

## tkinter Journeyman Reference

excludes ttk except noted p10   color codes: **explanatory**, **option**, **example**, **note**, **syntax**, ↪ = "results in"/"yields"

**1 Import:** `from tkinter import *` ( or `import tkinter as tk` - requires using "tk." prefix to commands)

**2 Establish root:** `root=Tk()`   **3 Define root or toplevel Geometry:** `root.Geometry(str(width)+"x"+str(height)+"+"+str(xoffset)+"+"+str(yoffset))`; find screen dimensions with `=root.info_screenwidth()` and `=root.infoScreenheight()`; in TCL8.4+: `root.attributes("-fullscreen", True)` ↪ quotes. To position root or toplevel windows use `window.lift()` or `.lower()`, or call on the window manager:

**top1.attributes("-topmost", True/False)** to hold it in place.   **4 Create Widgets:** `widget_name= widget_type(attributes/options/command callbacks)`; use any callable object as a callback: **functions** (most common), bound methods, lambda expressions, commands. No **event** info is provided for inherent callbacks. A example syntax diagram:  
 ↗ Your widget name ↗ option (ex: background color) ↗ function to bind when ↗ **auto event** occurs  
`b1=Button(parent, bg = 'light blue', text= 'Push me!', command= my_callback_function)`  
**widget ↗ type** ↗ parent window name ↗ option (ex: label text) **button click binding is automatic**

**5 Bindings** - events can bind at 4 levels: Application, Toplevel, Class, Instance (most common) ex: `label1.bind("Button-1", callback function)`   **6 Manual Bindings** - To respond to an event **not** auto bound to a widget, use the `.bind` method to connect a callback. **widget.bind (event, callback)** This binding delivers **event** objects to callback if a function accepts it: `def callback(event):`

## Common Manual Bindings

(\* You may need to use `w.focus_set()` to activate.)  
**Button events:** always in quotes like "<1>"

<Button-1> : leftmost button, <1> is alias  
 <Button-2> : middle button if available  
 <Button-3> : rightmost mouse button  
 <ButtonRelease1> : button up  
 <Leave> : mouse pointer left widget  
 <B1-Motion>: movement with button down  
 <DoubleButton1> : double click  
 <Enter> : mouse pointer entered widget

**Keyboard events:**

<FocusIn> : keyboard focus moved to w  
 <FocusOut> : keyboard focus moved away  
 <Return> : the keyboard enter key  
 <Key> : w.bind("<Key>", cbback) any keypress  
 "x" : a letter ex: frame.bind("x", callback)

## 18 Widgets (w/out ttk)

Button
Canvas
Checkbutton
Entry
Frame
Label
LabelFrame
Listbox
Menu
Menubutton
Message
PanedWindow
Radiobutton
Scale
Scrollbar
Spinbox
Text
Toplevel

## Options, values, processes, and constants

**Compass points:** 'n', 'ne', 'e', 'se', 's', 'sw', 'w', 'nw', 'center'.  
**Bitmaps:** 'error', 'gray75', 'gray50', 'gray25', 'gray12', 'hourglass', 'info', 'questhead', 'question', 'warning'



**Colors:** can be given as the names of colors in the `rgb.txt` file (downloaded with `tkinter`); also hex definitions `#rgb`, `#rrggb`, or `#rrrgggbb`

**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**; negative numbered sizes are measured in **pixels**.

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

**Region:** 4 space-delimited distances "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" "mouse" "pirate" "plus" "shuttle" "sizing" "spider" "spraycan" "star" "trek" "watch"

**Images: B&W:** id constructor: `myBWpic = tk.BitmapImage(file=myimagefile.xbm)`; **Color:** `myphotoimage = PhotoImage(file=myimagefile.{.gif, .pgm, .ppm formats})` see pg 6&7

**Control Variables** - shared by multiple widgets, updates all users automatically: constructors are `=DoubleVar()`, `=IntVar()`, `=BooleanVar()`  
`=StringVar();` use: `v.get(value)` and `v.set(value)`

**Type of Events** Listed above are **keyboard** and **mouse** or **pointer** events. Other types of events (not detailed here) are **crossing**, **focus**, **exposure**, **configuration**, and **colormap** more on pg. 6

**Special key bindings** Cancel (*the Break key*), BackSpace, Tab, Return (*the Enter key*), Shift\_L (*any Shift key*), Control\_L (*any Control key*), Alt\_L (*any Alt key*), Pause, Caps\_Lock, Escape, Prior (*Page Up*), Next (*Page Down*), End, Home, Left, Up, Right, Down, Print, Insert, Delete, F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, Num\_Lock, and Scroll\_Lock; *each encased in "< >"*; ex: "`<Tab>`"

**Other bindings:** **Class:** `.bind_class()`

ex: `self.Bind_class(w_type, "<event>", function)`

**Application:** `.bind_all('<some event>', function)`

ex: `self.bind_all('<Key-Print>', self.__printScreen)`

**Using lambda to pass simple values in a binding** Ordinarily no variables are passed in an automatic binding and only event data in manual bindings. A lambda statement can be used to overcome this limitation with simple data - for example regular or control variables. **Auto binding example:**

`command=lambda: button1callback(myvar)` or

`lambda: button1callback(cvar.get())`, the callback function must specify a receiving variable container. For manual bind:

`w.bind("<event>", lambda event, arg=variable: callback(event, arg))` **callback has 2 variables such as (event, myvar)**

comments and suggestions appreciated:  
 oakey.john@yahoo.com

WWW.WIKIPYTHON.COM

**Event sequence** or event name. It is a **string** containing one or more **event patterns**, as follows:  
quote and angle bracket enclosure: ex: "<Key>"

" < [opt modifier(s)]... **type** [opt detail] >"

Alt, Control, Double, ⌘ like ⌘ Key or ⌘like 1, 2,  
Lock, Shift, Triple Return 3 or 3

**Second Bindings** if an automatic binding is already set to a **callback** (using the **command= callback** option), another (manual) binding can be allowed to use it by including \*args in the **callback** parens: **callback(\*args)**. **callback** will now work for both, but only the event you manually bind sends back event data and using event data causes an error if called by the automatic callback.

