15-745: Optimizing Compilers, Spring 2012
Exam Coverage Information

The exam is closed book, closed notes. Most of the questions on the exam will be short-answer questions.

Regarding the material that will be covered in the exam, the lectures have been broken down into the following three categories:

1. **Lectures that may be covered in depth:**

   - Lecture 2: Local Optimizations
   - Lecture 4: Data Flow Analysis: Examples
   - Lecture 5: Data Flow Analysis: Theory
   - Lecture 7: Common Subexpressions, Constant Folding
   - Lecture 8: Loop Invariant Code Motion
   - Lecture 10: Partial Redundancy Elimination
   - Lecture 14: SSA-Style Optimizations
   - Lecture 15: Register Allocation: Coloring
   - Lecture 18: List Scheduling, Global Scheduling
     - Note: only *list scheduling* may be covered in depth (not global scheduling).
   - Lecture 20: Pointer Analysis
   - Lecture 26: Locality Analysis
   - Lecture 28: Array Dependence Analysis

2. **Lectures where you may see one or two high-level questions** *(to demonstrate that you understood some of of the key high-level points of the lecture)*:

   - Lecture 9: Induction Variables, Strength Reduction
   - Lecture 11: Lazy Code Motion
   - Lecture 12: Region-Based Analysis
   - Lecture 13: Intro to Static Single Assignment (SSA)
   - Lecture 16: Register Allocation: Spilling
   - Lecture 17: Intro to Instruction Scheduling
   - Lecture 19: Software Pipelining
   - Lecture 25: Memory Hierarchy Optimizations
   - Lecture 27: Prefetching

3. **Lectures that will not be covered on the exam:**

- Lecture 1: Overview of Optimizations
- Lecture 3: The LLVM Compiler: Getting Started
- Lecture 6: The LLVM Compiler: Further Details
- Lecture 21: Dynamic Code Optimization
- Lecture 22: Recent Research on Optimization I
- Lecture 23: Recent Research on Optimization II
- Lecture 24: Recent Research on Optimization III
- Lecture 29: Thread-Level Speculation