

CS 161 Fall 2017: Section 9

Max Flow Potpurri

- (a) Suppose that instead of having a single source and sink s, t respectively, we have multiple sources $S = \{s_1, s_2 \dots s_k\}$ and multiple sinks $T = \{t_1, t_2 \dots t_l\}$. We wish to still find the max flow in the graph from sources to sinks.
- (b) Suppose that in addition to edges having max flow capacities, vertices also have a limit to their capacity; that is, each vertex v_i has capacity c_i . We wish to find the max flow from a source s to sink t in this graph.
- (c) Given a solution to max-flow, verify that it is correct in linear time.

Expense Settling

You've gone on a trip with k friends, where friend i paid c_i for the group's expenses. You would like to develop an algorithm to ensure that everyone gets paid back fairly, but without going through one person (that is, each person would either pay or receive money, but not both).

Project Selection

Suppose you have a set of k tasks $t_1 \dots t_k$. There are certain tasks such that t_i is a prerequisite of t_j . Each task also has a reward r_i , which may be negative. Find an optimal subset of tasks to complete to maximize your reward.