

Cost

Let's compute the cost based on the potential lost sale (objective function 1), initially. (Later we may add more complexity by including objectives 2 and 3.)

As for “today” (day 0), workers have an initial skill level. We compare this initial skill level against the demand that must be satisfied “tomorrow” (day 1). If the initial skill level is enough to satisfy the demand forecast, the cost is 0. However, if the initial skill level is not enough to satisfy the demand forecast, we will have a cost of “demand - initial skill level”.

In this particular example (the data provided in the Excel file), the demand that must be satisfied on day 1 is 5 units, and the initial skill level of workers is higher than 5 (on any station). Hence, any allocation of workers on day 0 is fine.

Table 1: Computing the cost of assigning a worker to a station on day 0

	station 1	station 2	station 3
worker 1	$\max\{0, 5 - 9\} = 0$	$\max\{0, 5 - 11\} = 0$	$\max\{0, 5 - 7\} = 0$
worker 2	$\max\{0, 5 - 10\} = 0$	$\max\{0, 5 - 6\} = 0$	$\max\{0, 5 - 8\} = 0$
worker 3	$\max\{0, 5 - 7\} = 0$	$\max\{0, 5 - 8\} = 0$	$\max\{0, 5 - 12\} = 0$

Additional explanation

Suppose that on day 0:

worker 1 is assigned to station 1,

worker 2 is assigned to station 2, and

worker 3 is assigned to station 3.

Then, at the end of day 0, the skill inventory of workers must be updated:

	station 1	station 2	station 3
worker 1	calculate new skill level based on the skill improvement formula	calculate new skill level based on the skill deterioration formula	calculate new skill level based on the skill deterioration formula
worker 2	calculate new skill level based on the skill deterioration formula	calculate new skill level based on the skill improvement formula	calculate new skill level based on the skill deterioration formula
worker 3	calculate new skill level based on the skill deterioration formula	calculate new skill level based on the skill deterioration formula	calculate new skill level based on the skill improvement formula