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CS/ECE 752: ADVANCED COMPUTER ARCHITECTURE I

(Fall 1994-1995)

Course Handout

Computer architecture is the science and art of selecting and interconnecting hardware components to create a computer that meets functional, performance and cost goals. This course qualitatively and quantitatively examines computer design tradeoffs. We will learn, for example, why new instruction sets are no longer simple RISCs, how pipelining and superscalar interact, and when caches should handle multiple requests concurrently.

Examining tradeoffs requires that you already know how to design a correct computer, as is taught is the important prerequisite CS/ECE 552. CS 537 is also a prerequisite, but it is less important, and may be taken concurrently or adequately covered with external reading.

Online Information

Most course information will be available online in directory `/p/course/cs752-markhill/public/` or WWW URL `http://www.cs.wisc.edu/p/course/cs752-markhill/public/cs752.html`; this document is in `outline.ps`.

Instructor

Name:	Mark D. Hill
Office:	6373 CSS, markhill@cs.wisc.edu
Office hours:	10:30–11:30 Tuesday, 1:15–2:15 Friday, or by appointment

Teaching Assistant

Name:	Mo Shen
Office:	1351 CSS, mshen@cs.wisc.edu
Office hours:	9:30–10:30 Monday, 4:00–5:00 Thursday, or by appointment

Lecture

Time: 11:00–12:15 Monday, Wednesday, Friday (I have over-scheduled lectures so that we can cover more material early in the semester and have no class while you are working on your project; this class should only meet twice per week.)

Place: 213 Commerce (**NOT as in timetable**)

Required Course Material

- John L. Hennessy and David A. Patterson, *Computer Architecture: A Quantitative Approach*, Morgan Kaufmann Publishers, Beta of 2nd Edition, 1994.
- Readers containing selected papers will be available during the semester from DoIT.
- Some lecture notes will be available on-line shortly before class.

Reference Course Material

- J. Hennessy and D. Patterson, *Computer Organization and Design: The Hardware and Software Interface*, 1993.
- Siewiorek, Bell and Newell, *Computer Structures: Principles and Examples*, 1982.
- H. Stone, *High-Performance Computer Architecture*, 1993.

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Project

The default project is to do some original research in a group of three students. For example, you could examine a modest extension to a paper studied in class or simply re-validate the data in some paper by writing your own simulator. Alternatively, you may work in a group of two to write a paper that surveys an area within computer architecture. Projects will include an oral presentation and a paper.

Examinations

There will be two midterm exams, but no final exam. The midterms are listed in in the Approximate Outline. Please advise me of any conflicts with these likely exam times before the end of the second week of classes.

Homework

There will be several assignments. Many assignments will require the review of material that is touched upon, but not covered in depth in class. Assignments will not be weighted equally. The approximate weights of each assignment will be specified when the assignment is handed out. Assignments will be due in class on the due date. NO LATE ASSIGNMENTS WILL BE ACCEPTED, except under extreme non-academic circumstances discussed with the instructor at least one week before the assignment is due.

Grading

Homework	20%	Midterm 1	25%
Project	30%	Midterm 2	25%

Incompletes and Academic Misconduct

University policy on incompletes and academic misconduct will be followed strictly.

Approximate Outline

Week of	Mon	Wed	Fri	Chapter(s)
9/2	—	—	intro	1
9/5	—	performance	instrn sets	2, 3
9/12	instrn sets	instrn sets	mem. systems	3, papers 6
9/19	mem. systems	mem. systems	mem. systems	6, papers
9/26	mem. systems	mem. systems	review	papers
10/3	—	—	midterm1	
10/10	ILP	cont.	cont.	4
10/17	ILP	cont.	cont.	5
10/24	ILP	cont.	cont.	papers
10/31	storage	cont.	connect	7, 8
11/7	connect	multi	review	8, 9
11/14	—	—	midterm2	
11/21	—	—	—	
11/28	—	—	—	
12/5	talks	talks	talks	
12/12	talks	talks	—	
12/19	project due	talks	—	