AST Simplification and Optimization for M2-ISA-R Models

M2-ISA-R is the code generation toolchain for the instruction set simulator ETISS, both developed by the Chair of Electronic Design Automation at TUM. The core of M2-ISA-R is a meta-model based modeling framework used to represent arbitrary instruction set architectures. Various parsers for architecture description languages and code generators for simulation models use these intermediate models.

The metamodel consists of structural and behavioral components. In this project, the goal is to research, apply and compare various simplification and optimization methods when preprocessing the behavioral syntax tree. A basic expression simplifier is already present, however it is very barebones and lacks required further AST simplification methods.

Depending on experience and individual expectations, the scope of the project can be variable for the chosen project type.

Prerequisites

- Interest in learning about symbolic evaluation and simplification
- Ideally previous experience with static code analysis, natural language processing, compiler engineering etc.
- Very good knowledge of Python
- Some experience with parser generators, ideally ANTLR4

Contact

karsten.emrich@tum.de

Advisors

Karsten Emrich