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Question Paper Code: R4D04

B.E./B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Fourth Semester

Computer Science & Business Systems

R21UCB404 – DESIGN AND ANALYSIS OF ALGORITHM

(Regulations R2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

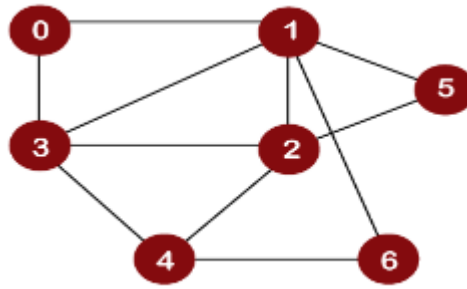
PART A - (10 x 2 = 20 Marks)

1. Define the term time complexity and space complexity. CO1- U
2. Find GCD(31415, 14142) by applying Euclid's algorithm. CO2-App
3. Differentiate the methods involved in Brute force approach and Divide & Conquer approach. CO1- U
4. Write an algorithm to find the Depth First Search. CO1-U
5. Define dynamic programming with an example. CO1- U
6. List out the usage or need of Floydwarshall algorithm. CO1- U
7. Name the constraints used in backtracking problem with an example. CO1- U
8. List the procedure used in recursive backtracking algorithm. CO1- U
9. Compare NP hard and NP complete problem. CO1-U
10. Write the difference between Deterministic & Non Deterministic algorithms with an example. CO1- U

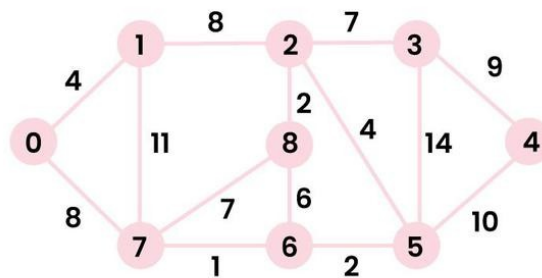
PART – B (5 x 16= 80 Marks)

11. (a) Explain in detail about fundamentals of algorithmic problem solving. CO1- U (16)
- Or
- (b) Explain any two Euclid's, Consecutive integer checking algorithm and Middle school method with an example. CO1- U (16)

12. (a) Analyze how selection sort is performing with an example CO2- App (16)
 Or
 (b) Apply the DFS algorithm for the given graph CO2- App (16)

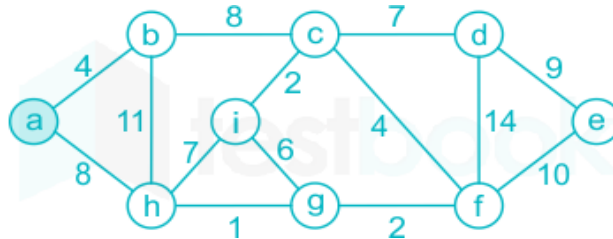


13. (a) CO2- App (16)



Apply the Dijkstra's algorithm for above mentioned graph.

- Or
 (b) CO2- App (16)



Construct the minimum spanning tree (MST) for the given graph using Prim's Algorithm.

14. (a) Solve the sum of subset problems using backtracking algorithmic strategy for the following data: $n = 4$ $W = (w_1, w_2, w_3, w_4) = (10, 20, 30 \text{ and } 40)$ and $\text{sum} = 50$. CO2- App (16)
 Or
 (b) 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 backtracking approach. CO2- App (16)

15. (a) Explain in detail about the P, NP, NP complete and NP hard classes with a diagram. CO1- U (16)

Or

- (b) (i) Explain about Reduction Source Problems with example. CO1- U (8)
- (ii) Compare NP-hard and NP-completeness problems with examples. CO1- U (8)

