Package ‘widgetTools’

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Title  Creates an interactive tcltk widget
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Description  This packages contains tools to support the construction of tcltk widgets
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Class "basicPW", a basic class for primary widgets

Description
This class defines the behavior shared by primary widget object used to build a GUI type interface

Objects from the Class
Objects can be created by calls of the form `new("basicPW", ...)`. Constructors have been defined to create objects of this class for specific widgets such as buttons, list boxes, ...

Slots
- `wName`: Object of class "character" - a string for the name of the object
- `wType`: Object of class "character" - a string defining the type of the primary widget. (e.g. button)
- `wValue`: Object of class "ANY" - the initial value to be associated with the object
- `wWidth`: Object of class "numeric" - an integer for the width of the object to be rendered (if applicable)
- `wHeight`: Object of class "numeric" - an integer for the height of the object to be rendered (if applicable)
- `wFuns`: Object of class "list" - a list of R functions to be executed before the widget is activated
- `wPreFun`: Object of class "function" - a list of functions to be executed before the value of the widget to be updated
- `wPostFun`: Object of class "function" - a list of functions to be executed before the value of the widget to be retrieved
- `wNotify`: Object of class "list" - a list of functions to be executed each time when the value of the widget changes
- `wEnv`: Object of class "environment" - an R environment object within which the value of the object is stored
- `wView`: Object of class "widgetView" - a object of the class widgetView to which the widget is rendered

Methods
- `wEnv<-` signature(object = "basicPW"): Set the value for wEnv slot
- `wEnv` signature(object = "basicPW"): Get the value for wEnv slot
- `wFuns<-` signature(object = "basicPW"): Set the value for wFuns slot
- `wFuns` signature(object = "basicPW"): Get the value for wFuns slot
- `wHeight<-` signature(object = "basicPW"): Set the value for wHeight slot
- `wHeight` signature(object = "basicPW"): Get the value for wHeight slot
- `wName<-` signature(object = "basicPW"): Set the value for wName slot
- `wName` signature(object = "basicPW"): Get the value for wName slot
- `wNotify<-` signature(object = "basicPW"): Set the value for wNotify slot
- `wNotify` signature(object = "basicPW"): Get the value for wNotify slot
wPostFun <- signature(object = "basicPW"): Set the value for wPostFun slot
wPostFun signature(object = "basicPW"): Get the value for wPostFun slot
wPreFun <- signature(object = "basicPW"): Set the value for wPreFun slot
wPreFun signature(object = "basicPW"): Get the value for wPreFun slot
wType <- signature(object = "basicPW"): Set the value for wType slot
wType signature(object = "basicPW"): Get the value for wType slot
wValue <- signature(object = "basicPW"): Set the value for wValue slot
wValue signature(object = "basicPW"): Get the value for wValue slot
wView <- signature(object = "basicPW"): Set the value for wView slot
view signature(object = "basicPW"): Get the value for wView slot
wWidth <- signature(object = "basicPW"): Set the value for wWidth slot
wWidth signature(object = "basicPW"): Get the value for wWidth slot

Author(s)
Jianhua Zhang

References
Programming with data

See Also

widgetView-class, widget-class

Examples

# Create an R environment to store the values of primary widgets
PWEnv <- new.env(hash = TRUE, parent = parent.frame())

# Create a label
label1 <- label(wName = "label1", wValue = "File Name: ", wEnv = PWEnv)

# Create an entry box with "Feed me using brows" as the default value
entry1 <- entryBox(wName = "entry1", wValue = "Feed me using browse", wEnv = PWEnv)

button

Functions to construct objects of primary widgets and render them

Description
All the primary widgets such as button, text box, and so on are objects of basicPW class. The functions are constructors of primary widgets that are subjects of basicPW class with behaviors specific to primary widgets.
Usage

