

# Data Structures and Algorithms

## 1. Introduction to DSA

- What are Data Structures and Algorithms?
  - Why is DSA important?
  - Time and Space Complexity (Big-O Notation)
- 

## 2. Arrays

- Basic Array Operations: Access, Insert, Delete
  - Traversing an Array
  - Searching in Arrays (Linear Search)
  - Common Problems: Find max/min, Reverse array
- 

## 3. Strings

- String Basics and Operations
  - String Manipulation: Concatenation, Reversal
  - Searching for substrings
  - Common Problems: Palindrome, Anagram Check
- 

## 4. Linked Lists

- Introduction to Linked Lists
  - Singly Linked List: Operations (Insert, Delete, Traverse)
  - Common Problems: Reverse a linked list, Detect loops
- 

## 5. Stacks

- Definition and Operations: Push, Pop, Peek
- Applications of Stacks (Expression evaluation)
- Parenthesis Matching Problem

# Data Structures and Algorithms

---

## 6. Queues

- Queue Basics: Enqueue, Dequeue
- Types of Queues: Circular Queue, Priority Queue
- Applications of Queues (Task scheduling)

---

## 7. Basic Sorting Algorithms

- Bubble Sort, Selection Sort, Insertion Sort
- Time and Space Complexity of Sorting

---

## 8. Searching Algorithms

- Linear Search
- Binary Search (on sorted arrays)

---

## 9. Recursion

- Basics of Recursion
- Recursive Problem Solving (Factorial, Fibonacci)

---

## 10. Time and Space Complexity

- Introduction to Big-O notation
- Analyzing simple algorithms