

Z 3508

M.C.A. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2006.

Second Semester

MC 1653 — DESIGN AND ANALYSIS OF ALGORITHMS

(Regulation 2005)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by Time Complexity and Space complexity of an algorithm?
2. Define Big Omega Notation.
3. Write the general divide and conquer recurrence relation.
4. State Master theorem.
5. What is the largest number of key comparisons made by binary search in searching for a key in an array of eleven elements?
6. Define Principle of Optimality.
7. What is the importance of memory function technique?
8. What do you mean by state space tree?
9. How do you terminate a search path at a current node in a state space tree of a branch and bound algorithm?
10. What is graph coloring problem?

PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the important problem types? Explain them. (10)
(ii) Discuss the various asymptotic efficiency classes. (6)

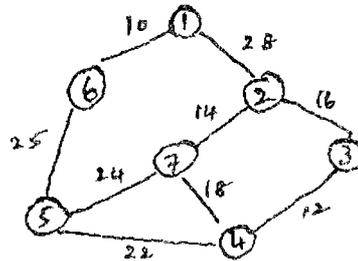
Or

- (b) (i) Given two algorithms, how do you find the efficiency of each? (8)
(ii) With illustrations, explain recursive algorithm analysis. (8)

12. (a) (i) Describe Divide and Conquer Methodology. (5)
(ii) How is it applied in Binary search? Give the algorithm. (8)
(iii) Do the worst case analysis for binary search algorithm? (3)

Or

- (b) (i) Discuss Greedy Approach. (5)
(ii) Apply Greedy method to obtain a minimum cost spanning tree for the following graph : (11)



13. (a) (i) What is Dynamic Programming? (5)
(ii) Apply Floyd's Algorithm to solve All-Pairs-Shortest-Paths problem. (11)

Or

- (b) (i) What is the principle application of binary search tree? (3)
(ii) Write an algorithm to find optimal Binary Search Tree. Also mention its space and Time efficiency. (13)

14. (a) (i) What is the principle idea of backtracking? (5)
(ii) Discuss the n -Queen's problem and draw the state space tree for solving the 4-Queen's problem by backtracking. (11)

Or

- (b) Consider the following Weighted Graph in Fig. (i). Apply Branch and Bound technique to solve the Traveling Sales Person problem. (16)

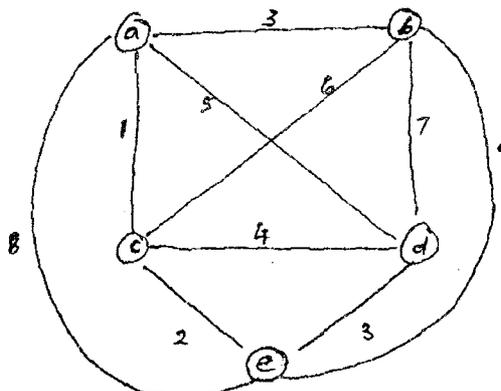


Fig. (i) Weighted graph

15. (a) Discuss the Approximation algorithm for KnapSack problem. (16)

Or

(b) Compare class P, class NP, NP-Hard and NP-Complete problems. (16)