CSC 110: Introduction to Computer Programming, Project 3   25 pts

Project Goals:
- Provide practice with opening files and reading data.
- Practice manipulating strings.
- Use of functions to create modular programs.

A. DNA SubStings: Write a program that opens the file, motifFinding.txt and stores its contents into two strings, *s* and *t*. Next write code that will find all instances of the string *t* within the string *s*. At the end, your program should output the starting position of each occurrence of the sub-string *t* within *s*.

Output example: 7 19 28 59

This output would mean that t occurs four times in s, with starting positions of 7, 19, 28 and 59. Of course you could format your output to explain this as well, but it is not necessary.

[Submission of #3A as a .py file to Canvas course page, Project_3A][10 pts]

B. Re-do Happy Birthday Bouncing Ball program from Project_2C utilizing functions to remove repetitive code and to modularize your program.

[Submission of #3B as a .py file to Canvas course page, Project_3B][5 pts]

C. Gas_Guzzlers

This problem uses fuel economy data in miles per gallon (mpg) taken from the following US Department of Energy website: http://www.fueleconomy.gov/feg/download.shtml. The data files you have been provided with have been adapted from the CSV file on the website, and contain vehicle testing data for all models tested between 1984 and 2014 (last updated Sept 30, 2014).

The first data file, **carModelData_city**, contains all the test results for city mpg and the second, **carModelData_hwy**, contains all the test results for highway mpg. Each file contains the same number of values, as the values in the same position in each list refer to the same vehicle. You will likely want to use the float() function to convert the string values to floats.

   a. Write a function **readData(filename)** that will read in all the data from a text file that consists of float data formatted such that each value is on a new line.
   b. Write a function **averageMPG(dataList)** that calculates the average mpg for all vehicles tested given a list of the mpg values.
   c. Write a function **countGasGuzzlers(list1, list2)** that calculates the number of gas guzzlers among the vehicle models tested – for this program, define a "gas guzzler" as a car that gets EITHER less than 22 mpg city OR less than 27 mpg highway.
   d. Write a function **output(<parameters>)** to print the following output (you will determine what parameters this function needs to have passed in to it):
      i. The total number of vehicles tested
      ii. The average for the city mpg for all the vehicles tested
      iii. The average for the highway mpg for all the vehicles tested
      iv. The number of gas guzzlers among the vehicle models tested
   e. Write a program **fuelEconomy.py** that contains a main() function that calls all the functions you made in parts a-d.

[Submission of #3C as a .py file to Canvas course page, Project_3C][10 pts]