## Geometries: Pack, Place, Grid: widget installation / formatting tools      Options and Attributes

Geometry Options	Pack	Grid	Place	Default or Requirement	Options	Note
after	●			other window		name of another window
anchor	●		●	center	compass points	default is NW
before ( <i>other</i> )	●			other window		name of another window
bordermode			●	inside	outside / ignore	border influence on slave placement
column		●		0	integer	column number; columns start with 0
columnspan		●		1	integer	number of columns spanned
expand	●			FALSE	true/false: 0/1	assign more space, distribute among widgets
fill	●			"none"	"x", "y", "both"	take up entire space, may need expand=
height			●	size	distance	outer dimension of window plus border
in_= ( <i>target</i> )	●	●	●	n/a	widget name	pack inside the target widget
ipadx	●	●		0	distance	internal padding pixels/ <i>distance</i> ; vertical
ipady	●	●		0	distance	internal padding pixels/ <i>distance</i> ; horizontal
padx	●	●		0	distance	external padding pixels/ <i>distance</i> ; vertical
pady	●	●		0	distance	external padding pixels/ <i>distance</i> ; horizontal
relheight			●	fp	fp 0 to 1.0	height relative to master; modified by - height
relwidth			●	fp	fp 0 to 1.0	width relative to master; modified by - width
relx			●	fp % * 100	0.0(left)-1.0(right)	anchor point x coordinates in master window
rely			●	fp % * 100	0.0(left)-1.0(right)	anchor point y coordinates in master window
row		●		first empty	row number	row number; rows start with 0
rowspan		●		1	integer	number of rows spanned
side	●			top / left/ right/ bottom		to pack against
sticky (glue widget to cell border)		●		centered	compass points	W+E stretch horiz; W+E+N+S - fill all; use a string="wens" or constants =W+E+N+S
width			●	size	distance	outer dimension of window <b>plus</b> border
x			●	0	distance	anchor point x coordinate in master window
y			●	0	distance	anchor point y coordinate in master window

### Methods: Universal Geometry Methods

[x=widget name.geometry name] **b1.pack\_forget()**  
**x\_forget()** remove from manager but do not destroy, can reuse **ex: lab1.grid\_forget()**, retrieve by repeating the original grid command

**x\_info()** ↲ a dictionary of options **w.grid\_info()**  
**x\_slaves()** returns list of sub widgets as tkinter widget references

**x\_configure(options)** 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  
**master.grid\_location(x,y)** ↲ r/c tuple with indexes  
**w.grid\_remove()** removes widget from manager; but the widget is 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=, uniform=

Widget Options and Attributes	Value Type															Default Value	Note		
	Button	Canvas	Checkbutton	Entry	Frame	Label	LabelFrame	Listbox	Menu	Message	PanedWindow	Radiobutton	Scale	Scrollbar	Spinbox	Text	Toplevel		
activebackground	●	●			●			●	●		●	●	●	●	●	●	color	a system value	mouse over or b1 press
activeborderwidth									●								distance value	1	menu; only if displaying > 1 element
activeforeground	●	●			●				●		●						color	a system value	
activerelief													●				relief	raised	displayed when element active
activestyle								●									dotbox, none, underline	underline	
anchor	●	●			●				●	●	●						compass points, center	usually center	
aspect									●								positive integer aspect ratio	150	message;
autoseparators												●					boolean	TRUE, 1	text; applies only if undo is true
background or -bg	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	color	system	
bigincrement											●						fp	0.1	large movement amoount
bitmap	●	●			●				●		●						"" or filename	see predefined list	see native available: "question"
blockcursor												●					boolean	false	text;
borderwidth or -bd	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	distance value	2 pixels	
buttonbackground												●					color	SystemButtonFace	spinbox;
buttoncursor												●					cursor name	default cursor	spinbox;
butondownrelief												●					relief	raised	spinbox;
buttonuprelief												●					relief	raised	spinbox;
class				●		●										●	class for window - determines options	w class name ->	toplevel, frame, labelframe
closeenough	●																fp value	1.0	how close is inside
colormap			●		●											●	new' or other window	screen default	toplevel, frame, labelframe;
command	●	●							●	●	●	●					callback function name	none	
compound	●	●	●	●	●	●			●		●						bottom, top, left, right, center	none	controls the display of text and images at same time
confine	●	●															boolean	True	canvas; T confines view to scroll region
container			●													●	boolean	false	toplevel, frame, labelframe; to embed app
cursor	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	cursor name	system	see cursor options
default	●																normal, active, disabled	disabled	button; disabled may draw smaller button
digits												●					integer	0	scale; string resolution, 0 yeilds all positions
direction								●									above, below, left, right, flush	below	menubutton; where menu pops up
disabledbackground			●									●					color	system	spinbox, entry;
disabledforeground	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		color	SystemDisabledText	
elementborderwidth											●						pixels	=borderwidth?	around arrows and slider
endline												●					next-after-last line index		
exportselection			●			●			●		●	●	●	●	●	●	integer		text only;
font	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	font 3 tuple	TkDefaultFont	name, size, weight
foreground or -fg	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		color	system	
from											●						fp - lowest value	0.0	scale, spinbox; used with to and increment
handlepad											●						distance value	8	paned window; sash to handle distance
handlesize											●						distance value	8	paned window; side length of sash handle
height	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	text-lines, image-distance value	1	centered
highlightbackground	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	color	system	
highlightcolor	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	color	system	
highlightthickness	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	distance value	1 pixel	width of highlight if widget has input focus
image	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	bit file: gif, pgm, ppm		image created with image_create command
inactiveselectbackground																	text; for selection when window does not have focus - no default		
increment												●					fp(can be + or -)	1.0	spinbox; widget adj amount
indicatoron	●								●								boolean	false	check, radio, menu buttons; raised if true
insertbackground	●	●	●								●	●					color	black	
insertborderwidth	●	●	●								●	●					distance value	0	
insertofftime	●	●	●								●	●					milliseconds	300	
insertontime	●	●	●								●	●					milliseconds	600	
insertunfocussed																none,(no cursor), hollow, solid	none	text; new in tcl81.6	
insertwidth	●	●	●								●	●					distance value	2 pixels	width of insertion cursor

