R15

Code No: 821AF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA II Semester Examinations, July/August - 2021
DATA STRUCTURES AND ALGORITHMS

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

Answer any five questions
All questions carry equal marks
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1. Define a list. Describe the fundamental operations performed on a double linked list data structure with pseudo codes. [15]

2.a) What are the applications of queue data structure?
b) Write down the algorithms for enqueue and dequeue operations using list ADT.
c) How does a Queue data structure differs from a stack data structure? [5+5+5]

3.a) Write an algorithm for insertion and deletion of a node into a Binary Tree and illustrate with an example.
b) Construct an expression tree for the following expression:
(a / b* c) + ((d * e+f)* g) + h. [8+7]

4.a) Write the procedure to insert into a binary heap and illustrate with an example.
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. [8+7]

5.a) Explain briefly about linear probing and quadratic probing collision resolution strategies.
b) What are the advantages and disadvantages of the various collision resolution strategies? [8+7]

6. What is quick sort? Write an algorithm for quick sort and derive its run time complexity with an illustrative example. [15]

7.a) Write down the algorithms for insertion and deletion operations of Red-Black Tree and illustrate with an example.
b) State the applications of B-Trees and AVL Trees. [8+7]

8. With an illustrative example, explain Optimal Binary Search Tree using Dynamic Programming approach. [15]

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