Computer Science & Engineering Syllabi   College of Engineering & Computer Science

Spring 2011

CS 801: Advanced Database Systems

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CS 801 Advanced Database Systems

Spring Quarter, 2011

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

Prerequisite : CS701 or an equivalent course.

Instructor : Dr. Soon M. Chung
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Class : Tu. Th. 6:05-7:20 pm, 208 Russ Center.

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

Course Material: Technical papers/chapters on the following topics:
    Database Recovery
    Enhanced ER Model
    Object-Oriented Database
    Query Processing in Distributed Databases
    Replica Control in Distributed Databases
    Parallel Query Processing and Optimization
    Data Mining
    Spatial Databases
    Heterogeneous Multidatabases
    Multimedia Databases
    Multidimensional Hashing

Reference Book : R. Elmasri and S. B. Navathe, Fundamentals of Database Systems,
      6th edition, Addison Wesley Co., 2011.

Grading : A:[85,100], B:[75,85), C:[65,75), D:[55,65), F:[0,55)
    Midterm 30% (5/5 Th), Final 40% (6/9 Th, 8:00-10:00 pm) and Project 30%

        Project is either writing a research proposal or a design and implementation (select by 5/12)
        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 5/12)

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 6/9)

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 Knowledge Discovery from Data
- ACM Trans. on Information Systems
- Information Systems (Journal)
- 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 SIGKDD Int'l Conf. on Knowledge Discovery and Data Mining
- Proc. of Int'l Conf. on Very Large Data Bases (VLDB)
- Knowledge and Information Systems (Journal)
- IEEE Trans. on Parallel and Distributed Systems
- ACM Computing Surveys
- ACM/Springer-Verlag Multimedia Systems
 and Others

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 5/12)

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 6/9)

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 a DB system
- Distributed database
- Multidatabase
- Multimedia database (e.g. Image/video database)
- Object-Oriented database
- XML 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 Knowledge Discovery from Data
- ACM Trans. on Information Systems
- Information Systems (Journal)
- 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
- Knowledge and Information Systems (Journal)
- IEEE Trans. on Parallel and Distributed Systems
- ACM Computing Surveys
- ACM/Springer-Verlag Multimedia Systems