button(wName, wEnv, wValue = "", wWidth = 12, wHeight = 0, wFuns = list(), wNotify = list(), wPreFun = function(x) x, wPostFun = function(x) x, wView = new("widgetView") )
entryBox(wName, wEnv, wValue = "", wWidth = 50, wHeight = 0, wFuns = list(), wNotify = list(), wPreFun = function(x) x, wPostFun = function(x) x, wView = new("widgetView") )
textBox(wName, wEnv, wValue = "", wWidth = 25, wHeight = 12, wFuns = list(), wNotify = list(), wPreFun = function(x) x, wPostFun = function(x) x, wView = new("widgetView") )
listBox(wName, wEnv, wValue = "", wWidth = 25, wHeight = 10, wFuns = list(), wNotify = list(), wPreFun = function(x) x, wPostFun = function(x) x, wView = new("widgetView") )
checkButton(wName, wEnv, wValue, wWidth = 50, wFuns = list(), wNotify = list(), wPreFun = function(x) x, wPostFun = function(x) x, wView = new("widgetView") )
radioButton(wName, wEnv, wValue, wWidth = 50, wFuns = list(), wNotify = list(), wPreFun = function(x) x, wPostFun = function(x) x, wView = new("widgetView") )
label(wName, wEnv, wValue = "", wWidth = 0, wHeight = 0, wFuns = list(), wNotify = list(), wPreFun = function(x) x, wPostFun = function(x) x, wView = new("widgetView") )
widget(wTitle, pWidgets, funs = list(), preFun = function() print("Hello"), postFun = function() print("Bye"), env, defaultNames = c( "Finish", "Cancel") )
widgetView(WVTitle, vName, widgetids = list(), theWidget = new("widget"), winid)

Arguments

wName a character string for the name to be associated with a given primary widget
vName vName same as wName but for a widget object
wEnv wEnv an R environment object within which the original values for each primary widget will be stored and updating and retrieval of the values will take place
env env same as wEnv but for a widget object
wValue wValue the initial values to be associated with a given primary widget
wWidth wWidth an integer for the width of the primary widget (if applicable)
wHeight wHeight an integer for the height of the primary widget (if applicable)
wFuns wFuns a list of R functions that will be associated with a primary widget and invoked when an operation (e.g. click, get focus, ...) is applied to the primary widget
funs funs same as wFuns but for a widget object
wNotify wNotify a list of functions defining the actions to be performed when the value of the primary widget changes
wPreFun wPreFun an R function that should be applied when the widget is activated
preFun preFun same as wPreFun but for a view
wPostFun wPostFun an R function that will be applied when the widget is deactivated
button

postFun postFun same as wPostFun but for a view
wTitle wTitle a character string for the title to be displayed when the widget is rendered
pWidgets pWidget a list of primary widgets (e.g. button, list box, ...) to be rendered
wTitle WVTitle same as wTitle
widgetids widgetids a list of tkwin ids for the primary widgets to be rendered
theWidget theWidget a widget object to render the primary widgets
wView wView an object of class widgetView
winid winid an object of class winid
defaultNames defaultName a vector of character string of length two for the text to be shown on the two default buttons. The first is to end the process and the second to abort the process

Details

toggle constructs a button widget object.
toggle constructs an entry box widget object.
textBox constructs a text box widget object.
listBox constructs a list box widget object. Value for a listbox object should be a named vector with names being the content to be shown in the list box and values being TRUE (default value) or FALSE.
checkButton constructs a group of check box widget objects. Value for check button objects should be a named vector with names being the content to be shown in the list box and values being TRUE (checked) or FALSE (not checked).
radioButton constructs a group of radio button widget objects. Value for radio button objects should be a named vector with names being the content to be shown in the list box and values being TRUE (default) or FALSE.
label constructs a text label widget object with the value displayed as the text.
widget constructs a widget object to render the primary widgets.
widgetView constructs a widgetView object. This class is for internal use by class widget-class. Users trying to create GUI type widget do not need to use this class.

Value

Each constructor returns a tkwin object for the primary widget object.

