

II B.Tech II Semester Supplementary Examinations, Apr/May 2006
DESIGN AND ANALYSIS OF ALGORITHMS
(Computer Science & Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Determine the frequency counts for all statements in the following two algorithm segments
 - i. for I:=1 to n do
 for j:=1 to I do
 for k:=1 to j do
 x:=x+1;
 - ii. I:=1;
 While (I ≤ n) do
 {
 x:=x+1;
 I:=I+1;
 }
- (b) What is best case, average and worst case performance. Explain. [8+8]
2. Write an algorithm to sort N numbers in descending order using quick sort. Also analyze the time complexity. [16]
3. Formulate an algorithm for a spanning tree problem in terms of a sequence of set operations in which take G as an undirected graph; S as an undirected tree; V as the number of vertices; E as the number of edges; T as a set used to collect the edges of the final minimum spanning tree; C as the cost function for the graph G given by $\{\sum_{e \in E^1} C(e)\}$ for the sub graph $G^1 = (V^1, E^1)$ of G. Use set VS for the vertex set of the trees in the spanning forest to write the minimum cost spanning tree algorithm. [16]
4. Use an AVL tree as the basis of an algorithm to execute MIN, UNION, and DELETE on sets consisting of integers 1 through n, using $O(\log n)$ steps per operation. . [16]
5. Using a dynamic programming approach coupled with the set generation approach, show how to obtain an $O(2^{n/2})$ algorithm for the 0/1 knapsack problem. [16]
6. Write and explain a non-recursive algorithm for inorder traversal of a binary tree with an example. What is the time & space complexity of your algorithm? [16]
7. (a) Write a complete LC - branch and bound algorithm for knapsack problem.
 (b) Explain Traveling sales person problem with an example. [8+8]

8. What is interpolation? Explain Lagrange interpolation algorithm & Newtonian Interpolation algorithm. [16]

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