Lab's Scope:

- **Pointers**

Problem 1:

Write a program initializing two-character variables with values. Assign two pointers to the variables. Change the values using the pointers, then print the new values using the pointers, and print them again using the original variables.

Problem 2:

Given the following program, trace it and write down its output. *Hint: you better try to draw your memory to have a vision about the content of memory locations.*

```
#include <iostream>
using namespace std;

int main() {
    int a = 42;
    int b = 7;
    int c = 999;
    int* t = &a;
    int* u = NULL;
    cout << *t << endl;

    c = b;
    u = t;
    cout << c << endl;
    cout << *u << endl;

    a = 8;
    b = 8;

    cout << c << endl;
    cout << *t << endl;
    cout << *u << endl;

    *t = 123;
    cout << a << endl;
    cout << b << endl;
    cout << c << endl;
    cout << *t << endl;
    cout << *u << endl;

    return 0;
}
```

Problem 3 :

Write a program that has 3 integer variables and creates three-pointers for these variables. Let your program:

i. Performs an addition and multiplication between the values referred to by these pointers.
ii. Change the values of the three variables.
iii. Repeat the addition and multiplication of the values referred to by the pointers.

Problem 4:

Write a program that takes the start and end of a range of numbers and calculates the sum of the elements in the range by using a pointer to the value of the starting element.

Example:

If the start is 30 and the end is 45, then the sum = 30+31+32+...+45 = 600

Problem 5:

Write a program that swaps two integer variables using pointers. (refer to lecture 3 slide 23 if needed)

Problem 6:

Write a program to find the sum of integers in an array using pointers to traverse through the array elements. (refer to Lecture 5 slide 24 if needed)