Introduction to LLVM compiler framework

Course outline

Stefano Cherubin

Politecnico di Milano

06-05-2016

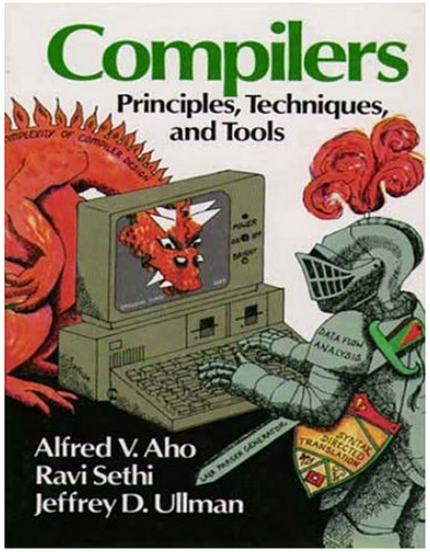
Welcome slides

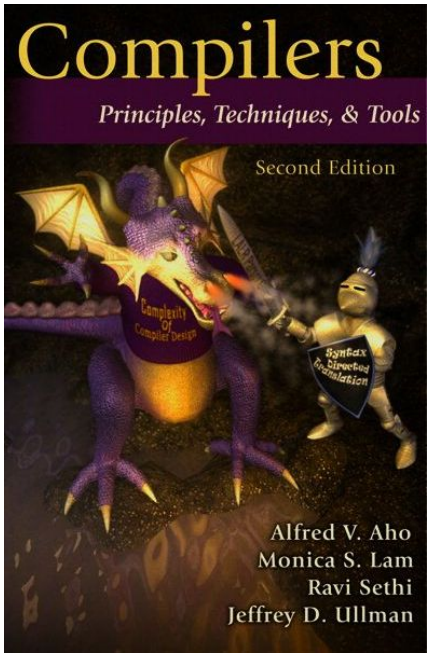
About the dragon

- The LLVM logo [1] is a stylized wyvern (a kind of dragon). Dragons have connotations of power, speed and intelligence, and can also be sleek, elegant, and modular (err, maybe not).

About the dragon

- The LLVM logo [1] is a stylized wyvern (a kind of dragon). Dragons have connotations of power, speed and intelligence, and can also be sleek, elegant, and modular (err, maybe not).
- There is a series of compiler books dating back to the 1970s showing illustrations with dragons and knights [2] [3] [4]





About me

Stefano Cherubin

- stefano.cherubin@polimi.it
- 1st year PhD student @ Politecnico di Milano (Italy)
- working on compilers since a few months ago
- definitly not an experienced knight...

About me

Stefano Cherubin

- stefano.cherubin@polimi.it
- 1st year PhD student @ Politecnico di Milano (Italy)
- working on compilers since a few months ago
- definitly not an experienced knight...
- ...I'm more like a lazy Hobbit

About you

In order to fully understand the content of this course you should have:

- knowledge of what a compiler is
- proficiency in most common data structures
- proficiency in Object-Oriented Programming
- at least some experience with C++

About the course

1. First part
   - Compiler design
   - LLVM structure overview
   - LLVM-IR language
2. Second part
   - Available middle-end passes (overview)
     - Normalization
     - Analysis
   - LLVM quick start tutorial

Goal of the course

At the end of these lectures you should:

- understand the LLVM compiler infrastructure
- be able to read a .ll file (LLVM-IR)
- know where to look for documentation
- know which are the main middle-end weapons LLVM provides you out of the box
- know how to implement a simple analysis / transformation
- know how to test your code

Bibliography I


Apple Inc.
Llvm logo.
http://llvm.org/Logo.html.


Alfred V. Aho and Jeffrey D. Ullman.
Principles of Compiler Design (Addison-Wesley Series in Computer Science and Information Processing).
Addison-Wesley Longman Publishing Co., Inc., Boston, MA, USA, 1977.


Alfred V. Aho, Ravi Sethi, and Jeffrey D. Ullman.
Compilers: Principles, Techniques, and Tools.
Addison-Wesley Longman Publishing Co., Inc., Boston, MA, USA, 1986.

Bibliography II


Alfred V. Aho, Monica S. Lam, Ravi Sethi, and Jeffrey D. Ullman.
Compilers: Principles, Techniques, and Tools (2Nd Edition).
Addison-Wesley Longman Publishing Co., Inc., Boston, MA, USA, 2006.


Think Geek.
Relaxing with a pipe full.
http://www.thinkgeek.com/product/ee7f/?i=14556.