CIS 8542 - Computer Architecture
Fall 2010
Monday & Wednesday 3:30 - 4:50 PM
Classroom: TL302

Instructor: Shan Lin
Instructor Office Location: Wachman Hall 1039
Instructor Office Hours: Tuesday & Thursday 10 - 11 AM or by appointment

Course Overview:
This course will introduce computer architecture and organization with an emphasis on the parallel and modern microprocessors. This course will cover the fundamentals of processor core, the memory system, and design issues when we interconnect them to build a multiprocessor system. The course material is drawn from textbooks as well as classic papers from computer architecture conferences and journals.

Course Topics:
• Basics of pipelining
• Hazards and exceptions
• Multi-cycle pipelines and implementing precise interrupts
• Superscalar processor design
  – Fetch and decode issues; branch prediction
  – Register renaming
  – Dynamic instruction scheduling
  – Load/store unit design and memory dependence prediction
• Memory-system design
  – Basics of caches, virtual memory, and main-memory design
  – Victim caches, prefetching, and stream buffers
• Multiprocessor concepts
  – Multiprocessor taxonomy and communication models
  – Coherence and consistency
• Storage system
• Networked and embedded system

Grading:
Homework 30%
Midterm 30%
Final Project 40%

Mandatory Prerequisites:
This course on computer architecture assumes prior knowledge of computer organization and architecture. You should already be familiar with hardware basics, instruction set architecture, pipelines, computer arithmetic, and digital logic. Students will have expected to have had a course that covers the material in a textbook/course such as Patterson and Hennessy's "Computer Organization and Design: The Hardware/Software Interface".
Required Textbook:

Supplemental Textbook:
D. A. Patterson and J. L. Hennessy's "Computer Organization and Design: The Hardware/Software Interface", Elsevier/Morgan Kaufmann.


Reading List:

Exams
There will be a mid-term exam and a final exam. The mid-term exam will be held in mid Oct; the final exam will be cumulative and will be held in mid Dec.

Honor Policy:
Because of the Honor System at the Temple University, I assume students in this class will be truthful in their dealings with me.

Some specific rules:
• All exams, homework, and project assignments are subject to this Honor policy. This means that placing your name on an exam or an assignment implicitly pledges that you abided by the terms of this policy.
• The homework assignments are to be done alone. Any malpractice (e.g., reporting fraudulent data, copying another student’s solution, plagiarism) will be treated as an Honor Code violation.
• The exams are obviously to be done alone. For open-book exams, you may use your notes, the textbooks listed in the syllabus, and the papers in the course reading list. You are not to consult any other references or notes, let alone people or online resources.
• For the project, collaboration with other people or groups is allowed, but collaboration does not mean copying each others’ solutions. Such collaboration should be limited to discussing concepts. You must understand the project that you turn in and be able to explain and defend it.

Finally, if you have any questions about appropriate behavior, please see me.