Sanjay Ghodawat University, Kolhapur

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EXM/P/09/00

Year and Program:2019-20
B. Tech. Computer Science & Engg.

School of Technology
Department of Computer Science & Engg

TY B. Tech. Semester – V

Course Code : CST301

Course Title: Design and Analysis of Algorithms

Day and Date: Tuesday 19/11/19

10.30am to 1.30pm

Max Marks: 100

End Semester Examination (ESE)

Instructions:
1) All Questions are compulsory
2) Figures to the right indicate full marks
3) Draw neat diagrams with pencil wherever necessary

Q.1		Marks	Bloom's Level	CO
a)	**Attempt Following**			
	Solve the following recurrence relation by back substitution method and recursive tree method. a. T(n)=T(n-1)+log(n) b. T(n)=2T(n-1)+1	07	L3	CO1
	OR			
	Find Minimum and Maximum number from the given set of numbers using Divide and Conquer Strategy. S={10,5,-3,0,19,8,35,45,6}. Estimate complexity of the algorithm.	07	L3	CO2
b)	**Attempt Following**			
	Estimate the minimum cost of the spanning tree for the given graph using Kruskal's algorithm.	08	L5	CO1

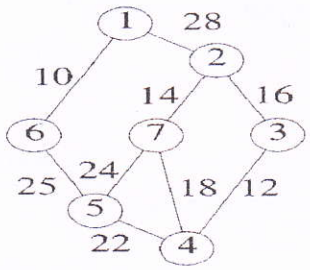


Fig: 1

OR

ESE

Solve the following Kanpsack problem using greedy method using the following instances n=7, m=15, $(p_1,p_2,p_3,p_4,p_5,p_6,p_7)=(10,5,15,7,6,18,3)$ and $(w_1,w_2,w_3,w_4,w_5,w_6,w_7)=(2,3,5,7,1,4,1)$. | 08 | L3 | CO1

Q.2

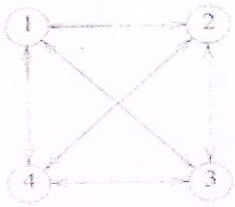
a) **Attempt Following**

Solve All Pair Shortest Paths for following graph using dynamic programming method. State "Principle of Optimality" | 07 | L3 | CO2

0	5	999	999
50	0	15	5
30	999	0	15
15	999	5	0

OR

Solve the travelling Salesman problem for the given graph. | 07 | L3 | CO2



0	10	15	20
5	0	9	10
6	13	0	12
8	8	9	0

Fig: 2

b) **Attempt Following**

Evaluate the Branch and Bound Knapsack problem for the following instance n=4, $(p_1,p_2,p_3,p_4)=(10,10,12,18)$ and $(w_1,w_2,w_3,w_4)=(2,4,6,9)$. | 08 | L5 | CO2

OR

Explain control abstraction of backtracking algorithmic statergy. | 08 | L2 | CO3

Q. 3 Solve any TWO from following

a) Describe ternary Search algorithm and estimate its complexity. | 08 | L3 | CO3

b) Construct the shortest path from source to all other nodes in the following graph. Consider source as 1. | 08 | L3 | CO2

ESE

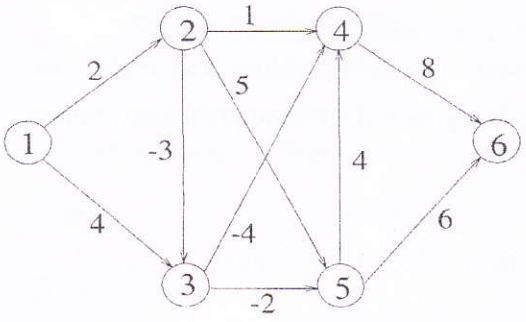


Fig: 3

c) Demonstrate working of the algorithm to find Longest Common subsequence from two strings by using appropriate example. 08 L2 CO2

d) Illustrate all possible Hamiltonian cycles with reference to Backtracking technique for folowing graph. 08 L2 CO3

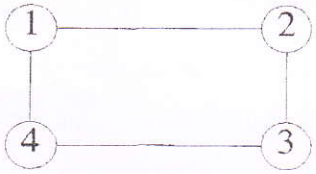


Fig: 4

Q. 4 Solve any TWO from following

a) Compare Naïve String algorithm and Rabin Karp algorithm. Justify which algorithm is efficient. 09 L2 CO4

b) Show the working of List Ranking algorithm on PRAM for the given list. 09 L1 CO3

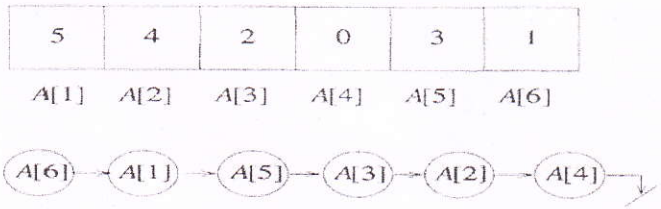


Fig: 5

c) Compare Packet routing techniques for linear and MESH PRAM. 09 L4 CO3

Q. 5 Solve any TWO from following

ESE

a)	Recall Deterministic and Non-deterministic algorithms and explain the relationship between P, NP, NP-Complete and NP Hard problems with neat diagram.	09	L1	CO2
b)	Show that Chromatic number decision problem is NP-complete.	09	L1	CO3
c)	Explain the reduction of CNF-satisfiability problem to Travelling Salesman decision problem.	09	L2	CO3

Q.6 Solve any THREE from following

a)	Analyze all three fundamental techniques of MESH parallel random access machine.	06	L4	CO
b)	Relate the variants of PRAM algorithms with respect to read and write operations.	06	L1	CO
c)	Explain And/OR Graph and show that And/OR decision problem is NP-Complete.	06	L2	CO
d)	Show that Node Cover decision Problem is NP-Hard.	06	L2	CO

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ESE