

STACKS & MONOTONIC STACK ROADMAP (SORTED + PATTERN + INDEXING)

EASY LEVEL (1–15)

1. Implement Stack using Array — Array simulation
2. Implement Stack using Linked List — LL simulation
3. Implement Stack using 2 Queues — Queue operations
4. Implement Stack using 1 Queue — Rotation trick
5. Reverse a Stack (recursion) — Recursion
6. Valid Parentheses — Stack
7. Min Stack — Auxiliary stack
8. Sort a Stack — Recursion
9. Infix to Postfix — Operator stack
10. Infix to Prefix — Reverse + postfix
11. Postfix to Prefix — Stack
12. Prefix to Postfix — Stack
13. Postfix to Infix — Stack
14. Prefix to Infix — Stack
15. Evaluate Postfix/Prefix — Stack

MEDIUM LEVEL (16–35)

16. Next Greater Element I — Monotonic stack
17. Next Greater Element II — Circular monotonic stack
18. Next Smaller Element — Monotonic stack
19. Number of NGEs to the right — Monotonic stack
20. Stock Span — Monotonic stack
21. Sliding Window Maximum — Monotonic deque
22. Largest Rectangle in Histogram — Monotonic stack
23. Maximal Rectangle in Matrix — Histogram + stack
24. Sum of Subarray Minimums — Monotonic stack
25. Sum of Subarray Ranges — Next greater/smaller
26. Remove K Digits — Monotonic stack

- 27. Decode String — Stack
- 28. Asteroid Collision — Stack
- 29. Trapping Rainwater — Two-pointer/stack
- 30. Celebrity Problem — Stack elimination
- 31. LRU Cache — DLL + hashmap
- 32. LFU Cache — Multi-list + hashmap
- 33. Min add to make parentheses valid — Counter
- 34. Remove outermost parentheses — Counter
- 35. Reverse every word using stack — Stack

HARD LEVEL (36–55)

-
- 36. Rainwater trapping using stack — Monotonic stack
 - 37. Maximum area skyline — Histogram optimized
 - 38. Combined subarray min/max problems — Dual monotonic
 - 39. Beauty of substrings (stack variant) — Hybrid
 - 40. Online Stock Span — Streaming monotonic
 - 41. Min stack $O(1)$ space — Encoding trick
 - 42. Remove adjacent duplicates repeatedly — Stack
 - 43. Make string great — Stack
 - 44. Basic Calculator I — Stack
 - 45. Basic Calculator II — Stack
 - 46. Basic Calculator III — Stack
 - 47. Longest Valid Parentheses — Stack
 - 48. Score of Parentheses — Stack
 - 49. Browser History — Two stacks
 - 50. Undo/Redo system — Two stacks
 - 51. 132 Pattern — Monotonic stack
 - 52. Remove Duplicate Letters — Stack
 - 53. Daily Temperatures — Monotonic stack
 - 54. Minimum in every window — Monotonic deque
 - 55. Maximum Binary Tree — Stack

BONUS (56–60)

- 56. Queue using Stack
- 57. Stack permutation validation
- 58. Min cost to make parentheses valid
- 59. Fully decode nested parentheses
- 60. Clone stack without extra space