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Tcl and C++ Utilities Package

Programmer's Manual

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1 INTRODUCTION

In any software development, there is always a certain amount of code that is generic and could be reused in other projects. This manual describes a collection of general purpose, reusable Tcl and C++ utilities. These are C++ classes and routines, Itcl classes and widgets, and support for writing configure scripts in other packages. Most of these were originally part of other packages and have been collected here in order to make them easily available for use by other packages. Among other things, the *tclutil* package, which can be dynamically loaded as a Tcl package, defines error handling used by C++ classes and base classes for C++ and Itcl widgets. In addition, a general purpose widget library is included, as well as C++ support for HTTP and mmap. The package configure script also generates a shell script that can be used by other packages to simplify their own configure scripts.

1.1 Purpose

The purpose of this manual is to describe the *Tcl and C++ utilities* package and its implementation.

1.2 Scope

This document is primarily aimed at software developers using the package. This package is currently used by the *astrotcl*, *rtd*, *cat*, and *skycat* packages.

1.3 Applicable Documents

This document is based on the following documents:

[1] VLT-PRO-ESO-10000-0228, 1.0 10/03/93 -- VLT Software Programming Standards

1.4 Reference Documents

The following documents are referenced in this document:

2 OVERVIEW

The *tclutil* package is designed for use in a Tcl/C/C++ environment. It is made up of the following parts:

- A collection of general purpose C++ classes and routines
- A collection of C++ classes that support Tcl/Tk development
- A library of Itcl classes and widgets

In addition, the configure script for the package exports a shell script file, *tclutilConfig.sh*, that can be used by the configure scripts in other packages to save work. The file sets shell variables based on information discovered by configure, in the same way as the tclConfig.sh script provided by Tcl. This tells you, for example, how to make shared libraries on a given system, the locations of various Tcl/Tk packages, the compiler name and options, etc.

The following tables give an overview of the classes and widgets found in this package. For more details, see the following section and the man pages in the Reference section.

General Purpose C++ Classes and Routines

Name	Description
error	Collection of C++ routines used to report errors. There are different versions for general errors, system errors and warnings. Some of the routines support a printf style interface. You can also supply a user defined error handler to be called for each error.
HTTP	This is a generic class that can be used to do an HTTP GET on a given URL and return the results.
Mem	This class makes it easy to memory map a file and use it as a string or other object in memory. SysV shared memory, mmap and malloced memory are all supported by the class in a transparent way.
util	This is a collection of general purpose C++ routines, mostly file and string operations.

C++ Classes for Tcl/Tk Development

Name	Description
TclCommand	Base class for C++ classes implementing a Tcl command (widgets and image types are also Tcl commands and are subclasses of this class).
TkImage	Base class of C++ classes implementing a Tk image type.
TkWidget	Base class of C++ classes implementing a Tk widget.

Itcl Classes and Widgets

Name	Description
Batch	Class for evaluatimg Tcl commands in the background.
ButtonFrame	Widget for a frame with a row of buttons.

Itcl Classes and Widgets

Name	Description
CanvasDraw	Line graphic editor for a Tk canvas, supports interactive drawing, moving and resizing of various shapes, in a selected outline and fill color, width, etc.
CanvasPrint	Popup window to print the contents of a Tk canvas (Printing of embedded images is not supported in this version).
CanvasWidget	A canvas frame with optional scrollbars.
CheckEntry	A checkbutton and an entry widget in a frame.
ChoiceDialog	Popup window with a title and radiobuttons, to get the user to make a choice.
Chooser	Simple popup widget for selecting items based on filename, suffix and directory.
DialogWidget	Base class for popup dialog widgets.
DoubleList	Frame displaying 2 listboxes with arrows in between.
DoubleTableList	Frame with 2 TableList widgets and arrows in between.
EntryForm	Popup window with a configurable list of labels with entries.
FileSelect	Popup motif style file select dialog.
FrameWidget	Base class for widgets contained in a frame.
GraphPrint	Popup dialog to print a BLT graph.
InputDialog	Popup dialog to get input from the user.
LabelCheck	Frame containing a label and a checkbutton.
LabelChoice	Frame containing a label and a list of radiobuttons.
LabelEntry	Frame containing a label and an entry.
LabelEntryScale	Frame displaying a label, an entry and a scale widget (type in value or use slider).
LabelMenu	Frame displaying a label and a menubutton.
LabelMessage	Frame displaying a label and a message (for read-only items).
LabelNumber	Frame displaying a label and a number.
LabelValue	Frame displaying a label and some value.
LabelWidget	Base class of widgets with a label.
ListDialog	Dialog to display a listbox and some text in a popup window.
ListboxWidget	Listbox frame with optional scrollbars, methods to set/get selection and contents.
PrintDialog	Base class of print dialogs.
ProgressBar	Frame containing a netscape style progress bar and message.
TableList	Listbox based table widget with headings and columns formatted automatically, supports sorting, rearranging columns, printing,
TableListConfig	Popup widget for editing the table layout for the TableList class.

Itcl Classes and Widgets

Name	Description
TableListConfigFile	Itcl class used to save configuration information for the TableList class.
TableListPrint	Print dialog for the TableList class.
TableListSort	Popup window used to set sorting options for the TableList class.
TextDialog	Popup dialog displaying a text window and a specified text.
TopLevelWidget	Base class of widgets with a top level window. Also provides methods for adding a menubar with menus and menu items at top and a short help window at the bottom. Provides support for user defined *plugins* for any subclass.

3 USER'S GUIDE

This section describes in general the contents of the *tclutil* package. For details, see the man pages in the Reference section.

3.1 General Purpose C++ Classes and Routines

3.1.1 Error Handling

Error handling in the C++ code consists of a collection library routines and a facility for specifying an error handler routine to be called to report errors. The error reporting routines keep a copy of the most recent error message, which can be retrieved using the getError() routine. In Tcl based applications, these routines normally generate Tcl error messages in the main interpreter, while in non-Tcl applications, the default action is to print the error messages on stderr. The *TclCommand(3)* class automatically defines an error handler for Tcl.

C++ Error Reporting Routines

Routine	Description
error	Report the error.
fmt_error	Same as `error`, but with a *printf* like interface.
sys_error	Report the error with the system error code, like perror.
fmt_sys_error	same as `sys_error`, but with a *printf* like interface.
log_message	Used to log a message that is not an error (not used here).
last_error	Return the text of the previous error message.
last_error_code	Return the error code for the previous error.
clear_error	Reset the last_error buf to empty.
set_error_handler	Set a routine to be called when errors occur and return a pointer to the previous handler.
print_error	Simple default error handler: print the error message on stdout.

3.1.2 Class HTTP

This class is used to access data over the network using HTTP GETs. Methods are available to get the data, given the URL and to step through the data line by line or return the entire result in a buffer. The syntax of the URL may be one of the following:

- `http:`*//host:port/path* (:*port* is optional)
- `file:`*//path*
- *command args*

In the first case, an HTTP GET is done to retrieve the data for the URL. If the URL starts with "file:", the contents of the local file is returned. If the URL does not start with "file:" or "http:", it may be a local command to execute. In this case, the command is executed and the output of the command is returned. This last case is only allowed if explicitly enabled with the allowUrlExec() method. This should only be done if you know that it is safe to execute the command.

The following example does an HTTP get on *url* and prints the result:

```
HTTP http;
int nlines = 0;
char* buf = http.get(url, nlines);
printf("answer = (%d lines)\n%s\n", nlines, (buf ? buf : "ERROR"));
```

See the man page HTTP(3) for details on the various constructors and methods.

3.1.3 Class Mem

This class uses reference counting to help manage memory areas. The memory may be allocated with the C++ "new" operator, SysV shared memory or mmap. The class keeps track of who owns the memory, who is responsible for deleting it when no longer needed and how many references there are to the memory area. When there are no more references, we can safely detach a shared memory area and if we are the "owner", delete it. Constructor arguments and flags determine whether shared memory, mmap or normal (unshared) memory is allocated or whether existing shared memory is used. The state can be changed at any time, i.e.: shared memory can be changed to unshared and unshared to shared.

The following example allocates 10000 bytes of sysV shared memory:

```
Mem m(10000, 1);
char* p = (char*)m.ptr();
```

This example uses mmap to map a file to memory:

```
Mem m(filename);
char* p = (char*)m.ptr();
```

See the man page Mem(3) for details on the various constructors and methods.

3.1.4 Other C++ Utilities

The file util.C contains a number of utility routines for string and file manipulation[1]. This includes routines to strip blanks from a string, get the size of a file, get the base name of a file or the real name (follow a symbolic link), unbuffered reading and writing to a socket, etc. See Util(3) for a description.

3.1.5 Test Cases

The util/test subdirectory contains test cases for the C++ classes. Type "make test" to run the tests. The results are compared with a previous run and an error message is printed if something changed.

1. These routines should probably be encapsulated in a class or use a common prefix, but they are kept for now for convenience and to remain compatible with existing software.

3.2 C++ Support for Implementing Tcl Commands, Widgets and Image Types

3.2.1 TclCommand

TclCommand is a base class for C++ classes defining Tcl commands. It offers support for an [incr Tk] like interface. That is, Tcl commands defined in this framework can be declared as Tcl objects, where each object may have any number of methods or subcommands. Tcl subcommands are defined in a static array mapping the name of the subcommand to the C++ method that implements it. Inheritance is supported so that new subcommands may be added in a derived class. Each class in the hierarchy defines the virtual *call* method, which calls a C++ method, given its name and passes control to the base class if it does not know the method. The methods that implement the Tcl subcommands all take the same arguments: the argc and argv arguments that were passed to the command (minus the command name).

See TclCommand(3) for more details and examples.

3.2.2 TkImage

TkWidget is a base class for C++ classes defining Tk widgets. In addition to the features inherited from its base class *TclCommand(3)*, TkWidget adds support for creating and configuring Tk widgets.

The configure (or config) and cget subcommands are implemented here automatically, so that derived classes don't have to handle this. The derived classes only need to define two structures required by Tk for widgets:

One is the `Tk_ConfigSpec` structure, a static struct describing the widget options.

The other is a non-static member struct for holding the values for widget configuration options. This struct must be derived from `TkWidgetOptions`, which is just a dummy struct used for passing the actual struct as a parameter.

See TkWidget(3) for more details.

3.2.3 TkWidget

TkImage is a base class for a class defining a new Tk image type. The image type defined here differs slightly from standard Tk image types, such as photo or bitmap in that it is only allowed to display a given image in a single widget and you can optionally specify what type of widget that should be.

The intent here is that you specify that the image can only be in, say, a canvas window. Since a given image "instance" can only be displayed in one canvas window (as far as Tk is concerned), you can use the scrolling offsets of the canvas to implement intelligent scrolling. It is still possible to display an image in multiple widgets, but this must be handled in the derived class (see *RtdImage(3)* for an example). The restriction comes about, because of the way Tk handles images in multiple widgets. Normally, if one changes size, the others do as well. This is not necessarily what you always want in an image processing application. You may want to have the same image at different sizes sharing the same data.

This class does some of the abstract work for dealing with Tk images. It declares some of the static member functions that Tk calls for image handling (GetImage, DisplayImage, FreeImage and DeleteImage) and calls virtual member functions where necessary to handle the actual display of the image.

This class also defines and implements the "configure" and "cget" image commands. The derived class passes the TkImage constructor information about the configuration options (`optionsPtr_` and `configSpecsPtr_`) for use in these subcommands. The derived class may still need to redefine the “`configureImage`” method in order to handle certain options, but most of the work is done in this base class.

3.2.4 bitmaps

The tclutil/bitmaps directory contains the bitmaps used by the widgets in this package. In order to make it easier to use the bitmaps and to release a single binary of applications, using packages such as ET (Embedded Tk), the bitmaps are compiled in as static bitmaps. They are available to all Tcl scripts by name (the base name of the bitmap file). Other packages can add their own bitmaps in the same way by compiling them as static bitmaps. This adds very little overhead and saves a lot of trouble locating the bitmaps at runtime. It may also increase Tk performance somewhat.

3.2.5 TclUtil

The tclutil/src/TclUtil.C file defines the code necessary to make this package loadable in Tcl. When configured with the --enable-shared option, a single shared library file is generated (libtclutil.so, or libtclutil.sl). This library may be loaded dynamically in a Tcl application using the Tcl “package require” command. In order for the package to be located, the global variable `auto_path` must include the directory where the tclutil package is installed. See the Tcl documentation for the *package(n)* command for more details.

3.3 Itcl Classes and Itk Widgets

This section gives an overview of the available Itcl widget classes. For details, methods and options, see the man pages in the Reference section.

3.3.1 Batch

This class is used to evaluate a set of Tcl commands in a separate process, so that it can be interrupted. Using the *bg_eval* method, you specify a command to evaluate in the background. When it is done, a callback method is called with the status and the results of the command. No exec is done, so the process is just a copy of the current one and has a copy of the memory and open files. This class is often used together with the ProgressBar(n) class, to do some processing in the background and allow the user to interrupt it.

This class does not have any visible window, although it does define a frame, which is used to make sure the object is automatically deleted when the class using it is deleted.

The following example evaluates the Tcl command *get_preview* in a separate process and calls *preview_done* with the results:

```
Batch $w_.batch \
    -command [code $this preview_done] \
    -debug $itk_option(-debug)
$w_.batch bg_eval [code $this get_preview]
```

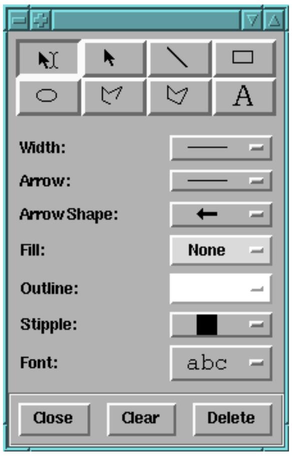
3.3.2 ButtonFrame

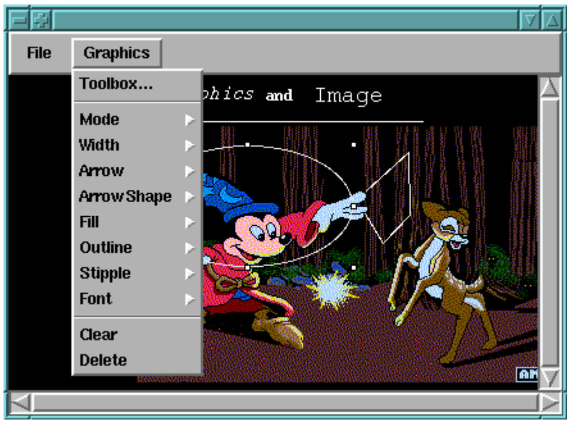
This class is an itcl widget for displaying a frame with a row of standard buttons, such as *OK* and *Cancel*, with options for adding and other buttons and actions.

The example below calls the *ok* method if OK is pressed and the *quit* method if quit is pressed:

```
set w [ButtonFrame $w_.b \
   -ok_cmd [code $this ok] \
   -cancel_cmd [code $this quit]]
pack $w -fill x -expand 1
```

3.3.3 CanvasDraw





CanvasDraw is an Itcl-widget class that an application can use to add interactive drawing capabilities to any Tk canvas. Since it is a subclass of TopLevelWidget, it creates its own toplevel window containing a drawing mode selection section and an option section for setting colors, fonts, line thickness, arrow types, etc. The window can be hidden on startup by specifying the "-withdraw 1" option inherited from TopLevelWidget. The widget provides methods to add a *Graphics* menu to another top level window (shown above at right). You can also load an image for the background of the canvas and draw graphics over the image. Methods are available to limit the drawing to the size of the image. All of the graphic objects may be moved or resized interactively by the user using FrameMaker style *handles*.

