Algorithms \& Models of Computation

## CS/ECE 374, Fall 2020

22.1.3

Polynomial equivalent problems: What do we know so far

## What do we know so far

(1) Independent Set $\leq_{P}$ Clique Clique $\leq_{p}$ Independent Set.
$\Longrightarrow$ Clique $\approx_{p}$ Independent Set.
(2) Vertex Cover $\leq_{P}$ Independent Set

Independent Set $\leq_{p}$ Vertex Cover. $\Longrightarrow$ Independent Set $\approx_{p}$ Vertex Cover.
(3) $3 S A T \leq_{P}$ SAT

SAT $\leq_{P}$ 3SAT.
$\Longrightarrow$ 3SAT $\approx_{p}$ SAT
( Clique $\approx_{P}$ Independent Set $\approx_{P}$ Vertex Cover 3SAT $\approx_{p}$ SAT.

## What do we know so far

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(3) Vertex Cover $\leq_{p}$ Independent Set

Independent Set $\leq_{P}$ Vertex Cover. $\Rightarrow$ Independent Set $\approx_{p}$ Vertex Cover.

- 3SAT $\leq p$ SAT

SAT $\leq_{P}$ 3SAT
$\Longrightarrow$ 3SAT $\approx_{P}$ SAT

- Clique $\approx_{p}$ Independent Set $\approx_{p}$ Vertex Cover 3SAT $\approx_{p}$ SAT


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SAT $\leq_{P}$ 3SAT.
(9) Clique $\approx_{P}$ Independent Set $\approx_{p}$ Vertex Cover 3SAT $\approx_{P}$ SAT

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(3) $3 \mathrm{SAT} \leq_{P}$ SAT

SAT $\leq_{P}$ 3SAT.
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(4) Clique $\approx_{p}$ Independent Set $\approx_{p}$ Vertex Cover 3SAT $\approx_{P}$ SAT.

## THE END

(for now)

