Project guidelines
Telecommunication Network Design

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It is recommended that you read the **entire** document before attending the first class.

Revision history

- October 5, 2017 — The first version of the document.

Basic rules and schedule

- The primary goal of the project is to design, implement, and evaluate an algorithm to solve a complex network optimization problem, and to compare the solution with the results obtained with the aid of an exact solver.
- Students will work either individually or in small teams (up to 3 people in each team).
- To receive credit, students are required to:
  - prepare a short written report documenting the proposed design and the evaluation results;
  - present the project in front of the other students in the group.
- According to the AGH UST rules (§11.3), presence at the project meetings is obligatory. Students who missed a meeting should present their contribution to the teacher until the end of the week of the meeting. If the contribution is not presented, the final grade will be decreased by 0.5.
- Before coming to the meeting, please contact the instructor to book a convenient time slot for your team. The appointments should be made **at least three days prior** to the meeting.

Contact via e-mail

- Teacher: Andrzej Kamisiński (andrzejk@agh.edu.pl)
- The subject of an e-mail should be created according to the following template:
  `[TND-project] <Team member(s)>: <subject of the e-mail>`, e.g.,
  `[TND-project] John Doe: meeting no. 2` or
  `[TND-project] John Doe and John Smith: corrections to the report`.
- Please sign your message using your full name.

General hints and requirements

- Once you have discussed the optimization problem with the instructor, you will be asked to:
  - define and implement the corresponding exact or suboptimal solution algorithm;
  - verify the operation and efficiency of the algorithm by comparing the results with the results obtained with the aid of an exact solver provided by CPLEX — therefore, it is also necessary to implement the problem in CPLEX/OPL, a language used to describe optimization problems; the evaluation can be performed for a small-sized problem;

Table 1: Meeting schedule

Date	Scope
Until Oct 23, 2017	• Decision about the project team and the high-level tasks of particular team members. • Discussion with the instructor about the details of the considered optimization problem. • Assignment of tasks to be completed by team members before the next project meeting.
Nov 13-17, 2017	• Each team member presents his/her contribution to the project since the previous meeting, according to the agreed list of tasks. • Assignment of tasks to be completed by team members before the next project meeting.
Nov 27-Dec 1, 2017	• Each team member presents his/her contribution to the project since the previous meeting, according to the agreed list of tasks. • Assignment of tasks to be completed by team members before the next project meeting.
Dec 18-21, 2017	• Each team member presents his/her contribution to the project since the previous meeting, according to the agreed list of tasks. • Assignment of tasks to be completed by team members before the next project meeting.
Jan 8-12, 2017	• Each team member presents his/her contribution to the project since the previous meeting, according to the agreed list of tasks.
Until Jan 17, 2018	• Submission of the project report (does not require a meeting).
Until Jan 25, 2018	• Presentation of the project in front of the other teams.

  - evaluate the efficiency of the algorithm on a large instance of the optimization problem (i.e., with many variables and constraints) — in this case, you should pay attention to the related computational complexity and the total computation time.

- Recommended programming languages: C, C++, Python.
- The use of third-party components must be explicitly indicated in the final report.
- It is expected that all members of a team will be familiar with every part of the project.

Final project report

- A successful delivery of the project report involves:
  - submission of the **final pdf version** of the report by e-mail, together with all files related to the project, such as the source code of the proposed algorithms, applications, scripts, and concise instructions presenting how to build and use the included tools;
  - delivery of the **printed version** of the report (you can leave the report at the security office in D5 — in this case, please notify the teacher via e-mail).
- The main components of the report:
  - a short presentation of the selected optimization problem (the objective, the selected parameters, assumptions);
  - description of your solution algorithm (you may consider to use block diagrams or pseudocode);
  - summary of the results: a) comparison of the performance of your algorithm with the exact solution method, b) the results for a big instance of the optimization problem;
  - conclusions, your own opinions, recommendations.
- Formal requirements:
  - standard typescript: margins no smaller than 1.5 cm, font size no smaller than 12 pt, standard line spacing;
  - up to **FIVE** pages (A4);
  - it is necessary to specify the contribution of each team member;
  - reports failing to meet the formal requirements will not be accepted.

Typical errors in writing — what to avoid in your report

You are expected to avoid the following typical errors in your report:

- Confusing 'amount' and 'number' (uncountable/countable).
- Confusing *hyphen* (e.g., 'branch-and-bound'), minus sign (the so called *en dash*, e.g., '$-\pi$') and *em dash* (e.g., 'λ_d — dual variable').
- Confusing algorithms (i.e., a sequence of operations to do something) and mathematical formulations.
- Confusing numerical calculations, emulation results and simulation results.
- Diminishing significance of your own work by writing that you 'tried', 'attempted', etc. to describe your efforts.
- Ending report, chapter or section title with a dot or colon.
- Giving captions of tables beneath them.
- Lack of commas/semicolons/dots in bullets.
- Lack of adjustment (alignment) of the paragraph text.
- Lack of description of the used abbreviations.
- Lack of full bibliographic data of the paper/book/text you reference.
- Lack of indentation at the beginning of a paragraph.
- Lack of italics while giving mathematical variables (or constants, sets).
- Lost references to figures or tables in the text (you should refer as "in Fig. 7" or "in Tab. III").
- Putting figures/tables without captions.
- Putting figures/tables without numbers.
- Usage of Polish quotation marks („").
- Writing comma instead of decimal dot.
- Writing digits, numbers, brackets and indicators of standard mathematical operations (e.g., the maximum function) or operators (e.g., the addition operator) with italics.

Significant failure to meet the recommendations above may result in the reduction of the final grade by 0.5.

Correction

After reading your report, the teacher may send you the scan of your text with some remarks. You should send back the improved pdf document containing your report, unless you are satisfied with the proposed grade. Please note that the following symbols might be used to draw your attention to some mistakes:

- Change of order: *change order*.
- Removal of unnecessary blank space: *(word*.
- Removal of a text fragment: *unnecessary ~~pleple~~ word*.
- Character/word insertion: *lacking*.
- Insertion of a lacking blank space: *spacenecessary*.
- Change of the font type to italics (or the other way round): *plain*.

Presentation of the results

- Each project team is granted 15 minutes to present its project in front of the other teams.
- Presentation of a project should involve all team members.
- Presentations are graded based on their quality, content, and the ability of the presenters to manage time appropriately.
- Grades will be assigned by the teacher, taking into account the results of a survey among the audience.

Grading

- Projects are graded based on their scientific value, novelty of ideas, quality of the implementation, the obtained results, the overall quality of the report, and presentation of the results by the team.
- The final grade is determined based on the weighted average value of two grades: one corresponding to the report (70%), and the other one corresponding to the presentation (30%).