

MASTER/DIPLOMA THESIS

Implementation of a Type System for Object Immutability with Flexible Initialization

May 28, 2009

The software technology group offers a Master/Diploma Thesis at the present time with the following topic: „Implementation of a Type System for Object Immutability with Flexible Initialization“.

Motivation

Immutable data structures greatly simplify programming, program maintenance, and reasoning about programs. Immutable structures can be freely shared, even between concurrent threads and with untrusted code, without the need to worry about modifications, even temporary ones, that could result in inconsistent states or broken invariants. In a nutshell, immutable data structures are simple. It is therefore not surprising that favoring immutability is a recommended coding practice for Java. Unfortunately, statically checking object immutability in Java-like languages is not easy.

Task

You should implement the type system presented in the paper *Type-based Object Immutability with Flexible Initialization* by Christian Haack and Erik Poll. This is done by extending the typing rules of an existing Java compiler by the ones presented in the paper. In a first step, the compiler must be made aware of the new type access qualifiers. The typing rules are then basically assertions over these new kinds of types which further restrict the set of valid Java programs. The implementation can be realized by extending the JSR 308 prototype (Java) compiler.

Requirements

- You should have participated in the lecture *Advanced Aspects of Object-Oriented Programming* and have a general good understanding of the Java language.
- Experience with working on compilers and language-processing tools is of great advantage.

Contact person

M. Sc. Yannick Welsch
Room: 34/408
Tel.: 0631 205-2625
Email: welsch@cs.uni-kl.de
Web: <http://sofech.cs.uni-kl.de/Homepage/YannickWelsch>