

Welcome!

CMPSC 305 – Database Systems



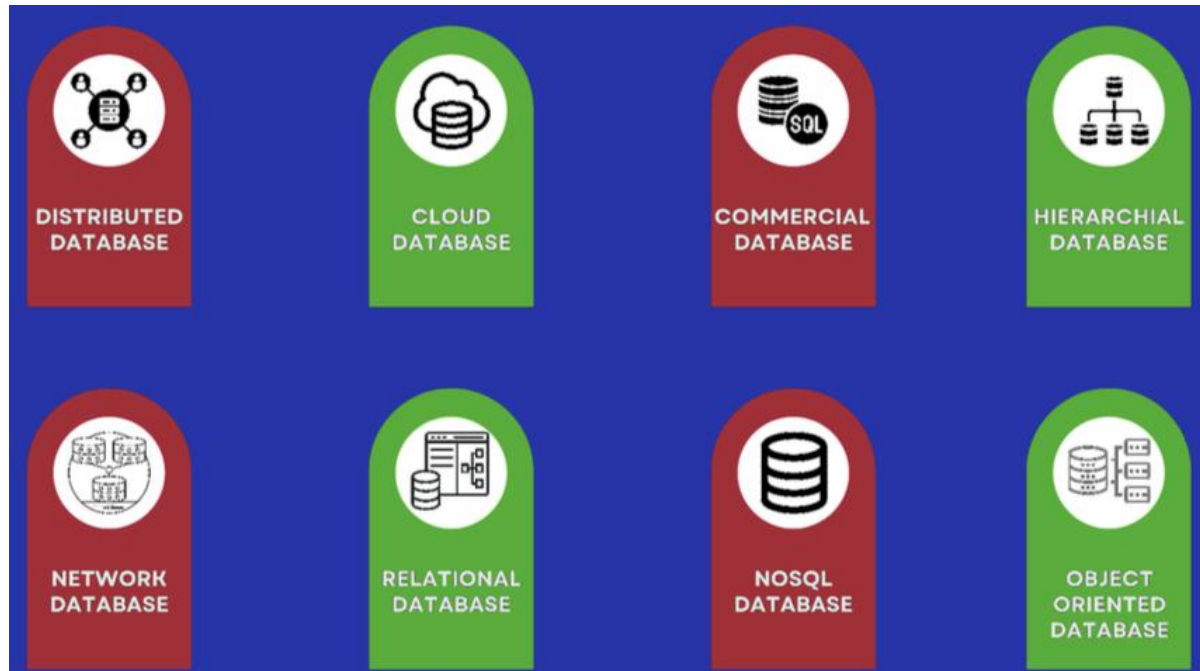
ALLEGHENY COLLEGE

So, What is a Database??

- “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

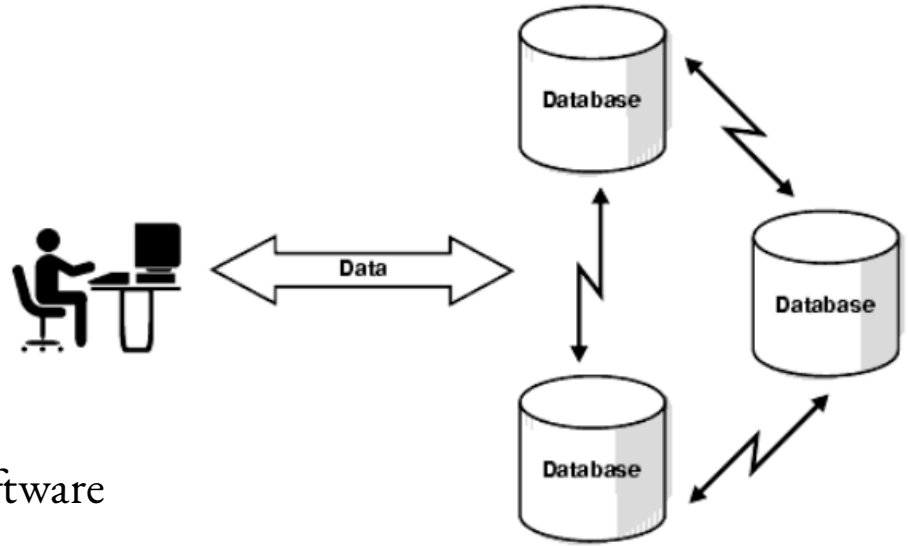
Learning Objectives

- Working with data: Storing, Updating, Retrieving, Organizing, Security



Database Systems

- 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??

Why study database systems

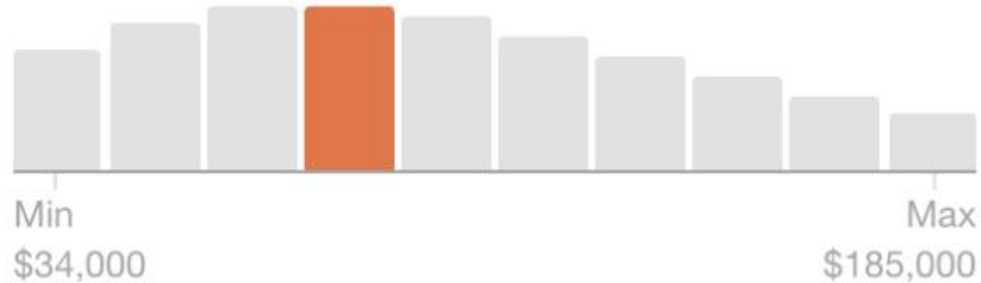
- Databases are useful
 - Many computing applications deal with large amounts of information
 - Database systems give a set of tools for storing, searching and managing this information
- Databases in CS
 - Databases are a core topic in computer science
 - Basic concepts and skills with database systems are part of the skill set you will be assumed to have as a CS graduate

Careers I

Database Administrator salaries in United States

\$94,769 per year ?

Based on 5,145 salaries



Database Administrator salaries by company in
United States

Careers II

Careers with Data and Databases (The top ten according to NorthEastern.edu)

- 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 percentage 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)

Careers III

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

Applications of Database



<https://www.youtube.com/watch?v=ISZdKK14zgg>

Applications of Database



Although this video did not mention databases, how do you think FedEx stores or uses its information to move packages?

Break-Out Groups



The year is 1823 and you and your associates are forming a package delivery service to move packages across the entire country. Assume that all you have is a paper-based system to record information. With your group, discuss the concerns on the next page and brainstorm to determine working solutions. Be creative! These solutions do not necessarily have to be practical if you cannot find any other way!

Break-Out Groups

A paper-based delivery service

- What kinds of information are necessary to deliver a package to an address?
- How would you record this information in an organized system?
- How do you update any of this information?
- What kinds of errors could happen when making updates to the information?
- How do you make this information available to anyone in the company who needs it?
- List two issues (not mentioned above) that require consideration when working with the information of a package? Please explain the concern and provide a creative solution.



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