BIG DADDY'S PYTHON TOOLBOX For 3.5

tkinter Toys Starter Set

This is a limited reference to help students get started with the tkinter GUI module in Python. It assumes a sound beginner's knowledge of Python, the most current versions of Python and tkinter (NOT Tkinter with a capital T), a basic orientation to object oriented programing, a Windows 10 computer with Python and IDLE installed. If anything said so far gives you the slightest reason to pause, go here: **https://www.python.org/about/gettingstarted/**. You should know that **t**kinter replaced **T**kinter in Python 3.0. and the next "level" of tkinter, **tkk,** is not addressed here except to say it replaces some, maintains some, and adds to, tkinter.

Importing or "Loading" **tkinter**: of the two valid ways to import tkinter, this doc assumes we use: **from tkinter import *** *[Alternative 2, import tkinter as tk, requires prefixing commands with "tk." which confuses new users.]*

A general idea of the process for the creation of a GUI object oriented application might be as follows:
1: Import tkinter
2: Establish a root window
3: Define the root geometry
4: Set up needed variables
5: Plan and build event functions
6: Instantiate and define widgets & set initial focus
7: Setup manual bindings as necessary
8: Deploy widgets with a geometry manager
9: Program app code
10: Establish mainloop boundry

Quick Start: ***For examples and use in testing as you learn, here is a working quick start gui framework.***

```
from tkinter import *
root=Tk()
root.wm_attributes("-fullscreen", True)
root.configure
(background='snow3')

def egress():
    root.destroy()

def textInput(event):
    e1.delete(0,END)
    e1.unbind("<Key>")
    e1.bind("<Return>", useInput)
    e1.insert(0, e1.get())

def useInput(self):
    L1Text.set(e1.get())
    e1.delete(0,END)
    e1.insert(0, "Line "+ str(Counter.get()) + ":  ")
    e1.bind("<Key>", textInput)
    Counter.set(Counter.get()+1)

top1 = Toplevel(root, bg="light blue")
top1.geometry('800'+'x'+'400')
top1.title("top1 Window: Starter Set Test Layout")
top1.attributes("-topmost", 1)

bexit=Button(root, command=egress, text="Close\rButton", \
bg="brown",fg="white",\
          font=("Calibi 14 bold"), width=10, height=2)
bexit.pack(ipady=2, ipadx=2, pady=3, padx=3,side="left",
anchor="nw")

EnterPrompt=StringVar()
akey=StringVar()
L1Text=StringVar()
Counter=IntVar()

EnterPrompt.set("Enter something: ")
akey.set("")
L1Text.set("")
Counter.set(2)

e1=Entry(top1, width=50, bg="beige",
textvariable=EnterPrompt)
e1.bind("<Key>", textInput)
e1.focus_set()
e1.icursor(END)
e1.pack(pady=80)

L1Text.set("Starter Set: Basic test layout")
l1=Label(top1, textvariable=L1Text, width = 50)
l1.pack(anchor= "center", side="bottom", pady=80)
mainloop()
```

This code with extensive documentation can be found (and downloaded) at **www.wikipython.com** Look for it close to where you will find TB5.

tkinter Widgets

In this Quick Start app:

root	Toplevel
Button	Label
Entry	

Others are:

Canvas	Checkbutton
Frame	Labelframe
Listbox	Menubutton
Message	Panedwindow
Scale	Radiobutton
Scrollbar	Spinbox
Text	Messagebox

Vocabulary: *note: w is a widget **instance**;* ↳= yields

WIDGET an **object** that you use to input, manipulate and display information. There are 18 widgets, this starter set refers to only **root** (not actually a widget)**, toplevel, button, label and text.** Widgets have **attributes** (values) and **methods** (actions); usually some attributes are assigned values when creating the widget.

OPTIONS are characteristics of an object like colors, and sizes; potion values are sometimes called **ATTRIBUTES** -*changeable*

METHODS, sometimes called **COMMANDS,** are actions that an object can take if programmatically called.

A **CALLBACK** is a function that is "called" or executed when an **event** that as been **bound** to a widget occurs. (a subroutine)

BIND means to link a **callback function** (code that does something) to a widget **instance** so that when an **event** occurs, that code will be executed. Widgets have **innate bindings**, ex: a left mouse click on a button is a built-in event. **Bind** it to a **callback** with "command=" when you create that button **instance**. Some events require that you create a manual binding to connect them to a widget **instance**. For example, if you want something special to happen when a user right-clicks a label widget, you must specially create that binding.

