

COP5622 Advanced Topics in Compilation
Tentative Schedule - Fall 2007

- 8/27 General Introduction, Introduction to Compiler Optimizations
- 8/29 Overview of VPO
- 9/3 No Classes (Labor Day)
- 9/5 Overview of VPO (cont.), Branch Chaining, *Discuss Branch Chaining Project*,
Useless Jump Elimination, Unreachable Code Elimination, Merging Basic Blocks
- 9/10 Basic Block Reorganization, Branch Reversal, *Discuss Branch Reversal Project*,
Instruction Selection, Instruction Simplification
- 9/12 Machine Descriptions, Evaluation Order Determination, Dataflow Analysis,
Live Variable Analysis, *Discuss Live and Dead Variable Analysis Project*
- 9/17 Global Instruction Selection, Register Assignment, Dominators, Loops,
Discuss Loop Detection Project, Reducible Flow Graphs
- 9/19 Register Allocation, *Discuss Register Allocation Project*
- 9/24 Register Allocation in VPO (cont.), Copy Propagation, Constant Propagation,
Dead Assignment Elimination, *Discuss Copy Propagation and Dead Assignment Elimination Project*,
Peephole Optimizations, *Discuss Peephole Optimization Project*
- 9/26 Local Common Subexpression Elimination (CSE),
Discuss Local Common Subexpression Elimination Project,
Global CSE
- 10/1 Loop Invariant Code Motion,
Discuss Loop Invariant Code Motion Project, Induction Variables
- 10/3 Loop Strength Reduction, Basic Induction Variable Elimination
Instruction Scheduling, Filling Delay Slots,
Discuss Filling Delay Slots Project

- Other Compiler Optimizations

- 10/8 Loop Reordering Transformations, Loop Restructuring Transformations,
Memory Access Transformations
- 10/10 Function Call Transformations, Exploitation of Architectural Features

- Student Paper Presentations of My Research

- 10/15 Present "Avoiding Unconditional Jumps by Code Replication"
Present "Isolation and Analysis of Optimization Errors"
- 10/17 Present "Isolation and Analysis of Optimization Errors"
Present "Avoiding Conditional Branches by Code Replication"
- 10/22 Present "Coalescing Conditional Branches into Efficient Indirect Jumps"
Present "Improving Performance by Branch Reordering"
- 10/24 Present "Improving Performance by Branch Reordering"
Present "Improving Memory Hierarchy Performance for Irregular Applications"
- 10/29 Present "Branch Elimination via Multi-Variable Condition Merging"
Present "Tuning High Performance Kernels through Empirical Compilation"

Student Paper Presentations of Other Research

- 10/31 Present "Profile Guided Code Positioning"
- Present "Scalable Cross-Module Optimization"
- 11/5 Present "Scalable Cross-Module Optimization"
- Present "Cache-Conscious Structure Definition"
- 11/7 Present "Enhanced Code Compression for Embedded RISC Processors"
- Present "Dynamo: A Transparent Runtime Optimization System"
- 11/12 No Classes (Veteran's Day)
- 11/14 Present "Dynamo: A Transparent Runtime Optimization System"
- Present "OS and Compiler Considerations in the Design of the IA-64 Architecture"
- 11/19 Present "Code Placement for Improving Dynamic Branch Prediction Accuracy"
- Present "Rapidly Selecting Good Optimizations Using Performance Counters"

Compiling for Embedded Design Constraints

- 11/21 Introduction and Decreasing Code Size
- 11/26 Reducing Energy Consumption
- 11/28 Improving Worst-Case Execution Time and Supporting User Tuning of Embedded Applications
- 12/3 No Class
- 12/5 No Class
- 12/10 Aggressive Compilation Systems