ECE 553 Compiler Construction
Spring 2019
Dr. Andrew (Drew) Hilton

Course Contact Information

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Course webpage: `https://adhilton.pratt.duke.edu/ece-553-compiler-construction`

Textbook

Required. "Modern Compiler Implementation in ML." by Andrew Appel.

- Be sure to get "in ML" (blue) version.

- Errata: `http://www.cs.princeton.edu/~appel/modern/ml/`

Optional. "ML for the Working Programmer." by L.C. Paulson

Assignments and Grading

Your grade for this course will be comprised of three components:

- SML Warmup: 2%

- Course Project: 35%

- Midterm Exam: 29%

- Final Exam: 34%

SML Warmup

You will complete an SML warmup exercise **individually** to familiarize yourself with the language
and prepare you for the programming you will do for your compiler. You can find that exercise on
the class webpage here:
  `https://adhilton.pratt.duke.edu/sites/adhilton.pratt.duke.edu/files/u37/sml-intro.pdf`
  You may not use late days for this assignment (as the late days are for your group work on the
compiler project, and this is individual work).

Course Project

Over the course of the semester, you will write a compiler start to finish. Important information about the project:

Deadline Your compiler is due Wed, April 24th, 2019 at 11:59 PM . You may use any remaining late days on the submission of your final compiler.

Partners You will work in pairs, or groups of 3.

Phases The compiler will be broken down into individual phases. Each phase of the compiler will be assigned as we cover the relevant course material. These phases will be:

Phase	Points	Due Date
Lexical Analysis	10	1/31
Parsing	15	2/14
Semantic Analysis	15	3/7
Frame Analysis and Intermediate Representation	10	3/21
Instruction Selection	10	3/28
Liveness Analysis	15	4/9
Register Allocation	15	4/18
Working compiler, produces assembly	10	4/24

Late Policy You begin the semester with 3 late days (days, not classes), and gain one additional late day after you submit Phases 2,4, and 6. You may use these as you see fit. Each phase is due at 11:59:59 PM on the date listed above. We will grant 15 minutes of "grace" to account for clock differences. Anything submitted after 12:15 AM on the next day uses an entire late day (no fractions). Late days are counted during weekends, but not during other school holidays (MLK, Spring break). Note that you may use late days to submit the final phase/entire compiler late if you have any remaining. You do *not* need to ask permission in advance, justify a reason, etc. to use late days: they are yours to use; there is no penalty for using them. There is no benefit to keeping leftovers.

Improvement When you submit each phase, the TA will grade it, and give you feedback. If you have problems that need to be addressed with a particular phase, you are encouraged to improve that phase before submitting your final compiler. Your grade-of-record on each phase will be the average of your grade on the initial turn-in of that phase, and the grading of that phase in your final compiler submission. For example, if you earn an 8/10 on the lexer when you initially submit, but fix all of your problems in your final compiler (i.e., 10/10), you will receive a 9/10 on that phase in your grade calculation. If you improve a phase in your final submission **please inform your TA** so he can be sure to re-examine that phase.

Warning Writing a compiler is a large, complex project. Most of these phases require significant work. Do not wait until the last minute to start a phase.

Programming Language You will write your compiler in SML-NJ. You may not be familiar with SML-NJ, but it is an excellent language for writing compilers. There will be an "SML warmup" assignment at the start of the semester for a small portion of your overall grade. This assignment is due Thursday 1/24. As previously mentioned, you will do this individually, and you may *not* use late days for this assignment.

Exams

You will have one mid-term exam (in class, Thursday March 7th), and one final exam (during the scheduled final exam time slot). These exams will be individual effort. The exams will be closed book/open notes.

Cheating Policy

Your work is expected to be your own (exams) or your group's (projects). If you commit academic misconduct in this course and are caught, you will face the appropriate disciplinary procedures (undergraduates: referral to the Office of Student Conduct. graduate students: referral to the Associate Dean in charge of your program).

If you are unsure whether a certain course of action is permissible or not, please ask. If you think that asking is a bad idea because I would probably say "no," you can be fairly certain it is not permissible.