Author(s)

Jianhua Zhang

References

R tcltk

See Also

widget-class, basicPW-class
Examples

# Create an R environment to store the values of primary widgets
PWEnv <- new.env(hash = TRUE, parent = parent.frame(1))

# Create a label
label1 <- label(wName = "label1", wValue = "File Name: ", wEnv = PWEnv)

# Create an entry box with "Feed me using brows" as the default value
entry1 <- entryBox(wName = "entry1", wValue = "Feed me using browse", wEnv = PWEnv)

# Create a button that will call the function browse2Entry1 when pressed.
browse2Entry1 <- function(){
  tempValue <- tclvalue(tkgetOpenFile())
  temp <- get(wName(entry1), env = PWEnv)
  wValue(temp) <- paste(tempValue, sep = "", collapse = ";")
  assign(wName(entry1), temp, env = PWEnv)
}
button1 <- button(wName = "button1", wValue = "Browse",
  wfuns = list(command = browse2Entry1), wEnv = PWEnv)

# Create a list box with "Option1", "Option2", and "Option3" as the content and "Option1" selected
list1 <- listBox(wName = "list1", wValue = c(Option1 = TRUE, Option2 = FALSE, Option3 = FALSE), wEnv = PWEnv)

# Create a text box with "Feed me something" displayed
text1 <- textBox(wName = "text1", wValue = "Feed me something", wEnv = PWEnv)

# Create a set of radio buttons with "radio1" as the default label2 <- label(wName = "label2", wValue = "Select one: ", wEnv = PWEnv)
radios1 <- radioButton(wName = "radios1", wValue = c(radio1 = TRUE, radio2 = FALSE, radio3 = FALSE), wEnv = PWEnv)

# Create a set of check boxes with "check1" selected and "check2" and "check3" not selected
label3 <- label(wName = "label3", wValue = "Select one to many: ", wEnv = PWEnv)
checks1 <- checkButton(wName = "checks1", wValue = c(check1 = TRUE, check2 = FALSE, check3 = FALSE), wEnv = PWEnv)

# Please note that the name of the primary widget object (e.g. checks1) should be the same as the value of the name slot of the object (e.g. name = "checks1")

# Render the widgets
pWidgets <- list(topRow = list(label1 = label1, entry1 = entry1, button1 = button1), textRow = list(list1 = list1, text1 = text1), radGroup = list(label2 = label2, radios1 = radios1), chkGroup = list(label3 = label3, checks1 = checks1))

## Not run:
## These cannot be run by examples() but should be OK when pasted into an interactive R session with the widgetTools package loaded
dropdownList

Description

The current tcltk library does not support dropdown lists unless an extension is included. The function dropdownList provide an alternative.

Usage

dropdownList(base, options, textvariable, width = 10, default, editable = FALSE)
getListOption(targetWidget, options, height, vScroll = FALSE)

Arguments

- **base**: base a tkwin object that is the parent frame of the dropdown list to be created
- **options**: options a vector of character strings for the content of the dropdown list
- **textvariable**: textvariable a tclVar object to be associated with the selected item of the dropdown list
- **width**: width an integer for the width in number of characters of the selection containing part of the dropdown list
- **default**: default a character string for the default selection that is going to be shown in the selection containing window of the dropdown list
- **targetWidget**: targetWidget a tkwin object for an entry box to which a button will be associated to make the look of a dropdown list
- **editable**: editable a boolean indicating whether the dropdown list will be editable or not
- **height**: height an integer for the height of the dropdown list box. If missing, height will be assigned the length of the options to be shown in the list box
- **vScroll**: vScroll a boolean indicating whether a vertical scroll bar will be associated with the dropdown list box

Details

base can be a top window or a frame.

The widget returns a frame that contains a dropdown list. The frame need to be placed using any of the layout methods of tcltk. The value of the selection will be accessed through the tclVar object passed to the function.

getListOptions is called by dropdown list to get the selected item
Value

dropdownList returns a tkwin object for the frame that contains a dropdown list
getListOptions returns a character string for the selected item

Author(s)
Jianhua Zhang

References
tcltk

See Also
tooltip

Examples

## Not run:
## These cannot be run by examples() but should be OK when pasted
## into an interactive R session with the widgetTools package loaded

```r
base <- tktoplevel()
selection <- tclVar()
dropdownList(base, c("Option 1", "Option 2", "Option 3"),
             selection, 15, "Option 2")
tclvalue(selection)
# Destroy toplevel widget
# tkdestroy(base)
```

## End(Not run)

---

```r
makeViewer(target, vWidth = "", vHeight = "", hScroll = FALSE,
vScroll = TRUE, what = "list", side = "left", text = ")
```

Arguments

target
tk widget that can accommodate a list box.

vWidth, vHeight
integers giving width and height of the listbox.

hScroll, vScroll
logicals indicating whether a horizontal or vertical scroll bar should be associated with the list box.

