



Please evaluate the lecture!

<https://onlineumfrage.kit.edu/evasys/online.php?p=EZY6A>

Input : comparability graph $G = (V, E)$.

Output : vertex coloring h and clique C .

```
1  compute transitive orientation  $F$  of  $G$ ;
2  compute tological ordering  $\sigma$  of  $(V, F)$ ;
3  for  $i \leftarrow 1$  to  $n$  do
4       $v \leftarrow \sigma(i)$ ;
5       $h(v) \leftarrow 1 + \max\{h(w) \mid wv \in F\}$ ;
6       $\chi \leftarrow \max\{\chi, h(v)\}$ ;
7       $w \leftarrow \operatorname{argmax}\{h(w), h(v)\}$ ;
8  end for
9  for  $i \leftarrow \chi$  to  $1$  do
10      $C \leftarrow C + \{w\}$ ;
11      $w \leftarrow \operatorname{argmax}\{h(v) \mid vw \in F\}$ ;
12 end for
13 return  $h$  and  $C$ ;
```

Algorithm 8 : Compute $\chi(G)$ and $\omega(G)$

$G = (V, F)$ transitive

$B = (V' + V'', E)$ bipartite

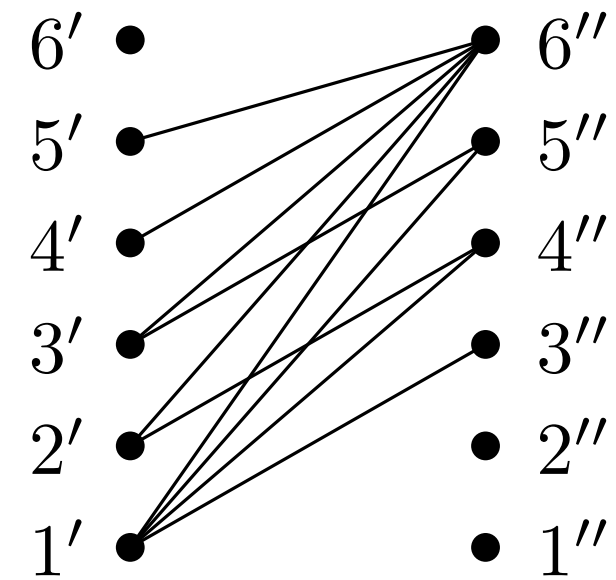
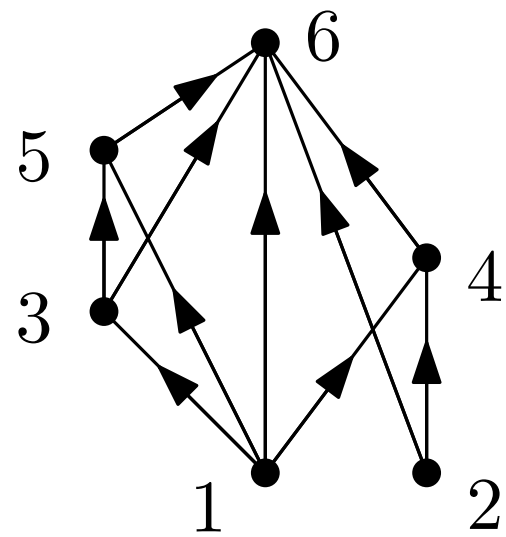
$$V' = \{v' \mid v \in V\}$$

