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? Note beside each line containing an expression what the value of that expression is.