# **IUP**

# Portable User Interface

### Version 2.3

(iup@tecgraf.puc-rio.br)

**IUP** is a portable toolkit for building graphical user interfaces. It offers a configuration API in three basic languages: C, Lua and LED. **IUP**'s purpose is to allow a program to be executed in different systems without any modification, therefore it is highly portable. Its main advantages are:

- high performance, due to the fact that it uses native interface elements.
- fast learning by the user, due to the simplicity of its API.

This work was developed at Tecgraf/PUC-Rio by means of the partnership with PETROBRAS/CENPES.

#### The **IUP** Team:

Antonio Escaño Scuri Mark Stroetzel Glasberg

Tecgraf - Computer Graphics Technology Group, PUC-Rio, Brazil <a href="http://www.tecgraf.puc-rio.br/iup">http://www.tecgraf.puc-rio.br/iup</a>

### **Overview**

IUP is a portable toolkit for building graphical user interfaces. It offers APIs in three basic languages: C, <u>Lua</u> and <u>LED</u>.

Its library contains about 100 functions for creating and manipulating dialogs.

IUP's purpose is to allow a program to run in different systems without changes - the toolkit provides the application portability. Supported systems include: Motif and Microsoft Windows 2000/XP/2003.

IUP uses an abstract layout model based on the boxes-and-glue paradigm from the  $T_EX$  text editor. This model, combined with the dialog-specification language (<u>LED</u>) or with the Lua binding (<u>IupLua</u>) makes the dialog creation task more flexible and independent from the graphics system's resolution.

Currently available interface elements can be categorized as follows:

- **Primitives** (effective user interaction): **dialog, label, button, text, multi-line, list, toggle, canvas, frame, image**.
- Composition (ways to show the elements): hbox, vbox, zbox, fill.
- **Grouping** (definition of a common functionality for a group of elements): **radio**.
- Menu (related both to menu bars and to pop-up menus): menu, submenu, item, separator.
- Additional (elements built outside the main library): dial, gauge, matrix, tabs, valuator, GL canvas, color chooser, color browser, toolbar.
- **Dialogs** (useful predefined dialogs): **file selection, message, alarm, data input, list selection**.

Hence IUP has some advantages over commercial interface toolkits available in the industry:

• **Simplicity:** due to the small number of functions and to its attribute mechanism, the learning curve for a new user is often faster.

- **Portability:** the same functions are implemented in each one of the platforms, thus assuring the interface system's portability.
- **Customization:** the dialog specification language (LED) and the Lua binding (IupLua) are two mechanisms in which it is possible to customize an application for a specific user with a simple-syntax text file.
- **Flexibility**: its abstract layout mechanism provides flexibility to dialog creation.
- **Extensibility:** the programmer can create new interface elements as needed.

IUP is free software, can be used for public and commercial applications.

### **Availability**

The library is available for several **compilers**:

- GCC and CC, in the UNIX environment
- Visual C++, Watcom C++ and GCC (Cygwin and MingW), in the Windows environment

The library is available for several **operating systems**:

- UNIX (SunOS, IRIX, AIX and Linux) using Motif 2.x (and optionally 1.x)
- Microsoft Windows 2000/XP/2003

### **Support**

The official support mechanism is by e-mail, using **iup AT tecgraf.puc- rio.br** (replace "AT " by "@"). Before sending your message:

- Check if the reported behavior is not described in the user guide.
- Check if the reported behavior is not described in the specific format characteristics.
- Check the History to see if your version is updated.
- Check the To Do list to see if your problem has already been reported.

If all these points were checked, you can report your problem. Please

specify in your message: **function, attribute, callback, platform** and **compiler**.

A discussion list is available at **LuaForge**: <a href="http://lists.luaforge.net/mailman/listinfo/iup-users">http://lists.luaforge.net/mailman/listinfo/iup-users</a>.

You can also submit *Bugs*, *Feature Requests* and *Support Requests* at **LuaForge**: <a href="http://luaforge.net/tracker/?group\_id=89">http://luaforge.net/tracker/?group\_id=89</a>.

The **IUP** page at **LuaForge** is available at: <a href="http://luaforge.net/projects/iup/">http://luaforge.net/projects/iup/</a>.

If you want us to develop a specific feature for the toolkit, Tecgraf is available for partnerships and cooperation. Please contact **tcg AT tecgraf.puc-rio.br**.

#### **Credits**

This work was developed at Tecgraf by means of the partnership with PETROBRAS/CENPES.

People who took part in IUP's development:

André Carregal

André Costa

André Derraik

Antonio Scuri

Carlos Augusto Mendes

Carlos Henrique Levy

Carlos José Pereira de Lucena

Claudio Coutinho de Biasi

Danny Reinhold

Diego Nehab

Diogo Martinez

Enio Emanuel Russo

Guilherme Fonseca Alvarenga

Henrique Dalcin Mendes Pinheiro

Leonardo Constantino Oliveira

Luiz Cristóvão Gomes Coelho

Luiz Henrique de Figueiredo

Marcelo Gattass
Mark Stroetzel Glasberg
Mauricio Oliveira Carneiro
Milton Jonathan
Neil Armstrong
Renato Borges
Renato Cerqueira
Roberto Beauclair
Vinicius Almendra

We must also mention engineer Enio Emanuel Russo, from PETROBRAS, who effectively contributed to the system's specification and project.

The initial version of the present document was developed by Carlos Henrique Levy, Neil Armstrong and André Carregal, being supervised and oriented by Luiz Martins, Luiz Henrique de Figueiredo, Marcelo Gattass and Carlos José Pereira de Lucena at Tecgraf, PUC-Rio for the Data Processing Sector (SEPROC) at CENPES/PETROBRAS.

#### **Documentation**

This toolkit is available at <a href="http://www.tecgraf.puc-rio.br/iup">http://www.tecgraf.puc-rio.br/iup</a>.

The full documentation can be downloaded from the <u>Download</u> by choosing the "Documentation Files" option.

The documentation is also available in Adobe Acrobat (<a href="iup.pdf">iup.pdf</a> ~1.1Mb) and Windows HTML Help (<a href="iup.chm">iup.chm</a> ~1.5Mb) formats.

The HTML navigation uses the WebBook tool, available at <a href="http://www.tecgraf.puc-rio.br/webbook">http://www.tecgraf.puc-rio.br/webbook</a>.

### **Publications**

This product stimulated the following scientific publications:

• Levy, C. H.; Figueiredo, L. H.; Gattass, M.; Lucena, C.; and Cowan, D. "IUP/LED: A Portable User Interface Development Tool". *Software: Practice & Experience*, 26 #7 (1996) 737-762. [spe95.pdf]

- Levy, C. H. "IUP/LED: Uma Ferramenta Portátil de Interface com Usuário". M.Sc. dissertation, Computer Science Department, PUC-Rio, 1993.[levy93.pdf]
- Figueiredo, L. H.;Gattass, M.; and Levy, C.H. "Uma Estratégia de Portabilidade para Aplicações Gráficas Interativas". Proceedings of VI SIBGRAPI (1993), 203-211. [sib93.pdf]
- Oliveira Prates, R.; Figueiredo, L. H.; and Gattass, M. "Especificação de Layout Abstrato por Manipulação Direta". Proceedings of VII SIBGRAPI (1994), 165-172. [sib94.pdf]
- Oliveira Prates, R.; Gattass, M.; and Figueiredo, L. H. "Visual LED: uma ferramenta interativa para geração de Interfaces gráficas". M.Sc. dissertation, Computer Science Department, PUC-Rio, 1994. [prates94.pdf]

# **Tecgraf Library License**

This product is free software: it can be used for both academic and commercial purposes at absolutely no cost. There are no royalties or GNU-like "copyleft" restrictions. It is licensed under the terms of the MIT license reproduced below, and so is compatible with GPL and also qualifies as Open Source software. It is not in the public domain, Tecgraf and Petrobras keep its copyright. The legal details are below.

The spirit of this license is that you are free to use the library for any purpose at no cost without having to ask us. The only requirement is that if you do use it, then you should give us credit by including the copyright notice below somewhere in your product or its documentation. A nice, but optional, way to give us further credit is to include a Tecgraf logo in a web page for your product.

The library is designed and implemented by a team at Tecgraf/PUC-Rio in Brazil. The implementation is not derived from licensed software. The library was developed by request of Petrobras. Petrobras permits Tecgraf to distribute the library under the coditions here presented.

Copyright © 1994-2005 Tecgraf / PUC-Rio and PETROBRAS S/A.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE

AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

# **History of Changes**

### Version 2.3 (16/Mar/2005)

#### General

- Download, Discussion List, Submission of Bugs, Support Requests and Feature Requests, are now available thanks to LuaForge site.
- New organization of the documentation.
- New MacOS X libraries using OpenMotif and gcc.
- New CARET\_CB callback for the IupText, IupMultiline and IupList controls. It is called every time the caret changes its position.

#### **Windows**

- IMPORTANT: Now the canvas background color is <u>only</u> redrawn if the ACTION callback is <u>not</u> defined. When defined the application must draw all the canvas contents. This will optimize the redraw of canvas based controls and application canvases. The TRANSPARENT value for the BGCOLOR is not supported anymore.
- New attribute IMMARGIN to control the spacing between the border and the image in IupButton.
- Optimized the IupButton and IupLabel drawing when IMAGE is specified.
- Fixed incorrect stop for the IupTimer. Improved start and stop control.
- Flicker now is significantly reduced. CLIPCHILDREN=YES is now default. IupFrame background drawing optimized.
- New dialog attribute "CONTROL" that enable the embedding of the dialog inside another window. Used by LuaCOM to create OLE (ActiveX) controls implemented in Lua.
- New IupText attribute "PASSWORD" to hide the typed character.
- IUP is now compatible with Windows XP Visual Styles. See the Win32 driver documentation.

#### Motif

- Fixed invalid return value when retreiving the FONT attribute.
- Added backward compatibility code for Motif 1.2. Must edit makefile to add the file "src/mot/ComboBox1.c".

### **IupControls**

- Missing support for IupList with EDITBOX=YES in iupMask.
- BGCOLOR for images were ignored in the IupTree.
- Now some matrix cell attributes are not inherited from parent. Like "L:C", "ALIGNMENT\*", "FGCOLOR\*", "BGCOLOR\*", "FONT\*", "WIDTH\*" and "HEIGHT\*", for optimization reasons.
- IupTree now uses double buffer for optimal drawing.

  To avoid flicker during resize in Windows, do not use it inside a IupFrame, and use CLIPCHILDREN=YES.
- New utility functions: IupTreeSetAttribute, IupTreeStoreAttribute IupTreeGetFloat, IupTreeSetfAttribute, IupTreeGetAttribute, IupTreeGetInt.
- New IupMatrix callback DRAW\_CB to allow a custom drawing of the cell contents.
- New IupTree DRAGDROP\_CB callback.
- New IupSpin and IupSpinbox utility functions.

### **IupLua**

- Fixed ihandle\_gettable in iuplua.lua when iupGetTable is nil when object is created in C.
  - This affected the object returned by iup.LoadImage.
- Fixed Zbox children names initialization.
- Missing DROPFILES\_CB callback management.

- Missing FGCOLOR\_CB and BGCOLOR\_CB callback management for the IupMatrix. The returned values order was inverted.
- Missing MAP\_CB callback management for IupCanvas in IupLua3.

### Version 2.2.2 (07/Oct/2004)

#### General

- Fixed bug in IupGetFile FILTER initialization.
- Improved IMINACTIVE automatic generation algorithm.
- New zip package for download with iup images in LED format.
- New application IupView to load and display LED files.
- Fixed some attribute storage in iupMask and IupGetParam. Fixed bug when several masks are used in the same dialog.
- Replaced the internal Lua4 code for a smaller hash table module. Thanks to Danny Reinhold.
- Fixed IupGetParam invalid memory access.
- IupNextField and IupPreviousField now only changes the focus for the checked toggle inside a radio.
- IupGetAttributes now returns the pointer address if attribute is a known internal pointer data.
- Now pressing Enter over a button activates it, even if it is not the DEFAULTENTER button.
- Esc and Backspace keys now will be translated even if CapsLock is active.

#### Windows

• New ENTERWINDOW\_CB and LEAVEWINDOW\_CB for buttons.

- Fixed double click for button, toggle and list were not being considered as two clicks.
- removed FLAT style from toggles with IMPRESS image. Fixed size of toggle with image.
- New attribute SHOWDROPDOWN to open the dropdown list programmatically.
- Removed a black border around IupMultiline and IupText.
- Removed the TABSTOP for non marked Toggles inside a Radio.
- Fixed invalid memory access when menu item is activated and all dialog controls are disabled.
- Fixed IupFileDlg ignored the x,y parameters of IupPopup.

#### **Motif**

- Enter in IupMultiline activated the DEFAULTENTER button instead of adding a new line.
- Fixed invalid memory access when set FONT to NULL.
- Fixed ACTION callback called for IupList when list contents were cleared.

### **IupControls**

• IupTree and IupTabs did not propagate to the parent the K\_ANY callback for non used keys.

### **IupMatrix**

- The TITLES, BGCOLORS, FGCOLORS and FONTs attributes were incorrectly set after a DELLIN, ADDLIN, DELCOL or ADDCOL.
- In Windows when the user double click a dropdown list now will start opened.

- The user callback scroll\_cb was incorrectly registered.
- New "HIDEFOCUS" attribute to hide the focus mark when drawing.
- Now in MARK\_MODE=CELL and MULTIPLE=YES you can click on the title area to mark a full line or collumn at once.
- New BGCOLOR\_CB and FGCOLOR\_CB callbacks.
- Fixed when MARKMODE=LIN/COL/LINCOL if the first cell in the line/column is selected the click in the title area was ignored.

### **IupLua**

- Removed "print" debug calls in internal code.
- IupGetAttribute/iup.GetAttribute now returns an user data if attribute is a known internal pointer data.
- New IupGetAttributeData/iup.GetAttributeData that returns the data always as an used data.
- Fixed incomplete initialization of image object returned by IupLoadImage.

### Version 2.2.1 (25/Aug/2004)

#### General

- Fixed some minor bugs introduced in version 2.2.
- Fixed HTML help navigation.
- For disabled buttons and toggles when the IMINACTIVE is not defined by IMAGE is defined, we replace the non transparent colors by a darker version of the background color creating the disabled effect.
- New key K\_PAUSE.

#### Windows

- Fixed dynamic cursor creation.
- Toggle with inactive image could be enabled/disabled only once.
- Fixed toggle in Radio behavior.
- Some keys were not being treated correctly.
- Improved key codes management.

#### **Motif**

 Fixed IupList setattribute VALUE and list items activated the ACTION callback.

#### **Controls**

- Circular IupDial now uses abssolute angle.
- CARET did not work when set inside EDITION\_CB in IupMatrix.
- Check for double initialization of IupControls.
- Better resize management for IupVal and IupDial.
- IupControls now depends on the CD library version 4.3.3 in Motif.

### **IupLua**

• Wrong implementation of DROPCHECK\_CB.

## Version 2.2 (11/Aug/2004)

#### **INCOMPATIBILITIES**

• Definition of K\_parenleft changed to K\_parentleft in C and all Lua bindings.

- Major IupLua5 change (see IupLua section bellow).
- IupLua4 is not supported.
- Motif 1.x is not supported.

#### General

- Documentation in Portuguese removed from the manual.
- Changed and documented the default palette used in IupImage.
- IupImage can now have up to 256 colors.
- New mouse wheel callback "WHEEL\_CB" for Windows and Motif. If not defined the wheel will automatically scroll the canvas vertically.
- Changes on global attributes:
   "COMPUTERNAME", "USERNAME" now implemented also in Motif.
   "COPYRIGHT" not documented
   "SCREENDEPTH", "SYSTEMVERSION" new for Windows and Motif
   "SYSTEM" Implementation were different from the documentation
   "CURSORPOS" was documented as if it was only for Windows.
   "LOCKLOOP" now implemented also in Motif..
- The definitions IUP\_SBDRAGV and IUP\_SBDRAGH were not documented.
- Callback MENUSELECT\_CB changed to HIGHLIGHT\_CB. Now implemented also in Motif.
- New menu callback MENUCLOSE\_CB.
- New utility functions IupMessagef and IupGetInt2.
- Improved visual appearance of IupScanf, IupAlarm and IupListDialog.
- New creation attribute "SEPARATOR" for IupLabel so you can create vertical or horizontal line separators.
- New IupGetText predefined dialog.
- Now all the predefined dialogs consult the global attribute IUP\_PARENTDIALOG.
- New "HELP\_CB" callback for all interactive controls.

- The "KEYPRESS\_CB" callback now will be called repeatedly if the key is pressed and held.
- IupList can now have an edit box associated.
- The OLD newfocus parameter of the KILLFOCUS\_CB is now NULL always, in Windows and Motif.
- The BGCOLOR color for IupImage transparency was not according to the documentation.

It was using the default background color of the dialog. Now it uses the BGCOLOR of the control where it is inserted.

#### **Windows**

- Menus for notification icons (system tray) were not working correctly.
- Cursors in Windows now accept more than 2 colors and can have size different from 32x32.
- IupImage was rewritten in Windows to be more simple and flexible. This also solved some weird button backgrounds in gcc3.
- New global attributes "SHIFTKEY" and "CONTROLKEY" can be "ON" or "OFF", return the key state (windows only).
- The default size for buttons in Windows was increased by 2 characters.
- Returning IUP\_CLOSE in a SHOW\_CB of an IupPopup wasn't closing dialog.
- IupOpen instead of initializing OLE, now only initializes COM (CoInitialize).
- The border of buttons are now drawn by a system function instead of simulated.
- New attribute "PLACEMENT" to show the dialog maximized or minimized.
- In IupFileDlg when browsing for folder it will use a new interface, with a resizable dialog and other features.

Also in IupFileDlg fixed start position for IupPopup. New file selection callback and preview area. IupFileDlg was not using the IUP\_PARENTDIALOG attribute. Default value for IUP\_NOOVERWRITEPROMPT was wrong. ALLOW\_NEW was inconsistent with the documentation.

- The button callback now is called only when the button is released inside the button area.
- WOM callback renamed to WOM\_CB.
- New "HELPBUTTON" attribute for the dialog.
- The menu item now accepts auxiliary bitmaps.
- When the dialog has a multiline and the user press ESC the window was improperly closed.
- Fixed comboox resize feedback. When resizing the dialog the combobox was temporarily opened.
- IupCanvas was not receiving arrow keys events correctly in keypress\_cb.
- IupHide now can close popup dialogs.
- Attribute TABSIZE for IupMultiline in Windows was not documented.
- Default value for attribute BGCOLOR for IupCanvas in Windows was not documented.
- Direction keys now are processed by the ACTION callback for IupText.
- The GETFOCUS\_CB and KILLFOCUS\_CB management for the controls was reviewed and optimized.
   GETFOCUS\_CB now works for toggle and button.
- First RESIZE\_CB of the canvas received a wrong canvas size.
- Label alignment for images was always center.

#### Motif

- New global attribute: "MOTIFVERSION".
- IUP\_SBDRAGV and IUP\_SBDRAGH were not implemented.
- HIGHLIGHT\_CB menu item callback.
- "COMPUTERNAME", "USERNAME" and "LOCKLOOP" global attributes.
- IupMessage now uses native XmMessageBox.
- The overwrite confirmation dialog was closing the file open if the user answered "No".
- Implemented the IUP\_NOOVERWRITEPROMPT attribute for IupFileDlg.
- The dropdown list now uses the Motif 2 combobox widget. So IUP is not compatible with Motif 1.x anymore.
- Now the GETFOCUS callback is also invoked when the list is dropdown.
- KEYPRESS\_CB is now called only for IupCanvas.

#### **Controls**

- DEFAULTESC and DEFAULTENTER were missing in IupGetColor.
- New function IupLoadImage that uses the library IM to load an image file (implemented in an additional library).
- New dialog IupGetParam, similar to IupScanf but uses variable controls for fields.
- IupTabs now uses the FGCOLOR for the text color.
- ICTL\_DASHED was missing in the documentation of IupGauge. The control now has the attributes MIN and MAX just like the valuator.

- For IupVal and IupDial, new keyboard and mouse wheel support.
   New attribute "SHOWTICKS" to show tick marks around the valuator.
   New attribute "UNIT" to change the angle unit to degrees in the dial.
   Completely changed visual of the controls.
   The controls can now be deactivated and it displays focus feedback.
- Updated visual for the IupGauge and IupTabs controls.
- In IupTabs the popup menu to select a tab sometimes did not set the new tab.

#### **Matrix**

- Documentation reviewed and reorganized.
- Returning IUP\_CLOSE in CLICK\_CB was not closing application.
- The scrollbar drag will now simultaneously scroll the matrix.
- New callback "DROPCHECK\_CB" to aid the dropdown feedback in the cell.
- New utility functions: IupMatSetAttribute, IupMatStoreAttribute IupMatGetFloat, IupMatSetfAttribute, IupMatGetAttribute, IupMatGetInt.
- Fixed some display erros in Windows because of an error in the size of the scrollbar.
- In Windows pressing a key in a menu activates the k\_any of the last active element. In the matrix this turns into an infinit loop. The matrix now uses the keypress\_cb instead of the k\_any callback.
- Fixed empty selection in the dropdown list if the user press a regular key to start editing the cell.
- Fixed invalid dropdown value if the user changed focus to the scrollbars.
- CLICK\_CB was called twice in a double click (press+release).
- In Motif, the textbox and the dropdown did not open when you double click

a cell. But now the user still needs to click again in the control to put it into focus.

- After editing the cell in the last line, now the focus goes to the column on the right at the last line, instead of the first line.
- BGCOLOR now works also for titles.
- FONT attribute now can be set/get just like BGCOLOR and FGCOLOR. But the cell size is calculated always from the matrix attribute IUP\_FONT.

#### Tree

- Documentation reviewed and reorganized.
- CTRL and SHIFT accepts only values IUP\_YES and IUP\_NO. Default value of SHIFT and CONTROL is NO, it was NULL.
- Pressing Space without Control now activates the RENAMENODE\_CB callback.

### **IupLua**

- The selection callback wasn't working in Lua 5 binding.
- MOUSEMOVE\_CB in Dial control was receiving wrong angle parameter in Lua 5 binding.
- IupGLCanvas wasn't working in Lua 5 binding.
- Major IupLua5 change.

It now complies to LTN7 (namespaces). All exported functions are accessed only through **iup.FunctionName** (no Iup prefix anymore)

All callbacks in Lua are now access through their exact name in the C API. Mostly add sufix "\_cb" to name (most common callbacks renamed for ex: getfocus\_cb, killfocus\_cb). Also some names were fix: valuecb >> value\_cb and mapcb >> map\_cb.

Numeric definitions also changed: IUP\_DEFAULT >> iup.DEFAULT String definitions for values are no longer supported, use "YES", "NO", etc. iupcb changed to iup.colorbrowser.

- Use LoadLibrary to load IUP from Lua.
- There was no stack pop in color processing loop fo IupImage in IupLua5.
- IupLua4 is not supported anymore.

#### **LEDC**

- Added support for IupTree and IupSbox.
- Fixed include for IupColorBrowser.
- Fixed small invalid memory access.

### Version 2.1 (18/Feb/2004)

#### General

- New split-panel control: IupSbox
- IupTree and IupMatrix libraries are now part of iupcontrols
- New functions to traverse IUP controls: IupGetNextChild, IupGetBrother, IupGetParent
- IupAppend accepts elements other than predefined internal controls (allowing CPI containers)
- Focus now may go to CPI controls
- Attribute IUP\_X, IUP\_Y are now valid for every control that has a native representation (returns the position of the control in screen coordinates)
- CURSORPOS global attribute is now returned from the driver
- IupGetFile was not allowing new files and should not change user directories
- IupGetFile was not accepting long directories
- IupAlarm does not take [ENTER] as button1 click anymore
- IupScanf does not accept "," when option is float
- Windows 95 is no longer supported

### **IupTree**

- Trying to get attribute NAME for and invalid ID returns NULL
- Fixed attributes IUP\_CTRL e IUP\_SHIFT for mouse interaction

### **IupMatrix**

- Special keys such as backspace, control+c, etc. are now ignored when not in edit mode
- leaveitem/enteritem were not being generated when the focus was leaving or entering the matrix
- leaveitem/enteritem should not being called when the cell enters edition mode through the mouse

#### Windows

- IupOpen/IupClose now initializes OLE (OleInitialize/OleUninitialize)
- ENTERWINDOW/LEAVEWINDOW reimplementation. LEAVEWINDOW does not fail anymore
- Mouse hook removed. Better performace
- New attributes TRAY, TRAYTIP and TRAYIMAGE and new callback TRAYCLICK\_CB which allows a dialog to be put in the tray
- Action in IupText now responds to the [ENTER] key
   Some keys were not working with keypress callback: \ ] [ '; /.,
- New attribute NATIVEPARENT, which makes any dialog in Windows able to be parent of a IUP dialog (even from other toolkits)
- Better protection dealing with other processes messages
- IupFileDialog when used to get directory was not updating STATUS attribute correctly
- IUP\_APPEND small memory problem fix
- atexit removed
- KILLFOCUS\_CB and GETFOCUS\_CB were not being called when focus goes to the menu
- MAP\_CB in a canvas is now called before RESIZE\_CB (like the Motif driver)
- ALT-F4 was not working to close application

- Images sometimes show black using Visual C: do not use option in Visual C 6.0 /NODEFAULTLIB:libcd
- IUP\_TIP does not show when the fade effect is on: MS fixed the problem, use autoupdate

### IupLua 3.2, 4.0, 5.0

- Functions exported to Lua: IupGetType, IupGetParent, IupGetNextChild, IupGetBrother
- IupTimer, IupSbox binding
- IupTreeGetTable, IupTreeSetTableId, IupTreeGetTableId functions created
- Several bug fixes in IupLua 5.0
- New function iuplua\_pushihandle, iuplua\_dofile and iuplua\_dostring, IupGetFromC
- If iuplua\_dofile and iuplua\_dostring are used errors are reported through ERRORMESSAGE function
- Default \_ERRORMESSAGE function shows a dialog with the error
- IupLua5: Removed Lua redefinitions of dofile and dostring
- Minor bug in IupTree function TreeSetValue
- IupListDialog was not returning a table as it should when in multiple mode

### **IupVal**

- Attribute IUP\_VALUE wasn't taking effect when set before mapping
- CD canvas was being altered during mouse movement event

#### Manual

- CPI manual revision
- IupLua manual revision
- Several examples revised
- Controls section rearranged

#### **Distribution**

• README on how to compile IUP with tecmake

### Version 2.0.1 (31/Jul/2003)

#### General

- Attribute IUP\_TYPENAME replaced by IupGetType function
- minor bugs introduced in 2.0 because of internal old misuse of the hash table.
- Following controls were not working with LED: val, dial, gl, matrix, tree.
- New canvas attribute "DRAWSIZE" that returns the drawing area of the canvas (in Windows we may have an addicional border included in "RASTERSIZE").

#### **Windows**

- Memory invasion when eliminating an item from an IupList with multiple items.
- Callback IUP\_OPEN\_CB sometimes was not being called.
- New dialog attribute "BRINGFRONT" which forces dialog to be the window in the front. Useful for multithreaded applications.
- Attribute ACTIVE was not working with radio control.
- Now folder selection in IupFileDlg uses IUP\_DIRECTORY as a start path.
- Now when ESC or ENTER is pressed KEYPRESS\_CB is generated

#### Motif

- Dropdown were becoming unstable when VALUE attribute is set after IupMap.
- Dropdown were not being positioned accordingly.
- IupList was not selecting the first item.
- IupTimer callback were called only once.
- The value "BGCOLOR" in a value of an image color table index appeared

- with erroneous color.
- keyboard and mouse callbacks were not being called when in full screen.

#### **LEDC**

- Updated to reflect 2.0 changes like "iupmatrx" to "iupmatrix".
- Now tests if name is not NULL before using IupSetHandle.

### **IupLua**

• New binding for Lua 5. This is beta version since uses old notation "iuplabel" instead of "iup.label".

### Version 2.0 (23/Jun/2003)

#### General

- IUP has undergone a large internal reorganization, but no structural or algorithmic changes have occurred. The purpose of this reorganization was to standardize function, variable and module nomenclature. This process is not yet complete, but the few remaining details will be solved in the next version.
- Table Hash was completely replaced with a modified version of Lua 4. This version is internal of IUP and does not affect applications. This has brought us a better management of the memory used by attributes.
- The CPI was changed to allow the creation of native controls, as well as controls based on IupCanvas. The internal controls were not yet rewritten over the new CPI this will be done progressively in the next versions.
- The Ihandle definition changed from "void" to "typedef struct Ihandle\_ Ihandle;". This has direct implications on C++ applications that did not do pointer typecast. In C++, code errors might occur and, in C, there might be warnings.
- New control IupTimer. Allows creating timers in Windows and Motif.
- New callback "KEYPRESS\_CB". Allows intercepting any key and replacing all callbacks "K\_xxx".
- IupHelp was rewritten in a simpler way. In Windows, it simply uses the

- system's configuration to open a URL and, in UNIX, it directly runs Netscape or another executable configured by an environment variable.
- New attribute "FULLSCREEN", allows creating a dialog that occupies exactly the whole screen.
- Dialog IupGetFile was rewritten using IupFileDlg.

#### **Windows**

- New attribute "CURSORPOS", allows programmatically changing the cursor's position on the screen.
- New attribute "NOOVERWRITEPROMPT" for IupFileDlg. It prevents IupFileDlg in Save mode from asking the user if s/he really wishes to overwrite a file.
- Problem corrected in the file list in the use of attribute "MULTIPLE\_FILES" for IupFileDlg. When only a folder was selected, it was not setting the "STATUS" attribute in a cancelled action.
- Greater driver stability Ihandle is no longer dependant on the native handle (HWND).
- New global attributes "HINSTANCE", "SYSTEMLANGUAGE", "COMPUTERNAME", "USERNAME".
- Global attribute IUP\_SYSTEM now returns a more complete string.
- Cursor now changes instantly it only changed before returning to IUP.
- In an inactive IupToggle, the IMINACTIVE image is now correct.

#### Motif

- The iupmot library no longer exists. Tecmake has been updated, but those who use their own metafiles must remove this file from the list of libraries in the application.
- New attribute "AUTOREPEAT" allows turning on and off the automatic repetition mode of pressed keys.

### **IupLua**

- [4/5] IupListDialog when selection type is 1 (single) was not returning any value.
- [4/5] Callbacks mapcb and showcb had their names wrong: map\_cb and show\_cb

- [3] Callback action in IupMultiline was not passing the parameter "after".
- [4/5] In IupTree, callbacks "afterselection" and "beforeselection" were replaced with the callback "selection".

### **IupControls**

 We have joined seven libraries in one: dial, gauge, cb, gc, mask, tabs and val. But neither the initialization functions nor each control's inclusion files were changed. The source code does not need to be altered, except for the makefiles. Tecmake was given a flag USE\_IUPCONTROLS to automatically include this library.

### **IupMatrix**

• The name of the library was changed from "iupmatrx" to "iupmatrix". The same for the inclusion files. Therefore, all applications that use IupMatrix must change the source code and the makefile to reflect these changes.

### **IupTree**

• In one case, the active CD canvas was not being returned to the old canvas before drawing.

### **IupGL**

- In Linux, the additional GLw library was added to the control library.
- New attributes for query in UNIX: CONTEXT (GLXContext), VISUAL (XVisualInfo\*), COLORMAP (Colormap).

### **History of Version 1.x**

### To Do

### General

- Allow the functions IupAppend and IupDetach to be used for dynamic creation of menus and IupTabs.
- To allow IupShow after a IupPopup.
- To show a border for visual location of VBOX, HBOX and FILL. Can be a dialog attribute. Or most likely a function to display the layout.
- Organize controls and driver initialization and management, improve the possibility of implementing new drivers.
- A gtk driver in Linux.
- A wxWidgets driver?
- A MacOS X native driver?
- Change all comments in the source code to english. Add comments to the internal includes for Doxygen.
- Attribute for boxes to retrieve the child controls like in IupLua. For now you should use IupGetNextChild and IupGetBrother.
- Fix names of headers, initialization functions and libraries that do not have the "iup" prefix.
- A tutorial section in the documentation. Add more complete samples.
- Flat button activated by mouse hover.
- Improve the fullscreen policy.

### Motif

- Reduce flicker when dialog is resized.
- Callback SHOW\_CB is not called when the dialog is hidden because of PARENTDIALOG.
- Some warnings in the SunOS when using the OpenGL canvas.
- When another Window Manager is running the IupPopup disable the other windows, but they can be placed in front of the popup window if PARENTDIALOG is not used. Also in this case, some window decorations do not work.
- Sometimes the control initialization is incomplete and its size is miscalculated. To solve this call IupMap(dialog) and set the dialog size to NULL "IupSetAttribute(dlg, IUP\_SIZE, NULL);" before calling IupShow.

This will fix the sizes.

### **Windows**

• The popup menu sometimes act as disabled when just before show some other control was activated or deactivated.

### **IupControls**

• A vertical IupGauge?

### **IupMatrix**

- In Motif, when start editing using a double click, the user must click again to the edit control get the focus.
- When removing a line, if it has the focus an invalid call to enteritem\_cb/leave\_item\_cb will occur for the removed cell.
- Copy and paste compatible with Excel?
- Sort for columns?

### **IupTree**

- Rename node like in IupMatrix.
- Images with variable sizes for nodes.

### **IupLua**

• IupGetParam binding.

### **New Controls**

- Image Listbox
- Concrete Layout Container (to position elements with abssolute coordinates relative to the box)
- Grid Container (to distribute elements in a grid)
- IupOle to create OLE controls in Windows
- RTF editor in Windows
- HTML viewer

• IupPlot to plot a XY graph

# **Comparing IUP with Other Interface Toolkits**

# Why to still maintain IUP if today we have so many other popular toolkits?

This is a question we always ask to ourselves before going on for another year.

To answer that question we must first define the characteristics of the "ideal" toolkit, list the available toolkits and compare them with the "ideal" and with IUP.

We would like a toolkit that has:

- **Portability.** That provides an abstraction for User Interface in Windows, UNIX and Macintosh.
- **Free License and Open Source.** This means that we can also produce commercial applications. The pure GPL license can not be used but the LGPL can but must contain an exception stating that derived works in binary form may be distributed on the user's own terms. This is a solution that satisfies those who wish to produce GPL'ed software and also those producing proprietary software. Many libraries are distributed with this license combination.
- **Small and Simple API.** This is rare. Many libraries assume that an Interface toolkit is also a synonymous of a system abstraction and accumulate thousands of extra functions that are not related to User Interface. At Tecgraf we like many small libraries instead of one big library. Almost all available toolkits today are in C++ only, so C applications are excluded, also this means a hundred classes to include and understand each member function. The use of attributes makes a lot of things more elegant and simpler to understand.
- Native Look & Feel. Many toolkits draw their own controls. This gives an uniformity among systems, but also a disparity among the available applications in the same system. Native controls are also faster because they are drawn by the system. But the problem is what's "native" in UNIX? Some commercial applications in UNIX start using Motif as the "native" option. It is the official standard but because of

license restrictions, before the OpenMotif event, the system became old and some good alternatives were developed, including GTK and Qt.

**Toolkits** 

With these characteristics in mind we select some of the available toolkits:

Name	License	Last Update	Version	Language	Platforms	Controls	Team	Con
V	LGPL	1998- 2003/03	1.9	C++	Win, X	native	1	
ZooLib	MIT	2000- 2003/04	0.9	I( ++	Win, X, Mac	own	4+9	Still
<u>Fresco</u>	LGPL	1998- 2004/02	Alpha	I( ++	Win, X, Mac	own	9	Lice restr Still Alpl COI
YAAF	BSD*	2002- 2004/03	1.1a8	IC . + +	Win, X, Mac	own	1+9	
GraphApp	BSD*	1997- 2004/05	3.52		Win, X, Mac	own	1	Sma inter
FOX	LGPL*	1997- 2005/03	1.5.0	C++	Win, X	own	3+15	grea licer total
FLTK	LGPL*	1998- 2004/11	1.1.6	C++	Win, X, Mac	own	3+16	was Digi Don Easy learı

GTK+	LGPL*	1997- 2005/03	2.6.4	С	Win, X	own	9	targe X-W basie GN( Win apar
Qt	GPL	1994- 2004/08	3.3.3	C++	Win, X, Mac	own	(many)	X is Non Con basic KDI Win paid Emu nativ
<u>wxWidgets</u>	LGPL*	1992- 2005/02	2.5.4	C++	Win, X, Mac	native	6+11	
<u>IUP</u>	MIT*	1994- 2005/03	2.3	С	Win, X	native	2	

Table Last Update: March 2005

More toolkits can be found here: The GUI Toolkit, Framework Page.

An interesting article can be found here: <u>GUI Toolkits for The X Window System.</u>

### **Conclusions**

From the selected toolkits using the defined approach we can eliminate some toolkits:

The gray ones are not updated anymore or the development is very slow or needs a better organization.

FOX has a great look but the license can be restrictive in some cases.

FLTK promises a new version with a better look, but until then it does not have a pretty good look. The FLTK documentation also does not help.

GTK+ can be used as a replacement for Motif, but not as a "portable" toolkit since is was target for X-Windows. Nowadays GTK 2 is a great free C toolkit. But some predefined dialogs could be the native ones, like the File Selection.

Qt has several license limitations, although is a very stable and powerful toolkit. Qt can be also used as a replacement for Motif.

The "best" free solution that we choose would be wxWidgets because of the native controls and its portability. But since version 2, GTK+ is a very strong option because it is in C and had its visual improved.

It is very hard to compare IUP with wxWidgets and Qt since they are much more than an Interface Toolkit. They are complete development platform that includes several secondary libraries. In IUP we focus only in Graphical User Interface.

### **Developing IUP**

IUP uses Native Controls in Windows and Motif. Mac port is outdated and not maintained for long time, MacOS 9 was terrible. With Mac OS X we may have the opportunity to do something better. Today IUP can be built in Mac OS X using X11 and Motif. Motif is still very important for non Linux systems, some of our applications run on old AIX, SGI and Sun, that only have Motif installed and we can not force the installation of other toolkits like GTK. On the other hand in Linux we should be using GTK instead of Motif.

IUP is in C, is small and powerful. We have a small but very active team and we have the support of the Tecgraf applications. Our objective is always to try to suppress the Tecgraf needs, keeping backward compatibility and improving the internal code.

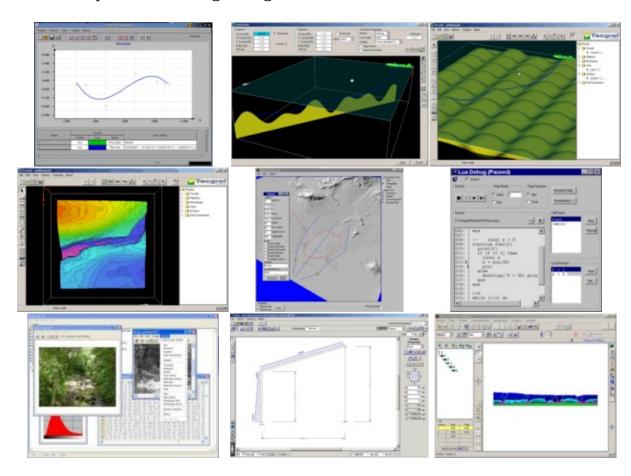
IUP does not have a wide localization feature, it only includes support for

messages in English and Portuguese. And it does not have support for Unicode characters.

.. "Make it Reusable, Make it Simple, Make it Small" ...

# **Screenshots**

Click on the picture to enlarge image.



# Guide

# **Building Applications**

To compile programs in C, simply include file **iup.h**. If the application only uses functions from IUP and other portable languages such as C or Lua, with the same prototype for all platforms, then the application immediately becomes platform independent, at least concerning user interface, because the implementation of the IUP functions is different in each platform. The linker is in charge of solving the IUP functions using the library specified in the project/makefile. For further information on how to link your application, please refer to the specific driver documentation.

IUP can also work together with other interface toolkits. The main problem is the IupMainLoop function. If you are going to use only Popup dialogs, then it is very simple. But to use non modal dialogs without the IupMainLoop you must call IupLoopStep from inside your own message loop. Also it is not possible to use Iup controls with dialogs from other toolkits and vice-versa.

The generation of applications is highly dependent on each system, but at least the **iup.lib/.a/.so** library must be linked.

To use the Lua Binding, you need to link the program with the **iuplua.lib/.a/.so** library and with the **lua.lib/.a/.so** and **lualib.lib/.a/.so** libraries. IupLua is available for Lua 3.2 and Lua 5.0.

The download files list includes the <u>Tecgraf/PUC-Rio Library Download</u> <u>Tips</u> document, with description of all the available binaries.

#### **Windows**

In Windows, you must link also with the libraries **ole32.lib** and **comctl32.lib** (provided with the compilers). The **iup.rc** resource file must be included in the application's project/makefile so that HAND, IUP, PEN and SPLITH cursors can be used.

There is also a guide on using the <u>Dev-C++ IDE Project Options</u> and <u>Visual C++ IDE Project Properties</u>.

#### Motif

In Motif, IUP uses the Motif (Xm), the Xtoolkit (Xt) and the Xlib (X11) libraries. To link an application to IUP, use the following options in the linker call (in the same order):

```
-liup -lXm -lXmu -lXt -lX11 -lm
```

Though these are the minimum requirements, depending on the platform other libraries might be needed. Typically, they are X extensions (Xext), needed in SunOS, and Xpm, needed in Linux. They must be listed after Xt and before X11. For instance:

```
-liup -lXm -lXmu -lXt -lXpm -lXext -lX11 -lm
```

Usually these libraries are placed in default directories, being automatically located by the linker. When the linker warns you about a missing library, add their location directories with option -L. In Tecgraf, some machines require such option:

Standard -L/usr/lib -I/usr/include

Linux -L/usr/X11R6/lib -I/usr/X11R6/include

IRIX -L/usr/lib32 -I/usr/include/X11

Solaris -L/usr/openwin/lib -

I/usr/openwin/share/include/X11

AIX -I/usr/include/Motif2.1

Following are some makefile suggestions. All of them can be used in SunOS (Sun), IRIX (Silicon) and AIX (IBM) systems. For Linux, -lXpm must be added at the end of the SYSLIBS variable.

- <u>Simple Makefile</u> This makefile can be used to generate simple applications which use only IUP.
- Makefile for IUP with CD For applications that use the CD graphics system.
- Makefile to generate several versions This makefile is a base to

generate several versions of the application, one for each platform. Each version is stored in a separate directory, managed by the makefile.

# **Building The Library**

The easiest way to build the library is to install the Tecmake tool into your system. It is easy and helps a lot. The Tecmake configuration files (\*.mak) available at the "src" folder are very easy to understand also.

Tecmake is a command line multi compiler build tool available at <a href="http://www.tecgraf.puc-rio.br/tecmake">http://www.tecgraf.puc-rio.br/tecmake</a>. Tecmake is used by all the Tecgraf libraries and many applications.

But we also provide a stand alone makefile for Linux systems and a Visual Studio workspace with the respective projects. The stand alone makefile is created using <a href="Premake">Premake</a> and a configuration file in lua called "premake.lua".

**IUP** runs on many different systems and interact with many different libraries such as Motif, OpenGL, Canvas Draw (CD) and Lua (3 and 5). You have to install some these libraries to use the IUP libraries. IUP standalone only depends on the Windows core libraries (alreay installed in the system) and on the Motif 2.x+X11-R6. In Linux you should use Open Motif 2.x. If you only have Motif 1.2 some features will be limited and you must add the file "src/mot/ComboBox1.c".

# **Tecmake Tips**

From the Tecmake manual:

"**Tecmake** is essentially a general GNU makefile with a series of predefined targets and rules with the purpose of providing those in charge of developing libraries and applications the necessary tools so that versions for different platforms can be generated homogeneously. In other words, the **tecmake** user does not need to create a makefile nor be concerned with his/her current platform to create a library or application, which we will here call *product*."

Note that **Tecmake** defines names for each system. For example: vc7 (Visual Studio 7) or Linux24g3 (Linux Kernel 2.4 with gcc 3.x.)

When installing **Tecmake** you will need to set a few environment variables. You should refer to **Tecmake**'s manual, but here are a few tips on how to install it (tested on Redhat 7.0):

- Set environment variables TCG\_HOME and TECMAKE\_HOME pointing to where tecmake.mak is installed;
- Set variables TEC\_UNAME, TEC\_SYSNAME, TEC\_SYSRELEASE. These are well explained in **Tecmake**'s manual under Platforms.

In **IUP**'s main directory there is a file named *make\_uname* (*make\_uname.bat* in Windows) that calls **Tecmake** for each **IUP** library. To build **IUP** for Windows using Visual C 7.0 for example, just execute *make\_uname.bat vc7* 

# **Dev-C++ IDE Project Options Guide**

# http://www.bloodshed.net/devcpp.html

"Bloodshed Dev-C++ is a full-featured Integrated Development Environment (IDE) for the C/C++ programming language. It uses Mingw port of GCC (GNU Compiler Collection) as it's compiler. Dev-C++ can also be used in combination with Cygwin or any other GCC based compiler."

It has many features, and integrated debug and it is free! To use IUP with Dev-C++ you will need to download the "mingw3" binaries in the download page.

After unpacking the file in your conputer you must configure your Project Options. In the Project Options dialog there are 3 important places:

• General / Type - you can configure Win32 GUI or Win32 Console, but if you set to console it will always create a console screen behind your window when the program starts. Do not select "Support Windows XP Themes".



- Parameters / Linker where you are going to list the libraries you use, for example:
- -liup
- -liupcontrols
- -lcd
- -lcdiup
- -lcomctl32
- -lole32

In this configuration you are using also the additional library of Controls that uses the <u>CD library</u>, also available at the download page.

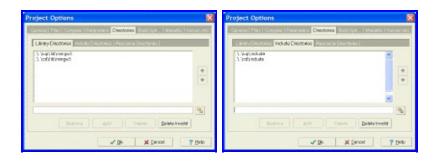


• Directories / Library Directories and Include Directories - where you are going to list the include path, for example:

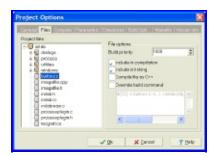
```
..\..\iup\lib\mingw3
..\..\cd\lib\mingw3
or
c:\tecgraf\iup\lib\mingw3
c:\tecgraf\cd\lib\mingw3
```

#### And:

```
..\..\iup\include
..\..\cd\include
or
c:\tecgraf\iup\include
c:\tecgraf\cd\include
```



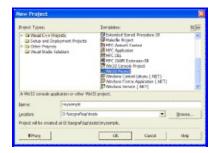
In some cases the IDE may force the compilation of C files as C++. If do not want that then uncheck the option in the settings for each file. Still in the Project Options dialog, in the Files tab, select the file and uncheck "Compile File as C++".



# **Visual C++ IDE Project Properties Guide**

This guide was built using Microsoft Visual Studio .NET 2003, which includes Visual C++ 7.1.

To create a new project go to the menu "File / New / Project":



Select "Win32 Project" on the Templates. Before finishing the Wizard, select "Application Settings". Mark "Windows application" and "Empty project".



You can also create a "Console application", and whenever you execute your application a text console will also be displayed. But this is a very useful situation so you can the use standard C printf function to display textual information for debugging purposes.

Then add your files in the menu "Project / Add New Item" or "Project / Add Existing Item".

After creating the project you must configure it to find the IUP includes and libraries. In Visual Studio there are two places where you can do this.

One is in the menu "Tools / Options", then select "Project / Visual C++ Directories". Select "Include Files" or "Library Files" in "Show directories

for:". In this dialog you will configure parameters that will affect all the projects you open.



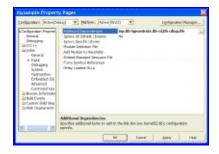
Or you can configure the parameters only for the project you created. In this case go the menu "Project / Properties". To configure the include files location select "C/C++ / General" in the left tree, then write the list of folders separated by ";" in "Additional Include Directories".



To configure the library files location select "Linker / General" in the left tree, then write the list of folders separated by ";" in "Additional Library Directories".



Now you must add the libraries you use. In this same dialog, select "Linker / Input" in the left tree, then write the list of files separated by spaces " " in "Additional Dependencies".

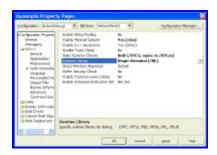


In this sample configuration the project is using the additional library of Controls that uses the <u>CD library</u>, also available at the download page.

When you build the project the Visual C++ linker will display the following message:

LINK: warning LNK4098: defaultlib 'LIBC' conflicts with use of

The default configuration use the C run time library with debug information, and IUP uses the C run time library without debug information. You can simply ignore this warning or change your project properties in "C/C++ / Code Generation" in the left tree, then change "Run Time Library" to "Single Threaded (/ML)".



If you want to use multithreading then you must use the DLL version of the IUP libraries. They are built with the "Multi-threaded DLL (/MD)" option. Or you must rebuild the libraries with your own parameters.

# **Complete Samples**

#### **Standard Controls**

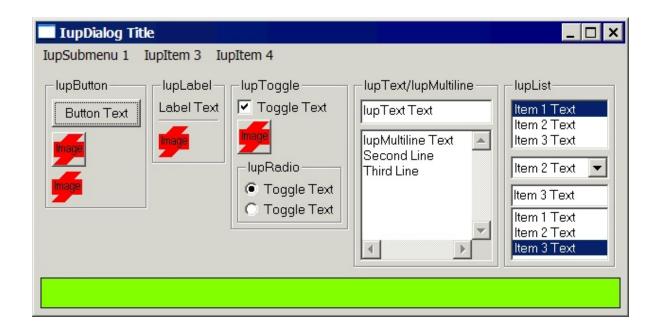
The following example creates a dialog with virtually all of IUP selements as well as some variations of them, with some attributes changed. The same example is implemented in C, LED and Lua. Both screens presented are from the same example, one in Windows 95 and the other in IRIX.

The C code is ready to compile. The LED code can be loaded and viewed in the IupView application. The Lua code can be loaded and executed in the IupLua standalone application. For the IupView and IupLua applications see the distribution files available at the Download.

in C in LED in IupLua3 in IupLua5

sample.c sample.led sample.lua sample.lua5

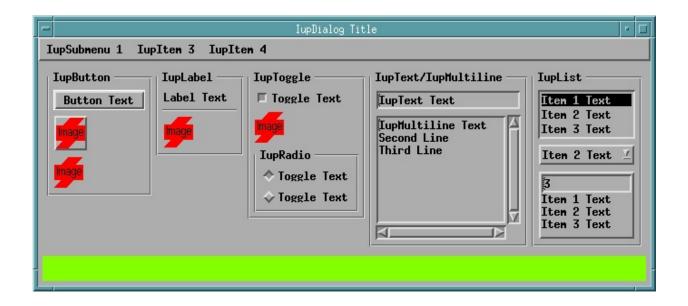
The Result in Windows



The Result in Windows XP



The Result in Motif



# **All Samples**

The IUP samples are spread in the documentation. Each control, dialog, menu has its own set of examples in C, LED and Lua.

You can browse the examples <u>here</u>.

# **External Samples**

The <u>CD</u> and <u>IM</u> libraries have samples that use IUP, check in their documentation.

Some freely available applications also use IUP:

**IMLAB** - Image Processing Laboratory

**EdPatt** - Pattern Editor

Ftool - Two-dimensional Frame Analysis Tool

#### **CPI**

#### Introduction

The IUP toolkit was originally designed to support a set of well-defined controls existing in all the destination platforms. With the evolution of native systems (e.g. Windows 95) and new requests from users, IUP needed to evolve with the purpose of making the addition of new interface elements to the toolkit easier.

Thus, to support the development of new controls for IUP, a specific API (Application Program Interface) was created for this purpose: it was called CPI (Control Program Interface). This new API is orthogonal to the original IUP API, that is, its use with a client application does not interfere with the conventional use of IUP. Only a developer wishing to implement a new IUP control is required study this API.

# **Control Implementation**

To create a new CPI control, follow these steps:

- Initialize the control
- Create control instances
- Implement the <u>CPI methods</u> associated to the control
- Make exported information available to the user (function prototypes, definitions, etc.)

#### **General Control Initialization**

The initialization function is in charge of passing IUP the necessary information so that the control can be used. Such information is grouped in an Iclass-type structure, which from now on is to be called the class of the control.

The first step is to create the structure. This is done by calling the <a href="https://increateNewClass"><u>iupCpiCreateNewClass</u></a> function. To this function, two pieces of information must be passed: a string identifying the control in a unique way

(the "name" of the control), and a string describing the creation parameters when the control is created via LED. The pointer returned by <a href="mailto:iupCpiCreateNewClass">iupCpiCreateNewClass</a> must be stored in a static module variable, as it will be necessary to create new control instances.

Next step is to replace, if necessary, the control's <u>CPI method</u>. This is done through function <u>iupCpiSetClassMethod</u>, which receives the control's class as an argument and the pointer to the new method.

Important: Function <u>iupCpiCreateNewClass</u> fills the class with <u>default</u> methods, which provide the control a default behavior.

This initialization function must be named Iup*Control*Open, where *Control* is the name of the control.

Example (class creation for a control named Dial):

```
#include <iup.h>
#include <iupcpi.h>

static Iclass *classe = NULL;

static Ihandle *DialCreate(...) /* método de criação */
{
    ...
}

void IupDialOpen(void)
{
    classe = iupCpiCreateNewClass("dial", "n");
    iupCpiSetClassMethod(classe, ICPI_CREATE, DialCreate);
}
```

#### **Creation of Control Instances**

The created control must make a function available whose name must be Iup*Control*, where *Control* is the control name. This function is to be used by the user to create a new control instance, and should not receive arguments. If the control is a container, the the arguments are necessarily its

children.

In this creation function, if no parameters are necessary, just call <u>IupCreate</u> with the control's name. If the control allows children, use <u>IupCreatev</u> to pass them forward to IUP. This function will create the control's Ihandle, by means of the function registered by ICPI\_CREATE.

```
Example1:
  Ihandle *IupDial()
    return IupCreate("dial");
  }
Example2:
  Ihandle *IupBox (Ihandle * first,...)
    Ihandle **params = NULL;
    Ihandle *elem = NULL;
    unsigned int i = 0;
    va_list arg;
    if(first)
      va_start (arg, first);
      i = 1;
      while (va_arg(arg, Ihandle *)) i++;
      va_end (arg);
      params = (Ihandle**) malloc (sizeof (Ihandle*) * (i+1));
      i = 0;
      va_start (arg, first);
      elem = first;
      while (elem != NULL)
        params[i++] = elem;
        elem = va_arg(arg, Ihandle *);
      params[i] = NULL;
      va_end (arg);
    }
    elem = IupCreatev(name, params);
```

```
free(params);
return elem;
}
```

#### **CPI Methods**

The <u>Iclass</u> structure fields are mostly pointers to functions to be called by IUP in certain moments. These pointers to functions play the same parts as objects in languages such as C++. Following the C++ philosophy, the CPI defines a set of functions which can be used to provide the controls a default behavior. The <u>Iclass</u> structure stores these function pointers, which are defined right after the call to <u>iupCpiCreateNewClass</u>.

In several occasions, the default behavior defined by the CPI is not adequate for the new control's implementation. In this case, a new function must be set, providing the desired implementation for such method. If convenient, this new function can call the function implementing the method's default behavior, either before or after performing the specific treatment of the new control. Generally, a method that will always be redefined to a new control is the one in charge of creating instances of this control. To redefine (replace) a control method, function <a href="https://www.upcpiSetClassMethod">upcpiSetClassMethod</a> must be used. It receives as parameters the values described below:

iupCpiSetClassMethod parameter  Default method used	Description
ICPI_CREATE iupCpiDefaultCreate	This method is called by IUP when an instance created. When this function is called, IUP alre for the control instance (represented by the sel parameter is an array with the required attribut the control creation function  Prototype:

	Ihandle *(*create) (Iclass* class, void** array
ICPI_DESTROY iupCpiDefaultDestroy	This method is called by IUP when the IupDes the control or its dialog. If necessary, this methodispose of structures maintained by the control Prototype:  void (*destroy) (Ihandle* self);
ICPI_MAP iupCpiDefaultMap	This method is called by IUP to map the contraparent parameter indicates of which window the window can either be a dialog or any other conformation.  Prototype: void (*map) (Ihandle* self, Ihandle* parent);
ICPI_UNMAP iupCpiDefaultUnmap	This method is called by IUP to "destroy" the native system without removing the control from IUP dialog.  Prototype: void (*unmap) (Ihandle* self);
ICPI_SETNATURALSIZE iupCpiDefaultSetNaturalSize	This method is called by IUP for the control to such, this function must call functions <a href="mailto:iupSetNaturalHeight">iupSetNaturalHeight</a> . Its implementation mi associated to the <a href="mailto:getsize">getsize</a> field of the Iclass stru on) to compute the natural size of the control. same value returned by the function associated Prototype: int (*setnaturalsize) (Ihandle* self);
	This method is called by IUP for the control to such, this function must call functions <a href="mailto:iupSet">iupSet</a>

ICPI_SETCURRENTSIZE iupCpiDefaultSetCurrentSize	<pre>iupSetCurrentHeight. Parameters w (width i pixels) represent the maximum values the con Prototype: void (*setcurrentsize) (Ihandle* self, int w, int</pre>
ICPI_SETPOSITION iupCpiDefaultSetPosition	This method is called by IUP for the control to parent window. Parameters x and y represent t left corner of the control) the control must hav default behavior for this method need only be sub-controls.  Prototype: void (*setposition) (Ihandle* self, int x, int y);
ICPI_SETATTR iupCpiDefaultSetAttr	This method is called to provide a new value t When this method is called, the attribute's value control's attribute environment. The received process following: attribute attribute being changed; value; ovalue is the previous attribute value.  Prototype: void (*setattr) (Ihandle* self, char* attr, char*
ICPI_GETATTR iupCpiDefaultGetAttr	This method is called by IUP to verify the value determined by parameter attr. This method is control's attribute environment. If this method control's attribute environment. If this check a method related to the <code>getdefaultattr</code> field is Prototype: char* (*getattr) (Ihandle* self, char* attr);
ICPI_GETDEFAULTATTR	This method is called by IUP when verifying a the call to the method related to the <code>getattr</code> f

iup Cpi Default Get Default Attr	the control's attribute environment fail (returne
	Prototype: char* (*getdefaultattr) (Ihandle* self, char* at
	This method is called by IUP when wishing to must have. This function must write to the w a size in pixels, respectively. The return value for one of the following:
ICPI_GETSIZE iupCpiDefaultGetSize	0 - The control size does not vary when the dial 1 - The control width may vary when the dialc 2 - The control height may vary when the dialc 3 - The control width and height may vary when the dialc int (*getsize) (Ihandle *self, int *w, int *h);
ICPI_POPUP	This method is called by IUP when wishing th dialog. The x and y parameters indicate the po initially have. This method must return IUP_N occurs, or IUP_ERROR if an error occurs.
_	Prototype: int (*popup) (Ihandle *self, int x, int y);

#### **Header File**

For a IUP application to use the new control, the prototypes of the initialization functions and the definitions of the new attributes must be made available. This is done by means of a header file, which must have the same name as the control.

#### **Function Prototypes**

The prototypes of all control functions that might be used by the

control's client applications must be provided. Usually there are only two prototypes: the initialization function and the instance creation function. It is important to consider that the control might be used in applications both in C and in C++. Therefore, the prototype declaration should be involved by a "C" extern block (see example below).

#### **Attribute Definition**

To match the IUP standard, macros must be defined to reference the strings identifying the new attributes used by the control. For example, if a new control has an attribute named MODE used to identify its operation mode, then the following macro must be defined:

```
#define IUP_MODE "MODE"
```

Note that the attributes used by the control may have already been defined (in another control's header, for instance). Thus, it is advisable to check if this happens to avoid compilation errors. Also refer to section Attribute Treatment.

#### Example:

```
/*
 * IupControle.h
 */

#ifndef IUPCONTROLE_H
#define IUPCONTROLE_H

#ifdef __cplusplus /* necessário quando controle é
utilizado em código C++ */
extern "C" {
#endif

void IupControleOpen(void);
Ihandle *IupControle(...);

#ifdef __cplusplus
}
#endif
```

```
/* Novos atributos */
#ifndef IUP_MODE
#define IUP_MODE "MODE"
#endif

#ifndef IUP_LENGTH
#define IUP_LENGTH "LENGTH"
#endif

#endif /* IUPCONTROLE H */
```

#### The Iclass Structure

The Iclass structure stores pointers to the control's methods (described in the table above) as well as the following fields:

#### • char\* name:

Stores the name given to the control. This name allows the control to be used in LED.

#### • char\* format:

Format string used to describe the required attributes defined in LED to create a control instance. If this field is null, then the new control type has no required attributes. The format string can be any sequence with the following characters:

Character	Meaning
n	name of a control instance or an action
S	any string
С	interface control (Ihandle *)
III XI	from this character on, a list of control-instance names or a list of actions will be passed
S	from this character on, a list of strings will be passed
IIC .	from this character on, a list of interface controls will be passed (Ihandle *)

#### **Attribute Treatment**

By default, a control inherits the same attributes defined for IUP's Canvas element.

The developer of a new control can define new attributes. For such, he/she must redefine the ICPI\_SETATTR, ICPI\_GETATTR and ICPI\_GETDEFATTR methods, if necessary.

If any attribute-manipulation method is redefined, the standard procedure is:

- identify if the given attribute is part of the set of attributes that must receive any special treatment by the new control;
- if the attribute is part of this set, then the adequate treatment must be provided;
- if not, the <u>default method</u> must be called to treat the attribute.

#### **Default Methods**

In this section, we present the set of functions corresponding to the default behavior of an interface element's methods. Such functions can either be used to fill an <a href="Iclass">Iclass</a> structure or be called by a new method to execute the default procedure (either before or after the specialized treatment of the new control is executed).

# Function corresponding to the setnaturalsize method:

int ctrsetnaturalsize (Ihandle\* self);

# Function corresponding to the setcurrentsize method:

void ctrsetcurrentsize (Ihandle\* self, int w, int h);

# Functions corresponding to the getsize method:

int ctrgetsize (Ihandle\* self, int\* w, int\* h); ou int ctrgetsizevar (Ihandle\* self, int\* w, int\* h);

Note: A control that associates the ctrgetsize function to its getsize method cannot vary in size when its dialog's size varies. On the other hand, a control that uses function ctrgetsizevar can vary in size according to the changes made to its

dialog size.

#### **Function corresponding to the setposition method:**

void ctrsetposition (Ihandle\* self, int w, int h);

#### Function corresponding to the create method:

void ctrcreate (Ihandle\* self, void\*\* array);

#### **Function corresponding to the destroy method:**

void ctrdestroy (Ihandle\* self);

#### Function corresponding to the map method:

void ctrmap (Ihandle\* self, Ihandle\* parent);

#### **Function corresponding to the unmap method:**

void ctrunmap (Ihandle\* self);

#### **Function corresponding to the setattr method:**

void ctrsetattr (Ihandle\* self, char\* attr, char\* value);

#### **Function corresponding to the getattr method:**

char\* ctrgetattr (Ihandle\* self, char\* attr);

# **Function corresponding to the getdefaultattr method:**

char\* ctrgetdefaultattr (Ihandle\* self, char\* attr);

#### **Extra Functions**

Following we provide a list of extra IUP functions. They can be used by programmers wishing to create a new control:

#### **Main control-creation functions**

Iclass \*iupCpiCreateNewClass(char \*name, char \*format); int iupCpiSetClassMethod(Iclass \*ic, char \*method, Imethod func);

# Functions that call the method in charge for the given action

```
int iupmethSetNaturalSize( Ihandle* self );
void iupmethSetCurrentSize( Ihandle* self, int w, int h );
```

```
int iupmethGetSize( Ihandle* self, int* w, int* h );
void iupmethSetPosition ( Ihandle* self, int w, int h );
void iupmethCreate( Ihandle* self, void** array );
void iupmethDestroy( Ihandle* self );
void iupmethMap( Ihandle* self, Ihandle* parent );
void iupmethUnmap( Ihandle* self );
void iupmethSetAttribute( Ihandle* self, char* attr, char* value);
char* iupmethGetAttribute( Ihandle* self, char* attr );
char* iupmethGetDefaultAttr( Ihandle* self, char* attr );
char* iupmethGetClassName( Ihandle* self );
```

#### Functions in charge of manipulating an element's size

```
void iupSetCurrentWidth(Ihandle* self, int w);
void iupSetCurrentHeight(Ihandle* self, int h);
int iupGetCurrentWidth(Ihandle* self);
int iupGetCurrentHeight(Ihandle* self);
int iupHorResizable(Ihandle* self);
int iupVertResizable(Ihandle* self);
void iupSetNaturalWidth(Ihandle* self, int w);
void iupSetNaturalHeight(Ihandle* self, int h);
void iupGetCharSize(Ihandle* n, int *w, int *h);
int iupGetSize(Ihandle* e, int* w, int *h);
void iupGetTextSize(Ihandle* h, char* text, int* size);
void iupdrvResizeObjects(Ihandle *n);
```

# **Example**

The best example possible can be taken from IUP distribution. As an advice, please refer to the iupgauge control.

# **System**

IUP has several global tables as togheter with some system tools must be initialized before any dialog is created. And the IupLua binding must be initialized also.

The default system language used by predefined dialogs and messages is Portuguese. But it can be changed to English.

# **System Guide**

#### **Initialization**

Before running any of IUP s functions, function **IupOpen** must be run to initialize the toolkit.

After running the last IUP function, function **IupClose** must be run so that the toolkit can free internal memory and close the interface system.

Executing these functions in this order is crucial for the correct functioning of the toolkit.

Between calls to the IupOpen and IupClose functions, the application can create dialogs and display them.

Therefore, usually an application employing IUP will have a code in the main function similar to the following:

```
void main(void)
{
  if (IupOpen() == IUP_ERROR)
  {
    fprintf(stderr, "Error Opening IUP.")
    return;
  }
  ...
  IupMainLoop();
  IupClose();
}
```

# **IupLua Initialization**

Before running any function from the Lua Binding, you must run the **iuplua\_open** function to initialize the toolkit. This function must be run after a call to function **IupOpen**. All this is done in C in Lua short short program.

Example:

```
int main(void)
  IupOpen();
  IupControlsOpen();
  /* Lua 3.2 initialization (could be Lua 4.0 or Lua 5.0) */
  lua open();
  lua iolibopen();
  lua strlibopen();
  lua_mathlibopen();
                 /* Initialize Binding Lua */
  iuplua open();
 controlslua_open(); /* Inicialize CPI controls binding Lua */
  IupMainLoop();
  IupControlsClose();
  IupClose();
  return 0;
}
```

#### **LED**

LED is a dialog-specification language whose purpose is not to be a complete programming language, but rather to make dialog specification simpler than in C.

In LED, attributes and expressions follow this form:

```
elem = element[attribute1=value1,attribute2=value2,...]
(...expression...)
```

The names of the elements must not contain the viup prefix. Attribute values are always interpreted as strings, but they need to be in quotes (v) only when they include spaces. The IUP prefix must not be added to the names of the attributes and predefined values. Expressions contain parameters for creating the element.

In LED there is no distinction between upper and lower case, except for attribute names.

Though the LED files are text files, there is no way to interpret a text in memory there is only the <a href="LupLoad"><u>IupLoad</u></a> function, which loads a LED file and

creates the IUP elements defined in it. Naturally, the same file cannot be loaded more than once, because the elements would be created again. This file interpretation does not map the elements to the native system.

The LED files are dynamically loaded and must be sent together with the application sexecutable. However, this often becomes an inconvenience. To deal with it, there is the <u>LEDC</u> compiler that creates a C module from the LED contents.

To simply view a LED file objects use the LED viewer application, see **IupView** in the applications included in the distribution

available at the Download.

#### **IupLua**

The Lua Binding is an interface between the Lua language and IUP, a portable user-interface system. The main purpose of this package is to provide facilities for constructing IUP dialogs using the Lua language. Abstractions were used to create a programming environment similar to that of object-oriented languages, even though Lua is not one of such languages. The concept of event-oriented programming is broadly used here, because the IUP library is based on this model. Most constructions used in IupLua were strongly based on the corresponding constructions in LED.

In IupLua5, attributes and expressions follow this form:

```
elem = iup.element{...expression...;
attribute1=value1,attribute2=value2,...}
```

The names of element creation functions are in lower case, since they are actually constructors of Lua tables.

Callbacks can be implemented directly in Lua see <u>Events and Callbacks</u> <u>Guide</u>.

Even though there are sintatic sugars used to handle callbacks and attributes in Lua, most of the functions defined in C are exported to Lua, such as IupSetAttribute, IupGetBrother among others.

In IupLua5 we follow the same organization of the Lua libraries using the namespace before all the definitions.

- All exported functions are accessed only through **iup.FunctionName**, including control initialization like **iup.label**.
- All callbacks in are access through their exact name in the C API.
- Numeric definitions where kept in upper case by without the IUP\_prefix, like: iup.DEFAULT.
- String definitions for values are no longer supported, always use "YES", "NO", "ACENTER", etc.

IUP s binding for Lua was made *a posteriori* and completely replaces the LED files. Besides, Lua is a complete language, so a good deal of the application can be implemented with it. However, this means that the application must link its program to the Lua and to the IupLua libraries, as well as the IUP library.

The Lua files are dynamically loaded and must be sent together with the application sexecutable. However, this often becomes an inconvenience. To deal with it, there is the **LuaC** compiler that creates a C module from the Lua contents. For example:

```
luac -o myfile.lo myfile.lua
bin2c myfile.lo > myfile.loh
```

In C, you can used a define to interchanged the use of .LOH files:

```
#ifdef _DEBUG
   ret_val = iuplua_dofile("myfile.lua");
#else
#include "myfile.loh"
#endif
```

The distribution files include two executables, one for Lua 3 (**IupLua**) and one for Lua 5 (**IupLua5**), that you can use to test your Lua code. Both applications have support for all the addicional controls and are

available at the Download.

# **LED Compiler for C**

# **Description**

The LED compiler (**ledc**) generates a C module from one or more LED files. The C module exports only one function, which builds the IUP interface described in the LED files. Running this function is equivalent to calling the IupLoad function over the original LED files.

One advantage of using the compiler is that it allows the application to be independent from LED files during its execution. Since the interface description is inside the executable file, there is no need to worry about locating the configuration files.

Another advantage is that **ledc** performs a stricter verification than IUP�s internal parser. This makes error detection in LED files easier.

Finally, running the function generated by the compiler is faster than reading the corresponding LED file with IupLoad, since the parsing step of the LED file is transferred from execution to compilation. However, creating the IUP elements described in LED takes most of the execution time of the IupLoad function, so the gain in efficiency may not be very significant.

# **Usage**

ledc [-v] [-c] [-f funcname] [-o file] files

-v shows **ledc**◆s version number

does not generate code, just checks for errors in the LED

files

-f function -f fun

function (default: led\_load)

-o file uses <file> as the name of the generated file (default: led.c)

#### **Error Messages**

Several warnings and error messages might be generated during compilation. Errors abort the compilation. The messages can be the following:

warning: undeclared control *name* (argument *number*) The *name* name was used as an argument where a IUP element was expected, but no element with this name was previously declared.

warning: string expected (argument *number*)
A name (callback?) was passed as a parameter for a string-type argument.

warning: callback expected (argument *number*)
A string was passed as a parameter for a callback-type argument.

warning: unknown control name used

An unknown element, called *name*, was used. The compiler assumes the element screation function is called Iup*Name*, with *name* capitalized, and assumes the arguments types based on what was passed on LED.

warning: elem declared without a name

An *elem*-type element was declared without being associated to any name. This declaration creates the element, but it will not be accessible, so it cannot be used.

element *name* already used in line *number* 

The *name* element was already used in line *number*. In IUP, the same element cannot have more than one parent.

too few arguments for name

The *name* element expects more arguments than those already passed.

too many arguments for name

The *name* element expects less arguments than those passed.

name is not a valid child

The *name* element cannot be used as a parameter in this case. This happens when trying to insert an image into a vbox, for instance.

control expected (argument *number*)

A string was passed as a parameter for an element-type argument.

string expected (argument *number*)

An element was passed as a parameter for a string-type argument.

number expected (argument *number*)

An element or a string was passed as a parameter for a number-type argument.

callback expected (argument number)

An element was passed as a parameter for a callback-type argument.

hotkeys not implemented

Even though it is a LED word reserved to an element, it is not implemented.

# **IupLua Advanced Guide**

# **Exchanging Values between C and Lua**

Each binding to a version of Lua uses different features of the language in order to implement IUP handles (Ihandle) in Lua. Therefore, functions have been created to help exchange references between Lua and C.

To push an Ihandle in Lua's stack, use the function:

```
iuplua_pushihandle(lua_State *L, Ihandle *n);
```

In Lua 3.2, the lua\_State parameter does not exist.

To receive an Ihandle in a C function called from Lua, just use one of the following functions according to which Lua you are using: lua\_getuserdata (Lua 3.2), lua\_touserdata (Lua 4) or lua\_unboxpointer in (Lua 5).

In order to bring IUP handles created in C to Lua, the user can give the IUP handle a name by means of IupSetHandle and call in Lua the function IupGetFromC.

```
Ex:
```

```
lua_ihandle = IupGetFromC{"element_name"}
```

where element\_name is the name of the element previously defined with IupSetHandle.

# **Error Handling**

Error handling differ between each Lua version. To keep IupLua's API as compatible as possible, functions have been created to execute Lua code:

```
int iuplua_dofile(lua_State *L, char *filename);
int iuplua_dostring(lua_State *L, const char *string, const char
```

If the given functions are used, in every IupLua version the errors will be

reported through the \_ERRORMESSAGE function. If this function is not defined by the user, IUP will use its default implementation (shows a dialog with the error message.)

If the user chooses not to use those functions, errors will be handled according to the version of Lua used.

# The Architecture Behind IupLua

The Lua API for the IUP system was based on object classes representing the different interface elements. A hierarchy was built among these classes, with the main purpose of reusing code. Code inheritance was implemented precisely as described in the <u>Lua</u> user guide.

The root of this hierarchy is the WIDGET class. It contains the basic procedures for construction, parameter type verification, and allocation of structures for controlling IUP s interface elements. This class also defines the basic parameters of all classes, such as handle (which stores the handle of the associated IUP element) and parent (used to implement the inheritance mechanism).

Even though almost all classes directly descend from the WIDGET class, some other classes serve as mediators in the tree. This is the case of the COMPOSITION class, located among the composition element classes: IUPHBOX, IUPVBOX and IUPZBOX.

Some classes use part of the code from other classes, when they are very similar. This happens to IUPITEM and IUPTOGGLE, which reuse the code related to the verification of parameter types and to the definition of the action callback in the IUPBUTTON class. Class IUPMULTILINE inherits several characteristics from IUPTEXT, such as the definition of the action callback and the verification of parameter types.

The complete class hierarchy can be represented as follows:

```
WIDGET
IUPBUTTON
IUPITEM
IUPTOGGLE
IUPCANVAS
```

COMPOSITION

**IUPHBOX** 

**IUPVBOX** 

**IUPZBOX** 

**IUPDIALOG** 

IUPFILL

**IUPFRAME** 

**IUPIMAGE** 

**IUPLABEL** 

IUPLIST

IUPMENU

IUPRADIO

IUPSEPARATOR

IUPSUBMENU

**IUPTEXT** 

IUPMULTILINE

## **IupOpen**

Initializes the IUP toolkit. Must be called before any other IUP function.

### Parameters/Return

```
int IupOpen(void); [in C]
[There is no equivalent in Lua]
```

This function returns IUP\_ERROR or IUP\_NOERROR.

### **Notes**

The IupOpen function in the Windows driver initializes OLE through the function OleInitialize; IupClose calls OleUninitialize.

The toolkit's initialization depends on several platform-dependent environment variables.

For a more detailed explanation on the system control, please refer to <u>Guide / System Control</u>.

## **Lua Binding**

Lua: This function must be called by the host program and before the Binding Lua initialization function, **iuplua\_open**.

### See Also

iuplua\_open, IupClose, Guide / System Control

# **IupClose**

Ends the IUP toolkit.

### Parameters/Return

```
void IupClose(void); [in C]
[There is no Lua equivalent]
```

### **Notes**

The IupOpen function in the Windows driver initializes OLE through the function OleInitialize; IupClose calls OleUninitialize.

## **Lua Binding**

This function must be called by the host program.

## **See Also**

**IupOpen** 

## iuplua\_open

Initializes the Lua Binding. This function must be called by the host program before running any Lua functions, but it is important to call it after **IupOpen**.

### Parameters/Return

```
void iuplua_open(void); [in C]
[There is no equivalent in Lua]
```

### Note

For a more detailed explanation on the system control for the Lua Binding, please refer to <u>Lua Binding / System Control</u>.

### See Also

<u>IupOpen</u>, <u>Guide / System Control</u>

# iupkey\_open

Allows IUP keyboard definitions to be used in IupLua. This function must be run by the host program after **iuplua\_open**. Please refer to the <u>Keyboard Codes</u> table for a list of possible values.

## Parameters/Return

```
void iupkey_open(void); [in C]
[There is no equivalent in Lua]
```

## **See Also**

**K\_ANY** callback, **KEY** attribute

## **IupLoad**

Compiles a LED specification.

### Parameters/Return

```
char *IupLoad(char *name_file); [in C]
IupLoad(name_file: string) -> error: string [in IupLua3]
iup.Load(name_file: string) -> error: string [in IupLua5]
```

**name\_file**: name of the file containing the LED specification.

This function returns NULL (nil in Lua) if the file was successfully compiled; otherwise it returns a pointer to a string containing the error message.

#### Note

Each time the function loads a LED file, the elements contained in it are created. Therefore, the same LED file cannot be loaded several times, otherwise the elements will also be created several times. The same applies for running Lua files several times.

# **IupSetLanguage**

Defines the language used by IUP.

### Parameters/Return

```
void IupSetLanguage(char *lng); [in C]
IupSetLanguage(language :string) [in IupLua3]
iup.SetLanguage(language :string) [in IupLua5]
```

**lng**: Language to be used. Can have one of the following values:

- "ENGLISH"
- "PORTUGUESE"

default: "PORTUGUESE".

### **Affects**

All elements that have predefined texts.

## **Example in C**

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include "iup.h"

void main(void)
{
    IupOpen();
    IupSetLanguage("ENGLISH");
    IupMessage("IUP Language", IupGetLanguage());
    IupClose();
    return;
}
```

## **IupGetLanguage**

Verifies the language used by IUP.

### Parameters/Return

```
char* IupGetLanguage(void); [in C]
IupGetLanguage() -> (language: string) [in IupLua3]
iup.GetLanguage() -> (language: string) [in IupLua5]
```

For a list of all possible return values, see <a href="IupSetLanguage">IupSetLanguage</a>.

### **Affects**

All elements with predefined texts.

## **Example in C**

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include "iup.h"

void main(void)
{
    IupOpen();
    IupMessage("IUP Language", IupGetLanguage());
    IupClose();
    return;
}
```

## **Motif System Driver**

Driver for the X-Windows/Motif 2.x environment. But it can run in Motif 1.x.

#### **Environment Variables**

#### **QUIET**

When this variable is set, IUP does not generate the message indicating the driver's version when initializing.

#### **DEBUG**

This variable's existence makes the driver operate in synchronous mode with the X server. This slows down all operations, but allows immediately detecting errors caused by X.

#### **Default Values – Resource Files**

Some default values used by the driver, such as background color, foreground color and font, can be set by the user by means of a resource file called Iup. It must be in the user's home or in a directory pointed to by the XAPPLRESDIR environment variable. Below you can see an example of this file's contents:

```
*background: #ff0000
*foreground: #a0ff00
*fontList: -misc-fixed-bold-r-normal-*-13-*
```

The values used in the example above are the ones used by IUP if these resources are not defined.

## **Tips**

• During linking in the Solaris environment: Can not find libresolv.so.2

This error occurs if the system does not have an applied patch containing

this library.

This library is important for all installations of Solaris 2.5 and 2.5.1 (SunOS 5.5 and 5.5.1, respectively). It is a correction of the DNS system, involving security.

The web address to get these patches is SunSolve's <a href="http://sunsolve1.sun.com/sunsolve/pubpatches/patches.html">http://sunsolve1.sun.com/sunsolve/pubpatches/patches.html</a>. Select the Solaris version you wish (2.5 or 2.5.1 for Sparc) and download the patches 103667-09, 102980-17, 103279-03, 103708-02, or more recent for 2.5 (the number after the '-' is the patch version, and the more recent number is the patch), or 103663-12, 103594-14, 103680-02 and 103686-02 for 2.5.1. All of them have a README file explaining installation, and groups have to be installed together.

#### TrueColor canvas

Whenever a canvas is created, one tries to create it with a TrueColor resolution Visual. This is not always possible, since it is subject to many conditions, such as hardware (graphics board) and the X server's configuration.

The **xdpyinfo** program informs which Visuals are available in the X server where the display is being made, so that you can see if your X allows creating a canvas with a TrueColor Visual. In some platforms, however, the X server may not make a TrueColor Visual available, even though the graphics board is able to display it. In this case, restart the server with parameters that force this. Below is a table with such parameters to some systems where the IUP library has been tested. If the command does not work, or if it is not possible, then the graphics library really does not support 24 bpp.

System	<b>Execution Command</b>
Linux	startxbpp 24
AIX	(not necessary)
IRIX	(not necessary)
Solaris	(not necessary)

Since color requests are "always" successful in TrueColor/24bpp windows,

we have minimized visualization problems for images that make use of complex color palettes (when there is a high color demand, not always all colors requested can be obtained). The IUP applications also coexist more "peacefully" with other applications and among themselves, since the colors used by TrueColor/24bpp windows do not use the colormap cells used by all applications.

#### XtAddCallback failed

When a warning about XtAddCallback appears during the application initialization, and it aborts, this usually means that you are using a Motif with a different version than the Motif used to build IUP. Reinstall Motif or rebuild IUP using your Motif.

### • Some Control Sizes are wrong

Sometimes the control initialization is incomplete and its size is miscalculated. To solve this call IupMap(dialog) and set the dialog size to NULL "IupSetAttribute(dlg, IUP\_SIZE, NULL);" before calling IupShow. This will fix the sizes. We hope to solve this problem in future versions.

# Win32 System Driver

This driver was designed for the modern Microsoft Windows in 32 bits (2000/XP/2003).

#### **Environment Variables**

#### **VERSION**

When this variable is set, IUP generates a message indicating the driver's version when initializing.

#### **DLL**

To use DLL, it is necessary to link the application with the IUP.lib and IUPSTUB.lib libraries (for technical reasons, these libraries cannot be unified). Note that IUP.lib is a library specially generated to work with iup.dll, and is usually distributed in the same directory as iup.dll. the IUP DLL depends on the MSVCRT.DLL, that it is already installed in Windows.

For the program to work, IUP.dll must be inside a PATH directory. Usually the program does not need to be relinked when the DLL is updated.

## **Debug Versions**

While using the debug version, two types of fatal errors can occur:

- 1) Protection errors: "Unhandled exception: access violation"
- 2) Assertive errors: "Assertion failed!"

In the second type, a dialog is shown with buttons Abort, Retry and Ignore, as well as a number of information, among which:

- + Name of the font file where the error occurred
- + Line number

The bug-correction process (if it exists) becomes <u>a lot faster</u> when this information is provided. Therefore, if you receive such error, please send

this information along in the e-mail.

## **Tips**

- On Windows a common error occurs: "Cannot find function InitCommonCtrl()" This error occurs if you forgot to add the comctl32.lib library to be linked with the program. This library is **not** usually in the libraries list for the Visual C++, you must add it.
- To use some cursors and the preview area of IupFileDlg you must include the "iup.rc" file into your makefile. Or include the contents of it into your resource file, you will need also to copy the cursor files.
- Windows XP Visual Styles can be enabled using a manifest file. Uncomment the manifest file section in iup.rc file or copy it to your own resource file, you will need also to copy the manifest file "iup.manifest".

# **Attributes**

Attributes are used to change properties of elements. Each element has a set of attributes that affect it, and each attribute can work differently for each element. Depending on the element, its value can be computed or simply verified also it can be internally stored or not.

If an element does not have a given attribute defined, this attribute will be inherited from its parent. Only a few attributes are not inherited: "TITLE", "VALUE", "ALIGNMENT", "X", "Y", "RASTERSIZE" and "SIZE".

## **Attributes Guide**

## **Using**

Attributes are strings, and there are two functions to change them:

- <u>IupSetAttribute</u> stores only a pointer to the string and does not duplicate it.
- <u>IupStoreAtribute</u> duplicates the string, allowing you to use it for other purposes.

With IupSetAttribute you can also store application pointers that can be strings or not. This can be very useful, for instance, used together with **callbacks**. For example, by storing a C pointer of an application defined structure, the application can retrieve this pointer inside the callback through function <u>IupGetAttribute</u>. Therefore, even if the callbacks are global functions, the same callback can be used for several objects, even of different types.

There are attributes common to all the elements. These attributes sometimes are not mentioned in each element documentation. We assume that the programmer knows they exist. In some cases, common attributes behave differently in different elements, but in such cases, there are comments explaining the behavior.

In LED there is no need to add the prefix IUP\_ or quotation marks for attributes, names or values.

#### **Inheritance**

Elements included in other elements inherit their attributes, unless the same attribute is defined directly in the element. This means there is an **inheritance** mechanism inside a given dialog. Therefore, when you consult an undefined attribute of an element, the inheritance mechanism will check the element containing it, and so forth, until it reaches the dialog.

This means, for example, that if you set the "MARGIN" attribute of a vbox containing several other elements, including other vboxes, all the elements

depending on the attribute "MARGIN" will be affected, except for those who the "MARGIN" attribute is already defined.

Please note that not all attributes are inherited. Exceptions are: "TITLE", "VALUE", "ALIGNMENT", "X", "Y", "RASTERSIZE" and "SIZE".

## **IupLua**

Each interface element is created as a Lua table, and its attributes are fields in this table. Some of these attributes are directly transferred to IUP, so that any changes made to them immediately reflect on the screen. However, not all attributes are transferred to IUP.

Control attributes, such as handle, which stores the handle of the IUP element, and parent, which stores the object immediately above in the class hierarchy, are not transferred. Attributes that receive strings or numbers as values are immediately transferred to IUP. Other values (such as functions or objects) are stored in IupLua and might receive special treatment.

For instance, a button can be created as follows (defining a title and the background color):

```
 \begin{tabular}{ll} myButton = iupbutton{title = "0k", bgcolor = "0 255 0"} & (IupLua3) \\ myButton = iup.button{title = "0k", bgcolor = "0 255 0"} & (IupLua5) \\ \end{tabular}
```

Font color can be subsequently changed by modifying the value of attribute fgcolor:

```
myButton.fgcolor = "255 0 0"
```

Note that the attribute names in C and in IupLua are the same, but in IupLua they can be written in lower case.

In the creation of an element some parameters are required attributes (such as title in buttons). Their types are checked when the element is created. The required parameters are exactly the paremeters that are necessary for the element to be created in C.

Some interface elements can contain one or more elements, as is the case of dialogs, lists and boxes. In such cases, the object selement list is put together as a vector, that is, the elements are placed one after the other,

separated by commas. They can be accessed by indexing the object containing them, as can be seen in this example:

While the attributes receiving numbers or strings are directly transferred to IUP, attributes receiving other interface objects are not directly transferred, because IUP only accepts strings as a value. The method that transfers attributes to IUP verifies if the attribute value is of a widget type, that is, if it is an interface element. If the element already has a name, this name is passed to IUP. If not, a new name is created, associated to the element and passed to IUP as the value of the attribute being defined.

This policy is very useful for associating two interface elements, because you can abstract the fact that IUP uses a string to make associations and imagine the interface element itself is being used.

The attributes in charge of treating the actions associated to objects are not directly transferred to IUP. Since the use of actions requires registering functions in C to be called when the event occurs, there is a differentiated treatment for such attributes. The IupLua system does not require the creation and registration of C functions for this purpose.

# **IupStoreAttribute**

Defines an attribute for an interface element.

### Parameters/Return

```
void IupStoreAttribute(Ihandle *element, char *a, char *v); [in C]
IupStoreAttribute(element: iulua_tag, attribute: string, value: st
iup.StoreAttribute(element: iulua_tag, attribute: string, value: s
```

**element**: identifier of the interface element.

**a**: name of the attribute.

**v**: value of the attribute. If it equals NULL (nil in IupLua), the attribute will be removed from the element.

#### Note

The value stored in the attribute is duplicated. Usually you will not use this function to store private attributes of the application.

### See Also

IupGetAttribute, IupSetAttribute

## **IupSetAttribute**

Defines an attribute for an interface element.

