 1306
- m_setText, 1307
- m_shiftDown, 754, 899
- m_skipped, 433
- m_text, 1307
- m_thread, 1250
- m_timeStamp, 433
- m_viewClassInfo, 403
- m_viewDocument, 1323
- m_viewFrame, 1323
- m_viewTypeName, 404, 1323
- m_wheelDelta, 899
- m_wheelRotation, 899
- m_x, 754, 899
- m_y, 754, 899
- Macros for template array definition, 44
- MainLoop, 34
- MakeAbsolute, 477
- MakeCellVisible, 573
- MakeConnection, 129
- MakeDefaultName, 395
- MakeGMT, 255
- MakeKey, 624
- MakeLower, 1174
- MakeModal, 1364
- MakeNull, 1318
- MakeRelativeTo, 477
- MakeString, 1318
- MakeTimezone, 255
- MakeUpper, 1174
- Matches, 1016, 1175
- Matching, 1678
- Maximize, 526, 843
- MaxX, 358
- MaxY, 358
- MB2WC, 204, 835, 837, 838, 839, 840
- Member, 766, 943, 1184, 1318
- Memory management, 45, 1163
- MessageParameters class, 488
- MetaDown, 605, 607, 609, 755, 904
- Metasyntax, 1677
- Mid, 1175
- MiddleDClick, 904
- MiddleDown, 904
- MiddleIsDown, 904
- MiddleUp, 904
- Minimal sample, 1513
- Minute, 1259
- Minutes, 1259
- MinX, 358
- MinY, 358
- Mirror, 720
- Miscellaneous, 1164, 1489
- Miscellaneous functions, 177
- Mkdir, 477
- MkDir, 537
- mnTemplates, 391
- Modify, 411
- ModifyColumn, 280
- Month, 227
- Months, 227
- More DDE details, 1649
- MoreRequested, 705
- Move, 117, 418, 955, 1364
- MoveCursorDown, 573
- MoveCursorDownBlock, 574
- MoveCursorLeft, 574
- MoveCursorLeftBlock, 574
- MoveCursorRight, 574
- MoveCursorRightBlock, 575
- MoveCursorUp, 574
- MoveCursorUpBlock, 575
- MovePageDown, 575
- MovePageUp, 575

Moving, 904
Multiply, 227, 1259, 1260

—N—

Native font information, 1597
Navigate, 29
Neg, 228, 1260
Negate, 228, 1260
new, 925
Next, 624
ngettext, 1437
Normalize, 478
Notebook sample, 1518
Notify, 1101, 1253
NotifyEvent, 29
Now, 240
Nth, 766
NullList, 1318
Number, 198, 766, 1002
Number of elements and simple item access, 45

—O—

Offset, 1010, 1020
Ok, 21, 75, 93, 148, 209, 358, 449, 450, 467, 482, 506, 698, 719, 886, 932, 939, 948, 965, 969, 972, 982, 1101
OnAcceptConnection, 1065
OnActivate, 389, 399, 589
OnActivateView, 1324
OnAdvise, 189
OnApply, 368
OnAssert, 34
OnBeginDocument, 979
OnBeginPrinting, 979
OnCalculateLayout, 1031
OnCancel, 369
OnCellClicked, 680
OnCellMouseHover, 681
OnChangedViewList, 411
OnChangeFilename, 1324
OnChar, 1241
OnCharHook, 368
OnClose, 1324
OnCloseDocument, 412
OnCloseWindow, 389, 399, 401, 402, 962, 1124
OnClosingDocument, 1325
OnCmdLineError, 35
OnCmdLineHelp, 35
OnCmdLineParsed, 35
OnCompareItems, 1296
OnCreate, 412, 1325
OnCreateClient, 850
OnCreateCommandProcessor, 412
OnCreateFileHistory, 395
OnCreatePrintout, 1325
OnCreateStatusBar, 527
OnCreateToolBar, 528
OnData, 424
OnDir, 383
OnDisconnect, 189

OnDoubleClickSash, 1132
OnDragOver, 425
OnDraw, 1055
OnDrawBackground, 1329
OnDrawItem, 1330
OnDrawSeparator, 1330
OnDrop, 424, 463, 1227
OnDropFiles, 463, 1219
OnDropText, 1227
OnEndDocument, 979
OnEndPrinting, 980
OnEnter, 424
OnExceptionInMainLoop, 36
OnExecute, 189
OnExit, 36, 895, 1247
OnFacename, 514
OnFatalException, 36
OnFile, 383
OnFileClose, 395
OnFileCloseAll, 395
OnFileNew, 395
OnFileOpen, 395
OnFileSave, 395
OnFileSaveAs, 396
OnFontEncoding, 514
OnFrameClose, 829
OnFrameCreate, 828
OnFrameDelete, 829
OnGetItem, 664
OnGetItemAttr, 785
OnGetItemImage, 786
OnGetItemMarkup, 664
OnGetItemText, 786
OnGetLineHeight, 1335
OnGetLinesHint, 1335
OnInit, 37, 896
OnInitCmdLine, 37
OnInternalIdle, 1365
OnLeave, 425
OnLeftClick, 1277
OnLinkClicked, 681
OnLog, 819
OnMakeConnection, 129
OnMeasureItem, 1330
OnMenuCommand, 396
OnMouseClick, 637
OnMouseEnter, 1277
OnNewDocument, 412
OnOK, 369
OnOpenDocument, 412
OnOpenError, 383
OnOpeningURL, 681
OnPaint, 959
OnPoke, 189
OnPreparePrinting, 980
OnPrintPage, 980
OnQueryEndSession, 37
OnQueryLayoutInfo, 1031
OnQuit, 629
OnRequest, 189
OnRightClick, 1278
OnRun, 38

OnSashPositionChange, 1133
OnSaveDocument, 413
OnSaveModified, 413
OnSelChange, 917
OnSetTitle, 682
OnStartAdvise, 189
OnStopAdvise, 190
OnSysColourChanged, 369, 941
OnSysRead, 1153
OnSysSeek, 1153
OnSysTell, 1153
OnSysWrite, 1153
OnTerminate, 988
OnUnhandledException, 38
OnUnsplit, 1132
OnUpdate, 1325
Open, 135, 280, 281, 318, 379, 446, 455, 988,
 1202, 1234
OpenContainer, 689
OpenFile, 484, 487
OpenURL, 666
Operating systems, 1487
Operations, 469, 1256
operator, 244, 545, 548, 1179
 =, 230, 481

operator-, 228
operator
 =, 55, 213

operator
 =, 726

operator-, 831
operator-, 832
operator-, 832
operator--, 832
operator--, 832
operator-, 1260
operator --, 332
operator !=, 22, 78, 95, 149, 210, 509, 700, 939,
 950, 1011, 1181, 1319, 1320
operator (), 1180
operator *, 1041
operator [], 1039, 1180, 1320
operator +, 1179
operator ++, 332, 1023
operator +=, 1180
operator <, 1181
operator <<, 1180, 1225
operator <=, 1181
operator =, 21, 55, 78, 94, 149, 151, 209, 508,
 511, 699, 725, 933, 939, 950, 968, 973, 1011,
 1021, 1072, 1179, 1318, 1319
operator ==, 21, 55, 78, 94, 149, 209, 213, 509,
 700, 725, 939, 950, 1011, 1181, 1319
operator >, 1181
operator ->, 1041
operator >=, 1181
operator >>, 1180
operator bool, 1023
operator char, 1320

operator const char*, 1181
operator double, 1320
operator long, 1320
operator void*, 1320
operator wxChar *, 1182
operator wxString, 1320
operator*=, 227, 1260
operator[], 55, 622, 1232
operator+, 831
operator++, 831
operator+=, 226, 229, 248, 1256
operator=, 49, 480, 701, 830
operator-=, 248
operator-=, 249
operator-=, 1260
operator==, 230, 480, 545, 548
Options, 178
OrderBy, 318
Other Python GUIs, 1661
Other string related functions and classes, 1528

—P—

Pad, 1175
PageSetup, 649
PaintBackground, 599
PaintPage, 982
Parse, 145, 667
ParseDate, 250
ParseDateTime, 250
ParseFormat, 249
ParseInner, 675
ParseRfc822Date, 249
ParseTime, 250
Parsing and formatting dates, 236
Parsing command line, 141
PassMessages, 823
Paste, 157, 1219
Path management, 174
Pause, 1151, 1247
Peek, 738, 1104
Pending, 39
PercentOf, 736
Play, 886, 1338
Pluggable event handlers, 1559
Poke, 190
PopEventHandler, 1365
PopProvider, 62
PopStatusText, 1148
PopTagHandler, 668
PopupMenu, 1200, 1366
PositionToXY, 1219
Positive thinking, 13
Post, 1062
Precompiled headers, 8
PrepareDC, 1055
Prepend, 866, 1077, 1078, 1175
PrependCheckItem, 867
PrependDir, 478
PrependItem, 1297
PrependRadioItem, 867
PrependSeparator, 867

PreProcessTip, 1262
PreviewFile, 648
PreviewText, 648
Print, 975, 982
PrintClasses, 340
PrintDialog, 975
PrinterSetup, 649
Printf, 1175
PrintFile, 648
PrintFV, 1175
PrintStatistics, 340
PrintText, 648
ProcessEvent, 440
ProcessMessage, 38
Programming with wxBoxSizer, 1577
Programming with wxFlexGridSizer, 1579
Programming with wxGridSizer, 1579
Programming with wxNotebookSizer, 1579
Programming with wxStaticBoxSizer, 1580
PushEventHandler, 1367
PushProvider, 62
PushStatusText, 1149
PushTagHandler, 667
Put, 624
PutC, 926
PutChar, 1156
PutProperty, 66
Pwd, 537

Q

Quantize, 994, 995
Query, 319
Query database, 889
QueryBySqlStmt, 320
QueryMatching, 322
QueryOnKeyFields, 323
Quit, 629

R

Raise, 1367
Read, 183, 184, 446, 455, 739, 1104, 1155, 1322
Read16, 215, 1236
Read16S, 1236
Read32, 216, 1237
Read32S, 1237
Read64, 216
Read8, 215, 1236
Read8S, 1236
ReadCustomization, 655, 660, 682
ReadDouble, 216, 1237
ReadFile, 651
ReadMailcap, 890
ReadMimeType, 891
ReadMsg, 1105
ReadString, 216
Realize, 1278
RecalcSizes, 89, 596, 1078
Reconnect, 992
Red, 148
Redirect, 989

Redo, 167, 1220
RedrawEverything, 956
RedrawXAxis, 956
RedrawYAxis, 956
Ref, 924
Reference counting and why you shouldn't care
 about it, 1529
Refresh, 324, 875, 1367
RefreshAll, 1336
RefreshItem, 786
RefreshItems, 786
RefreshLine, 1335
RefreshLines, 1336
RefreshLists, 660
RefreshRect, 1368
RegisterDataType, 585
RegisterHotKey, 1368
RegisterModule, 896
RegisterModules, 896
Regular Expression Character Names, 1681
Regular Expression Syntax, 1672
release, 1041
ReleaseCapture, 749
ReleaseMouse, 1369
Remove, 52, 57, 157, 733, 867, 876, 1078, 1175,
 1176, 1220
RemoveAll, 733
RemoveAt, 52, 57
RemoveBrush, 96
RemoveChild, 1369
RemoveDir, 479
RemoveDocument, 396
RemoveEventHandler, 1369
RemoveFile, 855
RemoveFont, 515
RemoveGrowableCol, 499
RemoveGrowableRow, 499
RemoveHandler, 75, 719
RemoveHelp, 633
RemoveIcon, 1201
RemoveLast, 1176
RemoveLine, 1234
RemoveMenu, 465
RemovePage, 917
RemovePen, 952
RemoveProvider, 62
RemoveTool, 1278
RemoveTraceMask, 822
RemoveView, 413
Removing items, 46
Rename, 537
Rename entries/groups, 177
RenameEntry, 185
RenameGroup, 185
Render, 646
Render sample, 1519
RenderPage, 983
Reparent, 1369
Replace, 157, 720, 733, 876, 1016, 1176, 1220
ReplaceAll, 1016
ReplaceFirst, 1016
ReplaceWindow, 1133

ReportError, 975
 Request, 190
 RequestMore, 704
 Rescale, 720
 reset, 1038, 1041
 Reset, 599, 1022, 1023
 ResetAttr, 111
 ResetBoundingBox, 358
 ResetBuffer, 1156
 ResetTime, 243
 ResetUpdateTime, 1308
 Resource file, 6
 Restore, 844
 RestoreState, 1101
 Resume, 820, 991, 1151, 1248
 ResumePropagation, 435
 right, 760
 Right, 1176
 RightDClick, 905
 RightDown, 905
 RightIsDown, 905
 RightOf, 736
 RightUp, 905
 Rmdir, 479
 Rmdir, 537
 Rmdir, 537
 RollbackTrans, 283
 Rotate, 720
 Rotate sample, 1519
 Rotate90, 720
 RTTI, 8
 Run, 1247
 RunWizard, 1395

—S—

SameAs, 479, 736
 Save, 413, 465
 SaveAs, 413
 SaveEditControlValue, 576
 SaveFile, 76, 87, 721, 728, 1220
 SaveObject, 413
 SaveState, 1101
 Scale, 722
 ScanParam, 674
 ScreenToClient, 1370
 Scroll, 1055
 Scroll subwindow sample, 1519
 ScrollLines, 1336, 1370
 ScrollList, 787
 ScrollPages, 1336, 1371
 ScrollTo, 1297
 ScrollToLine, 1336
 ScrollWindow, 1371
 SearchEventTable, 441
 Searching and replacing, 1163
 Searching and sorting, 46
 Second, 1260
 Seconds, 1260
 Seek, 447, 455, 1156
 SeekEnd, 447, 456
 SeekI, 739

SeekO, 100, 927
 Select, 29, 800, 1330, 1645
 SelectAll, 576, 683, 1331
 SelectBlock, 576
 SelectCol, 576
 SelectDocumentPath, 396
 SelectDocumentType, 397
 Selected, 772
 Selecting, 605, 607
 Selection functions, 560
 SelectionToDeviceRect, 585
 SelectItem, 1297
 SelectLine, 683
 SelectObject, 853
 SelectRange, 1331
 SelectRow, 576
 SelectViewType, 397
 SelectWord, 683
 SendCommand, 536
 SendIdleEvents, 39
 SendSizeEvent, 528
 Service, 741, 743
 Set, 19, 148, 185, 242, 243, 246, 519, 633, 736, 772, 1026, 1071, 1405
 Set3StateValue, 121
 SetAcceleratorTable, 1372
 SetAccessible, 1372
 SetActiveTarget, 819
 SetActualColor, 689
 SetAlign, 640, 689, 797
 SetAlignHor, 640
 SetAlignment, 592, 997, 1031, 1206
 SetAlignVer, 641
 SetAllowSymbols, 511
 SetAlpha, 723
 SetAppName, 39
 SetAscii, 537
 SetAttr, 111, 616
 SetAttrProvider, 615
 SetAuthStr, 295
 SetAuto3D, 39
 SetAutoLayout, 1372
 SetAxisOrientation, 358
 SetBackground, 359
 SetBackgroundColour, 112, 592, 642, 787, 797, 883, 1206, 1372
 SetBackgroundMode, 359
 SetBellOnError, 1313
 SetBezelFace, 543
 SetBinary, 537
 SetBitmap, 84, 883, 1139
 SetBitmapDisabled, 82
 SetBitmapFocus, 82
 SetBitmapLabel, 83
 SetBitmaps, 883
 SetBitmapSelected, 83
 SetBlinkTime, 117
 SetBorder, 113, 642, 1082, 1396
 SetBorderColour, 112
 SetBorders, 683
 SetBoundingRect, 1263
 SetBrush, 360

SetBufferIO, 1156, 1157
SetButtonsImageList, 1297
SetCanvas, 983
SetCanVeto, 137
SetCap, 948
SetCapture, 749
SetCaret, 1373
SetCellAlignment, 576
SetCellBackgroundColour, 588
SetCellBitmap, 589
SetCellEditor, 577
SetCellFont, 577
SetCellRenderer, 577
SetCellTextColour, 577
SetCellTextFont, 588
SetCellValue, 577
SetChar, 1176
SetCheckpoint, 340
SetCheckPrevious, 341
SetChooseFull, 150
SetChosenFont, 511
SetClassName, 40
SetClientData, 132, 165, 199, 442, 1102
SetClientObject, 132, 165, 199, 442
SetClientSize, 1373
SetClipboard, 886
SetClippingRegion, 359
SetCmdLine, 142
SetCol, 545, 603
SetColAttr, 578, 616
SetColDefs, 324, 325
SetColFormatBool, 578
SetColFormatCustom, 578
SetColFormatFloat, 578
SetColFormatNumber, 578
SetColLabelAlignment, 578
SetColLabelSize, 579
SetColLabelValue, 579, 615
SetCollate, 965, 972
SetColMinimalAcceptableWidth, 579
SetColMinimalWidth, 579
SetColNull, 328
SetColour, 93, 150, 511, 557, 948, 965
SetCols, 617
SetColSize, 579
SetColspan, 548
SetColumn, 787, 797
SetColumnImage, 800
SetColumns, 127
SetColumnWidth, 587, 787
SetCommandProcessor, 413
SetConcurrency, 1248
SetConfig, 519
SetConfigPath, 519
SetConnectCommand, 376
SetConstraints, 1374
SetContainer, 690
SetContainingSizer, 1374
SetControl, 603
SetCount, 53
SetCountry, 240
SetCurrent, 557
SetCurrentCurve, 955
SetCurrentPage, 983
SetCursor, 327, 1374
SetCustomColour, 150
SetCwd, 479
SetDashes, 949
SetData, 135, 211, 220, 222, 422, 723, 797, 911, 1183, 1318
SetDataObject, 426
SetDate, 108, 115
SetDay, 243
SetDays, 228
SetDC, 645, 690
SetDebugErrorMessages, 283
SetDebugMode, 341
SetDefAttr, 594
SetDefault, 104
SetDefaultBackgroundColour, 1375
SetDefaultCellAlignment, 580
SetDefaultCellBackgroundColour, 580
SetDefaultCellFont, 580
SetDefaultColSize, 581
SetDefaultDir, 295
SetDefaultEditor, 580
SetDefaultEncoding, 506
SetDefaultExtension, 407
SetDefaultForegroundColour, 1375
SetDefaultInfo, 932
SetDefaultItem, 942
SetDefaultMinMargins, 932
SetDefaultPath, 552
SetDefaultProxy, 1311
SetDefaultRenderer, 580
SetDefaultRowSize, 581
SetDefaults, 1071
SetDefaultSize, 1031
SetDefaultStyle, 1221
SetDelay, 1282
SetDepth, 77, 698
SetDesc, 144
SetDescription, 295, 407
SetDeviceOrigin, 359
SetDialogParent, 519
SetDialogTitle, 519
SetDimension, 1078, 1082
SetDirectory, 407, 461
SetDispatchPtr, 66
SetDividerPen, 589
SetDocument, 389, 399, 1325
SetDocumentManager, 407
SetDocumentName, 414
SetDocumentTemplate, 414
SetDropTarget, 1375
SetDsn, 295
SetDuplex, 965
SetEditable, 589, 1221
SetEditInPlace, 589
SetEditMenu, 168
SetEditor, 592
SetEmptyCellSize, 596
SetEndY, 953
SetEnlargeAroundWindowCentre, 957

SetEventHandler, 1102, 1375
SetEventObject, 435
SetEventType, 435
SetEvtHandlerEnabled, 442
SetExcludeList, 1242
SetExitOnFrameDelete, 40
SetExpandEnvVars, 185
SetExt, 479
SetExtension, 88, 729
SetExtraLong, 165
SetExtraStyle, 1376
SetFaceName, 506
SetFamily, 507
SetFieldsCount, 1149
SetFile, 341
SetFileFilter, 407
SetFilename, 414, 461
SetFileType, 295
SetFilter, 552
SetFilterIndex, 461, 552
SetFindString, 495
SetFirstItem, 773
SetFlag, 1083
SetFlags, 106, 407, 495, 997, 1102, 1207, 1405
SetFlexibleDirections, 499
SetFocus, 1377
SetFocusFromKbd, 1377
SetFont, 112, 360, 592, 797, 883, 1207, 1377
SetFontBold, 690
SetFontFace, 690
SetFontFixed, 690
SetFontItalic, 690
SetFonts, 645, 649, 669, 684, 691
SetFontSize, 690
SetFontUnderlined, 691
SetFooter, 650, 669
SetForce, 137
SetForegroundColor, 1377
SetFormat, 222
SetFrame, 983, 1326
SetFrameParameters, 629
SetFromClause, 327
SetFromPage, 972
SetFS, 668
SetFullName, 479
SetGridCursor, 581
SetGridLineColour, 581
SetHeader, 649, 670, 693
SetHeaderColours, 109
SetHeight, 77, 699, 1010, 1071
SetHelp, 883
SetHelpController, 630
SetHelpString, 868, 876
SetHelpText, 1378
SetHenv, 295
SetHGap, 617
SetHighlightColours, 110
SetHoliday, 111, 113
SetHolidayColours, 110
SetHour, 244
SetHtmlFile, 670
SetHtmlText, 646, 670
SetIcon, 370, 528, 1201
SetIcons, 370, 529
SetId, 214, 435, 638, 797, 984, 1304, 1378
SetImage, 797
SetImageList, 787, 917, 1198, 1297
SetIncludeList, 1242
SetIndent, 642, 1297
SetInitialFont, 511
SetInitSize, 1083
SetInputEncoding, 691
SetInsertionPoint, 157, 1222
SetInsertionPointEnd, 158, 1222
SetInt, 166
SetIntPosition, 1158
SetItem, 787, 788, 789
SetItemBackgroundColour, 789, 1298
SetItemBold, 1298
SetItemCount, 789, 1331
SetItemData, 789, 1197, 1298
SetItemFont, 1298
SetItemHasChildren, 1298
SetItemImage, 789, 1198, 1299
SetItemMinSize, 1079
SetItemPosition, 596, 789
SetItemSelectedImage, 1299
SetItemSize, 1198
SetItemSpan, 597
SetItemState, 790
SetItemText, 790, 1198, 1299
SetItemTextColour, 790, 1299
SetJoin, 949
SetLabel, 105, 194, 868, 877, 1002, 1146
SetLabelAlignment, 588
SetLabelBackgroundColour, 581
SetLabelFont, 581
SetLabelSize, 588
SetLabelTextColour, 581
SetLabelTop, 877
SetLabelValue, 588
SetLastDirectory, 398
SetLeftIndent, 1207
SetLevel, 341
SetLineCount, 1337
SetLineSize, 1091
SetLink, 638, 691
SetLinkColor, 691
SetLog, 823
SetLoggingOff, 137
SetLogicalFunction, 360
SetLogLevel, 821
SetLogo, 143
SetMapMode, 361
SetMarginBottomRight, 932
SetMargins, 586, 670, 1279, 1331
SetMarginTopLeft, 932
SetMarginWidth, 883
SetMask, 77, 723, 798
SetMaskColour, 724
SetMaskFromImage, 724
SetMaxDocsOpen, 398
SetMaximumSizeX, 1035
SetMaximumSizeY, 1035

SetMaxLength, 1222
SetMaxPage, 972
SetMenuBar, 529
SetMenuStrings, 168
SetMessage, 381, 461
SetMillisecond, 244
SetMimeType, 729
SetMinHeight, 644, 1149
SetMinimumPaneSize, 1134
SetMinimumSizeX, 1035
SetMinimumSizeY, 1035
SetMinMarginBottomRight, 933
SetMinMarginTopLeft, 932
SetMinPage, 972
SetMinSize, 1078
SetMinute, 244
SetModal, 370
SetMode, 705, 1309
SetMonth, 243
SetMonths, 228
SetMovementThreshold, 749
SetName, 87, 479, 729, 1379
SetNativeFontInfo, 507
SetNext, 638, 1400
SetNextHandler, 443
SetNoCopies, 965, 973
SetNonFlexibleGrowMode, 499
SetNotify, 1103
SetOffsetY, 953
SetOk, 699
SetOldSelection, 920
SetOnlineStatus, 375
SetOptimization, 361
SetOption, 724, 1189
SetOrCalcColumnSizes, 590
SetOrCalcRowSizes, 590
SetOrderByClause, 329
SetOrientation, 965, 997, 1031
SetOwner, 1253
SetPadding, 918, 1198
SetPage, 685
SetPageImage, 918
SetPageSize, 918, 1091, 1396
SetPageText, 918
SetPalette, 77, 360, 725, 1379
SetPaperId, 933, 965
SetPaperSize, 933
SetParameters, 598, 601, 602, 610
SetParent, 638
SetParentResource, 1409
SetParser, 675
SetPassword, 296, 538, 994
SetPath, 185, 381, 461, 553
SetPen, 362
SetPointSize, 507
SetPos, 547, 638
SetPosition, 631, 1123
SetPrecision, 610
SetPrev, 1400
SetPreviousHandler, 443
SetPrintData, 933, 973
SetPrinterName, 967
SetPrintout, 983
SetPrintToFile, 973
SetPriority, 1247
SetProportion, 1083
SetProxy, 1312
SetQuality, 968
SetQueryTimeout, 329
SetRange, 511, 544, 1090, 1119, 1122
SetRatio, 1083
SetReadOnly, 582, 592
SetRecordDefaults, 185
SetRect, 106
SetRedoAccelerator, 168
SetRefData, 924
SetRelatedFrame, 685
SetRelatedStatusBar, 685
SetRenderer, 592
SetReplaceString, 495
SetRequestedLength, 997
SetResolution, 958
SetReturnCode, 370
SetRGB, 725
SetRightIndent, 1207
SetRow, 545, 603
SetRowAttr, 582, 616
SetRowHeight, 587
SetRowLabelAlignment, 582
SetRowLabelSize, 582
SetRowLabelValue, 582, 615
SetRowMinimalAcceptableHeight, 582
SetRowMinimalHeight, 582
SetRows, 617
SetRowSize, 583
SetRowspan, 548
SetSashBorder, 1036
SetSashPosition, 1127, 1133
SetSashVisible, 1035
SetScrollbar, 1048, 1379
SetScrollbars, 1056
SetScrollOnThumbRelease, 956
SetScrollPos, 1380
SetScrollRate, 1057
SetScrollX, 587
SetScrollY, 587
SetSecond, 244
SetSelection, 158, 199, 918, 920, 973, 1002, 1067, 1091, 1122, 1198, 1222, 1332
SetSelectionBackground, 585, 1332
SetSelectionForeground, 585
SetSelectionMode, 583
SetSetupDialog, 973
SetShadowWidth, 544
SetShape, 530
SetShowHelp, 511
SetSingleStyle, 790
SetSize, 118, 599, 646, 997, 1381
SetSizeHints, 1079, 1382
SetSizer, 1083, 1383
SetSizerAndFit, 1384
SetSpacer, 1083
SetSpan, 547
SetSplitMode, 1134

- SetSqlLogging, 283
- SetStandardError, 342
- SetStartY, 953
- SetState, 798
- SetStateImageList, 1299
- SetStateMask, 798
- SetStatusBar, 530
- SetStatusBarPane, 530
- SetStatusText, 530, 1149
- SetStatusWidths, 530, 1150
- SetStipple, 93, 949
- SetStream, 342
- SetString, 166, 200, 1186
- SetStringSelection, 200, 1003
- SetStringSeparators, 1238
- SetStyle, 94, 381, 462, 508, 949, 1223, 1242
- SetSwitchChars, 143
- SetTable, 584
- SetTabs, 1207
- SetTargetWindow, 1057
- SetTempDir, 655, 657
- SetText, 798, 883, 1226, 1309
- SetTextBackground, 362
- SetTextColour, 112, 592, 790, 798, 884, 1207
- SetTextForeground, 362
- SetThemeEnabled, 1384
- SetThumbLength, 1092
- SetThumbPosition, 1047
- SetTick, 1092
- SetTickFreq, 1090
- SetTimeout, 1104
- SetTimes, 480
- SetTimestamp, 435, 821
- SetTip, 1282
- SetTipWindowPtr, 1263
- SetTitle, 371, 414, 531, 868, 1384
- SetTitleFormat, 655, 660
- SetToCurrent, 242
- SetToLastMonthDay, 253
- SetToLastWeekDay, 253
- SetToNextWeekDay, 252
- SetToolBar, 531, 851
- SetToolBitmapSize, 1279
- SetToolClientData, 1280
- SetToolLongHelp, 1280
- SetToolPacking, 1280
- SetToolSeparation, 1281
- SetToolShortHelp, 1281
- SetToolTip, 1303, 1384
- SetToPage, 973
- SetToPrevWeekDay, 252
- SetTopWindow, 40
- SetToTheWeek, 253
- SetToWeekDay, 252
- SetToWeekDayInSameWeek, 251
- SetToYearDay, 254
- SetTraceMask, 822
- SetTransferMode, 538
- SetType, 88, 214, 729
- SetUid, 296
- SetUmask, 186
- SetUnderlined, 508
- SetUndoAccelerator, 168
- SetUnitsPerValue, 956
- Setup, 976
- SetUpdateInterval, 1309
- SetupWindow, 1409
- SetUseBestVisual, 41
- SetUser, 538, 994
- SetUserID, 296
- SetUserScale, 362
- SetValidator, 1385
- SetValue, 121, 158, 544, 613, 1006, 1093, 1119, 1121, 1122, 1223, 1229, 1266
- SetValueAsBool, 614
- SetValueAsCustom, 614
- SetValueAsDouble, 614
- SetValueAsLong, 614
- SetVendorName, 41
- SetVerbose, 821
- SetVGap, 617
- SetView, 389, 400, 614
- SetViewer, 629
- SetViewName, 1326
- SetVirtualSize, 1385
- SetVirtualSizeHints, 1079, 1385
- SetVolume, 480
- SetWeekDay, 115
- SetWeeks, 228
- SetWeight, 508
- SetWellKnownHost, 376
- SetWhereClause, 330
- SetWidth, 78, 610, 699, 798, 949, 1010, 1071
- SetWidthFloat, 644
- SetWildcard, 462
- SetWindow, 30, 1083, 1313
- SetWindowMenu, 852
- SetWindowStyle, 1299, 1386
- SetWindowStyleFlag, 790, 1386
- SetWindowVariant, 1386
- SetX, 1011
- SetY, 1011
- SetYear, 243
- SetYears, 228
- SetZoom, 956, 983
- SetZoomControl, 961
- ShiftDown, 606, 607, 609, 756, 905
- ShouldInheritColours, 1386
- ShouldPropagate, 435
- Show, 118, 371, 418, 599, 828, 1003, 1079, 1083, 1387
- ShowCellEditControl, 584
- ShowFullScreen, 531
- ShowHelp, 633
- ShowModal, 153, 371, 381, 462, 513, 885, 928, 969, 1067, 1229
- ShowPosition, 1224
- Shrink, 53, 58, 1176
- Signal, 171
- Simplify the problem, 13
- size, 622
- Skip, 435
- Sleep, 1247
- SocketAddrLen, 1094

Socket state, 1095
Sockets sample, 1519
Some advice about using wxString, 1528
Sort, 53, 58, 766, 1184
SortChildren, 1300
SortItems, 790
Sound sample, 1520
SplitHorizontally, 1135
SplitPath, 480
SplitVertically, 1135
sprintf, 1176
SQLColumnName, 284
SQLTableName, 284
Start, 1151, 1254
StartAdvise, 190
StartDoc, 362
StartDrawingOnTop, 1037
StartingClick, 599
StartingKey, 599
StartPage, 363
StartsWith, 1176
Statbar sample, 1520
Static functions, 174, 233, 816, 1255
std::string compatibility functions, 1164
Stop, 1254, 1339
StopAdvise, 190
StopParsing, 668
StopPropagation, 436
Strategies for exceptions handling, 1563
Stream, 1159
String length, 1161
Strip, 1177
Submit, 168
Subtract, 1260
SubString, 1177
Substring extraction, 1162
Subtract, 229, 248, 249, 1019
Supported bitmap file formats, 1593
Supported languages, 802
Suspend, 819
swap, 1039, 1041
SwapBuffers, 557
Sync, 100

—T—

TableExists, 285
TablePrivileges, 286
Tag Handlers, 1654
Tags supported by wxHTML, 1657
TakeData, 212
Technicalities, 1564
Tell, 447, 456, 1156
Tell, 739
TellO, 927
Templates, 8
TestDestroy, 1248
Tests, 1256
Tests of existence, 177
Text sample, 1520
Thaw, 1387
The data provider (source) duties, 1623

The data receiver (target) duties, 1623
The idea behind sizers, 1573
This, 1248
Thread sample, 1521
Tile, 852
Time, 1152
Time zone and DST support, 237
Time zone considerations, 1533
ToAscii, 1177
Today, 241
ToDouble, 1177
Toggle, 1300, 1332
ToggleItemSelection, 1300
ToggleTool, 1281
ToGMT, 255
ToLong, 831, 1177
Toolbar sample, 1521
top, 761
ToString, 831
ToTimezone, 255
Touch, 480
ToULong, 1178
TransferDataFromWindow, 1387
TransferDataToWindow, 1387
TransferFromWindow, 554, 1242
TransferToWindow, 554, 1242, 1314
TranslateSqlState, 287
Traverse, 379
Treectrl sample, 1522
Trim, 1178
Truncate, 1178
TryLock, 909
TryWait, 1063
Tuning wxString for your application, 1529
Type of NULL, 8

—U—

Unconstrained, 736
Undo, 160, 169, 1224
Ungetch, 739, 740
UngetWriteBuf, 1178
Unicode and ANSI modes, 1535
Unicode and the outside world, 1537
Unicode support in wxWidgets, 1536
Unicode-related compilation settings, 1537
Union, 1020
Unload, 428
UnloadLibrary, 387
Unlock, 909
UNow, 241
Unread, 1106
UnRef, 925
UnregisterHotKey, 1388
Unselect, 1300
UnselectAll, 1300
UnselectItem, 1300
Unsplit, 1136
Update, 331, 992, 1388, 1646
UpdateAllViews, 414
UpdateAttrCols, 616
UpdateAttrRows, 616

UpdateBackingFromWindow, 418
 UpdateDimensions, 586
 UpdateResources, 1405
 UpdateRow, 337
 UpdateSize, 1137
 UpdateUI, 869
 UpdateWhere, 331
 UpdateWindowUI, 1388
 Upper, 1179
 UpperCase, 1179
 URLToFileName, 484
 Usage, 145
 Use a debugger, 13
 Use ASSERT, 12
 Use logging functions, 13
 Use relative positioning or constraints, 12
 Use the wxWidgets debugging facilities, 13
 Use wxString in preference to character arrays, 12
 Use wxWidgets resource files, 12
 UseConfig, 655, 660
 UseMenu, 466
 UsePrimarySelection, 135
 Using binary resource files, 1582
 Using embedded resources, 1583
 Using the toolbar library, 1613
 Using wxPython, 1661

—V—

Validate, 1242, 1314, 1389
 ValidateRow, 337
 ValidHost, 130
 version, 1027
 Veto, 137, 922

