

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) Define Sparse Matrix with suitable example.
 - i. Write algorithm to form sparse matrix and print non-zero elements with its location.
 - ii. Write program to form sparse matrix and print non-zero elements with its location with output.
- 2) Define recursion with suitable example.
 - i. Write algorithm to calculate factorial of n int number using recursion.
 - ii. Write program to calculate factorial of n int number using recursion
- 3) Define Stack with suitable example.
 - i. Write algorithm to perform PUSH and POP operation of Stack in LIFO sequence.
 - ii. Write menu driven program to perform PUSH and POP operation of Stack in LIFO sequence
- 4) Define linear queue with suitable example.
 - i. Write algorithm to perform INQUEUE and DEQUEUE operation of Queue in FIFO sequence.
 - ii. Write menu driven program to perform INQUEUE and DEQUEUE operation of Queue in FIFO sequence.
- 5) Define circular queue with suitable example.
 - i. Write algorithm to perform INQUEUE and DEQUEUE operation of Circular Queue in FIFO sequence.
 - ii. Write menu driven program to perform INQUEUE and DEQUEUE operation of Circular Queue in FIFO sequence.
- 6) Define Searching with example.
 - i. Write algorithm and C-program of sequential search
 - ii. Write algorithm and C-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 merge 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
 - v. Trace steps to sort given list of items: 15, 20, 55, 8, 15 using selection 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) Write algorithm and program of merge sort technique.
- 13) Write and algorithm and c program to implement a stack using linked list.
- 14) Write and algorithm and c program to implement a queue using linked list.
- 15) Define linked list with suitable example. Write algorithm and program to add and delete the node into singly linked list.
- 16) Given below assignments are not mandatory, it's for practice in LAB.
- 17) Writing programs with dynamic memory allocation and de-allocation.
- 18) Writing programs to implement stack operations.
- 19) Writing programs using stack to convert infix expression to postfix/prefix expression and to evaluate postfix/prefix expression.
- 20) Writing programs to implement queue operations for linear, circular, and priority queue.
- 21) Writing recursive programs to implement factorial, Fibonacci sequence, GCD, and Tower of Hanoi algorithms.
- 22) Writing programs to implement list using array and linked list.
- 23) Writing programs for linked list implementation of stack and queue.
- 24) Writing programs to implement sorting, searching and hashing algorithms.
- 25) Writing programs to implement Binary Search Trees and AVL Tress.
- 26) Writing programs to implement searching, spanning tree and shortest path.