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CS 801: Advanced Database Systems

Soon M. Chung
Wright State University - Main Campus, soon.chung@wright.edu

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Description: Introduction of current trends and research issues in database systems.

Prerequisite: CS701 or an equivalent.

Instructor: Dr. Soon M. Chung
403 Russ, 775-5119
soon.chung@wright.edu, http://www.cs.wright.edu/~schung

Class: M. W. 6:05-7:20 pm, 204 Fawcet Hall

Office hour: M. 4:30-5:30 pm, Tu. 2:30-3:30 pm at 403 Russ or by appointment.
*use e-mail for short questions.

Course Material: Technical papers on the following topics:
- Query Processing in Distributed Databases
- Replica Control in Distributed Databases
- Parallel Query Processing and Optimization
- Data Mining
- Spatial Databases
- HeterogeneousMultidatabases
- Multimedia Databases
- Logic and Databases
- Data Warehouse


Grading: A: [85, 100], B: [75, 85), C: [65, 75), D: [55, 65), F: [0, 55)
Midterm 30% (5/8 M), Final 40% (6/7 W, 8:00-10:00 pm), and Project 30%

Project: Either writing a research proposal or a design and implementation (select by 5/10)
Research proposal 30%
- papers reviewed 6%, technical quality 8%, written presentation 7%, originality 9%

Design project 30%
- design 8%, implementation and/or analysis 8%, written presentation 6%, discussion 8%
CS 801 Database Development Project

1. Design and implementation of a database or a database processing algorithm.

2. Possible topics are:

   • Object-Oriented database design and implementation, and then execute object-SQL queries or transactions on the database.

   • Design and implement a Web interface to your database (designed previously in CS605 or CS701). For example, Java applets can be implemented to accept user input, invoke queries/transactions on the DB, and return the result to the user.

   • Implement an algorithm and report the performance result. For example, a data mining algorithm or a parallel join algorithm can be implemented and executed on sample data.

3. Submit a description of your topic and a list of reference papers/documents. (due 5/10)

4. Detail description of design, implementation, result, and discussion must be included in the report.

5. Size of the final report is between 20 and 35 double-spaced pages. (due 6/7)

Technical 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 (Office) Information Systems
- Information Systems
- Journal of Data and Knowledge Engineering
- Journal of Knowledge Discovery and Data Mining
- IEEE Tutorials, such as Tutorial on Database Systems, etc.
- Proc. of IEEE Int'l Conf. on Data Engineering
- Proc. of ACM Conf. on Management of Data (SIGMOD Conference) refer to the volumes of SIGMOD RECORD
- Proc. of ACM SIGKDD Int'l Conf. on Knowledge Discovery and Data Mining
- Proc. of Int'l Conf. on Very Large Data Bases (VLDB)
- IEEE Trans. on Parallel and Distributed Systems
- ACM Computing Surveys
- ACM/Springer Multimedia Systems
- IEEE Multimedia
CS 801 Research Proposal Writing Project

1. Write a research proposal for design/implementation and/or performance analysis (based on
deterministic modeling, analytical modeling, or simulation).
2. Submit a description of your topic and a list of reference papers. (due 5/10)
3. Description of a research topic, background and problem statement, existing solutions, your solution
idea and/or approach with some justification, plans for design/implementation/performance analysis,
expected outcome, etc. can be included in the proposal.
4. Size of the final report is between 20 and 35 double-spaced pages. (due 6/7)

Possible Topics:
- Database models
- Database access mechanism (such as indexing, hashing, etc)
- Query optimization
- Concurrency control and recovery
- Parallel algorithms for query processing
- Performance evaluation of DBMS
- Distributed database
- Heterogeneous databases (Multidatabases)
- Expert database
- Logic and database
- Multimedia database (e.g. Image/video database)
- Object-Oriented database
- Engineering database
- CAD/CAM database
- Data mining
- Data warehouse
- 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 (Office) Information Systems
- Information Systems
- 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 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)
- Proc. of Int'l Conf. on Knowledge Discovery and Data Mining
- IEEE Trans. on Parallel and Distributed Systems
- ACM Computing Surveys
- ACM/Springer Multimedia Systems
- IEEE Multimedia