—W—

Wait, 172, 1063, 1106, 1107, 1249
 WaitForAccept, 1116
 WaitForRead, 1108
 WaitForWrite, 1108
 WaitOnConnect, 1111
 WaitTimeout, 1063
 WarpPointer, 1390
 WC2MB, 204, 836, 838, 839, 840, 841
 Week, 229, 1260
 Weeks, 229, 1260
 What is Unicode?, 1535
 What is wxPython?, 1660
 Where, 332
 Where to go for help, 1671
 Why use wxPython?, 1660
 width, 761, 1007
 widthSash, 1137
 Window identifiers, 1559
 Window layout examples, 1571
 Wizard sample, 1522
 Write, 186, 447, 448, 456, 927, 1109, 1155, 1202, 1234, 1322
 Write16, 223, 224
 Write32, 224

Write64, 224
 Write8, 223
 WriteCustomization, 656, 660, 685
 WriteDouble, 224
 WriteMsg, 1109
 WriteSqlLog, 287
 WriteString, 224
 WriteText, 1224
 Writing values into the string, 1163
 WX_APPEND_ARRAY, 48
 WX_CLEAR_ARRAY, 48
 wx_const_cast, 1471
 WX_DECLARE_EXPORTED_OBJARRAY, 47
 WX_DECLARE_OBJARRAY, 47
 WX_DECLARE_USER_EXPORTED_OBJARRA
Y, 47
 WX_DEFINE_ARRAY, 46
 WX_DEFINE_EXPORTED_ARRAY, 46
 WX_DEFINE_EXPORTED_OBJARRAY, 48
 WX_DEFINE_OBJARRAY, 48
 WX_DEFINE_SORTED_ARRAY, 46, 47
 WX_DEFINE_SORTED_EXPORTED_ARRAY,
47
 WX_DEFINE_SORTED_USER_EXPORTED_AR
RAY, 47
 WX_DEFINE_USER_EXPORTED_ARRAY, 46
 WX_DEFINE_USER_EXPORTED_OBJARRAY,
48
 WX_GL_AUX_BUFFERS, 555
 WX_GL_BUFFER_SIZE, 555
 WX_GL_DEPTH_SIZE, 555
 WX_GL_DOUBLEBUFFER, 555
 WX_GL_LEVEL, 555
 WX_GL_MIN_ACCUM_ALPHA, 556
 WX_GL_MIN_ACCUM_BLUE, 556
 WX_GL_MIN_ACCUM_GREEN, 556
 WX_GL_MIN_ACCUM_RED, 556
 WX_GL_MIN_ALPHA, 555
 WX_GL_MIN_BLUE, 555
 WX_GL_MIN_GREEN, 555
 WX_GL_MIN_RED, 555
 WX_GL_RGBA, 555
 WX_GL_STENCIL_SIZE, 556
 WX_GL_STEREO, 555
 wx_static_cast, 1472
 wxAcceleratorEntry, 18
 wxAcceleratorEntry::GetCommand, 18
 wxAcceleratorEntry::GetFlags, 19
 wxAcceleratorEntry::GetKeyCode, 19
 wxAcceleratorEntry::Set, 19
 wxAcceleratorEntry::wxAcceleratorEntry, 18
 wxAcceleratorTable, 20
 wxAcceleratorTable::~~wxAcceleratorTable, 21
 wxAcceleratorTable::Ok, 21
 wxAcceleratorTable::operator !=, 21
 wxAcceleratorTable::operator =, 21
 wxAcceleratorTable::operator ==, 21
 wxAcceleratorTable::wxAcceleratorTable, 20
 wxAccessible, 26
 wxAccessible::~~wxAccessible, 26
 wxAccessible::DoDefaultAction, 27
 wxAccessible::GetChild, 27

wxAccessible::GetChildCount, 27
wxAccessible::GetDefaultAction, 27
wxAccessible::GetDescription, 27
wxAccessible::GetFocus, 27
wxAccessible::GetHelpText, 27
wxAccessible::GetKeyboardShortcut, 28
wxAccessible::GetLocation, 28
wxAccessible::GetName, 28
wxAccessible::GetParent, 28
wxAccessible::GetRole, 28
wxAccessible::GetSelections, 28
wxAccessible::GetState, 28
wxAccessible::GetValue, 29
wxAccessible::GetWindow, 29
wxAccessible::HitTest, 29
wxAccessible::Navigate, 29
wxAccessible::NotifyEvent, 29
wxAccessible::Select, 29
wxAccessible::SetWindow, 29
wxAccessible::wxAccessible, 26
wxActivateEvent, 30
wxActivateEvent::GetActive, 31
wxActivateEvent::GetCapturedWindow, 897
wxActivateEvent::m_active, 30
wxActivateEvent::wxActivateEvent, 30
wxALIGN_BOTTOM, 1075
wxALIGN_CENTER, 1075
wxALIGN_CENTER_HORIZONTAL, 1075
wxALIGN_CENTER_VERTICAL, 1075
wxALIGN_CENTRE, 1144
wxALIGN_LEFT, 1075, 1144
wxALIGN_RIGHT, 118, 1075, 1144
wxALIGN_TOP, 1075
wxALL, 1075
wxALWAYS_SHOW_SB, 1340
wxANIHandler, 706
wxApp, 31
wxApp::~wxApp, 31
wxApp::argc, 32
wxApp::argv, 32
wxApp::CreateLogTarget, 32
wxApp::Dispatch, 32
wxApp::ExitMainLoop, 34
wxApp::FilterEvent, 32
wxApp::GetAppName, 32
wxApp::GetAuto3D, 33
wxApp::GetClassName, 33
wxApp::GetExitOnFrameDelete, 33
wxApp::GetTopWindow, 33
wxApp::GetUseBestVisual, 34
wxApp::GetVendorName, 34
wxApp::HandleEvent, 41
wxApp::MainLoop, 34
wxApp::OnAssert, 34
wxApp::OnCmdLineError, 35
wxApp::OnCmdLineHelp, 35
wxApp::OnCmdLineParsed, 35
wxApp::OnExceptionInMainLoop, 36
wxApp::OnExit, 36
wxApp::OnFatalException, 36
wxApp::OnInit, 37
wxApp::OnInitCmdLine, 37
wxApp::OnQueryEndSession, 37
wxApp::OnRun, 38
wxApp::OnUnhandledException, 38
wxApp::Pending, 38
wxApp::ProcessMessage, 38
wxApp::SendIdleEvents, 39
wxApp::SetAppName, 39
wxApp::SetAuto3D, 39
wxApp::SetClassName, 40
wxApp::SetExitOnFrameDelete, 40
wxApp::SetTopWindow, 40
wxApp::SetUseBestVisual, 41
wxApp::SetVendorName, 41
wxApp::wxApp, 31
wxApp::Yield, 41
wxArray, 49
wxArray copy constructor and assignment
operator, 49
wxArray::~wxArray, 49
wxArray::Add, 49
wxArray::Alloc, 50
wxArray::Clear, 50
wxArray::Count, 50
wxArray::Empty, 50
wxArray::GetCount, 51
wxArray::Index, 51
wxArray::Insert, 51
wxArray::IsEmpty, 51
wxArray::Item, 52
wxArray::Last, 52
wxArray::Remove, 52
wxArray::RemoveAt, 52
wxArray::SetCount, 53
wxArray::Shrink, 53
wxArray::Sort, 53
wxArrayString, 54
wxArrayString::~wxArrayString, 54
wxArrayString::Add, 55
wxArrayString::Alloc, 55
wxArrayString::Clear, 56
wxArrayString::Count, 56
wxArrayString::Empty, 56
wxArrayString::GetCount, 56
wxArrayString::Index, 56
wxArrayString::Insert, 56
wxArrayString::IsEmpty, 57
wxArrayString::Item, 57
wxArrayString::Last, 57
wxArrayString::operator!=, 55
wxArrayString::operator[], 55
wxArrayString::operator=, 55
wxArrayString::operator==, 55
wxArrayString::Remove, 57
wxArrayString::RemoveAt, 57
wxArrayString::Shrink, 58
wxArrayString::Sort, 58
wxArrayString::wxArrayString, 54
wxArtProvider::CreateBitmap, 61
wxArtProvider::GetBitmap, 62
wxArtProvider::GetIcon, 62
wxArtProvider::PopProvider, 62
wxArtProvider::PushProvider, 62

wxArtProvider::RemoveProvider, 62
 wxASSERT, 1481
 wxASSERT_MIN_BITSIZ, 1481
 wxASSERT_MSG, 1481
 wxAutomationObject, 63
 wxAutomationObject::~~wxAutomationObject, 63
 wxAutomationObject::CallMethod, 63
 wxAutomationObject::CreateInstance, 64
 wxAutomationObject::GetDispatchPtr, 64
 wxAutomationObject::GetInstance, 64
 wxAutomationObject::GetObject, 64
 wxAutomationObject::GetProperty, 65
 wxAutomationObject::Invoke, 65
 wxAutomationObject::PutProperty, 66
 wxAutomationObject::SetDispatchPtr, 66
 wxAutomationObject::wxAutomationObject, 63
 wxBeginBusyCursor, 1441
 wxBell, 1441
 wxBitmap, 67, 68
 wxBITMAP, 1450
 wxBitmap::~~wxBitmap, 70
 wxBitmap::AddHandler, 71
 wxBitmap::CleanUpHandlers, 71
 wxBitmap::ConvertToImage, 71
 wxBitmap::CopyFromIcon, 71
 wxBitmap::Create, 71
 wxBitmap::FindHandler, 72
 wxBitmap::GetDepth, 73
 wxBitmap::GetHandlers, 73
 wxBitmap::GetHeight, 73
 wxBitmap::GetMask, 73
 wxBitmap::GetPalette, 73
 wxBitmap::GetSubBitmap, 74
 wxBitmap::GetWidth, 74
 wxBitmap::InitStandardHandlers, 74
 wxBitmap::InsertHandler, 74
 wxBitmap::LoadFile, 74
 wxBitmap::Ok, 75
 wxBitmap::operator !=, 78
 wxBitmap::operator =, 78
 wxBitmap::operator ==, 78
 wxBitmap::RemoveHandler, 75
 wxBitmap::SaveFile, 76
 wxBitmap::SetDepth, 77
 wxBitmap::SetHeight, 77
 wxBitmap::SetMask, 77
 wxBitmap::SetPalette, 77
 wxBitmap::SetWidth, 78
 wxBitmap::wxBitmap, 67
 wxBITMAP_TYPE_ANI, 708, 714, 718
 wxBITMAP_TYPE_ANY, 708, 714
 wxBITMAP_TYPE_BMP, 69, 708, 714
 wxBITMAP_TYPE_BMP_RESOURCE, 69
 wxBITMAP_TYPE_CUR, 206, 708, 714
 wxBITMAP_TYPE_CUR_RESOURCE, 207
 wxBITMAP_TYPE_GIF, 69, 695, 708, 714
 wxBITMAP_TYPE_ICO, 207, 695, 708, 714
 wxBITMAP_TYPE_ICO_RESOURCE, 695
 wxBITMAP_TYPE_JPEG, 708, 714
 wxBITMAP_TYPE_PCX, 708, 714
 wxBITMAP_TYPE_PNG, 708, 714
 wxBITMAP_TYPE_PNM, 708, 714
 wxBITMAP_TYPE_RESOURCE, 69
 wxBITMAP_TYPE_TIF, 708, 714
 wxBITMAP_TYPE_XBM, 69, 206, 695
 wxBITMAP_TYPE_XPM, 69, 695, 708, 714
 wxBitmapButton, 80
 wxBitmapButton::~~wxBitmapButton, 81
 wxBitmapButton::Create, 81
 wxBitmapButton::GetBitmapDisabled, 81
 wxBitmapButton::GetBitmapFocus, 81
 wxBitmapButton::GetBitmapLabel, 82
 wxBitmapButton::GetBitmapSelected, 82
 wxBitmapButton::SetBitmapDisabled, 82
 wxBitmapButton::SetBitmapFocus, 82
 wxBitmapButton::SetBitmapLabel, 83
 wxBitmapButton::SetBitmapSelected, 83
 wxBitmapButton::wxBitmapButton, 80
 wxBitmapDataObject, 84
 wxBitmapDataObject::GetBitmap, 84
 wxBitmapDataObject::SetBitmap, 84
 wxBitmapHandler, 85
 wxBitmapHandler::~~wxBitmapHandler, 85
 wxBitmapHandler::Create, 85
 wxBitmapHandler::GetExtension, 86
 wxBitmapHandler::GetName, 86
 wxBitmapHandler::GetType, 86
 wxBitmapHandler::LoadFile, 86
 wxBitmapHandler::SaveFile, 87
 wxBitmapHandler::SetExtension, 88
 wxBitmapHandler::SetName, 87
 wxBitmapHandler::SetType, 88
 wxBitmapHandler::wxBitmapHandler, 85
 wxBMPHandler, 706
 wxBOTTOM, 1075
 wxBoxSizer, 88
 wxBoxSizer::CalcMin, 89
 wxBoxSizer::GetOrientation, 89
 wxBoxSizer::RecalcSizes, 88
 wxBoxSizer::wxBoxSizer, 88
 wxBrush, 90
 wxBrush::~~wxBrush, 91
 wxBrush::GetColour, 92
 wxBrush::GetStipple, 92
 wxBrush::GetStyle, 92
 wxBrush::Ok, 93
 wxBrush::operator !=, 94
 wxBrush::operator =, 94
 wxBrush::operator ==, 94
 wxBrush::SetColour, 93
 wxBrush::SetStipple, 93
 wxBrush::SetStyle, 94
 wxBrush::wxBrush, 90
 wxBrushList, 96
 wxBrushList::AddBrush, 96
 wxBrushList::FindOrCreateBrush, 96
 wxBrushList::RemoveBrush, 96
 wxBrushList::wxBrushList, 95
 wxBU_AUTODRAW, 79
 wxBU_BOTTOM, 79, 102
 wxBU_EXACTFIT, 102
 wxBU_LEFT, 79, 102
 wxBU_RIGHT, 79, 102
 wxBU_TOP, 79, 102

- wxBufferedDC, 97
- wxBufferedDC::~wxBufferedDC, 98
- wxBufferedDC::Init, 97
- wxBufferedDC::wxBufferedDC, 97
- wxBufferedOutputStream, 99
- wxBufferedOutputStream::~wxBufferedOutputStream, 99
- wxBufferedOutputStream::SeekO, 100
- wxBufferedOutputStream::Sync, 100
- wxBufferedOutputStream::wxBufferedOutputStream, 99
- wxBufferedPaintDC, 98
- wxBufferedPaintDC::~wxBufferedPaintDC, 98
- wxBufferedPaintDC::wxBufferedPaintDC, 98
- wxBusyCursor, 100
- wxBusyCursor::~wxBusyCursor, 100
- wxBusyCursor::wxBusyCursor, 100
- wxBusyInfo, 101
- wxBusyInfo::~wxBusyInfo, 102
- wxBusyInfo::wxBusyInfo, 101
- wxButton, 103
- wxButton::~wxButton, 103
- wxButton::Create, 104
- wxButton::GetDefaultSize, 104
- wxButton::GetLabel, 104
- wxButton::SetDefault, 104
- wxButton::SetLabel, 105
- wxButton::wxButton, 103
- wxCAL_MONDAY_FIRST, 107
- wxCAL_NO_MONTH_CHANGE, 107
- wxCAL_NO_YEAR_CHANGE, 107
- wxCAL_SEQUENTIAL_MONTH_SELECTION, 107
- wxCAL_SHOW_HOLIDAYS, 107
- wxCAL_SHOW_SURROUNDING_WEEKS, 107
- wxCAL_SUNDAY_FIRST, 107
- wxCalculateLayoutEvent, 105
- wxCalculateLayoutEvent::GetFlags, 105
- wxCalculateLayoutEvent::GetRect, 106
- wxCalculateLayoutEvent::SetFlags, 106
- wxCalculateLayoutEvent::SetRect, 106
- wxCalculateLayoutEvent::wxCalculateLayoutEvent, 105
- wxCalendarCtrl, 108
- wxCalendarCtrl::~wxCalendarCtrl, 108
- wxCalendarCtrl::Create, 108
- wxCalendarCtrl::EnableHolidayDisplay, 109
- wxCalendarCtrl::EnableMonthChange, 109
- wxCalendarCtrl::EnableYearChange, 109
- wxCalendarCtrl::GetAttr, 111
- wxCalendarCtrl::GetDate, 109
- wxCalendarCtrl::GetHeaderColourBg, 109
- wxCalendarCtrl::GetHeaderColourFg, 109
- wxCalendarCtrl::GetHighlightColourBg, 110
- wxCalendarCtrl::GetHighlightColourFg, 110
- wxCalendarCtrl::GetHolidayColourBg, 110
- wxCalendarCtrl::GetHolidayColourFg, 110
- wxCalendarCtrl::HitTest, 111
- wxCalendarCtrl::ResetAttr, 111
- wxCalendarCtrl::SetAttr, 111
- wxCalendarCtrl::SetDate, 108
- wxCalendarCtrl::SetHeaderColours, 109
- wxCalendarCtrl::SetHighlightColours, 110
- wxCalendarCtrl::SetHoliday, 111
- wxCalendarCtrl::SetHolidayColours, 110
- wxCalendarCtrl::wxCalendarCtrl, 108
- wxCalendarDateAttr, 112
- wxCalendarDateAttr::GetBackgroundColour, 114
- wxCalendarDateAttr::GetBorder, 114
- wxCalendarDateAttr::GetBorderColour, 114
- wxCalendarDateAttr::GetFont, 114
- wxCalendarDateAttr::GetTextColour, 114
- wxCalendarDateAttr::HasBackgroundColour, 113
- wxCalendarDateAttr::HasBorder, 113
- wxCalendarDateAttr::HasBorderColour, 113
- wxCalendarDateAttr::HasFont, 113
- wxCalendarDateAttr::HasTextColour, 113
- wxCalendarDateAttr::IsHoliday, 113
- wxCalendarDateAttr::SetBackgroundColour, 112
- wxCalendarDateAttr::SetBorder, 113
- wxCalendarDateAttr::SetBorderColour, 112
- wxCalendarDateAttr::SetFont, 112
- wxCalendarDateAttr::SetHoliday, 113
- wxCalendarDateAttr::SetTextColour, 112
- wxCalendarDateAttr::wxCalendarDateAttr, 112
- wxCalendarEvent::GetDate, 114
- wxCalendarEvent::GetWeekDay, 114
- wxCalendarEvent::SetDate, 115
- wxCalendarEvent::SetWeekDay, 115
- wxCAPTION, 364, 520, 841, 846, 891
- wxCaret, 115, 116
- wxCaret::Create, 116
- wxCaret::GetBlinkTime, 116
- wxCaret::GetPosition, 116
- wxCaret::GetSize, 116
- wxCaret::GetWindow, 117
- wxCaret::Hide, 117
- wxCaret::IsOk, 117
- wxCaret::IsVisible, 117
- wxCaret::Move, 117
- wxCaret::SetBlinkTime, 117
- wxCaret::SetSize, 118
- wxCaret::Show, 118
- wxCaret::wxCaret, 115
- wxCB_DROPDOWN, 154
- wxCB_READONLY, 154
- wxCB_SIMPLE, 154
- wxCB_SORT, 154
- wxCHECK, 1482
- wxCHECK_GCC_VERSION, 1418
- wxCHECK_MSG, 1483
- wxCHECK_RET, 1483
- wxCHECK_VERSION, 1418
- wxCHECK_W32API_VERSION, 1418
- wxCHECK2, 1483
- wxCHECK2_MSG, 1483
- wxCheckBox, 119
- wxCheckBox::~wxCheckBox, 120
- wxCheckBox::Create, 120
- wxCheckBox::Get3StateValue, 120
- wxCheckBox::GetValue, 120
- wxCheckBox::Is3rdStateAllowedForUser, 120
- wxCheckBox::Is3State, 121
- wxCheckBox::IsChecked, 121

-
- wxCheckBox::Set3StateValue, 121
 - wxCheckBox::SetValue, 121
 - wxCheckBox::wxCheckBox, 119
 - wxCheckListBox, 122
 - wxCheckListBox::~~wxCheckListBox, 123
 - wxCheckListBox::Check, 123
 - wxCheckListBox::IsChecked, 124
 - wxCheckListBox::wxCheckListBox, 122
 - wxCHK_2STATE, 118
 - wxCHK_3STATE, 118
 - wxCHK_ALLOW_3RD_STATE_FOR_USER, 118
 - wxChoice, 125
 - wxChoice::~~wxChoice, 126
 - wxChoice::Create, 126
 - wxChoice::Delete, 126
 - wxChoice::GetColumns, 126
 - wxChoice::SetColumns, 127
 - wxChoice::wxChoice, 125
 - wxClassInfo, 127, 1525
 - wxClassInfo::CreateObject, 127
 - wxClassInfo::FindClass, 127
 - wxClassInfo::GetBaseClassName1, 128
 - wxClassInfo::GetBaseClassName2, 128
 - wxClassInfo::GetClassName, 128
 - wxClassInfo::GetSize, 128
 - wxClassInfo::InitializeClasses, 128
 - wxClassInfo::IsKindOf, 128
 - wxClassInfo::wxClassInfo, 127
 - wxClient, 129
 - wxClient::MakeConnection, 129
 - wxClient::OnMakeConnection, 129
 - wxClient::ValidHost, 130
 - wxClient::wxClient, 129
 - wxClientData, 131
 - wxClientData::~~wxClientData, 131
 - wxClientData::wxClientData, 131
 - wxClientDataContainer, 132
 - wxClientDataContainer::~~wxClientDataContainer, 132
 - wxClientDataContainer::GetClientData, 132
 - wxClientDataContainer::GetClientObject, 132
 - wxClientDataContainer::SetClientData, 132
 - wxClientDataContainer::SetClientObject, 132
 - wxClientDataContainer::wxClientDataContainer, 132
 - wxClientDC, 130
 - wxClientDC::wxClientDC, 130
 - wxClientDisplayRect, 1451
 - wxCLIP_CHILDREN, 1340
 - wxClipboard, 133
 - wxClipboard::~~wxClipboard, 133
 - wxClipboard::AddData, 134
 - wxClipboard::Clear, 134
 - wxClipboard::Close, 134
 - wxClipboard::Flush, 134
 - wxClipboard::GetData, 134
 - wxClipboard::IsOpened, 134
 - wxClipboard::IsSupported, 135
 - wxClipboard::Open, 135
 - wxClipboard::SetData, 135
 - wxClipboard::UsePrimarySelection, 135
 - wxClipboard::wxClipboard, 133
 - wxClipboardOpen, 1455
 - wxCLOSE_BOX, 364, 520, 891
 - wxCloseClipboard, 1455
 - wxCloseEvent, 136
 - wxCloseEvent::CanVeto, 136
 - wxCloseEvent::GetForce, 137
 - wxCloseEvent::GetLoggingOff, 137
 - wxCloseEvent::GetSessionEnding, 137
 - wxCloseEvent::SetCanVeto, 137
 - wxCloseEvent::SetForce, 137
 - wxCloseEvent::SetLoggingOff, 137
 - wxCloseEvent::Veto, 137
 - wxCloseEvent::wxCloseEvent, 136
 - wxCmdLineParser, 141, 142
 - wxCmdLineParser::~~wxCmdLineParser, 143
 - wxCmdLineParser::AddOption, 144
 - wxCmdLineParser::AddParam, 144
 - wxCmdLineParser::AddSwitch, 144
 - wxCmdLineParser::AreLongOptionsEnabled, 143
 - wxCmdLineParser::ConvertStringToArgs, 142
 - wxCmdLineParser::DisableLongOptions, 143
 - wxCmdLineParser::EnableLongOptions, 143
 - wxCmdLineParser::Found, 145, 146
 - wxCmdLineParser::GetParam, 146
 - wxCmdLineParser::GetParamCount, 146
 - wxCmdLineParser::Parse, 145
 - wxCmdLineParser::SetCmdLine, 142
 - wxCmdLineParser::SetDesc, 144
 - wxCmdLineParser::SetLogo, 143
 - wxCmdLineParser::SetSwitchChars, 143
 - wxCmdLineParser::Usage, 145
 - wxCmdLineParser::wxCmdLineParser, 141, 142
 - wxColour, 147
 - wxColour::Blue, 148
 - wxColour::GetPixel, 148
 - wxColour::Green, 148
 - wxColour::Ok, 148
 - wxColour::operator !=, 149
 - wxColour::operator =, 149
 - wxColour::operator ==, 149
 - wxColour::Red, 148
 - wxColour::Set, 148
 - wxColour::wxColour, 147
 - wxColourData, 149
 - wxColourData::~~wxColourData, 149
 - wxColourData::GetChooseFull, 150
 - wxColourData::GetColour, 150
 - wxColourData::GetCustomColour, 150
 - wxColourData::operator =, 151
 - wxColourData::SetChooseFull, 150
 - wxColourData::SetColour, 150
 - wxColourData::SetCustomColour, 150
 - wxColourData::wxColourData, 149
 - wxColourDatabase, 152
 - wxColourDatabase::AddColour, 152
 - wxColourDatabase::Find, 152
 - wxColourDatabase::FindColour, 152
 - wxColourDatabase::FindName, 152
 - wxColourDatabase::wxColourDatabase, 151
 - wxColourDialog, 153
 - wxColourDialog overview, 1602
 - wxColourDialog::~~wxColourDialog, 153
-

-
- wxColourDialog::Create, 153
 - wxColourDialog::GetColourData, 153
 - wxColourDialog::ShowModal, 153
 - wxColourDialog::wxColourDialog, 153
 - wxColourDisplay, 1451
 - wxComboBox, 154, 155
 - wxComboBox::~wxComboBox, 156
 - wxComboBox::Copy, 156
 - wxComboBox::Create, 156
 - wxComboBox::Cut, 156
 - wxComboBox::GetInsertionPoint, 156
 - wxComboBox::GetLastPosition, 156
 - wxComboBox::GetValue, 157
 - wxComboBox::Paste, 157
 - wxComboBox::Remove, 157
 - wxComboBox::Replace, 157
 - wxComboBox::SetInsertionPoint, 157
 - wxComboBox::SetInsertionPointEnd, 158
 - wxComboBox::SetSelection, 158
 - wxComboBox::SetValue, 158
 - wxComboBox::wxComboBox, 154
 - wxCommand, 159
 - wxCommand overview, 1609
 - wxCommand::~wxCommand, 159
 - wxCommand::CanUndo, 159
 - wxCommand::Do, 159
 - wxCommand::GetName, 159
 - wxCommand::Undo, 160
 - wxCommand::wxCommand, 159
 - wxCommandEvent, 164
 - wxCommandEvent::Checked, 164
 - wxCommandEvent::GetClientData, 164
 - wxCommandEvent::GetClientObject, 164
 - wxCommandEvent::GetExtraLong, 164
 - wxCommandEvent::GetInt, 164
 - wxCommandEvent::GetSelection, 165
 - wxCommandEvent::GetString, 165
 - wxCommandEvent::IsChecked, 165
 - wxCommandEvent::IsSelection, 165
 - wxCommandEvent::m_clientData, 163
 - wxCommandEvent::m_commandInt, 163
 - wxCommandEvent::m_commandString, 164
 - wxCommandEvent::m_extraLong, 164
 - wxCommandEvent::SetClientData, 165
 - wxCommandEvent::SetClientObject, 165
 - wxCommandEvent::SetExtraLong, 165
 - wxCommandEvent::SetInt, 166
 - wxCommandEvent::SetString, 166
 - wxCommandEvent::wxCommandEvent, 164
 - wxCommandProcessor, 166
 - wxCommandProcessor overview, 1610
 - wxCommandProcessor::~wxCommandProcessor, 166
 - wxCommandProcessor::CanUndo, 166
 - wxCommandProcessor::ClearCommands, 167
 - wxCommandProcessor::GetCommands, 167
 - wxCommandProcessor::GetEditMenu, 167
 - wxCommandProcessor::GetMaxCommands, 167
 - wxCommandProcessor::GetRedoAccelerator, 167
 - wxCommandProcessor::GetRedoMenuLabel, 167
 - wxCommandProcessor::GetUndoAccelerator, 167
 - wxCommandProcessor::GetUndoMenuLabel, 168
 - wxCommandProcessor::Initialize, 168
 - wxCommandProcessor::Redo, 167
 - wxCommandProcessor::SetEditMenu, 168
 - wxCommandProcessor::SetMenuStrings, 168
 - wxCommandProcessor::SetRedoAccelerator, 168
 - wxCommandProcessor::SetUndoAccelerator, 168
 - wxCommandProcessor::Submit, 168
 - wxCommandProcessor::Undo, 169
 - wxCommandProcessor::wxCommandProcessor, 166
 - wxCOMPILE_TIME_ASSERT, 1481, 1482
 - wxCOMPILE_TIME_ASSERT2, 1482
 - wxCONCAT, 1457
 - wxConcatFiles, 1430
 - wxCondition, 171
 - wxCondition::~wxCondition, 171
 - wxCondition::Broadcast, 171
 - wxCondition::IsOk, 171
 - wxCondition::Signal, 171
 - wxCondition::Wait, 172
 - wxCondition::WaitTimeout, 172
 - wxCondition::wxCondition, 171
 - wxConfigBase, 178
 - wxConfigBase::~wxConfigBase, 180
 - wxConfigBase::Create, 180
 - wxConfigBase::DeleteAll, 180
 - wxConfigBase::DeleteEntry, 180
 - wxConfigBase::DeleteGroup, 180
 - wxConfigBase::DontCreateOnDemand, 180
 - wxConfigBase::Exists, 180
 - wxConfigBase::Flush, 180
 - wxConfigBase::Get, 181
 - wxConfigBase::GetAppName, 181
 - wxConfigBase::GetEntryType, 181
 - wxConfigBase::GetFirstEntry, 181
 - wxConfigBase::GetFirstGroup, 181
 - wxConfigBase::GetNextEntry, 182
 - wxConfigBase::GetNextGroup, 182
 - wxConfigBase::GetNumberOfEntries, 182
 - wxConfigBase::GetNumberOfGroups, 182
 - wxConfigBase::GetPath, 182
 - wxConfigBase::GetVendorName, 182
 - wxConfigBase::HasEntry, 183
 - wxConfigBase::HasGroup, 183
 - wxConfigBase::IsExpandingEnvVars, 183
 - wxConfigBase::IsRecordingDefaults, 183
 - wxConfigBase::Read, 183
 - wxConfigBase::RenameEntry, 185
 - wxConfigBase::RenameGroup, 185
 - wxConfigBase::Set, 185
 - wxConfigBase::SetExpandEnvVars, 185
 - wxConfigBase::SetPath, 185
 - wxConfigBase::SetRecordDefaults, 185
 - wxConfigBase::SetUmask, 186
 - wxConfigBase::Write, 186
 - wxConfigBase::wxConfigBase, 178
-

wxConnection, 188
wxConnection::Advise, 188
wxConnection::Disconnect, 188
wxConnection::Execute, 188
wxConnection::OnAdvise, 188
wxConnection::OnDisconnect, 189
wxConnection::OnExecute, 189
wxConnection::OnPoke, 189
wxConnection::OnRequest, 189
wxConnection::OnStartAdvise, 189
wxConnection::OnStopAdvise, 189
wxConnection::Poke, 190
wxConnection::Request, 190
wxConnection::StartAdvise, 190
wxConnection::StopAdvise, 190
wxConnection::wxConnection, 188
wxConstCast, 1470
wxContextHelp, 191
wxContextHelp::~wxContextHelp, 191
wxContextHelp::BeginContextHelp, 191
wxContextHelp::EndContextHelp, 192
wxContextHelp::wxContextHelp, 191
wxContextHelpButton, 192
wxContextHelpButton::wxContextHelpButton,
192
wxControl::Command, 193
wxControl::GetClassDefaultAttributes, 1353
wxControl::GetDefaultAttributes, 1354
wxControl::GetLabel, 194
wxControl::SetLabel, 194
wxControlWithItems::Append, 194
wxControlWithItems::Clear, 195
wxControlWithItems::Delete, 195
wxControlWithItems::FindString, 196
wxControlWithItems::GetClientData, 196
wxControlWithItems::GetClientObject, 196
wxControlWithItems::GetCount, 197
wxControlWithItems::GetSelection, 197
wxControlWithItems::GetString, 197
wxControlWithItems::GetStringSelection, 197
wxControlWithItems::Insert, 198
wxControlWithItems::IsEmpty, 198
wxControlWithItems::Number, 198
wxControlWithItems::SetClientData, 199
wxControlWithItems::SetClientObject, 199
wxControlWithItems::SetSelection, 199
wxControlWithItems::SetString, 200
wxControlWithItems::SetStringSelection, 200
wxCopyFile, 1430
wxCountingOutputStream, 201
wxCountingOutputStream::~wxCountingOutputSt
ream, 201
wxCountingOutputStream::GetSize, 201
wxCountingOutputStream::wxCountingOutputStr
eam, 201
wxCreateDynamicObject, 1470
wxCreateFileTipProvider, 1441
wxCRIT_SECT_DECLARE, 1426
wxCRIT_SECT_DECLARE_MEMBER, 1426
wxCRIT_SECT_LOCKER, 1426
wxCRITICAL_SECTION, 1426
wxCriticalSection, 202
wxCriticalSection::~wxCriticalSection, 202
wxCriticalSection::Enter, 202
wxCriticalSection::Leave, 202
wxCriticalSection::wxCriticalSection, 202
wxCriticalSectionLocker, 203
wxCriticalSectionLocker::~wxCriticalSectionLock
er, 203
wxCriticalSectionLocker::wxCriticalSectionLocker
, 203
wxCSConv, 204, 1539
wxCSConv::~wxCSConv, 204
wxCSConv::MB2WC, 204
wxCSConv::WC2MB, 204
wxCSConv::wxCSConv, 204
wxCURHandler, 706
wxCurrentTipProvider::GetCurrentTip, 1262
wxCursor, 205, 206
wxCursor::~wxCursor, 209
wxCursor::Ok, 209
wxCursor::operator !=, 210
wxCursor::operator =, 209
wxCursor::operator ==, 209
wxCursor::wxCursor, 205
wxCustomDataObject, 210
wxCustomDataObject::~wxCustomDataObject,
211
wxCustomDataObject::Alloc, 211
wxCustomDataObject::Free, 211
wxCustomDataObject::GetData, 211
wxCustomDataObject::GetSize, 211
wxCustomDataObject::SetData, 211
wxCustomDataObject::TakeData, 211
wxCustomDataObject::wxCustomDataObject,
210
wxDataFormat, 213
wxDataFormat::GetId, 213
wxDataFormat::GetType, 213
wxDataFormat::operator !=, 213
wxDataFormat::operator ==, 213
wxDataFormat::SetId, 214
wxDataFormat::SetType, 214
wxDataFormat::wxDataFormat, 213
wxDataInputStream, 215
wxDataInputStream::~wxDataInputStream, 215
wxDataInputStream::BigEndianOrdered, 215
wxDataInputStream::Read16, 215
wxDataInputStream::Read32, 216
wxDataInputStream::Read64, 216
wxDataInputStream::Read8, 215
wxDataInputStream::ReadDouble, 216
wxDataInputStream::ReadString, 216
wxDataInputStream::wxDataInputStream, 214
wxDataObject, 219
wxDataObject::~wxDataObject, 219
wxDataObject::GetAllFormats, 219
wxDataObject::GetDataHere, 219
wxDataObject::GetDataSize, 219
wxDataObject::GetFormatCount, 219
wxDataObject::GetPreferredFormat, 219
wxDataObject::SetData, 220
wxDataObject::wxDataObject, 219
wxDataObjectComposite, 220

wxDataObjectComposite::Add, 220
wxDataObjectComposite::wxDataObjectComposite, 220
wxDataObjectSimple, 221
wxDataObjectSimple::GetDataHere, 222
wxDataObjectSimple::GetDataSize, 222
wxDataObjectSimple::GetFormat, 221
wxDataObjectSimple::SetData, 222
wxDataObjectSimple::SetFormat, 221
wxDataObjectSimple::wxDataObjectSimple, 221
wxDataOutputStream, 223
wxDataOutputStream::~~wxDataOutputStream, 223
wxDataOutputStream::BigEndianOrdered, 223
wxDataOutputStream::Write16, 223
wxDataOutputStream::Write32, 224
wxDataOutputStream::Write64, 224
wxDataOutputStream::Write8, 223
wxDataOutputStream::WriteDouble, 224
wxDataOutputStream::WriteString, 224
wxDataOutputStream::wxDataOutputStream, 223
wxDateSpan, 225
wxDateSpan::Add, 226
wxDateSpan::Day, 226
wxDateSpan::Days, 226
wxDateSpan::GetDays, 226
wxDateSpan::GetMonths, 226
wxDateSpan::GetTotalDays, 226
wxDateSpan::GetWeeks, 227
wxDateSpan::GetYears, 227
wxDateSpan::Month, 227
wxDateSpan::Months, 227
wxDateSpan::Multiply, 227
wxDateSpan::Neg, 228
wxDateSpan::Negate, 228
wxDateSpan::operator!=, 230
wxDateSpan::operator==, 229
wxDateSpan::SetDays, 228
wxDateSpan::SetMonths, 228
wxDateSpan::SetWeeks, 228
wxDateSpan::SetYears, 228
wxDateSpan::Subtract, 229
wxDateSpan::Week, 229
wxDateSpan::Weeks, 229
wxDateSpan::wxDateSpan, 225
wxDateSpan::Year, 229
wxDateSpan::Years, 229
wxDateTime, 241, 242
wxDateTime and Holidays, 1534
wxDateTime characteristics, 1532
wxDateTime::Add, 248
wxDateTime::ConvertYearToBC, 237
wxDateTime::Format, 250
wxDateTime::FormatDate, 251
wxDateTime::FormatISODate, 251
wxDateTime::FormatISOTime, 251
wxDateTime::FormatTime, 251
wxDateTime::GetAmPmStrings, 238
wxDateTime::GetAsDOS, 247
wxDateTime::GetBeginDST, 238
wxDateTime::GetCentury, 239
wxDateTime::GetCountry, 238
wxDateTime::GetCurrentMonth, 238
wxDateTime::GetCurrentYear, 238
wxDateTime::GetDay, 245
wxDateTime::GetDayOfYear, 246
wxDateTime::GetEndDST, 239
wxDateTime::GetHour, 245
wxDateTime::GetJDN, 254
wxDateTime::GetJulianDayNumber, 254
wxDateTime::GetLastMonthDay, 253
wxDateTime::GetLastWeekDay, 253
wxDateTime::GetMillisecond, 245
wxDateTime::GetMinute, 245
wxDateTime::GetMJD, 254
wxDateTime::GetModifiedJulianDayNumber, 254
wxDateTime::GetMonth, 245
wxDateTime::GetMonthName, 239
wxDateTime::GetNextWeekDay, 252
wxDateTime::GetNumberOfDays, 239
wxDateTime::GetPrevWeekDay, 252
wxDateTime::GetRataDie, 254
wxDateTime::GetSecond, 245
wxDateTime::GetTicks, 244
wxDateTime::GetTm, 244
wxDateTime::GetWeek, 253
wxDateTime::GetWeekDay, 245, 252
wxDateTime::GetWeekDayInSameWeek, 251
wxDateTime::GetWeekDayName, 239
wxDateTime::GetWeekOfMonth, 246
wxDateTime::GetWeekOfYear, 246
wxDateTime::GetYear, 245
wxDateTime::GetYearDay, 254
wxDateTime::IsBetween, 247
wxDateTime::IsDST, 255
wxDateTime::IsDSTApplicable, 240
wxDateTime::IsEarlierThan, 247
wxDateTime::IsEqualTo, 247
wxDateTime::IsEqualUpTo, 248
wxDateTime::IsGregorianDate, 246
wxDateTime::IsLaterThan, 247
wxDateTime::IsLeapYear, 240
wxDateTime::IsSameDate, 247
wxDateTime::IsSameTime, 248
wxDateTime::IsStrictlyBetween, 247
wxDateTime::IsValid, 244
wxDateTime::IsWestEuropeanCountry, 240
wxDateTime::IsWorkDay, 246
wxDateTime::MakeGMT, 255
wxDateTime::MakeTimezone, 255
wxDateTime::Now, 240
wxDateTime::operator=, 244
wxDateTime::ParseDate, 250
wxDateTime::ParseDateTime, 250
wxDateTime::ParseFormat, 249
wxDateTime::ParseRfc822Date, 249
wxDateTime::ParseTime, 250
wxDateTime::ResetTime, 243
wxDateTime::Set, 242, 243
wxDateTime::SetCountry, 240
wxDateTime::SetDay, 243
wxDateTime::SetFromDOS, 246
wxDateTime::SetHour, 243
wxDateTime::SetMillisecond, 244

