CS302: Design and Analysis of Algorithms
Assignment 04

Due Date: 14th December 2020 **Total Marks: 100 Points**

1. Apply BFS(B), BFS(D), DFS(B), DFS(F) in Graph shown in Figure 2. Show all steps showing Queues and Visit Order discussed during the Lecture [10 Points]

2. Use Topological Sort to determine whether Figure 2 is a Directed Acyclic Graph (DAG) or not. Show all steps [10 Points]

3. Using Dijkstra and Bellman Ford Method, find the shortest path from Source 1. Discuss the complexities of both (Figure 1) [20 Points]

4. Using Floyd-Warshall and Johnsons Algorithm Method, find all pairs shortest path (Figure 1). Discuss the complexities of both [20 Points]

5. Find the minimum spanning tree shown in Figure 3 using (i) Kruskal's algorithm (ii) Prim's algorithm [10 Points]

6. Read Book, Lectures or Search through Internet to explain the worst time complexities of BFS, DFS, Kruskal's and Prims in your own words using (i) Adjacent Matrix (ii) Adjacent List [10 Points]

7. Go through the lecture https://www.youtube.com/watch?v=2E7MmKv0Y24 and write summary with focus on proof of Dijkstra Algorithm [20 Points]

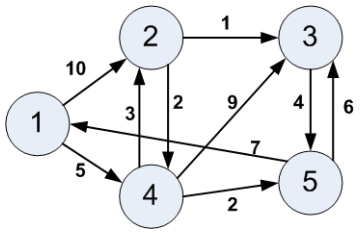

Figure 1: Graph for Dijkstra, Bellman Ford, Floyd-Warshall and Johnsons Algorithm.

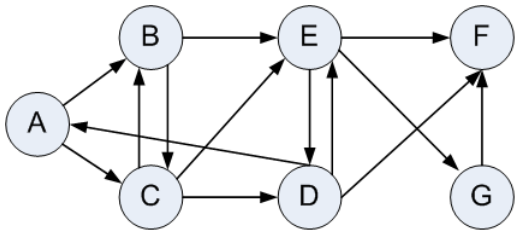

Figure 2: Graph for BFS, DFS and Toplological Sort.

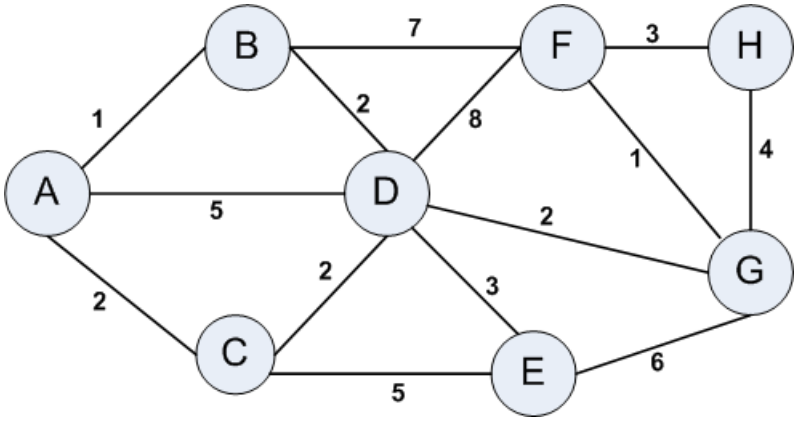

Figure 3: Graph for Minimum Spanning Tree.