1E9101

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M. Tech. (Sem. I) (Main / Back) Examination, February/March-2011
Software Engineering
1MSE4.1 -Advanced Data Structures (Common With 1MCS1)

Time : 3 Hours] [Total Marks : 100
[Min. Passing Marks : 33

Attempt any ***five*** *questions.*
Marks of questions are indicated against each question.
Draw ***neat*** *and comprehensive* ***sketches*** *wherever necessary to* ***clearly*** *illustrate your answer.*
Assume missing ***data suitably*** *if any and* ***specify*** *the same.*

Use of following supporting material is permitted during examination.
(Mentioned in form No 205)

1. Nil 2. Nil

1 (a) Explain Persistance tree in detail. **10**

(b) Prove that clique decision problem is NP complete **10**

2 (a) What is multidimensional tree. A multi- dimensional cum lexicographic tree with root key K is described below.

Node key	Left key	Middle key	Right key
K	J	I	P
J	F	B	S
I		T	X
T	R	H	Q
R		M	
M	A		
A			N

Draw above multi- dimensional tree and obtain whether following strings are successfully found in above tree, JB, KIRAN, KITH, KIR, KIRM. **10**

(b) What do you understand by randomized algorithms ? What are advantages of randomization ? Discuss various types of randomized algorithm with the help of suitable example. **10**

3 (a) Derive a randomized quick sort algorithm and calculate its time complexity. 10

(b) Explain ford - fulkerson method for solving maximum flow problem and analyze it. 10

4 (a) Explain Geometric and Binomial distributions with probabilistic analysis. 10

(b) Describe Grahm's scan algorithm for finding convex hull and compute its time complexity. 10

5 Explain following terms with respect to flow problem :
(a) Flow network
(b) Residual Network
(c) Augmenting path
(b) Cuts of flow network. 4×5=20

6 (a) Discuss PRAM model. Write a parallel algorithm to compute the depth of each node in a binary tree. 10

(b) Give an overview of linear programming with the help of simplex algorithm. 10

7 Define the following terms :
(a) Deterministic and Non-Deterministic algorithms
(b) P and NP class
(c) NP complete and NP Hard problems
(d) Vertex cover problem. 20

8 (a) What do you mean by Approximation algorithm ? Give approximation algorithm to solve Travelling Salesman problem. 10

(b) Explain parallel sorting algorithms. 10