-
- wxDatetime::SetMinute, 244
 - wxDatetime::SetMonth, 243
 - wxDatetime::SetSecond, 244
 - wxDatetime::SetToCurrent, 242
 - wxDatetime::SetToLastMonthDay, 253
 - wxDatetime::SetToLastWeekDay, 253
 - wxDatetime::SetToNextWeekDay, 252
 - wxDatetime::SetToPrevWeekDay, 252
 - wxDatetime::SetToTheWeek, 253
 - wxDatetime::SetToWeekDay, 252
 - wxDatetime::SetToWeekDayInSameWeek, 251
 - wxDatetime::SetToYearDay, 253
 - wxDatetime::SetYear, 243
 - wxDatetime::Subtract, 248, 249
 - wxDatetime::Today, 241
 - wxDatetime::ToGMT, 255
 - wxDatetime::ToTimezone, 255
 - wxDatetime::UNow, 241
 - wxDatetime::wxDatetime, 241, 242
 - wxDb, 264
 - wxDb/wxDbTable wxODBC Overview, 1624
 - wxDb::Catalog, 265
 - wxDb::Close, 266
 - wxDb::CommitTrans, 266
 - wxDb::CreateView, 267
 - wxDb::Dbms, 268
 - wxDb::DispAllErrors, 268
 - wxDb::DispNextError, 269
 - wxDb::DropView, 270
 - wxDb::ExecSql, 270
 - wxDb::FwdOnlyCursors, 271
 - wxDb::GetCatalog, 271
 - wxDb::GetColumnCount, 272
 - wxDb::GetColumns, 272
 - wxDb::GetData, 273
 - wxDb::GetDatabaseName, 275
 - wxDb::GetDatasourceName, 275
 - wxDb::GetHDBC, 275
 - wxDb::GetHENV, 275
 - wxDb::GetHSTMT, 275
 - wxDb::GetKeyFields, 275
 - wxDb::GetNext, 276
 - wxDb::GetNextError, 276
 - wxDb::GetPassword, 277
 - wxDb::GetTableCount, 277
 - wxDb::GetUsername, 277
 - wxDb::Grant, 277
 - wxDb::IsFwdOnlyCursors, 278
 - wxDb::IsOpen, 279
 - wxDb::LogError, 279
 - wxDb::ModifyColumn, 279
 - wxDb::Open, 280
 - wxDb::RollbackTrans, 283
 - wxDb::SetDebugErrorMessages, 283
 - wxDb::SetSqlLogging, 283
 - wxDb::SQLColumnName, 284
 - wxDb::SQLTableName, 284
 - wxDb::TableExists, 285
 - wxDb::TablePrivileges, 286
 - wxDb::TranslateSqlState, 287
 - wxDb::WriteSqlLog, 287
 - wxDb::wxDb, 264
 - wxDbCloseConnections, 262
 - wxDbColDef::Initialize, 289
 - wxDbColFor::Format, 290
 - wxDbColFor::Initialize, 290
 - wxDbCollInf::Initialize, 291
 - wxDbConnectInf, 291
 - wxDbConnectInf::~wxDbConnectInf, 292
 - wxDbConnectInf::AllocHenv, 293
 - wxDbConnectInf::FreeHenv, 293
 - wxDbConnectInf::GetAuthStr, 293
 - wxDbConnectInf::GetDefaultDir, 293
 - wxDbConnectInf::GetDescription, 294
 - wxDbConnectInf::GetDsn, 294
 - wxDbConnectInf::GetFileType, 294
 - wxDbConnectInf::GetHenv, 294
 - wxDbConnectInf::GetPassword, 294
 - wxDbConnectInf::GetUid, 294
 - wxDbConnectInf::GetUserID, 294
 - wxDbConnectInf::Initialize, 293
 - wxDbConnectInf::SetAuthStr, 295
 - wxDbConnectInf::SetDefaultDir, 295
 - wxDbConnectInf::SetDescription, 295
 - wxDbConnectInf::SetDsn, 295
 - wxDbConnectInf::SetFileType, 295
 - wxDbConnectInf::SetHenv, 295
 - wxDbConnectInf::SetPassword, 295
 - wxDbConnectInf::SetUid, 296
 - wxDbConnectInf::SetUserID, 296
 - wxDbConnectInf::wxDbConnectInf, 291
 - wxDbConnectionsInUse, 263
 - wxDbFreeConnection, 263
 - wxDbGetConnection, 263
 - wxDbGetDataSource, 264
 - wxDbGridCollInfo, 333
 - wxDbGridCollInfo::~wxDbGridCollInfo, 334
 - wxDbGridCollInfo::AddCollInfo, 334
 - wxDbGridCollInfo::wxDbGridCollInfo, 333
 - wxDbGridTableBase, 336
 - wxDbGridTableBase::AssignDbTable, 337
 - wxDbGridTableBase::UpdateRow, 337
 - wxDbGridTableBase::ValidateRow, 337
 - wxDbGridTableBase::wxDbGridTableBase, 336
 - wxDbInf::Initialize, 297
 - wxDbLogExtendedErrorMsg, 264
 - wxDbSqlLog, 264
 - wxDbTable, 298
 - wxDbTable::BuildDeleteStmt, 299
 - wxDbTable::BuildSelectStmt, 299
 - wxDbTable::BuildUpdateStmt, 300
 - wxDbTable::BuildWhereStmt, 301
 - wxDbTable::CanSelectForUpdate, 302
 - wxDbTable::CanUpdateByROWID, 302
 - wxDbTable::ClearMemberVar, 303
 - wxDbTable::ClearMemberVars, 303
 - wxDbTable::CloseCursor, 304
 - wxDbTable::Count, 304
 - wxDbTable::CreateIndex, 305
 - wxDbTable::CreateTable, 307
 - wxDbTable::DB_STATUS, 307
 - wxDbTable::Delete, 307
 - wxDbTable::DeleteCursor, 308
 - wxDbTable::DeleteMatching, 308
-

wxDcTable::DeleteWhere, 309
wxDcTable::DropIndex, 310
wxDcTable::DropTable, 310
wxDcTable::From, 311
wxDcTable::GetColDefs, 311
wxDcTable::GetCursor, 312
wxDcTable::GetDb, 312
wxDcTable::GetFirst, 312
wxDcTable::GetFromClause, 312
wxDcTable::GetLast, 313
wxDcTable::GetNewCursor, 313
wxDcTable::GetNext, 313
wxDcTable::GetNumberOfColumns, 314
wxDcTable::GetOrderByClause, 314
wxDcTable::GetPrev, 314
wxDcTable::GetQueryTableName, 315
wxDcTable::GetRowNum, 315
wxDcTable::GetTableName, 315
wxDcTable::GetTablePath, 315
wxDcTable::GetWhereClause, 315
wxDcTable::Insert, 316
wxDcTable::IsColNull, 317
wxDcTable::IsCursorClosedOnCommit, 317
wxDcTable::IsQueryOnly, 317
wxDcTable::Open, 318
wxDcTable::operator --, 332
wxDcTable::operator ++, 332
wxDcTable::OrderBy, 318
wxDcTable::Query, 319
wxDcTable::QueryBySqlStmt, 320
wxDcTable::QueryMatching, 322
wxDcTable::QueryOnKeyFields, 323
wxDcTable::Refresh, 324
wxDcTable::SetColDefs, 324
wxDcTable::SetColNull, 328
wxDcTable::SetCursor, 327
wxDcTable::SetFromClause, 327
wxDcTable::SetOrderByClause, 329
wxDcTable::SetQueryTimeout, 329
wxDcTable::SetWhereClause, 330
wxDcTable::Update, 331
wxDcTable::UpdateWhere, 331
wxDcTable::Where, 332
wxDcTable::wxDcTable, 298, 299
wxDcTableInf::Initialize, 333
wxDc, 344
wxDc::~wxDc, 344
wxDc::BeginDrawing, 344
wxDc::Blit, 345
wxDc::CalcBoundingBox, 346
wxDc::Clear, 347
wxDc::CrossHair, 347
wxDc::DestroyClippingRegion, 347
wxDc::DeviceToLogicalX, 347
wxDc::DeviceToLogicalXRel, 347
wxDc::DeviceToLogicalY, 347
wxDc::DeviceToLogicalYRel, 347
wxDc::DrawArc, 348
wxDc::DrawBitmap, 348
wxDc::DrawCheckMark, 348
wxDc::DrawCircle, 348
wxDc::DrawEllipse, 348
wxDc::DrawEllipticArc, 349
wxDc::DrawIcon, 349
wxDc::DrawLine, 349
wxDc::DrawLines, 349
wxDc::DrawPoint, 351
wxDc::DrawPolygon, 350
wxDc::DrawPolyPolygon, 350
wxDc::DrawRectangle, 351
wxDc::DrawRotatedText, 351
wxDc::DrawRoundedRectangle, 351
wxDc::DrawSpline, 352
wxDc::DrawText, 352
wxDc::EndDoc, 352
wxDc::EndDrawing, 352
wxDc::EndPage, 353
wxDc::FloodFill, 353
wxDc::GetBackground, 353
wxDc::GetBackgroundMode, 353
wxDc::GetBrush, 353
wxDc::GetCharHeight, 353
wxDc::GetCharWidth, 354
wxDc::GetClippingBox, 354
wxDc::GetFont, 354
wxDc::GetLogicalFunction, 354
wxDc::GetMapMode, 354
wxDc::GetOptimization, 354
wxDc::GetPartialTextExtents, 354
wxDc::GetPen, 355
wxDc::GetPixel, 355
wxDc::GetPPI, 355
wxDc::GetSize, 355
wxDc::GetSizeMM, 356
wxDc::GetTextBackground, 356
wxDc::GetTextExtent, 356
wxDc::GetTextForeground, 357
wxDc::GetUserScale, 357
wxDc::LogicalToDeviceX, 357
wxDc::LogicalToDeviceXRel, 357
wxDc::LogicalToDeviceY, 357
wxDc::LogicalToDeviceYRel, 357
wxDc::MaxX, 358
wxDc::MaxY, 358
wxDc::MinX, 358
wxDc::MinY, 358
wxDc::Ok, 358
wxDc::ResetBoundingBox, 358
wxDc::SetAxisOrientation, 358
wxDc::SetBackground, 359
wxDc::SetBackgroundMode, 359
wxDc::SetBrush, 360
wxDc::SetClippingRegion, 359
wxDc::SetDeviceOrigin, 359
wxDc::SetFont, 360
wxDc::SetLogicalFunction, 360
wxDc::SetMapMode, 361
wxDc::SetOptimization, 361
wxDc::SetPalette, 360
wxDc::SetPen, 362
wxDc::SetTextBackground, 362
wxDc::SetTextForeground, 362
wxDc::SetUserScale, 362
wxDc::StartDoc, 362

-
- wxDC::StartPage, 362
 - wxDC::wxDC, 344
 - wxDCClipper, 363
 - wxDCClipper::~wxDCClipper, 363
 - wxDCClipper::wxDCClipper, 363
 - wxDD_NEW_DIR_BUTTON, 380
 - wxDDECleanUp, 1459
 - wxDDEInitialize, 1459
 - WXDEBUG_NEW, 1470
 - wxDebugContext overview, 1551
 - wxDebugContext::Check, 338
 - wxDebugContext::Dump, 338
 - wxDebugContext::GetCheckPrevious, 338
 - wxDebugContext::GetDebugMode, 339
 - wxDebugContext::GetLevel, 339
 - wxDebugContext::GetStream, 339
 - wxDebugContext::GetStreamBuf, 339
 - wxDebugContext::HasStream, 340
 - wxDebugContext::PrintClasses, 340
 - wxDebugContext::PrintStatistics, 340
 - wxDebugContext::SetCheckpoint, 340
 - wxDebugContext::SetCheckPrevious, 341
 - wxDebugContext::SetDebugMode, 341
 - wxDebugContext::SetFile, 341
 - wxDebugContext::SetLevel, 341
 - wxDebugContext::SetStandardError, 342
 - wxDebugContext::SetStream, 342
 - wxDebugMsg, 1472
 - wxDEFAULT_DIALOG_STYLE, 364
 - wxDEFAULT_FRAME_STYLE, 520, 841, 846, 891
 - wxDelegateRendererNative, 343
 - wxDelegateRendererNative::DrawXXX, 344
 - wxDelegateRendererNative::wxDelegateRenderNative, 343
 - wxDialog, 365
 - wxDialog::~wxDialog, 366
 - wxDialog::Centre, 366
 - wxDialog::Create, 366
 - wxDialog::EndModal, 367
 - wxDialog::GetReturnCode, 367
 - wxDialog::GetTitle, 367
 - wxDialog::Iconize, 367
 - wxDialog::IsIconized, 368
 - wxDialog::IsModal, 368
 - wxDialog::OnApply, 368
 - wxDialog::OnCancel, 368
 - wxDialog::OnCharHook, 368
 - wxDialog::OnOK, 369
 - wxDialog::OnSysColourChanged, 369
 - wxDialog::SetIcon, 369
 - wxDialog::SetIcons, 370
 - wxDialog::SetModal, 370
 - wxDialog::SetReturnCode, 370
 - wxDialog::SetTitle, 371
 - wxDialog::Show, 371
 - wxDialog::ShowModal, 371
 - wxDialog::wxDialog, 365
 - wxDIALOG_EX_CONTEXTHELP, 365
 - wxDIALOG_NO_PARENT, 365
 - wxDialUpEvent, 372
 - wxDialUpEvent::IsConnectedEvent, 372
 - wxDialUpEvent::IsOwnEvent, 372
 - wxDialUpEvent::wxDialUpEvent, 372
 - wxDialUpManager::~~wxDialUpManager, 373
 - wxDialUpManager::CancelDialing, 374
 - wxDialUpManager::Create, 373
 - wxDialUpManager::Dial, 374
 - wxDialUpManager::DisableAutoCheckOnlineStatus, 375
 - wxDialUpManager::EnableAutoCheckOnlineStatus, 375
 - wxDialUpManager::GetISPNames, 373
 - wxDialUpManager::HangUp, 374
 - wxDialUpManager::IsAlwaysOnline, 375
 - wxDialUpManager::IsDialing, 374
 - wxDialUpManager::IsOk, 373
 - wxDialUpManager::IsOnline, 375
 - wxDialUpManager::SetConnectCommand, 376
 - wxDialUpManager::SetOnlineStatus, 375
 - wxDialUpManager::SetWellKnownHost, 376
 - wxDir, 377
 - wxDir::~~wxDir, 377
 - wxDir::Exists, 377
 - wxDir::GetAllFiles, 378
 - wxDir::GetFirst, 378
 - wxDir::GetName, 378
 - wxDir::GetNext, 378
 - wxDir::HasFiles, 378
 - wxDir::HasSubDirs, 378
 - wxDir::IsOpened, 379
 - wxDir::Open, 379
 - wxDir::Traverse, 379
 - wxDir::wxDir, 377
 - wxDIRCTRL_3D_INTERNAL, 549
 - wxDIRCTRL_DIR_ONLY, 549
 - wxDIRCTRL_EDIT_LABELS, 549
 - wxDIRCTRL_SELECT_FIRST, 549
 - wxDIRCTRL_SHOW_FILTERS, 549
 - wxDirDialog, 380
 - wxDirDialog overview, 1604
 - wxDirDialog::~~wxDirDialog, 381
 - wxDirDialog::GetMessage, 381
 - wxDirDialog::GetPath, 381
 - wxDirDialog::GetStyle, 381
 - wxDirDialog::SetMessage, 381
 - wxDirDialog::SetPath, 381
 - wxDirDialog::SetStyle, 381
 - wxDirDialog::ShowModal, 381
 - wxDirDialog::wxDirDialog, 380
 - wxDirExists, 1428
 - wxDirSelector, 1442
 - wxDirTraverser::OnDir, 383
 - wxDirTraverser::OnFile, 383
 - wxDisplay, 384
 - wxDisplay::~~wxDisplay, 384
 - wxDisplay::GetCount, 384
 - wxDisplay::GetDepth, 384
 - wxDisplay::GetFromPoint, 384
 - wxDisplay::GetGeometry, 384
 - wxDisplay::GetName, 385
 - wxDisplay::IsColor, 385
 - wxDisplay::IsColour, 385
 - wxDisplay::IsPrimary, 385
-

-
- wxDisplay::wxDisplay, 384
 - wxDisplayDepth, 1451
 - wxDisplaySize, 1451
 - wxDisplaySizeMM, 1451
 - wxDllLoader::GetDllExt, 386
 - wxDllLoader::GetProgramHandle, 386
 - wxDllLoader::GetSymbol, 387
 - wxDllLoader::LoadLibrary, 387
 - wxDllLoader::UnloadLibrary, 387
 - wxDocChildFrame, 388
 - wxDocChildFrame::~~wxDocChildFrame, 388
 - wxDocChildFrame::GetDocument, 389
 - wxDocChildFrame::GetView, 389
 - wxDocChildFrame::m_childDocument, 388
 - wxDocChildFrame::m_childView, 388
 - wxDocChildFrame::OnActivate, 389
 - wxDocChildFrame::OnCloseWindow, 389
 - wxDocChildFrame::SetDocument, 389
 - wxDocChildFrame::SetView, 389
 - wxDocChildFrame::wxDocChildFrame, 388
 - wxDocManager, 391
 - wxDocManager overview, 1609
 - wxDocManager::~~wxDocManager, 391
 - wxDocManager::ActivateView, 391
 - wxDocManager::AddDocument, 391
 - wxDocManager::AddFileToHistory, 391
 - wxDocManager::AssociateTemplate, 392
 - wxDocManager::CloseDocuments, 392
 - wxDocManager::CreateDocument, 392
 - wxDocManager::CreateView, 392
 - wxDocManager::DisassociateTemplate, 392
 - wxDocManager::FileHistoryAddFilesToMenu, 392
 - wxDocManager::FileHistoryLoad, 393
 - wxDocManager::FileHistoryRemoveMenu, 393
 - wxDocManager::FileHistorySave, 393
 - wxDocManager::FileHistoryUseMenu, 393
 - wxDocManager::FindTemplateForPath, 393
 - wxDocManager::GetCurrentDocument, 393
 - wxDocManager::GetCurrentView, 394
 - wxDocManager::GetDocuments, 394
 - wxDocManager::GetFileHistory, 394
 - wxDocManager::GetHistoryFilesCount, 394
 - wxDocManager::GetLastDirectory, 394
 - wxDocManager::GetMaxDocsOpen, 394
 - wxDocManager::Initialize, 394
 - wxDocManager::m_currentView, 390
 - wxDocManager::m_defaultDocumentNameCounter, 390
 - wxDocManager::m_docs, 390
 - wxDocManager::m_fileHistory, 390
 - wxDocManager::m_flags, 390
 - wxDocManager::m_lastDirectory, 391
 - wxDocManager::m_maxDocsOpen, 390
 - wxDocManager::m_templates, 391
 - wxDocManager::MakeDefaultName, 395
 - wxDocManager::OnCreateFileHistory, 395
 - wxDocManager::OnFileClose, 395
 - wxDocManager::OnFileCloseAll, 395
 - wxDocManager::OnFileNew, 395
 - wxDocManager::OnFileOpen, 395
 - wxDocManager::OnFileSave, 395
 - wxDocManager::OnFileSaveAs, 396
 - wxDocManager::OnMenuCommand, 396
 - wxDocManager::RemoveDocument, 396
 - wxDocManager::SelectDocumentPath, 396
 - wxDocManager::SelectDocumentType, 397
 - wxDocManager::SelectViewType, 397
 - wxDocManager::SetLastDirectory, 398
 - wxDocManager::SetMaxDocsOpen, 398
 - wxDocManager::wxDocManager, 391
 - wxDocMDIChildFrame, 399
 - wxDocMDIChildFrame::~~wxDocMDIChildFrame, 399
 - wxDocMDIChildFrame::GetDocument, 399
 - wxDocMDIChildFrame::GetView, 399
 - wxDocMDIChildFrame::m_childDocument, 398
 - wxDocMDIChildFrame::m_childView, 399
 - wxDocMDIChildFrame::OnActivate, 399
 - wxDocMDIChildFrame::OnCloseWindow, 399
 - wxDocMDIChildFrame::SetDocument, 399
 - wxDocMDIChildFrame::SetView, 400
 - wxDocMDIChildFrame::wxDocMDIChildFrame, 399
 - wxDocMDIParentFrame::~~wxDocMDIParentFrame, 400
 - wxDocMDIParentFrame::OnCloseWindow, 401
 - wxDocMDIParentFrame::wxDocMDIParentFrame, 400
 - wxDocParentFrame, 400, 402
 - wxDocParentFrame::~~wxDocParentFrame, 402
 - wxDocParentFrame::OnCloseWindow, 402
 - wxDocParentFrame::wxDocParentFrame, 401
 - wxDocTemplate, 404
 - wxDocTemplate overview, 1608
 - wxDocTemplate::~~wxDocTemplate, 405
 - wxDocTemplate::CreateDocument, 405
 - wxDocTemplate::CreateView, 405
 - wxDocTemplate::GetDefaultExtension, 405
 - wxDocTemplate::GetDescription, 406
 - wxDocTemplate::GetDirectory, 406
 - wxDocTemplate::GetDocumentManager, 406
 - wxDocTemplate::GetDocumentName, 406
 - wxDocTemplate::GetFileFilter, 406
 - wxDocTemplate::GetFlags, 406
 - wxDocTemplate::GetViewName, 406
 - wxDocTemplate::IsVisible, 406
 - wxDocTemplate::m_defaultExt, 402
 - wxDocTemplate::m_description, 403
 - wxDocTemplate::m_directory, 403
 - wxDocTemplate::m_docClassInfo, 403
 - wxDocTemplate::m_docTypeName, 403
 - wxDocTemplate::m_documentManager, 403
 - wxDocTemplate::m_fileFilter, 403
 - wxDocTemplate::m_flags, 403
 - wxDocTemplate::m_viewClassInfo, 403
 - wxDocTemplate::m_viewTypeName, 404
 - wxDocTemplate::SetDefaultExtension, 407
 - wxDocTemplate::SetDescription, 407
 - wxDocTemplate::SetDirectory, 407
 - wxDocTemplate::SetDocumentManager, 407
 - wxDocTemplate::SetFileFilter, 407
 - wxDocTemplate::SetFlags, 407
 - wxDocTemplate::wxDocTemplate, 404
-

wxDocument, 409
wxDocument overview, 1607
wxDocument::~~wxDocument, 409
wxDocument::AddView, 409
wxDocument::Close, 409
wxDocument::DeleteAllViews, 409
wxDocument::GetCommandProcessor, 409
wxDocument::GetDocumentManager, 410
wxDocument::GetDocumentName, 410
wxDocument::GetDocumentTemplate, 410
wxDocument::GetDocumentWindow, 410
wxDocument::GetFilename, 410
wxDocument::GetFirstView, 410
wxDocument::GetPrintableName, 410
wxDocument::GetTitle, 411
wxDocument::GetViews, 411
wxDocument::IsModified, 411
wxDocument::LoadObject, 411
wxDocument::m_commandProcessor, 408
wxDocument::m_documentFile, 408
wxDocument::m_documentModified, 408
wxDocument::m_documentTemplate, 408
wxDocument::m_documentTitle, 408
wxDocument::m_documentTypeName, 408
wxDocument::m_documentViews, 409
wxDocument::Modify, 411
wxDocument::OnChangedViewList, 411
wxDocument::OnCloseDocument, 412
wxDocument::OnCreate, 412
wxDocument::OnCreateCommandProcessor, 412
wxDocument::OnNewDocument, 412
wxDocument::OnOpenDocument, 412
wxDocument::OnSaveDocument, 412
wxDocument::OnSaveModified, 413
wxDocument::RemoveView, 413
wxDocument::Save, 413
wxDocument::SaveAs, 413
wxDocument::SaveObject, 413
wxDocument::SetCommandProcessor, 413
wxDocument::SetDocumentName, 414
wxDocument::SetDocumentTemplate, 414
wxDocument::SetFilename, 414
wxDocument::SetTitle, 414
wxDocument::UpdateAllViews, 414
wxDocument::wxDocument, 409
wxDos2UnixFilename, 1428
wxDOUBLE_BORDER, 1339
wxDragImage, 415, 416
wxDragImage::BeginDrag, 416
wxDragImage::DoDrawImage, 417
wxDragImage::EndDrag, 417
wxDragImage::GetImageRect, 418
wxDragImage::Hide, 418
wxDragImage::Move, 418
wxDragImage::Show, 418
wxDragImage::UpdateBackingFromWindow, 418
wxDragImage::wxDragImage, 415
wxDragResult, 421, 423
wxDROP_ICON, 1451
wxDropFilesEvent, 419
wxDropFilesEvent::GetFiles, 420
wxDropFilesEvent::GetNumberOfFiles, 420
wxDropFilesEvent::GetPosition, 420
wxDropFilesEvent::m_files, 419
wxDropFilesEvent::m_noFiles, 420
wxDropFilesEvent::m_pos, 420
wxDropFilesEvent::wxDropFilesEvent, 419
wxDropSource, 421
wxDropSource::~~wxDropSource, 422
wxDropSource::DoDragDrop, 422
wxDropSource::GiveFeedback, 422
wxDropSource::SetData, 422
wxDropSource::wxDropSource, 421
wxDropTarget, 424
wxDropTarget::~~wxDropTarget, 424
wxDropTarget::GetData, 424
wxDropTarget::OnData, 424
wxDropTarget::OnDragOver, 425
wxDropTarget::OnDrop, 424
wxDropTarget::OnEnter, 424
wxDropTarget::OnLeave, 425
wxDropTarget::SetDataObject, 426
wxDropTarget::wxDropTarget, 424
wxDynamicCast, 1470
wxDynamicCastThis, 1471
wxDynamicLibrary, 426
wxDynamicLibrary::CanonicalizeName, 426
wxDynamicLibrary::CanonicalizePluginName, 426
wxDynamicLibrary::Detach, 427
wxDynamicLibrary::GetSymbol, 427
wxDynamicLibrary::IsLoaded, 427
wxDynamicLibrary::Load, 427
wxDynamicLibrary::Unload, 427
wxDynamicLibrary::wxDynamicLibrary, 426
wxDYNLIB_FUNCTION, 1457
wxEdge, 734
wxEmptyClipboard, 1455
wxEnableTopLevelWindow, 1459
wxEncodingConverter, 428
wxEncodingConverter::CanConvert, 429
wxEncodingConverter::Convert, 429
wxEncodingConverter::GetAllEquivalents, 431
wxEncodingConverter::GetPlatformEquivalents, 430
wxEncodingConverter::Init, 428
wxEncodingConverter::wxEncodingConverter, 428
wxEndBusyCursor, 1443
wxENTER_CRIT_SECT, 1427
wxEntry, 1419
wxEnumClipboardFormats, 1455
wxEraseEvent, 432
wxEraseEvent::GetDC, 432
wxEraseEvent::m_dc, 432
wxEraseEvent::wxEraseEvent, 432
wxError, 1473
wxEvent, 433
wxEvent::Clone, 434
wxEvent::GetEventObject, 434
wxEvent::GetEventType, 434
wxEvent::GetId, 434
wxEvent::GetSkipped, 434

wxEvtHandler::GetTimestamp, 434
wxEvtHandler::IsCommandEvent, 435
wxEvtHandler::m_eventObject, 433
wxEvtHandler::m_eventType, 433
wxEvtHandler::m_id, 433
wxEvtHandler::m_propagationLevel, 433
wxEvtHandler::m_skipped, 433
wxEvtHandler::m_timeStamp, 433
wxEvtHandler::ResumePropagation, 435
wxEvtHandler::SetEventObject, 435
wxEvtHandler::SetEventType, 435
wxEvtHandler::SetId, 435
wxEvtHandler::SetTimestamp, 435
wxEvtHandler::ShouldPropagate, 435
wxEvtHandler::Skip, 435
wxEvtHandler::StopPropagation, 436
wxEvtHandler::widthSash, 1137
wxEvtHandler::wxEvtHandler, 433
wxEvtHandler, 436
wxEvtHandler::~~wxEvtHandler, 436
wxEvtHandler::AddPendingEvent, 436
wxEvtHandler::Connect, 437
wxEvtHandler::Disconnect, 438
wxEvtHandler::GetClientData, 439
wxEvtHandler::GetClientObject, 439
wxEvtHandler::GetEvtHandlerEnabled, 439
wxEvtHandler::GetNextHandler, 439
wxEvtHandler::GetPreviousHandler, 440
wxEvtHandler::ProcessEvent, 440
wxEvtHandler::SearchEventTable, 441
wxEvtHandler::SetClientData, 442
wxEvtHandler::SetClientObject, 442
wxEvtHandler::SetEvtHandlerEnabled, 442
wxEvtHandler::SetNextHandler, 443
wxEvtHandler::SetPreviousHandler, 443
wxEvtHandler::wxEvtHandler, 436
wxEXPAND, 1075
wxExecute, 1422
wxExit, 1423
wxEXPLICIT, 1458
wxFAIL, 1482
wxFAIL_MSG, 1482
wxFatalError, 1473
wxFFFile, 444
wxFFFile::~~wxFFFile, 445
wxFFFile::Attach, 445
wxFFFile::Close, 445
wxFFFile::Detach, 445
wxFFFile::Eof, 445
wxFFFile::Error, 446
wxFFFile::Flush, 446
wxFFFile::fp, 445
wxFFFile::IsOpened, 446
wxFFFile::Length, 446
wxFFFile::Open, 446
wxFFFile::Read, 446
wxFFFile::Seek, 447
wxFFFile::SeekEnd, 447
wxFFFile::Tell, 447
wxFFFile::Write, 447, 448
wxFFFile::wxFFFile, 444
wxFFFileInputStream, 449
wxFFFileInputStream::~~wxFFFileInputStream, 449
wxFFFileInputStream::Ok, 449
wxFFFileInputStream::wxFFFileInputStream, 449
wxFFFileOutputStream, 450
wxFFFileOutputStream::~~wxFFFileOutputStream, 450
wxFFFileOutputStream::Ok, 450
wxFFFileOutputStream::wxFFFileOutputStream, 450
wxFFFileStream, 450
wxFFFileStream::wxFFFileStream, 450
wxFile, 452
wxFile::~~wxFile, 453
wxFile::Access, 453
wxFile::Attach, 453
wxFile::Close, 453
wxFile::Create, 453
wxFile::Detach, 453
wxFile::Eof, 454
wxFile::Exists, 454
wxFile::fd, 454
wxFile::Flush, 454
wxFile::IsOpened, 454
wxFile::Length, 454
wxFile::Open, 455
wxFile::Read, 455
wxFile::Seek, 455
wxFile::SeekEnd, 456
wxFile::Tell, 456
wxFile::Write, 456
wxFile::wxFile, 452
wxFileDataObject, 457
wxFileDataObject::AddFile, 457
wxFileDataObject::GetFileNames, 457
wxFileDialog, 458
wxFileDialog overview, 1604
wxFileDialog::~~wxFileDialog, 460
wxFileDialog::GetDirectory, 460
wxFileDialog::GetFilename, 460
wxFileDialog::GetFileNames, 460
wxFileDialog::GetFilterIndex, 460
wxFileDialog::GetMessage, 460
wxFileDialog::GetPath, 460
wxFileDialog::GetPaths, 461
wxFileDialog::GetStyle, 461
wxFileDialog::GetWildcard, 461
wxFileDialog::SetDirectory, 461
wxFileDialog::SetFilename, 461
wxFileDialog::SetFilterIndex, 461
wxFileDialog::SetMessage, 461
wxFileDialog::SetPath, 461
wxFileDialog::SetStyle, 462
wxFileDialog::SetWildcard, 462
wxFileDialog::ShowModal, 462
wxFileDialog::wxFileDialog, 458
wxFileDropTarget, 462
wxFileDropTarget::OnDrop, 463
wxFileDropTarget::OnDropFiles, 463
wxFileDropTarget::wxFileDropTarget, 462
wxFileExists, 1428
wxFileHistory, 464
wxFileHistory overview, 1610

