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Question Paper Code: 54203

B.E./B.Tech. DEGREE EXAMINATION, MAY 2018

Computer Science and Engineering

15UCS403 - DESIGN AND ANALYSIS OF ALGORITHMS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

PART A - (5 x 1 = 5 Marks)

1. Desirable characteristic of an algorithm is CO1- R
 - (a) Generality
 - (b) Correctness
 - (c) Simplicity
 - (d) All of the above
2. Based on the problem statement and definitions, The straight forward approach is CO2- R
 - (a) Exhaustive Search
 - (b) Brute force
 - (c) Divide and Conquer
 - (d) Decrease and conquer
3. Dynamic programming is similar to the divide-and-conquer approach, then the solution of a large problem depends on CO3- R
 - (a) Overlapping Sub problems
 - (b) Sub problems that are completely separate
 - (c) Previously obtained solutions to sub problems
 - (d) None of the above
4. Which of the following standard algorithms is Dynamic Programming based? CO4- R
 - (a) 0/1 Knapsack problem
 - (b) Prim's Minimum Spanning Tree
 - (c) Kruskal's algorithm
 - (d) Dijkstra's algorithm

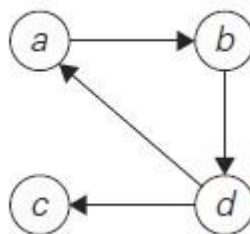
5. A Non-deterministic algorithm terminates unsuccessfully if and only if CO5- R
- (a) There exists no choices for success (b) The result of every operation varies
- (c) Stack overflow occurs (d) Sequence of choices available

PART – B (5 x 3= 15Marks)

6. Define Recursive and Non recursive algorithms. CO1- R
7. Examine the advantages and implementation issues of Divide and Conquer Methodology. CO2- U
8. Enumerate some real time applications of Maximum Flow Problem. CO3- U
9. Describe about 'Greedy algorithm'. CO2- R
10. How NP problems are different from NP complete? CO4-U

PART – C (5 x 16= 80Marks)

11. (a) Illustrate the working of Binary Search with an example and Write an pseudocode to perform Binary search algorithm. CO2- App (16)
- Or
- (b) Explain about the asymptotic notations and its properties. CO1- U (16)
12. (a) Apply bubble sort Algorithm for the given example. CO2 -App (16)
10,47,12,54,19,23
- Or
- (b) Write different algorithms for generating permutations and combinations. CO2- U (16)
13. (a) Write the Pseudocode of Warshall’s algorithm. Apply Warshall’s algorithm to find the transitive closure of the digraph. CO2 -App (16)



Or

- (b) Explain how dynamic programming technique is used to solve the knapsack problem with example. CO2- U (16)
14. (a) (i) Analyze Suitable method to find the optimal ordering for storage on tape problem CO3-Ana (8)
(ii) Solve the following job sequencing with deadlines problem. CO4 -Ana (8)
Given $n=7$
Profits $(p_1, p_2, p_3, p_4, p_5, p_6, p_7) = \{3, 5, 20, 18, 1, 6, 30\}$
Deadlines $(d_1, d_2, d_3, d_4, d_5, d_6, d_7) = \{1, 3, 4, 3, 2, 1, 2\}$
- Or
- (b) Consider an instance of the stable marriage problem given by the ranking matrix CO3- Ana (16)
- | | A | B | C |
|----------|------|------|------|
| α | 1, 3 | 2, 2 | 3, 1 |
| β | 3, 1 | 1, 3 | 2, 2 |
| γ | 2, 2 | 3, 1 | 1, 3 |
- For each of its marriage matchings, indicate whether it is stable or not.
For the unstable matchings, specify a blocking pair. For the stable matchings, indicate whether they are man-optimal, woman-optimal, or neither. (Assume that the Greek and Roman letters denote the men and women, respectively.)
15. (a) Indicate a solution to the traveling salesman using branch and bound technique. CO4- U (16)
- Or
- (b) Trace a State-Space tree to solve the 8-queens problem by with the help of backtracking technique. CO4- U (16)

