National University of Computer and Emerging Sciences

Laboratory Manual

for

Data Structures Lab

Course Instructor	Mr. Muhammad Naveed
Lab Instructor	Mr. Durraiz Waseem
Semester	Fall 2025

Department of Computer Science

FAST-NU, Lahore, Pakistan

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.