EXACT METHODS ASSIGNMENT

In this assignment, you will have to describe a problem, provide a numerical example, and write the mathematical model for that numerical example.

More specifically, this assignment consists in:

- Describe a problem of your choice.
    - You do not have to choose a complicated problem, something relatively simple is enough.
    - Naturally, the problem should not be exactly equal to the simplest versions of the problems (knapsack, traveling salesman, set covering / partitioning / packing, cutting stock) presented in the classes!
    - However, it can be a variation of these problems, resulting from adding more elements / restrictions to those basic versions (though it is likely better to avoid a traveling salesman variation, due to the very large number of constraints involved).
    - For instance, and for a knapsack-like problem, you may add weight and / or volume constraints, as well as decision subset bound constraints and / or implication constraints (such as items 6 and 8 cannot both be selected, or if item 3 is selected then item 5 has to be selected).
    - Similarly, for a facility location (set covering) problem, you may add decision subset bound constraints (such as facilities 2 and 3 cannot both be opened) and / or implication constraints and / or K out of N must hold constraints (such a minimum coverage of customers).
    - So, choose something that is not too complicated, but that is sufficiently different from what was presented in the classes.
- Provide a specific numerical example.
- Write the mathematical model for that numerical example. You may provide a general model (using summations and mathematical symbols), but please include the full model (all equations in full, as much as possible) for the specific numerical example.

The assignment must be submitted, via Moodle, until the end of Sunday, November 2, 2025. Please use either a Microsoft Word or a PDF file. Please make sure the name of each file starts with "G# EMA", where # is your group number (for instance, "G3 EMA" for group 3). The criteria, and respective weights, that will be used when grading the assignment are provided in the next page.

GOOD LUCK!!

weight	Criteria	Description of main elements
5%	Basic presentation	Cover page; Table of contents; When applicable, adequate citations and references section.
10%	Writing quality	Readability; Typos, mistakes and proper use of grammar.
15%	Overall quality	Overall quality of the entire assignment; Relative comparison with other assignments.
20%	Problem description	Problem is not exactly the same as one of those used in classes; Suitability of the problem; Adequate description of the problem.
10%	Numerical example	Adequate example; Adequate size.
40%	Mathematical model for numerical example	Full version provided (as much as possible); Model is correct.