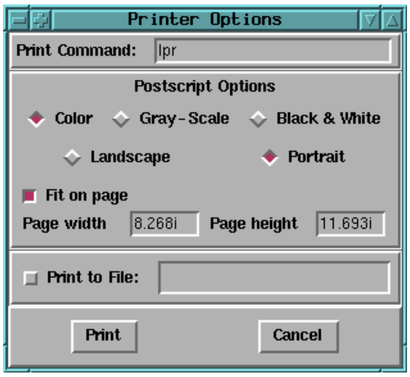
Here is the code for the example shown above (The menu code is not shown):

```
class tCanvasDraw {
    inherit TopLevelWidget

    constructor {args} {
      add_menubar
      itk_component add canvas {
            CanvasWidget $w_.canvas \
                   -canvasbackground black
      }
      pack $itk_component(canvas) -fill both -expand 1
      set canvas [$itk_component(canvas) component canvas]

      itk_component add draw {
            CanvasDraw $w_.draw\
                   -canvas $canvas \
                   -withdraw 1 \
                   -transient 1 \
                   -center 0
      }
      add_menu_items
      set image [image create photo -file mickey.gif]
      $canvas create image 40 40 -image $image -anchor nw
      eval itk_initialize $args
    }
```

3.3.4 CanvasPrint



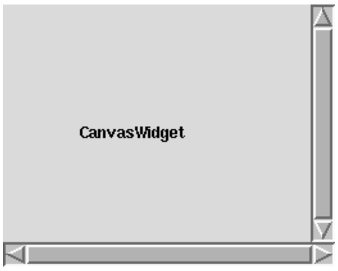
This class extends the PrintDialog class to be able to print the contents of a canvas as postscript. There are options to print in color, grayscale or mono, set the page size and orientation. You can print to a file or directly to a postscript printer.

Note: This class does not support printing images embedded in the canvas, since that is not currently supported by Tk. See *RtdImagePrint(n)* for a version that does print images by doing a screendump of the canvas window area.

Example:

```
CanvasPrint $w_.print
```

3.3.5 CanvasWidget



This is an Itcl class based on the Tk canvas widget. It creates a frame containing a canvas window and optional scrollbars.

Example:

```
set w [CanvasWidget .c]
pack $w -fill x -expand 1
[$w component canvas] create text 100 100 \
     -text "CanvasWidget"
```

3.3.6 CheckEntry

This class defines an itcl widget combining a checkbutton and an entry. This can be used to turn options on and off in a dialog window.

Example:

```
set w [CheckEntry .ce -text "Test label:"]
pack $w -fill x -expand 1
```

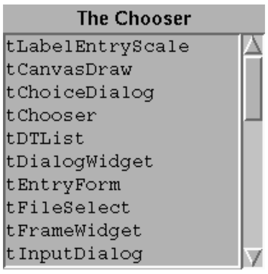
3.3.7 ChoiceDialog

A ChoiceDialog is a dialog widget used to display a message and a list of choices to get a choice from the user. A Tcl command is evaluated with the user's selection when the OK button is pressed.

Example:

```
set w [ChoiceDialog .d \
   -text {Please choose...} \
   -cols 2 \
   -messagewidth 3i \
   -choice {One Two Three Four Five Six Seven Eight} \
   -value {One}]
puts "Dialog returned: [$w activate]"
```

3.3.8 Chooser



Chooser is a simple itcl widget for selecting items based on files with a given suffix in a given directory.

Example:

```
set w [Chooser .c \
   -title "The Chooser" \
   -dir . \
   -suffix .tcl \
   -files [glob ./*.tcl] \
   -command puts]
```

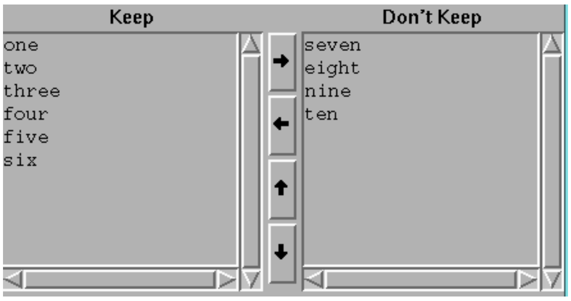
3.3.9 DialogWidget

A DialogWidget is the base class of dialog widgets. It is defined here as a window with a message at top and a row of buttons at bottom. Through inheritance, you can add widgets inbetween.

Example:

```
set w [DialogWidget .d \
   -text {This is a test message} \
   -bitmap warning \
   -default 1 \
   -buttons {OK Cancel Help}]
```

3.3.10 DoubleList



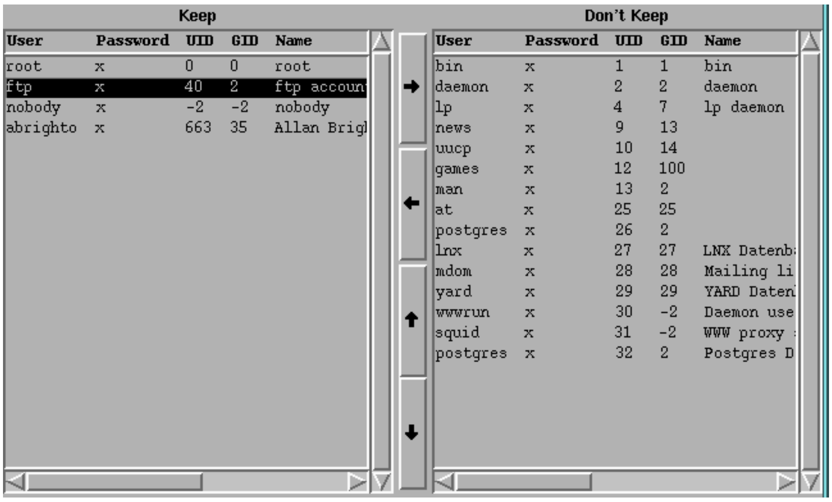
A DoubleList is an Itcl widget for displaying two ListboxWidgets with arrows between them for moving items back and forth or up and down. This widget is useful for selecting items from a long list of available items. The left and right listboxes are instances of the *ListboxWidget(n)* class and have the Itcl component names *left* and *right*.

Example:

```
itk_component add dlist {
      DoubleList $w_.dtlist \
            -lefttitle "Keep" \
            -righttitle "Don't Keep" \
            -hscroll 1 \
            -updown 1 \
            -selectmode extended
}
pack $itk_component(dlist) -fill both -expand 1

[$itk_component(dlist) component left] set_contents \
    {one two three four five six}
[$itk_component(dlist) component right] set_contents \
    {seven eight nine ten}
```

3.3.11 DoubleTableList



A DoubleTableList is an Itcl widget for displaying two TableLists with arrows between them for moving items back and forth or up and down. You can access the left and right TableLists as itk components *left* and *right*. This widget is used in the same way as the DoubleList widget, but is better suited for tabular data that should be formatted in columns. The *left* and *right* components are instances of the *TableList(n)* widget class.

Example:

```
# create the DoubleTableList
itk_component add dtlist {
    DoubleTableList $w_.dtlist \
      -lefttitle "Keep" \
      -righttitle "Don't Keep" \
      -hscroll 1 \
      -updown 1 \
      -selectmode extended
}
pack $itk_component(dtlist) -fill both -expand 1
set headings {User Password UID GID Name Home Shell}
set info {}
set fd [open /etc/passwd]
while {[gets $fd buf] != -1} {
    lappend info [split $buf :]
}

$itk_component(dtlist) config \
    -headings $headings \
    -leftinfo $info \
    -rightinfo {}
```

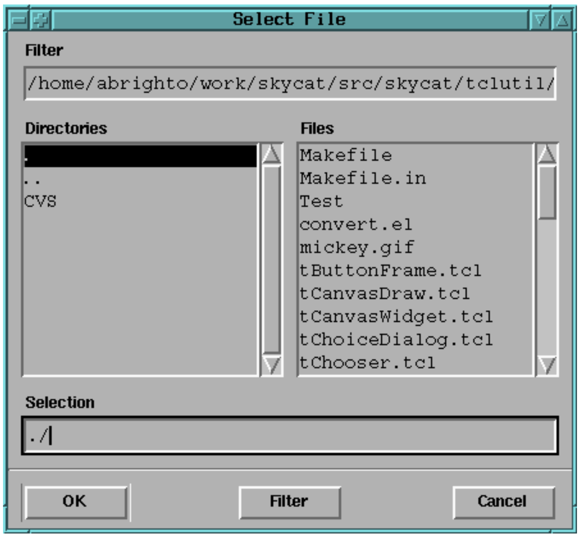
3.3.12 EntryForm

An EntryForm widget is a dialog for entering data at given labels. The title and labels are specified as options.

Example:

```
EntryForm .ef \
    -title {Please enter the data:} \
    -labels {Name Address Tel Fax Age Height Weight} \
    -command puts \
     -values {
           {My Name} {My Address} {My Tel}
            My Fax} {My Age} {My Height} {My Weight}
     }
```

3.3.13 FileSelect



This class implements a version of the OSF/Motif style file selection dialog box. This is a modified version of an older widget written by Mark Ulferts (before Iwidgets was released) that is still used because of poor performance in the iwidgets2.x version. This should probably be replaced with the new Tk version when we move to tcl8.x (Tk 8.x includes a standard file selection widget).

Example:

```
puts "got: [filename_dialog]"
```

3.3.14 FrameWidget

The FrameWidget Itcl class is the base class of widgets that are contained in a Tk frame (see also *TopLevelWidget(n)* for widgets that have thier own top level window). FrameWidget is a subclass of *itk::Widget* and thus inherits all of the features described in *Widget(n)*. In addition, a number of useful methods are defined, for use by the derived classes.

Both the *FrameWidget* and *TopLevelWidget* classes call the *init* method when all the constructors have completed (using the *after idle* command). The *init* method is often the best place to build widgets, since at that point you know the values of all of the Itcl options.

Example:

```
class util::CanvasWidget {
      inherit util::FrameWidget
      ...
```

3.3.15 GraphPrint

This widget defines a print dialog box for printing the contents of a BLT graph. This widget looks and acts just like *CanvasPrint(n)*, except that it works with a BLT graph rather than a Tk canvas.

Example:

```
GraphPrint $w_.print
```

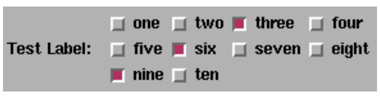
3.3.16 InputDialog

An InputDialog is a dialog to display a message and get input from the user.

Example:

```
set w [InputDialog .d \
   -text {Please type something...} \
   -bitmap warning \
   -modal 1 \
   -buttons {OK Cancel Help}]
puts “Dialog returned: [$w activate]”
```

3.3.17 LabelCheck

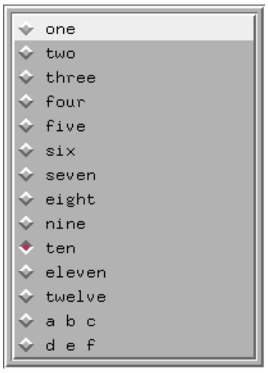


LabelCheck is an Itcl megawidget for choosing options using a label and radiobuttons (uses blt::table to arrange the buttons in rows and columns).

Example:

```
set w [LabelCheck .lc \
        -text {Test Label:} \
        -rows 3 \
        -choice {one two three four five six seven eight nine ten} \
        -value {three six nine} \
        -command puts]
pack $w -fill x -expand 1
```

3.3.18 LabelChoice



LabelChoice is an Itcl megawidget for choosing options using a label and a set of radiobuttons. The widget uses blt::table to arrange the buttons in rows and columns. You can specify the number of rows or columns and a list of items as options. There are methods to get a list of selected values or you can specify a command to be evaluated whenever the selected values change.

Example:

```
set w [LabelChoice .lc \
    -orient vertical \
    -text “Test label:” \
    -choice {one two three four five six seven eight \
                nine ten eleven twelve {a b c} {d e f}} \
    -value three \
    -relief groove \
    -anchor w \
    -borderwidth 3 \
    -command puts]
pack $w -fill both -expand 1
```

3.3.19 LabelEntry

This widget displays a label and an entry and implements convenient methods for accessing and modifying the label and the value.

Example:

```
set w [LabelEntry .le \
            -text “Test label:” \
            -value 42 \
            -labelwidth 20 \
            -valuefont 8x13 \
            -relief sunken \
            -borderwidth 3 \
            -command puts \
            -textvariable “myvar”]
pack $w -fill x -expand 1
```

3.3.20 LabelEntryScale

LabelEntryScale is an Itcl widget combining a labeled entry with a scale widget to make a scale with an editable entry field. This widget is useful for enterring numerical values.

Example:

```
set w [LabelEntryScale .les \
            -text “Test label:” \
            -from 10 \
            -to 120 \
            -value 25 \
            -valuewidth 4 \
```

```
            -validate real \
            -relief sunken \
            -borderwidth 3 \
            -command puts \
            -entrycommand foo \
            -validate real \
            -orient horizontal]
```

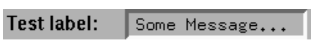
3.3.21 LabelMenu

This widget displays a label and a menubutton with a selector and a menu of radiobuttons. This can be used for choosing items from a list and displaying the current choice. The widget supports adding of items to the radiobutton menu and keeps track of which items are selected.

Example:

```
set w [LabelMenu .lm \
            -text “Test label:” \
            -valuefont 8x13 \
            -relief raised \
            -orient horizontal]
pack $w -fill x -expand 1
$w add -label “one” -command “foo one”
$w add -label “two” -command “foo two”
$w add -label “three” -command “foo three”
```

3.3.22 LabelMessage



LabelMessage is an Itcl widget for displaying a label and a (read-only) message.

Example:

```
set w [LabelMessage .lm \
            -text “Test label:” \
            -value “Some Message...” \
            -labelwidth 10 \
            -labelfont -Adobe-Helvetica-Bold-R-Normal--*-140-*-*-*-*-*-* \
            -valuefont 8x13 \
            -relief sunken \
            -borderwidth 3 \
            -aspect 1000 \
            -orient horizontal]
pack $w -fill x -expand 1
```

3.3.23 LabelNumber

LabelNumber is an Itcl widget for displaying a label, a number and buttons to increment and decrement the number.

Example:

```
set w [LabelNumber .ln \
            -text “Test label:” \
            -value 42 \
            -labelwidth 20 \
            -labelfont -Adobe-Helvetica-Bold-R-Normal--*-140-*-*-*-*-*-* \
```

```
                -valuefont 8x13 \
                -relief sunken \
                -borderwidth 3 \
                -command puts \
                -orient horizontal]
    pack $w -fill x -expand 1
```

3.3.24 LabelValue

This widget displays a label and a read-only value and implements convenient methods for accessing and modifying the label and the value.

Example:

```
    set w [LabelValue .le \
                -text "Test label:" \
                -value "test value"]
    pack $w -anchor w -fill x
```

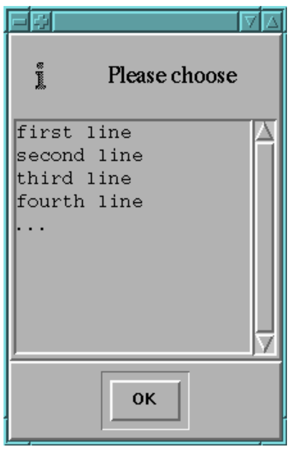
3.3.25 LabelWidget

LabelWidget is an Itcl widget for displaying a label and is the base class of labeled widgets. Derived classes add other widgets to the right or under the label.

Example:

```
    set w [LabelWidget .le \
       -text "Test label:" \
       -labelwidth 20]
```

3.3.26 ListDialog



A ListDialog is a dialog to display a listbox with a number of choices. When the user makes a selection and types OK or <Enter>, the widget returns the value via the activate method.

Example:

```
set w [ListDialog .d \
         -text {Please choose} \
         -choice {
               {first line}
               {second line}
               {third line}
               {fourth line}
               {...}} \
         -modal 0]
puts "Dialog returned: [$w activate]"
```

3.3.27 ListboxWidget

ListboxWidget is an Itcl widget for scrolled lists, based on the Tk listbox. Methods are available that make it easy to set and get the contents of the listbox.

Example:

```
set w [ListboxWidget .lb \
   -title “The Listbox”]
pack $w -fill x -expand 1

$w set_contents {
     {one   two   three ...}
     {four  five  six ...}
     {seven eight nine ...}
}
$w select_row 1
puts “selected [$w get_selected]”
puts “internal listbox name is: [$w component listbox]”

bind [$w component listbox] \
     <ButtonRelease-1> “puts \[$w get_selected\]”
```

3.3.28 PrintDialog

PrintDialog is the base class of Popup dialogs for specifying printer options. See *CanvasPrint(n)* for an example of how this is used or see the man page *PrintDialog(n)* for details.