Description

This function associates a tk listbox with a scroll bar and then puts them into a given tk widget.

Usage

```r
makeViewer(target, vWidth = "", vHeight = "", hScroll = FALSE,
vScroll = TRUE, what = "list", side = "left", text = "")
```
oneVScrList

what A character string indicating the type of the viewer to be put on a widget. Valid types include "list" for list box, "canvas", and "text" for text box

side A character string for the geometry management of the viewer on the widget. Valid values include "left", "right", "top", and "bottom"

text A character string to be displayed

Details

Tk list boxes (or canvas, text box) and scroll bars are separate widgets. This function provides a common interface to put them together and functionally associated.

Value

This function does not return any value.

Author(s)

Jianhua (John) Zhang

See Also

tklistbox (from the 'tcltk' package).

Examples

## Not run:
## These cannot be run by examples() but should be OK when pasted
## into an interactive R session with the widgetTools package loaded

# Create a top level window and put a list box in it
base <- tktoplevel()
listBox <- makeViewer(base)

# Destroy toplevel widget
# tkdestroy(base)

## End(Not run)

oneVScrList A function that creates a groups of list boxes sharing a single vertical scroll bar

Description

This function creates a group of list boxes what share a common vertical scroll bar. Values in all the list boxes scroll up or down when the scroll bar is dragged

Usage

oneVScrList(base, data)
safeFileOpen

Arguments

base  base a tkwin object that will be the container of the list boxes to be created

data  a matrix with data to be put in the list boxes

Details

The matrix should have names for its columns. The names of the list boxes to be created will be the same as the corresponding columns of the matrix.

Data in the list boxes can be sorted based on values in any of the list boxes.

Value

This function returns a list containing the tkwin objects of the list boxes created.

Author(s)

Jianhua Zhang

References

tcltk

See Also
dropdownList, tooltip

Examples

```r
## Not run:
## These cannot be run by examples() but should be OK when pasted
## into an interactive R session with the widgetTools package loaded
testData <- matrix(c(1:50, 100:51), ncol = 2)
colnames(testData) <- c("Column 1", "Column 2")
base <- tktoplevel()
tt <- oneVScrList(base, testData)

# Destroy toplevel widget
# tkdestroy(base)
```

## End(Not run)

safeFileOpen  A function that checks to see if a connection can be made to a given file

Description

This function checks to see if a given file name exists. If so, the function returns a connection to the file. Otherwise, it returns "fileName does not exist".
Usage

```r
safeFileOpen(fileName)
```

Arguments

- `fileName` a character string for the name of a file to which a connection is to be opened.

Details

When this function is used, users have to make sure to check to see if the returned object inherits object "connection". Otherwise, the file does not exist or a connection has not been made.

Value

The function returns a connection object that inherits class "connection" if the file exists and is opened. Otherwise, the string "fileName does not exist".

Note

This function is not placed here to be used by various widgets. May be moved to a more suitable place later.

Author(s)

Jianhua Zhang

See Also

`file`

Examples

```r
write("A test file", "testFile4safeFileOpen")
tt <- safeFileOpen("testFile4safeFileOpen")
inherits(tt, "connection")
unlink("testFile4safeFileOpen")
tt <- safeFileOpen("testFile4safeFileOpen")
inherits(tt, "connection")
```

---

### tooltip

A `tcltk` widget to mimic a tooltip

Description

Current `tcltk` library does not support tooltip unless an extension is included. The function `tooltip` is implemented as an alternative.

Usage

```r
tooltip(text, targetWidget, width = 350)
```
Arguments

text text a character string for the content of the tooltip

targetWidget targetWidget a tkwin object for the target tcltk widget to which a tool tip will be associated

width width an integer for the width (in pixels) of the tooltip

Details

Given a target tcltk widget, a tooltip will be associated with the widget. The content of the tooltip will be shown when mouse moves over the widget and disappear when mouse moves out of the widget.

