**Outline**

Develop a better understanding of procedural sequencing by solving shape drawing challenges using the turtle environment.

**Objectives**

* Use correct terminology to describe programming concepts;
* Describe the types of data that computers can process and store (e.g., numbers, text);
* Explain the difference between constants and variables used in programming;
* Use variables, expressions, and assignment statements to store and manipulate numbers and text in a program

**Materials**

* Python3 Development Environment at: https://repl.it/
* PythonWorksheetII form the GitHub Repository
* Web links identified in the questions below

**Level 0: Establishing the Python Turtle Environment**

1. Create an new Repl by selecting the “Python with Turtle” language / environment.
2. Begin all of your turtle programs with the following code to create a “pen”:

import turtle

myPen = turtle.Turtle()

1. Create a program to draw a red circle. Provide a listing of your program code below:

import turtle

myPen = turtle.Turtle()

myPen.circle(60)

myPen.color("red")

**Level 1: Drawing Basic Shapes**

1. Open the document PythonWorksheetII from the class GItHub repository.
2. Create a program to draw any three of the shapes described in “Part III” of the PythonWorksheetII document. Provide a listing of your program code below:

Square:

import turtle

# to draw a square, or eventually a turtle, you need to do the things below

def draw\_square():

""" draw square for turtles """

# to draw a square you want to : move forward, turn right,

# move forward, turn right,move forward turn right

brad = turtle.Turtle()

brad.forward(100) # forward takes a number which is the distance to move

brad.right(90) # turn right

brad.forward(100)

brad.right(90)

brad.forward(100)

brad.right(90)

brad.forward(100)

brad.right(90)

draw\_square()

**Level 2: Turtle Challenge 3&4 – Filled Shapes**

1. Review the sample code for creating filled shapes at:   
   <http://www.pythoncode.co.uk/turtle-challenge-3>.
2. Complete the challenge described at: <http://www.pythoncode.co.uk/turtle-challenge-4>  
   Provide a listing of your program code below:

**Level 3: Turtle Challenge 5&6 – Spirals**

1. Review the sample code for creating filled shapes at:   
   <http://www.pythoncode.co.uk/turtle-challenge-5>
2. Complete the challenge described at: <http://www.pythoncode.co.uk/turtle-challenge-6>

Provide a listing of your program code below:

**Level 4: Four Quadrant Cross Challenge**

1. Complete the challenge described at: <http://www.101computing.net/python-turtle-challenge/>

Provide a listing of your program code below: