Spring 2007

CEG 720-01: Computer Architecture I

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Catalog Data: Review of sequential computer architecture and study of parallel computers. Topics include memory hierarchy, reduced instruction set computer, pipeline processing, multiprocessing, various parallel computers, interconnection networks, and fault-tolerant computing. 3 hours lecture and 2 hours lab.

Prerequisite: CEG633, or CEG520 and CEG611
Prerequisite Topics: Process management, CPU scheduling, Memory management, Cache management, Disk management. If not familiar with these topics, take CEG433/633 (Operating Systems) first.

Instructor: Dr. Soon M. Chung, 403 Russ Engineering Center (775-5119)
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Class: Tu. Th. 4:10-5:25 pm at 341 Oelman

Office hour: Tu, Th. 2:20-3:00 pm at 403 Russ, or by appointment.
*use e-mail for short questions.


References:

Topics: Overview of computer architecture and parallel processing (Handout)
- Instruction-level Parallelism (Chapter 2)
- Limits on Instruction-level Parallelism (Chapter 3)
- Multiprocessors and Thread-Level Parallelism (Chapter 4)
- Memory Hierarchy Design (Chapter 5, Appendix C)
- Interconnection Networks (Appendix E)
- Storage Systems (Chapter 6)
- Pipelining (Appendix A)

Grading: A:[85,100], B:[75,85), C:[65,75), D:[55,65), F:[0,55)
Midterm 30% (5/8, Tu.)
Final 40% (6/5, Tu. 5:45-7:45 pm)
Paper-review project 30% {papers referenced 7%, organization 6%, written presentation 8%, discussion 9%}
CEG 720 Project

1. Choose a topic and select at least 5 relevant technical papers. High-quality journal papers are preferred.
2. Summarize and compare the papers, and then add your own discussion.
3. Submit the working title and the list of candidate papers. (due 5/10)
4. Present in the class (?), and submit the report and the papers you studied. (due 6/5)
5. Size of the report is between 25 and 35 double-spaced pages.
6. This project can be done as an individual project or a team (of two) project.

Possible Topics

- Multiprocessor cache management
- SIMD, MIMD machines
- Fault tolerant computing
- Parallel algorithms
- Performance evaluation of parallel computers
- Interconnection networks
- Cluster and GRID computing
- RISC/CISC processors
- Reconfigurable array of processors
- Optical computing
- Application specific architectures
- Realtime computer systems
- Artificial neural network
- Other relevant topics

Reference Sources

- IEEE Transactions on Computer
- Computer (IEEE Computer Magazine)
- Communications of ACM
- IEEE Tutorials, such as Tutorial on computer architecture, on supercomputing, etc.
- Proceedings of Int’l Conf. on Parallel Processing
- Journal of Parallel and Distributed Computing
- ACM Transactions on Computer Systems
- IEEE Transactions on Parallel and Distributed Systems
- ACM Computing Surveys
- ACM/Springer Multimedia Systems
- IEEE Multimedia
- ACM Transactions on Modeling and Simulation
- IEEE Transactions on Knowledge and Data Engineering
- IEEE Transactions on VLSI
- IEEE Transactions on Neural Networks
- IEEE Micro
- Journal of Supercomputing
- and others