Widget Options and Attributes	Button	Canvas	Checkbutton	Entry	Frame	Label	LabelFrame	Listbox	Menu	Message	PanedWindow	Radiobutton	Scale	Scrollbar	Spinbox	Text	Toplevel	Value Type	Default Value	Note
invalidcommand or -invcmd				●													script to evaluate	-	spinbox, entry; best use is "bell"	
jump													●				boolean F-smooth T-update at release	0	drag slider value change amt	
justify	●	●	●	●					●	●		●					see justify choices	center		
label												●					string	-	scale; label for the scale	
labelanchor				●													compass points	"nw"	labelframe; text option can not be empty	
labelwidget				●													widget	-	labelframe; widget to use as label	
length												●					distance value	100	scale; long dimension of the scale	
listvariable								●									name of a global variable		listbox; a list to be display in the widget	
maxundo													●				integer	0	text; 0 or neg yield unlimited undo stack	
menu									●								associated menu name		toplevel, menubutton; <not identical	
offrelief	●											●					relief	raised	checkbox, radiobutton; when button off	
offvalue	●											●					value	0	checkbox; variable when not selected	
onvalue	●											●					value	1	checkbox; variable when selected	
opaqueresize												●					boolean	1	panedwindow; true-resize as sash moved	
orient												●	●	●			'horizontal', 'vertical'	panwin is horiz	scale, scrollbar are vertical	
overrelief	●	●										●					relief	"" (empty string)	button, checkbutton, radiobutton; exposed during mouse over	
padx	●	●	●	●	●	●			●	●	●	●				●	●	distance value	1 pixel	
pady	●	●	●	●	●	●			●	●	●	●				●	●	distance value	1 pixel	
postcommand									●								a string holding ?			
proxybackground												●					color	background color		
proxyborderwidth												●					pixels	2		
proxyrelief												●					relief	flat		
readonlybackground		●										●					color	normal bg	spinbox, entry; if read only	
relief	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	see relief choices	"sunken"		
repeatdelay	●											●	●	●			ms before engage	300		
repeatinterval	●											●	●	●			ms between execution	100		
resolution												●					real value	1 (integral)	scale; resolution of the scale	
sashcursor												●					mouse cursor	hrzr: sb_h_double_arrow, vrt: sb_v_double_arrow	panedwindow; cursor when mouse over	
sashpad												●					distance value	0	panedwindow; pad on each side of sash	
sashrelief												●					relief	flat	panedwindow; sash relief	
sashwidth												●					distance value	3	panedwindow; width of sash	
screen												●					screen name for new window		toplevel; can not modify with config	
scrollregion	●																coords: fp		rectangle: params or list	
selectbackground	●	●				●				●	●						color	SystemHighlight		
selectborderwidth	●	●	●			●				●	●						distance value	0		
selectcolor	●					●				●							color	SystemWindow	checkbox, radiobutton; use when selected	
selectforeground	●	●	●			●				●	●						text color	SystemHighlightText		
selectimage	●																image	ignored unless image option specified	checkbox, radiobutton; when button selected	
selectmode						●											single, browse, multiple, extended	browse	listbox; styles for manipulatin the selection	
setgrid						●						●					boolean	0	listbox, text; widget controls toplevel grid size	
show		●															string - 1 character	-	entry; replaces entry - like "*" for password	
showhandle								●									boolean	0	panedwindow; sash handles shown or not	
showvalue												●					boolean	1	scale; show current value	
sliderrlength												●					distance value	30	scale; sze of slider	
sliderrelief												●					relief	raised	scale;	
spacing1												●					distance value	0	text; + space above text lines	

