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Data Structure & Algorithm

DSA is a fundamental concept in computer science that focuses on organizing and manipulating data efficiently

Introduction to Programming

- Introduction to Java
- Variables
- Data types
- keyword
- Identifier
- Control flow Statement
- if-else
- Nested if
- If else-if ladder
- Loops in java
- Continue
- Break
- Comments
- Functions
- Strings

Introduction to Programming Solving

- Introduction to Problem solving
- Time Complexity
- Space Complexity
- Bit Manipulations
- Maths

Arrays

- Introduction to Arrays

- Arrays - Prefix Sum
- Arrays-carry
- SubArrays
- 2D Matrices
- Array -question

Searching

- Binary Search(iterative)
- Binary Search(Recursive)
- Index of First Occurrence in sorted
- Index of Last Occurrence in sorted
- Two Pointers Approach
- Searching -Questions

Sorting

- Arrays.sort in Java
- Collections.Sort in Java
- Bubble Sort
- Selection Sort
- Insertion Sort'
- Merge Sort
- Quick Sort
- Heap Sort

String

- Palindrome Check
- Check if a String is Subsequence of other
- Longest Substring with Distinct Characters
- Pattern Searching
- Rabin Karp Algorithm

Linked List

- Introduction to Linked List
- Applications of Linked List
- Traversing a Linked List
- Recursively Traversal of Singly Linked List
- Insert At the begin and at the end of linked list
- Delete First and Last Node of linked list
- Doubly linked list
- Insert At the begin and at the end of doubly linked list
- Circular Linked list

Hashing

- Introduction to Hashing
- Hashing Application
- Hashing Functions
- Direct Address Table'
- Chaining
- Implementing of chaining
- HashSet
- HashMap

  Questions

Stack

- Introduction to Stack
- Array Implementation of Stack
- Linked List Implementation of Stack
- Applications of Stack
- Stack in Java Collections
- Infix ,Prefix and Postfix Introduction

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- questions

Queue

- Queue Data Structure
- Application of Queue
- Implementation of using Array
- Implementation of using Linked List
- Reversing a queue
- Implementing Stack with queue

Deque

- Introduction to deque
- ArrayDeque
- ArrayImplementation of Deque
- Questions

Tree

- Introduction to tree
- Application of tree
- Binary tree
- Tree Traversal
- Implementation of Inorder Traversal
- Implementation of Preorder Traversal
- Implementation of Postorder Traversal
- Iterative Inorder Traversal
- Iterative Preorder Traversal(Simple)
- Iterative Preorder Traversal(Optimized) question

Binary Search Tree

- Introduction
- Search in BST
- Insert in BST
- Deletion in BST
- AVL tree
- Question

Introduction to Graph

- Graph Representation(Adjacency matrix)
- Graph Representation(Adjacency list)
- BFS
- Application of BFS
- DFS
- Application of DFS
- Algorithm and question

BackTracking

- Concept of Backtracking
- N Queen Problem’
- Question

Dynamic Programming

- Introduction to DP
- DP Memoization
- DP Tabulation
- Longest Common Subsequence

- Subset Sum Problem
- 0-1 knapsack problem

Trie

- Introduction to Trie
- Trie Representation ,Search,Inset and Delete

Heap

- Binary Heap Introduction
- Implementation
- Binary Heap Insert
- Heap Sort
- PriorityQueue

Questions should be practiced from each topic