Computer Design and Organization

Where and When

Lectures: MWF 130-220 MOR 221

Sections: Th 130-220 MOR 225

Instructor

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Teaching Assistants

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Course Goals and Material to be covered

The purpose of this course is to present the concepts used for the architectural
design of modern microprocessors. Building on the knowledge of pipelining and
cache memories (as covered in CSE 378 for example), we will present features
that enhance the performance of computer systems. In particular we will look
at branch prediction, multiple instruction issue, the exploitation of instruction
level parallelism through out-of-order processing, multithreading, and cache hi-
erarchy optimizations. If time permits, we will look at VLIW (very large in-
struction word) instruction set architectures, shared-memory multiprocessors,
and/or modern memory structures.

We will illustrate some of these concepts with examples drawn from some recent
microprocessors from (in alphabetical order) Compaq now HP (ex-DEC), IBM,
Intel, MIPS, Sun etc.

Studies of the performance of various architectural schemes will be conducted
through the use of a simulator written by Mark OSkin and Steve Swanson, *Bliss*.

Text:

J.Hennessy and D.Patterson *Computer Architecture: A Quantitative Approach*
3rd Edition, 2002

Additional survey papers from the literature might be distributed.

Documentation on Bliss will be available on-line (cf. the CSE471 course home
page).

Assignments:

The assignments will be a mixture of experiments using Bliss (how to run it will be explained in Sections), programs and "paper and pencil" exercises.

These assignments will be done in teams of 2 or 3 (depending on class size). You should have different partner(s) for each assignment.

Late assignments will not be accepted.

Exams:
Alas, there will be some: 1 midterm and 1 final.

Grading:
Assignments 60%; midterm 15%; final 25%. These percentages are approximate. Intangibles may arise. Class participation is a bonus. (Class participation is strongly encouraged. Don't be afraid to ask questions: by definition, there are no dumb questions. If I ask you a question and you don't know, just say so. That's no problem. I will certainly answer some of your questions also by "I don't know!".)

e-mail and WWW
We will have a class mailing list and we will communicate often through e-mail. Feel free to send the TA's or me questions. We will forward questions and answers to the whole class if appropriate. Check the CSE471 home page frequently.