Indian Institute of Information Technology Sri City, Chittoor

(An Institute of National Importance under An Act of Parliament)

Name: **DSA Lab - 8** Duration: **3 Hrs**

Date: **25th October, 2021** Maximum Marks: **10**

INSTRUCTIONS:

1. Please carefully read all assignment problems and complete the function prototypes given to solve the problems. **Do not change the function prototypes.**

2. **Write only a single main function**. You can call the required functions from the main function with static input or input provided by the user. **Do not ask for any user input within the functions**.

3. Name the file as follows: S2020xxxxx_A8.c

4. DO NOT zip. Upload a single .c file directly to your submission in the common Google classroom.

If you do not follow the above-mentioned instructions, a strict penalty would be imposed.

ASSIGNMENT PROBLEMS

1. Write a function Read_Graph() that takes input in the following format: The first input will be an integer value n denoting the number of vertices in the graph (the vertices will be numbered from 1 to n). This will be followed by the edges in the graph. Every edge will be input by two values - its starting vertex and ending vertex. The list of edges will be terminated when the input received is "0 0". An example input is provided below:

```
5     //Number of vertices in the graph
1 2
2 3
3 4
1 4
0 0       //Signifies end of edges
```

[1 mark]

2.

   a. Write a function DFS() that performs DFS traversal on a given graph. The function simply prints the nodes visited by the traversal in the order in which they are visited. Assume that the starting vertex is vertex 1 and any ties are broken in favour of the node with the lower vertex index. **[3 marks]**

b. Write a function IsConnected() that checks whether the given graph is connected or not. The function can just print “Connected” or “Not Connected” **[2 marks]**

3. Write a function BFS() that performs BFS traversal on a given graph. Also print the shortest distance from the vertex 1 to every other vertex in the graph. **[4 marks]**

Only call the function Read_Graph() once in the entire program. Your main function should call the functions DFS(), IsConnected() and BFS() on the same graph. You may reuse functions as and when necessary.