CS4655 Syllabus

Course Outcomes

1. Students will develop collaborative research skills.
2. Students will develop a good understanding of basic compiler analysis and optimization techniques.
3. Students will sharpen their skills in comparing and evaluating different compiler techniques with the intent of choosing among several techniques for inclusion into a production compiler.
4. Students will develop their skill in adding to existing software.
5. Students will be able to design, implement and write about experimental compiler research in a professional manner.
6. Students will develop skills in professional oral presentation of their work.

Course Topics

Control Flow and Data Flow Analysis

"Traditional" Program Transformations

Register Assignment

Data Dependence Analysis

Instruction Scheduling Optimizations

Re-targetable compilers

Current research papers

Course Organization

Students will work in a collaborative environment throughout the term, including compiler design, implementation, and mastering of compiler analysis and optimization techniques.

Some (much) of the classic analysis and optimization techniques material will use a "flipped classroom" approach.

The early part of the course will investigate traditional compiler optimization techniques.

A portion of the course will include discussion of current research papers in the field of compilers.

A major portion of each student's efforts will be directed towards experimental work based upon implementation of optimization technique(s).

Grading

Experimental compiler study. This will entail a proposal implementation, gathering of experimental data, and a "conference" paper. — 40% of the grade

Presentation of experimental compiler study — 10% of the grade. (Presentations to take place during the regularly scheduled finals time)

Participation in class discussion — 10% of the grade

Homework — 20% of the grade.

A written test over compiler optimization and analysis — 20% of the grade. (This will be the only part of the course that is not collaborative.)