Essentials

- Tk Backgrounder (../resources/backgrounder.html)
- Installing Tk (../tutorial/install.html)
- Tutorial (../tutorial/index.html)
- Widget Roundup (../widgets/index.html)
- Languages Using Tk (../resources/languages.html)
- Official Tk Command Reference
  (Tcl-oriented; at www.tcl.tk) (http://www.tcl.tk/man/tcl8.6/TkCmd/contents.htm)

Tutorial

Show: All Languages ▾

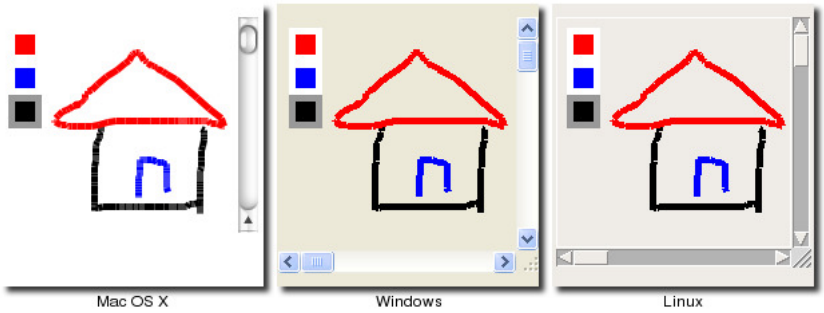
This tutorial will quickly get you up and running with the latest Tk from Tcl, Ruby, Perl or Python on Mac, Windows or Linux. It provides all the essentials about core Tk concepts, the various widgets, layout, events and more that you need for your application.

Previous: Fonts, Colors, Images (fonts.html) | Contents (index.html) | Single Page (onepage.html) | Next: Text (text.html)

Canvas

- Widget Roundup (../widgets/canvas.html)
- Reference Manual (http://www.tcl.tk/man/tcl8.6/TkCmd/canvas.htm)

A **canvas** widget manages a 2D collection of graphical objects — lines, circles, images, other widgets and more. Tk's canvas is an incredibly powerful and flexible widget, and truly one of Tk's highlights. It is suitable for a wide range of uses, including drawing or diagramming, CAD tools, displaying or monitoring simulations or actual equipment, and for building more complex widgets out of simpler ones. Canvas widgets are part of the classic Tk widgets, not the themed Tk widgets.



Canvas Widgets

Canvas widgets are created using the **tk::canvas** command:

```
tk::canvas .canvas
```

Canvas widgets are created using the **TkCanvas** class:

```
canvas = TkCanvas.new( parent )
```

Canvas widgets are created using the **new_tk__canvas** method, a.k.a. **Tkx::tk__canvas**:

```
$canvas = $parent->new_tk__canvas();
```

Canvas widgets are created using the **Canvas** function:

```
canvas = Canvas( parent )
```

Because canvas widgets have a huge amount of features, we won't be able to cover everything here. What we will do is take a fairly simple example (a freehand sketching tool) and incrementally add new pieces to it, each showing another new feature of canvas widgets. Towards the end of the chapter, we'll then cover some of the other major features not illustrated in the example.

Creating Items

When you create a new canvas widget, it will essentially be a large rectangle with nothing on it; truly a blank canvas in other words. To do anything useful with it, you'll need to add *items* to it. As mentioned, there are a wide variety of different types of items you can add. Here, we'll look at adding a simple line item to the canvas.

To create a line, the one piece of information you'll need to specify is where the line should be. This is done by using the coordinates of the starting and ending point, expressed as a list of the form *x0 y0 x1 y1*. The *origin* (0,0) is at the top left corner of the canvas, with the *x* value increasing as you move to the right, and the *y* value increasing as you move down. So to create a line from (10,10) to (200,50), we'd use this code:

```
.canvas create line 10 10 200 50
```

The "`create line`" command will return an item id (an integer) that can be used to uniquely refer to this item; every item created will get its own id. Though often we don't need to refer to the item later and can ignore the returned id, we'll see how it can be used shortly.

```
TkcLine.new( canvas, 10, 10, 200, 50)
```

This command will return an object representing the line. We'll see how this object can be used shortly. Note though that very often you won't need to refer to the line directly, and can therefore ignore the line object that has been returned.

