R15

Code No: 821AF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA II Semester Examinations, January - 2018
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) What are the applications of stacks and queues? [5]
b) Discuss about Union and Find Algorithms. [5]
c) Write down the differences between linear searching and binary searching. [5]
d) What are the advantages and disadvantages of Splay Trees? [5]
e) Formulate Job Sequencing with Deadlines problem and explain briefly. [5]

PART - B

5 × 10 Marks = 50

2.a) Find the upper bound of the recurrence relation: $T(n) = T(n/2) + T(2n/3) + 1$.
b) Write the pseudocode which inserts the element at the right end of an array representation of a linear list and give an example. [5+5]

OR

3.a) Explain the single linked list operations with appropriate algorithms.
b) Explain various operations of stack data structure with relative example. [5+5]

4.a) What is a priority queue? State the applications of priority queue.
b) Show the result at each pass of inserting the following elements in to an empty min heap: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. [4+6]

OR

5. Write down the algorithm for DFS graph traversal technique and explain with an example. [10]

6. What is collision in Hashing? Explain various methods to resolve the collision. [10]

OR

7.a) Sort the following numbers using Radix sort:
100, 300, 95, 60, 10, 900, 800 showing positions of various buckets.
b) Mention the advantages and disadvantages of Radix sort. [6+4]

8. Suppose the following list of numbers is inserted in order into an empty binary search tree: 45, 32, 90, 34, 68, 72, 15, 24, 30, 66, 11, 50, 10.
   a) Construct the binary search tree.
   b) Find the in-order, pre-order and post-order traversal of BST created. [4+6]

OR

9. Explain insertion and deletion operations of an AVL Tree. [10]

10. Explain the problem of optimal binary search Tree construction and give the solution method by the dynamic programming formulation. [10]

OR

11. Discuss the Knuth-Morris-Pratt pattern matching algorithm with an example. [10]

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