Institut für Systemsoftware

O.Univ.Prof. Dr. Hanspeter Mössenböck

JOHANNES KEPLER
UNIVERSITÄT LINZ
Netzwerk für Forschung, Lehre und Praxis

Automatic Dependency Reduction between Java Classes and Packages

Master thesis for Andreas Müller
Matr.-Nr.: 0555284
Email: a_m@gmx.at

Long-living Java projects are refined and restructured again and again. New dependencies between classes or packages are easily inserted, when new functionalities are added. The reduction of dependencies is however often neglected, because it does not add any immediate value to the program. Also, possible dependency reductions are hard to detect manually, and tool support is severely limited in current Java IDEs.

This thesis should investigate the automatic detection and reduction of dependencies between Java classes and Java packages. A class depends on another class if the source code of the first class accesses a field, calls a method, or declares a variable or a supertype of the second class. A package depends on another package if a class of the first package depends on a class of the second package.

A tool should be developed that

- analyzes Java source code for dependencies between classes and packages;
- calculates metrics to evaluate those dependencies;
- suggests to move a class to another package if this reduces package dependencies;
- suggests to move a method to another class if this reduces class dependencies;
- is capable of automatically refactoring the source code based on the suggested improvements;
- is integrated into a standard Java IDE.

The work progress should be discussed with the supervisor every 2 weeks. Please note the guidelines of the Institute for System Software when preparing the written thesis.

Supervisor: Dipl.-Ing. Thomas Würthinger

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