R15

Code No: 821AF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA II Semester Examinations, December - 2019
DATA STRUCTURES AND ALGORITHMS

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

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

5 × 5 Marks = 25

1.a) Write an algorithm to insert an element in a single linked list [5]
b) List and explain the applications of non linear data structures [5]
c) Give a brief note on collision resolution methods. [5]
d) Define a binary search tree and what are the properties of binary search tree. [5]
e) What do you mean by a spanning tree. [5]

PART - B

5 × 10 Marks = 50

2.a) Explain the Sequential and Linked allocation.
b) Compare and contrast exponential time complexity with polynomial time complexity [5+5]

OR

3. Analyze the best, average and worst-case time complexities of linear search with an example list of size n. [10]

4. Write algorithm to implement depth-first search and explain with example. [10]

OR

5.a) Explain the threaded binary trees.
b) Write disjoint set union and find algorithms. [5+5]

6. Search for the element 3 in the array that contain 1,3,5,2,4,6,8 using binary search. [10]

OR

7. Explain hash tables and hash functions. [10]

8. Construct binary search tree for given data and write the different traversals of tree. (100 150 125 25 12 50 135 75 62 175). [10]

OR

9. Explain insertion and deletion operations on a B-Tree. [10]

10.a) Device an algorithm m to find the optimal order of multiplying n matrices using dynamic programming technique.
b) Give a brief note on Suffix tries. [5+5]

OR

11. Find the shortest tour of traveling salesperson for the following cost matrix using Dynamic Programming [10]

$$\begin{pmatrix} \infty & 12 & 5 & 7 \\ 11 & \infty & 13 & 6 \\ 4 & 9 & \infty & 18 \\ 10 & 3 & 2 & \infty \end{pmatrix}$$

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