#### Parameters/Return

```
void IupSetAttribute(Ihandle *element, char *a, char *v); [in C]
IupSetAttribute(element: iulua_tag, attribute: string, value: stri
iup.SetAttribute(element: iulua_tag, attribute: string, value: str
```

**element**: Identifier of the interface element.

**a**: name of the attribute.

**v**: value of the attribute. If it equals NULL (nil in Lua), the attribute will be removed from the element.

### **Notes**

The value stored in the attribute is not duplicated. Therefore, you can store your private attributes, such as a structure with data to be used in a callback.

When you want IUP to store an attribute by duplicating a string passed as a value, use function <a href="IupStoreAttribute">IupStoreAttribute</a>.

For further information on memory allocation by IupSetAttribute, see IupGetAttributes notes section.

## Example 1

Defines a radios initial value.

#### In C

```
Ihandle *portrait = IupToggle("Portrait" , "acao_portrait");
Ihandle *landscape = IupToggle("landscape" , "acao_landscape");
Ihandle *box = IupVbox(portrait, IupFill(),landscape, NULL);
Ihandle *modo = IupRadio(box);
IupSetHandle("landscape", landscape); /* associates a name to initialize the radio
IupSetAttribute(modo, "VALUE", "landscape"); /* defines the radios initial value.
```

## Example 2

Some usages:

## In C

```
    IupSetAttribute(texto, "VALUE", "Olá!");
    IupSetAttribute(indicador, "VALUE", "ON");
    struct
        {
            int x;
            int y;
        } myData;
    IupSetAttribute(texto, "myData", (char*)&myData);
```

## See Also

<u>IupGetAttribute</u>, <u>IupSetAttributes</u>, <u>IupStoreAttribute</u>

# **IupSetfAttribute**

Defines an attribute for an interface element.

### Parameters/Return

```
void IupSetfAttribute(Ihandle *element, char *a, char *f, ...); [i
[There is no equivalent in Lua]

element: identifier of the interface element.
a: name of the attribute.
f: format that describes the attribute. It follows the same standard as the
printf function in C
....: values of the attribute.
```

#### Note

This function is very useful because we usually have integer values and want to pass them to IUP attributes, but this is done by means of a string. This way, we can commonly use **sprintf** to compose that string.

### See Also

<u>IupGetAttribute</u>, <u>IupSetAttribute</u>, <u>IupGetAttributes</u>, <u>IupGetAttributes</u>, <u>IupStoreAttribute</u>

# **IupGetAttribute**

Verifies the name of an interface element attribute.

#### Parameters/Return

```
char *IupGetAttribute(Ihandle *element, char *a); [in C]
IupGetAttribute(element: iuplua_tag, a: string) -> value: string [
iup.GetAttribute(element: iuplua_tag, a: string) -> value: string
```

**element**: Identifier of the interface element.

**a**: name of the attribute.

This function returns attributes value. If the attribute does not exist, NULL (nil in IupLua) is returned.

#### **Notes**

This functions return value is not necessarily the same one used by the application to define the attributes value. The subsequent call to the **IupGetAttribute** function may change the contents of the previously returned pointer, as this is an internal IUP buffer. The user is in charge of storing the value before calling any other IUP function.

The user has to understand that there is a difference between IUP attributes, such as VALUE or SIZE, and those stored for the user. The IUP attributes are often dynamically computed, stored in a temporary buffer and returned for the user to have access to the values. In the case of attributes stored for the user, the pointer returned by **IupGetAttribute** will be the same as the stored pointer, allowing the contents to be changed.

The pointers of internal IUP attributes returned by IupGetAttribute must **never** be freed or changed.

In IupLua, only known internal pointer attributes are returned as user data, all other attributes are returned as strings. To access attribute data always as user data use IupGetAttributeData (Lua 3) and iup.GetAttributeData (Lua 5).

# **Example**

# See Also

<u>IupSetAttribute</u>, <u>IupGetInt</u>, <u>IupGetFloat</u>, <u>IupSetAttributes</u>, <u>IupGetHandle</u>.

# **IupSetAttributes**

Defines a set of attributes for an interface element. This function keeps a copy of the attributes parameters.

#### Parameters/Return

```
Ihandle *IupSetAttributes(Ihandle *element, char *attributes); [ir
IupSetAttributes(element: iulua_tag, attributes: string) -> elem:
iup.SetAttributes(element: iulua_tag, attributes: string) -> elem:
```

**element**: Identifier of the interface element.

**attributes**: in the form v1=a1, v2=a2,... where vi is the name of an attribute and ai is its value.

This function returns **element** if all attributes were defined, or NULL (nil in Lua) otherwise.

#### **Notes**

It is worth noting that, in this function, the names of the attributes recognized by IUP cannot be defined with the prefix IUP\_.

This function returns the same Ihandle it receives. This way, it is a lot easier to create dialogs in C. For example:

## **Example**

Creates a list with country names and defines Japan as the selected option.

### In C

```
Ihandle *lista = IupList ("acao_lista");
IupSetAttributes(lista, "VALUE=3, 1=Brazil, 2=USA, 3=Japan, 4=France");
```

## See Also

<u>IupGetAttribute</u>, <u>IupSetAttribute</u>, <u>IupStoreAttribute</u>

# **IupGetAttributes**

Verifies all attributes of a given element that are in the internal hash table. The known internal pointers are returned as integers.

## Parameters/Return

and ai is its value.

```
char* IupGetAttributes (Ihandle *element); [in C]
IupGetAttributes(element: iulua_tag) -> (attributes: string) [in I
iup.GetAttributes(element: iulua_tag) -> (attributes: string) [in
element: Identifier of the interface element.
attributes: in the form v1=a1,v2=a2,... where vi is the name of an attribute
```

This function returns all attributes defined for that element.

### See Also

<u>IupGetAttribute</u>, <u>IupSetAttribute</u>, <u>IupStoreAttribute</u>

# **IupGetFloat**

Verifies the value of an interface element attribute and converts it to a float value.

### Parameters/Return

```
float IupGetFloat(Ihandle *element, char *a) [in C]
[There is no equivalent in IupLua]
```

**element**: Identifier of the interface element.

**a**: name of the attribute.

This function returns a float corresponding to the attributes value.

### Note

The call to IupGetFloat cancels IUPs internal buffer. This means that after the call to IupGetFloat, the contents previously returned by function <a href="IupGetAttribute">IupGetAttribute</a> is no longer valid.

## See Also

IupGetAttribute, IupGetInt.

# **IupGetInt**

Verifies the value of an interface element attribute and converts it to int.

### Parameters/Return

```
int IupGetInt(Ihandle *element, char *a); [in C]
[There is no equivalent in IupLua]
```

**element**: Identifier of the interface element. **a**: name of the attribute.

This function returns the value of the interface element converted to int.

#### **Notes**

If the attribute value is "YES"/"NO" or "ON"/"OFF", the function returns 1 / 0, respectively.

The call to function IupGetInt invalidates IUPs internal buffer. This means that after a call to this function the contents previously returned by <a href="IupGetAttribute">IupGetAttribute</a> will no longer be valid.

### See Also

<u>IupGetAttribute</u>, <u>IupGetFloat</u>.

# **IupStoreGlobal**

Defines an attribute for the global environment.

### Parameters/Return

```
void IupStoreGlobal(char *a, char *v); [in C]
IupStoreGlobal(attribute: string, value: string) [in IupLua3]
iup.StoreGlobal(attribute: string, value: string) [in IupLua5]
a: name of the attribute.
v: value of the attribute. If it equals NULL (nil in Lua), the attribute will be removed.
```

### Note

The value stored in the attribute is duplicated.

### See Also

<u>IupSetAttribute</u>, <u>IupGetGlobal</u>, <u>IupSetGlobal</u>

## **IupSetGlobal**

Defines an attribute for the global environment.

### Parameters/Return

```
void IupSetGlobal(char *a, char *v); [in C]
IupSetGlobal(attribute: string, value: string) [in IupLua3]
iup.SetGlobal(attribute: string, value: string) [in IupLua5]
a: name of the attribute.
v: value of the attribute. If it equals NULL (nil in IupLua), the attribute will be removed.
```

#### **Notes**

The value stored in the attribute is not duplicated. Therefore, you can store your private attributes, such as a structure of data to be used in a callback.

When you want IUP to store the attribute's value by duplicating the string, use function **IupStoreGlobal**.

### See Also

<u>IupSetAttribute</u>, <u>IupGetGlobal</u>, <u>IupStoreGlobal</u>

# **IupGetGlobal**

Verifies an attributes value in the global environment.

#### Parameters/Return

```
char *IupGetGlobal(char *a); [in C]
IupGetGlobal(a: string) -> value: string [in IupLua3]
iup.GetGlobal(a: string) -> value: string [in IupLua5]
a: name of the attribute.
```

This function returns the attributes value. If the attribute does not exist, NULL (nil in Lua) is returned.

#### Note

This functions return value is not necessarily the same one used by the application to define the attributes value.

The subsequent call to the **IupGetGlobal** function may change the contents of the previously returned pointer, as this is an internal IUP buffer. The user is in charge of storing the value before calling IupGetGlobal again. This pointer must not be freed either.

### See Also

<u>IupGetAttribute</u>, <u>IupSetGlobal</u>

# **ACTIVE**

Activates or inhibits user interaction.

## **Value**

```
"YES" (active), "NO" (inactive).

Default: "YES".
```

## **Affects**

All.

## **VISIBLE**

Shows or hides the element.

## **Value**

```
"YES" (visible), "NO" (hidden).

Default: "YES"
```

## Note

Returns NULL if the element has not yet been mapped.

## **Affects**

All except <u>IupItem</u> and <u>IupSeparator</u>.

# **BGCOLOR**

Elements background color.

## **Value**

The RGB components. Values should be between 0 and 255, separated by a blank space.

Default: Depends on the native interface system.

## **Affects**

All.

## See Also

**FGCOLOR** 

## **FGCOLOR**

Elements foreground color. Usually it is the color of the associated text.

## **Value**

The RGB components. Values should be between 0 and 255, separated by a blank space.

Default: Depends on the native interface system.

## **Affects**

All.

## **See Also**

**BGCOLOR** 

### **FONT**

Character font of the text shown in the element.

#### **Value**

Font name. Please refer to the <u>Character Fonts</u> table for a list of the fonts existing in IUP drivers. It also accepts values on the native format.

In Windows, the native format is as a string with the following format:

#### "name:attributes:size"

**name**: The name the user will see (Times New Roman, MS Sans Serif, etc.).

**attributes**: Can be empty, or a list separated by commas with the following names: BOLD ITALIC UNDERLINE STRIKEOUT

size: Size in pixels

## Examples:

```
"Times New Roman::10"
"Ms Sans Serif:ITALIC:20"
"Courier New:BOLD,STRIKEOUT:15"
```

In Motif, the native format uses the X-Windows font string format. You can use program **xfontsel** to select a font and obtain the string. For example:

```
"-*-times-medium-r*-*-10-*"
"-*-sans serif-*-o-*-*-19-*"
"-*-courier-*-r-*-14-*"
```

Default: Depends on the native interface system.

## **Affects**

All elements with an associated text.

## Note

To set a font, the user can use one of the font options provided in the <u>Character Fonts</u> table, or directly use the name of a native font in the driver. Attention: when consulting this attribute, the user will always be returned the name of the driver font being used, not the name of the IUP font. To get the name of the IUP font, the user must use the <u>IupUnMapFont</u> function.

## See Also

TITLE, JupMapFont, JupUnMapFont.

# **EXPAND**

Makes the size of an element dynamic. It expands or retracts, fulfilling empty spaces inside a dialog.

## **Value**

"YES" (both directions), "HORIZONTAL", "VERTICAL" or "NO".

Default: Depends on the element. When not specified otherwise, the default value is "NO".

# **Affects**

All that have a visual representation. Does not apply to radio, zbox, vbox, hbox.

# $\mathbf{X}$

Control's absolute horizontal position on the screen in pixels (relative to the upper left corner.) This attribute can only be consulted.

# **Value**

Integer number.

# **Affects**

All controls that have visual representation.

# $\mathbf{Y}$

Control's absolute vertical position on the screen in pixels (relative to the upper left corner.) This attribute can only be consulted.

# **Value**

Integer number.

# **Affects**

All controls that have visual representation.

## **SIZE**

Size of the element in units proportional to the size of a character.

#### **Value**

"widthxheight", where width and height are integer values corresponding to the horizontal and vertical size, respectively, in characters. The element may have only one dimension which is applicable to be modified - for instance, <a href="IupText">IupText</a>, which has only width. In this case, the second parameter is ignored and does not need to be passed. You can also change only one of the parameters by removing the other one and maintaining "x". For example: "x40" (height only) or "40x" (width only). The other size will be chosen by IUP depending on the composition elements and on the EXPAND attribute.

Default: Depends on the element and on the element's EXPAND attribute.

### **Notes**

The size observes the following heuristics:

- Width in 1/4's of the average width of a character.
- Height in 1/8's of the average height of a character.

When this attribute is changed, the <u>RASTERSIZE</u> attribute is automatically updated.

When this attribute is changed by means of a call to function IupSetAttribute or IupStoreAttribute, the size will be the minimum size for the element. If you wish to use this size only as an initial size, change this attribute to NULL after viewing the dialog.

### **Affects**

All.

# See Also

EXPAND, RASTERSIZE

# **WID**

Element identifier in the native interface system.

# **Value**

In Motif, returns a Widget which identifies the Intrinsics control.

In Windows, returns a handle (HWND) that identifies the window in the native system.

# Note

Verification-only attribute, available after the control is mapped.

# **Affects**

All.

# **TIP**

Summarized text, usually just a word, identifying the elements functionality. The text will be shown when the mouse lies over the element.

# **Value**

Text.

Default: NULL.

## Note

Background and foreground colors, and the font used, are predetermined and depend on the native system.

# **Affects**

All except label, menu item and submenu item.

# **RASTERSIZE**

Specifies the elements size in pixels.

### **Value**

"widthxheight", where width and height are integer values corresponding to the horizontal and vertical size, respectively, in pixels.

Default: Depends on the system and on the EXPAND attribute.

# **Affects**

All.

# Note

When this attribute is changed, the <u>SIZE</u> attribute is automatically updated. Please refer to the notes on the <u>SIZE</u> attribute for further detail.

# **See Also**

**SIZE** 

# **TITLE**

Elements title. It is often used to modify some static text of the element (which cannot be changed by the user).

# **Value**

Text.

Default: ""

# **Affects**

All elements with an associated text.

# **See Also**

**FONT** 

## **VALUE**

Affects several elements differently - that is, its behavior is element dependent. It is often used to change the control's main value, such as the text of a <a href="IupText">IupText</a>.

For the <u>IupRadio</u> and <u>IupZbox</u>, elements, which are categorized as composition elements, this attribute represents the element "selected" among the others in the designed composition. To change this attribute in such cases, different mechanisms are necessary according to the programming environment used. When the elements taking part in a composition were created in C, this attribute's contents is a name that must be defined by the <u>IupSetHandle</u> function. When the elements were created in Lua, this attribute's contents is the name of a variable - more precisely, the one receiving the return from the function that created the element you wish to select. In LED it is not possible to dynamically change the value of any attribute, so the elements created in this environment must be identified and manipulated in C by means of their identifying name.

# **Motif Common Attributes**

### **XDISPLAY**

Returns a Display\*, indicating the control's X display. It is a verification-only attribute, available after the control is mapped.

### **XWINDOW**

Returns a Window, indicating the control's X window. It is a verification-only attribute, available after the control is mapped.

#### **XSCREEN**

Returns a Screen\*, indicating the control's X screen. It is a verification-only attribute, available after the control is mapped.

# **Events and Callbacks**

IUP is a graphic-interface library, so most of the time it waits for an event to occur, such as a button click or a mouse leaving a window. The application can inform IUP which callback to be called, informing that en event has taken place. So events are handled through callbacks. And callbacks are just functions that the application register in IUP.

The events are processed only when IUP has the control of the application. After the application create and show a dialog it must return the control to IUP so it can process incoming events. This is done in the IUP main event loop. And it is usually done once at the application "main" function. One exception is the display of modal dialogs. This dialog will have its own event loop and the previous shown dialogs will stop receiving events until the modal dialog returns.

# **Events and Callbacks Guide**

# **Using**

Even though callbacks have different purposes from attributes, they are actually associated to an element by means of an attribute. To associate a function to a callback, the application must employ the <a href="LupSetAttribute">LupSetAttribute</a> function, linking the action to a name (passed as a string). From this point on, this name will refer to a callback. By means of function <a href="LupSetFunction">LupSetFunction</a>, the user connects this name to the callback.

### For example:

```
int myButton_action(Ihandle* self);
IupSetAttribute(myButton, "ACTION", "my_button_action");
IupSetFunction("my_button_action", (Icallback)myButton_action);
```

Therefore, callbacks also have some of the attributes' functionalities. The most important one is **inheritance**. Though many callbacks are specific to a given element, a callback can be set to a composition element, such as a **vbox**, which contains other elements, and while the composition element does not call that callback all other elements contained in it will call the same callback, unless the callback is redefined in the element.

All callbacks receive at least the element which activated the action as a parameter (self).

The callbacks implemented in C by the application must return one of the following values:

- IUP\_DEFAULT: Proceeds normally with user interaction. In case other return values do not apply, the callback should return this value.
- IUP\_CLOSE: Makes the <a href="IupMainLoop">IupMainLoop</a> function return the control to the application. Depending on the state of the application it will close all windows.
- IUP\_IGNORE: Makes the native system ignore that callback action. Applies only to some actions. Please refer to specific action

- documentation to know whether it applies or not.
- IUP\_CONTINUE: Makes the element to ignore the callback and pass the treatment of the execution to the parent element.

An important detail when using callbacks is that they are only called when the user actually executes an action over an element. A callback is not called when the programmer sets a value via <a href="IupSetAttribute">IupSetAttribute</a>. For instance: when the programmer changes a selected item on a list, no callback is called.

In a callback if one of the parameters is a string, this string may be modified during the callback if another IUP function (such as <a href="IupGetAttribute">IupGetAttribute</a>) is called.

# **Main Loop**

IUP is an event-oriented interface system, so it will keep a loop waiting for the user to interact with the application. For this loop to occur, the application must call the <a href="IupMainLoop">IupMainLoop</a> function, which is generally used right before <a href="IupClose">IupClose</a>.

When the application is closed by returning IUP\_CLOSE in a callback or by user closing the last dialog, the function IupMainLoop will return.

The <u>IupLoopStep</u> and the <u>IupFlush</u> functions force the processing of incoming events while inside an application callback.

# **IupLua**

In Lua, the callbacks are implemented as methods, using the language resources for object orientation. Thus, the element is implicitly passed as the **self** parameter and the functions do not need to return a value, since the binding is in charge of returning IUP\_DEFAULT. Note that the callbacks in IupLua3 do not contain the suffix \_CB\_, in IupLua5 the names are the same.

Callbacks of different types of interface events are registered by the library when they are initialized. These default callbacks call methods of the object receiving the event. Each different event calls a different method, which can have a few parameters. The objects are initialized with none of these methods set, so the programmer is in charge of setting them when required. They receive the same parameters as callbacks in C, in the same order, and they can either return a value or not. The following example shows the definition of an action for a button.

```
function myButton:action ()
   local aux = self.fgcolor
   self.fgcolor = self.bgcolor
   self.bgcolor = aux
   end

Or you can do

function myButton_action(self)
   ...
   end

myButton.action = myButton_action
```

# **IupMainLoop**

Executes the user interaction until a callback returns IUP\_CLOSE. Must be called before the IupClose function.

### Parameters/Return

```
int IupMainLoop(void); [in C]
IupMainLoop() -> ret: number [in IupLua3]
iup.MainLoop() -> ret: number [in IupLua5]
```

Returns IUP\_NOERROR or IUP\_ERROR.

### **Notes**

If this function is executed at any other moment, it will interrupt the execution until a callback returns IUP\_CLOSE. A second execution of **IupMainLoop** will have a platform-dependent behavior.

Presently, the return value can be ignored, as in all platforms it currently returns IUP NOERROR.

The message loop will go on only while there is a dialog. At the moment the last dialog is destroyed or hidden, the loop will be ended and **IupMainLoop** will return the control to the application, except if the Idle callback is defined - in this case, the Idle callback must return IUP\_CLOSE for the application to receive the control back.

# **Motif Driver**

Can be executed several times but a IUP\_CLOSE must occur for each execution.

### Win32 Driver

If the function is executed several times, only one IUP\_CLOSE will end all executions.

# See Also

IupOpen, IupClose, IupLoopStep, Guide / System Control,
IDLE\_ACTION.

# **IupLoopStep**

Runs an iteration of the message loop.

## Parameters/Return

```
int IupLoopStep(void); [in C]
IupLoopStep() -> ret: number [in IupLua3]
iup.LoopStep() -> ret: number [in IupLua5]
```

This function returns IUP\_CLOSE or IUP\_DEFAULT.

### Notes

This function is useful for allowing a second message loop to be managed by the application itself. This means that messages can be intercepted and callbacks can be processed inside an application loop.

An example of how to use this function is a counter that can be stopped by the user. For such, the user has to interact with the system, which is possible by calling the function periodically.

This way, this function also replaces some old mechanisms implemented using the Idle callback.

Note that this function does not replace **IupMainLoop**.

### See Also

<u>IupOpen</u>, <u>IupClose</u>, <u>IupMainLoop</u>, <u>IDLE\_ACTION</u>, <u>Guide / System</u> Control

# **IupFlush**

Processes all pending messages in the message queue.

### Parameters/Return

```
void IupFlush(void); [in C]
IupFlush() [in IupLua3]
iup.Flush() [in IupLua5]
```

### **Notes**

When you change an attribute of a certain element, the change may not take place immediately. For this update to occur faster than usual, run IupFlush after the attribute is changed.

*Important*: A call to this function may cause other callbacks to be processed before its returns.

In Motif, if the X server sent an event which is not yet in the event queue, after a call to IupFlush the queue might not be empty.

# **IupGetActionName**

Returns the name of the action being executed by the application.

### Parameters/Return

```
char* IupGetActionName(void); [in C]
[There is no equivalent in IupLua]
```

Returns the name of the action.

### Note

The programmer often defines an action with a given name, but when associating it to a function he/she might make a typo, or vice-versa. This kind of mistake is very common, but IUP cannot detect it automatically. The predefined **DEFAULT\_ACTION** action combined with function **IupGetActionName** can help the programmer detect this problem. Simply define a default action and check which action name activated it.

## See Also

**DEFAULT ACTION** 

# **IupGetFunction**

Verifies the function associated to an action.

## Parameters/Return

```
Icallback IupGetFunction (char *action); [in C]
[There is no equivalent in IupLua]
action: name of an action.
```

This function returns the path of the function associated to the action.

# See Also

<u>IupSetFunction</u>.

# **IupSetFunction**

Associates a function to an action.

### Parameters/Return

```
Icallback IupSetFunction (char *action, Icallback function); [in C [There is no equivalent in Lua]
```

**action**: name of an action. **function**: path of a function.

This function returns the address of the previous function associated to the action.

## See Also

<u>IupGetFunction</u>, <u>DEFAULT\_ACTION</u>.

# **ACTION**

Action generated when the element is activated. Affects each element differently.

## **Callback**

```
int function(Ihandle *self); [in C]
elem:action() -> (ret: number) [in IupLua]
```

**self**: identifier of the element that activated the function.

In some elements, this callback may receive more parameters, apart from **self**. Please refer to each element's documentation.

## **Affects**

<u>IupButton</u>, <u>IupItem</u>, <u>IupText</u>, <u>IupCanvas</u>, <u>IupMultiline</u>, <u>IupToggle</u>

# **BUTTON\_CB**

Action generated when a mouse button is pressed or released.

### Callback

```
int function(Ihandle* self, int but, int pressed, int x, int y, char* s
elem:button(but, pressed, x, y: number, status: string) -> (ret: r
elem:button_cb(but, pressed, x, y: number, status: string) -> (ret
self: identifies the canvas that activated the function's execution.
but: identifies the activated mouse button:
  IUP BUTTON1 left mouse button (button 1);
  IUP BUTTON2 middle mouse button (button 2);
  IUP BUTTON3 right mouse button (button 3).
```

**pressed**: indicates the state of the button:

```
0 mouse button was released;
1 mouse button was pressed.
```

**x**, **y**: position in the canvas where the event has occurred, in pixels. **status**: status of the mouse buttons and some keyboard keys at the moment the event is generated. The following macros must be used for verification:

```
isshift(status)
iscontrol(status)
isbutton1(status)
isbutton2(status)
isbutton3(status)
isdouble(status)
```

They return 1 if the respective key or button is pressed, and 0 otherwise.

### **Notes**

This callback can be used to customize a button behavior. For a standard

button use the ACTION callback of the IupButton.

# **Affects**

<u>IupCanvas</u>, <u>IupButton</u>

# CLOSE\_CB

Called just before a dialog is hidden due to some action over it - for example, double clicking the system's menu box, usually located to the left in the title bar.

## **Callback**

```
int function(Ihandle *self); [in C]
elem:close() -> (ret: number) [in IupLua3]
elem:close_cb() -> (ret: number) [in IupLua5]
```

Returning IUP\_IGNORE, it prevents the dialog from being hidden. If you destroy the dialog in this callback, you must return IUP\_IGNORE.

# **Affects**

**IupDialog** 

# **DEFAULT\_ACTION**

Predefined IUP action, generated every time an action has no associated function.

## **Callback**

```
int function(Ihandle *self); [in C]
[There is no Lua equivalent]
```

**self**: identifier of the element that activated the function.

### Note

Often a programmer defines an action with a name and, when associating it to a function, he/she mistypes the action name, or vice-versa. This kind of mistake is very common, and IUP is not able to automatically detect it. The predefined IUP\_DEFAULT\_ACTION action, combined with function IupGetActionName, can help the programmer detect this problem. All you have to do is define a default action and verify which is the name of the action that activated it.

## **Affects**

Global callback.

## See Also

<u>IupSetFunction</u>, <u>IupGetActionName</u>.

# **DROPFILES\_CB**

Action called when a file is "dragged" to the application. When several files are dragged, the callback is called several times, once for each file.

### Callback

```
int function(Ihandle *self, char* filename, int numFile, int posx,
elem:dropfiles(filename: string; numFile, posx, posy: number) -> (
elem:dropfiles_cb(filename: string; numFile, posx, posy: number) -
```

**self**: Indicator of the element that received the file drop.

**filename**: Name of the dragged file.

**numFile**: Number of the dragged file. If several files are dragged, numFile counts the number of dragged files up to zero.

**posx**: X coordinate of the point where the user released the mouse button. **posy**: Y coordinate of the point where the user released the mouse button.

The callback must return IUP\_DEFAULT to be called again for each of the dragged files. Returning IUP\_IGNORE, the process is interrupted.

#### **Notes**

The callback must be set before the element is mapped.

Windows Only, not available in Motif.

## **Affects**

**IupDialog**, **IupCanvas** 

# ENTERWINDOW\_CB

Action generated when the mouse enters the canvas.

## **Callback**

```
int function(Ihandle *self); [in C]
elem:enterwindow() -> (ret: number) [in IupLua3]
elem:enterwindow_cb() -> (ret: number) [in IupLua5]
```

**self**: identifier of the canvas the mouse has entered.

# **Affects**

## **IupCanvas**

In Motif can also be used by other controls.

# **GETFOCUS\_CB**

Action generated when an element is given keyboard focus. This callback is called after the KILLFOCUS\_CB.

### **Callback**

```
int function(Ihandle *self); [in C]
elem:getfocus() -> (ret: number) [in IupLua3]
elem:getfocus_cb() -> (ret: number) [in IupLua5]
```

**self**: identifier of the element that received keyboard focus.

# **Affects**

All elements with user interaction, except menus.

## See Also

**KILLFOCUS\_CB** 

# **HELP\_CB**

Action generated when the user press F1 at a control. In Motif is also activated by the Help button in some workstations keyboard.

## **Callback**

```
void function(Ihandle *self); [in C]
elem:help() -> (ret: number) [in IupLua3]
elem:help_cb() -> (ret: number) [in IupLua5]
self: identifier of the element that received keyboard focus.
```

## **Affects**

All elements with user interaction.

# HIGHLIGHT\_CB

Callback triggered every time the mouse pointer hovers an IupItem.

## **Callback**

```
int function(Ihandle *self); [in C]
elem:highlight() -> (ret: number) [in IupLua3]
elem:highlight_cb() -> (ret: number) [in IupLua5]
```

## **Comments**

This callback should not be used with popup menus.

# **Affects**

**IupItem** 

# **IUP\_IDLE\_ACTION**

Predefined IUP action, generated when there are no events.

### **Callback**

```
int function(); [in C]
```

## Note

Often used to perform background operations. For example, a time-consuming drawing operation may allow the user to take a decision before the operation is over.

In Windows this callback changes the message loop to a more CPU consuming one. Set to NULL when not using.

# **Lua Binding**

To modify this action, function **IupSetIdle**(myfunction) must be used. Use **iup.SetIdle**(myfunction) in IupLua5. Using nil as a parameter removes the association.

# **Examples**

## **Affects**

Global callback.

### See Also

<u>IupSetFunction</u>.

# **K\_ANY**

Action generated when a keyboard event occurs.

### Callback

```
int function(Ihandle *self, int c); [in C]
elem:k_any() -> (ret: number) [in IupLua]
```

self: identifier of the element where the user typed something.c: identifier of typed key. Please refer to the <u>Keyboard Codes</u> table for a list of possible values.

If the function returns IUP\_IGNORE, the system will ignore the typed character. If the function returns the code of any other key, IUP will treat this new key instead of the one typed by the user.

If the function returns IUP\_CONTINUE, the event will be propagated to the parent of the element receiving it.

### **Notes**

All defined keys are also callbacks of any element, called when the respective key is activated. For exemple: "K\_cC" is also a callback activated when the user press Ctrl+C. A shortcut key or hot key can also be associated to any existing callback, either in a menu or any other element, using this same mechanism. These callbacks do not work in IupLua.

The K\_ANY callback is a callback that depends on the keyboard focus and the keyboard usage of the control with the focus. It is usually only set for dialogs, but if a control set the K\_ANY callback the dialog callback will only be called if the control callback returns IUP\_CONTINUE.

Also some keys may not activate the callback since they are reserved keys, like Enter and Esc.

### **Affects**

# **KEYPRESS\_CB**

Action generated when a key is pressed or released. If the key is pressed and held several calls will occur.

### Callback

```
int function(Ihandle *self, int c, int press); [in C]
elem:keypress(c, press: number) -> (ret: number) [in IupLua3]
elem:keypress_cb(c, press: number) -> (ret: number) [in IupLua5]
```

**self**: identifier of the element.

**c**: identifier of typed key. Please refer to the <u>Keyboard Codes</u> table for a list of possible values.

**press**: 1 is the user pressed the key or 0 otherwise.

This function may return IUP\_CLOSE.

# **Affects**

**IupCanvas**.

# KILLFOCUS\_CB

Action generated when an element loses keyboard focus. This callback is called before the GETFOCUS\_CB.

### **Callback**

```
int function(Ihandle *self); [in C]
elem:killfocus() -> (ret: number) [in IupLua3]
elem:killfocus_cb() -> (ret: number) [in IupLua5]
```

self: identifier of the element that lost keyboard focus.

# **Affects**

All elements with user interaction, except menus.

### See Also

**GETFOCUS CB** 

# LEAVEWINDOW\_CB

Action generated when the mouse leaves a canvas.

### **Callback**

```
int function(Ihandle *self); [in C]
elem:leavewindow() -> (ret: number) [in IupLua3]
elem:leavewindow_cb() -> (ret: number) [in IupLua5]
self: identifier of the canvas the mouse left
```

# **Affects**

# **IupCanvas**

In Motif can also be used by other controls.

# MAP\_CB

Called right after an element is mapped.

# **Callback**

```
int function(Ihandle *self); [in C]
elem:mapcb() -> (ret: number) [in IupLua3]
elem:map_cb() -> (ret: number) [in IupLua5]
```

# **Affects**

<u>IupDialog</u>, <u>IupCanvas</u>

# MENUCLOSE\_CB

Called just before a submenu is closed.

### **Callback**

```
int function(Ihandle *self); [in C]
elem:menuclose() -> (ret: number) [in IupLua3]
elem:menuclose_cb() -> (ret: number) [in IupLua5]
```

### **Comments**

Does not work for popup menus.

### **Affects**

<u>IupMenu</u>, <u>IupSubMenu</u>

# **MOTION\_CB**

Action generated when the mouse moves.

### **Callback**

```
int function(Ihandle *self, int x, int y, char *r); [in C]
elem:motion(x, y: number, r: string) -> (ret: number) [in IupLua3]
elem:motion_cb(x, y: number, r: string) -> (ret: number) [in IupLu
self: identifier of the canvas that activated the function's execution.
x, y: position in the canvas where the event has occurred, in pixels.
r: status of mouse buttons and certain keyboard keys at the moment the event was generated. The following macros must be used for verification:
    isshift(r)
    iscontrol(r)
```

isbutton1(r) isbutton2(r)

isbutton3(r)

isdouble(r)

# **Affects**

**IupCanvas** 

# **OPEN\_CB**

Called just before a submenu is opened.

### **Callback**

```
int function(Ihandle *self); [in C]
elem:open() -> (ret: number) [in IupLua3]
elem:open_cb() -> (ret: number) [in IupLua5]
```

### **Comments**

Does not work for popup menus.

### **Affects**

<u>IupMenu</u>, <u>IupSubMenu</u>

# **RESIZE\_CB**

Action generated when the canvas size is changed.

### **Callback**

```
int function(Ihandle *self, int width, int height); [in C]
elem:resize(width, height: number) -> (ret: number) [in IupLua3]
elem:resize_cb(width, height: number) -> (ret: number) [in IupLua5
self: identifier of the canvas that activated the function's execution.
width: new canvas width, in pixels.
height: new canvas height, in pixels.
```

#### Note

This action is also generated right after the dialog is viewed by means of functions <u>IupShow</u>, <u>IupShowXY</u> or <u>IupPopup</u>.

In Windows, it is also generated after a map and before show.

# **Affects**

**IupCanvas** 

# SCROLL\_CB

Called when some manipulation is made to the scrollbar. When this attribute is defined, the <u>ACTION</u> callback is not called in such cases.

### Callback

```
int function(Ihandle *self, int op, float posx, float posy); [in C
elem:scroll(op, posx, posy: number) -> (ret: number) [in IupLua3]
elem:scroll_cb(op, posx, posy: number) -> (ret: number) [in IupLua
```

**op**: indicates the operation performed on the scrollbar.

If the manipulation was made on the vertical scrollbar, it can have the following values:

```
IUP_SBUP - line up
IUP_SBDN - line down
IUP_SBPGUP - page up
IUP_SBPGDN - page down
IUP_SBPOSV - vertical position
IUP_SBDRAGV - vertical drag
```

If it was on the horizontal scrollbar, the following values are valid:

```
IUP_SBLEFT - column left
IUP_SBRIGHT - column right
IUP_SBPGLEFT - page left
IUP_SBPGRIGHT - page right
IUP_SBPOSH - horizontal position
IUP_SBDRAGH - horizontal drag
```

**posx**, **posy**: the same as the <u>ACTION</u> canvas callback (corresponding to the values of attributes IUP\_POSX and IUP\_POSY).

### **Affects**

**IupCanvas** 

# SHOW\_CB

Called right after the dialog is opened, minimized or restored from a minimization.

### **Callback**

```
int function(Ihandle *self, int mode); [in C]
elem:showcb(mode: number) -> (ret: number) [in IupLua3]
elem:show_cb(mode: number) -> (ret: number) [in IupLua5]
```

Parameter **mode** indicates which of the following situations generated the event:

```
0 - Show, 1 - Restore, 2 - Minimize.
```

### **Affects**

**IupDialog** 

# WHEEL\_CB

Action generated when the mouse wheel is rotated. If this callback is not defined the wheel will automatically scroll the canvas in the vertical direction by some lines, the SCROLL\_CB callback if defined will be called with the IUP\_SBDRAGV operation.

### **Callback**

```
int function(Ihandle *self, float delta, int x, int y, char *r); [
elem:wheel(delta, x, y: number, r: string) -> (ret: number) [in It
elem:wheel_cb(delta, x, y: number, r: string) -> (ret: number) [ir
```

**self**: identifier of the canvas that activated the function's execution.

**delta**: the amount the wheel was rotated in notches.

**x**, **y**: position in the canvas where the event has occurred, in pixels.

**r**: status of mouse buttons and certain keyboard keys at the moment the event was generated. The following macros must be used for verification:

isshift(r)

iscontrol(r)

isbutton1(r)

isbutton2(r)

isbutton3(r)

isdouble(r)

### **Notes**

In Motif delta is always 1 or -1. In Windows is some situations delta can reach the value of two. In the future with more precise wheels this increment can be changed.

The wheel will only work if the focus is at the canvas.

### **Affects**

**IupCanvas** 

# WOM\_CB

Action generated when an audio device receives an event.

[WINDOWS DRIVER ONLY]

### **Callback**

```
void function(Ihandle *self, int v); [in C]
(not implemented in Lua)
where v is -1, 0, 1 meaning closing, ending and opening respecti
```

# **Affects**

**IupCanvas** 

# **Dialogs**

In IUP you can create your own dialogs or use one of the predefined dialogs. To create your own dialogs you will have to create all the controls of the dialog before the creation of the dialog. All the controls must be composed in a hierarchical structure so the root will be used as a parameter to the dialog creation.

When a control is created, its parent is not known. After the dialog is created all elements receive a parent. This mechanism is quite different from that of native systems, who first create the dialog and then the element are inserted, using the dialog as a parent. This feature creates some limitations for IUP, usually related to the insertion and removal of controls.

Since the controls are created in a different order from the native system, native controls can only be created after the dialog. This will happen automatically when the application call the <a href="LupShow">LupShow</a> function to show the dialog. But we often need the native controls to be created so we can use some other functionality of those before they are visible to the user. For that purpose, the <a href="LupMap">LupMap</a> function was created. It forces IUP to map the controls to their native system controls. The IupShow function internally uses IupMap before showing the dialog on the screen. IupShow can be called many times, but the map process will occur only once.

IupShow can be replaced by <u>IupPopup</u>. In this case the result will me a modal dialog and all the other previously shown dialogs will be unavailable to the user. Also the program will interrupt in the function call until the application return IUP\_CLOSE. When a modal dialog is displayed the application can display other modal dialogs using IupPopup again, but not other dialogs using IupShow.

# **IupDialog**

Creates a dialog element. It manages user interaction with the interface elements. For any interface element to be shown, it must be encapsulated in a dialog.

#### Creation

```
Ihandle* IupDialog(Ihandle *element); [in C]
iupdialog{element: iuplua_tag} -> (elem: iuplua_tag) [in IupLua3]
iup.dialog{element: iuplua_tag} -> (elem: iuplua_tag) [in IupLua5]
dialog(element) [in LED]
```

**element**: Identifier of an interface element.

This function returns the identifier of the created dialog, or NULL if an error occurs.

#### **Attributes**

**BORDER**: Shows a thick border around the dialog. Default: "YES". Used only in the creation. Can not be changed after that.

**CURSOR**: Defines a cursor for the dialog.

**ICON**: Dialog's icon.

MAXBOX: Requires a maximize button from the window manager. Creation-only attribute.

MENU: Associates a menu to the dialog.

<u>MENUBOX</u>: Requires a menu box from the window manager. Creation-only attribute.

MINBOX: Requires a minimize button from the window manager. Creation-only attribute.

**RESIZE**: Allows interactively changing the dialog's size. Creation-only

attribute.

<u>SIZE</u>: Dialog's size. Differently from other interface elements, the following values can be defined for width and height:

- "FULL": Defines the dialog's width (or height) equal to the screen's width (or height)
- "HALF": Defines the dialog's width (or height) equal to half the screen's width (or height)
- "THIRD": Defines the dialog's width (or height) equal to 1/3 the screen's width (or height)
- "QUARTER": Defines the dialog's width (or height) equal to 1/4 of the screen's width (or height)
- "EIGHTH": Defines the dialog's width (or height) equal to 1/8 of the screen's width (or height)

Default: the smallest size that allows viewing the dialog.

The dialog's size has precedence over the smallest size required by its children (either if it was specified in its creation or in run-time). Attributing a NULL value to SIZE or RASTERSIZE (in C) in a dialog will recompute its size according to its children.

<u>TITLE</u>: Dialog's title. On Motif, if it is not defined, the dialog will not be properly displayed.

<u>STARTFOCUS</u>: Name of the dialog element that must receive the focus right after the dialog is opened.

**DEFAULTENTER:** Name of the button activated when Enter is hit.

**DEFAULTESC:** Name of the button activated when Esc is hit.

X: Dialog's horizontal position on the screen, in pixels.

Y: Dialog's vertical position on the screen, in pixels.

<u>SHRINK</u>: Allows changing the elements' distribution when the dialog is smaller than the minimum size.

<u>PARENTDIALOG</u>: Makes the dialog be treated as a child of the specified dialog.

#### **FULLSCREEN**

Makes the dialog occupy the whole screen. All dialog details, such as border, maximize button, etc, are removed. Possible values: YES, NO. Must be set before mapping to the native system. In Motif you may have to click in the dialog to set its focus. Use IupPopup for better results.

#### **WIN\_SAVEBITS** (Windows Only)

This attribute is only consulted when the dialog is mapped. When this attribute is true (YES), the dialog stores the original image of the desktop region it occupies (if Windows has enough memory to store the image). In this case, when the dialog is closed or moved, a redrawing event is not generated for the windows that were shadowed by it. Its default value is YES.

### **TOPMOST** (Windows Only)

This attribute puts the dialog always in front of all other dialogs in all applications. Default: NO.

# TOOLBOX (Windows Only)

This attribute makes the dialog look like a toolbar. It is only valid if the PARENTDIALOG attribute is also defined. Default: NO.

### **CLIPCHILDREN** (Windows Only)

Modifies the way the dialog and its children are redrawn.

When option YES is selected, the area occupied by the children in the dialog is not redrawn, thus preventing the matrix and the canvas from blinking when a resize is made. Usually this brings better performance, but in some cases it may bring a performance reduction, as every time the dialog needs to be redrawn all children are redrawn as well. Default: YES.

### **BRINGFRONT** (Windows Only)

This attribute makes the dialog the foreground window. Use "YES" to activate it. Useful for multithreaded applications.

### **NATIVEPARENT** (Windows Only)

Makes any window created in the system (even from outside IUP) able to be parent of a IUP dialog. The value provided should be a valid window handle (HWND.)

#### **PLACEMENT** (Windows Only)

Changes how the dialog will be shown. Values: "MAXIMIZED", "MINIMIZED" and "NORMAL". After IupShow the attribute is set to "NORMAL" if it was different. "NORMAL" is equivalent of not defining the attribute.

### **HELPBUTTON** (Windows Only)

Inserts a help button in the same place of the maximize button. It can only be used for dialogs without the minimize and maximize buttons, and with the menu box. For the next interaction of the user with a control in the dialog, the callback <a href="https://example.com/HELP\_CB">HELP\_CB</a> will be called instead of the control defined ACTION callback. Possible values: YES, NO. Default: NO.

TRAY(Windows Only): When set to "YES", displays an icon on the system tray.

TRAYICON(Windows Only): System tray icon

TRAYTIP(Windows Only): Tray icon's tooltip text

### **HIDETASKBAR** (Windows Only)

When set to "YES", hides the dialog from the task bar. Must be used with TRAYICON attribute.

**CONTROL** (Windows Only): Embeds the dialog inside another window.

Creation-only attribute.

#### **Callbacks**

<u>SHOW\_CB</u>: Called right after the dialog is opened, minimized or restored from a minimization.

MAP\_CB: Called right after the element is mapped.

<u>CLOSE\_CB</u>: Called right before the dialog is closed.

TRAYCLICK\_CB: Called right after the mouse button is pressed or released over the tray icon.

```
int function(Ihandle *n, int but, int pressed, int dclick); [in
elem:trayclick(but, pressed, dclick: number) -> (ret: number) [i
elem:trayclick_cb(but, pressed, dclick: number) -> (ret: number)
```

**but**: identifies the activated mouse button. **pressed**: indicates the state of the button.

**dclick**: indicates a double click.

Returning CLOSE closes the dialog.

#### **Notes**

Except for the menu, all other elements must be inside a dialog to interact with the user. Therefore, an interface element will only be visible when its <u>VISIBLE</u> attribute and that of the dialog are "YES".

A menu that is not associated to a dialog can interact with the user by means of the IupPopup function.

Values attributed to the SIZE attribute of a dialog are **always** accepted, regardless of the minimum size required by its children. For a dialog to have the minimum necessary size to fit all elements contained in it, simply define NULL (in C) to SIZE. In the case of partial dimensions, a specified dimension is **always** used, while a non-defined dimension uses the smallest necessary size for the elements in the corresponding direction.

