LAB #6
Turtle and Functions in Python

For this lab, you will get credit for the turtle stuff you didn't finish in lab #5, as well as credit toward your lab #6!!!

You can choose to work individually or in pairs at this time.

(2 pts) Setting Up Python Turtle Graphics
ALL Students MUST DO!!!
To use turtle with Python on our server, you have to create a symbolic link in your home directory and use **~/python3** to run the correct python from wherever you are. Make sure you are in your home directory, **cd ~**, and use **ln –s** to create the symbolic link.

ln –s /usr/local/apps/python/current/bin/python3 python3

Next, export the ENGR display to your machine…

In order to see things displayed on the ENGR server, you have to export your display to your local machine. Below are the instructions for Windows and Linux.

Windows:
http://engineering.oregonstate.edu/computing/personal/134

In order to do this, you have to install an X server: Xming-6-9-0-31-setup.exe

Launch the Xming server, and choose to have multiple (or one) windows. If you choose multiple windows, nothing will happen, but the X server will be running.
Then you have to open Putty, load your engr settings, and now go to the **Connection -> SSH -> X11** and click on the **Enable X11 forwarding** checkbox. Now, connect to engr. (You might want to save this preference!!!).
Try running xeyes or xclock in your terminal/Putty to test that it's working☺

Linux/Mac:
Some Macs already have a builtin X server. First, try to **ssh –Y** to setup the X11 forwarding. Try running xeyes or xclock in your terminal/Putty to test that it's working☺

NOTE: If you are a Mac user and did not have an Xserver already installed to run turtle, then you need to install xquartz http://www.xquartz.org/. After the install, reboot your machine (turn it off and back on!!!), and then launch an xterm from within xquartz (not your normal terminal!!!). **Now, you can use ssh –Y.** Try running xeyes or xclock in your terminal/Putty to test that it's working☺

Using Turtle…

Make sure you DO NOT name your program turtle.py!!!!

Now, we are going to learn to read Python documentation to create a graphical program using the turtle library. http://docs.python.org/2/library/turtle.html

Another resource is:
http://openbookproject.net/thinkcs/python/english3e/hello_little_turtles.html

Practice writing some of the examples in the documentation. You must have these following statements in your program, as a bare minimum.

```
import turtle         #bring in the turtle library

window = turtle.Screen()  #create a variable for the window
my_turtle = turtle.Turtle() #create a variable for your turtle

window.mainloop()     #wait for the user to close the window
```

Now play with changing the background color of the screen, the shape and color of your turtle and pen, and learn how to move the turtle around the screen. To run your program, you need to remember use **~/python3**!!!

~/python3 my_turtle_prog.py

(3 pts) More Python Turtle Graphics

Use *for or while* loops to make a turtle draw these regular polygons (regular means all sides the same lengths, all angles the same):

a. An equilateral triangle
b. A square
c. A hexagon (six sides)
d. An octagon (eight sides)

(5 pts) Modify the Turtle Program

Change your turtle program to contain a main function, as well as functions for each one of these shapes drawn by the turtle. **Now, prompt the user for which shape they want to draw and then draw only that shape.**

Ask the user if they want to continue, and if they do, then clear the screen and ask them which shape they want to draw again. Continue this until the user doesn't want to draw anymore shapes!

1. An equilateral triangle
2. A square
3. A hexagon (six sides)
4. An octagon (eight sides)

Make sure you handle when the user doesn't enter a good input for continuing and/or a specific shape they can choose to draw.

Extended Learning:
First, write a program to draw a start like the one below, when the user clicks the turtle, and make sure you clear the screen and re-draw the star each time the user clicks the turtle: