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

Question Paper Code: 41842

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Fourth Semester

Information Technology

14UIT402 - ANALYSIS AND DESIGN OF ALGORITHMS

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Given $T(n)=5n^2+3n^3+100$, the upper bound for the T(n) is

   (a) $O(n^2)$ (b) $O(n^3)$ (c) O(n) (d) none of these

2. If the array is already sorted the upper bound of quick sort is

   (a) $O(n^{logn})$ (b) O(nlogn) (c) $O(n^2)$ (d) none of these

3. Balanced Search trees

   (a) AVL trees (b) Red Black Trees
   (c) B-Trees (d) All the above

4. In asymptotic analysis, an upper bound of an algorithm is represented as

   (a) Big-Oh (b) Big-Omega
   (c) Big-Theta (d) Big -Gamma

5. Fractional Knap Sack can be effectively solved using

   (a) Greedy Technique (b) Dynamic Programming
   (c) Brute Force (d) none of these

6. _____solves the single-source shortest-paths problem on a weighted, directed graph.

(a) Dijkstra's algorithm (b) Prim's Algorithm
(c) Kruskal Algorithm (d) Both (a) and (b)

7. A _____always makes the choice that looks best at the moment.

(a) Brute force (b) Dynamic Programming
(c) greedy algorithm (d) Back-tracking

8. For a directed graph G =(V,E); V is the vertices and E is the edges, the Floyd-Warshall algorithm, runs in

(a) $O(V^3)$ (b) $O(V^2)$ (c) $O(E^3)$ (d) O(V+E)

9. The Kruskal algorithm finds the

(a) Minimum cost spanning tree (b) Shortest path
(c) Longest path (d) none of these

10. The total number of solutions possible for8-Queen problem is

(a) 78 (b) 98 (c) 66 (d) 92

PART - B (5 x 2 = 10 Marks)

11. Write an algorithm for bubble sort and give its upper bound.

12. Define Master's method.

13. What are AVL trees?

14. Write arecursive algorithm to find factorial for the given number?

15. Differentiate back-tracking and branch and bound.

PART - C (5 x 16 = 80 Marks)

16. (a) Explain the types of algorithm strategies. Give a short description of problem types. (16)

Or

(b) How asymptotic notations are used in analysis of algorithms? Explain Big-OH, Big-Omega and Big-Theta. (16)

17. (a) Illustrate the mathematical analysis of recursive algorithm with an example. (16)

Or

(b) Explain the breadth first search and depth first search with an example. (16)

18. (a) Write an algorithm for Quicksort. Discuss running time efficiency of the algorithm in best case and worst case. (16)

Or

(b) Write an algorithm for selection sort and insertion sort. compare and analysis it's running time efficiencies. (16)

19. (a) Describe Prim's algorithm with a neat example. Discuss how greedy technique is incorporated in it. (16)

Or

(b) Explain the optimal binary search trees using dynamic programming. (16)

20. (a) Write an algorithm to solve subset-sum problem using backtracking concept.(16)

Or

(b) Explain how branch and bound strategy is used in solving Knapsack problem. (16)

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