ALGORITHMS (Fall 25-26)

Lab Assignment (Final-Term)

[Remember that the example input and output is just for reference. Your code should run for all possible cases.]

 # Problem-1:

Given two strings X and Y, find the length of their longest common subsequence (LCS) and all the actual LCS string. The LCS is the longest sequence that appears in both strings in the same relative order.

Example Input: X = "abcd" Y = "bd"	Example Output: Length of LCS: 2 LCS: "bd"

Question: Explain your coding approach for finding the LCS string. What is the time complexity of your solution for finding the string?

 # Problem-2:

You are given an undirected, unweighted graph with v vertices and e edges. Each edge represents a connection between two vertices.

Write a program to find the shortest distance (in terms of the number of edges) from a given source vertex s to every other vertex in the graph. You are allowed to apply only BFS to solve this. The Queue data structure needs to be created by you.

Input: Number of Vertex: 6 Number of Edges: 7 1 2 1 3 2 4 2 5 3 5 4 6 5 6 Source Vertex: 1	***Output:*** Node 1: 0 Node 2: 1 Node 3: 1 Node 4: 2 Node 5: 2 Node 6: 3

Question: Explain your coding approach to solving this problem. Draw the simulation of your code for the given example with step-by-step solution.

 # Problem-3:

You are given a directed graph with v vertices and e edges.

Write a program to find the cycle creating edge by classifying all the edges in the graph. The Stack data structure needs to be created by you.

Input:	***Output:***
Number of vertex: 3 Number of edges: 3 1 2 2 3 3 1	Edge_12: TE Edge_23: TE Edge_31: BE The cycle is created due to the edge 31.

Question: Explain your coding approach to solving this problem. Draw the simulation of your code for the given example with step-by-step solution.