ELEC-E7852 Computational Interaction and Design 2024
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Assignment 1B: Combinatorial optimization (optional)

This assignment builds on 1A. You must have obtained satisfactory results in it to attempt this assignment.

The main goal is to *extend* the optimization system to be able to handle a more interesting design optimization case.

Sub-tasks:

- Multi-objective optimization: Add another human-centric objective to your objective function. Report qualitative results (5 cases)
- A more efficient optimization approach: Choose a *metaheuristic* approach and implement it.
- Hyperparameter tuning: Identify one hyperparameter in your metaheuristic approach and tune it. Plot results as a function of the parameter.
- Sensitivity analysis: Report results for a sensitivity analysis of one variable.
- Final results: Combine the best solutions from the sub-tasks above and show the results. Compare them to what you obtained in A1A.

Reporting format:

1. Name, student ID
2. Multi-objective optimization and results
3. Metaheuristics approach and results
4. Hyperparameter tuning and results
5. Sensitivity analysis and results
6. Final results

Grading:

- Metaheuristics correctly understood. A metaheuristic technique trialled and results shown + 1
- Hyperparameter correctly identified and tuned +1
- Added objective is meaningful and shown to improve the design +1
- Sensitivity analysis correctly understood and a result shown +1
- Results demonstrably improved from Part 1 +1

Note: The core idea of all of subtasks can be implemented with a few lines of code. Pay attention to getting the concept right; do not overdo the approach.