CL-1002
Programming Fundamentals
Lab # 12

Objectives:

- Practice and understanding on basic c++ programs

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

1. There must be a block of comments at start of every question's code by students; the block should contain brief description about functionality of code.
2. Comment on every function about its functionality.
3. Use understandable name of variables.
4. Proper indentation of code is essential.
5. Write a C++ statement(s) for each of the following task one after the other, in the same order.
6. Make a Microsoft Word file and paste all of your C++ code with all possible screenshots of **every task output in MS word and submit .cpp file with word file**.
7. Make separate .cpp files for all tasks and use this format **23F-1234_Task1.cpp.**
8. First think about statement problems and then write/draw your logic on copy.
9. After copy pencil work, code the problem statement on MS Studio C++ compiler.
10. At the end when you done your tasks, attached C++ created files in MS word file and make your submission on Google classroom. (Make sure your submission is completed).
11. Please submit your word file in this format **23F-1234_L1.docx**
12. Do not submit your assignment **after the deadline**.
13. **Do not copy code from any source otherwise you will be penalized with negative marks.**

Problem: 1 | Arrays 1 dimensional

Write a program to declare an integer array of size 15. Now input some values in all indexes of array without using any loop. Finally display value at index 2.

Problem: 2 | Arrays 1 dimensional

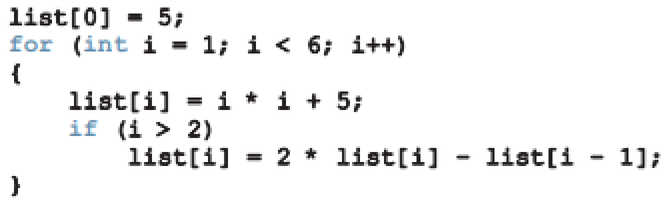
Write a program to initialize array of size 10 in single statement. Then find there sum and print numbers in reverse order.

Problem: 3 | Arrays 1 dimensional, Random Numbers

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

Problem: 4 | Arrays 1 dimensional

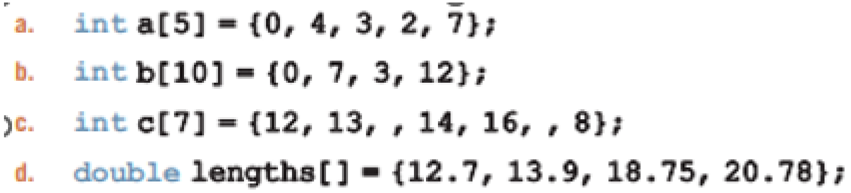
Suppose list is an array of six components of type int. What is stored in list after the following C++ code executes?



```
list[0] = 5;
for (int i = 1; i < 6; i++)
{
    list[i] = i * i + 5;
    if (i > 2)
        list[i] = 2 * list[i] - list[i - 1];
}
```

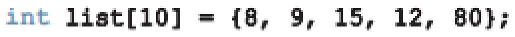
Problem: 5 | Array 1 dimensional

a) Determine whether the following array declarations are valid



```
a.  int a[5] = {0, 4, 3, 2, 7};
b.  int b[10] = {0, 7, 3, 12};
c.  int c[7] = {12, 13, , 14, 16, , 8};
d.  double lengths[] = {12.7, 13.9, 18.75, 20.78};
```

b) Suppose that you have the following declaration:



```
int list[10] = {8, 9, 15, 12, 80};
```

Problem: 6 | Array 1 dimensional

Write a C++ program that declares an array alpha of 30 components of type double. Initialize the array so that the first 10 components are equal to the square of the index variable, and the next 10 components are equal to three times the index variable. Last 10 elements are the sum of first 10 and last 10 indices. Output the array so that 10 elements per line are printed.

Problem: 7 | Array 1 dimensional, Linear Searching

Write a C++ program to find an element from an array. 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 word if found using input.

Problem: 8 | Array 1 dimensional, Duplicate Elimination

Use a one-dimensional array to solve the following problem. Read in 25 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 25 numbers are different. Use the smallest possible array to solve this problem.

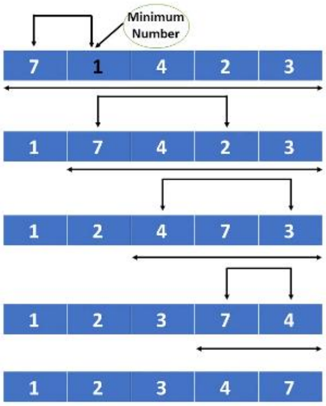
Problem: 9 | Shifting Array

Write a program that will be given as input an array and an integer p. The program will then cyclically shift the array p positions to the right: each element is moved p positions to the right, while the last p elements are moved to the beginning of the array. For example: if we have the array [1 2 3 4 5 6], shifting 2 positions to the right should give the array [5 6 1 2 3 4]. Your function should work correctly for negative values of p.

Problem: 10 | Selection Sort

The selection sort algorithm is a simple, yet effective sorting algorithm. A selection-based sorting algorithm is described as an in-place comparison-based algorithm that divides the list into two parts, the sorted part on the left and the unsorted part on the right. Initially, the sorted section is empty, and the unsorted section contains the entire list. When sorting a small list, selection sort can be used.

Now write a program and initialize 10 elements array which are unsorted and apply selection sort and sort these elements in ascending order.


Minimum Number
7 1 4 2 3
1 7 4 2 3
1 2 4 7 3
1 2 3 7 4
1 2 3 4 7