EEE 598/CEN 598: VLSI Design Automation
Mini Project 2

The Mini Project 2 has three phases, as briefly described below with the deadline. Each phase includes detailed documentation that will be released closer to the previous phase's deadlines.

Phase 1:

The first phase includes the development of your own static IR drop solver. Using modified nodal analysis (MNA), as explained in class, you will develop a solver that can handle resistance, voltage sources, and current sources. This solver will serve as a golden script for generating training data for Phase 2. For more details, refer to the Phase 1 tab.

Deadline: April 4, 2025
Points: 35 points

Phase 2:

This phase includes the development of an ML model to predict static IR drop. You can be as innovative as you like on feature engineering and the choice of ML model and the details on model training for this phase. The goal is to run your solver on a hundred different testcases to create a training dataset. Use this training dataset to train your choice of a ML model. During evaluation, the model will be tested on 10 hidden testcases.

Deadline: April 25, 2025
Points: 35 points

Phase 3:

This phase focuses on familiarizing yourself with the open-source EDA tool, OpenROAD. Your task is to develop scripts that interact with OpenROAD to generate a SPICE netlist representation of the power grid, run an IR drop simulation, and visualize the IR drop within the OpenROAD GUI. Additionally, you will use the exported SPICE netlist as input for your ML model to predict the IR drop. Finally, compare the IR drop observed in the OpenROAD GUI, including the worst-case IR drop, with the predictions from your ML model.

Deadline: May 4, 2025
Points: 30 points