ACADEMY OF TECHNOLOGY

LAB ASSIGNMENT

Subject: Data Structure Lab **Subject Code: ES-CS391**

Discipline: ECE **Semester: 3rd**

DO NOT WRITE PRACTICE PROGRAM(S) IN LAB NOTEBOOK, ONLY WRITE DOWN ASSIGNMENT PROGRAM

Day-1

Assignment (Introductions of Array and Function):

1. Write a program to insert an element in array at any position.
2. Write a program to delete an element in array at any position.
3. Write a program to insert elements in a 2D array and display the elements.

Practice:

1. Write a program to generate Fibonacci series using function

Day-2

Assignment

1. Write a program to test a given matrix is sparse or not. If it is sparse then represent it as 3-tuple format.

Practice:

1. Write a Program to multiply 2 matrices. (Elements in the matrix must be taken dynamically.)
2. Write a program to check whether a matrix is symmetric or not.
3. Write a program to take a 2D matrix as an input, map it to 1D array and display it.
4. Write a program to check a matrix is upper triangular matrix or not.

Day-3

Assignment

1. Write a program to search an element from array using linear search method.
2. Write a program to search an element from an array using Binary search method.

Practice:

1. Write a program to store the elements in a 2D array in column major order & display it.

Day-4

Assignment

1. Write a program to arrange list of numbers in ascending order using Bubble sort algorithms.
2. Create an array and then arrange the elements in ascending order using each of the following algorithms:

a) Selection sort

b) Insertion sort

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Day-5 & Day-6

Day-5 (Introduction of structure) :

1. Write a simple program to demonstrate the use and declaration of structure.
2. Write a program using structure to implement stack operations using switch case (push, pop, and display).

Day-6 Assignment

1. Write a program to reverse a string using stack.
2. Write a program to evaluate the given postfix expression.

Practice:

1. Write a program to convert infix expression to postfix expression.

Day-7

Assignment

1. Write a program to implement linear queue data structure using structure.
2. Write a program to implement circular queue using array.

Day-8 & Day-9

Day-8 (Introduction of Pointer and Dynamic Memory Allocation)

1.Write a program to access structure elements using pointer.

2. Write a program to create a single linked list (Self-referential structure) and display it. Then count the number of nodes in the list.

Day-9 Assignment

1. Write a program to insert an element in a single linked list
   a) at 1st position
   b) at last position
   c) at any position

2. Write a program to delete an element from a single linked list
   a) from 1st position
   b) from last position
   c) from any position

Practice:

1. Write a program to add two polynomials using linked list and then display the newly created polynomial.

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2. Write a program to create a double linked list and display it.
3. Write a program to merge two linked list in sorted order.
4. Write a program to insert an element in the created list and delete an element from the list and then display the list. Reverse the linked list and then display.

Day-10

Assignment

Assignment No. 1: **Using recursions solve the problem of Tower Of Hanoi.**

2. Write a program to implement recursive binary search.

Practice:

1. Write a program to implement stack data structure using linked list.
2. Write a program to implement queue data structure using linked list.
3. Write a program to insert and delete at any position from double linked list.

Day-11

Assignment

Assignment No. 1: **Write a program to implement quick sort.**

2. Write a program to implement merge sort.

Practice:

1. Write a program to implement heap sort.

Day-12

Assignment

Assignment No. 1: **Write a program to create a binary search tree and perform the following traversal algorithms:**

i) Pre-order ii) In-order iii)Post-order

Practice:

1. Write a program to implement radix sort.

Day-13

Assignment

1. Write a program to create and represent a graph using adjacency matrix.

Day-14

Assignment

1. Write a program to perform division method of hashing and the linear probing method of resolving collisions in a hash table.