

$$P := \{x \in \mathbb{R}^n : Ax \leq b, 0 \leq x \leq e\}$$

$$P_I := \text{conv}\{x \in \{0,1\}^n : Ax \leq b\} = \boxed{\text{conv}(P \cap \{0,1\}^n)}$$

If we can compute \bar{A}, \bar{b} such that $P_I = \{x \in \mathbb{R}^n : \bar{A}x \leq \bar{b}, 0 \leq x \leq e\}$, then we can use linear optimization techniques to solve the (COP).