

Last class

Decision/Optimization

$3\text{-SAT} \leq \text{Independent-Set}$

$\text{Independent-Set} \leq 3\text{-SAT}$

P, NP

Cook's Theorem

NP-hard, NP-complete

$3\text{-SAT} \leq \text{Clique, Subset-Sum, 3-COL}$

Reductions

$$A \leq B$$

all reductions we had were:

INSTANCE of A \mapsto INSTANCE of B
(many-to-one reductions)

the black-box intuition model allowed
more questions to an oracle for B
(Turing reductions)

Planar-3-COL

INSTANCE:

planar graph G

QUESTION:

can the vertices of G be assigned colors red, green, blue so that no two neighboring vertices have the same color?