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Course Code: A8516



VARDHAMAN COLLEGE OF ENGINEERING (AUTONOMOUS)

II B.Tech II Semester Continuous Assessment - I, April - 2024
(Regulations: VCE-R22)

DESIGN AND ANALYSIS OF ALGORITHMS (Common to CSE, CSE(AIML), IT and AIML)

Date: 10 April 2024

Time: 2 Hours

Maximum Marks: 30

Answer all Questions in Part-A

Answer any FOUR Questions in Part-B

Course Outcomes with Bloom's Levels:

CO#	CO Statement	Bloom's Level (L#)
CO1	Make use of asymptotic notations, divide and conquer techniques to decompose complex problems into small and simple.	L3
CO2	Choose Greedy method to find out feasible solutions of problems.	L3
CO3	Examine complex engineering problems in finding the optimal solution.	L4
CO4	Construct all possible solutions using backtracking methods	L3
CO5	Inspect Branch and Bound techniques and NP complete problems significance in algorithms.	L4

Questions:

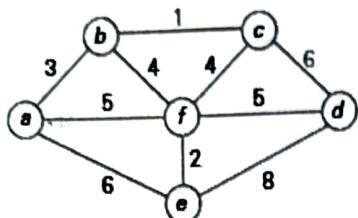
PART-A (Multiple Choice / Fill in the Blanks / Match the Following / Short Answer Type Questions)			
		CO#	BL#
1.	a) Worst case time complexity of quick sort is.....	CO1	BL1
	b) Define an algorithm	CO1	BL1
	c) Performance of an algorithm is depends on..... and	CO1	BL2
	d) Prove that $3n+2=\Theta(n)$	CO1	BL2
	e) Define Theta notation.	CO1	BL2
	f) What are the applications of greedy approach	CO2	BL1
	g) Kruskal's algorithm is method	CO2	BL1
	h) Discuss knapsack problem	CO2	BL1
	i) Given a weighted graph where weights of all edges are unique then there is always a unique shortest path from source to a destination (True / False)	CO2	BL1
	j) Define minimal cost spanning tree.	CO2	BL1

PART-B (Descriptive Questions)

2.	Solve the recurrence relation using Substitution Method $T(n) = \begin{cases} 1, & n=1 \\ 2T(n/2) + n, & n>1 \end{cases}$	CO1	BL2	5 M
3.	Sort the given list using merge sort [50, 25, 6, 20, 60, 30, 90, 10]	CO1	BL3	5 M
4.	Write an algorithm to find out the maximum and minimum of array elements	CO1	BL2	5 M

	using divide and conquer method. Derive its time complexity.		
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5. Calculate the minimum cost spanning tree of the following graph using Prim's algorithm.

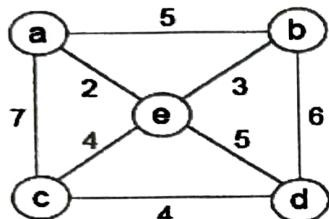


CO2 BL3 5 M

6. Write an algorithm for the job sequencing problem using greedy approach.

CO2 BL2 5 M

7. Apply the Dijkstra's algorithm to the following graph to find the single source shortest path. Consider vertex 'a' as the source vertex.



CO2 BL3 5 M