

IT360: Applied Database Systems

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www.cs.usna.edu/~adina/teaching/it360/spring2008

Outline

- Class Survey
- Why Databases (DB)?
- This Class?
- Admin

- Entity-Relationship Model

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

Best Jobs!

BEST JOBS IN AMERICA

MONEY Magazine and Salary.com rate careers on salary and job prospects.

By Tara Kalwarski, Daphne Mosher, Janet Paskin and Donna Rosato

Money
salary.com™



Top 10 best jobs

MONEY Magazine and Salary.com researched hundreds of jobs, considering their growth, pay, stress-levels and other factors. These careers ranked highest. ([more](#))

1. Software Engineer
2. College professor
3. Financial adviser
4. Human Resources Manager
5. Physician assistant
6. Market research analyst
7. Computer IT analyst
8. Real Estate Appraiser
9. Pharmacist
10. Psychologist

IT Analyst

http://money.cnn.com - MONEY Magazine: Best Jobs in America - Microsoft Internet Explorer

Money on CNNMoney.com BEST JOBS IN AMERICA salary.com™

No. 7: COMPUTER/IT ANALYST

AVERAGE SALARY **\$83,500**

10-YEAR GROWTH **36%**

AVERAGE ANNUAL JOB OPENINGS **67,300**

C	C	D	B
STRESS	FLEXIBILITY	CREATIVITY	EASE OF ENTRY

7. Computer IT analyst

Why it's great Seems like the entire world is at the mercy of information technology folks, thanks to the rapid spread of computers and swell of the Internet. And all of these jobs pay well, from desktop support technician to Webmaster to database work.

Entry-level analysts make \$60,000 and above. Senior database specialists and IT managers command six-figure salaries and decent bonuses. A bachelor's degree is enough to get started.

What's cool Telecommuting and freelance gigs abound. Plus: e-mail snooping!

[PREVIOUS](#) [NEXT](#) [Back to feature](#)

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