

Fall 2007

# CEG 720: Computer Architecture I

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# CEG 720 Computer Architecture I

Fall Quarter, 2007

*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)  
soon.chung@wright.edu, <http://www.cs.wright.edu/~schung>

**Class :** M. W. 4:10-5:25 pm at 350 Oelman

**Office hour :** M, W. 2:30-3:30 pm at 403 Russ, or by appointment.  
\*use e-mail for short questions.

**Text Book :** Handouts; and J. L. Hennessy and D. A. Patterson, Computer Architecture, 4th edition, Morgan Kaufmann, 2007.

## References :

K. Hwang, Advanced Computer Architecture: Parallelism, Scalability, and Programmability, McGraw-Hill, 1993.  
A. Silberschatz, P. Galvin, and G. Gagne, Operating System Concepts.

**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% (10/15, M.)

Final 40% (11/16, F., 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 10/22)
4. Present in the class (?), and submit the report and the papers you studied. (due 11/16)
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
- Proceedings of Int'l Symposium on Computer Architecture: available in the volumes of Computer Architecture News
- 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