In Motif the decorations ICON, MENUBOX, MINBOX, MAXBOX, RESIZE and BORDER will work only if the running Window Manager supports the Motif WM hints.

# **Examples**

# **IupDestroy**

Destroys an interface element and all of its descendants.

### Parameters/Return

```
void IupDestroy(Ihandle *element); [in C]
IupDestroy(element: iuplua_tag) [in IupLua3]
iup.Destroy(element: iuplua_tag) [in IupLua5]
or element:destroy() [in IupLua]
```

**element**: Identifier of the interface element to be destroyed.

#### **Notes**

This function deletes the names associated to the interface elements being destroyed. It does not free the memory of attribute values that was allocated by the application.

ATTENTION: The interface elements associated by means of attributes (such as menus in dialogs and images in buttons) are not destroyed. The application will be in charge of such task.

# **IupHide**

Hides an interface element. This function has the same effect as attributing value "NO" to the interface elements VISIBLE attribute.

#### Parameters/Return

```
int IupHide(Ihandle *element); [in C]
IupHide(element: iuplua_tag) -> (ret: number) [in IupLua3]
iup.Hide(element: iuplua_tag) -> (ret: number) [in IupLua5]
or element:hide() -> (ret: number) [in IupLua]
```

**element**: Identifier of the interface element.

This function returns IUP\_NOERROR if the element was removed from the screen.

#### Note

Once a dialog is hidden, either by means of **IupHide** or by changing the VISIBLE attribute or by means of a callback returning IUP\_CLOSE, the elements in this dialog are not destroyed, so that you can show them again. To destroy dialogs, the **IupDestroy** function must be called.

### See Also

<u>IupShowXY</u>, <u>IupShow</u>, <u>IupPopup</u>, <u>IupDestroy</u>.

# **IupMap**

Creates native interface objects corresponding to the given IUP interface elements.

#### Parameters/Return

```
int IupMap(Ihandle* element); [in C]
IupMap(element: iuplua-tag) -> ret: number [in IupLua3]
iup.Map(element: iuplua-tag) -> ret: number [in IupLua5]
```

**element**: Identifier of an interface element.

#### **Notes**

When **element** is of type *dialog*, this function creates the native interface element of a dialog and of each element it contains, but only if the **element** has not been mapped yet.

When **element** is not of type *dialog*, this function will only create the native interface element if the **element** is inside an already mapped dialog.

If **element** was already mapped, nothing happens.

If the WID attribute is NULL, it means the **element** was not already mapped.

This function is automatically called always before a dialog is made visible. This way, it only makes sense for the application to call it when the value of the WID attribute must be known before a dialog is made visible.

#### See Also

<u>IupShowXY</u>, <u>IupShow</u>, <u>IupPopup</u>.

# **IupPopup**

Shows a dialog or menu and restricts user interaction only to the specified element. This function will only return the control to the application after a callback returns **IUP\_CLOSE** or when the popup dialog is hidden, for exemple using **IupHide**.

### Parameters/Return

```
int IupPopup(Ihandle *element, int x, int y); [in C]
IupPopup(element: iuplua_tag, x, y: number) -> (ret: number) [in I
iup.Popup(element: iuplua_tag, x, y: number) -> (ret: number) [in
or element:popup(x, y: number) -> (ret: number) [in IupLua]
```

**element**: Identifier of a dialog or a menu.

**x**: x coordinate of the left corner of the interface element. The following macros are valid:

- IUP LEFT: Positions the element on the left corner of the screen
- IUP\_CENTER: Centers the element on the screen
- IUP\_RIGHT: Positions the element on the right corner of the screen
- IUP\_MOUSEPOS: Positions the element on the mouse cursor

**y**: y coordinate of the upper part of the interface element. The following macros are valid:

- IUP\_TOP: Positions the element on the top of the screen
- IUP\_CENTER: Vertically centers the element on the screen
- IUP\_BOTTOM: Positions the element on the base of the screen
- IUP\_MOUSEPOS: Positions the element on the mouse cursor

This function returns IUP\_ERROR if the element could not be created.

#### **Notes**

When a popup dialog is interacting with the user, another dialog can only be opened by means of the **IupPopup** function never with **IupShow** or **IupShowXY**.

This function can be executed more than once for the same dialog. In fact, it works just like functions **IupShow** and **IupShowXY**, but it inhibits interaction with other dialogs. Therefore, it does not destroy the dialogs elements when it ends. To destroy the elements, function **IupDestroy** must be called.

### See Also

<u>IupShowXY</u>, <u>IupShow</u>, <u>IupHide</u>.

# **IupShow**

Displays an interface element. This function has the same effect as setting value IUP\_YES to the IUP\_VISIBLE attribute of the interface element.

#### Parameters/Return

```
int IupShow(Ihandle *element); [in C]
IupShow(element: iuplua_tag) -> (ret: number) [in IupLua3]
iup.Show(element: iuplua_tag) -> (ret: number) [in IupLua5]
or element:show() -> (ret: number) [in IupLua]
```

**element**: identifier of the interface element.

This function returns IUP\_NOERROR if the element was displayed.

#### **Notes**

An interface element is only visible if the dialog that contains it is also visible.

This function can be executed more than once for the same dialog. This will make the dialog be placed above all other dialogs in the application.

### See Also

IupShowXY, IupHide, IupPopup.

# **IupShowXY**

Displays a dialog in a given position on the screen.

#### Parameters/Return

```
int IupShowXY(Ihandle *element, int x, int y); [in C]
IupShowXY(element: iuplua_tag, x, y: number) -> (ret: number) [in
iup.ShowXY(element: iuplua_tag, x, y: number) -> (ret: number) [ir
or element:showxy(x, y: number) -> (ret: number) [in IupLua]
```

**element**: identifier of the dialog.

**x**: x coordinate of the dialogs left corner. The following macros are valid:

- IUP\_LEFT: Positions the dialog on the left corner of the screen
- IUP\_CENTER: Horizontally centralizes the dialog on the screen
- IUP\_RIGHT: Positions the dialog on the right corner of the screen
- IUP\_MOUSEPOS: Positions the dialog on the mouse position

**y**: y coordinate of the dialogs upper part. The following macros are valid:

- IUP TOP: Positions the dialog on the top of the screen
- IUP\_CENTER: Vertically centralizes the dialog on the screen
- IUP\_BOTTOM: Positions the dialog on the base of the screen
- IUP\_MOUSEPOS: Positions the dialog on the mouse position

This function returns IUP\_NOERROR if the element was displayed.

### Note

This function can be executed more than once for the same dialog. This will make the dialog be placed above all other dialogs in the application.

### See Also

IupShow, IupHide, IupPopup.

# **IupFileDlg**

Creates the File Dialog element. It is a predefined dialog for selecting files or a directory. The dialog can be shown with the IupPopup function only.

### Creation

```
Ihandle* IupFileDlg (void); [in C]
iupfiledlg() -> (elem: iuplua_tag) [in IupLua3]
iup.filedlg() -> (elem: iuplua_tag) [in IupLua5]
filedlg() [in LED]
```

This function returns the identifier of the created dialog, or NULL if an error occurs.

### **Attributes**

**DIALOGTYPE**: Type of dialog (Open, Save or GetDirectory)

Can have values "OPEN", "SAVE" or "DIR". Default: "OPEN".

**TITLE**: Dialog's title.

**FILE**: Name of the file initially shown in the "File Name" field in the dialog. If the user clicks OK, this attribute will contain the filename selected by the user.

**FILTER**: String containing a list of file filters valid in the native system, separated by ';' without spaces. Example: "\*.C;\*.LED;teste.\*".

**FILTERINFO**: Filter's description.

**EXTFILTER**: (Windows Only) Defines several file filters. It has priority over FILTER and FILTERINFO. Must be a text with the format "Description1|filter1|Description2|filter2;filter3". The amount of descriptions and of filters is unlimited.

Example: "Text files|\*.txt;\*.doc|Image files|\*.gif;\*.jpg;\*.bmp".

**DIRECTORY**: Initial directory. If not defined the dialog opens in the

current directory. In Windows, if the current directory does not have files corresponding to the chosen filter, the directory opened will be "My Documents".

**PARENTDIALOG:** Makes the dialog be treated as a child of the specified dialog.

**ALLOWNEW**: Indicates if non-existent file names are accepted. If equals "NO" and the user specifies a non-existing file, an alert dialog is shown. Default: if the dialog is of type "OPEN", default is "NO"; if the dialog is of type "SAVE", default is "YES".

**NOCHANGEDIR**: Indicates if the initial working directory must be restored after the user navigation. Default: "YES".

**FILEEXIST**: Indicates if the file defined by the FILE attribute exists or not. It is only valid if the user has pressed OK in the dialog.

**STATUS**: Indicates the status of the selection made:

"1": New file.

"0": Normal, existing file.

"-1": Operation cancelled.

**VALUE**: Name of the selected file(s), or NULL if no file was selected. In Windows there is a limit of 32Kb for this string.

**NOOVERWRITEPROMPT** do not prompt to overwrite an existant file when in "SAVE" dialog. Default is "NO", i.e. prompt before overwrite.

# **MULTIPLEFILES** (Windows Only)

When "YES", this attribute allows the user of IupFileDlg in fileopen mode to select multiple files.

The value returned by VALUE is to be changed the following way: the directory and the files are passed separately, in this order. The character used for separating the directory and the files is '|'. The file list ends with character '|' followed by NULL.

When the user selects just one file, the directory and the file are not separated by '|'.

#### Ex.:

"C:\users\sab|a.txt|b.txt|" or

"C:\users\sab\a.txt" (only one file is selected)

The maximum size allowed by IupFiledlg for file return is 2000 characters. If the size exceeds 2000 characters, VALUE will return NULL.

### **FILTERUSED** (Windows Only)

In a IupFileDlg, this attribute allows the user to select which EXTFILTER to use. It is also possible to retrieve the selection made by the user. Value: a string containing the number of the filter.

### **SHOWPREVIEW** (Windows Only)

A preview area is show inside the File Dialog. Can have values "YES" or "NO". Default: "NO". When this attribute is set you must use the "FILE\_CB" callback to retreive the file name and the necessary attributes to paint the preview area. You must link with the "iup.rc" resource file so the preview area can be enabled.

# **PREVIEWDC**, **PREVIEWWIDTH** and **PREVIEWHEIGHT** (Windows Only)

Read only attributes that are updated during the "PAINT" status of the "FILE\_CB" callback. Return the Device Context (HDC), the width and the height of the client rectangle for the preview area.

### **Callbacks**

**FILE\_CB**: (Windows Only) Action generated when a file is selected.

int function(Ihandle \*self, const char\* file\_name, const char\* status); [in
elem:file(file\_name, status: string) -> (ret: number) [in IupLua3]
elem:file\_cb(file\_name, status: string) -> (ret: number) [in IupLua5]

```
self: identifier of the element that activated the function.file_name: name of the file selected.
```

status: describes the currect action. Can be:

```
"INIT" - when the dialog has started. file_name is NULL.
"FINISH" - when the dialog is closed. file_name is NULL.
"SELECT" - a file has been selected.
"OK" - the user pressed the OK button. If the callback returns
"PAINT" - the preview area must be repainted. This is used on]
```

#### **Notes**

In the Windows driver, the FileDialog is not altered by IupSetLanguage.

To show the dialog, use function **IupPopup**. In Lua, use the **popup** function.

```
Example in C
```

```
filedlg = IupFileDlg();
IupPopup(filedlg, IUP_ANYWHERE, IUP_ANYWHERE);
Example in IupLua 3
filedlg = iupfiledlg{}
filedlg:popup(IUP_ANYWHERE, IUP_ANYWHERE)
```

# **Examples**

### See Also

IupMessage, IupScanf, IupListDialog, IupAlarm, IupGetFile, IupPopup

# **IupAlarm**

Shows a modal dialog containing a message and up to three buttons.

#### **Creation and Show**

```
int IupAlarm(char *t, char *m, char *b1, char *b2, char *b3); [in
IupAlarm(t, m, b1, b2, b3: string) -> (button: number) [in IupLua3
iup.Alarm(t, m, b1, b2, b3: string) -> (button: number) [in IupLua3
```

**t**: Dialogs title

m: Message

**b1**: Text of the first button

**b2**: Text of the second button (optional)

**b3**: Text of the third button (optional)

This function returns the number (1, 2, 3) of the button selected by the user, or 0 (nil in IupLua) if the dialog could not be opened.

#### **Notes**

This function shows a dialog centralized on the screen, with the message and the buttons. The \n character can be added to the message to indicate line change.

A button is not shown if its parameter is NULL. This is valid only for **b2** and **b3**.

Button 1 is set as the "DEFAULTENTER" and "DEFAULTESC". If Button 2 exists it is set as the "DEFAULTESC". If Button 3 exists it is set as the "DEFAULTESC".

The dialog uses a global attribute called "PARENTDIALOG" as the parent dialog if it is defined.

# **Examples**



# See Also

<u>IupMessage</u>, <u>IupScanf</u>, <u>IupListDialog</u>, <u>IupGetFile</u>.

# **IupGetFile**

Shows a modal dialog of the native interface system to select a filename. Uses the <a href="IupFileDlg">IupFileDlg</a> element.

#### **Creation and Show**

```
int IupGetFile(char *file); [in C]
IupGetFile(file: string) -> (file: string, error: number) [in Iup.GetFile(file: string) -> (file: string) -
```

**file**: This parameter is used as an input value to define the default filter and directory. Example: "../docs/\*.txt". As an output value, it is used to contain the filename entered by the user.

**error**: The function returns an error code, whose values can be:

- 1: The name defined by the user is that of a new file
- 0: The name defined by the user is that of an already existent file
- -1: The operation was cancelled by the user

#### Note

The **IupGetFile** function does not allocate memory space to store the complete filename entered by the user. Therefore, the file parameter must be large enough to contain the directory and file names.

The dialog uses a global attribute called "PARENTDIALOG" as the parent dialog if it is defined.

# **Examples**

### See Also

<u>IupMessage</u>, <u>IupScanf</u>, <u>IupListDialog</u>, <u>IupAlarm</u>, <u>IupSetLanguage</u>.

# **IupGetText**

Shows a modal dialog to edit a multiline text.

### **Creation and Show**

```
int IupGetText(char* title, char *text); [in C]
IupGetText(title, text: string) -> (text: string) [in IupLua3]
iup.GetText(title, text: string) -> (text: string) [in IupLua5]
```

**text**: It contains the initial value of the text and the returned text. It must have room for the edited string.

The function returns a non zero value if successfull. In Lua if an error occured returns nil.

#### **Notes**

The dialog uses a global attribute called "PARENTDIALOG" as the parent dialog if it is defined.

### See Also

<u>IupMessage</u>, <u>IupScanf</u>, <u>IupListDialog</u>, <u>IupAlarm</u>, <u>IupSetLanguage</u>.

# **IupListDialog**

Shows a modal dialog to select options from a simple or multiple list.

#### **Creation and Show**

```
int IupListDialog(int type, char *title, int size, char *list[], i
IupListDialog(type: number, title: string, size: number, list: tak
iup.ListDialog(type: number, title: string, size: number, list: tak
```

**type**: =1 simple selection; =2 multiple selection

**title**: Text for the dialogs title

size: Number of options

**list**: List of options

option: Initial option, starting at 1 (note that this index is different from the

return value, kept for compability reasons)

max\_col: Maximum number of columns in the list
max\_lin: Maximum number of lines in the list
mark: Flag vector, used only when type=2

When type=1, the function returns the number of the selected option (the first option is 0), or -1 if the user cancels the operation.

When type=2, the function returns -1 when the user cancels the operation. If the user does not cancel the operationthe function returns a non zero value and the mark parameter will have value 1 for the options selected by the user and value 0 for non-selected options.

#### **Comments**

In IupLua, the return value depends on used option. In case type is 1 (simple selection), the return value is a 0-based number of the selected option. If the type is 2 (multiple selection), the return type is a table with the marked options.

The dialog uses a global attribute called "PARENTDIALOG" as the parent dialog if it is defined.

# **Examples**

# See Also

IupMessage, IupScanf, IupGetFile, IupAlarm

# **IupMessage**

Shows a modal dialog containing a message.

### **Creation and Show**

```
void IupMessage(char *t, char *m); [in C]
IupMessage(t: string, m: string) [in IupLua3]
iup.Message(t: string, m: string) [in IupLua5]
t: Dialogs title
m: Message
```

#### Note

The **IupMessage** function shows a dialog centralized on the screen, showing the message and the OK button. The \n character can be added to the message to indicate line change.

In C there is an utility function to help build the message string, it accepts the same format as the C **sprintf**:

```
void IupMessagef(char *t, char *f, ...); [in C]
```

The dialog uses a global attribute called "PARENTDIALOG" as the parent dialog if it is defined.

# **Examples**

#### See Also

<u>IupGetFile</u>, <u>IupScanf</u>, <u>IupListDialog</u>, <u>IupAlarm</u>

## **IupScanf**

Shows a modal dialog for capturing values with a format similar to the scanf function in the C stdio library.

#### **Creation and Show**

```
int IupScanf(char *fmt, ...); [in C]
IupScanf(fmt: string, ...) -> (n: number, ...) [in IupLua3]
iup.Scanf(fmt: string, ...) -> (n: number, ...) [in IupLua5]
fmt: Reading format
...: List of variables
```

This function returns the number of successfully read fields, or -1 when the user has canceled the operation.

In Lua, the values are returned by the function in the same order they were passed.

#### **Notes**

The **fmt** format must include a title and the descriptions of the variable fields to be read, using the following syntax:

- **First line**: Window title followed by '\n'
- **Following lines**: Must be specified for each variable to be read, in the following format:

```
"text%t.v%f\n", where:
```

**text** is a descriptive text, to be placed to the left of the entry field in a label.

t is the maximum number of characters allowed
v is the maximum number of visible characters in the entry field
f is the type (char, float, etc.), in the C format for I/O services

All the fields use a text box for input. If you need better control of what characters the user enters, you should use <a href="LupGetParam">LupGetParam</a>. This other dialog also has many other resources not available in <a href="LupScanf">LupScanf</a>.

The dialog uses a global attribute called "PARENTDIALOG" as the parent dialog if it is defined.

### **Examples**

Captures an integer number, a floating-point value and a character string.

#### See Also

<u>IupGetFile</u>, <u>IupMessage</u>, <u>IupListDialog</u>, <u>IupAlarm</u>, <u>IupGetParam</u>

## **IupGetColor**

Shows a modal dialog which allows the user to select a color.

This dialog is included in the **Controls Library**.

#### **Creation and Show**

```
int IupGetColor(int x, int y, unsigned char *r, unsigned char *ç <math>IupGetColor(x, y, r, g, b: number) -> (r, g, b: number) [in <math>IupGetColor(x, y, r, g, b: number) -> (r, g, b: number) [in <math>IupGetColor(x, y, r, g, b: number) -> (r, g, b: number)
```

x, y: x, y values of the IupPopup function.

**r, g, b**: Pointers to variables that will receive the color selected by the user if the OK button is pressed. The value in the variables at the moment the function is called defines the color being selected when the dialog is shown. If the OK button is not pressed, the r, g and b values are not changed. These values cannot be NULL.

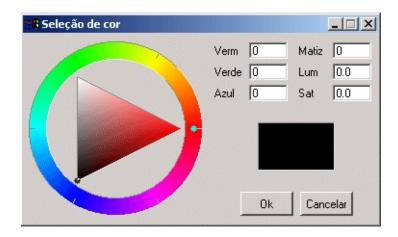
The function returns 1 if the OK button is pressed, or 0 otherwise.

#### **Notes**

In systems with few colors available (256), this function will show the colors by automatically performing dithering, providing good results. However, if only a few colors are available at the systems palette, strange artifacts may appear.

The dialog uses a global attribute called "PARENTDIALOG" as the parent dialog if it is defined.

### **Examples**



## See Also

<u>IupMessage</u>, <u>IupScanf</u>, <u>IupListDialog</u>, <u>IupAlarm</u>, <u>IupGetFile</u>.

## **IupGetParam**

Shows a modal dialog for capturing parameter values using several types of controls.

This dialog is included in the **Controls Library**.

#### **Creation and Show**

int IupGetParam(const char\* title, Iparamcb action, void\* user\_c
[Not available in IupLua]

title: dialog title.

**action:** user callback to be called whenever a parameter value was changed, and when the user pressed the OK button. It can be NULL.

**user\_data**: user pointer repassed to the user callback.

**format**: string describing the parameter

...: list of variables address with initial values for the parameters. The last variable must be NULL.

The function returns 1 if the OK button is pressed, 0 if the user canceled or if an error occurred. The function will abort if there are errors in the format string as in the number of the expected parameters.

### **Callback**

typedef int (\*Iparamcb)(Ihandle\* dialog, int param\_index, void\* user\_data);

dialog: dialog handle

**param\_index**: current parameter being changed. It is -1 if the user pressed the **OK** button. It is -2 when the dialog is **mapped**, just before shown. It is -3 if the user pressed the **Cancel** button.

**user\_data**: a user pointer that is passed in the function call.

You can reject the change or the OK action by returning "0" in the callback, otherwise you must return "1".

You should not programmatically change the current parameter value

during the callback. On the other hand you can freely change the value of other parameters.

Use the dialog attribute "PARAMn" to get the parameter "Ihandle\*", but not that this is not the actual control. Where "n" is the parameter index in the order they are specified starting at 0, but separators are not counted. Use the parameter attribute "CONTROL" to get the actual control. For example:

```
Ihandle* param2 = (Ihandle*)IupGetAttribute(dialog, "PARAM2");
int value2 = IupGetInt(param2, IUP_VALUE);

Ihandle* param5 = (Ihandle*)IupGetAttribute(dialog, "PARAM5");
Ihandle* ctrl5 = (Ihandle*)IupGetAttribute(param5, "CONTROL");

if (value2 == 0)
{
    IupSetAttribute(param5, IUP_VALUE, "New Value");
    IupSetAttribute(ctrl5, IUP_VALUE, "New Value");
}
```

Since parameters are user controls and not real controls, you must update the control value and the parameter value.

Be aware that programmatically changes are not filtered. The valuator, when available, can be retrieved using the parameter attribute "AUXCONTROL". The valuator is not automatically updated when the text box is changed programmatically. The parameter label is also available using the parameter attribute "LABEL".

### **Attributes (inside the callback)**

For the dialog:

```
"PARAMn" - returns an IUP Ihandle* representing the n<sup>th</sup> parameter, indexed by the declaration order not couting separators.

"OK" - returns an IUP Ihandle*, the main button.

"CANCEL" - returns an IUP Ihandle*, the close button.
```

For a parameter:

"LABEL" - returns an IUP Ihandle\*, the label associated with the

parameter.

"CONTROL" - returns an IUP Ihandle\*, the real control associated with the parameter.

"AUXCONTROL" - returns an IUP Ihandle\*, the auxiliary control associated with the parameter (only for Valuators).

"INDEX" - returns an integer value associated with the parameter index. IupGetInt can also be used.

"VALUE" - returns the parameter value as a string, but IupGetFloat and IupGetInt can also be used.

#### **Notes**

The format string must have the following format, notice the "\n" at the end

"text%t[extra]\n", where:

**text** is a descriptive text, to be placed to the left of the entry field in a label.

**t** is the type of the parameter. The valid options are:

**b** = boolean (shows a True/False toggle, use "int" in C)

**i** = integer (shows a integer filtered text box, use "int" in C)

**r** = real (shows a real filtered text box, use "float" in C)

a = angle in degrees (shows a real filtered text box and a
dial, use "float" in C)

**s** = string (shows a text box, use "char\*" in C, it must have room enough for your string)

**m** = multiline string (shows a multiline text box, use "char\*" in C, it must have room enough for your string)

**l** = list (shows a dropdown list box, use "int" in C for the zero based item index selected)

**t** = separator (shows a horizontal line separator label, in this case text can be an empty string)

extra is one or more additional options for type t

**[min,max]** are optional limits for <u>integer</u> and <u>real</u> types. The maximum value can be omited. When both are specified a

valuator will also be added to change the value. **[false,true]** are optional strings for <u>boolean</u> types. The strings can not have commas ',', nor brackets '[' or ']'. **mask** is an optional mask for the <u>string</u> and <u>multiline</u> types. The dialog uses the <u>IupMask</u> internally. In this case we do no use the brackets '[' and ']' to avoid confusion with the specified mask.

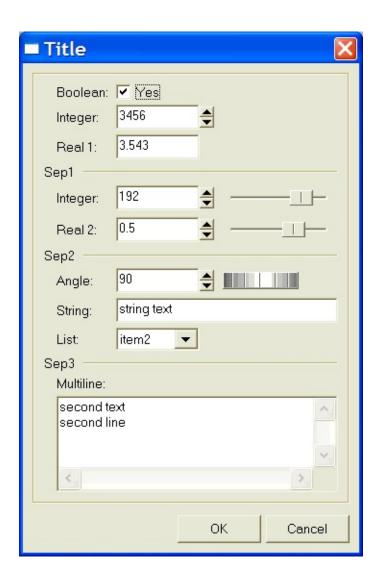
|item0|item1|item2,...| are the items of the <u>list</u>. At least one item must exist. Again the brackets are not used to increase the possibilities for the strings, instead you must use '|'. Items index are zero based start.

The dialog is resizable if it contains a string, a multiline string or a number with a valuator. All the multiline strings will increase size equally in both directions.

The dialog uses a global attribute called IUP\_PARENTDIALOG as the parent dialog if it is defined.

### **Examples**

Here is an example showing many the possible parameters. We show only one for each type, but you can have as many parameters of the same type you want.



## See Also

<u>IupScanf</u>, <u>IupGetColor</u>, <u>IupMask</u>, <u>IupValuator</u>, <u>IupDial</u>, <u>IupList</u>.

## **Layout Composition**

### **Abstract Layout**

Most interface toolkits employ the concrete layout model, that is, control positioning in the dialog is absolute in coordinates relative to the upper left corner of the dialog sclient area. This makes it easy to position the controls on it by using an interactive tool usually provided with the system. It is also easy to dimension them. Of course, this positioning intrinsically depends on the graphics system s resolution. Moreover, when the dialog size is altered, the elements remain on the same place, thus generating an empty area below and to the right of the elements. Besides, if the graphics system s resolution changes, the dialog inevitably will look larger or smaller according to the resolution increase or decrease.

IUP implements an abstract layout concept, in which the positioning of controls is done relatively instead of absolutely. For such, composition elements are necessary for composing the interface elements. They are boxes and fillings invisible to the user, but that play an important part. When the dialog size changes, these containers expand or retract to adjust the positioning of the controls to the new situation.

Watch the codes below. The first one refers to the creation of a dialog for the Microsoft Windows environment using its own resource API. The second uses IUP. Note that, apart from providing the specification greater flexibility, the IUP specification is simpler, though a little larger. In fact, creating a dialog on IUP with several elements will force you to plan your dialog more carefully � on the other hand, this will actually make its implementation easier.

Moreover, this IUP dialog has an indirect advantage: if the user changes its size, the elements (due to being positioned on an abstract layout) are automatically re-positioned horizontally, because of the **iupfill** elements.

The composition elements are vertical boxes (**vbox**), horizontal boxes (**hbox**) and filling (**fill**). There is also a depth box (**zbox**) in which layers of elements can be created for the same dialog, and the elements in each layer are only visible when that given layer is active.

in Windows in IupLua

```
dialogo = iupdialog
dialogo DIALOG 0, 0, 108, 34
                                              iuphbox
STYLE WS_MINIMIZEBOX | WS_MAXIMIZEBOX |
      WS_CAPTION | WS_SYSMENU |
                                                iupfill{},
      WS THICKFRAME
                                                iupbutton{title="0k"
CAPTION "Título"
                                                iupbutton{title="Can
BEGIN
                                                iupfill{}
  PUSHBUTTON "Ok", IDOK, 16, 9, 33, 15
                                               ;margin="15x15", gap=
 PUSHBUTTON "Cancel", IDCANCEL, 57, 9, 33, 15
END
                                             ;title="Título"
```





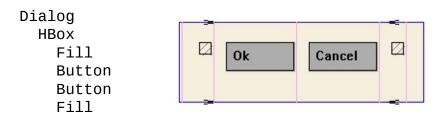
Now see the same dialog in LED and in C:

#### in LED

```
dialog = IupSetAttribu
DIALOG[TITLE="Título"]
                                               IupSetAttributes(Iup
  HBOX[MARGIN="15x15", GAP="10"]
                                                 IupFill(),
    FILL(),
                                                 IupSetAttributes(I
    BUTTON[SIZE="40"]("0k", do_nothing),
                                                 IupSetAttributes(I
    BUTTON[SIZE="40"]("Cancel", do_nothing),
                                                 IupFill(),
    FILL()
                                                 NULL
  )
                                               ), "MARGIN=15x15, GA
                                             ), "TITLE = Título")
```

Following, the abstract layout representation of this dialog:

### Layout Hierarchy Layout Visualization



### **Layout Hierarchy**

The layout of the elements of a dialog in IUP has a natural hierarchy because of the way they are composed together. The dialog is the root of the hierarchy tree. To retreive the dialog of a control you can simply call <a href="IupGetDialog">IupGetDialog</a>, but there are other ways to navigate in the hierarchy tree.

To get all the children of a container use <a href="IupGetNextChild">IupGetNextChild</a>. To get just the next control with the same parent use <a href="IupGetBrother">IupGetBrother</a>.

The hierarchy tree can also be dynamically created, but before mapping to the native system. You can add and remove elements from a container using <a href="mailto:IupAppend">IupAppend</a> and <a href="IupDetach">IupDetach</a>.

## **IupFill**

Creates a Fill composition element, which dynamically occupies empty spaces.

#### Creation

```
Ihandle* IupFill(void); [in C]
iupfill{} -> elem: iuplua_tag [in IupLua3]
iup.fill{} -> elem: iuplua_tag [in IupLua5]
fill() [in LED]
```

This function returns the identifier of the created Fill, or NULL if an error occurs.

### **Attributes**

<u>SIZE</u>: Defines the width, if the Fill is inside a horizontal box, or the height, if it is inside a vertical box. Default: "0".

**EXPAND**: The default value is "YES", which fills every possible space.

#### Note

This element is used to maintain the dialog's layout untouched after the user made size changes, and to align the interface elements.

### **Examples**



### **See Also**

<u>IupHbox</u>, <u>IupVbox</u>.

## **IupHbox**

Creates an hbox container for composing elements. It is a box that arranges the elements it contains, horizontally and from left to right.

#### Creation

```
Ihandle* IupHbox(Ihandle *elem1, Ihandle *elem2, ..., NULL); [in C
iuphbox{elem1, elem2, ...: iuplua_tag} -> (elem: iuplua_tag) [in I
iup.hbox{elem1, elem2, ...: iuplua_tag} -> (elem: iuplua_tag) [in
hbox(elem1, elem2, ...) [in LED]
```

**elem1**, **elem2**,...: List of identifiers that will be placed in the box. NULL defines the end of the list.

This function returns the identifier of the created box.

#### **Attributes**

**ALIGNMENT**: Aligns the elements vertically. Possible values: "ATOP", "ACENTER", "ABOTTOM". Default: "ATOP".

**GAP**: Defines a space in pixels between the interface elements. Default: "0".

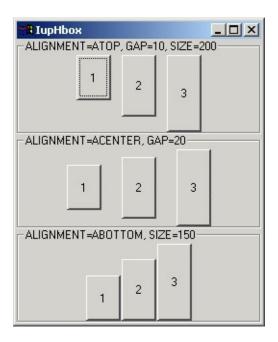
**MARGIN**: Defines a margin in pixels. Its value has the format "widthxheight", where width and height are integer values corresponding to the horizontal and vertical margins, respectively. Default: "0x0" (no margin).

<u>SIZE</u>: Width of the hbox. Default: the smallest size that contains the children elements.

#### Note

The box can be created with no elements and be dynamic filled using <u>IupAppen</u>.

# **Examples**



## See Also

<u>IupZbox</u>, <u>IupVBox</u>

## **IupVbox**

Creates a vbox container for composing elements. It is a box that arranges the elements it contains, vertically and from the top down.

#### Creation

```
Ihandle* IupVbox(Ihandle *elem1, Ihandle *elem2, ..., NULL); [in C
iupvbox{elem1, elem2, ...: iuplua_tag} -> (elem: iuplua_tag) [in I
iup.vbox{elem1, elem2, ...: iuplua_tag} -> (elem: iuplua_tag) [in vbox(elem1, elem2, ...) [in LED]
```

**elem1**, **elem2**, ...: List of the identifiers that will be placed in the box. NULL defines the end of the list.

This function returns the identifier of the created vbox, or NULL (nil in Lua) if an error occurs.

#### **Attributes**

**ALIGNMENT**: Horizontally aligns the elements. Possible values: "ALEFT", "ACENTER", "ARIGHT". Default: "ALEFT".

**GAP**: Defines a space, in pixels, between the interface elements. Default: "0".

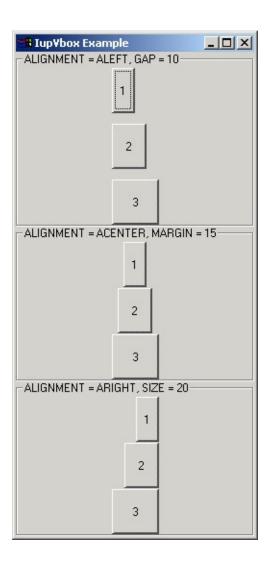
**MARGIN**: Defines a margin in pixels. Its value has the format "widthxheight", where width and height are integer values corresponding to the horizontal and vertical margins, respectively. Default: "0x0" (no margin).

<u>SIZE</u>: Height of the vbox. Default: smallest size that contains the children elements.

#### Note

The box can be created with no elements and be dynamic filled using IupAppen.

# **Examples**



## See Also

<u>IupZbox</u>, <u>IupHbox</u>

## **IupZbox**

Creates a zbox container for composing elements. It is a box that piles up the elements it contains, only the active element in visible.

#### Creation

```
Ihandle* IupZbox (Ihandle *elem1, Ihandle *elem2,..., NULL); [in C
iupzbox{elem1, elem2, ... : iuplua_tag} -> (elem: iuplua_tag) [in
iup.zbox{elem1, elem2, ... : iuplua_tag} -> (elem: iuplua_tag) [ir
zbox(elem1, elem2,...) [in LED]
```

**elem1, elem2, ...**: List of the elements that will be placed in the box.

Note that, in C, NULL must be added as the last element, defining the end of the list. **Important**: in C, each element must have a name defined by <a href="ImpSetHandle">IupSetHandle</a>. In Lua a name is always automatically created, but you can change it later.

This function returns the identifier of the created zbox, or NULL (nil in Lua) if an error occurs.

### **Attributes**

**ALIGNMENT:** Defines the alignment of the active element. Possible values:

```
"NORTH", "SOUTH", "WEST", "EAST", "NE", "SE", "NW", "SW", "ACENTER".
```

Default: "NE".

**MARGIN**: Defines the margin of the visible element. Its value has the format "widthxheight", where width and height are integer values corresponding to the horizontal and vertical margins, respectively. Default: "0x0" (no margin).

**VALUE**: Changes the active element. The value passed must be the name of one of the elements contained in the zbox. Default: the first element. To set the name of an element, use the <a href="LupSetHandle">LupSetHandle</a> function. In Lua you can also use the element reference directly.

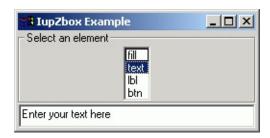
<u>SIZE</u>: Defines the zbox size. Default: the smallest size that fits its largest element.

#### Note

The box can be created with no elements and be dynamic filled using <a href="LupAppen">LupAppen</a>.

Though this element can have attributes ALIGNMENT and MARGIN, it does not have attribute GAP.

## **Examples**



#### See Also

IupHbox, IupVBox

## **IupRadio**

Creates the radio element for grouping mutual exclusive toggles. Only one of its descendet toggles will be active at a time. The toggles can be at any composion.

#### Creation

```
Ihandle* IupRadio(Ihandle *element); [in C]
iupradio{element: iuplua_tag} -> (elem: iuplua_tag) [in IupLua3]
iup.radio{element: iuplua_tag} -> (elem: iuplua_tag) [in IupLua5]
radio(element) [in LED]
```

**element**: Identifier of an interface element. Usually it is a vbox or an hbox containing the toggles associated to the radio.

This function returns the identifier of the created radio, or NULL (nil in IupLua) if an error occurs.

#### **Attributes**

**VALUE**: Identifier of the active toggle. The identifier is set by means of <a href="IupSetHandle">IupSetHandle</a>.

### **Examples**



## **IupAppend**

Inserts an interface element at the end of the container. Valid for hbox, vbox, zbox or menu.

#### Parameters/Return

```
Ihandle* IupAppend(Ihandle *box, Ihandle *element); [in C]
IupAppend(box, element: iuplua_tag) -> (box: iuplua_tag) [in IupLu iup.Append(box, element: iuplua_tag) -> (box: iuplua_tag) [in IupLu iuplua_tag)
```

**box**: Identifier of an hbox, vbox, zbox or menu.

**element**: Identifier of the element to be inserted in the box.

This function returns **box** if the interface element was successfully inserted. Otherwise, NULL (nil in Lua) is returned.

#### **Notes**

This function must be used when the interface elements that will compose an hbox, vbox, zbox or menu are not known *a priori* (in the program's compilation stage).

If the box where the interface element is being inserted is visible, the IupAppend function does not update it automatically. For such, the box must be hidden (IupHide) and made visible (IupShow) again.

**ATTENTION**: Currently, this function only works before the element is mapped by means of functions **IupMap**, **IupShow**, **IupShowXY** or **IupPopup**.

#### See Also

<u>IupDetach</u>, <u>IupHbox</u>, <u>IupVbox</u>, <u>IupZbox</u>, <u>IupMenu</u>.

## **IupDetach**

Disassociates an interface element from the dialog that contains it.

#### Parameters/Return

```
void IupDetach(Ihandle *element); [in C]
IupDetach(element: iuplua_tag) [in IupLua3]
iup.Detach(element: iuplua_tag) [in IupLua5]
or element:detach() [in IupLua]
```

**element**: Identifier of the interface element to be detached.

#### **Notes**

This function does not destroy an interface element, but only removes the dialog that contains it so that it can be used in another dialog.

**ATTENTION**: At the moment, this function only works before the element is mapped by means of functions **IupMap**, **IupShow**, **IupShowXY** or **IupPopup**. The following example does not actually work!

### **Example**

Inserts and removes a button box in/from a dialog.

#### In C

```
#include <stdlib.h> /* NULL */
#include "iup.h"

static Ihandle *pc; /* Identifier of the hbox that contains the button box */
static Ihandle *cb; /* Identifier of the button box */
static int visivel=1; /* =1 if the button box is on the screen, =0 otherwise */

/* Function that displays the button box */
static int exibe (void)
{
   if (visivel == 0)
```

```
{
    IupHide(pc);
    IupAppend(pc, cb);
    IupShow(pc);
    visivel = 1;
  }
  return IUP_DEFAULT;
}
/* Function that hides the button box */
static int retira (void)
  if (visivel == 1)
    IupHide(pc);
    IupDetach(cb);
    IupShow(pc);
    visivel=0;
  }
  return IUP_DEFAULT;
}
void main (void)
  Ihandle *d; /* Identifier of the dialog */
  IupOpen();
  /* Creates button box */
  cb = IupFrame(IupVbox(
                            IupButton(" Select " , "acao_select"),
                            IupButton(" Line ", "acao_line"),
                            IupButton("Poligono", "acao_poligono"),
IupButton(" Circulo", "acao_circulo"),
                            NULL));
  /* Creates a box containing a canvas and the buttons */
  pc = IupHbox(IupFrame(IupCanvas("acao_repaint")), cb, NULL);
  d = IupDialog (pc); /* criação do diálogo */
  IupSetAttribute (d, IUP_K_F1, "exibe_caixa"); /* Defines F1 to display th
  IupSetAttribute (d, IUP_K_F2, "retira_caixa"); /* Defines F2 to hide tl
  /* Associates functions to the actions */
  IupSetFunction("exibe_caixa",(Icallback)exibe);
  IupSetFunction("retira_caixa",(Icallback)retira);
```

```
IupShow(d); /* Shows the dialog */
IupMainLoop(); /* Interacts with user */
IupClose();
}
```

## See Also

<u>IupAppend</u>, <u>IupDestroy</u>.

## **IupGetNextChild**

Returns the children of the given control.

#### Parameters/Return

```
Ihandle *IupGetNextChild(Ihandle *parent, Ihandle *lastchild); [ir
IupGetNextChild(parent, lastchild: iuplua_tag) -> ret: iuplua_tag
iup.GetNextChild(parent, lastchild: iuplua_tag) -> ret: iuplua_tag
```

**parent**: Identifier of an interface control.

**lastchild**: Identifier of the last interface control returned by the function.

#### Note

This function will return the children of the control in the exact same order in which they were assigned. To get the first child use lastchild=NULL.

### **Example**

```
/* Lists all children of a IupVbox */
#include <stdio.h>
#include "iup.h"

int main()
{
    Ihandle *dialog, *bt, *lb, *vbox, *tmp = NULL;
    IupOpen();
    bt = IupButton("Button", "");
    lb = IupLabel("Label");
    vbox = IupVbox(bt, lb, NULL);
    dialog = IupDialog(vbox);
    IupShow(dialog);
    while(1)
    {
        tmp = IupGetNextChild(vbox, tmp);
    }
}
```

```
if(tmp)
    printf("vbox has a child of type %s\n", IupGetType(tmp));
    else
        break;
}

IupMainLoop();
IupClose();

return 0;
}
```

## See Also

<u>IupGetBrother</u>

## **IupGetBrother**

Returns the brother of a control or NULL if there is none.

#### Parameters/Return

```
Ihandle* IupGetBrother(Ihandle *control); [in C]
IupGetBrother(control: iuplua_tag) -> ret: iuplua_tag [in IupLua3]
iup.GetBrother(control: iuplua_tag) -> ret: iuplua_tag [in IupLua5]
```

**control**: Brother of interface control given.

#### See Also

**IupGetNextChild** 

## **IupGetDialog**

Verifies the identifier of a dialog to which an interface element belongs.

#### Parameters/Return

```
Ihandle* IupGetDialog(Ihandle *elem); [in C]
IupGetDialog(elem: iuplua_tag) -> (handle: iuplua_tag) [in IupLua3iup.GetDialog(elem: iuplua_tag) -> (handle: iuplua_tag) [in IupLua
```

elem: Identifier of an interface element.

This function returns the identifier of the dialog that contains that interface element.

### **Controls**

IUP contains several user interface controls. The library sometimes main characteristic is the use of native elements. This means that the drawing and management of a button or text box is done by the native interface system, not by IUP. This makes the application so appearance more similar to other applications in that system. On the other hand, the application appearance can vary from one system to another.

But this is valid only for the standard controls, many

additional

controls are drawn by IUP. Composition controls are not visible, so they are independent from the native system.

Each control has an unique creation function, and all of its management is done by means of **attributes** and **callbacks**, using functions common to all the controls. This simple but powerfull approach is one of the advantages of using IUP.

### **IupButton**

Creates an interface element that is a button. When selected, this element activates a function in the application. Its visual presentation can contain a text or an image.

#### Creation

```
Ihandle* IupButton(char *title, char *action); [in C]
iupbutton{title = title: string} -> elem: iuplua_tag [in IupLua3]
iup.button{title = title: string} -> elem: iuplua_tag [in IupLua5]
button(title, action) [in LED]
```

**title**: Text to be shown to the user.

**action**: Name of the action generated when the button is selected.

This function returns the identifier of the created button, or NULL (nil in IupLua) if an error occurs.

#### **Attributes**

**BGCOLOR**: Background color of the text.

**FGCOLOR**: Text color.

**FONT**: Character font of the text.

<u>IMAGE</u>: Image of the non-pressed button. The button's title (attribute TITLE) is not shown when this attribute is defined.

**IMPRESS**: Image of the pressed button.

<u>IMINACTIVE</u>: Image of the button when the ACTIVE attribute equals "NO". If it is not defined but IMAGE is defined then for inactive buttons the non transparent colors will be replaced by a darker version of the background color creating the disabled effect.

<u>SIZE</u>: Size of the button. Default: smallest size that allows viewing the text or image.

TITLE: Text of the button.

#### **Notes**

Buttons with images or texts can not change its behavior after mapped. This is a creation attribute. But after creation the image can be changed for another image, and the text for another text.

Text and images are always centered.

Buttons are activated using Enter or Space keys.

When IMPRESS and IMAGE are defined together, IUP does not show the element's border to provide a 3D effect; the user has to define the border in the image itself.

