Code No: R1632053 **R16** SET - 1

III B. Tech II Semester Supplementary Examinations, June-2022

DESIGN AND ANALYSIS OF ALGORITHMS

(Computer Science and Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A (14 Marks)

1. a) What is Space Complexity? Give an example. [2M]
   b) Describe the Algorithm Analysis of Binary Search. [2M]
   c) Define a Greedy strategy. [2M]
   d) List the applications of Dynamic Programming. [3M]
   e) Define: (i) Answer node (ii) E-Node and (iii) Dead Node. [3M]
   f) Write about fixed-tuple sized state space tree organization. [2M]

PART –B (56 Marks)

2. a) What is an algorithm? Explain its characteristics in detail. [7M]
   b) Explain the following Asymptotic Notations: [7M]
   (i) Big oh notation (ii) Omega notation (iii) Theta notation.

3. a) Define internal and external nodes of binary decision tree. Draw the binary decision tree for binary search with n = 14. [7M]
   b) Discuss the working strategy of merge sort and illustrate the process of merge sort algorithm for the given data: 43, 32, 22, 78, 63, 57, 91 and 13. [7M]

4. a) What is the time complexity of single source shortest path? Explain. [7M]
   b) What is optimal merge pattern? Find optimal merge pattern for ten files whose record lengths are 28, 32, 12, 5, 84, 53, 91, 35, 3, and 11. [7M]

5. a) What is reliability design problem in DAA? How is time complexity calculated in dynamic programming? [7M]
   b) Solve the following instance of 0/1 KNAPSACK problem using dynamic programming n = 3, (W1, W2, W3) = (2, 3, 4), (P1, P2, P3) = (1, 2, 5), and m = 6. [7M]

6. a) What is a backtracking? Give the explicit and implicit constraints in 8 queen's problem. [7M]
   b) What is a Hamiltonian Cycle? Explain how to find Hamiltonian path and cycle using backtracking algorithm. [7M]

7. a) Explain FIFO Branch and Bound solution. [7M]
   b) Which algorithm is best for knapsack problem? What is the use of knapsack algorithm? [7M]

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