Chapter-0-Overview

> - this is the my notes of Compilers in 2024
> - the course is taught by Prof. Hengfeng Wei @NJU

Credits

- Course Homepage: NJU-Compilers-Spring-2024
- Piazza: NJU-Compilers-Chatting
- Course Online: Bilibili-NJU-Compilers-Spring-2024

Introduction

1. 高级" 语言 ⇒ (通常) "低级" 语言 (如, 汇编语言)
2. 汇编语言经过汇编器生成机器语言
3. 汇编语言网站：godblot
4. 采用的指令集：RISC-V
5. RISC-V references：
   - https://riscv-programming.org/book.html
   - http://www.riscvbook.com/
6. RISC-V Simulator：
   - https://github.com/TheThirdOne/rars
7. 语言类应用程序：
   - 配置文件解析 (.properties)
   - CSV 文件 (Comma-Separated Values)
   - JSON 文件 (JavaScript Object Notation)
   - SQL 引擎 (Structured Query Language)
   - TLA+/TLAPS (TPaxos.tla)
   - (Java) 字节码解释器
   - C/C++ 语言编译器
   - 排版工具 (LATEX)
   - 绘图工具 (TikZ, Dot/Graphviz)
   - L-System (Cantor Set)
8. 语法分析器生成器 ANTLR
   - https://www.antlr.org/index.html
   - https://www.antlr.org/tools.html (IntelliJ Plugin)
   - http://lab.antlr.org/ (Online lab)
9. LLVM
   - https://llvm.org/
10. Reference Books

- http://docs.compilers.cpl.icu/#/2024/resources

Overview

- IR: Intermediate Representation (中间表示)
- Source Program → *Front End* → IR → *Back End* → Target Program
  - 前端 (分析阶段): 分析 **源语言** 程序, 收集所有必要的信息
  - 后端 (综合阶段): 利用收集到的信息, 生成 **目标语言程序**
- Clang: a C language family frontend for LLVM
  - https://clang.llvm.org/
- *机器无关* 的 **中间表示优化**

Slide

0-overview

Supplementary Materials

- LLVM
- Assembly Language
- Ruby
- Perl
- Lua
- Unity
- Temple OS
- Fortran
- WebAssembly
- Haskell
- Swift
- Elixir
- Kotlin
- redis