> *The underlying Tcl-based Tk library refers to individual objects by a unique id number, starting at 1 and counting up for each object created. Ruby encapsulates this well inside item objects, but in some cases, and in the documentation, you'll see reference to this numeric id. If you do need to retrieve it, you can do so via calling the "id" method of the canvas item object.*

```
$canvas->create_line(10,10,200,50);
```

The "`create_line`" method will return an item id (an integer) that can be used to uniquely refer to this item; every item created will get its own id. Though often we don't need to refer to the item later and will therefore ignore the returned id, we'll see how it can be used shortly.

```
canvas.create_line(10, 10, 200, 50)
```

The "`create_line`" method will return an item id (an integer) that can be used to uniquely refer to this item; every item created will get its own id. Though often we don't need to refer to the item later and will therefore ignore the returned id, we'll see how it can be used shortly.

Let's start our simple sketchpad example. For now, we'll want to be able to draw freehand on the canvas by dragging the mouse on it. We'll create a canvas widget, and then attach event bindings to it to capture mouse clicks and drags. When we first click the mouse, we'll remember that location as our "start" position. Every time the mouse is moved with the mouse button still held down, we'll create a line item going from this "start" position to the current mouse position. The current position will then be the "start" position for the next line segment.

```
package require Tk

grid [tk::canvas .canvas] -sticky nwes -column 0 -row 0
grid columnconfigure . 0 -weight 1
grid rowconfigure . 0 -weight 1

bind .canvas <1> "set lastx %x; set lasty %y"
bind .canvas <B1-Motion> "addLine %x %y"

proc addLine {x y} {
    .canvas create line $::lastx $::lasty $x $y
    set ::lastx $x; set ::lasty $y
}
```

```
require 'tk'
root = TkRoot.new()

@canvas = TkCanvas.new(root)
@canvas.grid :sticky => 'nwes', :column => 0, :row => 0
TkGrid.columnconfigure( root, 0, :weight => 1 )
TkGrid.rowconfigure( root, 0, :weight => 1 )

@canvas.bind( "1", proc{|x,y| @lastx = x; @lasty = y}, "%x %y")
@canvas.bind( "B1-Motion", proc{|x, y| addLine(x,y)}, "%x %y")

def addLine (x,y)
  TkcLine.new( @canvas, @lastx, @lasty, x, y )
  @lastx = x; @lasty = y;
end

Tk.mainloop
```

```
use Tkx;
$mw = Tkx::widget->new(".");

$canvas = $mw->new_tk__canvas;
$canvas->g_grid(-column=>0, -row=>0, -sticky=>"nwes");
$mw->g_grid_columnconfigure(0, -weight=>1);
$mw->g_grid_rowconfigure(0, -weight=>1);

$canvas->g_bind("<1>", [sub {my ($x,$y) = @_; $lastx=$x; $lasty=$y}, Tkx::Ev("%x","%y")]);
$canvas->g_bind("<B1-Motion>", [sub {my ($x,$y) = @_; addLine($x,$y)}, Tkx::Ev("%x","%y")]);

sub addLine {
    my ($x,$y) = @_;
    $canvas->create_line($lastx,$lasty,$x,$y);
    $lastx = $x; $lasty = $y;
}

Tkx::MainLoop();
```

```
from tkinter import *
from tkinter import ttk

lastx, lasty = 0, 0

def xy(event):
    global lastx, lasty
    lastx, lasty = event.x, event.y

def addLine(event):
    global lastx, lasty
    canvas.create_line((lastx, lasty, event.x, event.y))
    lastx, lasty = event.x, event.y

root = Tk()
root.columnconfigure(0, weight=1)
root.rowconfigure(0, weight=1)

canvas = Canvas(root)
canvas.grid(column=0, row=0, sticky=(N, W, E, S))
canvas.bind("<Button-1>", xy)
canvas.bind("<B1-Motion>", addLine)

root.mainloop()
```

Try it out - drag the mouse around the canvas to create your masterpiece.

Item Attributes

When creating items, you can also specify one or more *attributes* for the item, that will affect how it is displayed. For example, here we'll specify that the line should be red, and three pixels wide.

```
.canvas create line 10 10 200 50 -fill red -width 3
```

```
TkcLine.new( canvas, 10, 10, 200, 50, :fill => 'red', :width => 3)
```

```
$canvas->create_line(10, 10, 200, 50, -fill => "red", -width => 3);
```

```
canvas.create_line(10, 10, 200, 50, fill='red', width=3)
```

The exact set of attributes will vary according to the type of item.