3.3.29 ProgressBar

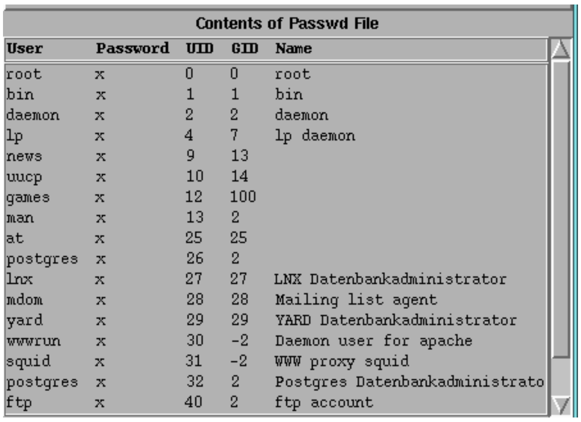
This object displays a message and a scale indicating that work is in progress. Methods are available to set the message to display and the percent done.

Example:

```
set w [ProgressBar .pb -text “Test label:” -from 0 -to 100 -value [set v 0]]
pack $w -fill x -expand 1

# dummy proc to animate the progress bar
proc foo {} {
    global w v
    incr v
    $w config -text “${v}% done” -value $v
    if {$v >= 100} {
      exit
    }
    after 100 foo
}
after 100 foo
```

3.3.30 TableList

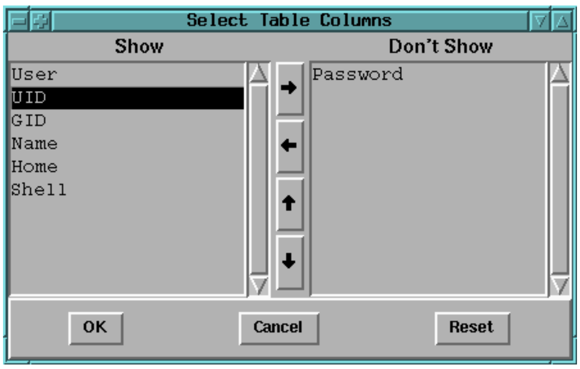


TableList is an itcl widget for displaying tabular information and headings in a Tk listbox. It lines up columns of data (specified in tcl list format) with column headings, optionally sorts the data by given columns, in a given order, can "hide" columns, rearrange columns, or display columns matching certain expressions. You can even print the contents of the table. This widget has been in use for a number of years and has grown to include quite a few features. It is well suited to displaying the results of database or catalog queries.

Example:

```
# create the TableList
itk_component add tlist {
    TableList $w_.tlist \
      -title "Contents of Passwd File" \
      -selectmode extended
}
pack $itk_component(tlist) -fill both -expand 1
...
set fd [open /etc/passwd]
set info {}
set headings {User Password UID GID Name Home Shell}
while {[gets $fd buf] != -1} {
    lappend info [split $buf :]
}
$itk_component(tlist) config \
    -headings $headings \
    -info $info
```

3.3.31 TableListConfig



TableListConfig is an Itcl popup widget for editing the table column layout for the *TableList* class. This can be used to specify that certain columns should not be displayed or should be displayed in a different order. Although it is possible to create an instance of this class yourself, it is normally done with the *TableList* method *layout_dialog*.

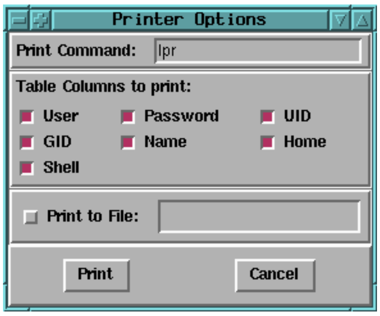
Example:

```
TableList $tablelist -headings {...}
...
$tablelist layout_dialog
```

3.3.32 TableListConfigFile

TableListConfigFile is an Itcl class for managing the configuration information for the *TableList* widget. This class does not have a visible window interface. It creates a frame, but only to ensure proper cleanup when the TableList window is deleted. See also *TableListConfig(n)* for the user interface to this class. This class is internal to TableList and should not normally be accessed from the outside.

3.3.33 TableListPrint

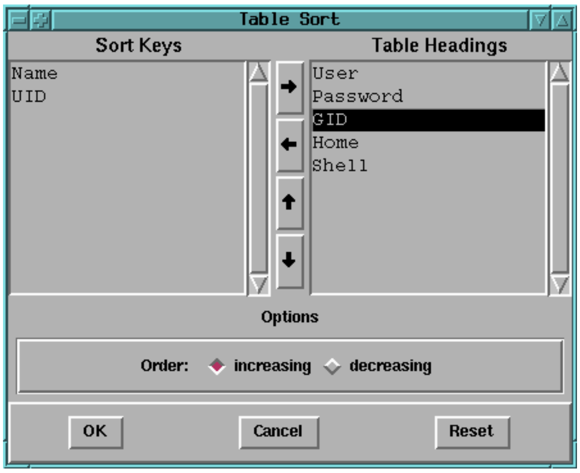


TableListPrint is a print dialog box for printing the contents of a TableList. It is a subclass of PrintDialog(n). You can choose which columns to print by selecting or deselecting the column names. Although you can use the class directly, it is usually easier to just call the *TableList::print_dialog* method.

Example:

```
TableList $tablelist -headings {...}
$tablelist print_dialog
```

3.3.34 TableListSort

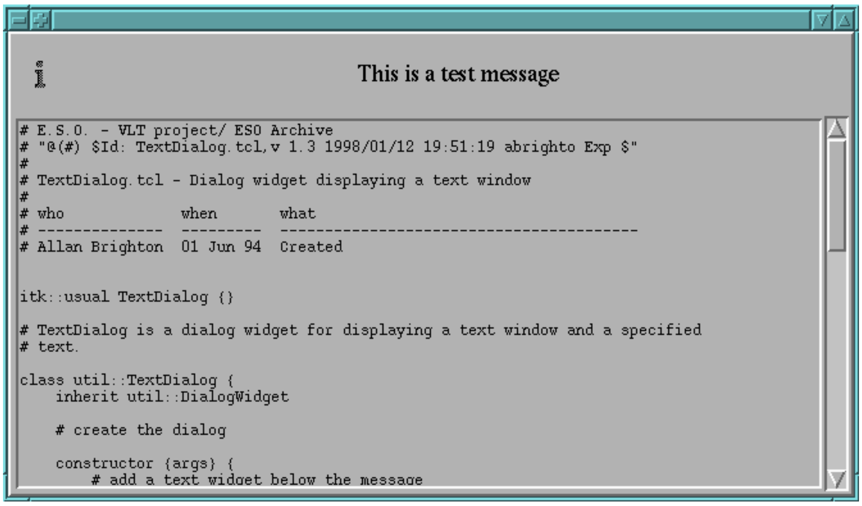


TableListSort is an Itcl popup widget for sorting contents of a *TableList*. You can specify one or more columns to sort the list by and the direction of the sort (*increasing* or *decreasing*). Although you can use the class directly, it is normally easier to simply call the *TableList::sort_dialog* method.

Example:

```
TableList $tablelist -headings {...}
$tablelist sort_dialog
```

3.3.35 TextDialog

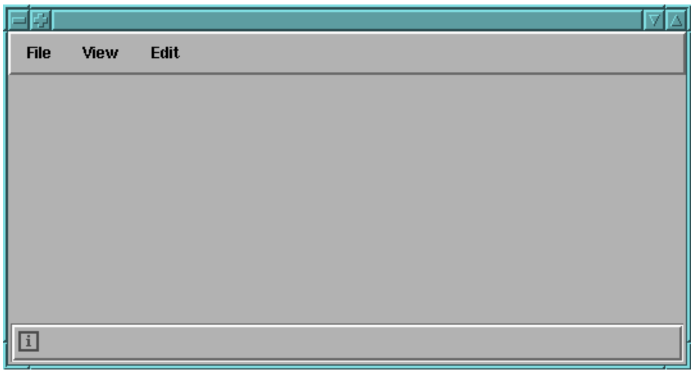


TextDialog is a dialog widget for displaying a text window and a specified text.

Example:

```
set w [TextDialog .d \
   -text $text\
   -contents $contents]
$w activate
```

3.3.36 TopLevelWidget



The TopLevelWidget Itcl class is a subclass of *itk::Toplevel* and thus inherits all of the features described in *Toplevel(n)*. In addition, a number of useful methods are defined, for use by the derived classes. These include support for adding a menubar, menu buttons and menu items to the top of the window and adding a short help window at the bottom. A short help text is defined for each menu item and widget and it is displayed (in the short help window) whenever the mouse passes over it.

Both the *FrameWidget* and *TopLevelWidget* classes call the *init* method when all the constructors have completed (using the *after idle* command). The *init* method is often the best place to build widgets, since at that point you know the values of all of the Itcl options.

Any subclass of *TopLevelWidget* automatically has support for a user defined *plugin*. For any class named *Foo*, for example, a Tcl proc named *Foo_plugin* many be defined. The plugin proc is called after the class construction is complete (after calling *init*) with the name of the class instance. If the environment variable *FOO_PLUGIN* is defined (replace *FOO* with the class name in upper case), it is assumed to be the name of the Tcl source file containing the plugin code and defining the Tcl proc *Foo_plugin*. The file is sourced and the file's directory is added to the Tcl *auto_path* variable.

This plugin feature can be used to add features to widgets, such as additional menus or buttons. Once you have the *handle* for the top level widget, it is usually easy to access other internal widgets, if necessary, to make any changes or additions you want. The Tcl language is also very flexible and will allow you to redefine procedures and methods at run time.

The normal way to use the TopLevelWidget class is to declare it as a base class:

```
inherit TopLevelWidget
```

However, you could also create an instance directly, for example:

```
TopLevelWidget .t
.t add_menubar
.t add_menubutton File
```

```
.t add_menubutton View
.t add_menubutton Edit
.t make_short_help
```

3.3.37 Test Cases

The tclutil/test directory contains test and demo scripts for all of the widgets. To run the tests, cd to the tclutil/test directory and type `Test`.

3.3.38 Tcl Utility Procs

This package also defines some simple, yet usefull Tcl utility procedures that are described below.

Utility Procs

utilGetTopLevel	Return the name of the top level window for $w, or an empty string if $w is the root window ".".
utilGetSelection	Get the current selection and return it or return an empty string if there is no selection.
utilRaiseWindow	Make the given top level window visible by raising it, if it is hidden, or deiconifying it if it is not mapped.
utilReUseWidget	If the given widget exists, make it visible and reconfigure it with the given options, otherwise create it with the given options.
utilPrintErrors	For debugging: causes all errors to be printed on stderr in addition to any other handling.

The file *udialog.tcl* also defines a number of utility procedures for common dialog windows.

Dialog Procs

filename_dialog	Choose a file with a file browser.
confirm_dialog	Ask for confirmation before doing something.
error_dialog	Report an error message.
errexit_dialog	Error message dialog with an *Exit* button for serious errors.
warning_dialog	Pop up a window with a warning message.
info_dialog	Display an informational message.
choice_dialog	Ask the user to make a choice form a number of items.
input_dialog	Ask the user to type something in.
action_dialog	Ask the user to do something or press cancel.

4 REFERENCE

This section contains man pages for the Itcl and C++ classes and utilities.

4.0.1 Batch(n)

NAME

Batch - Class to evaluate Tcl commands in a separate process.

NAMESPACE

util

PARENT CLASS

util::FrameWidget

SYNOPSIS

Batch <path> ?options?

DESCRIPTION

This class is used to evaluate a set of Tcl commands in a separate process, so that it can be interrupted. No exec is done, so the process is just a copy of the current one and has a copy of the memory and open files. .

OPTIONS

-command

Command to evaluate when process is done. Called with 2 args: status and result (or error message).

-debug

Flag: if true run commands in the foreground for better debugging.

-tmpfile

Temp file for results.

METHODS

bg_eval {cmd}

Evaluate the given tcl commands in the background, so that they can be interrupted. The option $command is evaluated when the results when done.

fg_eval {cmd}

Evaluate the given command in the foreground (useful for debugging) The option $command is evaluated when the results when done.

interrupt {}

Interrupt the current search .

read_pipe {rfd wfd}

Read the pipe from the child process.

PROTECTED VARIABLES

bg_pid_

Process id of background process.

COMMON CLASS VARIABLES

count_
Count used for filename generation.

SEE ALSO

FrameWidget(n)

\- - - - - -

Last change: 02 Feb 98

4.0.2 ButtonFrame(n)

NAME

ButtonFrame - Widget displaying a frame with some standard buttons.

NAMESPACE

util

PARENT CLASS

util::FrameWidget

SYNOPSIS

ButtonFrame <path> ?options?

DESCRIPTION

This class is an itcl widget for displaying a frame with the standard buttons like "OK Cancel", with options for configuring other labels and actions.

OPTIONS

-ok_label

Labels and commands for the standard buttons.

METHODS

append {label cmd}

Add a button.

buttonconfig {label args}

Add a button to the row or configure an existing button.

PROTECTED VARIABLES

but_

Array mapping label name to button name.

seq_

Counter for button names.

SEE ALSO

FrameWidget(n)

- - - - - -

Last change: 02 Feb 98

4.0.3 CanvasDraw(n)

NAME

CanvasDraw - Add interactive drawing capabilities to a Tk canvas.

NAMESPACE

util

PARENT CLASS

util::TopLevelWidget

SYNOPSIS

CanvasDraw <path> ?options?

DESCRIPTION

CanvasDraw is an [incrTcl] widget class that an application can use to add interactive drawing capabilities to any Tk canvas. Since it is a subclass of TopLevelWidget, it creates its own toplevel window containing a drawing mode selection section and an option section for setting colors, fonts, line thickness, arrow types, etc. The window can be hidden on startup by specifying the "-withdraw 1" option inherited from TopLevelWidget.

OPTIONS

-arrowshape

Default arrow shape for lines.

-arrowtype

Default arrow type for lines.

-bbox

Specify bounding box of interactive drawing area as a list {x0 y0 x1 y1}.

-canvas

Canvas window.

-colors

List of colors for menu.

-defaultcursor

Default cursor when not drawing.

-drawcursor

Cursor when drawing graphics.

-fillcolor

Default fill color for drawing.

-fonts

Default list of fonts for font menu.

-gripfill

Fill color of selection grips.

-gripoutline

Outline color of selection grips.

-gripwidth
Size of selection grips.

-linecursor
Cursor displayed over simple lines for resizing.

-linestipple
Default stipple for lines.

-linewidth
Default line width for drawing.

-outlinecolor
Default color for outlines.

-regioncommand
Tcl command to evaluate whenever a "region" object is created, if no specific "create" command was specified.

-regioncursor
Cursor when creating region items (dashed box marking a region).

-show_object_menu
Flag: if true, display menus over graphic objects when selected with <3>.

-show_selection_grips
Flag: if true, display selection grips when an item is selected.

-stipplepattern
Default stipple pattern for drawing.

-textcursor
Cursor when creating text items.

-textfont
Default text item font.

-withtoolbox
If true (default) create the GUI interface (toolbox), otherwise don't.

