

# Homework 2. 搜索.

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$$1. a) (color_{i1} \vee color_{i2} \vee \dots \vee color_{ik}) \wedge (color_{21} \vee \dots \vee color_{2k}) \wedge \dots \wedge (color_{v1} \vee \dots \vee color_{vk}) \\ = \bigwedge_{i=1}^V \left( \bigvee_{j=1}^K color_{ij} \right).$$

b) 对任一节点  $i \in V$ , 颜色  $k \neq k'$ , 我们有  $color_{ik} \wedge color_{ik'} = 0$

$$\neg (color_{ik} \wedge color_{ik'}) = (\neg color_{ik}) \vee (\neg color_{ik'}).$$

$$\text{将 } i=1, \dots, V \text{ 取交, 有 } \bigwedge_{i=1}^V \left( \bigwedge_{1 \leq k < k' \leq K} ((\neg color_{ik}) \vee (\neg color_{ik'})) \right).$$

c) 考虑  $i, j \in V, i \neq j, (i, j) \in E$ , 也即  $neighbor_{ij}$  为真, 取交颜色  $k \in \{1, \dots, K\}$

$$\neg (neighbor_{ij} \wedge color_{ik} \wedge color_{jk}) = (\neg neighbor_{ij}) \vee (\neg color_{ik}) \vee (\neg color_{jk}).$$

$$\text{有 } \bigwedge_{i \neq j, i, j \in V} \left( \bigwedge_{k=1}^K ((\neg neighbor_{ij}) \vee (\neg color_{ik}) \vee (\neg color_{jk})) \right)$$

$$d) CNF \text{ 用 } \wedge \text{ 连接, 有 } \left( \bigwedge_{i=1}^V \bigvee_{j=1}^K color_{ij} \right) \wedge \left( \bigwedge_{i=1}^V \bigwedge_{1 \leq k < k' \leq K} ((\neg color_{ik}) \vee (\neg color_{ik'})) \right) \\ \wedge \left( \bigwedge_{i \neq j, i, j \in V} \bigwedge_{k=1}^K ((\neg neighbor_{ij}) \vee (\neg color_{ik}) \vee (\neg color_{jk})) \right)$$

2. ca) 我们规定当 priority 相同时先弹出字典序较小的.

