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School of Engineering Sciences and Technology
DepartmentofComputerScience&Engineering
Even Semester Examination –2023
Subject: Getting Started with Competitive Programming
Paper Code: BTCSE MOOCS 1

TIME:3Hours **MAX.MARKS:75**

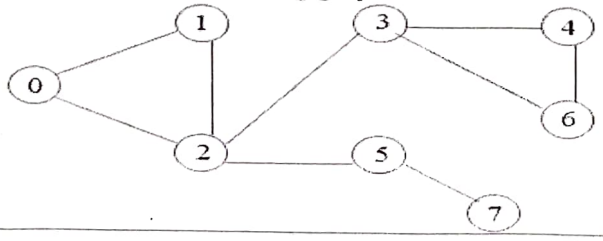
SECTION–A(35Marks)

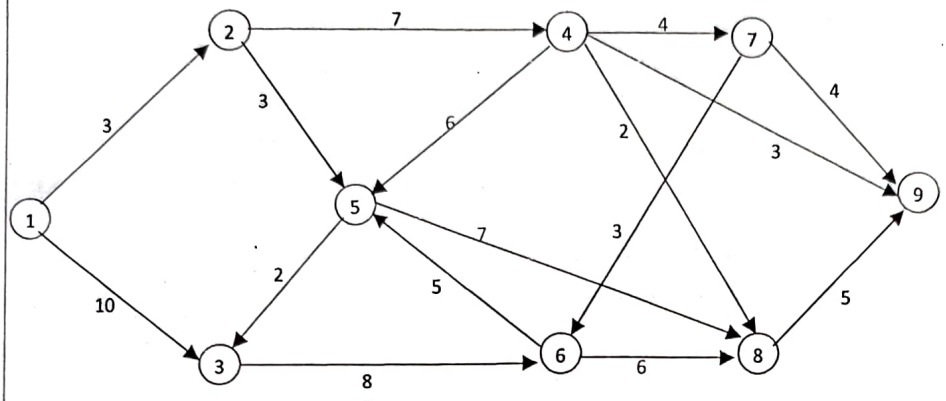
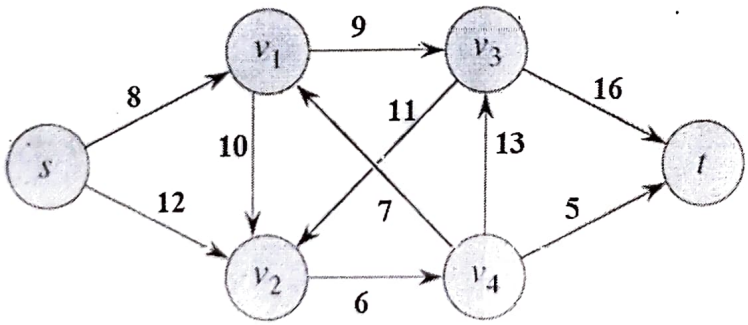
❖ *Attempt ALL questions. Each question is of 5 marks.*

Q. No.	Questions	CO*	BL*
1.	Write an algorithm for sorting numbers using divide and conquer technique. Sort the following number using divide and conquer algorithm: 3,8,0,2,9,5,1	CO1	L1, L2
2.	What is "greedy algorithm? A thief enters a house for robbing it. He can carry a maximal weight of 60 kg into his bag. There are 5 items in the house with the following weights and values. What items should thief take for maximum value of bag, if he can even take the fraction of any item with him? Items weight and their respective values are given below. {w1, w2, w3, w4, w5) = (5, 10, 15, 22, 25) and (v1, v2, v3, v4, v5) = (30, 40, 45, 77, 90)	CO3	L3, L6
3.	What do you mean by Trouble sort ? explain with example	CO3	L3, L5
4.	Describe Dynamic Programming. What are the differences between dynamic programming and Greedy method?	CO2	L2, L3
5.	Discuss various types of sorting algorithm. Also write the name of the various algorithms used to solve sorting problem.	CO1	L1, L2
6.	What is spanning tree? Apply Kruskal algorithm on any weighted graph to find minimum spanning tree.	CO2	L2, L3
7.	What is bottom up dynamic programming? explain with example.	CO1	L1, L2

SECTION–B(40Marks)

❖ *Attempt any FOUR questions. Eachquestion is of 10 marks.*

Q. No.	Questions	CO*	BL*
1.	Write the algorithms for BFS and DFS traversals of a graph. Show their difference in traversal for the following graph 	CO1	L1, L2, L3

2.	Find the shortest paths from node 1 to all other nodes Using Dijkstra's Algorithm:  	CO2	L1, L2, L3
3	Write prim's algorithm to find minimum spanning tree. Apply Prim's algorithm to find minimum spanning tree on the given below graph: $\begin{matrix} 0 & \infty & 3 & \infty \\ 2 & 0 & \infty & \infty \\ \infty & 2 & 0 & 1 \\ 1 & \infty & \infty & 0 \end{matrix}$	CO3	L3,
4.	Using Floyd Warshall's algorithm solve the all pair shortest path problem for the graph whose weight matrix is given below: $\begin{pmatrix} 0 & \infty & 3 & \infty \\ 2 & 0 & \infty & \infty \\ \infty & 7 & 0 & 1 \\ 6 & \infty & \infty & 0 \end{pmatrix}$	CO4	L3, L4, L5
5.	For the given flow network, use Ford-Fulkerson method to find the maximum flow:  	CO5	L3, L5,
6.	Write short note on a. Network flows b. Disjoint Set Union with Path Compression c. real world application of Greedy algorithm	CO2	L2, L3

CO*-CourseOutcomesfromSyllabus,BL*-Bloom'sTaxonomyLevels(1:Remembering,2:Understanding,3:Applying, 4: Analyzing,5: Evaluating 6:Creating)