Like with Tk widgets, changing attributes for canvas items after you've already created them can also be done.

```
set id [.canvas create line 0 0 10 10 -fill red]
...
.canvas itemconfigure $id -fill blue -width 2
```

```
line = TkcLine.new( canvas, 0, 0, 10, 10, :fill => 'red' )
line[:fill] = 'blue'
line[:width] = 2
```

```
$id = $canvas->create_line(0, 0, 10, 10, -fill => "red");
...
$canvas->itemconfigure($id, -fill => "blue", -width => 2);
```

```
id = canvas.create_line(0, 0, 10, 10, fill='red')
...
canvas.itemconfigure(id, fill='blue', width=2)
```

Bindings

We've already seen that the canvas widget as a whole, like any other Tk widget, can capture events using the `"bind"` command.

You can also attach bindings to individual items in the canvas (or groups of them, as we'll see in the next section using tags). So if you want to know whether or not a particular item has been clicked on, you don't need to watch for mouse click events for the canvas as a whole, and then figure out if that click happened on your item. Tk will take care of all this for you.

To capture these events, you use a bind command built into the canvas. It works exactly like the regular bind command, taking an event pattern and a callback. The only difference is you specify the canvas item this binding applies to.

```
.canvas bind $id <1> {...}
```

```
line.bind("1", ...)
```

```
$canvas->bind($id, "<1>", sub{...})
```

> *Note the difference between the item-specific `"bind"` method, and the widget-level `"g_bind"` method.*

```
canvas.tag_bind(id, '<1>', ...)
```

> *Note the difference between the item-specific `"tag_bind"` method, and the widgetlevel `"bind"` method.*

Let's add some code to our sketchpad example to allow changing the drawing color. We'll first create a few different rectangle items, each filled with a different color. Creating rectangle items is just like creating line items, where you'll specify the coordinates of two diagonally opposite corners. We'll then attach a binding to each of these so that when they're clicked on, they'll set a global variable to the color to use. Our mouse motion binding will look at that variable when creating the line segments.

```
set id [.canvas create rectangle 10 10 30 30 -fill red]
.canvas bind $id <1> "setColor red"

set id [.canvas create rectangle 10 35 30 55 -fill blue]
.canvas bind $id <1> "setColor blue"

set id [.canvas create rectangle 10 60 30 80 -fill black]
.canvas bind $id <1> "setColor black"

set ::color black

proc setColor {color} {
    set ::color $color
}
proc addLine {x y} {
    .canvas create line $::lastx $::lasty $x $y -fill $::color
    set ::lastx $x; set ::lasty $y
}
```

```
r = TkcRectangle.new( @canvas, 10, 10, 30, 30, :fill => 'red')
r.bind( "1", proc {setColor('red')})

r = TkcRectangle.new( @canvas, 10, 35, 30, 55, :fill => 'blue')
r.bind( "1", proc {setColor('blue')})

r = TkcRectangle.new( @canvas, 10, 60, 30, 80, :fill => 'black')
r.bind( "1", proc {setColor('black')})

@color = 'black'

def setColor color
   @color = color
end

def addLine (x,y)
  TkcLine.new( @canvas, @lastx, @lasty, x, y, :fill => @color )
  @lastx = x; @lasty = y;
end
```

```
$canvas->g_bind("<1>", [sub {my ($x,$y) = @_; $lastx=$x; $lasty=$y}, Tkx::Ev("%x","%y")]);
$canvas->g_bind("<B1-Motion>", [sub {my ($x,$y) = @_; addLine($x,$y)}, Tkx::Ev("%x","%y")]);

$id = $canvas->create_rectangle(10, 10, 30, 30, -fill => "red");
$canvas->bind($id, "<1>", sub {setColor("red")});

$id = $canvas->create_rectangle(10, 35, 30, 55, -fill => "blue");
$canvas->bind($id, "<1>", sub {setColor("blue")});

$id = $canvas->create_rectangle(10, 60, 30, 80, -fill => "black");
$canvas->bind($id, "<1>", sub {setColor("black")});

$color = "black";
sub setColor {
    my ($newcolor) = @_;
    $color = $newcolor;
}

sub addLine {
    my ($x,$y) = @_;
    $canvas->create_line($lastx,$lasty,$x,$y, -fill => $color);
    $lastx = $x; $lasty = $y;
}
```

```
color = "black"
def setColor(newcolor):
    global color
    color = newcolor

def addLine(event):
    global lastx, lasty
    canvas.create_line((lastx, lasty, event.x, event.y), fill=color)
    lastx, lasty = event.x, event.y

id = canvas.create_rectangle((10, 10, 30, 30), fill="red")
canvas.tag_bind(id, "<Button-1>", lambda x: setColor("red"))
id = canvas.create_rectangle((10, 35, 30, 55), fill="blue")
canvas.tag_bind(id, "<Button-1>", lambda x: setColor("blue"))
id = canvas.create_rectangle((10, 60, 30, 80), fill="black")
canvas.tag_bind(id, "<Button-1>", lambda x: setColor("black"))
```

Tags

We've seen that every canvas item has a unique id number, but there is another very useful and powerful way to refer to items on a canvas, and that is using *tags*.

