AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH (AIUB)
Faculty of Science and Technology (FST)
Department of Computer Science (CS)
Introduction to Programming [**Homework on Loop**]

1. Write a program in C++ to find the factorial of a number.
Sample output:
Input a number to find the factorial: 5
The factorial of the given number is: 120

2. Write a program in C++ to find the Greatest Common Divisor (GCD) of two numbers.
Sample Output:
Input the first number: 25
Input the second number: 15
The Greatest Common Divisor is: 5

3. Write a program in C++ to find the sum of digits of a given number.
Sample Output:
Input a number: 1234
The sum of digits of 1234 is: 10

4. Write a program in C++ to asked user to input positive integers to process count, maximum, minimum, and average or terminate the process with -1.

Sample Output:
Your input is for termination. Here is the result below:
Number of positive integers is: 4
The maximum value is: 9
The minimum value is: 3
The average is 6.00

5. Calculate the Factorial of a number.
Sample Output:
Your input to calculate factorial: 5
Factorial of 5 is 120

6. Find the Fibonacci series of n terms.
Sample Output:
Your input is: 9
Fibonacci Series: 0 1 1 2 3 5 8 13 21

7. Write a program in C++ to display the pattern like right angle triangle using an asterisk.

Sample Output:

```
Input number of rows: 5
*
**
***
****
*****
```

8. Write a program in C++ to make such a pattern like a pyramid with numbers increased by 1.

Sample Output:

```
Input number of rows: 4
      1
     2 3
    4 5 6
   7 8 9 10
```

9. Write a program in C++ to display the pattern like a diamond.

Sample Output:

```
 Input number of rows (half of the diamond): 5

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

10. Write a program in C++ to display the pattern using digits with right justified and the highest columns appears in first row.

Sample Output:

```
 Input number of rows: 5
12345
 1234
  123
   12
    1
```

11. Write a program in C++ to find the frequency of each digit in a given integer.

Sample Output:

```
Input any number: 122345
The frequency of 0 = 0
The frequency of 1 = 1
The frequency of 2 = 2
The frequency of 3 = 1
The frequency of 4 = 1
The frequency of 5 = 1
```

```
The frequency of 6 = 0
The frequency of 7 = 0
The frequency of 8 = 0
The frequency of 9 = 0
```

12. Write a program in C++ to convert a decimal number to binary number.
Sample Output:

```
Input a decimal number: 35
The binary number is: 100011
```

13. Write a program in C++ to convert a decimal number to hexadecimal number. Sample Output:

```
Input a decimal number: 43
The hexadecimal number is: 2B
```

14. Write a program in C++ to create and display unique three-digit number using 1, 2, 3, 4. Also count how many three-digit numbers are there.
Sample Output:

```
The three-digit numbers are:
123 124 132 134 142 143 213 214 231 234 241 243 312 314 321 324 341 342
412 413 421 423 431 432
Total number of the three-digit-number is: 24
```