Spring 2011

CS 405/605-02: Introduction to Database Management Systems

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CS 405/605 02
Introduction to Database Management Systems
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Description: This course will cover the following topics: (1) Logical and physical aspects of database management systems (2) Data models including entity-relationship (ER) and relational models (3) Physical implementation (data organization and indexing) methods. (4) Query languages including SQL and relational algebra. (4) High level concepts: transactions, relation normalization, and security and privacy. Students will gain experience in creating and manipulating a database, and gain knowledge on professional and ethical responsibility and on the importance of privacy/security of data.

Prerequisite: CS 400/600 Data Structure and Software Design

Instructor: Dr. Keke Chen
Office: Joshi 385
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Email: keke.chen@wright.edu
Office hours: 2:30pm-4pm, MW. Please use e-mail for short questions or setting up additional meetings.

Class meeting time: 4:10-5:25pm, TR
Classroom: Medical Sciences 127

Course materials: Slides and other relevant materials will be available on Pilot, and occasionally hardcopies of handouts will be distributed in class.

Required Textbook: R. Elmasri and S. B. Navathe, Fundamentals of Database Systems, 6th edition, Addison Wesley.

Reference texts:

- MySQL in a Nutshell, by Russell J. T. Dyer, O'Reilly, 2008, free access from OhioLink, or any online tutorials about MySQL.
- Oracle Databases 10g PL/SQL Programming, Scott Urman et al, 2004, free access from OhioLink

Topics: (The chapters have been updated for 6th edition)

1. DBMS concepts and architecture (Chap 1, 2) [1-2 classes]
2. Entity-Relationship model and enhancements (Chap 7, 8) [2 classes]
3. Relational data model and relational algebra (Chap 3, 6) [3 classes]
4. SQL - a relational database language (Chap 4, 5) [3 classes]
5. ER and EER to relational mapping (Chap 9) [1 class]
6. Using DBMS (MySQL) [1 class]
7. Relation storage and file organizations, index structures (Chap 17, 18) [2 classes]
8. Functional dependencies and relational design/normalization (Chap 15) [2-3 classes]
9. Transaction (Chap 21) [1-2 classes]
10. Data security and privacy (Chap 24) [1class]

Grading: A:[90,100], B:[80,90), C:[70,80), D:[60,70), F:[0,60)
Midterm 30%, Project 20%, Final 30%, Homeworks 20%.
No late submission will be accepted except for documented medical reasons.
The instructor will curve the grades according to the distribution.

All exams are closed book and closed notes. There will be no make-up exams except for documented reasons.

Project: The project is about database design, relational algebra, and SQL programming. You will be given a project specification, with details about the application and the problems. You will design the ER schemas (20%) and the relations schemas (10%) for the application, initialize your database with some given relations (10%), implement the given queries in SQL (35%), and implement some of the given queries in relational algebra (15%). You will use the open source software MySQL to implement your database and to test your SQL queries. The SQL queries must be entirely done by hand (without machine translations) to ensure understandability; they should also follow the SQL standard as discussed in the text.
You need to write a report, which will be used to mark your project. In the report you should include your ER and relational schemas, your SQL codes of the queries, your relational algebra expressions of the queries, and results of test runs of your SQL queries. It is important that this final report be nicely presented; 10% marks will be allocated to the clarity and organization of the report.

Independent work: All project, homework, and examination work must be your own. Academic dishonesty will result in a grade of "F".

Tentative Schedule:

- In class midterm exam: in 5th week.
- Project specification will be handed out around midterm.
- Project due: midnight Monday of 10^{th} week
- Final exam: 5:45-7:45pm, Tuesday, June 7.

Graduate students: Graduate students might be asked to do more than undergraduate students in the projects and exams.