

CAO 24.11.17

IP-Model for Graph-Coloring

variables: $x_{vj} \in \{0,1\}$ ($v \in V, j \in \{1, \dots, n\}$)
($n = |V|$)

$$\min \sum_{j=1}^n x_j$$

$$\sum_{j=1}^n x_{vj} = 1 \quad (v \in V)$$

$$x_{vj} + x_{wj} \leq 1 \quad (vw \in E, j \in \{1, \dots, n\})$$

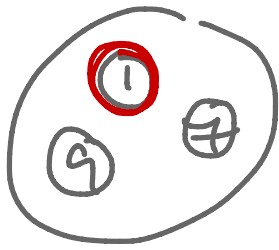
$$x_{vj} \leq x_j \quad (v \in V, j \in \{1, \dots, n\})$$

$$x_{vj} \in \{0,1\} \quad (v \in V, j \in \{1, \dots, n\})$$

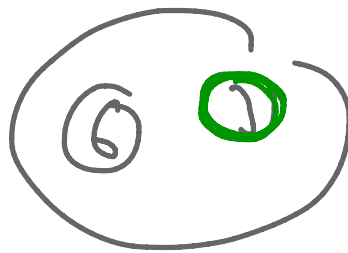
$$x_j \in \{0,1\} \quad (j \in \{1, \dots, n\})$$

can be left out

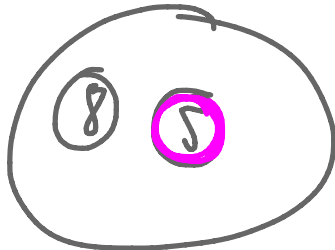
color 1



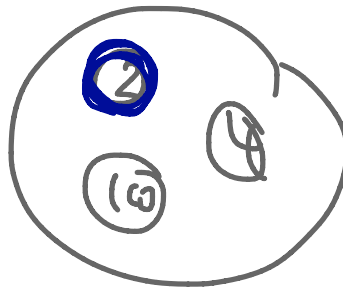
color 3



color 1



color 2



Crucial observation:

We can safely require that no node v is colored by a color number greater than v .