

Master's Thesis

Dependency Browser for Program Comprehension and Change Impact Analysis of PLC Programs

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With the PhD work of F. Angerer, a method and tool has been developed which allows analyzing the control and data dependencies within programmable logic controller (PLC) as well as Java programs [1], [2]. Based a system dependence graph (SDG), which encodes all the control and data dependencies within a program, efficient methods allow showing the possible impact of program changes [2]. Moreover, the system dependence graph also encodes the variability of a variable software system, e.g., a software product line.

In this Master thesis, an interactive and graphical dependency browser should be developed which allows investigating the dependencies as encoded in the SDG. The tool should support the following functions:

- Following dependencies as encoded in the SDG in both directions, i.e., forwards as well as backwards. It allows expanding and collapsing dependencies by the user.
- Showing the component hierarchy in the program and allowing views at multiple levels, i.e., at multiple levels of the component hierarchy and down to statement level. The tool supports interactive zooming.
- The tool allows excluding dependencies based on configuration settings. That means the tool should recognize that certain dependencies are not possible due to configuration settings and mark them as invalid.

Referenzen

[1] Angerer, F.; Prähofer, H.; Lettner, D.; Grimmer, A.; Grünbacher, P.: Identifying Inactive Code in Product Lines with Configuration-Aware System Dependence Graphs. Proceedings 18th Int'l Software Product Line Conference (SPLC 2014), Florence, Italy, pp. 52-61, 2014.

[2] Angerer, F.; Grimmer, A.; Prähofer, H.; Grünbacher, P.: Configuration-Aware Change Impact Analysis. 30th IEEE/ACM International Conference on Automated Software Engineering (ASE 2015), Lincoln, Nebraska, USA, pp. 385-395, 2015.