

ALGORITHMS

1. Introduction

Objective: Learn classic algorithms designed for classic problems, analyzing an Algorithm, learn techniques to design algorithms, computational tractability (NP-completeness)

Credits: 3-0-0

2. Prerequisite

Data Structures, Discrete mathematics

3. Course Outline

Introduction to algorithms, Asymptotical Notations, Solving Recurrences, Master Theorem

Divide-and-Conquer: Strassen's Algorithm, Quicksort, Randomized Quicksort, Linear time sorting, Medians and Order Statistics

Greedy Algorithms: Activity-Selection, Kruskal, Prim

Dynamic Programming: Shortest Paths in DAG, Matrix-Chain Multiplication, Bellman-Ford, Floyd-Warshall, Dijkstra Network Flow, Ford-Fulkerson Method, Max-Flow-Min-Cut, Maximum Matching

NP-Completeness, Reductions

Linear Programming, Duality

Randomized Algorithms
Approximation Algorithms

4. Reading Material

Text Books

1. Introduction to Algorithms” by Cormen et al, Third edition

References

1. “Algorithm Design” by Kleinberg and Tardos
2. Algorithms, 4th Edition by Robert Sedgwick and Kevin Wayne
3. “The Art of computer programming” by Donald Knuth