CPADS Reading Activity I

The goal of this section of the course is to introduce fundamental programming constructs using a simple scripting language, Python. This approach will allow us to focus on *programming* rather than *syntax*, i.e. formulating a procedural solution. To accomplish this task we may write both *console* programs that process text files, as well as *turtle graphics* programs where we draw graphics in an “Etch-a-Sketch” fashion.

**1. Let’s Draw**

We will now look at our first substantial Python program. For this program we will use a turtle graphics library known as *Swampy* (<http://www.greenteapress.com/thinkpython/swampy/>). In the turtle graphics world, we move a virtual turtle around the screen using only a few simple commands (hence *planning* will be important). Additionally, the turtle can pick *up* or put *down* the pen. The commands are:

fd(*t*, *length*) – moves turtle *t* forward *length* units

bk(*t*, *length*) – moves turtle *t* backward *length* units

lt(*t*, *angle*) – turns turtle *t* *angle* degrees to the left

rt(*t*, *angle*) – turns turtle *t* *angle* degrees to the right

pd(*t*) – starts drawing for turtle *t* (pen down)

pu(*t*) – stops drawing for turtle *t* (pen up)

**Program #1**

**# Create Turtle object**

**turtle = Turtle()**

**# Draw graphics**

**fd(turtle, 100)**

**rt(turtle, 90)**

**fd(turtle, 100)**

**rt(turtle, 90)**

Assuming the turtle begins in the center of the screen, sketch what output you think the above program will produce?

**Program #2**

**# Create Turtle object**

**turtle = Turtle()**

**length = 100**

**angle = 60**

**length2 = length/2**

**angle2 = angle\*2**

**# Draw graphics**

**fd(turtle, length)**

**rt(turtle, angle)**

**fd(turtle, length2)**

**lt(turtle, angle2)**

**length2 = length2 \* 0.5**

**fd(turtle, length2)**

**rt(turtle, angle + 30)**

**fd(turtle, (length2+55)/2)**

Assuming the turtle begins in the center of the screen, sketch what output you think the above program will produce? Beside each line containing a variable assignment, write the value that is assigned to the variable.