wxFileHistory::~~wxFileHistory, 464
wxFileHistory::AddFilesToMenu, 464
wxFileHistory::AddFileToHistory, 464
wxFileHistory::GetHistoryFile, 465
wxFileHistory::GetMaxFiles, 465
wxFileHistory::GetNoHistoryFiles, 465
wxFileHistory::Load, 465
wxFileHistory::m_fileHistory, 464
wxFileHistory::m_fileHistoryN, 464
wxFileHistory::m_fileMaxFiles, 464
wxFileHistory::m_fileMenu, 464
wxFileHistory::RemoveMenu, 465
wxFileHistory::Save, 465
wxFileHistory::UseMenu, 466
wxFileHistory::wxFileHistory, 464
wxFileInputStream, 466
wxFileInputStream::~~wxFileInputStream, 466
wxFileInputStream::Ok, 467
wxFileInputStream::wxFileInputStream, 466
wxFileModificationTime, 1429
wxFileName, 469, 470
wxFileName::AppendDir, 470
wxFileName::Assign, 470
wxFileName::AssignCwd, 470
wxFileName::AssignDir, 470
wxFileName::AssignHomeDir, 470
wxFileName::AssignTempFileName, 471
wxFileName::Clear, 471
wxFileName::CreateTempFileName, 471
wxFileName::DirExists, 471
wxFileName::DirName, 472
wxFileName::FileExists, 472
wxFileName::FileName, 472
wxFileName::GetCwd, 472
wxFileName::GetDirCount, 472
wxFileName::GetDirs, 473
wxFileName::GetExt, 473
wxFileName::GetForbiddenChars, 473
wxFileName::GetFormat, 473
wxFileName::GetFullName, 473
wxFileName::GetFullPath, 473
wxFileName::GetHomeDir, 473
wxFileName::GetLongPath, 473
wxFileName::GetModificationTime, 474
wxFileName::GetName, 474
wxFileName::GetPath, 474
wxFileName::GetPathSeparator, 474
wxFileName::GetPathSeparators, 474
wxFileName::GetShortPath, 475
wxFileName::GetTimes, 475
wxFileName::GetVolume, 475
wxFileName::GetVolumeSeparator, 475
wxFileName::HasExt, 475
wxFileName::HasName, 475
wxFileName::HasVolume, 475
wxFileName::InsertDir, 476
wxFileName::IsAbsolute, 476
wxFileName::IsCaseSensitive, 476
wxFileName::IsDir, 476
wxFileName::IsOk, 476
wxFileName::IsPathSeparator, 476
wxFileName::IsRelative, 476
wxFileName::MakeAbsolute, 477
wxFileName::MakeRelativeTo, 477
wxFileName::Mkdir, 477
wxFileName::Normalize, 478
wxFileName::operator!=, 481
wxFileName::operator=, 480
wxFileName::operator==, 480
wxFileName::PrependDir, 478
wxFileName::RemoveDir, 479
wxFileName::Rmdir, 479
wxFileName::SameAs, 479
wxFileName::SetCwd, 479
wxFileName::SetExt, 479
wxFileName::SetFullName, 479
wxFileName::SetName, 479
wxFileName::SetTimes, 479
wxFileName::SetVolume, 480
wxFileName::SplitPath, 480
wxFileName::Touch, 480
wxFileName::wxFileName, 469
wxFileNameFromPath, 1429
wxFileOutputStream, 481
wxFileOutputStream::~~wxFileOutputStream, 482
wxFileOutputStream::Ok, 482
wxFileOutputStream::wxFileOutputStream, 481
wxFileSelector, 1442
wxFileStream, 482
wxFileStream::wxFileStream, 482
wxFileSystem, 483
wxFileSystem::AddHandler, 483
wxFileSystem::ChangePathTo, 483
wxFileSystem::FileNameToURL, 484
wxFileSystem::FindFirst, 484
wxFileSystem::FindNext, 484
wxFileSystem::GetPath, 484
wxFileSystem::OpenFile, 484
wxFileSystem::URLToFileName, 484
wxFileSystem::wxFileSystem, 483
wxFileSystemHandler, 485
wxFileSystemHandler::CanOpen, 485
wxFileSystemHandler::FindFirst, 486
wxFileSystemHandler::FindNext, 487
wxFileSystemHandler::GetAnchor, 486
wxFileSystemHandler::GetLeftLocation, 486
wxFileSystemHandler::GetMimeTypeFromExt, 486
wxFileSystemHandler::GetProtocol, 486
wxFileSystemHandler::GetRightLocation, 486
wxFileSystemHandler::OpenFile, 487
wxFileSystemHandler::wxFileSystemHandler, 485
wxFileType, 489
wxFileType::~~wxFileType, 489
wxFileType::ExpandCommand, 491
wxFileType::GetDescription, 490
wxFileType::GetExtensions, 490
wxFileType::GetIcon, 490
wxFileType::GetMimeType, 489
wxFileType::GetMimeTypeNames, 489
wxFileType::GetOpenCommand, 490
wxFileType::GetPrintCommand, 491
wxFileType::wxFileType, 489

wxFilterInputStream, 492
wxFilterInputStream::wxFilterInputStream, 492
wxFilterOutputStream, 492
wxFilterOutputStream::wxFilterOutputStream, 492
wxFindDialogEvent, 493
wxFindDialogEvent::GetDialog, 494
wxFindDialogEvent::GetFindString, 493
wxFindDialogEvent::GetFlags, 493
wxFindDialogEvent::GetReplaceString, 493
wxFindDialogEvent::wxFindDialogEvent, 493
wxFindFirstFile, 1429
wxFindMenuItemId, 1460
wxFindNextFile, 1429
wxFindReplaceData, 495
wxFindReplaceData::GetFindString, 495
wxFindReplaceData::GetFlags, 495
wxFindReplaceData::GetReplaceString, 495
wxFindReplaceData::SetFindString, 495
wxFindReplaceData::SetFlags, 495
wxFindReplaceData::SetReplaceString, 495
wxFindReplaceData::wxFindReplaceData, 495
wxFindReplaceDialog, 496
wxFindReplaceDialog::~~wxFindReplaceDialog, 496
wxFindReplaceDialog::Create, 496
wxFindReplaceDialog::GetData, 496
wxFindReplaceDialog::wxFindReplaceDialog, 496
wxFindWindowAtPoint, 1461
wxFindWindowAtPointer, 1461
wxFindWindowByLabel, 1460
wxFindWindowByName, 1460
wxFinite, 1450
wxFIXED_MINSIZE, 1075
wxFlexGridSizer, 497
wxFlexGridSizer::AddGrowableCol, 497
wxFlexGridSizer::AddGrowableRow, 497
wxFlexGridSizer::GetFlexibleDirection, 498
wxFlexGridSizer::GetNonFlexibleGrowMode, 498
wxFlexGridSizer::RemoveGrowableCol, 498
wxFlexGridSizer::RemoveGrowableRow, 499
wxFlexGridSizer::SetFlexibleDirection, 499
wxFlexGridSizer::SetNonFlexibleGrowMode, 499
wxFlexGridSizer::wxFlexGridSizer, 497
wxFocusEvent, 500
wxFocusEvent::wxFocusEvent, 500
wxFont, 502
wxFont::~~wxFont, 504
wxFont::GetDefaultEncoding, 504
wxFont::GetFaceName, 504
wxFont::GetFamily, 505
wxFont::GetNativeFontInfoDesc, 505
wxFont::GetPointSize, 505
wxFont::GetStyle, 505
wxFont::GetUnderlined, 505
wxFont::GetWeight, 506
wxFont::IsFixedWidth, 504
wxFont::Ok, 506
wxFont::operator !=, 509
wxFont::operator =, 508
wxFont::operator ==, 509
wxFont::SetDefaultEncoding, 506
wxFont::SetFaceName, 506
wxFont::SetFamily, 507
wxFont::SetNativeFontInfo, 507
wxFont::SetPointSize, 507
wxFont::SetStyle, 508
wxFont::SetUnderlined, 508
wxFont::SetWeight, 508
wxFont::wxFont, 502
wxFontData, 509
wxFontData::~~wxFontData, 509
wxFontData::EnableEffects, 509
wxFontData::GetAllowSymbols, 510
wxFontData::GetChosenFont, 510
wxFontData::GetColour, 510
wxFontData::GetEnableEffects, 510
wxFontData::GetInitialFont, 510
wxFontData::GetShowHelp, 510
wxFontData::operator =, 511
wxFontData::SetAllowSymbols, 511
wxFontData::SetChosenFont, 511
wxFontData::SetColour, 511
wxFontData::SetInitialFont, 511
wxFontData::SetRange, 511
wxFontData::SetShowHelp, 511
wxFontData::wxFontData, 509
wxFontDialog, 512
wxFontDialog overview, 1603
wxFontDialog::~~wxFontDialog, 512
wxFontDialog::Create, 512
wxFontDialog::GetFontData, 513
wxFontDialog::ShowModal, 513
wxFontDialog::wxFontDialog, 512
wxFontEnumerator::EnumerateEncodings, 514
wxFontEnumerator::EnumerateFacenames, 514
wxFontEnumerator::GetEncodings, 514
wxFontEnumerator::GetFacenames, 514
wxFontEnumerator::OnFacename, 514
wxFontEnumerator::OnFontEncoding, 514
wxFontList, 515
wxFontList::AddFont, 515
wxFontList::FindOrCreateFont, 515
wxFontList::RemoveFont, 515
wxFontList::wxFontList, 515
wxFontMapper, 517
wxFontMapper::~~wxFontMapper, 517
wxFontMapper::CharsetToEncoding, 517
wxFontMapper::Get, 517
wxFontMapper::GetAltForEncoding, 517
wxFontMapper::GetEncoding, 518
wxFontMapper::GetEncodingDescription, 518
wxFontMapper::GetEncodingFromName, 518
wxFontMapper::GetEncodingName, 518
wxFontMapper::GetSupportedEncodingsCount, 518
wxFontMapper::IsEncodingAvailable, 518
wxFontMapper::Set, 519
wxFontMapper::SetConfig, 519
wxFontMapper::SetConfigPath, 519
wxFontMapper::SetDialogParent, 519
wxFontMapper::SetDialogTitle, 519
wxFontMapper::wxFontMapper, 517

wxFrm, 521, 522
wxFrm::~~wxFrm, 522
wxFrm::Centre, 523
wxFrm::Command, 523
wxFrm::Create, 523
wxFrm::CreateStatusBar, 523
wxFrm::CreateToolBar, 524
wxFrm::GetClientAreaOrigin, 525
wxFrm::GetMenuBar, 525
wxFrm::GetStatusBar, 525
wxFrm::GetStatusBarPane, 525
wxFrm::GetTitle, 525
wxFrm::GetToolBar, 526
wxFrm::Iconize, 526
wxFrm::IsFullScreen, 526
wxFrm::IsIconized, 526
wxFrm::IsMaximized, 526
wxFrm::Maximize, 526
wxFrm::OnCreateStatusBar, 527
wxFrm::OnCreateToolBar, 528
wxFrm::SendSizeEvent, 528
wxFrm::SetIcon, 528
wxFrm::SetIcons, 529
wxFrm::SetMenuBar, 529
wxFrm::SetShape, 529
wxFrm::SetStatusBar, 530
wxFrm::SetStatusBarPane, 530
wxFrm::SetStatusText, 530
wxFrm::SetStatusWidths, 530
wxFrm::SetTitle, 531
wxFrm::SetToolBar, 531
wxFrm::ShowFullScreen, 531
wxFrm::wxFrm, 521
wxFRAME_EX_CONTEXTHELP, 521, 1376
wxFRAME_FLOAT_ON_PARENT, 520
wxFRAME_NO_TASKBAR, 520
wxFRAME_NO_WINDOW_MENU, 847
wxFRAME_SHAPED, 521
wxFRAME_TOOL_WINDOW, 520
wxFSFile, 532
wxFSFile::GetAnchor, 533
wxFSFile::GetLocation, 534
wxFSFile::GetMimeType, 534
wxFSFile::GetModificationTime, 534
wxFSFile::GetStream, 534
wxFSFile::wxFSFile, 532
wxFTP, 536
wxFTP::~~wxFTP, 536
wxFTP::Abort, 536
wxFTP::ChDir, 537
wxFTP::CheckCommand, 536
wxFTP::FileExists, 538
wxFTP::GetDirList, 539
wxFTP::GetFileSize, 538
wxFTP::GetFilesList, 539
wxFTP::GetInputStream, 540
wxFTP::GetLastResult, 536
wxFTP::GetOutputStream, 539
wxFTP::MkDir, 537
wxFTP::Pwd, 537
wxFTP::Rename, 537
wxFTP::Rmdir, 537
wxFTP::RmFile, 537
wxFTP::SendCommand, 536
wxFTP::SetAscii, 537
wxFTP::SetBinary, 537
wxFTP::SetPassword, 538
wxFTP::SetTransferMode, 538
wxFTP::SetUser, 538
wxFTP::wxFTP, 536
wxFULL_REPAINT_ON_RESIZE, 1340
wxGA_HORIZONTAL, 541
wxGA_SMOOTH, 541
wxGA_VERTICAL, 541
wxGauge, 541
wxGauge::~~wxGauge, 542
wxGauge::Create, 542
wxGauge::GetBezelFace, 542
wxGauge::GetRange, 543
wxGauge::GetShadowWidth, 543
wxGauge::GetValue, 543
wxGauge::IsVertical, 543
wxGauge::SetBezelFace, 543
wxGauge::SetRange, 544
wxGauge::SetShadowWidth, 544
wxGauge::SetValue, 544
wxGauge::wxGauge, 541
wxGBPosition, 545
wxGBPosition::GetCol, 545
wxGBPosition::GetRow, 545
wxGBPosition::operator!, 545
wxGBPosition::operator==, 545
wxGBPosition::SetCol, 545
wxGBPosition::SetRow, 545
wxGBPosition::wxGBPosition, 545
wxGBSizerItem, 546
wxGBSizerItem::GetEndPos, 546
wxGBSizerItem::GetPos, 546
wxGBSizerItem::GetSpan, 546
wxGBSizerItem::Intersects, 547
wxGBSizerItem::SetPos, 547
wxGBSizerItem::SetSpan, 547
wxGBSizerItem::wxGBSizerItem, 546
wxGBSpan, 547
wxGBSpan::GetColspan, 548
wxGBSpan::GetRowspan, 548
wxGBSpan::operator!, 548
wxGBSpan::operator==, 548
wxGBSpan::SetColspan, 548
wxGBSpan::SetRowspan, 548
wxGBSpan::wxGBSpan, 547
wxGDIObject, 549
wxGDIObject::wxGDIObject, 549
wxGenericDirCtrl, 550
wxGenericDirCtrl::~~wxGenericDirCtrl, 551
wxGenericDirCtrl::Create, 551
wxGenericDirCtrl::ExpandPath, 551
wxGenericDirCtrl::GetDefaultPath, 551
wxGenericDirCtrl::GetFilePath, 551
wxGenericDirCtrl::GetFilter, 552
wxGenericDirCtrl::GetFilterIndex, 552
wxGenericDirCtrl::GetFilterListCtrl, 552
wxGenericDirCtrl::GetPath, 551
wxGenericDirCtrl::GetRootId, 552

wxGenericDirCtrl::GetTreeCtrl, 552
wxGenericDirCtrl::Init, 551
wxGenericDirCtrl::SetDefaultPath, 552
wxGenericDirCtrl::SetFilter, 552
wxGenericDirCtrl::SetFilterIndex, 552
wxGenericDirCtrl::SetPath, 553
wxGenericDirCtrl::wxGenericDirCtrl, 550
wxGenericValidator, 553, 554
wxGenericValidator::~~wxGenericValidator, 554
wxGenericValidator::Clone, 554
wxGenericValidator::TransferFromWindow, 554
wxGenericValidator::TransferToWindow, 554
wxGenericValidator::wxGenericValidator, 553
wxGetActiveWindow, 1461
wxGetApp, 1419
wxGetClientDisplayRect, 1451
wxGetClipboardData, 1456
wxGetClipboardFormatName, 1456
wxGetColourFromUser, 1443
wxGetCwd, 1431
wxGetDiskSpace, 1429
wxGetDisplayName, 1461
wxGetDisplaySize, 1451
wxGetDisplaySizeMM, 1451
wxGetElapsedTime, 1478
wxGetEmailAddress, 1434
wxGetenv, 1484
wxGetEnv, 1484
wxGetFontFromUser, 1444
wxGetFreeMemory, 1433
wxGetFullHostName, 1433
wxGetHomeDir, 1434
wxGetHostName, 1434
wxGetLocalTime, 1478
wxGetLocalTimeMillis, 1479
wxGetMousePosition, 1461
wxGetMultipleChoice, 1446
wxGetMultipleChoices, 1444, 1445
wxGetNumberFromUser, 1445
wxGetOsDescription, 1435
wxGetOSDirectory, 1430
wxGetOsVersion, 1435
wxGetPrinterCommand, 1453
wxGetPrinterFile, 1453
wxGetPrinterMode, 1453
wxGetPrinterOptions, 1453
wxGetPrinterOrientation, 1453
wxGetPrinterPreviewCommand, 1453
wxGetPrinterScaling, 1454
wxGetPrinterTranslation, 1454
wxGetProcessId, 1425
wxGetResource, 1461, 1462
wxGetSingleChoice, 1447
wxGetSingleChoiceData, 1448
wxGetSingleChoiceIndex, 1447
wxGetTempFileName, 1431
wxGetTextFromUser, 1445, 1446
wxGetTopLevelParent, 1462
wxGetTranslation, 1437
wxGetUserHome, 1436
wxGetUserId, 1434
wxGetUserName, 1436
wxGetUTCTime, 1479
wxGetVariantCast, 1322
wxGetWorkingDirectory, 1431
wxGIFHandler, 706
wxGLCanvas, 556
wxGLCanvas::SetColour, 557
wxGLCanvas::SetCurrent, 557
wxGLCanvas::SwapBuffers, 557
wxGLCanvas::wxGLCanvas, 556
wxGrid, 560, 586
wxGrid::~~wxGrid, 560
wxGrid::AppendCols, 560
wxGrid::AppendRows, 560
wxGrid::AutoSize, 561
wxGrid::AutoSizeColOrRow, 590
wxGrid::AutoSizeColumn, 561
wxGrid::AutoSizeColumns, 561
wxGrid::AutoSizeRow, 561
wxGrid::AutoSizeRows, 562
wxGrid::BeginBatch, 562
wxGrid::BlockToDeviceRect, 584
wxGrid::CanDragColSize, 562
wxGrid::CanDragGridSize, 562
wxGrid::CanDragRowSize, 562
wxGrid::CanEnableCellControl, 562
wxGrid::CanHaveAttributes, 591
wxGrid::CellToRect, 563
wxGrid::ClearGrid, 563
wxGrid::ClearSelection, 563
wxGrid::CreateGrid, 563
wxGrid::DeleteCols, 563
wxGrid::DeleteRows, 563
wxGrid::DisableCellEditControl, 564
wxGrid::DisableDragColSize, 564
wxGrid::DisableDragGridSize, 564
wxGrid::DisableDragRowSize, 564
wxGrid::DoGetBestSize, 589
wxGrid::EnableCellEditControl, 564
wxGrid::EnableDragColSize, 564
wxGrid::EnableDragGridSize, 564
wxGrid::EnableDragRowSize, 565
wxGrid::EnableEditing, 565
wxGrid::EnableGridLines, 565
wxGrid::EndBatch, 565
wxGrid::Fit, 589
wxGrid::ForceRefresh, 565
wxGrid::GetBatchCount, 565
wxGrid::GetCellAlignment, 566
wxGrid::GetCellBackgroundColour, 566
wxGrid::GetCellEditor, 566
wxGrid::GetCellFont, 566
wxGrid::GetCellRenderer, 566
wxGrid::GetCellTextColour, 566
wxGrid::GetCellTextFont, 588
wxGrid::GetCellValue, 567
wxGrid::GetColLabelAlignment, 567
wxGrid::GetColLabelSize, 567
wxGrid::GetColLabelValue, 567
wxGrid::GetColLeft, 590
wxGrid::GetColMinimalAcceptableWidth, 579
wxGrid::GetColMinimalWidth, 590
wxGrid::GetColRight, 590

wxGrid::GetCols, 586
wxGrid::GetColSize, 567
wxGrid::GetColumnWidth, 587
wxGrid::GetColWidth, 590
wxGrid::GetCursorColumn, 586
wxGrid::GetCursorRow, 586
wxGrid::GetDefaultCellAlignment, 568
wxGrid::GetDefaultCellBackgroundColour, 568
wxGrid::GetDefaultCellFont, 568
wxGrid::GetDefaultCellTextColour, 568
wxGrid::GetDefaultColLabelSize, 568
wxGrid::GetDefaultColSize, 568
wxGrid::GetDefaultEditor, 568
wxGrid::GetDefaultEditorForCell, 585
wxGrid::GetDefaultEditorForType, 585
wxGrid::GetDefaultRenderer, 569
wxGrid::GetDefaultRendererForCell, 585
wxGrid::GetDefaultRendererForType, 585
wxGrid::GetDefaultRowLabelSize, 569
wxGrid::GetDefaultRowSize, 569
wxGrid::GetDividerPen, 589
wxGrid::GetEditable, 588
wxGrid::GetEditInPlace, 589
wxGrid::GetGridCursorCol, 569
wxGrid::GetGridCursorRow, 569
wxGrid::GetGridLineColour, 569
wxGrid::GetLabelAlignment, 588
wxGrid::GetLabelBackgroundColour, 569
wxGrid::GetLabelFont, 570
wxGrid::GetLabelSize, 588
wxGrid::GetLabelTextColour, 570
wxGrid::GetLabelValue, 588
wxGrid::GetNumberCols, 570
wxGrid::GetNumberRows, 570
wxGrid::GetOrCreateCellAttr, 591
wxGrid::GetRowBottom, 590
wxGrid::GetRowHeight, 590
wxGrid::GetRowLabelAlignment, 570
wxGrid::GetRowLabelSize, 570
wxGrid::GetRowLabelValue, 570
wxGrid::GetRowMinimalAcceptableHeight, 583
wxGrid::GetRowMinimalHeight, 591
wxGrid::GetRows, 586
wxGrid::GetRowSize, 571
wxGrid::GetRowTop, 590
wxGrid::GetScrollPosX, 586
wxGrid::GetScrollPosY, 587
wxGrid::GetSelectedCells, 571
wxGrid::GetSelectedCols, 571
wxGrid::GetSelectedRows, 571
wxGrid::GetSelectionBackground, 585
wxGrid::GetSelectionBlockBottomRight, 571
wxGrid::GetSelectionBlockTopLeft, 571
wxGrid::GetSelectionForeground, 585
wxGrid::GetSelectionMode, 571
wxGrid::GetTable, 571
wxGrid::GetViewHeight, 587
wxGrid::GetViewWidth, 587
wxGrid::GridLinesEnabled, 569
wxGrid::HideCellEditControl, 572
wxGrid::InitColWidths, 589
wxGrid::InitRowHeights, 589
wxGrid::InsertCols, 572
wxGrid::InsertRows, 572
wxGrid::IsCellEditControlEnabled, 572
wxGrid::IsCurrentCellReadOnly, 572
wxGrid::IsEditable, 573
wxGrid::IsInSelection, 573
wxGrid::IsReadOnly, 573
wxGrid::IsSelection, 573
wxGrid::IsVisible, 573
wxGrid::MakeCellVisible, 573
wxGrid::MoveCursorDown, 573
wxGrid::MoveCursorDownBlock, 574
wxGrid::MoveCursorLeft, 574
wxGrid::MoveCursorLeftBlock, 574
wxGrid::MoveCursorRight, 574
wxGrid::MoveCursorRightBlock, 575
wxGrid::MoveCursorUp, 574
wxGrid::MoveCursorUpBlock, 575
wxGrid::MovePageDown, 575
wxGrid::MovePageUp, 575
wxGrid::OnActivate, 589
wxGrid::RegisterDataType, 585
wxGrid::SaveEditControlValue, 576
wxGrid::SelectAll, 576
wxGrid::SelectBlock, 576
wxGrid::SelectCol, 576
wxGrid::SelectionToDeviceRect, 585
wxGrid::SelectRow, 576
wxGrid::SetCellAlignment, 576
wxGrid::SetCellBackgroundColour, 588
wxGrid::SetCellBitmap, 589
wxGrid::SetCellEditor, 577
wxGrid::SetCellFont, 577
wxGrid::SetCellRenderer, 577
wxGrid::SetCellTextColour, 577
wxGrid::SetCellTextFont, 588
wxGrid::SetCellValue, 577
wxGrid::SetColAttr, 578
wxGrid::SetColFormatBool, 578
wxGrid::SetColFormatCustom, 578
wxGrid::SetColFormatFloat, 578
wxGrid::SetColFormatNumber, 578
wxGrid::SetColLabelAlignment, 578
wxGrid::SetColLabelSize, 579
wxGrid::SetColLabelValue, 579
wxGrid::SetColMinimalAcceptableWidth, 579
wxGrid::SetColMinimalWidth, 579
wxGrid::SetColSize, 579
wxGrid::SetColumnWidth, 587
wxGrid::SetDefaultCellAlignment, 580
wxGrid::SetDefaultCellBackgroundColour, 580
wxGrid::SetDefaultCellFont, 580
wxGrid::SetDefaultColSize, 581
wxGrid::SetDefaultEditor, 580
wxGrid::SetDefaultRenderer, 580
wxGrid::SetDefaultRowSize, 581
wxGrid::SetDividerPen, 589
wxGrid::SetEditable, 589
wxGrid::SetEditInPlace, 589
wxGrid::SetGridCursor, 581
wxGrid::SetGridLineColour, 581
wxGrid::SetLabelAlignment, 588

-
- wxGrid::SetLabelBackgroundColour, 581
 - wxGrid::SetLabelFont, 581
 - wxGrid::SetLabelSize, 588
 - wxGrid::SetLabelTextColour, 581
 - wxGrid::SetLabelValue, 588
 - wxGrid::SetMargins, 586
 - wxGrid::SetOrCalcColumnSizes, 590
 - wxGrid::SetOrCalcRowSizes, 590
 - wxGrid::SetReadOnly, 581
 - wxGrid::SetRowAttr, 582
 - wxGrid::SetRowHeight, 587
 - wxGrid::SetRowLabelAlignment, 582
 - wxGrid::SetRowLabelSize, 582
 - wxGrid::SetRowLabelValue, 582
 - wxGrid::SetRowMinimalAcceptableHeight, 582
 - wxGrid::SetRowMinimalHeight, 582
 - wxGrid::SetRowSize, 583
 - wxGrid::SetScrollX, 587
 - wxGrid::SetScrollY, 587
 - wxGrid::SetSelectionBackground, 585
 - wxGrid::SetSelectionForeground, 585
 - wxGrid::SetSelectionMode, 583
 - wxGrid::SetTable, 583
 - wxGrid::ShowCellEditControl, 584
 - wxGrid::UpdateDimensions, 586
 - wxGrid::wxGrid, 560, 586
 - wxGrid::XToCol, 584
 - wxGrid::XToEdgeOfCol, 584
 - wxGrid::YToEdgeOfRow, 584
 - wxGrid::YToRow, 584
 - wxGridBagSizer, 594
 - wxGridBagSizer::Add, 594
 - wxGridBagSizer::CalcMin, 595
 - wxGridBagSizer::CheckForIntersection, 595
 - wxGridBagSizer::FindItem, 595
 - wxGridBagSizer::FindItemAtPoint, 595
 - wxGridBagSizer::FindItemAtPosition, 595
 - wxGridBagSizer::FindItemWithData, 595
 - wxGridBagSizer::GetCellSize, 595
 - wxGridBagSizer::GetEmptyCellSize, 596
 - wxGridBagSizer::GetItemPosition, 596
 - wxGridBagSizer::GetItemSpan, 596
 - wxGridBagSizer::RecalcSizes, 596
 - wxGridBagSizer::SetEmptyCellSize, 596
 - wxGridBagSizer::SetItemPosition, 596
 - wxGridBagSizer::SetItemSpan, 597
 - wxGridBagSizer::wxGridBagSizer, 594
 - wxGridCellAttr, 591
 - wxGridCellAttr::Clone, 591
 - wxGridCellAttr::DecRef, 592
 - wxGridCellAttr::GetAlignment, 593
 - wxGridCellAttr::GetBackgroundColour, 593
 - wxGridCellAttr::GetEditor, 593
 - wxGridCellAttr::GetFont, 593
 - wxGridCellAttr::GetRenderer, 593
 - wxGridCellAttr::GetTextColour, 593
 - wxGridCellAttr::HasAlignment, 593
 - wxGridCellAttr::HasBackgroundColour, 593
 - wxGridCellAttr::HasEditor, 593
 - wxGridCellAttr::HasFont, 593
 - wxGridCellAttr::HasRenderer, 593
 - wxGridCellAttr::HasTextColour, 592
 - wxGridCellAttr::IncRef, 591
 - wxGridCellAttr::IsReadOnly, 594
 - wxGridCellAttr::SetAlignment, 592
 - wxGridCellAttr::SetBackgroundColour, 592
 - wxGridCellAttr::SetDefAttr, 594
 - wxGridCellAttr::SetEditor, 592
 - wxGridCellAttr::SetFont, 592
 - wxGridCellAttr::SetReadOnly, 592
 - wxGridCellAttr::SetRenderer, 592
 - wxGridCellAttr::SetTextColour, 592
 - wxGridCellAttr::wxGridCellAttr, 591
 - wxGridCellBoolEditor, 597
 - wxGridCellBoolEditor::wxGridCellBoolEditor, 597
 - wxGridCellBoolRenderer, 609
 - wxGridCellBoolRenderer::wxGridCellBoolRenderer, 609
 - wxGridCellChoiceEditor, 597, 598
 - wxGridCellChoiceEditor::SetParameters, 598
 - wxGridCellChoiceEditor::wxGridCellChoiceEditor, 597
 - wxGridCellEditor, 598
 - wxGridCellEditor::~~wxGridCellEditor, 600
 - wxGridCellEditor::BeginEdit, 599
 - wxGridCellEditor::Clone, 600
 - wxGridCellEditor::Create, 598
 - wxGridCellEditor::Destroy, 600
 - wxGridCellEditor::EndEdit, 599
 - wxGridCellEditor::HandleReturn, 600
 - wxGridCellEditor::IsCreated, 598
 - wxGridCellEditor::PaintBackground, 599
 - wxGridCellEditor::Reset, 599
 - wxGridCellEditor::SetSize, 599
 - wxGridCellEditor::Show, 599
 - wxGridCellEditor::StartingClick, 599
 - wxGridCellEditor::StartingKey, 599
 - wxGridCellEditor::wxGridCellEditor, 598
 - wxGridCellFloatEditor, 600
 - wxGridCellFloatEditor::SetParameters, 601
 - wxGridCellFloatEditor::wxGridCellFloatEditor, 600
 - wxGridCellFloatRenderer, 610
 - wxGridCellFloatRenderer::GetPrecision, 610
 - wxGridCellFloatRenderer::GetWidth, 610
 - wxGridCellFloatRenderer::SetParameters, 610
 - wxGridCellFloatRenderer::SetPrecision, 610
 - wxGridCellFloatRenderer::SetWidth, 610
 - wxGridCellFloatRenderer::wxGridCellFloatRenderer, 610
 - wxGridCellNumberEditor, 601
 - wxGridCellNumberEditor::GetString, 601
 - wxGridCellNumberEditor::HasRange, 601
 - wxGridCellNumberEditor::SetParameters, 601
 - wxGridCellNumberEditor::wxGridCellNumberEditor, 601
 - wxGridCellNumberRenderer, 611
 - wxGridCellNumberRenderer::wxGridCellNumberRenderer, 611
 - wxGridCellRenderer::Clone, 612
 - wxGridCellRenderer::Draw, 611
 - wxGridCellRenderer::GetBestSize, 611
 - wxGridCellStringRenderer, 612
 - wxGridCellStringRenderer::wxGridCellStringRenderer, 612
-