In Windows, when using Windows XP Visual Styles the BGCOLOR and FGCOLOR attributes are ignored when a text button is created, for buttons with an image the XP style is ignored and a traditional border is displayed.

#### **Callbacks**

<u>ACTION</u>: Action generated when the button 1 (usually left) is selected. This callback is called only after the mouse is released and whe it is released inside the button area.

<u>BUTTON</u> <u>CB</u>: Action generated when any mouse button is pressed and released.

### **Examples**

#### See Also

<u>IupImage</u>, <u>IupToggle</u>.

### **IupCanvas**

Creates an interface element that is a canvas - a working area for your application.

#### Creation

```
Ihandle* IupCanvas(char *action); [in C]
iupcanvas{} -> (elem: iuplua_tag) [in IupLua3]
iup.canvas{} -> (elem: iuplua_tag) [in IupLua5]
canvas(action) [in LED]
```

**action**: Name of the action generated when the canvas needs to be redrawn.

This function returns the identifier of the created canvas, or NULL if an error occurs.

#### **Attributes**

BGCOLOR: Background color. In Windows the background is painted only if the ACTION callback is not defined. If the callback is defined the application must draw all the canvas contents. For better results also let the attribute CLIPCHILDREN=YES in the dialog.

**CURSOR**: Canvas cursor.

<u>SIZE</u>: Size of the canvas. Default: size of one character.

<u>SCROLLBAR</u>: Associates a horizontal and/or vertical scrollbar to the canvas.

<u>DX</u>: Size of the thumb in the horizontal scrollbar.

**DY**: Size of the thumb in the vertical scrollbar.

**POSX**: Position of the thumb in the horizontal scrollbar.

<u>POSY</u>: Position of the thumb in the vertical scrollbar.

XMAX: Maximum value of the horizontal scrollbar.

**XMIN**: Minimum value of the horizontal scrollbar.

YMIN: Minimum value of the vertical scrollbar.

YMAX: Maximum value of the vertical scrollbar.

**BORDER**: Shows a border around the canvas. It can only be changed before the element is mapped. This attribute does not work on Motif. Default: "YES".

**EXPAND**: The default value is "YES".

**DRAWSIZE**: The size of the drawing area in pixels. In Motif this is identical to RASTERSIZE. In Windows it is obtained from the canvas client area since it may contains a border.

#### **Callbacks**

<u>ACTION</u>: Action generated when the canvas needs to be redrawn. Also receives as parameters the scrollbar position:

```
int function(Ihandle *self, float x, float y); [in C]
elem:action(x, y: number) -> (ret: number) [in IupLua]
```

**x**: Thumb position in the horizontal scrollbar.

**y**: Thumb position in the vertical scrollbar.

This action is also generated right after the dialog is viewed by means of functions <u>IupShow</u>, <u>IupShowXY</u> or <u>IupPopup</u>.

<u>BUTTON</u> <u>CB</u>: Action generated when any mouse button is pressed or released.

<u>ENTERWINDOW</u> <u>CB</u>: Action generated when the mouse enters the canvas.

<u>LEAVEWINDOW\_CB</u>: Action generated when the mouse leaves the canvas.

MOTION\_CB: Action generated when the mouse is moved.

<u>KEYPRESS\_CB</u>: Action generated when a key is pressed or released.

**RESIZE\_CB**: Action generated when the canvas' size is changed.

<u>SCROLL\_CB</u>: Called when the scrollbar is manipulated.

MAP\_CB: Called right after the element is mapped.

**WOM\_CB**: Action generated when an audio device receives an event.

<u>WHEEL\_CB</u>: Action generated when the mouse wheel is rotated.

#### Note

Note that some keys might remove the focus from the canvas. To avoid this, return IGNORE in the K ANY callback.

The mouse cursor position can be programatically controlled using the global attribute <a href="CURSORPOS">CURSORPOS</a>.

### **Examples**

## **IupFrame**

Creates a Frame interface element, which draws a frame with a title around an interface element.

#### Creation

```
Ihandle* IupFrame(Ihandle *element); [in C]
iupframe{element: iuplua_tag} -> (elem: iuplua_tag) [in IupLua3]
iup.frame{element: iuplua_tag} -> (elem: iuplua_tag) [in IupLua5]
frame(element) [in LED]
```

**element**: Identifier of an interface element which will receive the frame.

This function returns the identifier of the created frame, or NULL if an error occurs.

#### **Attributes**

**FGCOLOR**: Text color.

**SIZE**: Frame size.

<u>TITLE</u>: Text the user will see at the top of the frame.

**MARGIN**: Margin of the visible element. Its value has the format "widthxheight", where width and height are integer values corresponding to the horizontal and vertical margins, respectively. Default: "0x0" (no margin).

#### **Notes**

Though this element has the attribute MARGIN, it does not have the attributes ALIGNMENT and GAP, because it can contain only one element.

The **BGCOLOR** attribute has no effect.

# **Examples**

## **IupLabel**

Creates a label interface element, which displays a text or an image.

#### Creation

```
Ihandle* IupLabel(char *title); [in C]
iuplabel{title = title: string} -> (elem: iuplua_tag) [in IupLua3]
iup.label{title = title: string} -> (elem: iuplua_tag) [in IupLua5
label(title) [in LED]
```

**title**: Text to be shown on the label.

This function returns the identifier of the created label, or NULL (nil in IupLua) if an error occurs.

## **Attributes**

**BGCOLOR**: Background color of the text.

**FGCOLOR**: Text color.

**FONT**: Character font of the text.

<u>IMAGE</u>: Label image. When this attribute is defined, the text is not shown.

**SIZE**: Label size.

TITLE: Label's text.

**ACTIVE**: Activates or deactivates the label. The only difference between an active label and an inactive one is its visual feedback. Possible values:

```
"YES, "NO".
```

Default: "YES".

**ALIGNMENT**: Label's alignment. Possible values: "ALEFT", "ARIGHT", "ACENTER". Default: "ALEFT".

**SEPARATOR**: Turns the label into a line separator. The EXPAND attribute is updated accordingly. Possible values: "HORIZONTAL", "VERTICAL".

### **Notes**

Labels with images, texts or line separator can not change its behavior after mapped. This is a creation attribute. But after creation the image can be changed for another image, and the text for another text.

Though this element can have the IMAGE attribute, it does not have attributes IMINACTIVE and IMPRESS, because it does not interact with the user through the mouse or keyboard.

The '\n' character is accepted for line change, but the initial size of the element is computed for one line only. In this case, the EXPAND attribute must be "YES" so that the text can be properly visualized.

## **Examples**

## See Also

<u>IupImage</u>, <u>IupButton</u>.

## **IupList**

Creates a list interface element, which is a list of two-state (on or off) items. An action is generated when an event changes the state of an item.

### Creation

```
Ihandle* IupList(char *action); [in C]
iuplist{} -> (elem: iuplua_tag) [in IupLua3]
iup.list{} -> (elem: iuplua_tag) [in IupLua5]
list(action) [in LED]
```

**action**: String with the name of the action generated when the state of an item is changed.

This function returns the identifier of the created list, or NULL (nil in IupLua) if an error occurs.

## **Attributes**

```
"1": First item in the list.
"2": Second item in the list.
"3": Third item in the list.
...
"n": n<sup>th</sup> item in the list.
```

The values can be any text. Default: NULL. The first element with a NULL is considered the end of the list. The string containing the item's number does not need to be static, because IUP duplicates it internally, but the contents of each element in the list needs to be either static or stored in IUP by means of the <a href="IupStoreAttribute">IupStoreAttribute</a> function.

<u>DROPDOWN</u>: Changes the appearance of the list for the user: only the selected item is shown beside a button with the image of an arrow pointing down. Creation-only attribute. Can be "YES" or "NO". Default "NO".

**EDITBOX**: Adds an edit box to the list. Creation-only attribute. Can be "YES" or "NO". Default "NO".

**VISIBLE\_ITEMS**: Number of items that appear when a DROPDOWN list is activated. Default: Depends on the native system.

**MULTIPLE**: Allows selecting several items simultaneously (multiple list). Default: "NO".

SIZE: Size of the list. Default: smallest size that allows viewing the list.

**VALUE**: Depends on the list type:

**List with edit box:** Text entered by the user.

**Simple list:** Integer number representing the selected element in the

list (begins at 1). It can be zero if there is no selected item.

**Multiple list:** Sequence of '+' and '-' symbols indicating the state of each item. When setting this value, the user must provide the same amount of '+' and '-' symbols as the amount of items in the list, otherwise the specified items will be deselected.

<u>APPEND</u>: Inserts a text at the end of the current text. Valid only when EDITBOX=YES.

<u>INSERT</u>: Inserts a text in the caret's position. Valid only when EDITBOX=YES.

NC: Maximum number of characters allowed. Valid only when EDITBOX=YES.

**CARET**: Position of the insertion point. Valid only when EDITBOX=YES.

<u>READONLY</u>: Allows the user only to read the contents, without changing it. Possible values: YES, NO (default). Valid only when EDITBOX=YES.

<u>SELECTION</u>: Selection interval. Valid only when EDITBOX=YES.

**SELECTEDTEXT**: Selection text. Valid only when EDITBOX=YES.

SHOWDROPDOWN: Opens a dropdown list. Windows Only.

## **Callbacks**

<u>ACTION</u>: Action generated when the state of an item in the list is changed. Also provides information on the changed item:

```
int function (Ihandle *self, char *t, int i, int v); [in C]
elem:action(t: string, i, v: string) -> (ret: number) [in
IupLua]
```

- **t**: Text of the changed item.
- **i**: Number of the changed item.
- **v**: Equal to 1 if the option was selected or to 0 if the option was deselected.

**EDIT\_CB**: Action generated when the text in the text box is manually changed by the user. Valid only when EDITBOX=YES.

```
int function(Ihandle *self, int c, char *after); [in C]
elem:action(c: number, after: string) -> (ret: number) [in IupLu
```

**text**: Represents the new text value. This is the same callback definition as for the <a href="IupText">IupText</a>.

**CARET\_CB**: Action generated when the caret/cursor position is changed. Valid only when EDITBOX=YES.

```
int function(Ihandle *self, int row, int col); [in C]
elem:caretcb(row, col: number) -> (ret: number) [in IupLua3]
elem:caret_cb(row, col: number) -> (ret: number) [in IupLua5]
```

row, col: Row and collumn number.

#### **Notes**

Text is always left aligned.

## **Examples**





## See Also

<u>IupListDialog</u>, <u>Iuptext</u>

## **IupMultiLine**

Creates an editable field with one or more lines.

#### Creation

```
Ihandle* IupMultiLine(char *action); [in C]
iupmultiline{} -> (elem: iuplua_tag) [in IupLua3]
iup.multiline{} -> (elem: iuplua_tag) [in IupLua5]
multiline(action) [in LED]
```

**action**: name of the action generated when the user types something.

This function returns the identifier of the created multiline, or NULL if an error occurs.

## **Attributes**

**APPEND**: Inserts a text at the end of the multiline.

<u>INSERT</u>: Inserts a text in the caret's position.

BORDER: Shows a frame around the multiline. Default: "YES".

<u>CARET</u>: Position of the insertion point in the multiline.

<u>READONLY</u>: Allows the user only to read the contents, without changing it. Possible values: "YES", "NO" (default).

**SELECTION**: Selection interval.

**SELECTEDTEXT**: Selection's text.

NC: Maximum number of characters.

SIZE: Multiline size. Default: 5 characters width and 1 character height.

**VALUE**: Text typed by the user. The '\n' character indicates line change.

Default: NULL.

## **TABSIZE** (Windows Only)

Controls the number of characters for a tab stop.

#### **Callbacks**

<u>ACTION</u>: Action generated when a keyboard event occurs. The callback also receives the typed key.

```
int function(Ihandle *self, int c, char* after); [in C]
elem:action(c: number, after: string) -> (ret: number) [in IupLu
```

**c**: Identifier of the typed key. Please refer to the <u>Keyboard Codes</u> table for a list of possible values.

**after**: Represents the new text value if the key is validated (i.e. the callback returns IUP\_DEFAULT).

If the function returns IUP\_IGNORE, the system will ignore the typed character. If the function returns the code of any other key, IUP will treat this new key instead of the one typed by the user.

**CARET\_CB**: Action generated when the caret/cursor position is changed.

```
int function(Ihandle *self, int row, int col); [in C]
elem:caretcb(row, col: number) -> (ret: number) [in IupLua3]
elem:caret_cb(row, col: number) -> (ret: number) [in IupLua5]
```

row, col: Row and collumn number.

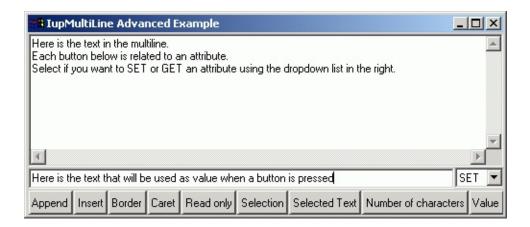
#### **Notes**

Text is always left aligned.

The multiline has a limitation of about 64,000 characters.

Since all the keys are processed to change focus to the next element press <Ctrl>+<Tab>. The "DEFAULTENTER" button will not be processed, but the "DEFAULTESC" will.

# **Examples**



## **IupText**

Creates an editable field with one line.

#### Creation

```
Ihandle* IupText(char *action); [in C]
iuptext{} -> (elem: iuplua_tag) [in IupLua3]
iup.text{} -> (elem: iuplua_tag) [in IupLua5]
text(action) [in LED]
```

**action**: name of the action generated when the user types something.

This function returns the identifier of the created text, or NULL if an error occurs.

### **Attributes**

**APPEND**: Inserts a text at the end of the current text.

<u>INSERT</u>: Inserts a text in the caret's position.

**BORDER**: Shows a border around the text. Default: "YES".

NC: Maximum number of characters allowed.

<u>CARET</u>: Position of the insertion point.

**READONLY**: Allows the user only to read the contents, without changing it. Possible values: "YES", "NO" (default).

**SELECTION**: Selection interval.

**SELECTEDTEXT**: Selection text.

SIZE: Text size. Default: 5 characters width and 1 character height.

PASSWORD: (Windows Only) Hide the typed character using an "\*".

**VALUE:** Text entered by the user. If the element is already mapped, the string is directly copied to the native control (see <a href="LupMap">LupMap</a>).

The value can be any text, including '\n' characters indicating line change. Default: NULL when the element is not yet mapped; "" if it is.

### **Callbacks**

<u>ACTION</u>: Action generated when a keyboard event occurs. The callback also receives the typed key.

```
int function(Ihandle *self, int c, char *after); [in C]
elem:action(c: number, after: string) -> (ret: number) [in IupLu
```

**c**: Identifier of the typed key. Please refer to the <u>Keyboard Codes</u> table for a list of possible values.

**after**: Represents the new text value in case the key is validated (i.e. the callback returns IUP\_DEFAULT).

If the function returns IUP\_IGNORE, the system will ignore the typed character. If the function returns the code of any other key, IUP will treat this new key instead of the one typed by the user.

**CARET\_CB**: Action generated when the caret/cursor position is changed.

```
int function(Ihandle *self, int row, int col); [in C]
elem:caretcb(row, col: number) -> (ret: number) [in IupLua3]
elem:caret_cb(row, col: number) -> (ret: number) [in IupLua5]
```

row, col: Row and collumn number.

#### **Notes**

Text is always left aligned.

On the Windows driver, the action callback is not called for the function keys (K\_F???).

The <u>IupMask</u> control can be used to create a mask and filter the text entered by the user.

# **Examples**

# See Also

<u>IupMultiLine</u>

# **IupToggle**

Creates the toggle interface element. It is a two-state (on/off) button that, when selected, generates an action that activates a function in the associated application. Its visual representation can contain a text or an image.

### Creation

```
Ihandle* IupToggle(char *title, char *action); [in C]
iuptoggle{title = title: string} -> (elem: iuplua_tag) [in IupLua3
iup.toggle{title = title: string} -> (elem: iuplua_tag) [in IupLua5
toggle(title, action) [in LED]
```

**title**: Text to be shown on the toggle.

**action**: name of the action generated when the toggle is selected.

This function returns the identifier of the created toggle, or NULL if an error occurs.

## **Attributes**

**BGCOLOR**: Background color of the text shown on the toggle.

**FGCOLOR**: Color of the text shown on the toggle.

**FONT**: Character font of the text shown on the toggle.

<u>IMAGE</u>: Toggle image. When the IMAGE attribute is defined, the TITLE is not shown. This makes the toggle look just like a button with an image, but its behavior remains the same.

<u>IMPRESS</u>: Image of the pressed toggle.

**IMINACTIVE**: Image of the inactive toggle. If it is not defined but IMAGE is defined then for inactive toggles the non transparent colors will be replaced by a darker version of the background color creating the disabled effect.

**VALUE**: Toggle's state. Values can be "ON" or "OFF". Default: "OFF".

**SIZE**: Toggle size.

**TITLE**: Toggle's text.

**SELECTCOLOR:** (Motif Only) Color of a selected toggle.

### **Callbacks**

<u>ACTION</u>: Action generated when the toggle's state (on/off) changes. The callback also receives the toggle's state.

```
int funcion(Ihandle *self, int v); [in C]
elem:action(v: number) -> (ret: number) [in IupLua]
```

**v**: 1 if the toggle's state was shifted to on; 0 if it was shifted to off.

#### **Notes**

Toggles with images or texts can not change its behavior after mapped. This is a creation attribute. But after creation the image can be changed for another image, and the text for another text.

Text is left aligned and image is centered.

Toggles are activated using the Space key.

To build a set of mutual exclusive toggles, insert them in a IupRadio container.

In Windows, the BGCOLOR attribute is ignored when an IMAGE is specified.

In Windows, for toggles inside a radio the ACTION callback may also be called when a not selected toggle receive the focus.

## **Examples**

#### See Also

<u>IupImage</u>, <u>IupButton</u>, <u>IupLabel</u>, <u>IupRadio</u>.

# **Additional Controls**

## **Controls Library**

Most of the addicional controls are included in only one library. Some of these controls are drawn by IUP and are not native controls.

The **iupcontrols.h** file must be included in the source code. If you plan to use the control in Lua, you should also include **luacontrols.h**.

The **IupControlsOpen** function must be called after **IupOpen**. To make the controls available in Lua, use the initialization function in C, **controlslua\_open**, after calling **iuplua\_open**.

Your application must be linked to the CPI control library (iupcontrols.lib on Windows and libiupcontrols.a on Unix), and with the CD library. To use its bindings to Lua, the program must also be linked to the luacontrol's libraries (luacontrols.lib on Windows and libluacontrols.a on Unix).

When closing the application, the user must call the function **IupControlsClose()** to free the resources used.

# **OpenGL Canvas**

The drawing canvas compatible with OpenGL is called <u>IupGLCanvas</u>.

# **Speech Control**

Creates a speech engine that allows speech recognition and speech. Uses Microsoft Speech SDK 5.1. See <a href="LupSpeech"><u>IupSpeech</u></a>.

## **IupColorBrowser**

Creates an element for selecting colors from the HLS (Hue Saturation Brightness) model, which allows the user to interactively choose a color. For a dialog that simply returns the selected color, you can use function <a href="https://linear.com/lupGetColor">lupGetColor</a>.

## Creation

```
Ihandle* IupColorBrowser(void); [in C]
iupcb{} (elem: iuplua_tag) [in IupLua3]
iup.colorbrowser{} (elem: iuplua_tag) [in IupLua5]
colorbrowser() [in LED]
```

The function returns the identifier of the created colorbrowser, or NULL if an e

#### **Attributes**

**RGB**: Contains the color selected in the control, in the rrr ggg bbb format; r, g and b are integers ranging from 0 to 255. This value can both be consulted and modified.

## **Callbacks**

**DRAG\_CB**: Called several times while the color is being changed by dragging the mouse over the control.

```
int drag(Ihandle *self, unsigned char r, unsigned char g, unsigned elem:drag(r: number, g: number, b: number) -> (ret: number) [in elem:drag_cb(r: number, g: number, b: number) -> (ret: number) [
```

**CHANGE\_CB**: Called when the user releases the left mouse button over the control, defining the selected color.

```
int change(Ihandle *self, unsigned char r, unsigned char g, unsi
elem:change(r: number, g: number, b: number) -> (ret: number) [i
elem:change_cb(r: number, g: number, b: number) -> (ret: number)
```

## **Examples**

## **IupDial**

Creates a dial for regulating a given angular variable. It inherits from <u>IupCanvas</u>.

### Creation

```
Ihandle* IupDial(char *type); [in C]
iupdial{type: string} -> (elem: iuplua_tag) [in IupLua3]
iup.dial{type: string} -> (elem: iuplua_tag) [in IupLua5]
dial(type) [in LED]
```

tipo: dial type. Can be "HORIZONTAL", "VERTICAL" or "CIRCULAR".

The function returns the identifier of the created dial, or NULL if an error occurs.

### **Attributes**

**FGCOLOR**: Controls the foreground color. The default value is "64 64". The foreground color is not used for the circular dial.

**BGCOLOR**: Controls the background color. The default value is the parent or the dialog background color.

**DENSITY**: Contains average value of the number of lines per pixel in the dial. The purpose of this attribute is to maintain the control's appearance when its size changes. Default is "0.2".

**UNIT**: Contains the unit of the angle. Can be "DEGREES" or "RADIANS". Default is "RADIANS".

**VALUE:** Contains the dial value in a given moment. The value is an angle starting at zero when the interaction started.

**TYPE:** Informs whether the dial is "VERTICAL", "HORIZONTAL" or "CIRCULAR".

**EXPAND**: The default is "NO".

**SIZE**: the default is "16x80", "80x16" or "40x35" according to the dial type.

#### **Callbacks**

**MOUSEMOVE\_CB**: Called each time the user moves the dial with the mouse button pressed. The angle the dial rotated since it was initialized is passed as a parameter.

```
int function(Ihandle *self, double angle); [in C]
elem:mousemove(angle: number) -> (ret: number) [in IupLua3]
elem:mousemove_cb(angle: number) -> (ret: number) [in IupLua5]
```

**BUTTON\_PRESS\_CB**: Called when the user presses the left mouse button over the dial. The angle here is always zero, except for the circular dial.

```
int function(Ihandle *self, double angle)
elem:buttonpress(angle: number) -> (ret: number) [in IupLua3]
elem:button_press_cb(angle: number) -> (ret: number) [in IupLua5]
```

**BUTTON\_RELEASE\_CB**: Called when the user releases the left mouse button after pressing it over the dial.

```
int function(Ihandle *self, double angle)
elem:buttonrelease(angle: number) -> (ret: number) [in IupLua3]
elem:button_release_cb(angle: number) -> (ret: number) [in IupLu
```

## **Notes**

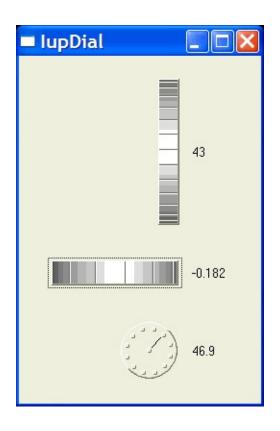
When the keyboard arrows are pressed and released the mouse press and the mouse release callbacks are called in this order. If you hold the key down a mouse move callback is also called.

When the wheel is rotated only the mouse move callback is called, and it increments the last angle the dial was rotated.

In these cases the value is incremented by PI/10 (18 degrees).

## **Examples**

Creates several Dials and shows each dial's value in a Label.



# See Also

<u>IupCanvas</u>

## **IupGauge**

Creates a Gauge control. Shows a percent value that can be updated to simulate a progression. It inherits from <u>IupCanvas</u>.

### Creation

```
Ihandle* IupGauge(void); [in C]
iupgauge{} -> (elem: iuplua_tag) [in IupLua3]
iup.gauge{} -> (elem: iuplua_tag) [in IupLua5]
gauge() [in LED]
```

The function returns the identifier of the created Gauge, or NULL if an error occurs.

## **Attributes**

**MIN**: Contains the minimum valuator value. Default is "0".

**MAX**: Contains the maximum valuator value. Default is "1".

**VALUE:** Contains a number between "MIN" and "MAX", indicating the gauge position.

**DASHED**: Changes the style of the gauge for a dashed pattern. Default is "NO".

**MARGIN**: Changes the distance from the Gauge's border to its inside. It is only one number that works in both directions (x and y). Default: 1. Ex.: IupSetAttribute(mygauge, "MARGIN", "5");

**TEXT**: Contains a text to be shown inside the Gauge. If it is NULL, the percentage value given by VALUE will be shown. If the gauge is dashed the text is never shown.

**SHOW\_TEXT**: Indicates if the text inside the Gauge is to be shown or not. Possible values:

```
"YES" or "NO". Default: "YES".
```

**FGCOLOR**: Controls the gauge and text color. The default is "64 96 192".

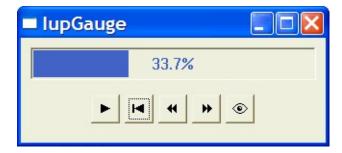
**FONT**: Character font of the text.

**SIZE**: The default is "170x17".

**EXPAND**: The default is "NO".

## **Examples**

Creates a Gauge with a control bar.



## See Also

**IupCanvas** 

## **IupSbox**

Creates a split panel control. Allows the provided control to be enclosed in a box that allows resizing.

### Creation

```
Ihandle* IupSbox(Ihandle* elem); [in C]
iupsbox{elem: iuplua_tag} -> (elem: iuplua_tag) [in IupLua3]
iup.sbox{elem: iuplua_tag} -> (elem: iuplua_tag) [in IupLua5]
sbox(elem) [in LED]
```

**elem:** This function receives as parameter the element that will be enclosed in a Sbox.

This function returns the created Sbox's identifier, or NULL if an error occurs.

## **Attributes**

**DIRECTION**: Indicates the direction of the resize. Possible values are:

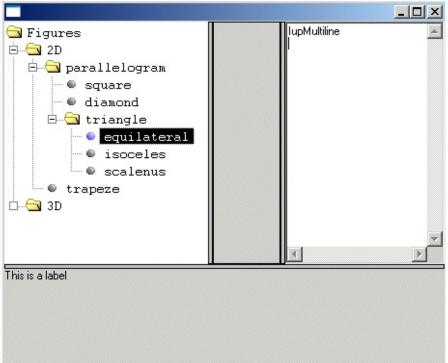
```
"NORTH", "SOUTH", "EAST", "WEST".
```

**COLOR**: Changes the color of the Sbox's thumb. The value should be given in "R G B" color style.

#### **Notes**

The controls that you want to be resized must have the EXPAND=YES attribute set.

## **Examples**



Example 2 image

## **IupSpin and IupSpinBox**

This functions will create a control set with a vertical box containing two buttons, one with an up arrow and the other with a down arrow, to be used to increment and decrement values.

### Creation

```
Ihandle* IupSpin(void); [in C]
iupspin{} -> (elem: iuplua_tag) [in IupLua3]
iup.spin{} -> (elem: iuplua_tag) [in IupLua5]
```

This function returns the identifier of the created box. It is just a IupVbox with two IupButton.

```
Ihandle* IupSpinbox(Ihandle* ctrl); [in C]
iupspinbox{ctrl: iuplua_tag} -> (elem: iuplua_tag) [in IupLua3]
iup.spinbox{ctrl: iuplua_tag} -> (elem: iuplua_tag) [in IupLua5]
```

This function returns the identifier of the created box. This will create a IupHbox with the additional control and a IupSpin set.

## **Callbacks**

**SPIN\_CB**: Called each time the user clicks in the buttons. It will increment 1 and decrement -1 by default. Holding Shit will set a factor of 2, holding Ctrl a factor of 10, and both a factor of 100.

```
int function(Ihandle *self, int inc); [in C]
elem:spincb(inc: number) -> (ret: number) [in IupLua3]
elem:spin_cb(inc: number) -> (ret: number) [in IupLua5]
```

## See Also

**IupGetParam** 

## **IupTabs**

Creates a Tabs element. Allows a single dialog to have several screens, grouping options. The grouping is done in a single line of tabs arranged according to the tab type. It inherits from <a href="LupCanvas"><u>IupCanvas</u></a>. It contains a <a href="LupZbox"><u>IupZbox</u></a> to control the groups of controls.

## Creation

```
Ihandle* IupTabs(Ihandle* elem1, Ihandle* elem2, ...); [in C]
Ihandle* IupTabsv(Ihandle** elems); [in C]
iuptabs{elem1, elem2, ...: iuplua_tag} -> (elem: iuplua_tag) [in I
iup.tabs{elem1, elem2, ...: iuplua_tag} -> (elem: iuplua_tag) [in tabs(elem1, elem2, ...) [in LED]
```

**elem1**, **elem2**, ...: List of the elements that will be placed into Tabs.

This function returns the created Tabs's identifier, or NULL if an error occurs. The second form in C must end the array with a NULL.

## **Attributes**

**ALIGNMENT**: Changes the respective attribute in the internal zbox.

**TABTITLE**: Contains the text to be shown in the tab's title. If this value is NULL, it will remain empty. This attribute is used only in the elements contained in the tab.

**TABTYPE**: Indicates the type of tab, which can be one of the following:

```
"TOP", "BOTTOM", "LEFT" or "RIGHT". Default is "TOP".
```

**FONT**: Indicates the font to be used in the internal tab text. <u>Font Table</u>

**FONT\_ACTIVE**: Indicates the font to be used when the tab is selected. Font Table

**FONT\_INACTIVE**: Indicates the font to be used when the tab is inactive. Font Table

**TABSIZE**: Contains the size of a tab. If this value is NULL, the tab will be shown with the smallest possible value that fits its title. This size can refer to the whole IupTabs, thus affecting all tabs, or to a specific tab. If both are defined, the size of a specific tab will have priority over the global IupTabs size.

**VALUE**: Changes the active tab. The value passed must be the name of one of the elements contained in the tabs. Default: the first element. To set the name of an element, use the <a href="IupSetHandle">IupSetHandle</a> function. In Lua you can also use the element reference directly.

**ACTIVE**: Allows or inhibits user interaction with a given tab. When the attribute is "NO", the corresponding tab modifies the text color to show that interaction is inhibited. Be careful, because a "REPAINT" may be needed to generate a Tabs repaint.

**REPAINT**: This attribute immediately generates a Tabs repaint.

## **Callbacks**

**TABCHANGE\_CB**: Callback called when the **user** shifts the active tab. The parameters passed are:

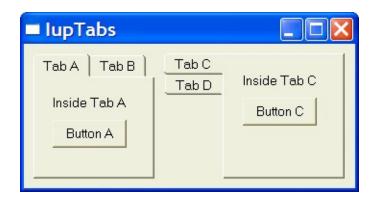
```
int function(Ihandle* self, Ihandle* new_tab, Ihandle* old_tab);
elem:tabchange(new_tab, old_tab: iuplua_tag) -> (ret: number) [i
elem:tabchange_cb(new_tab, old_tab: iuplua_tag) -> (ret: number)
self: Ihandle* of the control
new_tab: Ihandle* of the tab selected by the user
old_tab: Ihandle* of the previously selected tab
```

### Note

The Tabs elements, differently from a ZBOX, **does not** need to have associated *names*. Those without a name will receive an automatically generated one.

When you change the active tab the focus is not changed. If you want to control the focus behavior call IupSetFocus in the TABCHANGE\_CB callback.

# **Examples**



## See Also

<u>IupCanvas</u>

## **IupVal**

Creates the Valuator control. It allows creating a regulator similar to IupDial, but with well-defined limits. It inherits from <u>IupCanvas</u>.

### Creation

```
Ihandle* IupVal(char *type); [in C]
iupval{type: string} -> (elem: iuplua_tag) [in IupLua3]
iup.val{type: string} -> (elem: iuplua_tag) [in IupLua5]
val(type) [in LED]
```

**type**: Type of valuator. Can be "VERTICAL" or "HORIZONTAL".

The function returns the identifier of the created val, or NULL if an error occurs.

#### **Attributes**

**TYPE**: Informs whether the valuator is "VERTICAL" or "HORIZONTAL". Vertical valuators are bottom to up, and horizontal valuators are left to right variations of min to max.

**MIN**: Contains the minimum valuator value. Default is "0".

MAX: Contains the maximum valuator value. Default is "1".

**VALUE**: Contains a number between MIN and MAX, indicating the valuator position.

**STEP**: Controls the increment for keyboard control and the mouse wheel.

**PAGESTEP**: Controls the increment for pagedown and pageup keys.

**SHOWTICKS**: Display tick mark along the valuator trail. The attribute controls the number of ticks. Minimum value is "3". Default is "0", in this case the ticks are not shown. The precision of the ticks are affected by the raster size of the control.

**BGCOLOR**: Controls the background color. The default value is the parent or the dialog background color.

RASTERSIZE: The default is "124x28" or "28x124". We recomend to leave this as the minimum size.

**EXPAND**: The default is "NO". The thumb will not expand if the valuator is expanded.

### **Callbacks**

**MOUSEMOVE\_CB**: Called each time the user moves the valuator's thumb keeping the mouse button pressed. The value of VALUE is passed as parameter.

```
int function(Ihandle *self, double val); [in C]
elem:mousemove(val: number) -> (ret: number) [in IupLua3]
elem:mousemove_cb(val: number) -> (ret: number) [in IupLua5]
```

**BUTTON\_PRESS\_CB**: Called when the user presses the left mouse button over the valuator. The value of VALUE is passed as parameter. The thumb is always repositioned to the current mouse position.

```
int function(Ihandle *self, double val); [in C]
elem:buttonpress(val: number) -> (ret: number) [in IupLua3]
elem:button_press_cb(val: number) -> (ret: number) [in IupLua5]
```

**BUTTON\_RELEASE\_CB**: Called when the user releases the mouse button, after having pressed it over the valuator. The value of VALUE is passed as parameter.

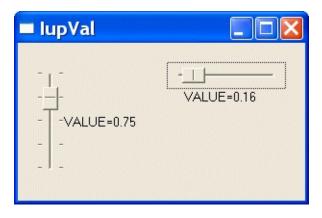
```
int function(Ihandle *self, double val); [in C]
elem:buttonrelease(val: number) -> (ret: number) [in IupLua3]
elem:button_release_cb(val: number) -> (ret: number) [in IupLua5]
```

#### **Notes**

When the keyboard arrows are pressed and released, or the mouse wheel is rotated, the mouse press and the mouse release callbacks are called, in this order. If you hold the key down a mouse move callback is also called.

In these cases the value is incremented by 10% of the interval max-min.

# **Examples**



## See Also

<u>IupCanvas</u>

## **IupMatrix**

Creates a matrix of alphanumeric fields. Therefore, all values of the matrix's fields are strings. The matrix is not a grid container like many systems have. It inherits from <u>IupCanvas</u>.

It has two modes of operation: normal and callback mode. In normal mode string values are stored in attributes for each cell. In callback mode these attributes are ignored and the cells are filled with strings returned by the "VALUE\_CB" callback. So the existence of this callback defines the mode the matrix will operate.

#### Creation

```
Ihandle* IupMatrix(char *action); [in C]
iupmatrix{} -> (elem: iuplua_tag) [in IupLua3]
iup.matrix{} -> (elem: iuplua_tag) [in IupLua5]
matrix(action) [in LED]
```

**action**: Name of the action generated when the user types something.

Returns the identifier of the created matrix, or NULL if an error occurs.

## **Attributes**

#### **Cell Attributes**

L:C
ALIGNMENTn
BGCOLOR
FGCOLOR
FONT
FOCUS\_CELL
VALUE

#### **Line and Column Attributes**

**NUMCOL** 

NUMCOL\_VISIBLE

**NUMLIN** 

NUMLIN\_VISIBLE

**ORIGIN** 

**WIDTHDEF** 

**WIDTHn** 

**HEIGHTn** 

**RESIZEMATRIX** 

### **Mark Attributes**

**AREA** 

MARK MODE

**MARKED** 

**MULTIPLE** 

### **Action Attributes**

**ADDCOL** 

**ADDLIN** 

**DELCOL** 

**DELLIN** 

**EDIT MODE** 

**REDRAW** 

### **General Attributes**

**CURSOR** 

**FRAMECOLOR** 

**SCROLLBAR** 

**SIZE** 

**CARET** 

**SELECTION HIDEFOCUS** 

## **Callbacks**

**ACTION** - Action generated when a keyboard event occurs.

<u>BGCOLOR\_CB</u> - Action generated to retrieve the background color of a cell when it needs to be redrawn.

<u>CLICK\_CB</u> - Action generated when any mouse button is pressed over a cell.

<u>DRAW\_CB</u> - Action generated before the cell is drawn. Allow a custom cell draw.

<u>DROP\_CB</u> - Action generated to determine if a text field or a dropdown will be shown.

<u>DROPCHECK\_CB</u> - Action generated to determine if a dropdown feedback should be shown.

<u>DROPSELECT\_CB</u> - Action generated when an element in the dropdown list is selected.

<u>EDITION CB</u> - Action generated when the current cell enters or leaves the edition mode.

<u>ENTERITEM\_CB</u> - Action generated when a matrix cell is selected, becoming the current cell.

<u>FGCOLOR\_CB</u> - Action generated to retrieve the foreground color of a cell when it needs to be redrawn.

<u>LEAVEITEM CB</u> - Action generated when a cell is no longer the current cell.

MOUSEMOVE\_CB - Action generated to notify the application that the mouse has moved over the matrix.

<u>SCROLL\_CB</u> - Action generated when the matrix' visualization surface is changed.

<u>VALUE CB</u> - Action generated to verify the value of a cell in the matrix when it needs to be redrawn.

<u>VALUE\_EDIT\_CB</u> - Action generated to notify the application that the value of a cell was changed.

## Additional Functions in IupLua

```
elem:setcell(lin, col: number, value: string)

Modifies the text of a cell.
elem:getcell(lin, col: number) -> (cell: string)

Returns the text of a cell.
```

#### **Notes**

The <u>IupMask</u> control can be used to create a mask and filter the text entered by the user in each cell.

In Motif, when start editing a cell using a double click, the user must click again to the edit control get the focus.

#### **Titles**

A matrix might have titles for lines and columns. This must be defined before the matrix is mapped, and cannot be changed afterwards. A matrix will have line titles if, before it is mapped, an attribute of the "L:0" type is defined. It will have column titles if, before being mapped, an attribute of the "0:C" type is defined. The size of a line title is given by attribute "WIDTH0", if it is defined. Otherwise, it is given by the size of the largest title defined when the matrix is mapped.

Titles (for lines or columns) can be generated with more that one text line. For such, the title value must contain a "\n". The matrix does not by itself change the line's height to fit titles with multiple lines. The user must change the line's size manually, by using attribute HEIGHTn. In IUP's size definition, a line with height 8 will fit one text line, a line with height 16 will fit two text lines, and so on.

#### Callback Mode

Very large matrices must use the callback mode to set the values, and not the regular value attributes of the cells. The idea is the following:

- 1 Register the VALUE\_CB callback
- 2 No longer set the value of the cells. They will be set one by one by the callback. Note that the values of the cells must now be stored by the user.
- 3 If the matrix is editable, set the VALUE\_EDIT\_CB callback.
- 4 When the matrix must be invalidated, use the REDRAW attribute to force a matrix redraw.

A negative aspect is that, when VALUE\_CB is defined, the matrix never verifies attributes of type "%d:%d". Therefore, it also does not verify line and column titles (which must be given by the callback). The result is that, at the moment the matrix is created, it resorts solely to the existence of attributes WIDTHO and HEIGHTO to find out if it will have line or column titles. That is, for such matrices to have titles, the WIDTHO and HEIGHTO attributes must be defined. This problem is not serious, because with IUP's definition of SIZE, HEIGHTO=8 will always produce a column title in the size desired.

Another important reminder: if VALUE\_CB is defined and VALUE\_EDIT\_CB is not, it is absolutely necessary that the application does not allow the user to edit any cell. This must be done by returning IUP\_IGNORE in the IUP\_EDITION\_CB callback. (In the future, this will be done inside the matrix.)

## **Utility Functions**

These functions can be used to help set and get attributes from the matrix:

```
void IupMatSetAttribute (Ihandle *n, char* a, int 1, int c, cha
void IupMatStoreAttribute(Ihandle *n, char* a, int 1, int c, char* IupMatGetAttribute (Ihandle *n, char* a, int 1, int c);
int IupMatGetInt (Ihandle *n, char* a, int 1, int c);
float IupMatGetFloat (Ihandle *n, char* a, int 1, int c);
void IupMatSetfAttribute (Ihandle *n, char* a, int 1, int c, char* a)
```

They work just like the respective tradicional set and get functions. But the attribute string is complemented with the L and C values. For ex:

```
IupMatSetAttribute (n, "" , 30, 10, v) = IupSetAttribute(n, "30: IupMatSetAttribute (n, "BGCOLOR" , 30, 10, v) = IupSetAttribute(IupMatSetAttribute (n, "ALIGNMENT" , 10, 0, v) = IupSetAttribute
```

(\*) noticed that in this case the second value will be ignored.

# Navigation

Navigating through the matrix cells outside the edition mode is done by using the following keys:

- **Arrows**: Shift from the current cell to the next one, according to the arrow's direction.
- **Page Up** and **Page Down**: Scroll a spreadsheet up or down one page.
- **Home**: Shifts from the current cell to the fist column in the line.
- **Home Home:** Shifts from the current cell to the upper left corner of the visible page.
- **Home Home:** Shifts form the current cell to the upper left corner of the first page of the matrix.
- **End**: Shifts from the current cell to the last column in the line.
- **End End:** Shifts from the current cell to the lower right corner of the visible page.
- **End End End:** Shifts from the current cell to the lower right corner of the last page in the matrix.
- **Del**: Deletes the contents of all selected cells.

Inside the edition mode, the following keys are used for a text field:

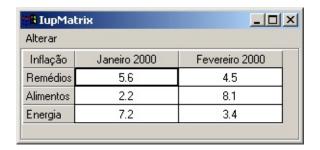
- **Up and down arrows**: Shift the current key, leaving the edition mode.
- **Left and right arrows**: If they are on the extremes of the text being edited, they shift the current key, leaving the edition mode.
- **Ctrl** + **Arrows**: Shift the current cell, leaving the edition mode.

When the matrix is outside the edition mode, pressing any character key makes the current key to enter in the edition mode, the old text is replaced by the new one being typed. If **Enter** or **Space** is pressed, the current cell enters the edition mode. If **Del** is pressed, the whole contents of the cell will be deleted. Double-clicking a cell also enters the edition mode.

When the matrix is in the edition mode, to confirm the entered value, press **Enter**. By pressing **Esc**, the previous value is restored. If the cell leaves the edition mode for any other reason (for instance, the user shifted the current cell, or the user clicked in another control), the value will be confirmed. After pressing **Enter** to confirm the value the focus goes to the cell bellow the current cell, if at the last line then the focus goes to the cell on the left.

## **Examples**

Creates a simple matrix with the values and layout shown in the image below. There is also a menu that allows making some changes to the matrix.



# See Also

<u>IupCanvas</u>

# **IupMatrix Attributes**

### **Cell Attributes**

**L:C**: Text of the cell located in line L and column C, where L and C are integer numbers. These are valid only in normal mode.

**L:0**: Title of line L.

**0:C**: Title of column C.

**0:0**: Title of the area between the line and column titles.

**ALIGNMENTn**: Alignment of the cells in column n, where n must be replaced by the wished column number ( $n \ge 0$ ). Possible values:

"ALEFT", "ACENTER" or "ARIGHT". Default: "ALEFT".

**BGCOLOR**: Background color of the matrix.

**BGCOLORL:**C: Background color of the cell in line L and column C.

**BGCOLORL:\***: Background color of the cells in line L. **BGCOLOR\*:C**: Background color of the cells in column C.

When more than one of the four types of attributes that define the background color are defined, or if two of them are in conflict, the color of a cell will be selected following this priority: BGCOLORL:C, BGCOLORL:\*, BGCOLOR\*:C, and last BGCOLOR. (L or C >= 0, but only the second forms is valid for titles.)

**FGCOLOR**: Text color.

**FGCOLORL:C**: Text color of the cell in line L and column C.

**FGCOLORL:\***: Text color of the cells in line L. **FGCOLOR\*:C**: Text color of the cells in column C.

When more than one of the four types of attributes that define the text color are defined, or if two of them are in conflict, the text color of a cell will be selected following this priority: FGCOLORL:C, FGCOLORL:\*, FGCOLOR\*:C, and last FGCOLOR. (L or C >= 0, but only the second forms is valid for titles.)

**FONT**: Character font of the text. This attribute must be set before the

control is showed. It affects the calculation of the size of all the matrix cells.

