COSC 101: Fall 2017
Lecture 04: Repetition (Loops & Turtles)

Turtle Questions

1. What is a turtle in Python?

2. What is a module in Python? And how do we load one?

3. How do we invoke a turtle object’s methods?

4. What are object attributes? Provide three examples.
   1.
   2.
   3.

5. What code should you include at the end of every turtle program?

6. What would happen if you include multiple turtle objects in the same program?
Turtle Exercises

What is drawn by the following Turtle programs? If an error occurs, which type of error?

1.

```python
import turtle
wn = turtle.Screen()

tutu = turtle
tutu.color("blue")
tutu.pensize(5)

tutu.forward(50)
tutu.right(90)
tutu.forward(50)
tutu.right(90)
tutu.forward(50)
tutu.right(90)
tutu.forward(50)

wn.exitonclick()
```

2.

```python
import turtle
wn = turtle.Screen()
wn.bgcolor("black")

bob = turtle.Turtle()
bob.color("white")
bob.pensize(50)

bob.circle(50)

wn.exitonclick()
```
3.

```python
import turtle
box = turtle.Screen()
my_turtle = turtle.Turtle()
my_turtle.pensize(10)
my_turtle.forward(150)
my_turtle.left(45)
my_turtle.forward(150)
my_turtle.left(45)
my_turtle.forward(150)
my_turtle.left(45)
my_turtle.forward(150)
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my_turtle.forward(150)
my_turtle.left(45)
my_turtle.forward(150)
my_turtle.left(45)
my_turtle.forward(150)
my_turtle.left(45)
my_turtle.forward(150)
my_turtle.left(45)
box.exitonclick()
```

4.

```python
import turtle
screen = turtle.Screen()
a_turtle = turtle.Turtle()
a_turtle.left(90)
a_turtle.forward(100)
a_turtle.left(45)
a_turtle.forward(100)
a_turtle.right(90)
a_turtle.forward(100)
screen.exitonclick()
```
for Loop Questions

1. What is a **for** loop?

2. How is the **flow of execution** different with loops than the programs we have written so far?

3. Why would we want to repeat the same code over and over again? Provide three examples.
   1. 
   2. 
   3. 

4. The following is a very simple **for** loop:

   ```python
   for number in [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]:
       print(number)
   ```

   1. What is the **loop variable** in this loop?
   2. What type of object is `[0, 1, 2, 3, 4, 5, 6, 7, 8, 9]`?
   3. What is the **terminating condition** for this loop?
   4. What do we call the code `print(number)` in this loop?
   5. What will the value of the loop variable be during the **third iteration** of this loop?
   6. How many times will this loop **execute**?
5. What is the purpose of the integers in the list in the following program:

```python
import turtle
wn = turtle.Screen()
alice = turtle.Turtle()
for number in [1, 5, 15, 30, 50, 75, 105, 145, 195, 250, 310, 375, 445, 520, 600 ]:
    alice.forward(15)
    alice.left(24)
wn.exitonclick()
```

6. Rewrite the code from Turtle Exercise #3 above using a for loop for the repeated code.

7. What function can you use to generate a list with specific integers?

8. Write statements to create the following lists:

   1. `[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20]`
   2. `[6, 9, 12, 15, 18, 21, 24, 27, 30]`
   3. `[100, 90, 80, 70, 60, 50, 40, 30, 20, 10, 0]`
for Loop Exercises

What is the output of the following programs? If an error occurs, which type of error?

1.

```python
import turtle
wn = turtle.Screen()
carlos = turtle.Turtle()

for num in range(15):
carlos.forward(15)
carlos.left(90)
carlos.forward(15)
carlos.right(90)

wn.exitonclick()
```

2.

```python
month = input("What month is it? ")
day_num = int(input("What is today's date? \n"+
"(for example, if today is the 4th of July, enter '4') " ))
print("Today is the", day_num, "of", month+".")
day_num = day_num + 1
print("Tomorrow will be the", day_num, "of", month+".")
for day in range(5):
day_num = day_num + 1
print("The next day will be the", day_num, "of", month+".")
```

3.

```python
for range(1000, 0, -67):
    print("the number is"+str(num))
```
4.

```python
import turtle
wn = turtle.Screen()
lola = turtle.Turtle()
for num in range(15):
    lola.backward(75)
lola.left(75)
wn.exitonclick()
```

5.

```python
fruit = input("What is your favorite fruit? ")
num = int(input("How many " + fruit + "s would you like today? "))
mins = int(input("How many minutes do you have for lunch? "))
print("\n")
for min_num in range(1, mins, 3):
    print("It is minute " + str(min_num) + " and you are eating " + fruit + " #" + str(num) + ".")
    num = num - 1
print("\n")
print("Time is up, and you have " + str(num) + " " + fruit + "s left over."")```