CSE 347 Analysis of Algorithms January 28, 2019

Lecture 4 Summary

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1. Problem: Scheduling all intervals $\{[s_i, t_i] : i = 1, \ldots, n\}$.
   (a) Candidate solutions: partitions of the intervals into sets
   (b) Constraints: intervals in the same partition cannot overlap
   (c) Objective: minimize the number of pieces in the partition
   (d) There is a greedy algorithm that returns a conflict free solution that uses the minimum number of pieces.
2. Problems: Network Design and Minimum Spanning Tree
   (a) Network design is a problem that looks for the subset of edges with minimum total weight such that the graph is still connected.
   (b) Candidate solutions for Network Design are subgraphs; but, the optimal solutions are all *trees*, so we may instead solve the Minimum Spanning Tree problem.
   (c) Two greedy algorithms for Minimum Spanning Tree: Kruskal's algorithm and Prim's algorithm. Always add the lowest cost edge, either overall or that is connected to the existing tree.