Chapter 13 Homework – Data Files

Reading Assignment:

Read Chapter 13in Introduction to Programming with C++, 3rd Edition by Liang

Problem Assignment:

Submit each of the following by the assigned due date.

1. (20 pts) Work Programming Exercise 13.3 (*Process Scores in a Text File*) in the textbook on page 518.
    *   Instead of displaying the results on the screen, send the results to an output named using your last name.
    *   Example:

    Contents of Exercise13_3.txt:

    ```
    100 95 88 97 71 67 80 81 82
    ```

    Contents of YourLastName.txt:

    ```
    Your first and last name
    Total = 761
    Average = 84.6
    ```
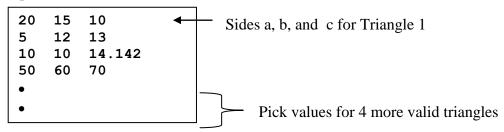
    *   Run the program for the example above and for another example with 15 scores.
    *   Turn in a printout of the program as well as printouts of the two input data files and the two output data files.

2. (21 points) Create a data file (using Notepad, perhaps) containing the values shown below (plus add 4 more lines of your choice) and then write a C++ program as follows:
    *   Read the data file (you can assume that it has exactly 8 lines with 3 numbers per line)
    *   Calculate the three angles using the law of cosines (assume that the sides are valid)
    *   Write the results to an output data file. The results should include headings and 2 digits after the decimal point for all values. An example is shown below.
    *   Print the program and the two data files.

    Input data file:

    ```
    20   15   10          Sides a, b, and  c for Triangle 1
    5    12   13
    10   10   14.142
    50   60   70
    •
    •                     Pick values for 4 more valid triangles
    ```

    Output data file:

Side a	Side b	Side c	Angle A(deg)	Angle B(deg)	Angle C(deg)
20.00	15.00	10.00	104.48	46.57	28.96
•					
•					

3. (20 points) Download the file BigData.dat from the course Blackboard site. Write a C++ program to read the file (assume that you do not know the number of values in the file) and determine (and display) each of the following:
   - The number of values in the file
   - The largest value in the file
   - The smallest value in the file
   - The number of negative numbers in the file
   - The number of values in the file that are between 100 and 200

4. (21 points) Create a data file containing around (but not exactly) 100 integers. The numbers should be on multiple lines in the file, but do not include the same number of integers on each line of the file. Write a C++ program to read the integers into an array with a max size of 200 (i.e., search for eof marker). The program should then determine and display (on the computer screen) the average value of the numbers (a real value), the number of integers greater than the average, and the number of integers less than the average. Print the program, the data file, and the output.

(Problem 5 is on the following two pages)

5. (18 pts) Determine **by hand** the output of each program listed on the following pages using the data files shown below.

Contents of E:dat1.in:

| 2.0 3 |
| 4.0 5 |
| 6.0 7 |

Contents of E:dat2.in:

| 9-15-20 |

Contents of E:dat3.in:

| **acrtjprltoiu** |
| **owhfdrtnfres** |
| **dnzzpogquse** |

C++ Program	Output
```cpp// Problem 5A#include <iostream>#include <fstream>using namespace std;int main (void){ double x,y,z; ifstream infile("E:dat1.in"); infile >> x >> y >> z; cout << "x = " << x << endl << "y = " << y << endl << "z = " << z << endl; infile.close(); return 0;}```	x = _____ y = _____ z = _____
```cpp// Problem 5B#include <iostream>#include <fstream>using namespace std;int main (void){ int x,z; double y; ifstream infile("E:dat1.in"); infile >> x >> y >> z; cout << "x = " << x << endl << "y = " << y << endl << "z = " << z << endl; infile.close(); return 0;}```	x = _____ y = _____ z = _____
```cpp// Problem 5C#include <iostream>#include <fstream>using namespace std;int main (void){ int x,y,z; ifstream infile("E:dat2.in"); infile >> x >> y >> z; cout << "x = " << x << endl << "y = " << y << endl << "z = " << z << endl; infile.close(); return 0;}```	x = _____ y = _____ z = _____

C++ Program	Output
``// Problem 5D
#include <iostream>
#include <fstream>
using namespace std;
int main (void)
{
int x,y,z;
char c1, c2;
ifstream infile("E:dat2.in");
infile >> x >> c1>> y >> c2 >> z;
cout << "Result: " << x << "\\" << y << "\\" << z << endl;
infile.close();
return 0;
}```	Result: = _____
``// Problem 5E - Code interpreter
#include <iostream>
#include <fstream>
using namespace std;
int main (void)
{
int x,y,z;
char c1,c2,c3,c4,c5;
ifstream infile("E:dat3.in");
cout << "Result: ";
infile >> c1 >> c2>> c3 >> c4 >> c5;
cout << c5;
infile >> c1 >> c2>> c3 >> c4 >> c5;
cout << c5;
infile >> c1 >> c2>> c3 >> c4 >> c5;
cout << c5;
infile >> c1 >> c2>> c3 >> c4 >> c5;
cout << c5 << " ";
infile >> c1 >> c2>> c3 >> c4 >> c5;
cout << c5;
infile >> c1 >> c2>> c3 >> c4 >> c5;
cout << c5;
infile >> c1 >> c2>> c3 >> c4 >> c5;
cout << c5 << endl;
infile.close();
return 0;
}```	Result: _____
``// Problem 5F
#include <iostream>
#include <fstream>
using namespace std;
int main (void)
{
char x,y,z;
ifstream infile("E:dat1.in");
infile >> x >> y >> z;
cout << "Results:" << endl;
cout << "x = " << x << endl << "y = " << y << endl
<< "z = " << z << endl;
infile.close();
return 0;
}```	x = _____ y = _____ z = _____