Widget Options and Attributes	Button	Canvas	Checkbutton	Entry	Frame	Label	LabelFrame	Listbox	Menu	Menubutton	Message	PanedWindow	Radiobutton	Scale	Scrollbar	Spinbox	Text	Toplevel	Value Type	Default Value	Note	
spacing2																		●	distance value	0	text; + space above single wrap lines	
spacing3																		●	distance value	0	text; + space above last wrap line	
startline																		●	integer index or ""	-	text; indicate line to start, "" is first line	
state	●	●	●	●	●	●		●	●	●			●	●	●	●	●	●	Normal or Disabled	normal		
tabs																	●		distances for stops	8 characters	stops can precede left, right, center, numeric	
tabstyle																	●		'tabular' or 'wordprocessor'	'tabular'	text;	
takefocus	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	0 or 1	1		
tearoff																			boolean	0		
tearoffcommand																			compound string	->	<a href="https://www.tcl.tk/man/tcl8.6/TkCmd/menu.htm#M8">https://www.tcl.tk/man/tcl8.6/TkCmd/menu.htm#M8</a>	
text	●	●	●	●	●	●	●	●	●	●	●								a string	-		
textvariable	●	●	●	●	●	●	●	●	●	●	●								a string	-		
tickinterval													●						real number	0.0	scale; tick spacing - if 0 no tick marks	
title								●												-		
to													●	●					real number	scale 100, spin 0.0	scale, entry; right or bottom end	
tristateimage		●											●						image	-	ignored if image unspecified	
tristatevalue		●																	a string holding ?	-		
troughcolor													●	●					color (not Windows)	SystemScrollbar	scale, scrollbar;	
type																			menu entry type	normal	command, separator, tearoff	
underline	●	●	●	●	●	●	●	●	●	●	●								integer	-1	index of char to underline	
undo													●						boolean	1	text; undo mechanism is active or not	
use																	●	hex string window identifier	-	toplevel; get from winfo id		
validate			●																none, focus, focusin, focusout, key, or all	none	spinbox, entry; specifies validation mode	
validatecommand or - vcmd			●																script to eval, {} disables {}		spinbox, entry; must return boolean value	
value													●						proper list	-	radiobutton; content control w/ precedence over from to	
values														●					proper list	-	spinbox; content control	
variable	●												●						global variable	SelectedButton value	checkbox, radiobutton, scale;	
visual			●			●								●					see TK_GetVisual for info/complex	parent values	toplevel, frame, lableframe;	
width	21	●	0	20	0	0	0	0	20	0	0	0	0	0	15	21	20	80	0	characters	varies by widget	canvas=473
wrap														●	●				string - char or word	char	spinbox, text; wrap around values of data	
wraplength	●	●	●	●	●	●	●	●	●	●	●								distance value	nowrap / 0	max line length; 0-none	
xscrollcommand	●	●	●	●	●	●	●	●	●	●	●								=scrollbar.set		scrollbar.config(command=w.xview)	
xscrollincrement	●	●																	distance	0	canvas; increment or horiz scroll	
yscrollcommand	●	●																	widget name + set		canvas, text, listbox;	
yscrollincrement	●	●																	distance	0	canvas; increment or vert scroll	

**tkinter Commands and Keywords** - the following are commands OTHER than those which create and define widgets, implement their attributes and options, bind actions, provide information and manage window activity. (**Commands** is the web folder name used by the TCL/Tk manual pages for these.) In the following, {Tk / Tcl} notes mean "see that specific command page" on the Tcl/Tk manual website.

**after {Tcl}** (1) **after( delay in milliseconds)** \*nothing executes during the delay (2) **after(delay in milliseconds, command to evaluate)**

ex: `e1.after(1000, top1.bell())` <- wait a second then execute a command to play a tone

**bell() {Tk}** - causes a system standard sound to play: ex: `widget.bell()`, or in a class function, `self.bell()`

**bind {Tk}** – see pages 1 and 2

**bindtags {Tk}** – produces a list of associations (a window/widget, class name, or "all" keyword) called binding tags that determines how events are processed. Ex: `bindlist=[widget.bindtags()]` might yield : `[('!toplevel.!mylabel', 'Label', '!toplevel', 'all')]`

\*Before reviewing Photo or Bitmap see note on images at the end of this Command and Keyword section.

(pg 7)

**bitmap {Tk}** – (1) do not confuse the 10 "built-in" bitmaps that can be called by name for placement on buttons (see page 1 for a list with pictures), with other (i.e., user defined) bitmap images. Example: `b1=Button(top1, bitmap='questhead')` will yield, in your GUI, something like at right:



(2) **BitmapImage Class** images are used to display 2 color 'xbm' images in text widgets, canvases, buttons, or labels; they can be read from strings or text files. They are concomitantly constructed and assigned to a variable with the syntax: `name = BitmapImage(file = "some path and file name" [,bg=color][,fg=color])`. There is no "easy" way to resize or convert xbm images in

## tkinter Commands and Keywords cont'd

**tkinter** – it must be done manually outside the program. The bitmap image variable name (holding its ID) is then used to display the image anywhere. For example if an image variable is created named “initials” that is 300x86 pixels: `I2= Label(top1, image=initials, height=100, width=300)`. Eliminate the height and width, and the label will be auto sized to fit the image if the label is too small.

