User Manual for wxCLIPS 1.64

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January 1997

Contents

1. Introduction

wxCLIPS was developed to enable CLIPS programmers to write portable, graphical programs which run under X and MS Windows. It is essentially CLIPS modified to work with an event driven style of programming, and a set of GUI functions. Its name reflects the fact that it is a CLIPS interface to wxWindows, a C++ GUI library also written by Julian Smart.

wxCLIPS supports CLIPS 6.0, and CLIPS 6.0 with fuzzy extensions, depending on how it is compiled.

wxCLIPS is really two entities:

1. A library of CLIPS functions to access a subset of wxWindows functionality.

2. A simple stand-alone development environment for developing wxWindows applications using these extra CLIPS functions.

The library can be used by any C++ program, to give it a tailoring language and interactive access to GUI functionality. The stand-alone wxCLIPS is a simple development interface making use of the library.

wxCLIPS is fundamentally a set of functions, rather than COOL objects, since C-based user extensions are restricted to functions. However, there is now a set of classes called *wxCOOL* (page 215) which encapsulates much of the wxCLIPS functionality in a properly object-oriented manner.

The wxCLIPS extensions to CLIPS were written by Julian Smart of the Artificial Intelligence Applications Institute, University of Edinburgh. You can get the latest version of the Windows and Sun Open Look and Motif binaries and source from the AIAI ftp site:

http://www.aiai.ed.ac.uk/~jacs/wxclips.html (WWW)
ftp.aiai.ed.ac.uk:/pub/packages/wxclips (FTP)

1.1. The relationship between CLIPS, wxCLIPS and wxWindows

wxWindows is a C++ class library for multi-platform development, developed at the Artificial Intelligence Applications Institute by Julian Smart and available free of charge.

CLIPS is NASA's expert system shell, allowing rule-based, functional and object-oriented programming in the one, portable system. It is written in C and is effectively free of charge.

wxCLIPS is the union of wxWindows and CLIPS -- a set of CLIPS functions to access a large portion of wxWindows functionality. It is available in three forms: as a library, within other products, or as an executable with a simple front end.

To fully understand wxCLIPS, it will help to read the wxWindows documentation. This is available from AIAI's anonymous ftp site in PostScript, wxHelp, and Windows Help format. The ftp site is ftp.aiai.ed.ac.uk, and wxWindows is in /pub/packages/wxwin.

This document only deals with functions added to standard CLIPS. There are PostScript, Word for Windows and ASCII files containing NASA's CLIPS documentation, some of which will be required for serious wxCLIPS development.

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1.2. Other products by Julian Smart

The following are available via the AIAI World Wide Web page or FTP site.

Hardy A superset of wxCLIPS, Hardy is a meta-CASE tool, or hypertext-based diagramming tool. It's good for rapidly developing applications that are heavily diagramming-oriented, such as business process modelling, object-oriented analysis and design, Petri nets, and knowledge acquisition. Hardy is free for academic and personal use.

Tex2RTF Translates a subset of LaTeX into WinHelp RTF, linear RTF, HTML and wxHelp format. Primarily a system for creating multi-format, multi-platform documentation, Tex2RTF can be useful for one-off LaTeX to word processor conversions if the contents are not too complex. MS Word 6 is supported rather well with contents page, indexing and simple bibliographic references. Tex2RTF is free.

wxWindows A free cross-platform C++ GUI toolkit with a growing following on the Internet and elsewhere. Most ftp-able AIAI applications are written in wxWindows.

1.2.1. About AIAI

The Artificial Intelligence Applications Institute was founded in 1985 as an off-shoot of the University of Edinburgh Department of Intelligence, as a technology transfer organization. AIAI works with many commercial clients as well as on government-funded projects. Past and present work includes planning and scheduling, enterprise decision support, egress modelling, toxic substances expert system, CASE tool development, oil well prospecting decision support, and intelligent database access.

Julian Smart joined the Decision Support Group at AIAI in 1991 and has been developing Hardy and wxWindows since 1992, with occasional forays into other areas. Julian left AIAI in 1996 and is available for freelance GUI and other design and programming. He is keen to promote free, multiplatform, Internet-based projects and the uptake of AI techniques into mainstream computing.

1.3. Acknowledgements and disclaimer

We are very grateful to NASA for producing and making available the CLIPS language, which we have used as an embedded language within wxCLIPS.

The National Research Council of Canada have added fuzzy extensions CLIPS, and Bob Orchard of NRCC has made wxCLIPS compatible with these.

We would also like to thank the AIAI staff and students who have helped find bugs in wxCLIPS.

2. Installing wxCLIPS

The Windows versions of wxCLIPS come with an installation program which should be self-explanatory. However, there are a few issues.

1. Currently, Windows versions require ODBC 2.5. If you have a different version installed, you may experience problems. To upgrade to ODBC 2.5, please download the ODBC Desktop Driver Pack 3.0 from:
   `ftp.aiai.ed.ac.uk/pub/packages/wxwin/tools/odbc25.zip`
   or, if you have Visual C++ 4.0, you can find it in the `redist` directory of your VC++ 4.0 CD-ROM.
2. For platforms other than Windows, if there is no binary available you will need to recompile wxCLIPS. Please see *Compiling wxCLIPS* (page 6) for details.

3. Running wxCLIPS

You can run wxCLIPS with or without command line arguments. The command line arguments are as follows:

- -clips *file*: Specifies a CLIPS file to batch on startup.
- -load *file*: Specifies a CLIPS file to load on startup. The file should contain constructs only, unlike -clips which can execute constructs. -load is much faster.
- -start Specifies that wxCLIPS should hide the development window and call the function *app-on-init* on startup.
- -dir *directory*: Specifies a directory to change to on startup.
- -h : Returns help on command line arguments (under UNIX only).

In addition, if you supply a CLIPS file as the first argument to wxCLIPS without any switches, wxCLIPS will batch the file, change to that directory, and call app-on-init. This way you can have a wxCLIPS association for .clp and simply run the file.

See also *Packaging your application* (page 16).

4. Compiling wxCLIPS

wxCLIPS comes with modified CLIPS source files for CLIPS 6.04, and CLIPS 6.04 with NRCC's fuzzy extensions.

If the source is not supplied with your version of wxCLIPS, download it from:

`ftp.aiai.ed.ac.uk:/pub/packages/wxclips`

The source archive should contain both wxclips and wxextend directories, which should be place below the utils directory of your wxWindows installation (see below). The wxExtend library is a helper library for interfacing wxWindows to interpreted languages via C.

You need to obtain the full distribution of each version of CLIPS, including any patches provided by NASA or NRCC. Fuzzy CLIPS is available from:

`ai.iit.nrc.ca:pub/fzclips`

You also need the latest wxWindows distribution, available from:

`ftp.aiai.ed.ac.uk:/pub/packages/wxwin/X.XX`

where X.XX is a version number such as 1.66.

Copy the modified files from one of the wxCLIPS directories CLIPS6.0 or FUZZY into the distribution, and make a library version of CLIPS. Use the makefiles provided in the respective wxCLIPS directories, specifying the target `clips.lib` (or `clips32v.lib` for a MS VC++ 4.0-compiled library).

Next, compile wxWindows for your platform. Supported platforms are UNIX with Motif 1.2 or XView 3.1, and MS Windows (using Microsoft or Borland C++). Minor adjustments may be needed for your compiler and environment.

Now compile wxCLIPS, after editing the makefile in the wxCLIPS src directory to set appropriate pointers to the CLIPS directory.

Under DOS, a typical command line to make wxCLIPS with CLIPS 6.0 is:

```
  nmake -f makefile.dos CLIPS6=1 wxclips.exe
or
  nmake -f makefile.dos full
```

Or for a fuzzy version:

```
  nmake -f makefile.dos CLIPS6=1 FUZZY=1 wxclips.exe
or
  nmake -f makefile.dos fullfuzz
```

For a non-debugging version (which gives a smaller executable), delete wxclips.exe and invoke make with `FINAL=1` appened to the make command line.

Under UNIX, use make -f makefile.unx with target xview or motif. Then use 'strip' to remove debugging information from the executable.

4.1. Using wxCLIPS as a library

The library is used by including the header file wx_cmds.h and linking with libcmds.a or wxcmds.lib. In addition to the set of new CLIPS functions described in the reference section, there are a few C++ functions to help embed CLIPS.

::ClipsErrorFunction

void ClipsErrorFunction(**char ***s*)

This function must be defined when using the wxCLIPS library. It will be called whenever a wxCLIPS error occurs to print out a message. The object **ClipsError** may be used with stream output operators to output error messages; the operators call the **ClipsErrorFunction** as appropriate.

::RouteCommand

void RouteCommand(**char ***command*, **int***showResult*)

Internal CLIPS command modified to be 're-entrant'. Takes a string containing a CLIPS command and executes it. This function cannot return a result from CLIPS on its own, but used in conjunction with the wxCLIPS function **return-result** and some predefined global variables the same effect can be achieved. For example,

```
  wxFrame *main_frame = NULL;
  clipsReturnType = clipsUNKNOWN;
  RouteCommand("(return-result (app-on-init))");
  if (clipsReturnType == clipsLONG)
  {
    main_frame = (wxFrame *)wxGetTypedObject(clipsReturnLong,
wxTYPE_FRAME);
  }
```

See the entry for **return-result** for more details.

::wxExecuteClipsFile

void wxExecuteClipsFile(**char ***filename*)

Execute a CLIPS batch file.

::wxCleanWindows

void wxCleanWindows(**void**)

Deletes wxWindows frames and dialog boxes created with CLIPS functions, allowing an application to be restarted from the wxCLIPS environment or the user's environment.

::wxInitClips

void wxInitClips(**void**)

Call this instead of the normal CLIPS initilization function, to initialize CLIPS and the wxCLIPS library.

::wxRouteNoEcho

void wxRouteNoEcho(**char ***command*)

Calls RouteCommand, but ensures that no echoing of returned results will take place during the call.

::wxUserFunctions

void wxUserFunctions(**void**)

This function contains the wxCLIPS function definitions. You must call this function from within the **UserFunctions** function that the CLIPS manual specifies you must define. This allows you to define additional CLIPS functions.

4.2. The wxCLIPS type system

To communicate between C++ and CLIPS, wxCLIPS uses long integers to represent objects. For convenience, they are simply the addresses of the C++ objects. However, when these handles are passed back to C++, wxCLIPS cannot simply coerce these integers back to objects, since the object may not exist or the type may be wrong. The program would simply crash without an error message, which is clearly unacceptable.

Instead, there is an explicit type system which, in conjunction with a hash table for the objects, allows C++ implementations of CLIPS functions to check that an objects exists and to check that the type is suitable for the intended operation. The type does not have to be an exact match, as with C++, so long as the passed type is at least a subtype of the intended type. For example, say someone passed a **wxFrame** to the **window-centre** function. If a **wxWindow** has a virtual member function **Centre**, and **wxFrame** is a subtype of **wxWindow**, then it's permissable to coerce the **wxFrame** to a **wxWindow** and call the **Centre** function.

The helper library wxExtend provides the mapping between C++ wxWindows functionality and C functions/callbacks which can be used by interpreted languages such as wxCLIPS. Please refer to the wxExtend documentation for further details.

4.3. Changes made to CLIPS

The following notes describe some of the modifications to CLIPS made for compilation with a variety of compilers, to be compatible with wxWindows names, and to allow CLIPS to be called in an event-driven style.

4.3.1. Accessing CLIPS C functions from C++

The file `clipscpp.h` was created to declare a selection of CLIPS functions as `extern "C"` so that C++ code can access them.

4.3.2. Code modifications

Please see the file `notes.txt` in the CLIPS6.0 and FUZZY subdirectories of the wxCLIPS source archive. Basically, setup.h has to be modified and commline.c replaced.

5. Using CLIPS for building GUIs

This chapter is a short introduction to the capabilities of wxCLIPS for general CLIPS program development and for building GUIs (Graphical User Interfaces).

5.1. The wxCLIPS development window

wxCLIPS has a basic development environment, consisting of a window with menus, a small input window, an output text window, and a toolbar (Windows only).

Type into the text input window and press return or the **Go** button to send the input to CLIPS. Results and error messages are written to the output window. Don't expect to use standard input in your CLIPS programs, since the text window is read-only, and when your program finally runs it will probably have its own specialised interface for entering and displaying data.

The menu bar contains menus for loading and saving CLIPS files, and substitutes for various CLIPS functions, such as clearing and starting the rule interpreter and listing CLIPS constructs.

Under Windows, there is a toolbar to accelerate a few commonly-used commands such as loading, batching, running the rule system and running a GUI application. Depending on platform, you may also be able to copy a command from the development window and paste into the command line; under Windows, select the text with the mouse, then press the Copy tool, click on the command line, and press shift-insert.

There is no *in situ* editing of CLIPS files, but see *DDE commands that wxCLIPS recognizes* (page 219), which shows how some integration with an editor is now possible.

5.2. Overview of wxCLIPS GUI functionality

Using wxCLIPS, you can create *frames*, each with an optional *menu bar* comprising a number of *menus*. Within a frame, you can create one or more *subwindows*. Subwindows can be *panels*, *canvases* and *text subwindows*.

Panels are used to contain *panel items*, such as buttons, text-entry items and list boxes. You can place panel items at specific places, or omit the position information in which case a left-to-right, top-to-bottom layout policy is used.

The dialog box is a special form of panel which has its own frame, so instead of creating a frame and a panel, you just create a dialog box and populate it with panel items.

Canvases are used for drawing arbitrary graphics. To issue drawing commands, the handle of the canvas **device context** must be used, because device contexts can represent other devices also, such as printers and metafiles. The concepts of *pen* and *brush* allow separate setting of outline and fill attributes, and *fonts* may be created and assigned to the device context before drawing text. User input on a canvas is handled by registering **OnEvent** and **OnChar** handler functions, and using event accessor functions to find out about the input event.

Text subwindows are used for displaying text files or writing text programmatically, and in the case of the X version of wxCLIPS, editing the text directly.

Because your program may have to respond to feedback from the user, such as resizing or closing of frames, it is often necessary to install *event handlers* using *window-add-callback* (page 175) to tell wxCLIPS what function to call when a user event happens. You may wish to handle

frame resize events by calculating positions and sizes for subwindows and setting their sizes. If there is only one subwindow, wxCLIPS handles subwindow resizing automatically if no event handler is supplied.

Instead of using explicit resizing, you can use the **window-fit** function to fit a frame or panel around its contents. For example, you can create a frame, a panel, some items on the panel, and then fit the panel to the items, and finally fit the frame to the panel.

You don't always have to create a dialog box manually, and handle all the button presses and other events; there is a small number of convenience functions, such as *get-text-from-user*, *message-box*, *get-choice* and *file-selector*. These all block the program flow at the point at which they were called, until the user dismisses the dialog in some way. Your program can examine the value returned and carry on.

5.2.1. Restrictions

The CLIPS function interface to the portable GUI library wxWindows is extensive but not yet complete.

To some extent the development of wxCLIPS is driven by user demand, and what we have time to do. Suggestions or requests for extensions are welcome.

The major difference with standard CLIPS is that the (read) function does not take input from standard input, and in fact there is no concept of standard input in wxCLIPS. Such functions must be replaced with GUI calls such as get-text-from-user.

5.3. Using wxCLIPS functions

wxCLIPS is really an interface to a C++ library, wxWindows. In wxWindows, each GUI entity is an object, with member functions associated with the object's class.

wxCLIPS has to use functions, so most functions take an integer identifier used as the handle of the object and returned from its creation function. Function names are comprised of the type of GUI element followed by the actual function name (corresponding to the C++ member function). Examples are `check-box-set-value` and `frame-set-menu-bar`. In C++, these are defined as `wxCheckBox::SetValue` and `wxFrame::SetMenuBar` respectively.

Creation functions are of the form 'GUI element'-create, and return the ID of the new object.

The following program shows off some of the wxCLIPS GUI capabilities, by create a frame with a panel and various panel items,

```
;;; hello.clp
;;; Shows how a frame may be created, with a menu bar and
;;; panel, using low-level windows functions.
;;; Load using -clips <file> on the command line or using the Batch
;;; or Load commands from the CLIPS development window; type
;;; (app-on-init) to start.

(defglobal ?*main-frame* = 0)
(defglobal ?*subframe* = 0)
(defglobal ?*panel* = 0)
(defglobal ?*canvas* = 0)
(defglobal ?*text-win* = 0)
```

```
(defglobal ?*hand-cursor* = 0)

(defglobal ?*small_font* = 0)
(defglobal ?*green_pen* = 0)
(defglobal ?*black_pen* = 0)
(defglobal ?*red_pen* = 0)
(defglobal ?*cyan_brush* = 0)

(defglobal ?*xpos* = -1.0)
(defglobal ?*ypos* = -1.0)

(defglobal ?*bitmap* = 0)
(defglobal ?*button-bitmap* = 0)
(defglobal ?*icon* = 0)

;;; Sizing callback
(deffunction on-size (?id ?w ?h)
 (if (and (neq ?id 0) (neq ?*panel* 0) (neq ?*text-win* 0)) then
  (bind ?client-width (window-get-client-width ?id))
  (bind ?client-height (window-get-client-height ?id))
  (window-set-size ?*panel* 0 0 ?client-width (* ?client-height 0.666))
  (window-set-size ?*text-win* 0 (* ?client-height 0.666) ?client-width
(/ ?client-height 3))
 )
)

;;; Utility function for drawing a bitmap
(deffunction draw-bitmap (?dc ?bitmap ?x ?y)
 (bind ?mem-dc (memory-dc-create))
 (memory-dc-select-object ?mem-dc ?bitmap)
 ; Blit the memory device context onto the destination device context
 (dc-blit ?dc ?x ?y (bitmap-get-width ?bitmap) (bitmap-get-height
?bitmap)
   ?mem-dc 0.0 0.0)
 (dc-delete ?mem-dc)
)

(deffunction draw-graphics (?dc)
  (if (> ?*bitmap* 0) then
   (draw-bitmap ?dc ?*bitmap* 0.0 250.0))

  (dc-set-font ?dc ?*small_font*)
  (dc-set-pen ?dc ?*green_pen*)
  (dc-draw-line ?dc 0.0 0.0 200.0 200.0)
  (dc-draw-line ?dc 200.0 0.0 0.0 200.0)

  (dc-set-pen ?dc ?*red_pen*)
  (dc-set-brush ?dc ?*cyan_brush*)
  (dc-draw-rectangle ?dc 100.0 100.0 100.0 50.0)
  (dc-draw-rounded-rectangle ?dc 150.0 150.0 100.0 50.0)

  (dc-set-clipping-region ?dc 150.0 150.0 100.0 50.0)
  (dc-draw-text ?dc "This text should be clipped within the rectangle"
150.0 170.0)
  (dc-destroy-clipping-region ?dc)

  (dc-draw-ellipse ?dc 250.0 250.0 100.0 50.0)
```

```
  (dc-draw-spline ?dc (mv-append 50.0 200.0 50.0 100.0 200.0 10.0))
  (dc-draw-line ?dc 50.0 230.0 200.0 230.0)
  (dc-draw-text ?dc "This is a test string" 50.0 230.0)
 )

;;; Painting callback
(deffunction on-paint (?id)
 (if (neq ?id 0) then
  (bind ?dc (canvas-get-dc ?id))
  (draw-graphics ?dc)
 )
)

(deffunction on-event (?canvas ?event)
  (bind ?dc (canvas-get-dc ?canvas))
  (dc-set-pen ?dc ?*black_pen*)
  (bind ?x (mouse-event-position-x ?event))
  (bind ?y (mouse-event-position-y ?event))
  (bind ?dragging (mouse-event-dragging ?event))
  (if (and (> ?*xpos* -1) (> ?*ypos* -1) (> ?dragging 0)) then
   (dc-draw-line ?dc ?*xpos* ?*ypos* ?x ?y)
  )
  (bind ?*xpos* ?x)
  (bind ?*ypos* ?y)
)

(deffunction on-close (?frame)
 (format t "Closing frame.%n")
 (window-delete ?*subframe*)
 (bind ?*panel* 0)
 (bind ?*text-win* 0)
 1)

(deffunction on-menu-command (?frame ?id)
 (switch ?id
  (case 200 then (message-box "CLIPS for wxWindows Demo
by Julian Smart (c) 1993" wxOK 1 0 "About wxWindows CLIPS Demo"))
  (case 3 then (if (on-close ?frame) then (window-delete ?frame)))
  (case 1 then
    (bind ?file (file-selector "Choose a text file to load"))
    (if (neq ?file "") then
     (text-window-load-file ?*text-win* ?file)))
  (case 4 then
    (bind ?dc (postscript-dc-create "" 1))
    (if (and (> ?dc 0) (= (dc-ok ?dc) 1)) then
     (if (= (dc-start-doc ?dc "Printing") 1) then
       (dc-start-page ?dc)
       (draw-graphics ?dc)
       (dc-end-page ?dc)
       (dc-end-doc ?dc)
     )
    )
    (if (> ?dc 0) then (dc-delete ?dc))
   )
  )
)
```

```
;;; Button callback
(deffunction frame-button-proc (?id)
 (bind ?parent (window-get-parent ?id))
 (bind ?grandparent (window-get-parent ?parent))
 (format t "Pressed button %d%n" ?id)
 (message-box "Hello")
)

;;; Text callback
(deffunction text-callback (?id)
 (bind ?event-id (panel-item-get-command-event))
 (if (eq "wxEVENT_TYPE_TEXT_ENTER_COMMAND" (event-get-event-type
?event-id)) then
  (format t "The text was %s%n" (text-get-value ?id))
 )
)

;;; Radiobox callback
(deffunction radio-box-callback (?id)
)

;;; Test program to create a frame
(deffunction app-on-init ()
  (unwatch all)
  (if (= ?*small_font* 0) then
    (bind ?*small_font* (font-create 10 wxSWISS wxNORMAL wxNORMAL 0))
    (bind ?*green_pen* (pen-create GREEN 1 wxSOLID))
    (bind ?*black_pen* (pen-create BLACK 1 wxSOLID))
    (bind ?*red_pen* (pen-create RED 3 wxSOLID))
    (bind ?*cyan_brush* (brush-create CYAN wxSOLID))
    (bind ?*hand-cursor* (cursor-create "wxCURSOR_HAND"))
    (if (eq "Windows 3.1" (get-platform)) then
     (bind ?*bitmap* (bitmap-load-from-file "wxwin.bmp"))
     (bind ?*button-bitmap* (bitmap-load-from-file "aiai.bmp"))
     (bind ?*icon* (icon-load-from-file "aiai.ico"
"wxBITMAP_TYPE_ICO"))
    )
  )

  (bind ?*main-frame* (frame-create 0 "Hello wxCLIPS!" -1 -1 500 460))
  (frame-create-status-line ?*main-frame*)
  (frame-set-status-text ?*main-frame* "Welcome to wxCLIPS")
  (if (> ?*icon* 0) then
   (frame-set-icon ?*main-frame* ?*icon*)
  )

  (window-add-callback ?*main-frame* OnSize on-size)
  (window-add-callback ?*main-frame* OnClose on-close)
  (window-add-callback ?*main-frame* OnMenuCommand on-menu-command)

  ;;; Make a menu bar
  (bind ?file-menu (menu-create))
  (menu-append ?file-menu 1 "&Load file")
  (menu-append ?file-menu 4 "&Print to PostScript")

  (bind ?pull-right (menu-create))
  (menu-append ?pull-right 100 "&Twips")
```

```
  (menu-append ?pull-right 101 "&10th mm")

  (menu-append ?file-menu 2 "&Scale picture" ?pull-right)
  (menu-append-separator ?file-menu)
  (menu-append ?file-menu 3 "&Quit")

  (bind ?help-menu (menu-create))
  (menu-append ?help-menu 200 "&About")

  (bind ?menu-bar (menu-bar-create))
  (menu-bar-append ?menu-bar ?file-menu "&File")
  (menu-bar-append ?menu-bar ?help-menu "&Help")

  (frame-set-menu-bar ?*main-frame* ?menu-bar)

  ;;; Make a panel and panel items
  (bind ?*panel* (panel-create ?*main-frame* 0 0 530 250))
  (panel-set-label-position ?*panel* wxVERTICAL)

  (bind ?*text-win* (text-window-create ?*main-frame* 0 250 500 250))

  (bind ?button (button-create ?*panel* frame-button-proc "A button"))
  (if (> ?*button-bitmap* 0) then
   (bind ?bitmap-button (button-create-from-bitmap ?*panel* frame-
button-proc ?*button-bitmap*))
  )
  (bind ?text (text-create ?*panel* "text-callback" "A text item"
"Initial value" -1 -1 200 -1 "wxPROCESS_ENTER"))
  (bind ?check (check-box-create ?*panel* "" "A check box"))

  (panel-new-line ?*panel*)

  (bind ?choice (choice-create ?*panel* "" "A choice item" -1 -1 -1 -1
(mv-append
   "One" "Two" "Three" "Four")))
  (choice-set-selection ?choice 0)

  (message-create ?*panel* "Hello! A simple message")

  (bind ?list (list-box-create ?*panel* "" "A list" 0 -1 -1 100 80))
  (list-box-append ?list "Apple")
  (list-box-append ?list "Pear")
  (list-box-append ?list "Orange")
  (list-box-append ?list "Banana")
  (list-box-append ?list "Fruit")

  (panel-new-line ?*panel*)

  (bind ?slider (slider-create ?*panel* "" "A slider" 40 22 101 200))

  (bind ?multi (multi-text-create ?*panel* "" "Multiline text" "Some
text" -1 -1 200 100))

  (bind ?radiobox (radio-box-create ?*panel* "radio-box-callback"
"Radiobox" -1 -1 200 100
   (mv-append "1" "2" "3" "4" "5" "6") 2 "wxVERTICAL"))
  (printout t "Radiobox id = " ?radiobox crlf)
```

```
;  (window-fit ?*panel*)
;  (window-fit ?*main-frame*)

  (text-window-load-file ?*text-win* "hello.clp")
  (bind ?*subframe* (frame-create 0 "Canvas Frame" 300 300 400 400))
  (bind ?*canvas* (canvas-create ?*subframe* 0 0 400 400))
  (window-set-cursor ?*canvas* ?*hand-cursor*)
  (window-add-callback ?*canvas* OnPaint on-paint)
  (window-add-callback ?*canvas* OnEvent on-event)
  (canvas-set-scrollbars ?*canvas* 20 20 50 50 4 4)

  (window-centre ?*main-frame* wxBOTH)

  (window-show ?*main-frame* 1)
  (window-show ?*subframe* 1)

  ?*main-frame*)
```

5.4. Development and debugging

Normally, you will write CLIPS files, and load (or batch) them into wxCLIPS from the **File** menu. If you find a bug, you can change the file in your editor and reload.

Note that there is a difference between batching and loading. The CLIPS *load* command only handles definitions, *not* function calls. However it does more error checking and is faster than batching. The purpose of batching is to allow function calls to be included in your files, and it is also the only way to automatically load CLIPS files from the command line (see below).

The best strategy is to have a small batch file which contains *load* commands to load the bulk of the application, plus a few function calls, and it is this file which is batched.

If you want to rerun a GUI application, but there are still windows lying around, you can use the **Clean up windows** menu option from the **Application** menu, or call the *clean-windows* function.

If you define a function called *app-on-init* (see next section) you can use the *Start application* menu item from the **Application**menu, which calls this function automatically.

Debugging can be made easier by typing `(watch all)` to get a trace of function calls.

5.5. Packaging your application

It is possible to make wxCLIPS load your application and start it up without the development window appearing. You need to define a function called *app-on-init*, which takes no arguments but must return the identifier of the top-level frame.

Now start your application as follows:

```
wxclips -clips load.clp -start
```

The file after the `-clips` switch is 'batched', which can be slow for a large file. Make the file small, with one or more calls to load definition files, followed by any function calls necessary (for example to register event handlers). If the file contains no CLIPS commands which should be executed immediately, use the `-load` switch instead.

The `-start` switch tells wxCLIPS to call the function *app-on-init*, and use the returned frame identifier as the top level window. The development window will not be displayed.

If you want wxCLIPS to start in a particular directory, you can use the `-dir` switch to `chdir` to a directory. This is useful to avoid the need for specifying absolute pathnames in your CLIPS code.

See also *Running wxCLIPS* (page 5).

6. wxCOOL class reference

See also *wxCOOL overview* (page 215)

This is the reference for the wxCOOL classes. With these functions, it is possible to create special-purpose user interfaces independent of platform. Currently these capabilities are supported under MS Windows, Open Look and Motif, except where stated.

6.1. wxApplication is-a wxObject

Not yet implemented.

One object of this class can be created, and its implementation depends upon the C++ application hosting the wxCLIPS environment.

wxApplication on-char-hook

bool (**on-char-hook wxKeyEvent** *event*)

Under Windows only, all key strokes going to a dialog box or frame can be intercepted before being passed on for normal processing. This function takes the window id and event id, and should return 1 to override further processing, or 0 to do default processing. If the function returns 0, the on-char-hook message will be sent to the active window. See also *Key event* (page 140).

6.2. wxBitmap is-a wxObject

A bitmap is a rectangular array of pixels, possibly in colour. A bitmap can be created in memory, or loaded from an XBM file under X, or BMP file under Windows.

A bitmap can be drawn on a canvas by selecting it into a *wxMemoryDC* (page 58) object and using *dc-blit* (page 115). Bitmaps can also be used to create buttons; see *button-create-from-bitmap* (page 96).

wxBitmap bitmap-type

string bitmap-type

Indicates the type of bitmap file the bitmap is being loaded from.

May be one of:

- wxBITMAP_TYPE_BMP: Windows BMP (the default under Windows).
- wxBITMAP_TYPE_XBM: X monochrome bitmap (the default under X).
- wxBITMAP_TYPE_GIF: GIF bitmap (only under X).
- wxBITMAP_TYPE_XPM: XPM colour bitmap (under Windows and X if wxCLIPS has been compiled to include this option).
- wxBITMAP_TYPE_RESOURCE: Windows resource bitmap; unlikely to be used since the resources compiled into wxCLIPS cannot be changed from CLIPS.

wxBitmap depth

long depth

The depth of the bitmap (number of bits per pixel). Optionally intialize this if creating an in-memory bitmap; omitting it makes the depth default to the current display depth of the screen.

wxBitmap filename

string filename

If this slot is initialized on creation, the wxBitmap will be created from the given file. The slot *bitmap-type* must also be initialized, to indicate the type of bitmap file.

Defaults to the empty string.

wxBitmap height

long height

The height of the bitmap. Intialize this if creating an in-memory bitmap.

wxBitmap width

long width

The width of the bitmap. Intialize this if creating an in-memory bitmap.

wxBitmap create

void (**create**)

Creates a bitmap in memory, either blank or from an existing bitmap file. The programmer can draw into the bitmap by selecting it into a memory device context, for later drawing on an output device context such as a canvas device context.

The method of bitmap construction depends on the slots that are initialized when the instance is created. Here are some examples:

```
; Load from a BMP file
(make-instance [my-bitmap] of wxBitmap
  (filename "aiai.bmp") (bitmap-type "wxBITMAP_TYPE_BMP"))

; Create a 'blank' bitmap
(make-instance [my-bitmap] of wxBitmap
   (width 100) (height 100))
```

6.3. wxBrush is-a wxObject

A brush is a an object that can be set for a *device context* (page 115) and determines the fill colour and style for subsequent drawing operations.

See also *wxPen* (page 69).

wxBrush colour

string colour

The colour of the brush. It may be a wxWindows colour string such as "BLACK", "WHITE", "CYAN" etc.

wxBrush style

symbol style

The style of the brush. It may be one of:

- wxSOLID (the default)
- wxTRANSPARENT
- wxBDIAGONAL_HATCH
- wxCROSSDIAG_HATCH
- wxFDIAGONAL_HATCH
- wxCROSS_HATCH
- wxHORIZONTAL_HATCH
- wxVERTICAL_HATCH

wxBrush create

void (**create**)

Creates a brush for use in a device context. A brush must be set to fill graphic shapes.

The following slots must be initialized:

- *colour* is a wxWindows colour string such as "BLACK", "CYAN").
- *style* may be a value such as wxSOLID or wxTRANSPARENT (see *style* (page 20) for complete list).

6.4. wxButton is-a wxItem

A wxButton is a rectangular control which can be placed on a *wxPanel* (page 66) to invoke a command.

wxButton bitmap

wxBitmap bitmap

The bitmap associated with a wxButton, if being used as a bitmap button.

wxButton create

void (**create**)

Creates a label or bitmap button on the given panel. If the *bitmap* slot is initialized, the button will be created from the bitmap. Otherwise, a text button will be created, using *label* for the label.

The following slots may be used in initializing a wxButton instance:

- *parent*: should be a wxPanel or wxDialogBox.
- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.
- *width*: may be absent or -1 to denote default width, or a positive integer.
- *height*: may be absent or -1 to denote default height, or a positive integer.
- *window-name*: may be absent or a string name to identify this button.
- *label*: for a text label button, must be a string.
- *bitmap*: for a bitmap label button, must be a wxBitmap.

When the button is pressed, the on-command message will be sent to the wxButton; if there is no default handler, it will be passed to the wxButton's parent, and then to the parent's parent. See *wxCommandEvent* (page 25) for a list of event types associated with wxCommandEvent.

6.5. wxCanvas is-a wxWindow

A subwindow used for drawing arbitrary graphics. It must be the child of a *wxFrame* (page 48).

wxCanvas dc

wxCanvasDC dc

The device context handle belonging to the canvas. The device context must be retrieved before anything can be drawn on the canvas. If your drawing function is parameterized by a device context, you will be able to pass other types of device context to your drawing routine, such as PostScript and Windows metafile device contexts.

wxCanvas create

bool (**canvas-create**)

Creates a canvas for drawing graphics on. The following slots may be initialized.

- *parent*: should be a wxFrame.
- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.
- *width*: may be absent or -1 to denote default width, or a positive integer.
- *height*: may be absent or -1 to denote default height, or a positive integer.
- *window-name*: may be absent or a string name to identify this canvas.
- *style*: may be absent or a string style: see below.

The value of **style** can be a *bit list* of the following values:

wxBORDER Gives the canvas a thin border (Windows 3 and Motif only).
wxRETAINED Gives the canvas a wxWindows-implemented backing store, making repainting

much faster but at a potentially costly memory premium (XView and Motif only).

wxBACKINGSTORE Gives the canvas an X-implemented backing store (XView and Motif only). The X server may choose to ignore this request, whereas wxRETAINED is always implemented under X.

wxCanvas set-scrollbars

bool (**set-scrollbars long** *x-unit-size* **long** *y-unit-size*
long *x-length* **long** *y-length* **long** *x-page-length* **long** *y-page-length*)

Set the scrollbars for the given canvas. The first argument pair specifies the number of pixels per logical scroll unit, that is, the number of pixels to scroll when a scroll arrow is clicked. If either is zero or less, that scrollbar will not appear. The second pair specifies the size of the virtual canvas in logical scroll units. The third pair of arguments specify the number of scroll units per page, that is, the amount to scroll by when the scrollbar is page-scrolled (usually by clicking either side of the scrollbar handle).

wxCanvas scroll

bool (**scroll long** *x-position* **long** *y-position*)

Scroll the canvas programmatically to the given scroll position. To convert from pixel position to scroll position, divide the pixel position by the scroll unit size you passed to *set-scrollbars* (page 22).

wxCanvas on-char

void (**on-char wxKeyEvent** *event*)

Allows interception of key events. See also *wxKeyEvent* (page 54).

wxCanvas on-event

void (**on-event wxMouseEvent***event*)

Allows interception of mouse events. See also *wxMouseEvent* (page 63).

wxCanvas on-paint

void (**on-paint**)

Override this handler to respond to paint events (sent when the canvas needs repainting).

wxCanvas on-size

void (**on-size long** *width* **long***height*)

The function is called with the canvas width and height when the canvas is resized.

6.6. wxCheckBox is-a wxItem

A wxCheckBox is a small box with a label, and can be in one of two states. It must be the child of a *wxPanel* (page 66).

wxCheckBox value

bool value

The value of the checkbox (TRUE or FALSE).

wxCheckBox create

void (**create**)

Creates a checkbox on the given panel. The following slots may be initialized.

- *parent*: should be a wxPanel or wxDialogBox.
- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.
- *width*: may be absent or -1 to denote default width, or a positive integer.
- *height*: may be absent or -1 to denote default height, or a positive integer.
- *window-name*: may be absent or a string name to identify this item.
- *label*: may be absent or a string name to label this item.
- *style*: reserved for future use.
- *value*: TRUE or FALSE.

6.7. wxChoice is-a wxItem

A wxChoice item is similar to a single-selection *wxListBox* (page 55) but normally only the current selection is displayed. It must be the child of a *wxPanel* (page 66).

wxChoice values

multifield values

List of string values for initializing the wxChoice item.

wxChoice create

bool (**wxChoice create**)

Creates a choice item on the given panel. A choice consists of a list of strings, one of which may be selected and displayed at any one time. The following slots may be initialized.

- *parent*: should be a wxPanel or wxDialogBox.
- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.
- *width*: may be absent or -1 to denote default width, or a positive integer.

- *height*: may be absent or -1 to denote default height, or a positive integer.
- *window-name*: may be absent or a string name to identify this item.
- *label*: may be absent or a string name to label this item.
- *style*: reserved for future use.
- *values*: a multifield list of strings.

Note that under Motif, it is recommended that the values are passed in this function, rather than using *append*, because of the nature of Motif. Otherwise, things are likely to be messed up.

wxChoice append

bool (**append string** *item*)

Appends the string item to the choice.

wxChoice find-string

long (**find-string string** *item*)

Searches for the given string and if found, returns the position ID of the string.

wxChoice clear

bool (**clear**)

Clears all the strings from the choice item.

wxChoice get-selection

long (**get-selection**)

Get the ID of the string currently selected.

wxChoice get-string-selection

string (**get-string-selection**)

Get the string currently selected.

wxChoice set-selection

bool (**set-selection long** *item-id*)

Sets the choice selection to the given item ID (numbered from zero).

wxChoice set-string-selection

bool (**set-string-selection string** *item*)

Sets the selection by passing the appropriate item string.

wxChoice get-string

string (**get-string long** *item-id*)

Gets the string associated with the given item ID.

6.8. wxClient is-a wxObject

See also *Interprocess communication overview* (page 201)

Not yet tested.

A client object represents the client side of a DDE conversation.

wxClient create

void (**create**)

Creates a client object. You should override the on-make-connection handler to return an object of class derived from wxConnection, since various members of wxConnection must be overridden to intercept messages.

A connection is not made until *make-connection* (page 25) is called.

wxClient make-connection

wxConnection (**make-connection string** *host* **string** *service* **string** *topic*)

Makes a connection to a server, returning an object of a user-defined derivative of *wxConnection* (page 26)if successful.

host is ignored under Windows, and should contain a valid internet host name under X.

service is a DDE service identifier (under X should contain a socket identifier).

topic is a topic name for this connection.

wxClient on-make-connection

wxConnection (**on-make-connection**)

Should be overridden to return an object of the appropriate wxConnection class, whenever a connection is made. The base wxConnection class cannot be used because various members of wxConnection must be overridden in order to respond to messages from the server.

