Code No: 821AF R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA II Semester Examinations, April/May - 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) Explain the operations of Queue with an example. [5]
b) What are the applications of Heap? [5]
c) Differentiate between Bubble sort and Insertion sort with an example. [5]
d) What are the properties of Red-Black tree? [5]
e) Write the flow chart of KMP. [5]

PART - B

5 × 10 Marks = 50

2. Write an algorithm to find the reverse of a given number and also its complexity of the same. [10]

OR

3. Write an algorithm to find the number of occurrences of All Elements in a Linked List. [10]

4. Explain how to represent the graph in the memory with an example. [10]

OR

5.a) Explain the realization of a priority Queue using heap.
b) Write an algorithm of DFS. [5+5]

6. Write an algorithm of Quick Sort. [10]

OR

7. Insert the following list of elements into the Hash Table by using Quadratic Probing (Size of Hash table is 10) 44, 15, 60, 24, 66, 30, 21, 18. [10]

8. Construct the AVL tree of the following list of elements 65, 89, 10, 5, 43, 28, 54. [10]

OR

9. Write an algorithm to delete an element from the B-tree. [10]

10. Consider n = 4 and the identifier set (a1,a2,a3,a4) = (do, if, int, while). The values for p's and q's are given as p (1:4) = (3,3,1,1) and q(0:4) = (2,3,1,1,1). Construct the optimal binary search tree. [10]

OR

11. Apply the all- pairs shortest algorithm to the weighted graph whose adjacency matrix is: [10]

$$\begin{bmatrix} 0 & 2 & \infty & 1 & 8 \\ 6 & 0 & 3 & 2 & \infty \\ \infty & \infty & 0 & 4 & \infty \\ \infty & \infty & 2 & 0 & 3 \\ 3 & \infty & \infty & \infty & 0 \end{bmatrix}$$

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