INSTANCE: tkinter supports 18 classes of widgets, but a class is just a general blueprint, to create an object you can use you must create it by telling tkinter how to make your special object (your **instance**) from a general class.

EVENT: something that occurs which might cause your program or application to interact with the user and/or

continued page 2

Deploy your widgets - w.pack (widget, attributes) Use one of the 3 geometry managers to place and make widgets visible. The 3 managers are: **pack** - a mode ideally suited for learning or very simple GUI interfaces; **grid** - an easy mode that works well for most GUI situations; grid works on cols and rows. **place** - a complex, precise, flexible system not covered here.

Methods: Universal Methods (x=widget name.a geometry name)
x_forget() remove from manager but do not destroy, can reuse **ex:** label1.grid_forget(), retrieve it by repeating the original grid command
x_info() ↳ a dictionary of options ex: print(label1.pack_info())
x_slaves() returns list of sub widgets as tkinter widget references
x_configure(opts) *same as* ***.pack()***

Geometry Specific Methods

place: *has no other Methods.*

pack and grid: **x_propagate(flag)** ; True/False; enables resizing of child widgets if too small

grid:

w.grid_bbox(column=None, row=None, col2=None, row2=None)
w.grid_size() tuple with number of columns and rows
w.grid_location(x,y) ↳ a tuple with indexes
w.grid_remove() removes widget from mgr; available for reuse
To change the following, you must call these on a widget's **parent**:
grid_columnconfigure(index, options)
grid_rowconfigure(index, options)
index = column number
options: minsize=, pad=, weight=

www.wikipython.com

Options and Attributes for configure: option: default: value: comment

pack - attributes for **configure()**

anchor=	center/top: compass points:
expand=	false : 0,1 : fill extra space
fill=	None : X (fill horiz), Y fill vert, BOTH: fill all space

To make a widget fill the entire master widget, set fill= to BOTH and expand= to a non-zero value.

in_= w	pack inside w
ipadx=	0 : int : internal pad horiz
ipady=	0: int : internal pad vert
padx=	0 : external pad horiz
pady=	0 : external pad vert
side=	"top" : "left", "right", "top" "bottom", : side to pack against, can mix sides in one geometry manager

grid - attributes for **configure()**

column=	0 : int : starts with 0
columnspan=	1 : int : span columns
in_=w in w	parent : sibling w : place w
ipadx=	0 : int : internal padding hz
ipady=	0 : int : internal padding vt
padx=	0 : int : external padding hz
pady=	0 : int : external padding vt
row= rows	first empty : row num : start with 0
rowspan=	1 : int : span multiple rows
sticky=	centered : Compass Points : strings or contants, W+E stretch horz, W+E+N+S fills all : alignment

BIG DADDY'S PYTHON TOOLBOX For 3.5

SSet1 V030118a

Selected tkinter Widget Options or Attributes	Button	Entry	Label	Toplevel	Value Type/Default
activebackground	●		●		color / system
activeforeground	●		●		color / system
anchor	●		●		compass points or "center" / usually center
background or -bg	●	●	●		color / system
bitmap	●		●		"" or filename / (see list)
borderwidth or -bd	●	●	●	●	distance value / 2 pixels
command	●				callback function name / none
container				●	boolean / false
cursor	●	●	●	●	cursor name / system
default	●				normal, active, disabled /
disabledforeground	●	●	●		color / n/a
font	●	●	●		font 3 tuple /
foreground or -fg	●	●	●		color /
height	●		●	●	text-lines, image-distance
highlightbackground	●	●	●	●	color / system
highlightcolor	●	●	●	●	color / system
highlightthickness	●	●	●	●	distance value / 1 pixel
image	●		●		bit flie: gif, pgm, ppm /
justify	●	●	●		see justify choices / center
padx	●		●	●	distance value / 1 pixel
pady	●		●	●	distance value / 1 pixel
relief	●	●	●	●	see relief choices / "sunken"
repeatdelay	●				milliseconds before engage /
repeatinterval	●				millisecs between execution
state	●	●	●		Normal or Disabled / normal
takefocus	●	●	●	●	0 or 1 / 1
text	●		●		a string /
textvariable	●	●	●		a string / (set to control var)
underline	●		●		integer /
width	●	●	●	●	characters /
wraplength	●		●		distance value / nowrap

STARTER SET METHODS

TOPLEVEL / LABEL / BUTTON

cget	(option)
configure	(options/values)

