ITCS285

Database Management System

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Chapter 1

Introduction

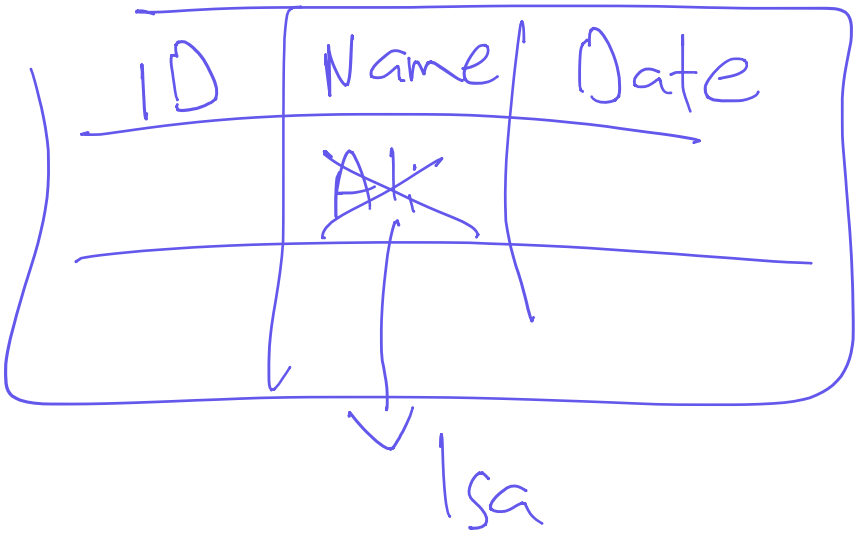
data → raw
information →
Process

Volume or the amount of data
Velocity or the speed of data
Variety or the range of data types and sources

