Lab 3.4 Lists and Tuples

Introduction.

Lists and tuples in python are powerful tools for data manipulation

Types

1. Write a program, called testLists.py, that creates a list and prints it out item by item, and then prints it in reverse (new line between items)

```
23
hi
True
True
hi
23
```

```
# Messing with lists
# Author: andrew Beatty

# demonstrating that a list can have hetrogenious types
aList = [23,'hi', True]

# normal
for item in aList:
    print(item)

# prints out the list in reverse
print ('\n'.join(map(str,aList[::-1])))
```

```
# a list of string
# aStringList=['asdf', 'hi', 'asdf']
# print('\n'.join(aStringList))
#
# but if the list has non string values in it
# then we will need to cast each item to a string

#print ('\n'.join(map(str,aList)))
```

This will print the list normally

2. Create a program that puts 10 random numbers into a queue(list), the program should then output all the values in the queue, then take the numbers from the queue one at a time, print it and the current numbers still in the queue. (the command pop(0) takes the first element out of a list)

```
queue is [17, 73, 31, 89, 42, 19, 83, 86, 49, 62]
current Number is 17 and the queue is [73, 31, 89, 42, 19, 83, 86, 49, 62]
current Number is 73 and the queue is [31, 89, 42, 19, 83, 86, 49, 62]
current Number is 31 and the queue is [89, 42, 19, 83, 86, 49, 62]
current Number is 89 and the queue is [42, 19, 83, 86, 49, 62]
current Number is 42 and the queue is [19, 83, 86, 49, 62]
current Number is 19 and the queue is [83, 86, 49, 62]
current Number is 83 and the queue is [86, 49, 62]
current Number is 86 and the queue is [49, 62]
current Number is 49 and the queue is [62]
current Number is 62 and the queue is []
the queue is now empty
```

Answer

```
import random
queue = []
numberOfNumbers=10
rangeTo=100

for n in range(0,numberOfNumbers):
    queue.append(random.randint(0,rangeTo))

print ("queue is {}".format(queue))

while len(queue) != 0:

    currentNumber = queue.pop(0)
    print ("current Number is {} and the queue is {} ".format(
currentNumber, queue))

print ("the queue is now empty")
```

To demonstrate unpacking

3. Create a program called lines.py, in it: Create an array that has tuples of x,y coordinates. Print out the distance each of those points are from the origin. The Distance for a point to origin is dist. = sqrt(X^2 + Y^2)

```
point(1,2) is 2.24 , from the origin
point(3,3) is 4.24 , from the origin
point(4,3) is 5.00 , from the origin
```

```
# program takes a list of points
# and prints out the distance to the origin for each
# Author: Andrew Beatty
import math

points = [(1,2),(3,3),(4,3)]

for x, y in points:
    dist = math.sqrt(x**2 + y**2)
    print ('point({},{}) is {:.2f} , from the origin'.format(x,y
,dist))
```