BUTTON

flash	
invoke	*callback*

ENTRY

bbox	index
cget	option
configure	option(s)/value(s)
delete	first, last
get	
icursor	index
index	index
insert	index string
scan	
mark	x
dragto	x
selection	
adjust	index
clear	
from	index
present	
range	start,end
index	
validate	
xview	
2 real fractions	visible span
index	to left edge
moveto	fraction
scroll	number, what
	what=units or pages

INDICES:

number	character -0 1st
anchor	point
end	char after string
insert	next after cursor
sel.first	1st char
sel.last	char after select
@number	x coord

PRIMARY BINDINGS

<Button1> : leftmost : <1> is alias
<Button2> : middle if available
<Button3> : right-most mouse button
<ButtonRelease1> :
<Leave> : mouse pointer left widget
<B1-Motion> : movement w/ button held down
<DoubleButton1> : double click
<Enter> : mouse pointer in widget
<FocusIn> : keyboard focus moved to widget
<FocusOut> : keyboard focus moved away from widget
<Return> : the keyboard enter key
<Key> : w.bind("<Key>", callback) any keypress
"x" : any letter : ex: label.bind("x", callback)
Special Keys: Cancel (Break), BackSpace, Tab, Shift, Contol, Alt, Pause, Escape, Page Up Page Down..

Event Object passed to **callback** includes:
widget - tkinter instance
x,y - current mouse position
x_root, y_root - mouse position relative to the upper left corner of the screen, in pixels.
char - character code (keyboard events only), as a string.
keysym - key symbol (keyboard events)
keycode - the key code (keyboard events)
num - The button number (mouse button events only).
width, height - new widget size, in pixels
type - event type

data; for example a mouse button press or a <RETURN> keypress .

Vocabulary: continued from page 1

Compass points: 'n', 'ne', 'e', 'se', 's', 'sw', 'w', 'nw', 'center'. Also constants W,E,N,S. W+E to stretch. "wens" to fill all

Colors: can be given as the names of colors in the rgb.txt file (downloaded with tkinter); also hex definitions #rbg, #rrggbb, or #rrrgggbbb

Distance: Pixels ➔ numeric; absolute distances ➔ strings with a trailing character denoting units: c-centimeters, i-inches, m-millimeters, p- printer's points - these vary with font used.

Fonts: Ex: font=("Verdana 10 bold"). Font sizes with positive numbers measured in points; sizes with neg numbers are measured in pixels. Note font definition is in quotes.

Justify: "left", "center", "right", "fill" include quotes

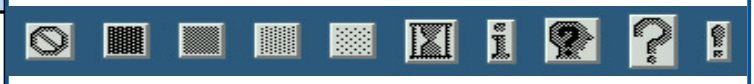
Region: 4 space-delimited legal distances ex: "3i 2i 4.5i 2i"

Relief: "raised", "sunken", "flat", "groove", "ridge"

Wrap: "none", "char", "word"

Cursors: many available such as: "arrow" "circle" "clock" "cross" "dotbox" "exchange" "fleur" "heart" "man" "plus" "shuttle" "watch"

Bitmaps: 'error', 'gray75', 'gray50', 'gray25', 'gray12', 'hourglass', 'info', 'questhead', 'question', 'warning'



Images: B&W id constructor: myBWpic = tk.BitmapImage (file=myimagefile.xbm); Color: myphotoimage = PhotoImage (file=myimagefile. {.gif, .pgm, .ppm formats})

Control Variables: StringVar(), DoubleVar(), BooleanVar(), IntVar(); use .set() and .get() , tracked and auto-changed.

Starter Set: Window Information Methods
ex: top1.winfo_geometry()
height() : widget height in pixels
rootx() : left edge cood rel to screen
rooty() : left edge cood rel to screen
screenheight() : height of widget screen
screenwidth() : width of screen in pixels
vrootx() : x offset of virtual root rel to root win
vrooty() : y offset of virtual root rel to root win
width() : widget width, pixels (update_idletasks)
x() : upper corner coord
y() : upper corner coord
pathname(displayof=0) : full window name

Starter Set: Window Manager Methods	
attributes ex: **root.attributes("-fullscreen", True)**	
-alpha	transparency, 0.0-1.0
-fullscreen	NEW
-topmost	place this window on top
-disabled	disables window
-transparentcolor	trans color index of toplvl
-transparent	window area transparent
geometry	widthxheight+woffset+yoffset
command	(value=); WM_COMMAND
iconify	iconify widget
withdraw	unmap w; deiconify to remap
deiconify	display, set focus, raise

.mainloop() - This method **must** be called - generally after all the static widgets are created - to start processing events. You can leave the main loop with the .quit() method. You can also call this method inside an event handler to resume the main loop.

Criticism & Comment Appreciated:
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