Introduction to Database Systems: CS312

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Meeting Time
Please read the syllabus before next class!!

- Lecture, Discussion, Presentations, and Group Work:
  - Monday, Wednesday, Friday 10:00AM - 10:50AM, Alden Hall, Room 101

- Laboratory Session:
  - Friday 2:30PM - 4:20PM, Alden Hall, Room 101
Instructor’s Office Hours’
Please make an appointment first!

- Monday: 2:00pm – 4:00pm (10 minute time slots)
- Tuesday: 11:00am – 12pm and 2:30am – 4:30pm (10 minute time slots)
- Thursday 11:00pm – 12:00pm (10 minute time slots)

To schedule a meeting with me during my office hours, please visit my Web site and click the “Schedule” link in the top right-hand corner. Now, you can view my calendar or by clicking “schedule an appointment” link browse my office hours and schedule an appointment by clicking the correct link to reserve an open time slot.
Websites
Please read the syllabus before next class!!

- Instructor website:
  http://www.cs.allegheny.edu/sites/obonhamcarter/

- Course webpage:
  http://www.cs.allegheny.edu/sites/obonhamcarter/cs312.html
Course Overview

- Database systems
- Data models and schemas
- Database design and implementation
- SQL programming
- Python for automatic queries
- XML
- Object-based databases
- Data Warehousing and Mining
- Distributed Databases
- NoSQL databases (i.e., MongoDB)
- And more!!

Consider this!

Group work

Overview

Introduction to Class
What is a Database??
Some Ideas...

Definitions...

- “A set of information held in a computer” - Oxford English Dictionary

- One or more large structured sets of persistent data, usually associated with software to update and query the data” - Free On-Line Dictionary of Computing

- “A collection of data arranged for ease and speed of search and retrieval” - Dictionary.com
Database Systems

- Database systems allow users to work with data:
  - Storing
  - Updating
  - Retrieving
  - Organizing
  - Providing protection and security
A database system consists of ...

- Data and Container Design
- Software and its Hardware
- Users (do not forget this part!)
- Implementation of the above

(We will focus mainly on the design, software and programming)
Let’s Discuss...

So, why study database systems??
Databases are useful
- Many computing applications deal with large amounts of information
- Database systems give a set of tools for storing, searching and managing this information

Databases in CS
- Databases are a core topic in computer science
- Basic concepts and skills with database systems are part of the skill set you will be assumed to have as a CS graduate
Introduction to Class Overview
Consider this!
Group work

Careers I

Database Administrator salaries in United States

$94,769 per year
Based on 5,145 salaries

Min $34,000
Max $185,000

Database Administrator salaries by company in United States

https://www.indeed.com/q-Database-jobs.html
https://www.computerscience.org/careers/database-administrator/
**Careers II**
The top ten according to NorthEastern.edu

### Careers with Data and Databases

- **10) Data Analyst**  
  Annual Salary Range: $77,500-$118,750  
  Increase in Salary Over the Last Year: 3.8 percent

- **9) Database Administrator**  
  Annual Salary Range: $98,500-$148,500  
  Increase in Salary Over the Last Year: 3.6 percent

- **8) Database Developer**  
  Annual Salary Range: $108,000-$161,500  
  Increase in Salary Over the Last Year: 5.1 percent

- **7) Data Modeler**  
  Annual Salary Range: $111,000-$161,500  
  Increase in Salary Over the Last Year: 3.9 percent

- **6) Data Scientist**  
  Annual Salary Range: $116,000-$163,500  
  Increase in Salary Over the Last Year: 6.4 percent

  *the highest increase of all data science jobs*

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https://www.northeastern.edu/graduate/blog/highest-paying-big-data-careers/
5) **Business Intelligence Analyst** Annual Salary Range: $118,000-$171,500 Increase in Salary Over the Last Year: 4.3 percent

4) **Database Manager** Annual Salary Range: $122,250-$177,000 Increase in Salary Over the Last Year: 3.7 percent

3) **Data Warehouse Manager** Annual Salary Range: $129,000-$179,000 Increase in Salary Over the Last Year: 4.1 percent

2) **Data Architect** Annual Salary Range: $131,250-$184,000 Increase in Salary Over the Last Year: 4.1 percent

1) **Big Data Engineer** Annual Salary Range: $135,000-$196,000 Increase in Salary Over the Last Year: 5.8 percent

the second-highest salary increase

https://www.northeastern.edu/graduate/blog/highest-paying-big-data-careers/
Applications of Database
Where do databases help in business?

FedEx and information handling
https://www.youtube.com/watch?v=lSZdKK14zgg
Applications of Database

How do you think FedEx uses its database systems?
Introduction to Class Overview

Consider this!

Group work

Databases and FedEx

- All package information must be easily accessible
- APEC tariff database: An Internet-base customs and trade database
- COSMOS (Customer Operations Service Master On-line System): A computerized package tracking system
General applications of databases

1. Choose one application of a database.
2. Describe how databases are used in that application.
3. What is the data in your application?
4. Who are the users of the application or database?
5. Share one an important and interesting fact that your group uncovered concerning databases in your application.
6. In your opinion, how could this work be done without the database?