



Analysis Of Algorithms

December 17

Computer Engineering (Semester 4)

Total marks: 80

Total time: 3 Hours

INSTRUCTIONS

(1) Question 1 is compulsory.

(2) Attempt any **three** from the remaining questions.

(3) Draw neat diagrams wherever necessary.

- 1.a.** What is backtracking approach. Explain how it is used in graph coloring. (5 marks)
- 1.b.** Explain Randomized algorithm with example. (5 marks)
- 1.c.** What is Knuth Morris Pratt Method of Pattern Matching ? Give Examples (5 marks)
- 1.d.** Explain in brief the concept of Multistage Graphs ? (5 marks)
- 1.e.** Merge sort and its complexity (5 marks)
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- 2.a.** Derive and comment on the complexity of Quick Sort algorithm. (10 marks)
- 2.b.** Solve the following Knapsack problem using dynamic approach
N = 4 items , Capacity of knapsack M = 9
|Item i |Value v_i | Weight w_i | -|-|-| |1|18|2| |2|25|4| |3|27|5| |4|10|3| (10 marks)
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- 3.a.** What is sum of subset problem? Write the Algorithm and solve the following.
Array A = [2,3,5,6,7,8,9] and K = 15 (10 marks)
- 3.b.** Write the algorithm for finding strassen's matrix multiplication and show how the complexity is being affected ? (10 marks)



4.a. What is longest common subsequence Problem ? Find LCS for the following

String $x = ACBAED$

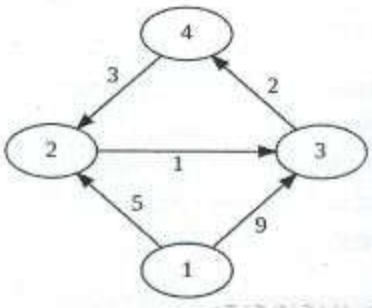
String $y = ABCABE$

(10 marks)

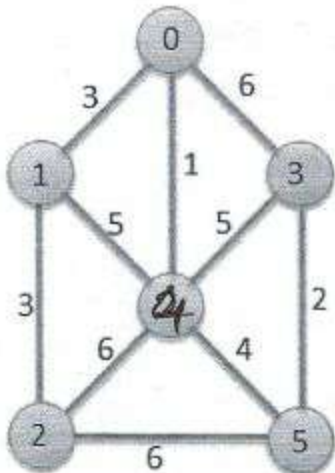
4.b. Explain binary search Tree? How to generate an optimal binary search tree. (10 marks)

5.a. What is all pairs shortest path algorithm ? Apply the same on following graph

(10 marks)



5.b. Find MST of following graph using Prim's and Kruskal's Algorithm. (10 marks)





- 6.a.** Write short note on Optimal Storages on Tapes (7 marks)
- 6.b.** Write short note on 15 puzzle problem. (7 marks)
- 6.c.** Write short note on binary search and its complexity. (7 marks)
- 6.d.** Write short note on Problem of Multiplying Long Integers. (7 marks)