

Bin packing model formulation

Problem description: https://developers.google.com/optimization/bin/bin_packing

Definitions

$s=1 \dots S$ sack indices

$b=1 \dots B$ bin indices

MaxWeight: max weights in each bin

$W[s]$, $s=1 \dots S$ weights vector

Decision variables

$x_{s,b} = \{0, 1\}$: Whether sack "s" gets selected in bin "b"

$y_b = \{0, 1\}$: whether bin "b" is used

Objective function

$$\text{minimize}(\sum_b y_b)$$

Constraints

C1: Total weight per bin should not exceed max weight

$$\forall b, \sum_s x_{s,b} * w_s \leq \text{maxweight}$$

C2: Each sack is included in one bin

$$\forall s, \sum_b x_{s,b} = 1$$