DATA STRUCTURES LAB
(Common to CSE & IT)

Course Code : 15CT1106

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Course Outcomes:

At the end of the course, a student will be able to

CO 1 Develop programs using recursive functions.

CO 2 Implement stacks and queues using arrays

CO 3 Develop Programs for searching and sorting algorithms.

CO 4 Develop programs using concepts of trees.

CO 5 Apply concepts of graphs.

List of Programs:

1. Write C programs that uses recursive function to:
   i) Compute factorial of a given number
   ii) Solve the towers of Hanoi problem.
2. Write C programs that implement the following data structures using arrays: i) Stack ii) Queue.
3. Write C programs to implement the following Stack applications i) Factorial ii) Evaluations of postfix expression.
4. Write C program to implement the following types of queues i) Priority Queue ii) Circular Queue.
5. Write C programs to implement the following types of Lists
   i) Singly linked list
   ii) Circular Linked list
   iii) Doubly linked list.
6. Write C programs to implement the following data structures using Lists i) Stack ii) Queue.

7. Write C programs to implement the following search algorithms:
   i) Linear Search ii) Binary Search iii) Fibonacci Search.
8. Write C programs to implement the following sorting algorithms i) Bubble Sort ii) Insertion Sort iii) Selection Sort.
9. Write C programs to implement the following sorting algorithms i) Merge Sort ii) Quick Sort.
10. Write a C program to implement binary tree using arrays and to perform binary tree traversals
    i) inorder ii) postorder iii) preorder.
11. Write a C program to perform the following operations using linked lists:
    i) Insert an element into a binary search tree.
    ii) Delete an element from a binary search tree.
    iii) Search for a key element in a binary search tree.
12. Write a C program to perform the following operations using linked lists :
    i) Insert an element into an AVL tree.
    ii) Delete an element from an AVL tree.
13. Write C programs for the implementation of bfs and dfs for a given graph.
14. Write a C program for the implementation of Prim's algorithm to obtain the minimum cost spanning tree from a connected undirected graph.
15. Write a C program to implement Dijkstra's algorithm for the single source shortest path problem.

REFERENCES:

1. G A V PAI, "Data Structures and Algorithms, Concepts, Techniques and Applications", Volume-1, 1st Edition, Tata McGraw-Hill, 2008.
2. Richard F. Gilberg & Behrouz A. Forouzan, "Data Structures, A Pseudo code Approach with C", 2nd Edition, Cengage Learning India Edition, 2007.