Intro to CS / Python — Lab Assignment #8

See due dates in the course management system for this class (10 points)

Description

This lab exercise is designed to gain additional practice with working with functions (modules) in Python.

Part I: Using some Math Functions (Ungraded portion of lab)

Using the following code segment, answer the following questions.

```
import math
x = 3.1;
y = 1.0 - x;
```

What is math.fabs(y)? _____

What is math.floor(x)? _____ What is math.ceil(x)? _____

What is math.floor(y)? _____ What is math.ceil(y)? _____

What does the function math.exp do?

What does the function math.pow do?

What happens if you try to execute z = math.sqrt(-4)?

What are some other math functions you would expect to be available in Python? Explore help(math) in your python console to see if you can find them. (Don't forget you need to *import math* in the console for help to find the library).

Part IIa: Writing your own functions

We will complete this program that requires the definition of a function named **computeGCRatio** to compute the GC content of a DNA molecule.

Given a **single string** as input where each character is one of **G, C, T or A,** the GC ratio is computed as the count of G+C values over the total count of A,T,C,G values. It is often written in texts as the following, where each letter represents the count of instances in the string:

$$\frac{G + C}{A + T + G + C}$$

Plan:

1. What would be the input value (parameter) needed for your function to use?
2. What is the name of your function?
3. What does the function return?
4. How do you compute then return the ratio value?

```
# Lab 8

# PUT YOUR DEFINITION OF THE FUNCTION computeGCRatio HERE!
#  Hint: your function will need 4 counter variables ( one for each
# letter.  And you will need to write a loop that steps through each
# character in the string

def computeGCRatio(    # what is/are the parameters needed here?

    # complete the logic here



# Main program to test the calculation
dnaFragment = input("Enter the DNA sequence: ")

gcratio =  computeGCRatio(dnaFragment)    # to test your function

print("For the sequence:",dnaFragment)
print("The GC-Ratio is {:6.3f}".format(gcratio)
```

Some example data you can use to check if your computation is correct:

```
AAAGGTAATACATTAGATC      (0.263)
TTTGAACATATAGGCCA        (0.353)
ACACACACACTAG            (0.462)
```

Finishing Up:

Upload your .py program file containing your solution to Part II. (Just the program is graded)