Data Structures and Algorithms

Mohammed Fahad

July 1, 2025

Syllabus

Basic Concepts of Data Structures

Definitions; Data Abstraction; Performance Analysis - Time & Space Complexity, Asymptotic Notations; Polynomial representation using Arrays, Sparse matrix (Tuple representation); Stacks and Queues - Stacks, Multi-Stacks, Queues, Circular Queues, Double Ended Queues; Evaluation of Expressions- Infix to Postfix, Evaluating Postfix Expressions.

1 Definitions

- **Data Structures:** ways of organizing and storing data in a computer so that it can be accessed and modified efficiently. Types:
  1. Linear: Arrays, Linked Lists, Stacks, Queues
  2. Non-linear: Trees, Graphs
- **Data Abstraction:** concept of hiding the internal details of how data is stored or maintained and only showing the essential features or operations that can be performed on the data.

2 Performance Analysis

1. **Time Complexity**
2. **Space Complexity**