Comprehensive Coding Patterns and Problems

1. Array/String Patterns (20 problems)

Two Pointers (4 problems)

- Two Sum
- Three Sum
- Container With Most Water
- Trapping Rain Water

Sliding Window (4 problems)

- Longest Substring Without Repeating Characters
- Minimum Window Substring
- Longest Repeating Character Replacement
- Permutation in String

Prefix Sum (4 problems)

- Subarray Sum Equals K
- Maximum Subarray
- Range Sum Query
- Continuous Subarray Sum

Kadane's Algorithm (4 problems)

- Maximum Subarray
- Maximum Product Subarray
- Maximum Sum Circular Subarray
- Maximum Sum of Two Non-Overlapping Subarrays

Array Manipulation (4 problems)

- Rotate Array
- Merge Intervals
- Insert Interval
- Meeting Rooms

2. Tree/Graph Patterns (16 problems)

DFS/BFS (4 problems)

- Number of Islands
- Word Search
- Course Schedule
- Clone Graph

Binary Search Tree (4 problems)

- Validate Binary Search Tree
- Lowest Common Ancestor
- Kth Smallest Element
- Binary Search Tree Iterator

Tree Traversals (4 problems)

- Binary Tree Level Order Traversal
- Binary Tree Zigzag Level Order
- Vertical Order Traversal
- Boundary of Binary Tree

Graph Algorithms (4 problems)

- Course Schedule II
- Redundant Connection
- Network Delay Time
- Minimum Height Trees

3. Dynamic Programming (16 problems)

1D DP (4 problems)

- Climbing Stairs
- House Robber
- Decode Ways
- Perfect Squares

2D DP (4 problems)

- Longest Common Subsequence
- Edit Distance
- Interleaving String
- Distinct Subsequences

Matrix DP (4 problems)

- Unique Paths
- Minimum Path Sum
- Dungeon Game
- Maximal Square

State Compression (4 problems)

- Partition to K Equal Sum Subsets
- Can I Win
- Maximum Product of Word Lengths
- Smallest Sufficient Team

4. Data Structure Patterns (16 problems)

Hash Maps (4 problems)

- Group Anagrams
- Longest Consecutive Sequence
- LRU Cache
- All O(1) Data Structure

Heaps (4 problems)

- Merge K Sorted Lists
- Find Median from Data Stream
- Top K Frequent Elements
- Sliding Window Maximum

Stacks/Queues (4 problems)

- Valid Parentheses

- Next Greater Element
- Basic Calculator
- Largest Rectangle in Histogram

Linked Lists (4 problems)

- Reverse Linked List
- Merge K Sorted Lists
- LRU Cache
- Copy List with Random Pointer

5. Advanced Patterns (16 problems)

Backtracking (4 problems)

- Subsets
- Permutations
- Word Search
- N-Queens

Greedy (4 problems)

- Jump Game
- Gas Station
- Task Scheduler
- Minimum Number of Arrows

Bit Manipulation (4 problems)

- Single Number
- Number of 1 Bits
- Bitwise AND of Numbers Range
- Sum of Two Integers

Design (4 problems)

- LRU Cache
- LFU Cache
- All O(1) Data Structure
- Design Twitter

6. Binary Search (8 problems)

Basic Binary Search (4 problems)

- Binary Search
- Search in Rotated Sorted Array
- Find First and Last Position
- Search in 2D Matrix

Advanced Binary Search (4 problems)

- Median of Two Sorted Arrays
- Kth Smallest Element
- Split Array Largest Sum
- Find Peak Element

7. Trie (4 problems)

Trie Operations (4 problems)

- Implement Trie
- Word Search II
- Add and Search Word
- Longest Word in Dictionary

8. Union Find (4 problems)

Union Find Applications (4 problems)

- Number of Islands
- Redundant Connection
- Accounts Merge
- Longest Consecutive Sequence

9. Segment Tree (4 problems)

Segment Tree Operations (4 problems)

- Range Sum Query
- Range Minimum Query
- Count of Range Sum
- My Calendar I

10. Advanced Graph (8 problems)

Topological Sort (4 problems)

- Course Schedule
- Alien Dictionary
- Reconstruct Itinerary
- Minimum Height Trees

Shortest Path (4 problems)

- Network Delay Time
- Cheapest Flights Within K Stops
- Path With Maximum Probability
- Find the City With Smallest Number of Neighbors

11. String Manipulation (8 problems)

String Matching (4 problems)

- Implement strStr()
- Longest Palindromic Substring
- Regular Expression Matching
- Wildcard Matching

String Transformation (4 problems)

- String to Integer (atoi)
- Integer to Roman
- Roman to Integer
- ZigZag Conversion

12. Matrix Operations (8 problems)

Matrix Traversal (4 problems)

