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Question Paper Code : 95403

5 Year M.Sc. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fifth Semester

Information Technology

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

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

(Regulations 2003/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the criteria that all algorithms must satisfy.

2. Define searching.

3. What is an optimal solution?

4. Distinguish greedy and dynamic methods.

5. Write pseudocode for post order traversal of binary trees.

6. What is adjacency list for a graph? Give an example.

7. List the important features of dynamic trees with an example.

8. What is a Hamiltonian cycle?

9. What is meant by non-deterministic algorithm?

10. Define Cooke's theorem.

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.

12. (a) Explain how the greedy method finds an optimal solution for knapsack problem.

Or

(b) Explain the procedure to solve all pairs shortest paths problem.

13. (a) Describe the graph traversal techniques in detail. Give examples.

Or

(b) Compare the following :

(i) Graphs and trees.

(ii) Spanning tree and binary tree.

(iii) Graph and connected component.

(iv) Binary search tree and binary tree. (4 × 4 = 16)

14. (a) (i) Explain 8-Queens problem. How can it be solved in backtracking method? (8)

(ii) Give an example for FIFO branch and bound solution for 0/1 knapsack problem. (8)

Or

(b) (i) Define graph coloring. What is the optimal solution for it? How can it be obtained in backtracking method? (10)

(ii) Give the control abstraction for LC search. (6)

15. (a) What are AND/OR graphs? Differentiate it from trees. How the problems are reduced using AND/OR graphs? Give example.

Or

(b) What is DAG? Explain how the arithmetic expressions are represented using DAGs. Explain the code generation for the corresponding DAGs.
