


CS406: Compilers

Spring 2022

Week1: Overview, Structure of a compiler

Why Study Compilers?




Company Description: We at MathWorks believe in the importance of human knowledge and profoundly improve our standard of living. We do their best work. Because of the breadth of work we do, compilers in the middle, and back. If you love geeking out with SIMD intrinsics, parallel analyses, designing elegant intermediate representations, playing with partially evaluating expressions, reasoning about parallel program systems, we've got a job for you.

Company Contact: Dale Martin -martind@mathworks.com

Job Title: Compiler Engineer LLVM

Job Description: Our group is responsible for the core technology



Company Description: At IBM, work is more than a job – it's a calling: To build along with clients and sell. To make markets. To invent. To collaborate. To attempt things you've never thought possible. Are you ready to lead in this the world's most challenging problems? If so, let's talk. IBM compilers technology targeting a variety of hardware and software; including AIX, IBM Linux on IBM Z. We produce compilers for a range of source language Python, Node.js) optimized for IBM Power and IBM Z.

Company Contact: Dickson Chau - dickson.chau@ca.ibm.com

Job Title: Intermediate C/C++ & Fortran Compiler Developer

Job Description: The IBM C/C++ & Fortran Compiler Group is looking for experienced

Company Contact: David Finkelstein - dxf@google.com

Job Title: Chrome OS Toolchain Engineer

Job Description: Our team delivers production quality tool debugging tools) for C, C++, Rust, and Go in Chrome OS. Our to boost the developers' experience and enhance Chrome's mentoring new team members.

Responsibilities:

Very Very Exciting Jobs!



Company Contact: Ted Kre

Job Title: Compiler and/or DL

Job Description: The LLDB team, most of your work will be in the LLVM and Swift community. LLDB software stack and externally by


Job Title: Linker Engineer

Job Description: The dyld team is responsible for Apple platforms (dyld, Id64, cc tools). As a linker, you will link and launch efficiently — an Apple device. You will also collaborate with software's CPU and memory efficiency across

Job Title: Performance Compiler Engineer

Job Description: The CPU and Accelerator compiler performance and optimization team. CPUs and Accelerators on all Apple platforms. industry-impacting technology that enhances performance, battery life, compile-time the LLVM open source project and get

Job Title: C++ Compiler Engineer



Company Description: NVIDIA is like no place you've ever worked and discover never-before-seen ways to improve the quality of Self-driving cars to blockbuster movies. And a growing list of

Company Contact: Linda Lim - lilim@nvidia.com

Job Title: Engineering Manager - Deep Learning Compiler

Job Description: In this role, you will be managing a team of engineers to learn networks and develop compiler optimization algorithms. You will communicate and establish and evolve policies and procedures for deep learning software framework teams and the hardware and analysis, crafting and implementing compiler and optimization software engineering work.

Job Title: Senior Backend Compiler Engineer

Job Description: What you will be doing:

- Guide the design and implementation of a new LLVM backend
- Design and develop new compiler passes and optimization compilation time requirements of the compiler
- Work with global compiler, hardware and application team resolutions.
- Apply and adapt the latest compiler technologies to product
- Get a chance to influence and work on new GPU architecture

Job Title: Senior Compiler Engineer



Company Description: Qualcomm is the world's leading mobile device manufacturer. We deliver breakthrough technologies that transform products and technologies that transform level camera

Company Contact: Taylor Simpson - tsimpson@quicinc.com

Job Title: LLVM Compiler Engineer

Job Description: The Compiler Team at Qualcomm Innovation Center is looking for compiler engineers to optimize LLVM for Qualcomm ARM and other LLVM teams at Qualcomm, as well as the general LLVM

