CSE 471: Computer Design and Organization
Fall 2004
Lectures: MWF 1:30-2:20 MEB 242
Section: Th 1:30-2:30 MOR 234

Instructor

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TA

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Course Material

The purpose of this course is to give you a broad understanding of the concepts behind several advanced microarchitectural features in today's microprocessors and to illustrate those concepts with modern machine examples. We will cover the rationale for and the designs of strategies for dynamic branch prediction, multiple-instruction issue, dynamic (out-of-order) instruction scheduling, multithreaded processors, shared memory multiprocessors, and, if there is time, dataflow machines. The machine examples will be taken from the latest processors from Intel, MIPS and Sun. Some of these topics you covered to some extent in 378; for these, we'll briefly review that material, and then go on from there.

You will augment your knowledge of the architectural schemes by doing experimental studies that examine and compare the performance of several alternative implementations for a particular feature. Here you will learn how to design architectural experiments, how to choose metrics that best illustrate a feature's performance, how to analyze performance data and how to write up your experiment and results – all skills you will need if you plan to do computer evaluation either in development or research, and in any applied subfield of computer science, not just computer architecture.

You must have already taken 370 and 378 in order to take this class.

Reading

All reading assignments will taken from *Computer Architecture: A Quantitative Approach* by John L. Hennessy & David A. Patterson, Morgan Kaufmann, 2003. To get the most out of the lectures, read the material *before* topics are discussed in class. There will also be some supplementary reading that you will be able to access from the course web pages.

Exams

There will be a midterm and a final. The final will cover material from the second part of the course, and will be more like a long midterm than a final.

Projects

The projects will be experimental studies that will give you experience in evaluating architecture features and hone your intuitions about the performance ramifications of changing certain aspects of their implementation. Experiments will be done using the SimpleScalar simulator. In the discussion sections Douglas will explain how to use the simulator.

You'll be working in teams of at least two students for each project. (Teams may be larger, depending on class size.) You should be with a different partner(s) for each assignment.

All project reports are due at the beginning of class; no late assignments will be accepted.

Machines

We'll be using attu, a cluster of four Dual Pentium IV 2.8GHz Xeon servers that are comprised of 4GB memory and run Linux 2.4.26. You may use the workstations in AC 002, AC 006 or AC 022 to log into attu. Alternatively you may use other computers to log in.

Grading

Grades will be computed using the following **approximate** weighting: midterm = 25%, final = 30% and projects = 45% for all. This may change, depending on the size of the projects.

Collaboration

Discussing the course content with fellow students is an effective way to learn the material, and is encouraged. However, exams must represent your own mastery of the material, and projects must represent the contribution of your team.

Communicating

We will communicate a lot through e-mail. Douglas and I will be mailing out assignments and clarifications of the assignments, if needed. And you should use e-mail for asking and answering each others' questions. (But if you have questions that need a detailed or long explanation, it would be much easier to come to our office hours.) Therefore you should register on the class mailing list **immediately**. To add yourself to the class email list (once it's set up), you can visit http://mailman.cs.washington.edu/mailman/listinfo/cse471. Alternatively you can email cse471-request@cs.washington.edu with the word "help" in the subject to return a message listing all of the email command options. The list archives can be accessed by clicking on the very first URL on the list "home page" http://mailman.cs.washington.edu/mailman/listinfo/cse471. The direct link is http://mailman.cs.washington.edu/mailman/private/cse471