

Пример: КЛИКА – полный подграф графа

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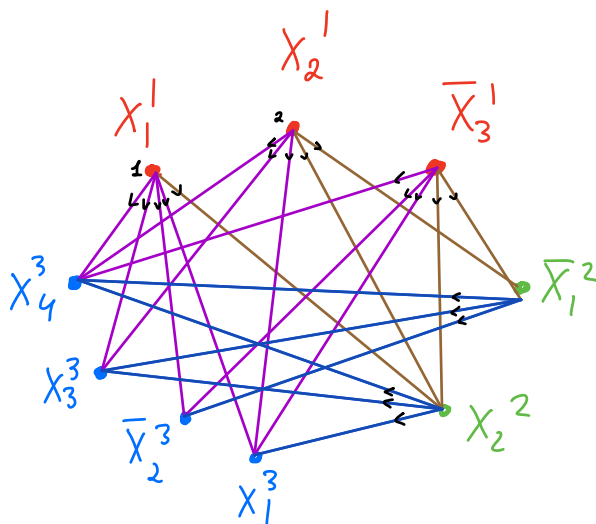
$$\text{КНФ: } (x_1 \vee x_2 \vee \bar{x}_3)(\bar{x}_1 \vee x_2)(x_1 \vee \bar{x}_2 \vee x_3 \vee x_4)$$

Задача выполнимости КНФ сводится к задаче КЛИКА для некоторого графа G на вершине имеет множество вершин

$$V(G) = \{x_1^1, x_2^1, \bar{x}_3^1, \bar{x}_1^2, x_2^2, x_1^3, \bar{x}_2^3, x_3^3, x_4^3\}$$

а так же множество рёбер

$$E(G) = \{ \underbrace{(x_1^1, x_2^1)}, \underbrace{(x_1^1, x_1^3)}, \underbrace{(x_1^1, \bar{x}_2^3)}, \underbrace{(x_1^1, x_3^3)}, \underbrace{(x_1^1, x_4^3)}, \\ \underbrace{(x_2^1, \bar{x}_1^2)}, \underbrace{(x_2^1, x_2^2)}, \underbrace{(x_2^1, x_1^3)}, \underbrace{(x_2^1, x_3^3)}, \underbrace{(x_2^1, x_4^3)}, \\ \underbrace{(\bar{x}_3^1, \bar{x}_1^2)}, \underbrace{(\bar{x}_3^1, x_2^2)}, \underbrace{(\bar{x}_3^1, x_1^3)}, \underbrace{(\bar{x}_3^1, \bar{x}_2^3)}, \underbrace{(\bar{x}_3^1, x_4^3)}, \\ \underbrace{(\bar{x}_1^2, \bar{x}_2^3)}, \underbrace{(\bar{x}_1^2, x_3^3)}, \underbrace{(\bar{x}_1^2, x_4^3)}, \\ \underbrace{(x_2^2, x_1^3)}, \underbrace{(x_2^2, x_3^3)}, \underbrace{(x_2^2, x_4^3)} \}$$



$$\begin{aligned} \text{red} + \text{blue} &= \text{purple} \\ \text{red} + \text{green} &= \text{brown} \\ \text{blue} + \text{green} &= \text{dark blue} \end{aligned}$$

Параметр $k=3$

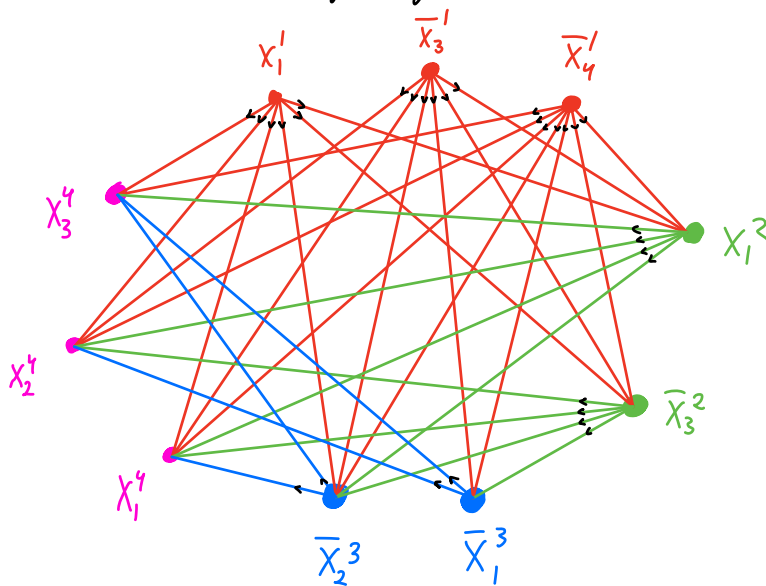
Задача 1:

$$\text{КНФ: } (x_1 \vee \bar{x}_3 \vee \bar{x}_4)(x_1 \vee \bar{x}_3)(\bar{x}_1 \vee \bar{x}_2)(x_1 \vee x_2 \vee x_3)$$

