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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 75551

5 Year M.Sc. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Fifth Semester

Computer Technology

XCS 355/10677 SW 503 — DESIGN AND ANALYSIS OF ALGORITHM

(Common to 5 Year M.Sc. Software Engineering/M.Sc. Information Technology)

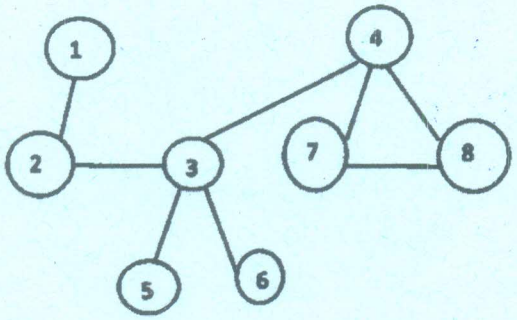
(Regulation 2003/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is Big 'Oh' notation?
2. What is Binary Search Tree?
3. Define the principle of optimality.
4. What is the difference between Greedy method and Dynamic programming?
5. Identify the articulation points and bi-connected components of the given graph.



6. State the applications of BFS and DFS.
7. What are Hamiltonian cycles?
8. What is Branch and Bound Technique?
9. What are Catalan Numbers?
10. Draw a diagram to describe the relationship among P,NP, NP- complete and NP-Hard problems.

PART B — (5 × 16 = 80 marks)

11. (a) Write down the Merge sort and Quick sort algorithm to sort the following sequences of Keys: 65,70,75,80,85,60, 55,50,45.Also find the recurrence equation and complexity of an algorithms. (16)

Or

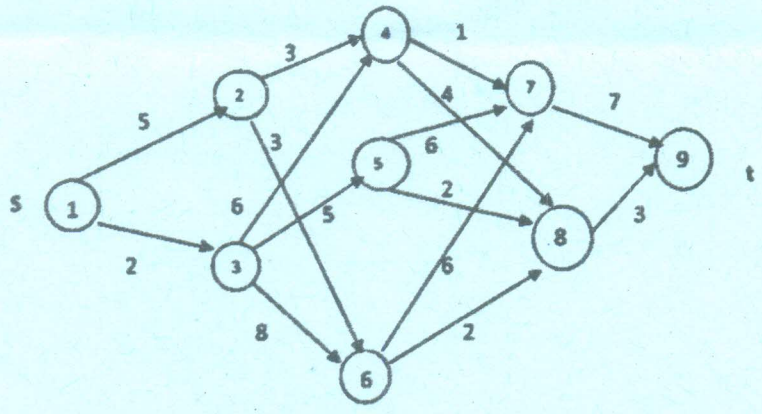
(b) (i) Write an algorithm for Binary search. List the properties of Binary Search Tree. (10)

(ii) Discuss techniques and methods to measure the performance of a given algorithm and give examples. (6)

12. (a) Solve Knapsack problem using Greedy Technique. (16)

Or

(b) Find a minimum-cost and path from source *(s)* to destination *(t)* in the multistage graph given below. Find the minimum-cost first using the forward approach and then using the backward approach. (16)



13. (a) Write an algorithm to find the reflexive transitive closure matrix A^* of a directed graph G. Show that if G has 'n' vertices and 'e' edges and is represented by its adjacency list's then, this can be done in time $\square(n^2+ne)$. How much space does your algorithm take in addition to that needed for G and A^*? (16)

Or

(b) Write an algorithm to identify an articulation points and to construct bi-connected components. Explain with suitable example. (16)

14. (a) (i) Using Backtracking approach, Derive an algorithm for n–queen's problem and apply the algorithm for 8-queen's problem to find a feasible solution. (8)

(ii) List the applications of Backtracking method. (8)

Or

(b) Solve the Knapsack problem using Dynamic programming techniques. (16)

15. (a) (i) State and prove Cooke's theorem. (8)

(ii) Discuss the need for Approximation Algorithms. (8)

Or

(b) Write short notes on P and NP problems. (8+8)

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