**National University of Computer and Emerging Sciences**



**Laboratory Manual**

*for*

# Data Structures Lab

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**Objectives:** Recursion and its applications

**Problem 1: Find nth Fibonacci Number:**

Write a recursive function to nth Fibonacci number of the series. For Example:   
**Input**: 6

**Output**: Fibonacci of 6 is: 8 (The Fibonacci sequence is: 0, 1, 1, 2, 3, 5, 8)

**Problem 2: Finding subsets of given string**Write the recursive method to find all the subsets of given string. Assume that if the given input is “abcd”, the output will be:

Abcd, abc, abd, ab, acd, ac, ad, a, bcd, bc, bd, b, cd, c

**Problem 3: Sum of Digits:**

Write a recursive function to find the sum of the digits of a positive integer n.

For example, the sum of the digits of 12345 is as following:

1 + 2 + 3 + 4 + 5 = 15.

**Problem 4: Find Factorial:**Write a recursive function to find the factorial of N. For Example:  
**Input**: N=5

**Output**: Factorial of 5 is: 120 (5! = 5 \* 4 \* 3 \* 2 \* 1 = 120)

**Problem 5: Finding greatest common divisor (GCD)**  
  
Write a recursive function to find the greatest common divisor (GCD) of two integers using the Euclidean algorithm. The GCD of two numbers is the largest number that divides both of them without leaving a remainder.

**Problem 6: Search value from Linked List:**Write a recursive function to search value from linked list.