

# Technical Interview Preparation

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## Data Structures:

- Arrays (multi-dimensional)
- Dynamic Arrays (multi-dimensional)
- Linked Lists (singly linked, doubly linked, circular)
- Stacks
- Queues
- HashMaps and HashSets
- Iterators
- Graphs (adjacency matrix, adjacency list, edge list)

## Algorithms:

- Complete Search: linear search, binary search, exponential search, BFS, DFS
- Shortest / Least Cost Path: Dijkstra's, Floyd-Warshall's
- Minimum Spanning Trees: Prim's, Kruskal's
- Tree Traversals: pre-order, in-order, post-order, level-order
- Strings: Knuth-Morris-Pratt's, Rabin-Karp's
- Sorting: Merge Sort, Selection Sort, Insertion Sort

## Programming Paradigms:

- Dynamic Programming: longest increasing subsequence, fibonacci sequence, max sum sub-array
- Recursion: DFS, Tree Traversals, Binary Search, Merge Sort
- Backtracking: Eight Queens, Sudoku

## Useful Background Knowledge:

- Prime Sieves: Sieve of Eratosthenes
- Geometry: area of convex polygon, convex hull, cross products, dot products
- Combinatorics: power set, permutations, palindromes, subsets
- Bitwise Manipulation: bit-masking, minimizing memory usage

## Resources for Learning:

### Books:

- Cracking the Coding Interview - Gayle Laakmann McDowell
- Programming Interviews Exposed - Eric Giguere, John Mongan, & Noah Kindler
- Algorithm Design Manual - Steven Skiena
- Competitive Programming 3 - Steven Halim & Felix Halim

### Sites:

- Learning: [algo.is](http://algo.is)
- Learning: [geeksforgeeks.org](http://geeksforgeeks.org)
- Practice: [open.kattis.com](http://open.kattis.com)
- Practice: [hackerrank.com](http://hackerrank.com)

### Youtube Playlists:

- Algorithms (William Fiset) - <https://www.youtube.com/user/purpongie>
- Math (3Blue1Brown) - [https://www.youtube.com/channel/UCYO\\_jab\\_esuFRV4b17AJtAw](https://www.youtube.com/channel/UCYO_jab_esuFRV4b17AJtAw)
- MIT Algorithms - [https://www.youtube.com/playlist?list=PLUI4u3cNGP61Oq3tWYp6V\\_F-5jb5L2iHb](https://www.youtube.com/playlist?list=PLUI4u3cNGP61Oq3tWYp6V_F-5jb5L2iHb)