Programming Fundamentals

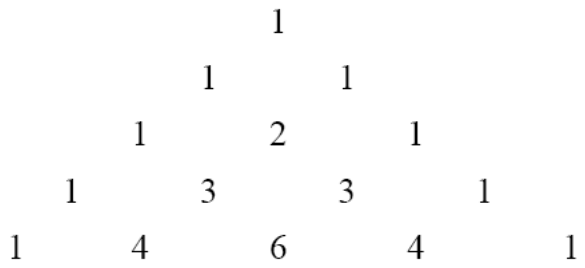
Assignment # 3 – Iterations

Total Marks: 100 **Due Date: 5th Oct 2023**

Note:

- *Submit soft copy (a single zipped folder)*
- *The name of the zipped folder should be your roll number.*
- *Plagiarism may cause an F grade in the course.*

Problem 1: Write a C++ code to produce the following output: [10]



Problem 2: Write a program to print all prime numbers from 1 to 300. [10]

A Prime Number can be divided evenly only by 1 or itself. And it must be greater than 1.

Hint: Use nested loops, break and/or continue

Problem 3: Write a program to fill the entire screen with a smiling face. The smiling face has an ASCII value 1. [10]

For this task you should know the height and width of your screen.

Problem 4: Write a program to generate all combinations of 1, 2 and 3 using for loop. [10]

Sample Output:

111

112

113

…

…

Problem 5: The natural logarithm can be approximated by the following series. [10]

$$\frac{x-1}{x}+\frac{1}{2}\left(\frac{x-1}{x}\right)^2+\frac{1}{2}\left(\frac{x-1}{x}\right)^3+\frac{1}{2}\left(\frac{x-1}{x}\right)^4+....$$

If x is input through the keyboard, write a program to calculate the sum of first seven terms of this series.

Problem 6: Write a C++ code to produce the following output: [10]

```
A B C D E F G F E D C B A
A B C D E F   F E D C B A
A B C D E       E D C B A
A B C D           D C B A
A B C               C B A
A B                   B A
A                       A
```

Problem 7: Write a program to add first seven terms of the following series using for loop(s) [10]

$$\frac{1}{1!}+\frac{2}{2!}+\frac{3}{3!}+\ldots\ldots$$

Problem 8: Take a positive input from the user and store in n. Produce an iterative sequence using the formula given below [10]

n = n/2 (if n is even)
n = 3n + 1 (if n is odd).

The program should print out the chain for the number n up till 1s. The length of each chain should be printed at the end of the chain.

Sample Input: 13

Sample Output:

```
13 -> 40 -> 20 -> 10 -> 5 -> 16 -> 8 -> 4 -> 2 -> 1 ; length = 10
```

Problem 9: You have to create a simple tic-tac-toe game with the help of for loop and if statements Do not use any built-in function, Array and any other loop only use for loop and if statement. [20]

Note: It is an independent assignment but discussion with your class fellows and your teacher is encouraged but plagiarism is strictly prohibited. Anyone involved in plagiarism would get zero marks in this assignment

Good Luck ☺