CL-1002
Programming Fundamentals
Lab # 13

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.**

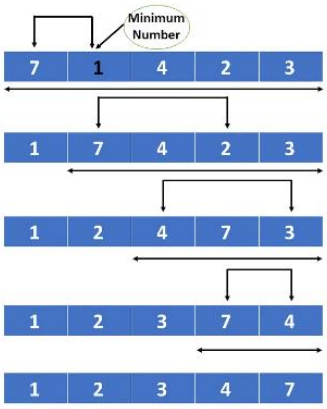
Problem: 1 | Shifting Array

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: 2 | 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.



Problem: 3 | Grocery management

Imagine you are managing an inventory system for a small grocery store. You need to develop a program that tracks the quantity of each product on the shelves. Each product is uniquely identified by a product code, and the initial quantities are provided. The program should allow the user to perform actions such as updating the quantity of a specific product, adding new products to the inventory, and generating reports on low-stock items. Design a solution that efficiently utilizes a one-dimensional array to manage this inventory system. Consider 10 shelves.

Problem: 4 | Weather monitoring

You are working on a weather monitoring system for a meteorological station. The system receives temperature data from different cities at hourly intervals throughout the day. Each city is identified by a unique code, and the temperature data is stored in a one-dimensional array. Your task is to develop a program that can perform various operations, such as finding the average temperature for a specific city, identifying the city with the highest temperature for a given day, and predicting temperature trends based on historical data. Design a solution that effectively utilizes a one-dimensional array to manage and analyze the temperature data for multiple cities. Consider 5 cities.