

Algorithms [course info](#) [lectures](#) [exams](#)

[R. Inkulu](#) at cse.iitg in Spring 2020

Euclid's GCD algo [CLRS]: 930, 934-936

Divide and conquer

Introduction with Master theorem [CLRS]: 64-67, 88-96

Finding a maximum subarray [CLRS]: 68-74

Counting inversions [KT]: 221-225

Matrix multiplication: Strassen's algo [CLRS]: 75-82

Integer multiplication: Karatsuba's algo [KT]: 231-234

Closest pair of points [KT]: 225-231

Polynomial multiplication: FFT [KT]: 234-242

Greedy

Job scheduling [KT]: 116-131

Huffman's algo for binary prefix-code [KT]: 161-175

Characterizing greedy [CLRS]: 423-425

Local search

Vertex cover [KT]: 664-666

Stable configuration [KT]: 671-675

Max cut appr [KT]: 676-679

Characterizing local search [KT]: 663-664, 679-680

Dynamic Programming

Job scheduling with positive profits [KT]: 252-258

Parenthesizing matrix chain multiplication [CLRS]: 370-377

Optimal BST [CLRS]: 397-403

Longest common subsequence [CLRS]: 390-396 --- AR

Sequence alignment [KT]: 278-282

Knapsack [CLRS]: 425-427; [KT]: 266-272, 648-649

Repeated squaring

Modular exponentiation [CLRS]: 956-958

Computing an n-th Fibonacci number in $O(n^2)$ time [CLRS]: 982 exer 31-3 c, d

Fingerprinting

Verify: polynomial identities, matrix multiplication [MR]: 162-164

Primality testing of non-absolute pseudoprimes [CLRS]: 965-968; [note]

Rabin-Karp algorithms' for pattern matching [CLRS]: 985, 988-994; [\[MR\]](#): 169-172

Universal hashing [CLRS]: 265-268; [\[note\]](#) --- AR (covered in data structures course)

More pattern matching

Using DFA [CLRS]: 995-1002

KMP algorithm [CLRS]: 1002-1006

Gale-Shapley's algo for stable matching [KT]: 4-12, 45-47

--- more topics will be added here as the course progress ---

- [CLRS]: Introduction to Algorithms by Cormen, Leiserson, Rivest, and Stein, Third Edition.
 - [KT]: Algorithm Design by Jon Kleinberg and Eva Tardos.

 - Additional resources are provided where necessary.

 - Prereq denotes that this topic is typically taught in a prereq course.
 - AR stands for additional reading (no lecture delivered but included in syllabus).
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