List of Important Algorithms in Data Structures and Algorithms (DSA)

1. Sorting Algorithms:

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

2. Searching Algorithms:

- Linear Search
- Binary Search
- Exponential Search
- Jump Search
- Interpolation Search
- Ternary Search

3. Hashing Algorithms:

- Direct Addressing
- Hashing with Chaining
- Open Addressing (Linear Probing, Quadratic Probing, Double Hashing)
- Hash Functions (Multiplicative, Division)

4. Graph Algorithms:

- Depth-First Search (DFS)
- Breadth-First Search (BFS)
- Dijkstra's Algorithm (Shortest Path)
- Bellman-Ford Algorithm
- Floyd-Warshall Algorithm
- A* Algorithm
- Kruskal's Algorithm (Minimum Spanning Tree)
- Prim's Algorithm (Minimum Spanning Tree)
- Topological Sorting
- Tarjan's Algorithm (Strongly Connected Components)
- Kosaraju's Algorithm (Strongly Connected Components)

- Johnson's Algorithm (All-Pairs Shortest Path)

5. Greedy Algorithms:

- Activity Selection Problem
- Fractional Knapsack Problem
- Huffman Coding
- Kruskal's Algorithm
- Prim's Algorithm
- Dijkstra's Algorithm
- Job Sequencing Problem

6. Dynamic Programming Algorithms:

- 0/1 Knapsack Problem
- Longest Common Subsequence (LCS)
- Longest Increasing Subsequence (LIS)
- Matrix Chain Multiplication
- Floyd-Warshall Algorithm
- Rod Cutting Problem
- Edit Distance
- Coin Change Problem
- Partition Problem
- Subset Sum Problem
- Bellman-Ford Algorithm
- Egg Dropping Problem

7. Divide and Conquer Algorithms:

- Merge Sort
- Quick Sort
- Binary Search
- Strassen's Matrix Multiplication
- Closest Pair of Points Problem
- Karatsuba Algorithm for Fast Multiplication

8. Backtracking Algorithms:

- N-Queens Problem
- Knight's Tour Problem
- Subset Sum Problem
- Hamiltonian Path
- Graph Coloring Problem
- Sudoku Solver
- Rat in a Maze Problem

9. String Algorithms:

- Knuth-Morris-Pratt (KMP) Algorithm
- Rabin-Karp Algorithm
- Boyer-Moore Algorithm
- Z Algorithm
- Longest Common Substring
- Suffix Trees
- Aho-Corasick Algorithm
- Manacher's Algorithm (Longest Palindromic Substring)
- Levenshtein Distance (Edit Distance)

10. Tree Algorithms:

- Inorder, Preorder, Postorder Traversal
- Level Order Traversal
- Binary Search Tree (BST) Operations
- AVL Tree (Balanced Binary Search Tree)
- Red-Black Tree
- Segment Tree
- Fenwick Tree (Binary Indexed Tree)
- Trie (Prefix Tree)
- B-Tree
- B+ Tree

11. Mathematical Algorithms:

- Sieve of Eratosthenes (Prime Numbers)
- Euclidean Algorithm (GCD)
- Extended Euclidean Algorithm
- Fast Exponentiation
- Fibonacci Sequence
- Modular Arithmetic
- Chinese Remainder Theorem
- Greatest Common Divisor (GCD)
- Least Common Multiple (LCM)

12. Bit Manipulation Algorithms:

- Counting Set Bits
- Checking if a number is Power of 2
- Bitwise AND/OR/XOR
- Swapping Two Numbers Using XOR
- Bit Masking

13. Advanced Algorithms:

- Disjoint Set (Union-Find)
- Convex Hull Algorithms (Graham Scan, Jarvis March)
- Dynamic Connectivity Problem

- Ford-Fulkerson Algorithm (Max Flow)
- Edmonds-Karp Algorithm (Max Flow)
- Dinic's Algorithm (Max Flow)

14. Miscellaneous Algorithms:

- Reservoir Sampling
- Floyd's Cycle Detection Algorithm (Tortoise and Hare)
- Randomized Algorithms (QuickSort, QuickSelect)
- Bloom Filter
- Monte Carlo and Las Vegas Algorithms