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Question Paper Code : 65060

5 Year M.Sc. DEGREE EXAMINATION, MAY/JUNE 2013.

Fifth Semester

Computer Technology

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

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

(Regulation 2003/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Using the step count method analyze the time complexity when two m × n matrices are added.

2. Give the control abstraction for divide and conquer technique.

3. What are the constraints of knapsack problem?

4. What is the basic difference between divide and conquer technique and greedy technique.

5. Give the constraints to solve the traveling sales person problem in dynamic programming.

6. What do you mean by traversal?

7. With an example list the important features of dynamic trees?

8. What is a Hamiltonian cycle?

9. What is the property of NP-Complete problem'?

10. What is Non-Deterministic Algorithm?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Write a recursive algorithm for the Tower of Hanoi puzzle. Obtain the recurrence equation. (8)

(ii) Explain Quick sort with an example. Give its time complexity. (8)

Or

(b) Explain the working of binary search algorithm and merge sort algorithm using divide-and-conquer with an example. (16)

12. (a) Solve the knapsack problem using greedy technique. (16)

Or

(b) What is multistage graph? Explain with an example. Write the procedure for finding the minimum cost path using backward approach. (16)

13. (a) Write and explain the algorithm for BFS and DFS with examples. (16)

Or

(b) Give an algorithm to identify articulation points and to construct biconnected components. Explain with an example. (16)

14. (a) Explain Graph Coloring problem with example. (16)

Or

(b) Solve the traveling sales person problem using branch and bound technique for the graph represented in adjacency matrix form in fig. 14 (b)

$$\begin{bmatrix} \infty & 25 & 40 & 31 & 27 \\ 5 & \infty & 17 & 30 & 25 \\ 19 & 15 & \infty & 6 & 1 \\ 9 & 50 & 24 & \infty & 6 \\ 22 & 8 & 7 & 10 & \infty \end{bmatrix}.$$

Fig. 14 (b)

15. (a) Describe approximation algorithm for Traveling Salesperson problem. (16)

Or

(b) Explain in detail about NP-Hard code generation problem. (16)

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