METHODS

add_menuitems {m}
Create the menu items in the given menu.

add_notify_cmd {id cmd {update_flag 0}}
Arrange to have cmd evaluated whenever the given object is moved or resized. id is the canvas id of the object, If update_flag is 1, $cmd is also evaluated while the item is being moved or resized, otherwise only when the operation is done.

add_object_bindings {id {target_id ""}}
Set up the canvas object bindings. target_id defaults to id. If target_id is specified, it will receive the events instead of id.

add_poly_point {x y}
Add a point to the curent polygon/polyline.

adjust_line_selection {id}
Adjust the selection handles for the given simple line.

```
adjust_object_selection {id}
        Adjust the selection handles for the given object to fit the new
        size/pos.

check_deselect {}
        If the mouse is not over an object, deselect all objects.

check_done {x y {update_method "update_object"}}
        Check if object creation is done: if the button has moved since it
        was pressed, we are done, otherwise dragging continues without the
        button pressed.

        update_method is the method to call to update the object, if
        needed.

clear {}
        Delete all canvas items.

clip {px py}
        Clip the given point to keep it over the drawing area.

config_selected {option value}
        Apply the given option to the selected canvas items.

create_arc {x y}
        Create  and return a new arc object.

create_done {x y}
        Finish creation of the current object and call the "create"
        command, if one was specified, otherwise, for region items, call
        the region command, if defined.

create_freehand {x y}
        Create  and return a new freehand object.

create_label {x y}
        Create and return a new label (entry) object.

create_line {x y}
        Create  and return a new line object.

create_object {x y}
        Create a new object in the canvas.

create_oval {x y}
        Create  and return a new oval object.

create_polygon {x y}
        Create  and return a new polygon object.

create_polyline {x y}
        Create  and return a new polyline object.

create_rectangle {x y}
        Create and return a new rectangle object.

create_region {x y}
        Create and return a new region (dashed rectangle marking a region
        of the canvas).

create_text {x y}
        Create  and return a new text object.
```

```
create_text_done {x y}
        Finish creation of the current text object.

delete_object {id}
        Delete the given canvas item.

delete_selected_objects {}
        Delete the selected canvas items.

deselect_object {id}
        Deselect the given object.

deselect_objects {}
        Deselect all canvas objects.

draw_line_selection_grips {id}
        Draw the selection grips for a simple line.  Lines get one grip at
        each end.

draw_selection_grips {id}
        Draw the object selection grips (small boxes similar to those used
        by FrameMaker and used to move and resize the object).  Lines (see
        above) get one at each end, other objects (here) get one at each
        corner and side of the object's bounding box.

end_move {id}
        This method is called when a move operation is done.

end_resize {id}
        Stop resizing the selected object.

end_resize_line {id}
        Stop resizing the selected line.

flipx {item maxx}
        Flip the named item(s) on the X axis by subtracting the x
        coordinates from $maxx.

flipy {item maxy}
        Flip the named item(s) on the Y axis by subtracting the y
        coordinates from $maxy.

get_line_color {}
        Return a color for a line that will be visible.

item_has_tag {item tag}
        Return 1 if the given item has the given tag.

item_is_selected {item}
        Return 1 if the given item is currently selected.

make_drawmode_frame {}
        Create the frame for selecting draw types  (line, oval, ...) in
        the given frame.

make_object_menu {}
        Create the canvas item menu.

make_options_frame {}
        Create the draw options frame (line width, color, etc...).

mark {x y}
```

```
        Mark (remember) the current position.

move_object {id x y}
        Move the given object.

post_object_menu {x y}
        Post the object menu at the mouse cursor position.  If an item is
        selected, post the menu with the items enabled.

remove_notify_cmd {id}
        Remove the notify command for the given canvas id.

reset_cursor {}
        Set the cursor for the canvas window back to the previous one,
        unless we are in the middle of a resize operation.

resize_label {text rect tag}
        Resize the rectangle for a label to fit the text.

resize_line {id x y side constrain}
        Resize the given line.

rotate {item}
        Rotate the named item(s) 90 degrees by swapping the X and Y
        coords.

select_object {id {any 0}}
        Select the given object by drawing 8 little grips on it, or for
        text objects, if any==1 and the selection type is "anyselect",
        select the text in the object.  The grips havethe tag "grip" and
        the object gets the tag "selected".

select_only_object {id x y}
        Select only the given object.

select_region {x0 y0 x1 y1}
        This method is called when a region object has been created to
        select a region of the canvas.  All objects in the region are
        selected and if a region command option was specified, the command
        is evaluated with the bounding box of the region.

selected_items {}
        Return a list of all of the currently selected items.

set_arrowshape {list}
        Set the arrow shape default and for any selected objects.

set_arrowtype {t}
        Set the arrow type default and for any selected objects.

set_cursor {cursor}
        Set the cursor for the canvas window and save the previous cursor
        for later restoration.

set_drawing_mode {type {create_cmd ""}}
        Set the type of object to draw (line, oval, ...) If create_cmd is
        specified, it is called with the coordinates of the new object
        when its creation is completed.

set_fillcolor {c}
        Set the fill color default and for any selected objects note: if
        the stipple is invisible (see through), make it solid to make sure
        fill is visible.
```

```
set_linewidth {w}
        Set the line width default and for any selected objects.

set_menu_state {state}
        Enable or disable the drawing items in the menu (enable is state
        is "normal", disable if "disabled".

set_outlinecolor {c}
        Set the outline color default and for any selected objects.

set_stipplepattern {index}
        Set the stipple pattern default and for any selected objects index
        is the pattern number (corresponding to pat$index.xbm).

set_textfont {f}
        Set the text font  default and for any selected objects.

start_resize {id x y side}
        Start resizing the selected object (19.9.96: added changes from
        pbiereic).

toggle_select_object {id x y}
        If the object is selected, deselect it, otherwise select it.

update_freehand {x y}
        Update the current  freehand object in the canvas with the new x,
        y end points.

update_line {x y {constrain 0}}
        Update the current line object in the canvas with the new x, y end
        points.

update_object {x y {constrain 0}}
        Update the current object in the canvas with the new x, y end
        points.

update_poly_object {x y}
        Update the current polygon/polyline object in the canvas with the
        new x, y end points.

update_region {x y {constrain 0}}
        Update the current region object (dashed rectangle used for
        marking a region on the canvas).

update_resize {id x y side constrain}
        Update the resizing of the selected object (updated with changes
        from pbiereic, 19.9.96).
```

PROTECTED VARIABLES

```
arrowshapes_
        Available arrow shapes for canvas lines (corresponds to bitmaps
        named ar$1_$2_$3).

canvas_
        Canvas widget.

dragx_
        Flag: true if resizing on X axis.

dragy_
        Flag: true if resizing on Y axis.
```

```
drawing_
        Flag, true if drawing currently.

drawing_mode_
        Current draw type.

drawing_modes_
        List of drawing types .

endx_
        Ending x coord of object being drawn.

endy_
        Ending y coord of object being drawn.

obj_coords_
        List of coords for current object being created.

obj_id_
        Canvas id of the current canvas item.

object_menu_
        Popup menu for canvas items.

option_map_
        Array(canvasID,option) of option to use instead for that id.

posx2_
        X2 pos for resize operations.

posx_
        X pos for resize operations.

posy2_
        Y2 pos for resize operations.

posy_
        Y pos for resize operations.

prev_cursor_
        Saved previous cursor for canvas.

startx_
        Starting x coord of object being drawn.

starty_
        Starting y coord of object being drawn.

stipple_index_
        Index of stipple bitmap (0 .. 15, 7 is see through, see
        -stipplepattern).

x1_
        X1 of bounding box of interactive drawing area.

xoffset_
        X offset for move operations.

y0_
        Y0 of bounding box of interactive drawing area.

y1_
```

Y1 of bounding box of interactive drawing area.

yoffset_
Y offsets for move operations.

COMMON CLASS VARIABLES

cursors_
Array(direction={n,w,e,s,nw,ne,sw,se}) of cursor names for selection handles.

SEE ALSO

TopLevelWidget(n)

- - - - - -

Last change: 02 Feb 98

4.0.4 CanvasPrint(n)

NAME

CanvasPrint - Popup dialog for printing the contents of a Tk canvas

NAMESPACE

util

PARENT CLASS

util::PrintDialog

SYNOPSIS

CanvasPrint <path> ?options?

DESCRIPTION

This class extends the PrintDialog class to be able to print the contents of a canvas as postscript. Note: this class does not support printing images embedded in the canvas.

OPTIONS

-bot_left
: Header text to appear at bottom left.

-bot_right
: Header text to appear at bottom right.

-canvas
: Canvas widget.

-fit_to_page
: Flag, if true, scale output to fit on page.

-header_font
: Header/footer fonts.

-pageheight
: Page height, used when fit_to_page is 1.

-pagewidth
: Page width, used when fit_to_page is 1.

-show_headers
: Flag, if true, insert headers before printing.

-top_left
: Header text to appear at top left.

-top_right
: Header text to appear at top right.

-x0
: X0 coordinate of area of canvas to print.

-x1
: X1 coordinate of area of canvas to print.

-y0

Y0 coordinate of area of canvas to print.

-y1

Y1 coordinate of area of canvas to print.

METHODS

add_headers {}

Add header and footer labels above/below draw area by temporarily inserting the text .

init {}

This method is called after all options have been evaluated.

print {fd}

Print the contents of the canvas to the open filedescriptor.

rm_headers {}

Remove the headers, if any and restore the original state.

toggle_fit_pagesize {}

Called when the "Fit on page" button is pressed.

PROTECTED VARIABLES

x0

Saved -x0 option value.

SEE ALSO

PrintDialog(n)

\- - - - - -

Last change: 02 Feb 98

4.0.5 CanvasWidget(n)

NAME

```
CanvasWidget -
```

NAMESPACE

```
util
```

PARENT CLASS

```
util::FrameWidget
```

SYNOPSIS

```
CanvasWidget <path> ?options?
```

DESCRIPTION

```
This is an itcl class based on the Tk canvas widget.
```

SEE ALSO

```
FrameWidget(n)
```

- - - - - -
Last change: 02 Feb 98

4.0.6 CheckEntry(n)

NAME

CheckEntry - Itcl widget combining a checkbutton and an entry

NAMESPACE

util

PARENT CLASS

util::FrameWidget

SYNOPSIS

CheckEntry <path> ?options?

DESCRIPTION

This class defines an itcl widget combining a checkbutton and an entry.

OPTIONS

-command

The command for <Return> in the entry.

-value

Set the value in the entry.

-variable

Optionally specify the trace variable to use.

METHODS

_command_proc {}

called for Return in the entry.

get {}

Get the value in the entry.

PROTECTED VARIABLES

variable_

Trace var for checkbutton.

SEE ALSO

FrameWidget(n)

- - - - - -

Last change: 02 Feb 98

4.0.7 ChoiceDialog(n)

NAME

ChoiceDialog - Dialog to display a message and get choice from the user

NAMESPACE

util

PARENT CLASS

util::DialogWidget

SYNOPSIS

ChoiceDialog <path> ?options?

DESCRIPTION

A ChoiceDialog is a dialog widget used to display a message and get a choice from the user.

METHODS

set_choice {choice}

Called when a choice is made.

set_result {}

This method is redefined here to change the value that is returned from activate to be the contents of the choice widget.

SEE ALSO

DialogWidget(n)

\- - - - - -

Last change: 02 Feb 98

4.0.8 Chooser(n)

NAME

    Chooser - A simple widget for selecting items based on filenames

NAMESPACE

    util

PARENT CLASS

    util::FrameWidget

SYNOPSIS

    Chooser <path> ?options?

DESCRIPTION

    Chooser is a simple itcl widget for selecting items based on files with
    a given suffix in a given directory.

OPTIONS

    -command
            Tcl command to evaluate with selected file name.

    -default
            Default selection.

    -dir
            Directory for files.

    -files
            List of files (complete pathnames, usually output of [glob
            $dir/*.$suffix].

    -suffix
            Suffix for files.

METHODS

    choose {}
            Set new values.

    set_choice {file}
            Change the selection to the given file.

PROTECTED VARIABLES

    listbox_
            Internal listbox widget.

SEE ALSO

    FrameWidget(n)

\- - - - - -
Last change: 02 Feb 98

4.0.9 DialogWidget(n)

NAME

    DialogWidget - Base class of dialog widget classes

NAMESPACE

    util

PARENT CLASS

    util::TopLevelWidget

SYNOPSIS

    DialogWidget <path> ?options?

DESCRIPTION

    A DialogWidget is an itcl widget for creating dialog windows. A dialog
    window here is a window with a message at top and a row of buttons at
    bottom. Through inheritance, you can add widgets inbetween.

OPTIONS

    -bitmap
            Optional bitmap to display to left of message.

    -buttons
            One or more strings to display in buttons across the bottom of the
            dialog box.

    -default
            Index of button that is to display the default ring (-1 means
            none).

    -image
            Optional image to display above the message.

    -modal
            Flag: if true, grab the screen.

    -title
            Title to display in dialog's decorative frame.

METHODS

    activate {}
            Display the window and return the user's selection.

    init {}
            This method is called after the options have been evaluated.

    set_result {}
            This method may be redefined in a derived class to change the
            value that is returned from activate (default is the number of the
            button selected).

PROTECTED VARIABLES

    variable_
            Trace variable --.

SEE ALSO

```
TopLevelWidget(n)
```

```
- - - - - -
Last change: 02 Feb 98
```

4.0.10 DoubleList(n)

NAME

DoubleList - Widget displaying two lists with arrows between them

NAMESPACE

util

PARENT CLASS

util::FrameWidget

SYNOPSIS

DoubleList <path> ?options?

DESCRIPTION

A DoubleList is an itcl widget for displaying two lists with arrows between them for moving items back and forth.

OPTIONS

-updown

Flag: if true, also display up and down buttons for moving list items vertically.

METHODS

clear {}

Make the lists empty.

move_down {}

Move the selected elements from the right to the left list.

move_left {}

Move the selected elements from the right to the left list.

move_right {}

Move the selected elements from the left to the right list.

move_up {}

Move the selected elements from the right to the left list.

SEE ALSO

FrameWidget(n)

\- - - - - -

Last change: 02 Feb 98

4.0.11 DoubleTableList(n)

NAME

DoubleTableList - Widget displaying two TableLists with arrows between them.

NAMESPACE

util

PARENT CLASS

util::FrameWidget

SYNOPSIS

DoubleTableList <path> ?options?

DESCRIPTION

A DoubleTableList is an itcl widget for displaying two TableLists with arrows between them for moving items back and forth. You can access the left and right TableLists as itk components "left" and "right".

OPTIONS

-command

Command to evaluate when the list contents change.

-updown

Flag: if true, also display up and down buttons for moving table items vertically.

METHODS

clear {}

Make the TableLists empty.

move_down {}

Move the selected elements from the right to the left TableList.

move_left {}

Move the selected elements from the right to the left TableList.

move_right {}

Move the selected elements from the left to the right TableList.

move_up {}

Move the selected elements from the right to the left TableList.

SEE ALSO

FrameWidget(n)

\- - - - - -

Last change: 02 Feb 98

4.0.12 error(3)

NAME

error - C++ routines used for error reporting

SYNOPSIS

```
#include "error.h"

enum {OK, ERROR};

int error(const char* msg1, const char* msg2="", int code = 0);
int sys_error(const char* msg1, const char* msg2="");

int fmt_error(const char* fmt, ...);
int fmt_sys_error(const char* fmt, ...);

char* last_error();
int last_error_code();
void clear_error();

void (*set_error_handler(void (*error_handler)(const char*)))(const char*);
void print_error(const char* msg);

void log_message(const char* fmt, ...);
void (*set_log_message_handler(void (*message_handler)(const char*)))(const char*);
void print_log_message(const char* msg);
```

DESCRIPTION

These C++ routines are used to report errors and log messages. Some of the routines take one or two char strings as arguments to print, others have a "printf" style interface, to make it easier to format the error messages. In some cases the system error description (errno) is appended to the message. The default action is to print the error on stderr, however an error handler may be defined to override this behavior.

An error handler is a C++ routine of the form:

```
void errhandler(const char* msg)
```

where "msg" is the text of the error message, already formatted, if needed.

ROUTINES

error(msg1, msg2, code)
: Concatenate msg1 and the optional msg2 and report the error with the optional system error code.

sys_error(msg1, msg2)
: Concatenate msg1 and the optional msg2 and report the error, including the system error code, in the same way as perror(1).

fmt_error(fmt, ...)
: Report the error with a printf(1) style interface.

fmt_sys_error(fmt, ...)
: Report a system error with a printf style interface.

last_error()
: Return the text of the previous error message.

```
last_error_code()
        Return the error code for the previous error.

clear_error()
        Reset the last_error buf to empty.

set_error_handler(errhandler)
        Set a routine to be called when errors occur and return a
        pointer to the previous handler.

print_error(msg)
        Simple error handler: print the message.

log_message(fmt, ...)
        Print a message (like printf).

set_log_message_handler(msghandler)
        Set a routine to be called for log messages and return a
        pointer to the previous handler.

print_log_message(msg)
        Simple message handler: print the message.
```

SEE ALSO

TclCommand(3)

\- - - - - -
Last change: 02 Feb 98

4.0.13 ErrorHandler(3)

NAME

```
ErrorHandler - A C++ class for managing Tk Error Handlers for
                 catching X errors
```

SYNOPSIS

```
#include "ErrorHandler.h"

/*
 * This class is used to install and remove Tk X error handlers
 * in order to catch X errors and deal with them.
 */
class ErrorHandler {
...
public:
    // constructor
    ErrorHandler(Display* display, int verbose = 1);

    // destructor
    ~ErrorHandler();

    // static version of error handler, called from Tk
    static int errorProc(ClientData clientData, XErrorEvent *errEventPtr);

    // install/remove an X error handler
    int install();
    int remove();

    // return 1 if errors occurred
    int errors();

    // reset the error flag
    int reset();
};
```

DESCRIPTION

This class is used to install and remove Tk X error handlers in order to catch X errors and deal with them.

