CL-1004
Object Oriented Programming
Lab No 6

Objectives:

- Structures within structures
- Class, object and member functions
- Class private data members

Note: Carefully read the following instructions (*Each instruction contains a weightage*)

1. There must be a block of comments at start of every question's code by students; the block should contain brief description about functionality of code.
2. Comment on every function and about its functionality.
3. Mention comments where necessary such as comments with variables, loop, classes etc to increase code understandability.
4. Use understandable name of variables.
5. Proper indentation of code is essential.
6. Write a code in C++ language.
7. Make a Microsoft Word file and paste all of your C++ code with all possible screenshots of every task **output in Microsoft Word and submit word file. Do not submit .cpp file.**
8. First think about statement problems and then write/draw your logic on copy.
9. After copy pencil work, code the problem statement on MS Studio C++ compiler.
10. At the end when you done your tasks, attached C++ created files in MS word file and make your submission on Google Classroom. (Make sure your submission is completed).
11. Please submit your file in this format **20F1234_L1**.
12. Do not submit your assignment after deadline. Late submission is not accepted.
13. Do not copy code from any source otherwise you will be penalized with negative marks.

Problem 1: | (Recursion) | 15 Min

Write a recursive function that receives an integer consisting of any number of digits. Your function should calculate and return the summation and average of the integer digits.

Enter number: 5

Total sum: 15

Note: Use minimum lines of code as possible to get max marks.

Problem 2: | (Recursion) | 15 Min

Write a recursive function to print a Fibonacci series up to N numbers

Enter the number of elements: 10

Fibonacci Series: 0 1 1 2 3 5 8 13 21 34

Note: Use minimum lines of code as possible to get max marks.

Problem 3: (Classes, objects, Private data members, Member functions) | 30 Mins

Write a class Employee with following data members and methods;

Private:

1. ID //A string to hold the ID of employee
2. Name //A string to hold the name of employee
3. Department //A string to hold the department name of employee
4. Bank Account number //A string to hold the organizational bank account
5. Grade //A string to hold the employee grade (1 to 8, 8 being the highest) of employee

Public:

1. **Default Constructor** should initialize all member variables with null value.
2. **Overloaded** Constructor should initialize all (initialize-able) data members of the employee class
3. **inputData** Input from user for all data members
4. **displayData** method that display data
5. **Destructor**

Now dynamically create 3 other objects and initialize them with user input data. Show your results on console.

Explicitly call **destructors** for all **local** objects with proper message.

Problem 4: | (Classes, objects, Constructor, Destructor and Member functions) 30 min

Write a class named Employee that has the following member variables:

- name. A string that holds the employee's name.
- idNumber. An int variable that holds the employee's ID number.
- department. A string that holds the name of the department where the employee works.
- position. A string that holds the employee's job title.

The class should have the following constructors:

• A default constructor that assigns empty strings ("") to the name, department, and position member variables, and 0 to the idNumber member variable.

A constructor that accepts the following values as arguments and assigns them to the appropriate member variables: employee's name, employee's ID number, department, and position.

Write appropriate set and get methods to set and retrieve values in these member variable.

Now use these set methods with three different objects to set the class members with the values given below.

Name	ID Number	Department	Position
Waleed Abbid	47899	Accounting	Vice President
Haidar Ali	39119	IT	Programmer
Nouman khaliq	81774	Manufacturing	Engineer

Create three objects and save above value is this members using set() and get() function. Now input data from user for all three objects.

Display the data for each employee on the console using get()and set()method. First display initialized data in objects and then after input from user display all data of three objects.

At the end when you exit your main() and know that your class object is now finish their work then write Destructor that shows a message "I am destructor ".