PyFTLK Manual

Michael Sheldon

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Examples

**All examples in this manual can be downloaded from:
http://linux.mikeasoft.com/pyfltk/examples.tar.gz.**

Preface

This manual is written in the hope of expanding the usage of PyFLTK (and by extension FLTK), the Fast Light Toolkit bindings for the Python programming language. It is dedicated to all the hard working PyFTLK and FLTK developers who have put together such an amazing toolkit.

As projects work hard to provide low end computer systems for schools, developing countries and computer training centres the development of lightweight software to support these systems becomes increasingly important. PyFLTK makes this task much simpler, reducing the learning curve to creating such software whilst not sacrificing too much in the way of efficiency.

I'm probably woefully unqualified to be writing such a document, anyone more knowledgable than myself is welcome to submit changes to webmaster@mikeasoft.com.

This manual is designed to be modular, so it should be possible to skip between sections depending on your interest; there's no need to read the whole manual from front to back unless you really want to. I shall be assuming some knowledge of Python and the object oriented programming model.

Contents

Chapter 1

Quick Tutorials

1.1 Introduction

In this sections we'll create a group of small programs to demonstrate the main features and design ideas behind PyFLTK. If you are brand new to PyFLTK you might find it advisable to read through these tutorials in order, since later tutorials will assume knowledge of these basics.

1.2 Windows

When creating any graphical program windows are pretty important, they give us a nice blank canvas to starting sticking widgets to. Creating a window in FLTK is pretty simple, take a look at the below example, each line is commented to show what's happening.

```
#!/usr/bin/python
#Give us access to FLTK
from fltk import *

#Create a class for our GUI
class MyApp:

    #Run these commands when the class is initialized
    def __init__(self):
        #Create a window 150 pixels wide and 50 pixels high
        self.window = Fl_Window(150, 50)
        #Set the window title
        self.window.label("My First Window")
        #Draw the window
        self.window.show()

#Create an instance of our GUI class
app = MyApp()
#Start the main FLTK loop
Fl.run()
```

Output:

The only command that needs further explanation here is *Fl.run()*. This command tells FLTK to go in to a loop, processing all graphical events. You need to make sure all your setup is done before this command.

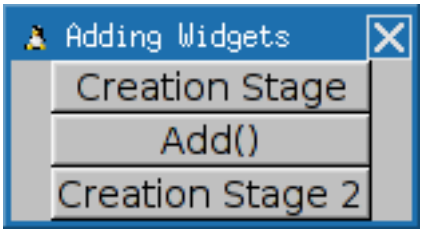
1.3 Adding Widgets

A widget is any graphical element such as a window, a button, a text box, etc. Certain widgets (all children of Fl_Group) can have other widgets added to them, windows are just such a type of widget. There are two ways to add a widget to a window (or any other group), either during the creation stage of that window or later with the *add()* method.

```
#!/usr/bin/python
from fltk import *

class MyApp:

    def __init__(self):
        #Create our window
        self.window = Fl_Window(150, 60)
        self.window.label("Adding Widgets")

        #Create a button
        #This button is added to the window automatically
        self.button1 = Fl_Button(15, 0, 120, 20)
        self.button1.label("Creation Stage")

        #End the creation phase of the window
        self.window.end()
        self.window.show()

        #Create another button
        self.button2 = Fl_Button(15, 20, 120, 20)
        self.button2.label("Add()")
        #This one needs to be added manually
        self.window.add(self.button2)

        #Manually begin creation phase
        self.window.begin()
        #Add a third button
        self.button3 = Fl_Button(15, 40, 120, 20)
        self.button3.label("Creation Stage 2")
        #End creation phase
        self.window.end()

app = MyApp()
```

```
Fl.run()
```

Output:



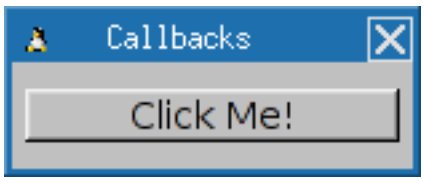
As you can see any widgets created before the *self.window.end()* method are automatically added to *self.window*, whereas those after it have to be added manually. For the third button we manually start the creation phase again with *self.window.begin()*. You can add as many widgets as you like during the creation phase.

1.4 Callbacks

A pretty GUI isn't a lot of use if we have no way of receiving input from the user, this is where callbacks come in. You can register a particular method to be executed when some change occurs in a widget (e.g. a button being clicked), this is called a callback. This is done with the *callback()* method of the widget you want to monitor.

```
#!/usr/bin/python
from fltk import *

class MyApp:

    def __init__(self):
        #Create our window
        self.window = Fl_Window(150, 40)
        self.window.label("Callbacks")

        #Create a button
        self.button1 = Fl_Button(5, 10, 140, 20)
        self.button1.label("Click Me!")
        #Create a callback to our 'clicked' function
        self.button1.callback(self.clicked)

        self.window.end()
        self.window.show()

    #This function is called when button1 is clicked
    def clicked(self, widget):
        widget.label("I've been clicked!")

app = MyApp()
Fl.run()
```

Output: Before clicking



Output: After clicking

The callback method itself is fairly self explanitory, we just specify the method we want to be called, but the type of method we need to create needs a little more detail. Our method has to accept an argument for the widget that is calling it, this allows us to write a method that can handle many similar widgets. If we prefered however, we could rewrite this mehod to use *self.button1.label('I've been clicked')* instead of *widget.label()*, they both point to the same widget in the end.

1.5 Labels

FLTK doesn't have a concept of labels as separate entities like most toolkits, instead each FLTK widget has the opportunity to have a label associated with it through the *label()* method. With certain widgets these labels take on special properties, such as with windows where they become the window title. The following example shows the various methods used to control labels.

```
#!/usr/bin/python
from fltk import *

class MyApp:

    def __init__(self):
        #Create our window
        self.window = Fl_Window(240, 30)
        #This label is used for the window title
        self.window.label("Labels")

        #Create an input field
        self.input = Fl_Input(130, 5, 105, 20)
        #Set the label for the input field
        self.input.label("Some Input:")
        #Make the label shadowed
        self.input.labeltype(FL_SHADOW_LABEL)
        #Set the label size
        self.input.labelsize(18)
        #Set the label colour
```

```
        self.input.labelcolor(fl_rgb_color(0, 0, 75))
        #Set the label font
        self.input.labelfont(FL_COURIER_ITALIC)
        #Align the label to the left
        self.input.align(FL_ALIGN_LEFT)

        self.window.end()
        self.window.show()


app = MyApp()
Fl.run()
```

Output:

The *fl_rgb_color()* function is explained at the end of the Styles & Colours section (1.7).

