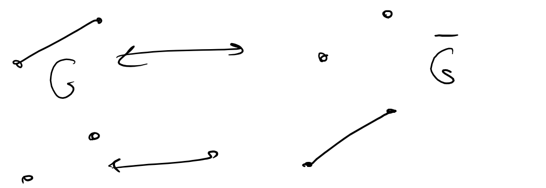
CSE 421 - Lecture 25

Wednesday, March 7, 2018 2:27 PM

Indep $\le$ Clique

$X = (G, k)$ input of indep

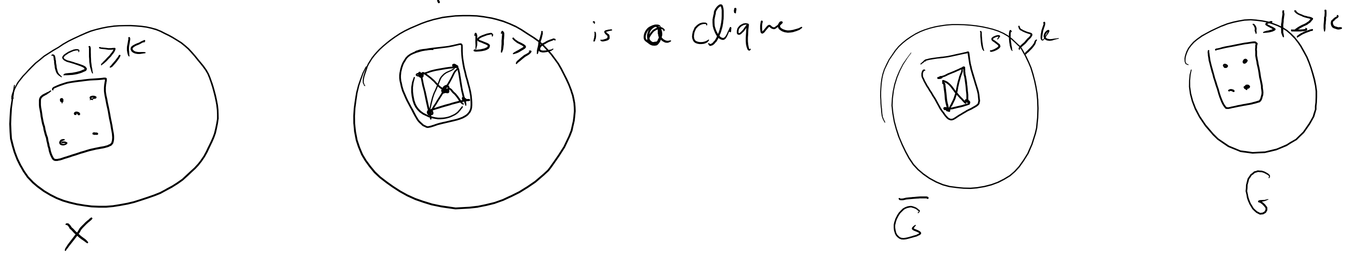
$f(X) = (\bar{G}, k)$ clique



X is yes indep $\iff$ f(x) yes of clique

X is yes indep $\Rightarrow$ f(x) yes clique

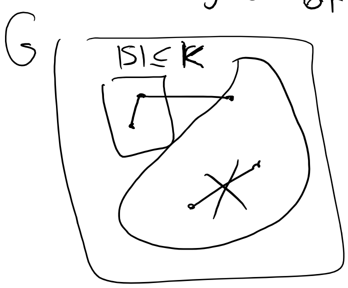
f(X) is yes clique $\Rightarrow$ X is yes indep



Vertex Cover $\le_p$ indep Set

(G, k) $f(x) = (G, n-k)$

yes of vertex cover $\Rightarrow$ yes indep set

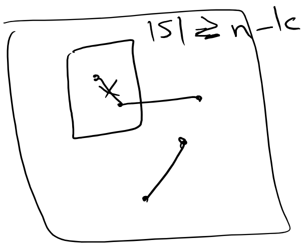


$\Rightarrow$

V-S in an indep set

$|V-S| \ge n-k$

yes of indep set $\Rightarrow$ yes instc of vertex cover



$|V-S| \le k$

V-S is a vertex cover

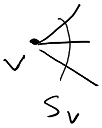
Vertex Cover $\le_p$ Set Cover

$X = (G = (V, E), k)$

$f(x) =$ $U = E$

For all v, $S_v = \{(u,v) \in E\}$

k



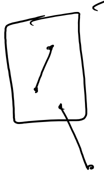
X is yes $\Rightarrow$ f(x) yes of set cover

f(x) is yes set cover $\Rightarrow$ x is yes vertex cover

X is yes vertex cover $\Rightarrow$ f(x) yes for set cover

T vertex cover

$|T| \leq k$



Choose S_v for all $v \in T$

f(x) is yes set cover $\Rightarrow$ x is yes vertex cover

$S_{v_1}, S_{v_2} \ldots S_{v_k}$ that cover all U.

All edges are in one of $S_{v_1}, \ldots, S_{v_k}$

So, connected to one of $v_1, \ldots, v_k$

So $\{v_1, \ldots, v_k\}$ is a vertex cover.