Object-Oriented Programming
Semester 2025 II
Domotic Circuit Simulation

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Requirements Documentation

For the Domotic Circuit Simulator, we found the following requirements.

Functional:

- Ask for a user and password for personal use.
- Grab and drop components on the board.
- The components must connect between them by jumpers or cables.
- The system has to be based on real life circuits, so if the connections are possible and can be made in the real world, the system will run them.
- The program has to show circuit values in a table. Each value corresponds to points or nodes in the circuit, and the user can choose where he needs the values.
- Save the changes automatically.
- Allow creating, saving, opening, and deleting circuit projects.
- Include a library of electronic and domotic components (resistors, capacitors, sensors, relays, etc.) with editable properties.
- Allow configuration of component parameters such as resistance, voltage, or sensor type.
- Simulate the circuit behavior in real time according to the user's connections.
- Display graphical representations of electrical signals (for example, voltage vs. time) at selected nodes.
- Detect and show connection errors such as short circuits or invalid wiring.
- Allow exporting and importing circuit designs in standard formats.

Non-Functional:

- The opening program waiting time will be less than 3 seconds.
- Include tips or indications of the function of any component.
- If the program is closed by mistake, save automatically the changes every 5 minutes. In that case, the program should be connected to the internet.
- The save/load button should have a waiting time less than 3 seconds.
- The interface must be intuitive and easy to use for users with basic knowledge of electronics.
- The system must allow adding new components or modules in future versions without affecting its core structure.
- User credentials and saved projects must be securely stored to prevent unauthorized access.
- The program must include a help section or basic documentation explaining how to use the simulator and the components.