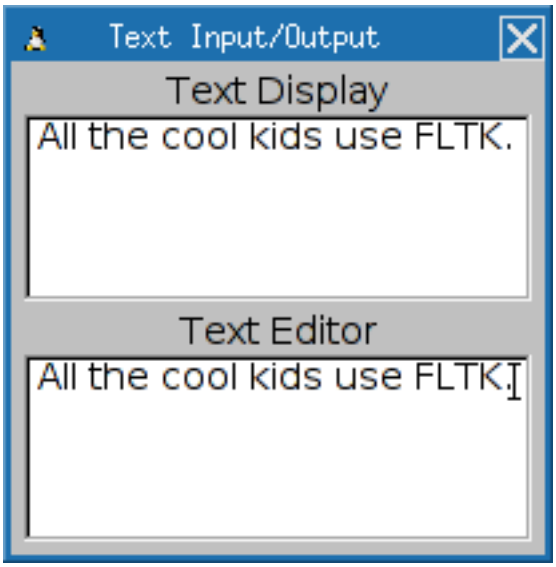
1.6 Text Input/Output

FLTK uses a system of buffers and displays for handling text. An *Fl_Text_Buffer* holds the actual text and formatting information while an *Fl_Text_Display* or an *Fl_Text_Editor* displays it. The following example shows both an *Fl_Text_Display* and an *Fl_Text_Editor* using the same *Fl_Text_Buffer* to illustrate their independence of one another.

```
#!/usr/bin/python
from fltk import *

class MyApp:

    def __init__(self):
        #Create our window
        self.window = Fl_Window(200, 185)
        self.window.label("Text Input/Output")

        #Create a text buffer, this stores the actual text
        self.textbuffer = Fl_Text_Buffer()
        #Add some text to it
        self.textbuffer.text("All the cool kids use FLTK.")

        #Create a text display, this shows the text but doesn't allow editing
        self.textdisplay = Fl_Text_Display(5, 20, 190, 70)
        #Set textdisplay to use our buffer
        self.textdisplay.buffer(self.textbuffer)
        self.textdisplay.label("Text Display")

        #Create a text editor, this shows the text and allows editing
```

```
        self.textedit = Fl_Text_Editor(5, 110, 190, 70)
        #Set textedit to use the same buffer as the display
        self.textedit.buffer(self.textbuffer)
        self.textedit.label("Text Editor")

        self.window.end()
        self.window.show()


app = MyApp()
Fl.run()
```

Output:



If you try editing the text in the editor section you'll see it also changes in the display section, this is because the text is being changed in the buffer we created and they both share this.

1.7 Styles & Colours

For most purposes the default look is perfectly good and it's probably a good idea to stick with this in preparation for a shift to FLTK2 which supports user defined themes, but sometimes it's necessary to make something look distinctly different for one reason or another. FLTK supports a range of different styles that can be applied to most widgets, as well as allowing for customisation of colours. In my opinion the prettiest of these is the plastic style, as shown in the following example.

```
#!/usr/bin/python
from fltk import *

class MyApp:

    def __init__(self):
        #Create our window
```

```
        self.window = Fl_Window(150, 55)
        self.window.label("Styles")

        #Create a normal looking button
        self.button1 = Fl_Button(5, 5, 140, 20)
        self.button1.label("Normal Style")

        #Create a plastic looking button
        self.button2 = Fl_Button(5, 30, 140, 20)
        self.button2.label("Plastic Style")
        #Set the box style
        self.button2.box(FL_PLASTIC_UP_BOX)
        #Set the main colour
        self.button2.color(fl_rgb_color(0, 0, 100))
        #Set the colour when being clicked
        self.button2.selection_color(fl_rgb_color(50, 50, 150))

        self.window.end()
        self.window.show()


app = MyApp()
Fl.run()
```

Output:

As shown above we set the style with the *box()* method of a widget. For changing colours the *fl_rgb_color()* function is very useful, it converts RGB (Red, Green, Blue) values to FLTK colours, be warned that at the time of writing this function has a bug making values greater than 127 in the red channel cause errors.

As well as a range of box styles being available there are a group of frame styles (changed with the *frame()* method) which can be mixed with the box styles, see B.1 for a full list of styles.

Chapter 2

Comprehensive Tutorials

2.1 Introduction

In this chapter we'll build a few complete applications and show off some of the more advanced features of PyFLTK.

2.2 Building A Calculator

2.3 OpenGL

Chapter 3

Fluid & FlConvert

Appendix A

API Reference

A.1 Classes

A.1.1 Fl_Adjuster

A.1.2 Fl_Bitmap

A.1.3 Fl_BMP_Image

A.1.4 Fl_Box

A.1.5 Fl_Browser

A.1.6 Fl_Browser_

A.1.7 Fl_Button

A.1.8 Fl_Chart

A.1.9 Fl_Check_Browser

A.1.10 Fl_Check_Button

A.1.11 Fl_Choice

A.1.12 Fl_Clock

A.1.13 Fl_Color_Chooser

A.1.14 Fl_Counter

A.1.15 Fl_Dial

A.1.16 Fl_Double_Window

A.1.17 Fl_End

A.1.18 Fl_File_Browser

A.1.19 Fl_File_Chooser

A.1.20 Fl_File_Icon

A.1.21 Fl_File_Input

A.1.22 Fl_Free

A.1.23 Fl_GIF_Images

A.1.24 Fl_GI_Window

A.1.25 Fl_Group

A.1.26 Fl_Help_Dialog

Appendix B

Styles

B.1 Boxes

B.2 Frames