**clipboard** {Tk} – tkinter has its own clipboard. Multiple comments on the web give conflicting reports about its efficacy exchanging data with various operating systems, but the Tk/Tcl docs do not make the claim that it does that. There are three clipboard commands for `clear()`, `append()` and `get()`. You must clear it before calling append. Examples:

```
top1.clipboard_clear() # test clipboard - start by clearing it
top1.clipboard_append("e1 is now: " + e1.get()) # put string data on the
clipboard from and entry widget named "e1"
```

```
I4.configure(text=top1.clipboard_get()) # retrieve the clipboard
```

**colors** {Tk} – you can find a lot about colors on [www.wiki.pyton.com](http://www.wiki.pyton.com). You can also find an “official” list of shortcut color names on the Tcl/Tk web site at: <https://www.tcl.tk/man/tcl8.6/TkCmd/colors.htm>

**console** {Tk} - See: <https://www.tcl.tk/man/tcl8.6/TkCmd/console.htm> - beyond this doc's scope.

**cursors** {Tk} -define inside configure, i.e., `e1.config(cursor="plus")`; see the whole list at <https://www.tcl.tk/man/tcl8.6/TkCmd/cursors.htm>; our favorite: “coffee\_mug”

**destroy** {Tk} – deletes window and all children ex: `root.destroy()` – if all destroyed, normal exit occurs.

**event** {Tk} – a series of commands to manage virtual and synthesized events

```
w.event_add("<> your new virtual event>>", sequences)
w.event_delete("<> your new virtual event>>", sequences)
...more... see https://www.tcl.tk/man/tcl8.6/TkCmd/event.htm
```

**focus** {Tk} – 5 Python variations

```
w.focus_set() - moves focus to widget w
w.focus_displayof() - ↲ w with focus if it is on current display, else "None"
w.focus_force() - override window manager and force focus to w - not
considered good programming: "impolite"
w.focus_get() - if your application is active, returns w with focus, else "None"
w.focus_lastfor() - returns the widget that last had the input focus in the top-
level window that contains it
```

**font** {Tk} – in modern Python it is no longer necessary to load a font submodule (fkFont) to change major font characteristics; 12 of 18 widgets allow setting the font it uses with a 1 to 6 item tuple in a string; usually with spaces for delimiters, for example, `w.configure(font=("Arial 8 bold italic underline overstrike"))`. If we want a font name with multiple words, a different format/syntax is necessary, for example: `w.configure(font=("Courier New", 12, "bold"))`. Note that if you drastically increase the font size of a widget that already holds text, the widget size may increase to fit the text displayed.

**grab** {Tk} – `w.grab_set()` for example: `self.top.grab_set()` – where top is a toplevel window the grab command limits all activity to that window. **Variations:**

```
w.grab_current() - if grab is in force returns identifier, else "None"
w.grab_release() - end any grab in force
w.grab_set_global() - considered bad if not evil programming, grabs all events
for everything!
```

```
w.grab_status() - returns 'local' or 'global' or 'None'
```

**grid** {Tk} – along with **pack** and **place** these are the geometry managers and are just commands like the rest of this list.

**image** {Tk} – both bitmap and photo images are created with the constructor

```
w.create_image(coords, options)
```

for options see below.  
**keyyms** {Tk} – TK recognized list of names recognized for bindings (ex: 'space', 'exclaim', 'quotedbl', 'percent') can be found at: <https://www.tcl.tk/man/tcl8.6/TkCmd/keyyms.htm>

**lift** - in the Python implementations, `lift(aboveThis=None)` replaces Tk's "raise

## Information Methods (`winfo_x()`)

**atom**(name (a string), displayof=0) : unique integer mapped to string  
**atomname**(id, displayof=0) : mapped to id  
**cells()** : # of cells in colormap  
**children()** : list of children  
**class()** : widget class  
**colormapfull()** :  
**containing**(rootx, rooty, displayof=0) : widget @ this position  
**depth()** : bit depth  
**exists()** : true if widget exists  
**fpixels**(distance, ) : fp-# of screen pixels  
**geometry()** : geometry sting  
**height()** : widget height in pixels  
**id()** : window identifier  
**interprets**(displayof=0) : TCL interpreter mem list  
**ismapped()** : boolean; check if window created  
**manager()** : geo mgr: grid, pack, place, canvas, text  
**name()** : widget name  
**parent()** : widget parents full name  
**pathname**(displayof=0) : full window name of id window  
**pixels**(distance, ) : convert to pixels  
**pointerx()** : x coord of pointer on the root  
**pointery()** : xy coords of pointer on the root  
**pointery()** : y coord of pointer on the root  
**reqheight()** : min size to display widget  
**reqwidth()** : min size needed to display widget  
**rgb**(color, ) : an RGB 3 tuple - 0 to 65535  
**rootx()** : left edge coord rel to screen  
**rooty()** : left edge coord rel to screen  
**screen()** : screen name as dec integer; always ".0.0" in Windows  
**screencells()** : # of color cells  
**screendepth()** : default bit depth  
**screenheight()** : height of widget screen  
**screenmmheight()** : screen height in mm  
**screenmmwidth()** : screen width in mm  
**screenvisual()** : "psuedocolor" or "truecolor"  
**screenwidth()** : width of screen in pixels  
**server()** : widget screen xserver window info  
**toplevel()** : widget root  
**viewable()** : True is widget chain is mapped  
**visual()** : directcolor, grayscale, pseudocolor, staticcolor, staticgray, or truecolor  
**visualid()** : X identifier for visual this widget  
**visualsavailable()** : list of all visuals available for widget screen  
**vrootheight()** : height of the virtual root window for widget  
**vrootwidth()** : width of the virtual root window for widget  
**vrootx()** : x offset of virtual root relative to root window of widget screen  
**vrooty()** : yoffset of virtual root relative to root window of widget screen  
**width()** : widget width, pixels (update\_idletasks)  
**x()** : upper corner coord  
**y()** : upper corner coord  
**ex: print(top1.winfo\_children())**

### More Event Types

syntax: "<type>"	Destroy
Key	Unmap
KeyRelease	Map
Button-x, <i>B1-B5</i>	Reparent
ButtonRelease	Configure
Motion < <i>B1-Motion</i> >	Gravity
Enter	Circulate
Leave	Property
FocusIn	Colormap
FocusOut	Activate
Expose	Deactivate
Visibility	MouseWheel

Font size differs between platforms so no pixel to character formula is completely dependable.

**tkinter Commands and Keywords cont'd**

(aboveThis=None)" since raise is a keyword in Python.

**loadTk** {Tk} – "loads binary code from a file into the application's address space and calls an initialization procedure in the package to incorporate it into an interpreter"-far beyond the scope of this doc or the knowledge of its author.  
**lower(belowThis=None)** {Tk} – change a window's position in the stack. "All toplevel windows may be restacked with respect to each other, whatever their relative path names, **but the window manager is not obligated to strictly honor requests to restack.**"

**option** {Tk} – there are several variations of the option command – one of which is dubious

**w.option\_add(pattern,value,priority)** explanation and examples by Fredrik Lundh himself in 1998 ( see: <http://effbot.org/zone/tkinter-option-database.htm> ), one of his examples: `root.option_add("*Font", "courier")`. The pattern format is explained at <https://www.tcl.tk/man/tcl8.6/TkCmd/option.htm#M9> and priority values are explained by Shipman at <http://infohost.nmt.edu/~shipman/soft/tkinter/web/universal.html>; briefly priority (default=80) are 20 – global, 40 – applications, 60 – user files, 80-option set up after app initialization.

**w.option\_clear()** – self descriptive

**w.option\_readfile(filename, priority)** – not tested

**w.option\_get(name-instance key, className – class key)** – our team includes folks with high SAT's, advanced degrees, and nobody who graduated below magna cum laude. After 3 days we could not find or discover a single example of this command that worked. Good luck. Since all widgets support **cget()**, it would be superfluous anyway. *Comments if we are wrong appreciated.*

**options** {Tk} – see standard options list: <https://www.tcl.tk/man/tcl8.6/TkCmd/options.htm>

**photo** {Tk} – pic2=pic.subsample(6,6) A full color image; currently the **PhotoImage** class reads only **GIF, PGM, and PPM**. Use **Pillow** (Imaging Library) to work with other image types. **"Pillow" replaces the "Python Image Library" in modern Python.** PhotoImage objects are simultaneously created and assigned a variable name with a command in the form **v=PhotoImage(file="file location and name")**, ex: `myphoto=PhotoImage(file="C:\BigSelfie.gif")` or PhotoImage can read encoded GIF files from strings. Keep a reference to your image stored in a global variable. Images are displayed with the **create\_image** command. There are useful methods associated with photo object instances scattered across the web – the most concise collector is Lundh's 1998 book in pdf form, page 112, which can be found at <https://users.tricity.wsu.edu/~bobl/cpts481/an-introduction-to-tkinter.pdf>. Included are **configure()**, **cget()**, **width()**, **height()**, **type()**, **get(x,y)**, **put(data)**, **put(data,bbox)**, **read()**, **write()**, **blank()**, **copy()**, **zoom(xscale,yscale)**, **zoom(scale)**, **subsample(xscale,yscale)**, and **subsample (scale)**.

**raise** {Tk} – RAISE DOES NOT EXIST in the Python implementation; the substituted command is "lift(aboveThis=None)" – see **lower()**

**selection** {Tk} – implements the full selection functionality described in the X Inter-Client Communication Conventions Manual (ICCCM). This includes **selection\_clear()**, **\_get()**, **\_handle(command)**, **\_own()**, **\_own\_get()**.

**send** {Tk} – execute a command in a different application – see <https://www.tcl.tk/man/tcl8.6/TkCmd/send.htm>

**update()** – force process of all pending events, can be used to force response to user inputs.

**update\_idletasks()** – processes only display and window calculations – does not allow new events

**Note on images:** (see **bitmap** and **photo**) tkinter natively handles two kinds of images, they are a (1) PhotoImage – full color - (GIF, PGM, PPM) or a (2) BitmapImage -monochrome X11 files - with the extension ".xbm". The command to display images is:

**widgetname.create\_image(position given by x, y; \*\*other options ).** The **other options** are: activeimage=, anchor=, disabledimage=, image= (the object), state= (normal, disabled, hidden), or tags=. The command returns the item id which can be used wherever an image object is needed.

