

Competitive Programming Foundations

1. Basics of Problem-Solving Techniques

- Introduction to Competitive Programming
- Sliding Window & Two-Pointer Techniques

2. Foundations of Mathematical Tools for CP

- Math & Number Theory: Divisors, Primes, Prime Factorization
- GCD, LCM, Binary Exponentiation & Modular Arithmetic

3. Binary Search & Variations

- Binary Search Fundamentals
- Binary Search on Answers, Monotonic Functions
- Lower Bound & Upper Bound

4. Foundations of Recursion

- Recursion Basics & Applications
- Introduction to Backtracking

5. Tree Basics & Applications

- Tree Data Structure Basics
- Binary Trees, Binary Search Trees, and Traversal Techniques (DFS, BFS)
- Recursive Tree Traversal (in-order, pre-order, post-order)

6. Graph Theory Essentials

- Graph Basics: Graph Representation, Adjacency Lists & Matrices
- DFS & BFS on Graphs
- Shortest Path Algorithms: Floyd-Warshall, Bellman-Ford, Dijkstra's Algorithm

7. Intermediate Data Structures

- Prefix Sum, 2D Prefix Sum, & Difference Array
- Policy-Based Data Structures (PBDS)

8. Bit Manipulation & Bitmasking Techniques

- Fundamentals of Bit Manipulation
- Bitmasking Applications in CP

9. Advanced Trees: Segment Trees

- Segment Tree Basics & Queries
- Lazy Propagation in Segment Trees

10. String Algorithms

- String Hashing & Applications

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