Note that checking for X errors requires calling XSync(3X) to flush the X event queue. This could have performance and other implications, but is necessary due to the nature of the X window system client server communication (error messages could be delayed otherwise).

To use this class, you only need to declare a (local) variable of type ErrorHandler before doing something that might cause X errors. When you want to check if any X errors occured, you can call the "errors()" method. It returns true if any X errors occured:

```
    {
        ErrorHandler errorHandler(display, verbose_flag);
        // ... (something that might produce X errors)
        if (errorHandler.errors()) {
                // errors occurred ...
        }
    }
```

The constructor installs the error handler and the destructor removes it - the destructor for local variables is called automatically at the end of the block or function where it is declared, and then the error handler is automatically removed.

Since installing the error handler causes all X errors to be ignored, it probably only makes sense to install one before certain operations and remove it immediately afterwards (unless you are prepared to handle X errors at any point in the application...).

METHODS

static int errorProc(ClientData clientData, XErrorEvent *errEventPtr)
Static version of error handler, called from Tk.

int install();
int remove();
Install or remove the X error handler.

int errors()
Return 1 if errors occurred. A call to XSync() is made here to avoid delays due to X buffering.

int reset();
Reset the error flag so that the "errors()" method will return 0.

SEE ALSO

CrtErrHdlr(3)

\- - - - - -
Last change: 02 Feb 98

4.0.14 FileSelect(n)

NAME

FileSelect - OSF/Motif standard file selection dialog

PARENT CLASS

util::TopLevelWidget

SYNOPSIS

FileSelect <path> ?options?

DESCRIPTION

This class implements a version of the OSF/Motif standard file selection dialog box using primitive widgets as the building blocks. This is a modified version of an old widget written by Mark Ulferts that is still used because of poor performance in the iwidgets2.x version. This should probably be replaced when we move to tcl8.x.

OPTIONS

-button_1
: The button label for button 1.

-button_2
: The button label for button 2.

-button_3
: The button label for button 3.

-dir
: Initial directory, default to [pwd].

-dirlabel
: Label for directory list, default "Directories".

-dispdir
: Display directory list, yes or no, default yes.

-dispfile
: Display file list, yes or no, default yes.

-dispfilter
: Display filter, yes or no, default yes.

-dispselect
: Display selection, yes or no, default yes.

-filelabel
: Label for file list, default "Files".

-filter
: File list filter, defaults to "*".

-filterlabel
: The label string above the filter widget.

-full
: Display full file names, yes/no, default no.

-height
    Set the height of the directory and file lists.

-modal
    flag: if true, grab the screen.

-selectlabel
    Label for selection entry, default "Selection".

-title
    Set the window title.

-width
    Set the width of the selection and filter entry widgets.

METHODS

_cancelcmd {}

- - - - - -
Last change: 02 Feb 98

4.0.15 FrameWidget(n)

NAME

```
FrameWidget - Itk base class for widgets with their own frame
```

NAMESPACE

```
util
```

PARENT CLASS

```
itk::Widget
```

SYNOPSIS

```
FrameWidget <path> ?options?
```

DESCRIPTION

```
The FrameWidget itcl class is a subclass of itk::Widget and thus
inherits all of the features described in Widget(n).  In addition, a
number of useful methods are defined, for use by the derived classes.
```

METHODS

```
init {}
        Derived classes can re-define the "init" method to run code after
        all options have been evaluated.
```

PROTECTED VARIABLES

```
w_
        Shorter name for $itk_component(hull).
```

SEE ALSO

```
Widget(n)
```

```
- - - - - -
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```

4.0.16 GraphPrint(n)

NAME

GraphPrint - Print dialog box for printing the contents of a graph

NAMESPACE

util

PARENT CLASS

util::CanvasPrint

SYNOPSIS

GraphPrint <path> ?options?

DESCRIPTION

This widget defines a print dialog box for printing the contents of a graph.

OPTIONS

-graph

Graph to print.

METHODS

ok {args}

Use PrintDialog::ok to get the fd (CanvasPrint::ok returns filename).

print {fd}

Print the contents of the graph as postscript to the given file descriptor.

SEE ALSO

CanvasPrint(n)

- - - - - -

Last change: 02 Feb 98

4.0.17 HTTP(3)

NAME

HTTP - utility class for communicating with the HTTP

SYNOPSIS

```
#include "HTTP.h"

class HTTP {
...
public:
    HTTP();
    ~HTTP();
    int status();

    int get(const char* url);
    char* get(const char* url, int& nlines, int freeFlag = 1);
    int get(const char* url, ostream&);

    int copy(ostream& os);
    int readline(char* ptr, int maxlen);
    char* getNext();
    const char* result() {return resultBuf_;}
    const char* result() {return resultBuf_;}

    void feedback(FILE* f);
    FILE* feedback();

    const char* hostname();
    int fd();

    char* content_type();
    int content_length();

    static int html_error(istream& is);
    static int html_error(char* s);

    static int allowUrlExec();
    static void allowUrlExec(int i);
};
```

DESCRIPTION

This class is used to access data over the network using HTTP GETs. Methods are available to get the data, given the URL and to step through the data line by line or return the entire result in a buffer. The syntax of the URL may be one of the following:

```
http://host:port/path        (:port is optional)

file://path

command args
```

In the first case, an HTTP GET is done to retrieve the data for the URL. If the URL starts with "file:", the contents of the local file is returned. If the URL does not start with "file:" or "http:", it may be a local command to execute. In this case, the command is executed and the output of the command is returned. This last case is only allowed if explicitly enabled with the allowUrlExec() method. This should only be done

```
if you know that it is safe to execute the command.
```

METHODS

```
get(url)
        Do an HTTP GET with the given URL and position the read fd
        after the result HTTP header. Returns 0 if OK. Use readNext()
        to read the result lines.

get(url, nlines&, freeFlag)
        Do an HTTP get on the given URL and return the result as a
        buffer.  nlines is set to the number of result lines (use
        getNext() to fetch the result lines from the buffer.

get(url, ostream&)
        Do an HTTP get on the given URL and write the results to the
        given stream.

copy(ostream&)
        Copy the results of a previous get(url) to the given stream.

readline(ptr, maxlen)
        Read a line of the results after a call to get(url, nlines).

getNext()
        Return the next result line after a call to get(url) or NULL
        if there are no more lines. A null char is inserted in place of
        the newline so that the line can be treated as a single string.

result()
        Return a pointer to the result buffer from http.

feedback(file)
feedback()
        Set (or get) the file ptr to use for feedback during http
        transfers.  This can be used to give "netscape" like feedback
        in a progress bar while the transfer is in progress.

status()
        Return status after constructor.

hostname()
        Return the hostname of the http server for the last URL.

fd()
        Return file desc from last call to get(url).


content_type()
content_length()
        Return http header values from last GET.

html_error(istream& is);
        Read an error message in HTML format and pass it on to
        error(), stripped of HTML syntax.

html_error(char* s);
        Take an error message string in HTML format and pass it on to
        error(), stripped of HTML syntax.

allowUrlExec()
allowUrlExec(int)
        Get or set the flag value to allow a URL to be a local command.
```

```
If the argument is non-zero, URLs not starting with "http:" or
"file:" may be local commands to be executed.
```

SEE ALSO

```
error(3)
```

```
- - - - - -
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```

4.0.18 itcldoc(1)

NAME

itcldoc - script to extract man pages from itcl class source files

SYNOPSIS

itcldoc ?filenames?

DESCRIPTION

Itcldoc is a tcl script used to extract man pages from itcl class source files. The itcldoc script assumes a certain style of coding, but does not require any special hints otherwise. It assumes comments precede each declaration in comment blocks. The script splits an itcl file into a Tcl list. It first filters the comments to make them list elements. It then looks for declaration keywords in the list: class, method, proc, itk_option, public, protected,... and sorts and documents them based on the comments in the code preceding the declarations.

In addition, each source file should have a comment header containing a line in the format:

```
# filename.tcl - short description
```

It is assumed that each file given defines one itcl class.

This script is only used for itcl files defining an itcl class. By convention itcl classes start with an upper case letter and the file names for files that contain classes should have the same name with a ".tcl" extension.

See the source files and man pages in this package for examples.

- - - - - -

Last change: 02 Feb 98

4.0.19 LabelCheck(n)

NAME

LabelCheck - Itcl megawidget for choosing options.

NAMESPACE

util

PARENT CLASS

util::LabelWidget

SYNOPSIS

LabelCheck <path> ?options?

DESCRIPTION

LabelCheck is an itcl megawidget for choosing options using a label and radiobuttons (uses blt_table to arrange the buttons in rows and columns).

OPTIONS

-choice

List of choices.

-cols

Max number of columns to display (0 for unlimited) note: specify either -rows OR -cols, but not both.

-command

Command to run when value is changed (new value is appended).

-orient

Widget orientation: horizontal or vertical.

-rows

Max number of rows to display (0 for unlimited) note: specify either -rows OR -cols, but not both.

-value

List of choices to display as ON, all others are then OFF.

-variable

Name of global variable to set (defaults to $w_.choice).

METHODS

clear {}

Clear the choice display.

command_proc_ {}

Call the command with the selected item.

do_layout {}

Layout the choices according to the options.

get {}

Return the current value of this option.

```
itemconfig {name args}
        Configure the individual buttons by name.
```

PROTECTED VARIABLES

```
but_
        Array(name) of button widgets.
```

SEE ALSO

```
LabelWidget(n)
```

\- - - - - -
Last change: 02 Feb 98

4.0.20 LabelChoice(n)

NAME

LabelChoice - Widget for choosing options using a label and radiobuttons

NAMESPACE

util

PARENT CLASS

util::LabelWidget

SYNOPSIS

LabelChoice <path> ?options?

DESCRIPTION

LabelChoice is an itcl megawidget for choosing options using a label and radiobuttons (uses blt_table to arrange the buttons in rows and columns).

OPTIONS

-choice
    List of choices.

-cols
    Max number of columns to display (0 for unlimited) note: specify either -rows OR -cols, but not both.

-command
    Command to run when value is changed (new value is appended).

-orient
    Widget orientation: horizontal or vertical.

-rows
    Max number of rows to display (0 for unlimited) note: specify either -rows OR -cols, but not both.

-value
    Value to display.

-variable
    Name of global variable to set (defaults to $w_.choice).

METHODS

clear {}
    Clear the choice display.

command_proc_ {}
    Call the command with the selected item.

do_layout {}
    Layout the choices according to the options.

get {}
    Return the current value of this option.

```
itemconfig {name args}
        Configure the individual buttons by name.
```

PROTECTED VARIABLES

```
but_
        Array(name) of button widgets.
```

SEE ALSO

```
LabelWidget(n)
```

```
- - - - - -
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```

4.0.21 LabelEntry(n)

NAME

LabelEntry - Itk widget for displaying a labeled entry

NAMESPACE

util

PARENT CLASS

util::LabelWidget

SYNOPSIS

LabelEntry <path> ?options?

DESCRIPTION

This widget displays a label and an entry and implements convenient methods for accessing and modifying the label and the value.

OPTIONS

-autoselect
: Select the contents of the entry whenever it gets the focus.

-changecmd
: Commands to evaluate whenever the entry value changes.

-command
: The command for <Return> in the entry, called with the new value.

-entrycommand
: Alternative name for use when -command is already used by a derived class.

-invalid
: For compat with iwidgets entryfield: action for invalid char with -validate .

-justify
: Set to "right" to make sure the end of the entry is visible.

-orient
: Widget orientation: horizontal or vertical.

-state
: Set the state to normal or disabled (greyed out).

-validate
: Valiadation of entry fields (based on iwidgets entryfield class) numeric, alphabetic, integer, hexidecimal, real, and alphanumeric.

-value
: Set the value displayed in the entry.

-valuewidth
: Set the width of the value displayed.

METHODS

command_proc_ {cmd}
called for return or keypress in entry, calls command proc with new value.

get {}
Get the value in the entry.

peek_ {char}
The peek procedure returns the value of the entry with the char inserted at the insert position. (ripped from iwidgets::entryfield).

select {}
Select the contents of the entry.

trace_ {args}
Called for traces on textvariable.

validate_ {char sym}
called for keypress events when validation is on (based on code from iwidgets).

PROCS

numeric {char}
Validation methods used for -validate option (from iwidgets::entryfield class).

PROTECTED VARIABLES

notrace_
This flag is set to 1 to avoid tracing when changing the entry's value.

validate_cmd_
Command to validate entry contents.

SEE ALSO

LabelWidget(n)

\- - - - - -
Last change: 02 Feb 98

4.0.22 LabelEntryScale(n)

NAME

```
LabelEntryScale - Widget combining a labeled entry with a scale widget
```

NAMESPACE

```
util
```

PARENT CLASS

```
util::LabelEntry
```

SYNOPSIS

```
LabelEntryScale <path> ?options?
```

DESCRIPTION

```
LabelEntryScale is an Itcl widget combining a labeled entry with a
scale widget to make a scale with an editable entry field.
```

OPTIONS

```
-command
        Command to execute when the value changes.

-from
        Scale range -from.

-increment
        Amount to add or subtract for each button push.

-orient
        Widget orientation: horizontal or vertical.

-show_arrows
        Flag: if true, display left and right arrows for incrementing the
        value.

-to
        Scale range -to.

-value
        Set the value in the entry.
```

METHODS

```
command_proc_ {cmd}
        Redefined from parent class to update scale when entry is
        changed.

increment {sign}
        Increment (1) or decrement (-1) the value by the current
        increment.

scaleCmd {newValue}
        Called for changes in the scale widget.
```

PROTECTED VARIABLES

```
from_
```

Original -from and -to values.

SEE ALSO

LabelEntry(n)

\- - - - - -

Last change: 02 Feb 98

4.0.23 LabelMenu(n)

NAME

LabelMenu - Itcl widget for displaying a label and a menubutton

NAMESPACE

util

PARENT CLASS

util::LabelWidget

SYNOPSIS

LabelMenu <path> ?options?

DESCRIPTION

This widget displays a label and a menubutton with a selector and a menu of radiobuttons. This can be used for choosing items from a list and displaying the current choice. The widget supports adding of items to the radiobutton menu and keeps track of which items are selected.

OPTIONS

-orient

Widget orientation: horizontal or vertical.

-value

Set the selected value (referenced by label or bitmap) note: this.var is the trace variable and values_ holds the valid values.

-variable

Global variable linked to menu.

METHODS

add {args}

Add an item to the menu. The args may be the options: -label <label for menuitem and menubutton when chosen> -bitmap <bitmap for menuitem and menubutton when chosen> -command <cmd to execute when item is selected> -background <color of menu item and button when chosen> -font <font of menu item and button when chosen>.

add_separator {}

Add a separator item to the menu.

clear {}

Remove all of the items in the menu.

contains {name}

Return true if the LabelMenu contains the given item (specified by the label or bitmap name).

get {}

Return the current value.

update_menubutton {args}

Update the label on the menubutton.

```
variable_changed {args}
        Called when "$variable_" has changed, via trace, to update menu.
```

PROTECTED VARIABLES

```
default_bg_
        Default background color.
```

SEE ALSO

LabelWidget(n)

\- - - - - -
Last change: 02 Feb 98

4.0.24 LabelMessage(n)

NAME

LabelMessage - Itcl widget for displaying a label and a message

NAMESPACE

util

PARENT CLASS

util::LabelWidget

SYNOPSIS

LabelMessage <path> ?options?

DESCRIPTION

LabelMessage is an Itcl widget for displaying a label and a message.

OPTIONS

-orient

Widget orientation: horizontal or vertical.

METHODS

get {}

Get the value in the message.

SEE ALSO

LabelWidget(n)

\- - - - - -

Last change: 02 Feb 98

4.0.25 LabelNumber(n)

NAME

LabelNumber - Widget displaying a label, a number, and arrow buttons

NAMESPACE

util

PARENT CLASS

util::LabelValue

SYNOPSIS

LabelNumber <path> ?options?

DESCRIPTION

LabelNumber is an Itcl widget for displaying a label, a number and buttons to increment and decrement the number.

OPTIONS

-command

    Commands to evaluate whenever the entry value changes.

-increment

    Amount to add or subtract for each button push.

-max

    Maximum value.

-min

    Minimum value.

-orient

    Widget orientation: horizontal or vertical.

METHODS

increment {sign}

    Increment (1) or decrement (-1) the value by the current increment.

SEE ALSO

LabelValue(n)

- - - - - -

Last change: 02 Feb 98

4.0.26 LabelValue(n)

NAME

LabelValue - Widget displaying a label and a selectable value

NAMESPACE

util

PARENT CLASS

util::LabelEntry

SYNOPSIS

LabelValue <path> ?options?

DESCRIPTION

This widget displays a label and a value (also a label(n)) and implements convenient methods for accessing and modifying the label and the value.

SEE ALSO

LabelEntry(n)

\- - - - - -

Last change: 02 Feb 98

4.0.27 LabelWidget(n)

NAME

```
LabelWidget - Base class of labeled widgets
```

NAMESPACE

```
util
```

PARENT CLASS

```
util::FrameWidget
```

SYNOPSIS

```
LabelWidget <path> ?options?
```

DESCRIPTION

```
LabelWidget is an itcl widget for displaying a label.  Another widget
may be added in a derived class...
```

OPTIONS

```
-disabledforeground
        Disabled foreground color.

