Project Optimization for Data Science

1 Organization

This project is a group assignment, with each group consisting of preferably and at most 5 students. Groups are formed as follows:

- You can organize groups yourself through canvas.
- Students not yet in a group at the end of week 3 will be assigned randomly to a group.

There are 2 important deadlines for the project.

- The deadline for the report is October 17 at 13.30.
- In week 8, each group gives a 15 minute presentation. The exact schedule will be communicated at a later time.

2 Instructions

For this project, your goal is to familiarize yourself with an optimization problem, and make use of the solution techniques seen during the lectures. As a group, you should produce a report containing the following information.

1. A literature study. The problem description will give you sufficient information to identify relevant papers. In this section, you should discuss a number of related papers. The following questions can guide you
   - Which techniques are used to solve this problem?
   - Is the problem part of a larger class of problems, or are there interesting special cases?
2. Problem formulation.
   - Give a formal linear/integer/non-linear programming formulation for the problem.
   - Can you give formulations that differ from those in the literature?
   - Discuss benefits and drawbacks of your own models, and those from literature.
3. Solution methods
   - Describe how the problem can be solved.
     - Exactly
     - Using heuristics

- Solution methods differing from literature are strongly encouraged.

4. Results
    - Describe the results you obtain from the methods described in "solution methods".
    - Can you solve (some instances of) the problem exactly? How quickly?
    - What is the quality of solutions you obtain using heuristics?
5. Group member contributions.
    - Make it clear which group members contributed to which aspects of the work and report.
    - Every group member should be involved in the development of solution methods.

2.1 Instructions on AI

AI usage is allowed only for the following aspects of the project.

- Editing of text.
- Co-pilot and similar tools for coding support.

If AI tools are used, this must be reported. AI tools are not allowed to be used for (and are pretty bad at) the development of mathematical models, algorithms, etc.