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Question Paper Code: U4203

B.E./B.Tech. DEGREE EXAMINATION, NOV 2023

Fourth Semester

Computer science and Engineering

21UCS403- ALGORITHM ANALYSIS

(Regulations 2021)

(Common to Information technology and Computer science and Design 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 CO3-App
2. Compare the orders of growth of $n!$ and 2^n CO3-Ana
3. Write the steps involved in the string matching algorithm and its algorithm analysis. CO1-U
4. Write an algorithm to find the Breadth First Search to find the minimum spanning tree CO2-App
5. Write an algorithm to find the shortest path using Prim's algorithm with its analysis. CO2-App
6. What is meant by Greedy technique? CO1-U
7. How do you identify a bounded node in a Subset Sum Problem? CO2-App
8. Define the steps involved in Assignment Problem with its analysis CO1-U
9. What is meant by NP hard and NP complete? CO1-U
10. Analyze the time complexity of pointer doubling algorithm? CO3-Ana

PART – B (5 x 16= 80 Marks)

11. (a) Analyze the general framework for computing the efficiency of an algorithm to search the unique element in the list of 10 numbers. CO3-Ana (16)

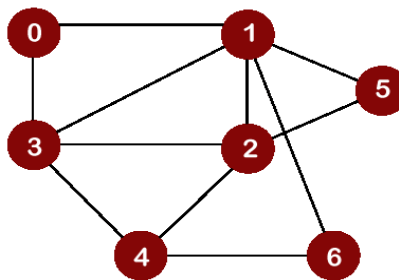
Or

- (b) Given two $n \times n$ matrices A and B, find the time efficiency of the definition-based algorithm for computing their product $C = AB$. By definition, C is an $n \times n$ matrix whose elements are computed as the scalar (dot) products of the rows of matrix A and the columns of matrix B. CO3-Ana (16)

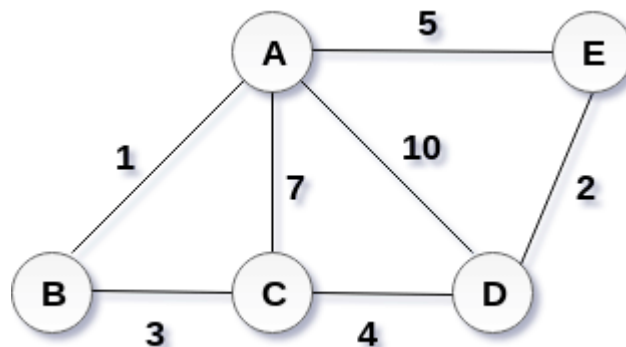
12. (a) Write an algorithm to sort the list E, X, A, M, P, L, E in alphabetical order using bubble sort and also analyze the complexities for this algorithm. CO2- App (16)

Or

- (b) Apply the DFS based algorithm to find whether the graph is cyclic or not and calculate the complexities for this algorithm. CO2- App (16)



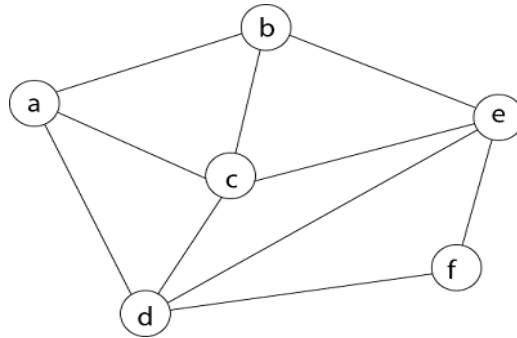
13. (a) Find out the minimum spanning tree using Kruskals algorithm and analyze the algorithm. CO2- App (16)



Or

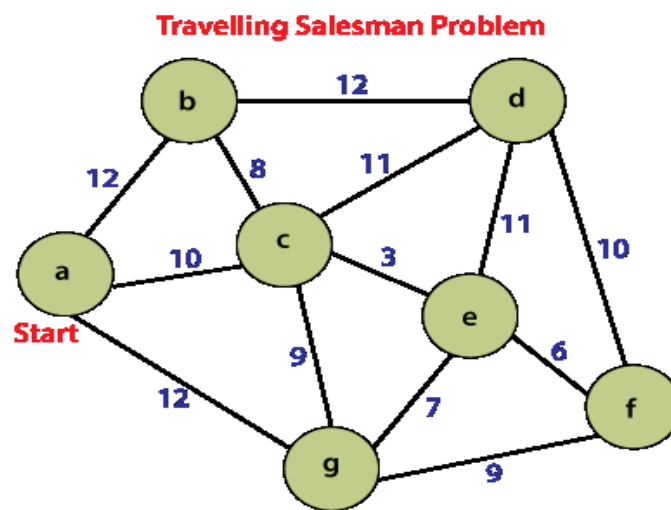
- (b) Construct an Optimal Binary Search tree for the given list of number 25,28,36,10,12,5,22,30,40,28,38,48. CO2- App (16)

14. (a) Apply the backtracking to the problem of finding Hamiltonian cycle in the following graphs CO2-App (16)



Or

- (b) Apply the branch-and-bound algorithm to solve the travelling sales man problem for the following graph. CO2-App (16)



15. (a) Describe in detail about the steps involved in the Vertex Cover Algorithm with an example CO1-U (16)

Or

- (b) Summarize the steps in the Pointer Doubling Algorithm with an example CO1-U (16)

