

Observation. $\forall (u, v) \in E$, \forall vertex cover S .

$u \in S$ or $v \in S$.

Choose an arbitrary edge $(u, v) \in E$

Try pick u into S .

Check in the remaining graph that there is no more than $(k-1)n$ edges.

Try having a vertex cover of size $\leq k-1$ that covers all edges not incident to u .

Try picking v into S .

Try $\dots \dots \dots \leq k-1$

ALG (k, n)

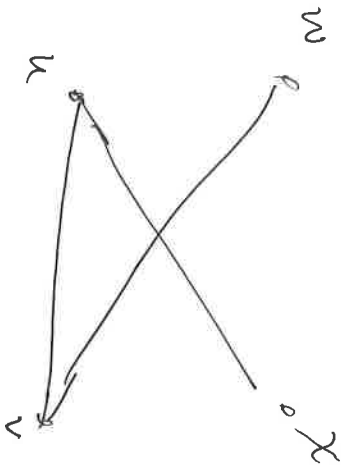
Running time v of the alg. for $k: \text{ALG}(k)$.

$$\text{ALG}(k) \leq 2 \text{ALG}(k-1) + \underbrace{cn}_{\text{for constant } c}$$

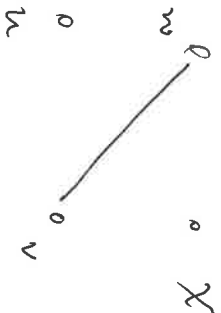
$$\leq 2 \cdot \text{ALG}(k-2) + cn + cn$$

$k = 2$

$(u, v) \in E$



try u :



$(w, v) \in E, k = 1$

$\{u, w\}$, or $\{u, v\}$ is vertex cover of size 2.