**FONTL:C**: Text font of the cell in line L and column C.

**FONT:\***: Text font of the cells in line L.

**FONT\*:C**: Text font of the cells in column C.

The cell size is always calculated from the base FONT attribute.

**FOCUS\_CELL**: Defines the currently focused cell.

Two numbers in the "L:C" format, (L and C>=1). Default: "1:1".

**VALUE**: Allows setting or verifying the value of the current cell. Is the same as using the "L:C" attribute, L and C corresponding to the current cell's line and column. (L and C>=0)

#### **Line and Column Attributes**

**NUMCOL**: Defines the number of columns in the matrix.

Must be an integer number. Default: "0".

**NUMCOL\_VISIBLE**: Defines the minimum number of visible columns in the matrix. The remaining columns will be accessible only by using the scrollbar.

Must be an integer number. Default: "4".

**NUMLIN**: Defines the number of lines in the matrix.

Must be an integer number. Default: "0".

**NUMLIN\_VISIBLE**: Defines the minimum number of visible lines in the matrix. The remaining lines will be accessible only by using the scrollbar.

Must be an integer number. Default: "3".

**ORIGIN**: Allows setting which cell will be placed in the upper left corner of the matrix by automatically scrolling the visible area. To keep one of the coordinates of the cell in the upper left corner from being modified, use a

value such as "L:\*"or "\*:C" (L and C>=1). Possible values:

Two numbers in the "L:C" format.

**WIDTHDEF**: Default column width.

Must be an integer number. Default: Width corresponding to 20 characters.

**WIDTHn**: Width of column n, where n is the number of the wished column (n>=0). If the width value is 0, the column will not be shown on the screen.

Must be an integer number. Default: Width defined in the WIDTHDEF attribute.

**HEIGHTn**: Height of column n, where n is the number of the wished column ( $n \ge 0$ ). If the height value is 0, the column will not be shown on the screen.

**RESIZEMATRIX**: Defines if the width of a column can be interactively changed. When this is possible, the user can change the size of a column by dragging the column title's upper corner. Possible values:

"YES" or "NO". Default: "NO" (does not allow interactive width change).

## **Mark Attributes**

**AREA**: Defines if the area to be interactively marked by the user will be continuous or not. Possible values:

```
"CONTINUOUS" or "NOT_CONTINUOUS". Default: "CONTINUOUS".
```

**MARK\_MODE**: Defines the entity that can be marked: none, lines, columns, lines and/or columns, and cells. Possible values:

"NO", "LIN", "COL", "LINCOL" or "CELL". Default: "NO" (no mark).

MARKED: Vector of "0" or "1" characters, informing which cells are marked (indicated by value "1"). The NULL value indicates there is no marked cell. The format of this character vector depends on the value of the MARK\_MODE attribute: if its value is CELL, the vector will have NUMLIN x NUMCOL positions, corresponding to all the cells in the matrix. If its value is LIN, the vector will begin with letter "L" and will have further NUMLIN positions, each one corresponding to a line in the matrix. If its value is COL, the vector will begin with letter "C" and will have further NUMCOL positions, each one corresponding to a column in the matrix. If its value is LINCOL, the first letter, which can be either "L" or "C", will indicate which of the above formats is being used.

The values must be numbers in a vector of characters "0" and "1". Default: NULL.

**MULTIPLE**: Defines if more than one entity defined by MARK\_MODE can be marked. Possible values:

"YES" or "NO". Default: "NO".

#### **Action Attributes**

**ADDCOL**: Adds a new column to the matrix after the number of the specified column. To insert a column at the top of the spreadsheet, value 0 must be used. To add more than one column, use format "**C-C**", where the first number corresponds to the base column and the second number corresponds to the number of columns to be added. It is valid only in normal mode.

The value must be a column number.

**ADDLIN**: Adds a new line to the matrix after the number of the specified line. To insert a line at the top of the spreadsheet, value 0 must be used. To add more than one line, use format "**L-L**", where the first number corresponds to the base line and the second number corresponds to the number of lines to be added. It is valid only in normal mode.

The value must be a line number.

**DELCOL**: Removes the given column from the matrix. To remove more than one column, use format "**C-C**", where the first number corresponds to the base column and the second number corresponds to the number of columns to be removed. It is valid only in normal mode.

The value must be a column number.

**DELLIN**: Removes the given line from the matrix. To remove more than one line, use format "**L-L**", where the first number corresponds to the base line and the second number corresponds to the number of lines to be removed. It is valid only in normal mode.

The value must be a line number.

**EDIT\_MODE**: When set to YES, programatically puts the current cell in edition mode, allowing the user to modify its value. When consulted informs if the the current cell is being edited. Possible values:

```
"YES" or "NO".
```

**REDRAW**: The user can inform the matrix that the data has changed, and it must be redrawn. Values:

```
"ALL": Redraws the whole matrix.
"L%d": Redraws the given line (e. g.: "L3" redraws line 3)
"L%d:%d": Redraws the lines in the given region (e.g.: "L2:4" redraws lines 2, 3 and 4)
"C%d": Redraws the given column (e.g.: "C3" redraws column 3)
"C%d:%d": Redraws the columns in the given region (e.g: "C2:4" redraws columns 2, 3 and 4)
```

### **General Attributes**

**CURSOR**: Default cursor used by the matrix. The default cursor is a symbol that looks like a cross. If you need to refer to this default cursor, use name "matrx\_img\_cur\_excel".

**FRAMECOLOR**: Sets the color to be used in the matrix's frame lines.

**SCROLLBAR**: Associates a horizontal and/or vertical scrollbar to the

matrix. Is only effective if defined before the matrix is mapped. Default is YES.

**SIZE**: Size of the matrix. Default: Minimum size which allows viewing the whole matrix.

**CARET**: Allows specifying and verifying the caret's position when the matrix is in edition mode.

**SELECTION**: Allows specifying and verifying selection interval when the matrix is in edition mode.

**HIDEFOCUS**: do not show the focus mark when drawing the matrix.

# **IupMatrix Callbacks**

**ACTION**: Action generated when a keyboard event occurs.

```
int function(Ihandle *self, int c, int lin, int col, int active,
elem:action(c, lin, col, active, after: number) -> (ret: number)
```

self: Identifier of the matrix where the user typed something.c: Identifier of the typed key. Please refer to the <u>Keyboard Codes</u> table for a list of possible values.

**lin**, **col**: Coordinates of the selected cell.

**active**: 1 if the cell is in edition mode, and 0 if it is not.

**after**: The new value of the text in case the key is validated (see return values).

Possible return values are: **IUP\_DEFAULT** validates the key, **IUP\_IGNORE** ignores the key, **IUP\_CONTINUE** forwards the key to IUP's conventional processing. This function can also return the identifier of the key to be treated by the matrix.

**BGCOLOR\_CB** - Action generated to retrieve the background color of a cell when it needs to be redrawn.

```
int function(Ihandle *self, int lin, int col, unsigned int *red,
elem:bgcolorcb(lin, col: number) -> (red, green, blue, ret: number) bgcolor_cb(lin, col: number) -> (red, green, blue, ret: number)
```

**self**: Identifier of the matrix where the user typed something.

**lin**, **col**: Coordinates of the cell.

red, green, blue: the cell background color.

If the function return IUP\_IGNORE, the return values are ignored and the attribute defined background color will be used. If returns IUP\_DEFAULT the returned values will be used as the background color.

**CLICK\_CB**: Action generated when any mouse button is pressed over a cell. This callback is always called after other callbacks.

```
int function(Ihandle *self, int lin, int col, char *r); [in C]
elem:click(lin, col: number, r:string) -> (ret: number) [in Iupl
elem:click_cb(lin, col: number, r:string) -> (ret: number) [in ]
```

**lin**, **col**: Coordinates of the cell where the mouse button was pressed. They can be -1 if the user click outside the matrix but inside the canvas that contains it.

**r**: Status of the mouse buttons and some keyboard keys at the moment the event is generated. The following macros must be used for verification: isshift(r), iscontrol(r), isbutton1(r), isbutton2(r), isbutton3(r), isdouble(r). They return 1 if the respective key or button is pressed, or 0 otherwise.

**DRAW\_CB**: Action generated before a cell is drawn. Allows to draw a custom cell contents. You must use the CD toolkit primitives.

```
int function(Ihandle *self, int lin, int col, int x1, int x2, ir
elem:draw(lin, col, x1, x2, y1, y2: number) -> (ret: number) [ir
elem:draw_cb(lin, col, x1, x2, y1, y2: number) -> (ret: number)
```

**self**: Identifier of the matrix interacting with the user.

**lin**, **col**: Coordinates of the current cell.

x1, x2, y1, y2: Bounding rectangle of the current cell in pixels.

If this function return IUP\_IGNORE the normal drawing will take place. The clipping is set for the bounding rectangle.

**DROPCHECK\_CB**: Action generated before the current cell is redrawn to determine if a dropdown feedback should be shown. If this action is not registered, no feedback will be shown.

```
int function(Ihandle *self, int lin, int col); [in C]
elem:dropcheck(lin, col: number) -> (ret: number) [in IupLua3]
elem:dropcheck_cb(lin, col: number) -> (ret: number) [in IupLua5]
```

**self**: Identifier of the matrix interacting with the user.

**lin**, **col**: Coordinates of the cell.

This function must return IUP\_DEFAULT to show a dropdown field feedback, or IUP\_IGNORE to ignore the dropdown feedback.

**DROP\_CB**: Action generated before the current cell enters edition mode to determine if a text field or a dropdown will be shown. It is called after EDITION\_CB. If this action is not registered, a text field will be shown. Its return determines what type of element will be used in the edition mode. If the selected type is a dropdown, the values appearing in the dropdown must be fulfilled in this callback, just like elements are added to any list (the drop parameter is the handle of the dropdown list to be shown). You should also set the list's current value ("VALUE"), the default is always "1". The previously cell value can be verified from the given drop Ihandle via the "PREVIOUSVALUE" attribute.

```
int function(Ihandle *self, Ihandle *drop, int lin, int col); [i
elem:drop(drop: iuplua_tag, lin, col: number) -> (ret: number) [
elem:drop_cb(drop: iuplua_tag, lin, col: number) -> (ret: number)
```

**self**: Identifier of the matrix interacting with the user.

**drop**: Identifier of the dropdown list which will be shown to the user.

**lin**, **col**: Coordinates of the current cell.

This function must return IUP\_IGNORE to show a text-edition field, or IUP\_DEFAULT to show a dropdown field.

**DROPSELECT\_CB**: Action generated when an element in the dropdown list is selected.

```
int function(Ihandle *self, int lin, int col, Ihandle *drop, cha
elem:dropselect(lin, col: number, drop: iuplua_tag, t: string, i
elem:dropselect_cb(lin, col: number, drop: iuplua_tag, t: string
```

**self**: Identifier of the matrix interacting with the user.

**lin, col**: Coordinates of the current cell.

**drop**: Identifier of the dropdown list shown to the user.

**t**: Text of the item whose state was changed.

i: Number of the item whose state was changed.

**v**: Indicates if item was selected or unselected (0 or 1).

**EDITION\_CB**: Action generated when the current cell enters or leaves the edition mode.

```
int function(Ihandle *self, int lin, int col, int modo); [in C]
elem:edition(lin, col, mode: number) -> (ret: number) [in IupLua
```

```
elem:edition_cb(lin, col, mode: number) -> (ret: number) [in Iur
```

**lin**, **col**: Coordinates of the current cell.

**mode**: 1 if the cell has entered the edition mode, or 0 if the cell has left the edition mode.

The user must return IUP\_IGNORE if he/she wants to prevent the field from being editable, or IUP\_DEFAULT otherwise.

**ENTERITEM\_CB**: Action generated when a matrix cell is selected, becoming the current cell.

```
int function(Ihandle *self, int lin, int col); [in C]
elem:enteritem(lin, col: number) -> (ret: number) [in IupLua3]
elem:enteritem_cb(lin, col: number) -> (ret: number) [in IupLua5]
```

**self**: Identifier of the matrix interacting with the user.

**lin**, **col**: Coordinates of the selected cell.

The user must return IUP DEFAULT.

**FGCOLOR\_CB** - Action generated to retrieve the foreground color of a cell when it needs to be redrawn.

```
int function(Ihandle *self, int lin, int col, unsigned int *red,
elem:fgcolorcb(lin, col: number) -> (red, green, blue, ret: numb
elem:fgcolor_cb(lin, col: number) -> (red, green, blue, ret: number)
```

**self**: Identifier of the matrix where the user typed something.

**lin**, **col**: Coordinates of the cell.

red, green, blue: the cell foreground color.

If the function return IUP\_IGNORE, the return values are ignored and the attribute defined foreground color will be used. If returns IUP\_DEFAULT the returned values will be used as the foreground color.

**LEAVEITEM\_CB**: Action generated when a cell is no longer the current cell.

```
int function(Ihandle *self, int lin, int col); [in C]
```

```
elem:leaveitem(lin, col: number) -> (ret: number) [in IupLua3]
elem:leaveitem_cb(lin, col: number) -> (ret: number) [in IupLua5]
```

**lin**, **col**: Coordinates of the cell which is no longer the current cell.

The user must return either IUP\_DEFAULT or IUP\_IGNORE. Returning IUP\_IGNORE prevents the current cell from changing (this will not work when the focus is leaving the matrix.)

**MOUSEMOVE\_CB**: Action generated to notify the application that the mouse has moved over the matrix.

```
int function(Ihandle *self, int lin, int col); [in C]
elem:mousemove(lin, col: number) -> (ret: number) [in IupLua3]
elem:mousemove_cb(lin, col: number) -> (ret: number) [in IupLua5]
```

**self**: Identifier of the matrix interacting with the user.

**lin**, **col**: Coordinates of the cell that the mouse cursor is currently on.

**SCROLL\_CB**: Action generated when the matrix' visualization surface is changed. Can be used together with the "ORIGIN" attribute to synchronize the movement of two or more matrices.

```
int function(Ihandle *self, int lin, int col); [in C]
elem:scroll(lin, col: number) -> (ret: number) [in IupLua3]
elem:scroll_cb(lin, col: number) -> (ret: number) [in IupLua5]
```

**self**: Identifier of the matrix interacting with the user.

**lin**, **col**: Coordinates of the cell currently in the upper left corner of the matrix.

The user must return IUP\_DEFAULT.

**VALUE\_CB**: Action generated to verify the value of a cell in the matrix when it needs to be redrawn. Called both for common cells and for line and column titles.

```
char* function(Ihandle* self, int lin, int col); [in C]
elem:valuecb(lin, col: number) -> (ret: string) [in IupLua3]
elem:value_cb(lin, col: number) -> (ret: string) [in IupLua5]
```

**lin**, **col**: Coordinates of the cell currently in the upper left corner of the matrix.

Must return the string to be redrawn. The existance of this callback defines the callback operation mode of the matrix.

**VALUE\_EDIT\_CB**: Action generated to notify the application that the value of a cell was changed. Since it is a notification, it cannot refuse the value modification (which can be done by the "EDITION\_CB" callback).

```
int function(Ihandle *self, int lin, int col, char* newval); [ir
elem:value_edit(lin, col, newval: string) -> (ret: number) [in l
elem:value_edit_cb(lin, col, newval: string) -> (ret: number) [i
```

**self**: Identifier of the matrix interacting with the user.

**lin**, **col**: Coordinates of the cell currently in the upper left corner of the matrix.

**newval**: String containing the new cell value

The user must return IUP\_DEFAULT.

The canvas callbacks <u>ACTION</u>, <u>SCROLL\_CB</u>, <u>KEYPRESS\_CB</u>, <u>GETFOCUS\_CB</u>, <u>KILLFOCUS\_CB</u> if set will be called before the internal callbacks. The IupGetAttribute always returns the internal callbacks.

The canvas callbacks <u>MOTION CB</u>, <u>MAP CB</u>, <u>RESIZE CB</u> and <u>BUTTON CB</u> can not be changed. The other callbacks can be freely changed.

The GETFOCUS/KILLFOCUS callbacks are always called before other callbacks.

See **IupCanvas**.

# **IupTree**

Creates a tree containing nodes of branches or leaves. It inherits from <a href="IupCanvas">IupCanvas</a>.

The branches can be expanded or collapsed. When a branch is expanded, its immediate children are visible, and when it is collapsed they are hidden. The leaves can generate an executed or renamed action, branches can only generate renamed actions. Both branches and leaves can have an associated text. The selected node is the node with the focus rectangle, marked nodes have their background inverted.

### Creation

```
Ihandle* IupTree(void); [in C]
iuptree{} -> (elem: iuplua_tag) [in IupLua3]
iup.tree{} -> (elem: iuplua_tag) [in IupLua5]
tree() [in LED]
```

This function returns the identifier of the created IupTree, or NULL if an error occurs.

## **Attributes**

#### **General**

SCROLLBAR FONT ADDEXPANDED SHOWDRAGDROP

#### **Marks**

CTRL SHIFT STARTING VALUE MARKED

## **Images**

IMAGELEAF
IMAGEBRANCHCOLLAPSED
IMAGEBRANCHEXPANDED
IMAGEid
IMAGEEXPANDEDid

#### **Nodes**

NAME STATE DEPTH KIND PARENT COLOR

#### **Action**

ADDLEAF ADDBRANCH DELNODE REDRAW

# **Callbacks**

**SELECTION\_CB**: Action generated when an node is selected or deselected.

BRANCHOPEN\_CB: Action generated when a branch is expanded. BRANCHCLOSE\_CB: Action generated when a branch is collapsed. EXECUTELEAF\_CB: Action generated when a leaf is to be executed. RENAMENODE\_CB: Action generated when a node is to be renamed. DRAGDROP\_CB: Action generated when a drag & drop is executed. RIGHTCLICK\_CB: Action generated when the right mouse button is pressed over a node.

### **Notes**

Branches may be added in IupLua using a Lua Table (see Example 2).

## Hierarchy

Branches can contain other branches or leaves. The tree always has at least one branch, the **root**, which will be the parent of all the first level branches and leaves.

#### **Structure**

The IupTree is stored as a list, so that each node or branch has an associated identification number (id), starting by the root, with id=0. However, this number does not always correspond to the same node as the tree is modified. For example, a node with id 2 will always refer to the third node in the tree. For that reason, there is also userid, which allows identifying a specific node. The userid always refers to the same node (just as the associated text). The userid may contain a user-created structure allowing the identification of a node.

Each node also contains its depth level, starting by the root, which has depth 0. To allow inserting nodes in any position, sometimes the depth of a node must be explicitly changed. For instance, if you create a leaf in a child branch of the root, it will be created with depth 2. To make it become a child of the root, its depth must be set to 1.

# **Images**

IupTree has three types of images: one associated to the leaf, one to the collapsed branch and the other to the expanded branch. Each image can be changed, both globally and individually.

The predefined images used in IupTree can be obtained by means of function IupGetHandle. The names of the predefined images are: IMGLEAF, IMGCOLLAPSED, IMGEXPANDED, IMGBLANK (blank sheet of paper) and IMGPAPER (written sheet of paper).

#### Scrollbar

IupTrees scrollbar is activated by default and works automatically. When a node leaves the visible area, the scrollbar automatically scrolls so as to make it visible. We recommend not changing the SCROLLBAR attribute.

#### **Fonts**

The fonts used by IupTree are like the ones defined by IUP (see attribute FONT). We recommend using only IUP-defined fonts.

#### **Colors**

The IupTree colors are fixed by definition. The tree background color is "255 255 255" in Windows and "156 156 165" in Motif. The tree selected node color is "8 33 107" in Windows and "0 0 156" in Motif.

### **Manipulation**

Node insertion or removal is done by means of attributes. It is allowed to remove nodes and branches inside callbacks associated to opening or closing branches.

This means that the user may insert nodes and branches only when necessary when the parent brach is opened, allowing the use of a larger IupTree without too much overhead. Then when the parent branch is closed the subtree can be removed. A side-effect of this use is that the expanded or collapsed state of the children branches must be managed by the user.

When a node is added, removed or renamed the tree is not automatically redrawn. You must set REDRAW=YES when you finish changing the tree.

## **Simple Marking**

Is the IupTrees default operation mode. In this mode only one node is marked, and it matches the selected node.

# **Multiple Marking**

IupTree allows marking several nodes simultaneously using the Shift and Control keys. To use multiple marking, the user must use attributes SHIFT and CTRL.

When a user keeps the Control key pressed, the individual marking mode is used. This way, the selected node can be modified without changing the marked node. To reverse a node marking, the user simply has to press the space bar.

When the user keeps the Shift key pressed, the block marking mode is used. This way, all nodes between the selected node and the initial node are marked, and all others are unmarked. The initial node is changed every time a node is marked without the Shift key being pressed. This happens when any movement is done without Shift or Control being pressed, or when the space bar is pressed together with Control.

### Removing a Node with "Del"

You can simply implement a K\_ANY or KEYPRESS\_CB and do:

```
int k_any(Ihandle* self, int c)
{
  if (c == K_DEL)
  {
    IupSetAttribute(self, "DELNODE", "MARKED");
    IupSetAttribute(self, "REDRAW", "");
  }
  return IUP_DEFAULT;
}
```

## **Navigation**

Using the keyboard:

- **Arrow Up/Down**: Shifts the selected node to the neighbor node, according to the arrow direction.
- **Arrow Left/Right**: Makes the branch collapse/expand
- **Home/End**: Selects the root/last node.
- Page Up/Page Down: Selects the node one page above/below the selected node.

- **Enter**: If the selected node is an expanded branch, it is collapsed; if it is a collapsed branch, it is expanded; if it is a leaf, it is executed.
- **Space**: If the Control key is pressed marks or unmarks a node, if not calls the rename callback.

### Using the mouse:

- **Clicking a node**: Selects the clicked node.
- **Clicking a (-/+) box**: Makes the branch to the right of the (-/+) box collapse/expand.
- **Clicking an empty region**: Unmarks all nodes (including the selected one).
- **Double-clicking a node image**: If the selected node is an expanded branch, it is collapsed; if it is a collapsed branch, it is expanded; if it is a leaf, it is executed.
- **Double-clicking a node text**: Calls the rename callback.

### **Extra Functions**

IupTree has functions that allow associating a pointer (or a user defined id) to a node. In order to do that, you provide the id of the node and the pointer (userid); even if the node's id changes later on, the userid will still be associated with the given node. In IupLua, instead of a pointer the same functions are defined for tables.

```
int IupTreeSetUserId(Ihandle *self, int id, void *userid); [in (
IupTreeSetUserId(self: handle, id: number, userid: userdata); [i
iup.TreeSetUserId(self: handle, id: number, userid: userdata); [
```

**self**: Identifier of the IupTree interacting with the user.

id: Node identifier.

**userid**: User pointer associated to the node. Use NULL value to free reference.

Note: This function needs to be called again freeing the node from the userdata or it will never be garbage collected.

```
void* IupTreeGetUserId(Ihandle *self, int id); [in C]
IupTreeGetUserId(self: handle, id: number) -> (ret: userdata) [i
iup.TreeGetUserId(self: handle, id: number) -> (ret: userdata) [
```

```
self: Identifier of the IupTree interacting with the user.
```

id: Node identifier.

Returns the pointer associated to the node.

```
int IupTreeGetId(Ihandle *self, void *userid); [in C]
IupTreeGetId(self: handle, userid: userdata) -> (ret: number) [i
iup.TreeGetId(self: handle, userid: userdata) -> (ret: number) [
```

**self**: Identifier of the IupTree interacting with the user.

**userid**: Pointer associated to the node.

Returns the id of the node on success and -1 on failure.

```
IupTreeSetTableId(self: handle, id: number, table: table) [in Iu
iup.TreeSetTableId(self: handle, id: number, table: table) [in I
```

**self**: Identifier of the IupTree interacting with the user.

id: Node identifier.

**table**: Table that should be associated to the node or leaf. Use nil value to free reference.

Notes: This function needs to be called again freeing the node from the table or the table will never be garbage collected. Also, the user should not use the same table to reference different nodes (neither in the same nor across different trees.)

```
iup.TreeGetTableId(self: handle, table: table) -> (ret: number)
iup.TreeGetTableId(self: handle, table: table) -> (ret: number)
```

**self**: Identifier of the IupTree interacting with the user.

**table**: Table that should be associated to the node or leaf.

Returns the **id** of the node on success and nil otherwise.

```
iup.TreeGetTable(self: handle, id: number) -> (ret: table) [in ]
iup.TreeGetTable(self: handle, id: number) -> (ret: table) [in ]
```

**self**: Identifier of the IupTree interacting with the user.

id: Node identifier.

Returns the **table** of the node on success and nil otherwise.

# **Utility Functions**

These functions can be used to help set and get attributes from the matrix:

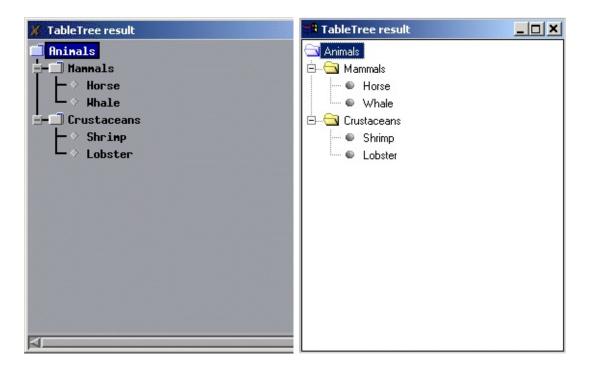
```
void IupTreeSetAttribute (Ihandle *n, char* a, int id, char* v)
void IupTreeStoreAttribute(Ihandle *n, char* a, int id, char* \( \)
char* IupTreeGetAttribute (Ihandle *n, char* a, int id);
int IupTreeGetInt (Ihandle *n, char* a, int id);
float IupTreeGetFloat (Ihandle *n, char* a, int id);
void IupTreeSetfAttribute (Ihandle *n, char* a, int id, char* f
```

They work just like the respective tradicional set and get functions. But the attribute string is complemented with the L and C values. For ex:

```
IupTreeSetAttribute (n, "KIND" , 30, v) = IupSetAttribute(n, "K] IupTreeSetAttribute (n, "ADDLEAF" , 10, v) = IupSetAttribute(n,
```

# **Examples**

Creates a IupTree with the values shown on the images below, and allows the user to change them dynamically.



### See Also

**IupCanvas** 

# **IupTree Attributes**

### General

<u>SCROLLBAR</u>: Associates a horizontal and/or vertical scrollbar to the canvas. Default: "YES".

**FONT**: Character font of the text displayed on the element.

**ADDEXPANDED**: Defines if branches will be expanded when created. The root node is always expanded when created. Possible values:

"YES": The branches will be created expanded "NO": The branches will be created collapsed

Default: "NO".

**SHOWDRAGDROP**: Shows a drag cursor if the user drags a node or branch and enables the **DRAGDROP\_CB** callback. Default: "NO".

#### **Marks**

**VALUE:** The selected node. When changed also marks the node, but only if the Control and Shift keys are not used. Possible values:

The node identifier to be selected.

When changed also accepts the values:

"ROOT": the root node "LAST": the last node

"PGUP": the node one page below "PGDN": the node one page above

"NEXT": the node following the selected node. If the selected node is the last one, the last one will be used instead "PREVIOUS": the previous node of the selected node. If the selected node is the root, the root will be used instead

The following values are also accepted but they are independent from the state of the Control and Shift keys, and from the CTRL and SHIFT attributes. And the selected node is <u>not</u> changed. These values are kept here for backward compatibility, but they would fit better in the MARKED attribute.

"INVERT": Inverts the node's marking. Using the "INVERTid" form, where id is the node identifier, it is possible to invert the marking of any node.

"BLOCK": Marks all nodes between the selected node and the initial block-marking node (see Navigation / Multiple Marking)

"CLEARALL": Unmarks all nodes

"MARKALL": Marks all nodes

"INVERTALL": Inverts the marking of all nodes

**MARKED**: The marking state of the selected node. Using the **MARKEDid** form, where id is the node identifier, it is possible to retrieve or change the marking state of any node. Possible values:

"YES": The node is marked "NO": The node is not marked

Returns NULL if the node's id is invalid.

CTRL: Activates or deactivates the Control key function. Possible values:

"YES": Control key activated; allows marking individual nodes "NO": Control key deactivated; does not allow marking individual nodes

Default: "NO".

**SHIFT**: Activates or deactivates the Shift key function. Possible values:

"YES": Shift key activated; allows marking adjacent nodes "NO": Shift key deactivated; does not allow marking adjacent nodes

Default: "NO".

**STARTING**: Defines the initial node for the block marking.

The value must be the node identifier.

Default: root node.

## **Images**

**IMAGELEAF**: Defines the image that will be shown for all leaves. Must be a 16x16 image.

IUP name of the image (see IupImage)

Default: "IMGLEAF".

**IMAGEBRANCHCOLLAPSED**: Defines the image that will be shown for all collapsed branches. Must be a 16x16 image.

IUP name of the image (see IupImage)

Default: "IMGCOLLAPSED".

**IMAGEBRANCHEXPANDED**: Defines the image that will be shown for all expanded branches. Must be a 16x16 image.

IUP name of the image (see IupImage)

Default: "IMGEXPANDED".

**IMAGEid**: Defines the image that will be shown on a specific node. Valid for leaves and for collapsed branches. This attribute must always be used with the id number. This attribute can only be set. Ex. "IMAGE2".

IUP name of the image (see IupImage)

Default: NULL.

**IMAGEEXPANDEDid**: Defines the image that will be shown on a specific node. It has no effect over leaves and is valid for expanded branches. This attribute must always be used with the id number. This attribute can only be set. Ex. "IMAGEEXPANDED3".

IUP name of the image (see IupImage)

Default: NULL.

#### **Nodes**

**NAME**: Changes or retrieves the name of the selected node. Using the "**NAMEid**" form, where id is the node identifier, it is possible to change the name of any node.

The value must be a node name.

**STATE**: Changes or retrieves the state of the selected branch. Using the "**STATEid**" form, where id is the node identifier, it is possible to change the state of any branch. This attribute only works on branches. If it is used on a leaf, nothing will happen. Possible values:

```
"EXPANDED": Expanded branch state (shows its children) "COLLAPSED": Collapsed branch state (hides its children)
```

**DEPTH**: If set, it defines the node's depth. Does not verify is the resulting tree is valid. If retrieved, it returns the node's depth. Using the "**DEPTHid**" form, where id is the node identifier, it is possible to refer to any node.

The value must be the node's depth

**KIND**: Returns the kind of the selected node. Using the "**KINDid**" form, where id is the node identifier, it is possible to retrieve the kind of any node. This attribute can only be retrieved. Possible values:

```
"LEAF": The node is a leaf "BRANCH": The node is a branch
```

**PARENT:** Returns the identifier of the selected node's parent. Using the "**PARENTid**" form, where id is the node identifier, it is possible to retrieve the identifier of any node. This attribute can only be retrieved.

**COLOR:** Color of the provided node. Using the form "**COLORid**", where id is the node identifier, it is possible to set or retrieve the color of any node. The value should be a string in the format "R G B" where R, G, B are

numbers from 0 to 255.

#### Action

**ADDLEAF**: Adds a new leaf after the selected node. The id of the new leaf will be the id of the selected node + 1. The selected node is marked and all others unmaked. The selected node position remains the same. Using the "**ADDLEAFid**" form, where id is the node identifier, it is possible to insert a leaf after any node. In this case, the id of the inserted node will be id + 1. If the specified node does not exist, nothing happens. This attribute can only be set.

The value must be a leaf name.

**ADDBRANCH**: Adds a new branch after the selected node. The id of the new branch will be the id of the selected node + 1. The selected node is marked and all others unmaked. The selected node position remains the same. Using the "**ADDBRANCHid**" form, where id is the node identifier, it is possible to insert a branch after any node. In this case, the id of the inserted node will be id + 1. By default, all branches created are expanded. If the specified node does not exist, nothing happens. This attribute can only be set.

The value must be a branch name.

**DELNODE**: Removes the marked node (or its children). Using the "**DELNODEid**" form, where id is the node identifier, it is possible to remove any node. The root cannot be removed. If the specified node does not exist, nothing happens. This attribute can only be set. Possible values:

"MARKED": Deletes all marked nodes (and all their children)
"SELECTED": Deletes only the selected node (and its children)
"CHILDREN": Deletes only the children of the selected node

Returns the identifier of the marked node's parent.

**REDRAW**: Forces an immediate redraw. It is necessary to force a redraw whenever the user adds or removes a node or a branch. The value is ignored.

# **IupTree Callbacks**

**SELECTION\_CB**: Action generated when an element is selected or deselected. This action occurs when the user clicks with the mouse or uses the keyboard with the appropriate combination of keys.

```
int function(Ihandle *self, int id, int status) [in C]
elem:selection(id, status: number) -> (ret: number) [in IupLua3]
elem:selection_cb(id, status: number) -> (ret: number) [in IupLu
self: Identifier of the IupTree interacting with the user.
id: Node identifier.
status: 1 - node was selected, 0 - node was unselected.
```

This function must return IUP\_IGNORE for the selected node not to be changed, or IUP\_DEFAULT to change it.

**BRANCHOPEN\_CB**: Action generated when a branch is expanded. This action occurs when the user clicks the "+" sign on the left of the branch, or when double clicks the branch image, or hits Enter on a collapsed branch.

```
int function(Ihandle *self, int id) [in C]
elem:branchopen(id: number) -> (ret: number) [in IupLua3]
elem:branchopen_cb(id: number) -> (ret: number) [in IupLua5]
self: Identifier of the IupTree interacting with the user.
id: Node identifier.
```

This function must return IUP\_IGNORE for the branch not to be opened, or IUP\_DEFAULT for the branch to be opened.

**BRANCHCLOSE\_CB**: Action generated when a branch is collapsed. This action occurs when the user clicks the "-" sign on the left of the branch, or when double clicks the branch **image**, or hits Enter on an expanded branch.

```
int function(Ihandle *self, int id); [in C]
elem:branchclose(id: number) -> (ret: number) [in IupLua3]
elem:branchclose_cb(id: number) -> (ret: number) [in IupLua5]
```

**self**: Identifier of the IupTree interacting with the user.

id: Identifier of the clicked node.

This function must return IUP\_IGNORE for the branch not to be closed, or IUP\_DEFAULT for the branch to be closed.

**EXECUTELEAF\_CB**: Action generated when a leaf is to be executed. This action occurs when the user double clicks the leaf **image**, or hits Enter on a leaf.

```
int function(Ihandle *self, int id); [in C]
elem:executeleaf(id: number) -> (ret: number) [in IupLua3]
elem:executeleaf_cb(id: number) -> (ret: number) [in IupLua5]
```

**self**: Identifier of the IupTree interacting with the user.

**id**: Identifier of the clicked node.

**RENAMENODE\_CB**: Action generated when a node is to be renamed. It occurs only when the user double clicks the **text** associated to a node (leaf or branch).

```
int function(Ihandle *self, int id, char *name); [in C]
elem:renamenode(id: number, name: string) -> (ret: number) [in I
elem:renamenode_cb(id: number, name: string) -> (ret: number) [i
```

**self**: Identifier of the IupTree interacting with the user.

id: Identifier of the clicked node.

**name**: Name of the clicked node.

**DRAGDROP\_CB**: Action generated when a drag & drop is executed. Only active if **SHOWDRAGDROP=YES**.

```
int function(Ihandle *self, int drag_id, int drop_id, int isshif
elem:dragdrop(drag_id, drop_id, isshift, iscontrol: number) -> (
elem:dragdrop_cb(drag_id, drop_id, isshift, iscontrol: number) -
```

**self**: Identifier of the IupTree interacting with the user.

drag\_id: Identifier of the clicked node where the drag start.

**drop** id: Identifier of the clicked node where the drop were executed.

**isshift**: Boolean flag indicatinf the shift key state.

**iscontrol**: Boolean flag indicatinf the control key state.

**RIGHTCLICK\_CB**: Action generated when the right mouse button is

pressed over the IupTree.

```
int function(Ihandle *self, int id); [in C]
elem:rightclick(id: number) -> (ret: number) [in IupLua3]
elem:rightclick_cb(id: number) -> (ret: number) [in IupLua5]
self: Identifier of the IupTree interacting with the user.
id: Identifier of the clicked node.
```

The canvas callback K ANY if set will be called before the internal callback. The IupGetAttribute always returns the internal callback.

The canvas callbacks <u>ACTION, SCROLL CB, MAP CB, RESIZE CB</u> and <u>BUTTON\_CB</u> can not be changed. The other callbacks can be freely changed.

See <u>IupCanvas</u>.

# **IupGLCanvas**

Creates an OpenGL canvas (drawing area for OpenGL). It inherits from <a href="https://linear.ncbi.nlm.

# **Initialization and Usage**

The **IupGLCanvasOpen** function must be called after a **IupOpen**, so that the control can be used. The iupgl.h file must also be included in the source code. The program must be linked to the control's library (iupgl.lib on Windows and libiupgl.a on Unix), and with the OpenGL library.

To make the control available in Lua, use the initialization function in C, **gllua\_open**, after calling **iuplua\_open**. The luagl.h file must also be included in the source code. The program must be linked to the control's libraries (luagl.lib on Windows and libluagl.a on Unix).

You will need also to link with the OpenGL libraries. In Windows add: opengl32.lib and optionally glu32.lib or glaux.lib. In Motif add before the Motif libraries: -LGLw -LGLU -LGL (in Linux the GLw library is not available in the system so we include it inside the iupgl library).

#### Creation

```
Ihandle* IupGLCanvas(char* action); [in C]
iupglcanvas{} -> (elem: iuplua_tag) [in IupLua3]
iup.glcanvas{} -> (elem: iuplua_tag) [in IupLua5]
glcanvas(action) [in LED]
```

**action**: Name of the action generated when the canvas needs to be redrawn.

This function returns the identifier of the created canvas, or NULL if an error occurs.

## **Attributes**

The IupGLCanvas element understands all attributes defined for a conventional canvas, see <u>IupCanvas</u>.

Apart from these attributes, IupGLCanvas understands specific attributes used to define the kind of buffer to be instanced. Such attributes must be set before the element is mapped on the screen. After the mapping, specifying these special attributes has no effect.

The specific IupGLCanvas attributes are:

**BUFFER**: Indicates if the buffer will be single "SINGLE" or double "DOUBLE". Default is "SINGLE".

**COLOR**: Indicates the color model to be adopted: "INDEX" or "RGBA". Default is "RGBA".

**BUFFER\_SIZE**: Indicates the number of bits for representing the color indices (valid only for INDEX). Default is "8" (256-color palette).

**RED\_SIZE**, **GREEN\_SIZE** and **BLUE\_SIZE**: Indicate the number of bits for representing each color component (valid only for RGBA). Default is "8" for each component (True Color support).

**ALPHA\_SIZE**: Indicates the number of bits for representing each color's alpha component (valid only for RGBA and for hardware that store the alpha component). Default is "0".

**DEPTH\_SIZE**: Indicates the number of bits for representing the *z* coordinate in the z-buffer. Value "0" means the z-buffer is not necessary.

**STENCIL\_SIZE**: Indicates the number of bits in the stencil buffer. Value "0" means the stencil buffer is not necessary. Default is "0".

ACCUM\_RED\_SIZE, ACCUM\_GREEN\_SIZE, ACCUM\_BLUE\_SIZE and ACCUM\_ALPHA\_SIZE: Indicate the number of bits for representing the color components in the accumulation buffer. Value "0" means the accumulation buffer is not necessary. Default is "0".

**STEREO**: Creates a stereo GL canvas (special glasses are required to visualize it correctly). Possible values: "YES" or "NO". Default: "NO".

"ERROR": If an error is found, returns a string containing a description of

```
"CONTEXT", "VISUAL" and "COLORMAP": [Motif Only] Returns "GLXContext", "XVisualInfo*" and "Colormap".
```

"**PRINTINFO**": [Motif Only] If "1" during the canvas initialization some information will be printed on stderr.

#### **Callbacks**

The IupGLCanvas element understands all callbacks defined for a conventional canvas, see <u>IupCanvas</u>.

Addicionally:

```
RESIZE_CB: By default the resize callback sets:
glviewport(0,0,width,height);
```

# **Auxiliary Functions**

```
void IupGLMakeCurrent(Ihandle* self);
```

Activates the "self" canvas. All subsequent OpenGL commands are directed to such canvas.

```
void IupGLSwapBuffers(Ihandle* self);
```

Makes the "BACK" buffer visible. This function is necessary when a double buffer is used.

```
\label{local_point} \mbox{void $\bf IupGLPalette} (\mbox{Ihandle* self, int index, float $r$, float $g$, float $r$, and $r$ index $r$ is $r$. }
```

Defines a color in the color palette. This function is necessary when INDEX color is used.

## **Comments**

An OpenGL canvas when put inside an IupFrame will not work.

# **Examples**

# See Also

<u>IupCanvas</u>

# **IupSpeech**

Creates a speech engine that allows speech recognition and speech.

[Windows only]

### **Initialization and Usage**

The **IupSpeechOpen** function must be called after a **IupOpen**, so that the Speech control can be used (no binding available yet.)

To generate an application that uses this control, the program must be linked to the control's library (iupspeech.lib on Windows). The **iupspeech.h** file must also be included in the source code.

The Microsoft Speech SDK 5.1 must be installed in the system.

#### Creation

```
Ihandle* IupCreate("speech"); [in C]
[Not available in IupLua]
```

The function returns the identifier of the created handle, or NULL if an error occurs.

## **Attributes**

**GRAMMAR**: Accepts a full directory path to a .xml file defining the grammar that the speech engine will be considering. Only one grammar allowed.

**SAY**: Speaks the given text.

### **Callbacks**

**ACTION\_CB**: Called when the engine recognizes a word/sentence.

```
int function(Ihandle *self, char *text); [in C]
```

self: Ihandle.

text: Full recognized text based on given grammar.

### **Comments**

Check <u>Speech SDK help</u> file for more information on how to create an input xml file.

IUP's speech interface will create a "shared-recognizer", i.e., a unique recognizer that will work for the entire system. That means that the input focus can be anywhere in the system and still the recognition will be triggered.

Only one process in the system can initialize IupSpeech.

The system is greatly improved by training. Look in the control-panel in the Speech tab for more details.

Available only in Microsoft Visual Studio .NET.

### **Examples**

# **Other Controls**

• **Color Bar** (Portuguese)

The extended control **Colorbar** was developed with the purpose of aiding <u>IUP</u> / <u>CD</u> applications which need to work with a color palette, allowing a selection of up to two colors.

• **Joystick** (Portuguese) - OLD

Allows the use use of joystick (Windows only).

• Play Video (Portuguese) - OLD

Allows the user to play videos using IUP (Windows only).

• Capture Video (Portuguese) - OLD

Allows the user to capture frames from cameras, VCRs and TVs (Windows only).

• **<u>IupDB</u>** (Portuguese) - DISCONTINUED

Associates controls to database fields.

# **Keyboard**

Keyboard navigation is the dialog uses the "Tab" key to change the keyboard focus from one control to another. All IUP interactive controls have Tab stops, but the navigation order is related to the order the controls are placed in the dialog and can not be changed. When the focus is at a Multiline control to change focus the combination "Ctrl+Tab" must be used, because "Tab" is a valid character for the Multiline. The application can also control the focus using the functions: <a href="IupGetFocus">IupGetFocus</a>, <a href="IupGetFocus">IupSetFocus</a>, <a href="IupGetFocus">IupGetFocus</a>, <a

Two keys are also important in keyboard navigation: "Enter" and "Esc". But they are only active is the application register the attributes DEFAULTENTER and DEFAULTESC of the <a href="IupDialog">IupDialog</a>. These attributes configure buttons to be activated when the respective key is pressed. Again "Enter" is a valid key for the Multiline so the combination "Ctrl+Enter" must be used instead. If the focus is at a button then the Enter key will activate this button independent from the DEFAULTENTER attribute.

Usualy the application will process keyboard input in the canvas using the KEYPRESS\_CB callback. But there is also the K\_ANY callback that can be used for all the controls, but it does not have control of the press state. Both callbacks use the key codification explained in Keyboard Codes. These codes are also used in the ACTION callbacks of IupText and IupMultiline, and in shortcuts for menu items and submenus using the KEY attribute of IupItem and IupSubmenu. Finally all the keyboard codes can be used as callback names to implement application hot keys.

### **Keyboard Codes**

The table below shows the IUP codification of every key in the keyboard. Each key is represented by an integer value, defined in the iupkey.h file, which must be included in the application.

IUP uses the US default codification this means that if you installed a keyboard specific for your country the key codes will be different from the real keys for a small group of keys. For the Brazilian ABNT keyboard the keys ", ',  $\sim$ , $^,$ , $^,$ ,], $^,$ ,[, $^,$ , $^,$ , usually will have a different codification. But this does not affect the IupText and IupMultiline text input.