-orient
        Widget orientation: horizontal, vertical.

-state
        Set the state to normal or disabled (greyed out).
```

PROTECTED VARIABLES

```
side_
        Pack option.
```

SEE ALSO

```
FrameWidget(n)
```

- - - - - -

Last change: 02 Feb 98

4.0.28 ListboxWidget(n)

NAME

ListboxWidget -

NAMESPACE

util

PARENT CLASS

util::FrameWidget

SYNOPSIS

ListboxWidget <path> ?options?

DESCRIPTION

ListboxWidget is an itcl widget for scrolled lists, based on the Tk listbox.

OPTIONS

-editable
    Enable/disable editing of rows.

-hscroll
    Flag: if true, list will have a horizontal scrollbar.

-title
    Title string for listbox.

-vscroll
    Flag: if true, list will have a vertical scrollbar.

METHODS

append {line}
    Append a line to the list.

append_list {list}
    Append a list of items to the list.

clear {}
    Make the list empty.

clear_selection {}
    Clear the selection.

deselect_row {n}
    Deselect the row with the given index.

edit_row {}
    Pop up a dialog window to edit the value in the selected row.

get_contents {}
    Return the contents of the listbox as a tcl list.

get_selected {}
    Return a list of the selected items.

```
move_down {}
        Move the selected row down 1 row.

move_up {}
        Move the selected row up 1 row.

num_selected {}
        Return the number of rows currently selected in the table.

remove_selected {}
        Remove the selected items from the listbox and return them as a
        list.

select_row {n {clear 1}}
        Select the row with the given index. If clear is 1, clear the
        selection first.

select_rows {from to}
        Select a range of rows.

set_contents {list}
        Set the contents of the listbox from the list.

set_row {oldrow newrow}
        Replace the contents of the given row with the new row Note: this
        assumes that no 2 rows are exactly alike.

show_last_row {}
        Scroll to the end of the table and display the last set of rows.
```

PROTECTED VARIABLES

```
listbox_
        Listbox widget.
```

SEE ALSO

```
FrameWidget(n)
```

\- - - - - -

Last change: 02 Feb 98

4.0.29 ListDialog(n)

NAME

ListDialog - Dialog to display a listbox window and some text

NAMESPACE

util

PARENT CLASS

util::DialogWidget

SYNOPSIS

ListDialog <path> ?options?

DESCRIPTION

A ListDialog is a dialog to display a listbox window and some text.

OPTIONS

-choice

List of items to choose from.

METHODS

set_result {}

This method may be redefined in a derived class to change the value that is returned from activate (default is the number of the button selected).

SEE ALSO

DialogWidget(n)

\- - - - - -

Last change: 02 Feb 98

4.0.30 Mem(3)

NAME

Mem - C++ class for managing shared, unshared or mmaped memory areas

SYNOPSIS

```
#include "Mem.h"

class Mem {
...
public:
    Mem();
    Mem(int size, int shmId, int owner, int verbose);
    Mem(int size, int useShm, int verbose = 0);
    Mem(const char *filename, int verbose = 0);
    Mem(const Mem& m);

    ~Mem();

    Mem& operator=(const Mem&);

    int shared() const;
    int shared(int share);

    static void cleanup();

    int length() const;
    int size() const;
    void* ptr() const;
    int shmId() const;
    int status() const;
    int verbose() const;
    void offset(long newOffset);
    long offset() const;
};

void Mem_cleanup(int);
```

DESCRIPTION

This class uses reference counting to help manage memory areas. The memory may be allocated with the C++ "new" operator, SysV shared memory or mmap. The class keeps track of who owns the memory, who is responsible for deleting it when no longer needed and how many references there are to the memory area. When there are no more references, we can safely detach a shared memory area and if we are the "owner", delete it. Constructor arguments and flags determine whether shared memory, mmap or normal (unshared) memory is allocated or whether existing shared memory is used. The state can be changed at any time, i.e.: shared memory can be changed to unshared and unshared to shared.

METHODS

Mem()

Default constructor, create empty, unshared memory.

Mem(size, shmId, owner, verbose)

Constructor: attach (if needed) to existing shared memory area. The size gives the expected size in bytes (for error checking) and shmId is the shared memory Id to use. If owner

```
        is non-zero, the memory will also be deleted when there are no
        more references.  If "verbose" is non-zero, debugging messages
        are printed on stdout.

Mem(size, useShm, verbose)
        Constructor: create a new memory area of the given size (in
        bytes), using shared shared memory if "useShm" is true.  If
        "verbose" is non-zero, debugging messages are printed on
        stdout.

Mem(filename, verbose)
        Constructor: uses mmap to map a file to a read-only mmap area.

Mem(mem)
        Copy constructor: only copies internal pointer.

~Mem()
        Destructor: detaches and/or deletes the memory, if needed,
        depending on the value of "owner" specified in the
        constructor.

Mem& operator=(mem)
        Assignment operator.

shared()
        Return true if the memory is shared.

shared(share)
        Force the memory to be shared (1) or not shared (0).

cleanup()
        Remove all "owned" shared memory areas (should be called
        before exit).

void offset(long newOffset)
        Set an offset in the memory area. two Mem objects may share
        the same memory area, both with different offsets. this is
        common when using mmap.

long offset() const
        Return the offset.

int length() const
        Return the working length of the memory (size minus offset).

size()
        Return the size of the memory area in bytes.

ptr()
        Return a pointer to the memory area.

shmId()
        Return the shared memory Id or -1 if the memory is not shared.

status()
        Return the status after the constructor has completed (as
        usual, 0 is OK, 1 means errors occured).

verbose()
        Return the value of the verbose flag.
```

SEE ALSO

FitsIO(3), ImageData(3), ImageIO(3)

\- - - - - -
Last change: 02 Feb 98

4.0.31 PrintDialog(n)

NAME

PrintDialog - Base class of Popup dialogs for specifying printer options

NAMESPACE

util

PARENT CLASS

util::TopLevelWidget

SYNOPSIS

PrintDialog <path> ?options?

DESCRIPTION

PrintDialog is the base class of Popup dialogs for specifying printer options.

OPTIONS

-filename
    File name for print to file.

-print_to_file
    Bool: print to file ?.

-printcmd
    Default print command.

-suffix
    Default suffix for print to file.

-userfile
    User defaults file (without path, $HOME will be added).

METHODS

file_writable {file}
    This method checks if a file can be used for writing. Returns the 'globbed' filename if so otherwise an empty string.

get_pathname {file}
    Return 'globbed' pathname for a file. If the extension is not set in $file then $itk_option(-suffix) is used.

init {}
    This method is called after all options have been evaluated.

load {}
    Load the user config file (created by save) if one exists, otherwise set the default values. The file is searched for in $HOME and the current dir.

ok {args}
    This method is called when the OK button is pressed Open the file or pipe and pass the fd to the subclass print method.

print {fd}

Should be redefined in subclass.

save {}

This method is called when the save button is pressed to save the print configuration for this user in a file for later loading.

PROTECTED VARIABLES

magic_

Header string for userfile for comparison.

SEE ALSO

TopLevelWidget(n)

\- - - - - -

Last change: 02 Feb 98

4.0.32 ProgressBar(n)

NAME

ProgressBar - widget to display a message and a progress bar

NAMESPACE

util

PARENT CLASS

util::FrameWidget

SYNOPSIS

ProgressBar <path> ?options?

DESCRIPTION

This object displays a message and a scale indicating that work is in progress.

OPTIONS

-busycolor

Color of bar when busy.

-from

Set the starting point for the scale.

-idlecolor

Color of bar when busy.

-sliderlength

Length of slider (displayed when busy).

-speed

Speed in ms/tick when looking busy.

-text

Set the text of the label.

-to

Set the end point for the scale.

-value

Set the value of the bar between from and to.

METHODS

do_something {}

Do something to look busy.

look_busy {{bool 1}}

Start (or stop) some animation to indicate that work is in progress. This will continue until the next reset or until -to is set with config.

reset {{text ""}}

Reset the bar to the beginning.

PROTECTED VARIABLES

```
color_
        Current bar color.

inc_
        Controls direction for busy animation.

looking_busy_
        Flag: true if currently looking busy.
```

SEE ALSO

```
FrameWidget(n)
```

- - - - - -
Last change: 02 Feb 98

4.0.33 TableList(n)

NAME

TableList - A listbox based table widget

NAMESPACE

util

PARENT CLASS

util::ListboxWidget

SYNOPSIS

TableList <path> ?options?

DESCRIPTION

TableList is an itcl widget for displaying tabular information and headings in a Tk listbox. It lines up columns of data (specified in tcl list format) with column headings, optionally sorts the data by given columns, in a given order, can "hide" columns, rearrange columns, or display columns matching certain expressions. You can even print the contents of the table. This widget has been in use for a number of years and has grown to include quite a few features. It is well suited to displaying the results of database or catalog queries.

OPTIONS

-filtercmd

Command to call to filter each row, hook to modify the row before it is displayed arg is is the name of the list holding the row (call by reference).

-formats

List of printf formats for columns (if not specified, will be calculated, see also -sizes).

-headings

Field names for heading - Note: specify before "-info".

-hformats

Print format string for the headings (set after -formats, defaults to same as $formats_) This might be different for headings if a column uses %f formats...

-ignore_case

Flag: if true, ignore case in matching (only works when -use_regexp 1 was specified).

-info

List of lists, one per line to display in table/list.

-layoutcommand

Command to call when layout options have been selected.

-menubar

Name of menubar frame in which to place table menubutton (optional).

-order

```
        Set the order of the columns.

-printcmd
        Default print command.

-sizes
        List of column sizes (if not specified, will be calculated).

-sort_by
        List of col index: sort table based on given columns (empty means
        don't sort).

-sort_cols
        List of col names to sort by (empty means don't sort).

-sort_order
        Set direction of sort: may be one of (increasing, decreasing) .

-sortcommand
        Command to call when sort options have been selected.

-static_col_sizes
        If true, reuse the calculated column sizes rather than recalculate
        for new info.

-use_regexp
        Flag: if true, use regular exprs for matching, otherwise use
        wildcards.
```

METHODS

```
add_row {newrow}
        Add a new row to the list and update the display.

append_row {row}
        Append a row to the table. (call new_info when done).

append_rows {rows}
        Append a list of rows to the table.

calculate_format_ {}
        Calculate the print formats for table rows from the max column
        widths and options. The format string takes care of column widths,
        show/hide column and column separators.

        If the format was set explicitly (formats_flag_ = 1), use it
        otherwise, if the column widths are known (-sizes was set) use
        them, otherwise calculate the max column widths from the info
        list.

        The formats list uses %n$-s type format strings to set left/right
        alignment, width and order all at once, for example:  "%-10s" for
        left justify, "%.0s" effectively hides the item...

        If the Precision option is set for a column, assume it is a
        floating point value to be formatted like: %6.2f for example
        (precision = 2).

clear {}
        Make the table empty.

cmp_row_ {r1 r2}
        Compare the 2 given rows, ascii version (called by lsort above)
```

```
        (see lsort man page for desc.).

delete_config {file}
        Get a name from the user and use it to save the current
        configuration to a file under the user's home directory.

edit_row {}
        Pop up a dialog window to edit the values in the selected row.

format_headings_ {h}
        Format and return the table headings.

format_line_ {line}
        Format the given line with the given format string and return the
        new string. The line is assumed to be a list of strings.
        $formats_ is a list of format strings, one for each element.  If
        the line consists of only one char in the set "_-=", a line is
        drawn using that char.

get_col_sizes_ {}
        Setup the sizes_ array to hold the max width of each column.  if
        the -sizes option was specified, use it, otherwise scan the info
        for the max widths.

get_contents {}
        Return the contents of the table as a list of rows.

get_headings {}
        Return the table headings.

get_option {name option}
        Return the option value for the given heading name.  See above for
        list of Options...

get_selected {}
        Return a list of the selected rows note: use disp_info_, since
        listbox contains formated lines.

get_selected_with_rownum {}
        Return a list of {{rownum row} {rownum row} ...} for the selected
        rows.

info_rows {}
        Return the number of rows being displayed in the table (after
        matching).

layout_dialog {}
        Pop up a window to change the layout of the table and call the
        optional command when done.

load_config {file}
        Load the named config file and update the display based on the new
        settings.

make_table_menu {}
        Add the table config menu items to the given menu.

match_glob_ {row}
        Return true if the given row matches the current wildcard
        patterns.

match_info_ {}
        Apply the current wildcard filters to the info list so that only
```

```
        the rows that match will be displayed.

match_regexp_ {row}
        Return true if the given row matches the current regexp.

match_regexp_nocase_ {row}
        Return true if the given row matches the current regexp (ignore
        case).

move_down {}
        Move the selected row down 1 row and make the changes in the info
        list.

move_up {}
        Move the selected row up 1 row and make the changes in the info
        list.

new_headings {}
        This method is called whenever the headings list changes.

new_info {}
        This method is called whenever the info list changes.

print {fd}
        Print the contents of the table to the open file descriptor.

print_dialog {}
        Pop up a dialog to print the contents of the table to a printer or
        file.

print_heading_ {fd h1 h2 underline}
        Print the table heading(s) given by h1 and h2 to the given fd and
        underline it (them) with the given underline char.

remove_row {row}
        Remove the given row (given by its value).

remove_selected {}
        Remove the selected rows from the table and return them as a list
        of lists.

restore_selection {}
        Restore the previously saved row selection.

restore_yview {}
        Restore the previously saved scroll position .

save_dialog {}
        Get a name from the user and use it to save the current
        configuration to a file under the user's home directory.

save_selection {}
        Save a list of the currently selected rows so they can be restored
        later. .

save_yview {}
        Save the current scroll position so it can be restored later. .

search {name value}
        Search for and highlight the first row containing the given value
        in the named column.

set_headings_ {}
```

```
        Set the table headings - Note: headings may be 1 or 2 lines. The
        first and second lines should be separated by spaces i.e.: {Sub
        Total} to put "Sub" on the first line and "Total" on the second.
        use the -headinglines 2 option to enable this...

set_info_ {}
        Update the display with the new info.

set_option {name option value}
        Set the option value for the given heading name

        Options:
         Show (bool)         - display or don't display the column Align
         (Left,Right)  - for left or right justify Separator           -
         set the separator string (goes after col) Wildcard            -
         only show rows where wildcard matches Precision           -
         number of places after the decimal for floating point values.

set_options {headings option value}
        Same as set_option, but works on a list of column heading names.

set_row {oldrow newrow}
        Replace the contents of the given row with the new info Note: this
        assumes that no 2 rows are exactly alike.  We can't use the row
        index here, since sorting and matching may mix things up too
        much.

setup_matching_ {}
        Set up the wildcard list to filter the info list.

sort_dialog {}
        Pop up a dialog to sort the contents of the table.

sort_info_ {}
        Sort the info list, if requested, based on the sort keys.

split_headings_ {}
        If using 2 line headings, split the table headings in 2 lines and
        return the results as a list of heading lines, otherwise just
        return a list whose only element is the single line of headings.

total_rows {}
        Return the total number of rows (before matching).

update_sort_info_ {}
        Update the indexes ($sort_by) for the sort columns.

xview {args}
        Scroll both the heading box and the main listbox syncronously
        (called for horizontal scrolling in listbox).

yview {args}
        Scroll the listbox vertically.
```

PROTECTED VARIABLES

```
disp_info_
        List of info to display (after filtering and sorting).

formats_
        Printf format string for table rows.

formats_flag_
```

```
        Flag: true if the -formats option was specified so that we don't
        have to calculate the format string for a row.

headbox_
        Box for headings.

headings_
        Table column headings.

hformats_
        Printf format string for table headings.

info_
        Table contents as list of rows/cols.

info_cols_
        Number of columns in table .

info_rows_
        Number of rows in the info list (not including hidden rows).

line_length_
        Length of a line in the table.

match_all_
        Flag: true if match_list_ should match all rows.

match_any_
        String used to match any string.

match_proc_
        Method to use for matching rows (match_glob_ or match_regexp_).

ord_
        Array(heading) of column order.

order_
        List of indexes in row for headings (indep. of viewing order).

saved_selection_
        Used for save_/restore_selection methods.

saved_yview_
        Used for save_/restore_yview methods.

size_
        Array(col) of col width.

total_rows_
        Total number of rows, including hidden rows.
```

SEE ALSO

ListboxWidget(n)

\- - - - - -

Last change: 02 Feb 98

4.0.34 TableListConfig(n)

NAME

TableListConfig - Popup widget for editing table layout for TableList

NAMESPACE

util

PARENT CLASS

util::TopLevelWidget

SYNOPSIS

TableListConfig <path> ?options?

DESCRIPTION

TableListConfig is an itcl popup widget for editing table layout for the TableList class.

OPTIONS

-command
: Command to eval when done.

-table
: TableList whose layout is being edited.

METHODS

cancel {}
: Called for the cancel button - reset to original values and quit.

deselect_all {}
: Deselect all items in the lists and disable the entries and options.

init {}
: Initialize layout .

left_selected {}
: Called when an item in the left listbox is selected.

load {}
: The information was read by $config_file_ already, so we just display it here.

make_button_row {}
: Make the row of buttons at bottom.

make_list_window {}
: Create a window with 2 scrolling lists and arrows between then to move items back and forth.

ok {args}
: Accept the current information.

reset {}
: Reset to default configuration.

