

Course Information

Time and place

Place: HRBB 126
Time: Tuesday, Thursday, 2:20 – 3:35 pm
Pre-requisite: CPSC 434 or equivalent
Working knowledge of C++

Course personnel

Instructor: Lawrence Rauchwerger
Office HRBB 425E
email: rwerger
Phone 845 - 8872
Hours TBA
Grader: Maikel Pennings
Office HRBB 419 A
email: pennings@cs.tamu.edu

Course Materials

Lecture Notes: parasol.tamu.edu/people/rwerger/Courses/605
News group news.tamu.cpsc605
Project Description MiniPolaris:<http://parasol.tamu.edu/people/rwerger/MiniPolaris.html/>

Text Book

A. Aho, R. Sethi, J. Ullman, M. Lam *Compilers: Principles, Techniques and Tools, 2nd edition* Addison-Wesley Publishing Company, New York, New York, 2006.

Ken Kennedy, Randy Allen, *Optimizing Compilers for Modern Architectures: A Dependence-based Approach*, Morgan Kaufmann, 2001. ISBN: 1558602860.

Michael Wolfe, *High Performance Compilers for Parallel Computing* Addison-Wesley Publishing Company, New York, New York, 1995.

Steven Muchnick, *Advanced Compiler Design & Implementation*, Morgan Kaufmann, San Francisco, CA, 1997.

Additional readings will be made available.

Tentative Grading

Assignments	Pass/Fail%
Midterm:	25%
Final:	25%
Project:	50%

There will be written assignments. In general, no late assignments are accepted. Projects will represent the stepwise implementation of optimizations within MiniPolaris restructuring compiler.

Tentative Topics

1. Introduction. Overall compiler organization Overview of optimizations
2. Basic block code generation and optimization
3. Control flow. Control flow graphs and reducibility, normalization.
4. Fundamentals of data flow analysis.
5. Intro to Interval Analysis
6. Loop optimizations (scalar).
 - loop invariant expression
 - strength reduction
7. Data dependence and optimizations. Automatic detection of parallelism.
8. Static single assignment (SSA) and its use in loop optimizations.
9. Source-to-source restructurers for multiprocessors.
10. Effectiveness of compiler transformations.

Project Collaboration Policy

Students can exchange information about class assignments by asking questions and answering on the news group. However each project is to be coded individually - No code sharing is allowed and heavy penalties may result if projects “look similar”.