Design and Analysis of Algorithms Practice
LAB 9
Date: 29^{th} October 2024

General instructions:

1. Students have to write the pseudo code first in their notebooks and implement it after that. Students can use either C / C++.

2. The point of contact (Member 1 as submitted in Gform) from the group has to submit all the programs. You may ask the TA, if you forgot the point of contact (Member 1).

3. Submit all the programs as a single Zip file in Google Class Room (GCR).

4. Pseudo code, Demonstration and Viva will be evaluated by the TA for 10 marks each and a total of 30. Pseudo code and Viva will be evaluated in the lab itself.

5. If the students wish to submit the programs later, then they can do it with in 2 days (i.e., if the lab is on Tuesday, then programs need to be submitted by Thursday 11:59 PM by point of contact (Member 1).). This evaluation will be considered for Demonstration 10 marks.

Graph related algorithms

Q1) **Graph Traversal Algorithms:** Implement following 6 functions with respect to graph traversal.

1. DFS(Graph G) – choose start vertex arbitrarily and perform DFS
2. DFS(Graph G, vertex s)
3. DFS(Graph G, vertex s, vertex t) – is t reachable from s
4. BFS(Graph G) – choose start vertex arbitrarily and perform BFS
5. BFS(Graph G, vertex s)
6. BFS(Graph G, vertex s, vertex t) – is t reachable from s

Q2) **Minimum Spanning Tree Algorithms:** Implement following 3 functions with respect to minimum spanning trees.

1. MST_Prim(Graph G)
2. MST_Kruskal(Graph G)
3. MST_Youralgo(Graph G)

Note: Students who have finished the above programs in less time can explore implementing shortest path using Dijkstra and Bellman-Ford algorithms. Anyway they will be given in next lab.