6.9. wxCommandEvent is-a wxEvent

A wxCommandEvent is passed to a message handler when a panel item command is issued (usually by a user action).

The command event types are as follows:

- **wxEVENT_TYPE_BUTTON_COMMAND**
- **wxEVENT_TYPE_CHECKBOX_COMMAND**
- **wxEVENT_TYPE_CHOICE_COMMAND**
- **wxEVENT_TYPE_LISTBOX_COMMAND**
- **wxEVENT_TYPE_TEXT_COMMAND**
- **wxEVENT_TYPE_TEXT_ENTER_COMMAND**
- **wxEVENT_TYPE_MULTITEXT_COMMAND**
- **wxEVENT_TYPE_MENU_COMMAND**
- **wxEVENT_TYPE_SLIDER_COMMAND**
- **wxEVENT_TYPE_RADIOBOX_COMMAND**
- **wxEVENT_TYPE_SET_FOCUS**
- **wxEVENT_TYPE_KILL_FOCUS**

wxCommandEvent get-selection

long (**get-selection**)

Returns the identifier selection corresponding to the selected item, for example a listbox or menu item.

wxCommandEvent is-selection

bool (**is-selection**)

Returns 1 if the event was a selection event, 0 otherwise.

6.10. wxConnection is-a wxObject

Not yet tested.

See also *Connection overview* (page 202)

A wxConnection object has no creation function, since it is implicitly created when a connection is requested (one object at each side of the connection).

A connection object is used for initiating DDE commands and requests using functions such as execute, and it also has message handlers associated with it to respond to commands from the other side of the connection.

wxConnection service-name

string service-name

Service name variable.

wxConnection advise

bool (**advise string** *item* **string** *data*)

Called by a server application to pass data to a client (for example, when a spreadsheet cell has been updated, and the client is interested in this value).

item is the name of the item, and *data* is a string representing the item's data.

Returns TRUE if successful, FALSE otherwise.

wxConnection execute

bool (**wxConnection execute string** *data*)

Called by a client application to execute a command in the server. Note there is no item in this command.

data is a string representing the item's data.

Returns TRUE if successful, FALSE otherwise.

To get a result from a server, you need to call *request* explicitly, since *execute* doesn't return data.

wxConnection disconnect

bool (**disconnect**)

Called by a client or server application to terminate this connection. After this call, the connection object is no longer valid.

Returns TRUE if successful, FALSE otherwise.

wxConnection poke

bool (**poke string** *item* **string** *data*)

Called by a client application to poke data into the server.

item is the name of the item, and *data* is a string representing the item's data.

Returns TRUE if successful, FALSE otherwise.

wxConnection request

string (**request string** *item*)

Called by a client application to request data from a server.

item is the name of the requested data item.

Returns a string representing the data if successful, the empty string otherwise.

wxConnection start-advise

bool (**start-advise string** *item*)

Called by a client application to indicate interest in a particular piece of data in a server. The client connection should then recieve OnAdvise messages when the data is updated in the server.

item is the name of the data item of interest.

Returns TRUE if the advise loop is allowed, FALSE otherwise.

wxConnection stop-advise

bool (**stop-advise string** *item*)

Called by a client application to indicate a termination of interest in a particular piece of data in a server.

item is the name of the data item of interest.

Returns TRUE if successful, FALSE otherwise.

wxConnection on-advise

bool (**on-advise string** *topic* **string** *item* **string** *data*)

Called on the client side of the connection, when the server side sends an *advise* message. Used for advising the client of a change in server data. Override this to intercept such messages.

wxConnection on-execute

bool (**on-execute string** *topic* **string** *data*)

Called on the server side of the connection, when the client side sends an *execute* message. Used for implementing commands on the server side. Override this to implement command execution; you might wish to store the last result(s) to be returned when the client sends a *request* message.

wxConnection on-poke

bool (**on-poke string** *topic* **string** *item* **string** *data*)

Called on the server side of the connection, when the client side sends a *poke* message. Used for poking data into a server. Override this to intercept such messages.

wxConnection on-request

string (**on-request string** *topic* **string** *item*)

Called on the server side of the connection, when the client side sends a *request* message. Used for getting information from a server. Override this to intercept such messages and return data back to the client.

wxConnection on-start-advise

bool (**on-start-advise string** *topic* **string** *item*)

Called on the server side of the connection, when the client side wishes to start an *advise* loop for the given topic and item. The server should respond with TRUE to accept this advise loop, FALSE otherwise.

wxConnection on-stop-advise

bool (**on-stop-advise string** *topic* **string** *item*)

Called on the server side of the connection, when the client side wishes to stop an *advise* loop for the given topic and item. The server should respond with TRUE to terminate this advise loop, FALSE otherwise.

6.11. wxCursor is-a wxBitmap

A cursor is a small bitmap used for representing the mouse pointer. It can be set for a particular subwindow, using *wxWindow set-cursor* (page 90), as a cue for what operations are possible in this window at this point in time.

wxCursor cursor-name

string cursor-name

A stock cursor name, one of the following:

- wxCURSOR_ARROW
- wxCURSOR_BULLSEYE
- wxCURSOR_CHAR
- wxCURSOR_CROSS
- wxCURSOR_HAND
- wxCURSOR_IBEAM
- wxCURSOR_LEFT_BUTTON
- wxCURSOR_MAGNIFIER
- wxCURSOR_MIDDLE_BUTTON
- wxCURSOR_NO_ENTRY
- wxCURSOR_PAINT_BRUSH
- wxCURSOR_PENCIL
- wxCURSOR_POINT_LEFT
- wxCURSOR_POINT_RIGHT
- wxCURSOR_QUESTION_ARROW

- wxCURSOR_RIGHT_BUTTON
- wxCURSOR_SIZENESW
- wxCURSOR_SIZENS
- wxCURSOR_SIZENWSE
- wxCURSOR_SIZEWE
- wxCURSOR_SIZING
- wxCURSOR_SPRAYCAN
- wxCURSOR_WAIT
- wxCURSOR_WATCH
- wxCURSOR_BLANK
- wxCURSOR_CROSS_REVERSE (X only)
- wxCURSOR_DOUBLE_ARROW (X only)
- wxCURSOR_BASED_ARROW_UP (X only)
- wxCURSOR_BASED_ARROW_DOWN (X only)

wxCursor x

long x

The cursor hotspot x position (used only when loading a cursor from a file).

wxCursor y

long y

The cursor hotspot y position (used only when loading a cursor from a file).

wxCursor create

void (**create**)

Creates either a stock cursor (if *cursor-name* is non-nil) or a cursor loaded from a disk file (if *filename* and *bitmap-type* are non-nil).

Under X, the permitted cursor types in *bitmap-type* 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 wx_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 wx_setup.h). Specify *x* and *y* slot values.

Examples:

```
; Create a stock cursor
```

```
  (bind ?cursor (make-instance (gensym*)
     of wxCursor (cursor-name "wxCURSOR_PENCIL")))

  ; Create a cursor from a .cur file
  (bind ?cursor (make-instance (gensym*)
     of wxCursor (filename "figure.cur") (bitmap-type
"wxBITMAP_TYPE_CUR")))

  ; Create a cursor from a .ico file
  (bind ?cursor (make-instance (gensym*)
     of wxCursor (filename "figure.icor") (bitmap-type
"wxBITMAP_TYPE_CUR")
                 (x 10) (y 10)))
```

6.12. wxDatabase is-a wxObject

See also *Database classes overview* (page 207)

Not yet implemented.

Every database object represents an ODBC connection. The connection may be closed and reopened.

wxDatabase close

bool (**close**)

Resets the statement handles of any associated recordset objects, and disconnects from the current data source.

wxDatabase create

long (**database-create**)

Creates a new ODBC database handle. The constructor of the first wxDatabase instance of an application initializes the ODBC manager.

wxDatabase delete

bool (**delete**)

Destructor. Resets and destroys any associated wxRecordSet instances.

The destructor of the last wxDatabase instance will deinitialize the ODBC manager.

wxDatabase error-occurred

bool (**error-occurred**)

Returns 1 if the last action caused an error.

wxDatabase get-database-name

string (**get-database-name**)

Returns the name of the database associated with the current connection.

wxDatabase get-data-source

string (**get-data-source**)

Returns the name of the connected data source.

wxDatabase get-error-code

string (**wxDatabase get-error-code**)

Returns the error code of the last ODBC function call. This will be a string containing one of:

SQL_ERROR General error.
SQL_INVALID_HANDLE An invalid handle was passed to an ODBC function.
SQL_NEED_DATA ODBC expected some data.
SQL_NO_DATA_FOUND No data was found by this ODBC call.
SQL_SUCCESS The call was successful.
SQL_SUCCESS_WITH_INFO The call was successful, but further information can be obtained from the ODBC manager.

wxDatabase get-error-message

string (**get-error-message**)

Returns the last error message returned by the ODBC manager.

wxDatabase get-error-number

long (**get-error-number**)

Returns the last native error. A native error is an ODBC driver dependent error number.

wxDatabase is-open

bool (**is-open**)

Returns 1 if a connection is open.

wxDatabase open

bool (**open string** *datasource* **optional long** *exclusive = 1* **optional string** *readonly = 1* **optional string** *username = "ODBC"* **optional string** *password = ""*)

Connect to a data source. *datasource* contains the name of the ODBC data source. The parameters *exclusive* and *readonly* are not used.

6.13. wxDate is-a wxObject

A class for manipulating dates.

Not yet implemented.

wxDate add-months

bool (**add-months long** *months*)

Adds the given number of months to the date, returning TRUE if successful.

wxDate add-weeks

bool (**add-weeks long** *weeks*)

Adds the given number of weeks to the date, returning TRUE if successful.

wxDate add-years

bool (**add-years long** *years*)

Adds the given number of months to the date, returning TRUE if successful.

wxDate create

void (**create**)

Constructs a date object, initialized to zero. You are responsible for deleting this object when you have finished with it.

void (**create long** *month* **long** *day* **long** *year*)

Constructs a date object with the specified date. You are responsible for deleting this object when you have finished with it.

month is a number from 1 to 12.

day is a number from 1 to 31.

year is a year, such as 1995, 2005.

wxDate create-julian

bool (**create-julian long** *julian*)

Constructor taking an integer representing the Julian date.

wxDate create-string

bool (**wxDate create-string string** *date*)

Constructor taking a string representing a date. This must be either the string TODAY, or of the form `MM/DD/YYYY` or `MM-DD-YYYY`. For example:

```
(make-instance (gensym*) (date-string "11/26/1966"))
```

wxDate format

string (**format**)

Formats the date into a string according to the current display type.

wxDate get-day

long (**get-day**)

Returns the numeric day (in the range 1 to 365).

wxDate get-day-of-week

long (**get-day-of-week**)

Returns the integer day of the week (in the range 1 to 7).

wxDate get-day-of-week-name

string (**day-of-week-name**)

Returns the name of the day of week.

wxDate get-day-of-year

long (**get-day-of-year**)

Returns the day of the year (from 1 to 365).

wxDate get-days-in-month

long (**get-days-in-month**)

Returns the number of days in the month (in the range 1 to 31).

wxDate get-first-day-of-month

long (**get-first-day-of-month**)

Returns the day of week that is first in the month (in the range 1 to 7).

wxDate get-julian-date

long (**get-julian-date**)

Returns the Julian date.

wxDate get-month

long (**get-month**)

Returns the month number (in the range 1 to 12).

wxDate get-month-end

long (**get-month-end**)

Returns a new date representing the day that is last in the month. The new date must be deleted when it is finished with.

wxDate get-month-name

string (**get-month-name**)

Returns the name of the month.

wxDate get-month-start

wxDate (**get-month-start**)

Returns a new date representing the first day of the month. The new date must be deleted when it is finished with.

wxDate get-week-of-month

long (**get-week-of-month**)

Returns the week of month (in the range 1 to 6).

wxDate get-week-of-year

long (**get-week-of-year**)

Returns the week of year (in the range 1 to 52).

wxDate get-year

long (**get-year**)

Returns the year as an integer (such as '1995').

wxDate get-year-end

wxDate (**get-year-end**)

Returns a new date the date representing the last day of the year. Delete the new date when you have finished with it.

wxDate get-year-start

wxDate (**get-year-start**)

Returns a new date the date representing the first day of the year. Delete the new date when you have finished with it.

wxDate is-leap-year

bool (**is-leap-year**)

Returns TRUE if the year of this date is a leap year.

wxDate set

bool (**set**)

Sets the date to current system date.

wxDate set-julian

bool (**set-julian long** *julian*)

Sets the date to the given Julian date.

wxDate set-date

bool (**set-date long** *month* **long** *day* **long** *year*)

Sets the date to the given date.

month is a number from 1 to 12.

day is a number from 1 to 31.

year is a year, such as 1995, 2005.

wxDate set-format

bool (**set-format string** *format*)

Sets the current format type.

format should be one of:

wxDAY	Format day only.
wxMONTH	Format month only.
wxMDY	Format MONTH, DAY, YEAR.
wxFULL	Format day, month and year in US style: DAYOFWEEK, MONTH, DAY, YEAR.
wxEUROPEAN	Format day, month and year in European style: DAY, MONTH, YEAR.

wxDate set-option

bool (**set-option string** *option* **long** *enable=1*)

Enables or disables an option for formatting. *option* may be one of:

wxNO_CENTURY	The century is not formatted.
wxDATE_ABBR	Month and day names are abbreviated to 3 characters when formatting.

wxDate add-days

wxDate (**add-days long** *days*)

Adds an integer number of days to the date, returning a new date object.

wxDate subtract-days

wxDate (**subtract-days long** *days*)

Subtracts an integer number of days from the date, returning a new date object.

wxDate subtract

long (**subtract long** *date1* **long** *date2*)

Subtracts one date from another, return the number of intervening days.

wxDate add-self

bool (**add-self long** *days*)

Adds an integer number of days to the date, returning TRUE if successful.

wxDate subtract-self

bool (**subtract-self long** *days*)

Subtracts an integer number of days from the date, returning TRUE if successful.

wxDate le

bool (**lelong** *date*)

Compare two dates, returning TRUE if the current date object is earlier than *date*.

wxDate leq

bool (**leq long** *date*)

Function to compare two dates, returning TRUE if the current date object is earlier or equal to *date*.

wxDate ge

bool (**ge long** *date*)

Function to compare two dates, returning TRUE if the current date object is later than *date*.

wxDate geq

dboollong (**geq long** *date*)

Function to compare two dates, returning TRUE if the current date object is later than or equal to *date*.

wxDate eq

bool (**eq long** *date*)

Function to compare two dates, returning TRUE if the current date object is equal to *date*.

wxDate neq

bool (**neq long** *date*)

Function to compare two dates, returning TRUE if the current date object is not equal to *date*.

6.14. wxDC is-a wxObject

See also *Overview* (page 204)

A wxDC (device context) is an abstraction of a surface that can be drawn onto.

The following functions can be used with any device context identifier, with the exception of blit which must not be used with a PostScript device context, and get-text-extent-width, get-text-extent-height which do not function correctly on PostScript or metafile device contexts.

wxDC begin-drawing

bool (**begin-drawing**)

Bracket a series of drawing primitives in begin-drawing and end-drawing to optimize drawing under Windows, and also if drawing to a panel or dialog box context, for which these calls are mandatory. The calls may be nested.

wxDC blit

bool (**blit double** *dest-x* **double** *dest-y* **double** *width* **double** *height* **wxDC** *source-dc* **double** *source-x* **double** *source-y* **string** *logical-op = "wxCOPY"*)

Block-copies the given area from a source device context to a destination device context (the current object). This operation is not available to PostScript and Windows Metafile destination device contexts.

The argument *logical-op* sets the current logical function for the canvas. This determines how a source pixel from the source device context combines with a destination pixel in the current device context. It will most commonly be "wxCOPY", which simply draws with the current source pixels.

The possible values and their meaning in terms of source and destination pixel values are as follows:

```
wxAND                src AND dst
wxAND_INVERT         (NOT src) AND dst
wxAND_REVERSE        src AND (NOT dst)
wxCLEAR              0
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 most commonly used is wxCOPY. The others combine the current colour and the background using a logical operation. wxXOR is commonly used for drawing rubber bands or moving outlines, since drawing twice reverts to the original colour.

wxDC clear

bool (**wxDC clear**)

Clears the device context using the background colour.

wxDC destroy-clipping-region

bool (**destroy-clipping-region**)

Destroys the current clipping region.

wxDC draw-ellipse

bool (**draw-ellipse double** *x* **double** *y* **double** *width* **double** *height*)

Draws an ellipse. The outline and filling attributes are determined by the pen and brush settings respectively.

wxDC draw-line

bool (**draw-line double** *x1* **double** *y1* **double** *x2* **double** *y2*)

Draws a line between the given points.

wxDC draw-lines

bool (**draw-lines multifield** *list*)

Draws lines between the given points. *list* is a multifield, which can be created by a call to mv-append and a list of arguments. The list must contain an even number of floating-point values, interpreted in pairs as the points determining the multiline.

wxDC draw-point

bool (**dc-draw-point double** *x* **double** *y*)

Draws a point.

wxDC draw-polygon

bool (**draw-polygon multifield** *list*)

Draws a (possibly filled) polygon. *list* is a multifield, which can be created by a call to mv-append and a list of arguments. The list must contain an even number of floating-point values, interpreted in pairs as the points determining the polygon. The outline and filling attributes are determined by the pen and brush settings respectively.

wxDC draw-rectangle

bool (**draw-rectangle double** *x* **double** *y* **double** *width* **double** *height*)

Draws a rectangle. The outline and filling attributes are determined by the pen and brush settings respectively.

wxDC draw-rounded-rectangle

bool (**draw-rounded-rectangle double** *x* **double** *y* **double** *width* **double** *height* **double** *radius*)

Draws a rounded rectangle, with corners with a specified radius (optional). The outline and filling attributes are determined by the pen and brush settings respectively.

wxDC draw-text

bool (**dc-draw-text string** *text* **double** *x* **double** *y*)

Draw text at the given position, using the font set by *set-font* (page 44), and using the colours set by *set-text-foreground* (page 44) and *set-text-background* (page 44) respectively.

wxDC draw-spline

bool (**draw-spline multifield** *list*)

Draws a spline curve. *list* is a multifield, which can be created by a call to mv-append and a list of arguments. The list must contain an even number of floating-point values, interpreted in pairs as the points determining the spline shape.

wxDC end-doc

bool (**end-doc**)

Ends a document (such as a PostScript or Windows printer document).

wxDC end-drawing

bool (**end-drawing**)

Bracket a series of drawing primitives in begin-drawing and end-drawing to optimize drawing under Windows, and also if drawing to a panel or dialog box context, for which these calls are mandatory. The calls may be nested.

wxDC end-page

bool (**end-page**)

Ends a page.

wxDC get-min-x

double (**get-min-x**)

Returns the minimum X value drawn so far on the device context.

wxDC get-min-y

double (**get-min-y**)

Returns the minimum Y value drawn so far on the device context.

wxDC get-max-x

double (**get-max-x**)

Returns the maximum X value drawn so far on the device context.

wxDC get-max-y

double (**get-max-y**)

Returns the maximum Y value drawn so far on the device context.

wxDC get-text-extent-height

double (**get-text-extent-height string** *text*)

Returns the height of the text as drawn on this device context, in logical units.

wxDC get-text-extent-width

double (**get-text-extent-width string** *text*)

Returns the width of the text as drawn on this device context, in logical units.

wxDC ok

bool (**ok**)

Returns TRUE if the device context is OK (usually meaning, it has been initialised correctly), and FALSE otherwise.

wxDC start-doc

bool (**start-doc string** *message*)

Starts a document (such as a PostScript or Windows printer document) using the given string for any associated message box (the message is not in fact currently used).

wxDC start-page

bool (**start-page**)

Starts a page.

wxDC set-background

bool (**set-background long** *brush*)

Sets the background brush.

wxDC set-background-mode

bool (**set-background-mode string** *mode*)

Sets the mode for drawing text background.

mode may be wxSOLID (use the text background colour) or wxTRANSPARENT (do not fill the background).

wxDC set-brush

bool (**set-brush wxBrush** *brush*)

Sets the current brush for the device context. *brush* is a *wxBrush* (page 19) object, or nil t select any existing brush out of the device context.

wxDC set-colourmap

bool (**set-colourmap wxColourMap** *cmap*)

Sets the colourmap for the device context. If *cmap* is nil, the original colourmap is restored so that it is safe to delete the device context (or colourmap).

wxDC set-clipping-region

bool (**set-clipping-region double** *x1* **double** *y1* **double** *x2* **double** *y2*)

Sets a rectangular clipping region, outside which drawing operations have no effect.

wxDC set-font

bool (**set-font long** *font*)

Sets the current font for the device context. *font* is a *wxFont* (page 47) object, or nil to select any existing font out of the device context.

wxDC set-logical-function

bool (**set-logical-function string** *logical-function*)

Sets the current logical function for the device context. The logical function determines how pixels are changed by the drawing functions, and may be one of wxCOPY, wxXOR, wxINVERT, wxOR_REVERSE and wxAND_REVERSE.

wxDC set-pen

bool (**set-pen long** *pen*)

Sets the current pen for the device context. *pen* is a *wxPen* (page 69) object, or nil to select any existing pen out of the device context.

wxDC set-text-foreground

bool (**set-text-foreground string** *colour*)

Sets the colour for the text foreground, effective when *draw-text* (page 41) is used. *colour* is a capitalized name from the list defined in the wxWindows manual.

wxDC set-text-background

bool (**set-text-background string** *colour*)

Sets the colour for the text background, effective when *draw-text* (page 41) is used. *colour* is a capitalized name from the list defined in the wxWindows manual.

6.15. wxDialogBox is-a wxPanel

See also *Overview* (page 204)

A dialog box is essentially a *wxPanel* (page 66) with its own *wxFrame* (page 48), and therefore shares some functions and behaviour with both of these objects.

Any panel item can be created as a child of a dialog box, and also the dialog box can be created *modal*, so that the flow of program control halts until the dialog box is dismissed.

The following event handlers are valid for the panel class:

on-command Override this to intercept panel item commands (such as button presses). See *wxCommandEvent* (page 25) for a list of event types associated with wxCommandEvent.
on-event Called with a *wxMouseEvent* (page 63) identifier. This can only be guaranteed only when the dialog box is in user edit mode (to be implemented).
on-paint Called with no arguments when the dialog box receives a repaint event from the window manager.
on-size The function is called with the window width and height.

wxDialogBox modal

bool modal

Initialize to TRUE if the dialog box is to be modal, FALSE otherwise. The default is FALSE.

wxDialogBox create

void (**create**)

The following slots may be initialized if not loading from a resource.

- *parent*: should be a wxFrame or wxDialogBox.
- *title*: a title for the dialog box caption.
- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.
- *width*: may be absent or -1 to denote default width, or a positive integer.
- *height*: may be absent or -1 to denote default height, or a positive integer.
- *window-name*: may be absent or a string name to identify this dialog box.
- *modal*: TRUE if the dialog is to be modal, FALSE otherwise (the default).
- *style*: may be absent or a string style: see below.

The following slots should be initialized if loading from a resource (see *Resource overview* (page 217) for further details).

- *parent*: should be a wxFrame.
- *resource*: the string name of the resource.

The value of **style** can be a *bit list* of the following values:

wxCAPTION Puts a caption on the dialog box (under XView and Motif this is mandatory).
wxSTAY_ON_TOP Stay on top of other windows (Windows only).
wxSYSTEM_MENU Display a system menu (manadatory under XView and Motif).
wxTHICK_FRAME Display a thick frame around the window (manadatory under XView and Motif).

wxVSCROLL Give the dialog box a vertical scrollbar (XView only).
wxDEFAULT_DIALOG_STYLE Equivalent to a combination of wxCAPTION, wxSYSTEM_MENU and wxTHICK_FRAME
.

The default value for *style* is wxDEFAULT_DIALOG_STYLE.

If *modal* is TRUE, when the *show* message is sent to the dialog box object, the flow of control will stop until the *show* message has been called again with a FALSE parameter. Otherwise, if *modal* is FALSE, flow of control will immediately return to the program when the dialog box has been shown.

wxDialogBox on-char-hook

bool (**on-char-hook wxKeyEvent** *event*)

Under Windows only, all key strokes going to a dialog box or frame can be intercepted before being passed on for normal processing. This handler takes the event object, and should return TRUE to override further processing, or FALSE to do default processing. See also *wxKeyEvent* (page 54).

wxDialogBox on-close

bool (**on-close**)

The function is called when the user dismisses the dialog box. If the handler returns TRUE, the window is automatically deleted (possibly terminating the application). A return value of FALSE forbids automatic deletion.

wxDialogBox on-paint

void (**on-paint**)

Override this handler to respond to paint events (sent when the dialog box needs repainting). Normally, a dialog box's items repaint themselves, but for special purposes, you may wish to draw on the dialog box device context.

wxDialogBox on-size

void (**on-size long** *width* **long***height*)

The function is called with the dialog box width and height when the user resizes the frame.

6.16. wxEvent is-a wxObject

wxEvent is an 'abstract class' from which other event classes, such as mouse, key and command events, are derived.

wxEvent get-event-type

string (**get-event-type**)

Returns the event type.

6.17. wxEvtHandler is-a wxObject

wxEvtHandler is an 'abstract class' for classes which have event handlers, such as wxCanvas or wxFrame. This class has yet to be documented.

6.18. wxFont is-a wxObject

A font is an object that can be set for a *device context* (page 115) to determine the characteristics of text drawn with *draw-text* (page 41). It can also be used to set panel item fonts.

wxFont point-size

long point-size

The point size of the font. The default is 10.

wxFont family

symbol family

The family of the font. May be one of wxROMAN, wxSCRIPT, wxDECORATIVE, wxSWISS, wxMODERN. The default is wxSWISS.

wxFont style

symbol style

The style of the font. May be one of wxNORMAL, wxITALIC, wxSLANT. The default is wxNORMAL.

wxFont weight

symbol weight

The weight of the font. May be one of wxNORMAL, wxLIGHT, wxBOLD. The default is wxNORMAL.

wxFont underlined

bool underlined

Whether the font is underlined (Windows only). May be TRUE of FALSE. The default is FALSE.

wxFont create

void (**create**)

Creates a font for use in a device context. The following slots can be used to initialize the font.

- *point-size* gives the font point size.
- *family* may be one of wxROMAN, wxSCRIPT, wxDECORATIVE, wxSWISS, wxMODERN, wxDEFAULT.
- *style* may be one of wxNORMAL, wxITALIC, wxSLANT.
- *weight* may be one of wxBOLD, wxLIGHT, wxNORMAL.
- *underlined* may be 1 or 0.

6.19. wxFrame is-a wxWindow

A wxFrame is a window containing text, canvas or panel subwindows. It normally has decorations added by the window manager, such as a system menu, a thick frame, and resize handles. When a wxWindows or wxCLIPS application initializes, a top-level frame must be returned to the system for successful start-up. When a top-level frame and all its children are deleted, the application terminates.

Usually an application will need to override the on-close handler in case the window manager sends the application a close message. If the handler returns TRUE, the frame is deleted by the system (possibly terminating the application).

See *wxWindow* (page 88) for message handlers in addition to the ones documented here.

wxFrame create

void (**create**)

The following slots may be initialized.

- *parent*: should be a wxFrame.
- *title*: a title for the dialog box caption.
- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.
- *width*: may be absent or -1 to denote default width, or a positive integer.
- *height*: may be absent or -1 to denote default height, or a positive integer.
- *window-name*: may be absent or a string name to identify this dialog box.
- *style*: may be absent or a string style: see below.

The style parameter may be a combination of the following, using the bitwise 'or' operator.

wxICONIZE Display the frame iconized (minimized) (Windows only).
wxCAPTION Puts a caption on the frame (under XView and Motif this is mandatory).
wxDEFAULT_FRAME Defined as a combination of wxMINIMIZE_BOX, wxMAXIMIZE_BOX, wxTHICK_FRAME, wxSYSTEM_MENU and wxCAPTION.
wxMDI_CHILD Specifies a Windows MDI (multiple document interface) child frame.
wxMDI_PARENT Specifies a Windows MDI (multiple document interface) parent frame.
wxMINIMIZE Identical to **wxICONIZE**.
wxMINIMIZE_BOX Displays a minimize box on the frame (Windows only).
wxMAXIMIZE Displays the frame maximized (Windows only).
wxMAXIMIZE_BOX Displays a maximize box on the frame (Windows only).
wxSDI Specifies a normal SDI (single document interface) frame.

wxSTAY_ON_TOP Stay on top of other windows (Windows only).
wxSYSTEM_MENU Displays a system menu (manadatory under XView and Motif).
wxTHICK_FRAME Displays a thick frame around the window (manadatory under XView and Motif).

The function *show* must be called before a new frame is visible.

wxFrame create-status-line

bool (**create-status-line optional long** *n=1*)

Creates a status line at the bottom of the frame. Use *set-status-text* (page 49) to write to the status line.

n is a number from 1 to 5 for the number of status areas to create.

wxFrame iconize

bool (**iconize optional bool** *minimize*)

Minimizes the frame if the second argument is TRUE or absent, restores the frame otherwise.

wxFrame set-menu-bar

bool (**set-menu-bar wxMenuBar** *menu-bar*)

Associates a menu bar with the frame. See *wxMenuBar* (page 60). You should not call this more than once for any given frame, and you should also not delete the wxMenuBar object once it has been assigned to a frame. It will be deleted when the wxFrame object is deleted.

wxFrame set-icon

bool (**set-icon wxIcon** *icon*)

Sets the icon of a frame. See *wxIcon* (page 53).

wxFrame set-status-text

bool (**set-status-text string** *text*, **optional long** *i=0*)

Sets the text for the status line (previously created with *create-status-line* (page 49)).

i is a number from 0 to 4 for the number of the status area to write to.

wxFrame set-title

bool (**set-title string** *text*)

Set the title of a frame.

wxFrame set-tool-bar

bool (**set-tool-bar long** *toolbar*)

Tells the MDI frame to manage the subwindow as a toolbar. Use in Windows MDI mode *only*.

wxFrame on-activate

void (**on-activate bool** *active*)

Called the frame is activated or deactivated. Under Windows, you may need to intercept this message and set the focus for a subwindow, or the subwindow may not receive character events. By default, wxWindows will set the focus for the first subwindow of a frame.

wxFrame on-char-hook

bool (**on-char-hook wxKeyEvent** *event*)

Under Windows only, all key strokes going to a dialog box or frame can be intercepted before being passed on for normal processing. This handler takes the event object, and should return TRUE to override further processing, or FALSE to do default processing. See also *wxKeyEvent* (page 54).

wxFrame on-close

bool (**on-close**)

The function is called when the user dismisses the frame. If the handler returns TRUE, the window is automatically deleted (possibly terminating the application). A return value of FALSE forbids automatic deletion.

wxFrame on-menu-command

void (**on-menu-command long** *menu-item*)

Called with the menu item identifier. Test the menu item identifier and perform an appropriate action.

wxFrame on-menu-select

void (**on-menu-select long** *menu-item*)

Called with a menu item identifier, when the cursor travels over the menu item (but the user does not click). Test the menu item identifier and perform an appropriate action.

wxFrame on-size

void (**on-size long** *width* **long***height*)

The function is called with the frame width and height when the user resizes the frame. The application should define appropriate subwindow resizing behaviour in this handler, if appropriate.

The default handler performs child window resizing behaviour if there is only one child window. Otherwise, it gives up.

6.20. wxHelpInstance is-a wxObject

Not yet implemented.

A 'help instance' is created to manage on-line help associated with one or more files. wxCLIPS supports both Windows Help under MS Windows, and wxHelp under all platforms.

Windows Help (.hlp) files may be created using a number of tools, such as Tex2RTF. wxHelp (.xlp) files can be created with a text editor or a tool such as Tex2RTF.

wxHelp is very limited in its capabilities and should only be used on platforms with no native help. Consider using HTML files instead (although you cannot currently access HTML files from your application).

wxHelpInstance native

bool native

If TRUE, the native help system will be invoked (such as WinHelp under MS Windows). If FALSE, wxHelp will be invoked.

wxHelpInstance create

void (**create**)

Creates a help instance. If *native* is TRUE, the native help system will be invoked (such as WinHelp under MS Windows). If FALSE, wxHelp will be invoked.

wxHelpInstance display-block

bool (**display-block long** *blockId*)

Displays the help file at the given block identifier (system dependent).

wxHelpInstance display-contents

bool (**display-contents string** *filename*)

Displays the contents of the help file currently loaded.

wxHelpInstance display-section

bool (**display-section long** *section*)

Displays the help file at the given section (system dependent).

wxHelpInstance keyword-search

bool (**keyword-search string** *keyword*)

Positions the help file at a section matching the given string.

wxHelpInstance load-file

bool (**load-file string** *filename*)

Attempts to load the given file into the help instance. Use a function like display-contents to display the file.

6.21. wxGauge is-a wxItem

A gauge is used for displaying a quantity, for example amount of processing done. It must be a child of a wxPanel or wxDialogBox.

wxGauge value

long value

The current value of the gauge. The default is 1.

wxGauge range

long range

The range of the gauge. The default is 100.

wxGauge create

void (**create**)

Creates a gauge item on the given panel. The following slots may be initialized.

- *parent*: should be a wxPanel or wxDialogBox.
- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.
- *width*: may be absent or -1 to denote default width, or a positive integer.
- *height*: may be absent or -1 to denote default height, or a positive integer.
- *window-name*: may be absent or a string name to identify this item.

- *label*: may be absent or a string name to label this item.
- *style*: a bit list of values (see below).
- *value*: TRUE or FALSE.
- *range*: indicates the maximum value of the gauge.

style is a *bit list* of the following:

wxGA_HORIZONTAL The item will be created as a horizontal gauge.
wxGA_VERTICAL The item will be created as a vertical gauge.
wxGA_PROGRESSBAR Under Windows 95, the item will be created as a horizontal progress bar.

wxGauge set-bezel-face

bool (**set-bezel-face long** *width*)

Set the bezel parameter of the gauge (takes effect under Windows version only).

wxGauge set-shadow-width

bool (**set-shadow-width long** *width*)

Set the shadow width of the gauge (takes effect under Windows version only).

6.22. wxGroupBox is-a wxItem

A wxGroupBox is a box drawn around one or more controls. Available under Windows only.

wxGroupBox create

void (**create**)

Creates a group box. The following slots may be initialized.

- *parent*: should be a wxPanel or wxDialogBox.
- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.
- *width*: may be absent or -1 to denote default width, or a positive integer.
- *height*: may be absent or -1 to denote default height, or a positive integer.
- *window-name*: may be absent or a string name to identify this item.
- *label*: may be absent or a string name to label this item.
- *style*: reserved for future use.

6.23. wxIcon is-a wxBitmap

An icon is a small bitmap which can be used to decorate a minimized frame. There are platform-specific ways of creating an icon.

wxIcon height

long height

Height of the icon in pixels.

wxIcon width

long width

Width of the icon in pixels.

wxIcon create

void (**create**)

Loads an icon from a file or resource. Under X, the argument must be the filename of a valid XBM (X bitmap) file. Under Windows, the argument must be a icon filename, or the name of an icon resource compiled into the current executable.

Use *wxFrame set-icon* (page 49) to set the icon of a frame.

Under X, the permitted icon types in the *bitmap-type* are:

- **wxBITMAP_TYPE_BMP** Load a Windows bitmap file (if USE_IMAGE_LOADING_IN_X is enabled in wx_setup.h).
- **wxBITMAP_TYPE_GIF** Load a GIF bitmap file (if USE_IMAGE_LOADING_IN_X is enabled in wx_setup.h).
- **wxBITMAP_TYPE_XBM** Load an X bitmap file.
- **wxBITMAP_TYPE_XPM** Load an XPM (colour pixmap) file. Only available if USE_XPM_IN_X is enabled in wx_setup.h.

Under Windows, the permitted types are:

- **wxBITMAP_TYPE_ICO** Load a cursor from a .ico icon file (only if USE_RESOURCE_LOADING_IN_MSW is enabled in wx_setup.h).
- **wxBITMAP_TYPE_ICO_RESOURCE** Load a Windows resource (as specified in the .rc file).

Examples:

```
; Under X
(bind ?icon (make-instance (gensym*)
   (bitmap-type wxBITMAP_TYPE_XBM)
   (filename "icon.xbm")))

; Under Windows
(bind ?icon (make-instance (gensym*)
   (bitmap-type wxBITMAP_TYPE_ICO)
   (filename "icon.ico")))
```

6.24. wxKeyEvent is-a wxEvent

A key event identifier is passed to a window's on-char or on-char-hook handler. The key code,

position and state of shift/control/alt can be examined by calling the following functions.

wxKeyEvent alt-down

bool (**alt-down**)

Returns TRUE if alt was pressed.

wxKeyEvent control-down

bool (**control-down**)

Returns TRUE if control was pressed.

wxKeyEvent get-key-code

string (**get-key-code**)

Returns a string corresponding to the internal wxWindows key code, such as "WXK_BACK", "WXK_F1" or "WXK_RETURN".

wxKeyEvent position-x

double (**position-x**)

Gets the x position of the mouse pointer at the moment the key was pressed.

wxKeyEvent position-y

double (**event-position-y**)

Gets the y position of the mouse pointer at the moment the key was pressed.

wxKeyEvent shift-down

bool (**shift-down**)

Returns TRUE if shift was pressed.

6.25. wxListBox is-a wxItem

A wxListBox displays a choice of strings. It must be the child of a panel or dialog box. In a single-selection listbox, only one choice may be highlighted. In a multiple-selection listbox, several may be highlighted.

wxListBox values

multifield values

List of string values for initializing the wxListBox item.

wxListBox multiple

bool multiple

Initalize to TRUE for a multi-selection listbox, FALSE for a single-selection listbox.

wxListBox create

void (**create**)

Creates a list box item on the given panel or dialog box. The following slots may be initialized.

- *parent*: should be a wxPanel or wxDialogBox.
- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.
- *width*: may be absent or -1 to denote default width, or a positive integer.
- *height*: may be absent or -1 to denote default height, or a positive integer.
- *window-name*: may be absent or a string name to identify this item.
- *label*: may be absent or a string name to label this item.
- *style*: see below.
- *values*: a multifield list of strings.
- *multiple*: TRUE for a multiple-selection listbox, FALSE otherwise.

style is a *bit list* of some of the following:

wxNEEDED_SB Create scrollbars if needed.
wxALWAYS_SB Create scrollbars immediately.
wxHSCROLL Create horizontal scrollbar if contents are two wide (Windows only).

wxListBox append

bool (**append string** *item* **optional string** *client-data*)

Append a string to the list box, with an optional client data string.

wxListBox find-string

long (**find-string string** *item*)

Find the string in the list box and return the integer position if found, -1 if not.

wxListBox clear

bool (**clear**)

Clear all strings from the list box.

wxListBox get-selection

long (**get-selection**)

Get the position of the selection (for single-selection list boxes only).

wxListBox get-string-selection

string (**get-string-selection**)

Get the selected string (for single-selection list boxes only).

wxListBox set-selection

bool (**set-selection long** *item-pos* **bool** *flag=TRUE*)

Set a selection by item position.

If *flag* is TRUE, the item will be selected, otherwise it will be deselected (multiple-selection listboxes only).

wxListBox set-string-selection

bool (**set-string-selection string** *item*)

Set a selection by string.

wxListBox number

long (**number**)

Return the number of items in the list box.

wxListBox delete-item

bool (**delete-item long** *item-pos*)

Delete an item in the list box.

wxListBox get-string

string (**get-string long** *item-pos*)

Return the string at the given position.

wxListBox get-first-selection

long (**get-first-selection**)

Get the first selection position in a multi-selection list box (-1 for no more selections).

wxListBox get-next-selection

long (**get-next-selection**)

Get the next selection position in a multi-selection list box (-1 for no more selections).

6.26. wxMemoryDC is-a wxCanvasDC

A memory device context is used for drawing into, or copying from, a bitmap. See also the *wxBitmap* (page 18) object.

wxMemoryDC create

void (**create**)

Create a memory device context using the current display depth. No slots need to be initialized.

wxMemoryDC select-object

bool (**select-object wxBitmap** *bitmap*)

Makes this device context the drawing surface for the given bitmap (see *wxBitmap* (page 18)). Deleting the memory device context disassociates the bitmap, freeing it to be used with another memory device context. To draw a bitmap on a device context that supports bitmap drawing (i.e. not a Metafile or PostScript device context), using code like the following:

