

Bin-Packing Problem (BPP)

Parameters

- n = amount of items (*index* i)
- m = amount of bins (*index* j)
- w_i = weight of item i ($\forall i = 1, \dots, n$)
- C_j = capacity of bin j ($\forall j = 1, \dots, m$)

Variables

$$- x_{ij} = \begin{cases} 1 & \text{if the item } i \text{ is in bin } j; \\ 0 & \text{otherwise.} \end{cases}$$

$$- y_j = \begin{cases} 1 & \text{if bin } j \text{ is used;} \\ 0 & \text{otherwise.} \end{cases}$$

$$\min \sum_{j=1}^m y_j \tag{1}$$

S.V

$$\sum_{i=1}^n w_i \cdot x_{ij} \leq y_j \cdot C_{ij} \quad \forall j = 1, \dots, m \tag{2}$$

$$\sum_{j=1}^m x_{ij} = 1 \quad \forall i = 1, \dots, n \tag{3}$$

$$x_{ij} \in \{0, 1\} \quad \forall i = 1, \dots, n \quad \forall j = 1, \dots, m \tag{4}$$

$$y_j \in \{0, 1\} \quad \forall j = 1, \dots, m \tag{5}$$