Computer Engineering 259
Advanced Compiler Design

Fall 2019
Mondays and Wednesdays
9:30 am – 11:20 am

Instructor

Instructor:	Darren Atkinson
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Textbook

Required: Cooper and Torczon, *Engineering a Compiler*, 2nd edition, 2012.

Grading

Exam #1 (front-end): 20%
Exam #2 (back-end): 20%
Exam #3 (optimization): 30%
Project #1 (syntactic analysis): 5%
Project #2 (semantic analysis): 5%
Project #3 (code generation): 10%
Project #4 (optimization): 10%

Overview

1. Front-end concepts: lexical, syntactic, and semantic analysis; intermediate representations (2 weeks)
2. Back-end concepts : storage allocation, code generation (2 weeks)
3. Optimization: peephole, local, global, and interprocedural optimizations (6 weeks)

Learning Outcomes

Students will . . .

1. Specify the lexical and syntactic structure of a programming language, and implement a compiler to validate the structure of an input program.
2. Apply the principles of storage allocation and register allocation to the generation of assembly code for an input program.
3. Compare and contrast different intermediate representations (e.g., syntax trees, three-address code, SSA form).
4. Define and implement peephole and local optimizations (e.g., constant folding, algebraic simplification, local value numbering, local register allocation).
5. Define and implement global data-flow analyses and optimizations (e.g., live variable analysis, copy propro-gation, dead code elimination, global register allocation).

Policies

In-Class Recordings

The *Student Conduct Code* ***prohibits students from making a video recording, audio recording***, or streaming audio/video of private, non-public conversations and/or meetings, inclusive of the classroom setting, without the knowledge and consent of all recorded parties, except in cases of approved disability accommodations.

Accessible Education

If you have a documented disability for which accommodations may be required in this class, please contact the Office of Accessible Education as soon as possible to discuss your needs and register for accommodations with the University. If you have already arranged accommodations through OAE, please ***discuss them with me within the first two weeks of class***.

Academic Integrity Policy

The University is committed to academic excellence and integrity. Students are expected to do their own work and to cite any sources they use. ***A student who is guilty of a dishonest act*** in an examination, paper, or other work required for a course, ***or who assists others in such an act***, may, at the discretion of the instructor, ***receive a grade of F for the course***. In addition, a student found guilty of a dishonest act may be subject to sanctions up to and including dismissal from the University as a result of the student judicial process as described in the *Community Handbook*. A student who violates copyright laws, including those covering the copying of software programs, or who knowingly alters official academic records from this or any other institution is subject to similar disciplinary action.