```
  ;;; Utility function for drawing a bitmap
  (deffunction draw-bitmap (?dc ?bitmap ?x ?y)
   (bind ?mem-dc (make-instance (gensym*) of wxMemoryDC))
   (send ?mem-dc select-object ?bitmap)
   ; Blit the memory device context onto the destination device context
   (send ?dc blit ?x ?y (send ?bitmap get-width) (send ?bitmap get-
height)
     ?mem-dc 0.0 0.0)
   (send ?mem-dc delete)
  )
```

If *bitmap* is nil, the existing bitmap (if any) will be selected out of the device context. This might be necessary if you wish to delete the bitmap before deleting the device context (for example, for reusing the same device context for different bitmaps).

6.27. wxMenu is-a wxWindow

The menu is used as a component of a *wxMenuBar* (page 60) or as a popup menu. For a menu

bar, create menus, append menu items (strings, separators or further menus), and finally append the menu to the menu bar.

A menu or menu bar string may contain an ampersand, which is taken to mean 'underline the next character and use it as the hotkey'. This gives the user the opportunity to use keystrokes to access menus and items.

wxMenu callback

symbol callback

This slot should be initialized if creating a popup menu. The name represents a function that will be called with the wxMenu instance and wxCommandEvent instance when the user selects an item. Use *wxCommandEvent get-selection* to retrieve the selected menu item id.

wxMenu create

void (**create**)

Create a menu and returns the menu's ID. The following slots may be initialized.

- *callback*: should be present if creating a popup menu (i.e. not a menubar menu). It will be called with the wxMenu instance and wxCommandEvent instance when the user selects an item. Use *wxCommandEvent get-selection* to retrieve the selected menu item id.

wxMenu append

bool (**append long** *item-id*
string *item-string* **optional wxMenu** *submenu* **optional string** *help-string* **optional bool** *checkable*)

Append a string or submenu to the menu, passing the integer ID by which the menu item will be referenced, a string to be displayed, an optional pullright menu, and an optional flag for specifying whether this menu item can be checked.

A help string can be supplied, in which case the string will be shown on the first field of the status line (if any) in the frame containing the menu bar, when the mouse pointer moves over the menu item.

wxMenu append-separator

bool (**append-separator**)

Append a menu separator.

wxMenu break

bool (**break**)

Inserts a column break into the menu.

wxMenu check

bool (**check long** *item-id* **bool** *check*)

Check (*check* = *TRUE* or uncheck *check* = *FALSE* the given menu item. MS Windows only.

wxMenu enable

bool (**enable long** *item-id* **bool** *enable*)

Enable (*enable* = *TRUE* or disable *enable* = *FALSE* the given menu item.

6.28. wxMenuBar is-a wxWindow

A menu bar is a standard user interface element which places the main commands of an application along the top of a *wxFrame* (page 123).

The menu bar must be assigned to a frame using *wxFrame set-menu-bar* (page 49). Once this is done, the menu bar must not be deleted by the application: it will be deleted when the frame is deleted.

A menu or menu bar string may contain an ampersand, which is taken to mean 'underline the next character and use it as the hotkey'. This gives the user the opportunity to use keystrokes to access menus and items.

See also *wxMenu* (page 58).

wxMenuBar create

void (**create**)

Creates a menu bar.

wxMenuBar append

bool (**append long** *menu-id* **string** *title*)

Appends a menu to a menu bar.

wxMenuBar check

bool (**check long** *item-id* **bool** *check*)

Checks (*check* = *TRUE*) or unchecks (*check* = *FALSE*) the given menu item. MS Windows only.

wxMenuBar checked

bool (**checked long** *item-id*)

Returns TRUE if the menu item is checked, FALSE otherwise.

wxMenuBar enable

bool (**enable long** *item-id* **bool** *enable*)

Enables (*enable* = *TRUE*) or disables (*enable* = *FALSE*) the given menu item.

6.29. wxMessage is-a wxItem

A wxMessage is a simple piece of text, or a bitmap, on a panel or dialog box.

wxMessage bitmap

wxMessage bitmap

The bitmap associated with a wxMessage, if being used as a bitmap message.

wxMessage create

long (**create**)

Creates a label or bitmap message item on the given panel.

The following slots may be used in initializing a wxButton instance:

- *parent*: should be a wxPanel or wxDialogBox.
- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.
- *window-name*: may be absent or a string name to identify this message.
- *label*: for a text label message, must be a string.
- *bitmap*: for a bitmap label message, must be a wxBitmap.

6.30. wxMetaFile is-a wxObject

Not yet implemented.

A metafile is the Windows vector format. Currently, the only way of creating a Windows metafile is to close a metafile device context, and the only valid operations are to delete the metafile and to place it on the clipboard.

These functions are only available under Windows.

6.30.1. Example

Below is a example of metafle, metafile device context and clipboard use. 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.

```
  (bind ?dc (make-instance (gensym*) of wxMetaFileDC))
  (if (send ?dc ok) then
   (
     ; Do some drawing
     (bind ?mf (send ?dc close))
     (if (neq ?mf nil) then
      ; Pass metafile to the clipboard
      (send ?md set-clipboard (send ?dc get-max-x) (send ?dc get-max-
y))
      (send ?mf delete)
     )
   )
  )
  (send ?dc delete)
```

wxMetaFile set-clipboard

bool (**wxMetaFile set-clipboard long** *width* **long** *height*)

Places the metafile on the clipboard, returning TRUE for success and FALSE for failure.

The metafile should be deleted immediately after this operation.

6.31. wxMetaFileDC is-a wxDC

A metafile device context is used for creating a metafile. The programmer should create the metafile device context, close it to return a metafile, delete the device context, use the metafile (the only valid thing to do with it currently is to place it on the clipboard, and then delete the metafile.

These functions are only available under Windows.

See also *wxMetaFile* (page 61).

wxMetaFileDC filename

string filename

Filename if creating this metafile device context as disk-based.

wxMetafileDC create

void (**create**)

Creates a metafile device context.

filename is the file to be used if creating a disk-based metafile. Usually this will be zero or absent, and an in-memory metafile will be created.

wxMetaFileDC close

wxMetaFile (**close**)

Closes the metafile device context and returns a metafile (or nil if the function failed). The device context should no longer be used after this call is made, and it should be deleted.

See *wxMetaFile* (page 61).

6.32. wxMouseEvent is-a wxEvent

A mouse event identifier is passed to the canvas on-event handler. The state of the mouse buttons (and some keys) can be examined by calling the following functions.

wxMouseEvent button

bool (**button long** *button*)

Returns TRUE if the given button is changing state. *button* may be 1, 2 or 3 (left, middle and right buttons respectively).

wxMouseEvent button-down

bool (**button-down**)

Returns TRUE if the event is a mouse button down event.

wxMouseEvent control-down

bool (**control-down**)

Returns TRUE if the control key is down.

wxMouseEvent dragging

bool (**dragging**)

Returns TRUE if the event is a dragging event (holding a mouse button down and moving).

wxMouseEvent left-down

bool (**left-down**)

Returns TRUE if the left mouse button is down.

wxMouseEvent left-up

bool (**left-up**)

Returns TRUE if the left mouse button is up.

wxMouseEvent is-button

bool (**is-button**)

Returns TRUE the event is a button press or release.

wxMouseEvent middle-down

bool (**middle-down**)

Returns TRUE if the middle mouse button is down.

wxMouseEvent middle-up

bool (**middle-up**)

Returns TRUE if the middle mouse button is up.

wxMouseEvent position-x

double (**position-x**)

Returns the mouse x-position.

wxMouseEvent position-y

double (**position-y**)

Returns the mouse y-position.

wxMouseEvent right-down

bool (**right-down**)

Returns TRUE if the right mouse button is down.

wxMouseEvent right-up

bool (**right-up**)

Returns TRUE if the right mouse button is up.

wxMouseEvent shift-down

bool (**shift-down**)

Returns TRUE if the shift key is down.

6.33. wxMultiText is-a wxText

A multi-line text item is able to show several lines of text, unlike the single line *wxText* (page 81) item. It must be the child of a panel or dialog box.

wxMultiText create

long (**create**)

Creates a multi-line text item on the given panel or dialog box. The following slots may be initialized.

- *parent*: should be a wxPanel or wxDialogBox.
- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.
- *width*: may be absent or -1 to denote default width, or a positive integer.
- *height*: may be absent or -1 to denote default height, or a positive integer.
- *window-name*: may be absent or a string name to identify this item.
- *label*: may be absent or a string name to label this item.
- *style*: see below.
- *value*: a string for initializing the value of the multi-text.

The *style* parameter can be a *bit list* of the following:

wxHSCROLL	A horizontal scrollbar will be displayed. If wxHSCROLL is omitted, only a vertical scrollbar is displayed, and lines will be wrapped. This parameter is ignored under XView.
wxREADONLY	The text is read-only (not XView).

6.34. wxObject

wxObject is an 'abstract class' from which other wxCOOL classes are derived.

wxObject dont-create

symbol dont-create

Set on creation when it is not desireable for the usual underlying object creation to occur. Specifically, used when creating objects to wrap wxCLIPS integer identifiers for panel items created when loading in a dialog or panel resource. See wx_item.clp, wxPanel handler create-child-objects.

wxObject id

long id

The integer identifier of the underlying wxCLIPS object.

wxObject pending-delete

bool pending-delete

TRUE if the object is about to be deleted (an internal setting to avoid double deletion).

wxObject add-event-handlers

void (**add-event-handlers**)

All classes should override (but still call) this handler in order to add callbacks for this instance. The wxObject version adds an OnDelete callback that will be called for all instances.

wxObject create

void (**create**)

For wxObject, this is a no-operation that must be redefined by derived classes to perform per-instance initialization.

wxObject init after

void (**init after**)

This handler is implemented to call the *create* handler after the slot initialization phase is complete. *create* is also defined for wxObject, as an no-operation, and must be redefined by each major subclass to do the construction for the instance.

6.35. wxPanel is-a wxCanvas

A panel is a subwindow for placing panel items, such as the *wxButton* (page 20) and *wxText* (page 81) item. Its parent must be a *wxFrame* (page 48). A panel inherits most properties from canvas, except for scrollbar functionality.

Note that a *wxDialogBox* (page 44) may be used in a similar way to a panel.

The following event handlers are valid for the panel class:

on-default-action Override this to intercept double clicks in listboxes.
on-command Override this to intercept panel item commands (such as button presses). See *wxCommandEvent* (page 25) for a list of event types associated with wxCommandEvent.
on-event Called with a *wxMouseEvent* (page 63) identifier. This can only be guaranteed only when the panel is in user edit mode (to be implemented).
on-paint Called with no arguments when the panel receives a repaint event from the window manager.
on-size The function is called with the window width and height.

wxPanel resource

string resource

The name of the resource the panel or dialog is to be loaded from, if any. Initially the empty string.

wxPanel create

void (**create**)

Creates a panel.

The following slots may be initialized if not loading from a resource.

- *parent*: should be a wxFrame.
- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.
- *width*: may be absent or -1 to denote default width, or a positive integer.
- *height*: may be absent or -1 to denote default height, or a positive integer.
- *window-name*: may be absent or a string name to identify this pane;.
- *style*: may be absent or a string style: see below.

The following slots should be initialized if loading from a resource (see *Resource overview* (page 217) for further details).

- *parent*: should be a wxFrame.
- *resource*: the string name of the resource.

The *style* parameter may be a combination of the following, using the bitwise 'or' operator.

wxABSOLUTE_POSITIONING A hint to the windowing system not to try native Windowing system layout (Motif only). This is the recommended style for all Motif panels and dialog boxes.
wxBORDER Draws a thin border around the panel.
wxVSCROLL Gives the dialog box a vertical scrollbar (XView only).

void (**on-default-action wxItem** *item*)

A panel receives this message in response to a double click in a listbox.

wxPanel on-command

void (**on-command wxItem** *item* **wxCommandEvent** *command-event*)

A panel or dialog box receives this message in response to a command (such as a button press), if the item has not overriden on-command. See *wxCommandEvent* (page 25) for a list of event types associated with wxCommandEvent.

wxPanel set-button-font

bool (**set-button-font wxFont** *font*)

Sets the font used for panel or dialog box item buttons (or contents). See also *set-label-font* (page 68).

wxPanel set-label-font

bool (**set-label-font wxFont** *font*)

Sets the font used for panel or dialog box item labels. See also *set-button-font* (page 68).

wxPanel set-label-position

bool (**set-label-position string** *position*)

Change the current label orientation for panel items: *position* may be wxVERTICAL or wxHORIZONTAL.

wxPanel new-line

bool (**new-line**)

Insert a new line, that is, make subsequent panel items appear at the start of the next line.

6.36. wxItem is-a wxWindow

A panel item is a control (or widget) that can be placed on a *wxPanel* (page 66) or *wxDialogBox* (page 44) to accept user input, and display information.

The following functions apply to panel items, which include *wxButton* (page 20), *wxCheckbox* (page 23), *wxChoice* (page 23), *wxMessage* (page 61), *wxText* (page 81), *wxMultiText* (page 65), *wxSlider* (page 80).

wxItem get-label

string (**get-label**)

Get the item's label.

wxItem on-command

void (**on-command wxItem** *item* **wxCommandEvent** *command-event*)

An item receives this message in response to a command (such as a button press). If this handler is not overriden, then on-command is sent to the item's parent panel. It is usually more convenient to override this handler for a panel rather than per panel item.

See *wxcommandevent* (page 25) for a list of event types associated with wxCommandEvent.

wxItem set-default

bool (**set-default**)

Make this item the default.

wxItem set-label

bool (**set-label string** *label*)

Set the item's label.

6.37. wxPen is-a wxObject

A pen is used to control the colour and style of subsequent drawing operations on a *device context* (page 115).

wxPen colour

string colour

The colour for initializing the wxPen.

wxPen style

symbol style

The style for initializing the wxPen. May be one of wxSOLID, wxDOT, wxLONG_DASH, wxSHORT_DASH, wxTRANSPARENT.

wxPen create

void (**create**)

Creates a pen for use in a device context. A pen is used for the outlines of graphic shapes. A brush must be set to fill the shapes.

The following slots may be initialized.

- *colour* is a wxWindows colour string such as "BLACK", "CYAN".
- *width* specifies the width of the pen.
- *style* may be one of wxSOLID, wxDOT, wxLONG_DASH, wxSHORT_DASH, wxTRANSPARENT.

6.38. wxPostScriptDC is-a wxDC

A wxPostScriptDC is used for drawing into a postscript file.

wxPostScriptDC filename

string filename

The filename associated with the device context.

wxPostScriptDC interactive

bool interactive

TRUE if the creation of the device context should pop up a printer dialog.

wxPostScriptDC window

wxWindow window

Initialize this to the parent window for any dialogs the device context will pop up. Defaults to nil.

wxPostScriptDC create

void (**create**)

Creates a postscript device context. The following slots may be initialized.

- *filename* is the file to be used for printing to.
- *interactive* may be TRUE to popup up a printer dialog, or FALSE otherwise.
- *window* is a parent window for the printer dialog.

6.39. wxPrinterDC is-a wxDC

A wxPrinterDC is used for drawing onto a Windows printer.

wxPrinterDC device

string device

The device name for this device context. Defaults to the empty string.

wxPrinterDC driver

string driver

The driver name for this device context. Defaults to the empty string.

wxPrinterDC filename

string filename

The filename associated with the device context, if printing to a file.

wxPrinterDC interactive

bool interactive

TRUE if the creation of the device context should pop up a printer dialog.

wxPrinterDC window

wxWindow window

Initialize this to the parent window for any dialogs the device context will pop up. Defaults to nil.

wxPrinter create

void (**create**)

Creates a printer device context. The following slots may be initialized.

- *device* is the Windows device name (defaults to the empty string).
- *driver* is the Windows printer driver name (defaults to the empty string).
- *filename* is the file to be used for printing to.
- *interactive* may be TRUE to popup up a printer dialog, or FALSE otherwise.

6.40. wxRadioBox is-a wxItem

A radiobox item is a matrix of strings with associated radio buttons. The buttons are mutually exclusive, so pressing one will deselect the current selection.

wxRadioBox major-dimension

long major-dimension

Specifies the number of rows (if style is wxVERTICAL) or columns (if style is wxHORIZONTAL) for a two-dimensional radiobox.

wxRadioBox values

multifield values

List of string values for initializing the wxRadioBox labels.

wxRadioBox create

void (**create**)

Creates a radiobox item on the given panel or dialog box. The following slots may be initialized.

- *parent*: should be a wxPanel or wxDialogBox.
- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.
- *width*: may be absent or -1 to denote default width, or a positive integer.
- *height*: may be absent or -1 to denote default height, or a positive integer.
- *window-name*: may be absent or a string name to identify this item.
- *label*: may be absent or a string name to label this item.
- *style*: A bit list of values (see below).
- *values*: a multifield list of strings for the radiobox labels.
- *major-dimension*: specifies the number of rows (if style is wxVERTICAL) or columns (if style is wxHORIZONTAL) for a two-dimensional radiobox.

style may be a *bit list* of:

wxVERTICAL Lays the radiobox out in columns.
wxHORIZONTAL Lays the radiobox out in rows.

wxRadioBox get-selection

long (**get-selection**)

Get the ID of the button currently selected.

wxRadioBox set-selection

bool (**set-selection long** *item*)

Sets the given button to be the current selection.

6.41. wxRecordSet is-a wxObject

See also *Database classes overview* (page 207)

Not yet implemented.

Each recordset represents an ODBC database query. You can make multiple queries at a time by using multiple recordsets with a database or you can make your queries in sequential order using the same recordset.

wxRecordSet database

wxDatabase database

The parent database.

wxRecordSet type

wxRecordSet type

The initial type of the recordset. Currently there are two possible values of *type*:

- "wxOPEN_TYPE_DYNASET": Loads only one record at a time into memory. The other data of the result set will be loaded dynamically when moving the cursor. This is the default type.
- "wxOPEN_TYPE_SNAPSHOT": Loads all records of a result set at once. This will need much more memory, but will result in faster access to the ODBC data.

wxRecordSet create

void (**create**)

Constructs a recordset object, and appends the recordset object to the parent database's list of recordset objects, for later destruction when the database is destroyed.

The following slots may be initialized.

- *database*: the parent wxDatabase.
- *type*: the type of recordset, see below.
- *options*: not yet used.

Currently there are two possible values of *type*:

- "wxOPEN_TYPE_DYNASET": Loads only one record at a time into memory. The other data of the result set will be loaded dynamically when moving the cursor. This is the default type.
- "wxOPEN_TYPE_SNAPSHOT": Loads all records of a result set at once. This will need much more memory, but will result in faster access to the ODBC data.

wxRecordSet delete

bool (**delete**)

Deletes the recordset. All data except that stored in user-defined variables will be lost. It also unlinks the recordset object from the parent database's list of recordset objects.

wxRecordSet execute-sql

bool (**execute-sql string** *sql*)

Directly executes a SQL statement. The data will be presented as a normal result set. Note that the recordset must have been created as a snapshot, not dynaset. Dynasets will be implemented in the near future.

Examples of common SQL statements are given in *A selection of SQL commands* (page 211).

wxRecordSet get-char-data

string (**get-char-data string-or-long** *col*)

Returns the character (string) data for the current record at the specified column. The column can be a name or an integer position (starting from zero).

wxRecordSet get-col-name

string (**get-col-name long** *col*)

Gets the name of the coumn at position *col*. Returns the empty string if *col* does not exist.

wxRecordSet get-col-type

string (**get-col-type string-or-long** *col*)

Gets the name of the coumn at position *col* or name *col*. Returns "SQL_TYPE_NULL" if *col* does not exist.

See *ODBC SQL data types* (page 210) for the possible return values from this function.

wxRecordSet get-columns

long (**get-columns optional string** *table = ""*)

Returns the columns of the table with the specified name. If no name is given, the internal class member *table* will be used. If both names are NULL nothing will happen. The data will be presented as a normal result set, organized as follows:

0 (VARCHAR) TABLE_QUALIFIER

1 (VARCHAR) TABLE_OWNER

2 (VARCHAR) TABLE_NAME

3 (VARCHAR) COLUMN_NAME

4 (SMALLINT) DATA_TYPE

5 (VARCHAR) TYPE_NAME

6 (INTEGER) PRECISION

7 (INTEGER) LENGTH

8 (SMALLINT) SCALE

9 (SMALLINT) RADIX

10 (SMALLINT) NULLABLE

11 (VARCHAR) REMARKS

wxRecordSet get-data-sources

bool (**get-data-sources**)

Gets the currently-defined data sources via the ODBC manager. The data will be presented as a normal result set. See the documentation for the ODBC function SQLDataSources for how the data is organized. The name of the source is at column 0.

wxRecordSet get-error-code

string (**get-error-code**)

Returns the error code of the last ODBC action. This will be a string containing one of:

SQL_ERROR General error.
SQL_INVALID_HANDLE An invalid handle was passed to an ODBC function.
SQL_NEED_DATA ODBC expected some data.
SQL_NO_DATA_FOUND No data was found by this ODBC call.
SQL_SUCCESS The call was successful.
SQL_SUCCESS_WITH_INFO The call was successful, but further information can be obtained from the ODBC manager.

wxRecordSet get-filter

string (**get-filter**)

Returns the current filter.

wxRecordSet get-float-data

double (**get-float-data string-or-long** *col*)

Returns the floating-point data for the current record at the specified column. The column can be a name or an integer position (starting from zero).

wxRecordSet get-foreign-keys

bool (**get-foreign-keys optional string** *ftable* = "" **optional string** *ktable* = "")

Returns a list of foreign keys in the specified table (columns in the specified table that refer to primary keys in other tables), or a list of foreign keys in other tables that refer to the primary key in the specified table.

If *ptable* contains a table name, this function returns a result set containing the primary key of the specified table.

If *ftable* contains a table name, this functions returns a result set of containing all of the foreign keys in the specified table and the primary keys (in other tables) to which they refer.

If both *ptable* and *ftable* contain table names, this function returns the foreign keys in the table

specified in *ftable* that refer to the primary key of the table specified in *ptable*. This should be one key at most.

GetForeignKeys returns results as a standard result set. If the foreign keys associated with a primary key are requested, the result set is ordered by FKTABLE_QUALIFIER, FKTABLE_OWNER, FKTABLE_NAME, and KEY_SEQ. If the primary keys associated with a foreign key are requested, the result set is ordered by PKTABLE_QUALIFIER, PKTABLE_OWNER, PKTABLE_NAME, and KEY_SEQ. The following table lists the columns in the result set.

0 (VARCHAR) PKTABLE_QUALIFIER
1 (VARCHAR) PKTABLE_OWNER
2 (VARCHAR) PKTABLE_NAME
3 (VARCHAR) PKCOLUMN_NAME
4 (VARCHAR) FKTABLE_QUALIFIER
5 (VARCHAR) FKTABLE_OWNER
6 (VARCHAR) FKTABLE_NAME
7 (VARCHAR) FKCOLUMN_NAME
8 (SMALLINT) KEY_SEQ
9 (SMALLINT) UPDATE_RULE
10 (SMALLINT) DELETE_RULE
11 (VARCHAR) FK_NAME
12 (VARCHAR) PK_NAME

wxRecordSet get-int-data

long (**get-int-data string-or-long** *col*)

Returns the integer data for the current record at the specified column. The column can be a name or an integer position (starting from zero).

wxRecordSet get-number-cols

long (**get-number-cols**)

Returns the number of columns in the result set.

wxRecordSet get-number-fields

long (**get-number-fields**)

Not implemented.

wxRecordSet get-number-params

long (**get-number-params**)

Not implemented.

wxRecordSet get-number-records

long (**get-number-records**)

Returns the number of records in the result set.

wxRecordSet get-primary-keys

long (**get-primary-keys optional string** *table = ""*)

Returns the column names that comprise the primary key of the table with the specified name. If no name is given the class member *tablename* will be used. If both names are NULL nothing will happen. The data will be presented as a normal result set, organized as follows:

0 (VARCHAR) TABLE_QUALIFIER
1 (VARCHAR) TABLE_OWNER
2 (VARCHAR) TABLE_NAME
3 (VARCHAR) COLUMN_NAME
4 (SMALLINT) KEY_SEQ
5 (VARCHAR) PK_NAME

wxRecordSet get-result-set

bool (**get-result-set**)

Copies the data presented by ODBC into the recordset. Depending on the recordset type all or only one record(s) will be copied. Usually this function will be called automatically after each successful database operation.

wxRecordSet get-table-name

string (**get-table-name**)

Returns the name of the current table.

wxRecordSet get-tables

bool (**get-tables**)

Gets the tables of a database. The data will be presented as a normal result set, organized as follows:

0 (VARCHAR) TABLE_QUALIFIER
1 (VARCHAR) TABLE_OWNER
2 (VARCHAR) TABLE_NAME
3 (VARCHAR) TABLE_TYPE (TABLE, VIEW, SYSTEM TABLE, GLOBAL TEMPORARY, LOCAL TEMPORARY, ALIAS, SYNONYM, or database-specific type)
4 (VARCHAR) REMARKS

wxRecordSet goto

bool (**goto long** *n*)

Moves the cursor to the record with the number n, where the first record has the number 0.

wxRecordSet is-bof

TRUE (**is-bof**)

Returns TRUE if the user tried to move the cursor before the first record in the set.

wxRecordSet is-field-dirty

bool (**is-field-dirty string-or-long** *field*)

Returns TRUE if the given field has been changed but not saved yet.

wxRecordSet is-field-null

bool (**is-field-null string-or-long** *field*)

Returns TRUE if the given field has no data.

wxRecordSet is-col-nullable

bool (**is-col-nullable string-or-long** *field*)

Returns TRUE if the given column may contain no data.

wxRecordSet is-eof

bool (**is-eof**)

Returns TRUE if the user tried to move the cursor behind the last record in the set.

wxRecordSet is-open

bool (**is-open**)

Returns TRUE if the parent database is open.

wxRecordSet move

bool (**move long** *rows*)

Moves the cursor a given number of rows. Negative values are allowed.

wxRecordSet move-first

bool (**move-first**)

Moves the cursor to the first record.

wxRecordSet move-last

bool (**move-last**)

Moves the cursor to the last record.

wxRecordSet move-next

bool (**move-next**)

Moves the cursor to the next record.

wxRecordSet move-prev

bool (**move-prev**)

Moves the cursor to the previous record.

wxRecordSet query

bool (**query string** *columns* **string** *table* **optional string** *filter*)

Start a query. An SQL string of the following type will automatically be generated and executed: "SELECT columns FROM table WHERE filter".

wxRecordSet set-table-name

bool (**set-table-name string** *table*)

Specify the name of the table you want to use.

6.42. wxServer is-a wxObject

See also *Interprocess communication overview* (page 201)

A server object represents the server side of a DDE conversation.

wxServer service-name

string service-name

The name of the service (or server).

wxServer create

void (**create**)

Creates a server object, and returns an integer id if successful.

The *service-name* slot should be initialized with a string identifying this service to potential clients. Under UNIX, it should contain a valid port number.

wxServer on-accept-connection

wxConnection (**on-accept-connection string** *topic*)

Should be overrident to return an instance of the appropriate wxConnection class, or nil to reject the connection.

6.43. wxSlider is-a wxItem

A slider is a panel item for denoting a range of values. It must be a child of a panel or dialog box.

wxSlider min

int min

The slider minimum value.

wxSlider max

int max

The slider maximum value.

wxSlider value

int value

The value of the slider (set-value and get-value can be called after initialization).

wxSlider create

long (**create**)

Creates a horizontal slider item on the given panel or dialog box. The following slots may be initialized.

- *parent*: should be a wxPanel or wxDialogBox.
- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.

- *width*: may be absent or -1 to denote default width, or a positive integer.
- *height*: may be absent or -1 to denote default height, or a positive integer.
- *window-name*: may be absent or a string name to identify this item.
- *label*: may be absent or a string name to label this item.
- *style*: a bit list of values (see below).
- *value*: an integer for initializing the value of the sider.
- *min*: the minimum value (zero or greater).
- *max*: the maximum value (1 or greater).

style is a *bit list* of the following:

wxHORIZONTAL The item will be created as a horizontal slider.
wxVERTICAL The item will be created as a vertical slider.

6.44. wxText is-a wxItem

A text item is used for displaying and editing a single line of text. It must be a child of a panel or dialog box. See also *wxMultiText* (page 65) for multiline text items.

wxText value

string value

The initial value. The handlers put-value and get-value are defined for this slot. set-value is a synonym for put-value.

wxText create

long (**create**)

Creates a single-line text item on the given panel or dialog box. The following slots may be initialized.

- *parent*: should be a wxPanel or wxDialogBox.
- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.
- *width*: may be absent or -1 to denote default width, or a positive integer.
- *height*: may be absent or -1 to denote default height, or a positive integer.
- *window-name*: may be absent or a string name to identify this item.
- *label*: may be absent or a string name to label this item.
- *style*: see below.
- *value*: a string for initializing the value of the text item.

The *style* parameter can be a *bit list* of the following:

wxTE_PROCESS_ENTER The callback function will receive the event wxEVENT_TYPE_TEXT_ENTER_COMMAND. Note that this will break tab traversal for this panel item under Windows. Single-line text only.
wxTE_PASSWORD The text will be echoed as asterisks. Single-line text only.
wxTE_READONLY The text will not be user-editable.
wxHSCROLL A horizontal scrollbar will be displayed. If wxHSCROLL is omitted, only a vertical

scrollbar is displayed, and lines will be wrapped. This parameter is ignored under XView. Multi-line text only.

wxText set-value

bool (**set-value string** *value*)

Set the text item's string value. A synonym for put-value.

6.45. wxTextWindow is-a wxWindow

To display a lot of text, use this subwindow as the child of a *wxFrame* (page 48). It is capable of loading and saving files of ASCII text, and the text can be edited directly.

The following callbacks are valid for the dialog box class:

OnChar (Not XView.) The function is called with the text window identifier, key code, and key event identifier. If the event is an ASCII keypress, the code will correspond to the ASCII code; otherwise, the programmer must refer to the constants defined in `common.h`, in the wxWindows library.

To invoke default processing, call text-window-on-char (to be implemented).

OnSize The function is called with the text window identifier, width and height.

wxTextWindow clear

bool (**clear**)

Clears the contents of a text subwindow. Returns TRUE if successful, FALSE otherwise.

wxTextWindow copy

bool (**copy**)

Copies the selected text to the clipboard.

wxTextWindow cut

bool (**cut**)

Copies the selected text to the clipboard, then removes the selection.

wxTextWindow create

void (**create**)

Creates a text subwindow. The following slots may be initialized.

- *parent*: should be a wxFrame.

- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.
- *width*: may be absent or -1 to denote default width, or a positive integer.
- *height*: may be absent or -1 to denote default height, or a positive integer.
- *window-name*: may be absent or a string name to identify this canvas.
- *style*: may be absent or a string style: see below.

style is a *bit list* of some of the following:

wxBORDER Use this style to draw a thin border in Windows (non-native implementation only).
wxNATIVE_IMPL Use this style to allow editing under Windows, albeit with a 64K limitation.

wxTextWindow discard-edits

void (**discard-edits**)

Discard any edits in the text window.

wxTextWindow get-contents

string (**get-contents**)

Returns the contents (up to a maximum of 1000 characters).

wxTextWindow load-file

bool (**load-file string** *filename*)

Load the file onto the text subwindow, returning TRUE for success, FALSE for failure.

wxTextWindow modified

bool (**modified**)

Returns TRUE if the text has been modified, FALSE otherwise.

wxTextWindow paste

bool (**paste**)

Pastes the text (if any) from the clipboard to the text window.

wxTextWindow save-file

bool (**save-file string** *filename*)

Saves the text in the subwindow to the given file, returning TRUE for success, FALSE for failure.

wxTextWindow set-editable

Bool (**set-editable bool** *editable*)

Sets the text window to be editable or read-only.

wxTextWindow write

bool (**write string** *text*)

Writes the given string into the text window, at the current cursor point.

6.46. wxTimer is-a wxObject

A timer object can be created to notify the application at regular intervals.

wxTimer create

void (**create**)

Creates a timer object. Use timer-start to start the timer, and register a Notify callback function to receive notification.

wxTimer start

bool (**start long** *milliseconds*)

Starts the timer, notifying at intervals of duration *milliseconds*.

wxTimer stop

bool (**stop**)

Stops the timer.

6.47. wxToolBar is-a wxPanel

See also *Overview* (page 205)

A toolbar is an array of bitmap buttons, implemented by drawing bitmaps onto a canvas, instead of using the native button implementation.

Note: under XView, wxToolBar inherits from wxCanvas, not wxPanel, due to limitations in the XView toolkit.

wxToolBar create-buttons

bool create-buttons

Specify TRUE if the enhanced underlying wxButtonBar class is to be used (optimized for Windows), FALSE for the standard wxToolBar class. The default is TRUE.

wxToolBar orientation

string orientation

Specify wxVERTICAL for vertical layout, or wxHORIZONTAL for horizontal layout. Ignored if doing manual layout.

wxToolBar rows-or-columns

long rows-or-columns

The maximum number of rows or columns in this toolbar (depends on the value of *orientation*. Ignored if doing manual layout.

wxToolBar add-separator

bool (**add-separator long** *id*)

Adds a separator between tools: only functional under Windows 95, but harmless under other platforms.

wxToolBar add-tool

bool (**add-tool long** *id* **long** *index* **wxBitmap** *bitmap1* **optional wxBitmap** *bitmap2 = nil* **optional bool** *is-toggle = FALSE* **optional double** *x = -1.0* **optional double** *x = 1.0* **optional long** *client-data = 0* **optional string** *short-help-string=""* **optional string** *long-help-string=""*)

Adds a tool to the toolbar. Pass at least one bitmap, the bitmap to be displayed when active and not depressed; and optionally, the bitmap to be displayed when the tool is depressed or toggled. Under Windows, only one bitmap is necessary, and under X, the second bitmap will be created automatically as the inverse of the first button if none is supplied.

You can specify whether the tool is allowed to toggle, and pass a position if you are not going to automatically layout the toolbar with *toolbar-layout*. You can associate client data with the tool.

short-help-string is only used by Windows 95 versions of wxCLIPS. The string is used to supply text for a tooltip, a small yellow window that appears as the mouse pointer hovers over the button.

long-help-string specifies a longer help string that can be used by the application.

wxToolBar clear-tools

bool (**clear-tools**)

Clears all the tools from the toolbar.

wxToolBar create

void (**create**)

Creates a toolbar. The following slots may be initialized.

- *parent*: should be a wxFrame.
- *x*: may be absent or -1 to denote default layout, or zero/positive integer.
- *y*: may be absent or -1 to denote default layout, or zero/positive integer.
- *width*: may be absent or -1 to denote default width, or a positive integer.
- *height*: may be absent or -1 to denote default height, or a positive integer.
- *window-name*: may be absent or a string name to identify this toolbar.
- *style*: may be absent or a string style: see below.
- *create-buttons*: should be 1 (the default) if the toolbar should superimpose the user-supplied buttons onto a larger 3D button. If 0, the tool will be the same size as the button, and the toggle state will be represented by inverting the tool (Windows) or adding a border (X).
- *orientation*: specify wxVERTICAL for vertical layout, or wxHORIZONTAL for horizontal layout. Ignored if doing manual layout.
- *rows-or-columns*: the maximum number of rows or columns in this toolbar (depends on the value of *orientation*. Ignored if doing manual layout.

style may be a *bit list* of:

- wxTB_3DBUTTONS: gives a simple 3D look to the buttons.

Note that absolute tool positioning (or the layout function) does not work for buttonbars under Windows 95: instead, you can specify the number of rows for the toolbar, and use add-separator to achieve inter-tool spacing.

wxToolBar create-tools

bool (**create-tools**)

This should be called when creating Windows 95 buttonbars, after all tools have been added. It adds the tools to the toolbar. You can also call it for non-Windows 95 toolbars and buttonbars, in which case it will have no effect.

wxToolBar enable-tool

bool (**enable-tool long** *tool-id* **bool** *enable*)

Enables the tool (if *enable* is TRUE) or disables it (if *enable* is FALSE).

wxToolBar get-max-height

double (**get-max-height**)

Gets the maximum height of the toolbar when it has been automatically laid out.

wxToolBar get-max-width

double (**get-max-width**)

Gets the maximum width of the toolbar when it has been automatically laid out.

wxToolBar get-tool-client-data

long (**get-tool-client-data long** *tool-id*)

Returns the client data associated with the given tool.

wxToolBar get-tool-enabled

bool (**get-tool-enabled long** *tool-id*)

Returns TRUE if the tool is enabled, FALSE otherwise.

wxToolBar get-tool-long-help

string (**get-tool-long-help long** *tool-id*)

Returns the long help string.

wxToolBar get-tool-short-help

string (**get-tool-short-help long** *tool-id*)

Returns the short help string.

wxToolBar get-tool-state

bool (**get-tool-state long** *tool-id*)

Returns the tool state (TRUE for toggled on, FALSE for off).

wxToolBar layout

bool (**layout**)

Lays out all the tools if automatic layout is required.

wxToolBar on-paint

void (**on-paint**)

Calls the default toolbar paint handler. You may wish to call this if you override the default handler.

wxToolBar set-default-size

bool (**set-default-size long** *width* **long** *height*)

Sets the width and height of tool buttons (Windows only). The default is 24 by 22.

wxToolBar set-margins

bool (**set-margins long** *x* **long** *y*)

Sets the width and height of the toolbar margins and spacing, if automatic layout is being used.

wxToolBar set-tool-long-help

bool (**set-tool-long-help long** *tool-id* **string** *help-string*)

Sets the long help string for this tool.

wxToolBar set-tool-short-help

bool (**set-tool-short-help long** *tool-id* **string** *help-string*)

Sets the short help string for this tool.

wxToolBar toggle-tool

bool (**toggle-tool long** *tool-id* **bool** *toggle*)

Toggles the tool on or off.

6.48. wxWindow is-a wxEvtHandler

The wxWindow is an 'abstract' class, used to access the functionality of classes derived from it. Therefore, please refer to this section when considering other classes.

wxWindow x

long x

The x coordinate of the window.

wxWindow y

long y

The window y coordinate.

wxWindow width

long width

The window width.

wxWindow height

long height

The window height.

wxWindow client-width

long client-width

The window client width (space available for contents of this window).

wxWindow client-height

long client-height

The window client height (space available for contents of this window).

wxWindow centre

bool (**centre word** *orientation*)

orientation may be wxVERTICAL, wxHORIZONTAL or wxBOTH. Centres the window with respect to its parent (or desktop).

wxWindow enable

bool (**enable bool** *enable*)

If *enable* is TRUE, enables the window for input. If *enable* is FALSE, the window is disabled (greyed out in the case of a panel item).

wxWindow find-window-by-name

wxWindow (**find-window-by-name string** *name*)

Finds the descendant window for this window.

wxWindow find-window-by-label

wxWindow (**find-window-by-label string** *label*)

Finds the descendant window for this window.

wxWindow fit

bool (**fit**)

Fits the panel, dialog box or frame around its children.

wxWindow get-name

string (**get-name**)

Gets the window's name (the 'name' parameter passed to a window constructor).

wxWindow get-parent

wxWindow (**get-parent**)

Gets the window's parent, or nil if there no parent.

wxWindow make-modal

bool (**make-modal bool** *modal*)

modal may be TRUE to disable all frames and dialog boxes except this one, or FALSE to enable all frames and dialogs again.

Has no effect under XView.

wxWindow popup-menu

bool (**popup-menu wxMenu** *menu* **double** *x* **double** *y*)

Pops up a menu on the window, at the given position. The menu will be dismissed (but not destroyed) when the user makes a selection.

Note that there is a reliability problem with Motif popup menus; they may not pop up after the first time.

wxWindow set-cursor

bool (**set-cursor wxCursor** *cursor*)

Sets the cursor for this window.

wxWindow set-focus

bool (**set-focus**)

Set this window to have the keyboard focus.

wxWindow set-size

bool (**set-size long** *x* **long** *y* **long** *width* **long** *height*)

Sets the position and size of the window.

wxWindow set-client-size

bool (**set-client-size long** *width* **long** *height*)

Sets the client size (available space for child windows) of the window.

wxWindow show

bool (**show long** *show*)

If *show* is TRUE, shows the window. If *show* is FALSE, the window is hidden. If the window is a modal dialog box, *show* = *TRUE* will start the modal loop, and *show* = *FALSE* will terminate the loop (allowing execution to proceed after the first call to *show*).

7. wxCLIPS function groups

This is the reference for CLIPS windowing and other, miscellaneous functions. With these functions, it is possible to create special-purpose user interfaces independent of platform. Currently these capabilities are supported under MS Windows, Open Look and Motif.

7.1. How to use this reference

In the function definitions below, bold words are types, and are not part of CLIPS syntax. Parameter names are in italics. Types are as follows:

- **double** is a double-precision floating point number.
- **long** is a long integer.
- **string** is a double-quoted ASCII string.
- **word** is an unquoted string.
- **multifield** is a CLIPS multi-field value list.

Parameters can be **optional**, in which case defaults are assumed.

Some parameters can be *bit lists* of flags. wxCLIPS mimics the compact C++ syntax by parsing strings, for example:

