CS-522 - Spring 2008
Computer Organization and Architecture
MW: 5:10 – 6:40, room SL 210

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Class web page: http://www.cs.binghamton.edu/~dima/cs522

Course goals:
• To develop a thorough understanding of critical timing issues and complexities involved in the design of modern high-performance microprocessors and memory systems
• To acquire the skills of working with realistic cycle-accurate processor simulators

Topics to be covered:
• Basic pipeline theory
• Instruction pipelines: forwarding, dynamic scheduling, register renaming, speculative execution
• Software scheduling: software interlocking, software pipelining, loop unrolling
• Supporting precise interrupts in the out-of-order pipelines
• Advanced branch handling techniques
• Issues in superscalar processor design
• Memory systems: DRAMs, caches, virtual memory, TLBs, trace caches.
• VLIW and EPIC architectures
• Introduction to multicore and multithreaded architectures
• Case studies.

Text:

Assessment:
There will be two exams: a midterm and a final, both in class. Theoretical homework assignments and programming assignments will also be given out on an as-needed basis. At the end of the semester, final projects will have to be submitted. Programming assignments and final projects will be performed using the cycle-accurate simulator of a fairly realistic out-of-order superscalar microprocessor. The simulator source code will be available on the class web page sometime in February. The goal of the programming assignments is to make you comfortable with using the simulator, while the final projects (to be done in groups of two) will involve the evaluation of the more complex ideas.

Grade distribution:
• Midterm Exam - 25%
• Final Exam - 25%
• Homework Assignments - 20%
• In-class Quizzes – 10%
• Final Project - 20%

Homework preparation and submission policy:
All homework and programming assignments will have to be turned in at the end of the class on the due date. No late submissions will be accepted. You can discuss the assignments and help each other understand the ideas, but the work must be done individually.