**DATA STRUCTURES LAB (CSX-229)**

**LIST OF PRACTICALS**

**Lab 1**

1. Write a program for
   * + - 1. Insertion in an Array
         2. deletion in an Array
         3. Sorting elements of an array
         4. Count the frequency of elements

**Lab 2**

1. Write a program to implement
   * + - 1. Reverse an Array without using extra storage
         2. Multiplication of matrix
         3. Linear and Binary search

**Lab 3**

1. Write a program to implement
   * + - 1. Input and print sparse matrix
         2. Find the transpose of sparse matrix
         3. Multiplication and addition of two regular and irregular sparse matrices

**Lab 4**

1. Write a program to implement
   * + - 1. Create and Traverse a Singly linked list
         2. Double of original value of Linked List
         3. Sum of previous elements of linked list
         4. Find Min and Max element from integer Linked List
         5. Insertion in a Singly Linked List at Beginning, middle and end position
         6. Deletion of node from beginning , middle and end of list

**Lab 5**

1. Write a program to implement
   * + - 1. Frequency of elements in sorted and unsorted linked list
         2. Swapping of 2 nodes in a linked list for consecutive and non-consecutive nodes
         3. Reverse a Singly Linked List
         4. Concatenation of two Linked list
         5. Splitting of linked list in even and odd elements list

**Lab 6**

1. Write a program to create doubly linked list which can store integers and write functions to perform
2. Insertion in list
3. Deletion in list
4. Display of list in reverse direction
5. Display of list in forward direction
6. WAP to create polynomial using linked list and perform Addition and multiplication.

**Lab 7**

1. Write a program to Implement basic operations of stack using Linked and and Array
2. Push
3. Pop
4. Display of elements
5. WAP which performs
   * + - 1. Infix to Postfix
         2. Evaluate prefix expression
6. Write a program to convert decimal number to octal number using stacks.

**Lab 8**

1. WAP to sort elements using Quick sort using Stack.
2. WAP using recursion to
   * + - 1. Find GCD of two numbers
         2. Sorting elements using Recursion (Quick sort)
         3. Find factorial of a number using

Tail recursion and

Non Tail recursion

* + - * 1. WAP to display Fibonacci series using

Tail recursion

Non tail recursion

**Lab 9**

1. WAP to implement basic operations on queue using array. (Insertion, Deletion and Display of elements).
2. WAP to implement basic operations on queue using Linked list. (Insertion, Deletion and Display of elements).
3. WAP to implement
   * + - 1. Input restricted Queue
         2. Output Restricted Queue
4. WAP to implement Priority queue using Array and linked list.

**Lab 10**

1.WAP to implement the basic operations on Binary tree and Binary Search Tree i.e.

* + - * 1. Insertion
        2. Deletion
        3. Counting Number of nodes
        4. Height of tree

**Lab 11**

1. WAP to implement:

a.Insertion in AVL tree

* 1. In-order Traversal of AVL tree
  2. Balance Factor of AVL Tree

**Lab 12**

WAP to implement operations:

Insertion in Heap Tree

Deletion in Heap tree

Deletion of Root Node from Heap

Sort the heap.

* + - 1. WAP to implement:
         1. Creation of Graph
         2. Insertion of an edge
         3. Deletion of an edge
         4. Display of graph

**Lab 13**

WAP to find Path matrix using:

Powers of matrix

Warshall algorithm

Write Functions to perform:

Breadth First Search

Depth First Search

3. Find the shortest path in graph using Dijkstra’s algorithm.