ECE 459: Programming for Performance
Midterm Information

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First, the logistical information.

- **Date:** Wednesday, February 27
- **Time:** 19:00 to 20:20
- **Place:** RCH 301/309

Coverage. I may ask questions about all of the material up to Lecture 12. Lecture notes for Lectures 13 and 14 may also be helpful (I expand on some of the material I've previously discussed), but all of the answers should be in the notes for Lectures 1 through 12.

Format. There are four questions on the exam. The first question is short-answer, while the other three are multiple-part questions with longer answers. Some of the questions do involve writing code. Since you don't have access to a compiler, I won't be picky about syntax, but I do expect you to use the correct concepts.

Topics. We saw the following concepts in class. Some will be on the exam.

- Bandwidth versus latency.
- Calculating speedups and maximum speedups: Amdahl's Law and Gustafson's Law.
- Concurrency vs Parallelism.
- Threads: Pthreads, simple locks, synchronizing threads, race conditions.
- Working with the compiler.
- Dependencies.
- Breaking dependencies: speculative execution, value speculation.
- Parallelization patterns.
- Automatic parallelization.
- OpenMP.
- Memory models, reordering, fences and barriers, atomic instructions.