```
(frame-create ... "wxSDI | wxDEFAULT")
```

Each identifier in such a parameter is translated to an integer value, and all are logical-or'ed together to produce an integer which is passed to the appropriate wxWindows C++ function.

Note: In Windows NT or WIN32s versions of Hardy, integer identifiers can be negative. So when validating integer identifiers, test for values of zero or -1, rather than for values less than zero.

Functions are grouped by class: in the underlying C++ library wxWindows, these are actual C++ classes. The functions are used in an object-oriented way, in that long integer identifiers represent an object, or instance, of a particular class. Some functions operate on several classes of object; for example, the functions prefixed **window** operate on classes derived from window, such as canvas, frame, dialog box, panel item. Similarly, the functions prefixed **dc** operate on different kinds of device context.

Most functions either take an integer identifier (checking its type before doing the appropriate thing) or return a new one.

In C++, the application would derive new classes and override certain member functions, such as **OnClose**, to intercept messages or events sent to the window objects. In CLIPS, the same effect is achieved by registering callback functions for specific events, using *window-add-callback* (page 175).

7.2. Application

One object of class 'application' is always present, and its implementation depends upon the C++ application hosting the wxCLIPS environment.

If an application defines a function called app-on-init, the wxCLIPS user interface can start up the application from a standard menu item, or straightaway if the **-start** flag is used on the command line. This function is not relevant to embedded versions of wxCLIPS.

If app-on-init is defined, it must initialize the main frame and return its integer identifier, or zero if the application could not be initialized.

The following *callbacks* are valid for the app class.

OnCharHook Under Windows only, all key strokes going to a dialog box or frame can be intercepted before being passed on for normal processing. This callback function takes the window id and event id, and should return 1 to override further processing, or 0 to do default processing. If the function returns 0, the OnCharHook message will be sent to the active window. See also *Key event* (page 140).

app-create

long (**app-create**)

Returns the identifier of the current application object. If called multiple times, will always return the same number since there is only one application object, which will have been created before wxCLIPS is initialized.

app-get-show-frame-on-init

long (**app-get-show-frame-on-init long** *id*)

Returns 1 if the application will show the top-level frame automatically on initialization, 0 otherwise.

You can pass 0 or a return value from app-create for the *id* parameter.

app-on-init

long (**app-on-init**)

If defined, should initialize the application and return the identifer of the top-level frame, or zero if there is no main window associated with the CLIPS program. If zero is returned, the wxCLIPS development window will be created if it does not already exist. Under Windows, you may call *show-ide-window* (page 188) from this function.

app-set-show-frame-on-init

void (**app-set-show-frame-on-init long** *id* **long** *show*)

Called before on-app-init returns, can change the behaviour of wxCLIPS to not force a 'show' of the main frame. This might be needed if you wish to set the focus for a different window on initialization. *show* should be 0 to disable showing, 1 otherwise (the default behaviour).

You can pass 0 or a return value from app-create for the *id* parameter.

7.3. Bitmap

A bitmap is a rectangular array of pixels, possibly in colour. A bitmap can be created in memory,

or loaded from an XBM file under X, or BMP file under Windows.

A bitmap can be drawn on a canvas by selecting it into a *memory-dc* (page 143) object and using *dc-blit* (page 115). Bitmaps can also be used to create buttons; see *button-create-from-bitmap* (page 96).

bitmap-create

long (**bitmap-create float** *width* **float** *height* **optional int** *depth*)

Creates a bitmap in memory. The programmer can draw into the bitmap by selecting it into a memory device context, for later drawing on an output device context such as a canvas device context.

bitmap-delete

long (**bitmap-delete long** *bitmap-id*)

Deletes the given bitmap.

bitmap-get-colourmap

long (**bitmap-get-colourmap long** *id*)

Gets the colourmap associated with the bitmap; if none, zero will be returned.

bitmap-get-height

long (**bitmap-get-height long** *id*)

Gets the height of the bitmap.

bitmap-get-width

long (**bitmap-get-width long** *id*)

Gets the width of the bitmap.

bitmap-load-from-file

long (**bitmap-load-from-file string** *file* **optional word** *bitmap-type*)

Loads a bitmap from a file, and returns a new bitmap identifier.

bitmap-type specifies the type of bitmap to be loaded, and may be one of:

- wxBITMAP_TYPE_BMP: Windows BMP (the default under Windows).
- wxBITMAP_TYPE_XBM: X monochrome bitmap (the default under X).

- wxBITMAP_TYPE_GIF: GIF bitmap (only under X).
- wxBITMAP_TYPE_XPM: XPM colour bitmap (under Windows and X if wxCLIPS has been compiled to include this option).
- wxBITMAP_TYPE_RESOURCE: Windows resource bitmap; unlikely to be used since the resources compiled into wxCLIPS cannot be changed from CLIPS.

Note that whether any of these formats are available depends on how wxCLIPS was compiled.

7.4. Brush

A brush is a an object that can be set for a device context (see *canvas-get-dc* (page 97), *device context* (page 115)) and determines the fill colour and style for subsequent drawing operations.

See also *pen* (page 156).

brush-create

long (**brush-create string** *colour* **word** *style*)

long (**brush-create long** *colour-value* **word** *style*)

Creates a brush for use in a device context.

colour is a wxWindows colour string such as "BLACK", "CYAN"), and *style* may be one of wxSOLID, wxTRANSPARENT.

colour-value is a value returned from *colour-create* (page 103).

A brush must be set to fill graphic shapes.

brush-delete

long (**brush-delete long** *brush-id*)

Deletes the given brush.

7.5. Button

A button is a rectangular control which can be placed on a *panel* (page 154) to invoke a function.

button-create

long (**button-create long** *panel-id* **string** *callback* **string** *label*
optional long *x* **optional long** *y*
optional long *width* **optional long** *height* **optional string** *style* **optional string** *name*)

Creates a label button on the given panel. The callback may be the empty string ("") to denote no callback, or a word or string for the function name. The function will be called when the button is pressed, with the button ID as argument. If no position is given, the panel item is placed after the last item. The value -1 may be passed to denote a default, so that the position may be left unspecified and the size given.

The *style* argument is reserved for future use.

name gives the button a name that can be retrieved with *window-get-name* (page 176).

button-create-from-bitmap

long (**button-create-from-bitmap long** *panel-id* **string** *callback* **long** *bitmap-id*
optional long *x* **optional long** *y*
optional long *width* **optional long** *height* **optional string** *style* **optional string** *name*)

Creates a bitmap button on the given panel. The callback may be the empty string ("") to denote no callback, or a word or string for the function name. The function will be called when the button is pressed, with the button ID as argument. If no position is given, the panel item is placed after the last item. The value -1 may be passed to denote a default, so that the position may be left unspecified and the size given.

The *style* argument is reserved for future use.

name gives the button a name that can be retrieved with *window-get-name* (page 176).

7.6. Canvas

A subwindow used for drawing arbitrary graphics. It must be the child of a *frame* (page 123).

The following callbacks are valid for the canvas class.

OnChar The function is called with the canvas identifier, key code, and key event identifier. If the event is an ASCII keypress, the code will correspond to the ASCII code; otherwise, the programmer must refer to the constants defined in `common.h`, in the wxWindows library. See also *Key event* (page 140).
OnEvent Called with a canvas identifier and a *mouse event* (page 148) identifier.
OnScroll Called with a canvas identifier and a *command event* (page 103) identifier.
OnPaint Called with a canvas identifier when the canvas receives a repaint event from the window manager.
OnSize The function is called with the window identifier, width and height.

See also *window-add-callback* (page 175).

canvas-create

long (**canvas-create long** *parent-id* **optional long** *x* **optional long** *y*
optional long *width* **optional long** *height* **optional string** *style="wxRETAINED"* **optional string** *name*)

Creates a canvas for drawing graphics on. *parent-id* must be a valid frame ID.

The value of **style** can be a *bit list* of the following values:

wxBORDER Gives the canvas a thin border (Windows 3 and Motif only).
wxRETAINED Gives the canvas a wxWindows-implemented backing store, making repainting much faster but at a potentially costly memory premium (XView and Motif only).
wxBACKINGSTORE Gives the canvas an X-implemented backing store (XView and Motif only). The X server may choose to ignore this request, whereas wxRETAINED is

always implemented under X.

name gives the canvas a name that can be retrieved with *window-get-name* (page 176).

canvas-get-dc

long (**canvas-get-dc long** *canvas-id*)

Return the device context handle belonging to the canvas. The device context must be retrieved before anything can be drawn on the canvas. If your drawing function is parameterized by a device context, you will be able to pass other types of device context to your drawing routine, such as PostScript and Windows metafile device contexts.

canvas-get-scroll-page-x

long (**canvas-get-scroll-page-x long** *canvas-id*)

Gets the number of lines per horizontal scroll page.

canvas-get-scroll-page-y

long (**canvas-get-scroll-page-y long** *canvas-id*)

Gets the number of lines per vertical scroll page.

canvas-get-scroll-pos-x

long (**canvas-get-scroll-pos-x long** *canvas-id*)

Gets the horizontal scroll position in scroll units.

canvas-get-scroll-pos-y

long (**canvas-get-scroll-pos-y long** *canvas-id*)

Gets the vertical scroll position in scroll units.

canvas-get-scroll-range-x

long (**canvas-get-scroll-range-x long** *canvas-id*)

Gets the number of horizontal scroll positions.

canvas-get-scroll-range-y

long (**canvas-get-scroll-range-y long** *canvas-id*)

Gets the number of vertical scroll positions.

canvas-get-scroll-pixels-per-unit-x

long (**canvas-get-scroll-pixels-per-unit-x long** *canvas-id*)

Gets the number of pixels per horizontal scroll unit, as set in *canvas-set-scrollbars* (page 98).

canvas-get-scroll-pixels-per-unit-x

long (**canvas-get-scroll-pixels-per-unit-y long** *canvas-id*)

Gets the number of pixels per vertical scroll unit, as set in *canvas-set-scrollbars* (page 98).

canvas-on-char

long (**canvas-on-char long** *panel-id* **long** *event-id*)

The default implementation of the OnChar callback. Call this to pass intercepted characters through to the canvas.

canvas-on-scroll

long (**canvas-on-scroll long** *panel-id* **long** *event-id*)

The default implementation of the OnScroll callback.

canvas-set-scrollbars

long (**canvas-set-scrollbars long** *canvas-id* **long** *x-unit-size* **long** *y-unit-size*
long *x-length* **long** *y-length* **long** *x-page-length* **long** *y-page-length*)

Set the scrollbars for the given canvas. The first argument pair specifies the number of pixels per logical scroll unit, that is, the number of pixels to scroll when a scroll arrow is clicked. If either is zero or less, that scrollbar will not appear. The second pair specifies the size of the virtual canvas in logical scroll units. The third pair of arguments specify the number of scroll units per page, that is, the amount to scroll by when the scrollbar is page-scrolled (usually by clicking either side of the scrollbar handle).

canvas-set-scroll-page-x

void (**canvas-set-scroll-page-x long** *canvas-id* **long** *value*)

Sets the number of lines per horizontal scroll page.

canvas-set-scroll-page-y

void (**canvas-set-scroll-page-y long** *canvas-id* **long** *value*)

Sets the number of lines per vertical scroll page.

canvas-set-scroll-pos-x

void (**canvas-set-scroll-pos-x long** *canvas-id* **long** *value*)

Sets the horizontal scroll position.

canvas-set-scroll-pos-y

void (**canvas-set-scroll-pos-y long** *canvas-id* **long** *value*)

Sets the vertical scroll position.

canvas-set-scroll-range-x

void (**canvas-set-scroll-range-x long** *canvas-id* **long** *value*)

Sets the number of positions on the horizontal scrollbar.

canvas-set-scroll-range-y

void (**canvas-set-scroll-range-y long** *canvas-id* **long** *value*)

Sets the number of positions on the vertical scrollbar.

canvas-scroll

long (**canvas-scroll long** *canvas-id* **long** *x-position* **long** *y-position*)

Scroll the canvas programmatically to the given scroll position. To convert from pixel position to scroll position, divide the pixel position by the scroll unit size you passed to *canvas-set-scrollbars* (page 98).

canvas-view-start-x

long (**canvas-view-start-x long** *canvas-id*)

Returns the first visible horizontal scroll position. Note this is in scroll units, not pixel, so to convert to pixel position you need to multiply this value by the result of *canvas-get-scroll-pixels-per-unit-x* (page 98).

canvas-view-start-y

long (**canvas-view-start-y long** *canvas-id*)

Returns the first visible vertical scroll position. Note this is in scroll units, not pixel, so to convert to pixel position you need to multiply this value by the result of *canvas-get-scroll-pixels-per-unit-y* (page 98).

7.7. Checkbox

A checkbox is a small box with a label, and can be in one of two states. It must be the child of a *panel* (page 154).

check-box-create

long (**check-box-create long** *panel-id* **string** *callback* **string** *label*
optional long *x* **optional long** *y*
optional long *width* **optional long** *height* **optional string** *style*
optional string *name*)

Creates a checkbox on the given panel. The callback may be the empty string ("") to denote no callback, or a word or string for the function name. The function will be called when the checkbox is turned on or off, with the checkbox ID as argument. If no position is given, the panel item is placed after the last item. The value -1 may be passed to denote a default, so that the position may be left unspecified and the size given.

The *style* parameter is reserved for future use.

name gives the checkbox a name that can be retrieved with *window-get-name* (page 176).

check-box-set-value

long (**check-box-set-value long** *check-box-id* **long** *value*)

Set the check box value (0 or 1).

check-box-get-value

long (**check-box-get-value long** *check-box-id*)

Gets the check box value (0 or 1).

7.8. Choice

A choice item is similar to a single-selection *listbox* (page 141) but normally only the current selection is displayed. It must be the child of a *panel* (page 154).

choice-create

long (**choice-create long** *panel-id* **string** *callback* **string** *label*
optional long *x* **optional long** *y* **optional long** *width* **optional long** *height*
optional multifield *strings* **optional string** *style* **optional string** *name*)

Creates a choice item on the given panel. A choice consists of a list of strings, one of which may be selected and displayed at any one time. The callback may be the empty string ("") to denote no callback, or a word or string for the function name. The function will be called when an item in the choice list is selected, with the choice ID as argument. If no position is given, the panel item is placed after the last item. The value -1 may be passed to denote a default, so that the position may be left unspecified and the size given.

strings should be a multifield of strings. Note that under Motif, it is recommended that the values are passed in this function, rather than using *choice-append*, because of the nature of Motif (i.e. horrible). Otherwise, things are likely to be messed up.

The *style* parameter is reserved for future use.

name gives the choice item a name that can be retrieved with *window-get-name* (page 176).

choice-append

long (**choice-append long** *choice-id* **string** *item*)

Append the string item to the choice.

choice-find-string

long (**choice-find-string long** *choice-id* **string** *item*)

Searches for the given string and if found, returns the position ID of the string.

choice-clear

long (**choice-clear long** *choice-id*)

Clears all the strings from the choice item.

choice-get-selection

long (**choice-get-selection long** *choice-id*)

Get the ID of the string currently selected.

choice-get-string-selection

string (**choice-get-string-selection long** *choice-id*)

Get the string currently selected.

choice-set-selection

long (**choice-set-selection long** *choice-id* **long** *item-id*)

Sets the choice selection to the given item ID (numbered from zero).

choice-set-string-selection

long (**choice-set-string-selection long** *choice-id* **string** *item*)

Set the selection by passing the appropriate item string.

choice-get-string

string (**choice-get-string long** *choice-id* **long** *item-id*)

Get the string associated with the given item ID.

choice-number

long (**choice-number long** *choice-id*)

Returns the number of strings in the choice item.

7.9. Client

See also *Interprocess communication overview* (page 201)

A client object represents the client side of a DDE conversation.

To delete a client object, use object-delete.

client-create

long (**client-create**)

Creates a client object, returning the integer id of the object if successful. No event handlers need be defined for a client object.

A connection is not made until *client-make-connection* (page 102) is called.

client-make-connection

long (**client-make-connection long** *id* **string** *host* **string** *service* **string** *topic*)

Makes a connection to a server, returning the id of the connection if successful.

id is the client id returned from client-create.

host is ignored under Windows, and should contain a valid internet host name under X.

service is a DDE service identifier (under X should contain a socket identifier).

topic is a topic name for this connection.

Any connection event handlers should be defined by the application code after this function is called, assuming the return result is not zero.

7.10. Colour

A colour value is not in fact a class, but a long integer which contains the values of the red, green and blue components in a colour. A colour value may be passed to pen and brush creation functions, and also to some *Grid* (page 129) member functions.

colour-create

long (**colour-create long** *red* **long** *green* **long** *blue*)

long (**colour-create long** *parent-id* **string** *name*) A colour value may be created either by passing red, green and blue values, or by passing a colour name such as RED.

colour-red

long (**colour-red long** *colour*)

Returns the red component of the colour, a number between 0 and 255.

colour-green

long (**colour-green long** *colour*)

Returns the green component of the colour, a number between 0 and 255.

colour-blue

long (**colour-blue long** *colour*)

Returns the blue component of the colour, a number between 0 and 255.

7.11. Command event

A command event is associated with each panel item or menu callback. It is not passed to the callback, so must be retrieved within a callback using *panel-item-get-command-event* (page 155).

The command event types are as follows:

- **wxEVENT_TYPE_BUTTON_COMMAND**
- **wxEVENT_TYPE_CHECKBOX_COMMAND**
- **wxEVENT_TYPE_CHOICE_COMMAND**
- **wxEVENT_TYPE_LISTBOX_COMMAND**
- **wxEVENT_TYPE_TEXT_COMMAND**
- **wxEVENT_TYPE_TEXT_ENTER_COMMAND**
- **wxEVENT_TYPE_MULTITEXT_COMMAND**
- **wxEVENT_TYPE_MENU_COMMAND**

- **wxEVENT_TYPE_SLIDER_COMMAND**
- **wxEVENT_TYPE_RADIOBOX_COMMAND**
- **wxEVENT_TYPE_SET_FOCUS**
- **wxEVENT_TYPE_KILL_FOCUS**

command-event-get-selection

long (**command-event-get-selection long** *id*)

Returns the identifier selection corresponding to the selected item, for example a listbox or menu item.

command-event-is-selection

long (**command-event-is-selection long** *id*)

Returns 1 if the event was a selection event, 0 otherwise.

7.12. Connection

See also *Connection overview* (page 202)

A connection object id is used for initiating DDE commands and requests using functions such as connection-execute, and it also has event handlers associated with it to respond to commands from the other side of the connection.

connection-advise

long (**connection-advise long** *id* **string** *item* **string** *data*)

Called by a server application to pass data to a client (for example, when a spreadsheet cell has been updated, and the client is interested in this value).

item is the name of the item, and *data* is a string representing the item's data.

Returns 1 if successful, 0 otherwise.

connection-create

long (**connection-create**)

Creates a connection object. Note that if you use the server OnAcceptConnection callback, the object will be created for you. If you use OnAcceptConnectionEx then you must call connection-create yourself from within that callback.

connection-execute

long (**connection-execute long** *id* **string** *data*)

Called by a client application to execute a command in the server. Note there is no item in this command.

data is a string representing the item's data.

Returns 1 if successful, 0 otherwise.

To get a result from a server, you need to call connection-request explicitly, since connection-execute doesn't return data.

connection-disconnect

long (**connection-disconnect long** *id*)

Called by a client or server application to terminate this connection. After this call, the connection id is no longer valid.

Returns 1 if successful, 0 otherwise.

connection-poke

long (**connection-poke long** *id* **string** *item* **string** *data*)

Called by a client application to poke data into the server.

item is the name of the item, and *data* is a string representing the item's data.

Returns 1 if successful, 0 otherwise.

connection-request

string (**connection-request long** *id* **string** *item*)

Called by a client application to request data from a server.

item is the name of the requested data item.

Returns a string representing the data if successful, the empty string otherwise.

connection-start-advise

long (**connection-start-advise long** *id* **string** *item*)

Called by a client application to indicate interest in a particular piece of data in a server. The client connection should then recieve OnAdvise messages when the data is updated in the server.

item is the name of the data item of interest.

Returns 1 if the advise loop is allowed, 0 otherwise.

connection-stop-advise

long (**connection-stop-advise long** *id* **string** *item*)

Called by a client application to indicate a termination of interest in a particular piece of data in a server.

item is the name of the data item of interest.

Returns 1 if successful, 0 otherwise.

7.13. Cursor

A cursor is a small bitmap used for representing the mouse pointer. It can be set for a particular subwindow, using *window-set-cursor*, as a cue for what operations are possible in this window at this point in time.

At present, it is only possible to create a cursor in wxCLIPS from a fixed range of cursor types.

cursor-create

long (**cursor-create string** *stock-cursor-name*)

Creates a stock cursor. *stock-cursor-name* must be one of the following:

- wxCURSOR_ARROW
- wxCURSOR_BULLSEYE
- wxCURSOR_CHAR
- wxCURSOR_CROSS
- wxCURSOR_HAND
- wxCURSOR_IBEAM
- wxCURSOR_LEFT_BUTTON
- wxCURSOR_MAGNIFIER
- wxCURSOR_MIDDLE_BUTTON
- wxCURSOR_NO_ENTRY
- wxCURSOR_PAINT_BRUSH
- wxCURSOR_PENCIL
- wxCURSOR_POINT_LEFT
- wxCURSOR_POINT_RIGHT
- wxCURSOR_QUESTION_ARROW
- wxCURSOR_RIGHT_BUTTON
- wxCURSOR_SIZENESW
- wxCURSOR_SIZENS
- wxCURSOR_SIZENWSE
- wxCURSOR_SIZEWE
- wxCURSOR_SIZING
- wxCURSOR_SPRAYCAN
- wxCURSOR_WAIT
- wxCURSOR_WATCH
- wxCURSOR_BLANK
- wxCURSOR_CROSS_REVERSE (X only)
- wxCURSOR_DOUBLE_ARROW (X only)

- wxCURSOR_BASED_ARROW_UP (X only)
- wxCURSOR_BASED_ARROW_DOWN (X only)

cursor-delete

long (**cursor-delete long** *cursor-id*)

Deletes the given cursor.

cursor-load-from-file

long (**cursor-load-from-file string** *filename* **word** *bitmap-type* **optional long** *hotspot-x* **optional long** *hotspot-y*)

Loads a cursor from a file.

hotspot-x and *hotspot-y* 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.

Under X, the permitted cursor types in *bitmap-type* 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 wx_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 wx_setup.h). Specify *hotSpotX* and *hotSpotY*.

7.14. Database

See also *Database classes overview* (page 207)

Every database object represents an ODBC connection. The connection may be closed and reopened.

database-close

long (**database-close long** *id*)

Resets the statement handles of any associated recordset objects, and disconnects from the current data source.

database-create

long (**database-create**)

Creates a new ODBC database handle and returns an id. The constructor of the first wxDatabase instance of an application initializes the ODBC manager.

database-delete

long (**database-delete long** *id*)

Destructor. Resets and destroys any associated wxRecordSet instances.

The destructor of the last wxDatabase instance will deinitialize the ODBC manager.

database-error-occurred

long (**database-error-occurred long** *id*)

Returns 1 if the last action caused an error.

database-get-database-name

string (**database-get-database-name long** *id*)

Returns the name of the database associated with the current connection.

database-get-data-source

string (**database-get-data-source long** *id*)

Returns the name of the connected data source.

database-get-error-code

string (**database-get-error-code long** *id*)

Returns the error code of the last ODBC function call. This will be a string containing one of:

SQL_ERROR General error.
SQL_INVALID_HANDLE An invalid handle was passed to an ODBC function.
SQL_NEED_DATA ODBC expected some data.
SQL_NO_DATA_FOUND No data was found by this ODBC call.
SQL_SUCCESS The call was successful.
SQL_SUCCESS_WITH_INFO The call was successful, but further information can be obtained from the ODBC manager.

database-get-error-message

string (**database-get-error-message long** *id*)

Returns the last error message returned by the ODBC manager.

database-get-error-number

long (**database-get-error-number long** *id*)

Returns the last native error. A native error is an ODBC driver dependent error number.

database-is-open

long (**database-is-open long** *id*)

Returns 1 if a connection is open.

database-open

long (**database-open long** *id* **string** *datasource* **optional long** *exclusive = 1* **optional string** *readonly = 1* **optional string** *username = "ODBC"* **optional string** *password = ""*)

Connect to a data source. *datasource* contains the name of the ODBC data source. The parameters *exclusive* and *readonly* are not used.

7.15. Date

A class for manipulating dates.

date-add-months

long (**date-add-months long** *date* **long** *months*)

Adds the given number of months to the date, returning 1 if successful.

date-add-weeks

long (**date-add-weeks long** *date* **long** *weeks*)

Adds the given number of weeks to the date, returning 1 if successful.

date-add-years

long (**date-add-years long** *date* **long** *years*)

Adds the given number of months to the date, returning 1 if successful.

date-create

long (**date-create**)

Constructs a date object, initialized to zero. You are responsible for deleting this object when you have finished with it.

long (**date-create long** *month* **long** *day* **long** *year*)

Constructs a date object with the specified date. You are responsible for deleting this object when you have finished with it.

month is a number from 1 to 12.

day is a number from 1 to 31.

year is a year, such as 1995, 2005.

date-create-julian

long (**date-create-julian long** *julian*)

Constructor taking an integer representing the Julian date.

date-create-string

long (**date-create-string string** *date*)

Constructor taking a string representing a date. This must be either the string TODAY, or of the form `MM/DD/YYYY` or `MM-DD-YYYY`. For example:

```
(bind ?date (date-create-string "11/26/1966"))
```

date-delete

long (**date-delete long** *date*)

Deletes the date object.

date-format

string (**date-format long** *date*)

Formats the date into a string according to the current display type.

date-get-day

long (**date-get-day long** *date*)

Returns the numeric day (in the range 1 to 365).

date-get-day-of-week

long (**date-get-day-of-week long** *date*)

Returns the integer day of the week (in the range 1 to 7).

date-get-day-of-week-name

string (**get-day-of-week-name long** *date*)

Returns the name of the day of week.

date-get-day-of-year

long (**date-get-day-of-year long** *date*)

Returns the day of the year (from 1 to 365).

date-get-days-in-month

long (**date-get-days-in-month long** *date*)

Returns the number of days in the month (in the range 1 to 31).

date-get-first-day-of-month

long (**date-get-first-day-of-month long** *date*)

Returns the day of week that is first in the month (in the range 1 to 7).

date-get-julian-date

long (**date-get-julian-date long** *date*)

Returns the Julian date.

date-get-month

long (**date-get-month long** *date*)

Returns the month number (in the range 1 to 12).

date-get-month-end

long (**date-get-month-end long** *date*)

Returns a new date representing the day that is last in the month. The new date must be deleted when it is finished with.

date-get-month-name

string (**date-get-month-name long** *date*)

Returns the name of the month.

date-get-month-start

long (**date-get-month-start long** *date*)

Returns a new date representing the first day of the month. The new date must be deleted when it is finished with.

date-get-week-of-month

long (**date-get-week-of-month long** *date*)

Returns the week of month (in the range 1 to 6).

date-get-week-of-year

long (**date-get-week-of-year long** *date*)

Returns the week of year (in the range 1 to 52).

date-get-year

long (**date-get-year long** *date*)

Returns the year as an integer (such as '1995').

date-get-year-end

long (**date-get-year-end long** *date*)

Returns a new date the date representing the last day of the year. Delete the new date when you have finished with it.

date-get-year-start

long (**date-get-year-start long** *date*)

Returns a new date the date representing the first day of the year. Delete the new date when you have finished with it.

date-is-leap-year

long (**date-is-leap-year long** *date*)

Returns 1 if the year of this date is a leap year.

date-set-current-date

long (**date-set-current-date long** *date*)

Sets the date to current system date.

date-set-julian

long (**date-set-julian long** *date* **long** *julian*)

Sets the date to the given Julian date.

date-set-date

long (**date-set-date long** *date* **long** *month* **long** *day* **long** *year*)

Sets the date to the given date.

month is a number from 1 to 12.

day is a number from 1 to 31.

year is a year, such as 1995, 2005.

date-set-format

long (**date-set-format long** *date* **string** *format*)

Sets the current format type.

format should be one of:

wxDAY	Format day only.
wxMONTH	Format month only.
wxMDY	Format MONTH, DAY, YEAR.
wxFULL	Format day, month and year in US style: DAYOFWEEK, MONTH, DAY, YEAR.
wxEUROPEAN	Format day, month and year in European style: DAY, MONTH, YEAR.

date-set-option

long (**date-set-option long** *date* **string** *option* **long** *enable=1*)

Enables or disables an option for formatting. *option* may be one of:

wxNO_CENTURY The century is not formatted.
wxDATE_ABBR Month and day names are abbreviated to 3 characters when formatting.

date-add-days

long (**date-add-days long** *date* **long** *days*)

Adds an integer number of days to the date, returning a new date object.

date-subtract-days

long (**date-subtract-days long** *date* **long** *days*)

Subtracts an integer number of days from the date, returning a new date object.

date-subtract

long (**date-subtract long** *date* **long** *date1* **long** *date2*)

Subtracts one date from another, return the number of intervening days.

date-add-self

long (**date-add-self long** *date* **long** *days*)

Adds an integer number of days to the date, returning 1 if successful.

date-subtract-self

long (**date-subtract-self long** *date* **long** *days*)

Subtracts an integer number of days from the date, returning 1 if successful.

date-le

long (**date-le long** *date1* **long** *date2*)

Function to compare two dates, returning 1 if *date1* is earlier than *date2*.

date-leq

long (**date-leq long** *date1* **long** *date2*)

Function to compare two dates, returning 1 if *date1* is earlier than or equal to *date2*.

date-ge

long (**date-ge long** *date1* **long** *date2*)

Function to compare two dates, returning 1 if *date1* is later than *date2*.

date-geq

long (**date-geq long** *date1* **long** *date2*)

Function to compare two dates, returning 1 if *date1* is later than or equal to *date2*.

date-eq

long (**date-eq long** *date1* **long** *date2*)

Function to compare two dates, returning 1 if *date1* is equal to *date2*.

date-neq

long (**date-neq long** *date1* **long** *date2*)

Function to compare two dates, returning 1 if *date1* is not equal to *date2*.

7.16. Device context

See also *Overview* (page 204)

A device context is an abstraction of a surface that can be drawn onto.

The following functions can be used with any device context identifier, with the exception of dc-blit which must not be used with a PostScript device context, and dc-get-text-extent-width, dc-get-text-extent-height which do not function correctly on PostScript or metafile device contexts.

dc-begin-drawing

long (**dc-begin-drawing long** *id*)

Bracket a series of drawing primitives in dc-begin-drawing and dc-end-drawing to optimize drawing under Windows, and also if drawing to a panel or dialog box context, for which these calls are mandatory. The calls may be nested.

dc-blit

long (**dc-blit long** *dest-dc-id* **double** *dest-x* **double** *dest-y* **double** *width* **double** *height* **long** *source-dc-id* **double** *source-x* **double** *source-y* **optional string** *logical-op = "wxCOPY"*)

Block-copies the given area from a source device context to a destination device context. This

operation is not available to PostScript and Windows Metafile destination device contexts.

The argument *logical-op* sets the current logical function for the canvas. This determines how a source pixel from the source device context 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:

```
wxAND                src AND dst
wxAND_INVERT         (NOT src) AND dst
wxAND_REVERSE        src AND (NOT dst)
wxCLEAR              0
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. wxXOR is commonly used for drawing rubber bands or moving outlines, since drawing twice reverts to the original colour.

dc-clear

long (**dc-clear long** *dc-id*)

Clears the device context using the background colour.

dc-delete

long (**dc-delete long** *dc-id*)

Deletes a device context that has been explicitly created (so not a canvas DC).

dc-destroy-clipping-region

long (**dc-destroy-clipping-region long** *dc-id*)

Destroys the current clipping region.

dc-draw-ellipse

long (**dc-draw-ellipse long** *dc-id*

double *x* **double** *y* **double** *width* **double** *height*)

Draws an ellipse. The outline and filling attributes are determined by the pen and brush settings respectively.

dc-draw-line

long (**dc-draw-line long** *dc-id*
double *x1* **double** *y1* **double** *x2* **double** *y2*)

Draws a line between the given points.

dc-draw-lines

long (**dc-draw-lines long** *dc-id* **multifield** *list*)

Draws lines between the given points. *list* is a multifield, which can be created by a call to mv-append and a list of arguments. The list must contain an even number of floating-point values, interpreted in pairs as the points determining the multiline.

dc-draw-point

long (**dc-draw-point long** *dc-id* **double** *x* **double** *y*)

Draws a point.

dc-draw-polygon

long (**dc-draw-polygon long** *dc-id* **multifield** *list*)

Draws a (possibly filled) polygon. *list* is a multifield, which can be created by a call to mv-append and a list of arguments. The list must contain an even number of floating-point values, interpreted in pairs as the points determining the polygon. The outline and filling attributes are determined by the pen and brush settings respectively.

dc-draw-rectangle

long (**dc-draw-rectangle long** *dc-id*
double *x* **double** *y* **double** *width* **double** *height*)

Draws a rectangle. The outline and filling attributes are determined by the pen and brush settings respectively.

dc-draw-rounded-rectangle

long (**dc-draw-rounded-rectangle long** *dc-id*
double *x* **double** *y* **double** *width* **double** *height* **double** *radius*)

Draws a rounded rectangle, with corners with a specified radius (optional). The outline and filling

attributes are determined by the pen and brush settings respectively.

dc-draw-text

long (**dc-draw-text long** *dc-id*
string *text* **double** *x* **double** *y*)

Draw text at the given position, using the font set by *dc-set-font* (page 120), and using the colours set by *dc-set-text-foreground* (page 121) and *dc-set-text-background* (page 121) respectively.

dc-draw-spline

long (**dc-draw-spline long** *dc-id* **multifield** *list*)

Draws a spline curve. *list* is a multifield, which can be created by a call to mv-append and a list of arguments. The list must contain an even number of floating-point values, interpreted in pairs as the points determining the spline shape.

dc-end-doc

long (**dc-end-doc long** *dc-id*)

Ends a document (such as a PostScript or Windows printer document).

dc-end-drawing

long (**dc-end-drawing long** *id*)

Bracket a series of drawing primitives in dc-begin-drawing and dc-end-drawing to optimize drawing under Windows, and also if drawing to a panel or dialog box context, for which these calls are mandatory. The calls may be nested.

dc-end-page

long (**dc-end-page long** *dc-id*)

Ends a page.

dc-get-min-x

double (**dc-get-min-x long** *dc-id*)

Returns the minimum X value drawn so far on the device context.

dc-get-min-y

double (**dc-get-min-y long** *dc-id*)

Returns the minimum Y value drawn so far on the device context.

dc-get-max-x

double (**dc-get-max-x long** *dc-id*)

Returns the maximum X value drawn so far on the device context.

dc-get-max-y

double (**dc-get-max-y long** *dc-id*)

Returns the maximum Y value drawn so far on the device context.

dc-get-text-extent-height

double (**dc-get-text-extent-height long** *dc-id* **string** *text*)

Returns the height of the text as drawn on this device context, in logical units.

dc-get-text-extent-width

double (**dc-get-text-extent-width long** *dc-id* **string** *text*)

Returns the width of the text as drawn on this device context, in logical units.

dc-ok

long (**dc-ok long** *id*)

Returns 1 if the device context is OK (usually meaning, it has been initialised correctly), and 0 otherwise.

dc-start-doc

long (**dc-start-doc long** *dc-id* **string** *message*)

Starts a document (such as a PostScript or Windows printer document) using the given string for any associated message box (the message is not in fact currently used).

dc-start-page

long (**dc-start-page long** *dc-id*)

Starts a page.

dc-set-background

long (**dc-set-background long** *dc-id* **long** *brush*)

Sets the background brush.

dc-set-background-mode

long (**dc-set-background-mode long** *dc-id* **string** *mode*)

Sets the mode for drawing text background.

mode may be wxSOLID (use the text background colour) or wxTRANSPARENT (do not fill the background).

dc-set-brush

long (**dc-set-brush long** *dc-id* **long** *brush-id*)

Sets the current brush for the device context. *brush-id* is an ID returned from a call to *brush-create* (page 95), or zero to select any existing brush out of the device context.

dc-set-colourmap

long (**dc-set-colourmap long** *dc-id* **long** *cmap-id*)

Sets the colourmap for the device context. If *cmap-id* is zero, the original colourmap is restored so that it is safe to delete the device context (or colourmap).

dc-set-clipping-region

long (**dc-set-clipping-region long** *dc-id*
double *x1* **double** *y1* **double** *x2* **double** *y2*)

Sets a rectangular clipping region, outside which drawing operations have no effect.

dc-set-font

long (**dc-set-font long** *dc-id* **long** *font-id*)

Sets the current font for the device context. *font-id* is an ID returned from a call to *font-create* (page 123), or zero to select any existing font out of the device context.

dc-set-logical-function

long (**dc-set-logical-function long** *dc-id* **string** *logical-function*)

Sets the current logical function for the device context. The logical function determines how pixels are changed by the drawing functions, and may be one of wxCOPY, wxXOR, wxINVERT, wxOR_REVERSE and wxAND_REVERSE.

dc-set-pen

long (**dc-set-pen long** *dc-id* **long** *pen-id*)

Sets the current pen for the device context. *pen-id* is an ID returned from a call to *pen-create* (page 156), or zero to select any existing pen out of the device context.

dc-set-text-foreground

long (**dc-set-text-foreground long** *dc-id* **string** *colour*)

Sets the colour for the text foreground, effective when *dc-draw-text* (page 118) is used. *colour* is a capitalized name from the list defined in the wxWindows manual.

dc-set-text-background

long (**dc-set-text-background long** *dc-id* **string** *colour*)

Sets the colour for the text background, effective when *dc-draw-text* (page 118) is used. *colour* is a capitalized name from the list defined in the wxWindows manual.

