SE Sem III (R-2019) C Scheme "AI & DS" Nov '2023

28/11/2023

Paper / Subject Code: 49313 / Data Structure

Duration:3 Hours **Total Marks: 80**

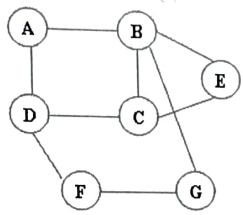
N.B: (1) Question No. 1 is compulsory.
(2) Attempt any three questions out of the remaining five questions.
(3) Figures to the right indicate full marks.
(4) Make suitable assumptions wherever necessary with proper justifications.

Q.1. A) Define ADT with an example. [05]
B) Evaluate the postfix expression "94*28+-" using stack ADT. Show the process stepwise. [05]
C) Justify the statement with suitable example: "Circular queue overcomes the disadvantage of linear queue". [05]
D) Differentiate between linear search and binary search. [05]

Q.2. A) Construct Huffman tree and determine the code for each symbol in the string "BCAADDDCCACACAC". [10]
B) Discuss the cases of deleting a node from Binary Search Tree with suitable example. [10]

Q.3. A) Write a program in C to implement queue ADT using linked list. [10]
B) Construct an AVL tree by inserting the following elements in the given order. Apply necessary rotations wherever required. [10]
54, 12, 24, 68, 85, 99, 42, 27, 87, 80

Q.4. A) Write C function for BFS graph traversal. Show the stepwise BFS traversal with the help of data structures for the following graph: [10]



B) Write functions in C to perform the following operations on the Doubly Linked List: [10]
i) Delete a node after given node.
ii) Find node with smallest data value.
iii) Display the list.
iv) Insert a node at the end of the list.

Q.5. A) Build a Binary Search Tree, given the following sequences: [05]
Inorder: 35, 41, 48, 52, 57, 72, 79, 85, 86, 90
Preorder: 57, 41, 35, 52, 48, 90, 72, 85, 79, 86
B) What is topological sort? Explain Topological Sorting with an example. [05]

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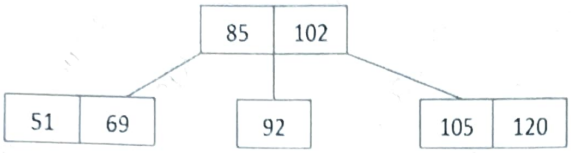
C) What is collision? Using linear probing, insert the following values in the hash table of size 11 & count the no. of collisions: [10]

83, 53, 64, 25, 39, 96, 12,71.

Q.6. A) Write short note on Priority Queue. [05]

B) Write a function in C to count the number of nodes in Singly Linked List. [05]

C) Create a B-tree of order 3 by inserting 87,94,59,98,63,7,27. [10]



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