



CL-2001
Data Structures
Lab Task # 1

Objectives:

- Revision of Pointers and DMA
- Revision of Arrays
- Revision of Abstract Data Types

Note: Carefully read the following instructions

1. Use proper font family (Calibri or Times New Roman) and font size of title (16 points), heading (14 points), sub heading (12 points) and normal text (10 points).
2. First think about problem statement and then write/draw your logic on paper.
3. **Microsoft Visual Studio** should be used to make C++ programs. Programs made with any other software would not be accepted.
4. For each task, create a new C++ program with the naming convention as follows: **TASK-NO**
5. Mention what is happening in each line of code using comments.
6. Write all codes one by one with proper numbering and also paste screen shot of each problem using **snipping tool**(default screen capture software in windows) on **Microsoft word file**.
7. Please submit your file with this naming convention **ROLLNO_SECTION_GROUPNO_LABNO**.
8. **Do not copy from any source otherwise you will be penalized with ZERO grades.**
9. Submit your lab on **Google Classroom**.

Problem 1: Integer pointers, Initialization and Struct

10

Write a program that asks the user to enter integers as inputs to be stored in the variables 'a' and 'b' respectively. There are also two integer pointers named ptrA and ptrB. Assign the values of 'a' and 'b' to ptrA and ptrB respectively.

Make a struct with name 'person' which has two variables of integer type namely 'Age' and 'Weight'. Initialize the value of the instance for 'Age' using ptrA and for 'weight' using ptrB.

Problem 2: Program to add two distances**15**

Develop a program that has a struct with two attributes 'feet' and 'inch'. Then in the 'main' function declare and initialize two instances of struct named as 'd1' and 'd2'. Initialize d1 and d2. Write a function that adds d1 and d2, and displays the sum.

Problem 3: Loops, Conditions and Structs**15**

You are to develop a C++ program that has two major structs, 'Employee' and 'Address'. Employee object has attributes: employeenumber, name, address, desination with types as int, char*[], Address, and char*[]. Address struct has following attributes: street, city and state with types being char*[] for all. Make 5 instances of Employee and take data from user. Now take an employee id as input from user and show details of that employee.

Problem 4: Passing an array of structs to a function**20**

Develop a C++ code with a struct names 'items' which has attributes 'code', 'description' and 'stock'. In the main function, declare an array of 10 'items'. Develop a function which takes this array of 10 items and taken the input for all 10 items from user. Stores them in the array itself. Later on, in the main, function, write code to show all content of the items array.

Problem 5: List ADT Implementation (via dynamic array)

40

Implement the following operations of List ADT by using array class

- Constructors (default, parameterize, copy) & destructor
- void printList ()
- int searchElement (int X)
- void insertElement (int X)
- void insertElementAt (int X, int pos)
- bool deleteElement (int X)
- bool isFull ()
- bool isEmpty ()
- int length ()
- void reverseList ()
- void emptyList ()
- void copyList (...)
- void sort();
- bool compareList(L1,L2); return true if same, false if not same elements
- **Also write a driver (main) program to test your code (provide menu for all operations).**

Proper text alignment and screenshots will extra marks, best of luck 😊