R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, February/March - 2022
ALGORITHM DESIGN AND ANALYSIS
(Information Technology)

**Time: 3 Hours**   **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1.a) What are the features of an efficient algorithm? Explain with an example.
 b) Write control Abstraction algorithm of Divide – and Conquer.   [9+6]

2.a) Give the Big – O notation definition and briefly discuss with suitable example.
 b) Explain recursive functions algorithm analysis with an example.
 c) What is stable sorting method? Is Merge sort a stable sorting method?   [5+5+5]

3. Explain the Graph – coloring problem. And draw the state space tree for m= 3 colors n=4 vertices graph. Discuss the time and space complexity.   [15]

4. Write the backtracking algorithm for the sum of subsets problem using the state space tree corresponding to m=35, w = (20,18,15,12,10,7,5). Also draw the state space tree.
[15]

5.a) Explain the Optimal Binary Search Tree with an example.
 b) Find the shortest path of the following by using all pairs shortest path.   [8+7]
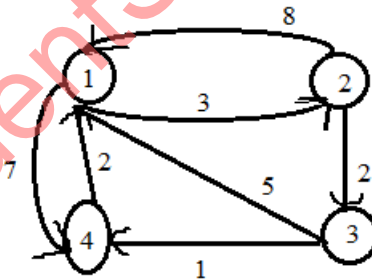
6. Design a 3 stage system with device types D1, D2, D3. The costs are Rs 30, 15, 20 respectively. The cost of system is to be no more the Rs 105. The reliability of each device type is 0.9, 0.8 and 0.5 respectively.   [15]

7.a) Find optimal solution to the knapsack problem instance n=6, m=15, (p1…p6) = (10,5,15,7,6,18), (w1…w6) = (2,3,5,7,1,4).
 b) Write a greedy algorithm for sequencing unit time jobs with deadlines and profits.[8+7]

8. Draw the portion of state space tree generated by LCBB for the 0/1 Knapsack instance: n = 5, (p1,p2,…,p5) = (10,15,6,8,4), (w1,w2,..,w5) = (4,6,3,4,2) and m=12. Find an optimal solution using fixed – tuple sized approach.   [15]

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