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Winter 2012

### CS 701-01: Database Systems and Design

Soon M. Chung

*Wright State University - Main Campus, soon.chung@wright.edu*

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## CS 701 Database Systems and Design

Winter Quarter, 2012

**Description:** Introduction of DB design concepts and operating principles of database systems.

**Prerequisite:** CS405/605 or equivalent.

**Instructor:** Dr. Soon M. Chung  
403 Russ Center, (937)775-5119  
soon.chung@wright.edu, <http://www.cs.wright.edu/~schung>

**Class:** M., W. 8:00-9:15 p.m., 153 Russ.

**Office hour:** M., Tu, 4:30-5:30 pm at 403 Russ Center, or by appointment.  
\* Use e-mail for short questions.

**Text Book:** R. Elmasri and S. B. Navathe, Fundamentals of Database Systems, 6th (or 5th) edition, Addison-Wesley.

**Topics:** File Structures and Hashing (Ch. 17)  
Indexing Structures for Files (Ch. 18)  
Relational DB Design Theory and Normalization (Ch. 15, 16)  
Query Processing and Optimization (Ch. 19)  
Transaction Processing, Concurrency Control and Recovery (Ch. 21, 22, 23)  
Enhanced ER Modeling (Ch. 8, Section 9.2)  
Object-Oriented Databases (Ch. 11)  
Distributed Databases (Ch. 25)  
Database Security(Ch. 24)

**Grading:** A:[85,100], B:[75,85), C:[65,75), D:[55,65), F:[0,55)  
Midterm 30% (on 2/13, M.), Final 40% (on 3/16, F. 6:30-8:30 p.m.), and Project 30%.  
Project is either paper-review or DB Transaction programming (select by 2/20)

(1) paper-review project 30%

{ papers referenced 7%, technical quality of the report 7%  
written presentation of the report 7%, discussion 9% }

- submit the topic and a list of selected papers by 2/20.
- submit the final report (around 25 pages in double space) by 3/16.

(2) DB Transaction programming 30%

{ specification 7%, design 7%,  
correctness 7%, discussion 9% }

- submit a description of database and transactions by 2/20.
- submit the final report by 3/16.

## CS 701 Programming Project

1. Design and implement a database (with at least 3 tables) for an application of your choice.
2. Design a set of transactions which are meaningful for your database and application. The minimum number of transactions is 3. Each transaction can be implemented in C, C++, Visual Basic, Java, or any other high-level language that can embed SQL statements.
3. Chapter 13 describes how to embed SQL statements in programs. An example of embedding SQL queries in Java program for an MS Access DB is available at <http://www.cs.wright.edu/~schung/cs701.htm>
4. Run the transactions and print the results.
5. Your final report should include the followings:
  - ER diagram and Relational schema of your database.
  - Printout of the content of data tables
  - Description of your transactions, including the input data, output data, functionality, etc.
  - Printout of the transaction programs.
  - Printout of the transaction results.
  - Discussion. Discussion can include your comments on the design and implementation, performance and functionality of the DBMS, future topics, etc.

# CS 701 Paper Review Project

## Possible Topics

- Database access mechanism (such as indexing, hashing, etc.)
- Query optimization
- Concurrency control and recovery
- Parallel algorithms for query processing
- Performance evaluation of DBMS
- Database machines
- Distributed database
- Multidatabases (Federated databases)
- Expert database
- Logic and database
- Multimedia database
- Object-Oriented database
- Multimedia database
- XML database
- Text retrieval system
- Data mining
- Data warehousing
- Web database/services
- Other relevant topics

## Reference Sources

- IEEE Trans. on Software Engineering
- IEEE Trans. on Knowledge and Data Engineering
- Computer (IEEE Computer Magazine)
- Communications of ACM
- ACM Trans. on Database Systems
- ACM Trans. on Knowledge Discovery from Data
- ACM Trans. on Information Systems
- Information Systems
- Multimedia Systems (Journal by ACM and Springer International)
- IEEE Multimedia (Magazine by IEEE)
- Data and Knowledge Engineering (Journal)
- Data Mining and Knowledge Discovery (Journal)
- IEEE Tutorials, such as Tutorial on Database Systems, etc.
- Proc. of IEEE Int'l Conf. on Data Engineering
- Proc. of IEEE Int'l Conf. on Data Mining
- Proc. of ACM Conf. on Management of Data (SIGMOD Conference)  
refer to the volumes of SIGMOD RECORD
- Proc. of ACM Symp. on Principles of Database Systems (PODS)
- Proc. of Very Large Data Bases (VLDB) Conference
- IEEE Trans. on Parallel and Distributed Systems
- ACM Computing Surveys
- Proc. of Int'l Conf. on Knowledge Discovery and Data Mining  
and Others