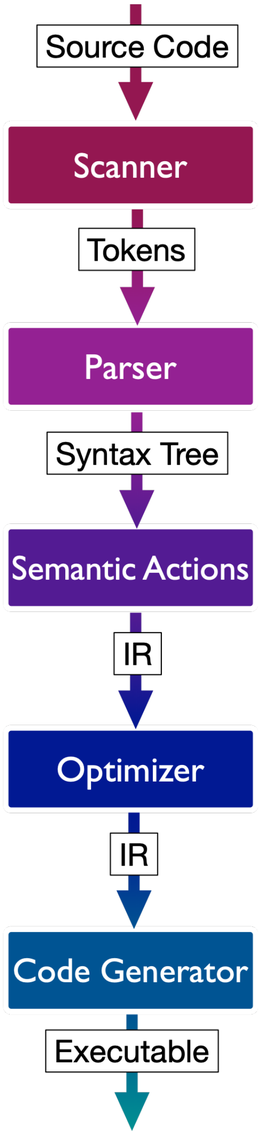
Structure of a Compiler

overall structure of a compiler



Use *regular expressions* to define tokens. Can then use scanner generators like flex or ANTLR

Define language using *context free grammar*. Can then use parser generators like bison or ANTLR

Typically written by hand, but can be formalized

Written manually. Optimization is an active research area

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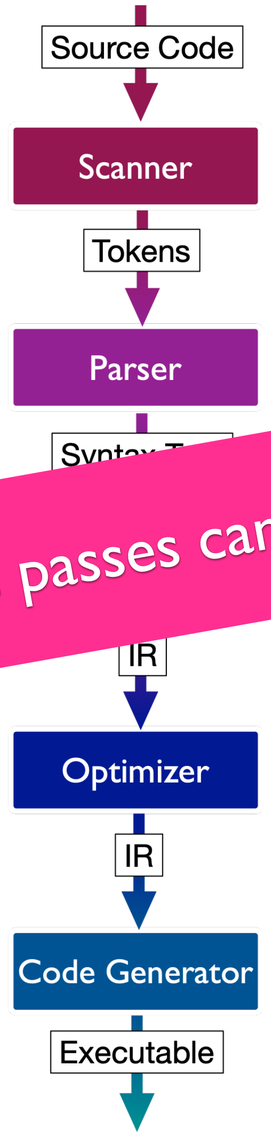

Many of these passes can be combined

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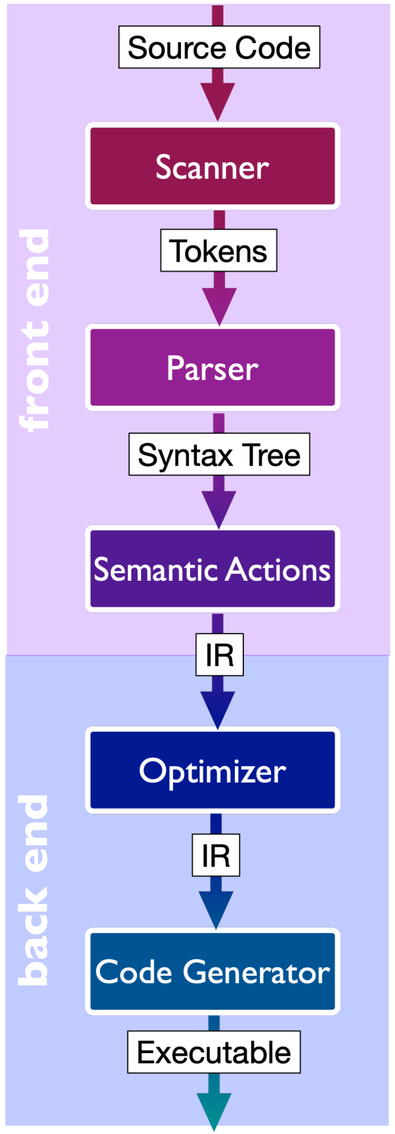
front-end vs back-end



- Scanner + Parser + Semantic actions + (high level) optimizations called the front-end of a compiler
- IR-level optimizations and code generation (instruction selection, scheduling, register allocation) called the back-end of a compiler
- Can build multiple front-ends for a particular back-end
  - e.g., both Java and Scala target Java bytecode
- Can build multiple back-ends for a particular front-end
  - e.g., llvm allows targeting different architectures

next: how do scanners work?

Or: Wait, regexes are involved?