**Other Modules Supporting tkinter:**  means see discussion on [www.wiki.python.org](http://www.wiki.python.org)

- ⦿ **scrolledtext** - text widget + scrollbar, works similar to message
- ⦿ **colorchooser** - very Windows similar, tricky, not well documented online
- commandialong** - baseclass for other dialogs below
- ⦿ **filedialog** - handle file open and save interface - like Windows dialog
- ⦿ **fontchooser** - designate font - good demo hard to find
- ⦿ **messagebox** - standard (limited) message function - very similar to windows - OK, YES, NO , CANCEL, unfortunately not always well behaved but it can be tamed
- ⦿ **simpledialog** - basic dialogs and convenience functions: one item input: strings, integers, floating point
- turtle** - use turtle graphics in a tkinter environment
- dnd** - \*experimental! - drag-and drop support

Some Handy Color Names

white	snow	linen	blanched almond	aliceblue
pink1	red4	red2	indian red	DeepPink2
saddle brown	coral1	Dark Orange3	orange2	DarkGoldenrod4
DarkGoldenrod2	gold2	yellow	LightGoldenrod2	green yellow
dark green	sea green	PaleGreen2	navy	Dodger Blue3
blue2	SkyBlue1	SteelBlue4	VioletRed4	magenta
orchid3	purple	Dark Orchid4	thistle1	lavender blush
misty rose	grey10	grey25	grey50	grey75

Note these are **modules** that must be imported - they do not come in automatically when importing tkinter. See the top of pg 10 for a **scrolledtext** example.

**Running the Color Utility Color Chooser:**

from tkinter import colorchooser  
**colorchooser.askcolor(initialcolor='#ff0000')**

Please send comments/suggestions to oakey.john@yahoo.com

## Widget Methods or Commands

All 18 widgets have the following two methods:

**cget (option)** - retrieve opt value  
**configure (opts/values)** - set options/values

Six widgets have ONLY these two commands:

## Frame, Label, LabelFrame, Menubutton, Message and Toplevel

### PANEDWINDOW

<b>add</b>	(child, option(s))
<b>forget</b>	(child)
<b>identify</b>	(xy coord)
<b>proxy</b>	(arg[s])
coord	Ä proxy xy
forget	
place	place @ xy
<b>sash</b>	
coord	index
dragto	index x y
mark	index x y
place	index x y
<b>panecget</b>	(window, option)
<b>paneconfigure</b>	(child, opt/vals)
after	(child)
before	(child)
height	size
hide	boolean
minsize	x y
padx	distance
pady	distance
sticky	nesw
stretch	when - one of: <i>always, first, last, middle, never</i>
width	size

### TEXT

<b>bbox</b>	index x,y,width,height
<b>compare</b>	indx1 operator indx2
<b>count</b>	option, index1/2
chars	abbrv as 'c'
displaychars	(visbl chars)
displayindices	^+wins,img
displaylines	lines i1 to i2
indices	all objects
lines	abbrv as "l"
xpixels	hz pix to i2
ypixels	vt pix to i2
<b>debug</b>	boolean; internal ck
<b>delete</b>	index1/2
<b>dlineinfo</b>	ind> 5 ele area info
<b>dump</b>	default is all
all	all info
command	key value index
image	+ in dump reslt
mark	+ in dump reslt
tag	+ in dump reslt

- retrieve opt value  
 - set options/values

Six widgets have ONLY these two commands:

**cget and configure** are available but not shown in the following method lists

### BUTTON

<b>flash</b>	
<b>invoke</b>	callback

### CHECKBUTTON

<b>deselect</b>	
<b>flash</b>	
<b>invoke</b>	
<b>select</b>	
<b>toggle</b>	

<b>insert</b>	index string
<b>invoke</b>	element
<b>scan</b>	option args
mark	x y
dragto	x y
<b>selection</b>	to adj selection
adjust	sel end index
clear	
element	
from	
present	
range	start, end
to	index
<b>set</b>	string
<b>validate</b>	↳ 0 or 1
<b>xview</b>	args chg hz pos
index	
moveto	fraction
scroll	number, what
<b>Embedded images</b>	
align	where
image	Tk image name
name	image name
padx	pixels
pady	pixels
<b>SCROLLBAR</b>	
<b>scrollbars are created and attached to other widgets</b>	
<b>Scrollbar methods</b>	
<b>activate</b>	element
<b>delta</b>	Δx Δy
<b>fraction</b>	x y
<b>get</b>	
<b>identify</b>	x y
<b>set</b>	first, last
<b>Scrolling methods</b>	
<b>prefix moveto</b>	
	fraction 0=start
<b>prefix scroll</b>	
	# units (chr/Ins)
<b>prefix scroll</b>	
	# pages
<b>SPINBOX</b>	
<b>see indices reference block</b>	
<b>bbox</b>	index
<b>delete</b>	first, last
<b>get</b>	
<b>icursor</b>	index
<b>identify</b>	x y
<b>index</b>	index
<b>SCALE</b>	
<b>coords</b>	X Y list @ val point
<b>get</b>	x y
<b>identify</b>	x y
<b>set</b>	value

