

Code: 9A05403

R09

B.Tech II Year II Semester (R09) Supplementary Examinations December/January 2014/2015

**DESIGN & ANALYSIS OF ALGORITHMS**

(Common to CSE, IT & CSS)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 (a) Present an algorithm for finding Fibonacci sequence up to a given number.  
(b) Discuss about space complexity in detail.
- 2 (a) Describe UNION and FIND algorithms.  
(b) What are disjoint sets and its operations? Explain.
- 3 (a) Explain the principle of Divide – and – Conquer Technique.  
(b) Draw the tree of calls of merge for the following set of elements:  
(20, 30, 10, 40, 5, 60, 90, 45, 35, 25, 15, 55)
- 4 (a) Find optimal solution for the following knapsack problem:  $n = 3$ ,  $m = 20$ ,  $(P_1, P_2, P_3) = (25, 24, 15)$  and  $(W_1, W_2, W_3) = (18, 15, 10)$ .  
(b) Prove that if  $P_1/W_1 \geq P_2/W_2 \geq \dots \geq P_n/W_n$ , then greedy knapsack generates an optimal solution to the given instance of knapsack problem.
- 5 (a) Write an algorithm of all pair shortest path.  
(b) Explain the matrix chain multiplication with an example.
- 6 Write a backtracking algorithm for:  
(a) The Hamiltonian circuit problem.  
(b) M-coloring problem.
- 7 Draw the portion of the state space tree generated by LC branch and bound for an instance  $n = 4$ ,  $(P_1, P_2, P_3, P_4) = (10, 10, 12, 18)$ ,  $(w_1, w_2, w_3, w_4) = (2, 4, 6, 9)$ , and  $m=15$ .
- 8 (a) Write short notes on:  
(i) Classes of NP-hard.  
(ii) Classes of NP-complete.  
(b) How are P and NP problems related?

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