A tag is just an identifier of your creation, something meaningful to your program. You can attach tags to canvas items; each item can have any number of tags. Unlike item id numbers, which are unique for each item, many items can have the same tag.

What can you do with tags? We saw that you can use the item id to modify a canvas item (and we'll see soon there are other things you can do to items, like move them around, delete them, etc.). Any time you can use an item id, you can use a tag. For example, you can change the color of all items having a specific tag.

Tags are a good way to identify certain types of items in your canvas (items that are part of a drawn line, items that are part of the palette, etc.). You can use tags to correlate canvas items to particular objects in your application (for example, tag all canvas items that are part of the robot with id #37 with the tag "robot37"). With tags, you don't have to keep track of the ids of canvas items to refer to groups of items later; tags let Tk do that for you.

You can assign tags when creating an item using the `"tags"` item configuration option. You can add tags later with the `"addtag"` method, or remove them with the `"dtags"` method. You can get the list of tags for an item with the `"gettags"` method, or return a list of item id numbers having the given tag with the `"find"` command.

For example:

```
% canvas .c
.c
% .c create line 10 10 20 20 -tags "firstline drawing"
1
% .c create rectangle 30 30 40 40 -tags "drawing"
2
% .c addtag rectangle withtag 2
% .c addtag polygon withtag rectangle
% .c gettags 2
drawing rectangle polygon
% .c dtag 2 polygon
% .c gettags 2
drawing rectangle
% .c find withtag drawing
1 2
```

```
>> canvas = TkCanvas.new root
=> #<TkCanvas:0x73c92c @path=".w00000">l
>> l = TkcLine.new canvas, 10, 10, 20, 20, :tags => 'firstline drawing'
=> #<TkcLine:0x737990 @id=1, @parent=#<TkCanvas:0x73c92c @path=".w00000">,
        @path=".w00000", @c=#<TkCanvas:0x73c92c @path=".w00000">>
>> r = TkcRectangle.new canvas, 30, 30, 40, 40, :tags => 'drawing'
=> #<TkcRectangle:0x732b34 @id=2, @parent=#<TkCanvas:0x73c92c @path=".w00000">,
        @path=".w00000", @c=#<TkCanvas:0x73c92c @path=".w00000">>
>> r.addtag 'rectangle'
=> #<TkcRectangle:0x732b34 @id=2, ... >
>> canvas.addtag 'polygon', :withtag, 'rectangle'
=> <TkCanvas:0x73c92c @path=".w00000">
>> canvas.gettags r
=> ["drawing", "rectangle", "polygon"]
>> r.dtag 'polygon'
=> #<TkcRectangle:0x732b34 @id=2 ... >
>> r.gettags
=> ["drawing", "rectangle"]
>> canvas.find :withtag, 'drawing'
=> [#<TkcLine:0x737990 @id=1 ... >, #<TkcRectangle:0x732b34 @id=2 ... >]
```

```
Perl> $c = $mw->new_canvas()
.c
Perl> $c->create_line(10, 10, 20, 20, -tags => "firstline drawing")
1
Perl> $c->create_rectangle(30,30,40,40, -tags => "drawing")
2
Perl> $c->addtag("rectangle", "withtag", 2)
Perl> $c->addtag("polygon", "withtag", "rectangle")
Perl> $c->gettags(2)
drawing rectangle polygon
Perl> $c->dtag(2,"polygon")
Perl> $c->gettags(2)
drawing rectangle
Perl> $c->find_withtag("drawing")
1 2
```

```
>>> c = Canvas(root)
>>> c.create_line(10, 10, 20, 20, tags=('firstline', 'drawing'))
1
>>> c.create_rectangle(30, 30, 40, 40, tags=('drawing'))
2
>>> c.addtag('rectangle', 'withtag', 2)
>>> c.addtag('polygon', 'withtag', 'rectangle')
>>> c.gettags(2)
('drawing', 'rectangle', 'polygon')
>>> c.dtag(2, 'polygon')
>>> c.gettags(2)
('drawing', 'rectangle')
>>> c.find_withtag('drawing')
(1, 2)
```

As you can see, things like "withtag" will take either an individual item or a tag; in the latter case, they will apply to all items having that tag (which could be none). The "addtag" and "find" have many other options, allowing you to specify items near a point, overlapping a particular area, and more.