Notice that somes key combinations are not available, like: Shift+Ins, Shift+Del, Alt+Space, Alt/Ctrl/Shift+Backspace, Alt/Ctrl/Shift+Pause, Alt/Ctrl/Shift+Esc, Ctrl/Alt+Enter. When CapsLock is active the Shift+ <Key> combination is used, except for Esc and Backspace that will ignore the combination.

The isxkey(key) macro defined in the **<iupkey.h>** file informs whether a given key is an extended code instead of an alphanumeric key.

In IUP the codification implies that some keys have the same code: K BS=K cH, K TAB=K cI and K CR=K cM.

Key	Code / Attribute	Key	Code / Attribute	Key	Co Attr
SPACE	K_SP	Alt-A	K_mA	Ctrl-SPACE	K_cSI
!	K_exclam	Alt-B	K_mB	Ctrl-A	K_cA
"	K_quotedbl	Alt-C	K_mC	Ctrl-B	K_cB
#	K_numbersign	Alt-D	K_mD	Ctrl-C	K_cC
\$	K_dollar	Alt-E	K_mE	Ctrl-D	K_cD
%	K_percent	Alt-F	K_mF	Ctrl-E	K_cE
&	K_ampersand	Alt-G	K_mG	Ctrl-F	K_cF
'	K_quoteright	Alt-H	K_mH	Ctrl-G	K_cG
(	K_parentleft	Alt-I	K_mI	Ctrl-H	K_cH

)	K_parentright	Alt-J	K_mJ	Ctrl-I	K_cI
*	K_asterisk	Alt-K	K_mK	Ctrl-J	K_cJ
+	K_plus	Alt-L	K_mL	Ctrl-K	K_cK
,	K_comma	Alt-M	K_mM	Ctrl-L	K_cL
_	K_minus	Alt-N	K_mN	Ctrl-M	K_cM
•	K_period	Alt-O	K_mO	Ctrl-N	K_cN
/	K_slash	Alt-P	K_mP	Ctrl-O	K_cO
0	K_0	Alt-Q	K_mQ	Ctrl-P	K_cP
1	K_1	Alt-R	K_mR	Ctrl-Q	K_cQ
2	K_2	Alt-S	K_mS	Ctrl-R	K_cR
3	K_3	Alt-T	K_mT	Ctrl-S	K_cS
4	K_4	Alt-U	K_mU	Ctrl-T	K_cT
5	K_5	Alt-V	K_mV	Ctrl-U	K_cU
6	K_6	Alt-W	K_mW	Ctrl-V	K_cV
7	K_7	Alt-X	K_mX	Ctrl-W	K_cW
8	K_8	Alt-Y	K_mY	Ctrl-X	K_cX
9	K_9	Alt-Z	K_mZ	Ctrl-Y	K_cY
:	K_colon	Alt-1	K_m1	Ctrl-Z	K_cZ
;	K_semicolon	Alt-2	K_m2	Ctrl-Tab	K_cT/
<	K_less	Alt-3	K_m3	Ctrl-Home	K_cH(
=	K_equal	Alt-4	K_m4	Ctrl-UP	K_cUl
>	K_greater	Alt-5	K_m5	Ctrl-PgUp	K_cP(
?	K_question	Alt-6	K_m6	Ctrl-LEFT	K_cLI
@	K_at	Alt-7	K_m7	Ctrl-MIDDLE	K_cM
A	K_A	Alt-8	K_m8	Ctrl-RIGHT	K_cRI
В	K_B	Alt-9	K_m9	Ctrl-END	K_cEl
С	K_C	Alt-0	K_m0	Ctrl-DOWN	K_cD(
D	K_D	Alt-Tab	K_mTAB	Ctrl-PgDn	K_cP(
E	K_E	Alt-Home	K_mHOME	Ctrl-Insert	K_cIN
F	K_F	Alt-UP	K_mUP	Ctrl-Del	K_cDl
G	K_G	Alt-PgUp	K_mPGUP	Ctrl-F1	K_cF1

Н	K_H	Alt-LEFT	K_mLEFT
Ι	K_I	Alt-RIGHT	K_mRIGHT
J	K_J	Alt-END	K_mEND
K	K_K	Alt-DOWN	K_mDOWN
L	K_L	Alt-PgDn	K_mPGDN
M	K_M	Alt-Insert	K_mINS
N	K_N	Alt-Del	K_mDEL
О	K_O	Alt-F1	K_mF1
P Q	K_P	Alt-F2	K_mF2
Q	K_Q	Alt-F3	K_mF3
R	K_R	Alt-F4	K_mF4
S	K_S	Alt-F5	K_mF5
Т	K_T	Alt-F6	K_mF6
U	K_U	Alt-F7	K_mF7
V	K_V	Alt-F8	K_mF8
W	K_W	Alt-F9	K_mF9
X Y	K_X	Alt-F10	K_mF10
Y	K_Y	Alt-F11	K_mF11
Z	K_Z	Alt-F12	K_mF12
[	K_bracketleft	<u>,                                      </u>	
\	K_backslash		
]	K_bracketright		
Λ	K_circum		
_	K_underscore		
`	K_quoteleft		
a	K_a		
b	K_b		
С	K_c		
b c d e	K_d		
e	K_e		
f	K_f		

Ctrl-F2	K_cF2
Ctrl-F3	K_cF3
Ctrl-F4	K_cF4
Ctrl-F5	K_cF5
Ctrl-F6	K_cF6
Ctrl-F7	K_cF7
Ctrl-F8	K_cF8
Ctrl-F9	K_cF9
Ctrl-F10	K_cF1
Ctrl-F11	K_cF1
Ctrl-F12	K_cF1

g	K_g
h	K_h
i	K_i
j	K_j
k	K_k
1	K_l
m	K_m
n	K_n
0	K_o
p	K_p
q	K_q
r	K_r
S	K_s
t	K_t
u	K_u
V	K_v
W	K_w
X	K_x
у	K_y
Z	K_z
{	K_braceleft
	K_bar
}	K_braceright
~	K_tilde
ESC	K_ESC
Enter	K_CR
BackSpace	K_BS
Insert	K_INS
Del	K_DEL
Tab	K_TAB
Home	K_HOME

UP	K_UP		
PgUp	K_PGUP		
LEFT	K_LEFT		
MIDDLE	K_MIDDLE		
RIGHT	K_RIGHT		
END	K_END		
DOWN	K_DOWN		
PgDn	K_PGDN		
Pause	K_PAUSE		
F1	K_F1		
F2	K_F2		
F3	K_F3		
F4	K_F4		
F5	K_F5		
F6	K_F6		
F7	K_F7		
F8	K_F8		
F9	K_F9		
F10	K_F10		
F11	K_F11		
F12	K_F12		

## **IupNextField**

Shifts the focus to the next element in a dialog to which the specified element belongs. In does not depend on the element currently with the focus.

### Parameters/Return

```
Ihandle* IupNextField(Ihandle* element); [in C]
IupNextField(element: iuplua_tag) -> (elem: iuplua_tag) [in IupLua_iup.NextField(element: iuplua_tag) -> (elem: iuplua_tag) [in IupLua_tag)
```

**element**: An element.

This function returns the element that received the focus.

### See Also

<u>IupPreviousField</u>.

# **IupPreviousField**

Shifts the focus to the previous element in a dialog to which the specified element belongs. In does not depend on the element currently with the focus.

### Parameters/Return

```
Ihandle* IupPreviousField(Ihandle* element); [in C]
IupPreviousField(element: iuplua_tag) -> (elem: iuplua_tag) [in Iuiup.PreviousField(element: iuplua_tag) -> (elem: iuplua_tag) [in Iuiplua_tag]
```

element: An element.

This function returns the element that received the focus.

### See Also

<u>IupNextField</u>.

# **IupGetFocus**

Verifies the interface element with keyboard focus, that is, the element that receives keyboard events.

### Parameters/Return

```
Ihandle* IupGetFocus(void); [in C]
IupGetFocus() -> elem: iuplua_tag [in IupLua3]
iup.GetFocus() -> elem: iuplua_tag [in IupLua5]
```

This function returns the identifier of the interface element which at the moment is receiving keyboard events.

### See Also

<u>IupSetFocus</u>.

## **IupSetFocus**

Defines the interface element that will receive the keyboard focus, i.e., the element that will receive keyboard events.

### Parameters/Return

```
Ihandle *IupSetFocus (Ihandle *element); [in C]
IupSetFocus(element: iuplua_tag) -> elem: iuplua_tag [in IupLua3]
iup.SetFocus(element: iuplua_tag) -> elem: iuplua_tag [in IupLua5]
```

**element**: identifier of the interface element that will receive the keyboard focus.

This function returns the identifier of the interface element that will receive the keyboard focus.

### See Also

<u>IupGetFocus</u>.

## Resources

Resources are several auxiliary tools including menus, images, fonts and global names.

Some objects like menus and images, that are not inserted in the dialog tree, are in fact associated with dialogs, other controls or exist independent from both. They all must be destroyed independently. When associated with dialogs or controls they must be destroyed after the respective dialog is destroyed. When not they can be destroyed any time.

Menus can be associated with dialogs only. Images can be associated with labels, buttons, toggles and menu items (this last in Windows only).

Both images and menus to be associated use a global table of names. This exist because of the LED scripts. First you associate the image or menu Ihandle to a name, then you associated the MENU or IMAGE attribute to the respective name.

For example, in C:

```
Ihandle* img = IupImage (11, 11, pixmap);
IupSetHandle("myImg", img);
IupSetAttribute(myButton, "IMAGE", "myImg");

or in LED:

myImg = image[...] (
    ...
    )
    myButton = button[IMAGE = myImg]("")

or in Lua:

myImg = iupimage {
    ...
    }
    myButton = iupbutton { title = "", image = myImg }
```

## **IupItem**

Creates an item of the menu interface element. When selected, it generates an action.

#### Creation

```
Ihandle* IupItem(char *title, char *action); [in C]
iupitem(title = title: string) -> elem: iuplua_tag [in IupLua3]
iup.item(title = title: string) -> elem: iuplua_tag [in IupLua5]
item(title, action) [in LED]
```

**title**: Text to be shown on the item.

**action**: Name of the action generated when the item is selected.

This function returns the identifier of the created item.

#### **Attributes**

**KEY**: Associates a key to the item.

**VALUE**: Indicates the item's state. When the value is ON, a mark will be displayed to the left of the item. Default: OFF.

**TITLE**: Text shown to the user. It is possible to change its value on-the-fly.

**IMAGE**: (Windows Only) Image of the non-checked menu item.

**IMPRESS**: (Windows Only) Image of the checked menu item.

### **Callbacks**

**ACTION**: Action generated when the item is selected.

**HIGHLIGHT** CB: Action generated when the item is highlighted.

#### **Notes**

The text of the menu item accepts the control character '\t' to force text alignment to the right after this character. This is used to add shortcut keys to the menu, aligned to the right. Ex.: "Save\tCtrl+S".

Menu items are activated using the Enter key.

Attention: Never use the same menu item in different menus.

## **Examples**

## **See Also**

<u>IupSeparator</u>, <u>IupSubmenu</u>, <u>IupMenu</u>.

## **IupMenu**

Creates a menu element, which groups 3 types of interface elements: item, submenu and separator. Any other interface element defined inside a menu will be ignored.

#### Creation

```
Ihandle* IupMenu(Ihandle *elem1, Ihandle *elem2,..., NULL); [in C]
iupmenu{elem1, elem2, ...: iuplua_tag} -> (elem: iuplua_tag) [in I
iup.menu{elem1, elem2, ...: iuplua_tag} -> (elem: iuplua_tag) [in
menu(elem1, elem2, ...) [in LED]
```

**elem1**, **elem2**, ...: List of identifiers that will be grouped by the menu. NULL defines the end of the list in C.

This function returns the identifier of the created menu, or NULL if an error occurs.

### Note

A menu can be that of a dialog bar, defined by the dialog's MENU attribute, or a popup menu. A popup menu is displayed for the user (usually on the mouse position) and disappears when an item is selected. Its implementation is done by means of a call to the IupPopup function. IupDestroy should be called only for popup menus.

### **Lua Binding**

Offers a "cleaner" syntax than LED for defining menu, submenu and separator items. The list of elements in the menu is described as a string, with one element after the other, separated by commas.

Each element can be:

- 1) {"<item\_name>","<action>"} menu item
- 2) {"<submenu\_name>","<menu>"} submenu
- 3) {} separator

4) <interface element> - submenu item

## **Callbacks**

**OPEN\_CB**: Called just before a submenu is opened.

MENUCLOSE\_CB: Called right before the submenu is closed.

## **Examples**

## **See Also**

<u>IupDialog</u>, <u>IupPopup</u>, <u>IupItem</u>, <u>IupSeparator</u>, <u>IupSubmenu</u>

## **IupSeparator**

Creates the separator interface element. It shows a line between two menu items.

### Creation

```
Ihandle* IupSeparator(void); [in C]
iupseparator{} -> (elem: iuplua_tag) [in IupLua3]
iup.separator{} -> (elem: iuplua_tag) [in IupLua5]
separator() [in LED]
```

This function returns the identifier of the created separator, or NULL if an error occurs.

### Note

The separator is ignored when it is part of the definition of the items in a bar menu.

## **Examples**

### **See Also**

IupItem, IupSubMenu, IupMenu.

## **IupSubmenu**

Creates a menu item that, when selected, opens another menu.

#### Creation

```
Ihandle* IupSubmenu(char *title, Ihandle *menu); [in C]
iupsubmenu{menu: iuplua_tag; title = title: string} -> (elem: iupl
iup.submenu{menu: iuplua_tag; title = title: string} -> (elem: iupl
submenu(title, menu) [in LED]
```

**title**: String containing the text to be shown on the item. It is a creation-only attribute and cannot be changed later.

menu: menu identifier.

This function returns the identifier of the created submenu, or NULL if an error occurs.

### **Attributes**

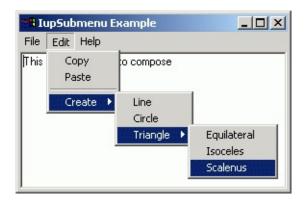
**KEY**: Associates a key to the submenu. In Windows, when used will also set an underscore on the respective letter of the submenu title.

### **Callbacks**

**OPEN\_CB**: Called just before the submenu is opened.

MENUCLOSE CB: Called right before the submenu is closed.

### **Examples**



## See Also

<u>IupItem</u>, <u>IupSeparator</u>, <u>IupMenu</u>.

## **IupImage**

Creates an image to be shown on a label, button, toggle, or as a cursor.

#### Creation

```
Ihandle* IupImage(int width, int height, char *pixels); [in C] iupimage{pixels: table of numbers, colors: table of colors} -> (el iup.image{pixels: table of numbers, colors: table of colors} -> (el image(width, height, b1, b2, ...) [in LED] width: Image width in pixels. height: Image height in pixels. pixels: Vector containing the color of each pixel. b1, b2, ...: Color index of the pixels.
```

This function returns the identifier of the created image, or NULL (nil in IupLua) if an error occurs.

### **Attributes**

```
"0" Color in index 0.
"1" Color in index 1.
...
"i" Color in index i.
```

The indices can range from 0 to 255. The total number of colors is limited to 256 colors. Notice that in Lua the first index in the array is "1", the index "0" is ignored in IupLua. Be careful when setting colors, since they are attributes they follow the same storage rules for standard attributes.

The values are integer numbers from 0 to 255, one for each color in the RGB standard ("255 255 255"). If the value of a given index is "BGCOLOR", the color used will be the background color of the element on which the image will be inserted. The "BGCOLOR" must be defined with an index less than 16.

**HOTSPOT**: Hotspot is the position inside a cursor image indicating the mouse-click spot. Its value is given by the x and y coordinates inside a cursor image. Its value has the format "x:y", where x and y are integers defining the coordinates in pixels.

**HEIGHT**: Image height in pixels.

**WIDTH**: Image width in pixels.

#### **Notes**

An image created with IupImage can be reused for different buttons and labels. But in Motif the BGCOLOR color index will be calculated only once when it is first used.

The images must be destroyed when they are no longer necessary, by means of the IupDestroy function. To destroy an image, it cannot be in use. Please observe the rules for creating cursor images: <u>CURSOR</u>.

The pixels array is duplicated internally so you can discart it after calling IupImage.

If do not set a colors it is used a default color for the 16 first colors. The default color table is the same for Windows and Motif:

```
0, 0 (black)
       Θ,
1 = 128, 0, 0 (dark red)
2 = 0,128, 0 (dark green)
 3 = 128, 128, 0 (dark yellow)
 4 = 0, 0,128 (dark blue)
 5 = 128, 0,128 (dark magenta)
      0,128,128 (dark cian)
 7 = 192, 192, 192 (gray)
 8 = 128, 128, 128  (dark gray)
 9 = 255, 0, 0 (red)
      0,255, 0 (green)
10 =
11 = 255, 255, 0 (yellow)
12 = 0, 0,255  (blue)
13 = 255, 0,255  (magenta)
14 = 0,255,255 (cian)
15 = 255, 255, 255 (white)
```

For images with more than 16 colors, all the color indices must be defined up to the maximum number of colors. For example, if the biggest image index is 100, then all the colors from i=16 up to i=100 must be defined even if some indices are not used. Note that to use more than 128 colors you must use an "unsigned char\*" pointer and simply cast it to "char\*" when calling the IupImage function.

The <u>EdPatt</u> and the <u>IMLAB</u> applications can load and save images in LED format. They allow operations such as importing GIF images and exporting them as IUP images. **EdPatt** allows you to manually edit the images, and also have support for imagens in IupLua.

You can donwload several IUP images in LED format from <u>iup\_images.zip</u>. To view the images you can use the LED viewer application, see **IupView** in the applications included in the distribution.

Application icons are usually 32x32. Toolbar bitmaps are 24x24. Menu bitmaps and small icons are 16x16.

### **Examples**

#### See Also

<u>IupLabel</u>, <u>IupButton</u>, <u>IupToggle</u>.

# **IupLoadImage**

A function that creates an IupImage from file using the IM library. The function can load the formats: BMP, JPEG, GIF, TIFF, PNG, PNM, PCX, ICO and others. For more information about the IM library see <a href="http://www.tecgraf.puc-rio.br/im">http://www.tecgraf.puc-rio.br/im</a>.

### **Initialization and Usage**

To generate an application that uses this function, the program must be linked to the function's library (iupim.lib on Windows and libiupim.a on Unix). The iupim.h file must also be included in the source code.

To make the function available in Lua, use the initialization function in C, **iupluaim\_open**, after calling **iuplua\_open**. The iupluaim.h file must also be included in the source code. The program must be linked to the functions's libraries (iupluaim.lib on Windows and libiupluaim.a on Unix).

#### Creation

```
Ihandle* IupLoadImage(const char* file_name); [in C]
IupLoadImage{file_name: string} -> (elem: iuplua_tag) [in IupLua3]
iup.LoadImage{file_name: string} -> (elem: iuplua_tag) [in IupLua5]
```

**file\_name**: Name of the file to be loaded.

This function returns the identifier of the created image, or NULL if an error occurs.

### See Also

**IupImage** 

# **IupSetHandle**

Defines a name for an interface element.

### Parameters/Return

```
Ihandle *IupSetHandle(char *name, Ihandle *element); [in C]
IupSetHandle(name: string, element: iuplua_tag) -> handle: iuplua_
iup.SetHandle(name: string, element: iuplua_tag) -> handle: iuplua
```

name: name of the interface element.

**element**: identifier of the interface element.

This function returns the identifier of the interface element previously associated to the parameter **name**.

### Note

Attention: To delete an elements name, use

IupSetHandle("my element name", NULL);

### See Also

<u>IupGetHandle</u>.

# **IupGetHandle**

Retrieves the identifier of an interface element.

### Parameters/Return

```
Ihandle *IupGetHandle(char *name); [in C]
IupGetHandle(name: string) -> handle: iuplua_tag [in IupLua3]
iup.GetHandle(name: string) -> handle: iuplua_tag [in IupLua5]
```

**name**: name of an interface element.

This function returns the identifier of the interface element.

#### Note

This function is used for integrating IUP and LED. To manipulate an interface element defined in LED, first capture its identifier using function **IupGetHandle**, passing the name of the interface element as parameter, then use this identifier on the calls to IUP functions for example, a call to the function that verifies the value of an attribute, **IupGetAttribute**.

Attention: in Lua, IupGetHandle is not able to get the Ihandle of a IUP element created in C. To get an Ihandle created in C, use IupGetFromC{"name"}.

### See Also

IupSetHandle.

## **IupGetName**

Verifies the name of an interface element.

### Parameters/Return

```
char* IupGetName(Ihandle* elem); [in C]
IupGetName(elem: iuplua_tag) -> (name: string) [in IupLua3]
iup.GetName(elem: iuplua_tag) -> (name: string) [in IupLua5]
```

**elem**: Identifier of the interface element.

This function returns the name of an interface element.

## **Lua Binding**

This name is not associated with the Lua variable name; this was inherited from LED and is needed for some functions.

### See Also

<u>IupSetHandle</u>, <u>IupGetHandle</u>, <u>IupGetAllNames</u>.

# **IupGetAllNames**

Verifies the names of all interface elements defined.

### Parameters/Return

```
int IupGetAllNames(char *names[], int n); [in C]
IupGetAllNames(names: string table, n: numer) -> (num: number) [ir
iup.GetAllNames(names: string table, n: numer) -> (num: number) [i
```

**names**: table receiving the names **n**: maximum number of names the table can receive.

This function returns the number of names loaded to the table.

## **Lua Binding**

This name is not associated to the name of the Lua variable this was inherited from LED and is needed for some functions.

### See Also

<u>IupSetHandle</u>, <u>IupGetName</u>, <u>IupGetAllDialogs</u>.

# **IupGetAllDialogs**

Verifies the names of all defined dialogs.

### Parameters/Return

```
int IupGetAllDialogs(char *names[], int n); [in C]
IupGetAllDialogs(names: string table, n: numer) -> (num: number) [
iup.GetAllDialogs(names: string table, n: numer) -> (num: number)
```

**names**: table receiving the names **n**: maximum number of names the table can receive.

This function returns the number of names loaded to the table.

## **Lua Binding**

This name is not associated to the name of the Lua variable this was inherited from LED and is needed for some functions.

### See Also

<u>IupSetHandle</u>, <u>IupGetAllNames</u>.

# **IupMapFont**

Retrieves the name of a native font, given the name of the IUP font.

### Parameters/Return

```
char* IupMapFont(char *iupfont); [in C]
IupMapFont(iupfont : string) -> (nativefont : string) [in IupLua3]
iup.MapFont(iupfont : string) -> (nativefont : string) [in IupLua5]
```

This function returns the name of the native font.

### See Also

IupUnMapFont, FONT attribute

# **IupUnMapFont**

Retrieves the name of the IUP font, given the native font.

### Parameters/Return

```
char* IupUnMapFont(char *font); [in C]
IupUnMapFont(font :string) -> (iupfont : string) [in IupLua3]
iup.UnMapFont(font :string) -> (iupfont : string) [in IupLua5]
```

This function returns the name of the IUP font, given the native font. If such font does not exist, the function will return NULL.

### See Also

IupMapFont, IUP\_FONT

## **Character Fonts**

"COURIER_NORMAL_8"	"TIMES_NORMA
"COURIER_ITALIC_8"	"TIMES_ITALIC_
"COURIER_BOLD_8"	"TIMES_BOLD_{
"COURIER_NORMAL_10"	"TIMES_NORMA
"COURIER_ITALIC_10"	"TIMES_ITALIC_
"COURIER_BOLD_10"	"TIMES_BOLD_1
"COURIER_NORMAL_12"	"TIMES_NORMA
"COURIER_ITALIC_12"	"TIMES_ITALIC_
"COURIER_BOLD_12"	"TIMES_BOLD_1
"COURIER_NORMAL_14"	"TIMES_NORMA
"COURIER_ITALIC_14"	"TIMES_ITALIC_
"COURIER_BOLD_14"	"TIMES_BOLD_1
	"COURIER_ITALIC_8"  "COURIER_BOLD_8"  "COURIER_NORMAL_10"  "COURIER_ITALIC_10"  "COURIER_BOLD_10"  "COURIER_NORMAL_12"  "COURIER_ITALIC_12"  "COURIER_BOLD_12"  "COURIER_NORMAL_14"  "COURIER_ITALIC_14"

## **IupTimer**

Creates a timer which periodicaly invokes a callback when the time is up.

#### Creation

```
Ihandle* IupTimer(); [in C]
iuptimer() -> (elem: iuplua_tag) [in IupLua3]
iup.timer() -> (elem: iuplua_tag) [in IupLua5]
timer() [in LED]
```

The function returns the identifier of the created handle, or NULL if an error occurs.

### **Attributes**

**TIME**: The time interval in miliseconds.

**RUN**: Starts and stops the timer. Possible values: "YES" or "NO".

### **Callbacks**

```
ACTION_CB: Called when the time is up.
```

```
int function(Ihandle *self); [in C]
elem:action() -> (ret: number) [in IupLua]
```

**self**: Timer handle.

## **Examples**

## **IupUser**

Creates a user element in IUP, which is not associated to any interface element. It is used to map an external element to a IUP element. Its use is usually done by CPI elements, but you can use it to create an Ihadle\* to store private attributes.

### Creation

```
Ihandle* IupUser(void); [in C]
[There is no equivalent in IupLua]
[There is no equivalent in LED]
```

This function returns the identifier of the created element, or NULL if an error occurs.

## **IupGetType**

Verifies the name of the type of an interface element.

### Parameters/Return

```
char* IupGetType(Ihandle* elem); [in C]
IupGetType(elem: iuplua_tag) -> (name: string) [in IupLua3]
iup.GetType(elem: iuplua_tag) -> (name: string) [in IupLua5]
```

**elem**: Identifier of the interface element.

This function returns the name of the type of an interface element.

### **Notes**

The following names are predefined:

```
"unknown"
"color"
"image"
"button"
"canvas"
"dialog"
"fill"
"frame"
"hbox"
"item"
"separator"
"submenu"
"label"
"list"
"menu"
"radio"
"text"
"toggle"
"vbox"
"zbox"
"multiline"
"user"
```

# **IupHelp**

Opens the given URL. In UNIX executes Netscape passing the desired URL as a parameter. In Windows calls the default application that handle URLs.

In UNIX you can change the used browser setting the environment variable IUP\_HELPAPP. If set it will replace "netscape".

#### Parameters/Return

```
void IupHelp(char* url); [in C]
IupHelp(url: string) [in IupLua3]
iup.Help(url: string) [in IupLua5]
```

**url**: may be any kind of address accepted by the Browser, that is, it can include 'http://', or be just a file name, etc.

# iupMask

Functions to associate an input mask to a IupText or a IupMatrix element.

These functions are included in the **Controls Library**.

See the <u>Pattern Specification</u> for information on patterns.

#### **Functions**

```
int iupMaskSet(Ihandle *h, char *mask, int autofill, int casei) [i
int iupMaskMatSet(Ihandle *h, char *mask, int autofill, int casei,
```

These functions are responsible for setting the mask to be used.

**h**: Ihandle of IupText or IupMatrix

**mask**: Mask to be used

**autofill**: When "1", turns the auto-fill mode on. In auto-fill mode, whenever possible, literal characters will be automatically added to the field

**casei**: When "1", uppercase or lowercase characters will be treated indistinctly

**lin, col**: Line and column numbers in the matrix

They return 1 if the mask is set, or 0 if there is an error (e.g., invalid mask).

```
int iupMaskSetInt(Ihandle *h, int autofill, int min, int max); [ir
int iupMaskSetFloat(Ihandle *h, int autofill, float min, float max
int iupMaskMatSetInt(Ihandle *h, int autofill, int min, int max,
int iupMaskMatSetFloat(Ihandle *h, int autofill, float min, float
```

These functions set a mask that defines a limit to the typed number. Works only for integers and floats. Limitations: since the validation process is performed key by key, the user cannot type intermediate numbers (even inside the limit) if they are not following predetermined rules

**h**: Ihandle of IupText or IupMatrix

**autofill**: When "1", turns the auto-fill mode on. In auto-fill mode, whenever possible, literal characters will be automatically added to the field

min: Minimum value accepted in the fieldmax: Maximum value accepted in the field

**lin, col**: Line and column numbers in the matrix

They always return 1.

```
int iupMaskCheck (Ihandle *h); [in C or in IupLua]
int iupMaskMatCheck(Ihandle *h, int lin, int col); [in C or in Iup
```

These functions verify if what was typed by the user is valid for the defined mask.

**h**: Ihandle of IupText or IupMatrix **lin, col**: Line and column numbers in the matrix

They return 1 if the text satisfies the mask, or 0 otherwise.

```
int iupMaskGet(Ihandle *h, char **val); [in C]
int iupMaskGetFloat(Ihandle *h, float *fval); [in C]
int iupMaskGetInt(Ihandle *h, int *ival); [in C]
int iupMaskMatGet(Ihandle *h, char **val, int lin, int col); [in C
int iupMaskMatGetFloat(Ihandle *h, float *fval, int lin, int col)
int iupMaskMatGetDouble(Ihandle *h, double *dval, int lin, int col)
int iupMaskMatGetInt(Ihandle *h, int *ival, int lin, int col);
```

These functions check if the mask is complete, and they retrieve the field's value in only one call.

**h**: Ihandle of IupText or IupMatrix **val, fval, ival**: Pointers used to complete the return value **lin, col**: Line and column numbers in the matrix.

They return 1 if the text satisfies the mask, or 0 otherwise.

#### **Notes**

User callbacks previously associated to the text-editing field or to the Matrix field (that is, before the iupMaskSet function is called) will be called

by the library if the pressed key satisfies the mask. Attention: for the callback to be actually called, the user must call not only IupSetAttribute, but also IupSetFunction.

To make the use of masks simpler, the following predefined masks were created:

IUPMASK\_FLOAT - Float number
IUPMASK\_UFLOAT - Float number with no sign
IUPMASK\_EFLOAT - Float number with exponential notation
IUPMASK\_INT - Integer number
IUPMASK\_UINT - Integer number with no sign

### **Examples**

# iupMask - Pattern Specification

The pattern to be searched in the text can be defined by the rules given below. Note that such rules are very similar to the ones used by Lua, even though they are not the same. For further information on these patterns, please refer to the <u>Lua Manual</u>.

#### **Notes**

- "Function" codes (such as /l, /D, /w) cannot be used inside a class ([...]).
- If the character following a / does not mean a special case (such as /w or /n), it is matched with no / that means that /x will match only x, and not /x. If you want to match /x, use //x.
- The caret (^) character has different meanings when used inside or outside a class inside a class it means negative, and outside a class it is an anchor to the beginning of a line.
- The boundary function (/b) anchors the pattern to a word boundary it does not match anything. A word boundary is a point between a /w and a /W character.
- Capture operators (f and g) group patterns and are also used to keep matched sections of texts.
- A word on precedence: concatenation has precedence over the alternation (j) operator that is, faj fej fi will match fa OR fe OR fi.
- The @ character is used to determine that, instead of searching the text until the first match is made, the function should try to match the pattern only with the first character. If present, it must be the first character of the pattern.
- The % character is used to determine that the text should be searched to its end, independently of the number of matches found. If present, it must be the first character of the pattern. This is only useful when combined with the capture feature.

### Allowed pattern characters

С	Matches a c (non-special) character	
	Matches any single character	

[abc]	Matches an a, b or c	
[a-d]	Matches any character between a and d, including them (just like [abcd])	
[^a-dg]	Matches any character which is neither between a and d nor a g	
/d	Matches any digit (just like [0-9])	
/D	Matches any non-digit (just like [^0-9])	
/l	Matches any letter (just like [a-zA-Z])	
/L	Matches any non-letter (just like [^a-zA-Z])	
/w	Matches any alphanumeric character (just like [0-9a-zA-Z ])	
/W	Matches any non-alphanumeric character (just like [^0-9a-zA-Z ])	
/s	Matches any "blank" character (TAB, SPACE, CR)	
/S	Matches ant non-blank character	
/n	Matches a newline character	
/t	Matches a tabulation character	
/nnn	Matches an ASCII character with a nnn value (decimal)	
/xnn	Matches an ASCII character with a nn value (hexadecimal)	
/special	Matches the special character literally (/[, //, /.)	
abc	Matches a sequence of a, b and c patterns in order	
aj bj c	Matches a pattern a, b or c	
a*	Matches 0 or more characters a	
a+	Matches 1 or more characters a	
a?	Matches 1 or no characters a	
	Considers pattern as one character for the above	
fpatterng	Captures pattern for later reference	
/b	Anchors to a word boundary	
/B	Anchors to a non-boundary	
^pattern	Anchors pattern to the beginning of a line	
pattern\$	Anchors pattern to the end of a line	
@pattern	Returns the match found only in the beginning of the text	
%pattern	Returns the firstmatch found, but searches all the text	

# Examples

` ' '	Matches both my pattern and his pattern.
/d/d:/d/d(:/d/d)?	Matches time with seconds (01:25:32) or without seconds (02:30).
III	Matches names such as Australia, Bolivia, Canada or Denmark, but not England, Spain or single letters such as A.
/l/w*	my variable = 23 * width;
^Subject: [^/n]*/n	Subject: How to match a subject line.1
/b[ABab]/w*	Matches any word that begins with A or B
from:/s*/w+	Captures "sender" in a message from sender

# **History of Changes of Version 1.x**

### Version 1.9.1 (17/Oct/2002)

#### General

• Version number now resides in iup.h (it is also included in the library during compilation.)

#### Windows Driver

- IupLabel with \n was not working.
- Line-break in attribute IUP\_TIP is now accepted.
- Double-click in the Windows top-left corner made the program crash.
- IUP\_READONLY was only accepted if used before IupMap in a IupText or IupMultiline.
- Windows Driver was limiting initial elements of a IupList to 999.
- New attribute FULLSCREEN created.
- The codes of the numeric keyboard when the CapsLock was turned on were not mapped correctly to IUP.
- New callback added MENUSELECT\_CB (called when the mouse hovers over a menu or item.) not fully implemented.

#### **Motif Driver**

- IUP\_MOTFONT did not accept IUP fonts. Now it accepts both native fonts and IUP fonts.
- It is acceptable now to select an option in a popup menu with any mouse key.
- Attribute IUP\_STATUS in a filedly was not working in a silicon.

### **IupLua**

- Better error messages.
- In the iuptree control, the callback BRANCHOPEN\_CB was not passing

- the node parameter.
- In the iuptree control, new functions were implemented to associate and retrieve a Lua Table from a node or leaf.
- IupGLCanvas binding.

### **IupTree**

- Expand and collapse no more alters selection of elements.
- When all nodes were deleted using "DELNODE0", "CHILDREN" inside a tree\_selection callback, the program crashed.
- BRANCH\_OPEN now passes parameter node.
- IUP\_DEPTH now works for folders and leaves. Attention: the depth works only with the appointed element, not with its children.
- Some conditions necessary for a DEPTH change were wrong.
- Redraw optimization.
- When a tree was big, the scrollback was not working properly.
- When the tree was totally expanded and the scrollbar was all down, collapsing folders made the thumb be wrongly calculated.
- PGDN and PGUP were stopping in any folder that was closed.
- Even when the user did not want a folder or leaf to be selected, sometimes the tree allowed it.
- When the tree's folder does not have children, an empty box is shown next to it (instead of the + and symbol.)
- Sometimes an error occurred in selection when a double click was done in a tree.
- Callback RENAMENODE\_CB now works correctly.
- When the TreeSetValue function was used to define a tree, using a folder with no leaves made the program crash.
- New attribute "COLORid" allows the text color to be changed.

### **IupTabs**

IUP\_REPAINT was not repainting the elements in its interior.

### **IupMatrx**

• The attributes IUP\_DEFAULTESC and IUP\_DEFAULTENTER of a dialog were not working in Windows (they work only when the matrix is not in

- edition mode.)
- The matrix did not show the selected elements when the focus passed to another interface element.
- In a dropdown, when the user left edition mode changing the focus away from the matrix, the previously entered value was lost.
- Selection with the control key now works for selecting and deselecting.
- The cell with the input focus now draws the selection status.
- The attribute IUP\_MARKED now works after the matrix is mapped.
- The matrix now starts with no cell selected.
- Clicking on the first column of a marked line with MARK\_MODE LIN now also deselects the line.
- When MARK\_MODE is LIN, COL or LINCOL the selection is not done on the focused cell.
- When MARK\_MODE is CELL and MULTIPLE is NO the whole line cannot be marked.
- When MARK\_MODE is NO nothing can be selected.
- The [TAB] key in the matrix now changes focus to next element.
- When MARK\_MODE was NO (default), after leaving the edition mode with [ENTER] the cell was being marked.

### **IupVal**

- Mousemove is now standardized.
- Idle is not used anymore (better optimization and code simplicity.)
- Minimum and maximum value when different from 0 and 1 now work.
- Clicking a position in the middle of the IupVal now work correctly.

### Version 1.9.0 (18 Dec 2001)

#### General

- The K\_ANY callback now considers the state of the CAPSLOCK key. The native behavior of the combination of the keys CAPSLOCK and SHIFT was kept.
- New binding for IUP: Lua 4.0.
- New binding for IupMask.

#### **Windows Driver**

- Driver Windows now deals only with messages generated for IUP elements (this used to be a problem with CD's print dialog).
- Label fonts did not work when set before IupMap.
- Attribute IUP\_FILTERUSED now can be set on before the creation of IupFileDlg.
- Tip in Windows now accepts \n.
- Tip in Windows is now modified immediatly after it is set though programming.
- Tip now can be removed immediatly.
- In a SubMenu, the attribute ACTIVE was not working propertly.
- The OPEN\_CB callback was implemented in the SubMenu.

#### **Motif Driver**

- Callback OPEN\_CB in a SubMenu was providing wrong parameter.
- Attribute IUP\_BORDER in a dialog was working differently from the manual when the window manager was sawfish.

### **IupMask Control**

- IupMask was becoming unstable when the user set the attribute IUP\_SELECTION in a IupText.
- There was a bug in the IupMask-IupMatrix combination.

### **IupMatrx Control**

- Adding a new column or line is now correctly dealing with color inheritance.
- There was IUP\_MARK\_MODE defined but not: IUP\_LIN, IUP\_COL, IUP\_LINCOL and IUP\_CELL.
- The drop\_cb callback was being called for any focus change. It is now being called just when the matrix enters edition mode.
- The matrix was not showing the selected cells when the user changed focus from the matrix.
- The matrix was not calling K\_ANY from the parent if the callback had been set after matrix creation.
- IUP\_RIGHTCLICK\_CB is now called IUP\_CLICK\_CB. This callback is now called for every mouse button.

• New callback IUP\_MOUSEMOVE\_CB.

### **IupTree Control**

- Attribute IUP\_MARKED now also sets.
- IupTree's binding now exports functions to set and get ID.
- Redraw is now done with one attribute. This avoids unecessary redraw when the user wants to insert a lot of data.
- IupTree now takes leafs and nodes before IupMap.
- Clicking to select a LEAF was not always working in Windows.
- BRANCHOPEN and BRANCHCLOSE callbacks were not testing the return value correctly.
- Double clicking was not working propertly. When the user clicked a node, while the timer was still waiting for the second click, it was impossible to click a nother node.
- Hitting the space button with CTRL pressed now marks the element immediatly.
- SELECTION\_CB callback was created. This callback is called when any type of mark is made on the Tree. The return value blocks this action.
- Removed callbacks BEFORESELECTION\_CB and AFTERSELECTION\_CB.
- Setting IUP\_VALUE though programming does not activate callbacks anymore.
- Keyboard control, including arrow keys, PGUP, PGDOWN, HOME e END were not working propertly.
- Clicking + or was not activating the SELECTION\_CB callback.
- SELECTION\_CB is now in the binding. BEFORESELECTION\_CB and AFTERSELECTION\_CB are not.
- The IUP\_MARKEDid attribute now returns IUP\_YES or IUP\_NO depending on the state of the node's mark. If the node does not exist, the returned value is NULL.
- IupTree was breaking when it tried to erase a marked node inside BRANCHCLOSE CB.
- The BRANCHCLOSE\_CB callback was not being called for the correct node.
- SELECTION\_CB was included in the binding.
- Including a new leaf now does not alter selection.

### **IupGL Control**

• Created attribute "ERROR" indicating error in a GL canvas.

### **IupCB Control**

• User canvas was not being reactivated after the mouse callbacks.

#### **IupLua**

- IupGetGlobal and IupSetGlobal were not doing toupper.
- New function created to get an Ihandle created in C: IupGetFromC.
- The IUP\_BUTTON\_CB callback was not being called.
- Functions isshift, iscontrol, isbutton1, isbutton2, isbutton3 and isdouble are now exported.
- IupPreviousField and IupNextField were not implemented.
- The OPEN\_CB callback was implemented in the binding with the name OPEN.
- New callback IUP\_MOUSEMOVE\_CB for matrix.

### Version 1.8.9 (07 May 2001)

### **IupMatrx Control**

- If the user defined FGCOLOR while the matrix was in edition mode, the application crashed.
- Hitting Esc was causing garbage to be written in the matrix field.
- A bug that made the value\_edit callback be called several times was fixed (it was called several times because the matrix kept trying to exit the edition mode with other events).

### **IupTree Control**

- New IupTree control.
- Scrollbar.
- Multiple selection.
- Default image size: 16x16.
- Lua Binding.

### **IupCB** Control

• The name of the Lua colorbrowser element has changed. Now it is called iupcb, not cb.

#### **Windows Driver**

- The IUP\_MULTIPLEFILES attribute was created. Now it is possible, in Windows, to select several files in a FileDlg.
- IupHelp now only initializes DDE when it is used.

### Version 1.8.8 (15 Mar 2001)

- The global.h, macros.h, rgb.h and hls.h files are no longer exported by IUP.
- Some keys were in conflict among themselves (shift-home and 4, for instance). Shift-space and Ctrl-space were added to the K\_ANY callback (Windows and Motif).
- IUP\_VISIBLE was returning NULL on IUP when the dialog was not mapped.
- IupSetLanguage can now be called before IupOpen();
- iuptoolbar and iupfiletext were removed from the distribution.

#### **CPI**

- Several defines (such as strieq) are no longer exported from iupcpi.h
- Functions iupAddSymbol, iupGetSymbol, iupgetdata and iupsetdata are no longer exported from the CPI.

#### **Motif Driver**

- The Tip font is now inherited from the element it belongs.
- Inserting a text (IUP\_INSERT or IUP\_APPEND) on Motif was ignoring the maximum number of characters.
- Some ITALIC fonts were not working.
- Several visibility problems were fixed for ZBOX inside a ZBOX.
- The default value of the ALLOWNEW attribute (in fileopen mode) allowed

creating a new file (now standardized).

### **IupTabs Control**

- IupTabs was not considering attribute IUP\_ALIGNMENT.
- Tabs was not showing the selected element if it was selected while the Tabs was invisible (it was a Motif bug).
- The <TAB> key was neither passing the focus to IupTabs nor taking the focus off it.
- The SIZE attribute is now defined for the tabs of IupTabs ICTL TABSIZE.
- Changing the text value for Tabs was not recomputing the Tabs size.
- The appearance of IupTabs was enhanced.
- IupTabs now sends the focus back to the first element when the user tries to shift right after the last element.
- Now a redraw can be forced on Tabs with the IUP\_REDRAW attribute.

### **IupMatrx Control**

- Ctrl+arrows was not working properly.
- The behavior of the DEL key to delete a set of cells now also considers the return of the IUP\_EDITION\_CB callback.
- The mark is now shown (not the focus) when matrx loses the focus (users were having problems when wishing to hit a button to cause an action over the matrix).
- Oh the NT platform, the fields of the created matrix had the wrong values when an automatic scroll occurred.
- Right-clicking the matrix now passes the control parameter (as in BUTTON\_CB) isshift(r), iscontrol(r), isbutton1(r), isbutton2(r), isbutton3(r), isdouble(r)
- Vertically scrolling by dragging the thumb now works properly.
- The focus is now correctly drawn inside the matrix (when only half the cell appears, half of the focus is drawn).
- When leaving the edition mode by clicking an element outside the matrix, the focus was remaining on the IupText in the matrix.
- Colors and alignments are now moved when a cell is moved either by adding new lines or columns or by deleting lines or columns.
- The matrix now leaves the edition mode whenever lines or columns are

removed.

 When the user clicked a cell near the end of the matrix (on the x coordinate) an automatic scroll was made and the cell beside the desired cell was marked.

#### **Windows Driver**

• KEY in IupItem was replicating the underlined KEYs (and some times adding the wrong values because of that).

