Introduction to Database Systems: CS312

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31 August 2020
Lecture, Discussion, Presentations, and Group Work:

- 31\textsuperscript{st} August - 11\textsuperscript{th} December 2020
- **Class**: Monday, Wednesday and Friday, 11:30 am – 12:20 pm, Alden Hall, Room 101
- **Lab**: Wednesday, 3:00 PM - 4:50 PM, online meeting only. See calendar for Zoom meeting links.
Introduction to Class

Instructor's Office Hours

Overview

Consider this!

Group work

Course Calendar

I have created a calendar for the course which contains the class meeting times, lab time, as well as the above Zoom links for the class meetings and lab.

Google Calendar Link for Database Systems

https://calendar.google.com/calendar/b/1?cid=Y182ZWhvaHY2ZWkxazU1N2hwYmc1ZjR0cjA5c0Bncm91cC5jYWx1bmRhci5nb29nbGUuY29t
Note: There will be no in-person meeting times. Instead, we will be using Zoom.

- Tuesdays and Thursdays: 2:00 pm – 4:00 pm (10 minute time slots)
- Wednesday and Friday: 1:30 pm – 2:30 pm (10 minute time slots)
- By appointment, if these times do not work for you.

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
Textbook

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!

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 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??
Introduction to Class Overview

Consider this!

Group work

- 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

Database Administrator salaries in United States

$94,769 per year

Based on 5,145 salaries

Database Administrator salaries by company in United States

https://www.indeed.com/q-Database-jobs.html
https://www.computerscience.org/careers/database-administrator/
Introduction to Class Overview
Consider this! Group work

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 of the top-three highest increases

- **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

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/](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
How do you think FedEx uses its database systems?
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. What kinds of information were used to get a package from the sender to the receiver?
2. In your opinion, what information is most critical to delivering packages?
3. Briefly describe two types of employees who require this information for their jobs at FedEx?

Brainstorming and Ideas

https://jamboard.google.com/d/1RyzKZPAVX9TizbYCSJmAfF7hYMJoNreqpMKFn2u0ZA0/edit?usp=sharing