The LLVM compiler framework

Welcome & Course Outline

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About the dragon

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  Dragons have connotations of power, speed and intelligence, and can also be sleek, elegant, and modular (err, maybe not).

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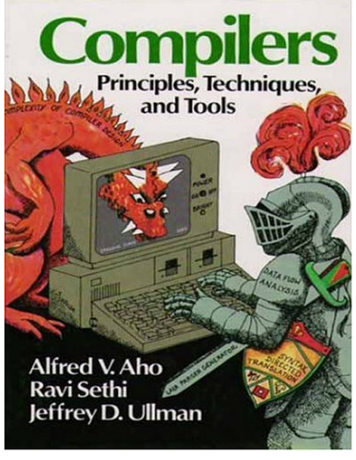
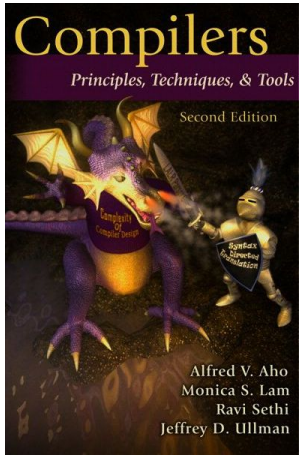
  Dragons have connotations of power, speed and intelligence, and can also be sleek, elegant, and modular (err, maybe not).
- There is a famous **compiler book** dating back to the 1970s with cover art featuring a knight fighting a dragon. [2]

  After all, compilers are also **scary**...





About LLVM

The idea behind LLVM is that
compilers should **NOT** be scary!

Instead, they should be **easy**
to extend and hack at your leisure.

In this course we will see how to have fun with compilers,
instead of being scared of them.

About me

Daniele Cattaneo

- daniele.cattaneo@polimi.it
- PhD candidate @ Politecnico di Milano (Italy)
- Obsessed with compilers for a long time...
- ...now working on research projects with LLVM!
- (yes I have strange tastes, I know)

About you

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

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

That's it!

About the course

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

Goal of the course

At the end of these lectures you will (hopefully) be able to:

- understand the LLVM compiler infrastructure
- read a .ll file (LLVM-IR)
- know where to look for documentation
- know which 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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