# **DSA ALGORITHM LIST**

## **1. Searching Algorithms**

* Linear Search (Important)
* Binary Search (Important)
* Jump Search
* Interpolation Search
* Exponential Search

## **2. Sorting Algorithms**

* Bubble Sort
* Selection Sort
* Insertion Sort
* Merge Sort
* Quick Sort
* Heap Sort
* Counting Sort
* Radix Sort
* Bucket Sort
* Shell Sort
* Tim Sort

## **3. Graph Traversal Algorithms**

* Depth First Search (DFS)
* Breadth First Search (BFS)

## **4. Dynamic Programming Algorithms**

* Fibonacci Sequence (DP)
* Longest Common Subsequence (LCS)
* Longest Increasing Subsequence (LIS)
* Matrix Chain Multiplication
* 0/1 Knapsack Problem
* Edit Distance
* Subset Sum Problem
* Coin Change Problem
* Rod Cutting Problem
* Catalan Number Series

## **5. Greedy Algorithms**

* Activity Selection Problem
* Fractional Knapsack
* Huffman Encoding
* Kruskal’s Algorithm
* Prim’s Algorithm
* Job Sequencing with Deadlines
* Dijkstra’s Algorithm
* Minimum Cost Spanning Tree

## **6. Divide and Conquer Algorithms**

* Merge Sort
* Quick Sort
* Binary Search
* Closest Pair of Points
* Strassen’s Matrix Multiplication

## **7. Backtracking Algorithms**

* N-Queens Problem
* Sudoku Solver
* Rat in a Maze
* Hamiltonian Cycle
* Subset Sum Problem
* Word Search in Grid

## **8. Bit Manipulation Algorithms**

* Check if Number is Power of 2
* Count Number of Set Bits
* Find the Only Non-Repeating Element
* XOR of All Elements
* Find Missing Number in Range

## **9. Mathematical Algorithms**

* Euclidean Algorithm (GCD)
* Sieve of Eratosthenes
* Modular Exponentiation
* Modular Inverse
* Prime Factorization
* Chinese Remainder Theorem
* Fast Exponentiation

## **10. String Matching Algorithms**

* Naive Pattern Search
* Knuth-Morris-Pratt (KMP)
* Rabin-Karp
* Z-Algorithm
* Boyer-Moore Algorithm
* Aho-Corasick Algorithm

## **11. Geometric Algorithms**

* Convex Hull (Graham’s Scan, Jarvis March)
* Closest Pair of Points
* Line Intersection Check
* Point in Polygon Test
* Rotating Calipers

## **12. Randomized Algorithms**

* Randomized Quick Sort
* Randomized Binary Search
* Monte Carlo Algorithms
* Las Vegas Algorithms

## **13. Number Theory Algorithms**

* Sieve of Eratosthenes
* Modular Exponentiation
* Miller-Rabin Primality Test
* Euler’s Totient Function
* Chinese Remainder Theorem

## **14. Branch and Bound Algorithms**

* N-Queens Problem
* Travelling Salesman Problem (TSP)
* 0/1 Knapsack Problem
* Job Assignment Problem

## **15. Topological Sorting Algorithms**

* DFS-based Topological Sort
* Kahn’s Algorithm (BFS-based Topological Sort)

## **16. Hashing Algorithms**

* Hash Table
* Hash Map
* Open Addressing
* Separate Chaining
* Locality Sensitive Hashing (LSH)

## **17. Tree Traversal Algorithms**

* Inorder Traversal
* Preorder Traversal
* Postorder Traversal
* Level Order Traversal (BFS)

## **18. Priority Queue and Heap Algorithms**

* Max Heap
* Min Heap
* Heapify
* Priority Queue Operations
* Median of Stream using Heap
* Kth Largest / Smallest Element

## **19. Shortest Path Algorithms**

* Dijkstra’s Algorithm
* Bellman-Ford Algorithm
* Floyd-Warshall Algorithm
* A\* Search Algorithm

## **20. Minimum Spanning Tree Algorithms**

* Prim’s Algorithm
* Kruskal’s Algorithm
* Boruvka’s Algorithm