```
right_selected {}
        Called when an item in the right listbox is selected.
```

PROTECTED VARIABLES

```
config_file_
        Table config class.

options_
        Array(name,option) of option values, loaded from config_file.

table_
        TableList whose layout is being edited.
```

SEE ALSO

```
TopLevelWidget(n)
```

\- - - - - -
Last change: 02 Feb 98

4.0.35 TableListConfigFile(n)

NAME

TableListConfigFile - Class for managing config info for TableList widget

NAMESPACE

util

PARENT CLASS

util::FrameWidget

SYNOPSIS

TableListConfigFile <path> ?options?

DESCRIPTION

TableListConfigFile is an itcl class (no windows) for managing the config file for the TableList widget. See also TableListConfig(n) for the user interface to this class.

OPTIONS

-headings
    Column headings from table.

-order
    List of headings, in the order they (and the columns) should be displayed.

-sort_by
    List of col index: sort table based on given columns (empty means don't sort).

-sort_order
    Set direction of sort: may be one of (increasing, decreasing) .

-sort_type
    Set type of sort key: may be one of (ascii, integer, real) .

-use_regexp
    Flag: if true, use regular exprs for matching, otherwise use wildcards.

METHODS

get_option {name option}
    Return the value of the given option for the given heading name (see comments above for set_option...).

get_options {ar}
    Write the current option values to the named array.

get_order {}
    Return a list of column headings in the order they are displayed.

load {file}
    Load the user config file (created by save) if one exists, otherwise set the default values. .

```
save {file}
        Save the current information to the given file for later loading
        (with "load" below).

set_defaults {{force 0}}
        Set the default values in case there is no config file or it was
        out of date

        If force is 1, set even values that are already set.

set_option {name option value}
        Set the option value for the given heading name

        Options:
         Show (bool)         - display or don't display the column Align
         (Left,Right)  - for left or right justify Separator          -
         set the separator string (goes after col) Wildcard           -
         only show rows where wildcard matches Precision          -
         number of places after the decimal for floating point columns.

set_options {ar}
        Read option values from the named array.
```

PROTECTED VARIABLES

```
headings_
        Table column headings.

initialized_
        Set to 1 after initialization.

match_any_
        String used to match any string.

options_
        Array(heading,opt) of option values.

order_
        Sort order.

saved_headings_
        Previous column headings - read from config_file.

sort_by_
        Sort keys.

sort_order_
        Direction of sort: may be one of (increasing, decreasing) .

sort_type_
        Set type of sort key: may be one of (ascii, integer, real) .
```

SEE ALSO

FrameWidget(n)

\- - - - - -
Last change: 02 Feb 98

4.0.36 TableListPrint(n)

NAME

TableListPrint - Print dialog box for printing the contents of a TableList

NAMESPACE

util

PARENT CLASS

util::PrintDialog

SYNOPSIS

TableListPrint <path> ?options?

DESCRIPTION

TableListPrint is a print dialog box for printing the contents of a TableList.

OPTIONS

-choose

Flag: if true, add a widget for choosing the columns to print.

-table

Handle of the TableList class that created this dialog (used to access the current values there...).

METHODS

init {}

This method is called after all options have been evaluated.

make_choice_frame {}

Add a frame to let the user choose which columns to print.

print {fd}

This method is redefined here from the parent class to print the contents of the TableList with specified columns.

PROTECTED VARIABLES

headings_

Table column headings.

SEE ALSO

PrintDialog(n)

- - - - - -

Last change: 02 Feb 98

4.0.37 TableListSort(n)

NAME

```
TableListSort - itcl popup widget for sorting contents of a TableList
```

NAMESPACE

```
util
```

PARENT CLASS

```
util::TopLevelWidget
```

SYNOPSIS

```
TableListSort <path> ?options?
```

DESCRIPTION

```
TableListSort is an itcl popup widget for sorting contents of a
TableList.
```

OPTIONS

```
-command
        Command to eval when sort options have been selected.  called with
        2 args: 1: list of sort cols, 2: sort order (increasing or
        decreasing).

-table
        TableList whose layout is being edited.
```

METHODS

```
apply {}
        Apply the changes (called for OK button).

cancel {}
        Called for the cancel button.

create_main_window {}
        Do the main window layout.

init {}
        Initialize components.

load {}
        Load the sort settings from the config file object.

make_button_row {}
        Make the row of buttons at bottom.

make_dlist_window {}
        Create a window with 2 lists - one for the headings and one for
        the sort keys.

make_options_window {}
        Create a window for setting column options.

reset {}
        Reset the sorting parameters to the default values.
```

```
table_sort {sort_cols sort_order}
        Default method called when sort options have been selected. May be
        overridden with the -command option.  sort_cols is a list of
        column names to sort by sort_order is one of "increasing",
        "decreasing".
```

PROTECTED VARIABLES

```
config_file_
        Object managing config info.
```

SEE ALSO

```
TopLevelWidget(n)
```

- - - - - -
Last change: 02 Feb 98

4.0.38 TclCommand(3)

NAME

TclCommand - C++ base class for implementing new Tcl commands

SYNOPSIS

```
#include <TclCommand.h>


class TclCommand {
protected:
    // tcl interpreter
    Tcl_Interp* interp_;

    // stream to evaluate tcl commands
    TclInterpStream tcl_;

    // status after constructor
    int status_;

    // class of tcl command (same as prefix for instname_)
    const char* cmdname_;

    // name of tcl command created for this object
    char* instname_;

    // used to generate unique tcl command name if name is specified as '#auto'
    static int seq_;

protected:
    // tcl command proc, called by tcl, calls teh correct member function
    static tclCmdProc(ClientData, Tcl_Interp* interp, int argc, char* argv[]);

    // tcl delete proc, called when tcl object is deleted
    static void tclDeleteProc(ClientData);

    // check the arg count for a subcommand
    int check_args(const char* name, int argc, int min_args, int max_args);

    // call a member function by name
    virtual int call(const char* name, int argc, char* argv[]);

    // append an integer result in tcl
    int append_result(int);

    // append a string result in tcl
    int append_result(char*);

    // return an integer value in tcl
    int set_result(int);

    // return a string value in tcl
    int set_result(char*);

    // report an error in tcl
    int error(char* msg);

public:

    // constructor
    TclCommand(Tcl_Interp*, const char* cmdname, const char* instname);
```

```
    // destructor
    virtual ~TclCommand();

    // return status of constructor
    int status() const { return status_; }

    // tcl delete sub command (always the same)
    int delete_(int argc, char* argv[]);

    TclInterpStream& tcl() {return tcl_;}

};
```

DESCRIPTION

```
TclCommand is a base class for C++ classes defining Tcl commands.  It
offers support for an [incr Tk] like interface.  That is, Tcl
commands defined in this framework can be declared as Tcl objects,
where each object may have any number of methods (or subcommands).
For example, you can define a Tcl command Dir in C++ and use it like
this:

#create a Dir object called d
Dir d
foreach file [d lsfiles] {...}
foreach dir [d lsdirs] {...}

# The '#auto' syntax is also supported (generate a unique object name)
set d [Dir #auto]

# From within itcl classes, I usually use something like this:
Dir $this.d
$this.d lsfiles ...

The TclCommand class and classes derived from it each define
the virtual member function

int call(const char* name, int argc, char* argv[])

to call a the member function that implements the named Tcl
subcommand.  The search starts at the bottom of the C++ inheritance
hierarchy and works its way up to the base class.  Each derived class
checks a local static table of member functions (if necessary) to see
if it implements the named method and if so, calls the method with the
given arguments. If the given name does not correspond to a local
method, control is passed to the next higher class in the inheritance
hierarchy.

The member functions that implement Tcl subcommands all have the same
signature. For example, the member function for the delete subcommand
is defined in the base class for all Tcl objects like this:

// tcl delete sub command (always the same)
int delete_(int argc, char* argv[]);
```

EXAMPLE

```
An example of a simple Tcl command implemented in C++ is the Dir
command, which has a number of subcommands for listing file and/or
directories.  The C++ class declaration for the Dir command looks like
this:
```

```
#include "TclCommand.h"

/* This class declares the methods used to implement the Tcl "Dir"
 * command.  This command should be some what faster than "glob" or
 * "ls" for getting a list of "only files" or "only dirs" in a
 * directory.
 */

class TclDirCmd : public TclCommand {
private:
    DIR* opendir_(char* dirname);
    int isdir_(char* path);
    int isfile_(char* path);
public:

    // -- tcl subcommands --

    int ls_(int argc, char* argv[]);
    int lsfiles_(int argc, char* argv[]);
    int lsdirs_(int argc, char* argv[]);
    int cd_(int argc, char* argv[]);
    int pwd_(int argc, char* argv[]);

    // constructor
    TclDirCmd(Tcl_Interp*, const char* cmdname, const char* instname);
};
```

The C++ body file then looks something like this:

```
/*
 * declare a table of tcl subcommands
 * format: name, min_args, max_args, method
 */
static class TclDirSubCmds {
public:
    char* name; // method name
    int (TclDirCmd::*fptr)(int argc, char* argv[]);
    int min_args;    // minimum number of args
    int max_args;    // maximum number of args
} subcmds_[] = {
    {"ls", &TclDirCmd::ls_,  1,  1},
    {"lsfiles", &TclDirCmd::lsfiles_,  1,  1},
    {"lsdirs",  &TclDirCmd::lsdirs_,   1,  1},
    {"cd", &TclDirCmd::cd_,  1,  1},
    {"pwd",&TclDirCmd::pwd_, 0,  0},
};


/*
 * Call the given method in this class with the given arguments
 */
int TclDirCmd::call(const char* name, int argc, char* argv[])
{
    for(int i = 0; i < sizeof(subcmds_)/sizeof(*subcmds_); i++) {
        TclDirSubCmds* t = &subcmds_[i];
        if (strcmp(t->name, name) == 0) {
            if (check_args(name, argc, t->min_args, t->max_args) != TCL_OK)
                return TCL_ERROR;
            return (this->*t->fptr)(argc, argv);
        }
    }
    return TclCommand::call(name, argc, argv);
}
```

SEE ALSO

TkWidget(3), TkImage(3), TclInterpStream(3)

\- - - - - -

Last change: 02 Feb 98

4.0.39 TextDialog(n)

NAME

TextDialog - Dialog widget displaying a text window

NAMESPACE

util

PARENT CLASS

util::DialogWidget

SYNOPSIS

TextDialog <path> ?options?

DESCRIPTION

TextDialog is a dialog widget for displaying a text window and a specified text.

OPTIONS

-contents

Contents of the text window.

SEE ALSO

DialogWidget(n)

\- - - - - -

Last change: 02 Feb 98

4.0.40 TkImage3C(3)

NAME

TkImage3C++ - A C++ base class for implementing Tk image types

PARENT CLASS

TclCommand

DERIVED CLASSES

RtdImage

SYNOPSIS

```
#include "TkImage.h"

/*
 * This class or a class derived from it is used to hold the values
 * modified by the configure image command
 */
class TkImageOptions {
public:
};


/*
 * This is the base class for classes defining tk images from
 * C++ classes.
 * In this class, only one instance of an image may be displayed,
 * in a window, however multiple views of the image with varying
 * sizes may be displayed (I didn't see any need for exact copies
 * of the same image in the same size...)
 */
class TkImage : public TclCommand {
protected:
    Tk_ImageMaster master_;     // passed from the Tk imaging routines

    TkImageOptions* optionsPtr_; // ptr to class or struct holding option values
    Tk_ConfigSpec* configSpecsPtr_; // ptr to configSpecs array for Tk options
    int refCount_;              // Number of instances that share this
                                // image (may only be one here).

    Tk_Window tkwin_;           // Window in which the image will be displayed.
    Display *display_;          // X token for the window's display
    Visual *visual_;            // X visual for window
    GC gc_;                     // Graphics context for copying to screen
    Pixmap pm_;                 // Pixmap for storing the image

    int width_;                 // total width of image
    int height_;                // total height of image
    int pixw_;                  // width of X pixmap, if used
    int pixh_;                  // height of X pixmap, if used
    int depth_;                 // depth of screen

    char* pclass_;              // if specified, restrict images to only be displayed
                                // in widgets of that class

    int update_pending_;        // flag: true if image needs to be updated

    int initialized_;           // flag: true after image has been initialized
                                // (configured, after constructor is done)
```

```
    // -- member functions --

    // do first time image configuration
    virtual int initImage(int argc, char* argv[]);

    // configure the image with cmd line options.
    virtual int configureImage(int argc, char* argv[], int flags = 0);

    // these are called indirectly by the Tk imaging routines
    virtual TkImage* getImage(Tk_Window);
    virtual void displayImage(Drawable, int imageX, int imageY,
                              int width, int height,
                              int drawableX, int drawableY) = 0;

    // update the image display eventually
    virtual void imageChanged();

    // make the X graphics context
    void makeGC();

    // set the image size and create/update a pixmap, if use_pixmap is 1
    int setImageSize(int width, int height, int use_pixmap, int pixw, int pixh);

    // utility method: equivalent of Tk "update idletasks" command
    void updateIdleTasks();

    // call a member function by name
    virtual int call(const char* name, int len, int argc, char* argv[]);

public:

    // constructor
    TkImage(Tcl_Interp* interp, char* cmdname, char* instname,
             Tk_ConfigSpec* specs, TkImageOptions& options,
             Tk_ImageMaster master, char* pclass = NULL);

    // destructor
    virtual ~TkImage();

    // the following static methods are called by the Tk image handling routines
    static ClientData GetImage(Tk_Window, ClientData);
    static void DisplayImage(ClientData, Display*, Drawable,
                             int imageX, int imageY,
                             int width, int height,
                             int drawableX, int drawableY);
    static void FreeImage(ClientData, Display*);
    static void DeleteImage(ClientData);

    // implement the configure Tk command
    virtual int configureCmd(int argc, char* argv[]);

    // called for the cget image command
    virtual int cgetCmd(int argc, char* argv[]);

