CL-1002
Programming Fundamentals
Lab # 8

Objectives:

- Practice and understanding on basic C++ programs
- 1-D Arrays
- Nested Loops
- Loops with arrays

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

1. First think about statement problems and then write your program.
2. Write Program in C/C++ compiler/IDE and save source file **for each program.**
3. Do not copy from any source otherwise you will be penalized with negative marks.
4. Complete your lab **within given Time Slot**.
5. Add your source code in this word document + Make one ZIP file of your all source codes.
6. Please submit your **Both files** with this naming convention ROLLNO_SECTION_LABNO.
7. Submit your lab on Google Classroom.

```
Program 1:
int main() {
  int a[5] = {2,3,4,5};
     cout<<a[2]<<endl<<a[4];
  return 0;
}

Program 2:
int main() {
   char a[5] = {'A','B'};
cout<<a[1]<<endl<<a[4];
   return 0;
}
```

```
Program 3:
int main() {
  char ch[10];
  cin>>ch;      //Input is "Pakistan"
        cout <<ch[4];
  return 0;
}
Program 4:
int main() {
  int a[] = {1,2,3};
        int b[4] = {7};
   cout <<a[2]<<b[2];
return 0;
}
```

Problem: 1 (1-D Array, Nested Loop)	(Marks = 5)

Write a C++ program that take 5 elements from the user into an integer array, then you need to print the table for each value using loop.

Problem: 2 (1-D Array, Rand) (Marks = 5)

Write a C++ program to initialize 200 random numbers using array. Display all numbers with proper spaces and line break after 10 numbers.

Problem: 3 (Loops, 1-D Array) (Marks = 5)

Write a C++ program to find an element from an array of 10 integers taken from user. Each element will be checked. If searched element exists multiple time, then its count will also be shown. Also show a message to user to update the element if found using input.

Problem: 4 (1-D Array) (Marks = 5)

Write a C++ program that have array of size 10 elements, you need to take 9 elements as input from user to fill the array and then print it out on the console screen. After that you need to take last element, and index number from user then place the element at the appropriate position without overwriting any element.

Note: You need to shift the elements to adjust the indexes of array.

Sample Input/Output:

Enter 9 Elements of Array
1 2 3 4 5 6 7 8 9
Elements in Arrays are: **[1,2,3,4,5,6,7,8,9]**
Enter Your 10th Element:
78
Enter Index:
4
Elements in Arrays are: **[1,2,3,4,78,5,6,7,8,9]**

Problem: 5 (1-D Array, Duplicate Elimination) (Marks = 10)

Use a one-dimensional array to solve the following problem. Read in 10 numbers, each of which is between 10 and 100, inclusive. As each number is read, validate it and store it in the array only if it isn't a duplicate of a number already read. After reading all the values, display only the unique values that the user entered. Provide for the "worst case" in which all 10 numbers are different.

Bonus Point:

Use the smallest possible array to solve this problem.

Problem: 6 (Character Arrays)	**(Marks = 10)**

Write a C++ program that takes a string of size 30 character maximum from user without space, and then you need to convert the All Small Case Letters to Capital Case and All Capital Case Letters to Small Case.

You are not allowed to use any of the built-in function, you can use ASCII table to do conversion.

Sample Input: HelloWorld

Sample Output: hELLOwORLD

Problem: 7 (Rand, Nested Loops, 1-D Arrays)	**(Marks = 10)**

Write a program that simulates the rolling of two dice. The program should use rand to roll the first die and should use rand again to roll the second die. The sum of the two values should then be calculated. [Note: Each die can show an integer value from 1 to 6, so the sum of the two values will vary from 2 to 12.] Using 1d array, you have to count number of times each sum combination occur and store it at appropriate index i.e if score is 7 you will increment the number in index (7-1=6) by one and repeat the loop. The loop should be repeated 1000 times. Initialize the array by 0 at start. Print the final count in array at the end.