

Code No: 153AK**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 $H(X) = X \bmod 10$, 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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