Introduction to databases

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Based on Christopher Ré and Jennifer Widom slides

Agenda

What is a Database Management System?

Scopus of this course

Key concepts

Key people

Database Management System (DBMS)

Provides efficient, reliable, convenient, and safe multi-user storage of and access to massive amounts of persistent data.

Massive
- Terabytes of data

Persistent
- Data in databases outlive the programs that execute on that data

Safe
- Possible failures: hardware, software, power, users
- Ensure the consistency of the data

Multi-user
- Concurrency control

Convenient
- Physical data independence
- High-level query languages

Efficient
- Thousands of queries/updates per second

Reliable
- 99,99999% up time

Scopus of this course

Database applications may be programmed via “frameworks”

DBMS may run in conjunction with “middleware”

Data-intensive applications may not use DBMS at all

We’ll focus on the DBMS itself.

Key concepts

Data model

- Description of how the data is structured
- Examples: set of records, XML, graph

Schema versus data

- Analogy: types and variables in programming languages

Data definition language (DDL)

- Set up schema

Data manipulation or query language (DML)

- Querying and modifying

Key people

DBMS implementer

Builds system

Database designer

Establishes schema

Database application developer

Programs that operate on database

Database administrator

Loads data, keeps running smoothly

Whether you know it or not, you're using a database every day.