**CIS 115**

**M3LAB: Turtle Graphics Part 3**

**Introduction**

In this assignment, we’ll use a custom turtle library called TurtleWorld and look at how one can build a class library (in Python, called a “package”) by gradually building up new methods.

The basic principles will work the same as previous turtle examples, but the wording and setup of the way you do some things will differ. This is common – every library is developed by different people, and everyone’s idea of what’s “obvious” as far as interface design is different. Learning how to use this library is part of the goal of the assignment – but the main goal is to get practice in general at learning to use a new library.

**Setup**

This material is adapted from *Think Python* by Allen B. Downey. TurtleWorld is part of a larger library called Swampy.

The book section dealing with TurtleWorld can be found here: <http://greenteapress.com/thinkpython/html/thinkpython005.html#toc40> (opens in new window)

I’ve created a ZIP with the parts of Swampy you’ll need to do all the TurtleWorld examples. Be sure to download and extract that from the assignment page. You’ll want to keep all those files in the same folder.

Load polygon.py in IDLE and run it to confirm the circle() method works as advertised. Next, we’ll add some code to main()

**Exercise 1: Using the Library**

Modify main() so it does three things:

1. Draws a square
2. Draws a triangle
3. Draws a circle inside another circle

**Exercise 2: Adding documentation**

Write an appropriate docstring for polygon, arc, and circle. You may want to look at docstrings from built in python functions. To do so, just run the command help(function) at the IDLE shell prompt

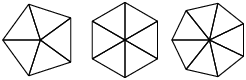
Example:

>>> help (input)

>>> help (print)

**Exercise 3: Turtle Pies**

Add a function draw\_pie() that creates a “pie” shape like this:



Add a call to draw the three “pies” above into main()

**Exercise 3: Draw a Pumpkin**

For all the following exercises, you can use TurtleWorld or the built in python Turtle library. (To be honest, the built-in library is easier.)

Write a new program that does the following:

a function draw\_pumpkin(t) that makes a drawing of a pumpkin with the turtle t.

The easiest way to do this would be to draw a circle, then two triangles for the eyes and a rectangle for the mouth. (Feel free to add more detail, color, etc.)

Then write a main() function that calls draw\_pumpkin()

**Exercise 4: Upload to GitHub**

Upload all files you worked on to your GitHub repository.

**Exercise 5: Bonus: Flowers and Stars**

**Do one of the following:**

Either write a function that draws “stars”, which are like the “pies” except that the shape extends out from the base polygon instead of being inside it.

OR

Write a function that draws “flowers” using the arc functions. They should look something like this:

