CS 445
Introduction to Database Systems
TTH 1:00 – 2:15
Chadd Williams

Office Hours
M 2-4pm
Tue 11-noon
Thur 1-2
Overview

• Practical introduction to databases
  – theory + hands on projects

• Topics
  – Relational Model
  – Database Design
  – Structured Query Language (SQL)
  – Web accessible databases
  – Cloud computing

• There will be a number of lab days for hands on work
  – approximately 6
Syllabus

- *Database Management Systems (3rd)*, Ramakrishnan & Gehrke

- Grades:
  - Midterm 1 15%
  - Midterm 2 15%
  - Final 20%
  - Homework/Quizzes 15%
  - Database Projects 35%

- Quizzes: frequent, unannounced, open-note quizzes will be given

- Late Policy: No late assignments accepted

- Grade Complaints: one paragraph summary of why the grade is wrong, *within one week of receiving the graded material*

- All projects are *individual* projects

- [http://zeus.cs.pacificu.edu/chadd/cs445f09](http://zeus.cs.pacificu.edu/chadd/cs445f09)

- Don't forget about the CS Message boards
Database Projects

• All database projects are to be done using MySQL 5.1 Community Server
  - http://dev.mysql.com/downloads/mysql/5.1.html#downloads

• First DB Assignment
  - Learn to use MySQL & SQL
  - Build graphical front end (Web/MS Access/OpenOffice)

• Big Database Project
  - You design, document, and implement a database
    - I have topics ideas but you are free to come up with your own
  - Build a web-based front end
    - We will discuss how to do this using PHP and the Apache webserver
  - 5 minute presentation of your design
  - 7–10 minute presentation of your final design and implementation
Introduction to Databases

- Read Chapter 1
  - homework: page 23: 1.2, 1.6 (Due Sept 9)
- What's a database?
  - DBMS?
- Why do we use one?
- Who uses one?
- How do we model the data?
DATA!

Where is the data?
How do we model it?

http://www.smallbars.com/bin/GL_CompassRoom2.jpg
http://www.loc.gov/exhibits/treasures/images/at0069_4s.jpg
http://www.goboxers.com/facilities/lincoln-park/webcam.cfm
http://www.masterteacher.com/graphics/products/prodpics600/1210.jpg
Database Usage Scenario
Why not just use a text file/file system/XML?

- Data Independence
- Efficient Data Access
- Data Integrity and Security
- Data Administration
- Concurrent Access/Crash Recovery
- Reduced Application Development Time

(page 9)
Storing data in the DB

• Data Models

• Semantic Data Model (high level)
  – Entity–Relationship (ER) Model
    • Entity:
    • Relationship:

• Relational Data Model (low level)

• Schema

• Constraints/Integrity
What's inside a Relational database?

• Tables

• Indexes/Keys

• Data
How do we access the data?

• Query Language
  – Structured Query Language (SQL)
  – What types of queries can we run?
What about multiple users?

- Transactions

- Concurrency
Dirty Details

- Figure 1.3  
  page 20

Figure 1.3  Architecture of a DBMS