Lab Task 9

Note: You must write all the programs using For & Nested For loop only

Problem 01:

The **Fibonacci Sequence** is the **series** of **numbers** such that every number in the series is the sum of previous 2 numbers (except first two numbers).

0 , 1 , 1 , 2 , 3, 5 , 8 , 13 , 21 , 34 , ..

0 + 1 = 1
1 + 1 = 2
1 + 2 = 3
2 + 3 = 5
Write a program that displays the Fibonacci sequence of 20 elements.

Problem 02:

Write a program that converts binary numbers to decimal.

For binary number with n digits d_{n-1} ... $d_3 d_2 d_1 d_0$ *The decimal number is equal to the sum of binary digits (d_n) times their power of 2 (2^n):*

decimal = $d_0 \times 2^0$ *+* $d_1 \times 2^1$ *+* $d_2 \times 2^2$ *+ ...*

Problem 03:

Write a program that asks for a set of test scores. The program keeps taking the input from the user as long as the score is non-negative. As soon as the user enters a negative value, the program should calculate the average test score and display it.

Nested FOR loop

For loop is used to repeat a process for specific number of times. It is used when number of iterations are known in advance. Nested loop is a loop that occurs within another loop. Any combination of loops can be used as outer or inner loop such as while, for or do while.

Following is an example program for nested for loop:

```
for (int i =1; i<=5; i++) {
    for (int j = 1; j<=5; j++) {
        cout<<"* ";
    }
    cout<<endl;
}
```

Output:

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

In the above example the outer for loop is used to control rows i.e 1 to 5 whereas the inner for loop is used to control columns or content of each row. In this case since each row has 5 asterisks therefore the inner loop was given fix range to print the same number of asterisks each time. The inner loop can be given a dynamic range if the content of each row is different. Try converting inner loop condition to j<=i the updated output would be:

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

Problem 04

Write a program to print following half pyramid pattern using nested FOR

1

1 2

1 2 3

1 2 3 4

1 2 3 4 5

Problem 05

Write a program to print factorial of first 10 integers. You are required to skip if number is a multiple of 3. Use outer loop to control the iteration from 1 to 10. Use inner for loop to process factorial for each number of outer loops.

Problem 06

Use nested for loop to print the below given pattern. **Guide**: Use outer most for loop to control rows, use 2 inner for loops, one for printing '-'and another for printing '+'. You must give dynamic increment/decrement to inner loops. Use comparison conditions and new line commands wisely.

----+

---++

--+++

-++++

+++++

Problem 07

Count down from each integer to 1 for first 5 integers. Use outer loop to count forward from 1 to 5. Use inner for loop to count back from each number to 1.

1

2 1

3 2 1

4 3 2 1

5 4 3 2 1