Value

This function returns invisible()

Author(s)

Jianhua Zhang

References

tcltk

See Also

dropdownList

Examples

## Not run:
## These cannot be run by examples() but should be OK when pasted
## into an interactive R session with the widgetTools package loaded

base <- tktoplevel()
but <- tkbutton(base, text = "Move Mouse Over Me")
tkpack(but)
tkbind(but, "<Enter>", expression(tooltip("Move mouse off me", but)))

# Destroy toplevel widget
# tkdestroy(base)

## End(Not run)
Class "widget" creates a widget with primary widgets contained in the list pWidgets rendered

Description

This class takes a list of primary widgets and then creates a "widgetView" object that renders the primary widgets

Objects from the Class

Objects can be created by calls of the form new("widget", ...).

Slots

- wTitle: Object of class "character" - a character string for the title of the widget to be created
- pWidgets: Object of class "list" - a list of "basicPW" objects representing widget elements to be rendered
- env: Object of class "environment" - an R environment for the object to work within
- funs: Object of class "list" - a list of functions that will be associated with buttons on the widget to be rendered. The name of the function in the list will be the text appears on the button and the function will be executed when the button is pressed
- preFun: Object of class "function" - a function that will be executed before the widget is constructed
- postFun: Object of class "function" - a function that will be executed before the widget is destroyed

Methods

- env<- signature(object = "widget"): set the value for env
- wEnv signature(object = "widget"): get the value for env
- funs<- signature(object = "widget"): set the value for funs
- funs signature(object = "widget"): get the value for funs
- postFuns<- signature(object = "widget"): set the value for postFuns
- postFun signature(object = "widget"): get the value for postFuns
- preFuns<- signature(object = "widget"): set the value for preFun
- preFun signature(object = "widget"): get the value for preFun
- pWidgets<- signature(object = "widget"): set the value for pWidgets
- pWidgets signature(object = "widget"): get the value for pWidgets
- updateCheck signature(object = "widget"): update the value of check buttons of the widget to be rendered
- updateList signature(object = "widget"): update the value of list box/entry of the widget to be rendered
- updateRadio signature(object = "widget"): update the value of radio buttons of the widget to be rendered
**updateText** signature(object = "widget"): update the value of text box of the widget to be rendered

**wTitle**<- signature(object = "widget"): set the value of wTitle

**wTitle** signature(object = "widget"): get the value of wTitle

**Author(s)**

Jianhua Zhang

**References**

Programming with data

**See Also**

`basicPW-class, widgetView-class`

**Examples**

```r
PWEnv <- new.env(hash = TRUE, parent = parent.frame(1))

label1 <- label(wName = "label1", wValue = "File Name: ", wEnv = PWEnv)
entry1 <- entryBox(wName = "entry1", wValue = "Feed me using browse", wEnv = PWEnv)
browse2Entry1 <- function()
{
  tempValue <- fileBrowser()
  temp <- get(wName(entry1), wEnv = PWEnv)
  wValue(temp) <- paste(tempValue, sep = "", collapse = ";")
  assign(wName(entry1), temp, env = PWEnv)
}

button1 <- button(wName = "button1", wValue = "Browse", wFuns = list(command = browse2Entry1), wEnv = PWEnv)
list1 <- listBox(wName = "list1", wValue = c(Option1 = TRUE, Option2 = FALSE, Option3 = FALSE), wEnv = PWEnv)
text1 <- textBox(wName = "text1", wValue = "Feed me something", wEnv = PWEnv)
label2 <- label(wName = "label2", wValue = "Select one: ", wEnv = PWEnv)
radios1 <- radioButton(wName = "radios1", wValue = c(radio1 = TRUE, radio2 = FALSE, radio3 = FALSE), wEnv = PWEnv)
label3 <- label(wName = "label3", wValue = "Select one to many: ", wEnv = PWEnv)
checks1 <- checkButton(wName = "checks1", wValue = c(check1 = TRUE, check22 = FALSE, check3 = FALSE), wEnv = PWEnv)
pWidgets <- list(topRow = list(label1 = label1, entry1 = entry1, button1 = button1), textRow = list(list1 = list1, text1 = text1), radGroup = list(label2 = label2, radios1 = radios1), chkGroup = list(label3 = label3, checks1 = checks1))

# Not run:
## These cannot be run by examples() but should be OK when pasted into an interactive R session with the widgetTools package loaded
aWidget <- widget(wTitle = "A test widget", pWidgets, funs = list(), preFun = function() print("Hello"), postFun = function() print("Bye"), env = PWEnv)
```
## End(Not run)

### widgetView-class

**Class** "widgetView", a class for a GUI type widget holding widget elements

**Description**

"widgetView" renders element widgets

**Objects from the Class**

Objects can be created by calls of the form `new("widgetView", ...`). This class is for internal use by class `widget-class`. Users trying to create GUI type widget do not need to use this class.

