Introduction to LLVM

UG3 Compiling Techniques
Aaron Smith
About Me

• Call me Aaron
  • Originally from Texas and now in Seattle

• Working on compilers in industry and academia for 20 years
  • Manage a compiler and computer architecture group at Microsoft Research
  • Visiting Professor at UEdi for the last two years

• Studied at the University of Texas at Austin
  • Bachelors, Masters, PhD in Computer Science
  • Go Horns! 😊
Schedule

• Week 1
  • Nov 15: Overview
  • Nov 18: Introduction to LLVM
  • LAB: How to use LLVM on DICE

• Week 2
  • Nov 22: LLVM Bitcode and Internals Part I
  • Nov 25: LLVM Bitcode and Internals Part II
  • LAB: Writing an LLVM Pass

• Week 3
  • Nov 29: Static Analysis, JIT’ers, Javascript, Security
  • Dec 2: Compiler Trivia!!
  • LAB: Work on Final Project
Project Overview

• LLVM is written in C++
  • But no templates or tricky C++ code
  • If you know C or Java you will be OKAY

• LLVM sources are hosted in both SVN and Git
  • You can use either but we will only discuss Git in the course
  • You need to submit the final project to Github

• Project will be graded on Linux
  • LLVM works on Osx and Windows but we will only grade on Linux
  • If you work on other platforms make sure it also works on Linux!

• Final project is due by Monday, January 16, 2017 at 10am
Contact Information

• Office: IF 2.22

• Email: aaron.lee.smith@gmail.com

• Office Hours:
  • Tuesday from 11-12pm
  • Anytime by appointment (i.e. send me an email)
Getting Started

• Read the original LLVM paper (optional)
  • LLVM: A Compilation Framework for Lifelong Program Analysis & Transformation, Chris Lattner and Vikram Adve, CGO 2004
  • http://dl.acm.org/citation.cfm?id=977673

• Read the Dr Dobbs article on LLVM (optional)
  • The Design of LLVM, Chris Lattner 2012
  • http://www.drdobbs.com/architecture-and-design/the-design-of-llvm/240001128

• Look at LLVM.org