Class Task (25-03-2025)

Pointer

Task 1:

Write a C++ program that will take input a 3x3 matrix (2D array) elements from user. And will show the elements using pointers. (User will input the array elements)

Task 2:

Write a C++ program that calculates the sum of an array of integers using pointers. The program should take the size of the array elements as input from the user. Use a pointer to iterate through the array elements to calculate and print the sum.

Task 3:

Write a C++ program to demonstrate the concept of a pointer to a pointer (double pointer). Declare an integer variable and use a pointer to store its address. Then, use another pointer (pointer to a pointer) to store first pointer's address. Print the following:

- Value of the variable
- Address of the variable
- Value stored in the first pointer (address of the variable)
- Value stored in the double pointer (address of the first pointer)

String

Task 1:

Take a string as input from the user and display the lowercase and uppercase letters with their count. Take the input so that it contains uppercase and lowercase letters.

Sample Input: BanGlaDeSh

Sample Output:
Lowercase letters: a n l a e h
Total lowercase letters: 6
Uppercase letters: B G D S
Total upperrcase letters: 4

Task 2:

Write a C++ program that takes a string (take a line) as input from user and counts the number of vowels and consonants present in it. The program should ignore any non-alphabetic characters, meaning they should not be counted as either vowels or consonants. Finally show the number of vowels and consonants present in the string.

Structure

Task 1:

Write a C++ program to create a structure named Employee that stores information about employees. The structure should contain the following attributes: Employee ID (integer) and Employee Name (string) using the private access modifier, while Age (integer) and Designation (string) should use the public access modifier. You need to add functions to access and give value for the private attributes. For the public attributes you can give value to them in the main() function. Finally, display the Employee ID, Employee Name, Age, and Designation using the appropriate functions.

Task 2:

Write a C++ program that defines a structure Student to store the following information for each student: Roll Number (integer) with the private access modifier. Name (string) with the public access modifier. Age (integer) with the public access modifier. Marks (float) with the private access modifier, and Grade (char) with the public access modifier. The program should include functions to set and get the private attributes (Roll Number and Marks) and to calculate the Grade based on the Marks (e.g., follow AIUB grading system).

You should do the following: In the main() function:

- Accept the details of multiple students (Roll Number, Name, Age).
- For each student, display their Roll Number, Name, Age, Marks, and Grade.

Searching

Task 1:

You are working on a digital library system where books are stored in alphabetical order. Take the input form user of a **sorted array of book titles**. You need to implement a **binary search** function that helps users quickly find a specific book by the title. If the book is found, return its position in the list; otherwise, inform the user that the book is not available.

Sample Input:
Book Titles: {"C++ Programming", "Data Structures", "Database Management", "Machine Learning", "Operating Systems"}
Search for: "Machine Learning"

Sample Output:
"Machine Learning" found at index 3 // if found
"Learn C++" is not found // if not found