Let's use tags first to put a border around whichever item in our color palette is currently selected.

```
set id [.canvas create rectangle 10 10 30 30 -fill red -tags "palette palettered"]
set id [.canvas create rectangle 10 35 30 55 -fill blue -tags "palette paletteblue"]
set id [.canvas create rectangle 10 60 30 80 -fill black -tags "palette paletteblack paletteSelected"]

proc setColor {color} {
    set ::color $color
    .canvas dtag all paletteSelected
    .canvas itemconfigure palette -outline white
    .canvas addtag paletteSelected withtag palette$color
    .canvas itemconfigure paletteSelected -outline #999999
}

setColor black
.canvas itemconfigure palette -width 5
```

```
r = TkcRectangle.new( @canvas, 10, 10, 30, 30, :fill => 'red', :tags => 'palette palettered')
r = TkcRectangle.new( @canvas, 10, 35, 30, 55, :fill => 'blue', :tags => 'palette paletteblue')
r = TkcRectangle.new( @canvas, 10, 60, 30, 80, :fill => 'black', :tags => 'palette paletteblack paletteSelected')

def setColor color
   @color = color
   @canvas.dtag 'all', 'paletteSelected'
   @canvas.itemconfigure 'palette', :outline => 'white'
   @canvas.addtag 'paletteSelected', :withtag, "palette#{color}"
   @canvas.itemconfigure 'paletteSelected', :outline => '#999999'
end

setColor 'black'
@canvas.itemconfigure 'palette', :width => 5
```

The canvas "itemconfigure" method provides another way to change the properties of a canvas item. The advantage over dealing with the canvas item object directly is that we can specify a tag, so that the change we're making applies to all items having that tag. Without this, we could use "gettags" to get all the items, iterate through them, and set the option, but "itemconfigure" is more convenient.

```
$id = $canvas->create_rectangle(10, 10, 30, 30, -fill => "red", -tags => "palette palettered");
$id = $canvas->create_rectangle(10, 35, 30, 55, -fill => "blue", -tags => "palette paletteblue");
$id = $canvas->create_rectangle(10, 60, 30, 80, -fill => "black", -tags => "palette paletteblack paletteSelected");

sub setColor {
    my ($newcolor) = @_;
    $color = $newcolor;
    $canvas->dtag_all("paletteSelected");
    $canvas->itemconfigure("palette", -outline => "white");
    $canvas->addtag("paletteSelected", withtag => "palette".$color);
    $canvas->itemconfigure("paletteSelected", -outline => "#999999");
}
setColor "black";
$canvas->itemconfigure("palette", -width => 5);
```

```
def setColor(newcolor):
    global color
    color = newcolor
    canvas.dtag('all', 'paletteSelected')
    canvas.itemconfigure('palette', outline='white')
    canvas.addtag('paletteSelected', 'withtag', 'palette%s' % color)
    canvas.itemconfigure('paletteSelected', outline='#999999')

id = canvas.create_rectangle((10, 10, 30, 30), fill="red", tags=('palette', 'palettered'))
id = canvas.create_rectangle((10, 35, 30, 55), fill="blue", tags=('palette', 'paletteblue'))
id = canvas.create_rectangle((10, 60, 30, 80), fill="black", tags=('palette', 'paletteblack', 'paletteSelected'))

setColor('black')
canvas.itemconfigure('palette', width=5)
```

Let's also use tags to make the current stroke we're drawing appear more visible; when we release the mouse, we'll put it back to normal.

```
bind .canvas <B1-ButtonRelease> "doneStroke"

proc addLine {x y} {
    .canvas create line $::lastx $::lasty $x $y -fill $::color -width 5 -tags currentline
    set ::lastx $x; set ::lasty $y
}
proc doneStroke {} {
    .canvas itemconfigure currentline -width 1
}
```

```
@canvas.bind( "B1-ButtonRelease", proc{doneStroke})
def addLine (x,y)
  TkcLine.new( @canvas, @lastx, @lasty, x, y, :fill => @color, :width => 5, :tags => 'currentline' )
  @lastx = x; @lasty = y;
end
def doneStroke
  @canvas.itemconfigure 'currentline', :width => 1
end
```

```
$canvas->g_bind("<B1-ButtonRelease>", sub {doneStroke();});
sub addLine {
    my ($x,$y) = @_;
    $canvas->create_line($lastx,$lasty,$x,$y, -fill => $color, -width => 5, -tags => "currentline");
    $lastx = $x; $lasty = $y;
}
sub doneStroke {
    $canvas->itemconfigure("currentline", -width => 1);
}
```

```
def addLine(event):
    global lastx, lasty
    canvas.create_line((lastx, lasty, event.x, event.y), fill=color, width=5, tags='currentline')
    lastx, lasty = event.x, event.y

def doneStroke(event):
    canvas.itemconfigure('currentline', width=1)

canvas.bind("<B1-ButtonRelease>", doneStroke)
```

Modifying Items

You've seen how you can modify the configuration options on an item — its color, width and so on. There are a number of other things you can do items.

