Patan Multiple Campus

CSIT 3rd semester

Data Structure and Algorithm

Laboratory Assignment Work Sheet:

After completing this course, students should have practical knowledge of data structures, algorithms, and ADTs. The laboratory work includes:

1. I) Define Sparse Matrix with suitable example.

   II) Write algorithm to form sparse matrix and print non-zero elements with its location.

   III) Write program to form sparse matrix and print non-zero elements with its location with output.

2. I) Define recursion with suitable example.

   II) Write algorithm to calculate factorial of n int number using recursion.

   III) Write program to calculate factorial of n int number using recursion

3. I) Define Stack with suitable example.

   II) Write algorithm to perform PUSH and POP operation of Stack in LIFO sequence.

   III) Write menu driven program to perform PUSH and POP operation of Stack in LIFO sequence

4. I) Define linear queue with suitable example.

   II) Write algorithm to perform INQUEUE and DEQUEUE operation of Queue in FIFO sequence.

   III) Write menu driven program to perform INQUEUE and DEQUEUE operation of Queue in FIFO sequence.

5. I) Define circular queue with suitable example.

   II) Write algorithm to perform INQUEUE and DEQUEUE operation of Circular Queue in FIFO sequence.

   III) Write menu driven program to perform INQUEUE and DEQUEUE operation of Circular Queue in FIFO sequence.

6. Define Searching with example.

   I) Write algorithm of sequential search

   II) Write program of sequential search

   III) Write algorithm of binary search

   IV) Write program of binary search

7. Define sorting with example.
    I) Trace steps to sort given list of items: 10, 20, 5, 8, 15 using bubble sort technique
    II) Trace steps to sort given list of items: 10, 28, 5, 18, 55 using bubble selection sort technique
    III) Trace steps to sort given list of items: 10, 25, 5, 8, 15 using insertion sort technique
    IV) Trace steps to sort given list of items: 15, 20, 55, 8, 15 using quick sort technique
8. Write algorithm and program of bubble sort technique.
9. Write algorithm and program of selection sort technique.
10. Write algorithm and program of insertion sort technique.
11. Write algorithm and program of quick sort technique.
12. Define linked list with suitable example. Write algorithm and program to add and delete the node into singly linked list.

Given below assignments are not mandatory, its for practice in LAB.

- Writing programs with dynamic memory allocation and de-allocation.
- Writing programs to implement stack operations.
- Writing programs using stack to convert infix expression to postfix/prefix expression and to evaluate postfix/prefix expression.
- Writing programs to implement queue operations for linear, circular, and priority queue.
- Writing recursive programs to implement factorial, Fibonacci sequence, GCD, and Tower of Hanoi algorithms.
- Writing programs to implement list using array and linked list.
- Writing programs for linked list implementation of stack and queue.
- Writing programs to implement sorting, searching and hashing algorithms.
- Writing programs to implement Binary Search Trees and AVL Tress.
- Writing programs to implement searching, spanning tree and shortest path.