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.
   - In addition to finding the average and total, find the number of grades.
   - Example:

   Contents of Exercise13_3.txt:

70 88 91 95
66 82 71 99 84 57
80 100 93 73 82

   Contents of YourLastName.txt:

Your first and last name
Number of grades = 16
Total of all grades = 1231
Average grade = 82.1

   - Run the program for the example above and for another example with 20 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) **Right Triangle Analysis**: Create a data file (using Notepad, perhaps) containing the values shown below (plus add 5 more lines of your choice) and then write a C++ program as follows:
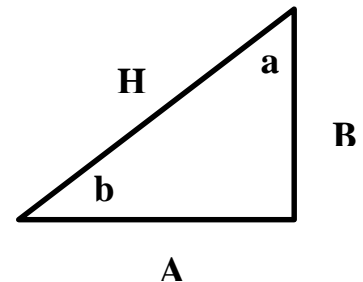   - Read the data file. Assume that it has exactly 10 lines with 2 numbers per line. Side A values are in the left column and side B values are in the right column.
   - Calculate the hypotenuse, H, and the two angles, a and b (in degrees), shown in the diagram below. Assume that the sides are valid.
   - Write the results to an output data file. The results should include headings and 2 digits after the decimal point for all sides and 1 digit after the decimal point for all angles. The values should align with the headings. An example is shown below.
   - Print the program and the two data files.

Input data file:

10	6
15	10
20	14
25	18
30	22
•	
•	

Sides A and B a right triangle

Pick values for 5 more valid triangles

Output data file (heading plus values for 10 triangles):

Side A	Side B	Side H	Angle a(deg)	Angle b(deg)
10.00	6.00	11.66	59.0	31.0
•				
•				

3. (20 points) Download the file HugeFile.dat from the course Blackboard site. This file contains a very large number of integers. The number of values per line varies.
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 even numbers in the file
- The number of values in the file that are greater than 80
- The number of values in the file that are less than or equal to 30

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:

| 9.5 8.5 |
| 7.5 6.5 |
| 5.5 4.5 |

Contents of E:dat2.in:

123-45-6789

Contents of E:dat3.in:

ecrtjnrltoguowsifrt
wnfresednzvepogqr
usejivywrnzxwogrt

C++ Program	Output

`// 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 = _____

`// Problem 5B`
`#include <iostream>`
`#include <fstream>`
`using namespace std;`
`int main ( void )`
`{`
`   double x,z;`
`   int 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 = _____

`// 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: ";
   for (int k = 0; k <=10; k++)
   {  infile >> c1 >> c2>> c3 >> c4 >> c5;
      cout << c1;
   }
   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 = _____<br><br>y = _____<br><br>z = _____ |