

Gender equality at home

Difficulty level: beginner

Keywords

- Assignment
- Integer Programming
- Excel Solver
- Python+PuLP

Problem description

Anna and Mario have just moved in and they want to divide the main housework between them: grocery shopping, cooking, washing the dishes, doing the laundry, ironing, and taking out the trash. Anyway, their skills in the various tasks are different, and this has an impact on the time each one of them needs to carry them out, as shown in Table 1.

	Grocery	Cooking	Washing dishes	Doing laundry	Ironing	Taking out the trash
Anna	25	30	10	8,5	42	6
Mario	37	20	12	13	35	4

Table 1: Time (in minutes) needed by Anna and Marco to perform the housework.

How can they organize themselves in such a way that each of them performs exactly three tasks and that the total time spent is minimal?

Tasks

1. Formulate the problem by applying Linear, Integer, or Mixed Integer Linear Programming.
2. Solve the problem by using Excel Solver.
3. Implement the mathematical model in Python and solve it by exploiting the PuLP library.