INF 334: Advanced Algorithms

August-December 2018

Topics to be covered: Syllabus

This is the syllabus for INF334. The course is based on three different books, mainly from:

- \( AD = \) Algorithm Design by Kleinberg / Tardos

But also from

- \( PA = \) Parameterized Algorithms

- \( EA = \) Exact Exponential Time Algorithms

Note: The course assumes familiarity with the curriculum of INF334 and INF235. There will also be some results taught directly from some articles. Those articles will be provided during the course.

Parameterized Algorithms: Basic, Branching, Kernelization, Iterative Compression [PA]

Approximation Algorithms: Greedy Algorithm – Load Balancing, Center Selection Problem, Set Cover, The Pricing Method: Vertex Cover, Linear Programming and Rounding: An application to Vertex Cover, Knapsack [Chapter 11, AD]

Randomized Algorithms: Contention Resolution, Global Mincut, Random Variables and Expectations, Max-3-SAT approximation [Chapter 12, AD], Color Coding [PA]

Exact Exponential Time Algorithms: Exact Algorithms for Coloring, SAT, Directed Feedback Arc Set, Max-Cut, Monotone-Loacal-Search [EA]

Graph Classes: Tree-Decompositions, Tree-decompositions and Chordal Graphs, [Chapter 7, PA] Chordal Graphs and Interval Graphs