-
- derer, 612
 - wxGridCellTextEditor, 602
 - wxGridCellTextEditor::SetParameters, 602
 - wxGridCellTextEditor::wxGridCellTextEditor, 602
 - wxGridEditorCreatedEvent, 602, 603
 - wxGridEditorCreatedEvent::GetCol, 603
 - wxGridEditorCreatedEvent::GetControl, 603
 - wxGridEditorCreatedEvent::GetRow, 603
 - wxGridEditorCreatedEvent::SetCol, 603
 - wxGridEditorCreatedEvent::SetControl, 603
 - wxGridEditorCreatedEvent::SetRow, 603
 - wxGridEditorCreatedEvent::wxGridEditorCreatedEvent, 602
 - wxGridEvent, 605
 - wxGridEvent::AltDown, 605
 - wxGridEvent::ControlDown, 605
 - wxGridEvent::GetCol, 605
 - wxGridEvent::GetPosition, 605
 - wxGridEvent::GetRow, 605
 - wxGridEvent::MetaDown, 605
 - wxGridEvent::Selecting, 605
 - wxGridEvent::ShiftDown, 606
 - wxGridEvent::wxGridEvent, 604
 - wxGridRangeSelectEvent, 606
 - wxGridRangeSelectEvent::AltDown, 606
 - wxGridRangeSelectEvent::ControlDown, 606
 - wxGridRangeSelectEvent::GetBottomRightCoords, 606
 - wxGridRangeSelectEvent::GetBottomRow, 607
 - wxGridRangeSelectEvent::GetLeftCol, 607
 - wxGridRangeSelectEvent::GetRightCol, 607
 - wxGridRangeSelectEvent::GetTopLeftCoords, 607
 - wxGridRangeSelectEvent::GetTopRow, 607
 - wxGridRangeSelectEvent::MetaDown, 607
 - wxGridRangeSelectEvent::Selecting, 607
 - wxGridRangeSelectEvent::ShiftDown, 607
 - wxGridRangeSelectEvent::wxGridRangeSelectEvent, 606
 - wxGridSizeEvent, 608
 - wxGridSizeEvent::AltDown, 608
 - wxGridSizeEvent::ControlDown, 608
 - wxGridSizeEvent::GetPosition, 608
 - wxGridSizeEvent::GetRowOrCol, 609
 - wxGridSizeEvent::MetaDown, 609
 - wxGridSizeEvent::ShiftDown, 609
 - wxGridSizeEvent::wxGridSizeEvent, 608
 - wxGridSizer, 616
 - wxGridSizer::GetCols, 617
 - wxGridSizer::GetHGap, 617
 - wxGridSizer::GetRows, 617
 - wxGridSizer::GetVGap, 617
 - wxGridSizer::SetCols, 617
 - wxGridSizer::SetHGap, 617
 - wxGridSizer::SetRows, 617
 - wxGridSizer::SetVGap, 617
 - wxGridSizer::wxGridSizer, 616
 - wxGridTableBase, 612
 - wxGridTableBase::~wxGridTableBase, 612
 - wxGridTableBase::AppendCols, 615
 - wxGridTableBase::AppendRows, 614
 - wxGridTableBase::CanGetValueAs, 613
 - wxGridTableBase::CanHaveAttributes, 615
 - wxGridTableBase::CanSetValueAs, 613
 - wxGridTableBase::Clear, 614
 - wxGridTableBase::DeleteCols, 615
 - wxGridTableBase::DeleteRows, 614
 - wxGridTableBase::GetAttr, 616
 - wxGridTableBase::GetAttrProvider, 615
 - wxGridTableBase::GetColLabelValue, 615
 - wxGridTableBase::GetNumberCols, 613
 - wxGridTableBase::GetNumberRows, 613
 - wxGridTableBase::GetRowLabelValue, 615
 - wxGridTableBase::GetTypeName, 613
 - wxGridTableBase::GetValue, 613
 - wxGridTableBase::GetValueAsBool, 613
 - wxGridTableBase::GetValueAsCustom, 614
 - wxGridTableBase::GetValueAsDouble, 613
 - wxGridTableBase::GetValueAsLong, 613
 - wxGridTableBase::GetView, 614
 - wxGridTableBase::InsertCols, 615
 - wxGridTableBase::InsertRows, 614
 - wxGridTableBase::IsEmptyCell, 613
 - wxGridTableBase::SetAttr, 616
 - wxGridTableBase::SetAttrProvider, 615
 - wxGridTableBase::SetColAttr, 616
 - wxGridTableBase::SetColLabelValue, 615
 - wxGridTableBase::SetRowAttr, 616
 - wxGridTableBase::SetRowLabelValue, 615
 - wxGridTableBase::SetValue, 613
 - wxGridTableBase::SetValueAsBool, 614
 - wxGridTableBase::SetValueAsCustom, 614
 - wxGridTableBase::SetValueAsDouble, 614
 - wxGridTableBase::SetValueAsLong, 614
 - wxGridTableBase::SetView, 614
 - wxGridTableBase::UpdateAttrCols, 616
 - wxGridTableBase::UpdateAttrRows, 615
 - wxGridTableBase::wxGridTableBase, 612
 - wxHandleFatalExceptions, 1420
 - wxHashMap, 620
 - wxHashMap::begin, 621
 - wxHashMap::clear, 621
 - wxHashMap::count, 621
 - wxHashMap::empty, 621
 - wxHashMap::end, 621
 - wxHashMap::erase, 621
 - wxHashMap::find, 622
 - wxHashMap::insert, 622
 - wxHashMap::operator[], 622
 - wxHashMap::size, 622
 - wxHashMap::wxHashMap, 620
 - wxHashTable, 623
 - wxHashTable::~wxHashTable, 623
 - wxHashTable::BeginFind, 623
 - wxHashTable::Clear, 623
 - wxHashTable::Delete, 623
 - wxHashTable::DeleteContents, 624
 - wxHashTable::Get, 624
 - wxHashTable::GetCount, 624
 - wxHashTable::MakeKey, 624
 - wxHashTable::Next, 624
 - wxHashTable::Put, 624
 - wxHashTable::wxHashTable, 623
 - wxHelpController, 626
-

-
- wxHelpController::~wxHelpController, 626
 - wxHelpController::DisplayBlock, 626
 - wxHelpController::DisplayContents, 627
 - wxHelpController::DisplayContextPopup, 627
 - wxHelpController::DisplaySection, 627
 - wxHelpController::DisplayTextPopup, 628
 - wxHelpController::GetFrameParameters, 628
 - wxHelpController::Initialize, 626
 - wxHelpController::KeywordSearch, 628
 - wxHelpController::LoadFile, 629
 - wxHelpController::OnQuit, 629
 - wxHelpController::Quit, 629
 - wxHelpController::SetFrameParameters, 629
 - wxHelpController::SetViewer, 629
 - wxHelpController::wxHelpController, 626
 - wxHelpControllerHelpProvider, 630
 - wxHelpControllerHelpProvider::GetHelpController, 630
 - wxHelpControllerHelpProvider::SetHelpController, 630
 - wxHelpControllerHelpProvider::wxHelpControllerHelpProvider, 630
 - wxHelpEvent, 631
 - wxHelpEvent::GetPosition, 631
 - wxHelpEvent::SetPosition, 631
 - wxHelpEvent::wxHelpEvent, 631
 - wxHelpProvider::~wxHelpProvider, 632
 - wxHelpProvider::AddHelp, 632
 - wxHelpProvider::Get, 632
 - wxHelpProvider::GetHelp, 632
 - wxHelpProvider::RemoveHelp, 633
 - wxHelpProvider::Set, 633
 - wxHelpProvider::ShowHelp, 633
 - wxHF_BOOKMARKS, 652, 658
 - wxHF_CONTENTS, 652, 658
 - wxHF_DEFAULT_STYLE, 653, 658
 - wxHF_FLAT_TOOLBAR, 652, 658
 - wxHF_ICONS_BOOK, 652, 658
 - wxHF_ICONS_BOOK_CHAPTER, 653, 658
 - wxHF_ICONS_FOLDER, 653, 658
 - wxHF_INDEX, 652, 658
 - wxHF_MERGE_BOOKS, 652, 658
 - wxHF_OPEN_FILES, 652, 658
 - wxHF_PRINT, 652, 658
 - wxHF_SEARCH, 652, 658
 - wxHF_TOOLBAR, 652, 658
 - wxHSCROLL, 846, 1208, 1340
 - wxHTML quick start, 1650
 - wxHtmlCell, 634
 - wxHtmlCell::AdjustPagebreak, 634
 - wxHtmlCell::Draw, 634
 - wxHtmlCell::DrawInvisible, 634
 - wxHtmlCell::Find, 635
 - wxHtmlCell::GetDescent, 635
 - wxHtmlCell::GetHeight, 636
 - wxHtmlCell::GetId, 636
 - wxHtmlCell::GetLink, 636
 - wxHtmlCell::GetNext, 636
 - wxHtmlCell::GetParent, 636
 - wxHtmlCell::GetPosX, 636
 - wxHtmlCell::GetPosY, 636
 - wxHtmlCell::GetWidth, 637
 - wxHtmlCell::Layout, 637
 - wxHtmlCell::OnClick, 637
 - wxHtmlCell::SetId, 637
 - wxHtmlCell::SetLink, 638
 - wxHtmlCell::SetNext, 638
 - wxHtmlCell::SetParent, 638
 - wxHtmlCell::SetPos, 638
 - wxHtmlCell::wxHtmlCell, 634
 - wxHtmlColourCell, 638
 - wxHtmlColourCell::wxHtmlColourCell, 638
 - wxHtmlContainerCell, 639
 - wxHtmlContainerCell::GetAlignHor, 639
 - wxHtmlContainerCell::GetAlignVer, 639
 - wxHtmlContainerCell::GetBackgroundColour, 640
 - wxHtmlContainerCell::GetFirstCell, 640
 - wxHtmlContainerCell::GetIndent, 640
 - wxHtmlContainerCell::GetIndentUnits, 640
 - wxHtmlContainerCell::InsertCell, 640
 - wxHtmlContainerCell::SetAlign, 640
 - wxHtmlContainerCell::SetAlignHor, 640
 - wxHtmlContainerCell::SetAlignVer, 641
 - wxHtmlContainerCell::SetBackgroundColour, 642
 - wxHtmlContainerCell::SetBorder, 642
 - wxHtmlContainerCell::SetIndent, 642
 - wxHtmlContainerCell::SetMinHeight, 643
 - wxHtmlContainerCell::SetWidthFloat, 644
 - wxHtmlContainerCell::wxHtmlContainerCell, 639
 - wxHtmlDCRenderer, 645
 - wxHtmlDCRenderer::GetTotalHeight, 647
 - wxHtmlDCRenderer::Render, 646
 - wxHtmlDCRenderer::SetDC, 645
 - wxHtmlDCRenderer::SetFonts, 645
 - wxHtmlDCRenderer::SetHtmlText, 646
 - wxHtmlDCRenderer::SetSize, 645
 - wxHtmlDCRenderer::wxHtmlDCRenderer, 645
 - wxHtmlEasyPrinting, 647
 - wxHtmlEasyPrinting::GetPageSetupData, 650
 - wxHtmlEasyPrinting::GetPrintData, 650
 - wxHtmlEasyPrinting::PageSetup, 649
 - wxHtmlEasyPrinting::PreviewFile, 648
 - wxHtmlEasyPrinting::PreviewText, 648
 - wxHtmlEasyPrinting::PrinterSetup, 649
 - wxHtmlEasyPrinting::PrintFile, 648
 - wxHtmlEasyPrinting::PrintText, 648
 - wxHtmlEasyPrinting::SetFonts, 649
 - wxHtmlEasyPrinting::SetFooter, 650
 - wxHtmlEasyPrinting::SetHeader, 649
 - wxHtmlEasyPrinting::wxHtmlEasyPrinting, 647
 - wxHtmlFilter, 651
 - wxHtmlFilter::CanRead, 651
 - wxHtmlFilter::ReadFile, 651
 - wxHtmlFilter::wxHtmlFilter, 651
 - wxHtmlHelpController, 652
 - wxHtmlHelpController::AddBook, 653
 - wxHtmlHelpController::CreateHelpFrame, 654
 - wxHtmlHelpController::Display, 654
 - wxHtmlHelpController::DisplayContents, 654
 - wxHtmlHelpController::DisplayIndex, 654
 - wxHtmlHelpController::KeywordSearch, 655
 - wxHtmlHelpController::ReadCustomization, 655
 - wxHtmlHelpController::SetTempDir, 655
-

wxHtmlHelpController::SetTitleFormat, 655
wxHtmlHelpController::UseConfig, 655
wxHtmlHelpController::WriteCustomization, 656
wxHtmlHelpController::wxHtmlHelpController,
652
wxHtmlHelpData, 656
wxHtmlHelpData::AddBook, 656
wxHtmlHelpData::FindPageById, 656
wxHtmlHelpData::FindPageByName, 656
wxHtmlHelpData::GetBookRecArray, 656
wxHtmlHelpData::GetContents, 657
wxHtmlHelpData::GetContentsCnt, 657
wxHtmlHelpData::GetIndex, 657
wxHtmlHelpData::GetIndexCnt, 657
wxHtmlHelpData::SetTempDir, 657
wxHtmlHelpData::wxHtmlHelpData, 656
wxHtmlHelpFrame, 658
wxHtmlHelpFrame::AddToolBarButtons, 661
wxHtmlHelpFrame::Create, 658
wxHtmlHelpFrame::CreateContents, 659
wxHtmlHelpFrame::CreateIndex, 659
wxHtmlHelpFrame::CreateSearch, 659
wxHtmlHelpFrame::Display, 659
wxHtmlHelpFrame::DisplayContents, 659
wxHtmlHelpFrame::DisplayIndex, 659
wxHtmlHelpFrame::GetData, 660
wxHtmlHelpFrame::KeywordSearch, 660
wxHtmlHelpFrame::ReadCustomization, 660
wxHtmlHelpFrame::RefreshLists, 660
wxHtmlHelpFrame::SetTitleFormat, 660
wxHtmlHelpFrame::UseConfig, 660
wxHtmlHelpFrame::WriteCustomization, 660
wxHtmlHelpFrame::wxHtmlHelpFrame, 658
wxHtmlLinkInfo, 661
wxHtmlLinkInfo::GetEvent, 661
wxHtmlLinkInfo::GetHref, 662
wxHtmlLinkInfo::GetHtmlCell, 661
wxHtmlLinkInfo::GetTarget, 662
wxHtmlLinkInfo::wxHtmlLinkInfo, 661
wxHtmlListBox, 662
wxHtmlListBox::~wxHtmlListBox, 662
wxHtmlListBox::Create, 662
wxHtmlListBox::GetFileSystem, 663
wxHtmlListBox::GetSelectedTextBgColour, 663
wxHtmlListBox::GetSelectedTextColour, 663
wxHtmlListBox::OnGetItem, 664
wxHtmlListBox::OnGetItemMarkup, 664
wxHtmlListBox::wxHtmlListBox, 662
wxHtmlParser, 664
wxHtmlParser::AddTag, 664
wxHtmlParser::AddTagHandler, 665
wxHtmlParser::AddText, 665
wxHtmlParser::DoneParser, 665
wxHtmlParser::DoParsing, 665
wxHtmlParser::GetFS, 665
wxHtmlParser::GetProduct, 666
wxHtmlParser::GetSource, 666
wxHtmlParser::InitParser, 666
wxHtmlParser::OpenURL, 666
wxHtmlParser::Parse, 667
wxHtmlParser::PopTagHandler, 668
wxHtmlParser::PushTagHandler, 667
wxHtmlParser::SetFS, 668
wxHtmlParser::StopParsing, 668
wxHtmlParser::wxHtmlParser, 664
wxHtmlPrintout, 669
wxHtmlPrintout::AddFilter, 669
wxHtmlPrintout::SetFont, 669
wxHtmlPrintout::SetFooter, 669
wxHtmlPrintout::SetHeader, 669
wxHtmlPrintout::SetHtmlFile, 670
wxHtmlPrintout::SetHtmlText, 670
wxHtmlPrintout::SetMargins, 670
wxHtmlPrintout::wxHtmlPrintout, 669
wxHtmlTag, 671
wxHtmlTag::GetAllParams, 671
wxHtmlTag::GetBeginPos, 671
wxHtmlTag::GetEndPos1, 671
wxHtmlTag::GetEndPos2, 672
wxHtmlTag::GetName, 672
wxHtmlTag::GetParam, 672
wxHtmlTag::GetParamAsColour, 672
wxHtmlTag::GetParamAsInt, 673
wxHtmlTag::HasEnding, 673
wxHtmlTag::HasParam, 673
wxHtmlTag::IsEnding, 673
wxHtmlTag::ScanParam, 674
wxHtmlTag::wxHtmlTag, 671
wxHtmlTagHandler, 675
wxHtmlTagHandler::GetSupportedTags, 675
wxHtmlTagHandler::HandleTag, 675
wxHtmlTagHandler::m_Parser, 674
wxHtmlTagHandler::ParseInner, 675
wxHtmlTagHandler::SetParser, 675
wxHtmlTagHandler::wxHtmlTagHandler, 674
wxHtmlTagsModule::FillHandlersTable, 676
wxHtmlWidgetCell, 677
wxHtmlWidgetCell::wxHtmlWidgetCell, 677
wxHtmlWindow, 678
wxHtmlWindow::AddFilter, 678
wxHtmlWindow::AppendToPage, 678
wxHtmlWindow::GetInternalRepresentation, 678
wxHtmlWindow::GetOpenedAnchor, 679
wxHtmlWindow::GetOpenedPage, 679
wxHtmlWindow::GetOpenedPageTitle, 679
wxHtmlWindow::GetRelatedFrame, 679
wxHtmlWindow::HistoryBack, 679
wxHtmlWindow::HistoryCanBack, 679
wxHtmlWindow::HistoryCanForward, 679
wxHtmlWindow::HistoryClear, 679
wxHtmlWindow::HistoryForward, 680
wxHtmlWindow::LoadFile, 680
wxHtmlWindow::LoadPage, 680
wxHtmlWindow::OnCellClicked, 680
wxHtmlWindow::OnCellMouseHover, 681
wxHtmlWindow::OnLinkClicked, 681
wxHtmlWindow::OnOpeningURL, 681
wxHtmlWindow::OnSetTitle, 682
wxHtmlWindow::ReadCustomization, 682
wxHtmlWindow::SelectAll, 683
wxHtmlWindow::SelectLine, 683
wxHtmlWindow::SelectWord, 683
wxHtmlWindow::SetBorders, 683
wxHtmlWindow::SetFont, 684

wxHtmlWindow::SetPage, 685
wxHtmlWindow::SetRelatedFrame, 685
wxHtmlWindow::SetRelatedStatusBar, 685
wxHtmlWindow::WriteCustomization, 685
wxHtmlWindow::wxHtmlWindow, 678
wxHtmlWinParser, 686
wxHtmlWinParser::AddModule, 686
wxHtmlWinParser::CloseContainer, 687
wxHtmlWinParser::CreateCurrentFont, 687
wxHtmlWinParser::GetActualColor, 687
wxHtmlWinParser::GetAlign, 687
wxHtmlWinParser::GetCharHeight, 687
wxHtmlWinParser::GetCharWidth, 687
wxHtmlWinParser::GetContainer, 687
wxHtmlWinParser::GetDC, 688
wxHtmlWinParser::GetEncodingConverter, 688
wxHtmlWinParser::GetFontBold, 688
wxHtmlWinParser::GetFontFace, 688
wxHtmlWinParser::GetFontFixed, 688
wxHtmlWinParser::GetFontItalic, 688
wxHtmlWinParser::GetFontSize, 688
wxHtmlWinParser::GetFontUnderlined, 688
wxHtmlWinParser::GetInputEncoding, 689
wxHtmlWinParser::GetLink, 689
wxHtmlWinParser::GetLinkColor, 689
wxHtmlWinParser::GetOutputEncoding, 689
wxHtmlWinParser::GetWindow, 689
wxHtmlWinParser::OpenContainer, 689
wxHtmlWinParser::SetActualColor, 689
wxHtmlWinParser::SetAlign, 689
wxHtmlWinParser::SetContainer, 690
wxHtmlWinParser::SetDC, 690
wxHtmlWinParser::SetFontBold, 690
wxHtmlWinParser::SetFontFace, 690
wxHtmlWinParser::SetFontFixed, 690
wxHtmlWinParser::SetFontItalic, 690
wxHtmlWinParser::SetFonts, 691
wxHtmlWinParser::SetFontSize, 690
wxHtmlWinParser::SetFontUnderlined, 691
wxHtmlWinParser::SetInputEncoding, 691
wxHtmlWinParser::SetLink, 691
wxHtmlWinParser::SetLinkColor, 691
wxHtmlWinParser::wxHtmlWinParser, 686
wxHtmlWinTagHandler::m_WParser, 691
wxHTTP::GetHeader, 693
wxHTTP::GetInputStream, 692
wxHTTP::GetResponse, 692
wxHTTP::SetHeader, 693
wxHW_NO_SELECTION, 677
wxHW_SCROLLBAR_AUTO, 677
wxHW_SCROLLBAR_NEVER, 677
wxICOHandler, 706
wxIcon, 694
wxICON, 1452
wxIcon::~~wxIcon, 697
wxIcon::CopyFromBitmap, 697
wxIcon::GetDepth, 697
wxIcon::GetHeight, 697
wxIcon::GetWidth, 697
wxIcon::LoadFile, 698
wxIcon::Ok, 698
wxIcon::operator !=, 700
wxIcon::operator =, 699
wxIcon::operator ==, 700
wxIcon::SetDepth, 698
wxIcon::SetHeight, 699
wxIcon::SetOk, 699
wxIcon::SetWidth, 699
wxIcon::wxIcon, 694
wxIconBundle, 700, 701
wxIconBundle::~~wxIconBundle, 701
wxIconBundle::AddIcon, 701
wxIconBundle::GetIcon, 701
wxIconBundle::operator=, 701
wxIconBundle::wxIconBundle, 700
wxICONIZE, 520, 841, 846, 891
wxIconizeEvent, 703
wxIconizeEvent::Iconized, 703
wxIconizeEvent::wxIconizeEvent, 703
wxIconLocation::IsOk, 702
wxID, 1559
wxIdleEvent, 704
wxIdleEvent::CanSend, 704
wxIdleEvent::GetMode, 704
wxIdleEvent::MoreRequested, 704
wxIdleEvent::RequestMore, 704
wxIdleEvent::SetMode, 705
wxIdleEvent::wxIdleEvent, 704
wxIFFHandler, 706
wxImage, 707
wxImage::~~wxImage, 709
wxImage::AddHandler, 709
wxImage::CleanUpHandlers, 710
wxImage::ComputeHistogram, 710
wxImage::ConvertToBitmap, 710
wxImage::ConvertToMono, 710
wxImage::Copy, 711
wxImage::Create, 711
wxImage::Destroy, 711
wxImage::FindFirstUnusedColour, 711
wxImage::FindHandler, 712
wxImage::GetAlpha, 713
wxImage::GetBlue, 713
wxImage::GetData, 713
wxImage::GetGreen, 714
wxImage::GetHandlers, 715
wxImage::GetHeight, 715
wxImage::GetImageCount, 714
wxImage::GetImageExtWildcard, 713
wxImage::GetMaskBlue, 715
wxImage::GetMaskGreen, 715
wxImage::GetMaskRed, 715
wxImage::GetOption, 716
wxImage::GetOptionInt, 716
wxImage::GetPalette, 715
wxImage::GetRed, 715
wxImage::GetSubImage, 716
wxImage::GetWidth, 716
wxImage::HasAlpha, 716
wxImage::HasMask, 716
wxImage::HasOption, 717
wxImage::InitStandardHandlers, 717
wxImage::InsertHandler, 717
wxImage::LoadFile, 717

-
- wxImage::Mirror, 720
 - wxImage::Ok, 719
 - wxImage::operator !=, 726
 - wxImage::operator =, 725
 - wxImage::operator ==, 725
 - wxImage::RemoveHandler, 719
 - wxImage::Replace, 720
 - wxImage::Rescale, 720
 - wxImage::Rotate, 720
 - wxImage::Rotate90, 720
 - wxImage::SaveFile, 721
 - wxImage::Scale, 722
 - wxImage::SetAlpha, 723
 - wxImage::SetData, 723
 - wxImage::SetMask, 723
 - wxImage::SetMaskColour, 724
 - wxImage::SetMaskFromImage, 724
 - wxImage::SetOption, 724
 - wxImage::SetPalette, 725
 - wxImage::SetRGB, 725
 - wxImage::wxImage, 707
 - wxIMAGE_LIST_NORMAL, 780
 - wxIMAGE_LIST_SMALL, 780
 - wxIMAGE_LIST_STATE, 780
 - wxImageHandler, 726
 - wxImageHandler::~~wxImageHandler, 727
 - wxImageHandler::GetExtension, 727
 - wxImageHandler::GetImageCount, 727
 - wxImageHandler::GetMimeType, 727
 - wxImageHandler::GetName, 727
 - wxImageHandler::GetType, 727
 - wxImageHandler::LoadFile, 727
 - wxImageHandler::SaveFile, 728
 - wxImageHandler::SetExtension, 729
 - wxImageHandler::SetMimeType, 729
 - wxImageHandler::SetName, 729
 - wxImageHandler::SetType, 729
 - wxImageHandler::wxImageHandler, 726
 - wxImageList, 730
 - wxImageList::Add, 730
 - wxImageList::Create, 731
 - wxImageList::Draw, 731
 - wxImageList::GetImageCount, 732
 - wxImageList::GetSize, 732
 - wxImageList::Remove, 733
 - wxImageList::RemoveAll, 733
 - wxImageList::Replace, 733
 - wxImageList::wxImageList, 730
 - wxIndividualLayoutConstraint, 735
 - wxIndividualLayoutConstraint::Above, 735
 - wxIndividualLayoutConstraint::Absolute, 735
 - wxIndividualLayoutConstraint::AsIs, 735
 - wxIndividualLayoutConstraint::Below, 736
 - wxIndividualLayoutConstraint::LeftOf, 736
 - wxIndividualLayoutConstraint::PercentOf, 736
 - wxIndividualLayoutConstraint::RightOf, 736
 - wxIndividualLayoutConstraint::SameAs, 736
 - wxIndividualLayoutConstraint::Set, 736
 - wxIndividualLayoutConstraint::Unconstrained, 736
 - wxIndividualLayoutConstraint::wxIndividualLayoutConstraint, 735
 - wxInitAllImageHandlers, 1420
 - wxInitDialogEvent, 737
 - wxInitDialogEvent::wxInitDialogEvent, 737
 - wxInitialize, 1420
 - wxInputStream, 737
 - wxInputStream::~~wxInputStream, 738
 - wxInputStream::Eof, 738
 - wxInputStream::GetC, 738
 - wxInputStream::LastRead, 738
 - wxInputStream::Peek, 738
 - wxInputStream::Read, 738
 - wxInputStream::SeekI, 739
 - wxInputStream::TellI, 739
 - wxInputStream::Ungetch, 739
 - wxInputStream::wxInputStream, 737
 - wxINT16_SWAP_ALWAYS, 1465
 - wxINT16_SWAP_ON_BE, 1465
 - wxINT16_SWAP_ON_LE, 1466
 - wxINT32_SWAP_ALWAYS, 1465
 - wxINT32_SWAP_ON_BE, 1465
 - wxINT32_SWAP_ON_LE, 1465
 - wxINTXX_SWAP_ALWAYS, 1465
 - wxINTXX_SWAP_ON_BE, 1465
 - wxINTXX_SWAP_ON_LE, 1465
 - wxIPAddress::AnyAddress, 741
 - wxIPAddress::Hostname, 740
 - wxIPAddress::IPAddress, 741
 - wxIPAddress::IsLocalHost, 742
 - wxIPAddress::LocalHost, 741
 - wxIPAddress::Service, 741
 - wxIPCFormat, 187
 - wxIPv4address::AnyAddress, 743
 - wxIPv4address::Hostname, 742
 - wxIPv4address::IPAddress, 742
 - wxIPv4address::LocalHost, 743
 - wxIPv4address::Service, 743
 - wxIsAbsolutePath, 1430
 - wxIsBusy, 1448
 - wxIsClipboardFormatAvailable, 1456
 - wxIsDebuggerRunning, 1484
 - wxIsEmpty, 1438
 - wxIsMainThread, 1427
 - wxIsNaN, 1450
 - wxIsWild, 1431
 - wxJoystick, 744
 - wxJoystick::~~wxJoystick, 744
 - wxJoystick::GetButtonState, 744
 - wxJoystick::GetManufacturerId, 744
 - wxJoystick::GetMovementThreshold, 744
 - wxJoystick::GetNumberAxes, 745
 - wxJoystick::GetNumberButtons, 745
 - wxJoystick::GetNumberJoysticks, 745
 - wxJoystick::GetPollingMax, 745
 - wxJoystick::GetPollingMin, 745
 - wxJoystick::GetPosition, 745
 - wxJoystick::GetPOVCTSPosition, 746
 - wxJoystick::GetPOVPosition, 746
 - wxJoystick::GetProductId, 745
 - wxJoystick::GetProductName, 745
 - wxJoystick::GetRudderMax, 746
 - wxJoystick::GetRudderMin, 746
 - wxJoystick::GetRudderPosition, 746
-

1790

wxList::Number, 766
wxList::Sort, 766
wxList::wxList, 763
wxListBox, 769
wxListBox::~~wxListBox, 770
wxListBox::Create, 770
wxListBox::Deselect, 770
wxListBox::GetSelections, 771
wxListBox::InsertItems, 771
wxListBox::Selected, 772
wxListBox::Set, 772
wxListBox::SetFirstItem, 773
wxListBox::wxListBox, 769
wxListCtrl, 776
wxListCtrl::~~wxListCtrl, 776
wxListCtrl::Arrange, 776
wxListCtrl::AssignImageList, 777
wxListCtrl::ClearAll, 777
wxListCtrl::Create, 777
wxListCtrl::DeleteAllItems, 777
wxListCtrl::DeleteColumn, 777
wxListCtrl::DeleteItem, 778
wxListCtrl::EditLabel, 778
wxListCtrl::EnsureVisible, 778
wxListCtrl::FindItem, 778
wxListCtrl::GetColumn, 779
wxListCtrl::GetColumnCount, 779
wxListCtrl::GetColumnWidth, 779
wxListCtrl::GetCountPerPage, 779
wxListCtrl::GetEditControl, 779
wxListCtrl::GetImageList, 780
wxListCtrl::GetItem, 780
wxListCtrl::GetItemBackgroundColour, 780
wxListCtrl::GetItemCount, 780
wxListCtrl::GetItemData, 780
wxListCtrl::GetItemPosition, 780
wxListCtrl::GetItemRect, 781
wxListCtrl::GetItemSpacing, 781
wxListCtrl::GetItemState, 781
wxListCtrl::GetItemText, 781
wxListCtrl::GetItemTextColour, 781
wxListCtrl::GetNextItem, 782
wxListCtrl::GetSelectedItemCount, 783
wxListCtrl::GetTextColour, 783
wxListCtrl::GetTopItem, 783
wxListCtrl::GetViewRect, 783
wxListCtrl::HitTest, 783
wxListCtrl::InsertColumn, 784
wxListCtrl::InsertItem, 784
wxListCtrl::OnGetItemAttr, 785
wxListCtrl::OnGetItemImage, 786
wxListCtrl::OnGetItemText, 786
wxListCtrl::RefreshItem, 786
wxListCtrl::RefreshItems, 786
wxListCtrl::ScrollList, 786
wxListCtrl::SetBackgroundColour, 787
wxListCtrl::SetColumn, 787
wxListCtrl::SetColumnWidth, 787
wxListCtrl::SetImageList, 787
wxListCtrl::SetItem, 787
wxListCtrl::SetItemBackgroundColour, 789
wxListCtrl::SetItemCount, 789
wxListCtrl::SetItemData, 789
wxListCtrl::SetItemImage, 789
wxListCtrl::SetItemPosition, 789
wxListCtrl::SetItemState, 790
wxListCtrl::SetItemText, 790
wxListCtrl::SetItemTextColour, 790
wxListCtrl::SetSingleStyle, 790
wxListCtrl::SetTextColour, 790
wxListCtrl::SetWindowStyleFlag, 790
wxListCtrl::SortItems, 790
wxListCtrl::wxListCtrl, 776
wxListEvent, 793
wxListEvent::GetCacheFrom, 793
wxListEvent::GetCacheTo, 793
wxListEvent::GetColumn, 793
wxListEvent::GetData, 794
wxListEvent::GetImage, 794
wxListEvent::GetIndex, 793
wxListEvent::GetItem, 794
wxListEvent::GetKeyCode, 793
wxListEvent::GetLabel, 793
wxListEvent::GetMask, 794
wxListEvent::GetPoint, 793
wxListEvent::GetText, 794
wxListEvent::IsEditCancelled, 794
wxListEvent::wxListEvent, 792
wxListItem, 795
wxListItem::Clear, 795
wxListItem::GetAlign, 795
wxListItem::GetBackgroundColour, 795
wxListItem::GetColumn, 795
wxListItem::GetData, 795
wxListItem::GetFont, 795
wxListItem::GetId, 795
wxListItem::GetImage, 796
wxListItem::GetMask, 796
wxListItem::GetState, 796
wxListItem::GetText, 796
wxListItem::GetTextColour, 796
wxListItem::GetWidth, 797
wxListItem::SetAlign, 797
wxListItem::SetBackgroundColour, 797
wxListItem::SetColumn, 797
wxListItem::SetData, 797
wxListItem::SetFont, 797
wxListItem::SetId, 797
wxListItem::SetImage, 797
wxListItem::SetMask, 798
wxListItem::SetState, 798
wxListItem::SetStateMask, 798
wxListItem::SetText, 798
wxListItem::SetTextColour, 798
wxListItem::SetWidth, 798
wxListItem::wxListItem, 795
wxListView::ClearColumnImage, 799
wxListView::Focus, 799
wxListView::GetFirstSelected, 799
wxListView::GetFocusedItem, 799
wxListView::GetNextSelected, 800
wxListView::IsSelected, 800
wxListView::Select, 800
wxListView::SetColumnImage, 800

wxLL, 1458
wxLoadUserResource, 1462
wxLocale, 810
wxLocale::~~wxLocale, 811
wxLocale::AddCatalog, 811
wxLocale::AddCatalogLookupPathPrefix, 811
wxLocale::AddLanguage, 811
wxLocale::FindLanguageInfo, 812
wxLocale::GetCanonicalName, 812
wxLocale::GetLanguage, 812
wxLocale::GetLanguageInfo, 812
wxLocale::GetLanguageName, 813
wxLocale::GetLocale, 813
wxLocale::GetName, 813
wxLocale::GetString, 813
wxLocale::GetSysName, 814
wxLocale::GetSystemEncoding, 814
wxLocale::GetSystemEncodingName, 814
wxLocale::GetSystemLanguage, 814
wxLocale::Init, 814
wxLocale::IsLoaded, 815
wxLocale::IsOk, 816
wxLocale::wxLocale, 810
wxLOCALE_CONV_ENCODING, 815
wxLOCALE_LOAD_DEFAULT, 815
wxLog::AddTraceMask, 818
wxLog::ClearTraceMasks, 819
wxLog::DoLog, 820
wxLog::DoLogString, 820
wxLog::DontCreateOnDemand, 820
wxLog::Flush, 820
wxLog::FlushActive, 821
wxLog::GetActiveTarget, 819
wxLog::GetLogLevel, 821
wxLog::GetTimestamp, 821
wxLog::GetTraceMask, 822
wxLog::GetTraceMasks, 819
wxLog::GetVerbose, 821
wxLog::IsAllowedTraceMask, 822
wxLog::OnLog, 819
wxLog::RemoveTraceMask, 822
wxLog::Resume, 820
wxLog::SetActiveTarget, 819
wxLog::SetLogLevel, 821
wxLog::SetTimestamp, 821
wxLog::SetTraceMask, 822
wxLog::SetVerbose, 821
wxLog::Suspend, 819
wxLogChain, 823
wxLogChain::~~wxLogChain, 823
wxLogChain::GetOldLog, 823
wxLogChain::IsPassingMessages, 823
wxLogChain::PassMessages, 823
wxLogChain::SetLog, 823
wxLogChain::wxLogChain, 823
wxLogDebug, 1475
wxLogError, 1473
wxLogFatalError, 1473
wxLogGui, 824
wxLogGui::wxLogGui, 824
wxLogMessage, 1474
wxLogNull, 825
wxLogNull::~~wxLogNull, 825
wxLogNull::wxLogNull, 825
wxLogPassThrough::wxLogPassThrough, 826
wxLogStatus, 1474
wxLogStderr, 826
wxLogStderr::wxLogStderr, 826
wxLogStream, 827
wxLogStream::wxLogStream, 827
wxLogSysError, 1474
wxLogTextCtrl, 827
wxLogTextCtrl::wxLogTextCtrl, 827
wxLogTrace, 1475
wxLogVerbose, 1474
wxLogWarning, 1474
wxLogWindow, 828
wxLogWindow::GetFrame, 828
wxLogWindow::OnFrameClose, 829
wxLogWindow::OnFrameCreate, 828
wxLogWindow::OnFrameDelete, 829
wxLogWindow::Show, 828
wxLogWindow::wxLogWindow, 828
wxLongLong, 830
wxLongLong::Abs, 830
wxLongLong::Assign, 830
wxLongLong::GetHi, 830
wxLongLong::GetLo, 831
wxLongLong::GetValue, 831
wxLongLong::operator-, 831, 832
wxLongLong::operator--, 832
wxLongLong::operator+, 831
wxLongLong::operator++, 831
wxLongLong::operator+=", 831
wxLongLong::operator=, 830
wxLongLong::operator==, 832
wxLongLong::ToLong, 831
wxLongLong::ToString, 831
wxLongLong::wxLongLong, 830
wxLongLongFmtSpec, 1458
wxMakeMetafilePlaceable, 1452
wxMask, 833
wxMask::~~wxMask, 833
wxMask::Create, 833
wxMask::wxMask, 832
wxMatchWild, 1431
wxMAXIMIZE, 520, 841, 846, 891
wxMAXIMIZE_BOX, 365, 520, 841, 846, 891
wxMaximizeEvent, 834
wxMaximizeEvent::wxMaximizeEvent, 834
wxMBConv, 835
wxMBConv classes, 1538
wxMBConv objects, 1538
wxMBConv::cMB2WC, 836
wxMBConv::cMB2WX, 836
wxMBConv::cWC2MB, 836
wxMBConv::cWC2WX, 836
wxMBConv::cWX2MB, 836
wxMBConv::cWX2WC, 837
wxMBConv::MB2WC, 835
wxMBConv::WC2MB, 836
wxMBConv::wxMBConv, 835
wxMBConvFile::MB2WC, 837
wxMBConvFile::WC2MB, 837