**Slots**

- **WVTitle**: Object of class "character" - a character string that will be displayed as the title of the widget to be created
- **vName**: Object of class "character" - a character string for the vName of the widget
- **winid**: Object of class "tkwin" - a tkwin object for the id of the top window for the widget
- **widgetids**: Object of class "list" - a list of tkwin ids for element widgets
- **theWidget**: Object of class "widget" - a widget object that creates the widgetView

**Methods**

- **killWin** signature `(tkWidget = "widgetView")`: destroys the window representing the widgetView
- **vName<-** signature `(object = "widgetView")`: set the value for vName
- **vName** signature `(object = "widgetView")`: get the value for vName
- **renderWidgets** signature `(widgetView = "widgetView", pWidgets = "list")`: takes a list of "basicPW" objects (pWidgets) and renders them accordingly
- **renewView** signature `(widgetView = "widgetView", pWidgets = "list")`: using values contained by the "basicPW" objects of pWidgets to update the values of widget elements displayed
- **theWidget<-** signature `(object = "widgetView")`: set the value for theWidget
- **theWidget** signature `(object = "widgetView")`: get the value for theWidget
- **updateDisplay** signature `(widgetView = "widgetView")`: update the value of list box or text box element widgets
- **widgetids<-** signature `(object = "widgetView")`: set the value of widgetids
- **widgetids** signature `(object = "widgetView")`: get the value of widgetids
- **winid<-** signature `(object = "widgetView")`: set the value of winid
- **winid** signature `(object = "widgetView")`: get the value of winid
- **winWait** signature `(tkWidget = "widgetView")`: make widgetView modal
- **WVTitle** signature `(object = "widgetView")`: get the value for WVTitle
Author(s)
Jianhua Zhang

References
Programming with data

See Also
widget-class,basicPW-class

Examples
## Not run:
## These cannot be run by examples() but should be OK when pasted
## into an interactive R session with the widgetTools package loaded

widgetView <- widgetView(WVTitle = "demo", vName = "widget1")

## End(Not run)

writeText Functions that read from and write to tcltk widgets

Description
These functions provide some of the common read and write operations for tcltk widgets

Usage
writeText(widget, value, clear = TRUE)
writeList(widget, value, clear = TRUE)
getListValue(which)
getTextValue(which)
getEntryValue(which)

Arguments
widget a tkwin object for the tcltk widget to be read or written to
value the text of numerical value to be written to a tcltk widget
clear a boolean to indicate whether a value will append to the existing one (FALSE)
which a tkwin object for the tcltk widget whose value will be retrieved

Details
writeText writes to a given tcltk text box widget.
writeList writes to a given tcltk list or entry box widget.
getListValue retrieves the selected value in a tcltk list widget.
getTextValue retrieves the value of a text box.
getEntryValue retrieves the value of an entry box.
Value

getListValue returns the selected value in a tcltk list widget.

getTextValue returns the value of a text box.

getEntryValue returns the value of an entry box.

Author(s)

Jianhua Zhang

References

R tcltk

See Also

basicPW-class, widget-class

Examples

## Not run:
## These cannot be run by examples() but should be OK when pasted
## into an interactive R session with the widgetTools package loaded

# Create the widgets
base <- tkoplevel()
list <- tklistbox(base, width = 20, height = 5)

entry <- tkentry(base)
text <- tktext(base, width = 20, height = 5)
tkpack(list, entry, text)

# Write and read from the widgets
writeList(list, c("Option1", "Option2", "Option3"))
writeList(entry, "An Entry box")
writeText(text, "A text box")

# Will be NULL if not selected
getListValue(list)
getTextValue(text)
getEntryValue(entry)

# Destroy toplevel widget
# tkdestroy(base)

## End(Not run)
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