

Data Structures & Algorithms Lab

COURSE OBJECTIVE:

This lab course is intended to write and execute programs in C to solve problems using data structures such as linked lists, stacks, queues, trees, graphs, hash tables search trees, pattern matching techniques and implement various searching and sorting methods

SOFTWARE REQUIREMENTS:

Turbo C / Linux

SYLLABUS:

LIST OF PROGRAMS

1. Write a program that uses functions to perform the following operations on singly linked list.
 - i) Creation
 - ii) Insertion
 - iii) Deletion
 - iv) Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list.
 - i) Creation
 - ii) Insertion
 - iii) Deletion
 - iv) Traversal
3. Write a program that uses functions to perform the following operations on circular linked list.
 - i) Creation
 - ii) Insertion
 - iii) Deletion
 - iv) Traversal
4. Write a program that implement stack (its operations) using
 - i) Arrays
 - ii) Pointers
5. Write a program that implement Queue (its operations) using
 - i) Arrays
 - ii) Pointers
6. Write a program that implements the following sorting methods to sort a given list of integers in ascending order
 - i) Bubble sort
 - ii) Merge sort
 - iii) Heap sort
 - iv) Quick sort
7. Write a program that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:
 - i) Linear search
 - ii) Binary search
8. Write a program to implement the tree traversal methods.
9. Write a program to implement AVL Tree.
10. Write a program to implement the graph traversal methods.
11. Write a program to implement pattern matching algorithms.
12. Write a program to implement stack using queues

13. Write a program to implement queue using stacks
14. Write a program to implement tree traversal methods without using recursion

TEXT BOOKS:

1. Fundamentals of data structures in C, 2 nd edition, E.Horowitz, S.Sahni and Susan Anderson Freed, Universities Press.
2. Data structures using c – A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/pearson education.

REFERENCE BOOKS:

1. Data structures: A Pseudocode Approach with C, 2 nd edition, R.F.Gilberg And B.A.Forouzan, Cengage Learning.
2. Introduction to data structures in c, 1/e Ashok Kamthane.

COURSE OUTCOMES:

Upon successful completion of this Lab, students will be able to:

CO 1: Identify the appropriate data structure for given problem

CO 2: Analyze the time and space complexity of algorithm or program

CO 3: Effectively use compilers including library functions, debuggers and trouble shooting

CO 4: Implement the various searching and sorting techniques

CO 5: Compare and contrast the abstract data types and pattern matching algorithms