

CS 302 Design and Analysis of Algorithms

- 1) Introduction
 - 2) Time and Space Complexity
 - 3) Best, worst and Average Case Complexities
 - 4) Calculation of simple algorithms
 - 5) Asymptotic Notations – Properties & Applications
 - 6) Recurrence Equations – Iteration Method, Recursion Tree Methods, Master's Theorem
 - 7) AVL Trees – rotations
 - 8) Red-Black Trees insertion and deletion
 - 9) B-Trees – insertion and deletion operations
 - 10) Sets- Union and find operations on disjoint sets.
-
- 11) Graphs – DFS and BFS traversals, complexity,
 - 12) Spanning trees – Minimum Cost Spanning Trees, Prim's Algorithm, Kruskal's Algorithm.
 - 13) Single source shortest path algorithms – Dijkstras Algorithm
 - 14) Topological sorting
 - 15) Strongly connected components.
 - 16) Divide and Conquer, Dynamic Programming, Greedy, Backtracking, Branch & Bound: The Control Abstraction
 - 17) 2 way Merge sort
 - 18) Strassen's Matrix Multiplication, Analysis
 - 19) Optimality Principle
 - 20) Optimal matrix multiplication
 - 21) Bellman-Ford Algorithm
-
- 22) Greedy Strategy: the Fractional Knapsack Problem,
 - 23) Back Tracking: The N Queen's Problem,
 - 24) Back Tracking: 0/1 Knapsack Problem
 - 25) Branch and Bound: Travelling Salesman Problem.
 - 26) Tractable and Intractable Problems
 - 27) The P and NP Classes, NP- Hard and NP-Complete Classes
 - 28) Polynomial Time Reductions