$$V'' = \{v'' \mid v \in V\}$$

$$vw \in F$$

$$\iff$$

$$v'w'' \in E$$



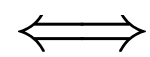
$G = (V, F)$ transitive

$B = (V' + V'', E)$ bipartite

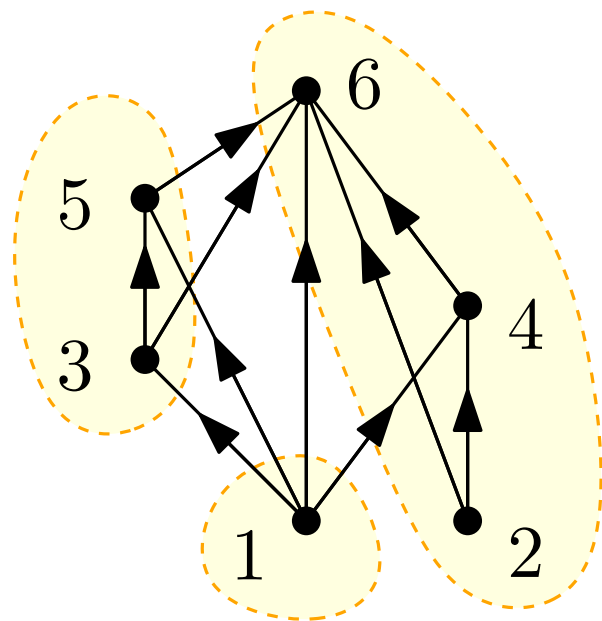
$$V' = \{v' \mid v \in V\}$$

$$V'' = \{v'' \mid v \in V\}$$

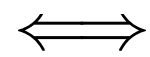
$$vw \in F$$



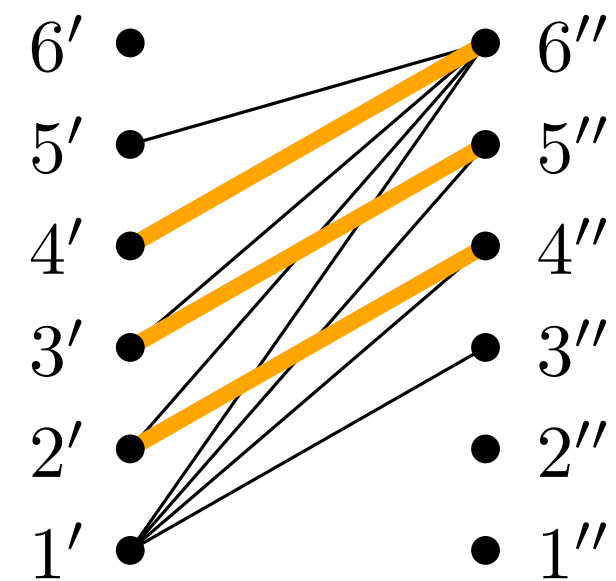
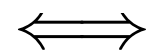
$$v'w'' \in E$$



