Notes for January 12 class.

The Python installation comes with a graphics library called Tkinter, and an 'interactive development environment' called IDLE. You don’t really need to use IDLE—you can create Python programs in any text editor and run them from the Terminal utility on Mac or the Command Prompt in Windows. IDLE is just much more convenient.

After you get Python installed and running, you should test the two programs provided. One simply prints some text to the window called 'Python Shell' in IDLE, the other draws a picture.

To complete Assignment 0, you will have to modify both these programs. There’s not a lot to do to modify the text program—you just have to add a couple of lines directing the program to print some additional text. However, to modify the graphics program, you should understand how the graphics co-ordinate system works, and what the four drawing statements in the program are doing.

The 'canvas' on which this program draws is 500 units wide and 500 units high. The coordinates of the top-left corner of the canvas are (0,0), and of the bottom right (300,300). Note that unlike the standard co-ordinate geometry you use in math class, the y-coordinates of a point increase downward. Also note that the coordinates of a point are integers.

The instruction

the_canvas.create_oval(a,b,c,d,....)

inscribes an ellipse inside a rectangle (which is not drawn) whose top left corner has coordinates (a,b) and whose bottom right corner has coordinates (c,d). If the
bounding rectangle is a square, then the ellipse is a circle.

If you don't specify a fill color, only the black outline of the ellipse will be drawn. The posted program draws one large yellow-filled oval for the head, and two tiny black-filled ovals for the eyes.

The instruction

```python
the_canvas.create_arc(125,125,175,175,start=225,extent=90,style=ARC)
```

which creates the smile, is more complicated: The first four arguments again specify the corners of a bounding rectangle of an ellipse; the next two specify what portion of the ellipse to draw. In our program, the arc starts at an angle 225 degrees counterclockwise from the positive x-direction, and extends counterclockwise for 90 degrees.

To complete Assignment 0, you can change the color or the dimensions of the face, change the smile to a frown, the circle to a rectangle, whatever you like---you have carte blanche. The command for drawing a rectangle is

```python
the_canvas.create_rectangle
```

with arguments that have the same meaning as those of the `create_oval`. You can also try

```python
the_canvas.create_line(a,b,c,d)
```

which draws a line segment between the points (a,b) and (c,d).