wxMBConvUTF16::MB2WC, 840
 wxMBConvUTF16::WC2MB, 840
 wxMBConvUTF32::MB2WC, 840
 wxMBConvUTF32::WC2MB, 841
 wxMBConvUTF7::MB2WC, 838
 wxMBConvUTF7::WC2MB, 838
 wxMBConvUTF8::MB2WC, 839
 wxMBConvUTF8::WC2MB, 839
 wxMDIChildFrame, 842
 wxMDIChildFrame::~wxMDIChildFrame, 843
 wxMDIChildFrame::Activate, 843
 wxMDIChildFrame::Create, 843
 wxMDIChildFrame::Maximize, 843
 wxMDIChildFrame::Restore, 844
 wxMDIChildFrame::wxMDIChildFrame, 842
 wxMDIClientWindow, 844
 wxMDIClientWindow::~wxMDIClientWindow, 845
 wxMDIClientWindow::CreateClient, 845
 wxMDIClientWindow::wxMDIClientWindow, 844
 wxMDIParentFrame, 847
 wxMDIParentFrame::~wxMDIParentFrame, 848
 wxMDIParentFrame::ActivateNext, 848
 wxMDIParentFrame::ActivatePrevious, 848
 wxMDIParentFrame::ArrangeIcons, 848
 wxMDIParentFrame::Cascade, 849
 wxMDIParentFrame::Create, 849
 wxMDIParentFrame::GetActiveChild, 850
 wxMDIParentFrame::GetClientSize, 849
 wxMDIParentFrame::GetClientWindow, 850
 wxMDIParentFrame::GetToolBar, 850
 wxMDIParentFrame::GetWindowMenu, 850
 wxMDIParentFrame::OnCreateClient, 850
 wxMDIParentFrame::SetToolBar, 851
 wxMDIParentFrame::SetWindowMenu, 851
 wxMDIParentFrame::Tile, 852
 wxMDIParentFrame::wxMDIParentFrame, 847
 wxMemoryDC, 853
 wxMemoryDC::SelectObject, 853
 wxMemoryDC::wxMemoryDC, 853
 wxMemoryFSHandler, 854
 wxMemoryFSHandler::AddFile, 854
 wxMemoryFSHandler::RemoveFile, 855
 wxMemoryFSHandler::wxMemoryFSHandler, 854
 wxMemoryInputStream, 855
 wxMemoryInputStream::~wxMemoryInputStream, 855
 wxMemoryInputStream::wxMemoryInputStream, 855
 wxMemoryOutputStream, 856
 wxMemoryOutputStream::~wxMemoryOutputStream, 856
 wxMemoryOutputStream::CopyTo, 856
 wxMemoryOutputStream::wxMemoryOutputStream, 856
 wxMenu, 858
 wxMenu::~wxMenu, 858
 wxMenu::Append, 858
 wxMenu::AppendCheckItem, 860
 wxMenu::AppendRadioItem, 860
 wxMenu::AppendSeparator, 861
 wxMenu::Break, 861
 wxMenu::Check, 861
 wxMenu::Delete, 861
 wxMenu::Destroy, 862
 wxMenu::Enable, 862
 wxMenu::FindItem, 863
 wxMenu::FindItemByPosition, 863
 wxMenu::GetHelpString, 863
 wxMenu::GetLabel, 864
 wxMenu::GetMenuItemCount, 864
 wxMenu::GetMenuItems, 864
 wxMenu::GetTitle, 864
 wxMenu::Insert, 865
 wxMenu::InsertCheckItem, 865
 wxMenu::InsertRadioItem, 865
 wxMenu::InsertSeparator, 865
 wxMenu::IsChecked, 866
 wxMenu::IsEnabled, 866
 wxMenu::Prepend, 866
 wxMenu::PrependCheckItem, 867
 wxMenu::PrependRadioItem, 867
 wxMenu::PrependSeparator, 867
 wxMenu::Remove, 867
 wxMenu::SetHelpString, 868
 wxMenu::SetLabel, 868
 wxMenu::SetTitle, 868
 wxMenu::UpdateUI, 869
 wxMenu::wxMenu, 857
 wxMenuBar, 870
 wxMenuBar::~wxMenuBar, 870
 wxMenuBar::Append, 870
 wxMenuBar::Check, 871
 wxMenuBar::Enable, 871
 wxMenuBar::EnableTop, 872
 wxMenuBar::FindItem, 872
 wxMenuBar::FindMenu, 872
 wxMenuBar::FindMenuItem, 872
 wxMenuBar::GetHelpString, 873
 wxMenuBar::GetLabel, 873
 wxMenuBar::GetLabelTop, 874
 wxMenuBar::GetMenu, 874
 wxMenuBar::GetMenuCount, 874
 wxMenuBar::Insert, 874
 wxMenuBar::IsChecked, 875
 wxMenuBar::IsEnabled, 875
 wxMenuBar::Refresh, 875
 wxMenuBar::Remove, 876
 wxMenuBar::Replace, 876
 wxMenuBar::SetHelpString, 876
 wxMenuBar::SetLabel, 877
 wxMenuBar::SetLabelTop, 877
 wxMenuBar::wxMenuBar, 870
 wxMenuEvent, 878
 wxMenuEvent::GetMenuId, 879
 wxMenuEvent::IsPopup, 879
 wxMenuEvent::m_menuId, 878
 wxMenuEvent::wxMenuEvent, 878
 wxMenuItem, 879
 wxMenuItem::~wxMenuItem, 880
 wxMenuItem::Check, 880
 wxMenuItem::Enable, 880
 wxMenuItem::GetBackgroundColour, 880
 wxMenuItem::GetBitmap, 880

wxMenuItem::GetFont, 881
 wxMenuItem::GetHelp, 881
 wxMenuItem::GetId, 881
 wxMenuItem::GetKind, 881
 wxMenuItem::GetLabel, 881
 wxMenuItem::GetLabelFromText, 881
 wxMenuItem::GetMarginWidth, 881
 wxMenuItem::GetName, 882
 wxMenuItem::GetSubMenu, 882
 wxMenuItem::GetText, 882
 wxMenuItem::GetTextColour, 882
 wxMenuItem::IsCheckable, 882
 wxMenuItem::IsChecked, 882
 wxMenuItem::IsEnabled, 882
 wxMenuItem::IsSeparator, 883
 wxMenuItem::SetBackgroundColour, 883
 wxMenuItem::SetBitmap, 883
 wxMenuItem::SetBitmaps, 883
 wxMenuItem::SetFont, 883
 wxMenuItem::SetHelp, 883
 wxMenuItem::SetMarginWidth, 883
 wxMenuItem::SetText, 883
 wxMenuItem::SetTextColour, 884
 wxMenuItem::wxMenuItem, 879
 wxMessageBox, 1448
 wxMessageDialog, 884
 wxMessageDialog overview, 1605
 wxMessageDialog::~~wxMessageDialog, 885
 wxMessageDialog::ShowModal, 885
 wxMessageDialog::wxMessageDialog, 884
 wxMetafile, 886
 wxMetafile::~~wxMetafile, 886
 wxMetafile::Ok, 886
 wxMetafile::Play, 886
 wxMetafile::SetClipboard, 886
 wxMetafile::wxMetafile, 886
 wxMetafileDC, 887
 wxMetafileDC::~~wxMetafileDC, 887
 wxMetafileDC::Close, 888
 wxMetafileDC::wxMetafileDC, 887
 wxMimeTypesManager, 889
 wxMimeTypesManager::~~wxMimeTypesManager, 889
 wxMimeTypesManager::AddFallbacks, 890
 wxMimeTypesManager::GetFileTypeFromExtension, 890
 wxMimeTypesManager::GetFileTypeFromMimeType, 890
 wxMimeTypesManager::IsOfType, 890
 wxMimeTypesManager::ReadMailcap, 890
 wxMimeTypesManager::ReadMimeTypes, 891
 wxMimeTypesManager::wxMimeTypesManager, 889
 wxMiniFrame, 892
 wxMiniFrame::~~wxMiniFrame, 893
 wxMiniFrame::Create, 893
 wxMiniFrame::wxMiniFrame, 892
 wxMINIMIZE, 520, 841, 846, 891
 wxMINIMIZE_BOX, 365, 520, 841, 846, 891
 wxMirrorDC, 894
 wxMirrorDC::wxMirrorDC, 894
 wxMkdir, 1431
 wxModule, 895
 wxModule::~~wxModule, 895
 wxModule::CleanupModules, 895
 wxModule::Exit, 895
 wxModule::Init, 895
 wxModule::InitializeModules, 895
 wxModule::OnExit, 895
 wxModule::OnInit, 896
 wxModule::RegisterModule, 896
 wxModule::RegisterModules, 896
 wxModule::wxModule, 895
 wxMouseCaptureChangedEvent, 897
 wxMouseCaptureChangedEvent::wxMouseCaptureChangedEvent, 897
 wxMouseEvent, 900
 wxMouseEvent::AltDown, 900
 wxMouseEvent::Button, 900
 wxMouseEvent::ButtonDClick, 900
 wxMouseEvent::ButtonDown, 901
 wxMouseEvent::ButtonUp, 901
 wxMouseEvent::ControlDown, 901
 wxMouseEvent::Dragging, 901
 wxMouseEvent::Entering, 901
 wxMouseEvent::GetButton, 901
 wxMouseEvent::GetLinesPerAction, 902
 wxMouseEvent::GetLogicalPosition, 902
 wxMouseEvent::GetPosition, 902
 wxMouseEvent::GetWheelDelta, 902
 wxMouseEvent::GetWheelRotation, 902
 wxMouseEvent::GetX, 902
 wxMouseEvent::GetY, 903
 wxMouseEvent::IsButton, 903
 wxMouseEvent::IsPageScroll, 903
 wxMouseEvent::Leaving, 903
 wxMouseEvent::LeftDClick, 903
 wxMouseEvent::LeftDown, 903
 wxMouseEvent::LeftIsDown, 903
 wxMouseEvent::LeftUp, 904
 wxMouseEvent::m_altDown, 898
 wxMouseEvent::m_controlDown, 898
 wxMouseEvent::m_leftDown, 898
 wxMouseEvent::m_linesPerAction, 899
 wxMouseEvent::m_metaDown, 899
 wxMouseEvent::m_middleDown, 898
 wxMouseEvent::m_rightDown, 899
 wxMouseEvent::m_shiftDown, 899
 wxMouseEvent::m_wheelDelta, 899
 wxMouseEvent::m_wheelRotation, 899
 wxMouseEvent::m_x, 899
 wxMouseEvent::m_y, 899
 wxMouseEvent::MetaDown, 904
 wxMouseEvent::MiddleDClick, 904
 wxMouseEvent::MiddleDown, 904
 wxMouseEvent::MiddleIsDown, 904
 wxMouseEvent::MiddleUp, 904
 wxMouseEvent::Moving, 904
 wxMouseEvent::RightDClick, 905
 wxMouseEvent::RightDown, 905
 wxMouseEvent::RightIsDown, 905
 wxMouseEvent::RightUp, 905
 wxMouseEvent::ShiftDown, 905
 wxMouseEvent::wxMouseEvent, 900

-
- wxMoveEvent, 906
 - wxMoveEvent::GetPosition, 906
 - wxMoveEvent::wxMoveEvent, 906
 - wxMultiChoiceDialog overview, 1605
 - wxMutex, 908
 - wxMutex::~~wxMutex, 908
 - wxMutex::Lock, 908
 - wxMutex::TryLock, 909
 - wxMutex::Unlock, 909
 - wxMutex::wxMutex, 908
 - wxMutexGuiEnter, 1427
 - wxMutexGuiLeave, 1428
 - wxMutexLocker, 910
 - wxMutexLocker::~~wxMutexLocker, 910
 - wxMutexLocker::IsOk, 910
 - wxMutexLocker::wxMutexLocker, 910
 - wxNB_BOTTOM, 912
 - wxNB_FIXEDWIDTH, 912
 - wxNB_LEFT, 912
 - wxNB_MULTILINE, 912
 - wxNB_RIGHT, 912
 - wxNewId, 1459
 - wxNO_3D, 365
 - wxNO_BORDER, 102, 1340
 - wxNO_FULL_REPAINT_ON_RESIZE, 1340
 - wxNode<T>::GetData, 911
 - wxNode<T>::GetNext, 911
 - wxNode<T>::GetPrevious, 911
 - wxNode<T>::IndexOf, 911
 - wxNode<T>::SetData, 911
 - wxNotebook, 912
 - wxNotebook::~~wxNotebook, 913
 - wxNotebook::AddPage, 913
 - wxNotebook::AdvanceSelection, 914
 - wxNotebook::AssignImageList, 914
 - wxNotebook::Create, 914
 - wxNotebook::DeleteAllPages, 914
 - wxNotebook::DeletePage, 915
 - wxNotebook::GetImageList, 915
 - wxNotebook::GetPage, 915
 - wxNotebook::GetPageCount, 915
 - wxNotebook::GetPageImage, 915
 - wxNotebook::GetPageText, 915
 - wxNotebook::GetRowCount, 915
 - wxNotebook::GetSelection, 915
 - wxNotebook::HitTest, 916
 - wxNotebook::InsertPage, 916
 - wxNotebook::OnSelChange, 917
 - wxNotebook::RemovePage, 917
 - wxNotebook::SetImageList, 917
 - wxNotebook::SetPadding, 918
 - wxNotebook::SetPageImage, 918
 - wxNotebook::SetPageSize, 918
 - wxNotebook::SetPageText, 918
 - wxNotebook::SetSelection, 918
 - wxNotebook::wxNotebook, 912
 - wxNotebookEvent, 919
 - wxNotebookEvent::GetOldSelection, 919
 - wxNotebookEvent::GetSelection, 920
 - wxNotebookEvent::SetOldSelection, 920
 - wxNotebookEvent::SetSelection, 920
 - wxNotebookEvent::wxNotebookEvent, 919
 - wxNotebookSizer, 920
 - wxNotebookSizer::GetNotebook, 921
 - wxNotebookSizer::wxNotebookSizer, 920
 - wxNotifyEvent, 921
 - wxNotifyEvent::Allow, 921
 - wxNotifyEvent::IsAllowed, 922
 - wxNotifyEvent::Veto, 922
 - wxNotifyEvent::wxNotifyEvent, 921
 - wxNow, 1479
 - wxObjArray, 49
 - wxObjArray::Detach, 50
 - wxObject, 922
 - wxObject::~~wxObject, 922
 - wxObject::Dump, 923
 - wxObject::GetClassInfo, 923
 - wxObject::GetRefData, 923
 - wxObject::IsKindOf, 924
 - wxObject::m_refData, 923
 - wxObject::operator delete, 925
 - wxObject::operator new, 925
 - wxObject::Ref, 924
 - wxObject::SetRefData, 924
 - wxObject::UnRef, 925
 - wxObject::wxObject, 922
 - wxObjectRefData, 926
 - wxObjectRefData::~~wxObjectRefData, 926
 - wxObjectRefData::m_count, 925
 - wxObjectRefData::wxObjectRefData, 926
 - wxODBC - Basic Step-By-Step Guide, 1629
 - wxODBC - Compiling, 1628
 - wxODBC - Configuring your system for ODBC use, 1628
 - wxODBC - Known Issues, 1638
 - wxODBC - Sample Code, 1640
 - wxODBC Where To Start, 1624
 - wxOnAssert, 1480
 - wxOpenClipboard, 1456
 - wxOpenErrorTraverser::OnOpenError, 383
 - wxOutputStream, 926
 - wxOutputStream::~~wxOutputStream, 926
 - wxOutputStream::LastWrite, 926
 - wxOutputStream::PutC, 926
 - wxOutputStream::SeekO, 927
 - wxOutputStream::TellO, 927
 - wxOutputStream::Write, 927
 - wxOutputStream::wxOutputStream, 926
 - wxPageSetupDialog, 928
 - wxPageSetupDialog::~~wxPageSetupDialog, 928
 - wxPageSetupDialog::GetPageSetupData, 928
 - wxPageSetupDialog::ShowModal, 928
 - wxPageSetupDialog::wxPageSetupDialog, 928
 - wxPageSetupDialogData, 929
 - wxPageSetupDialogData::~~wxPageSetupDialogData, 929
 - wxPageSetupDialogData::EnableHelp, 929
 - wxPageSetupDialogData::EnableMargins, 929
 - wxPageSetupDialogData::EnableOrientation, 930
 - wxPageSetupDialogData::EnablePaper, 930
 - wxPageSetupDialogData::EnablePrinter, 930
 - wxPageSetupDialogData::GetDefaultInfo, 931
 - wxPageSetupDialogData::GetDefaultMinMargins, 930
-

wxPageSetupDialogData::GetEnableHelp, 931
wxPageSetupDialogData::GetEnableMargins, 930
wxPageSetupDialogData::GetEnableOrientation, 930
wxPageSetupDialogData::GetEnablePaper, 930
wxPageSetupDialogData::GetEnablePrinter, 930
wxPageSetupDialogData::GetMarginBottomRight, 931
wxPageSetupDialogData::GetMarginTopLeft, 931
wxPageSetupDialogData::GetMinMarginBottomRight, 931
wxPageSetupDialogData::GetMinMarginTopLeft, 931
wxPageSetupDialogData::GetPaperId, 931
wxPageSetupDialogData::GetPaperSize, 931
wxPageSetupDialogData::GetPrintData, 932
wxPageSetupDialogData::Ok, 932
wxPageSetupDialogData::operator =, 933
wxPageSetupDialogData::SetDefaultInfo, 932
wxPageSetupDialogData::SetDefaultMinMargins, 932
wxPageSetupDialogData::SetMarginBottomRight, 932
wxPageSetupDialogData::SetMarginTopLeft, 932
wxPageSetupDialogData::SetMinMarginBottomRight, 932
wxPageSetupDialogData::SetMinMarginTopLeft, 932
wxPageSetupDialogData::SetPaperId, 933
wxPageSetupDialogData::SetPaperSize, 933
wxPageSetupDialogData::SetPrintData, 933
wxPageSetupDialogData::wxPageSetupDialogData, 929
wxPaintDC, 934
wxPaintDC::wxPaintDC, 934
wxPaintEvent, 935
wxPaintEvent::wxPaintEvent, 935
wxPalette, 936
wxPalette::~~wxPalette, 937
wxPalette::Create, 937
wxPalette::GetPixel, 938
wxPalette::GetRGB, 938
wxPalette::Ok, 939
wxPalette::operator !=, 939
wxPalette::operator =, 939
wxPalette::operator ==, 939
wxPalette::wxPalette, 936
wxPanel, 940
wxPanel::~~wxPanel, 941
wxPanel::Create, 941
wxPanel::GetDefaultItem, 941
wxPanel::InitDialog, 941
wxPanel::OnSysColourChanged, 941
wxPanel::SetDefaultItem, 942
wxPanel::wxPanel, 940
wxPaperSize, 965
wxPathList, 942
wxPathList::Add, 943
wxPathList::AddEnvList, 943
wxPathList::EnsureFileAccessible, 943
wxPathList::FindAbsoluteValidPath, 943
wxPathList::FindValidPath, 943
wxPathList::Member, 943
wxPathList::wxPathList, 942
wxPathOnly, 1430
wxPCXHandler, 706
wxPen, 945
wxPen::~~wxPen, 946
wxPen::GetCap, 947
wxPen::GetColour, 947
wxPen::GetDashes, 947
wxPen::GetJoin, 947
wxPen::GetStipple, 947
wxPen::GetStyle, 948
wxPen::GetWidth, 948
wxPen::Ok, 948
wxPen::operator !=, 950
wxPen::operator =, 950
wxPen::operator ==, 950
wxPen::SetCap, 948
wxPen::SetColour, 948
wxPen::SetDashes, 949
wxPen::SetJoin, 949
wxPen::SetStipple, 949
wxPen::SetStyle, 949
wxPen::SetWidth, 949
wxPen::wxPen, 944
wxPenList, 951
wxPenList::AddPen, 951
wxPenList::FindOrCreatePen, 951
wxPenList::RemovePen, 951
wxPenList::wxPenList, 951
wxPLOT_BUTTON_ALL, 954
wxPLOT_BUTTON_ENLARGE, 954
wxPLOT_BUTTON_MOVE, 954
wxPLOT_BUTTON_ZOOM, 954
wxPLOT_DEFAULT, 954
wxPLOT_X_AXIS, 954
wxPLOT_Y_AXIS, 954
wxPlotCurve, 952
wxPlotCurve::GetEndX, 952
wxPlotCurve::GetEndY, 952
wxPlotCurve::GetOffsetY, 952
wxPlotCurve::GetStartX, 953
wxPlotCurve::GetStartY, 953
wxPlotCurve::GetY, 952
wxPlotCurve::SetEndY, 953
wxPlotCurve::SetOffsetY, 953
wxPlotCurve::SetStartY, 953
wxPlotCurve::wxPlotCurve, 952
wxPlotWindow, 954
wxPlotWindow::~~wxPlotWindow, 954
wxPlotWindow::Add, 954
wxPlotWindow::Delete, 955
wxPlotWindow::Enlarge, 955
wxPlotWindow::GetAt, 955
wxPlotWindow::GetCount, 955
wxPlotWindow::GetCurrentCurve, 955
wxPlotWindow::GetUnitsPerValue, 956
wxPlotWindow::GetZoom, 956
wxPlotWindow::Move, 955
wxPlotWindow::RedrawEverything, 956
wxPlotWindow::RedrawXAxis, 956

-
- wxPlotWindow::RedrawYAxis, 956
 - wxPlotWindow::SetCurrentCurve, 955
 - wxPlotWindow::SetEnlargeAroundWindowCentre, 957
 - wxPlotWindow::SetScrollOnThumbRelease, 956
 - wxPlotWindow::SetUnitsPerValue, 955
 - wxPlotWindow::SetZoom, 956
 - wxPlotWindow::wxPlotWindow, 954
 - wxPNGHandler, 706
 - wxPNMHandler, 706
 - wxPoint, 957
 - wxPoint::wxPoint, 957
 - wxPoint::x, 957
 - wxPoint::y, 957
 - wxPostDelete, 1463
 - wxPostEvent, 1463
 - wxPostScriptDC, 958
 - wxPostScriptDC::GetResolution, 958
 - wxPostScriptDC::SetResolution, 958
 - wxPostScriptDC::wxPostScriptDC, 958
 - wxPreviewCanvas, 959
 - wxPreviewCanvas::~~wxPreviewCanvas, 959
 - wxPreviewCanvas::OnPaint, 959
 - wxPreviewCanvas::wxPreviewCanvas, 959
 - wxPreviewControlBar, 960
 - wxPreviewControlBar::~~wxPreviewControlBar, 960
 - wxPreviewControlBar::CreateButtons, 960
 - wxPreviewControlBar::GetPrintPreview, 960
 - wxPreviewControlBar::GetZoomControl, 961
 - wxPreviewControlBar::SetZoomControl, 961
 - wxPreviewControlBar::wxPreviewControlBar, 960
 - wxPreviewFrame, 961
 - wxPreviewFrame::~~wxPreviewFrame, 961
 - wxPreviewFrame::CreateCanvas, 962
 - wxPreviewFrame::CreateControlBar, 962
 - wxPreviewFrame::Initialize, 962
 - wxPreviewFrame::OnCloseWindow, 962
 - wxPreviewFrame::wxPreviewFrame, 961
 - wxPrintData, 963
 - wxPrintData::~~wxPrintData, 963
 - wxPrintData::GetCollate, 963
 - wxPrintData::GetColour, 964
 - wxPrintData::GetDuplex, 964
 - wxPrintData::GetNoCopies, 964
 - wxPrintData::GetOrientation, 964
 - wxPrintData::GetPaperId, 964
 - wxPrintData::GetPrinterName, 964
 - wxPrintData::GetQuality, 964
 - wxPrintData::Ok, 965
 - wxPrintData::operator =, 968
 - wxPrintData::SetCollate, 965
 - wxPrintData::SetColour, 965
 - wxPrintData::SetDuplex, 965
 - wxPrintData::SetNoCopies, 965
 - wxPrintData::SetOrientation, 965
 - wxPrintData::SetPaperId, 965
 - wxPrintData::SetPrinterName, 967
 - wxPrintData::SetQuality, 968
 - wxPrintData::wxPrintData, 963
 - wxPrintDialog, 969
 - wxPrintDialog overview, 1604
 - wxPrintDialog::~~wxPrintDialog, 969
 - wxPrintDialog::GetPrintDC, 969
 - wxPrintDialog::GetPrintDialogData, 969
 - wxPrintDialog::Ok, 969
 - wxPrintDialog::ShowModal, 969
 - wxPrintDialog::wxPrintDialog, 968
 - wxPrintDialogData, 970
 - wxPrintDialogData::~~wxPrintDialogData, 970
 - wxPrintDialogData::EnableHelp, 970
 - wxPrintDialogData::EnablePageNumbers, 970
 - wxPrintDialogData::EnablePrintToFile, 970
 - wxPrintDialogData::EnableSelection, 971
 - wxPrintDialogData::GetAllPages, 971
 - wxPrintDialogData::GetCollate, 971
 - wxPrintDialogData::GetFromPage, 971
 - wxPrintDialogData::GetMaxPage, 971
 - wxPrintDialogData::GetMinPage, 971
 - wxPrintDialogData::GetNoCopies, 971
 - wxPrintDialogData::GetPrintData, 971
 - wxPrintDialogData::GetPrintToFile, 971
 - wxPrintDialogData::GetSelection, 972
 - wxPrintDialogData::GetToPage, 972
 - wxPrintDialogData::Ok, 972
 - wxPrintDialogData::operator =, 973
 - wxPrintDialogData::SetCollate, 972
 - wxPrintDialogData::SetFromPage, 972
 - wxPrintDialogData::SetMaxPage, 972
 - wxPrintDialogData::SetMinPage, 972
 - wxPrintDialogData::SetNoCopies, 972
 - wxPrintDialogData::SetPrintData, 973
 - wxPrintDialogData::SetPrintToFile, 973
 - wxPrintDialogData::SetSelection, 973
 - wxPrintDialogData::SetSetupDialog, 973
 - wxPrintDialogData::SetToPage, 973
 - wxPrintDialogData::wxPrintDialogData, 970
 - wxPrinter, 974
 - wxPrinter::~~wxPrinter, 974
 - wxPrinter::Abort, 974
 - wxPrinter::CreateAbortWindow, 974
 - wxPrinter::GetLastError, 974
 - wxPrinter::GetPrintDialogData, 975
 - wxPrinter::Print, 975
 - wxPrinter::PrintDialog, 975
 - wxPrinter::ReportError, 975
 - wxPrinter::Setup, 975
 - wxPrinter::wxPrinter, 974
 - wxPrinterDC, 976
 - wxPrinterDC::wxPrinterDC, 976
 - wxPrintout, 977
 - wxPrintout::~~wxPrintout, 977
 - wxPrintout::GetDC, 977
 - wxPrintout::GetPageInfo, 977
 - wxPrintout::GetPageSizeMM, 978
 - wxPrintout::GetPageSizePixels, 978
 - wxPrintout::GetPPIPrinter, 978
 - wxPrintout::GetPPIScreen, 978
 - wxPrintout::GetTitle, 978
 - wxPrintout::HasPage, 979
 - wxPrintout::IsPreview, 979
 - wxPrintout::OnBeginDocument, 979
 - wxPrintout::OnBeginPrinting, 979
 - wxPrintout::OnEndDocument, 979
-

-
- wxPrintout::OnEndPrinting, 980
 - wxPrintout::OnPreparePrinting, 980
 - wxPrintout::OnPrintPage, 980
 - wxPrintout::wxPrintout, 977
 - wxPrintPreview, 981
 - wxPrintPreview::~~wxPrintPreview, 981
 - wxPrintPreview::DrawBlankPage, 981
 - wxPrintPreview::GetCanvas, 981
 - wxPrintPreview::GetCurrentPage, 981
 - wxPrintPreview::GetFrame, 981
 - wxPrintPreview::GetMaxPage, 981
 - wxPrintPreview::GetMinPage, 982
 - wxPrintPreview::GetPrintData, 982
 - wxPrintPreview::GetPrintout, 982
 - wxPrintPreview::GetPrintoutForPrinting, 982
 - wxPrintPreview::Ok, 982
 - wxPrintPreview::PaintPage, 982
 - wxPrintPreview::Print, 982
 - wxPrintPreview::RenderPage, 983
 - wxPrintPreview::SetCanvas, 983
 - wxPrintPreview::SetCurrentPage, 983
 - wxPrintPreview::SetFrame, 983
 - wxPrintPreview::SetPrintout, 983
 - wxPrintPreview::SetZoom, 983
 - wxPrintPreview::wxPrintPreview, 980
 - wxPrivateDropTarget, 984
 - wxPrivateDropTarget::GetId, 984
 - wxPrivateDropTarget::SetId, 984
 - wxPrivateDropTarget::wxPrivateDropTarget, 984
 - wxProcess, 985
 - wxProcess::~~wxProcess, 985
 - wxProcess::CloseOutput, 985
 - wxProcess::Detach, 986
 - wxProcess::Exists, 988
 - wxProcess::GetErrorStream, 986
 - wxProcess::GetInputStream, 986
 - wxProcess::GetOutputStream, 986
 - wxProcess::IsErrorAvailable, 986
 - wxProcess::IsInputAvailable, 986
 - wxProcess::IsInputOpened, 987
 - wxProcess::Kill, 987
 - wxProcess::OnTerminate, 988
 - wxProcess::Open, 988
 - wxProcess::Redirect, 989
 - wxProcess::wxProcess, 985
 - wxProcessEvent, 990
 - wxProcessEvent::GetExitCode, 990
 - wxProcessEvent::GetPid, 990
 - wxProcessEvent::wxProcessEvent, 989
 - wxProgressDialog, 990
 - wxProgressDialog::~~wxProgressDialog, 991
 - wxProgressDialog::Resume, 991
 - wxProgressDialog::Update, 991
 - wxProgressDialog::wxProgressDialog, 990
 - wxProtocol::Abort, 993
 - wxProtocol::GetContentType, 994
 - wxProtocol::GetError, 993
 - wxProtocol::GetInputStream, 992
 - wxProtocol::Reconnect, 992
 - wxProtocol::SetPassword, 994
 - wxProtocol::SetUser, 994
 - wxQuantize, 994
 - wxQuantize::DoQuantize, 995
 - wxQuantize::Quantize, 994
 - wxQuantize::wxQuantize, 994
 - wxQueryLayoutInfoEvent, 996
 - wxQueryLayoutInfoEvent::GetAlignment, 996
 - wxQueryLayoutInfoEvent::GetFlags, 996
 - wxQueryLayoutInfoEvent::GetOrientation, 996
 - wxQueryLayoutInfoEvent::GetRequestedLength, 996
 - wxQueryLayoutInfoEvent::GetSize, 996
 - wxQueryLayoutInfoEvent::SetAlignment, 997
 - wxQueryLayoutInfoEvent::SetFlags, 997
 - wxQueryLayoutInfoEvent::SetOrientation, 997
 - wxQueryLayoutInfoEvent::SetRequestedLength, 997
 - wxQueryLayoutInfoEvent::SetSize, 997
 - wxQueryLayoutInfoEvent::wxQueryLayoutInfoEvent, 996
 - wxRA_SPECIFY_COLS, 998
 - wxRA_SPECIFY_ROWS, 998
 - wxRadioBox, 998
 - wxRadioBox::~~wxRadioBox, 999
 - wxRadioBox::Create, 999
 - wxRadioBox::Enable, 1000
 - wxRadioBox::FindString, 1000
 - wxRadioBox::GetCount, 1001
 - wxRadioBox::GetLabel, 1001
 - wxRadioBox::GetSelection, 1001
 - wxRadioBox::GetString, 1001
 - wxRadioBox::GetStringSelection, 1001
 - wxRadioBox::Number, 1002
 - wxRadioBox::SetLabel, 1002
 - wxRadioBox::SetSelection, 1002
 - wxRadioBox::SetStringSelection, 1003
 - wxRadioBox::Show, 1003
 - wxRadioBox::wxRadioBox, 998
 - wxRadioButton, 1004
 - wxRadioButton::~~wxRadioButton, 1005
 - wxRadioButton::Create, 1005
 - wxRadioButton::GetValue, 1005
 - wxRadioButton::SetValue, 1006
 - wxRadioButton::wxRadioButton, 1004
 - wxRAISED_BORDER, 1340
 - wxRB_GROUP, 1004
 - wxRB_SINGLE, 1004
 - wxRealPoint, 1006
 - wxRealPoint::wxRealPoint, 1006
 - wxRect, 1007
 - wxRect::Deflate, 1008
 - wxRect::GetBottom, 1008
 - wxRect::GetBottomRight, 1009
 - wxRect::GetHeight, 1008
 - wxRect::GetLeft, 1008
 - wxRect::GetPosition, 1008
 - wxRect::GetRight, 1009
 - wxRect::GetSize, 1009
 - wxRect::GetTop, 1009
 - wxRect::GetTopLeft, 1008
 - wxRect::GetWidth, 1009
 - wxRect::GetX, 1009
 - wxRect::GetY, 1009
 - wxRect::height, 1007
-

wxRect::Inflate, 1009
wxRect::Offset, 1010
wxRect::operator !=, 1011
wxRect::operator =, 1011
wxRect::operator ==, 1011
wxRect::SetHeight, 1010
wxRect::SetWidth, 1010
wxRect::SetX, 1010
wxRect::SetY, 1011
wxRect::width, 1007
wxRect::wxRect, 1007
wxRect::x, 1007
wxRect::y, 1007
wxRect::Inside, 1010
wxRect::Intersects, 1010
wxRecursionGuard, 1012
wxRecursionGuard::~wxRecursionGuard, 1012
wxRecursionGuard::IsInside, 1012
wxRecursionGuard::wxRecursionGuard, 1012
wxRegEx, 1015
wxRegEx::~wxRegEx, 1015
wxRegEx::Compile, 1015
wxRegEx::GetMatch, 1015
wxRegEx::GetMatchCount, 1015
wxRegEx::IsValid, 1015
wxRegEx::Matches, 1016
wxRegEx::Replace, 1016
wxRegEx::ReplaceAll, 1016
wxRegEx::ReplaceFirst, 1016
wxRegEx::wxRegEx, 1014
wxRegion, 1017, 1018
wxRegion::~wxRegion, 1018
wxRegion::Clear, 1018
wxRegion::Contains, 1018
wxRegion::ConvertToBitmap, 1018
wxRegion::GetBox, 1018
wxRegion::Intersect, 1019
wxRegion::IsEmpty, 1019
wxRegion::Offset, 1020
wxRegion::operator =, 1021
wxRegion::Subtract, 1019
wxRegion::Union, 1020
wxRegion::wxRegion, 1017
wxRegion::Xor, 1020
wxRegionIterator, 1021
wxRegionIterator::GetH, 1022
wxRegionIterator::GetHeight, 1022
wxRegionIterator::GetRect, 1022
wxRegionIterator::GetW, 1022
wxRegionIterator::GetWidth, 1022
wxRegionIterator::GetX, 1021
wxRegionIterator::GetY, 1022
wxRegionIterator::HaveRects, 1022
wxRegionIterator::operator ++, 1023
wxRegionIterator::operator bool, 1023
wxRegionIterator::Reset, 1022
wxRegionIterator::wxRegionIterator, 1021
wxRegisterClipboardFormat, 1457
wxRegisterId, 1459
wxRelationship, 734
wxRemoveFile, 1432
wxRenameFile, 1432
wxRendererNative::~wxRendererNative, 1024
wxRendererNative::DrawHeaderButton, 1024
wxRendererNative::DrawSplitterBorder, 1025
wxRendererNative::DrawSplitterSash, 1025
wxRendererNative::DrawTreeItemButton, 1025
wxRendererNative::Get, 1025
wxRendererNative::GetDefault, 1025
wxRendererNative::GetGeneric, 1025
wxRendererNative::GetSplitterParams, 1026
wxRendererNative::GetVersion, 1026
wxRendererNative::Load, 1026
wxRendererNative::Set, 1026
wxRendererVersion::age, 1027
wxRendererVersion::IsCompatible, 1027
wxRendererVersion::version, 1027
wxRESIZE_BORDER, 364, 520, 841, 846, 892
wxRETAINED, 1050
wxRIGHT, 1075
wxRmdir, 1432
wxSafeShowMessage, 1476
wxSafeYield, 1420
wxSashEvent, 1028
wxSashEvent::GetDragRect, 1029
wxSashEvent::GetDragStatus, 1029
wxSashEvent::GetEdge, 1028
wxSashEvent::wxSashEvent, 1028
wxSashLayoutWindow, 1030
wxSashLayoutWindow::~wxSashLayoutWindow, 1030
wxSashLayoutWindow::GetAlignment, 1030
wxSashLayoutWindow::GetOrientation, 1031
wxSashLayoutWindow::OnCalculateLayout, 1031
wxSashLayoutWindow::OnQueryLayoutInfo, 1031
wxSashLayoutWindow::SetAlignment, 1031
wxSashLayoutWindow::SetDefaultSize, 1031
wxSashLayoutWindow::SetOrientation, 1031
wxSashLayoutWindow::wxSashLayoutWindow, 1030
wxSashWindow, 1033
wxSashWindow::~wxSashWindow, 1034
wxSashWindow::GetMaximumSizeX, 1034
wxSashWindow::GetMaximumSizeY, 1034
wxSashWindow::GetMinimumSizeX, 1034
wxSashWindow::GetMinimumSizeY, 1034
wxSashWindow::GetSashVisible, 1034
wxSashWindow::HasBorder, 1034
wxSashWindow::SetMaximumSizeX, 1035
wxSashWindow::SetMaximumSizeY, 1035
wxSashWindow::SetMinimumSizeX, 1035
wxSashWindow::SetMinimumSizeY, 1035
wxSashWindow::SetSashBorder, 1036
wxSashWindow::SetSashVisible, 1035
wxSashWindow::wxSashWindow, 1033
wxSB_HORIZONTAL, 1043
wxSB_VERTICAL, 1043
wxScopedArray, 1038
wxScopedArray::get, 1039
wxScopedArray::operator [], 1039
wxScopedArray::reset, 1038
wxScopedArray::swap, 1039
wxScopedArray::wxScopedArray, 1038