To delete items, use the `"delete"` method. To change an item's size and position, you can use the `"coords"` method; this allows you to provide new coordinates for the item, specified the same way as when you first created the item. Calling this method without a new set of coordinates will return the current coordinates of the item. To move one or more items by a particular horizontal or vertical amount from their current location, you can use the `"move"` method.

All items are ordered from top to bottom in what's called the stacking order. If an item later in the stacking order overlaps the coordinates of an item below it, the item on top will be drawn on top of the lower item. The `"raise"` and `"lower"` methods allow you to adjust an item's position in the stacking order.

There are several more operations described in the reference manual page, both to modify items and to retrieve additional information about them.

Scrolling

In many applications, you'll want the canvas to be larger than what appears on the screen. You can attach horizontal and vertical scrollbars to the canvas in the usual way, via the `"xview"` and `"yview"` methods.

As far as the size of the canvas, you can specify both how large you'd like it to be on screen, as well as what the full size of the canvas is, which would require scrolling to see. The `"width"` and `"height"` configuration options for the canvas widget will request the given amount of space from the geometry manager. The `"scrollregion"` configuration option (e.g. `"0 0 1000 1000"`) tells Tk how large the canvas surface is.

You should be able to modify the sketchpad program to add scrolling, given what you already know. Give it a try.

Once you've done that, scroll the canvas down just a little bit, and then try drawing. You'll see that the line you're drawing appears *above* where the mouse is pointing! Surprised?

What's going on is that the global `"bind"` command doesn't know that the canvas is scrolled (it doesn't know the details of any particular widget). So if you've scrolled the canvas down by 50 pixels, and you click on the top left corner, bind will report that you've clicked at (0,0). But we know that because of the scrolling, that position should really be (0,50).

The `"canvasx"` and `"canvasy"` methods will translate the position onscreen (which bind is reporting) into the actual point on the canvas, taking into account scrolling. If you're adding these directly to the event bindings (as opposed to procedures called from the event bindings), be careful about quoting and substitutions, to make sure that the conversions are done when the event fires.