clique cover



v, w consecutive



matching

$$v'w'' \in M$$

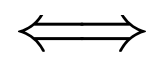
$G = (V, F)$ transitive

$B = (V' + V'', E)$ bipartite

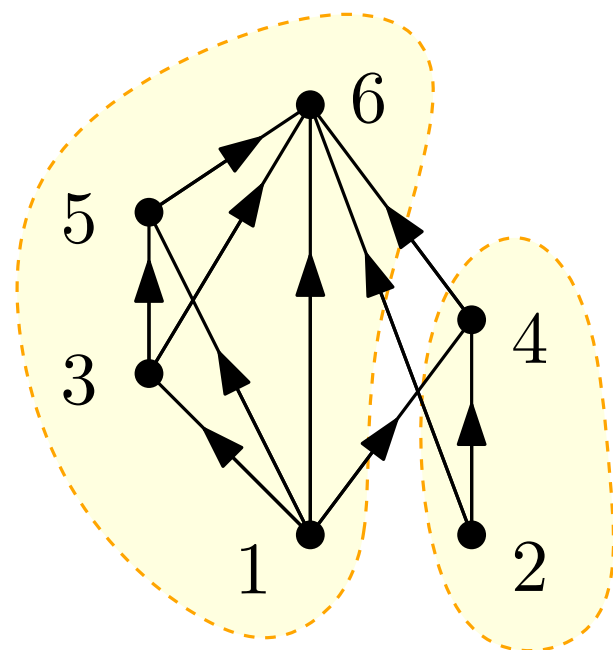
$$V' = \{v' \mid v \in V\}$$

$$V'' = \{v'' \mid v \in V\}$$

$$vw \in F$$

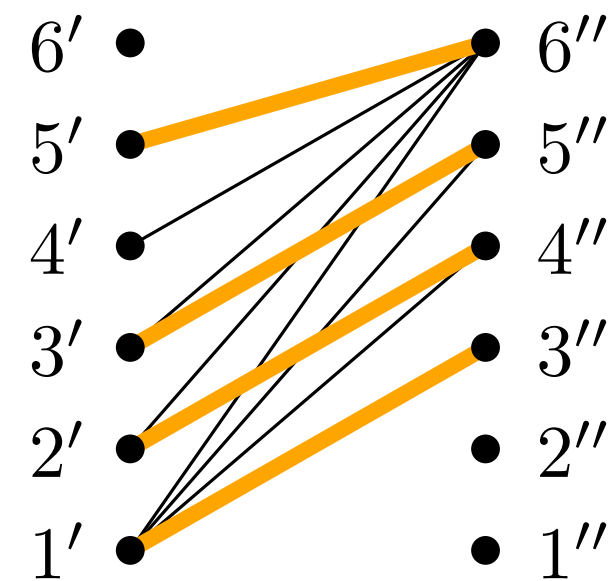
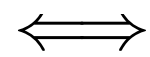


