Lecture 36

CSE 331

Nov 22, 2019

HW 10 (last one!) is out

Homework 10

Due by **11:00am, Friday December 6, 2019**.

Make sure you follow all the homework policies.

All submissions should be done via Autolab.

The support page on SAT solvers could be useful for Question 3.

How are graphs represented in Q1 and Q2?

It does not matter: you can assume either the adjacency list representation or the adjacency matrix representation-- whatever is more covenient for y'all.

No walkthrough videos: sorry!

Question 1 (Clique problem) [50 points]

In this problem, we will consider a problem that is essentially the "complement" of the independent set problem. Given a graph $G = (V, E)$, a *clique* is a subset $S \subseteq V$ such that **all** $\binom{|S|}{2}$ edges between the vertices in S exist. As we have done in class, we consider the following *decision* version of the problem of finding the *largest* clique in a graph

The problem

Minor tweaks on Autolab for Q3 in the weekend

HW 9 solutions

At the end of the lecture

HW 8 grading

Hopefully by tonight

Upcoming deadlines @11am

Problem 3: Tuesday, Nov 26

There are no optimal algorithms known!

Other than the first problem, we do not know of optimal algorithms to solve the rest of the problems (and we suspect that doing so is not possible (definitely not within a semester). Note that this is unlike the HW Q3s where your code is supposed to always output the optimal/correct solution: i.e. you will have to think of algorithms where you might not be able to prove any guarantee on how good your output is.

Try your solution on all Problems 2 to 5!

Make sure everyone has accept group invitation and THEN submit

Questions?

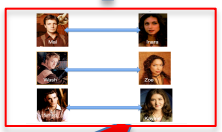
$Y \leq_P X$

Question 2 (Big G is in town)

$\leq_P$

NRMP
National Resident Matching Program

Poly time steps



ANY algo for stable matching problem works!

Arbitrary Y instance

Pre-process the input

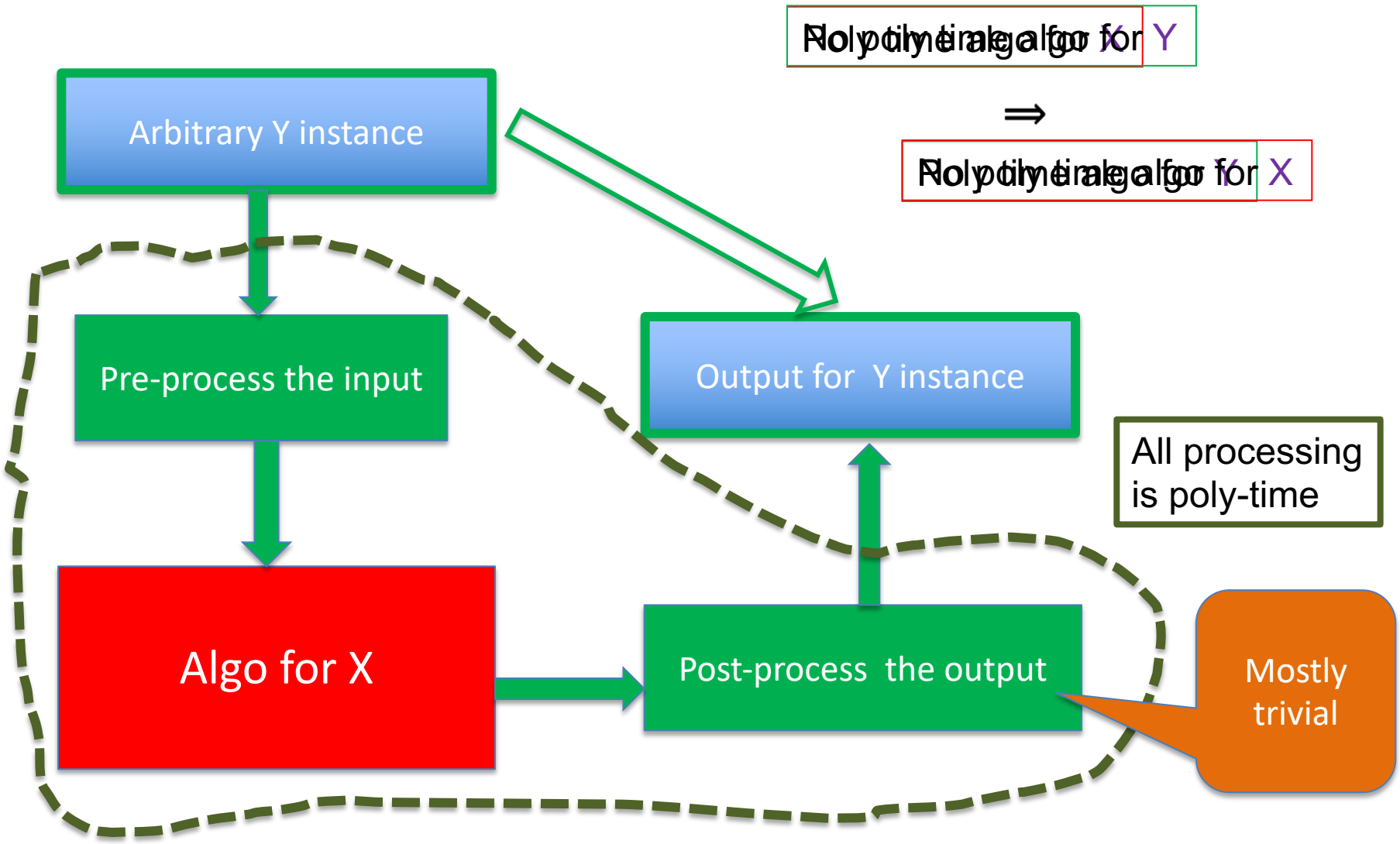
Algo for X

Post-process the output

Output for Y instance

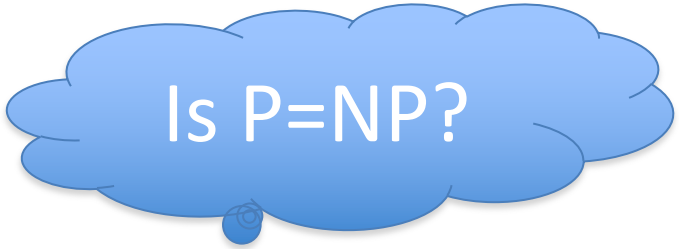
All processing is poly-time

Implications of $Y \leq_P X$



P vs NP question

P: problems that can be solved by poly time algorithms



NP: problems that have polynomial time verifiable witness to optimal solution