

Department of Computer Science and Engineering
University of Liberal Arts Bangladesh
Final Examination
Semester – Fall 2020
Course Title: Data Structure Lab
Course Code: CSE 208 (Sec: 3)
Duration: 1:45 Hours

PLEASE ANSWER ALL QUESTIONS.

Total 30 Marks

Name: _____ **ID:** _____

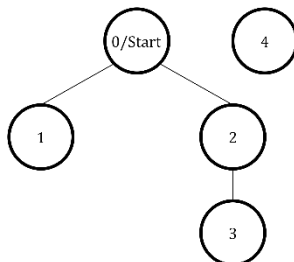
QUESTION 1

10 marks

Consider an undirected graph where each of the nodes is labeled consecutively starting from 0.

You will be given a number of queries. For each query, you will be given a list of edges describing an undirected graph. After you create a representation of the graph, you must determine and report the shortest distance to each of the other nodes from a given starting position using the breadth-first search algorithm (BFS). Distances are to be reported in node number order, ascending. If a node is unreachable, print -1 for that node.

For example, given a graph with 5 nodes and 3 edges, $[0,1]$, $[0,2]$, $[2,3]$, a visual representation is:



The start node for the example is node 0. Outputs are calculated for distances to nodes 1 through 4: $[1, 1, 2, -1]$.

Input Description:

The first line contains an integer q , the number of queries. Each of the following q sets of lines has the following format:

- The first line contains two space-separated integers n and m , the number of nodes and edges in the graph.
- Each line i of the m subsequent lines contains two space-separated integers, u and v , describing an edge connecting node u to node v .
- The last line contains a single integer, s , denoting the index of the starting node.

Output Description:

For each of the q queries, print a single line of $n - 1$ space-separated integers denoting the shortest distances to each of the $n - 1$ other nodes from starting position s . These distances should be listed sequentially by node number (i.e., $0, 1, \dots, n - 1$), but should not include node s . If some node is unreachable from s , print -1 as the distance to that node.

P.T.O

SAMPLE INPUT	SAMPLE OUTPUT
2 4 2 0 1 0 2 0 3 1 1 2 1	1 1 -1 -1 1

QUESTION 2

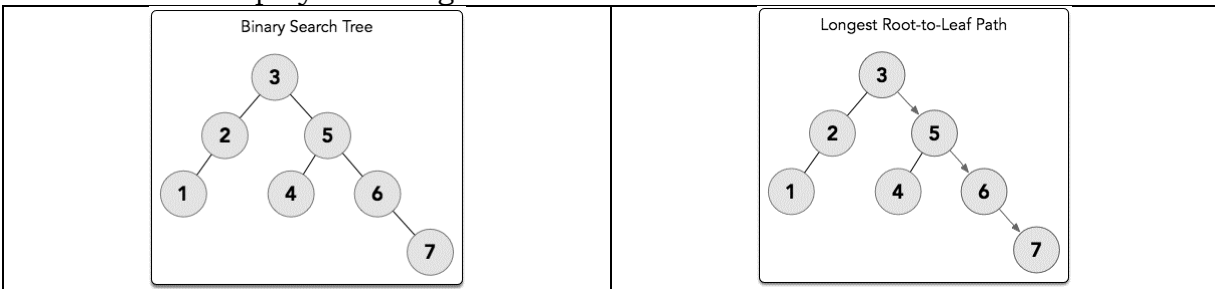
5 marks

Interview

QUESTION 3

10 marks

The height of a Binary Search Tree is the number of edges between the tree's root and its furthest leaf. Write a program that inserts integer values into a Binary Search tree and afterward displays the height of the tree.



In the above diagram, there are 4 nodes in the longest root-to-leaf path that are connected by 3 edges, meaning our BST's *height* = 3. Thus, we print 3 as our answer.

Input Description:

The first line contains an integer, n , denoting the number of nodes in the tree. Each of the n subsequent lines contains an integer, *data*, denoting the value of an element that must be added to the BST.

SAMPLE INPUT	SAMPLE OUTPUT
7 3 5 2 1 4 6 7	3

QUESTION 4

5 marks

Interview

****END OF QUESTIONS****