$$v'w'' \in E$$



clique cover

v, w consecutive



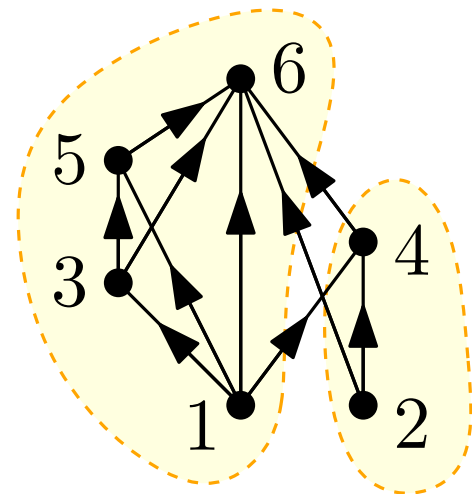
matching

$$v'w'' \in M$$

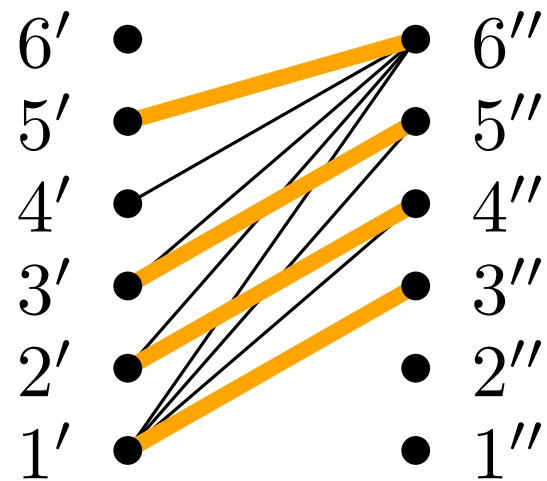
$G = (V, F)$ transitive
 $vw \in F$

$\iff$

$B = (V' + V'', E)$ bipartite
 $v'w'' \in E$



clique cover
 $V_1 + \dots + V_k$

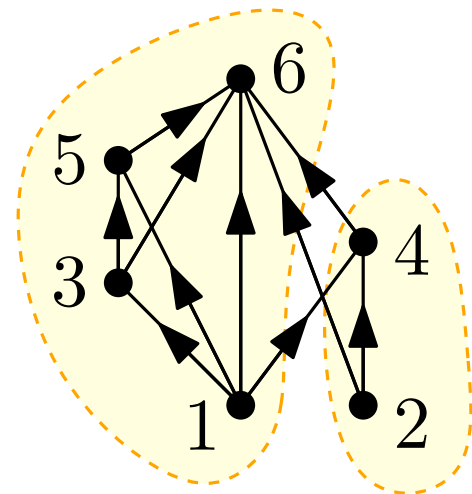


matching
 $|M| = |V| - k$

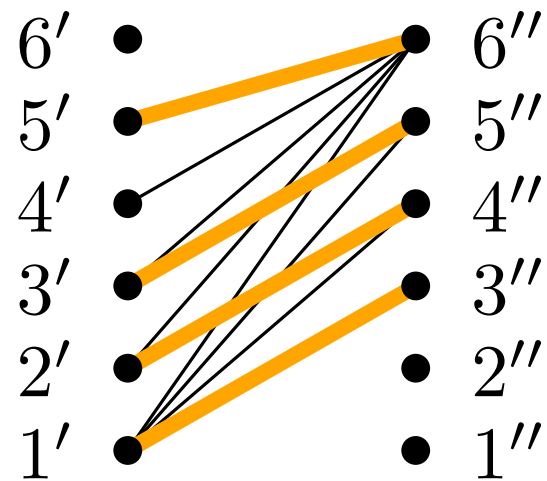
$G = (V, F)$ transitive
 $vw \in F$

$\iff$

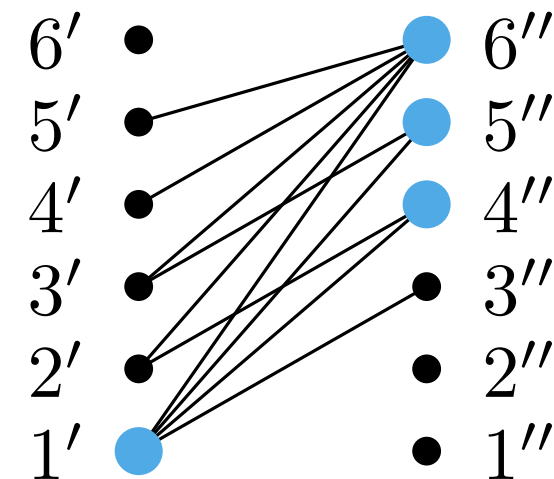
$B = (V' + V'', E)$ bipartite
 $v'w'' \in E$



clique cover
 $V_1 + \dots + V_k$



matching
 $|M| = |V| - k$

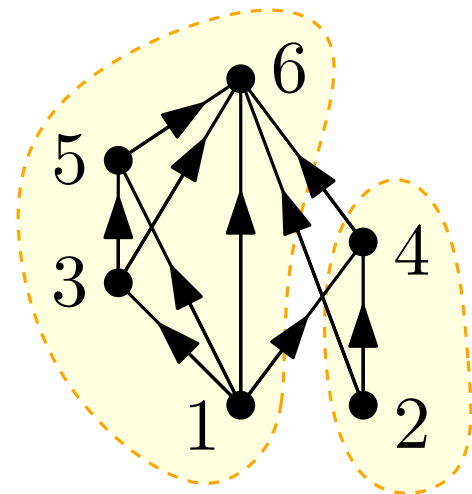


vertex cover
 S

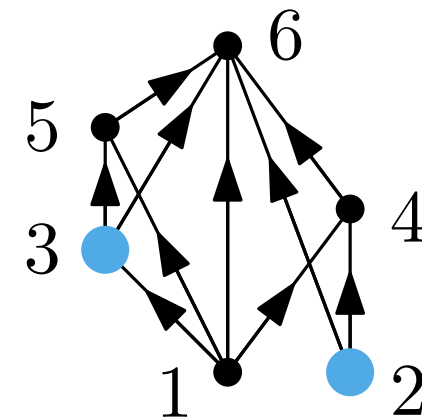
$G = (V, F)$ transitive
 $vw \in F$

$\iff$

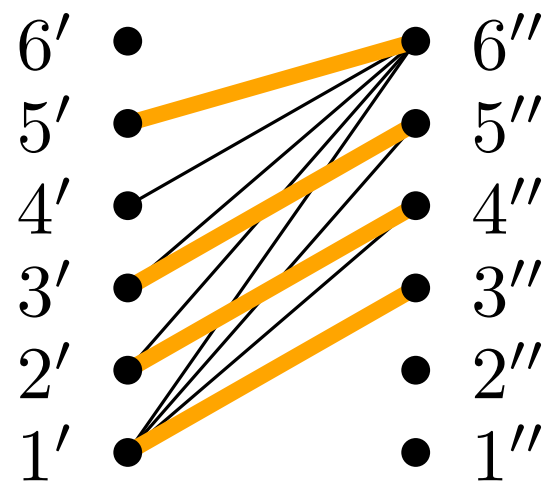
$B = (V' + V'', E)$ bipartite
 $v'w'' \in E$



