CS 472 Computer Architecture

Fall Semester 2012 / Monday nights 6-9:00 p.m.

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Text: David A. Patterson and John L. Hennessy
Computer Organization & Design: The Hardware/Software Interface
Revised Fourth Edition (ISBN 978-0-12-374750-1)

Prerequisites: MET CS231 or CS232
Some assembly language is helpful but not mandatory.

Objectives: Enable you to understand the internal workings of computers, what makes them fast and what the primary design challenges are.

Grades: There will be a midterm (30%) and a final (40%) which will together account for 70% of the grade. There will be also three programming projects (in the language of your choice) for the other 30%.

In general, an "A" will be awarded for work that totals 92-100% of the possible points, "A-" for 90-92%, "B+" for 88-90%, "B" for 82-88% and so on down to F for below 60%. Grades may be scaled upwards based on class scores, but not downwards.

Grades are YOUR responsibility. If you need a particular grade to get into the M.S. program, receive tuition reimbursement or stay academically eligible, then it is YOUR responsibility to perform at that level. "A" work will get you an "A" and "F" work (or cheating) will get you an "F". There is an attempt to distinguish between exceptional work and that which falls short of that level.

Exams: You must take the exams at the scheduled time. If there is no way that you can take it at the scheduled time, you MUST take the exam BEFORE the rest of the class. No exceptions. If you are a "no show" you get a zero.

Exams are closed book, with no notes. However, reference material from the text is provided to make the test one of your understanding rather than photographic memory. The focus is on thorough comprehension of the concepts, not mindless memorization of trivia.

Ethics: I try to be friendly and to inject humor into the lectures, but don't mistake that for anything less than a zero-tolerance policy toward cheating. YOU CHEAT, YOU FAIL. Additional punishment can be as severe as expulsion, subject to procedural review.

All projects in this course are INDIVIDUAL. Feel free to discuss ideas with your classmates, but **any** shared code will mean an F for the course. **No exceptions!** It is not acceptable for someone else to do your work, whether that be a classmate, a spouse or anyone. Do not share even one line of code.

Incompletes: Incompletes will be given only in the case of serious emergencies or other documented extenuating circumstances clearly beyond the student's control. Incompletes will NOT, repeat NOT, be given to students who abandon the class, students not satisfied with their grade, students who are too busy to complete the work on time and students who miss the final exam.

Availability: I will do my best to make myself available to you. I have provided my email address and phone number and encourage you to use them as long as you have consulted your textbook and notes first.

Weather: Call (617) 353-SNOW if you have any questions about whether class will be held. I don't expect snow this semester. ☺ If that number says that BU is open, we will have class.

SCHEDULE

Date	Topics	Related Reading
Sep 10	Course Overview, Number systems, Signed numbers, Characters	Chapter 1 (skim), 2.4, 2.5, 2.9
Sep 17	MIPS Instructions - Assembly Language and Internal Representation *First project assigned: Due Oct 9*	Chapter 2 (skip asm programming)
Sep 24	Measuring Computer Performance, CISC/RISC The Memory Hierarchy - Caches (Part 1)	Chapter 1.4 Chapter 5 (ignore math re performance)
Oct 1	The Memory Hierarchy - Caches (Part 2), *Second project assigned: Due Nov. 12*	
Oct 9	(TUESDAY) The Memory Hierarchy - Virtual Memory, Start-of-the-Art Cache extensions	
Oct 15	The Processor: Datapath and Control	Chapter 4
Oct 22	MIDTERM EXAM	
Oct 29	Midterm Discussion, Pipelines (Part 1)	Chapter 4
Nov 5	Pipelines (Part 2) *Third project assigned: Due Dec 10*	
Nov 12	Advanced Architectures - Superscalar, Superpiplining...	
Nov 19	Parallelism, Multicores, OS Concepts	Chapter 7
Nov 26	OS Concepts , Logic Design, Computer Arithmetic and ALUs	Chapter 3, App. C: pp. 1-19, 26-47
Dec 3	Input/Output Subsystems	Chapter 6
Dec 10	Final Exam Review	
Dec 17	FINAL EXAM	