Job Title: LLVM Compiler Developer, Senior

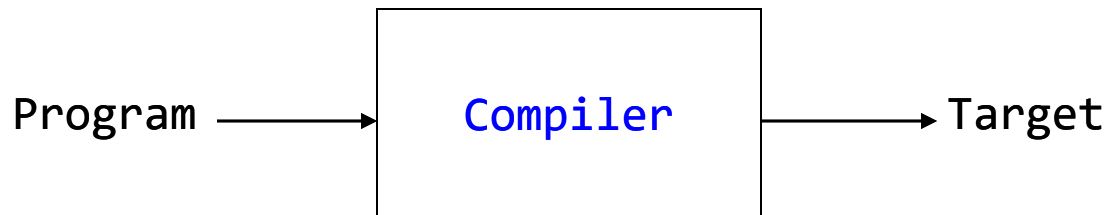
Job Description: Interested in enabling millions of users beautiful moments look fantastic? Come join our team!

- Few disciplines with **deep theory + practice**

"..Theory and practice are two sides of the same coin.." - Jeff Ullman, *ACM Turing Award lecture*.

Intro to Compilers

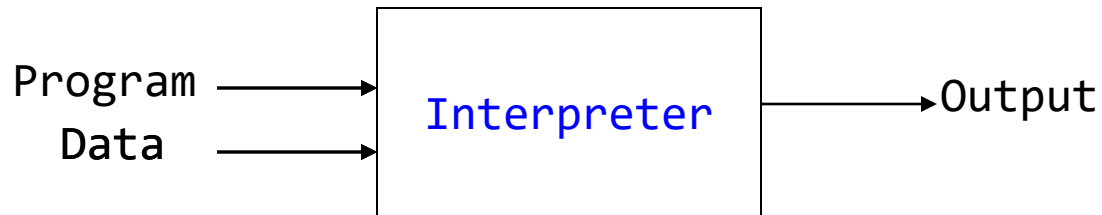
- One way to implement *programming languages*
 - Programming languages are notations for specifying computations to machines

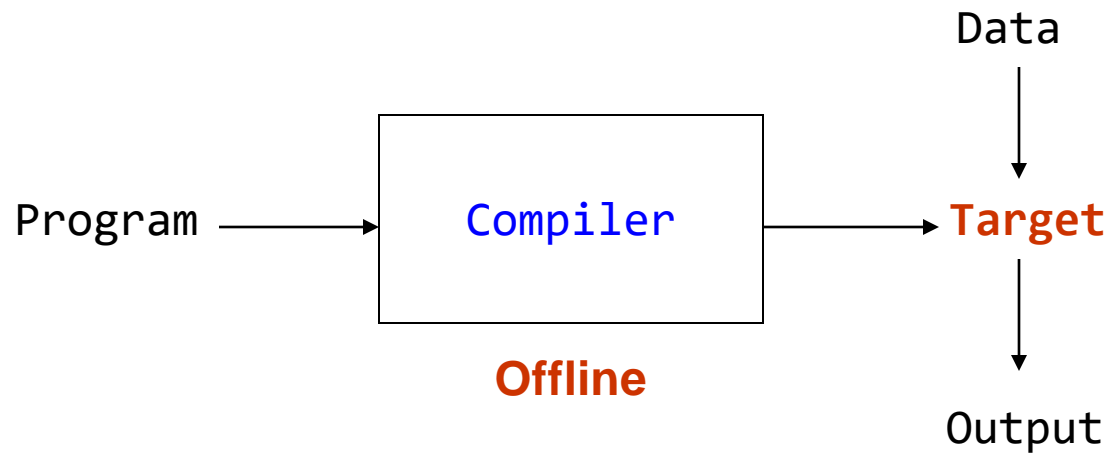


- *Target* can be an assembly code, executable, another source program etc.

Intro to Compilers

- Alternate way to implement programming languages





these are the two types of language processing systems

Suggested Reading

- Alfred V. Aho, Monica S. Lam, Ravi Sethi and Jeffrey D. Ullman: Compilers: Principles, Techniques, and Tools, 2/E, AddisonWesley 2007
 - Chapter 1 (Sections: 1.1 to 1.3, 1.5)
- Fisher and LeBlanc: Crafting a Compiler with C
 - Chapter 1 (Sections 1.1 to 1.3, 1.5)