Introduction to Loops: Python

Loops allow a quick repetition of code.

In any loop, there are three parts:

1) **Initialization** - this is done BEFORE the loop starts and consists of setting up things that need to be done once, and only once, before the loop starts.

2) **Body -** the instructions that are repeated are referred to as the body of the loop – these instructions are indented to show that they are the part of the loop (good programming form)

3) **Exit -** there must be some method by which the programming language knows when to exit the loop – failure to provide this will result in an infinite loop. A test to exit can be done a) prior to execution of the body b) during the execution of the body c) after the execution of the body

Python has two forms of loops: **while** and **for**

The For Loop

```
for count in range(1, 11):      # initialization and exit at the same time
        print(count)            # the body
```

In the above program, count will start at 1 and the loop will continue until the count is at 11. The numbers 1 to 10 will be displayed. The 11 in range is the exit.

Note that the body requires indentation. Anything indented is part of the body.

The range command with a for loop can work as follows:

Example #1

```
for count in range(10):
        print (count)
```

- default start value is 0, so the above for statement would count from 0 to 9 and exit on 10.

Example #2

```
for count in range(1, 10, 3):
        print (count)
```

- count starts at 1, exits at 10 (or more), but counts up by 3

For Loop Questions

Use a for loop for each of the following questions.

1) Write a program that displays on the screen the numbers from 1 to 100.

2) Write a program that displays all the even numbers from 20 to 40.

3) Write a program that displays all the odd numbers from 31 to 21.

4) Write a program that asks the user to input two numbers. Your program should count from the first number to the second number. Note that the first number is **not** always less than the second number.

5) Write a program that moves a circle across a screen, horizontally, in pygame.

Challenge:
Write a program that bounces the circle off the sides so we have continuous movement back and forth.