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

Question Paper Code: 94203

B.E./B.Tech. DEGREE EXAMINATION, NOV 2022

Fourth Semester

Computer science and Engineering

19UCS403- DESIGN AND ANALYSIS OF ALGORITHMS

(Regulations 2019)

Duration: Three hours Maximum: 100 Marks

Answer All Questions

PART A - (5x 1 = 5 Marks)

1. Two main measures for the efficiency of an algorithm are CO1- U

   (a) Processor and memory (b) Complexity and capacity

   (c) Time and space (d) Data and space

2. Which is the straight forward approach of solving the problem? CO1- U

   (a) Divide and Conquer (b) Decrease and Conquer

   (c) Brute force (d) Dynamic Programming

3. Greedy approach is applicable to only CO1- U

   (a) Sorting (b) Searching (c) Optimization Problem (d) String Problems

4. Problems that can be solved in polynomial time is called_____ CO1- U

   (a) Tractable problem (b) Intractable problem

   (c) Decision problems (d) Sorting problem

5. Which of the following problem solved by back tracking? CO1-U

   (a) N-Queens Problem (b) Assignment problem

   (c) Kanpsack Problem (d) Traveling salesman problem

PART – B (5 x 3= 15Marks)

6. If f (n) = n! and g(n) = 2n, indicate whether f = O(g), or f = Ω(g), or both (f = Θ(g)). CO1- U

7. List out the advantages of Divide and Conquer algorithms. CO1- U

8. What is the asymptotic complexity of maximum matching problem? CO1- U

9. Define NP hard problem CO1- U

10. What is subset sum problem? CO1- U

PART – C (5 x 16= 80Marks)

11. (a) Explain the analysis of recursive algorithms with the example of Towers of Hanoi puzzle. CO1-U (16)

Or

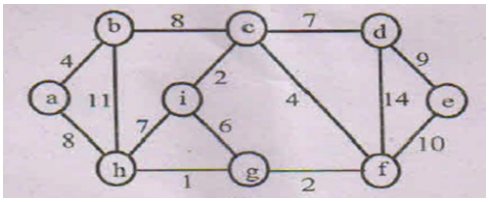
(b) Explain the analysis of non-recursive algorithms with the example of matrix multiplication problem CO1-U (16)

12. (a) Apply quick sort and bubble sort to sort the following array A [5, 3, 1, 9, 8, 2, 4, 7]. Compare its efficiency CO2-App (16)

Or

(b) Analyze the efficiency of the binary search algorithm and find the number of key comparisons made by a successful binary search for the following array. [Key=34] 7,12,26,34,45,56.78,79,91,93 CO2-App (16)

13. (a) Apply the Kruskal's algorithm to find the shortest path for the given graph CO2-App (16)



Or

(b) Write OBST algorithm to find optimal solution and solve the below problem and give the tree structure which has lowest expected cost. CO2-App (16)

14. (a) Explain in detail about how the problem of sorting the given set of numbers can be solved in a Polynomial time with supportive proofs. CO2- App (16)

Or

(b) Find the computational complexity of the Cook's Theorem. Classify whether the problem is NP-hard or NP-complete? CO2- App (16)

15. (a) The N–queens puzzle is the problem of placing N chess queens on an N × N chessboard so that no two queens threaten each other. Thus, the solution requires that no two queens share the same row, column, or diagonal. Use the suitable technique to print all possible solution to this problem by assigning n as 4 — CO2- App — (16)

Or

(b) Explain how traveling salesman problem is solved by branch and bound method with example. — CO2- App — (16)

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