Lab-01 Tasks

Task-01

You are given a one-dimensional array of integers, and your task is to process it step by step using different functions.

1. **Write a function** to remove all duplicate values while keeping the first occurrence of each number.
2. **Write a function** to count the frequency of every unique element in the original array.
3. **Write a function** to rearrange the elements in descending order of their frequency. If two elements have the same frequency, then the smaller element should appear first.
4. **Write a function** to display the rearranged array along with the frequency of each element.

   For example, if the input array is:

   [4, 5, 6, 5, 4, 3, 4, 6, 7, 3, 5]

   The output should be:

   Rearranged Array: [4, 5, 3, 6, 7]

   Frequencies:

   4 -> 3

   5 -> 3

   3 -> 2

   6 -> 2

   7 -> 1

Task-02

You are given a one-dimensional character array containing a sentence (for example:

['H','e','l','l','o',' ','W','o','r','l','d']

Without using string library functions, perform the following operations

1. **Write a function** to reverse the entire sentence stored in the array.

2. **Write a function** to reverse each individual word in the sentence while keeping their order the same.
3. **Write a function** to convert all vowels to uppercase and all consonants to lowercase.
4. **Write a function** to remove all spaces from the array.
5. **Write a function** to display the final compressed array.

Example

If the input is:

Hello World

Output should be

OllehDlrow

Task-03

In a school, there is a system to keep track of a single student's roll number. The teacher directly knows the roll number, which is similar to using a single pointer. The class in-charge does not know the roll number directly but gets it from the teacher, which is similar to using a double pointer. Finally, the principal gets the roll number from the class in-charge, which is similar to using a triple pointer.

Write a C++ program that creates an integer variable rollNo and stores a value in it. Then, use a single pointer to represent the teacher, a double pointer to represent the class in-charge, and a triple pointer to represent the principal. Finally, print the roll number in four ways: directly through the variable, through the single pointer (teacher), through the double pointer (class in-charge), and through the triple pointer (principal).

Task-04

You are given a 1D integer array of size n.

1. Write a function findSecondLargest(int *arr, int n) that finds the **second largest element** in the array using **only pointers**.
2. Write a function countEvenOdd(int *arr, int n, int *evenCount, int *oddCount) that counts how many numbers are even and odd using pointers.

3. Write a function rotateArray(int *arr, int n, int k) that rotates the array k positions to the left using pointers.
4. Write a function sumOfPrimes(int *arr, int n) that returns the **sum of all prime numbers** in the array using pointer arithmetic.
5. In main(), take input from the user, call all these functions, and display results using pointer notation.