Here then is our complete example. We probably don't want the palette to be scrolled away when the canvas is scrolled, but we'll leave that for another day.

```
package require Tk

grid [tk::canvas .canvas -scrollregion "0 0 1000 1000" -yscrollcommand ".v set" -xscrollcommand ".h set"] -sticky nwes -column 0 -row 0
grid columnconfigure . 0 -weight 1
grid rowconfigure . 0 -weight 1

grid [tk::scrollbar .h -orient horizontal -command ".canvas xview"] -column 0 -row 1 -sticky we
grid [tk::scrollbar .v -orient vertical -command ".canvas yview"] -column 1 -row 0 -sticky ns
grid [ttk::sizegrip .sz] -column 1 -row 1 -sticky se

bind .canvas <1> {set lastx [.canvas canvasx %x]; set lasty [.canvas canvasy %y]}
bind .canvas <B1-Motion> {addLine [.canvas canvasx %x] [.canvas canvasy %y]}
bind .canvas <B1-ButtonRelease> "doneStroke"


set id [.canvas create rectangle 10 10 30 30 -fill red -tags "palette palettered"]
.canvas bind $id <1> "setColor red"

set id [.canvas create rectangle 10 35 30 55 -fill blue -tags "palette paletteblue"]
.canvas bind $id <1> "setColor blue"

set id [.canvas create rectangle 10 60 30 80 -fill black -tags "palette paletteblack paletteSelected"]
.canvas bind $id <1> "setColor black"

proc setColor {color} {
    set ::color $color
    .canvas dtag all paletteSelected
    .canvas itemconfigure palette -outline white
    .canvas addtag paletteSelected withtag palette$color
    .canvas itemconfigure paletteSelected -outline #999999
}
proc addLine {x y} {
    .canvas create line $::lastx $::lasty $x $y -fill $::color -width 5 -tags currentline
    set ::lastx $x; set ::lasty $y
}
proc doneStroke {} {
    .canvas itemconfigure currentline -width 1
}

setColor black
.canvas itemconfigure palette -width 5
```

```
require 'tk'
require 'tkextlib/tile'

root = TkRoot.new()

@canvas = TkCanvas.new(root) {scrollregion '0 0 1000 1000'}
@h = TkScrollbar.new(root) {orient 'horizontal'}
@v = TkScrollbar.new(root) {orient 'vertical'}
@canvas.xscrollbar(@h)
@canvas.yscrollbar(@v)

@canvas.grid :sticky => 'nwes', :column => 0, :row => 0
@h.grid :sticky => 'we', :column => 0, :row => 1
@v.grid :sticky => 'ns', :column => 1, :row => 0
TkGrid.columnconfigure( root, 0, :weight => 1 )
TkGrid.rowconfigure( root, 0, :weight => 1 )

@canvas.bind( "1", proc{|x,y| @lastx = @canvas.canvasx(x); @lasty = @canvas.canvasy(y)}, "%x %y")
@canvas.bind( "B1-Motion", proc{|x, y| addLine(@canvas.canvasx(x), @canvas.canvasy(y))}, "%x %y")
@canvas.bind( "B1-ButtonRelease", proc{doneStroke})

r = TkcRectangle.new( @canvas, 10, 10, 30, 30, :fill => 'red', :tags => 'palette palettered')
r.bind( "1", proc {setColor('red')})

r = TkcRectangle.new( @canvas, 10, 35, 30, 55, :fill => 'blue', :tags => 'palette paletteblue')
r.bind( "1", proc {setColor('blue')})

r = TkcRectangle.new( @canvas, 10, 60, 30, 80, :fill => 'black', :tags => 'palette paletteblack paletteSelected')
r.bind( "1", proc {setColor('black')})

@canvas.itemconfigure 'palette', :width => 5

def setColor color
   @color = color
   @canvas.dtag 'all', 'paletteSelected'
   @canvas.itemconfigure 'palette', :outline => 'white'
   @canvas.addtag 'paletteSelected', :withtag, "palette#{color}"
   @canvas.itemconfigure 'paletteSelected', :outline => '#999999'
end

setColor 'black'

def addLine (x,y)
  TkcLine.new( @canvas, @lastx, @lasty, x, y, :fill => @color, :width => 5, :tags => 'currentline' )
  @lastx = x; @lasty = y;
end
def doneStroke
  @canvas.itemconfigure 'currentline', :width => 1
end

Tk.mainloop
```

```
use Tkx;
$mw = Tkx::widget->new(".");

$canvas = $mw->new_tk__canvas(-scrollregion => "0 0 1000 1000");
$canvas->g_grid(-column=>0, -row=>0, -sticky=>"nwes");
$mw->g_grid_columnconfigure(0, -weight=>1);
$mw->g_grid_rowconfigure(0, -weight=>1);

$hscroll = $mw->new_tk__scrollbar(-orient => "horizontal", -command => [$canvas, "xview"]);
$vscroll = $mw->new_tk__scrollbar(-orient => "vertical", -command => [$canvas, "yview"]);
$hscroll->g_grid(-column => 0, -row => 1, -sticky => "we");
$vscroll->g_grid(-column => 1, -row => 0, -sticky => "ns");
$mw->new_ttk__sizegrip()->g_grid(-column => 1, -row => 1, -sticky => "se");
$canvas->configure(-yscrollcommand => [$vscroll, "set"], -xscrollcommand => [$hscroll, "set"]);

$canvas->g_bind("<1>", [sub {my ($x,$y) = @_; $lastx=$canvas->canvasx($x); $lasty=$canvas->canvasy($y)}, Tkx::Ev("%x","%y")]);
$canvas->g_bind("<B1-Motion>", [sub {my ($x,$y) = @_; addLine($canvas->canvasx($x),$canvas->canvasy($y))}, Tkx::Ev("%x","%y")]);
$canvas->g_bind("<B1-ButtonRelease>", sub {doneStroke();});

$id = $canvas->create_rectangle(10, 10, 30, 30, -fill => "red", -tags => "palette palettered");
$canvas->bind($id, "<1>", sub {setColor("red")});

$id = $canvas->create_rectangle(10, 35, 30, 55, -fill => "blue", -tags => "palette paletteblue");
$canvas->bind($id, "<1>", sub {setColor("blue")});

$id = $canvas->create_rectangle(10, 60, 30, 80, -fill => "black", -tags => "palette paletteblack paletteSelected");
$canvas->bind($id, "<1>", sub {setColor("black")});

sub setColor {
    my ($newcolor) = @_;
    $color = $newcolor;
    $canvas->dtag_all("paletteSelected");
    $canvas->itemconfigure("palette", -outline => "white");
    $canvas->addtag("paletteSelected", withtag => "palette".$color);
    $canvas->itemconfigure("paletteSelected", -outline => "#999999");
}
setColor "black";
$canvas->itemconfigure("palette", -width => 5);

sub addLine {
    my ($x,$y) = @_;
    $canvas->create_line($lastx,$lasty,$x,$y, -fill => $color, -width => 5, -tags => "currentline");
    $lastx = $x; $lasty = $y;
}

sub doneStroke {
    $canvas->itemconfigure("currentline", -width => 1);
}

Tkx::MainLoop();
```

```
from tkinter import *
from tkinter import ttk
root = Tk()

h = ttk.Scrollbar(root, orient=HORIZONTAL)
v = ttk.Scrollbar(root, orient=VERTICAL)
canvas = Canvas(root, scrollregion=(0, 0, 1000, 1000), yscrollcommand=v.set, xscrollcommand=h.set)
h['command'] = canvas.xview
v['command'] = canvas.yview
ttk.Sizegrip(root).grid(column=1, row=1, sticky=(S,E))

canvas.grid(column=0, row=0, sticky=(N,W,E,S))
h.grid(column=0, row=1, sticky=(W,E))
v.grid(column=1, row=0, sticky=(N,S))
root.grid_columnconfigure(0, weight=1)
root.grid_rowconfigure(0, weight=1)

lastx, lasty = 0, 0

def xy(event):
    global lastx, lasty
    lastx, lasty = canvas.canvasx(event.x), canvas.canvasy(event.y)

def setColor(newcolor):
    global color
    color = newcolor
    canvas.dtag('all', 'paletteSelected')
    canvas.itemconfigure('palette', outline='white')
    canvas.addtag('paletteSelected', 'withtag', 'palette%s' % color)
    canvas.itemconfigure('paletteSelected', outline='#999999')

def addLine(event):
    global lastx, lasty
    x, y = canvas.canvasx(event.x), canvas.canvasy(event.y)
    canvas.create_line((lastx, lasty, x, y), fill=color, width=5, tags='currentline')
    lastx, lasty = x, y

def doneStroke(event):
    canvas.itemconfigure('currentline', width=1)

canvas.bind("<Button-1>", xy)
canvas.bind("<B1-Motion>", addLine)
canvas.bind("<B1-ButtonRelease>", doneStroke)

id = canvas.create_rectangle((10, 10, 30, 30), fill="red", tags=('palette', 'palettered'))
canvas.tag_bind(id, "<Button-1>", lambda x: setColor("red"))
id = canvas.create_rectangle((10, 35, 30, 55), fill="blue", tags=('palette', 'paletteblue'))
canvas.tag_bind(id, "<Button-1>", lambda x: setColor("blue"))
id = canvas.create_rectangle((10, 60, 30, 80), fill="black", tags=('palette', 'paletteblack', 'paletteSelected'))
canvas.tag_bind(id, "<Button-1>", lambda x: setColor("black"))

setColor('black')
canvas.itemconfigure('palette', width=5)
root.mainloop()
```

