CMPE-50 Object-Oriented Concepts and Methodologies, Tarng, Spring 2021
Homework #2

Due: Thursday 3/4/2021 midnight

The submission of the homework should be the cpp files with the output in the code comment. Each problem needs to have a complete program, meaning, it needs to contain the main() function and some test code and data. Therefore, you need to submit six cpp files in total. Do not zip the files. Name the files in the following way: CMPE50-HW-3-1.cpp, CMPE50-HW-3-2.cpp, etc. If the solution includes some input files, also submit the input files.

Chapters: 6, 8.1, 8.2

Total 60 points

1. [10 pts] (Chapter 6: Input file stream)
   Write a program that takes its input from a file of numbers of type `double` and outputs the average of the numbers in the file to the screen. The file contains nothing but numbers of type double separated by blanks and/or line breaks.

2. [10 pts] (Chapter 6: Input and output file streams)
   Write a program that merges the numbers in two files and writes all the numbers into a third file. Your program takes input from two different files and writes its output to a third file. Each input file contains a list of numbers of type `int` in sorted order from the smallest to the largest. After the program is run, the output file will contain all the numbers in the two input files in one longer list in sorted order from the smallest to the largest. Your program should define a function that is called with the two input-file streams and the output-file stream as three arguments. Create two input files containing at least 5 numbers (in sorted order) each for testing.

3. [10 pts] (Chapter 6: File I/O and formatting)
   Write a C++ program to organize student grades. The course records a in a file that will serve as the input file. The input is in this format: each line contains a student's last name, then follows by 5 quiz scores (in double), all in one line. Your program will take its input from this file and send its output to a second file. The data in the output file will be the same as the data in the input file except it is organized in the following format: student name with 10 spaces, left justified, quiz score shows two decimal places and occupies 7 spaces and is right justified.
   Sample input file:

```
   Jones    80.5      77    95.7     88.6    100
      Smith     80     99     100     87.8               93.76
 Holmes 53.65       84.54    76.67    97.75    89.9
```

Sample output file:

```
 1. Jones      80.50  77.00  95.70  88.60 100.00
 2. Smith      80.00  99.00  76.75  87.00  93.76
 3. Holmes     53.65  84.54  76.67  97.75  89.90
```

4. [10 pts] (Chapter 6: File I/O, format, character I/O)
   This program numbers the lines found in a text file. Write a C++ program that reads text from a file and outputs each line to the screen preceded by a line number. Print the line number at the start of the line and right-adjusted in a field of three spaces. Follow the line number with a colon, then one space, then the text of the line. You should get a character at a time so you will not modify the content. You may assume that the lines are short enough to fit within a line on the screen.

   Sample input file:

```
With three or four    loggerheads amongst three or four
score   hogsheads.     I have sounded     the very
  base-string of humility.  Sirrah,   I am   sworn brother
to a leash of drawers;    and can call them all by
their christen names, as Tom,    Dick, and Francis.
  They take it already upon       their salvation, that
though I be but the prince of    Wales, yet I am king
of   courtesy; and tell me flatly I am no proud   Jack,
   like Falstaff, but a    Corinthian, a lad of mettle, a
good boy, by the Lord, so they call me,   and when I
am king of    England, I shall    command all the good
lads in Eastcheap.
```

   Sample screen output:

```
  1: With three or four    loggerheads amongst three or four
  2: score   hogsheads.     I have sounded     the very
  3:  base-string of humility.  Sirrah,   I am   sworn brother
  4: to a leash of drawers;    and can call them all by
  5: their christen names, as Tom,    Dick, and Francis.
  6:  They take it already upon       their salvation, that
  7: though I be but the prince of    Wales, yet I am king
  8: of   courtesy; and tell me flatly I am no proud   Jack,
  9:   like Falstaff, but a    Corinthian, a lad of mettle, a
 10: good boy, by the Lord, so they call me,   and when I
 11: am king of    England, I shall    command all the good
 12: lads in Eastcheap.
```

5. [10 pts] (Chapter 8.1 C-string)
   Write a program that will read in a line of text and output the number of words and the number of letters in the line. Define a word to be any string of letters that is delimited at each end by either whitespace, a period, a comma, or the beginning or end of the line. You can assume that the input consists entirely of letters, whitespace, commas, and periods. For example, the input line "`Now is the Winter of our discontent.`"

should produce output as 7 words and 29 letters.

6. [10 pts] (Chapter 8.2 String Class)
   Use the string class to solve the problem. Write a program that inputs two string variables, first and last, each of which the user should enter with his or her name. First, convert both string to all lowercase. Your program should then create a new string that contains the full name in pig latin with the first letter capitalized for the first and last name. The rules to convert a word into pig latin are as follows.

   If the first letter is a consonant, move it to the end and add "ay" to the end.

   If the first letter is a vowel, add "way" to the end.

   For example, if the user inputs "Erin" for the first name and "Jones" for the last name, then the program should create a new string with the text "Erinway Onesjay" and print it.