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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?

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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.