# National University
**Of Computer & Emerging Sciences Faisalabad-Chiniot Campus**

# CL-1002
# Programming Fundamentals
# Lab # 11

> **Objectives:**
>
> - Practice and understanding on basic c++ programs
> - Arrays
> - Character Arrays
> - Arrays manipulation using arrays
> - Nested Loops
> - Random function

**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 compiler/IDE and save source file for each program.**
3. <span style="color:red">Do not copy from any source otherwise you will be penalized with negative marks.</span>
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.

## Problem: 1 (Character Arrays and reverse order)                                    (Marks = 5)

Write a computer program that creates two character arrays of size = 10. You are to take inputs in array-1 and program should populate/insert the second array in reverse order. Lastly, display the contents of both arrays.

**Sample input in array-1:**     [a, b, c, d, e, f, g, h, i, j]

**Sample output in array-2:**    [j, i, h, g, f, e, d, c, b, a]

## Problem: 2  (Integer Arrays and Loops)                                             (Marks = 5)

Write a C++ program that create an array of 10 integers, then user is asked to enter odd numbers. If user entered number is an off number then number is inserted into array; otherwise, user is asked to enter odd numbers. Once the array is full, program terminates with a message "Array is full".

## Problem: 3 (Character Arrays)            (Marks = 5)

Write a C++ program that create an array of length 30 characters, then you need to get input from user to get string in array.

Your program should predict the all characters of input string. Whether it is Alphabet ( Small Case)Alphabet (Capital Case),  Digital, Special Character OR other character.

**Input:**
aBC3*

**Sample Output:**
a - Small Alphabet
B - Capital Alphabet
C - Capital Alphabet
3 - Digit
* - Special Character

**Hint:** You can use ASCII Table

**Bonus:** If Character is Alphabet, then it should be checked also that it is vowel OR consonant.

Like:
A - Capital Alphabet & Vowel
C - Capital Alphabet & Consonant

## Problem: 4 (Loops)            (Marks = 5)

Write a computer program that creates an integer array of size 10. Asks the user to populate its indexes with 1 and 0 as taken input by the user. Then shows what value it becomes if convert the binary to decimal.

**Sample Input:**       [0, 0, 1, 0, 0, 0, 1, 0, 0, 1]
**Sample Output:**     73

## Problem: 5 (Loops and Random Function)                                    (Marks = 5)

Write a program to develop a guessing number game. In this game, a secret is initialized using Random value in a variable called **"secret_no"**. User is asked to guess the secret number repeatedly unless user guesses right. User input is taken in an array of integers called **"guess_numbers"** with size equals **10**. If user guesses wrong, the guess value is inserted in an array and user is given one of the advices **"Guess a bigger number"** and **"Guess a smaller number"**. If user guesses the number right, system should show **"You have won"** and print all guesses the player took and displays the secret number as well. If array is full and user doesn't guess the secret_no, then display **"You are out of guesses, Game over"**

## Problem: 6 (Loops and Arrays)                                             (Marks = 5)

Write a C++ program that creates an array of 15 integers, then you need to initialized all even index of array elements with 1 and all odd index of array with 0 using a loop.

## Problem: 7 (Loops and Searching)                                          (Marks = 5)

Write a C++ program that creates an array of 10 integers, takes input from user, then the program should display all values in the array which are greater than the average of the array values.

## Problem: 8 (Loops and Searching)                                          (Marks = 5)

Write a C++ program that creates an array of 10 integers, takes input from user, then the program should display all numbers in the array which are prime.

Problem 9:

Write a computer program that checks if a given array is a palindrome array or not. Remember that you are not allowed to make a second array in the process.

Sample Input in array-1:    ['a', 'b', 'c', 'd', 'e', 'e', 'd', 'c', 'b', 'a']

Sample Output:    Palindrome

Problem 10:

Write a C++ program that creates an array of 10 integers, then user is asked to enter prime numbers. If user entered number is a prime number then number is inserted into array; otherwise, user is asked to enter prime numbers. Once the array is full, program terminates with a message "Array is full".

Problem 11:

Write a C++ program that create an array of length 30 characters, then you need to get input from user to get a series of characters in array.

Program should tell how many unique values are present in the array.

Also, the program should tell the occurrence of each unique value in the character array.

Problem 12:

Write a computer program that creates an integer array of size 10. Asks the user to populate the array with numbers as taken input by the user(user may enter less than 10 numbers). Form an integer variable which has the list content numbers as elaborated by following:

Sample values in Array:     [2, 3, 7, 5, 0, 0, 9, , , ]

Sample Integer:   2375009

Problem: 5 (Loops)          (Marks = 5)

Problem 13:

Write a program to takes an array of 20 integers as input from the user and then shows minimum and maximum elements of the array.

Problem 14:

Write a C++ program that creates an array of 15 integers, then you need to show the game winner which is the unique highest value in the array.

Sample Input:     [1, 2, 3, 2, 3, 2, 3, 5, 6, 7, 5, 4, 7, 4, 6, 7]

Sample Output:   1


Problem 15:


Write a C++ program that creates two arrays of 10 integers, takes input from user, then program should create a 3rd array of size 10 integers. 3rd array should have top 10 biggest integers from both arrays.

Sample Input:     [1, 2, 3, 4, 5, 6, 6, 7, 8, 9], [4, 5, 6, 7, 8, 9, 10, 11, 12, 13]

Sample Output:   [13, 12, 11, 10, 9, 9, 8, 8, 7, 7]


Problem 16:
Write a C++ program that creates two arrays of 20 integers, takes input from user, then program should create 2 arrays(named 'even' and 'odd') each of size 20 integers. 'even' array should have all even integers from 1st array and 'odd' array should have all odd integers from 1st array.


Sample Input:     [1, 2, 3, 4, 5, 6, 6, 7, 8, 9, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13]

Sample Output:   even = [2, 4, 6, 6, 8, 8, 4, 6, 8, 10, 12]

Odd = [1, 3, 5, 7, 9, 5, 7, 9, 11, 13]