Задача выполнимости КНФ сводится к задаче КЛИКА для которой граф G на входе имеет множество вершин

$$V(G) = \{ \underbrace{x_1^1, \bar{x}_3^1, \bar{x}_4^1}_{\text{red}}, \underbrace{x_1^2, \bar{x}_3^2}_{\text{green}}, \underbrace{\bar{x}_1^3, \bar{x}_2^3}_{\text{blue}}, \underbrace{x_1^4, x_2^4, x_3^4}_{\text{pink}} \}$$

а так же множество рёбер



$$E(G) = \{ \underbrace{\{x_1^1, x_1^2\}}_{\text{red}}, \underbrace{\{x_1^1, \bar{x}_3^2\}}_{\text{red}}, \underbrace{\{x_1^1, \bar{x}_2^3\}}_{\text{red}}, \underbrace{\{x_1^1, x_1^4\}}_{\text{red}}, \underbrace{\{x_1^1, x_2^4\}}_{\text{red}}, \underbrace{\{x_1^1, x_3^4\}}_{\text{red}}, \quad \textcircled{x_1^1}$$

$$, \underbrace{\{\bar{x}_3^1, x_1^2\}}_{\text{red}}, \underbrace{\{\bar{x}_3^1, \bar{x}_3^2\}}_{\text{red}}, \underbrace{\{\bar{x}_3^1, \bar{x}_1^3\}}_{\text{red}}, \underbrace{\{\bar{x}_3^1, \bar{x}_2^3\}}_{\text{red}}, \underbrace{\{\bar{x}_3^1, x_1^4\}}_{\text{red}}, \underbrace{\{\bar{x}_3^1, x_2^4\}}_{\text{red}}, \quad \textcircled{\bar{x}_3^1}$$

$$, \underbrace{\{\bar{x}_4^1, x_1^2\}}_{\text{red}}, \underbrace{\{\bar{x}_4^1, \bar{x}_3^2\}}_{\text{red}}, \underbrace{\{\bar{x}_4^1, \bar{x}_1^3\}}_{\text{red}}, \underbrace{\{\bar{x}_4^1, \bar{x}_2^3\}}_{\text{red}}, \underbrace{\{\bar{x}_4^1, x_1^4\}}_{\text{red}}, \underbrace{\{\bar{x}_4^1, x_2^4\}}_{\text{red}}, \underbrace{\{\bar{x}_4^1, x_3^4\}}_{\text{red}}, \quad \textcircled{\bar{x}_4^1}$$

$$, \underbrace{\{x_1^2, \bar{x}_2^3\}}_{\text{green}}, \underbrace{\{x_1^2, x_1^4\}}_{\text{green}}, \underbrace{\{x_1^2, x_2^4\}}_{\text{green}}, \underbrace{\{x_1^2, x_3^4\}}_{\text{green}}, \quad \textcircled{x_1^2}$$

$$, \underbrace{\{\bar{x}_3^2, \bar{x}_1^3\}}_{\text{green}}, \underbrace{\{\bar{x}_3^2, \bar{x}_2^3\}}_{\text{green}}, \underbrace{\{\bar{x}_3^2, x_1^4\}}_{\text{green}}, \underbrace{\{\bar{x}_3^2, x_2^4\}}_{\text{green}}, \quad \textcircled{\bar{x}_3^2}$$

$$, \underbrace{\{\bar{x}_1^3, x_2^4\}}_{\text{blue}}, \underbrace{\{\bar{x}_1^3, x_3^4\}}_{\text{blue}}, \quad \textcircled{\bar{x}_1^3}$$

$$, \underbrace{\{\bar{x}_2^3, x_1^4\}}_{\text{blue}}, \underbrace{\{\bar{x}_2^3, x_3^4\}}_{\text{blue}} \} \quad \textcircled{\bar{x}_2^3}$$