Course Title : Data Structures Laboratory			
Course Code : P18CSL37	Semester : 4	L :T:P:H : 0:0:3:3	Credits: 1.5
Contact Period: Laboratory : 3 Hrs/week Exam: 3 Hr		Weightage: CIE:50%, SEE:50%	

Course Content

Programs on Stacks

1. Write a C program to construct a stack and to perform the following operations.
   i) Push ii) Pop iii) Display
   The program should print appropriate message for stack overflow, stack underflow & stack empty.
2. Write a C program to convert and print a given valid parenthesized infix arithmetic expression to prefix expression. The expression consists of single character operands and binary operators + (Plus), - (Minus), * (Multiply), / (Divide).
3. Write a C program to evaluate a valid prefix expression using stack. Assume that the prefix expression is read as single line consisting of non negative single digit operands and binary arithmetic operations.
4. Write a C program to check whether a given string is palindrome or not using stack.

Programs on Recursion

5. Write a recursive C programs for
   i) To find larger of 'n' elements in an array
   ii) To multiply two natural numbers
   iii) Solving the Towers of Hanoi Problem

Programs on Queus

6. Write a C program to simulate the working of a queues using an array provide the following operation
   i) Insert ii) Delete iii) Display
7. Write a C program to simulate the working of a circular queues with items as strings. Provide the following operations
   i) Insert ii) Delete iii) Display
8. Write a C program to simulate the working of Double Ended Queue of integers using Structures. Provide the following operations
   i) Insert from front/rear end ii) Delete from front/rear end iii) Display
9. Write a C program to implement priority queues using structures (Assume a maximum of 3 queues).

Programs on Linked List

10. Write a C program using dynamic variables and pointers, to construct a Singly Linked List consisting of the following information in each node: Employee id (integer), Employee name (character string) and Department (character string). The operation to be supported are :
    a) The insertion operation
       (i) At the front end (ii) At the rear end (iii) At any portion in the list
    b) Deleting a node based on employee id. If the specified node is not present in the list an error message should be displayed. Both the options should be demonstrated.

c) Searching a node based on employee id and updates the information content. If the specified node is not present in the list an error message should be displayed. Both situations should be displayed.
d) Displaying all the nodes in the list

11. Write a C program to construct a **Ordered Singly Linked List** and to perform the following operations
    i) Reverse a list ii) Concatenation of two lists

12. Write a C program to support the following operations on a Doubly Linked List where each node consists of integers
    i) Create a Doubly Linked List by adding each node at the front
    ii) Insert a new node to the right of the node whose key value is read as an input
    iii) To delete all nodes whose info is same as key item.
    iv) Display the contents of the list

Programs on Trees

13. Write a C program
    i) To create a tree ii) To search for an item
    iii) To get the exact copy of a tree iv) To display the elements
14. Write a C program
    i) To construct a binary search tree of integers
    ii) To traverse the tree using In-Order, Pre-Order and Post-Order traversal method
    iii) To display the elements
15. Write a C program
    i) To construct a ordered BST of items
    ii) To insert an item into an ordered BST (No duplicates are allowed)
    iii) To search an item in BST
    iv) To display the elements
16. Write a C program to sort the given list of 'n' numbers using
    i) Merge Sort ii) Quick Sort