EE 7700-3: Advanced Computer Implementation

Where/When/How/URL
3141 CEBA Building, Monday Wednesday Friday 13:40–14:30, Spring 2005
Call Number 7426, http://www.ece.lsu.edu/tca/

Who
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Tentative office hours: Monday–Friday: 9:00–10:00.

Prerequisites
By Course: Credit or registration in EE 4720 or equivalent.
By Topic: Computer architecture and digital logic must be thoroughly understood. Students must also have a familiarity machine language and C programming and the basics of operating systems.

Topics
- Computer Simulation and Instrumentation
- Limit Studies
- Machine Organizations for Explicit Parallelism
  - Grid, distributed, cluster, multiprocessor (single-core chips), multiprocessor (multi-core chips), simultaneous multithreading (hyperthreading).
- Instruction Fetch Techniques
  - Multiple branch prediction / multi-ported instruction cache.
  - Trace Caches
- Critical Path Compression
  - Dynamic Re-compilation, Optimization Caches
  - Value Prediction, Computation Re-Use
  - Master/Slave Speculative Parallelization
- Out-of-Order Fetch, Pre-execution
  - Out-of-Order Fetch (Multiscalar, IMT, Skipper, etc.)
  - Pre-Execution
- Memory Techniques
  - Store/Load Dependence Prediction
  - Prefetching and address prediction.
- Multiprocessor Memory
  - Memory Models (eg, sequential consistency)
  - Coherence and Memory Model Implementation

Topics subject to change.

Text
Recommended: “Computer architecture, a quantitative approach,” John L. Hennessy & David A. Patterson, Third Edition; only one or two chapters used. Papers and other references.

Grading
35% Midterm Exam • 35% Final Exam • 30% Homework and Projects
Final exam weight may be increased for a student who shows significant improvement on the final exam.

Late assignment penalty: 10% per day late deducted. Missed-midterm-exam policy: at instructor’s discretion either a makeup exam, use final exam grade for midterm grade (i.e., 70% final exam weight), or use of zero for midterm grade. Daily attendance: optional, however students are responsible for all material, instructions, and notices presented in class.