DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CSE207 (DATA STRUCTURES AND ALGORITHMS II)

Class Test 1 (Sep 06, 2020), Time: 20 minutes, Total Marks: 20

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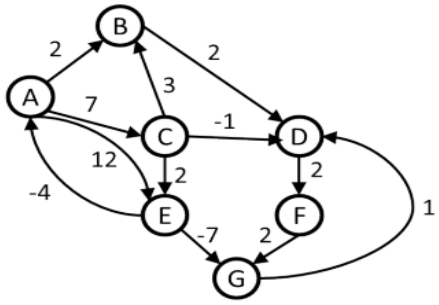
1. Consider the following directed, weighted graph *G*. **5 + 3 + 2 = 10**



(a) Even though the graph has negative weight edges, using Dijkstra's algorithm calculate supposedly shortest paths and distance from *A* to every other vertex (sample: A–B–D–F–G). Show your **answer in the table below**.

(b) Dijkstra's algorithm may find wrong path to some of the vertices. For just the vertices where the wrong path was computed, write the correct shortest paths and distance **in the table below**.

(c) Which edge(s) could be removed from the graph such that Dijkstra's algorithm would happen to compute correct answers for all vertices in the remaining graph?

From *A* to	Using Dijkstra's algorithm		Correct Shortest	
	Path	Distance	Path	Distance
B				
C				
D				
E				
F				
G				

Answer for c):

2. Write Time Complexity and Graph Type that give correct output for the following algorithms. **6**

Sl.	Algorithm	Time Complexity	Graph Type
1	Dijkstra's algorithm with binary heap		
2	Bellman-Ford algorithm		
3	Prim-Jarnik algorithm		
4	Dijkstra's algorithm with Ordinary Array		
5	BFS algorithm for Single-source shortest paths		
6	Johnson's algorithm		

3. Find a Minimum Spanning Tree (MST) for the graph *G* shown below. Does the graph *G* have multiple possible MSTs? Why or why not? **4**