

ANURAG ENGINEERING COLLEGE

(An Autonomous Institution)

M.Tech I Year I Sem

ADVANCED DATA STRUCTURES AND ALGORITHMS LAB

Course Objectives:

- The fundamental design, analysis, and implementation of basic data structures.
- Basic concepts in the specification and analysis of programs.
- Principles for good program design, especially the uses of data abstraction.

Sample Problems on Data structures:

1. Write Java programs that use both recursive and non-recursive functions for implementing the following searching methods:
a) Linear search b) Binary search
2. Write Java programs to implement the following using arrays and linked lists
a) List ADT
3. Write Java programs to implement the following using an array.
a) Stack ADT b) Queue ADT
4. Write a Java program that reads an infix expression and converts the expression to postfix form. (Use stack ADT).
5. Write a Java program to implement circular queue ADT using an array.
6. Write a Java program that uses both a stack and a queue to test whether the given string is a palindrome or not.
7. Write Java programs to implement the following using a singly linked list.
a) Stack ADT b) Queue ADT
8. Write Java programs to implement the deque (double ended queue) ADT using
a) Array b) Singly linked list c) Doubly linked list.
9. Write a Java program to implement priority queue ADT.
10. Write a Java program to perform the following operations:
a) Construct a binary search tree of elements.
b) Search for a key element in the above binary search tree.
c) Delete an element from the above binary search tree.
11. Write a Java program to implement all the functions of a dictionary (ADT) using Hashing.
12. Write a Java program to implement Dijkstra's algorithm for Single source shortest path problem.
13. Write Java programs that use recursive and non-recursive functions to traverse the given binary tree in

- a) Preorder b) Inorder c) Postorder.
14. Write Java programs for the implementation of bfs and dfs for a given graph.
 15. Write Java programs for implementing the following sorting methods:
 - a) Bubble sort d) Merge sort g) Binary tree sort
 - b) Insertion sort e) Heap sort
 - c) Quick sort f) Radix sort
 16. Write a Java program to perform the following operations:
 - a) Insertion into a B-tree b) Searching in a B-tree
 17. Write a Java program that implements Kruskal's algorithm to generate minimum cost spanning tree.
 18. Write a Java program that implements KMP algorithm for pattern matching.

Course Outcomes:

- Attains the knowledge on implementing linear search, binary search, stacks, queues.
- Gain the knowledge on implementing sorting techniques, B-trees.

REFERENCE BOOKS:

1. Data Structures and Algorithms in java, 3rd edition, A.Drozdek, Cengage Learning.
2. Data Structures with Java, J.R.Hubbard, 2nd edition, Schaum's Outlines, TMH.
3. Data Structures and algorithms in Java, 2nd Edition, R.Lafore, Pearson Education.
4. Data Structures using Java, D.S.Malik and P.S. Nair, Cengage Learning.
5. Data structures, Algorithms and Applications in java, 2nd Edition, S.Sahani, Universities Press.
6. Design and Analysis of Algorithms, P.H.Dave and H.B.Dave, Pearson education.
7. Data Structures and java collections frame work, W.J.Collins, Mc Graw Hill.
8. Java: the complete reference, 7th editon, Herbert Schildt, TMH.
9. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education / Java: How to Program P.J.Deitel and H.M.Deitel , 8th edition, PHI.
10. Java Programming, D.S.Malik, Cengage Learning.
11. A Practical Guide to Data Structures and Algorithms using Java, S.Goldman & K.Goldman, Chapman & Hall/CRC, Taylor & Francis Group.

(Note: Use packages like java.io, java.util, etc)