FAST School of Computing

Object Oriented Programming – Spring 2023

Cyber Security Department

LAB 04

Recursion in C++

Learning Outcomes

In this lab you are expected to learn the following:

- Recursion Technique and its implementation

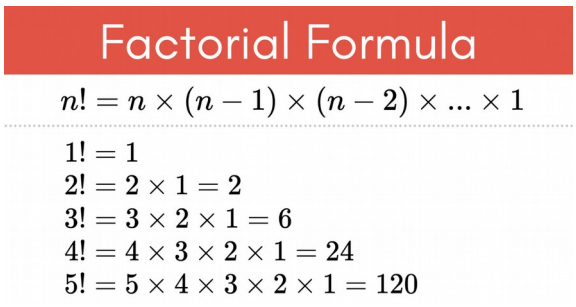
Note: Plagiarism(from some else or internet) in any 1 question will lead to zero marks in the whole lab task.

Run the test cases for all problems

Problem 1:

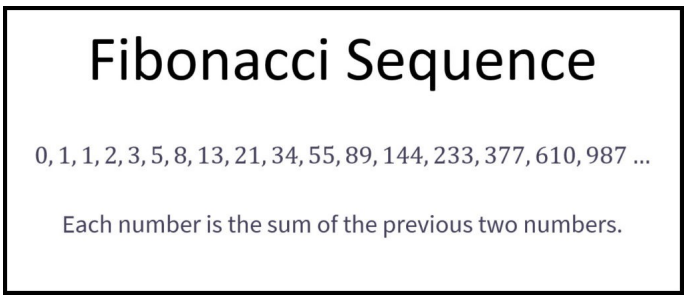
Write a C++ program to calculate Factorial of a number using Recursion.

int Factorial(int n)



Problem 2:

By using recursion print Fibonacci series by taking user input. For example if user inputs 10, then print first 10 numbers in Fibonacci series. **int fib(int x)**



Problem 3:

Write a function that calls itself recursively to find Greatest Common Divisor (GCD) of two numbers. **int findGCD(int num1,int num2)**

The greatest common divisor (GCD) of two or more numbers is **the greatest common factor number that divides them, exactly**. It is also called the highest common factor (HCF). For example, the greatest common factor of 15 and 10 is 5, since both the numbers can be divided by 5.

Problem 4:

Write a function called elfish that recursively checks, given a word, if that word is elfish or not. **bool elfish(int word, int elf, int index)**

A word is considered **elfish** if it contains the **letters: e, l, and f** in it, in any order. For example, we would say that the following words are elfish: white leaf, tasteful, unfriendly, and waffles, because they each contain those letters.

Problem 5:

Write a code that defines an integer array of size 10. Initialize array values by user input. Then ask user to provide a number to find in array. Write a function that recursively calls it self to linearly search for that number in the array.

bool LinearSearch(int array[10],int find, int size)

Submission Details:

1. Save single .cpp file with your roll no and lab number e.g. i22-XXXX_Lab4.cpp
2. Take screen shot of running test cases of tasks.
3. Zip the .cpp file and screen shots (Do not create .rar file) with roll no and lab no. e.g. i22-XXXX_Lab4.zip.
4. Submit the zip file on google class room.