

arithmetic expression with (+, -, *, /, ^) operations. Your algorithm should read the expression, perform the computation and output the result. List your assumptions if any.

UNIT - III

- 3 a) Write a C Program to implement insert, delete and display operations on a linear queue. 10

- b) Write C routines:

- To print singly linked list elements in reverse order
- Given is a pointer to a node X in a singly linked list with at-least two nodes. X can be any node except the last node. Pointer to first node (head pointer) is not given. Write a C routine to delete the node X from given linked list.
- To delete last node in a singly linked list.

OR

- 4 a) Chotu needs an implementation of a circular buffer that uses a single, fixed size buffer as if it were connected end to end. Help Chotu to implement his requirement by suggesting a suitable data structure and writing the C program for its primitive operations. 10
- b) Compare linked list with array. Given a linked list, implement a C function to determine if it is a palindrome. List any assumptions made.

UNIT - IV

- 5 a) Given are two strings represented as linked lists, where every character is a node in doubly linked list. Implement a C program includes a user defined function 'compare' that works similar to strcmp, i.e., it returns 0 if both strings are same, 1 if first linked list is alphabetically greater, and -1 if second is alphabetically greater. 10
- b) Write 'C' functions to perform following operations on a Binary Tree 10
- Count the number of leaf nodes
 - Finding a smallest element

UNIT - V

- 6 a) Construct the binary search tree given the preorder traversal: - 11, 8, 6, 4, 7, 10, 19, 43, 31, 29, 37, 49. 05
- b) Appraise the use of selection tree taking any real-time application example 08

- c) Write 'C' functions for the following operations on a Binary Tree –

- Calculate height
- Count nodes with single child

OR

- 7 a) Define threaded binary tree. Implement the insertion, and traversal operations on a threaded binary tree. 10

- b) Write 'C' functions to perform following operations on a Binary Search Tree

- Insertion of a new node
- Deleting a node with only one child.

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February 2019 Semester End Make Up Examinations

Programme: B.E.

Branch : INFORMATION SCIENCE AND ENGINEERING

Course Code: 15IS3DCDSC

Course Title: DATA STRUCTURES WITH C

Semester : III

Duration: 3 hrs.

Max Marks: 100

Date:04.02.2019

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any may suitably assumed.

UNIT - I

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| 1 | a) With suitable examples, compare and contrast
i. array ii. structure iii. union. 06 |
| | b) Appraise C language support for dynamic memory allocation. 06 |
| | c) What is a sparse matrix? Write a C program to check if a given M x N matrix is a sparse matrix. 08 |

UNIT - II

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| 2 | a) A bracket is considered to be: () {} []. Two brackets are considered to be a matched pair if the an opening bracket i.e., (, [, or {, occurs to the left of a closing bracket i.e.,),], or } of the exact same type. A matching pair of brackets is not balanced if the set of brackets it encloses are not matched. A sequence of brackets is considered to be balanced if the following conditions are met:
<ul style="list-style-type: none"> • It contains no unmatched brackets. • The subset of brackets enclosed within the confines of a matched pair of brackets is also a matched pair of brackets. Given strings of brackets, write a C program using suitable data structure to determine whether each sequence of brackets is balanced. List assumptions made, if any. 08 |
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| b) | Suppose that you are part of a team developing a financial application. One of the functions used in the application is a calculator, for infix arithmetic expressions. For example, given the expression $5*((9+8)*(4*6))+7$, the function outputs the result 2075. You are supposed to design the data structures and algorithm for this calculator function. The input may be any 12 |
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Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
Revealing of identification, appeal to evaluator will be treated as malpractice.