

## 25 Must-Know DSA Patterns

### 1. Sliding Window

Used for problems involving subarrays or substrings, often with max/min/average.

### 2. Two Pointers

Involves two pointers moving through the array, usually for sorted arrays or linked lists.

### 3. Fast and Slow Pointers

Detects cycles in linked lists or arrays.

### 4. Merge Intervals

Used to solve overlapping interval problems.

### 5. Cyclic Sort

Great for problems involving numbers in a range.

### 6. In-place Reversal of Linked List

For reversing lists or parts of them.

### 7. Breadth-First Search (BFS)

Level-order traversal, shortest path in unweighted graphs.

### 8. Depth-First Search (DFS)

Used for exploring all paths or connected components.

### 9. Two Heaps

Solves problems involving medians or K largest/smallest elements.

### 10. Subsets

Generates all subsets, permutations, or combinations.

### 11. Modified Binary Search

Find elements in a sorted array with modifications.

### 12. Bitwise XOR

Used for problems involving finding the missing number or duplicates.

### 13. Top K Elements

Frequently uses heaps or quickselect to find the most/least frequent.

#### **14. K-way Merge**

Merges multiple sorted arrays using a min-heap.

#### **15. 0/1 Knapsack**

Classic DP pattern involving choices with capacity constraints.

#### **16. Topological Sort**

Used for ordering tasks based on prerequisites.

#### **17. Trie-based Problems**

Great for prefix search or dictionary matching.

#### **18. Backtracking**

Try all possibilities recursively and backtrack on failure.

#### **19. Dynamic Programming (DP)**

Break problem into overlapping subproblems and cache results.

#### **20. Greedy**

Make local optimal choices aiming for a global solution.

#### **21. Union-Find (Disjoint Set)**

Used in Kruskals algorithm and connected components.

#### **22. Segment Tree**

Solves range query and update problems efficiently.

#### **23. Monotonic Stack**

Used for problems involving the next/previous greater/smaller element.

#### **24. Graph - Dijkstras**

Shortest path in weighted graphs.

#### **25. Graph - Floyd Warshall / Bellman Ford**

All pairs shortest path / negative cycles.