- wxScopedPtr::~wxScopedPtr, 1041
- wxScopedPtr::get, 1041
- wxScopedPtr::operator *, 1041
- wxScopedPtr::operator ->, 1041
- wxScopedPtr::release, 1041
- wxScopedPtr::reset, 1041
- wxScopedPtr::swap, 1041
- wxScopedPtr::wxScopedPtr, 1041
- wxScopedTiedPtr, 1042
- wxScopedTiedPtr::~wxScopedTiedPtr, 1042
- wxScopedTiedPtr::wxScopedTiedPtr, 1042
- wxScreenDC, 1036
- wxScreenDC::EndDrawingOnTop, 1037
- wxScreenDC::StartDrawingOnTop, 1037
- wxScreenDC::wxScreenDC, 1036
- wxScrollBar, 1045, 1046
- wxScrollBar::~wxScrollBar, 1046
- wxScrollBar::Create, 1046
- wxScrollBar::GetPageSize, 1047
- wxScrollBar::GetRange, 1047
- wxScrollBar::GetThumbPosition, 1047
- wxScrollBar::GetThumbSize, 1047
- wxScrollBar::SetScrollbar, 1048
- wxScrollBar::SetThumbPosition, 1047
- wxScrollBar::wxScrollBar, 1045
- wxScrolledWindow, 1050, 1051
- wxScrolledWindow::~wxScrolledWindow, 1051
- wxScrolledWindow::CalcScrolledPosition, 1051
- wxScrolledWindow::CalcUnscrolledPosition, 1052
- wxScrolledWindow::Create, 1052
- wxScrolledWindow::EnableScrolling, 1052
- wxScrolledWindow::GetScrollPixelsPerUnit, 1053
- wxScrolledWindow::GetViewStart, 1053
- wxScrolledWindow::GetVirtualSize, 1054
- wxScrolledWindow::IsRetained, 1054
- wxScrolledWindow::OnDraw, 1055
- wxScrolledWindow::PrepareDC, 1055
- wxScrolledWindow::Scroll, 1055
- wxScrolledWindow::SetScrollbars, 1056
- wxScrolledWindow::SetScrollRate, 1057
- wxScrolledWindow::SetTargetWindow, 1057
- wxScrolledWindow::wxScrolledWindow, 1050
- wxScrollEvent, 1060
- wxScrollEvent::GetOrientation, 1060
- wxScrollEvent::GetPosition, 1060
- wxScrollEvent::wxScrollEvent, 1060
- wxScrollWinEvent, 1061
- wxScrollWinEvent::GetOrientation, 1061
- wxScrollWinEvent::GetPosition, 1061
- wxScrollWinEvent::wxScrollWinEvent, 1061
- wxSemaphore, 1062
- wxSemaphore::~wxSemaphore, 1062
- wxSemaphore::Post, 1062
- wxSemaphore::TryWait, 1063
- wxSemaphore::Wait, 1063
- wxSemaphore::WaitTimeout, 1063
- wxSemaphore::wxSemaphore, 1062
- wxServer, 1064
- wxServer::Create, 1064
- wxServer::OnAcceptConnection, 1065
- wxServer::wxServer, 1064
- wxSetClipboardData, 1457
- wxSetCursor, 1452
- wxSetDisplayName, 1463
- wxSetEnv, 1484
- wxSetPrinterCommand, 1454
- wxSetPrinterFile, 1454
- wxSetPrinterMode, 1454
- wxSetPrinterOptions, 1454
- wxSetPrinterOrientation, 1454
- wxSetPrinterPreviewCommand, 1455
- wxSetPrinterScaling, 1455
- wxSetPrinterTranslation, 1455
- wxSetWorkingDirectory, 1432
- wxSHAPED, 1075
- wxShell, 1425
- wxShowTip, 1449
- wxShutdown, 1425
- wxSIMPLE_BORDER, 1339
- wxSingleChoiceDialog, 1066
- wxSingleChoiceDialog overview, 1605
- wxSingleChoiceDialog::~wxSingleChoiceDialog, 1067
- wxSingleChoiceDialog::GetSelection, 1067
- wxSingleChoiceDialog::GetSelectionClientData, 1067
- wxSingleChoiceDialog::GetStringSelection, 1067
- wxSingleChoiceDialog::SetSelection, 1067
- wxSingleChoiceDialog::ShowModal, 1067
- wxSingleChoiceDialog::wxSingleChoiceDialog, 1066
- wxSingleInstanceChecker, 1068, 1069
- wxSingleInstanceChecker::~wxSingleInstanceChecker, 1069
- wxSingleInstanceChecker::Create, 1069
- wxSingleInstanceChecker::IsAnotherRunning, 1069
- wxSingleInstanceChecker::wxSingleInstanceChecker, 1068
- wxSize, 1070
- wxSize::DecTo, 1070
- wxSize::GetHeight, 1071
- wxSize::GetWidth, 1070
- wxSize::IncTo, 1071
- wxSize::IsFullySpecified, 1070
- wxSize::operator =, 1072
- wxSize::Set, 1071
- wxSize::SetDefaults, 1071
- wxSize::SetHeight, 1071
- wxSize::SetWidth, 1071
- wxSize::wxSize, 1070
- wxSizeEvent, 1072
- wxSizeEvent::GetSize, 1072
- wxSizeEvent::wxSizeEvent, 1072
- wxSizer, 1073
- wxSizer::~wxSizer, 1073
- wxSizer::Add, 1074
- wxSizer::CalcMin, 1075
- wxSizer::Detach, 1076
- wxSizer::Fit, 1076
- wxSizer::FitInside, 1076
- wxSizer::GetMinSize, 1077
- wxSizer::GetPosition, 1077

wxSizer::GetSize, 1076
wxSizer::Insert, 1077
wxSizer::Layout, 1077
wxSizer::Prepend, 1077
wxSizer::RecalcSizes, 1078
wxSizer::Remove, 1078
wxSizer::SetDimension, 1078
wxSizer::SetItemMinSize, 1079
wxSizer::SetMinSize, 1078
wxSizer::SetSizeHints, 1079
wxSizer::SetVirtualSizeHints, 1079
wxSizer::Show, 1079
wxSizer::wxSizer, 1073
wxSizerItem, 1080
wxSizerItem::~~wxSizerItem, 1080
wxSizerItem::CalcMin, 1080
wxSizerItem::DeleteWindows, 1080
wxSizerItem::DetachSizer, 1080
wxSizerItem::GetBorder, 1080
wxSizerItem::GetFlag, 1081
wxSizerItem::GetMinSize, 1081
wxSizerItem::GetPosition, 1081
wxSizerItem::GetProportion, 1081
wxSizerItem::GetRatio, 1081
wxSizerItem::GetSize, 1081
wxSizerItem::GetSizer, 1081
wxSizerItem::GetSpacer, 1081
wxSizerItem::GetUserData, 1082
wxSizerItem::GetWindow, 1082
wxSizerItem::IsShown, 1082
wxSizerItem::IsSizer, 1082
wxSizerItem::IsSpacer, 1082
wxSizerItem::IsWindow, 1082
wxSizerItem::SetBorder, 1082
wxSizerItem::SetDimension, 1082
wxSizerItem::SetFlag, 1083
wxSizerItem::SetInitSize, 1083
wxSizerItem::SetProportion, 1083
wxSizerItem::SetRatio, 1083
wxSizerItem::SetSizer, 1083
wxSizerItem::SetSpacer, 1083
wxSizerItem::SetWindow, 1083
wxSizerItem::Show, 1083
wxSizerItem::wxSizerItem, 1080
wxSL_AUTOTICKS, 1084
wxSL_HORIZONTAL, 1084
wxSL_LABELS, 1084
wxSL_LEFT, 1084
wxSL_RIGHT, 1084
wxSL_SELRange, 1084
wxSL_TOP, 1084
wxSL_VERTICAL, 1084
wxSleep, 1479
wxSlider, 1086, 1087
wxSlider::~~wxSlider, 1087
wxSlider::ClearSel, 1088
wxSlider::ClearTicks, 1088
wxSlider::Create, 1088
wxSlider::GetLineSize, 1088
wxSlider::GetMax, 1088
wxSlider::GetMin, 1088
wxSlider::GetPageSize, 1089
wxSlider::GetSelEnd, 1089
wxSlider::GetSelStart, 1089
wxSlider::GetThumbLength, 1089
wxSlider::GetTickFreq, 1090
wxSlider::GetValue, 1090
wxSlider::SetLineSize, 1091
wxSlider::SetPageSize, 1091
wxSlider::SetRange, 1090
wxSlider::SetSelection, 1091
wxSlider::SetThumbLength, 1092
wxSlider::SetTick, 1092
wxSlider::SetTickFreq, 1090
wxSlider::SetValue, 1092
wxSlider::wxSlider, 1086
wxSnprintf, 1439
wxSocketAddress, 1093
wxSocketAddress::~~wxSocketAddress, 1093
wxSocketAddress::Clear, 1093
wxSocketAddress::SockAddrLen, 1093
wxSocketAddress::wxSocketAddress, 1093
wxSocketBase, 1097
wxSocketBase::~~wxSocketBase, 1097
wxSocketBase::Callback, 1097
wxSocketBase::CallbackData, 1097
wxSocketBase::Close, 1098
wxSocketBase::Destroy, 1098
wxSocketBase::Discard, 1098
wxSocketBase::Error, 1099
wxSocketBase::GetClientData, 1099
wxSocketBase::GetFlags, 1099
wxSocketBase::GetLocal, 1099
wxSocketBase::GetPeer, 1099
wxSocketBase::InterruptWait, 1099
wxSocketBase::IsConnected, 1100
wxSocketBase::IsData, 1100
wxSocketBase::IsDisconnected, 1100
wxSocketBase::LastCount, 1100
wxSocketBase::LastError, 1100
wxSocketBase::Notify, 1101
wxSocketBase::Ok, 1101
wxSocketBase::Peek, 1104
wxSocketBase::Read, 1104
wxSocketBase::ReadMsg, 1105
wxSocketBase::RestoreState, 1101
wxSocketBase::SaveState, 1101
wxSocketBase::SetClientData, 1102
wxSocketBase::SetEventHandler, 1102
wxSocketBase::SetFlags, 1102
wxSocketBase::SetNotify, 1103
wxSocketBase::SetTimeout, 1104
wxSocketBase::Unread, 1106
wxSocketBase::Wait, 1106
wxSocketBase::WaitForLost, 1107
wxSocketBase::WaitForRead, 1107
wxSocketBase::WaitForWrite, 1108
wxSocketBase::Write, 1109
wxSocketBase::WriteMsg, 1109
wxSocketBase::wxSocketBase, 1097
wxSocketClient, 1110
wxSocketClient::~~wxSocketClient, 1110
wxSocketClient::Connect, 1110
wxSocketClient::WaitOnConnect, 1111

wxSocketClient::wxSocketClient, 1110
wxSocketEvent, 1113
wxSocketEvent::GetClientData, 1113
wxSocketEvent::GetSocket, 1113
wxSocketEvent::GetSocketEvent, 1113
wxSocketEvent::wxSocketEvent, 1112
wxSocketInputStream, 1113, 1114
wxSocketInputStream::wxSocketInputStream,
1113
wxSocketOutputStream::wxSocketOutputStream,
1114
wxSocketServer, 1114
wxSocketServer::~wxSocketServer, 1115
wxSocketServer::Accept, 1115
wxSocketServer::AcceptWith, 1115
wxSocketServer::WaitForAccept, 1115
wxSocketServer::wxSocketServer, 1114
wxSortedArray, 49
wxSound, 1337
wxSound::~wxSound, 1337
wxSound::Create, 1338
wxSound::IsOk, 1338
wxSound::IsPlaying, 1338
wxSound::Play, 1338
wxSound::Stop, 1339
wxSound::wxSound, 1337
wxSP_3D, 1128
wxSP_3DBORDER, 1128
wxSP_3DSASH, 1128
wxSP_ARROW_KEYS, 1117, 1120
wxSP_BORDER, 1128
wxSP_HORIZONTAL, 1117
wxSP_LIVE_UPDATE, 1128
wxSP_NO_XP_THEME, 1128
wxSP_NOBORDER, 1128
wxSP_PERMIT_UNSPPLIT, 1128
wxSP_VERTICAL, 1117
wxSP_WRAP, 1117, 1120
wxSpinButton, 1117
wxSpinButton::~wxSpinButton, 1118
wxSpinButton::Create, 1118
wxSpinButton::GetMax, 1118
wxSpinButton::GetMin, 1118
wxSpinButton::GetValue, 1119
wxSpinButton::SetRange, 1119
wxSpinButton::SetValue, 1119
wxSpinButton::wxSpinButton, 1117
wxSpinCtrl, 1120
wxSpinCtrl::Create, 1121
wxSpinCtrl::GetMax, 1122
wxSpinCtrl::GetMin, 1122
wxSpinCtrl::GetValue, 1122
wxSpinCtrl::SetRange, 1122
wxSpinCtrl::SetSelection, 1122
wxSpinCtrl::SetValue, 1121
wxSpinCtrl::wxSpinCtrl, 1120
wxSpinEvent, 1123
wxSpinEvent::GetPosition, 1123
wxSpinEvent::SetPosition, 1123
wxSpinEvent::wxSpinEvent, 1123
wxSplashScreen, 1124
wxSplashScreen::~wxSplashScreen, 1124
wxSplashScreen::GetSplashStyle, 1125
wxSplashScreen::GetSplashWindow, 1125
wxSplashScreen::GetTimeout, 1125
wxSplashScreen::OnCloseWindow, 1124
wxSplashScreen::wxSplashScreen, 1124
wxSplitPath, 1432
wxSplitterEvent, 1126
wxSplitterEvent::GetSashPosition, 1126
wxSplitterEvent::GetWindowBeingRemoved,
1127
wxSplitterEvent::GetX, 1127
wxSplitterEvent::GetY, 1127
wxSplitterEvent::SetSashPosition, 1127
wxSplitterEvent::wxSplitterEvent, 1126
wxSplitterRenderParams::border, 1137
wxSplitterRenderParams::IsHotSensitive, 1137
wxSplitterWindow, 1129
wxSplitterWindow::~wxSplitterWindow, 1130
wxSplitterWindow::Create, 1130
wxSplitterWindow::GetMinimumPaneSize, 1131
wxSplitterWindow::GetSashPosition, 1131
wxSplitterWindow::GetSplitMode, 1131
wxSplitterWindow::GetWindow1, 1131
wxSplitterWindow::GetWindow2, 1131
wxSplitterWindow::Initialize, 1131
wxSplitterWindow::IsSplit, 1132
wxSplitterWindow::OnDoubleClickSash, 1132
wxSplitterWindow::OnSashPositionChange, 1133
wxSplitterWindow::OnUnsplit, 1132
wxSplitterWindow::ReplaceWindow, 1133
wxSplitterWindow::SetMinimumPaneSize, 1134
wxSplitterWindow::SetSashPosition, 1133
wxSplitterWindow::SetSplitMode, 1134
wxSplitterWindow::SplitHorizontally, 1135
wxSplitterWindow::SplitVertically, 1135
wxSplitterWindow::Unsplit, 1136
wxSplitterWindow::UpdateSize, 1137
wxSplitterWindow::wxSplitterWindow, 1129
wxST_NO_AUTORESIZE, 1144
wxST_SIZEGRIP, 1146
wxStartTimer, 1480
wxSTATIC_BORDER, 1340
wxStaticBitmap, 1138
wxStaticBitmap::Create, 1139
wxStaticBitmap::GetBitmap, 1139
wxStaticBitmap::SetBitmap, 1139
wxStaticBitmap::wxStaticBitmap, 1138
wxStaticBox, 1140
wxStaticBox::~wxStaticBox, 1141
wxStaticBox::Create, 1141
wxStaticBox::wxStaticBox, 1140
wxStaticBoxSizer, 1142
wxStaticBoxSizer::GetStaticBox, 1142
wxStaticBoxSizer::wxStaticBoxSizer, 1142
wxStaticCast, 1471
wxStaticLine, 1143
wxStaticLine::Create, 1143
wxStaticLine::GetDefaultSize, 1144
wxStaticLine::IsVertical, 1144
wxStaticLine::wxStaticLine, 1143
wxStaticText, 1145
wxStaticText::Create, 1145

wxStaticText::GetLabel, 1145
wxStaticText::SetLabel, 1146
wxStaticText::wxStaticText, 1144
wxStatusBar, 1147
wxStatusBar::~~wxStatusBar, 1147
wxStatusBar::Create, 1147
wxStatusBar::GetFieldRect, 1147
wxStatusBar::GetFieldsCount, 1148
wxStatusBar::GetStatusText, 1148
wxStatusBar::PopStatusText, 1148
wxStatusBar::PushStatusText, 1149
wxStatusBar::SetFieldsCount, 1149
wxStatusBar::SetMinHeight, 1149
wxStatusBar::SetStatusText, 1149
wxStatusBar::SetStatusWidths, 1150
wxStatusBar::wxStatusBar, 1147
wxSTAY_ON_TOP, 365, 520, 841, 846, 891
wxStopWatch, 1151
wxStopWatch::Pause, 1151
wxStopWatch::Resume, 1151
wxStopWatch::Start, 1151
wxStopWatch::Time, 1151
wxStopWatch::wxStopWatch, 1151
wxStrcmp, 1438
wxStreamBase, 1152
wxStreamBase::~~wxStreamBase, 1152
wxStreamBase::GetLastError, 1152
wxStreamBase::GetSize, 1153
wxStreamBase::IsOk, 1152
wxStreamBase::OnSysRead, 1153
wxStreamBase::OnSysSeek, 1153
wxStreamBase::OnSysTell, 1153
wxStreamBase::OnSysWrite, 1153
wxStreamBase::wxStreamBase, 1152
wxStreamBuffer, 1154, 1155
wxStreamBuffer::~~wxStreamBuffer, 1154
wxStreamBuffer::FillBuffer, 1158
wxStreamBuffer::Fixed, 1158
wxStreamBuffer::Flushable, 1158
wxStreamBuffer::FlushBuffer, 1158
wxStreamBuffer::GetBufferEnd, 1157
wxStreamBuffer::GetBufferPos, 1157
wxStreamBuffer::GetBufferStart, 1157
wxStreamBuffer::GetChar, 1155
wxStreamBuffer::GetDataLeft, 1159
wxStreamBuffer::GetIntPosition, 1158
wxStreamBuffer::GetLastAccess, 1158
wxStreamBuffer::PutChar, 1155
wxStreamBuffer::Read, 1155
wxStreamBuffer::ResetBuffer, 1156
wxStreamBuffer::Seek, 1156
wxStreamBuffer::SetBufferIO, 1156
wxStreamBuffer::SetIntPosition, 1158
wxStreamBuffer::Stream, 1159
wxStreamBuffer::Tell, 1156
wxStreamBuffer::Write, 1155
wxStreamBuffer::wxStreamBuffer, 1154
wxStreamToTextRedirector, 1160
wxStreamToTextRedirector::~~wxStreamToTextRe
director, 1160
wxStreamToTextRedirector::wxStreamToTextRe
director, 1160
wxStricmp, 1438
wxString, 1167, 1168
wxString::~~wxString, 1168
wxString::AfterFirst, 1169
wxString::AfterLast, 1169
wxString::Alloc, 1168
wxString::Append, 1169
wxString::BeforeFirst, 1169
wxString::BeforeLast, 1169
wxString::c_str, 1169
wxString::Clear, 1169
wxString::Cmp, 1170
wxString::CmpNoCase, 1170
wxString::CompareTo, 1170
wxString::Contains, 1170
wxString::Empty, 1170
wxString::Find, 1171
wxString::First, 1171
wxString::Format, 1171
wxString::FormatV, 1171
wxString::Freq, 1171
wxString::FromAscii, 1171
wxString::GetChar, 1172
wxString::GetData, 1172
wxString::GetWritableChar, 1172
wxString::GetWriteBuf, 1172
wxString::Index, 1172
wxString::IsAscii, 1172
wxString::IsEmpty, 1173
wxString::IsNull, 1173
wxString::IsNumber, 1173
wxString::IsSameAs, 1173
wxString::IsWord, 1173
wxString::Last, 1174
wxString::Left, 1174
wxString::Len, 1174
wxString::Length, 1174
wxString::Lower, 1174
wxString::LowerCase, 1174
wxString::MakeLower, 1174
wxString::MakeUpper, 1174
wxString::Matches, 1175
wxString::Mid, 1175
wxString::operator (), 1180
wxString::operator [], 1180
wxString::operator +, 1179
wxString::operator +=, 1180
wxString::operator <<, 1180
wxString::operator =, 1179
wxString::operator >>, 1180
wxString::operator const char*, 1181
wxString::operator!, 1179
wxString::Pad, 1175
wxString::Prepend, 1175
wxString::Printf, 1175
wxString::PrintfV, 1175
wxString::Remove, 1175
wxString::RemoveLast, 1176
wxString::Replace, 1176
wxString::Right, 1176
wxString::SetChar, 1176
wxString::Shrink, 1176

wxString::sprintf, 1176
 wxString::StartsWith, 1176
 wxString::Strip, 1177
 wxString::SubString, 1177
 wxString::ToAscii, 1177
 wxString::ToDouble, 1177
 wxString::ToLong, 1177
 wxString::ToULong, 1178
 wxString::Trim, 1178
 wxString::Truncate, 1178
 wxString::UngetWriteBuf, 1178
 wxString::Upper, 1179
 wxString::UpperCase, 1179
 wxString::wstring, 1167
 wxStringBuffer, 1182
 wxStringBuffer::~~wxStringBuffer, 1182
 wxStringBuffer::operator wxChar *, 1182
 wxStringBuffer::wxStringBuffer, 1182
 wxStringClientData, 1182, 1183
 wxStringClientData::GetData, 1183
 wxStringClientData::SetData, 1183
 wxStringClientData::wxStringClientData, 1182
 wxStringEq, 1438
 wxStringList, 1183
 wxStringList::~~wxStringList, 1183
 wxStringList::Add, 1184
 wxStringList::Clear, 1184
 wxStringList::Delete, 1184
 wxStringList::ListToArray, 1184
 wxStringList::Member, 1184
 wxStringList::Sort, 1184
 wxStringList::wxStringList, 1183
 wxStringMatch, 1438
 wxStringTokenizer, 1186
 wxStringTokenizer::CountTokens, 1186
 wxStringTokenizer::GetNextToken, 1186
 wxStringTokenizer::GetPosition, 1186
 wxStringTokenizer::GetString, 1186
 wxStringTokenizer::HasMoreTokens, 1186
 wxStringTokenizer::SetString, 1186
 wxStringTokenizer::wxStringTokenizer, 1186
 wxStripMenuCodes, 1463
 wxStrlen, 1439
 wxSUNKEN_BORDER, 1339
 wxSW_3D, 1032
 wxSW_3DBORDER, 1032
 wxSW_3DSASH, 1032
 wxSW_BORDER, 1032
 wxSysColourChanged, 1187
 wxSysColourChangedEvent::wxSysColourChanged, 1187
 wxSysErrorCode, 1476
 wxSysErrorMsg, 1477
 wxSYSTEM_MENU, 364, 520, 841, 846, 891
 wxSystemOptions, 1188
 wxSystemOptions::GetOption, 1188
 wxSystemOptions::GetOptionInt, 1188
 wxSystemOptions::HasOption, 1189
 wxSystemOptions::SetOption, 1189
 wxSystemOptions::wxSystemOptions, 1188
 wxSystemSettings, 1190
 wxSystemSettings::GetColour, 1190
 wxSystemSettings::GetFont, 1191
 wxSystemSettings::GetMetric, 1192
 wxSystemSettings::wxSystemSettings, 1189
 wxT, 1439
 wxTAB_TRAVERSAL, 1340
 wxTabCtrl, 1194
 wxTabCtrl::~~wxTabCtrl, 1195
 wxTabCtrl::Create, 1195
 wxTabCtrl::DeleteAllItems, 1195
 wxTabCtrl::DeleteItem, 1195
 wxTabCtrl::GetCurFocus, 1195
 wxTabCtrl::GetImageList, 1195
 wxTabCtrl::GetItemCount, 1195
 wxTabCtrl::GetItemData, 1195
 wxTabCtrl::GetItemImage, 1196
 wxTabCtrl::GetItemRect, 1196
 wxTabCtrl::GetItemText, 1196
 wxTabCtrl::GetRowCount, 1196
 wxTabCtrl::GetSelection, 1196
 wxTabCtrl::HitTest, 1196
 wxTabCtrl::InsertItem, 1197
 wxTabCtrl::SetImageList, 1198
 wxTabCtrl::SetItemData, 1197
 wxTabCtrl::SetItemImage, 1198
 wxTabCtrl::SetItemSize, 1198
 wxTabCtrl::SetItemText, 1198
 wxTabCtrl::SetPadding, 1198
 wxTabCtrl::SetSelection, 1198
 wxTabCtrl::wxTabCtrl, 1194
 wxTabEvent, 1199
 wxTabEvent::wxTabEvent, 1199
 wxTaskBarIcon, 1200
 wxTaskBarIcon::~~wxTaskBarIcon, 1200
 wxTaskBarIcon::IsIconInstalled, 1200
 wxTaskBarIcon::IsOk, 1200
 wxTaskBarIcon::PopupMenu, 1200
 wxTaskBarIcon::RemoveIcon, 1201
 wxTaskBarIcon::SetIcon, 1201
 wxTaskBarIcon::wxTaskBarIcon, 1200
 wxTB_DOCKABLE, 1267
 wxTB_FLAT, 1267
 wxTB_HORIZONTAL, 1267
 wxTB_HORZ_LAYOUT, 1267
 wxTB_HORZ_TEXT, 1267
 wxTB_NOALIGN, 1267
 wxTB_NODIVIDER, 1267
 wxTB_NOICONS, 1267
 wxTB_TEXT, 1267
 wxTB_VERTICAL, 1267
 wxTE_AUTO_URL, 1208
 wxTE_CENTRE, 1208
 wxTE_DONTWRAP, 1208
 wxTE_LEFT, 1208
 wxTE_LINEWRAP, 1208
 wxTE_MULTILINE, 1208
 wxTE_NOHIDESEL, 1208
 wxTE_PASSWORD, 1208
 wxTE_PROCESS_ENTER, 1208
 wxTE_PROCESS_TAB, 1208
 wxTE_READONLY, 1208
 wxTE_RICH, 1208
 wxTE_RICH2, 1208

wxTE_RIGHT, 1208
wxTE_WORDWRAP, 1208
wxTempFile, 1202
wxTempFile::~~wxTempFile, 1203
wxTempFile::Commit, 1203
wxTempFile::Discard, 1203
wxTempFile::IsOpened, 1202
wxTempFile::Open, 1202
wxTempFile::Write, 1202
wxTempFile::wxTempFile, 1202
wxTextAttr, 1204, 1205
wxTextAttr::GetAlignment, 1205
wxTextAttr::GetBackgroundColour, 1205
wxTextAttr::GetFlags, 1206
wxTextAttr::GetFont, 1205
wxTextAttr::GetLeftIndent, 1205
wxTextAttr::GetLeftSubIndent, 1205
wxTextAttr::GetRightIndent, 1205
wxTextAttr::GetTabs, 1205
wxTextAttr::GetTextColour, 1206
wxTextAttr::HasBackgroundColour, 1206
wxTextAttr::HasFont, 1206
wxTextAttr::HasTextColour, 1206
wxTextAttr::IsDefault, 1206
wxTextAttr::SetAlignment, 1206
wxTextAttr::SetBackgroundColour, 1206
wxTextAttr::SetFlags, 1206
wxTextAttr::SetFont, 1207
wxTextAttr::SetLeftIndent, 1207
wxTextAttr::SetRightIndent, 1207
wxTextAttr::SetTabs, 1207
wxTextAttr::SetTextColour, 1207
wxTextAttr::wxTextAttr, 1204
wxTextCtrl, 1211
wxTextCtrl::~~wxTextCtrl, 1212
wxTextCtrl::AppendText, 1212
wxTextCtrl::CanCopy, 1213
wxTextCtrl::CanCut, 1213
wxTextCtrl::CanPaste, 1213
wxTextCtrl::CanRedo, 1213
wxTextCtrl::CanUndo, 1213
wxTextCtrl::Clear, 1213
wxTextCtrl::Copy, 1213
wxTextCtrl::Create, 1214
wxTextCtrl::Cut, 1214
wxTextCtrl::DiscardEdits, 1214
wxTextCtrl::EmulateKeyPress, 1214
wxTextCtrl::GetDefaultStyle, 1214
wxTextCtrl::GetInsertionPoint, 1214
wxTextCtrl::GetLastPosition, 1215
wxTextCtrl::GetLineLength, 1215
wxTextCtrl::GetLineText, 1215
wxTextCtrl::GetNumberOfLines, 1216
wxTextCtrl::GetRange, 1216
wxTextCtrl::GetSelection, 1216
wxTextCtrl::GetStringSelection, 1217
wxTextCtrl::GetStyle, 1217
wxTextCtrl::GetValue, 1217
wxTextCtrl::HitTest, 1217
wxTextCtrl::IsEditable, 1218
wxTextCtrl::IsModified, 1218
wxTextCtrl::IsMultiLine, 1218
wxTextCtrl::IsSingleLine, 1218
wxTextCtrl::LoadFile, 1218
wxTextCtrl::OnDropFiles, 1218
wxTextCtrl::operator <<, 1225
wxTextCtrl::Paste, 1219
wxTextCtrl::PositionToXY, 1219
wxTextCtrl::Redo, 1220
wxTextCtrl::Remove, 1220
wxTextCtrl::Replace, 1220
wxTextCtrl::SaveFile, 1220
wxTextCtrl::SetDefaultStyle, 1221
wxTextCtrl::SetEditable, 1221
wxTextCtrl::SetInsertionPoint, 1222
wxTextCtrl::SetInsertionPointEnd, 1222
wxTextCtrl::SetMaxLength, 1222
wxTextCtrl::SetSelection, 1222
wxTextCtrl::SetStyle, 1223
wxTextCtrl::SetValue, 1223
wxTextCtrl::ShowPosition, 1223
wxTextCtrl::Undo, 1224
wxTextCtrl::WriteText, 1224
wxTextCtrl::wxTextCtrl, 1211
wxTextCtrl::XYToPosition, 1224
wxTextDataObject, 1226
wxTextDataObject::GetText, 1226
wxTextDataObject::GetTextLength, 1226
wxTextDataObject::SetText, 1226
wxTextDataObject::wxTextDataObject, 1226
wxTextDropTarget, 1227
wxTextDropTarget::OnDrop, 1227
wxTextDropTarget::OnDropText, 1227
wxTextDropTarget::wxTextDropTarget, 1227
wxTextEntryDialog, 1228
wxTextEntryDialog overview, 1605
wxTextEntryDialog::~~wxTextEntryDialog, 1228
wxTextEntryDialog::GetValue, 1229
wxTextEntryDialog::SetValue, 1229
wxTextEntryDialog::ShowModal, 1229
wxTextEntryDialog::wxTextEntryDialog, 1228
wxTextFile, 1230
wxTextFile::~~wxTextFile, 1230
wxTextFile::AddLine, 1231
wxTextFile::Clear, 1234
wxTextFile::Close, 1231
wxTextFile::Create, 1231
wxTextFile::Eof, 1232
wxTextFile::Exists, 1231
wxTextFile::GetCurrentLine, 1232
wxTextFile::GetEOL, 1232
wxTextFile::GetFirstLine, 1232
wxTextFile::GetLastLine, 1233
wxTextFile::GetLine, 1231
wxTextFile::GetLineCount, 1231
wxTextFile::GetLineType, 1233
wxTextFile::GetName, 1233
wxTextFile::GetNextLine, 1233
wxTextFile::GetPrevLine, 1233
wxTextFile::GoToLine, 1232
wxTextFile::GuessType, 1233
wxTextFile::InsertLine, 1234
wxTextFile::IsOpened, 1231
wxTextFile::Open, 1234

