



Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058, India

(Autonomous College Affiliated to University of Mumbai)

End Semester Examination

May 2021

Max. Marks: 60

Class: S.Y.MCA

Course Code:MCA43

Name of the Course: Design and Analysis of Algorithms

Duration: 2.00 hrs

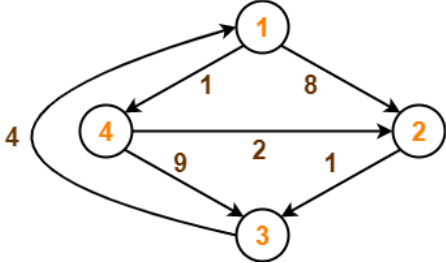
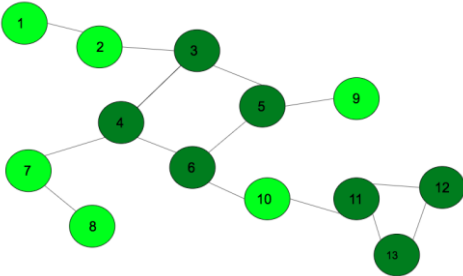
Semester: IV

Branch: M.C.A.

Instruction:

- (1) All questions are compulsory
- (2) Draw neat diagrams
- (3) Assume suitable data if necessary

Q. No.	Questions	Max. Marks	CO-BL-PI																		
Q2		15																			
A	Write the algorithm for quick sort and analyze its time complexity.	5	2-4-2.2.3 1-4-2.2.3																		
B	Multiply the matrices A and B using Strassens's Matrix Multiplication. $\mathbf{A} = \begin{bmatrix} 2 & 4 \\ 6 & 8 \end{bmatrix} \qquad \mathbf{B} = \begin{bmatrix} 5 & 6 \\ 7 & 3 \end{bmatrix}$	5	2-4-2.2.3																		
C	The knapsack can hold 60 pounds find the optimal solution using Greedy Method <table border="1"><thead><tr><th>Items</th><th>w_i</th><th>v_i</th></tr></thead><tbody><tr><td>Item1</td><td>5 pounds</td><td>30\$</td></tr><tr><td>Item2</td><td>10 pounds</td><td>20\$</td></tr><tr><td>Item3</td><td>20 pounds</td><td>100\$</td></tr><tr><td>Item4</td><td>30 pounds</td><td>90\$</td></tr><tr><td>Item5</td><td>40 pounds</td><td>160\$</td></tr></tbody></table>	Items	w _i	v _i	Item1	5 pounds	30\$	Item2	10 pounds	20\$	Item3	20 pounds	100\$	Item4	30 pounds	90\$	Item5	40 pounds	160\$	5	3-2-4.3.4
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Q3		15																			
A	Let the dimensions of A,B,C,D respectively be 10X5, 5X15, 15X8, 8X20 generate matrix product chains that produces minimum number of matrix multiplications using dynamic programming.	8	3-4-2.2.4																		
B	Draw the portion of state space tree generated by recursive backtracking algorithm for sum of subsets problem with an example. OR Explain the importance of bounding function in generating the solutions. And also write about different types of bounding	7	4-4-4.3.4																		

	functions with an example each.		
Q4		15	
A	<p>Find the shortest path distance between every pair of vertices using Floyd Warshall Algorithm.</p> 	5	5-4-4.3.3
B	Analyse the string matching algorithm with finite automata, compare with brute force string matching.	5	5-5-4.3.3
C	<p>Do you think set cover problem belongs to NP-Complete class? Give the proof to justify your answer.</p> <p style="text-align: center;">OR</p> <p>Find the vertex cover of the given graph.</p> 	5	6-4-1.3.1