

B.TECH. DEGREE EXAMINATION, MAY 2014**Sixth Semester**

Branch : Computer Science and Engineering

ALGORITHM ANALYSIS AND DESIGN (R)

(Old Scheme—Supplementary/Mercy Chance)

[Prior to 2010 Admissions]



Time : Three Hours

Maximum : 100 Marks

Part A*Answer all questions.**Each question carries 4 marks.*

1. Write short note on recursive algorithms with examples.
2. Define theta notation of a function $f(n)$.
3. Write short note on the control abstraction of divide and conquer strategy.
4. Discuss how the Strassen's matrix multiplication algorithm outperforms the classical one.
5. Write short note on the Greedy strategy.
6. Find an optimal placement for 13 programs on three tapes T0, T1 and T2 where the programs are of length 12, 5, 8, 32, 7, 5, 18, 26, 4, 3, 11, 10 and 6.
7. Write short note on Multistage graphs.
8. What is a comparison tree ? Draw the comparison tree for sorting four elements.
9. Explain the general principle of backtracking method, taking an example.
10. Differentiate between backtracking and branch-and-bound algorithm.

(10 × 4 = 40 marks)

Part B*Answer all questions.**Each full question carries 12 marks.*

11. Discuss about the methods used for solving recurrences. (12 marks)
- Or*
12. Explain the various pseudo code conventions used in algorithms. (12 marks)

Turn over

13. Explain Heapsort algorithm and its complexity.

(12 marks)

Or

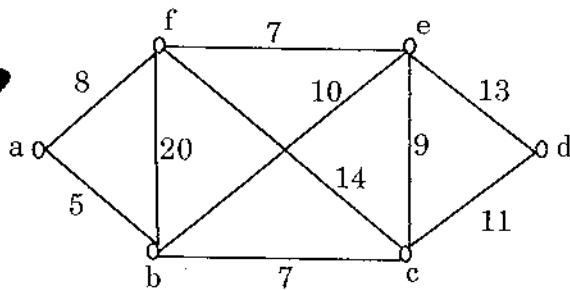
14. Write an algorithm to perform binary search on sorted list of elements. Analyze the algorithm for the best case, average case and worst case.

(12 marks)

15. Illustrate the steps for computing a minimum cost spanning tree for the graph given below using

(a) Prim's algorithm

(b) Kruskal's algorithm



(12 marks)

Or

16. Discuss about Knapsack problem and its solution.

(12 marks)

17. Discuss about All-pairs shortest paths problem. Solve the all-pair shortest path problem for the diagraph with the weight matrix given below.

$$\begin{bmatrix} 0 & 2 & \infty & 1 & 8 \\ 6 & 0 & 3 & 2 & \infty \\ \infty & \infty & 0 & 4 & 8 \\ \infty & \infty & 2 & 0 & 3 \\ 3 & \infty & \infty & \infty & 0 \end{bmatrix}$$

(12 marks)

Or

18. Explain the backward approach for finding minimum cost path in multistage graphs. Solve the following graph using it.

(12 marks)

19. Explain the recursive backtracking algorithm used in sum of subsets problem. Draw the state space diagram for the sum of subsets problem for the instance, $w = \{5, 7, 8, 10\}$ and $m = 15$.

(12 marks)

Or

20. Explain how backtracking is used for solving 8-queens problem. Show the state space tree.

(12 marks)

[5 × 12 = 60 marks]