7.17. Dialog box

See also *Overview* (page 204)

A dialog box is essentially a *panel* (page 154) with its own *frame* (page 123), and therefore shares some functions and behaviour with both of these objects.

Any panel item can be created as a child of a dialog box, and also the dialog box can be created *modal*, so that the flow of program control halts until the dialog box is dismissed.

The following callbacks are valid for the dialog box class: see also those listed for panels.

OnCharHook Under Windows only, all key strokes going to a dialog box or frame can be intercepted before being passed on for normal processing. This callback function takes the window id and event id, and should return 1 to override further processing, or 0 to do default processing. See also *Key event* (page 140).

dialog-box-create

long (**dialog-box-create long** *parent-id* **string** *title*
optional long *modal* **optional long** *x* **optional long** *y*
optional long *width* **optional long** *height* **optional string** *style* **optional string** *name*)

Creates a dialog box. *parent-id* can be zero or a valid dialog or frame ID; *title* should be a string for the dialog box's title. The value of *modal* may be 1 (when *window-show* (page 179) is called with an argument of 1, the dialog blocks until window-show is called with an argument of 0) or 0

(dialog is modeless, and window-show returns immediately).

The *window-show* (page 179) function must be called with argument 1 to make the dialog visible, and with argument 0 to undisplay the dialog (and to dimiss a modal dialog).

The *style* parameter may be a combination of the following, using the bitwise 'or' operator:

wxCAPTION Puts a caption on the dialog box (under XView and Motif this is mandatory).
wxSTAY_ON_TOP Stay on top of other windows (Windows only).
wxSYSTEM_MENU Display a system menu (manadatory under XView and Motif).
wxTHICK_FRAME Display a thick frame around the window (manadatory under XView and Motif).
wxVSCROLL Give the dialog box a vertical scrollbar (XView only).

The default value for *style* is "wxCAPTION | wxSYSTEM_MENU | wxTHICK_FRAME".

name gives the dialog box a name that can be retrieved with *window-get-name* (page 176).

dialog-box-create-from-resource

long (**dialog-box-create-from-resource long** *parent-id* **string** *resource-name*)

Creates a dialog box from the given wxWindows resource. The resource file containing this resource must first have been loaded with *load-resource-file* (page 186).

Panel items on a panel or dialog box that has been created from a resource, do not have conventional callbacks. Therefore you need to intercept the OnCommand event for the panel or dialog box and test the name and event of the item passed to this callback.

dialog-box-is-modal

long (**dialog-box-is-modal long** *parent-id*)

Returns 1 if the dialog box is modal, 0 otherwise.

dialog-box-set-modal

long (**dialog-box-set-modal long** *parent-id*, **long** *modal*)

Sets the dialog box to be modal or non-modal, before window-show is issued. Pass 1 or 0 to *modal*.

7.18. Event

An event is an 'abstract class' from which other event classes, such as mouse, key and command events, are derived.

event-get-event-type

string (**event-get-event-type long** *id*)

Returns the event type.

7.19. Font

A font is an object that can be set for a *device context* (page 115) to determine the characteristics of text drawn with *dc-draw-text* (page 118).

font-create

long (**font-create long** *point-size* **word** *family* **word** *style* **word** *weight* **long** *underlined* **optional string***facename*)

Creates a font for use in a device context.

point-size gives the font point size.

family may be one of wxROMAN, wxSCRIPT, wxDECORATIVE, wxSWISS, wxMODERN, wxDEFAULT.

style may be one of wxNORMAL, wxITALIC.

weight may be one of wxBOLD, wxLIGHT, wxNORMAL.

underlined may be 1 or 0.

facename is an optional font facename, for specifying the exact font face required.

font-delete

long (**font-delete long** *font-id*)

Deletes the given font.

7.20. Frame

A frame is a window containing text, canvas or panel subwindows. It normally has decorations added by the window manager, such as a system menu, a thick frame, and resize handles. When a wxWindows or wxCLIPS application initializes, a top-level frame must be returned to the system for successful start-up. When a top-level frame and all its children are deleted, the application terminates.

Usually an application will need to register an OnClose handler in case the window manager sends the application a close message. If the handler returns 1, the frame is deleted by the system (possibly terminating the application).

The user can register the following callbacks:

OnActivate Called with a frame identifier and integer flag, when the frame is activated. Under Windows, you may need to intercept this event and set the focus for a subwindow, or the subwindow may not receive character events. By default, wxWindows will set the focus for the first subwindow of a frame.

OnCharHook Under Windows only, all key strokes going to a dialog box or frame can be

intercepted before being passed on for normal processing. This callback function takes the window id and event id, and should return 1 to override further processing, or 0 to do default processing. See also *Key event* (page 140).

OnClose The function is called with the window identifier. If the callback returns 1 and the function was called by the window manager, the window is automatically deleted (possibly terminating the application). A return value of 0 forbids automatic deletion.

OnMenuCommand Called with a frame identifier and menu item identifier. Test the menu item identifier and perform an appropriate action.

OnMenuSelect Called with a frame identifier and menu item identifier, when the cursor travels over the menu item (but the user does not click). Test the menu item identifier and perform an appropriate action.

OnSize The function is called with the window identifier, width and height.

See also *window-add-callback* (page 175).

frame-create

long (**frame-create long** *parent-id* **string** *title*
optional long *x* **optional long** *y*
optional long *width* **optional long** *height* **optional string** *style* **optional string** *name*)

Creates a frame. *parent-id* can be zero or a valid frame ID; *title* should be a string for the frame's title.

The style parameter may be a combination of the following, using the bitwise 'or' operator.

wxICONIZE Display the frame iconized (minimized) (Windows only).
wxCAPTION Puts a caption on the frame (under XView and Motif this is mandatory).
wxDEFAULT_FRAME Defined as a combination of wxMINIMIZE_BOX, wxMAXIMIZE_BOX, wxTHICK_FRAME, wxSYSTEM_MENU, and wxCAPTION.
wxMDI_CHILD Specifies a Windows MDI (multiple document interface) child frame.
wxMDI_PARENT Specifies a Windows MDI (multiple document interface) parent frame.
wxMINIMIZE Identical to **wxICONIZE**.
wxMINIMIZE_BOX Displays a minimize box on the frame (Windows only).
wxMAXIMIZE Displays the frame maximized (Windows only).
wxMAXIMIZE_BOX Displays a maximize box on the frame (Windows only).
wxSDI Specifies a normal SDI (single document interface) frame.
wxSTAY_ON_TOP Stay on top of other windows (Windows only).
wxSYSTEM_MENU Displays a system menu (manadatory under XView and Motif).
wxTHICK_FRAME Displays a thick frame around the window (manadatory under XView and Motif).

name gives the frame a name that can be retrieved with *window-get-name* (page 176).

The function *window-show* must be called before a new frame is visible.

frame-create-status-line

long (**frame-create-status-line long** *parent-id*, **optional long** *n=1*)

Creates a status line at the bottom of the frame. Use *frame-set-status-text* (page 125) to write to the status line.

n is a number from 1 to 5 for the number of status areas to create.

frame-iconize

long (**frame-iconize long** *frame-id* **optional long** *minimize*)

Minimize the frame if the second argument is 1 or absent, restore the frame otherwise.

frame-is-iconized

long (**frame-is-iconized long** *frame-id*)

Returns 1 if the frame is iconized (minimized), 0 otherwise.

frame-on-size

long (**frame-on-size long** *frame-id* **long** *width* **long** *height*)

Performs default processing for the OnSize event. Can be called from within an OnSize callback.

frame-set-menu-bar

long (**frame-set-menu-bar long** *frame-id* **long** *menu-bar-id*)

Associate a menu bar with the frame. See *menu bar* (page 145).

frame-set-tool-bar

long (**frame-set-tool-bar long** *frame-id* **long** *tool-bar*)

Informs an MDI parent window that a panel or canvas should be treated as a toolbar, and sized accordingly. Windows only.

frame-set-icon

long (**frame-set-icon long** *frame-id* **long** *icon-id*)

Set the icon of a frame. See *icon* (page 138).

frame-set-status-text

long (**frame-set-status-text long** *frame-id* **string** *text*, **optional long** *i=0*)

Sets the text for the status line (previously created with *frame-create-status-line* (page 124)).

i is a number from 0 to 4 for the number of the status area to write to.

frame-set-title

long (**frame-set-title long** *frame-id* **string** *text*)

Set the title of a frame.

7.21. Help

A 'help instance' is created to manage on-line help associated with one or more files. wxCLIPS supports both Windows Help under MS Windows, and wxHelp under all platforms.

Windows Help (.hlp) files may be created using a number of tools, such as Tex2RTF. wxHelp (.xlp) files can be created with a text editor or a tool such as Tex2RTF.

wxHelp is very limited in its capabilities and should only be used on platforms with no native help. Consider using HTML files instead (although you cannot currently access HTML files from your application).

help-create

long (**help-create optional long** *native = 1*)

Creates a help instance. If *native* is 1, the native help system will be invoked (such as WinHelp under MS Windows). If 0, wxHelp will be invoked.

help-delete

long (**help-delete long** *id*)

Deletes the help instance.

help-display-block

long (**help-display-block long** *id* **long** *blockId*)

Displays the help file at the given block identifier (system dependent).

help-display-contents

long (**help-display-contents long** *id* **string** *filename*)

Displays the contents of the help file currently loaded.

help-display-section

long (**help-display-section long** *id* **long** *section*)

Displays the help file at the given section (system dependent).

help-keyword-search

long (**help-keyword-search long** *id* **string** *keyword*)

Positions the help file at a section matching the given string.

help-load-file

long (**help-load-file long** *id* **string** *filename*)

Attempts to load the given file into the help instance. Use a function like help-display-contents to display the file.

7.22. HWND functions

This group of functions allows MS Windows programs to perform a few operations on another program's window.

hwnd-find

long (**hwnd-find string** *title*)

Searches for a window with the given title, and returns the window handle. Returns zero if none was found.

hwnd-iconize

long (**hwnd-iconize long** *hwnd* **optional long** *iconize=1*)

Iconizes or deiconizes the given window.

hwnd-move

long (**hwnd-move long** *hwnd* **long** *x* **long** *y* **long** *width* **long** *height* **optional long** *repaint=1*)

Moves and resizes the given window.

hwnd-refresh

long (**hwnd-refresh long** *hwnd* **optional long** *erase-background=1*)

Refreshes (invalidates) the given window.

hwnd-send-message

long (**hwnd-send-message long** *hwnd* **long** *msg* **long** *wparam* **long** *lparam*)

Sends a Windows message to the window.

hwnd-show

long (**hwnd-show long** *hwnd* **optional long** *show=1*)

Shows or hides the given window.

hwnd-quit

long (**hwnd-quit long** *hwnd*)

Sends a WM_CLOSE message to the given window.

7.23. Gauge

A gauge is used for displaying a quantity, for example amount of processing done. It must be a child of a *panel* (page 154).

gauge-create

long (**gauge-create long** *panel-id* **string** *label*
long *range* **optional long** *x* **optional long** *y*
optional long *width* **optional long** *height* **optional string** *style* **optional string** *name*)

Creates a gauge item on the given panel.

range indicates the maximum value of the gauge.

style is a *bit list* of the following:

wxGA_HORIZONTAL The item will be created as a horizontal gauge
wxGA_VERTICAL The item will be created as a vertical gauge.
wxGA_PROGRESSBAR Under Windows 95, the item will be created as a horizontal progress bar.

name gives the gauge a name that can be retrieved with *window-get-name* (page 176).

If no position is given, the panel item is placed after the last item. The value -1 may be passed to denote a default, so that the position may be left unspecified and the size given.

gauge-set-value

long (**gauge-set-value long** *gauge-id* **long** *value*)

Set the value of a gauge item.

gauge-set-bezel-face

long (**gauge-set-bezel-face long** *gauge-id* **long** *width*)

Set the bezel parameter of the gauge (takes effect under Windows version only).

gauge-set-shadow-width

long (**gauge-set-shadow-width long** *gauge-id* **long** *width*)

Set the shadow width of the gauge (takes effect under Windows version only).

7.24. Grid

See also *Overview* (page 212)

A subwindow used for displaying grids (matrices/tables). A grid can contain text or bitmaps.

Note: this functionality is implemented in Windows only, for the time being.

The following callbacks are valid for the grid class.

OnPaint Called with a window identifier when the window receives a repaint event from the window manager.
OnSize The function is called with the window identifier, width and height.
OnCellLeftClick The function is called with the window identifier, row, column, x, y, control down flag, shift down flag.
OnCellRightClick The function is called with the window identifier, row, column, x, y, control down flag, shift down flag.
OnCellChange The function is called with the window identifier, row, column.
OnChangeLabels The function is called with the window identifier.
OnChangeSelectionLabel The function is called with the window identifier.

See also *window-add-callback* (page 175).

grid-adjust-scrollbars

void (**grid-adjust-scrollbars long** *grid-id*)

Adjusts the scrollbars to suit the size of the grid: this may cause one or both to be hidden. You may wish to call this from code which alters the number of rows or columns (or height/width of rows or columns), or from an OnSize callback.

grid-append-cols

long (**grid-append-cols long** *grid-id* **long** *n* **optional long** *update-labels=1*) Inserts *n* columns at the end of the table, updating the grid labels if *update-labels* is 1.

Returns 1 if successful, 0 otherwise.

grid-append-rows

long (**grid-append-rows long** *grid-id* **long** *n* **optional long** *update-labels=1*) Inserts *n* rows at

the end of the table, updating the grid labels if *update-labels* is 1.

Returns 1 if successful, 0 otherwise.

grid-clear-grid

void (**grid-clear-grid long** *grid-id*)

Clears the grid (untested).

grid-create

long (**grid-create long** *parent-id* **optional long** *x* **optional long** *y* **optional long** *width* **optional long** *height* **optional string** *style=0* **optional string** *name="grid"*)

Creates a grid window. You must also call grid-create-grid after you call this function.

parent-id must be a valid frame ID.

name gives the canvas a name that can be retrieved with *window-get-name* (page 176).

grid-create-grid

long (**grid-create-grid long** *grid-id* **long** *rows* **long** *cols* **optional long** *default-width* **optional long** *default-height*)

Initializes the size of the grid. Returns 1 if successful, 0 otherwise.

grid-delete-cols

long (**grid-delete-cols long** *grid-id* **long** *position* **long** *n* **optional long** *update-labels=1*)
Deletes *n* columns starting at *position*, updating the grid labels if *update-labels* is 1.

Returns 1 if successful, 0 otherwise.

grid-delete-rows

long (**grid-delete-rows long** *grid-id* **long** *position* **long** *n* **optional long** *update-labels=1*)
Deletes *n* rows starting at *position*, updating the grid labels if *update-labels* is 1.

Returns 1 if successful, 0 otherwise.

grid-get-cell-alignment

string (**grid-get-cell-alignment long** *grid-id* **long** *row* **long** *col*) Gets the cell text alignment at *row*, *col*. The return value is one of wxLEFT, wxRIGHT, wxCENTRE.

grid-get-cell-background-colour

long (**grid-set-cell-background-colour long** *grid-id* **optional long** *row=-1* **optional long** *col=-1*) Gets the cell background colour.

The return value is a colour value of the kind created using *colour-create*.

If *row* and *col* are zero or greater, the returned colour is that of an individual cell. If these values are -1 or absent, the colour is the global, default cell background colour.

grid-get-cell-bitmap

long (**grid-get-cell-bitmap long** *grid-id* **long** *row* **long** *col*) Returns the bitmap associated with the cell at *row*, *col*. If none has been set, 0 will be returned. See also *grid-set-cell-bitmap* (page 134).

grid-get-cell-text-colour

long (**grid-set-cell-text-colour long** *grid-id* **optional long** *row=-1* **optional long** *col=-1*) Gets the cell text colour.

The return value is a colour value of the kind created using *colour-create*.

If *row* and *col* are zero or greater, the returned colour is that of an individual cell. If these values are -1 or absent, the colour is the global, default cell text colour.

grid-get-cell-value

string (**grid-get-cell-value long** *grid-id* **long** *row* **long** *col*) Gets the cell value at *row*, *col*.

grid-get-column-width

long (**grid-get-column-width long** *grid-id* **long** *col*) Gets the given column width in pixels.

grid-get-cursor-column

long (**grid-get-cursor-column long** *grid-id*) Returns the column of the currently selected cell.

grid-get-cursor-row

long (**grid-get-cursor-row long** *grid-id*) Returns the row of the currently selected cell.

grid-get-rows

long (**grid-get-rows long** *grid-id*)

Returns the number of rows in the grid.

grid-get-cols

long (**grid-get-cols long** *grid-id*)

Returns the number of columns in the grid.

grid-get-editable

long (**grid-get-editable long** *grid-id*)

Returns 1 if the grid is editable (the text field is showing), 0 otherwise.

grid-get-label-alignment

string (**grid-get-label-alignment long** *grid-id* **string** *orientation*) Gets the column label or row label alignment.

If *orientation* is wxVERTICAL, the row label alignment is returned. If *orientation* is wxHORIZONTAL, the column label alignment is returned.

The return value is one of wxLEFT, wxRIGHT, wxCENTRE.

grid-get-label-background-colour

long (**grid-get-label-background-colour long** *grid-id*) Gets the label background colour.

The return value is a colour value of the kind created using *colour-create*.

grid-get-label-size

long (**grid-get-label-size long** *grid-id* **string** *orientation*) Gets the column label height or row label width in pixels. If *orientation* is wxVERTICAL, the row label width is returned. If *orientation* is wxHORIZONTAL, the column label height is returned.

grid-get-label-text-colour

long (**grid-get-label-text-colour long** *grid-id*) Gets the label text colour.

The return value is a colour value of the kind created using *colour-create*.

grid-get-label-value

string (**grid-get-label-value long** *grid-id* **string** *orientation* **long** *position*) *position* is the label row or column position (starting from zero).

Gets a column label or row label value.

If *orientation* is wxVERTICAL, the row label alignment is set. If *orientation* is wxHORIZONTAL, the column label alignment is set.

grid-get-row-height

long (**grid-get-row-height long** *grid-id* **long** *row*) Gets the given row height in pixels.

grid-get-scroll-pos-x

long (**grid-get-scroll-pos-x long** *grid-id*)

Returns the current scroll position in the horizontal dimension (in scroll positions, not pixels).

grid-get-scroll-pos-y

long (**grid-get-scroll-pos-y long** *grid-id*)

Returns the current scroll position in the vertical dimension (in scroll positions, not pixels).

grid-get-text-item

long (**grid-get-text-item long** *grid-id*)

Returns the identifier of the text item which is used for editing cells. Use this to set the label of the text item, for example, in an OnChangeSelectionLabel callback, which is called when the user selects a different cell.

grid-insert-cols

long (**grid-insert-cols long** *grid-id* **long** *position* **long** *n* **optional long** *update-labels=1*) Inserts *n* columns in front of *position*, updating the grid labels if *update-labels* is 1.

Returns 1 if successful, 0 otherwise.

grid-insert-rows

long (**grid-insert-rows long** *grid-id* **long** *position* **long** *n* **optional long** *update-labels=1*) Inserts *n* rows in front of *position*, updating the grid labels if *update-labels* is 1.

Returns 1 if successful, 0 otherwise.

grid-on-activate

void (**grid-on-activate long** *grid-id* **long** *active*)

Call this function from a frame OnActivate callback. This function causes focus to be given to the text field (if in editable mode).

grid-on-paint

void (**grid-on-paint long** *grid-id*)

Call this function if you override the on-paint event handler.

grid-on-size

void (**grid-on-size long** *grid-id* **long** *w* **long** *h*)

Call this function if you override the on-size event handler.

grid-set-cell-alignment

void (**grid-set-cell-alignment long** *grid-id* **string** *alignment* **long** *row* **long** *col*) Sets the cell text alignment at *row*, *col* to the given value. *alignment* should be one of wxLEFT, wxRIGHT, wxCENTRE.

grid-set-cell-background-colour

void (**grid-set-cell-background-colour long** *grid-id* **long** *colour* **optional long** *row=-1* **optional long** *col=-1*) Sets the cell background colour.

colour should be a colour value created with *colour-create*.

If *row* and *col* are zero or greater, the colour will be associated with an individual cell. If these values are -1 or absent, the colour will refer to all cells.

grid-set-cell-bitmap

void (**grid-set-cell-bitmap long** *grid-id* **long** *bitmap-id* **long** *row* **long** *col*) Associates a bitmap with the cell at *row*, *col*. If this is called, the bitmap will be displayed instead of text. Since colourmaps are not used in drawing the bitmap, use low-colour bitmaps if possible (16 colours or less).

grid-set-cell-text-colour

void (**grid-set-cell-text-colour long** *grid-id* **long** *colour* **optional long** *row=-1* **optional long** *col=-1*) Sets the cell text colour.

colour should be a colour value created with *colour-create*.

If *row* and *col* are zero or greater, the colour will be associated with an individual cell. If these values are -1 or absent, the colour will refer to all cells.

grid-set-cell-text-font

void (**grid-set-cell-text-font long** *grid-id* **long** *font-id* **optional long** *row=-1* **optional long** *col=-*

1) Sets the cell text font.

font should be a valid font identifier.

If *row* and *col* are zero or greater, the font will be associated with an individual cell. If these values are -1 or absent, the font will refer to all cells.

grid-set-cell-value

void (**grid-set-cell-value long** *grid-id* **string** *value* **long** *row* **long** *col*) Sets the cell at *row*, *col* to the given value.

grid-set-column-width

void (**grid-set-column-width long** *grid-id* **long** *col* **long** *width*) Sets the given column width in pixels.

grid-set-divider-pen

void (**grid-set-divider-pen long** *grid-id* **long** *pen-id*)

Sets the pen for drawing the cell divisions (light grey by default). If *pen-id* is 0, the divisions are switched off.

grid-set-editable

void (**grid-set-editable long** *grid-id* **long** *editable*)

If *editable* is 1, displays the text field for entering cell values. If *editable* is 0, hides the text field.

grid-set-grid-cursor

void (**grid-set-grid-cursor long** *grid-id* **long***row* **long***column*) Sets the selection to the given cell.

grid-set-label-alignment

void (**grid-set-label-alignment long** *grid-id* **string** *orientation* **string** *alignment*) Sets the column label or row label alignment.

If *orientation* is wxVERTICAL, the row label alignment is set. If *orientation* is wxHORIZONTAL, the column label alignment is set.

alignment should be one of wxLEFT, wxRIGHT, wxCENTRE.

grid-set-label-background-colour

void (**grid-set-label-background-colour long** *grid-id* **long** *colour*) Sets the label background colour.

colour should be a colour value created with *colour-create*.

grid-set-label-size

void (**grid-set-label-size long** *grid-id* **string** *orientation* **long** *size*) Sets the column label height or row label width in pixels. If *orientation* is wxVERTICAL, the row label width is set. If *orientation* is wxHORIZONTAL, the column label height is set.

A value of zero switches off the label in the specified dimension.

grid-set-label-text-colour

void (**grid-set-label-text-colour long** *grid-id* **long** *colour*) Sets the label text colour.

colour should be a colour value created with *colour-create*.

grid-set-label-text-font

void (**grid-set-label-text-font long** *grid-id* **long** *font-id*) Sets the label text font.

grid-set-label-value

void (**grid-set-label-value long** *grid-id* **string** *orientation* **string** *value* **long** *position*)

Sets a column label or row label value.

If *orientation* is wxVERTICAL, the row label alignment is set. If *orientation* is wxHORIZONTAL, the column label alignment is set.

position is the label row or column position (starting from zero).

grid-set-row-height

void (**grid-set-row-height long** *grid-id* **long** *row* **long** *height*) Sets the given row height in pixels.

grid-update-dimensions

void (**grid-update-dimensions long** *grid-id*)

Recalculates dimensions so drawing is accurate. You may wish to call this if you alter a grid dimension, such as column width.

7.25. Groupbox

A group box is a box drawn around one or more controls. Available under Windows only.

group-box-create

long (**group-box-create long** *panel-id* **string** *label*
long *x* **long** *y* **long** *width* **long** *height* **optional string** *style* **optional string** *name*)

Creates a group box and returns its id.

name gives the group box a name that can be retrieved with *window-get-name* (page 176).

7.26. Html

A subwindow used for displaying HTML files, using a class library written by Andrew Davison. At present only local HTML files should be loaded, and links in HTML files should again be local files, with non-URL specifications. Later releases will eventually allow Web browsing functionality, but to simplify wxCLIPS installation, this functionality has been omitted.

There are some bugs in scrolling and presentation, but for simple needs, it may prove handy to be able to show text and graphics (GIF files).

Note: this functionality is implemented in Windows only for the time being, and even then, not in all Windows releases of wxCLIPS and Hardy.

The following callbacks are valid for the html class.

OnSize The function is called with the window identifier, width and height.
OnOpenURL The function is called just before a URL is about to be opened, with the window identifier, and a URL. Return 1 to allow default processing, 0 to veto further processing. You can use this to program special URLs as buttons, if you test the URL and return 0 if you will process it yourself.
OnSetStatusText This is called with the window identifier and text, whenever it is appropriate to notify the user of the URL the mouse is over.

See also *window-add-callback* (page 175).

html-back

void (**html-back long** *id*)

Loads and displays the previously-displayed URL or file.

html-cancel

void (**html-cancel long** *id*)

Sets a flag to cancel the current operation.

html-clear-cache

void (**html-clear-cache long** *id*)

Clears the internal cache.

html-create

long (**html-create long** *parent-id* **optional long** *x* **optional long** *y* **optional long** *width* **optional long** *height* **optional string** *style=0* **optional string** *name="html"*)

Creates an HTML window.

parent-id must be a valid frame ID.

name gives the canvas a name that can be retrieved with *window-get-name* (page 176).

html-get-current-url

string (**html-get-current-url long** *id*) Returns the current URL.

html-on-size

void (**html-on-size long** *id* **long** *width* **long** *height*)

Invokes the HTML panel's OnSize member. This may need to be called if you override OnSize.

html-open-file

long (**html-open-file long** *id* **string** *file*) Opens and displays a file.

html-resize

void (**html-resize long** *id*)

Resizes and displays the current file.

html-save-file

long (**html-save-file long** *id* **string** *file*) Saves the currently displayed file.

html-open-url

long (**html-open-url long** *id* **string** *url*)

Opens a URL (not yet functioning).

7.27. Icon

An icon is a small bitmap which can be used to decorate a minimized frame. There are platform-

specific ways of creating an icon.

icon-create

long (**icon-create string** *fileOrResource*)

Creates an icon. Under X, the argument must be the filename of a valid XBM (X bitmap) file. Under Windows, the argument must be the name of an icon resource compiled into the current executable.

Use *frame-set-icon* (page 125) to set the icon of a frame.

icon-delete

long (**icon-delete long** *icon-id*)

Deletes the given icon.

icon-get-height

long (**icon-get-height long** *icon-id*)

Gets the height of the icon.

icon-get-width

long (**icon-get-width long** *icon-id*)

Gets the width of the icon.

icon-load-from-file

long (**icon-load-from-file string** *file*, **string** *bitmap-type*)

Loads an icon from a file. Under X, the argument must be the filename of a valid XBM (X bitmap) file. Under Windows, the argument must be the filename of a Windows icon file.

Under X, the permitted icon types in the *bitmap-type* are:

- **wxBITMAP_TYPE_BMP** Load a Windows bitmap file (if USE_IMAGE_LOADING_IN_X is enabled in wx_setup.h).
- **wxBITMAP_TYPE_GIF** Load a GIF bitmap file (if USE_IMAGE_LOADING_IN_X is enabled in wx_setup.h).
- **wxBITMAP_TYPE_XBM** Load an X bitmap file.
- **wxBITMAP_TYPE_XPM** Load an XPM (colour pixmap) file. Only available if USE_XPM_IN_X is enabled in wx_setup.h.

Under Windows, the permitted types are:

- **wxBITMAP_TYPE_ICO** Load a cursor from a .ico icon file (only if

USE_RESOURCE_LOADING_IN_MSW is enabled in wx_setup.h).
- **wxBITMAP_TYPE_ICO_RESOURCE** Load a Windows resource (as specified in the .rc file).

7.28. Instance table

wxCLIPS provides some functions for mapping between the integer identifiers used to represent objects in wxCLIPS funtions, and COOL instance names. When creating object-oriented wrappers around wxCLIPS function groups, you can add an instance name entry in the **init** handler, and delete it in the **delete** handler. For each event, you can register a callback which retrieves the instance name from the identifier passed to the callback, and sends an appropriate message to that instance.

See also *wxclips-object-exists* (page 190).

instance-table-add-entry

long (**instance-table-add-entry long** *id* **instance** *instance-name*)

Adds an entry to the instance table, indexing on the integer id.

instance-table-delete-entry

long (**instance-table-delete-entry long** *id*)

Deletes an entry from the instance table.

instance-table-get-instance

instance-name (**instance-table-get-instance long** *id*)

Retrieves an instance name for the integer id.

7.29. Key event

A key event identifier is passed to a window's OnChar or OnCharHook callback. The key code, position and state of shift/control/alt can be examined by calling the following functions.

key-event-alt-down

long (**key-event-alt-down long** *event-id*)

Returns 1 if alt was pressed.

key-event-control-down

long (**key-event-control-down long** *event-id*)

Returns 1 if control was pressed.

key-event-get-key-code

string (**key-event-get-key-code long** *event-id*)

Returns a string corresponding to the internal wxWindows key code, such as "WXK_BACK", "WXK_F1" or "WXK_RETURN".

key-event-position-x

double (**key-event-position-x long** *event-id*)

Gets the x position of the mouse pointer at the moment the key was pressed.

key-event-position-y

double (**key-event-position-y long** *event-id*)

Gets the y position of the mouse pointer at the moment the key was pressed.

key-event-shift-down

long (**key-event-shift-down long** *event-id*)

Returns 1 if shift was pressed.

7.30. Listbox

A listbox displays a choice of strings. It must be the child of a *panel* (page 154). In a single-selection listbox, only one choice may be highlighted. In a multiple-selection listbox, several may be highlighted.

list-box-create

long (**list-box-create long** *panel-id* **string** *callback* **string** *label*
long *multiple*, **optional long** *x* **optional long** *y*
optional long *width* **optional long** *height* **optional string** *style* **optional string** *name*)

Creates a list box item on the given panel. The callback may be the empty string ("") to denote no callback, or a word or string for the function name. The function will be called when an item in the list box is selected or deselected, with the list box ID as argument. The value of *multiple* should be 1 if multiple selections are required, or 0 if only a single selection is required.

style is a *bit list* of some of the following:

wxNEEDED_SB Create scrollbars if needed.
wxALWAYS_SB Create scrollbars immediately.
wxHSCROLL Create horizontal scrollbar if contents are two wide (Windows only).

name gives the group box a name that can be retrieved with *window-get-name* (page 176).

If no position is given, the panel item is placed after the last item. The value -1 may be passed to denote a default, so that the position may be left unspecified and the size given.

list-box-append

long (**list-box-append long** *list-box-id* **string** *item*
optional string *client-data*)

Append a string to the list box, with an optional client data string.

list-box-find-string

long (**list-box-find-string long** *list-box-id* **string** *item*)

Find the string in the list box and return the integer position if found, -1 if not.

list-box-clear

long (**list-box-clear long** *list-box-id*)

Clear all strings from the list box.

list-box-get-selection

long (**list-box-get-selection long** *list-box-id*)

Get the position of the selection (for single-selection list boxes only).

list-box-get-string-selection

string (**list-box-get-string-selection long** *list-box-id*)

Get the selected string (for single-selection list boxes only).

list-box-is-selected

long (**list-box-is-selected long** *list-box-id* **long** *item*)

Returns 1 if *item* is selected, 0 otherwise.

list-box-set-selection

long (**list-box-set-selection long** *list-box-id* **long** *item-pos* **long** *flag=1*)

Set a selection by item position.

If *flag* is 1, the item is selected, otherwise it is deselected.

list-box-set-string-selection

long (**list-box-set-string-selection long** *list-box-id* **string** *item*)

Set a selection by string.

list-box-number

long (**list-box-number long** *list-box-id*)

Return the number of items in the list box.

list-box-delete

long (**list-box-delete long** *list-box-id* **long** *item-pos*)

Delete an item in the list box.

list-box-get-string

string (**list-box-get-string long** *list-box-id* **long** *item-pos*)

Return the string at the given position.

list-box-get-first-selection

long (**list-box-get-first-selection long** *list-box-id*)

Get the first selection position in a multi-selection list box (-1 for no more selections).

list-box-get-next-selection

long (**list-box-get-next-selection**)

Get the next selection position in a multi-selection list box (-1 for no more selections).

7.31. Memory device context

A memory device context is used for drawing into, or copying from, a bitmap. See also the *Bitmap* (page 93) object.

memory-dc-create

long (**memory-dc-create**)

Create a memory device context and returns its ID.

memory-dc-select-object

long (**memory-dc-select-object long** *id* **long** *bitmap-id*)

Makes this device context the drawing surface for the given bitmap (see *Bitmap* (page 93)). Deleting the memory device context disassociates the bitmap, freeing it to be used with another memory device context. To draw a bitmap on a device context that supports bitmap drawing (i.e. not a Metafile or PostScript device context), using code like the following:

```
  ;;; Utility function for drawing a bitmap
  (deffunction draw-bitmap (?dc ?bitmap ?x ?y)
   (bind ?mem-dc (memory-dc-create))
   (memory-dc-select-object ?mem-dc ?bitmap)
   ; Blit the memory device context onto the destination device context
   (dc-blit ?dc ?x ?y (bitmap-get-width ?bitmap) (bitmap-get-height
?bitmap)
     ?mem-dc 0.0 0.0)
   (memory-dc-delete ?mem-dc)
  )
```

If *bitmap-id* is zero, the existing bitmap (if any) will be selected out of the device context. This might be necessary if you wish to delete the bitmap before deleting the device context (for example, for reusing the same device context for different bitmaps).

7.32. Menu

The menu is used only as a component of a *menu bar* (page 145). Create menus, append menu items (strings, separators or further menus), and finally append the menu to the menu bar.

A menu or menu bar string may contain an ampersand, which is taken to mean 'underline the next character and use it as the hotkey'. This gives the user the opportunity to use keystrokes to access menus and items.

menu-create

long (**menu-create optional string** *label* **optional string** *callback*)

Create a menu and returns the menu's ID.

label is unused at present.

callback should be present if creating a popup menu (i.e. not a menubar menu). It will be called with the menu's id when the user selects an item. From within the callback, use *panel-item-get-command-event* (page 155) to retrieve the command event and from that, the menu item selection.

menu-append

long (**menu-append long** *menu-id* **long** *item-id*

string *item-string* **optional long** *submenu-id* **optional string** *help-string* **optional long** *checkable*)

Append a string or submenu to the menu, passing the integer ID by which the menu item will be referenced, a string to be displayed, an optional id for a pullright menu, and an optional flag for specifying whether this menu item can be checked.

A help string can be supplied, in which case the string will be shown on the first field of the status line (if any) in the frame containing the menu bar, when the mouse pointer moves over the menu item.

menu-append-separator

long (**menu-append-separator long** *menu-id*)

Append a menu separator.

menu-break

long (**menu-break long** *menu-id*)

Inserts a column break into the menu.

menu-check

long (**menu-check long** *menu-id* **long** *item-id* **long** *check*)

Check (*check = 1* or uncheck *check = 0* the given menu item. MS Windows only.

menu-enable

long (**menu-enable long** *menu-id* **long** *item-id* **long** *enable*)

Enable (*enable = 1* or disable *enable = 0* the given menu item.

7.33. Menu bar

A menu bar is a standard user interface element which places the main commands of an application along the top of a *frame* (page 123).

The menu bar must be assigned to a frame using *frame-set-menu-bar* (page 125). Once this is done, the menu bar must not be deleted by the application: it will be deleted when the frame is deleted.

A menu or menu bar string may contain an ampersand, which is taken to mean 'underline the next character and use it as the hotkey'. This gives the user the opportunity to use keystrokes to access menus and items.

See also *Menu* (page 144).

menu-bar-create

long (**menu-bar-create**)

Create a menu bar and return its ID.

menu-bar-create-from-resource

long (**menu-bar-create-from-resource string** *resource-name*)

Create a menu bar and return its ID, given a resource name.

The resource file containing this resource must first have been loaded with *load-resource-file* (page 186).

menu-bar-append

long (**menu-bar-append long** *menu-bar-id* **long** *menu-id* **string** *title*)

Append a menu to a menu bar.

menu-bar-check

long (**menu-bar-check long** *menu-bar-id* **long** *item-id* **long** *check*)

Check (*check* = *1*) or uncheck (*check* = *0*) the given menu item (MS Windows only).

menu-bar-checked

long (**menu-bar-checked long** *menu-bar-id* **long** *item-id*)

Returns 1 if the menu item is checked, 0 otherwise.

menu-bar-enable

long (**menu-bar-enable long** *menu-bar-id* **long** *item-id* **long** *enable*)

Enable (*enable* = *1*) or disable (*enable* = *0*) the given menu item.