LISTBOX		focus	tagOrId	dragto	x	MENU
activate	index	gettags	tagOrId	selection	adjust	index
bbox	index	icursor	tagOrId, index	clear	from	index
curselection		imove	tagOrId, index x y	present		
delete	first, last	index	tagOrId, index	range	start,end	
get	first, last	insert	tagOrId beforeThis	index		
index	index	itemcget	tagOrId, option	validate		
insert	index, element	itemconfig	tagOrId, opt/val...	xview		
itemcget	index, option	lower	tagOrId, belowThis		2 real fractions visible span	
itemconfigure	(opts/values)	move	tagOrId, xamt, yam	index	to left edge	
	background	moveto	tagOrId, x, y	moveto	fraction	
	foreground	postscript	option/value...	scroll	number.what	
	selectbackground				what=units or pages	
	selectforeground	channel	channelName			
nearest	y	colormap	varName			
nearest		colormode	mode			
	mark x y	file	fileName			
	dragto x y	fontmap	varName			
see	index	height	size			
selection	option	pageanchor	anchor			
anchor	index	pageheight	size			
clear	first, last	pagewidth	size			
includes	index	pagex	position			
set	first, last	pagey	position			
size	str no of elemnts	rotate	boolean			
xview		width	size			
	2 real fractions visible span	x	position			
	index	y	position			
	moveto fraction					
	scroll number, what	raise	tagOrId aboveThis			
yview		rchars	tagOrId first last string			
	2 real fractions visible span	scale	tagOrId xOrigin yOrigin xScale yScale			
	index	scan	option, args			
	moveto fraction	mark	x y			
	scroll number, what	dragto	x y, gain			
CANVAS		select				
addtag		_adjust	tagOrId index			
above	tagOrId	_clear				
all		_from	tagOrId index			
below	tagOrId	_item				
closest	x,y,halo,start	_to	tagOrId index			
enclosed	x1 y1 x2 y2	type	tagOrId			
overlapping	x1 y1 x2 y2	xview	args			
withtag	tagOrId	moveto	fraction			
bbox	tagOrId...	scroll	number, what			
bind	tagOrId, seq, commnd	yview				
canvasx	screenx, gridspacing	moveto	fraction			
canvasy	screenx, gridspacing	scroll	number, what			
ENTRY						
coords	tagOrId, x, y	bbox	index			
coords	tagOrId, coordList	delete	first, last			
create	type xy, xy, opt/val	get				
create	type xy, xy, opt/val	icursor	index			
dchars	tagOrId, first, last	index	index			
delete	tagOrId, tagOrId...	insert	index string			
dtag	tagOrId.tagToDelete	scan				
find	searchCommand, arg..	mark	x			

**Scrolled Text Widget**

one of the separate tkinter.scrolledtext modules: constructed like a Text widget but has a text widget and a vertical scroll bar packed in a frame. Special Attributes: `ScrolledText.frame`, and `Scrolledtext.vbar`

**To import:**

```
from tkinter import *
import tkinter.scrolledtext
(test header on www.wikipython.com
will be useful for trying this)
```

**To use:** (example assumes a butt-load of text in a variable called "testtext")  
`st=tkinter.scrolledtext.ScrolledText(top1, width=50, wrap=WORD, height=8)`

`st.grid(row=1, column=1)`  
`st.insert(INSERT, testtext)`

See the example and get useful Latin text filler for testing on [www.wikipython.com](http://www.wikipython.com)

# adding ttk

ttk was a major optional addition to tkinter. It reduces the options available per widget by employing STYLES and THEMES. A widget's style is either the value of its style configuration option or the default for the widget defined by its class. Usually the style is "T" + the class, i.e., TButton. The exception is "Treeview", not "TTreeview". A widget is made up of elements. A **style** defines a widget's elements and how they are laid out. Each element may have multiple options. Options can be different in every theme. Every widget class has a **Style()**. **THEMES** are a collection of similar styles. Stock ttk **themes** are: **winnative, clam, alt, default, classic, Vista, xpnative**. ttk replaces some tkinter widgets, has no effect on another group of tkinter widgets, and adds six brand new widgets of its own, see table: →

One purpose of ttk is to simplify code by separating methods and attributes and "automating" attributes with **styles** emulating existing platforms, or at least to provide a consistent appearance. Python has a fair, if sometimes misleading, ttk summary at:

<https://docs.python.org/3/library/tkinter.ttk.html>

and **most** of the following is summarized from there.

**To Use a Theme:** ([winnative](#), [calm](#), [alt](#), [default](#), [classic](#), [Vista](#), [xpnative](#))

`style=Style()`

`style.theme_use("themename")`

**To Configure a style:**

`style.configure("myStyleName", foreground="red", background="blue")`

**Universal Standard ttk Widget Options:**

`class` (read only for option values), `cursor` (default is inherited), `takefocus` (in traversal: 0,1, or ""), `style` (to specify custom style)

**Scollable Widget Options:** `xscrollcommand`, `yscrollcommand` – use `Scrollbar.set()`

**Label Options:** `text`, `textvariable`, `underline`, `image`, `compound`, `width`

**Universal Standard ttk Widget Methods:** `Tkinter.Widget.cget()`,

`tkinter.Widget.configure()`, `class` `tkinter.ttk.Widget`: `identify(x,y)`, `instate`

`(statespec, callback=None, *args, **kw)`, `state(statespec=None)`

**Widget States:**

`active`, `disabled`, `focus`, `pressed`, `selected`, `background`, `readonly`, `alternate`, `invalid`

**Style:** is a class used to manipulate the style database and supports the following methods:

<code>configure(style, query_opt=None, **kw)</code>	<code>map(style, query_opt=None, **kw)</code>	<code>lookup (style, option, state=None, default=None)</code>
<code>theme_create (themename, parent=None, settings=None)</code>	<code>theme_names()</code> <code>theme_use (themename=None)</code> <code>theme_settings (themename, settings)</code>	<code>element_options (elementname)</code> <code>element_names()</code>
<code>element_create (elementname, etype="image", or "from", *args, **kw= border, height, padding, sticky, and/or width)</code>		
<code>layout (style, layoutspec=None) (None, side:whichside, sticky:nsew, unit: 0 or 1, children:[sublayout...])</code>		

**what about tix?** *Deprecated since version 3.6:*

This Tk extension is unmaintained and should not be used in new code. Use [tkinter.ttk](#) instead.

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