

Bachelor's Thesis

A Parser Generator for LALR(1) Grammars

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At the Institute of System Software there is a compiler generator called Coco/R, which transforms a compiler specification into a scanner and a recursive descent parser. The goal of this thesis is to rewrite this program into a compiler generator Coco/LR that produces the same scanners as Coco/R, but an LALR(1) parser instead of a recursive descent parser.

The compiler specification should be as close to Coco/R as possible. The scanner specification should be completely identical. The parser specification should consist of pure BNF productions without attributes and semantics actions. A nonterminal can have multiple productions. There must be at least one production for the start symbol of the grammar, which is the name used in the header of the compiler specification.

Coco/LR should create LALR(1) tables from the BNF grammar and should insert them as Java initializations into the generated parser. The parser should do automatic error recovery according to the technique presented in the compilers course. On demand, the generated tables should be printed in human-readable form and the steps of the table generation should be visualized so that they can be checked for correctness.

Coco/LR should be applied to at least one real-world grammar, e.g. for C or Java. For testing the generated parsers, a unit test suite should be developed that should include normal cases as well as corner cases.

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.