7.34. Message

A message is a simple piece of text on a *panel* (page 154).

message-create

long (**message-create long** *panel-id* **string** *label*
optional long *x* **optional long** *y*
optional string *style* **optional string** *name*)

Creates a message item on the given panel (a simple, non-selectable, non-editable string). If no position is given, the panel item is placed after the last item. The value -1 may be passed to denote a default, so that the position may be left unspecified and the size given.

style is reserved for future use.

name gives the message a name that can be retrieved with *window-get-name* (page 176).

message-create-from-bitmap

long (**message-create-from-bitmap long** *panel-id* **long** *bitmap-id*
optional long *x* **optional long** *y*
optional long *width* **optional long** *height* **optional string** *style* **optional string** *name*)

Creates a bitmap message given a valid bitmap identifier.

name gives the message a name that can be retrieved with *window-get-name* (page 176).

7.35. Metafile

A metafile is the Windows vector format. Currently, the only way of creating a Windows metafile is to close a metafile device context, and the only valid operations are to delete the metafile and to place it on the clipboard.

These functions are only available under Windows.

7.35.1. Example

Below is a example of metafle, metafile device context and clipboard use. 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.

```
  (bind ?dc (metafile-dc-create))
  (if (eq (dc-ok ?dc) 1) then
   (
     ; Do some drawing
     (bind ?mf (metafile-dc-close ?dc))
     (if (neq ?mf 0) then
      ; Pass metafile to the clipboard
      (metafile-set-clipboard ?mf (dc-get-max-x ?dc) (dc-get-max-y
?dc))
      (metafile-delete ?mf)
     )
   )
  )
  (dc-delete ?dc)
```

metafile-delete

long (**metafile-delete long** *id*)

Deletes the metafile.

metafile-set-clipboard

long (**metafile-set-clipboard long** *id* **int** *width* **int** *height*)

Places the metafile on the clipboard, returning 1 for success and 0 for failure.

The metafile should be deleted immediately after this operation.

7.36. Metafile device context

A metafile device context is used for creating a metafile. The programmer should create the metafile device context, close it to return a metafile, delete the device context, use the metafile (the only valid thing to do with it currently is to place it on the clipboard, and then delete the metafile.

These functions are only available under Windows.

See also *Metafile* (page 147).

metafile-dc-create

long (**metafile-dc-create optional string** *filename*)

Creates a metafile device context and returns its ID.

filename is the file to be used if creating a disk-based metafile. Usually this will be zero or absent, and an in-memory metafile will be created.

metafile-dc-close

long (**metafile-dc-close long** *id*)

Closes the metafile device context and returns a metafile. The device context should no longer be used after this call is made, and it should be deleted.

See *Metafile* (page 147).

7.37. Mouse event

A mouse event identifier is passed to the canvas *OnEvent* (page 175) callback. The state of the mouse buttons (and some keys) can be examined by calling the following functions.

mouse-event-button

long (**mouse-event-button long** *event-id* **long** *button*)

Returns 1 if the given button is changing state. *button* may be 1, 2 or 3 (left, middle and right buttons respectively).

mouse-event-button-down

long (**mouse-event-button-down long** *event-id*)

Returns 1 if the event is a mouse button down event.

mouse-event-control-down

long (**mouse-event-control-down long** *event-id*)

Returns 1 if the control key is down.

mouse-event-dragging

long (**mouse-event-dragging long** *event-id*)

Returns 1 if the event is a dragging event (holding a mouse button down and moving).

mouse-event-left-down

long (**mouse-event-left-down long** *event-id*)

Returns 1 if the left mouse button is down.

mouse-event-left-up

long (**mouse-event-left-up long** *event-id*)

Returns 1 if the left mouse button is up.

mouse-event-is-button

long (**mouse-event-is-button long** *event-id*)

Returns 1 if the event is a button press or release.

mouse-event-middle-down

long (**mouse-event-middle-down long** *event-id*)

Returns 1 if the middle mouse button is down.

mouse-event-middle-up

long (**mouse-event-middle-up long** *event-id*)

Returns 1 if the middle mouse button is up.

mouse-event-position-x

double (**mouse-event-position-x long** *event-id*)

Returns the mouse x-position.

mouse-event-position-y

double (**mouse-event-position-y long** *event-id*)

Returns the mouse y-position.

mouse-event-right-down

long (**mouse-event-right-down long** *event-id*)

Returns 1 if the right mouse button is down.

mouse-event-right-up

long (**mouse-event-right-up long** *event-id*)

Returns 1 if the right mouse button is up.

mouse-event-shift-down

long (**mouse-event-shift-down long** *event-id*)

Returns 1 if the shift key is down.

7.38. Multi-line text

A multi-line text item is able to show several lines of text, unlike the single line *text* (page 166) item. It must be the child of a *panel* (page 154).

Under Windows, there is an extended range of functions. Some take character positions - a single integer which can identify a character position - and others take line and character numbers. If you want to use a function that takes one form, but you only have the other, you can convert between them using a function such as multi-text-xy-to-position or multi-text-position-to-line. Note that line and character numbers start from zero.

multi-text-create

long (**multi-text-create long** *panel-id* **string** *callback* **string** *label*
optional string *value* **optional long** *x* **optional long** *y*
optional long *width* **optional long** *height* **optional string** *style* **optional string** *name*)

Creates a multi-line text item on the given panel. The callback may be the empty string ("") to denote no callback, or a word or string for the function name. The function will be called when return is pressed in the text item, with the text item ID as argument. The default value is optional.

If no position is given, the panel item is placed after the last item. The value -1 may be passed to denote a default, so that the position may be left unspecified and the size given.

The *style* parameter can be a *bit list* of the following:

wxHSCROLL	A horizontal scrollbar will be displayed. If wxHSCROLL is omitted, only a vertical scrollbar is displayed, and lines will be wrapped. This parameter is ignored under XView.
wxREADONLY	The text is read-only (not XView).

name gives the multitext a name that can be retrieved with *window-get-name* (page 176).

multi-text-copy

long (**multi-text-copy long** *window-id*)

Copies the selected text to the clipboard. Windows only.

multi-text-cut

long (**multi-text-cut long** *window-id*)

Copies the selected text to the clipboard, then removes the selection. Windows only.

multi-text-get-insertion-point

long (**multi-text-get-insertion-point long** *window-id*)

Returns the insertion point. Windows only.

multi-text-get-last-position

long (**multi-text-get-last-position long** *window-id*)

Returns the final position in the text window. Windows only.

multi-text-get-line-length

long (**multi-text-get-line-length long** *window-id* **long** *line-no*)

Returns the length of the text at line *line-no*. Windows only.

multi-text-get-line-length

long (**multi-text-get-line-text long** *window-id* **long** *line-no*)

Returns the text at *line-no*.

multi-text-get-number-of-lines

long (**multi-text-get-number-of-lines long** *window-id*)

Returns the number of lines in the text window. Windows only.

multi-text-get-value

string (**multi-text-get-value long** *multi-text-item*)

Get the multi-text item's string value.

multi-text-set-value

long (**multi-text-set-value long** *multi-text-item* **string** *value*)

Set the multi-text item's string value.

multi-text-paste

long (**multi-text-paste long** *window-id*)

Pastes the text (if any) from the clipboard to the text window. Windows only.

multi-text-position-to-char

long (**multi-text-position-to-char long** *window-id* **long** *pos*)

Returns the character position (starting from zero) for the given index position. Windows only.

multi-text-position-to-line

long (**multi-text-position-to-line long** *window-id* **long** *pos*)

Returns the line number (starting from zero) for the given index position. Windows only.

multi-text-remove

long (**multi-text-remove long** *window-id* **long** *start-pos* **long** *end-pos*)

Removes the text between the given span selection. Windows only.

multi-text-replace

long (**multi-text-replace long** *window-id* **long** *start-pos* **long** *end-pos* **string** *text*)

Replaces the text between the given span selection with the given text.

multi-text-set-insertion-point

long (**multi-text-set-insertion-point long** *window-id* **long** *pos*)

Sets the insertion point to the given index position. Windows only.

multi-text-set-selection

long (**multi-text-set-selection long** *window-id* **long** *start-pos* **long** *end-pos*)

Sets the selection to the given span of text. Windows only.

multi-text-show-position

long (**multi-text-show-position long** *window-id* **long** *pos*)

Shows the text at the given index position. Windows only.

multi-text-write

long (**multi-text-write long** *window-id* **string** *text*)

Writes the given string into the multitext, at the current cursor point. Windows only.

multi-text-xy-to-position

long (**multi-text-xy-to-position long** *window-id* **long** *char-position* **long** *line*)

Converts the character and line number (each starting from zero) to a position.

7.39. Object

An object is a general term for any wxCLIPS entity, such as window, brush, pen, listbox, etc.

object-delete

long (**object-delete long** *id*)

Deletes an object.

object-get-type

char * (**object-get-type long** *id*)

Returns the C++ class name for the object.

7.40. Panel

A panel is a subwindow for placing panel items, such as *buttons* (page 95) and *text items* (page 166). Its parent must be a *frame* (page 123). A panel inherits most properties from canvas, except for scrollbar functionality.

Note that a *dialog box* (page 121) may be used in a similar way to a panel.

The following callbacks are valid for the panel class:

OnCommand Called with a panel identifier, an item identifier and a command event identifier when a command event is received by a panel item that does not have an associated callback. If you have created a panel or dialog box from a resource, you will need to intercept OnCommand.
OnDefaultAction Called with a panel identifier and an item identifier, when a double click has been received from a listbox.
OnEvent Called with a panel identifier and a *mouse event* (page 148) identifier. This can only be guaranteed only when the panel is in user edit mode (to be implemented).
OnPaint Called with a panel identifier when the panel receives a repaint event from the window manager.
OnSize The function is called with the window identifier, width and height.

See also *window-add-callback* (page 175).

panel-create

long (**panel-create long** *parent-id* **optional long** *x* **optional long** *y*
optional long *width* **optional long** *height* **optional string** *style* **optional string** *name*)

Creates a panel. *parent-id* must be a valid frame ID.

The *style* parameter may be a combination of the following, using the bitwise 'or' operator.

wxABSOLUTE_POSITIONING A hint to the windowing system not to try native Windowing system layout (Motif only). This is the recommended style for all Motif panels and dialog boxes.
wxBORDER Draws a thin border around the panel.
wxVSCROLL Gives the dialog box a vertical scrollbar (XView only).

name gives the panel a name that can be retrieved with *window-get-name* (page 176).

panel-create-from-resource

long (**panel-create-from-resource long** *parent-id* **string** *resource-name*)

Creates a panel from the given wxWindows resource. The resource file containing this resource

must first have been loaded with *load-resource-file* (page 186).

Panel items on a panel or dialog box that has been created from a resource, do not have conventional callbacks. Therefore you need to intercept the OnCommand event for the panel or dialog box and test the name and event of the item passed to this callback.

panel-set-button-font

long (**panel-set-button-font long** *panel-id* **long** *font-id*)

Sets the font used for panel or dialog box item buttons (or contents). See also *panel-set-label-font* (page 155).

panel-set-label-font

long (**panel-set-label-font long** *panel-id* **long** *font-id*)

Sets the font used for panel or dialog box item labels. See also *panel-set-button-font* (page 155).

panel-set-label-position

long (**panel-set-label-position long** *panel-id* **string** *position*)

Change the current label orientation for panel items: *position* may be wxVERTICAL or wxHORIZONTAL.

panel-new-line

long (**panel-new-line long** *panel-id*)

Insert a new line, that is, make subsequent panel items appear at the start of the next line.

7.41. Panel item

A panel item is a control (or widget) that can be placed on a *panel* (page 154) to accept user input, and display information.

The following functions apply to panel items, which include *button* (page 95), *checkbox* (page 100), *choice* (page 100), *message* (page 146), *text* (page 166), *multi-line text* (page 150), *slider* (page 165).

panel-item-get-command-event

long (**panel-item-get-command-event**)

Returns the identifier of the command event for the current panel item or menu callback, or zero if not called within a callback.

panel-item-get-label

string (**panel-item-get-label long** *panel-id*)

Get the item's label.

panel-item-set-default

long (**panel-item-set-default long** *panel-id*)

Make this item the default.

panel-item-set-label

long (**panel-item-set-label long** *panel-id* **string** *label*)

Set the item's label.

7.42. Pen

A pen is used to control the colour and style of subsequent drawing operations on a *device context* (page 115).

pen-create

long (**pen-create string** *colour* **long** *width* **word** *style*)

long (**pen-create long** *colour-value* **long** *width* **word** *style*)

Creates a pen for use in a device context. A pen is used for the outlines of graphic shapes. A brush must be set to fill the shapes.

colour is a wxWindows colour string such as "BLACK", "CYAN".

colour-value is a value returned from *colour-create* (page 103).

width specifies the width of the pen.

style may be one of wxSOLID, wxDOT, wxLONG_DASH, wxSHORT_DASH, wxTRANSPARENT.

pen-delete

long (**pen-delete long** *pen-id*)

Deletes the given pen.

7.43. PostScript device context

A PostScript device context is used for drawing into a postscript file.

postscript-dc-create

long (**postscript-dc-create optional string** *file*
  optional long *interactive* **optional long** *window-id*)

Creates a postscript device context and returns its ID.

file is the file to be used for printing to. *interactive* may be 1 to popup up a printer dialog, or 0 otherwise. *window-id* is a parent window for the printer dialog.

7.44. Printer device context

A Printer device context is used for drawing onto a Windows printer.

printer-dc-create

long (**printer-dc-create optional string** *driver* **optional string** *device*
  optional string *filename* **optional long** *interactive*)

Creates a printer device context and returns its ID.

file is the file to be used for printing to. *interactive* may be 1 to popup up a printer dialog, or 0 otherwise.

7.45. Radiobox

A radiobox item is a matrix of strings with associated radio buttons. The buttons are mutually exclusive, so pressing one will deselect the current selection.

radio-box-create

long (**radio-box-create long** *panel-id* **string** *callback* **string** *label*
  long *x* **long** *y* **long** *width* **long** *height*
  multivalue *strings* **long** *major-dimension* **optional string** *style* **optional string** *name*)

Creates a radiobox item on the given panel. The callback may be the empty string ("") to denote no callback, or a word or string for the function name. The function will be called when an item in the radiobox is selected, with the radiobox ID as argument. If no position is given, the panel item is placed after the last item. The value -1 may be passed to denote a default, so that the position may be left unspecified and the size given.

strings should be a multifield of strings.

major-dimension specifies the number of rows (if style is wxVERTICAL) or columns (if style is wxHORIZONTAL) for a two-dimensional radiobox.

style specifies a *bit list* of styles.

wxVERTICAL Lays the radiobox out in columns.
wxHORIZONTAL Lays the radiobox out in rows.

name gives the radiobox a name that can be retrieved with *window-get-name* (page 176).

radio-box-get-selection

long (**radio-box-get-selection long** *radio-box-id*)

Get the ID of the button currently selected.

radio-box-set-selection

long (**radio-box-set-selection long** *radio-box-id* **long** *item*)

Sets the given button to be the current selection.

7.46. Recordset

See also *Database classes overview* (page 207)

Each recordset represents an ODBC database query. You can make multiple queries at a time by using multiple recordsets with a database or you can make your queries in sequential order using the same recordset.

recordset-create

long (**recordset-create long** *db* **optional string** *type = "wxOPEN_TYPE_DYNASET"* **optional string** *options = "wxOPTION_DEFAULT"*)

Constructs a recordset object and returns its id. *db* is a pointer to the database instance you wish to use the recordset with. Currently there are two possible values of *type*:

- "wxOPEN_TYPE_DYNASET": Loads only one record at a time into memory. The other data of the result set will be loaded dynamically when moving the cursor. This is the default type.
- "wxOPEN_TYPE_SNAPSHOT": Loads all records of a result set at once. This will need much more memory, but will result in faster access to the ODBC data.

The *options* parameter is not used yet.

The function appends the recordset object to the parent database's list of recordset objects, for later destruction when the database is destroyed.

recordset-delete

long (**recordset-delete long** *id*)

Deletes the recordset. All data except that stored in user-defined variables will be lost. It also unlinks the recordset object from the parent database's list of recordset objects.

recordset-execute-sql

long (**recordset-execute-sql long** *id* **string** *sql*)

Directly executes a SQL statement. The data will be presented as a normal result set. Note that the recordset must have been created as a snapshot, not dynaset. Dynasets will be implemented in the near future.

Examples of common SQL statements are given in *A selection of SQL commands* (page 211).

recordset-get-char-data

string (**recordset-get-char-data long** *id* **string-or-long** *col*)

Returns the character (string) data for the current record at the specified column. The column can be a name or an integer position (starting from zero).

recordset-get-col-name

string (**recordset-get-col-name long** *id* **long** *col*)

Gets the name of the coumn at position *col*. Returns the empty string if *col* does not exist.

recordset-get-col-type

string (**recordset-get-col-type long** *id* **string-or-long** *col*)

Gets the name of the coumn at position *col* or name *col*. Returns "SQL_TYPE_NULL" if *col* does not exist.

See *ODBC SQL data types* (page 210) for the possible return values from this function.

recordset-get-columns

long (**recordset-get-columns long** *id* **optional string** *table = ""*)

Returns the columns of the table with the specified name. If no name is given, the internal class member *table* will be used. If both names are NULL nothing will happen. The data will be presented as a normal result set, organized as follows:

0 (VARCHAR) TABLE_QUALIFIER

1 (VARCHAR) TABLE_OWNER

2 (VARCHAR) TABLE_NAME

3 (VARCHAR) COLUMN_NAME

4 (SMALLINT) DATA_TYPE

5 (VARCHAR) TYPE_NAME

6 (INTEGER) PRECISION

7 (INTEGER) LENGTH

8 (SMALLINT) SCALE

9 (SMALLINT) RADIX

10 (SMALLINT) NULLABLE

11 (VARCHAR) REMARKS

recordset-get-database

long (**recordset-get-database long** *id*)

Returns the identifier of the parent database.

recordset-get-data-sources

long (**recordset-get-data-sources long** *id*)

Gets the currently-defined data sources via the ODBC manager. The data will be presented as a normal result set. See the documentation for the ODBC function SQLDataSources for how the data is organized. The name of the source is at column 0.

recordset-get-error-code

string (**recordset-get-error-code long** *id*)

Returns the error code of the last ODBC action. This will be a string containing one of:

SQL_ERROR General error.
SQL_INVALID_HANDLE An invalid handle was passed to an ODBC function.
SQL_NEED_DATA ODBC expected some data.
SQL_NO_DATA_FOUND No data was found by this ODBC call.
SQL_SUCCESS The call was successful.
SQL_SUCCESS_WITH_INFO The call was successful, but further information can be obtained from the ODBC manager.

recordset-get-filter

string (**recordset-get-filter long** *id*)

Returns the current filter.

recordset-get-float-data

double (**recordset-get-float-data long** *id* **string-or-long** *col*)

Returns the floating-point data for the current record at the specified column. The column can be a name or an integer position (starting from zero).

recordset-get-foreign-keys

long (**recordset-get-foreign-keys long** *id* **optional string** *ftable* = *""* **optional string** *ktable* = *""*)

Returns a list of foreign keys in the specified table (columns in the specified table that refer to primary keys in other tables), or a list of foreign keys in other tables that refer to the primary key in the specified table.

If *ptable* contains a table name, this function returns a result set containing the primary key of the specified table.

If *ftable* contains a table name, this functions returns a result set of containing all of the foreign keys in the specified table and the primary keys (in other tables) to which they refer.

If both *ptable* and *ftable* contain table names, this function returns the foreign keys in the table specified in *ftable* that refer to the primary key of the table specified in *ptable*. This should be one key at most.

GetForeignKeys returns results as a standard result set. If the foreign keys associated with a primary key are requested, the result set is ordered by FKTABLE_QUALIFIER, FKTABLE_OWNER, FKTABLE_NAME, and KEY_SEQ. If the primary keys associated with a foreign key are requested, the result set is ordered by PKTABLE_QUALIFIER, PKTABLE_OWNER, PKTABLE_NAME, and KEY_SEQ. The following table lists the columns in the result set.

0 (VARCHAR) PKTABLE_QUALIFIER
1 (VARCHAR) PKTABLE_OWNER
2 (VARCHAR) PKTABLE_NAME
3 (VARCHAR) PKCOLUMN_NAME
4 (VARCHAR) FKTABLE_QUALIFIER
5 (VARCHAR) FKTABLE_OWNER
6 (VARCHAR) FKTABLE_NAME
7 (VARCHAR) FKCOLUMN_NAME
8 (SMALLINT) KEY_SEQ
9 (SMALLINT) UPDATE_RULE
10 (SMALLINT) DELETE_RULE
11 (VARCHAR) FK_NAME
12 (VARCHAR) PK_NAME

recordset-get-int-data

long (**recordset-get-int-data long** *id* **string-or-long** *col*)

Returns the integer data for the current record at the specified column. The column can be a name or an integer position (starting from zero).

recordset-get-number-cols

long (**recordset-get-number-cols long** *id*)

Returns the number of columns in the result set.

recordset-get-number-fields

long (**recordset-get-number-fields long** *id*)

Not implemented.

recordset-get-number-params

long (**recordset-get-number-params long** *id*)

Not implemented.

recordset-get-number-records

long (**recordset-get-number-records long** *id*)

Returns the number of records in the result set.

recordset-get-primary-keys

long (**recordset-get-primary-keys long** *id* **optional string** *table = ""*)

Returns the column names that comprise the primary key of the table with the specified name. If no name is given the class member *tablename* will be used. If both names are NULL nothing will happen. The data will be presented as a normal result set, organized as follows:

0 (VARCHAR) TABLE_QUALIFIER
1 (VARCHAR) TABLE_OWNER
2 (VARCHAR) TABLE_NAME
3 (VARCHAR) COLUMN_NAME
4 (SMALLINT) KEY_SEQ
5 (VARCHAR) PK_NAME

recordset-get-result-set

long (**recordset-get-result-set long** *id*)

Copies the data presented by ODBC into the recordset. Depending on the recordset type all or only one record(s) will be copied. Usually this function will be called automatically after each successful database operation.

recordset-get-table-name

string (**recordset-get-table-name long** *id*)

Returns the name of the current table.

recordset-get-tables

long (**recordset-get-tables long** *id*)

Gets the tables of a database. The data will be presented as a normal result set, organized as follows:

0 (VARCHAR) TABLE_QUALIFIER
1 (VARCHAR) TABLE_OWNER
2 (VARCHAR) TABLE_NAME
3 (VARCHAR) TABLE_TYPE (TABLE, VIEW, SYSTEM TABLE, GLOBAL TEMPORARY, LOCAL TEMPORARY, ALIAS, SYNONYM, or database-specific type)
4 (VARCHAR) REMARKS

recordset-goto

long (**recordset-goto long** *id* **long** *n*)

Moves the cursor to the record with the number n, where the first record has the number 0.

recordset-is-bof

long (**recordset-is-bof long** *id*)

Returns 1 if the user tried to move the cursor before the first record in the set.

recordset-is-field-dirty

long (**recordset-is-field-dirty long** *id* **string-or-long** *field*)

Returns 1 if the given field has been changed but not saved yet.

recordset-is-field-null

long (**recordset-is-field-null long** *id* **string-or-long** *field*)

Returns 1 if the given field has no data.

recordset-is-col-nullable

long (**recordset-is-col-nullable long** *id* **string-or-long** *field*)

Returns 1 if the given column may contain no data.

recordset-is-eof

long (**recordset-is-eof long** *id*)

Returns 1 if the user tried to move the cursor behind the last record in the set.

recordset-is-open

long (**recordset-is-open long** *id*)

Returns 1 if the parent database is open.

recordset-move

long (**recordset-move long** *id* **long** *rows*)

Moves the cursor a given number of rows. Negative values are allowed.

recordset-move-first

long (**recordset-move-first long** *id*)

Moves the cursor to the first record.

recordset-move-last

long (**recordset-move-last long** *id*)

Moves the cursor to the last record.

recordset-move-next

long (**recordset-move-next long** *id*)

Moves the cursor to the next record.

recordset-move-prev

long (**recordset-move-prev long** *id*)

Moves the cursor to the previous record.

recordset-query

long (**recordset-query long** *id* **string** *columns* **string** *table* **optional string** *filter*)

Start a query. An SQL string of the following type will automatically be generated and executed: "SELECT columns FROM table WHERE filter".

recordset-set-table-name

long (**recordset-set-table-name long** *id* **string** *table*)

Specify the name of the table you want to use.

7.47. Server

See also *Interprocess communication overview* (page 201)

A server object represents the server side of a DDE conversation.

To delete a server object, use object-delete.

server-create

long (**server-create string** *service-name*)

Creates a server object, and returns an integer id if successful.

service-name is a string identifying this service to potential clients. Under UNIX, it should contain a valid port number.

The application should use *window-add-callback* (page 175) to register the window callback OnAcceptConnection or OnAcceptConnectionEx, which will be called when a client requests a connection.

OnAcceptConnection will be called with arguments:

1. server id (long)
2. the name of the topic in which the client is interested (string)
3. tentative connection id (long)

If this function returns zero, the connection is rejected and deleted, otherwise it is confirmed. See also *connection* (page 104).

OnAcceptConnectionEx will be called with arguments:

1. server id (long)
2. the name of the topic in which the client is interested (string)

This form assumes that the connection object will be created with connection-create from within the callback.

7.48. Slider

A slider is a panel item for denoting a range of values. It must be a child of a *panel* (page 154).

slider-create

long (**slider-create long** *panel-id* **string** *callback* **string** *label*
long *value* **long** *min-value* **long** *max-value*
long *width* **optional long** *x* **optional long** *y* **optional string** *style* **optional string** *name*)

Creates a horizontal slider item on the given panel. The callback may be the empty string ("") to denote no callback, or a word or string for the function name. The function will be called when the slider value is changed, with the slider item ID as argument.

If no position is given, the panel item is placed after the last item. The value -1 may be passed to denote a default, so that the position may be left unspecified and the size given.

style is a *bit list* of the following:

wxHORIZONTAL The item will be created as a horizontal slider.
wxVERTICAL The item will be created as a vertical slider.

name gives the slider a name that can be retrieved with *window-get-name* (page 176).

slider-set-value

long (**slider-set-value long** *slider-id* **long** *value*)

Set the value of the slider.

slider-get-value

long (**slider-get-value long** *slider-id*)

Gets the value of the slider.

7.49. Text

A text item is used for displaying and editing a single line of text. It must be a child of a *panel* (page 154).

See also *multi-line text* (page 150).

text-create

long (**text-create long** *panel-id* **string** *callback* **string** *label*
optional string *value* **optional long** *x* **optional long** *y*
optional long *width* **optional long** *height* **optional string** *style* **optional string** *name*)

Creates a single-line text item on the given panel. The callback may be the empty string ("") to denote no callback, or a word or string for the function name. The function will be called when return is pressed in the text item, with the text item ID as argument. The default value is optional.

If no position is given, the panel item is placed after the last item. The value -1 may be passed to denote a default, so that the position may be left unspecified and the size given.

style may be the empty string, or a *bit list* of:

wxTE_PROCESS_ENTER The callback function will receive the event wxEVENT_TYPE_TEXT_ENTER_COMMAND. Note that this will break tab

traversal for this panel item under Windows. Single-line text only.
wxTE_PASSWORD The text will be echoed as asterisks. Single-line text only.
wxTE_READONLY The text will not be user-editable.
wxHSCROLL A horizontal scrollbar will be displayed. If wxHSCROLL is omitted, only a vertical scrollbar is displayed, and lines will be wrapped. This parameter is ignored under XView. Multi-line text only.

name gives the group box a name that can be retrieved with *window-get-name* (page 176).

text-set-value

long (**text-set-value long** *text-id* **string** *value*)

Set the string value of a text item.

text-get-value

string (**text-get-value long** *text-id*)

Get the string value of a text item.

7.50. Text window

To display a lot of text, use this subwindow as the child of a *frame* (page 123). It is capable of loading and saving files of ASCII text, and under Open Look and Motif, the text can be edited directly.

To allow the user to edit text under Windows as well as the other platforms, either invoke an external editor or create a *multi-line text item* (page 150) on a panel.

Under Windows, there is an extended range of functions. Some take character positions - a single integer which can identify a character position - and others take line and character numbers. If you want to use a function that takes one form, but you only have the other, you can convert between them using a function such as text-window-xy-to-position or text-window-position-to-line. Note that line and character numbers start from zero.

The following callbacks are valid for the dialog box class:

OnChar (Not XView.) The function is called with the text window identifier, key code, and key event identifier. If the event is an ASCII keypress, the code will correspond to the ASCII code; otherwise, the programmer must refer to the constants defined in `common.h`, in the wxWindows library.

To invoke default processing, call text-window-on-char.
OnSize The function is called with the text window identifier, width and height.

See also *window-add-callback* (page 175).

text-window-clear

long (**text-window-clear long** *window-id*)

Clears the contents of a text subwindow. Returns 1 if successful, 0 otherwise.

text-window-copy

long (**text-window-copy long** *window-id*)

Copies the selected text to the clipboard.

text-window-cut

long (**text-window-cut long** *window-id*)

Copies the selected text to the clipboard, then removes the selection.

text-window-create

long (**text-window-create long** *parent-id* **optional long** *x* **optional long** *y* **optional long** *width* **optional long** *height* **optional string** *style* **optional string** *name*)

Creates a text subwindow. *parent-id* must be a valid frame ID.

style is a *bit list* of some of the following:

wxBORDER Use this style to draw a thin border in Windows 3 (non-native implementation only).
wxNATIVE_IMPL Use this style to allow editing under MS Windows, albeit with a 64K limitation.

name gives the text window a name that can be retrieved with *window-get-name* (page 176).

text-window-discard-edits

void (**text-window-discard-edits long** *window-id*)

Discard any edits in the text window.

text-window-get-contents

string (**text-window-get-contents long** *window-id*)

Returns the window contents (to a maximum of 1000 characters).

text-window-get-insertion-point

long (**text-window-get-insertion-point long** *window-id*)

Returns the insertion point.

text-window-get-last-position

long (**text-window-get-last-position long** *window-id*)

Returns the final position in the text window.

text-window-get-line-length

long (**text-window-get-line-length long** *window-id* **long** *line-no*)

Returns the length of the text at line *line-no*.

text-window-get-line-length

long (**text-window-get-line-text long** *window-id* **long** *line-no*)

Returns the text at *line-no*.

text-window-get-number-of-lines

long (**text-window-get-number-of-lines long** *window-id*)

Returns the number of lines in the text window.

text-window-load-file

long (**text-window-load-file long** *window-id* **string** *filename*)

Load the file onto the text subwindow, returning 1 for success, 0 for failure.

text-window-modified

long (**text-window-modified long** *window-id*)

Returns 1 if the text has been modified, 0 otherwise.

text-window-on-char

long (**text-window-on-char long** *panel-id* **long** *event-id*)

The default implementation of the OnChar callback. Call this to pass intercepted characters through to the text window. Note that under Windows, there seems to be an intermittent GPF bug when using this and then closing the window.

text-window-paste

long (**text-window-paste long** *window-id*)

Pastes the text (if any) from the clipboard to the text window.

text-window-position-to-char

long (**text-window-position-to-char long** *window-id* **long** *pos*)

Returns the character position (starting from zero) for the given index position.

text-window-position-to-line

long (**text-window-position-to-line long** *window-id* **long** *pos*)

Returns the line number (starting from zero) for the given index position.

text-window-remove

long (**text-window-remove long** *window-id* **long** *start-pos* **long** *end-pos*)

Removes the text between the given span selection.

text-window-replace

long (**text-window-replace long** *window-id* **long** *start-pos* **long** *end-pos* **string** *text*)

Replaces the text between the given span selection with the given text.

text-window-show-position

long (**text-window-show-position long** *window-id* **long** *pos*)

Shows the text at the given index position.

text-window-save-file

long (**text-window-save-file long** *window-id* **string** *filename*)

Saves the text in the subwindow to the given file, returning 1 for success, 0 for failure.

text-window-set-editable

long (**text-window-set-editable long** *window-id* **long** *editable*)

Sets the window editable (*editable* is 1) or read-only (*editable* is 0).

text-window-set-insertion-point

long (**text-window-set-insertion-point long** *window-id* **long** *pos*)

Sets the insertion point to the given index position.

text-window-set-selection

long (**text-window-set-selection long** *window-id* **long** *start-pos* **long** *end-pos*)

Sets the selection to the given span of text.

text-window-write

long (**text-window-write long** *window-id* **string** *text*)

Writes the given string into the text window, at the current cursor point.

text-window-xy-to-position

long (**text-window-xy-to-position long** *window-id* **long** *char-position* **long** *line*)

Converts the character and line number (each starting from zero) to a position.

7.51. Timer

A timer object can be created to notify the application at regular intervals.

timer-create

long (**timer-create**)

Creates a timer object. Use timer-start to start the timer, and register a Notify callback function to receive notification.

timer-delete

long (**timer-delete long** *id*)

Stops and deletes the timer object.

timer-start

long (**timer-start long** *id* **long** *milliseconds*)

Starts the timer, notifying at intervals of duration *milliseconds*.

timer-stop

long (**timer-stop long** *id*)

Stops the timer.

7.52. Toolbar

See also *Overview* (page 205)

A toolbar is an array of bitmap buttons, implemented by drawing bitmaps onto a canvas, instead of using the native button implementation.

toolbar-add-separator

long (**toolbar-add-separator long** *id*)

Adds a separator between tools.

toolbar-add-tool

long (**toolbar-add-tool long** *id* **long** *index* **long** *bitmap-id1* **optional long** *bitmap-id2 = 0* **optional long** *is-toggle = 0* **optional double** *x = -1.0* **optional double** *x = 1.0* **optional long** *client-data = 0* **optional string** *short-help-string=""* **optional string** *long-help-string=""*)

Adds a tool to the toolbar. Pass at least one bitmap, the bitmap to be displayed when active and not depressed; and optionally, the bitmap to be displayed when the tool is depressed or toggled. Under Windows, only one bitmap is necessary, and under X, the second bitmap will be created automatically as the inverse of the first button if none is supplied.

You can specify whether the tool is allowed to toggle, and pass a position if you are not going to automatically layout the toolbar with *toolbar-layout*. You can associate client data with the tool.

short-help-string is only used by Windows 95 versions of wxCLIPS. The string is used to supply text for a tooltip, a small yellow window that appears as the mouse pointer hovers over the button.

long-help-string can be used for longer help strings, such as status line help.

toolbar-clear-tools

long (**toolbar-clear-tools long** *id*)

Clears all the tools from the toolbar.

toolbar-create

long (**toolbar-create long** *parent_id* **optional long** *x* **optional long** *y* **optional long** *width* **optional long** *height* **optional string** *style* **optional string** *orientation = "wxVERTICAL"* **optional long** *nrows-or-columns* **optional long** *create-buttons* **optional string** *name*)

Creates a toolbar, with a given layout orientation (whether the tools are automatically laid out in rows or columns) and the number of rows or columns. These parameters are arbitrary if the tools are to be positioned manually and *toolbar-layout* not called.

style may be a *bit list* of:

- wxTB_3DBUTTONS: gives a simple 3D look to the buttons.

create-buttons should be 1 (the default) if the toolbar should superimpose the user-supplied buttons onto a larger 3D button. If 0, the tool will be the same size as the button, and the toggle state will be represented by inverting the tool (Windows) or adding a border (X).

Returns the toolbar id if successful, zero otherwise.

name gives the toolbar a name that can be retrieved with *window-get-name* (page 176).

Note that absolute tool positioning (or the toolbar-layout function) does not work for buttonbars under Windows 95: instead, you can specify the number of rows for the toolbar, and use toolbar-add-separator to achieve inter-tool spacing.

toolbar-create-tools

long (**toolbar-create-tools long** *id*)

This should be called when creating Windows 95 buttonbars, after all tools have been added. It adds the tools to the toolbar. You can also call it for non-Windows 95 toolbars and buttonbars, in which case it will have no effect.

toolbar-enable-tool

long (**toolbar-enable-tool long** *id* **long** *tool-id* **long** *enable*)

Enables the tool (if *enable* is 1) or disables it (if *enable* is 0).

toolbar-get-max-height

double (**toolbar-get-max-height long** *id*)

Gets the maximum height of the toolbar when it has been automatically laid out.

toolbar-get-max-width

double (**toolbar-get-max-width long** *id*)

Gets the maximum width of the toolbar when it has been automatically laid out.

toolbar-get-tool-client-data

long (**toolbar-get-tool-client-data long** *id* **long** *tool-id*)

Returns the client data associated with the given tool.

toolbar-get-tool-enabled

long (**toolbar-get-tool-enabled long** *id* **long** *tool-id*)

Returns 1 if the tool is enabled, 0 otherwise.

toolbar-get-tool-long-help

string (**toolbar-get-tool-long-help long** *id* **long** *tool-id*)

Returns the long help associated with this tool.

toolbar-get-tool-short-help

string (**toolbar-get-tool-short-help long** *id* **long** *tool-id*)

Returns the short help associated with this tool.

toolbar-get-tool-state

long (**toolbar-get-tool-state long** *id* **long** *tool-id*)

Returns the tool state (1 for toggled on, 0 for off).

toolbar-layout

long (**toolbar-layout long** *id*)

Lays out all the tools if automatic layout is required.

Note that this function does not work for buttonbars under Windows 95: but you can still specify the number of rows for the toolbar.

toolbar-on-paint

void (**toolbar-on-paint long** *id*)

Calls the default toolbar paint callback. You may wish to call this if you override the default callback.

toolbar-set-default-size

long (**toolbar-set-default-size long** *id* **long** *width* **long** *height*)

Sets the width and height of tool buttons (Windows only). The default is 24 by 22.

toolbar-set-margins

long (**toolbar-set-margins long** *id* **long** *x* **long** *y*)

Sets the width and height of the toolbar margins and spacing, if automatic layout is being used.

toolbar-set-tool-long-help

long (**toolbar-set-tool-long-help long** *id* **long** *tool-id* **string** *help-string*)

Sets the long help associated with this tool.

toolbar-set-tool-short-help

long (**toolbar-set-tool-short-help long** *id* **long** *tool-id* **string** *help-string*)

Sets the short help associated with this tool.

toolbar-toggle-tool

long (**toolbar-toggle-tool long** *id* **long** *tool-id* **long** *toggle*)

Toggles the tool on or off.

7.53. Window

The window is an 'abstract' class which does not exist in its own right, but is used to access the functionality of classes derived from it. Therefore, please refer to this section when considering other classes.

window-add-callback

long (**window-add-callback long** *window-id* **word** *event* **word** *function*)

Sets the callback function of a given window (frame, panel, panel item etc.) for the given event, to be the given CLIPS function. See individual window descriptions for details of valid callbacks.

window-centre

long (**window-centre long** *window-id* **word** *orientation*)

orientation may be wxVERTICAL, wxHORIZONTAL or wxBOTH. Centres the window with respect to its parent (or desktop).

window-close

long (**window-close long** *window-id* **long** *force-close*)

Closes the dialog or frame without immediately deleting the object. The object will be cleaned up in 'idle' processing time. Use of this function instead of deleting the window directly is highly recommended, especially under Motif which is sensitive to frame and dialog deletion.

