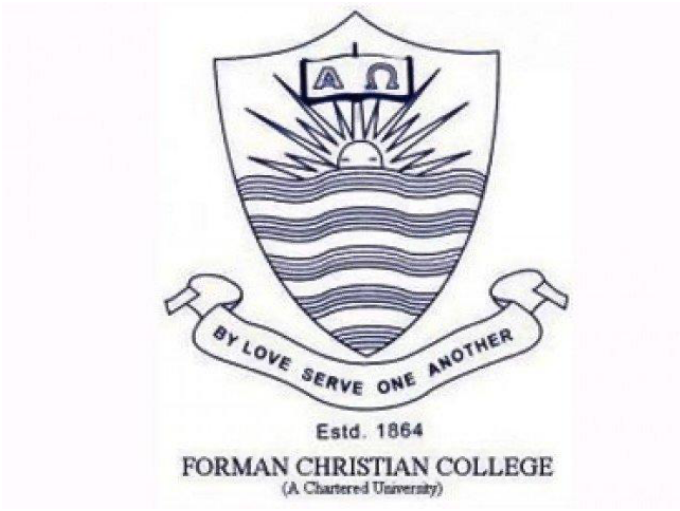
Introduction to C/C++

Comp 295

Spring 2023



Department of Computer Science

Forman Christian College University

Lab 5
Pointers & Dynamic Arrays

Question #	Total Marks
Question 1	-
Question 2	-
Question 3	-
Question 4	-

Example Code

```cpp
#include <iostream>

using namespace std;

int main() {
    // Get the size of the array from the user
    int n;
    cout << "Enter the size of the array: ";
    cin >> n;

    // Create a dynamic array of size n
    int *arr = new int[n];

    // Initialize the array with values
    for (int i = 0; i < n; i++) {
        arr[i] = i * i;
    }

    // Print the values in the array
    for (int i = 0; i < n; i++) {
        cout << arr[i] << " ";
    }
    cout << endl;

    // Delete the dynamic array
    delete[] arr;

    return 0;
}
```

In this example, the program first gets the size of the array n from the user. Then, it creates a dynamic array of size n using the new keyword. The array is then initialized with values using a loop.

After the array is initialized, the program prints the values in the array using another loop. Finally, the program deletes the dynamic array using the delete[] keyword.

Note that dynamic arrays can be used for any data type, not just integers. Also, you should always remember to delete the dynamic array to avoid memory leaks.

In Lab Problems

Question 1. Write a C++ program where you have two integer variables
int firstvalue = 5, secondvalue = 15;
and two pointers
int * p1, * p2;
You have to perform the following steps

- // p1 = address of firstvalue
- // p2 = address of secondvalue
- // value pointed by p1 = 10
- // value pointed by p2 = value pointed by p1
- // p1 = p2 (address of pointer is copied)
- // value pointed by p1 = 20
- // print firstvalue, secondvalue

And comment like above after each step

Values will be p1=10 and p2=20

Question 2. Write a C++ function **swapAcrossCenter()** that takes pointer array and array size as argument.

and swap its values across center. The size of array should be an odd number.

Example: suppose values are 2 5 6 7 8

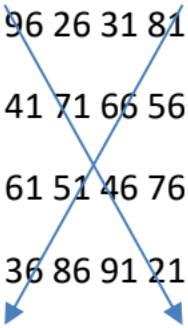
Before function call (Input): 2 5 6 7 8

After function call (Output): 8 7 6 5 2

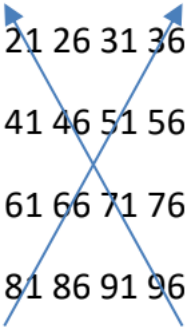
Question 3. Write a program that create the dynamic array having size equal to the user input. Write a function **DoubleIt()** that accepts that integer array and an integer variable for size. The function should create a new array that is twice the size of the argument array. The function should initialize the first half of elements with 0 copy and for second copy the contents of the argument array to the new array. The function should return a pointer to the new array. Now in main, get the pointer and print the new created array.

Question 4. Write a C++ program that will take input of 2D square Matrix and will reverse both the diagonals. Use 2-dimensional dynamic array to solve the problem. User will input the size of rows and columns. Enforce user to enter the size that it should be square matrix. For example,

Here is a two dimensional array of size 4×4:



What it should look like after the function:



Write your program for 4×4 Matrix but it should be generic that if we change it to 3×3 or any other size

it should work fine. No other array should be used for this task. Your main should be in following flow.

Int** Matrix;

Input(Matrix);

Display(Matrix); // this function will display the Matrix array in matrix form

reverselDiaganol(Matrix); // this function will reverse both diagonals Display(Matrix); // Now this function will display the Matrix array in matrix form with reversed diagonals