20 Coding Patterns to Master for MAANG Interviews

What if you don't like solving hundreds of coding questions before your interview? Don't just LeetCode; follow these 20 coding patterns instead.

1. **Sliding Window**
   - **Usage**: Handle input data in a specific window size.
   - **DS Involved**: Array, String, HashTable
   - **Sample Problems**: Longest Substring with 'K' Distinct Characters, Fruits into Baskets
2. **Islands (Matrix Traversal)**
   - **Usage**: Efficient ways of traversing a matrix.
   - **DS Involved**: Matrix, Queue
   - **Sample Problems**: Number of Islands, Flood Fill, Cycle in a Matrix
3. **Two Pointers**
   - **Usage**: Iterate input data with two pointers moving in opposite directions.
   - **DS Involved**: Array, String, LinkedList
   - **Sample Problems**: Squaring a Sorted Array, Dutch National Flag Problem, Minimum Window Sort
4. **Fast & Slow Pointers**
   - **Usage**: Traverse input data at different speeds.
   - **DS Involved**: Array, String, LinkedList
   - **Sample Problems**: Middle of the LinkedList, Happy Number, Cycle in a Circular Array
5. **Merge Intervals**
   - **Usage**: Deal with overlapping intervals.
   - **DS Involved**: Array, Heap
   - **Sample Problems**: Conflicting Appointments, Minimum Meeting Rooms
6. **Cyclic Sort**
   - **Usage**: Solve array problems with data in a fixed range.
   - **DS Involved**: Array
   - **Sample Problems**: Find all Missing Numbers, Find all Duplicate Numbers, Find the First K Missing Positive Numbers
7. **In-place Reversal of a LinkedList**
   - **Usage**: Reverse links between nodes of a LinkedList in-place.
   - **DS Involved**: LinkedList
   - **Sample Problems**: Reverse every K-element Sub-list, Rotate a LinkedList
8. **Breadth-First Search**
   - **Usage**: Traverse trees or graphs in a breadth-first manner.
   - **DS Involved**: Tree, Graph, Matrix, Queue
   - **Sample Problems**: Binary Tree Level Order Traversal, Minimum Depth of a Binary Tree, Connect Level Order Siblings
9. **Depth First Search**
   - **Usage**: Traverse trees or graphs in a depth-first manner.
   - **DS Involved**: Tree, Graph, Matrix
   - **Sample Problems**: Path With Given Sequence, Count Paths for a Sum
10. **Two Heaps**
   - **Usage**: Find smallest and biggest elements in divided sets.

- **DS Involved**: Heap, Array
- **Sample Problems**: Find the Median of a Number Stream, Next Interval

11. Subsets

- **Usage**: Deal with permutations or combinations of elements.
- **DS Involved**: Queue, Array, String
- **Sample Problems**: String Permutations by changing case, Unique Generalized Abbreviations

12. Modified Binary Search

- **Usage**: Search a sorted set of elements efficiently.
- **DS Involved**: Array
- **Sample Problems**: Ceiling of a Number, Bitonic Array Maximum

13. Bitwise XOR

- **Usage**: Manipulate bits to solve problems.
- **DS Involved**: Array, Bits
- **Sample Problems**: Two Single Numbers, Flip and Invert an Image

14. Top 'K' Elements

- **Usage**: Find top/smallest/frequently occurring 'K' elements in a set.
- **DS Involved**: Array, Heap, Queue
- **Sample Problems**: 'K' Closest Points to the Origin, Maximum Distinct Elements

15. K-way Merge

- **Usage**: Solve problems involving sorted arrays.
- **DS Involved**: Array, Queue, Heap
- **Sample Problems**: Kth Smallest Number in M Sorted Lists, Kth Smallest Number in a Sorted Matrix

16. Topological Sort

- **Usage**: Find a linear ordering of elements with dependencies.
- **DS Involved**: Array, HashTable, Queue, Graph
- **Sample Problems**: Tasks Scheduling, Alien Dictionary

17. 0/1 Knapsack

- **Usage**: Select elements to maximize profit with capacity limitations.
- **DS Involved**: Array, HashTable
- **Sample Problems**: Equal Subset Sum Partition, Minimum Subset Sum Difference

18. Fibonacci Numbers

- **Usage**: Solve problems following the Fibonacci sequence.
- **DS Involved**: Array, HashTable
- **Sample Problems**: Staircase, House Thief

19. Palindromic Subsequence

- **Usage**: Solve optimization problems related to palindromic sequences.
- **DS Involved**: Array, HashTable
- **Sample Problems**: Longest Palindromic Subsequence, Minimum Deletions in a String to make it a Palindrome

20. Longest Common Substring

- **Usage**: Find the optimal part of a string/sequence.
- **DS Involved**: Array, HashTable
- **Sample Problems**: Maximum Sum Increasing Subsequence, Edit Distance