The LLVM compiler framework

Welcome & Course Outline

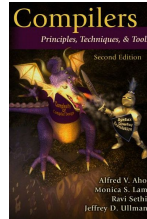Daniele Cattaneo

Politecnico di Milano

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About the dragon

- The **LLVM logo** [1] is a stylized wyvern (a kind of dragon).
  Dragons have connotations of power, speed and intelligence,
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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**...
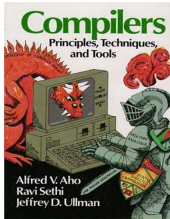
About LLVM

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

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- PhD candidate @ Politecnico di Milano (Italy)
- I work on compiler research (mostly)

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

Thank You!

Questions?

Bibliography I

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

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Addison-Wesley Longman Publishing Co., Inc., Boston, MA, USA, 1977.