

Bachelor's Thesis

Extending Microjava with Object-orientation and Extensions

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MicroJava is a small sample language that is used as a compilation source in the introductory compiler construction course at JKU. It offers only very basic data types (int, char, arrays, classes with fields) and some basic statement kinds (assignments, calls, if, while, return, read, print).

The goal of this thesis is to extend MicroJava with object-orientation (methods within classes, inheritance, dynamic binding, type casts, dynamic type tests) and exception handling similar to Java. This requires changes throughout the compiler. The scanner and the parser have to be adapted due to new syntax and new keywords. The symbol table must be extended with concepts such as class-bound methods, inheritance and method overriding. New bytecodes for dynamically-bound methods calls and type tests have to be introduced and emitted by the code generator. Finally, also the interpreter and the loader of the MicroJava VM have to be adapted. A rough sketch of the necessary changes has been presented in the compiler course and should be implemented and tested in this thesis. Part of this thesis is also the development of a unit test suite for testing all implemented new language features.

The progress of the thesis should be discussed bi-weekly with the supervisor. The normal duration of a bachelor's thesis is 6 months. The mark "sehr gut" is only possible if the software and the written thesis are submitted not later than August 31, 2023. Within the first few weeks of the work a rough time schedule should be developed and discussed with the supervisor.