This function first calls the window's OnClose handler. If OnClose returns FALSE, the close will be vetoed *unless* the *force-close* argument is 1, in which case the deletion will take place anyway.

window-close should only be used for frames and dialog boxes.

window-delete

long (**window-delete long** *window-id*)

Deletes a window. See also *window-close* (page 175).

window-enable

long (**window-enable long** *window-id* **long** *enable*)

If *enable* is 1, enables the window for input. If *enable* is 0, the window is disabled (greyed out in the case of a panel item).

window-fit

long (**window-fit long** *window-id*)

Fits the panel, dialog box or frame around its children.

window-get-name

string (**window-get-name long** *window-id*)

Gets the window's name (the 'name' parameter passed to a window constructor).

window-get-next-child

long (**window-get-next-child long** *window-id* **long** *child-id*)

If *child-id* is zero, returns the id of the first child window of *window-id*.

If *child-id* is a valid child id, returns the id of the next child window.

Returns -1 if there are no more children.

Example:

```
(bind ?child-id (window-get-next-child ?win-id 0))
```

```
(while (neq ?child-id -1)
  (bind ?type (object-get-type ?child-id))
  ...
  (bind ?child-id (window-get-next-child ?win-d ?child-id))
)
```

window-get-parent

long (**window-get-parent long** *window-id*)

Gets the id of the window's parent.

window-get-x

long (**window-get-x long** *window-id*)

Get the *x* coordinate of the window.

window-get-y

long (**window-get-y long** *window-id*)

Gets the *y* coordinate of the window.

window-get-width

long (**window-get-width long** *window-id*)

Gets the width of the window.

window-get-height

long (**window-get-height long** *window-id*)

Gets the height of the window.

window-get-client-width

long (**window-get-client-width long** *window-id*)

Gets the client width (space available for child windows) of the window.

window-get-client-height

long (**window-get-client-height long** *window-id*)

Gets the client height (space available for child windows) of the window.

window-is-shown

long (**window-is-shown long** *window-id*)

Returns 1 if the window is shown, 0 otherwise.

window-make-modal

long (**window-make-modal long** *window-id* **long** *modal*)

modal may be 1 to disable all frames and dialog boxes except this one, or 0 to enable all frames and dialogs again.

Has no effect in XView.

window-popup-menu

long (**window-popup-menu long** *window-id* **long** *menu-id* **double** *x* **double** *y*)

Pops up a menu on the window, at the given position. The menu will be dismissed (but not destroyed) when the user makes a selection.

Note that there is a reliability problem with Motif popup menus; they may not pop up after the first time.

window-refresh

long (**window-refresh long** *window-id* **long** *erase-background=1* **long** *x=-1* **long** *y=-1* **long** *width=-1* **long** *height=-1*) Refreshes the give window, causing OnPaint to be called. This function should be called in preference to calling an OnPaint handler directly.

erase-background controls whether the window background is automatically cleared in the current background colour (1) or not (0). The default is 1.

The last four optional arguments define a rectangle to limit the 'damaged' area. If all arguments are -1, this is taken to mean that the whole window should be refreshed.

window-remove-callback

long (**window-remove-callback long** *window-id* **word** *event*)

Removes the callback function associated with this event.

window-set-cursor

long (**window-set-cursor long** *window-id* **long** *cursor-id*)

Sets the cursor for this window.

window-set-focus

long (**window-set-focus long** *window-id*)

Set this window to have the keyboard focus.

window-set-size

long (**window-set-size long** *window-id* **long** *x* **long** *y* **long** *width* **long** *height*)

Sets the position and size of the window.

window-set-size-hints

long (**window-set-size-hints long** *window-id* **long** *min-width=-1* **long** *min-height=-1* **long** *max-width=-1* **long** *max-height=-1* **long** *inc-width=-1* **long** *inc-height=-1*) Tells the windowing system to restrict the resizing of the frame or dialog box.

min-width, min-height determine the minimum size of the window.

max-width, max-height determine the maximum size of the window.

inc-width, inc-height determine the increments by which the window is sized (Motif only).

-1 values indicate where default values should be used instead of application-specified values.

window-set-client-size

long (**window-set-client-size long** *window-id* **long** *width* **long** *height*)

Sets the client size (available space for child windows) of the window.

window-show

long (**window-show long** *window-id* **long** *show*)

If *show* is 1, shows the window. If *show* is 0, the window is hidden. If the window is a modal dialog box, *show = 1* will start the modal loop, and *show = 0* will terminate the loop (allowing execution to proceed after the first call to *window-show*).

7.54. Miscellaneous

This section contains an assortment of useful GUI and other functions.

batch

void (**batch string** *filename*)

Executes the given file of CLIPS commands as if from a terminal. Note that full error checking on construct definitions is not performed; use load when checking is required.

begin-busy-cursor

void (**begin-busy-cursor**)

Starts a 'busy' section of code, putting up an hourglass cursor. Use *end-busy-cursor* (page 182) at the end of the section.

These pairs of calls may be nested for programming convenience.

bell

void (**bell**)

Rings the system bell.

chdir

long (**chdir string** *directory*)

Changes to the given directory and returns 1 if successful, 0 otherwise.

clean-windows

void (**clean-windows**)

Delete all frames and dialog boxes created through CLIPS calls.

clear-ide-window

void (**clear-ide-window**)

Clears the wxCLIPS development window.

clear-resources

long (**clear-resources**)

Clears the wxCLIPS resource table. This table is separate from the default resource table that is used by wxCLIPS and other host C++ applications.

See also *load-resource-file* (page 186), *panel-create-from-resource* (page 154), *dialog-box-create-from-resource* (page 122).

copy-file

long (**copy-file string** *f1* **string** *f2*)

Copies file *f1* to *f2*, returning 1 if successful, 0 otherwise.

debug-msg

void (**debug-msg string** *text*)

Outputs *text* to the debugging stream. Under X, this is the standard error stream. Under Windows, this outputs to the debugger (if present) or any other program that can intercept debug messages, such as Microsoft's DBWIN sample application. This can be useful if you don't have a text window available, and you want the messages to persist after your program has exited, gracefully or otherwise.

dir-exists

long (**dir-exists string** *directory*)

Returns 1 if the directory exists, 0 otherwise.

dll-execute

char* (**dll-execute string** *library* **string** *function* **string** *argument=""*)

Calls a function in a DLL (32-bit Windows only). For example:

```
  (bind ?ans (dll-execute "c:\\windows\\system\\mydll.dll" "MyFunction"
"my args"))
```

The C DLL function must be of the form:

```
  extern "C" char* APIENTRY FunctionName(char* arg) ;
```

The function argument and return types must be fixed because it is not possible to construct an arbitrary function call. The DLL function must parse the argument (which might, for example, be one or more space-separated numbers) and convert the result of the call to a string. The calling CLIPS code has to in turn convert the argument(s) to a string, and parse the returned string.

To speed up execution of a DLL function and avoid unnecessary loading and unloading of the module, call *dll-load-library* (page 182) before any dll-execute calls are made and *dll-free-library* (page 181) when the function will no longer be called. Windows keeps a reference count and will keep the DLL in memory between these two calls.

See also *dll-load-library* (page 182), *dll-free-library* (page 181), *dll-function-exists* (page 182).

dll-free-library

long (**dll-free-library long** *library-id*)

Frees the given DLL module, return 1 if succesful, 0 otherwise. This should match a call to *dll-*

load-library (page 182).

dll-function-exists

long (**dll-function-exists string** *file* **string** *function*)

Returns 1 if the given function exists in the DLL file, 0 otherwise.

dll-load-library

long (**dll-load-library string** *library*)

Loads the given DLL module. Call *dll-free-library* (page 181) to free the module. This does not have to be called before *dll-execute* (page 181), but if you are calling a function multiple times, it will speed things up.

The function returns an identifier that must be passed to dll-free-library.

end-busy-cursor

void (**end-busy-cursor**)

Ends a 'busy' section of code, resetting the cursor to the original for each window. Use *begin-busy-cursor* (page 180) at the start of the section.

These pairs of calls may be nested for programming convenience.

execute

long (**execute string** *command* **optional long** *synchronous = 0*)

Executes the given system command, either asynchronously (the function returns control immediately) or synchronously (the function returns control when the command terminates). The default is asynchronous execution.

This function should be used in preference to the CLIPS *system* command. Under Windows, it calls WinExec. You cannot call built-in DOS commands (such erase) with this function: you may need to write a batch file instead.

See also *shell-execute* (page 189).

fact-string-existp

bool (**fact-string-existp string** *fact*)

Allows an application to test a fact from within a function. For example:

```
CLIPS> (fact-string-existp "(Example 1)")
CLIPS> FALSE
```

```
CLIPS> (assert (Example 2))
CLIPS> <Fact-0>
CLIPS> (fact-string-existp "(Example 2)")
CLIPS> TRUE
CLIPS> (retract 0)
CLIPS> (fact-string-existp "(Example 2)")
CLIPS> FALSE
```

file-exists

long (**file-exists string** *filename*)

Returns 1 if the file exists, 0 otherwise.

file-selector

string (**file-selector optional string** *message* **optional string** *path* **optional string** *file* **optional string** *extension* **optional string** *wildcard* **optional long** *parent-id* **optional string** *flags*)

Pops up a file selector with given (optional) arguments, returning a fully qualified filename or the empty string.

flags can be the empty string or a *bit list* of the following:

wxSAVE Display the Save button instead of the Open button (Windows only).
wxOVERWRITE_PROMPT Prompts the user when saving if there is already a file of that name (Windows only).
wxOPEN Display the Open button (Windows only).
wxHIDE_READONLY Hide the "Open as read-only" checkbox (Windows only).

find-window-by-label

long (**find-window-by-label string** *label* **optional long** *parent-id*)

Finds a window with a label or title corresponding to *label*. Optionally pass a parent id from where to start searching.

find-window-by-name

long (**find-window-by-name string** *name* **optional long** *parent-id*)

Finds a window with a name corresponding to *name*. Optionally pass a parent id from where to start searching.

float-to-string

string (**float-to-string double** *n*)

Convert a floating point number to a string.

get-active-window

long (**get-active-window**)

Returns the id of the active window, or -1 if either there is no active window in this application, or the active window has not been created as a wxCLIPS window.

This function only works under MS Windows.

get-choice

string (**get-choice string** *message* **multifield** *choices* **optional long** *centre-message* **optional long** *parent-id*)

Given a message string and a multifield comprising a number of choice strings, pops up a menu for the user to select one item. Returns one of the supplied strings if the user pressed Ok, or the null string if the user pressed Cancel.

A multifield can be created with the CLIPS function mv-append, for example:

```
(bind ?choice (get-choice "Choose please"
                          (mv-append "One" "Two" "Three")))
```

If *centre-message* is 1 (the default), the message will be centred on the dialog box. If it is 0, the message will be left-justified. New lines are allowed in the message.

get-elapsed-time

long (**get-elapsed-time optional long** *reset-timer = 1*)

Returns the elapsed time in milliseconds since the last reset, using *start-timer* (page 189) or by passing 1 to this function.

get-ide-window

long (**get-ide-window**)

Gets the id of the wxCLIPS development window (stand-alone wxCLIPS only). If the development window has not been created, zero is returned.

get-os-version

string (**get-os-version**)

Returns a string representing the operating system under which the program is currently running. It is more precise than *get-platform* (page 185). However, be careful about inferring from a value

of wxWIN95 that this version of wxCLIPS is compiled as a Windows 95 application: it may be compiled as a generic WIN32 application.

This may be one of the following (although only a number of these platforms are currently supported).

- wxCURSES: Text-only CURSES platform
- wxXVIEW_X: Sun's XView OpenLOOK toolkit
- wxMOTIF_X: OSF Motif 1.x.x
- wxCOSE_X: OSF Common Desktop Environment
- wxNEXTSTEP: NeXTStep
- wxMACINTOSH: Apple System 7
- wxGEOS: GEOS
- wxOS2_PM: OS/2 Workplace
- wxWINDOWS: Windows or WfW
- wxPENWINDOWS: Windows for Pen Computing
- wxWINDOWS_NT: Windows NT
- wxWIN32S: Windows 32S API
- wxWIN95: Windows 95
- wxWIN386: Watcom 32-bit supervisor mode

get-platform

string (**get-platform**)

Gets a string indicating the current platform the program is running on. Currently one of "XView", "Motif" and "Windows 3.1".

For a more precise notion of current operating system, see *get-os-version* (page 184).

get-resource

string (**get-resource string** *section* **string** *entry* **optional string** *filename*)

Gets the value from the resource file (such as WIN.INI or .Xdefaults, depending on platform). If the filename is omitted, WIN.INI under Windows or .Xdefaults under X will be used.

See also *write-resource* (page 190)

get-text-from-user

string (**get-text-from-user string** *message* **optional string** *default-value*
optional long *centre-message* **optional long** *parent-id*)

Give a message string and a default value, pops up a dialog box prompting the user to enter a string. Returns the input string if the user pressed Ok, or the null string if the user pressed Cancel.

If *centre-message* is 1 (the default), the message will be centred on the dialog box. If it is 0, the message will be left-justified. New lines are allowed in the message.

load-resource-file

long (**load-resource-file string** *filename*)

Loads the given `.wxr` resource file, return 1 if the operation was successful.

See also *clear-resources* (page 180), *panel-create-from-resource* (page 154), *dialog-box-create-from-resource* (page 122).

long-to-string

string (**long-to-string long** *value*)

Convert the integer to a string.

make-metafile-placeable

long (**make-metafile-placeable string** *filename* **long** *min-x* **long** *min-y* **long** *max-x* **long** *max-y* **optional double** *scale*)

Given a filename for an existing, valid metafile, 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 dc-get-min-x, dc-get-min-y, dc-get-max-x, and dc-get-max-y.

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 MM_TEXT mapping mode, which wxWindows 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.

See also *metafile-dc* (page 148).

mci-send-string

string (**mci-send-string string** *command*)

Sends an MCI (Media Control Interface) string to Windows. Returns an error string if there was an error, or the empty string if there was no error. This allows you to play MIDI and WAV files, for example, and videos if you have an appropriate device driver.

For example:

```
 (bind ?err (mci-send-string "play bark.wav"))
 (if (neq ?err "") then (printout t "Error: " ?err crlf))
```

The following describes the basic command syntax.

```
load device_name        {file_name}

pause device_name

play device_name        [from position]
                        [to position]
                        [insert | overwrite]

resume device_name

save device_name        [file_name]

seek device_name        {to position | to start | to end}

set device_name         [audio all off
                          | audio all on
                          | audio left off
                          | audio left on
                          | audio right off
                          | audio right on
                          | video off
                          | video on]
                        [door closed | door open]
                        [time format milliseconds | time format ms]

status device_name      {current track
                          | length
                          | length track track_number
                          | mode
                          | number of tracks
                          | position
                          | position track track_number
                          | ready
                          | start position
                          | time format}

stop device name
```

message-box

word (**message-box string** *message* **optional word** *type*
optional long *centre-message* **optional long** *parent-id* **optional string** *title*)

Pops up a dialog box with a message, where the buttons on the dialog box depend on the *type* parameter. This may be OK, OK-CANCEL, YES-NO or YES-NO-CANCEL. The return value is OK, CANCEL, YES or NO.

If *centre-message* is 1 (the default), the message will be centred on the dialog box. If it is 0, the

message will be left-justified. New lines are allowed in the message.

The optional *title* parameter allows the message box title to be changed from the default string 'Message'.

mkdir

long (**mkdir string** *directory*)

Creates the given directory and returns 1 if successful, 0 otherwise.

now

string (**now**)

Returns a string representing the current time and date.

read-string

string (**read-string**)

Read a string (pops up a dialog box).

return-result

void (**return-result any** *result*)

Used by internal C++ functions to get the return value of an arbitrary CLIPS expression.

rmdir

long (**rmdir string** *directory*)

Removes the given directory and returns 1 if successful, 0 otherwise.

show-ide-window

void (**show-ide-window**)

Shows the wxCLIPS development window if it has not already been created (stand-alone wxCLIPS only). This can be useful if starting a CLIPS program from the command line, and you want the development window to be shown before app-on-init has finished. Only likely to work under Windows.

set-work-proc

void (**set-work-proc string** *function*)

Sets the work function, a function with no parameter and no return result, which will be called when the application is otherwise idle. If this is the empty string, the work procedure is cancelled.

(Stand-alone version of wxCLIPS only).

Note: this has been found not to work properly on the Windows version, and is not implemented for XView. So probably this is useful only under Motif.

shell-execute

long (**shell-execute string** *op* **string** *file* **optional string** *params=""* **optional string** *directory=""* **optional string** *show="show"*)

Executes the given shell command, in Windows only.

op can be one of "open", "print" and "explore".

file should be an executable or file.

params can be a list of parameters ("" if the file is a document file).

directory is a the default directory to open the file in.

show is one of "show", "hide", "maximize", "minimize", "restore", "showdefault", "showmaximized", "showminimized", "showminnoactive", "showna", "shownoactivate", "shownormal". See the Windows API documentation for the meaning of these flags.

Example:

```
(shell-execute "print" "c:\\temp\\temp.txt" "" "" "show")
```

See also *execute* (page 182).

sleep

long (**sleep long** *no-secs*)

Makes the process dormant for the given number of seconds. This might be used in a loop involving interprocess communication, for example, to allow time for programs to be loaded. Message processing will take place whilst the process is asleep, so beware of the user interacting with the system during this period.

start-timer

void (**start-timer**)

Starts the wxCLIPS stopwatch. You can get elapsed time in milliseconds with *get-elapsed-time* (page 184).

string-sort

multifield (**string-sort multifield** *string-list*)

Sorts the given multifield list in ascending alphabetical order. A list may be created using the mv-append CLIPS function.

string-to-float

double (**string-to-float string** *value*)

Convert the string to a floating point number.

string-to-long

long (**string-to-long string** *value*)

Convert the string to a long integer.

string-to-symbol

word (**string-to-symbol string** *value*)

Convert the string to a symbol.

symbol-to-string

string (**symbol-to-string word** *value*)

Convert the string to a symbol.

write-resource

long (**write-resource string** *section* **string** *entry* **string** *value* **optional string** *filename*)

Writes the value into the resource file (such as WIN.INI or .Xdefaults, depending on platform). If the filename is omitted, WIN.INI under Windows or .Xdefaults under X will be used.

See also *get-resource* (page 185)

wxclips-object-exists

long (**wxclips-object-exists long** *id*)

Returns 1 if the given wxCLIPS object exists, 0 otherwise.

yield

long (**yield**)

Yields to the windowing system message loop, if appropriate. Normally only of use under Windows, during periods of intensive processing, particularly following window creation or modification. It has no effect under XView or Motif.

8. wxCLIPS classes by category

A classification of wxCLIPS classes by category.

8.1. 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 *subwindows* (page 192), and dialog boxes have their own built-in subwindow similar to a panel.

wxCLIPS function groups

- *Frame* (page 123)
- *Dialog box* (page 121)

wxCOOL classes

- *wxFrame* (page 48)
- *wxDialogBox* (page 44)

8.2. Subwindows

Subwindows should be created as children of frames. The panel subwindow may contain panel items (controls or widgets).

wxCLIPS function groups

- *Canvas* (page 96)
- *Grid* (page 129)
- *Panel* (page 154)
- *Text window* (page 167)
- *Toolbar* (page 172)

wxCOOL classes

- *wxCanvas* (page 21)
- *wxPanel* (page 66)
- *wxTextWindow* (page 82)
- *wxToolBar* (page 84)

See also *Window* (page 175) and *wxWindow* (page 88).

8.3. Panel items

These are widgets (in Motif terminology) or controls (in MS Windows terminology) that can be placed on panels and dialog boxes, with the exception of Menu and MenuBar.

wxCLIPS function groups

- *Button* (page 95)
- *CheckBox* (page 100)
- *Choice* (page 100)
- *Gauge* (page 128)
- *GroupBox* (page 136)

- *Item* (page 155)
- *ListBox* (page 141)
- *MultiText* (page 150)
- *Menu* (page 144)
- *MenuBar* (page 145)
- *Message* (page 146)
- *RadioBox* (page 157)
- *Slider* (page 165)
- *Text* (page 166)

wxCOOL classes

- *wxButton* (page 20)
- *wxCheckBox* (page 23)
- *wxChoice* (page 23)
- *wxGauge* (page 52)
- *wxGroupBox* (page 53)
- *wxItem* (page 68)
- *wxListBox* (page 55)
- *wxMultiText* (page 65)
- *wxMenu* (page 58)
- *wxMenuBar* (page 60)
- *wxMessage* (page 61)
- *wxRadioBox* (page 71)
- *wxSlider* (page 80)
- *wxText* (page 81)

See also *Window* (page 175) and *wxWindow* (page 88).

8.4. Convenience dialogs

Popup-related special-purpose dialogs, and related functions.

- *file-selector* (page 183)
- *get-choice* (page 184)
- *get-text-from-user* (page 185)
- *message-box* (page 187)
- *begin-busy-cursor* (page 180)
- *end-busy-cursor* (page 182)

8.5. Device contexts

See also *Overview* (page 204)

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.

wxCLIPS function groups

- *wxDC* (page 115)
- *MemoryDC* (page 143)
- *MetaFileDC* (page 148)
- *PostScriptDC* (page 156)

- *PrinterDC* (page 157)
- *Metafile* (page 147)

wxCOOL classes

- *DC* (page 39)
- *wxMemoryDC* (page 58)
- *wxMetaFileDC* (page 62)
- *wxPostScriptDC* (page 69)
- *wxPrinterDC* (page 70)
- *wxMetafile* (page 61)

See also *make-metafile-placeable* (page 186).

8.6. Graphics device interface

These classes are related to the Graphics Device Interface, in MS Windows terminology.

wxCLIPS function groups

- *Bitmap* (page 93)
- *Brush* (page 95)
- *Cursor* (page 106)
- *Font* (page 123)
- *Icon* (page 138)
- *Pen* (page 156)
- *Colour* (page 103)

wxCOOL classes

- *wxBitmap* (page 18)
- *wxBrush* (page 19)
- *wxCursor* (page 29)
- *wxFont* (page 47)
- *wxIcon* (page 53)
- *wxPen* (page 69)

8.7. Events

Some member functions that an application overrides are passed event objects containing information about the event.

wxCLIPS function groups

- *CommandEvent* (page 103)
- *Event* (page 122)
- *KeyEvent* (page 140)
- *MouseEvent* (page 148)

wxCOOL classes

- *wxCommandEvent* (page 25)
- *wxEvent* (page 46)
- *wxKeyEvent* (page 54)

- *wxMouseEvent* (page 63)

8.8. Interprocess communication

See also *Overview* (page 201)

wxCLIPS provides a simple interprocess communications facilities based on DDE.

wxCLIPS function groups

- *Client* (page 102)
- *Connection* (page 104)
- *Help* (page 126)
- *Server* (page 165)

wxCOOL classes

- *wxClient* (page 25)
- *wxConnection* (page 26)
- *wxHelpInstance* (page 51)
- *wxServer* (page 79)

8.9. Database classes

See also *Database classes overview* (page 207)

wxCLIPS provides a set of classes for accessing Microsoft's ODBC (Open Database Connectivity) product.

wxCLIPS function groups

- *Database* (page 107)
- *RecordSet* (page 158)

wxCOOL classes

- *wxDatabase* (page 31)
- *wxRecordSet* (page 72)

8.10. File functions

- *chdir* (page 180)
- *dir-exists* (page 181)
- *file-exists* (page 183)
- *get-resource* (page 185)
- *write-resource* (page 190)

8.11. Time-related functions

Functions

- *Date class* (page 109)
- *Timer class* (page 171)
- *get-elapsed-time* (page 184)

- *start-timer* (page 189)
- *now* (page 188)

wxCLIPS function groups

- *Date class* (page 109)
- *Timer class* (page 171)

wxCOOL classes

- *wxDate* (page 33)
- *wxTimer* (page 84)

8.12. Noisy functions

- *bell* (page 180)
- *mci-send-string* (page 186)

8.13. Operating system functions

These functions are related to operating system functionality.

- *execute* (page 182)
- *get-platform* (page 185)
- *get-resource* (page 185)
- *write-resource* (page 190)
- *yield* (page 190)
- *sleep* (page 189)

8.14. wxCLIPS environment functions

These functions are related to the wxCLIPS development environment.

- *app-on-init* (page 93)
- *batch* (page 179)
- *clean-windows* (page 180)
- *debug-msg* (page 181)
- *get-ide-window* (page 184)
- *get-resource* (page 185)
- *show-ide-window* (page 188)

8.15. Data functions

These functions are related to general data manipulation.

- *float-to-string* (page 183)
- *long-to-string* (page 186)
- *read-string* (page 188)
- *string-sort* (page 189)
- *string-to-float* (page 190)
- *string-to-long* (page 190)
- *string-to-symbol* (page 190)
- *symbol-to-string* (page 190)

9. Topic overviews

9.1. Window styles

Window styles are used to specify alternative behaviour and appearances for windows, when they are created. The symbols are defined in such as way that they can be combined in a 'bit list' using the *bitwise-or* operator, as found in C and C++. In CLIPS, you enclose this bit list in a string. For example:

```
"wxCAPTION | wxMINIMIZE_BOX | wxMINIMIZE_BOX | wxTHICK_FRAME"
```

9.1.1. wxFrame styles

The following styles apply to wxFrame windows.

wxICONIZE Display the frame iconized (minimized) (Windows only).
wxCAPTION Puts a caption on the frame (Windows and XView only).
wxDEFAULT_FRAME Defined as a combination of wxMINIMIZE_BOX, wxMAXIMIZE_BOX, wxTHICK_FRAME, wxSYSTEM_MENU, and wxCAPTION.
wxMDI_CHILD Specifies a Windows MDI (multiple document interface) child frame.
wxMDI_PARENT Specifies a Windows MDI (multiple document interface) parent frame.
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).
wxSDI Specifies a normal SDI (single document interface) 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).
wxRESIZE_BORDER Displays a resizeable border around the window (Motif only).
wxTINY_CAPTION_HORIZ Under Windows 3.1, displays a small horizontal caption if USE_ITSY_BITSY is set to 1 in wx_setup.h and the Microsoft ItsyBitsy library has been compiled. Use instead of wxCAPTION.
wxTINY_CAPTION_VERT Under Windows 3.1, displays a small vertical caption if USE_ITSY_BITSY is set to 1 in wx_setup.h and the Microsoft ItsyBitsy library has been compiled. Use instead of wxCAPTION.

9.1.2. wxDialogBox styles

The following styles apply to wxDialogBox windows.

wxCAPTION Puts a caption on the dialog box (Motif only).
wxDEFAULT_DIALOG_STYLE Equivalent to a combination of wxCAPTION, wxSYSTEM_MENU and wxTHICK_FRAME
wxRESIZE_BORDER Display a resizeable frame around the window (Motif only).
wxSYSTEM_MENU Display a system menu (Motif only).
wxTHICK_FRAME Display a thick frame around the window (Motif only).
wxUSER_COLOURS Under Windows, overrides standard control processing to allow setting of the dialog box background colour.
wxVSCROLL Give the dialog box a vertical scrollbar (XView only).

9.1.3. wxItem styles

The following styles apply to all *wxItem* (page 68) derived windows.

wxHORIZONTAL_LABEL The item will be created with a horizontal label.
wxVERTICAL_LABEL The item will be created with a vertical label.
wxFIXED_LENGTH Allows the values of a column of items to be left-aligned. Create an item with this style, and pad out your labels with spaces to the same length. The item labels will initially created with a string of identical characters, positioning all the values at the same x-position. Then the real label is restored.

9.1.4. wxButton styles

There are no styles specific to *wxButton* (page 20).

9.1.5. wxGauge styles

The following styles apply to *wxGauge* (page 52) items.

wxGA_HORIZONTAL The item will be created as a horizontal gauge.
wxGA_VERTICAL The item will be created as a vertical gauge.
wxGA_PROGRESSBAR Under Windows 95, the item will be created as a horizontal progress bar.

9.1.6. wxGroupBox styles

There are no styles specific to *wxGroupBox* (page 53).

9.1.7. wxListBox styles

The following styles apply to *wxListBox* (page 55) items.

wxNEEDED_SB Create scrollbars if needed.
wxLB_NEEDED_SB Same as wxNEEDED_SB.
wxALWAYS_SB Create scrollbars immediately.
wxLB_ALWAYS_SB Same as wxALWAYS_LB.
wxLB_SINGLE Single-selection list.
wxLB_MULTIPLE Multiple-selection list.
wxLB_EXTENDED Extended-selection list (Motif only).
wxHSCROLL Create horizontal scrollbar if contents are too wide (Windows only).

9.1.8. wxMessage styles

There are no styles specific to *wxMessage* (page 61).

9.1.9. wxRadioBox

The following styles apply to *wxRadioBox* (page 71) items.

wxVERTICAL Lays the radiobox out in columns.
wxHORIZONTAL Lays the radiobox out in rows.

9.1.10. wxSlider styles

The following styles apply to *wxSlider* (page 80) items.

wxHORIZONTAL The item will be created as a horizontal slider.
wxVERTICAL The item will be created as a vertical slider.

9.1.11. wxText/wxMultiText styles

The following styles apply to *wxText* (page 81) and *wxMultiText* (page 65) items.

wxTE_PROCESS_ENTER The callback function will receive the event wxEVENT_TYPE_TEXT_ENTER_COMMAND. Note that this will break tab traversal for this panel item under Windows. Single-line text only.
wxTE_PASSWORD The text will be echoed as asterisks. Single-line text only.
wxTE_READONLY The text will not be user-editable.
wxHSCROLL A horizontal scrollbar will be displayed. If wxHSCROLL is omitted, only a vertical scrollbar is displayed, and lines will be wrapped. This parameter is ignored under XView. Multi-line text only.

9.1.12. wxTextWindow styles

The following styles apply to *wxTextWindow* (page 82) objects.

wxBORDER Use this style to draw a thin border in Windows 3 (non-native implementation only).
wxNATIVE_IMPL Use this style to allow editing under Windows 3.1, albeit with a 64K limitation.
wxREADONLY Use this style to disable editing.
wxHSCROLL Use this style to enable a horizontal scrollbar, or leave it out to allow line wrapping. Windows and Motif only.

9.1.13. wxPanel styles

The following styles apply to *wxPanel* (page 66) windows.

wxBORDER Draws a thin border around the panel.
wxUSER_COLOURS Under Windows, overrides standard control processing to allow setting of the panel background colour.
wxVSCROLL Gives the dialog box a vertical scrollbar (XView only).

9.1.14. wxCanvas styles

The following styles apply to *wxCanvas* (page 21) windows.

wxBORDER Gives the canvas a thin border (Windows 3 and Motif only).
wxRETAINED Gives the canvas a wxWindows-implemented backing store, making repainting much faster but at a potentially costly memory premium (XView and Motif only).

9.1.15. wxToolBar styles

The following styles apply to *wxToolBar* (page 84) objects.

wxTB_3DBUTTONS Gives a 3D look to the buttons, but not to the same extent as wxButtonBar.

9.2. Interprocess communication overview

wxCLIP function groups: *Server* (page 165), *Connection* (page 104), *Client* (page 102).

wxCOOL classes: *wxServer* (page 79), *wxConnection* (page 26), *wxClient* (page 25).

The following describes how wxCLIPS implements DDE. The following three classes are central.

1. Client. This represents the client application, and is used only within a client program.
2. Server. This represents the server application, and is used only within a server program.
3. Connection. This represents the connection from the current client or server to the other application (server or client), and can be used in both server and client programs. 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 sends the message client-make-connection to the client 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 must contain an integer port identifier.

The server then responds and either vetos the connection or allows it. If allowed, a connection object is created which persists until the connection is closed. The connection object is then used for subsequent messages between client and server.

To create a working server, the programmer must:

1. Create a server object, giving it a service name.
2. Register the callback OnAcceptConnection for accepting or rejecting a connection, on the basis of the topic argument.
3. Create a Connection object.
4. Provide callbacks for various messages that are sent to the server side of a Connection.

To create a working client, the programmer must:

1. Create a client object.
2. Create a connection object using *client-make-connection* (page 102).
3. Provide callbacks for various messages that are sent to the client side of a Connection.
4. Use the Connection functions to send messages to the server.

9.2.1. Data transfer

These are the ways that data can be transferred from one application to another.

- **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.

9.2.2. Connection overview

See also *Interprocess communication overview* (page 201)

A connection object has no creation function, since it is implicitly created when a connection is requested (one object at each side of the connection).

A connection object id is used for initiating DDE commands and requests using functions such as connection-execute, and it also has event handlers associated with it to respond to commands from the other side of the connection.

The callbacks you can define for a connection (using *window-add-callback* (page 175)) are as follows.

OnAdvise Called when an OnAdvise message is received by the client in response to a server-side connection-advise call. The function should take arguments: connection id, OnAdvise, topic string, item name string, data string. The function should return 1 if successful, 0 otherwise. The data string is what the server is passing to the client.

OnExecute Called when an OnExecute message is received by the server in response to a client-side connection-execute call. The function should take arguments: connection id, OnExecute, topic string, dummy item, data string. The function should return 1 if successful, 0 otherwise.

OnPoke Called when an OnPoke message is received by the server in response to a client-side connection-poke call. The function should take arguments: connection id, OnPoke, topic string, item name, data string. The function should return 1 if successful, 0 otherwise.

OnRequest Called when an OnRequest message is received by the server in response to a client-side connection-request call. The function should take arguments: connection id, OnRequest, topic string, item name, data string. The function should return the data being requested, or the empty string if none. otherwise.

OnStartAdvise Called when an OnStartAdvise message is received by the server in response to a client-side connection-start-advise call. The function should take arguments: connection id, OnStartAdvise, topic string, item name, dummy data. The function should return 1 if successful, 0 otherwise.

OnStopAdvise Called when an OnStopAdvise message is received by the server in response to a client-side connection-start-advise call. The function should take arguments: connection id, OnStopAdvise, topic string, item name, dummy data. The function should return 1 if successful, 0 otherwise.

9.2.3. Examples

See the sample programs ddeserv.clp, ddeclien.clp in the examples directory. Run the server, then the client (you'll have to copy wxclips.exe to wxclips2.exe to run two copies simulataneously).

The sample ddetest.clp shows a simple example of accessing the Program Manager using DDE (Windows only).

```
;;; Demo of DDE functions: chatting to PROGMAN
;;;

(defglobal ?*progman-server* = 0)
(defglobal ?*progman-server-name* = "PROGMAN")
(defglobal ?*progman-host-name* = "none")
(defglobal ?*progman-topic-name* = "PROGMAN")
(defglobal ?*progman-client* = 0)
(defglobal ?*progman-connection* = 0)

;;; Convert a multifield list of strings to one string
(deffunction many-strings-to-one ($?strings)
  (bind ?counter 1)
  (bind ?string "")
  (while (<= ?counter (length $?strings)) do
    (bind ?string (str-cat ?string (nth ?counter $?strings)))
    (bind ?counter (+ ?counter 1))
  )
  (return ?string)
)

(deffunction progman-demo ()
 ;; Get a group name from the user
 (bind ?new-group-name (get-text-from-user "New PROGMAN group name"))
 (if (neq ?new-group-name "") then
  ;; Form create group command
  (bind ?command (many-strings-to-one (mv-append "[CreateGroup(" ?new-
group-name ")]")))

  ;; Construct a client object
  (bind ?*progman-client* (client-create))

  ;; Construct a connection object
```

```
  (bind ?*progman-connection* (client-make-connection
             ?*progman-client* ?*progman-host-name*
             ?*progman-server-name* ?*progman-topic-name*))

  ;; Execute a command to create a group
  (bind ?exe (connection-execute ?*progman-connection* ?command))

  ;; Request a list of groups
  (bind ?req (connection-request ?*progman-connection* "PROGMAN"))
  (format t "%nProgram Manager Groups:%n")
  (format t "%s%n%n" ?req)

  ;; Disconnect
  (connection-disconnect ?*progman-connection*)
 )
)

;;; Automatically called when running application from command line
;;; e.g. wxclips -start -clips ddetest.clp
;;; Also runnable from the Application: Run application.
(deffunction app-on-init ()
  (progman-demo)
)
```

9.3. Device context overview

wxCLIPS function groups: *DC* (page 115), *PostScriptDC* (page 156), *MetaFileDC* (page 148), *MemoryDC* (page 143), *PrinterDC* (page 157)

wxCOOL classes: *wxDC* (page 39), *wxPostScriptDC* (page 69), *wxMetaFileDC* (page 62), *wxMemoryDC* (page 58), *wxPrinterDC* (page 70)

A device context is an abstraction of all the devices that can be drawn onto, such as PostScript file, canvas, printer, metafile, and bitmap. Instead of drawing directly on one of these devices, the application programmer can write a function that writes to a device context, and then pass any device context to that function. The most frequently used device context is probably the canvas device context. This cannot be created by an application but can be retrieved from a *canvas* (page 96) by calling *canvas-get-dc* (page 97).

At present, wxCLIPS supports the canvas, memory, PostScript, Windows printer and Windows metafile device contexts.

When writing code to draw into a device context, use a device context variable as a parameter whenever possible, to allow the most general use of your drawing code. You can then pass a device context object of any derived type.

9.4. Dialog box overview

Function group/class: *DialogBox* (page 121)/*wxDialogBox* (page 44)

A dialog box is similar to a panel, in that it is a window which can be used for placing panel items, 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 XView, some panel items may display incorrectly in a modal dialog, and two modal dialogs may not be open simultaneously. This can be corrected using a wxWindows patch.

Under implementations that permit it, Dialog box inherits from Canvas via Panel, and has a Panel DC that the application can draw on.

The panel device context associated with Dialog box behaves slightly differently than for a panel or canvas: drawing to it *requires* enclosing code in dc-begin-drawing, dc-end-drawing calls. This is because under Windows, dialog box device contexts are not 'retained' and settings would be lost if the device context were retrieved and released for each drawing operations.

See *Miscellaneous* (page 179) for convenience dialog functions which avoid the need to create a dialog box and individual items.

The following callbacks are valid for the dialog box class:

OnCommand Called with a panel identifier, an item identifier and a command event identifier when a command event is received by a panel item that does not have an associated callback. If you have created a panel or dialog box from a resource, you will need to intercept OnCommand.

OnClose The function is called with the window identifier. If the callback returns 1 and the function was called by the window manager, the window is automatically deleted. A return value of 0 forbids automatic deletion.

OnEvent Called with a dialog box identifier and a *mouse event* (page 148) identifier. This can only be guaranteed only when the dialog box is in user edit mode (to be implemented).

OnPaint Called with a dialog box identifier when the dialog box receives a repaint event from the window manager.

OnSize The function is called with the dialog box identifier, width and height.

See also *Panel* (page 154) and *Window* (page 175) for inherited member functions.

9.5. Toolbar overview

Function group/class: *Toolbar* (page 172)/*wxToolBar* (page 84)

A toolbar is an array of bitmap buttons, implemented by drawing bitmaps onto a canvas, instead of using the native button implementation. Since the toolbar inherits from canvas, you can use all canvas functions on a toolbar object.

Each tool can be specified as a normal button, on/off toggle, and disabled or enabled. Tool layout is automatic or manual. Left click and right click events may be intercepted, using OnLeftClick and OnRightClick callbacks. The OnMouseEnter callback is used to update the status line (for example) with help text as the mouse moves over the tools. See *window-add-callback* (page 175) for details on these callbacks.

