Database Systems

- How does Wal-Mart manage its 200 TB data warehouse?
- What is the database technology behind eBay’s website?
- How do you build an Oracle 9i, MySQL or Microsoft SQL Server database?

ICE: The Mid Store

- Create a system to keep track of inventory
Problems

- Changes to data - Data model
- “on the fly” queries
- Data inconsistencies
- Security of information (views)
- Performance
- Partial processing
- Concurrency

What is a Database?

- A very large, integrated collection of data
- Models real-world enterprise.
  - Entities (e.g., students, courses)
  - Relationships
- A Database Management System (DBMS) is a software package designed to store and manage databases.

Why Use a DBMS?

- Data independence and efficient access
- Reduced application development time
- Data integrity and security
- Performance and scalability
- Concurrent data access
- Recovery from system crashes

Why Study Databases?

- Used everywhere
  - Universities (MIDS), military, enterprises
- Datasets increasing in diversity and volume.
  - Digital libraries, interactive video, Facebook, YouTube, Google
  - ... need for DBMS exploding
- DBMS encompasses most of CS
  - OS, languages, theory, data mining, multimedia, logic
IT Analyst

Course Topics
- Database design
- Relational model
- SQL
- Normalization
- Database administration
- PHP
- MySQL
- Transaction Processing
- Data Storage and Indexing

Course Goals
- Explain the main advantages of modern database management systems over file systems.
- Design, create, and query relational databases to satisfy user requirements.
- Design, build and deploy database-backed applications with dynamic website front-end.
- Implement data access control mechanisms for database and application security.
- Analyze the ethical issues and responsibilities related to records management

Create applications that use a Database Management System
Things We Will NOT Cover

- Relational algebra and calculus
- Implementation of index structures
- Query evaluation and optimization

How to BUILD a Database Management System

Success in IT360

- Lecture – stay engaged
  - Take notes – provided slides are not enough!
  - Exams closed-book – but open-note!
  - Ask & answer questions
- Make the most of in-class lab time
  - Read lab in advance
  - Think before you start typing
  - Don’t stay stuck!
  - Don’t fall behind
  - Finish lab early and leave time for reading
  - See me for help and/or talk to friends
- Course material builds on itself and gets more complex

Academic Integrity - Honor

- Collaboration on labs/ hws is allowed, but submitted work should be your own
  - Cite any assistance, from any sources
- Collaboration on projects, quizzes and exams is prohibited
  
  http://www.cs.usna.edu/academics/honor.htm

Resources

- Lecture slides / your notes
- PHP and MySQL Web Development by L. Welling and L. Thomson
- Database Processing by David Kroenke
- Database Management Systems by R. Ramakrishnan and J. Gehrke