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Question Paper Code: U4203

B.E./B.Tech. DEGREE EXAMINATION, APRIL 2024

Fourth Semester

Computer science and Engineering

21UCS403- ALGORITHM ANALYSIS

(Regulations 2021)

(Common to IT, AI&DS, CSD and CSE(AIML) Engineering branches)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10 x 2 = 20 Marks)

1. Find GCD(31415, 14142) by applying Euclid's algorithm. CO2-App
2. How will you measure an input size to develop an algorithm? CO1-U
3. What is the worst case complexity of Binary Search? Justify your answer with an example. CO1-U
4. Differentiate the methods involved in Brute force approach and Divide & Conquer approach. CO1-U
5. Write an algorithm to find the shortest path using Kruskals algorithm with its analysis. CO2-App
6. Define dynamic programming with an example. CO1-U
7. List the procedure used in recursive backtracking algorithm. CO1-U
8. Write the steps involved in Knapsack Problem with its analysis CO1-U
9. Define the terms Clique and Vertex Cover. CO1-U
10. What is meant by NP hard and NP complete? CO1-U

PART – B (5 x 16= 80Marks)

11. (a) Discuss the fundamentals of algorithmic problem solving. CO2-App (16)
Examine how time efficiency of an algorithm can be calculated to find the given number in the list.
- Or
- (b) Examine the Asymptotic efficiency analysis for finding the factorial of given number. CO2-App (16)

12. (a) Apply merge sort algorithm to sort the given numbers 40,55,63,17,22,68,89,97 and also analyze the efficiency of this algorithm CO2-App (16)

Or

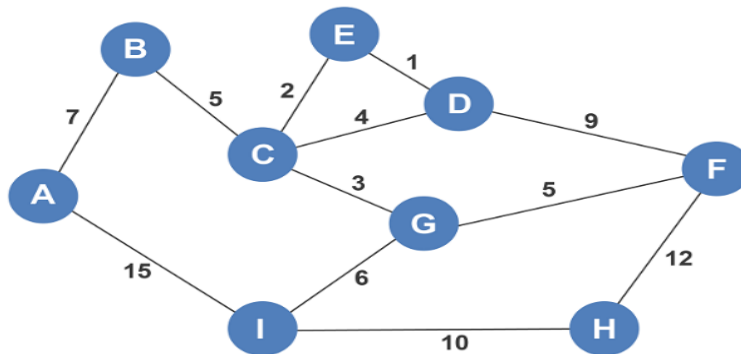
- (b) Apply quick sort and bubble sort to sort the following array CO2-App (16)
A [5, 3, 1, 9, 8, 2, 4, 7]. Compare its efficiency

13. (a) Construct an Optimal Binary Search tree for the given list of Keys CO2- App (16)

Key	A	B	C	D
Probability	0.1	0.2	0.4	0.3

Or

- (b) Apply Prims algorithm to find the Minimum Spanning Tree for the following graph. CO2- App (16)



14. (a) Consider knapsack problem: $n = 8$. $(W_1, W_2, W_3, W_4, W_5, W_6, W_7, W_8) = (1, 11, 21, 23, 33, 43, 45, 55)$, $P = (11, 21, 31, 33, 43, 53, 55, 65)$, $m = 110$. Solve the problem using Branch and Bound approach. CO2- App (16)

Or

- (b) The N-queens puzzle is the problem of placing N chess queens on an $N \times N$ 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)

15. (a) Differentiate NP hard and NP complete problems with its algorithm analysis. CO1-U (16)

Or

- (b) Explain non-deterministic sorting algorithm and also analyze its complexity. CO1-U (16)