#### IupLua.exe

• Now works properly with all controls.

#### **IUP Manual**

- All elements now have examples at least in IupLua and C.
- The IupMask manual was created.

### Version 1.8.7 (23 Nov 2000)

- The alignment of composition elements can now be changed on-the-fly.
- Current language treatment has been changed. ATTENTION: previous putenv no longer works! Use new functions IupSetLanguage and IupGetLanguage. Default language: Portuguese.
- IupAlarm's design was reformulated. Now all buttons have the same size.
- Functions IupUnMapFont and IupMapFont were created to make the use of the driver's fonts easier.
- Attribute IUP\_FONT now accepts a string either with the native font or the IUP font, and always returns the native font (attributes WINFONT and MOTFONT are now obsolete).

#### **Motif Driver**

- Motif did not have K\_ANY for IupList in dropdown mode.
- The IUP\_VISIBLE attribute now works for FRAME, ZBOX, VBOX, HBOX and RADIO (all elements were tested). Now it is no longer lost for

- internal HBOX elements when the HBOX visibility is changed.
- When the user changed from one ZBOX to another, the first one was forgetting which elements were visible.

#### Windows Driver

- When Toggle 1 (default) begins deactivated, it no longer remains marked forever.
- Toggle with image now accepts images IUP\_IMPRESS and IUP\_IMINACTIVE, but it follows the Windows standard for Toggle manipulation.
- Toggle was not verifying whether it was active or not when it was created.
- Canvas redraw was optimized. The canvas now uses transparent color as default. The user is in charge of drawing the canvas, but now it no longer "blinks" when a redraw is made. Tip: To avoid unnecessary canvas redraws, do not put it inside a frame and use the IUP\_CLIPCHILDREN attribute.
- Initializing Toggle (or Radio) with a value and then modifying it via callback was marking both toggles.
- Changing Toggle's color (IUP\_FGCOLOR) was not working on Windows unless its background color was also changed.
- IupItem outside a submenu was not calling the callback.
- On Windows, the IUP\_HOTSPOT attribute was being read incorrectly (the correct form is with ':').

### **IupMatrix Control**

- DROPDOWN's function in Matrix was corrected. Now the user fulfills the dropdown values, which always start at position 1. If the user wishes, he/she can set the initial dropdown value by checking the IUP\_PREVIOUSVALUE attribute about the dropdown element passed as parameter. This attribute returns the previously selected string value.
- Dropdown now enters "edition mode" just as regular fields do.
- Dropdown can automatically close after the user's choice. Simply return IUP\_CONTINUE for the callback chosen by the dropdown.
- Now the dropdown accepts the ESC key, restoring its previous value.
- An element with focus is now drawn with double focus.
- The color of a selected element is now 20% attenuated.
- When the user entered edition mode using the mouse and exited it hitting

- ENTER, the cell remained selected.
- Matrix no longer gets lost when it has 0 lines.
- Matrix was not accepting a user to return a constant string with '\n' from a callback.
- A Matrix that loses the focus does not lose the selection (but it is not apparent).
- TAB no longer changes cells in the Matrix (it now changes IUP elements).
- Hitting 'delete' on a marked element deletes everything.
- Matrix leaves the edition mode when IupText's exit arrows are used.
- There was a computation mistake in cell size when the Matrix was in edition mode.
- When the user scrolls, the Matrix exits the edition mode.
- ALL problems caused by cdActivate in Matrix were solved.

#### **Other Extended Controls**

- The element from IupGL was not getting the focus when it was the only element in the dialog.
- In IupGL, OpenGL now synchronizes its functioning with Motif (glXWaitX) at resize.
- IupGC now works with IUP\_ENGLISH's variable set (cancel/cancela, red/Verm, etc.)
- IupGauge now accepts changing text or percentage values on-the-fly.
- Tabs font now has a differentiated color when it is inactive.

### **IupLua**

- IupScanf at IupLua was not performing the final dialog's popup.
- IupSetLanguage, IupGetLanguage, IupMapFont and IupUnMapFont were created at IupLua.
- It now considers the IUPLUA\_QUIET attribute.
- The callbacks in IupLua are now inherited (eg.: k\_any from a dialog is called when IupCanvas does not have k\_any).
- The library's opening message now follows a standard.
- IupLua was passing Lua's pointer to IUP instead of copying its value in IupSetHandle (making it crash).

### IupLua Program

- iuplua was not running with IupVal and IupGetColor.
- iuplua now accepts several files as a parameter.
- iuplua is now joined with iupluafull
- iuplua now shows line number and cursor column.

### Version 1.8.6 (21 Jun 2000)

- All libraries were generated for AIX 4.3.2, which is available in new IBM machines.
- A series of memory management problems was solved for all platforms.
- Attribute IUP\_SELECTEDTEXT now can also be used to change the selected text in a IupText and IupMultiline field.
- The IupLabel element now takes the IUP\_ALIGNMENT attribute into account.
- The IupList (dropdown) element now always leaves some option selected (unless there is none to select).
- When the selected elements value in IupList (dropdown) is changed, it now remains selected with the new value.

#### **User Manual**

- The user manual is now also available in several Windows Help formats, including the help format for Visual C++ (5 and 6). To configure your account for Visual C++ to access IUP's Help, run W:\iup\help\iuphelp.reg (ATTENTION: On Visual Studio, IUP's manual must be activated and deactivated through option "Help -> Use extension Help"). Other available formats can be found at W:\iup\Help.
- A general revision of the user manual is being made.
- The CPI manual was rewritten.
- Several examples were included.
- An application called "iupluatest" (W:\iup\bin) was created to run the IupLua examples included in the manual (it works with the controls using the installed DLLs).

#### **Windows Driver**

• There is no longer any restriction for the number of dialogs created using IUP (the only limitation now is Windows' capacity to create native

- elements).
- Events of IupButton and IupToggle were being improperly called when a IupHide or a IupShow was made on the dialog.
- A bug when drawing an image associated to a IupToggle element was fixed.
- The functioning of attributes IUP\_DEFAULTENTER and IUP\_DEFAULTESC was corrected.
- Now, when a user changes the selection of a multiple IupList via programming, IUP internally updates the selection.
- The IUP\_BGCOLOR attribute to define a new cursor was not standardized with the Motif driver, and color 0 in the Windows image was never allowed to be transparent.
- A bug in the dropdown list was fixed. It was not calling callback GETFOCUS\_CB, causing instability in the IupMatrix element).
- The transparency color in a cursor now must be color number 0 (according to the manual, this is the way it was supposed to be).
- The IupList (dropdown) callback is no longer called for element 0 (which does not exist).
- A button in a Popup dialog was only allowing to be pressed via mouse. Now it can be pressed with the space key.
- The "IupSetAttribute(x,IUP\_VISIBLE,IUP\_YES)" call, when x was a dialog, was not working.
- Calling IupHide with a frame, with [hvz]box or with radio was not the same thing as calling "IupSetAttribute(n,IUP\_VISIBLE,IUP\_NO)".
- The IUP\_MOUSEPOS position in a dialog's IupPopup was not functioning.

#### **Motif Driver**

- Several memory leaks were fixed. They occurred when IupGetAttribute called functions from XM which allocated memory to store the attribute's value. This change may cause problems for applications which did not copy the value returned from IupGetAttribute and used the returned string. This usage of the return value from IupGetAttribute is not appropriate, because the user has to copy this string if he/she intends to remain using it (the returned string is intern to IUP).
- The dialog's Close callback was not closing the application when it returned IUP CLOSE.
- The IUP\_ACTION callback from IupMultiline was not returning the new text value if the key was validated (parameter *after*).

- The dropdown list was not automatically showing the first element when it was opened.
- The Motif driver now returns the default font when "IupGetAttribute(n,IUP\_FONT)" is performed.

### **IupLua**

- The names of callbacks show\_cb and map\_cb were corrected.
- A bug that made a toggle image not appear was fixed.

#### **Extended Controls**

- The default cursor of the IupMatrix element now looks like the MS Excel cursor. (Remember to call IupMatrixOpen() even when using IupLua!)
- Alignment (center) of the field in column 0 of the IupMatrix element.
- The user can now return IUP\_CONTINUE at the action callback of element IupMatrix to allow IUP to go on treating pressed keys in the conventional IUP way.
- The dropdown list at IupMatrix was losing its current value when the user changed cells.
- The IupGetColor element was being drawn outside the canvas (old problem in cdActivate).
- The font in IupTabs is now inherited.
- Attributes ICTL\_ACTIVE\_FONT, ICTL\_INACTIVE\_FONT, ICTL\_FONT were implemented in the IupTabs element.
- Attribute IUP\_MARGIN was implemented for the IupGauge element.

### Version 1.8.5 (18 Apr 2000)

- The versions of libraries IUP and IupLua were synchronized. From this version on, these tools will be distributed together.
- The library generation mechanism was changed to use libmake. All DLLs are available and following the same standard as the DLLs of other Tecgraf libraries.
- A FAQ was created for IUP: <a href="http://www.tecgraf.puc-rio.br/~mark/iup/faq-iup.txt">http://www.tecgraf.puc-rio.br/~mark/iup/faq-iup.txt</a>.
- Several memory management problems were fixed.

- Attribute IUP\_DIALOGTYPE can now assume three values: IUP\_OPEN, IUP\_SAVE and IUP\_DIR. Due to the creation of IUP\_DIR, the IUP\_ALLOWDIR attribute is no longer used.
- One more value was added to attribute BGCOLOR: IUP\_TRANSPARENT (used only by the Canvas to avoid unnecessary drawing).
- Function IupGetError was removed from iup.h.
- Function IupDataEntry was removed from iup.h.

#### **Windows Driver**

- Function iupdrvSetIdleFunction was added to make the Windows driver compatible with Motif.
- The bug that made IUP crash when using MessageBox inside a button callback was fixed.
- IupDestroy now reconfigures the button control function (it was making IUP crash).
- The IUP\_READONLY attribute was implemented (valid for Text and Multiline).
- The IUP\_FILTERUSED attribute was implemented: it informs which is the filter selected by the user (1, 2, 3...).
- A bug that caused IupPopup(IupMenu(item)) not to call the item's callback was fixed.

#### **Motif Driver**

- IupDestroy was corrected. In a IupFrame, it made IUP crash.
- IupList was corrected. It crashed when the user changed its elements and tried to set IUP\_VALUE.
- The memory leak at IupGetFile was removed.
- List elements were not being correctly deleted.

### **IupMatrix Element**

- The bug in the NT matrix was fixed. It was not refreshing added elements (the values on the cells were wrong).
- The bug in the scroll matrix was fixed.

### Version 1.8.4 (09 Dec 1999)

#### **Windows Driver**

- A problem, which called the dropdown callback even for an already-deleted element, was fixed.
- Function IupHelp is now available.
- A bug was fixed; it caused excessive system resource usage when dialogs with several elements were used.
- The size of the version dialog was corrected.
- A bug was fixed; it made IUP crash depending on the use of MessageBox. Same for IupFileDialog.
- Callback IUP\_BUTTON\_CB was added for the IupButton element.
- A bug was fixed; it made IupGetInt(d,IUP\_X) return a wrong value when the dialog was maximized.

#### **CPI Controls**

- The color inheritance problem was fixed.
- Corrections were made to the Dial size.
- Attributes of colors FGCOLOR, BGCOLOR, and fonts FONT, WINFONT, MOTIFFONT.

### Version 1.8.3 (15 Jun 1999)

#### **Windows Driver**

- The IUP\_ACTIVE attribute now also works in the frame.
- The action callback in Multiline now also accepts the DEL key.
- Toggle element now accepts an image.
- The IUP\_TOOLBOX attribute was implemented for dialogs.
- A bug was removed; it made a second IupShow in a dialog reset its position to the center of the screen.
- Treatment of the SIZE and RASTERSIZE attributes was changed.
- The IUP\_ACTION callback now treats the DEL key and commands and keys from the Cut and Paste menu.

- A conflict was solved; it made the key generate a call to the callback as if it were key ' (plic).
- Keyboard accelerators for menus now work, since the focus is no longer on the dialog. When a dialog receives the focus back, it sets the focus to the last control inside it that had the focus.
- IUP\_K\_ANY no longer issues beeps when keys are pressed on the canvas.
- When the IUP\_STARTFOCUS attribute is not defined, the focus is set for the first control in the dialog that accepts it, thus preventing the dialog from keeping the focus and allowing the menus to be called via accelerator.
- Attribute IUP\_SELECTION was implemented.

#### **Motif Driver**

- Color management for 8bpp displays (256 colors) was re-implemented. Basic colors used by IUP (black, white and the grays used for highlight and shadow) are now reserved, and the search for colors in the palette was optimized.
- Elements such as IupCanvas now have their own visual, independent from their "parent's". If allowed by the display, the default visual of a canvas will be TrueColor (24bpp); if not, it will be the same as the default display visual.
- The IupToggle element now processes the IMAGE attribute differently: it now shows the toggle with the same appearance as the IupButton element, but maintaining its functionality the button remains pressed until the user clicks it again. The IMPRESS attribute can be used to define the image used for the pressed button. In this case, the user is in charge of giving it a 3D appearance.
- IMPORTANT: The size of the dialog can be adjusted after being mapped, by means of the SIZE and RASTERSIZE attributes
  - The size of the dialog has now precedence over the smallest size required by its children (either having been specified in its creation or in run-time).
  - Attributing a NULL value to the SIZE or RASTERSIZE (in C) of a dialog will re-compute its size according to the size of its children.
  - Partial dimensions (###x and x###) are now treated correctly.
  - Therefore, applications that define sizes for dialogs (either in LED or in C) smaller than the minimum size required by their children will show truncated dialogs. To force a computation based on the size of

the children, set any of these attributes to NULL (in C) or simply do not define them in LED. As a general rule, avoid specifying a dialog size unless there is a real need for such – in this case, be careful to specify a sufficient size.

### • IupFileDlg:

- The default value for the DIALOGTYPE attribute was not being recognized (the program aborted when there was no defined value).
- When ALLOWNEW = NO, the dialog informs if the user is specifying a non-existing file (instead of simply returning, as was happening).
- ∘ When the dialog type was OPEN, the returned value was −1 (Cancel) even when the user confirmed the operation.
- If DIALOGTYPE is SAVE, a confirmation is required if the file already exists.
- A new dialog was created for each popup without destroying the previous dialog.
- The NOCHANGEDIR attribute was implemented.
- The dialog does not return if the user specifies a new file when attribute ALLOWNEW = NO. The same happens when attribute ALLOWDIR = NO and a directory is specified. In these cases, alerts are shown.
- The iupGetColor function for CPI controls was replaced in functionality by the iupGetRGB function (iupGetColor is maintained for compatibility purposes, but it should no longer be used).
- TRUECOLORCANVAS was created. It indicates if the display allows the creation of TrueColor windows (> 8bpp), even if the default is PseudoColor.
- Tabs: a problem was fixed concerning the use of the VISIBLE attribute for elements belonging to a non-selected tab.
- IupHelp: allows using a browser (default = Netscape) for viewing HTML pages.
- The ACTION\_CB callback, from IupText, now receives, apart from Ihandle\* and int, a char\* pointing to the new text value in case the key is confirmed.
- Dropdown lists were not correctly processing the VISIBLE attribute.
- A problem with the initialization of multiple-selection lists was solved: the VALUE attribute was not being respected in some cases.
- Attributes FGCOLOR and BGCOLOR from the dropdown list were not being correctly updated.
- IupLoopStep was re-implemented: now it no longer blocks when there are

- no events to be processed (it simply returns DEFAULT).
- The dropdown list is closed when the associated textbox is totally or partially darkened.
- The dropdown list was not being closed when the dialog lost the focus if IupIdle was registered.
- A problem in the exhibition of CPI controls was fixed.
- New return code (CONTINUE) was created, specific for key callbacks, to be used when the event is to be propagated to the parent of the element receiving it.
- In some situations, elements destroyed by means of IupDestroy were receiving events, making the application abort.
- The redefinition of items in the main menu was making the dialog return to its original size.
- Consulting attribute BGCOLOR in a dropdown list was aborting the application.
- Consulting attributes BGCOLOR and FGCOLOR of a canvas with a different visual from the default was generating an X-Windows error message.
- The problem with IupFileDlg was fixed (the application was aborting).
- IupDestroy in a bar menu was inducting an infinite loop to the application.
- The list now matches the documentation: it calls the action callback for the de-selected element (with the v = 0 parameter).
- Bug correction: The use of a Motif attribute instead of a function was making Motif lost control of memory management (memory already liberated was liberated again, which aborted the application).
- ACTION in IupText caused SIGSEV when the user pressed ENTER.
- New IupMapFont for mapping IUP fonts -> Motif.

### Version 1.8.2

### Windows Driver (12 Jan 99)

- Function char\* IupMapFont( char\* font ) converts a IUP font describer (used by the IUP\_FONT attribute) into a native font describer (used by IUP\_WIN\_FONT).
- File Drag & Drop was implemented in dialogs and canvases, via the IUP\_DROPFILES\_CB callback.

- Attribute IUP\_EXTFILTER was implemented for the IupFileDlg control, allowing the use of more than one filter.
- Changes were made to allow the creation of CPI elements other than CANVASes or dialogs.
- The IUP\_ACTIVE attribute of a dialog can now be changed after it was mapped.
- List callback correction: the callback is now called both for selected and not selected items.
- New function void IupHelp(char \*url) shows a URL in a Netscape window.
- The treatment of the new return value for keyboard callbacks, IUP\_CONTINUE, was implemented.
- IUP\_CURSOR attribute was implemented.
- A code was added to treat the case of toggle de-selection via IupSetAttribute.
- IUP\_CARET now uses ',' as a separator instead of old ':'.
- A restriction was eliminated that prevented the function iupGetTextSize from being called passing a dialog or frame as a parameter.
- New text callback was implemented; it receives the text both before and after the change, and receives the code of the typed key.
- It was possible to set two activated radio toggles by selecting VALUE for one of them on the radio and VALUE = ON on the other toggle.
- Attributes IUP\_STARTFOCUS, IUP\_DEFAULTENTER and IUP\_DEFAULTESC were implemented.
- The IUP\_VALUE of a IupRadio was not allowing to be changed if it was not visible.
- A problem was corrected for the lists, which were being reset between a IupShow/IupPopup and another.
- Attribute IUP\_SELECTEDTEXT was implemented. It returns the selected text (if there is any), with the '\r' already filtered.
- A bug was corrected; it caused and "Assertion Failed" when the mouse was moved after a window was destroyed.
- The value of IUP\_VALUE of a IupText and a IupMultiline now does not contain '\r'.

### **Motif Driver v1.8.2 (14 Aug 98)**

• IupFileDlg was corrected: the IUP\_FILE and IUP\_DIR attributes were not being treated correctly.

• In some specific situations, closing a dialog could lead to the end of IupMainLoop, causing an abortion of the application.

#### Version 1.8.1

### Windows Driver v1.8.1 (17 Jul 98)

- Correction: IUP's Matrix element was being shown with different fonts from the ones used by IUP, especially on UNIX platforms.
- A bug related to ZBOX was fixed.
- IupAppend on Multiline now includes '\n' at the end of the text.
- A font set by CD no longer affects canvas size computation.
- IupSetAttribute from a IupRadio's VALUE with the name of a toggle with more than one name now works.
- Default attributes now store values that match the documentation.
- Function IupFlush was implemented.
- Small errors in dialog size computations were corrected.
- Now the dialog size is changed when the size of one of its children increases.

### Motif Driver v1.8.1 (16 Jun 98)

- Correction: IUP's Matrix element was being shown with different fonts from the ones used by IUP, especially on UNIX platforms.
- Dropdown list (combo box) remained opened if the element was hidden or destroyed.
- The use of popup dialogs was sometimes preventing the last IUP\_CLOSE (or IUP\_DEFAULT) from ending IupMainLoop.
- [LINUX] The button press event was not being received by the canvas when the CTRL key was pressed.

### Version 1.8 (29 May 98)

- General (also includes changes to both drivers)

- BUG: Valuator, Dial and Gauge could cause an invalid memory access on resize or destroy.
- BUG: The parse of CPI elements described in LED was corrected.
- BUG: Valuator was removing the application's idle action.
- NEW: FILEDLG control.
- NEW: IupStoreAttribute function.
- NEW: IupSetfAttribute function.
- NEW: IupSetGlobal, IupGetGlobal and IupStoreGlobal functions for global attributes.
- NEW: K\_sCR key; shift-enter combination is now treated by IUP (callback: IUP\_K\_sCR, code: K\_sCR).
- NEW: IUP\_TYPENAME attribute returns the name of the element type.
- NEW: CPI popup method.
- NEW: Definition of global attributes (verification only) IUP\_VERSION, IUP\_DRIVER, IUP\_SYSTEM and IUP\_SCREENSIZE.
- NEW: Attributes IUP\_X and IUP\_Y were implemented, for dialogs only.
   They provide the dialog's upper left corner coordinates in relation to the upper left corner of the screen.
- NEW: IUP\_SHRINK attribute to change the computation of the position and size of elements.
- NEW: CPI control for an OpenGL canvas.
- CHANGE: The IUP\_TYPE attribute of the IupFileDlg control was changed into IUP\_DIALOGTYPE, which must contain OPEN, SAVE or NULL.
- CHANGE: The IupSetAttributes function now returns the Ihandle\*.
- CHANGE: The IupSetAttribute function no longer returns the old value.
- CHANGE: CPI's create method now creates the handle.
- CHANGE: New function for CPI class creation.
- CHANGE: Some obsolete definitions of iup.h are now only available when the IUP COMPAT macro is set.
- CHANGE: The ICTL\_TYPE attribute of the IupTabs control was changed to ICTL\_TABTYPE.

### - Lua Binding

• NEW: iupkey\_open function allows using IUP's key definitions in Lua.

#### - Windows Driver

- NEW: Image now accepts "BGCOLOR" color. This turns the color associated to the index into the background color of the element linked to the image.
- BUG: the IUP\_TITLE attribute of the IupItem element can now be changed after the element has been mapped.
- BUG: A color problem was fixed; it occurred when the name or path of the executable file contained spaces.

#### - Motif Driver

- BUG: The dropdown list no longer remains on the screen.
- BUG: The computation of scrollbar attributes POSX and POSY was fixed.
- BUG: Double-click was only being generated for the first button.
- BUG: FRAME layout was corrected.
- BUG: The color of the menu item was corrected.
- BUG: The management of the nested elements of a ZBOX and/or with the VISIBLE attribute defined for its children was fixed.
- BUG: The color remained undefined when the value of attribute FGCOLOR or BGCOLOR was not valid.
- BUG: General cleaning was made to remove memory leaks from the driver.
- NEW: Attributes IUP\_X and IUP\_Y to provide the pixel position of any element.
- NEW: Attribute IUP\_RASTERSIZE can be consulted.
- NEW: Menu item now accepts '\t' to align the text to the right Windows already allowed it.
- NEW: Version number was added; can be retrieved with tecver.
- CHANGE: Multiline's scrollbar is no longer deactivated with ACTIVE=NO.
- CHANGE: Multiline's and list's BGCOLOR no longer affects the scrollbars.

#### Version 1.7

• The implemented code was made compatible with manual specifications. iup.h was changed to reflect that. To use old definitions, set IUP\_COMPAT before including the iup.h file to the applications.

# **Tecgraf/PUC-Rio Library Download Tips**

All the libraries were build using **Tecmake**. Please use it if you intend to recompile the sources. **Tecmake** can be found at <a href="http://www.tecgraf.puc-rio.br/tecmake">http://www.tecgraf.puc-rio.br/tecmake</a>.

The documentation files already include CHM and PDF versions. But they are also provided as a separate download.

Some of the libraries depends on the **Lua** libraries. Precompiled binaries of the **Lua** libraries build at Tecgraf are available at <a href="http://www.tecgraf.puc-rio.br/download">http://www.tecgraf.puc-rio.br/download</a>.

The IM library can be downloaded at <a href="http://luaforge.net/project/showfiles.php?group\_id=86">http://luaforge.net/project/showfiles.php?group\_id=86</a>. The IUP library can be downloaded at <a href="http://luaforge.net/project/showfiles.php?group\_id=88">http://luaforge.net/project/showfiles.php?group\_id=88</a>. <a href="http://luaforge.net/project/showfiles.php?group\_id=89">http://luaforge.net/project/showfiles.php?group\_id=89</a>.

### **Binaries Description**

3.4.2 / Open Motif 2.2.3

```
AIX43 = IBM AIX 4.3 / gcc 2.95.2 / Motif 2.1.0
AIX43cc = IBM AIX 4.3 / cc 4.4 / Motif 2.1.0
IRIX65 = SGI IRIX 6.5 / gcc 3.0.4 / Motif 2.1.20
IRIX6465 = SGI IRIX 6.5 (64 bits OS, but libs are still 32 bits) / gcc 3.0.4 / Motif 1.2.4
IRIX6465cc = SGI IRIX 6.5 (") / cc MIPSpro 7.30 / Motif 1.2.4
Linux24 = Red Hat 7.3 (i686) / Kernel 2.4.18-27.7.x / gcc 2.95.3 / Open Motif 2.1.30
Linux24g3 = Red Hat 8.0 (i686) / Kernel 2.4.18-27.8.0 / gcc 3.2 / Open Motif 2.2.2
Linux26 = Fedora Core 3 (i686) / Kernel 2.6.9-1.667 / gcc
```

- SunOS57 = Sun Solaris 7 (sparc) / gcc 2.95.2 / Motif 2.1.0
- SunOS57cc = Sun Solaris 7 (sparc) / cc 5.2 (Sun WorkShop 6 update 1) / Motif 2.1.0

- SunOS58 = Sun Solaris 8 (sparc) / gcc 2.95.3 / Motif 2.1.0
- dll = built using vc6, depends on the MSVCRT.DLL
- vc6 = Visual C++ 6
- vc7 = Visual C++ 7 (.NET)
- owc1 = Open Watcom 1.0 http://www.openwatcom.org/
- gcc2 = Cygwin gcc 2.95 http://www.cygwin.com/
- gcc3 = Cygwin gcc 3.2 http://www.cygwin.com/
- mingw3 = MingW gcc 3.2 http://www.mingw.org/

Also compatible with Dev-C++

http://www.bloodshed.net/devcpp.html

• Win32 = Executable for Windows NT/2000/XP

### **CURSOR**

Defines the element's cursor.

#### Value

Name of a cursor predefined by IUP:

```
"NONE" "ARROW"
"BUSY"
"CROSS"
"HAND" (*)
"IUP" (*)
"MOVE"
"PEN" (*)
"RESIZE N"
"RESIZE S"
"RESIZE W"
"RESIZE E"
"RESIZE NE"
"RESIZE SE"
"RESIZE NW"
"RESIZE SW"
"TEXT"
```

Default: "ARROW"

(\*) To use these cursors on Windows, the **iup.rc** file, provided with IUP, must be linked with the application.

It can receive as a parameter the name of an image, to be used as an application-defined cursor (the cursor must be a <a href="LupImage">LupImage</a>, but the image is not a regular one. See the notes below).

#### **Notes**

For the image to represent a cursor, it must use attribute "HOTSPOT" to

define its hotspot (place where the mouse click is actually effective). Only color indices 0, 1 and 2 can be used in a cursor, where 0 will be transparent. The RGB colors corresponding to indices 1 and 2 are defined just as in regular images. In Windows the cursor can have more than 2 colors. Cursor sizes are usually less than or equal to 32x32.

In the interface system, the cursor will only change when the interface system regains control.

The Windows SDK recomends that cursors and icons should be implemented as resources rather than created at run time.

When the cursor image is no longer necessary, it must be destroyed through function <u>IupDestroy</u>. Attention: the cursor cannot be in use when it is destroyed.

#### **Affects**

<u>IupDialog</u>, <u>IupCanvas</u>

In Motif can also be used in other controls.

### **See Also**

**IupImage** 

### **ICON**

Dialog's icon. This icon will be used when the dialog is minimized.

#### **Value**

Name of a IUP image.

Default: NULL

#### Note

Icon sizes are usually less than or equal to 32x32.

On Windows, names of resources (.RES) linked to the application are also accepted. The Windows SDK recomends that cursors and icons should be implemented as resources rather than created at run time.

On Motif, it only works with some window managers, like *mwm* and *gnome*. Icon colors can have the BGCOLOR values, but it works better if it is at index 0.

### **Affects**

**IupDialog** 

## **MAXBOX**

Requests a maximize button from the window manager.

#### **Value**

```
"YES" or "NO".

Default: "YES"
```

### Note

This attribute is only consulted when the dialog is first mapped (<u>IupMap</u>, <u>IupShow</u>, <u>IupShowXY</u> or <u>IupPopup</u>). After such, it cannot be changed. On Motif, it only works if the active window-management system is *mwm*.

### **Affects**

**IupDialog** 

# **MENU**

Associates a menu to the dialog.

# **Value**

Name of a menu-type interface element.

# **Affects**

# **MENUBOX**

When set, this attribute shows the menu box in a dialog title area.

#### **Value**

```
"YES" or "NO".

Default: "YES"
```

#### Note

This attribute is only consulted when the dialog is first mapped (<u>IupMap</u>, <u>IupShow</u>, <u>IupShowXY</u> or <u>IupPopup</u>). After such, it cannot be changed. On Motif, it only works if the active window-management system is *mwm*.

## **Affects**

# **MINBOX**

Requests a minimize button from the window manager.

#### **Value**

```
"YES" or "NO".

Default: "YES"
```

#### Note

This attribute is only consulted when the dialog is first mapped (<u>IupMap</u>, <u>IupShow</u>, <u>IupShowXY</u> or <u>IupPopup</u>). After such, it cannot be changed. On Motif, it only works if the active window-management system is *mwm*.

### **Affects**

# **RESIZE**

Allows interactively changing the dialog's size.

#### **Value**

```
"YES" or "NO".

Default: "YES"
```

### Note

This attribute is only consulted when the dialog is first mapped (<u>IupMap</u>, <u>IupShow</u>, <u>IupShowXY</u> or <u>IupPopup</u>). After such, it cannot be changed. On Motif, it only works if the active window-management system is *mwm*.

## **Affects**

# **STARTFOCUS**

Name of the dialog's element that must receive the focus right after the dialog is opened.

# **Value**

Name of an element.

# **Affects**

# **DEFAULTENTER**

Name of the default button activated when the user hits ENTER on a dialog.

# **Value**

Identifier of a button.

Default: NULL.

# **Affects**

# **DEFAULTESC**

Name of the default button activated when the user hits ESC on a dialog.

# **Value**

Identifier of a button.

Default: NULL.

# **Affects**

### **SHRINK**

If this attribute is defined, the elements will try to adjust even when the dialog's size is smaller than its minimum limit.

#### Value

```
"YES" or "NO".

Default: "NO".
```

#### **Notes**

When the user changes the size of the dialog, the elements are automatically re-distributed inside the dialog. Some elements even have their size changed if the EXPAND attribute is active. When this size is smaller than a minimum limit in which all elements still fit the dialog, the elements' distribution is no longer modified. Actually, the virtual size of the dialog remains larger than its actual size on the screen, and some elements to the right are hidden by the borders.

The SHRINK attribute offers an alternative to this behavior. It makes the elements continue to rearrange, even if they must overlap.

The results of this new rearrangement may vary according to the elements' distribution on the dialog.

### **Affects**

# **PARENTDIALOG**

The dialog that specifies this attribute is treated as the child dialog of the specified value.

### Value

Name of a IUP dialog.

Default: NULL.

#### Note

This behavior is system dependent, but usually what happens is: this dialog does not move behind its PARENTDIALOG, even if the user clicks the PARENTDIALOG. If the PARENTDIALOG is minimized, this dialog is automatically hidden.

## **Affects**

# **TRAY**

When set to YES, displays an icon on the system tray.

#### **Value**

```
"YES"
"NO"

Default: "NO"
```

#### Note

Must be set to "YES" prior to changing TRAYICON an TRAYTIP attributes.

The user must set TRAY to "NO" or else the tray image will not disappear from the tray automatically.

Windows only.

### **Affects**

**IupDialog** 

## **See Also**

TRAYICON, TRAYTIP

# **TRAYICON**

Image to be used as the tray icon.

### **Value**

Name of a IUP image.

Default: NULL

## Note

To work properly, the image size must be 32x32.

Windows only.

## **Affects**

<u>IupDialog</u>'s tray icon

## **See Also**

TRAY, TRAYTIP

# **TRAYTIP**

Summarized text, usually just a word, identifying the application. The text will be shown when the mouse lies over the icon on the system tray.

#### **Value**

Text.

Default: NULL.

#### Note

Background and foreground colors, and the font used, are predetermined and depend on the native system.

Windows only.

### **Affects**

<u>IupDialog</u>'s tray icon

### See Also

TRAY, TRAYICON

### **CONTROL**

**Windows only.** Whether the dialog is embedded inside the parent window or has a window of its own.

#### Value

YES or NO. If the value is YES, the dialog will appear embedded inside its parent window (you must set a parent, either with PARENTDIALOG or NATIVEPARENT, or this setting will be ignored). If the value is NO, the dialog will have its own window.

#### Note

This is useful for implementing ActiveX controls, with the help of the LuaCOM library. ActiveX controls run embedded inside another window. LuaCOM will send a window creation event the the control, passing a handle to the parent window and the size of the control. You can use this to set the dialog's NATIVEPARENT and RASTERSIZE attributes. See the LuaCOM documentation for more information.

#### **Affects**

**IupDialog** 

#### See Also

NATIVEPARENT, PARENTDIALOG, RASTERSIZE

# **IMAGE**

Bitmap image. Must be created with function IupImage.

### **Value**

Name of an image.

Default: NULL.

### Note

The definition after mapping is only assured if the image has the same size as the image it is replacing.

## **Affects**

<u>IupButton</u>, <u>IupToggle</u>, <u>IupLabel</u>.

### See Also

<u>IupImage</u>

# **IMPRESS**

Image of the element while the user keeps the left mouse button pressed over it. Must be created with function IupImage.

### Value

Name of an image.

Default: NULL.

#### Note

When <u>IMPRESS</u> and <u>IMAGE</u> are defined, IUP does not show the element's borders to provide a 3D effect. The user must define the borders on the image.

### **Affects**

<u>IupButton</u>, <u>IupToggle</u>.

#### See Also

**IupImage** 

# **IMINACTIVE**

Image of the element when the ACTIVE attribute equals "NO". Must be created using function IupImage.

## **Value**

Name of an image.

Default: NULL.

# **Affects**

<u>IupButton</u>, <u>IupToggle</u>.

## **See Also**

<u>IupImage</u>

### **SCROLLBAR**

Associates a horizontal and/or vertical scrollbar to the canvas.

#### Value

"VERTICAL", "HORIZONTAL", "YES" (both) or "NO" (none).

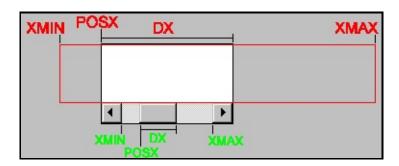
Default: "NO"

#### **Notes**

The scrollbar allows you to create a virtual space associated to the canvas. In the image below, such space is marked in <u>red</u>, as well as the attributes that affect the composition of this space. In <u>green</u> you can see how these attributes are reflected on the scrollbar.

Hence you can clearly deduce that POSX is limited to XMIN and XMAX-DX, or XMIN<=POSX<=XMAX-DX.

When the virtual space has the same size as the canvas, DX equals XMAX-XMIN, and at this moment the scrollbar could be hidden, as it is not useful (this behavior occurs only for the Win32 driver).



#### **Affects**

**IupCanvas** 

## $\mathbf{D}\mathbf{X}$

Size of the horizontal scrollbar's thumbnail in any unit.

#### **Value**

Any floating-point value greater than zero and smaller than the difference between <u>XMAX</u> and <u>XMIN</u>.

Default:: "0.1".

#### Note

A change in these values will only be effective after attribute <u>POSX</u> or <u>POSY</u> has been changed.

## **Affects**

**IupCanvas** 

#### See Also

# $\mathbf{DY}$

Size of the vertical scrollbar's thumbnail in any unit.

#### **Value**

Any floating-point value greater than zero and smaller than the difference between <u>YMAX</u> and <u>YMIN</u>.

Default:: "0.1".

#### Note

A change in these values will only be effective after attribute <u>POSX</u> or <u>POSY</u> has been changed.

## **Affects**

**IupCanvas** 

### **See Also**

# **POSX**

Thumbnail position in the horizontal scrollbar in any unit.

#### **Value**

Any floating-point value. Must be a value between XMIN and XMAX-DX.

Default: "0.0"

#### Note

When the canvas is visible, a change in POSX generates a redraw in the horizontal scrollbar on the screen. This attribute does not generate a redraw of the canvas. Shall the user need this, he/she must call a redraw callback.

## **Affects**

**IupCanvas** 

#### See Also

# **POSY**

Thumbnail position in the vertical scrollbar in any unit.

#### **Value**

Any floating-point value. Must be a value between YMIN and YMAX-DY.

Default: "0.0"

#### Note

When the canvas is visible, a change in POSY generates a redraw in the vertical scrollbar on the screen. This attribute does not generate a redraw of the canvas. Shall the user need this, he/she must call a redraw callback.

## **Affects**

**IupCanvas** 

### **See Also**

# XMAX

Maximum value of the horizontal scrollbar, in any unit.

### **Value**

Any floating-point value.

Default: "1.0"

### Note

A change in this value will only be effective after attribute <u>POSX</u> or <u>POSY</u> is changed.

# **Affects**

<u>IupCanvas</u>

### **See Also**

# **XMIN**

Minimum value of the horizontal scrollbar, in any unit.

### **Value**

Any floating-point value.

Default: "0.0"

### Note

A change in this value will only be effective after attribute <u>POSX</u> or <u>POSY</u> is changed.

# **Affects**

<u>IupCanvas</u>

### See Also

# **YMIN**

Minimum value of the vertical scrollbar, in any unit.

### **Value**

Any floating-point value.

Default: "0.0"

### Note

A change in this value will only be effective after attribute <u>POSX</u> or <u>POSY</u> is changed.

# **Affects**

**IupCanvas** 

### See Also

# **YMAX**

Maximum value of the vertical scrollbar, in any unit.

### **Value**

Any floating-point value.

Default: "1.0"

### Note

A change in this value will only be effective after attribute <u>POSX</u> or <u>POSY</u> is changed.

# **Affects**

<u>IupCanvas</u>

### See Also

## **Global Attributes**

All the attributes are for verification only.

#### **VERSION**

Returns the name of IUP's version.

#### **Value**

The value follows the "major.minor.driver" format, major referring to broader changes, minor referring to smaller changes and corrections, and driver referring to changes in the respective driver. Ex.: "1.7.2".

#### **COPYRIGHT**

Returns the IUP's copyright.

#### **Value**

Ex: "Copyright (C) 1994-2004 Tecgraf/PUC-Rio and PETROBRAS S/A".

#### **DRIVER**

Informs the current driver being used.

#### **Value**

Two drivers are available now, one for each platform: "MOTIF" and "WIN32".

#### **SYSTEM**

Informs the current operating system.

#### **Value**

On UNIX, it is equivalent to the command "uname -s" (sysname). On Windows, it identifies if you are on NT, WinXP or 98.

Several values can be provided:

```
"Linux" "SunOS"
"Solaris"
"IRIX"
"AIX"
"Win95"
"Win95OSR2"
"Win98"
"Win98SE"
"WinMe"
"WinNT"
"Win2K"
"WinXP"
```

### **SYSTEMVERSION**

Informs the current operating system version.

#### **Value**

On UNIX, it is equivalent to the command "uname -r" (release). On Windows, it identifies the system version with build number and service pack version.

#### **SCREENSIZE**

Returns the screen size in pixels. In Windows it excludes the task bar area.

#### **Value**

String in the "widthxheight" format.

#### **SCREENDEPTH**

Returns the screen depth in bits per pixel.

#### **LOCKLOOP**

Locks the loop even when an all dialogs have been closed. Possible values: "YES" or "NO".

### **CURSORPOS**

This attribute programaticaly changes the cursor position. Accept values in the format "poshxposv", example "200x200", in absolute coordinates relative to the upper left corner of the screen.

#### **COMPUTERNAME**

Returns the hostname.

### **USERNAME**

Returns the user logged in.

## **Win32 Global Attributes**

#### **HINSTANCE**

This attribute returns a handle (**HINSTANCE**) that identifies the application in the native system. It is a verification-only attribute.

#### **SYSTEMLANGUAGE**

Return respectively a text with a description of the system language.

### WIN\_DEFAULTFONT

Stores the name of the default font used in the interface controls.

#### **SHIFTKEY**

Returns the state of the Shit keys (left and right). Possible values: "ON" or "OFF".

#### **CONTROLKEY**

Returns the state of the Control keys (left and right). Possible values: "ON" or "OFF".

# **Motif Global Attributes**

#### **MOTIFVERSION**

Returns the version of the run time Motif.

### **TRUECOLORCANVAS**

Indicates if the display allows creating TrueColor (> 8bpp) windows, even if PseudoColor is the default. Returns "YES" or "NO".

#### **AUTOREPEAT**

Turns on/off ("YES" or "NO") the autorepeat of keyboard keys in the whole system - may be used as an optimization in high performance applications.

## **DROPDOWN**

Changes the appearance of the list for the user: only the selected item is shown beside a button with an arrow pointing down. To select another option, the user must press this button, which displays all items in the list.

#### **Value**

```
"YES" or "NO".

Default: "NO"
```

#### **Notes**

This attribute is ignored for multiple lists (MULTIPLE=YES).

This attribute is only consulted when the dialog is first mapped (<u>IupMap</u>, <u>IupShow, IupShowXY</u> or <u>IupPopup</u>). After such, it cannot be changed.

### **Affects**

**IupList** 

# **APPEND**

Inserts a text at the end of the current text, independently from the caret's position.

In the Multiline, a "\n" character will be automatically inserted.

### Value

Any text.

## Note

Only works if the element is mapped.

## **Affects**

<u>IupList</u>, <u>IupMultiline</u>, <u>IupText</u>

# **INSERT**

Inserts a text in the caret's position.

# **Value**

Any text, even with '\n' characters indicating line change.

# **Affects**

<u>IupList</u>, <u>IupMultiline</u>, <u>IupText</u>

# NC

Maximum number of characters.

# Value

Positive integer number.

Default: 32767

# **Affects**

IupList, IupText, IupMultiline

### **CARET**

Places the insertion point in a text-edition field. The first line and the first column begin at 1.

### Value (Multiline)

String with the "*line,column*" format, where *line* and *column* are integer numbers corresponding to the caret's position.

Default: "1,1" (first character in the first line).

## Value (Text,List)

String in the "pos" format. Pos is an integer number corresponding to the caret's position.

Default: "1" (first character).

#### Note

When the value set for the line is greater than the number of lines, the caret is placed after the last line (only multiline). When the value set for the column is greater than the number of characters in a line, the caret is placed after the last character in the line.

#### **Affects**

IupList, IupMultiline, IupText

# **READONLY**

Defines whether an element can be entered text or not.

### **Value**

```
"YES" or "NO"

Default: "NO"
```

### Note

Even though this attribute prevents the user from editing text, it allows the user to use the navigation keys (right, left, etc.).

## **Affects**

<u>IupList</u>, <u>IupMultiline</u>, <u>IupText</u>

## **SELECTION**

Modifies or returns the selection of a text-edition field.

# Value (Multiline)

A text in the "lin1,col1:lin2,col2" format, where lin1, col1, lin2 and col2 are integer numbers corresponding to the selection's interval. The first position is "1".

Default: "1,1:1,1"

# Value (Text,List)

A text in the "beg:end" format, where beg and end are integer numbers corresponding to the selection's interval.

Default: "1:1".

### **Affects**

**IupList**, **IupText**, **IupMultiline** 

# **SELECTEDTEXT**

Modifies or consults the selected text.

# **Value**

Text.

## Note

The text is modified even if the element uses the **READONLY** attribute.

# **Affects**

<u>IupList</u>, <u>IupText</u>, <u>IupMultiline</u>

### **KEY**

Associates a key to a menu item or submenu. Such key works as a shortcut when the menu is open, this is not a hot key.

#### **Value**

String containing a key description. Please refer to the <u>Keyboard Codes</u> table for a list of the possible values.

Default: NULL

#### **Notes**

IUP automatically underlines the first appearance of the chosen menu letter. For such, the chosen letter must necessarily be a part of the menu text.

In the menu bar, some systems automatically associate the ALT+<letter> combination for the chosen letter. This is valid for the Windows driver, but not for the Motif driver.

Be careful not to misuse this attribute in relation to **K** ANY callback.

#### **Affects**

<u>IupItem</u>, <u>IupSubMenu</u>.