Lab 4.2 loops

Introduction.

In this lab we look at while loops and for loops

While

1. Write a program (evens.py) that uses a while loop to print all the even numbers from 2 to 100.

```
# Prints out all the even numbers from 2 to 100
# Author: Andrew Beatty

numberTo = 100
evenNum = 2

while evenNum <= numberTo:
    print (evenNum)
    evenNum += 2
```

2. Write a program (guess1.py) that prompts the user to guess a number, the program should keep prompting the user to guess the number until the user gets the right on

```
Please guess the number:2
Wrong
Please guess again:5
Wrong
Please guess again:30
Well done! Yes the number was  30
```

```
numberToGuess = 30

guess = int(input("Please guess the number:"))
while guess != numberToGuess:
    print ("Wrong")
    guess = int(input("Please guess again:"))

print ("Well done! Yes the number was ", numberToGuess)
```

3. How would you modify the program in 3 (guess2.py) above, so that the program tells the user if there guess is too high or too low, each time they guess. HINT: put an if statement inside the while loop

```
Please guess the number:22
too low
Please guess again:55
too high
Please guess again:30
Well done! Yes the number was  30
```

```
numberToGuess = 30

guess = int(input("Please guess the number:"))
while guess != numberToGuess:
    if guess < numberToGuess:
        print("too low")
    else: # I know it cant be equal or too low, so it must
be too high
        print("too high")
    guess = int(input("Please guess again:"))

print("Well done! Yes the number was ", numberToGuess)
```

4. Extra: get the program to generate a random number between 0 and 100 to guess (I am not giving the answer to this)

For Loops

5. Write a program (average.py) that keeps reading numbers until the user enters a 0. (the program should append each of them into a list)
   The program should then print out each of the numbers entered and the average of them. (Use a list)

```
enter number (0 to quit): 33
enter another (0 to quit): 34
enter another (0 to quit): 0
33
34
The average is 33.5
```

Answer

```
# This program reads in numbers until
# the user enters 0
# it will them print back out again
# and their average

numbers = []

# first number then we check if it is 0 in the while loop
number = int(input("enter number (0 to quit): "))

while number != 0:
    numbers.append(number)

    # read the next number and check if 0
    number = int(input("enter another (0 to quit): "))

for value in numbers:
    print (value)

# I want average to be a float
average = float(sum(numbers)) / len(numbers)
print ("The average is {}".format(average))
```

6. Write a program (topthree.py) generates 10 random numbers (0-100) , prints them out then prints out the top three. (there are concepts I have not covered yet in this question)

10 random numbers	[34, 70, 48, 17, 77, 55, 68, 93, 36, 67]
The top 3 are	[93, 77, 70]

Answer

```
# This program generates 10 random numbers.
# prints them out, then
# prints out the top 3

# I will use a list to store and
# manipulate the numbers

import random
# I programming the general case
howMany    = 10
topHowMany = 3
rangeFrom  = 0
rangeto    = 100

numbers = []

for i in range(0,10):
    numbers.append(random.randint(rangeFrom,rangeto))
print ("{} random numbers\t {}".format(howMany,numbers))

# I am keeping the original list maybe I don't need to
# I got the idea to sort and split the list from stackover flow
# https://stackoverflow.com/q/32296887
topOnes = numbers.copy()
topOnes.sort(reverse = True)
print ("The top {} are \t\t {}
".format(topHowMany,topOnes[0:topHowMany]))
```

7. Write a program (lab04.04-student.py) that reads in students until the user enters blank in they students first name. The program should then print out all the students entered in a neat way.

```
enter firstname (blank to quit): joe
enter lastname: burke
enter firstname of next (blank to quit): mary
enter lastname: walsh
enter firstname of next (blank to quit):
here are the students you entered:
joe burke
mary walsh
```

Answer

```
# A Program that reads in students
# until the user enters a blank
# and then prints them all out again

students = []

firstname = input("enter firstname (blank to quit): ").strip()
while firstname != "":
    student = {}
    student["firstname"] = firstname
    lastname = input("enter lastname: ").strip()
    student["lastname"] = lastname
    students.append(student)
    # next student
    firstname = input("enter firstname of next (blank to
quit): ").strip()

print ("here are the students you entered:")
for currentStudent in students:
    print ("{} {}".format(currentStudent["firstname"],
currentStudent["lastname"]))
```