

Computer Design and Organization

Where and When

Lectures: MEB 248 MWF 10:30-11:20

Sections: MEB 248 Th 10:30-11:20

Instructor

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Office hours: M 1:30-2:30 F 2:30-3:30 or by appointment.

Teaching Assistants

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Office hours: TBA

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 hierarchy optimizations. If time permits, we will look at VLIW (very large instruction 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 (ex-DEC), IBM, Intel, MIPS, Sun etc.

Studies of the performance of various architectural schemes will be conducted through the use of a simulator *SimpleScalar*.

Text:

D.Patterson and J.Hennessy *Computer Architecture: A Quantitative Approach*
2nd Edition, 1996

Additional survey papers from the literature might be distributed.

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

Assignments:

The assignments will be a mixture of experiments using SimpleScalar (how to run it will be explained in Sections) and of “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.