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Master's Thesis

A Profiler for Java Programs

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A profiler counts the execution frequencies of methods, blocks and statements. The result can be used to find the "hot spots" of a program, i.e., the most frequently executed parts that lend themselves to optimization. The execution frequencies can also be used to find statements that have never be executed, which can hint to bugs or can help to evaluate test coverage.

The goal of this Master's thesis is to implement a profiler for Java programs. It consists of an *instrumenter* that instruments the files of a program by inserting counters in blocks, and the proper *profiler* that evaluates and visualizes the counter data. The instrumented program must be compiled and executed so that the execution frequencies are collected. The collected counter data is then written to a file which is read by the profiler to visualize and analyze the execution frequencies of the previous program run.

A similar profiler has been implemented for C# programs before [1]. It can be used as an example of how the frequencies should be visualized, but the Java profiler should be implemented from scratch. A more thorough specification of the task, describing the implementation of the instrumenter and the desired visualization in the profiler can be found under [2] (in German).

The task requires a good knowledge of compiler construction basics and a commitment to implement a robust and user-friendly tool that can be provided to programmers for their daily work.

The work's progress should be discussed with the advisor at least every 2 weeks. Please follow the guidelines of the Institute for System Software when preparing the written thesis. The deadline for submitting the written thesis is 29.2.2024.

References:

[1] http://dotnet.jku.at/projects/Prof-It/
[2] https://ssw.jku.at/Teaching/MasterTheses/JavaProfiler/Specification.pdf