

# Lecture 36

CSE 331

Apr 29, 2020

$$Y \leq_P X$$

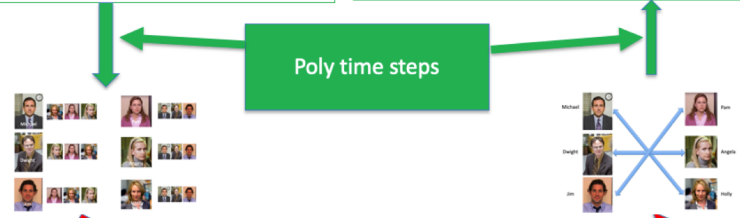
Question 2 (Big G is in town)

$\leq_P$



CSE Major	Slot 1	Slot 2	Slot 3	Slot 4
S <sub>1</sub>	E <sub>1</sub>	free	E <sub>2</sub>	free
S <sub>2</sub>	free	E <sub>1</sub>	free	E <sub>2</sub>

CSE Major	Slot 1	Slot 2	Slot 3	Slot 4
S <sub>1</sub>	E <sub>1</sub>	free	E <sub>2</sub> (truncate here)	
S <sub>2</sub>	free	E <sub>1</sub> (truncate here)		



ANY algo for stable matching problem works!

Arbitrary Y instance

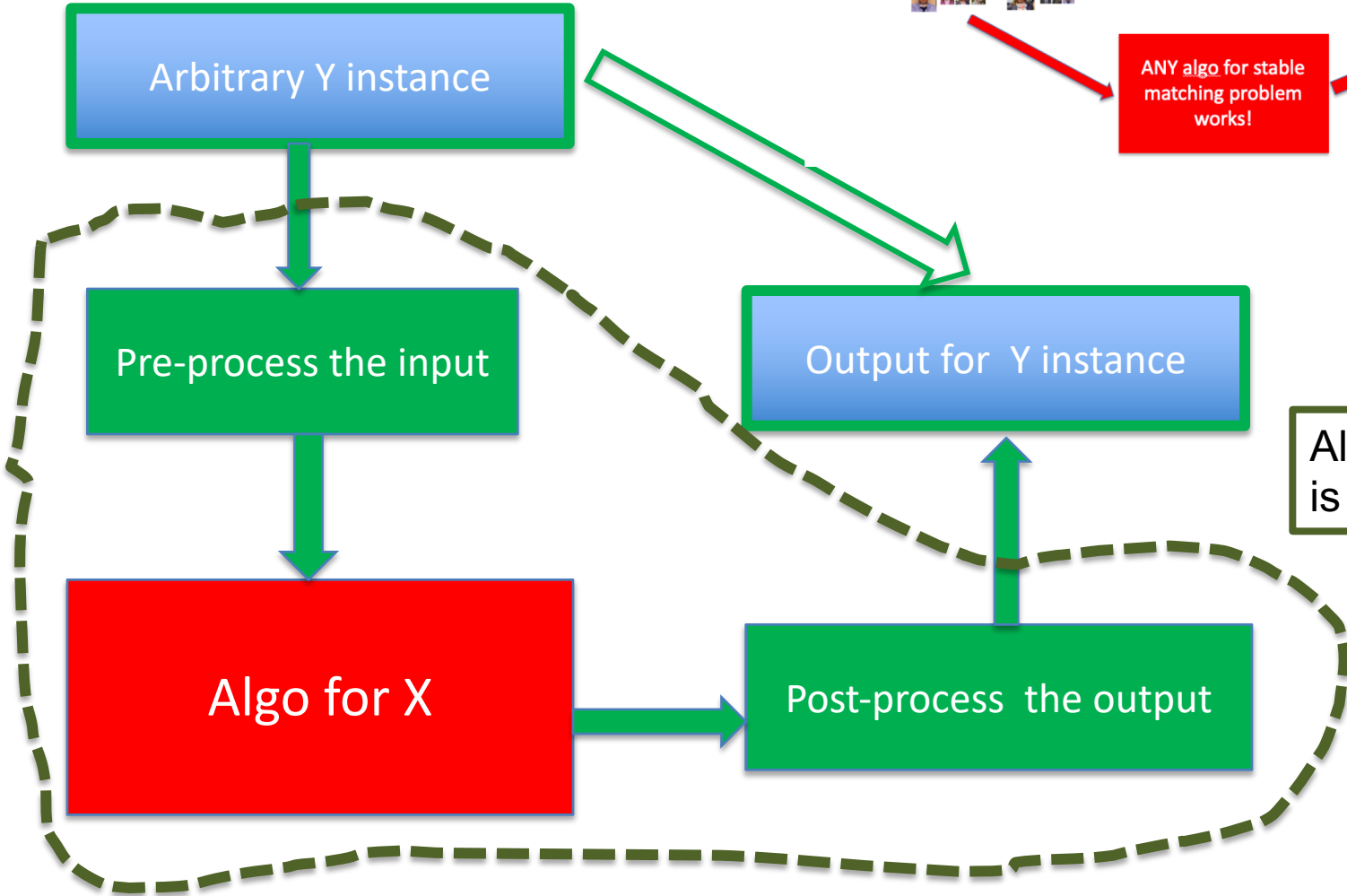
Pre-process the input

Algo for X

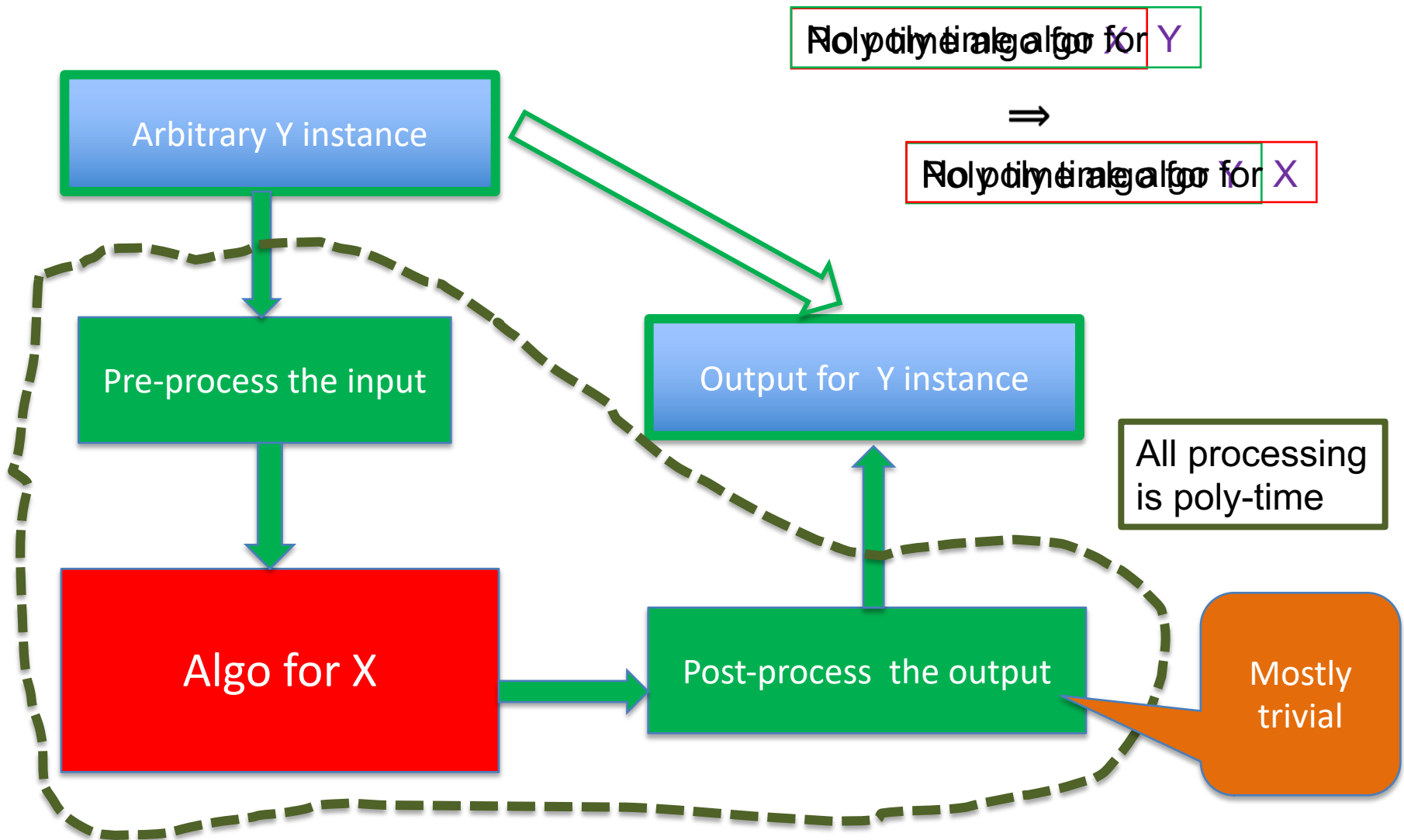
Output for Y instance

Post-process the output

All processing is poly-time

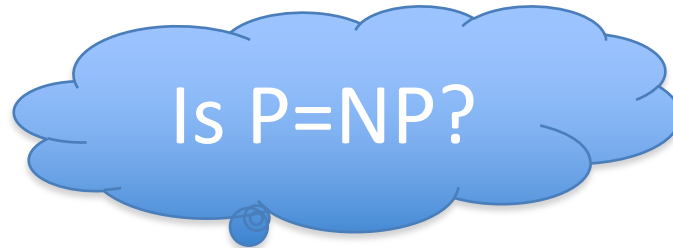


# Implications of $Y \leq_p X$



# 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