CL-1002
Programming Fundamentals
Lab # 10

Objectives:

- Practice and understanding on basic c++ programs
- For Loops
- While Loops
- Do-While Loops
- Nested Loops

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. Do not copy from any source otherwise you will be penalized with negative marks.
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 (Nested Loops) (Marks = 5)

Write a program that prints all the prime numbers in the range [min - max].

Note: Where 'min' and 'max' are integers variables taken from the user.

Problem: 2 (Nested Loops) (Marks = 5)

Write a program that prints the following pattern using nested loops

```
* * * * *
*       *
*       *
* * * * *
```

Problem: 3 (Nested Loops) **(Marks = 5)**

Write a program that prints the following patterns using nested loops

```
* * * *
  * * *
    * *
      *
```

And also, this

```
      *
    * *
  * * *
* * * *
```

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

Write a computer program that prints the following sequence up to n-terms where 'n' is taken as input from the user.

0, 2, 6, 14, 30, 62, . . .

Sample Input: 4
Sample Output: 0, 2, 6, 14

Problem: 5 (Nested Loop) **(Marks = 5)**

Write a program that prints the following patterns using nested loops. Take 'n' as input from the user and show n-lines of the sequence.

```
1
2 4
3 6 9
4 8 12 16
```

Problem: 6 (For Loops) **(Marks = 5)**

Write a program to print the first n-terms of a Fibonacci sequence where 'n' is taken as input by the user. A Fibonacci sequence is a sequence whose every term is the sum of its previous two terms.

Sample Input: 8
Sample Output: 0, 1, 1, 2, 3, 5, 8, 13

Problem: 7 (Loops) **(Marks = 5)**

Write a program to take two numbers as input from the user namely N and r.

The program calculates ${}^{n}P_{r}$. The formula to calculate ${}^{n}P_{r}$ is:

Problem: 8 (Loops) **(Marks = 5)**

Write a program to calculate that how many number of bits are required to represent an integer number. You are to calculate the power using loops themselves.

Sample Input: 61
Sample Output: 6