Data Structures and Algorithms Lab

CSL 221

Lab Journal

Lab # 1

Student Name
Enrolment No.
Class and Section

Department of Computer Sciences
BAHRIA UNIVERSITY, ISLAMABAD

Lab Title

Objectives:

Tools Used:

Submission Date:

Evaluation:

Signatures of Lab Instructor:

Instructions: Please submit your assignment in pdf format otherwise straight half marks will be deducted.

Note: Your lab manual includes all of the examples in which you need to add extra functionality.

Exercise 1.1

In ***Example* 1.2**, add a function to multiply two complex numbers using Operator overloading.

Exercise 1.2

In ***Example 1.4,*** add a function to compute minimum of two numbers in the above class.

Exercise 1.3

Modify the ***Example 1.6,*** to count number of words and number of sentences along with the characters.

Exercise 1.4

Assume that a file contains the midterm1, midterm2 and final exam scores and names of students of a class. Write a C++ program to read the input file and produce an output file containing the original and average scores for each student. Suppose that the weights of the exams are as follows:

midterm1 –
25% midterm2
–25%
final – 50%.

The average score of a student is calculated using the formula:

$$0.25MT1 + 0.25MT2 + 0.5FIN$$

Exercise 1.5

a. Declare a class named House for a real estate locator service. The following information should be included:
   Owner: (a string of up to 20 characters)
   Address: (a string of up to 20 characters)
   Bedrooms: (an integer)

Price (floating point)

b. Declare available to be an array of 100 objects of class House.
c. Write a function to read values into the members of an object of House.
d. Write a driver program to test the data structures and the functions you have developed.

The driver program should read in house entries into the available array. After the code for entering the data, you should write code to output the data that you have entered to verify that it is correct.

Your program should look like this:

```
Enter Owner:  M. Khan
Enter Address: G-9, Islamabad
Number of Bedrooms? : 4
Price: 4500000
Enter another house? N
```

The output should look like:

Owner	Address	Bedrooms	Price
M. Khan	G-9, Islamabad	4	4500000

Exercise 1.6

Write a student grades "database" program. It will read data of students from a file and will let the user perform various operations on the data. You will have to store the student data in an array of objects.

Input:

The input file will look like:

```
 4    // number of students
 3    // number of grades (per student)
Hassan Khan 99 87 90  // name grade grade ... grade
Sara Nazir 90 98 99
Ali Zaidi  55 43 0
Raza Ahmad 100 100 100
```

Data structure:

You will store all the information in an array of "student" objects. You may use the following class definition:

```
class student {
 private:
```

```
        char name[30];
        int grades[10];
       float average;
public:
.
 .
 . };
```

Output:

Your program should work as follows:

- Ask the user for the filename and open the file.
- Read in the input from the file and store it in the student array.
- Compute and store an average for every student.
- Display the student data in tabular (formatted) form.
- Compute the class average.
- Compute the highest and lowest average grades.
- List all the students whose average grade is less than the class average.

Task # 1:

Procedure/Program:

Result/Output:

Analysis/Conclusion: