Improving relevancy of dynamically-inferred contracts in Eiffel

DIPLOMA THESIS PROJECT PLAN

Project period: Feb 2009 – June 2009

Student name: Flaviu ROMAN

Status (10-th semester)

Email address: romanfl@student.ethz.ch, flaviu.roman@gmail.com

Supervisor name: Nadia Polikarpova

1. PROJECT DESCRIPTION

Overview

Assertions help programmers in contract based language improve the reliability and robustness of the code. Programmers can usually write correct and useful assertions, but they are limited to what the programmer can infer regarding his work. Automatic inferencing tools are designed to help programmers discover and add additional inferences and contracts to their source code.

Scope of the work

Initial studies[4] have shown that some of the automatically inferred assertions are correct (90%), while some of them are actually useful (interesting, 64%). By useful one means that the assertion is a property of the class / feature / loop and only of that, regardless of the tests performed on that structure. However, it has been proven[4] on several types of Eiffel classes than automatic tools are able to inference 5 times more useful and correct assertions than programmers do.

Intended results

Eliminating uninteresting assertions is intended in order to increase the percentage of useful assertions automatically inferred by the tool

2. BACKGROUND MATERIAL

Reading list

Eiffel tutorial
Daikon user manual (optionally Daikon developer manual)
Citadel user manual
Nadia Polikarpova, Ilinca Ciupa, Bertrand Meyer: A comparative study of programmer-written and automatically inferred contracts.

3. PROJECT MANAGEMENT

Objectives and priorities

To attempt a classification of the uninteresting assertions

To attempt removal of uninteresting assertions from various classes

Criteria for success

Tests will be performed on the same existing set of classes, and the results will be compared to the existing ones. Obtaining a better percentage of interesting assertions is a success criteria.

Method of work

Meetings to keep track of work progress

Quality management

Documentation

Documentation of the improvements in Citadel for filtering uninteresting assertions

Validation steps

Testing

4. PLAN WITH MILESTONES

Project steps

Analysis and design, determining conceptual classes of uninteresting assertions
Implementation of filters for uninteresting assertions of various classes
Testing the implementation and comparison to the existing results

Deadline

June 12, 2009

Tentative schedule

Introduction to Eiffel, Design by Contract™, assertions, Daikon, Citadel: 23.02 – 06.03
Analysis and design: 09.03 – 27.03
Implementation: 30.03 – 01.05
Testing, comparison of results: 04.05 – 22.05
Conclusions, future estimations and development: 25.06 – 29.06
Diploma thesis writing: 01.06 – 12.06

REFERENCES

[1] Chair of Software Engineering: *Semester-/Diplomarbeiten*; Online at: http://se.inf.ethz.ch/projects/index.html.

[2] Bertrand Meyer: *Object-Oriented Software Construction, 2nd edition*, Prentice Hall, 1997.

[3] M. D. Ernst. Dynamically Discovering Likely Invariants. PhD Dissertation. University of Washington, 2000.

[4] Nadia Polikarpova, Ilinca Ciupa, Bertrand Meyer: A comparative study of programmer-written and automatically inferred contracts.

[5] CITADEL website. http://se.inf.ethz.ch/people/polikarpova/citadel.html