wxTextFile::operator[], 1232
wxTextFile::RemoveLine, 1234
wxTextFile::Write, 1234
wxTextFile::wxTextFile, 1230
wxTextInputStream, 1235
wxTextInputStream::~wxTextInputStream, 1236
wxTextInputStream::Read16, 1236
wxTextInputStream::Read16S, 1236
wxTextInputStream::Read32, 1236
wxTextInputStream::Read32S, 1237
wxTextInputStream::Read8, 1236
wxTextInputStream::Read8S, 1236
wxTextInputStream::ReadChar, 1237
wxTextInputStream::ReadDouble, 1237
wxTextInputStream::ReadLine, 1237
wxTextInputStream::ReadString, 1237
wxTextInputStream::ReadWord, 1237
wxTextInputStream::SetStringSeparators, 1238
wxTextInputStream::wxTextInputStream, 1235
wxTextOutputStream, 1238
wxTextOutputStream::~wxTextOutputStream, 1238
wxTextOutputStream::GetMode, 1239
wxTextOutputStream::SetMode, 1239
wxTextOutputStream::Write16, 1239
wxTextOutputStream::Write32, 1239
wxTextOutputStream::Write8, 1239
wxTextOutputStream::WriteDouble, 1239
wxTextOutputStream::WriteString, 1239
wxTextOutputStream::wxTextOutputStream, 1238
wxTextValidator, 1240
wxTextValidator::~wxTextValidator, 1241
wxTextValidator::Clone, 1241
wxTextValidator::GetExcludeList, 1241
wxTextValidator::GetIncludeList, 1241
wxTextValidator::GetStyle, 1241
wxTextValidator::OnChar, 1241
wxTextValidator::SetExcludeList, 1241
wxTextValidator::SetIncludeList, 1242
wxTextValidator::SetStyle, 1242
wxTextValidator::TransferFromWindow, 1242
wxTextValidator::TransferToWindow, 1242
wxTextValidator::Validate, 1242
wxTextValidator::wxTextValidator, 1240
wxTHICK_FRAME, 365, 841, 846, 892
wxThread, 1243
wxThread::~wxThread, 1243
wxThread::~wxThreadHelper, 1250
wxThread::Create, 1243
wxThread::Delete, 1244
wxThread::Entry, 1244
wxThread::Exit, 1245
wxThread::GetCPUCount, 1245
wxThread::GetCurrentId, 1245
wxThread::GetId, 1245
wxThread::GetPriority, 1245
wxThread::IsAlive, 1245
wxThread::IsDetached, 1246
wxThread::IsMain, 1246
wxThread::IsPaused, 1246
wxThread::IsRunning, 1246
wxThread::Kill, 1246
wxThread::OnExit, 1247
wxThread::Pause, 1247
wxThread::Resume, 1248
wxThread::Run, 1247
wxThread::SetConcurrency, 1248
wxThread::SetPriority, 1247
wxThread::Sleep, 1247
wxThread::TestDestroy, 1248
wxThread::This, 1248
wxThread::Wait, 1249
wxThread::wxThread, 1243
wxThread::Yield, 1248
wxThreadHelper, 1249
wxThreadHelper::Create, 1250
wxThreadHelper::Entry, 1250
wxThreadHelper::GetThread, 1250
wxThreadHelper::m_thread, 1250
wxThreadHelper::wxThreadHelper, 1249
wxThreadHelperThread, 1251
wxThreadHelperThread::CallEntry, 1251
wxThreadHelperThread::Entry, 1251
wxThreadHelperThread::m_owner, 1251
wxThreadHelperThread::wxThreadHelperThread, 1251
wxTIFFHandler, 706
wxTimer, 1252, 1253
wxTimer::~wxTimer, 1253
wxTimer::GetInterval, 1253
wxTimer::IsOneShot, 1253
wxTimer::IsRunning, 1253
wxTimer::Notify, 1253
wxTimer::SetOwner, 1253
wxTimer::Start, 1253
wxTimer::Stop, 1254
wxTimer::wxTimer, 1252
wxTimerEvent::GetInterval, 1255
wxTimeSpan, 1261
wxTimeSpan::Abs, 1256
wxTimeSpan::Add, 1256
wxTimeSpan::Day, 1257
wxTimeSpan::Days, 1257
wxTimeSpan::Format, 1257
wxTimeSpan::GetDays, 1257
wxTimeSpan::GetHours, 1257
wxTimeSpan::GetMilliseconds, 1258
wxTimeSpan::GetMinutes, 1258
wxTimeSpan::GetSeconds, 1258
wxTimeSpan::GetValue, 1258
wxTimeSpan::GetWeeks, 1258
wxTimeSpan::Hour, 1258
wxTimeSpan::Hours, 1258
wxTimeSpan::IsEqualTo, 1258
wxTimeSpan::IsLongerThan, 1259
wxTimeSpan::IsNegative, 1259
wxTimeSpan::IsNull, 1259
wxTimeSpan::IsPositive, 1259
wxTimeSpan::IsShorterThan, 1259
wxTimeSpan::Minute, 1259
wxTimeSpan::Minutes, 1259
wxTimeSpan::Multiply, 1259
wxTimeSpan::Neg, 1260

- wxTimeSpan::Negate, 1260
- wxTimeSpan::Second, 1260
- wxTimeSpan::Seconds, 1260
- wxTimeSpan::Subtract, 1260
- wxTimeSpan::Week, 1260
- wxTimeSpan::Weeks, 1260
- wxTimeSpan::wxTimeSpan, 1261
- wxTINY_CAPTION_HORIZ, 892
- wxTINY_CAPTION_VERT, 892
- wxTipProvider, 1261
- wxTipProvider::GetTip, 1261
- wxTipProvider::PreprocessTip, 1262
- wxTipProvider::wxTipProvider, 1261
- wxTipWindow, 1262
- wxTipWindow::SetBoundingRect, 1263
- wxTipWindow::SetTipWindowPtr, 1263
- wxTipWindow::wxTipWindow, 1262
- wxToggleButton, 1264
- wxToggleButton::~wxToggleButton, 1265
- wxToggleButton::Create, 1265
- wxToggleButton::GetValue, 1265
- wxToggleButton::SetValue, 1266
- wxToggleButton::wxToggleButton, 1264
- wxToolBar, 1268
- wxToolBar::~wxToolBar, 1269
- wxToolBar::AddCheckTool, 1271
- wxToolBar::AddControl, 1269
- wxToolBar::AddRadioTool, 1271
- wxToolBar::AddSeparator, 1269
- wxToolBar::AddTool, 1270
- wxToolBar::DeleteTool, 1271
- wxToolBar::DeleteToolByPos, 1272
- wxToolBar::EnableTool, 1272
- wxToolBar::FindById, 1272
- wxToolBar::FindControl, 1273
- wxToolBar::FindToolForPosition, 1273
- wxToolBar::GetMargins, 1274
- wxToolBar::GetToolBitmapSize, 1273
- wxToolBar::GetToolClientData, 1274
- wxToolBar::GetToolEnabled, 1274
- wxToolBar::GetToolLongHelp, 1274
- wxToolBar::GetToolPacking, 1275
- wxToolBar::GetToolPos, 1275
- wxToolBar::GetToolSeparation, 1275
- wxToolBar::GetToolShortHelp, 1275
- wxToolBar::GetToolSize, 1273
- wxToolBar::GetToolState, 1276
- wxToolBar::InsertControl, 1276
- wxToolBar::InsertSeparator, 1276
- wxToolBar::InsertTool, 1276
- wxToolBar::OnLeftClick, 1277
- wxToolBar::OnMouseEnter, 1277
- wxToolBar::OnRightClick, 1278
- wxToolBar::Realize, 1278
- wxToolBar::RemoveTool, 1278
- wxToolBar::SetMargins, 1279
- wxToolBar::SetToolBitmapSize, 1279
- wxToolBar::SetToolClientData, 1280
- wxToolBar::SetToolLongHelp, 1280
- wxToolBar::SetToolPacking, 1280
- wxToolBar::SetToolSeparation, 1281
- wxToolBar::SetToolShortHelp, 1281
- wxToolBar::ToggleTool, 1281
- wxToolBar::wxToolBar, 1268
- wxToolTip, 1282
- wxToolTip::Enable, 1282
- wxToolTip::GetTip, 1282
- wxToolTip::GetWindow, 1283
- wxToolTip::SetDelay, 1282
- wxToolTip::SetTip, 1282
- wxToolTip::wxToolTip, 1282
- wxTOP, 1075
- wxTR_DEFAULT_STYLE, 1284
- wxTR_EDIT_LABELS, 1283
- wxTR_EXTENDED, 1284
- wxTR_FULL_ROW_HIGHLIGHT, 1283
- wxTR_HAS_BUTTONS, 1283
- wxTR_HAS_VARIABLE_ROW_HEIGHT, 1284
- wxTR_HIDE_ROOT, 1284
- wxTR_LINES_AT_ROOT, 1284
- wxTR_MULTIPLE, 1284
- wxTR_NO_BUTTONS, 1283
- wxTR_NO_LINES, 1283
- wxTR_ROW_LINES, 1284
- wxTR_SINGLE, 1284
- wxTR_TWIST_BUTTONS, 1283
- wxTrace, 1477
- WXTRACE, 1477
- wxTraceLevel, 1478
- WXTRACELEVEL, 1477
- wxTransferFileToStream, 1433
- wxTransferStreamToFile, 1433
- wxTRANSLATE, 1439
- wxTRANSPARENT_WINDOW, 1340
- wxTrap, 1483
- wxTreeCtrl, 1285, 1288
- wxTreeCtrl::~wxTreeCtrl, 1286
- wxTreeCtrl::AddRoot, 1286
- wxTreeCtrl::AppendItem, 1287
- wxTreeCtrl::AssignButtonsImageList, 1287
- wxTreeCtrl::AssignImageList, 1287
- wxTreeCtrl::AssignStateImageList, 1287
- wxTreeCtrl::Collapse, 1287
- wxTreeCtrl::CollapseAndReset, 1287
- wxTreeCtrl::Create, 1288
- wxTreeCtrl::Delete, 1288
- wxTreeCtrl::DeleteAllItems, 1288
- wxTreeCtrl::DeleteChildren, 1288
- wxTreeCtrl::EditLabel, 1288
- wxTreeCtrl::EndEditLabel, 1289
- wxTreeCtrl::EnsureVisible, 1289
- wxTreeCtrl::Expand, 1289
- wxTreeCtrl::GetBoundingRect, 1289
- wxTreeCtrl::GetButtonsImageList, 1289
- wxTreeCtrl::GetChildrenCount, 1290
- wxTreeCtrl::GetCount, 1290
- wxTreeCtrl::GetEditControl, 1290
- wxTreeCtrl::GetFirstChild, 1290
- wxTreeCtrl::GetFirstVisibleItem, 1290
- wxTreeCtrl::GetImageList, 1291
- wxTreeCtrl::GetIndent, 1291
- wxTreeCtrl::GetItemBackgroundColour, 1291
- wxTreeCtrl::GetItemData, 1291
- wxTreeCtrl::GetItemFont, 1291

wxTreeCtrl::GetItemImage, 1292
wxTreeCtrl::GetItemParent, 1293
wxTreeCtrl::GetItemSelectedImage, 1294
wxTreeCtrl::GetItemText, 1292
wxTreeCtrl::GetItemTextColour, 1292
wxTreeCtrl::GetLastChild, 1292
wxTreeCtrl::GetNextChild, 1292
wxTreeCtrl::GetNextSibling, 1293
wxTreeCtrl::GetNextVisible, 1293
wxTreeCtrl::GetParent, 1293
wxTreeCtrl::GetPrevSibling, 1293
wxTreeCtrl::GetPrevVisible, 1294
wxTreeCtrl::GetRootItem, 1294
wxTreeCtrl::GetSelection, 1294
wxTreeCtrl::GetSelections, 1294
wxTreeCtrl::GetStateImageList, 1295
wxTreeCtrl::HitTest, 1295
wxTreeCtrl::InsertItem, 1295
wxTreeCtrl::IsBold, 1296
wxTreeCtrl::IsExpanded, 1296
wxTreeCtrl::IsSelected, 1296
wxTreeCtrl::IsVisible, 1296
wxTreeCtrl::ItemHasChildren, 1296
wxTreeCtrl::OnCompareItems, 1296
wxTreeCtrl::PrependItem, 1297
wxTreeCtrl::ScrollTo, 1297
wxTreeCtrl::SelectItem, 1297
wxTreeCtrl::SetButtonsImageList, 1297
wxTreeCtrl::SetImageList, 1297
wxTreeCtrl::SetIndent, 1297
wxTreeCtrl::SetItemBackgroundColour, 1298
wxTreeCtrl::SetItemBold, 1298
wxTreeCtrl::SetItemData, 1298
wxTreeCtrl::SetItemFont, 1298
wxTreeCtrl::SetItemHasChildren, 1298
wxTreeCtrl::SetItemImage, 1299
wxTreeCtrl::SetItemSelectedImage, 1299
wxTreeCtrl::SetItemText, 1299
wxTreeCtrl::SetItemTextColour, 1299
wxTreeCtrl::SetStateImageList, 1299
wxTreeCtrl::SetWindowStyle, 1299
wxTreeCtrl::SortChildren, 1299
wxTreeCtrl::Toggle, 1300
wxTreeCtrl::ToggleItemSelection, 1300
wxTreeCtrl::Unselect, 1300
wxTreeCtrl::UnselectAll, 1300
wxTreeCtrl::UnselectItem, 1300
wxTreeCtrl::wxTreeCtrl, 1285
wxTreeEvent, 1302
wxTreeEvent::GetItem, 1302
wxTreeEvent::GetKeyCode, 1302
wxTreeEvent::GetKeyEvent, 1302
wxTreeEvent::GetLabel, 1302
wxTreeEvent::GetOldItem, 1303
wxTreeEvent::GetPoint(), 1303
wxTreeEvent::IsEditCancelled(), 1303
wxTreeEvent::SetToolTip, 1303
wxTreeEvent::wxTreeEvent, 1302
wxTreeltemData, 1304
wxTreeltemData::~wxTreeltemData, 1304
wxTreeltemData::GetId, 1304
wxTreeltemData::SetId, 1304
wxTreeltemData::wxTreeltemData, 1304
wxUINT16_SWAP_ALWAYS, 1465
wxUINT16_SWAP_ON_BE, 1465
wxUINT16_SWAP_ON_LE, 1466
wxUINT32_SWAP_ALWAYS, 1465
wxUINT32_SWAP_ON_BE, 1465
wxUINT32_SWAP_ON_LE, 1465
wxULL, 1464
wxUninitialize, 1421
wxUnix2DosFilename, 1430
wxUnsetEnv, 1484
wxUpdateUIEvent, 1306
wxUpdateUIEvent::CanUpdate, 1307
wxUpdateUIEvent::Check, 1307
wxUpdateUIEvent::Enable, 1307
wxUpdateUIEvent::GetChecked, 1307
wxUpdateUIEvent::GetEnabled, 1307
wxUpdateUIEvent::GetMode, 1308
wxUpdateUIEvent::GetSetChecked, 1308
wxUpdateUIEvent::GetSetEnabled, 1308
wxUpdateUIEvent::GetSetText, 1308
wxUpdateUIEvent::GetText, 1308
wxUpdateUIEvent::GetUpdateInterval, 1308
wxUpdateUIEvent::m_checked, 1306
wxUpdateUIEvent::m_enabled, 1306
wxUpdateUIEvent::m_setChecked, 1306
wxUpdateUIEvent::m_setEnabled, 1306
wxUpdateUIEvent::m_setText, 1306
wxUpdateUIEvent::m_text, 1307
wxUpdateUIEvent::ResetUpdateTime, 1308
wxUpdateUIEvent::SetMode, 1309
wxUpdateUIEvent::SetText, 1309
wxUpdateUIEvent::SetUpdateInterval, 1309
wxUpdateUIEvent::wxUpdateUIEvent, 1306
wxURL, 1310
wxURL::~wxURL, 1310
wxURL::ConvertToValidURI, 1312
wxURL::GetError, 1311
wxURL::GetInputStream, 1311
wxURL::GetPath, 1310
wxURL::GetProtocol, 1310
wxURL::GetProtocolName, 1310
wxURL::SetDefaultProxy, 1311
wxURL::SetProxy, 1312
wxURL::wxURL, 1310
wxUsleep, 1480
wxValidator, 1313
wxValidator::~wxValidator, 1313
wxValidator::Clone, 1313
wxValidator::GetWindow, 1313
wxValidator::SetBellOnError, 1313
wxValidator::SetWindow, 1313
wxValidator::TransferFromWindow, 1313
wxValidator::TransferToWindow, 1314
wxValidator::Validate, 1314
wxValidator::wxValidator, 1313
wxVariant, 1315
wxVariant::~wxVariant, 1316
wxVariant::Append, 1316
wxVariant::ClearList, 1316
wxVariant::Delete, 1316
wxVariant::GetBool, 1316

wxVariant::GetChar, 1316
wxVariant::GetCount, 1316
wxVariant::GetData, 1316
wxVariant::GetDouble, 1316
wxVariant::GetLong, 1317
wxVariant::GetName, 1317
wxVariant::GetString, 1317
wxVariant::GetType, 1317
wxVariant::GetVoidPtr, 1317
wxVariant::GetWxObjectPtr, 1317
wxVariant::Insert, 1317
wxVariant::IsNull, 1317
wxVariant::IsType, 1318
wxVariant::IsValueKindOf, 1318
wxVariant::MakeNull, 1318
wxVariant::MakeString, 1318
wxVariant::Member, 1318
wxVariant::NullList, 1318
wxVariant::operator !=, 1319
wxVariant::operator [], 1320
wxVariant::operator =, 1318
wxVariant::operator ==, 1319
wxVariant::operator char, 1320
wxVariant::operator double, 1320
wxVariant::operator void*, 1320
wxVariant::operator wxString, 1320
wxVariant::SetData, 1318
wxVariant::wxVariant, 1315
wxVariantData, 1321
wxVariantData::Copy, 1321
wxVariantData::Eq, 1321
wxVariantData::GetType, 1321
wxVariantData::GetValueClassInfo, 1321
wxVariantData::Read, 1322
wxVariantData::Write, 1322
wxVariantData::wxVariantData, 1321
wxView, 1323
wxView overview, 1608
wxView::~~wxView, 1323
wxView::Activate, 1323
wxView::Close, 1323
wxView::GetDocument, 1324
wxView::GetDocumentManager, 1324
wxView::GetFrame, 1324
wxView::GetViewName, 1324
wxView::m_viewDocument, 1322
wxView::m_viewFrame, 1323
wxView::m_viewTypeName, 1323
wxView::OnActivateView, 1324
wxView::OnChangeFilename, 1324
wxView::OnClose, 1324
wxView::OnClosingDocument, 1325
wxView::OnCreate, 1325
wxView::OnCreatePrintout, 1325
wxView::OnUpdate, 1325
wxView::SetDocument, 1325
wxView::SetFrame, 1325
wxView::SetViewName, 1326
wxView::wxView, 1323
wxVListBox, 1326
wxVListBox::Clear, 1327
wxVListBox::Create, 1327
wxVListBox::DeselectAll, 1327
wxVListBox::GetFirstSelected, 1327
wxVListBox::GetItemCount, 1328
wxVListBox::GetMargins, 1328
wxVListBox::GetNextSelected, 1328
wxVListBox::GetSelectedCount, 1328
wxVListBox::GetSelection, 1328
wxVListBox::GetSelectionBackground, 1329
wxVListBox::HasMultipleSelection, 1329
wxVListBox::IsCurrent, 1329
wxVListBox::IsSelected, 1329
wxVListBox::OnDrawBackground, 1329
wxVListBox::OnDrawItem, 1329
wxVListBox::OnDrawSeparator, 1330
wxVListBox::OnMeasureItem, 1330
wxVListBox::Select, 1330
wxVListBox::SelectAll, 1331
wxVListBox::SelectRange, 1331
wxVListBox::SetItemCount, 1331
wxVListBox::SetMargins, 1331
wxVListBox::SetSelection, 1332
wxVListBox::SetSelectionBackground, 1332
wxVListBox::Toggle, 1332
wxVListBox::wxVListBox, 1326
wxVLogDebug, 1475
wxVLogError, 1473
wxVLogFatalError, 1473
wxVLogMessage, 1474
wxVLogStatus, 1474
wxVLogSysError, 1474
wxVLogTrace, 1475
wxVLogVerbose, 1474
wxVLogWarning, 1474
wxVSCROLL, 846, 1340
wxVScrolledWindow, 1333
wxVScrolledWindow::Create, 1334
wxVScrolledWindow::EstimateTotalHeight, 1334
wxVScrolledWindow::GetFirstVisibleLine, 1334
wxVScrolledWindow::GetLastVisibleLine, 1334
wxVScrolledWindow::GetLineCount, 1334
wxVScrolledWindow::HitTest, 1335
wxVScrolledWindow::IsVisible, 1335
wxVScrolledWindow::OnGetLineHeight, 1335
wxVScrolledWindow::OnGetLinesHint, 1335
wxVScrolledWindow::RefreshAll, 1336
wxVScrolledWindow::RefreshLine, 1335
wxVScrolledWindow::RefreshLines, 1336
wxVScrolledWindow::ScrollLines, 1336
wxVScrolledWindow::ScrollPages, 1336
wxVScrolledWindow::ScrollToLine, 1336
wxVScrolledWindow::SetLineCount, 1337
wxVScrolledWindow::wxVScrolledWindow, 1333
wxVsnprintf, 1440
wxWakeUpIdle, 1421
wxWANTS_CHARS, 1340
wxWidgets 1.xx compatibility functions, 1164
wxWidgets classes implemented in wxPython, 1664
wxWidgets predefined command identifiers, 1611
wxWindow, 1341
wxWindow::~~wxWindow, 1342
wxWindow::AddChild, 1342

wxWindow::CaptureMouse, 1343
wxWindow::Center, 1343
wxWindow::CenterOnParent, 1343
wxWindow::CenterOnScreen, 1343
wxWindow::Centre, 1343
wxWindow::CentreOnParent, 1344
wxWindow::CentreOnScreen, 1344
wxWindow::ClearBackground, 1344
wxWindow::ClientToScreen, 1345
wxWindow::Close, 1345
wxWindow::ConvertDialogToPixels, 1346
wxWindow::ConvertPixelsToDialog, 1347
wxWindow::Destroy, 1347
wxWindow::DestroyChildren, 1348
wxWindow::Disable, 1348
wxWindow::DoUpdateWindowUI, 1348
wxWindow::DragAcceptFiles, 1348
wxWindow::Enable, 1349
wxWindow::FindFocus, 1349
wxWindow::FindWindow, 1349
wxWindow::FindWindowById, 1350
wxWindow::FindWindowByLabel, 1350
wxWindow::FindWindowByName, 1350
wxWindow::Fit, 1351
wxWindow::FitInside, 1351
wxWindow::Freeze, 1351
wxWindow::GetAcceleratorTable, 1351
wxWindow::GetAccessible, 1351
wxWindow::GetAdjustedBestSize, 1351
wxWindow::GetBackgroundColour, 1352
wxWindow::GetBestSize, 1352
wxWindow::GetCapture, 1352
wxWindow::GetCaret, 1352
wxWindow::GetCharHeight, 1352
wxWindow::GetCharWidth, 1353
wxWindow::GetChildren, 1353
wxWindow::GetClientSize, 1353
wxWindow::GetConstraints, 1354
wxWindow::GetContainingSizer, 1354
wxWindow::GetCursor, 1354
wxWindow::GetDropTarget, 1355
wxWindow::GetEventHandler, 1355
wxWindow::GetExtraStyle, 1355
wxWindow::GetFont, 1355
wxWindow::GetForegroundColour, 1355
wxWindow::GetGrandParent, 1356
wxWindow::GetHandle, 1356
wxWindow::GetHelpText, 1356
wxWindow::GetId, 1356
wxWindow::GetLabel, 1357
wxWindow::GetName, 1357
wxWindow::GetParent, 1357
wxWindow::GetPosition, 1357
wxWindow::GetRect, 1358
wxWindow::GetScrollPos, 1358
wxWindow::GetScrollRange, 1358
wxWindow::GetScrollThumb, 1358
wxWindow::GetSize, 1359
wxWindow::GetSizer, 1359
wxWindow::GetTextExtent, 1359
wxWindow::GetTitle, 1360
wxWindow::GetToolTip, 1360
wxWindow::GetUpdateRegion, 1361
wxWindow::GetValidator, 1361
wxWindow::GetVirtualSize, 1361
wxWindow::GetWindowStyleFlag, 1361
wxWindow::GetWindowVariant, 1361
wxWindow::HasCapture, 1362
wxWindow::Hide, 1362
wxWindow::InheritAttributes, 1362
wxWindow::InitDialog, 1362
wxWindow::IsEnabled, 1362
wxWindow::IsExposed, 1363
wxWindow::IsRetained, 1363
wxWindow::IsShown, 1363
wxWindow::IsTopLevel, 1363
wxWindow::Layout, 1364
wxWindow::LineDown, 1364
wxWindow::LineUp, 1364
wxWindow::Lower, 1364
wxWindow::MakeModal, 1364
wxWindow::Move, 1364
wxWindow::OnInternalIdle, 1365
wxWindow::PageDown, 1365
wxWindow::PageUp, 1365
wxWindow::PopEventHandler, 1365
wxWindow::PopupMenu, 1366
wxWindow::PushEventHandler, 1367
wxWindow::Raise, 1367
wxWindow::Refresh, 1367
wxWindow::RefreshRect, 1368
wxWindow::RegisterHotKey, 1368
wxWindow::ReleaseMouse, 1369
wxWindow::RemoveChild, 1369
wxWindow::RemoveEventHandler, 1369
wxWindow::Reparent, 1369
wxWindow::ScreenToClient, 1370
wxWindow::ScrollLines, 1370
wxWindow::ScrollPages, 1371
wxWindow::ScrollWindow, 1371
wxWindow::SetAcceleratorTable, 1372
wxWindow::SetAccessible, 1372
wxWindow::SetAutoLayout, 1372
wxWindow::SetBackgroundColour, 1372
wxWindow::SetCaret, 1373
wxWindow::SetClientSize, 1373
wxWindow::SetConstraints, 1374
wxWindow::SetContainingSizer, 1374
wxWindow::SetCursor, 1374
wxWindow::SetDefaultBackgroundColour, 1374
wxWindow::SetDefaultFont, 1375
wxWindow::SetDefaultForegroundColour, 1375
wxWindow::SetDropTarget, 1375
wxWindow::SetEventHandler, 1375
wxWindow::SetExtraStyle, 1376
wxWindow::SetFocus, 1377
wxWindow::SetFocusFromKbd, 1377
wxWindow::SetFont, 1377
wxWindow::SetForegroundColour, 1377
wxWindow::SetHelpText, 1378
wxWindow::SetId, 1378
wxWindow::SetName, 1379
wxWindow::SetPalette, 1379
wxWindow::SetScrollbar, 1379

wxWindow::SetScrollPos, 1380
 wxWindow::SetSize, 1381
 wxWindow::SetSizeHints, 1382
 wxWindow::SetSizer, 1383
 wxWindow::SetSizerAndFit, 1384
 wxWindow::SetThemeEnabled, 1384
 wxWindow::SetTitle, 1384
 wxWindow::SetToolTip, 1384
 wxWindow::SetValidator, 1385
 wxWindow::SetVirtualSize, 1385
 wxWindow::SetVirtualSizeHints, 1385
 wxWindow::SetWindowStyle, 1386
 wxWindow::SetWindowStyleFlag, 1386
 wxWindow::SetWindowVariant, 1386
 wxWindow::ShouldInheritColours, 1386
 wxWindow::Show, 1387
 wxWindow::Thaw, 1387
 wxWindow::TransferDataFromWindow, 1387
 wxWindow::TransferDataToWindow, 1387
 wxWindow::UnregisterHotKey, 1388
 wxWindow::Update, 1388
 wxWindow::UpdateWindowUI, 1388
 wxWindow::Validate, 1389
 wxWindow::WarpPointer, 1389
 wxWindow::wxWindow, 1341
 wxWindowDC, 1390
 wxWindowDC::wxWindowDC, 1390
 wxWindowDisabler, 1391
 wxWindowDisabler::~wxWindowDisabler, 1391
 wxWindowDisabler::wxWindowDisabler, 1391
 wxWizard, 1392, 1393
 wxWizard::Create, 1393
 wxWizard::FitToPage, 1394
 wxWizard::GetCurrentPage, 1394
 wxWizard::GetPageAreaSizer, 1394
 wxWizard::GetPageSize, 1395
 wxWizard::HasNextPage, 1395
 wxWizard::HasPrevPage, 1395
 wxWizard::RunWizard, 1395
 wxWizard::SetBorder, 1396
 wxWizard::SetPageSize, 1396
 wxWizard::wxWizard, 1392
 wxWIZARD_EX_HELPBUTTON, 1392
 wxWizardEvent, 1397
 wxWizardEvent::GetDirection, 1397
 wxWizardEvent::GetPage, 1397
 wxWizardEvent::wxWizardEvent, 1397
 wxWizardPage, 1398
 wxWizardPage::GetBitmap, 1399
 wxWizardPage::GetNext, 1399
 wxWizardPage::GetPrev, 1398
 wxWizardPage::wxWizardPage, 1398
 wxWizardPageSimple, 1400
 wxWizardPageSimple::Chain, 1400
 wxWizardPageSimple::SetNext, 1400
 wxWizardPageSimple::SetPrev, 1400
 wxWizardPageSimple::wxWizardPageSimple, 1400
 wxWriteResource, 1464
 wxWS_EX_BLOCK_EVENTS, 1341, 1376
 wxWS_EX_PROCESS_IDLE, 1341, 1377
 wxWS_EX_PROCESS_UI_UPDATES, 1341, 1377
 wxXmlResource, 1401
 wxXmlResource::~wxXmlResource, 1401
 wxXmlResource::AddHandler, 1401
 wxXmlResource::AttachUnknownControl, 1402
 wxXmlResource::ClearHandlers, 1402
 wxXmlResource::CompareVersion, 1402
 wxXmlResource::CreateResFromNode, 1402
 wxXmlResource::DoFindResource, 1402
 wxXmlResource::FindResource, 1402
 wxXmlResource::Get, 1402
 wxXmlResource::GetFlags, 1403
 wxXmlResource::GetVersion, 1403
 wxXmlResource::GetXRCID, 1403
 wxXmlResource::InitAllHandlers, 1403
 wxXmlResource::Load, 1403
 wxXmlResource::LoadBitmap, 1403
 wxXmlResource::LoadDialog, 1403
 wxXmlResource::LoadFrame, 1404
 wxXmlResource::LoadIcon, 1404
 wxXmlResource::LoadMenu, 1404
 wxXmlResource::LoadMenuBar, 1404
 wxXmlResource::LoadPanel, 1404
 wxXmlResource::LoadToolBar, 1405
 wxXmlResource::Set, 1405
 wxXmlResource::SetFlags, 1405
 wxXmlResource::UpdateResources, 1405
 wxXmlResource::wxXmlResource, 1401
 wxXmlResourceHandler, 1405
 wxXmlResourceHandler::~wxXmlResourceHandler, 1406
 wxXmlResourceHandler::AddStyle, 1406
 wxXmlResourceHandler::AddWindowStyles, 1406
 wxXmlResourceHandler::CanHandle, 1406
 wxXmlResourceHandler::CreateChildren, 1406
 wxXmlResourceHandler::CreateChildrenPrivately, 1406
 wxXmlResourceHandler::CreateResFromNode, 1406
 wxXmlResourceHandler::CreateResource, 1407
 wxXmlResourceHandler::DoCreateResource, 1407
 wxXmlResourceHandler::GetBitmap, 1407
 wxXmlResourceHandler::GetBool, 1407
 wxXmlResourceHandler::GetColour, 1407
 wxXmlResourceHandler::GetCurFileSystem, 1407
 wxXmlResourceHandler::GetDimension, 1407
 wxXmlResourceHandler::GetFont, 1407
 wxXmlResourceHandler::GetIcon, 1408
 wxXmlResourceHandler::GetID, 1408
 wxXmlResourceHandler::GetLong, 1408
 wxXmlResourceHandler::GetName, 1408
 wxXmlResourceHandler::GetNodeContent, 1408
 wxXmlResourceHandler::GetParamNode, 1408
 wxXmlResourceHandler::GetParamValue, 1408
 wxXmlResourceHandler::GetPosition, 1408
 wxXmlResourceHandler::GetSize, 1409

wXmlResourceHandler::GetStyle, 1409
wXmlResourceHandler::GetText, 1409
wXmlResourceHandler::HasParam, 1409
wXmlResourceHandler::IsOfClass, 1409
wXmlResourceHandler::SetParentResource,
1409
wXmlResourceHandler::SetupWindow, 1409
wXmlResourceHandler::wXmlResourceHandle
r, 1405
wXPMHandler, 706
wYield, 1421
wZipInputStream, 1410
wZipInputStream::wZipInputStream, 1410
wZlibInputStream, 1411
wZlibInputStream::CanHandleGZip, 1411
wZlibInputStream::wZlibInputStream, 1411
wZlibOutputStream, 1412
wZlibOutputStream::CanHandleGZip, 1412
wZlibOutputStream::wZlibOutputStream, 1412

—X—

x, 1006

x, 957
x, 1007
Xor, 1020
XRC C++ sample, 1583
XRC concepts, 1581
XRC file format, 1589
XRC resource file sample, 1586
XToCol, 584
XToEdgeOfCol, 584
XYToPosition, 1224

—Y—

y, 957, 1006
y, 1007
Year, 229
Years, 229
Yield, 41, 1248
YToEdgeOfRow, 584
YToRow, 584