

Master Thesis

Static Universe Type Inference using a SAT-Solver

Matthias Niklaus

1.12.2005

Introduction The Universe type system was developed for aliasing control and is applied as an extension of the Java programming language. Aliasing control is a requirement for modular verification. The Universe Annotations are integrated in JML. To verify existing programs, a first system to statically annotate the Java-files was developed during a previous master thesis. To enhance the quality of the annotations, the power of the former inference tool should be augmented.

Goal of this master's project is the development of a new back-end using a SAT-solver for the previous static inference tool.

The current back-end using Prolog does not provide the expected quality of annotations. Replacing this back-end by a new one, using a SAT-solver should extend the potential, so that we can generate better annotations. Then it should be possible to provide to the programmer a sensible, fully annotated program usable by JML.

The main parts of this project are:

1. replace the Prolog rules by a boolean formula in the conjunctive normal form,
2. determine the SAT-solver and implement the new back-end, and
3. elaborate a more sophisticated heuristic using the whole power of the new back-end.

Potential Extensions of this project are:

1. application to examples and case studies,
2. include the support for Generic Universes.