Roll No. [redacted] Paper Code: TCS 302

END SEMESTER Examination 2024

B.Tech (CSE) III Sem

Data Structures with 'C'

Time : Three Hours Maximum Marks :100

NSTRUCTIONS TO STUDENTS

Note:

(i) All questions are compulsory.

(ii) Answer any two sub questions among a, b & c in each main question.

(iii) Each question carries 10 marks.

Q1. (2X10=20 Marks)(CO1, CO3,CO4)

A. Assuming that you have single linked list with pointer ptr at first node. Write a c function to deleteall the nodeshaving even information in the linked list.

B. Write advantages of an AVL tree. Draw an AVL tree with following keys: 16,17,20,6,7,18,19,25,23,21.

C. Draw an expression tree using following expression:(A-B*C) + D%E - (F+G)-H^M

Q2.(2X10=20 Marks)(CO2, CO3,CO5)

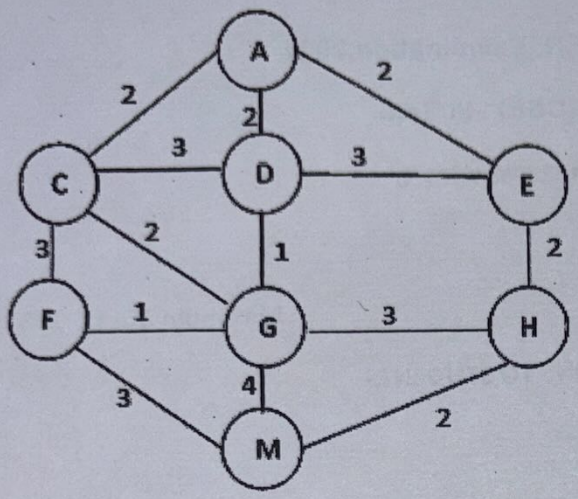
A. Explain B and B+ Trees. Draw a B-tree of order 4, when the keys arrive in the following order 4,9,8,3,1,10,2,15,20,25,30,12,35.

B. Apply Huffman's algorithm to find human's tree and code for using following signal: abacdefabcdfecfdea, also find the minimum weighted path length.

C. Explain hash collision with an example. Consider a hash table of size (m) 12. Using linear probing technique insert following keys 21,12,24,30,80,25,95,55,33,88 and 39 into the hash table.

Q3. (2X10=20 Marks)(CO2, CO3,CO5)

A. Apply Dijkstra's algorithm to find the shortest path from source vertex A to all other vertices inthe given weighted graph.

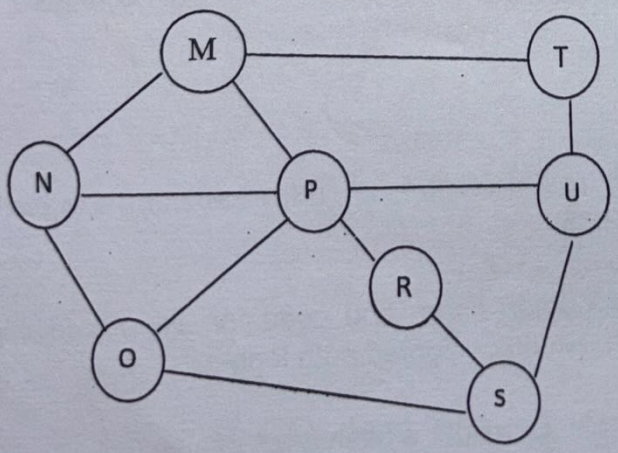


B. Apply mergesort technique to sort the following sequence:16, 45, 5, 88, 22, 56, 77, 13, 30,55,25, 89, Show the sorting process by indicating how the data would appear in intermediate steps (do not write code).

C. Write an algorithm to delete a node from a binary search tree. Discuss algorithm with an example.

Q4. (2X10=20 Marks)(CO1, CO3,CO5)

A. Give name and apply the graph traversal technique on the given graph, to find a path from
M to S with minimum number of nodes in between. (Show all steps)



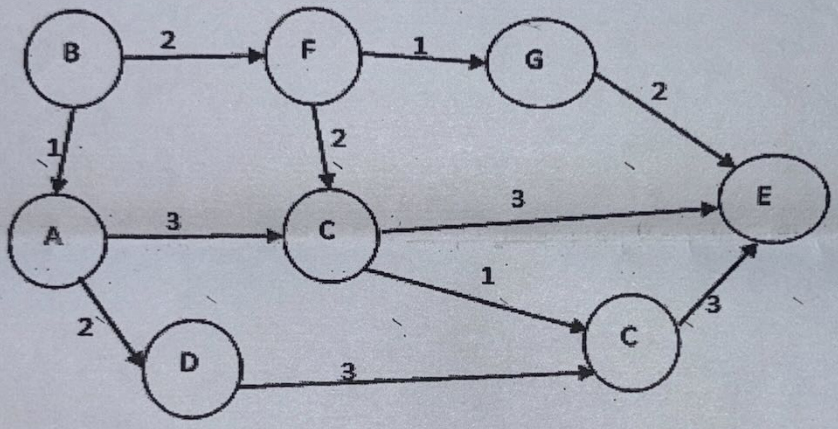
B. Assume that you have a single linked list with a pointer ptr at first node. Writea c function to print the Nth node form last in the linked list.
Example :Input:10 -> 20 -> 30 -> 40->50, and N = 2
Output: 40

C. Convert the following infix expression into the postfix expression using stack (show all the steps). (A*B-C)/(D%E*F)-G^H

Q5.

A. Explain sequential organization and index sequential file organization with examples

B. What do you mean by spanning tree? Find minimal spanning tree from the given graph using Kurskal's algorithm (show all steps).



C. Write a 'C' function to create a binary search tree and write another function to count the nodes having same parent in the BST.