Data Structures and Algorithms Laboratory
Paper code –ES-CS391
3rd Semester ECE1

Assignment #1:

Write a C program to perform polynomial representation and addition between two given polynomials.

Example: P1: $3X^3 + 4X^2 + X$
P2: $4X^4 + 2X^3 + 10$
P3 = P1 + P2 = $4X^4 + 5X^3 + 4X^2 + X + 10$

Assignment #2:

a) Write a program to store element in 2D array and calculate the address of a particular location using Row Major and Column Major Representation.
b) Write a program to check whether a given matrix is sparse or not. If it is sparse then represent it in 3-tupe format.
c) Write a program to add two sparse matrices.

Assignment #3:

Write C programs to perform following operations using functions:
a) Write a function to implement linear search algorithm.
b) Write a non-recursive function to implement binary search algorithm.
c) Write a recursive function to implement binary search algorithm.

Assignment #4:

Write menu driven program to perform following operations using functions:
a) Implementation of stack operations like push(), pop(), isEmpty(), isFull() using Array
b) Implementation of stack operations like push(), pop(), isEmpty(), isFull() using Structure and structure pointers.

Assignment #5:

Write menu driven program to perform following operations using stack:
a) Convert infix expression to postfix expression
b) Evaluate postfix expression.

Assignment #6:

Write menu driven program to perform following operations using functions:
a) Implementation of Linear Queue operations like insert(), del() using Array
b) Implementation of Linear Queue operations like insert(), del() using structure.

Assignment #7:

Write menu driven program to perform following operations using functions:
a) Implementation of Circular Queue operations like insert(), del() using Array
b) Implementation of Double Ended Queue operations like rearAdd(), frontDel(), rearDel() and frontAdd() using Array.

Assignment #8:

Write C programs to perform following operations using functions:
a) Write a program to sort a list of elements using bubble sort algorithm
b) Write a program to sort a list of elements using selection sort algorithm.

Assignment #9:

Write C programs to perform following operations using functions:
a) Write a program to sort a list of elements using insertion sort algorithm
b) Write a program to sort a list of elements using quick sort algorithm.

Assignment #10:

Write C programs to perform following operations using functions:
a) Write a program to sort a list of elements using merge sort algorithm.
b) Write a program to sort a list of elements using heap sort algorithm

Assignment #11:

Write menu driven program to perform following operations using functions:

a) Creation of Singly linked list
b) Display of Singly linked list
c) Insert a node in different positions of Singly linked list
d) Delete a node from different positions of Singly linked list

Assignment #12:

Write a menu driven program to perform following operations / application using functions:

a) Merging of two linked lists and splitting a linked list
b) Reverse a linked list
c) Polynomial representation
d) Addition of two polynomials

Assignment #13:

Write menu driven program to perform following operations using functions:

a) Creation of circular linked lists
b) Display circular linked lists
c) Insertion of a new node in different positions of existing circular linked lists.
d) Deletion of an existing node from an existing circular linked lists
e) Merging of two circular linked lists & Splitting a circular linked lists

Assignment #14:

Write menu driven program to perform following operations using functions:

a) Creation of doubly linked lists
b) Display doubly linked lists
c) Insertion of a new node in different positions of existing doubly linked lists.
d) Deletion of an existing node from an existing doubly linked lists

Assignment #15:

Write menu driven program to perform following operations using functions:

a) Creation of doubly circular linked lists
b) Display doubly circular linked lists
c) Insertion of a new node in different positions of existing doubly circular linked lists.
d) Deletion of an existing node from an existing doubly circular linked lists

Assignment #16:

Write C programs to perform following operations using functions:

a) Write a recursive function to display n Fibonacci terms.
b) Write a recursive function to implement Tower of Hanoi problem.

Assignment #17:

Write C programs to perform following operations using functions:

a) Write a program to create Binary Search Tree
b) Write a program to traverse BST in inorder, preorder and postorder.
c) Write a program to search an element from a BST.