

## BINARY SEARCH ROADMAP (SORTED BY DIFFICULTY + PATTERN)

### EASY LEVEL (1–20)

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1. Binary Search in Sorted Array — Classic BS
2. Lower Bound Implementation — BS
3. Upper Bound Implementation — BS
4. Search Insert Position — BS
5. Floor in Sorted Array — BS
6. Ceil in Sorted Array — BS
7. First Occurrence — BS on boundaries
8. Last Occurrence — BS on boundaries
9. Count Occurrences — First + Last
10. Single Element in Sorted Array — Pair logic BS
11. Square Root — BS
12. Nth Root — BS on answer
13. Kth Missing Positive — BS
14. Find Peak Element — BS
15. Find Pivot — BS
16. Count Rotations — Pivot logic
17. Min in Rotated Array — BS
18. Search in Rotated Sorted Array I — BS
19. Search in Rotated Sorted Array II — BS
20. Find Row With Maximum 1s — BS row logic

### MEDIUM LEVEL (21–45)

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21. Book Allocation — BS on answer
22. Painter Partition — BS on answer
23. Split Array - Largest Sum — BS on answer
24. Aggressive Cows — BS on distance
25. Koko Eating Bananas — BS on speed
26. Capacity to Ship Packages — BS on capacity

- 27. Min Days to Make Bouquets — BS on days
- 28. Smallest Divisor — BS
- 29. Min Time to Complete Trips — BS
- 30. Search in 2D Matrix — BS flatten
- 31. Search Row & Column Sorted Matrix — Staircase search
- 32. Find Peak (2D Matrix) — BS on columns
- 33. Matrix Median — BS on value
- 34. Median of 2 Sorted Arrays — BS partition
- 35. Kth Element of 2 Sorted Arrays — BS partition
- 36. Rotated Array with duplicates — BS
- 37. Search in nearly sorted array — BS modified
- 38. Search in infinite sorted array — Exponential + BS
- 39. Smallest letter greater than target — BS
- 40. Next greatest element in rotated — BS
- 41. Fixed point  $\text{arr}[i] = i$  — BS
- 42. Find local minima — BS
- 43. Min absolute diff between 2 arrays — BS
- 44. Ceil in sorted matrix — BS
- 45. Floor in sorted matrix — BS

#### HARD LEVEL (46–70)

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- 46. Minimize Max Distance to Gas Station — Precision BS
- 47. Min penalty in division — BS
- 48. Maximize minimum distance — BS
- 49. Maximum tastiness — BS
- 50. Minimize max array sum after ops — BS
- 51. Kth smallest in sorted matrix — BS
- 52. Kth largest in sorted matrix — BS
- 53. Count  $\leq X$  in matrix — BS row-wise
- 54. Median of matrix — BS
- 55. Peak in Mountain Array — BS

- 56. Search in Mountain Array — BS + peak
- 57. Min time to repair cars — BS
- 58. Find K closest elements — BS
- 59. Split array minimize penalty — BS
- 60. Find element in bitonic array — BS
- 61. Unknown length array search — Exponential + BS
- 62. Painter partition extended — BS
- 63. Allocate pages hard — BS
- 64. Eating speed variant — BS
- 65. Binary search on real numbers — Precision BS
- 66. Kth position after removals — BS
- 67. Smallest range from k lists — Heap + BS
- 68. Closest sum using BS + 2 pointer — Hybrid
- 69. Eating speed constraints — BS
- 70. Monotonic predicate BS — General pattern

#### BONUS JAVA QUESTIONS

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- 71. Comparable vs Comparator with BS
- 72. Binary search with custom comparator
- 73. Generic BS template in Java
- 74. BS on chars using ASCII
- 75. Arrays.binarySearch() behavior