

Tutorial Sheet 6: Automated Quality Assessment

A computer with internet access is required for this tutorial sheet.

Assignment 1: Code Cloning

- Describe briefly what a code clone is.
- Explain how cloning can lead to faults in software. Use an illustrative code example.
- What is the purpose of the normalization phase within the clone detection process.
- It has been shown that cloning does not only occur in source code. Name other artifacts where cloning has been reported.
- System A has 2,500 statements. It contains 5 clones where each clone occurs twice in the code. All 5 clones have length of 25 statements. System B has 2,000 statements. It contains 1 clone that occurs 5 times within the system. The clone has a length of 100 statements. Compute the clone coverage and the number of redundancy free source statements (RFSS) for both systems.

[Response:

First three items: see lecture slides and notes.

System A:

$$5 \cdot 2 \cdot 25 = 250 \text{ clone statements}$$

$$250/2500 = 10\% \text{ clone coverage}$$

$$2500 - (5 \cdot 1 \cdot 25) = 2375 \text{ RFSS}$$

System B:

$$1 \cdot 5 \cdot 100 = 500 \text{ clone statements}$$

$$500/2000 = 25\% \text{ clone coverage}$$

$$2000 - (1 \cdot 4 \cdot 100) = 1600 \text{ RFSS}$$

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Assignment 2: Automated static analysis with Findbugs

Findbugs is a static analysis tool that looks for bugs in Java code.

- Download and install the Eclipse IDE on your computer from the following URL if it is not already installed: <http://www.eclipse.org/downloads/>

Choose the package *Eclipse Classic 3.5.2*.

- Install the *Findbugs* plug-in by performing the following steps: From your Eclipse menu select Help → Install New Software. In the Install dialog enter <http://findbugs.cs.umd.edu/eclipse> at the Work with field. Check the latest Findbugs Feature and press Next. Follow the steps in the installation wizard.
- Import the project Jabref into your workspace by performing the following steps: Download the zip file at <http://www4.in.tum.de/lehre/vorlesungen/sqm/ss10/sheets/Jabref.zip> and select File→Import...→General→Existing Projects into Workspace and choose *Select archive file* in the next dialog page. Click *Browse* and select the downloaded Jabref zip file. Select the project Jabref and press finish.
- Perform a Findbugs analysis by right-clicking on the project and selecting Find Bugs →Find Bugs from the Context menu.
- After the analysis is completed, you will be prompted to switch to the Find Bugs perspective. Confirm this with Yes.
- In the Bug Explorer, appearing on the left hand side, browse through the bugs that Findbugs detected. Double-clicking on one of the bugs will open the source file and annotating the line with the problem. The description of the problem will be shown in the Properties view below.
- Choose 5 of the detected bugs, briefly describe the rationale for it and suggest how the problem can be solved.

[Response:

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