



CHHOTUBHAI GOPALBHAI PATEL INSTITUTE OF TECHNOLOGY
Computer Engineering

Design and Analysis of Algorithms

Lesson Planning

Unit	Sub Unit	No. of Lecture(s)	Topics	Reference Chapter/Additional Reading
Analysis of Algorithms				
1	1.1	1	Algorithm, Performance analysis of algorithm, Efficiency of algorithms	BR #1,#2; CO #1; SH #1; DD #4
	1.2	1	Average and worst-case analysis	BR #2; CO #2
	1.3	2	Elementary operation, Asymptotic Notation	BR #2,#3; CO #3; SH #1; DD #4
	1.4	3	Analysing control statements	BR #4; CO #2
	1.5	7	Solving recurrences	BR #4; CO #4
Divide-and-Conquer Strategy				
2	2.1	1	Multiplying large integers problem	BR #7
	2.2	4	Binary Search, Sorting (Sorting - Merge sort, Quick sort)	BR #7; CO #4; SH #3; AU #3; DD #15
	2.3	1	Strassen's matrix multiplication	BR #7; CO #28; SH #3
	2.4	1	Exponentiation	BR #7
Greedy Algorithms				
3	3.1	2	General characteristics of greedy algorithms, Making change problem	BR #6; SH #4
	3.2	2	Fractional-Knapsack problem, Job scheduling problem	BR #6; CO #16; SH #4; DD #10,
	3.3	2	Huffman code, Activity selection problem	CO #16
	3.4	3	Graph-map colouring, Graph vertex cover, Tape storage problem	SH #7; CO #35
Dynamic Programming				
4	4.1	1	Introducing dynamic approach, The principle of optimality, Calculating binomial coefficient	BR #8; CO #15; SH #5
	4.2	3	Making change problem, Knapsack problem	BR #8; SH #5
	4.3	3	Floyd's algorithm for shortest path, Chained matrix multiplication	BR #8; CO #15; SH #5; DD #11
	4.4	4	Longest common subsequence, Assembly	BR #8; CO #15; DD #11

			line scheduling, Optimal binary search tree	
Exploring Graphs				
5	5.1	3	Graph - Articulation points, Topological sort, Strongly connected components, Maximum bipartite cover problem	BR #9; CO #22; SH #6; AU #5; DD #12
	5.2	2	Network flows: Ford Fulkerson algorithm, Max-flow Min-cut theorem	BR #9; CO #22;
	5.3	3	Backtracking - Knapsack problem, Eight queens problem, Travelling salesman problem, Sum of subsets problem	BR #9; SH #7; DD #12
	5.4	4	Branch and bound Techniques- Assignment problem, Knapsack problem	BR #9; SH #8; DD #12

String matching and NP-completeness

6	6.1	3	Naive string matching algorithm, Rabin-Karp algorithm	CO #32; DD #16
	6.2	2	String matching with finite automata	CO #32
	6.3	1	The class P and NP, Polynomial reduction	BR #12; CO #34; SH #11; DD #14
	6.4	1	NP-completeness problem, NP-hard problems	BR #12; CO #34; DD #18

Text Books:

1. Gills Brassard, Paul Bratley – “Fundamental of Algorithms”, PHI [BR]

Reference Books:

1. Introduction to Algorithms: By Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, PHI [CO]
2. Horowitz, Sahni, Rajasekaran – “Fundamentals of Computer Algorithms”, Universities Press [SH]
3. A. V. Aho, J. D. Ullman – “Design and Analysis of Algorithms”, Pearson LPE [AU]
4. Dave and Dave – “Design and Analysis of Algorithms”, Pearson [DD]

Note: # denotes chapter number.

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01/08/2022