2017CA84

Subject: Analysis of Algorithms
Duration: 3 Hours

Paper code: CA-3304
Max. Marks: 60

Note: Attempt all questions. Make assumptions wherever necessary and quote it.

Q1. Explain back-tracking, DFS and BFS with help of small example. Differentiate in between backtracking and dynamic programming. Apply the backtracking algorithm to solve the three- colouring problem for the following graph using state space tree. Assume three colours red, green and blue. **[8 Marks]**
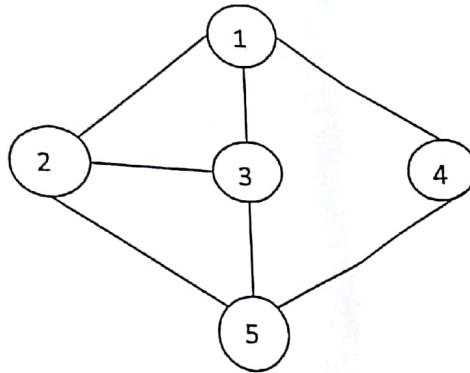
Q2. Explain the optimal sub-structure and overlapping sub-problem with help of example. Consider the following four matrices. Find an optimal parenthesization of a matrix-chain product $A_1*A_2*A_3*A_4$. Give the complexity analysis. **[8 Marks]**

Matrix	Order
A_1	20×30
A_2	30×50
A_3	50×10
A_4	10×5

Q3. Consider the rod of length and piece of all prices smaller than 7, find the most profitable way of cutting of rod. Give the complexity analysis. **[6 Marks]**

Length	1	2	3	4	5	6	7
Prices in $	2	6	9	11	18	19	21

Q4. What do you mean by optimal solution in greedy approach? Define the properties and function of greedy approach. Consider the graph G=(V,E) given below. Find the minimum spanning tree by Prim's algorithms. **[8 Marks]**

P.T.O.
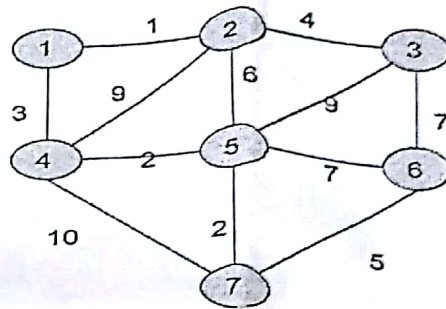
Q5. Is it possible to combine (hybrid) two sorting algorithm for reducing the time and space complexity?, Yes or NO. If yes, what will be the best choices to combine sorting algorithms from available options, explain with valid reason? **[6 Marks]**

Q6. Determine the LCS of X= ATGTAT and Y=ACTACT. **[8 Marks]**

Q7. Give the complete solution (step by step using state space tree) for N- Queen problem using back-tracking with pseudocode. Give the complexity analysis. **[8 Marks]**

OR

Q8. Solve the following

a) Show the comparisons the naive string matcher makes for the pattern P = 0001 in the text T = 000010001010001. **[3 Marks]**

b) Working modulo q = 11, how many spurious hits does the Rabin-Karp matcher encounter in the text T = 3141592653589793 when looking for the pattern P = 26? **[3 Marks]**

c) Compute the prefix function π for the pattern T = ababbabbabbababbabb. **[2 Marks]**

Q9. Write short note on: **[2×4=8 Marks]**
  a. Floyd Warshall algorithm.
  b. Branch and bound technique.
  c. Asymptotic Notations.
  d. Divide-N- Conquer VS Dynamic Programming.

--ALL THE BEST----------------------------------