Data Structures

Basic Data Structures

- Stack (Array & Linked List Implementation)
- Queue (Array & Linked List Implementation)
- Linked List (Single, Double & Circular)
- Lists

Tree Data Structures

- Binary Search Tree
- Heaps
- Height Balanced Tree
- K-ary Tree
- AVL Tree
- B Tree
- B+ Tree
- Indexing with Trees
- Segment Tree
- Fenwick Tree
- Binary Indexed Tree (BIT)
- Red-Black Tree
- Splay Tree
- Binomial Queues
- Fibonacci Heaps
- Leftist Heaps
- Skew Heaps
- Open Hash Tables (Closed Addressing)
- Closed Hash Tables (Open Addressing)
- Closed Hash Tables, using buckets

Uncategorized

- Trie
- Disjoint-set Data Structures
- Suffix Arrays

Algorithms

Sorting Algorithms

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

Graph/Search Algorithms

- Depth First Search (DFS)
- Breadth First Search (BFS)
- Iterative Deepening Depth First Search (Depth Limited Search)
- A* Search
- Ternary Search
- Meet in the middle
- Strongly Connected Components (SCC)
- Bipartite Matching
- Kruskal Minimum Cost Spanning Tree Algorithm
- Prim's Minumum Cost Spanning Tree
- Dijkstra's Algorithm for Shortest Paths
- Floyd-Warshall Algorithm for Shortest Paths
- Bellman-Ford Algorithm
- Edmonds-Karp Algorithm
- Hungarian Algorithm
- Sweep Line Algorithm
- Graham scan
- Tarjan's Algorithm
- Knuth-Morris-Pratt Algorithm
- Z algorithm
- Hill Climbing

Dynamic Programming

- Integer Knapsack problem
- Matrix Chain Multiplication
- Longest Common Subsequence
- Rod Cutting

Greedy Algorithms

- Elementary cases : Fractional Knapsack Problem, Task Scheduling
- Data Compression using Huffman Trees
- Activity Selection

Number Theory

- Modular Arithmetic
- Fermat's Theorem
- Chinese Remainder Theorem(CRT)
- Euclidian Method for GCD
- Logarithmic Exponentiation
- Sieve of Eratosthenes
- Euler's Totient Function

Geometric Algorithms

- 2D Rotation and Scale Matrices
- 2D Rotation and Translation Matrices
- 2D Changing Coordinate Systems
- 3D Rotation and Scale Matrices
- 3D Changing Coordinate Systems

Uncategorized

- Recursion
- Huffman Coding
- Regex Algorithm (Pattern Matching and Parsing)
- Hashing- Hash Functions
- Monotone Chains Algorithm
- Coordinate Compression

- Ford--Fulkerson Method
- Preflow-Push Algorithm
- Dinic's Algorithm
- Monte Carlo method or Metropolis Algorithm
- Krylov Subspace Iteration Method
- Householder Matrix Decomposition
- QR Algorithm
- Fast Fourier Transform
- Integer Relation Detection Algorithm
- Fast Multipole algorithm
- MinMax Algorithm
- Divide and Conquer Algorithm