Normal subwindow geometry considerations are applicable (i.e., in a frame with more than one subwindow, you must resize the subwindows when you receive an OnSize event from the frame). The exception is for Multiple Document Interface (MDI) frames under Windows, where you must call *frame-set-tool-bar* to associate the toolbar with the MDI client window, and after initializing the toolbar height, further resizing is unnecessary.

Toolbars are often displayed as a horizontal strip under the menubar, or in a floating frame. If you

wish to draw a border for the toolbar, you must intercept the toolbar's OnPaint handler. In this overriden callback, you must first call the toolbar's *toolbar-on-paint* function to draw all the tools, and then draw the border onto the toolbar canvas.

Note that under Windows, you must supply bitmaps that are 16 pixels wide and 15 pixels high: they will be placed on a tool button that is 24 by 22 pixels. If you wish to supply bitmaps of a different size, you must call *toolbar-set-default-size* to set the overall tool button size (as opposed to the bitmap size), *or* use the toolbar in non-button-creation mode by supplying an extra argument to *toolbar-create* to disable this functionality.

Note also that in some circumstances, especially for the WIN32 version of wxCLIPS, there are problems with the buttonbar (the symptoms are bitmaps scrambled randomly). If this happens, revert to the normal toolbar by passing 0 in the create-buttons argument to toolbar-create, or download a Windows 95 version of wxCLIPS.

Under X, tool buttons are the same size as the supplied button and there is no need to call *toolbar-set-default-size*.

Tip: in circumstances where you might think of using drag and drop, which is not currently implemented in wxWindows or wxCLIPS, you can use a toolbar to select 'modes' of operation which change the cursor in a subwindow. Intercept left-click in the subwindow to place an object or perform some operation.

Canvas callbacks apply, plus:

OnLeftClick The function is called with the toolbar identifier, tool index, and an integer which is 1 if the tool is being toggled on, or zero otherwise. If this is a toggle tool, return 1 to allow the toggle to take place, or 0 otherwise.

OnRightClick The function is called with the toolbar identifier, tool index, and x and y floating point parameters indicating the position of the click. No value need be returned.

OnMouseEnter The function is called with the tool index, whenever the mouse goes into a tool, or out of all tools. In the latter case, the tool index is -1. No value need be returned.

9.5.1. Differences in toolbar types

Different toolbar code kicks in according to the platform, and the arguments given to tool-bar-create.

1. If *create-buttons* is 0, then the bog-standard wxToolBar class from wxWindows is used: no 3D effect. This works across all supported wxCLIPS platforms. Layout can either be automated, or tools must be placed at absolute coordinates.
2. If *create-buttons* is 1 and the platform is Windows 3.1 or generic WIN32 (not Windows 95), then the buttons will be 3D effect using the wxButtonBar class. On WIN32 toggle tools will not work. On UNIX, the standard wxToolBar code will be used instead of wxButtonBar. Again, layout is automatic or absolute.
3. If *create-buttons* is 1 and the Windows 95 version of wxCLIPS is being used (not just the WIN32 version running on Windows 95), then the toolbar common control is used, supporting tooltips. However, layout is different: you must specify wxVERTICAL for layout orientation, plus the number of rows (usually 1), and you need to use toolbar-add-separator to get spaces between tools. You cannot place tools at absolute coordinates or use the toolbar-layout function. You must also call toolbar-create-tools after adding tools. Device context painting is restricted and no events may be intercepted for the toolbar except OnLeftClick and OnMouseEnter.

Note: under Windows 95, a wxButtonBar cannot be moved to any position other than the top-left

of the frame.

9.6. Database classes overview

wxCLIPS function groups: *Database* (page 107), *Recordset* (page 158)

wxCOOL classes: *wxDatabase* (page 31), *wxRecordSet* (page 72)

IMPORTANT NOTE: The ODBC classes are a preliminary release and incomplete. Please take this into account when using them. Feedback and bug fixes are appreciated, as always. The classes are being developed by Olaf Klein (oklein@smallo.ruhr.de) and Patrick Halke (patrick@zaphod.ruhr.de).

wxCLIPS provides a set of classes for accessing a subset of Microsoft's ODBC (Open Database Connectivity) product. Currently, this wrapper is available under MS Windows only, although ODBC may appear on other platforms, and a generic or product-specific SQL emulator for the ODBC classes may be provided in wxWindows at a later date.

ODBC presents a unified API (Application Programmer's Interface) to a wide variety of databases, by interfacing indirectly to each database or file via an ODBC driver. The language for most of the database operations is SQL, so you need to learn a small amount of SQL as well as the wxCLIPS ODBC wrapper API. Even though the databases may not be SQL-based, the ODBC drivers translate SQL into appropriate operations for the database or file: even text files have rudimentry ODBC support, along with dBASE, Access, Excel and other file formats.

The run-time files for ODBC are bundled with many existing database packages, including MS Office.

The minimum you need to distribute with your application is odbc.dll, which must go in the Windows system directory. For the application to function correctly, ODBC drivers must be installed on the user's machine. If you do not use the database classes, odbc.dll will be loaded but not called (so ODBC does not need to be setup fully if no ODBC calls will be made).

A sample is distributed with wxCLIPS in `examples/odbc`.

9.6.1. Procedures for writing an ODBC application

You first need to create a Database object. If you want to get information from the ODBC manager instead of from a particular database (for example using *recordset-get-data-sources* (page 160)), then you do not need to call *database-open* (page 109). If you do wish to connect to a datasource, then call database-open. You can reuse your Database object, calling database-close and database-open multiple times.

Then, create a Recordset object for retrieving or sending information. For ODBC manager information retrieval, you can create it as a dynaset (retrieve the information as needed) or a snapshot (get all the data at once). If you are going to call *recordset-execute-sql* (page 158), you need to create it as a snapshot. Dynaset mode is not yet implemented for user data.

Having called a function such as recordset-execute-sql or recordset-get-data-sources, you may have a number of records associated with the recordset, if appropriate to the operation. You can now retrieve information such as the number of records retrieved and the actual data itself. Use functions such as *recordset-get-int-data* (page 161) or *recordset-get-char-data* (page 159) to get the data, passing a column index or name. The data returned will be for the current record. To move around the records, use *recordset-move-next* (page 164), *recordset-move-prev* (page 164)

and associated functions.

You can use the same recordset for multiple operations, or delete the recordset and create a new one.

Note that when you delete a Database, any associated recordsets also get deleted, so beware of holding onto invalid pointers.

9.6.2. Examples

Here's an example of a function that updates a value in a database.

```
;;; Function for updating a field in a record in the incident.dbf demo
;;; file.
;;; E.g. (demo-update-integer "BD34" "X" 999)
;;; The key is the ASSET column, BD34 in the example. Record(s)
matching
;;; this key will be changed.
;;; "X" is the name of the column to be updated.
;;; 999 is a value to replace the current value.
;;;
;;; You must have previously registered the file incident.dbf
;;; with ODBC (e.g. from the control panel), with the source
;;; name "wxCLIPS demo". You can check if the file has changed
;;; by using Microsoft Query.

(deffunction demo-update-integer (?asset ?col ?value)
  (bind ?database (database-create))

  ;; Open data source
  (if (eq 0 (database-open ?database "wxCLIPS demo")) then
   (bind ?msg (database-get-error-message ?database))
   (printout t ?msg crlf)
   (return 0)
  )

  ;; Create a recordset
  (bind ?recordset (recordset-create ?database "wxOPEN_TYPE_SNAPSHOT"))

  ;; Construct an SQL statement
  (bind ?sql (str-cat "UPDATE Incident SET " ?col " = " ?value " WHERE
ASSET = '" ?asset "'"))
  (printout t ?sql crlf)

  ;; Execute the SQL.
  (if (eq 0 (recordset-execute-sql ?recordset ?sql)) then

   (bind ?msg (database-get-error-message ?database))
   (printout t ?msg crlf)
   (return 0)
  )

  (recordset-delete ?recordset)
  (database-close ?database)
  (database-delete ?database)
```

```
  (return 1)
)
```

The next example gets a value from a particular field of a record.

```
;;; Function for returning the value of an integer field.
;;; E.g. (demo-get-integer "BD34" "X")
;;; The key is the ASSET column, BD34 in the example. The first record
matching
;;; this key will be returned.
;;; "X" is the name of the column whose value is to be returned.

(deffunction demo-get-integer (?asset ?col)
  (bind ?database (database-create))

  ;; Open data source
  (if (eq 0 (database-open ?database "wxCLIPS demo")) then
   (bind ?msg (database-get-error-message ?database))
   (printout t ?msg crlf)
   (return 0)
  )

  ;; Create a recordset
  (bind ?recordset (recordset-create ?database "wxOPEN_TYPE_SNAPSHOT"))

  ;; Construct an SQL statement
  (bind ?sql (str-cat "SELECT * FROM Incident WHERE ASSET = '" ?asset
"'"))
  (printout t ?sql crlf)

  ;; Execute the SQL.
  (if (eq 0 (recordset-execute-sql ?recordset ?sql)) then

   (bind ?msg (database-get-error-message ?database))
   (printout t ?msg crlf)
   (return 0)
  )

  ;; Get the relevant field of the first record
  (bind ?data (recordset-get-int-data ?recordset ?col))

  (recordset-delete ?recordset)
  (database-close ?database)
  (database-delete ?database)
  (return ?data)
)
```

You can find out all the source names available to you with the following code.

```
  (bind ?*database* (database-create))
  (bind ?*recordset* (recordset-create ?*database*
"wxOPEN_TYPE_SNAPSHOT"))

  ;;; Get the list of currently-defined ODBC sources
  (if (eq 0 (recordset-get-data-sources ?*recordset*)) then

   (show-database-error) else
```

```
  ;;; Loop through all the source names (one per record)
  (bind ?cont 1)
  (while (eq ?cont 1)
   ;;; The source name is at the first column (0) in the record
   (bind ?data (recordset-get-char-data ?*recordset* 0))
   (list-box-append ?*sources-listbox* ?data)
   (bind ?cont (recordset-move-next ?*recordset*))
  )
 )
```

9.6.3. Database overview

See also *Database classes overview* (page 207)

Function group/class: *Database* (page 107)/*wxDatabase* (page 31)

Every database object represents an ODBC connection. To do anything useful with a database object you need to create a Recordset object. All you can do with Database is opening/closing connections and getting some info about it (users, passwords, and so on).

9.6.4. Recordset overview

See also *Database classes overview* (page 207)

Function group/class: *Recordset* (page 158)/*wxRecordSet* (page 72)

Each Recordset represents a database query. You can make multiple queries at a time by using multiple Recordsets with a Database or you can make your queries in sequential order using the same Recordset.

If Recordset is of the type wxOPEN_TYPE_DYNASET, there will be only one field for each column, which will be updated every time you call functions like recordset-move or recordset-goto. If Recordset is of the type wxOPEN_TYPE_SNAPSHOT, all records returned by an ODBC function will be loaded at once.

9.6.5. ODBC SQL data types

See also *Database classes overview* (page 207)

These are the data types supported in ODBC SQL. Note that there are other, extended level conformance types, not currently supported in wxCLIPS.

CHAR(n)	A character string of fixed length *n*.
VARCHAR(n)	A varying length character string of maximum length *n*.
LONG VARCHAR(n)	A varying length character string: equivalent to VARCHAR for the purposes of ODBC.
DECIMAL(p, s)	An exact numeric of precision *p* and scale *s*.
NUMERIC(p, s)	Same as DECIMAL.
SMALLINT	A 2 byte integer.
INTEGER	A 4 byte integer.
REAL	A 4 byte floating point number.

FLOAT An 8 byte floating point number.
DOUBLE PRECISION Same as FLOAT.

These data types correspond to the following ODBC identifiers:

SQL_CHAR A character string of fixed length.
SQL_VARCHAR A varying length character string.
SQL_DECIMAL An exact numeric.
SQL_NUMERIC Same as SQL_DECIMAL.
SQL_SMALLINT A 2 byte integer.
SQL_INTEGER A 4 byte integer.
SQL_REAL A 4 byte floating point number.
SQL_FLOAT An 8 byte floating point number.
SQL_DOUBLE Same as SQL_FLOAT.

9.6.6. A selection of SQL commands

See also *Database classes overview* (page 207)

The following is a very brief description of some common SQL commands, with examples.

9.6.6.1. 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)
 )
```

9.6.6.2. Insert

Inserts records into a table.

Example:

```
INSERT INTO Book
  (BookNumber, CategoryCode, Title)
  VALUES(5, 'HR', 'The Lark Ascending')
```

9.6.6.3. 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.

9.6.6.4. 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'.

9.7. Grid overview

Function group/class: *Grid* (page 129)

The grid class is a window designed for displaying data in tabular format. Possible uses include:

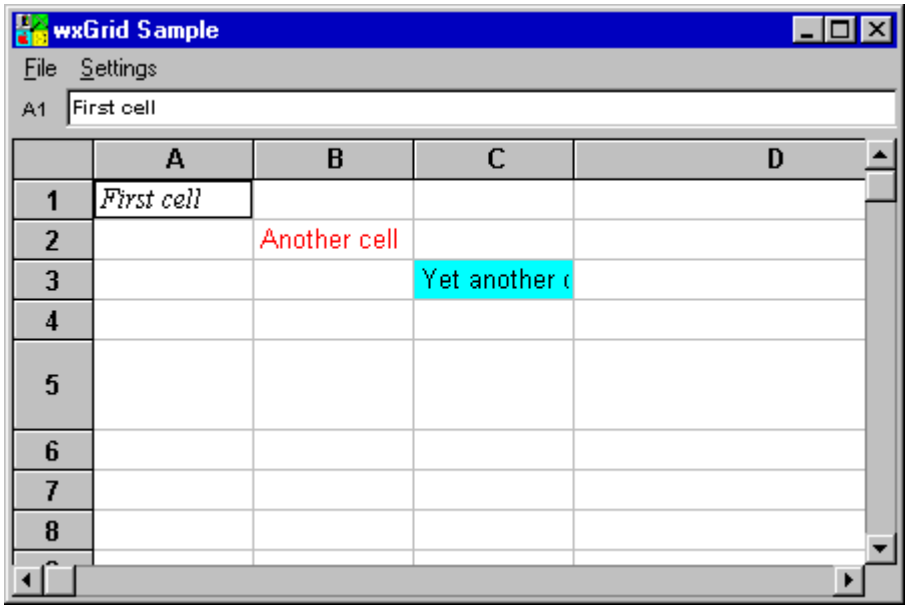
- Displaying database tables;
- building spreadsheet applications;
- displaying files and their attributes;
- use as a more sophisticated listbox where different fonts and colours are required.

This manual currently describes the version of Grid that operates under Windows, implementing

using mostly generic wxWindows code. It is intended to provide a similar API for Motif using the public domain Xbae matrix widget, included in the wxGrid distribution. Work needs to be done to wrap the Xbae functionality in a similar API.

9.7.1. The appearance and behaviour of a grid

The following screenshot shows the initial appearance of the sample grid application.



The Grid class is a panel that provides a text editing area, and a grid with scrollbars. The grid has horizontal and vertical label areas whose colours may be changed independently from the cell area. The text editing area, and the label areas, may be switched off if desired.

The user navigates the grid using the mouse to click on cells and scroll around the virtual grid area (no keyboard navigation is possible as yet). If the edit control is enabled, it always has the focus for the currently selected cell and the user can type into it. The text in the edit control will be reflected in the currently selected cell.

If the row and column label areas are enabled, the user can drag on the label divisions to resize a row or column.

The sample application allows the user to change various aspects of the grid using the Grid API. These include:

- Changing the background and foreground colour of labels and cells;
- toggling row and column label areas on and off independently;
- toggling the edit control on and off;
- toggling the light grey cell dividers on and off;
- changing cell alignment.

There are various other aspects that can be controlled via the API, including changing individual cell font and colour properties.

You need to call grid-create-grid before there are any cells in the grid.

All row and column positions start from zero, and dimensions are in pixels.

If you make changes to row or column dimensions, call grid-update-dimensions and then grid-adjust-scrollbars. If you make changes to the grid appearance (such as a change of cell background colour or font), call window-refresh for the changes to be shown.

9.7.2. Example

The following is an example of using the grid functionality.

```
;;; grid.clp
;;; grid test
;;; Load using -clips <file> on the command line or using the Batch
;;; or Load commands from the CLIPS development window; type
;;; (app-on-init) to start.

(defglobal ?*main-frame* = 0)
(defglobal ?*grid* = 0)

(deffunction on-close (?frame)
 (format t "Closing frame.%n")
 (bind ?*grid* 0)
 1)

(deffunction on-activate (?frame ?active)
  (if (> ?*grid* 0) then (grid-on-activate ?*grid* ?active))
)

(deffunction on-menu-command (?frame ?id)
 (switch ?id
  (case 200 then (message-box "CLIPS for wxWindows Demo
by Julian Smart (c) 1993" wxOK 1 0 "About wxWindows CLIPS Demo"))
  (case 3 then (if (on-close ?frame) then (window-delete ?frame)))
 )
)

;;; Test program to create a frame
(deffunction app-on-init ()
  (unwatch all)

  (bind ?*main-frame* (frame-create 0 "wxCLIPS Grid Test" -1 -1 400
300))

  (window-add-callback ?*main-frame* OnClose on-close)
  (window-add-callback ?*main-frame* OnMenuCommand on-menu-command)
  (window-add-callback ?*main-frame* OnActivate on-activate)

  ;;; Make a menu bar
  (bind ?file-menu (menu-create))
  (menu-append ?file-menu 3 "&Quit")

  (bind ?menu-bar (menu-bar-create))
  (menu-bar-append ?menu-bar ?file-menu "&File")
```

```
  (frame-set-menu-bar ?*main-frame* ?menu-bar)

  ;;; Make a grid
  (bind ?*grid* (grid-create ?*main-frame* 0 0 400 300))
  (grid-create-grid ?*grid* 10 8)
  (grid-set-column-width ?*grid* 3 200)
  (grid-set-row-height ?*grid* 4 45)
  (grid-set-cell-value ?*grid* "First cell" 0 0)
  (grid-set-cell-value ?*grid* "Another cell" 1 1)
  (grid-set-cell-value ?*grid* "Yet another cell" 2 2)
  (grid-set-cell-text-font ?*grid* (font-create 12 wxROMAN wxITALIC
wxNORMAL 0) 0 0)
  (bind ?red (colour-create RED))
  (grid-set-cell-text-colour ?*grid* ?red 1 1)
  (bind ?cyan (colour-create CYAN))
  (grid-set-cell-background-colour ?*grid* ?cyan 2 2)
  (grid-update-dimensions ?*grid*)

  (window-centre ?*main-frame* wxBOTH)

  (window-show ?*main-frame* 1)

  ?*main-frame*)
```

9.8. wxCOOL overview

9.8.1. What is wxCOOL?

Up until July 1995, wxCLIPS functionality was conceptually object-oriented, but solely implemented using CLIPS functions. Since the only way to couple CLIPS to C or C++ programs is by defining user functions, the functional route is a prerequisite. wxCOOL is a set of CLIPS classes built on top of the user functions, encapsulating most of the wxCLIPS functionality for which it is sensible to do so. At present, it is not quite complete. wxCOOL resides in the wxcool subdirectory of the wxCLIPS installation directory, and is loaded by batching the file wx.clp. Before using the classes, you need to call the function wxcool-init.

Because wxCOOL is implemented in terms of the wxCLIPS functions, it does add overhead to a CLIPS application in terms of loading time, execution speed, and (to a less significant degree) memory requirements. So you may still wish to code speed-critical parts of your application using the raw wxCLIPS functions, especially where a lot of GUI elements are to be created.

Saving your application as a binary file will certainly speed up loading time (and help protect your source code from prying eyes) but there may be a size limit on binary files under MS Windows (as yet undetermined). Another problem is that you cannot load a binary file and then load non-binary constructs: it's all-or-nothing.

9.8.2. How to use the wxCOOL class reference

In the *message handler definitions* (page 18), bold words are types, and are not part of CLIPS syntax. Parameter names are in italics. Types are as follows:

- **double** is a double-precision floating point number.
- **long** is a long integer.

- **string** is a double-quoted ASCII string.
- **word** is an unquoted string.
- **bool** is a CLIPS symbol taking values TRUE or FALSE.
- **multifield** is a CLIPS multi-field value list.
- **void** means that no value is returned.

Parameters can be **optional**, in which case defaults are assumed.

Some parameters can be combinations ('bit lists') of flags. wxCLIPS mimics the compact C++ syntax by parsing strings, for example:

```
(make-instance (gensym*) of wxFrame (style "wxSDI | wxDEFAULT")
   ...)
```

Each identifier in such a parameter is translated to an integer value, and all are logical-or'ed together to produce an integer which is passed to the appropriate wxWindows C++ function.

Slots are listed before the message handlers.

Accessors (put-... and get-... functions) are not documented explicitly, but can be assumed where appropriate: see the documentation for each class's slots.

Create handlers for each class are documented, but are not explicitly called by the programmer: they are called by the *init* handler on instance creation. You can use call-next-handler from within a Create handler, to ensure all ancestors get a chance to initialise. However, you should not invoke call-next-handler in a 'delete' handler since CLIPS calls this for each class anyway.

9.8.3. Instance creation

Instance creation is done in the conventional CLIPS way, e.g.

```
 (make-instance test1 of MyFrame (title "Hello world!") (x 20) (y 20)
(width 200) (height 200))
```

Slot initializers take the place of function parameters, which makes for more legible code, albeit for instance creation only, and not normal message passing.

Each class has a message handler called 'create', which constructs the underlying object and adds callbacks for the instance. The initialization code cannot be put into the standard 'init' handler for each class, since this is called for every class that an instance inherits from, and would result in multiple wxCLIPS objects being created for one instance. Instead, there is one init handler for wxObject which sends a create message to the object, and create is redefined for each class.

Note that the integer identifier of the underlying wxCLIPS object can be retrieved with the get-id accessor.

9.8.4. Types

wxCLIPS uses integers for various purposes, including boolean values. This is inconvenient in CLIPS applications, which normally use the symbolic values TRUE and FALSE. Accordingly, all wxCOOL boolean values are now symbolic (TRUE or FALSE). wxCOOL will not work correctly if you attempt to use integers instead of symbolic values.

9.8.5. wxCOOL event handling

wxCOOL function callbacks and events work differently from wxCLIPS callbacks and events. Instead of adding callbacks for events such as on-menu-command, you override the default event handler. All window objects derive from the class wxEvtHandler, which contains default handlers for all window callbacks. A window will normally process its own messages, so you would for example add an on-menu-command handler to your wxFrame-derived class. However, you can use the put-event-handler message to set the event handler to be a different instance of wxEvtHandler. So, you could avoid deriving from a window class altogether, and have one class which accepts the events from a variety of windows.

Panel items no longer require callback functions to be specified on creation. Instead, panel item events are sent as an on-command message to the panel item. The default wxItem on-command handler sends the message to its parent wxPanel, so you could derive a new class from wxPanel to receive on-command events, or set the item's event handler to direct it to a different instance.

The on-command handler takes wxItem instance and wxCommandEvent instance parameters. A convenient way of distinguishing incoming events is to give an item a name on creation, and test for that name in the on-command handler, using the get-name accessor.

9.8.6. Implementation details

From version 1.42, wxCLIPS has a few built-in functions to aid in maintaining a parallel set of classes corresponding to the underlying wxCLIPS classes (and ultimately, C++ classes). The *instance table* (page 140) functions help map between integer identifiers and CLIPS instance names. When an instance is constructed, the underlying wxCLIPS object is created and this id added to the instance table. On deletion, the entry is removed from the instance table. Callbacks are defined, such as gui-window-on-close, that are used for all instances of a class (and derived classes); they use instance-table-get-instance to retrieve the instance corresponding to the wxCLIPS object.

wxCLIPS sends OnDelete callbacks to the application when a wxCLIPS object is being deleted. This is exploited in wxCOOL to ensure that wxCOOL instances are cleaned up if wxCLIPS, and not the CLIPS application, deletes wxCLIPS objects. The twist is that we need to distinguish between an application-initiated deletion, for which we wish to call a function such as window-delete, and a wxCLIPS-initiated deletion, for which window-delete is effectively being called implicitly. To avoid deleting objects twice, wxCOOL sets a pending-delete slot in the object which is tested before deleting the underlying object.

In some cases, *all* deletions of a class's objects are initiated by wxCLIPS: for example, wxMenu instances will be deleted by the parent wxMenuBar, which is deleted implicitly when the wxFrame is deleted.

9.9. Resource overview

From version 1.49, wxCLIPS can load panels and dialog boxes from wxWindows resource files (extension `.wxr`). You may create dialog resources using the wxWindows Dialog Editor, which can be downloaded from:

`ftp.aiai.ed.ac.uk/pub/packages/wxwin/binary/dialoged10.zip`

Before creating a panel or dialog, load the resource file using *load-resource-file* (page 186). Then

use *panel-create-from-resource* (page 154) or *dialog-box-create-from-resource* (page 122). Alternatively you can use the wxCOOL panel or dialog box instance creation syntax, supplying the *resource* slot value).

To find an arbitrary panel item, you may need to use *find-window-by-name* (page 183) or *find-window-by-label* (page 183).

10. DDE commands that wxCLIPS recognizes

Under Windows, wxCLIPS functions as a simple DDE server, responding to server and topic 'WXCLIPS'. This is mainly to allow the possibility of using an external editor to load files into wxCLIPS and execute commands, offering some of the benefits of an Integrated Development Environment (IDE). It could also be used to control wxCLIPS applications remotely without having to set up a DDE server explicitly using CLIPS.

The DDE client must connect to the server using the service name WXCLIPS, and establish a conversation on the WXCLIPS topic. An example of a program that can do this is wxclipsx.exe, the source of which is provided with wxCLIPS: an executable is available from the AIAI ftp site. This may be run with the switch -c and then the DDE command to execute; if run with command line parameters, the command is executed and wxclipsx.exe exits immediately. If run without parameters, the program runs interactively and the user can type in commands. Being a wxWindows program, wxclipsx.exe is large (500K); so there is a native Windows equivalent called ddesend.exe, which is only 10 K. Ddesend takes only the DDE command, and no other switches (e.g. no -c).

The file examples/macros.rc is a sample MicroEMACS for Windows macro file, that implements commnds for loading files into wxCLIPS, and executing CLIPS commands, from within MicroEMACS, using ddesend.exe.

Here are some examples of wxCLIPS DDE commands. They consist of a letter, a space, and then some data.

```
L c:\example.clp
B c:\example.clp
E (app-on-init)
Q
C
```

Here is a list of commands that wxCLIPS recognizes:

- L: load the given file of constructs into CLIPS
- B: batch the given file of constructs into CLIPS
- E: execute the given command
- C: clear the wxCLIPS development window
- Q: quit wxCLIPS

11. Change log

11.1. Version 1.64

December 15th, 1997

- Fixed bug whereby message items constructed from .wxr files would not retain their user-defined dimensions.
- Added shell-execute (Windows only).
- Added dll-execute, dll-load-library, dll-free-library, dll-function-exists for calling functions in an external dynamic link library (Windows only).

11.2. Version 1.63

August 4th, 1997

- If you supply a CLIPS file as a single argument to wxCLIPS, it will batch the file, change to that directory, and call app-on-init. This way you can have a wxCLIPS association for .clp and simply run the file.
- Better installation program provided, which registers the clp extension.

11.3. Version 1.62

January 28th, 1997

- Added facename argument to font-create.

11.4. Version 1.61

December 20th, 1996

- Compiled with CLIPS 6.04 (or Fuzzy CLIPS 6.04), using the latest patches taken from the CLIPS ftp site on 20th December 1996. It is now much easier to make a wxCLIPS-enabled CLIPS library - only two files need to be changed from the original CLIPS or Fuzzy CLIPS distribution.
- Compiled with wxWindows 1.66E (unreleased at this time).
- Added up-to-date Fuzzy CLIPS examples to examples/fuzzy directory.

11.5. Version 1.60

August 1st, 1996

- Added an argument to list-box-set-selection to allow for deselection in a multiple-selection listbox.

11.6. Version 1.59

July 11th, 1996

- Added OnAcceptConnectionEx server object callback to make implementation of wxCOOL classes easier.
- Added object-delete.

11.7. Version 1.58

May 22nd, 1996

- Added fact-string-existp.

11.8. Version 1.57

May 22nd, 1996

- Added frame-is-iconized, menu-bar-create-from-resource, list-box-is-selected.
- Added wxCOOL functions wxWindow::find-window-by-name, wxWindow::find-window-by-name.
- Can create wxMenuBar from resource now; see resource example.

11.9. Version 1.56

May 2nd, 1996

- Added window-close, window-refresh, window-set-size-hints.
- Cured some grid bugs.
- Cured a problem with reading in panels from .wxr resource files.

11.10. Version 1.55

April 10th, 1996

- Cured a popup-menu bug introduced in 1.55.
- Added find-window-by-name, find-window-by-label.
- Cured dc-get-text-extent-width, dc-get-text-extent-height bug.
- Added grid-get-cell-value, corrected grid-get-cols documentation.
- Added grid-on-paint, grid-on-size functions.
- Added window/object-remove-callback.

11.11. Version 1.55

March 26th, 1996

- Removed a Windows-resource-eating bug, showed especially when opening/closing dialogs or panels with listboxes or choice items.
- Added mkdir, rmdir, copy-file.
- Added a flags argument to file-selector to enable specification of a Save button instead of Open, for example.
- wxCLIPS save operations display Save instead of Open button.
- Added dc-set-background-mode, documented dc-set-background.

11.12. Version 1.54

March 10th, 1996

- Increased stack size for Windows 3.1 version.
- Fixed problem with type system that broke the Grid and HTML windows.

11.13. Version 1.53

March 4th, 1996

- Added OnCommand callback for panels and dialog boxes (needed when loading resources).
- Added object-get-type.
- Added window-get-next-child.
- Added resource example.
- Corrected and extended wxCLIPS/wxCOOL to handle dialog resource loading properly: see resource example.

11.14. Version 1.52

February 21st, 1996

- Cured problem introduced in previous version when MDI child windows are maximized.
- Bitmaps can now be displayed in grid cells (grid-set-cell-bitmap).
- WIN32 version of make-metafile-placeable debugged.
- First Windows 95 version, with Win95 toolbars: see documentation for toolbar API changes.
- Documented OnDefaultAction panel callback for listbox double-click notification.
- Minor bug fixes to wxCOOL.

11.15. Version 1.51

January 29th, 1996

- Added HTML viewer class (Windows only).

11.16. Version 1.50

January 16th, 1996

- Added various functions related to canvas scrolling, plus OnScroll event.
- Windows dialog and panel default font reduced in size.
- Added grid functionality (Windows only).
- Cured bug in toolbar-add-tool where second bitmap was not recognised.
- Added get-active-window (Windows only).

11.17. Version 1.49

December 21st, 1995

- Cured bug in font-create where style and weight parameters were confused.
- Added load-resource-file, clear-resources, panel-create-from-resource, dialog-box-create-from-resource.

11.18. Version 1.48

November 21st, 1995

- Added more text window, multitext commands (position manipulation).

- Added app-set/get-show-frame-on-init.
- Added hwnd-send-message.

11.19. Version 1.47

October, 1995.

- Added text-window-set-editable, text-window-get-contents.

11.20. Version 1.46

October 16th, 1995.

- Debugged OnChar callbacks, but wxTextWindow::OnChar still has problems under Windows.
- Toolbars can now have panel items placed on them under Windows (see toolbar demo).

11.21. Version 1.45

September 5th, 1995.

- Added OnCharHook for app, frame, dialog box (Windows only).
- Added app-create, key-event-... functions.

11.22. Version 1.44

September, 1995.

- Added recordset-get-primary-keys, recordset-get-foreign-keys.
- Added preliminary Windows 95 support (i.e. runs under Windows 95 when compiled for Win32).
- Added get-os-platform.

11.23. Version 1.43

August, 1995.

- WIN32s version introduced. Doesn't seem to work under NT or Windows 95 yet, but under WIN32s all seems well. The WIN32s version is small and faster, and bload, bsave work properly for files over 64K.
- Uses an improved version of wxWindows which tries to optimize GDI objects under MS Windows, resulting in reduced consumption of resources.
- Cured behaviour where after a CLIPS error, nothing would subsequently work (until a load, for example).

11.24. Version 1.42

July, 1995.

- Added 'name' parameter to all window creation calls.
- Added window-get-name, frame-on-size.
- wxCLIPS now calls OnDelete callback when each object is being deleted.
- Started wxCOOL: an object-oriented wrapper around wxCLIPS.

11.25. Version 1.41

July 12th, 1995.

- Changed radiobox semantics slightly.
- Added date class.

11.26. Version 1.40

June 17th, 1995.

- Added ODBC subset support and example (Windows only).
- Started to add overviews, separate from the alphabetical reference.
- Added timer documentation.
- Added dc-get-text-extent-width, dc-get-text-extent-height.
- Added radiobox, groupbox.
- Added window-popup-menu and extra argument to menu-create for creating popup menus.
- Added command-event functions and panel-item-get-command-event for more detailed event inspection from panel item callbacks.
- Added functions: start-timer, get-elapsed-time, now, mci-send-string, bell, show-ide-window.
- Added -dir command line switch.

11.27. Version 1.38

April 28th, 1995.

- Cured various bugs in DDE server implementation and this manual. Sorry...
- Added ddeserv.clp, ddeclien.clp examples.

11.28. Version 1.36

March 14th, 1995.

- Rewrite of much of wxCLIPS: generic extension-support library (wxExtend) created for code-sharing with projects such as wxPython. Please beware of bugs introduced in this release: hopefully none, but you never know.
- Addition of *execute* function, with synchronous or asynchronous operation. Please use instead of system.
- DDE changes: use add-event-handler instead of the previous callback mechanism. Client DDE code has minimal change, just omit any arguments to client-create. For server operation, register interest for events OnAdvise, OnExecute, OnRequest etc., one callback function each.

11.29. Version 1.35

February 26th, 1995.

- Fixed bug in wxWindows where the editable text window didn't respond properly to some characters, under MS Windows.
- Added CLIPS toolbar creation functions (see examples/toolbar for a Windows demo).
- Added dc-set-background.
- Added get-ide-window.

- Added cursor-create, cursor-delete, window-set-cursor.
- message-box now has a title parameter.
- Added DDE capability under Windows, so it is possible to load files into wxCLIPS from within an editor.

11.30. Version 1.34

February 12th, 1995.

- Command entry panel now recognises Enter key under Windows (at last).
- Added toolbar to the development window (Windows only).
- Main text window (under Windows) is now a standard EDIT control, with better scrolling and copy to clipboard functionality.
- Added WinHelp manual logo and new Windows icon.

11.31. Version 1.33

December 11th, 1994.

- Added windows printer and metafile device context support.
- Added metafile support, make-metafile-placeable.
- Added Copy, Cut, Paste to text window.
- Added begin-busy-cursor, end-busy-cursor.
- Added better file loading support to bitmap-load-from-file.
- Added basic colourmap support (bitmap-get-colourmap, dc-set-colourmap).
- Added get-resource, write-resource.

11.32. Version 1.32

November 21st, 1994.

- Added PostScript device context support.
- Replaced memory-dc-delete with the more general dc-delete.
- Added timer and 'work procedure' functions.
- Added some more device context functions, e.g. dc-get-width.
- Added the file wxcitems.cc.
- Moved Clear screen menu item to File menu.

11.33. Version 1.30

August 21st, 1994.

- Added bitmap and icon support (including bitmap buttons).
- Added memory device context support.
- Divided the source up a bit.

11.34. Versions 1.00 to 1.20

- First and subsequent releases.

References

CLIPS 6.0 User Guide, NASA Software Technology Branch

CLIPS 6.0 Reference Manual, NASA Software Technology Branch

wxWindows User Manual, Julian Smart, Artificial Intelligence Applications Institute, University of Edinburgh, 1996

Glossary

API

Application Programmer's Interface - a set of calls and classes defining how a library can be used.

Bit list

A bit list in wxCLIPS is a way of specifying several window styles. It derives from C and C++ syntax, where by defining identifiers with carefully chosen binary numbers, it is possible to combine several values in one integer. In wxCLIPS, you use similar syntax to C, but enclose the list in quotes:

```
"wxCAPTION | wxMINIMIZE_BOX | wxMINIMIZE_BOX | wxTHICK_FRAME"
```

Callback

Callbacks are application-defined functions which receive events from the GUI. You normally add a callback for a particular window (such as a canvas) and event (such as OnPaint) using window-add-callback, or pass the callback in a panel item creation function, such as button-create.

Canvas

A canvas is a subwindow on which graphics (but not panel items) can be drawn. It may be scrollable. A canvas has a*device context overview* (page 115) associated with it.

DDE

Dynamic Data Exchange - Microsoft's interprocess communication protocol. wxCLIPS provides a subset of DDE under both Windows and UNIX.

Device context

A device context is an abstraction away from devices such as windows, printers and files. Code that draws to a device context is generic since that device context could be associated with a number of different real device. A canvas has a device context, although duplicate graphics calls are provided for the canvas, so the beginner doesn't have to think in terms of device contexts when starting out. See *device context overview* (page 115).

Dialog box

In wxCLIPS a dialog box is a convenient way of popping up a window with panel items, without having to explicitly create a frame and a panel. A dialog box may be modal or modeless. A modal dialog does not return control back to the calling program until the user has dismissed it, and all other windows in the application are disabled until the dialog is dismissed. A modeless dialog is just like a normal window in that the user can access other windows while the dialog is displayed.

Frame

A visible window usually consists of a frame which contains zero or more subwindows, such as text subwindow, canvas, and panel.

GUI

Graphical User Interface, such as MS Windows or Motif.

Menu bar

A menu bar is a series of labelled menus, usually placed near the top of a window.

Metafile

MS Windows-specific object which may contain a restricted set of GDI primitives. It is device independent, since it may be scaled without losing precision, unlike a bitmap. A metafile may exist in a file or in memory. wxCLIPS implements enough metafile functionality to use it to pass graphics to other applications via the clipboard or files.

Open Look

A specification for a GUI 'look and feel', initiated by Sun Microsystems. XView is one toolkit for writing Open Look applications under X, and wxCLIPS sits on top of XView (among other toolkits).

Panel

A panel is a subwindow on which a limited range of panel items (widgets or controls for user input) can be placed. wxCLIPS allows panel items to be placed explicitly, or laid out from left to right, top to bottom, which is a more platform independent method since spacing is calculated automatically at run time. Panel items cannot be placed on a canvas, which is specifically for drawing graphics. However, you can draw on a panel.

Resource

Resource takes several meanings in wxCLIPS. The functions get-resource, write-resource deal with MS Windows `.ini` and X `.Xdefaults` resource entries. The wxWindows/wxCLIPS 'resource system', on the other hand, is a facility for loading dialog specifications from `.wxr` files (which may be created by hand or using the wxWindows Dialog Editor).

Status line

A status line is often found at the base of a window, to keep the user informed (for instance, giving a line of description to menu items, as in the**hello** demo).

XView

An X toolkit supplied by Sun Microsystems for implementing the Open Look 'look and feel'. Freely available, but virtually obsolete.

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