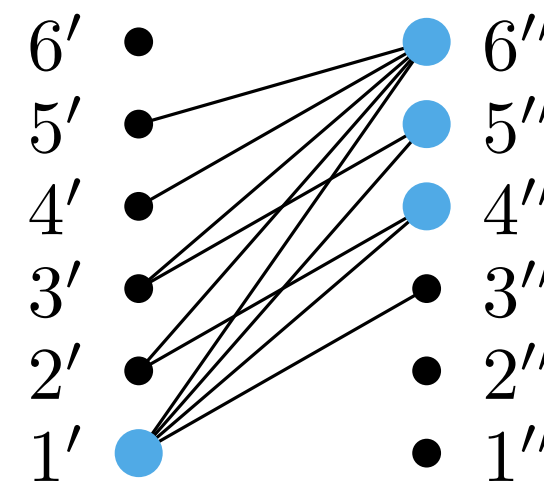
clique cover
 $V_1 + \dots + V_k$



independent set
 $|Y| = |V| - |S|$



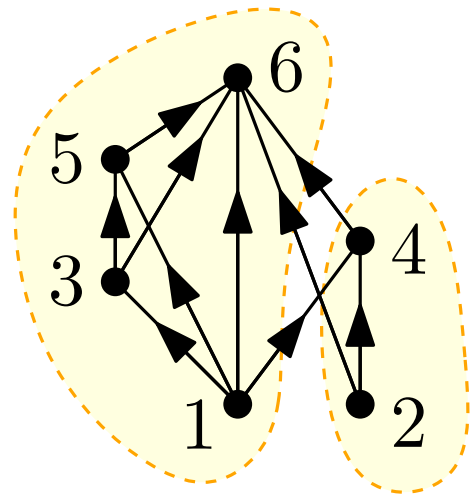
matching
 $|M| = |V| - k$



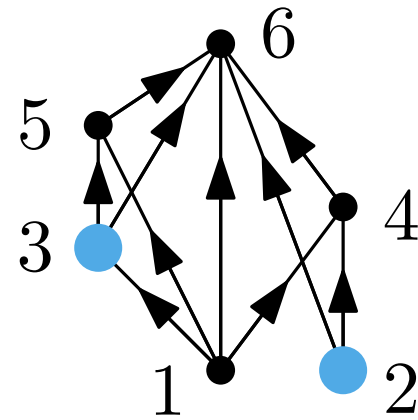
vertex cover
 S

$$G = (V, F) \text{ transitive}$$

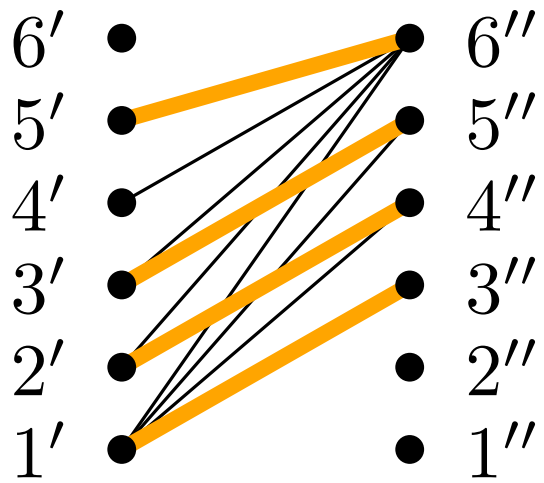
$$vw \in F$$
$$B = (V' + V'', E) \text{ bipartite}$$

$$v'w'' \in E$$


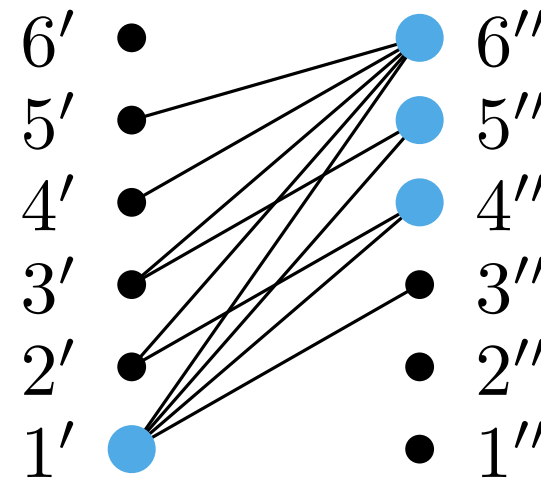
clique cover
 $V_1 + \dots + V_k$



independent set
 $|Y| = |V| - |S|$



matching

$$|M| = |V| - k$$


vertex cover
 S