Code No: 153AK

R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, August/September - 2022
DATA STRUCTURES
(Common to CSE, IT, ECM, CSBS, CSIT, ITE, CSE(SE), CSE(CS), CSE(AIML), CSE(DS), CSE(IOT), CSE(N))

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

Answer any five questions
All questions carry equal marks
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1.a) The following numbers 10, 20, 50, 30, 90, 60 (Top) are present in a stack of size 10. Perform the following operations in sequence. pop(), push(30), push(40), pop(), push (60), pop(), pop(), pop() What is the peek element at last? Draw and explain it.
b) Implement a queue data structure using Single Linked list. [8+7]

2.a) The Professor Lilly is very strict in class room. She never gives the attendance to those who are coming last in her class. Write a function to help Professor to delete the last Occurrence of a student from the list.
b) Implement a stack data structure using Single Linked list. [8+7]

3.a) Explain how Insertion, Deletion and Search is done in skip lists with example.
b) What is the expected number of probes for both successful and unsuccessful searches in a linear probing table with load factor 0.25? [7+8]

4.a) Given the input (4371, 1323, 6173, 4199, 4344, 9679, 19891), a fixed table size of 10, and a hash function H(X) = X mod 10, show the resulting quadratic probing hash table.
b) Outline Double Hashing with an example. [8+7]

5.a) In an initially empty AVL tree insert the following keys: DEC, JAN, APR,MAR, JUL, AUG, OCT, FEB, NOV. Draw AVL tree after every insertion and apply rotations where ever necessary.
b) Briefly discuss about different cases of imbalance that might be caused by a red-black tree insertion and corresponding methods to rebalance the tree. [7+8]

6.a) Construct Splay tree with the following node values: 18, 10, 5, 28, 13, 25, 42,3,56,2,68,1,90. And perform normal splaying at nodes 1 and at node 90.
b) Explain insertion operation with following numbers into Red Black tree 45, 10, 8, 9, 34, 35, 12, 60, 90. [7+8]

7.a) Assume a list containing 4500 records is to be sorted using a computer with internal memory capable of sorting at most 750 records at a time and input list is maintained on a disk that has block length of 250 records. For this scenario explain how external sorting may be performed to accomplish the task.
b) Compare BFS and DFS with suitable examples. [8+7]

8.a) Solve the Boyer-Moore algorithm for the following Example:
Text: ABCABCDABABCDABCDABDE
Pattern: ABCDABD

b) Solve the Knuth Morris-Pratt algorithm for the following Example:
Text: HEREISASIMPLEEXAMPLE
Pattern: EXAMPLE [8+7]

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