Other Item Types

Besides lines and rectangles, there are a number of different types of items that canvas widgets support. Remember that each one has its own set of item configuration options, detailed in the reference manual.

Items of type `"line"` can actually be a bit fancier than what we've seen. A line item can actually be a series of line segments, not just one; in our example, we could have chosen to use a single line item for each complete stroke. The line can also be drawn directly point-to-point, or smoothed out into a curved line.

Items of type `"rectangle"` we've seen. Items of type `"oval"` work the same but draw as an oval. Items of type `"arc"` allow you to draw just a piece of an oval. Items of type `"polygon"` allow you to draw a closed polygon with any number of sides.

Pictures can be added to canvas widgets, using items of type `"bitmap"` (for black and white), or type `"image"` (for full color).

You can add text to a canvas using items of type `"text."` You have complete control of the font, size, color and more, as well as the actual text that is displayed.

Perhaps most interestingly, you can embed other widgets (which would include a frame which itself contains other widgets) into a canvas using an item of type `"window"`. When we do this, the canvas in effect acts as a geometry manager for those other widgets. This capability raises all kinds of possibilities for your application.

There is a lot more to canvas widgets than we've described here; be sure to consult the reference manual, as well as the wide range of example programs included with the Tk distribution.

Previous: Fonts, Colors, Images (fonts.html) | Contents (index.html) | Single Page (onepage.html) | Next: Text (text.html)