10. Write short note on following : [14]

(a) String Matching

(b) N-Queen Problem

(c) Hamiltonian Cycle

(d) Graph Coloring

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Question Paper Code : 6574

BCA (Semester-V) Examination, 2021

DESIGN AND ANALYSIS OF ALGORITHM

[Paper : BCA-502]

Time : Three Hours] **[Maximum Marks : 70**

Note : Answer **five** questions in all.

1. Define the term Algorithm and its complexities. Write properties of an algorithm and also different methods for analyzing growth of an algorithm with the help of diagram. [14]

2. (a) Write down the algorithm of Quick sort and its time complexity in all cases. Also Sort the following sequence of numbers using Quick sort: 8, 6, 4, 12, 11, 5, 7, 9. [7]

   (b) What is Backtracking ? What are its applications ? [7]

3. (a) Explan Red Black tree and write its algorithm for insertion. Perform insertion of following sequence in RB tree : 38, 13, 51,10, 12, 40, 84, 25. [7]

(b) Sort the following elements using Heap Sort : 47, 29, 82, 11, 48, 32, 28, 17,65, 36. Show each step, while creating a heap and processing a heap. [7]

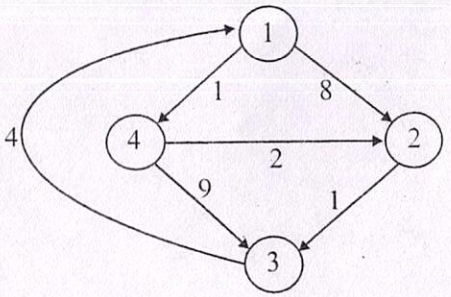
4. (a) Describe string matching algorithm and their applications. Explain any string matching algorithm with an example. [7]

(b) What do you mean by Resource Allocation Problem ? Explain. [7]

5. (a) Explain the essential idea of Dynamic Programming. How does Dynamic Programming differ from Divide and Conquer approach for solving problems. [7]

(b) Explain how Binary Search Method finds or fails to find the given value '43' in the sorted array : 9, 13, 76, 27, 36, 49, 58, 79, 86 [7]

6. Explain Floyd Warshall's algorithm. Consider the following directed weighted graph. Find the shortest path distance between every pair of vertices. [14]



7. (a) What is Approximation Algorithm ? Briefly explain the concepts of P, NP and NP complete problem. [7]

(b) What do you mean by Backtracking Strategy ? Discuss with an example. [7]

8. (a) State and explain Bellman Ford algorithm to solve single source shortest path problem with an example. What is its time complexity ? [7]

(b) Explain Max Heap and Min Heap with example. [7]

9. (a) Discuss the concepts of asymptotic notations and its properties. [7]

(b) State and explain the working of Brute force algorithm with example. [7]