};
```

DESCRIPTION

TkImage is a base class for a class defining a new TkImage type. The image type defined here differs slightly from standard Tk image types, such as photo or bitmap in that it is only allowed to display a given image in a single widget and you can optionally specify what type of widget that should be.

The intent here is that you specify that the image can only be in, say, a canvas window. Since a given image "instance" can only be displayed in one canvas window (as far as Tk is concerned), you can use the scrolling offsets of the canvas to implement intelligent scrolling. It is still possible to display an image in multiple widgets, but this must be handled in the derived class (see RtdImage for an example). The restriction comes about, because of the way Tk handles images in multiple widgets. Normally, if one changes size, the others do as well. This is not necessarily what you always want in an image processing application. You may want to have the same image at different sizes sharing the same data.

This class does some of the abstract work for dealing with Tk images. It declares some of the static member functions that Tk calls for image handling (GetImage, DisplayImage, FreeImage and DeleteImage) and calls virtual member functions where necessary to handle the actual display of the image.

This class also defines and implements the "configure" and "cget" image commands. The derived class passes the TkImage constructor information about the configuration options (optionsPtr_ and configSpecsPtr_) for use in these subcommands. The derived class may still need to redefine the "configureImage" method inorder to handle certain options, but most of the work is done in this base class.

INHERITANCE

Note that each class in this class hierarchy defines the virtual method "call" to call a member member function, given the name of the Tcl subcommand. The search starts in the derived class and if a method is not found there, its parent class is searched and so on. In this way, each level in the class hierarchy can define Tcl subcommands (see TclCommand(3)).

MEMBER VARIABLES

This class keeps track of the following information for the derived class:

- o Tk image record (master_)
- o Configuration options (optionsPtr_, configSpecsPtr_)
- o Widget Reference count (only allowed to be 1) (refCount_)
- o Tk window where image is displayed (tkwin_)
- o X Display for window (display_)
- o X Visual for window (visual_)
- o Graphics Context (gc_)
- o X Pixmap for drawing (not always used) (pm_)
- o Width and Height of image (width_, height_)
- o Width and Height of Pixmap (pixw_, pixh_)
- o Allowed widget type for image (pclass_)
- o Update pending flag (to force image update) (update_pending_)
- o Initialization flag (set after first create/config) (initialized_)

METHODS

This class also defines the following methods for use by the derived class:

```
virtual int initImage(int argc, char* argv[])
```

Do first time image configuration. This procedure needs to be called from the derived class constructor to complete the image initialization. This can't be done in the constructor

```
        here since the options_ struct wouldn't be initialized yet.

virtual void imageChanged()
        This method should be called when the image has changed and
        should be redrawn eventually.

int setImageSize(int width, int height, int use_pixmap, int pixw, int pixh)
        Set the image dimensions to the given width and height and if
        use_pixmap is 1, create or update a pixmap to have the same
        dimensions.

void updateIdleTasks()
        Utility method: equivalent of Tk "update idletasks" command.
        Process all pending display events.
```

SEE ALSO

TclCommand(3), RtdImage(3), image(3)

\- - - - - -

Last change: 02 Feb 98

4.0.41 TkWidget(3)

NAME

TkWidget - C++ base class for implementing new Tk Widgets

PARENT CLASS

TclCommand

DERIVED CLASSES

TkTree

SYNOPSIS

```
#include "TkWidget.h"


/*
 * This is the base class for classes defining tk widgets from
 * C++ classes
 */
class TkWidget : public TclCommand {
protected:
    Tk_Window tkwin_;   // widget's Tk window
    Display *display_;  // X token for the window's display

    char* pname_;       // name of parent window
    char* wclass_;      // this widget's class

    Tk_ConfigSpec* configSpecsPtr_; // ptr to widget's config struct
    TkWidgetOptions* optionsPtr_;   // ptr to struct holding option values

    int redraw_pending_;   // flag: true if widget needs to be redrawn


    // do first time widget configuration
    virtual int initWidget(int argc, char* argv[]);

    // configure the widget with cmd line options.
    virtual int configureWidget(int argc, char* argv[], int flags = 0);

    // If not already scheduled, schedule the widget to be redrawn
    virtual int eventually_redraw();

    // this method may be redefined in a derived class to redraw
    // the widget.
    virtual void redraw();

    // called for DestroyNotify events in the widget
    virtual void destroyNotify(XEvent *eventPtr);

    // called for ConfigureNotify events (resize)
    virtual void configureNotify(XEvent *eventPtr);

public:

    // constructor: pclass is the expected parent window class type,
    // the specs and options args are used to process the command line
    // args and for the configure widget command.
    TkWidget(Tcl_Interp*, const char* pclass,
             Tk_ConfigSpec* specs, TkWidgetOptions& options,
```

```
                int argc, char* argv[]);

        // destructor
        virtual ~TkWidget();

        // call a member function by name
        virtual int call(const char* name, int len, int argc, char* argv[]);

        virtual int configureCmd(int argc, char* argv[]);

        // called for the cget widget command
        virtual int cgetCmd(int argc, char* argv[]);

        // Redraw the widget by calling the virtual redraw_ method
        // which may be defined in a derived class.
        static void redrawWidget(ClientData);

        // called for StructureNotify events in the widget
        static void structureNotify(ClientData clientData, XEvent *eventPtr);

        // invoked by Tk_EventuallyFree to clean up widget
        static void destroyProc(ClientData clientData);
    };
```

DESCRIPTION

TkWidget is a base class for C++ classes defining Tk widgets. In addition to the features inherited from its base class TclCommand(3), TkWidget adds support for creating and configuring Tk widgets.

The configure (or config) and cget subcommands are implemented here automatically, so that derived classes don't have to handle this. The derived classes only need to define two structures required by Tk for widgets:

One is the Tk_ConfigSpec structure, a static struct describing the widget options.

The other is a non-static member struct for holding the values for widget configuration options. This struct must be derived from TkWidgetOptions, which is just a dummy struct used for passing the actual struct as a parameter.

SEE ALSO

TclCommand(3), TkTree(3)

\- - - - - -

Last change: 02 Feb 98

4.0.42 TopLevelWidget(n)

NAME

TopLevelWidget - Itk base class for popup windows

NAMESPACE

util

PARENT CLASS

itk::Toplevel

SYNOPSIS

TopLevelWidget <path> ?options?

DESCRIPTION

The TopLevelWidget itcl class is a subclass of itk::Toplevel and thus inherits all of the features described in Toplevel(n). In addition, a number of useful methods are defined, for use by the derived classes.

OPTIONS

-center

If true, center the application window on startup.

-shorthelpwin

Optionally specify a different TopLevelWidget to display short help messages.

-standalone

True if running as separate process.

-transient

If true and this is a child of another TopLevel widget, make the toplevel window transient - so that it will open and close with its parent.

-withdraw

If true, withdraw the application window on startup.

METHODS

add_menu_short_help {menu label msg}

Set the text of the short help message to be displayed whenever the mouse enters the menu item with the given label (see short_help below).

add_menubar {}

Add a menubar to the main frame.

add_menubutton {label {helptext ""} {side left}}

Add a menu button to the menubar, or reset it's menu to empty if the menubutton already exists. If helptext is specified, it is used as the short help text. If side is specified, the menu button is placed on the given side.

add_menuitem {menu type label msg args}

Add a menu item of the given type to the given menu and arrange to have the given short help message displayed when the mouse is over

```
        the item.  The extra args are passed to the "$menu add" command.

add_short_help {w msg}
        Set the text of the short help message to be displayed whenever
        the mouse enters the widget w (see short_help below) If "win" is
        specified, it is used to display the help text rather than this
        window (it should also be a TopLevelWidget).

busy {cmd}
        Run the given tcl command in the scope of this class while
        displaying the (blt) busy cursor in the toplevel window.

call_init {}
        Call the init method and then check if there is a plugin for this
        class.

center_window {}
        Center this window on the screen.  this doesn't work with gridded
        geometry...

check_plugin {}
        Check for the existance of a plug-in for this class.  For any
        TopLevelWodget class Foo, a plug-in Tcl source file may be
        specified by the environment variable $FOO_PLUGIN. The file should
        define a Tcl proc named "Foo_plugin".

        If the environment variable is defined, source the file. In any
        case, if the plug-in proc is defined, call it, passing it the name
        of this instance.

get_menu {label}
        Return the path name of the menu for the given menubutton label.

get_menubutton {label}
        Return the path name of the menubutton for the given menubutton
        label.

init {}
        This method is called after all options have been evaluated and is
        meant to be redefined in a derived class.

make_short_help {{side bottom}}
        Add a subwindow at the bottom of the screen for short help
        messages.

menu_motion {m y}
        Called for motion events in menubar menus for short help use.

quit {}
        Use this method to quit the application if you might want to reuse
        the window later.

short_help {msg {mf ""}}
        Set the text of the short help message (display now) Note:
        embedded bitmaps can be specified as follows:

        short_help "some text {bitmap mybitmap} other text ..."

        The optional mf arg is the "%m" value for the Enter/Leave event.
        I don't see why it is needed:  pbiereic says: no display after
        button-1 press (makes double-press impossible) XXX need to check
        why this should be (maybe Peter has different bindings...).
```

```
test {cmd}
        Run the given tcl command and print out any errors.
```

PROCS

```
call_plugin {procname inst}
        Call the given proc and pass it the given instance name.  $file is
        the file that is supposed to have contained $procname.

set_command {cmd}
        Specify a command to be evaluated for each TopLevelWidget.

start {class {default_opt ""} {usage ""} {name ""}}
        Start an itcl application - that is, an application with an itcl
        TopLevel widget as its main window.  This proc assumes that the
        command line args (global: $argv) should be passed on to the class
        (which is derived from this class).  If any errors occur, we print
        a usage message based on the itcl info about the class.

        If default_opt is specified, args without options are treated as
        belonging to that option (-file, for example)

        an optional "usage" message may also be specified, to be printed
        when unknown options are found.

        If "name" is not specified, the class name in lower case is used
        with a "." prepended.

start_err_ {class name {default_opt ""} {msg ""} {usage ""}}
        This proc is called by "start" above, in case of errors.  It
        attempts to print an informative message indicating which option
        was wrong and what options are available by using the itcl "info"
        command.

        The args are the itcl class name, widget name, default option
        (-file, for example) and an error message.
```

PROTECTED VARIABLES

```
bitmap_bg_
        Bitmap colors for short help area.

w_
        Shorter name for $itk_component(hull).
```

COMMON CLASS VARIABLES

```
command_
        Optional tcl command to eval for each TopLevelWidget created.
```

SEE ALSO

```
Toplevel(n)
```

```
- - - - - -
Last change: 02 Feb 98
```

4.0.43 util(3)

NAME

util - Collection of C++ utility routines

SYNOPSIS

```
#include "util.h"

char** copyArray(int len, char** ar);
char* stripWhiteSpace(char* p);
const char* fileSuffix(const char* p);
const char* fileBasename(const char* p);
const char* fileRealname(const char* filename, char* buf, int buflen);
int fileSize(const char* filename);
int fileAbsPath(const char* filename, char* path, int pathlen, int& flag);
int readUnbufferedLine(int fd, char* ptr, int maxlen);
int readUnbufferedBytes(int fd, char* ptr, int nbytes);
int writeUnbufferedLine(int fd, char* ptr);
int writeUnbufferedBytes(int fd, char* ptr, int nbytes);
int localSockConnect(int& sock, int port);
int localSockListen(int& sock, int& port);
```

DESCRIPTION

A number of general purpose C++ routines have been gathered here. Most of these should probably be in more specialized C++ String or File classes.

ROUTINES

copyArray(len, ar);

Make a copy of the given string array in a single buffer.

stripWhiteSpace(p);

Strip white space from string p by returning offset in string and setting trailing white space to '\0'.

fileSuffix(p);

Return the suffix of the string p (part following ".", if any).

fileBasename(p);

Return the basename of the filename p (part following last "/", if any).

fileRealname(filename, buf, buflen);

Get the real name of the given file, which may be the name of a symbolic link. If the file exists, the resolved name is written to the given buffer and returned, otherwise a pointer to the original filename is returned. No error message is generated here.

fileSize(filename);

Return the size of the file in bytes or -1 on error.

fileAbsPath(filename, path, pathlen, flag);

If filename is not an absolute path (starting with '/'), write an absolute path for it to "path". Sets flag to 1 if path was changed.

readUnbufferedLine(fd, ptr, maxlen);

Read a line from the given file descriptor one byte at a time,

```
                with no buffering, into the given buffer of the given length
                (for sockets and pipes, stdin, ...).

        readUnbufferedBytes(fd, ptr, nbytes);
                Read nbytes bytes from the given file descriptor into the
                given buffer, with no buffering.

        int writeUnbufferedLine(int fd, char* ptr);
                Write the given buffer (ptr) using unbuffered I/O to the given
                file descriptor, followed by a newline.

        int writeUnbufferedBytes(int fd, char* ptr, int nbytes);
                Write nbytes bytes to the given file descriptor using
                unbuffered I/O (for sockets and pipes, stdin,...).

        int localSockConnect(int& sock, int port);
                Open a socket connection on the given port on teh local host.

        int localSockListen(int& sock, int& port);
                Open a socket and start listening on the given port (or choose
                port, if 0).
```

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Last change: 02 Feb 98

4.0.44

5 Installing the Tclutil Package

5.1 Before you build the Tclutil Package...

Make sure you have a proper Itcl-2.2 distribution (Tcl, Tk, BLT, TclX and ITCL extensions) with the necessary patches applied. Tclutil requires the following software to be already installed (not included):

- itcl-2.2 (includes tcl7.6, tk4.2)
- BLT-2.1
- tclX-7.6.0

These packages are available from the TCL archives.

See: http://www.tcltk.com/ for Itcl.

and http://www.NeoSoft.com/tcl/ for TclX and other contributed Tcl software

You can also get a copy of the whole Tcl/Tk source tree, with the patches already applied from ftp://ftp.archive.eso.org/pub/skycat/.

5.2 Build the Tclutil Package

To make the Tclutil package, configure and make as follows:

```
configure
make
make install
```

The default install dir is /usr/local. You can specify the -prefix argument to configure to change this:

```
configure -prefix $INSTALLDIR
```

If the environment variable TCLTK_ROOT is set, it is used as the default top level directory fo Tcl/Tk.

The default compilers used are g++ and gcc. If you wish to use another compiler, such as CC and cc, do this:

```
setenv CC cc
setenv CXX CC
configure -prefix $INSTALLDIR --with-cc
```

If you prefer using shared libraries and loadable Tcl modules (see 4) configure with:

```
configure --enable-shared
```

Note: If you are using g++, you must also have libg++ compiled as a shared library for this to work (libg++-2.7.2 also has the "--enable-shared" option) (This requires gcc-2.7.2.1 or newer on HP-UX).

5.3 VLT Make Procedure

As an alternative to running configure and make, you can also do this:

```
cd src
make
make install
```

The Makefile in the $TCLUTIL/src directory runs configure and then make as described above. You can also specify options to that Makefile, for example:

```
cd src
make PREFIX=$INSTALLDIR CONFIGURE_FLAGS=--with-gcc
```

The PREFIX variable defaults to /usr/local and is the prefix of the directory in which to install the software.

If the environment variable TCLTK_ROOT is set, it is used as the default top level directory fo Tcl/Tk.

5.4 Start the demo application

To run the demo, type:

```
INSTALLDIR/lib/tclutil/demos/tclutil
```

This package does not currently include any applications, so this just starts tclutil_wish with the correct environment. See the tclutil/test dir for short examples.

5.5 If you are using shared libraries

The Tclutil shared library libtclutil.sl (in HPs) or libtclutil.so (on Suns) is built with the same options used to build the Tcl shared library. The options are read from the file tclConfig.sh, which is searched for in the following places:

```
$prefix/lib/itcl         # $prefix is the value of the -prefix
$prefix/lib              # configure option, default: /usr/local
$TCLTK_ROOT/lib/itcl
$TCLTK_ROOT/lib
/vlt/tcltk/lib/itcl
/vlt/tcltk/lib
/usr/local/lib/itcl
/usr/local/lib
```

This assumes that you have built and installed Tcl with the same "--enable-shared" and compiler option used for Tclutil.

You may need to modify the SHLIB_PATH (HP) or LD_LIBRARY_PATH (Sun) environment variable so that the necessary shared libraries are found at run time. Both variables have the same format: a colon ":" separated list of directories to search for shared libraries.

From a tcl script you can load the TCLUTIL library dynamically with the command "load <path>/libtclutil.sl" or "load <path>/libtclutil.so" or it can be loaded automatically as a package. See the Tcl man pages for more information.

5.6 Tip for HP-UX users

If you are compiling under HP-UX, you can check with the program below if the shared library is loadable. If libtclutil.sl on HP-UX is not properly built you get the misleading error message "Not enough memory".

```
#include <dl.h>
#include <errno.h>
#include <stdio.h>
main(int argc, char *argv[])
{
  shl_t handle;
  handle = shl_load(argv[1], BIND_IMMEDIATE | BIND_VERBOSE, 0L);
  if (handle == 0)
    {
    printf("shl_load failed %s\n", argv[1]);
```

```
    perror("");
    }
  else
    printf("shl_load ok\n");
}
```