- Spiral Matrix
- Rotate Image
- Set Matrix Zeroes
- Game of Life

Matrix Search (4 problems)

- Search a 2D Matrix
- Word Search
- Number of Islands
- Pacific Atlantic Water Flow

13. Advanced Tree Patterns (8 problems)

Tree Construction (4 problems)

- Construct Binary Tree from Preorder and Inorder
- Construct Binary Tree from Postorder and Inorder
- Serialize and Deserialize Binary Tree
- Recover Binary Search Tree

Tree Properties (4 problems)

- Balanced Binary Tree
- Symmetric Tree
- Same Tree
- Subtree of Another Tree

14. Advanced DP Patterns (8 problems)

DP on Trees (4 problems)

- Binary Tree Maximum Path Sum
- House Robber III
- Longest Path With Different Adjacent Characters
- Sum of Distances in Tree

DP on Graphs (4 problems)

- Longest Increasing Path in Matrix
- Cheapest Flights Within K Stops
- Minimum Cost to Reach Destination
- Maximum Vacation Days

15. Advanced Array Patterns (8 problems)

Array Rotation (4 problems)

- Rotate Array
- Search in Rotated Sorted Array
- Find Minimum in Rotated Sorted Array
- Find Peak Element

Array Partitioning (4 problems)

- Partition Equal Subset Sum
- Partition to K Equal Sum Subsets
- Partition Labels
- Partition Array for Maximum Sum

16. Advanced Graph Patterns (8 problems)

Eulerian Path (4 problems)

- Reconstruct Itinerary
- Valid Arrangement of Pairs
- Cracking the Safe
- Find the Town Judge

Bipartite Graph (4 problems)

- Is Graph Bipartite?
- Possible Bipartition
- Flower Planting With No Adjacent
- Coloring A Border

17. Advanced String Patterns (8 problems)

Palindrome (4 problems)

- Longest Palindromic Substring
- Palindromic Substrings
- Valid Palindrome
- Shortest Palindrome

Anagram (4 problems)

- Group Anagrams
- Valid Anagram
- Find All Anagrams in String
- Minimum Window Substring

18. Advanced Binary Search (8 problems)

Binary Search on Answer (4 problems)

- Split Array Largest Sum
- Capacity To Ship Packages
- Koko Eating Bananas
- Minimize Max Distance to Gas Station

Binary Search with Custom Condition (4 problems)

- Find First and Last Position
- Search in Rotated Sorted Array
- Find Peak Element
- H-Index II

19. Advanced Data Structure Patterns (8 problems)

Skip List (4 problems)

- Design Skiplist

- Range Sum Query
- Count of Range Sum
- Count of Smaller Numbers After Self

Advanced Heap (4 problems)

- Find Median from Data Stream
- Sliding Window Median
- Kth Largest Element in Array
- Merge K Sorted Lists

20. Advanced Bit Manipulation (8 problems)

Bit Operations (4 problems)

- Single Number II
- Single Number III
- Maximum XOR of Two Numbers
- Counting Bits

Bit Masking (4 problems)

- Subsets
- Gray Code
- Repeated DNA Sequences
- Maximum Product of Word Lengths

21. Advanced Backtracking (8 problems)

Constraint Satisfaction (4 problems)

- Sudoku Solver
- N-Queens
- Word Search
- Generate Parentheses

Combinatorial (4 problems)

- Combinations
- Combination Sum
- Permutations
- Permutations II

22. Advanced Greedy (8 problems)

Interval Scheduling (4 problems)

- Meeting Rooms
- Meeting Rooms II
- Non-overlapping Intervals
- Minimum Number of Arrows

Greedy with Priority Queue (4 problems)

- Task Scheduler
- Reorganize String
- Minimum Cost to Connect Sticks
- Maximum Performance of a Team

Summary of Problems

1. Array/String Patterns: 20 problems
2. Tree/Graph Patterns: 16 problems
3. Dynamic Programming: 16 problems
4. Data Structure Patterns: 16 problems
5. Advanced Patterns: 16 problems
6. Binary Search: 8 problems
7. Trie: 4 problems
8. Union Find: 4 problems
9. Segment Tree: 4 problems
10. Advanced Graph: 8 problems
11. String Manipulation: 8 problems
12. Matrix Operations: 8 problems
13. Advanced Tree Patterns: 8 problems
14. Advanced DP Patterns: 8 problems
15. Advanced Array Patterns: 8 problems
16. Advanced Graph Patterns: 8 problems
17. Advanced String Patterns: 8 problems
18. Advanced Binary Search: 8 problems
19. Advanced Data Structure Patterns: 8 problems
20. Advanced Bit Manipulation: 8 problems
21. Advanced Backtracking: 8 problems
22. Advanced Greedy: 8 problems

Total: 320 problems across 80 patterns