Coffee Shop Problem

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Let x_i be the number of workers that do not work on day i (free day), with $i \in \{1, 2, 3, 4, 5\}$, which represents Monday, Tuesday, Wednesday, Thursday, and Friday, respectively.

The objective function to minimize is the number of total worker, which can be represented by:

$$z = \sum_{i=1}^{5} x_i \tag{1}$$

With the demand of each day being represented as d_i for i in the same domain as before, the demand restrictions can be represented as:

$$x_2 + x_3 + x_4 + x_5 \geq d_1 \tag{2}$$

$$x_1 + x_3 + x_4 + x_5 \geq d_2 \tag{3}$$

$$x_1 + x_2 + x_4 + x_5 \geq d_3 \tag{4}$$

$$x_1 + x_2 + x_3 + x_5 \geq d_4 \tag{5}$$

$$x_1 + x_2 + x_3 + x_4 \geq d_5 \tag{6}$$

The additional restriction where at least 40% of the workers should have a free Friday can be represented by:

$$x_5 \geq 0.4 \times \sum_{i=1}^{5} x_i \tag{7}$$

Finally, we can make sure that the variables x_i are integers and that are non-negative:

$$x_i \in \mathbb{Z}_{\geq 0} \quad \forall i \in \{1, 2, 3, 4, 5\} \tag{8}$$