Big data is having high volume, high velocity and high variety information

Use big data

1. Store
2. Query
3. Share
4. Mine

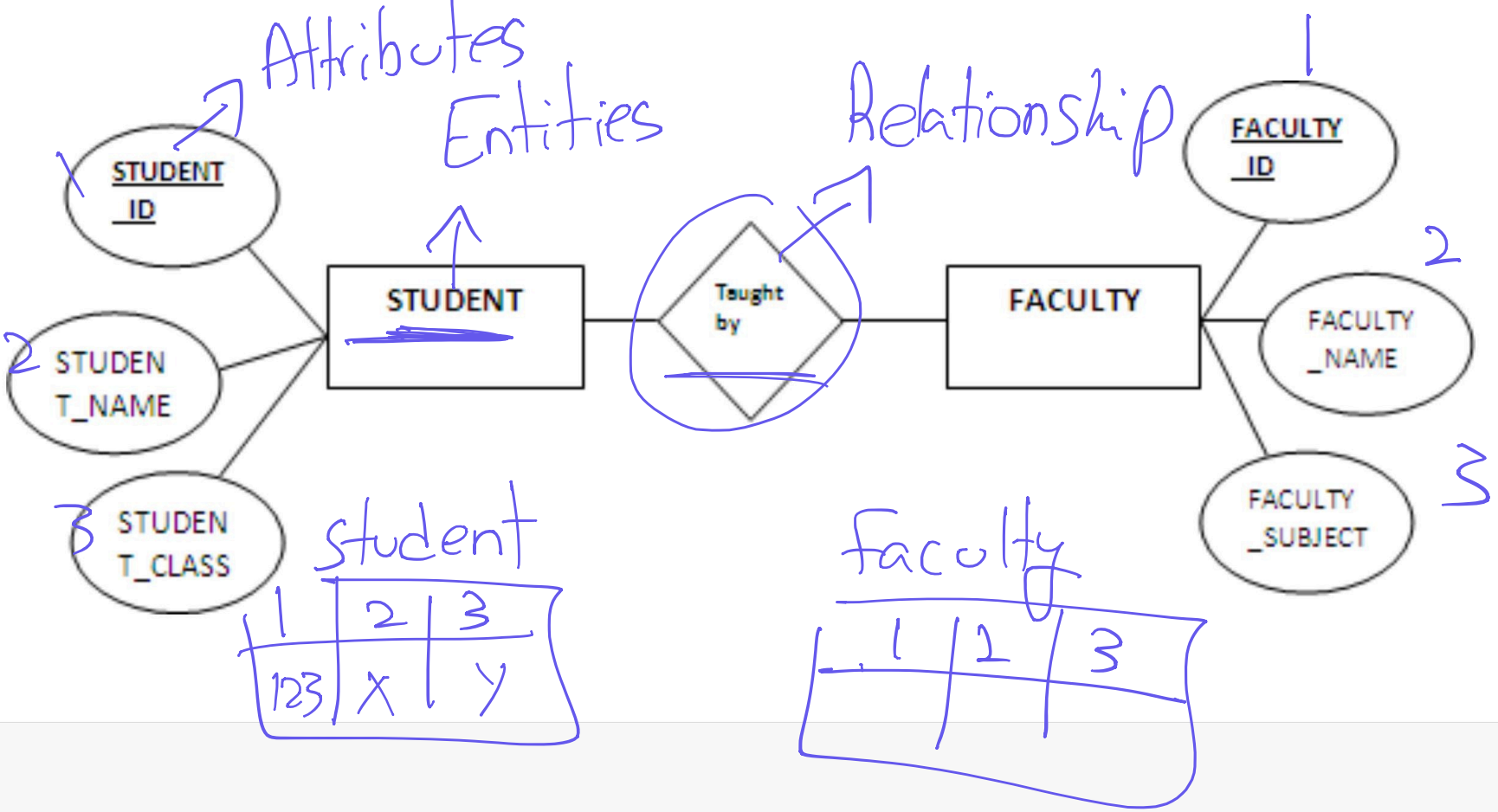


Data is an important thing as it needs to be stored, maintained, accessed and manipulated as needed.

Using a **database** would satisfy all the needs.

Before creating the tables

Entity-relationship (ER) model



Relational model

Primary key
Unique

An attribute, field or column

Integrity Constraint: Every student has a unique *sid* value

A record, tuple or row

sid	name	login	dob	gpa
512412	Khaled	khaled@qatar.cmu.edu	18-9-1995	3.5
512311	Jones	jones@qatar.cmu.edu	1-12-1994	3.2
512111	Maria	maria@qatar.cmu.edu	3-8-1995	3.85

An *instance* of a Students *relation*

Student(sid, name, login, dob, gpa)

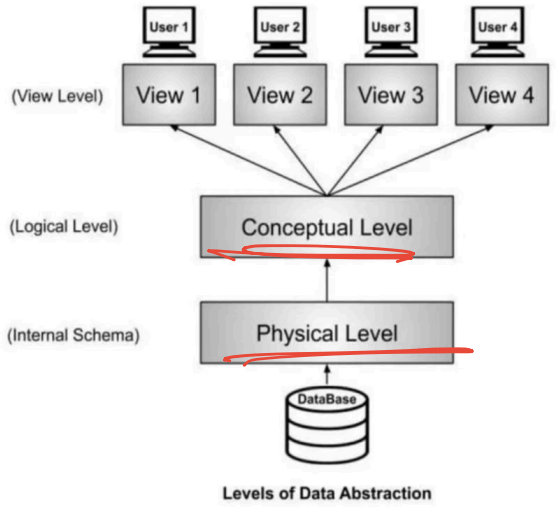
Asbtraction within DBMS

View Level of Abstraction

The view level is the highest level of abstraction seen by end users or applications.

It allows users to interact with a subset of the database tailored to their specific needs.

Views can combine data from multiple tables and provide a customized perspective on the data.



Levels of Data Abstraction

Data independence

- Logical data independence: users are shielded from changes in the conceptual schema (e.g., add/drop a column in a table)
- Physical data independence: users are shielded from changes in the physical schema (e.g., add index or change record order)

Queries

- Used to ease with which information can be queried from a database determines its value to users

The relational model supports powerful **query languages:**

- Relational calculus: a formal language based on mathematical logic
- Relational algebra: a formal language based on a collection of operators (e.g., selection and projection) for manipulating relations
- Structured Query Language (SQL): Builds upon relational calculus and algebra

DBMS concurrent accesses

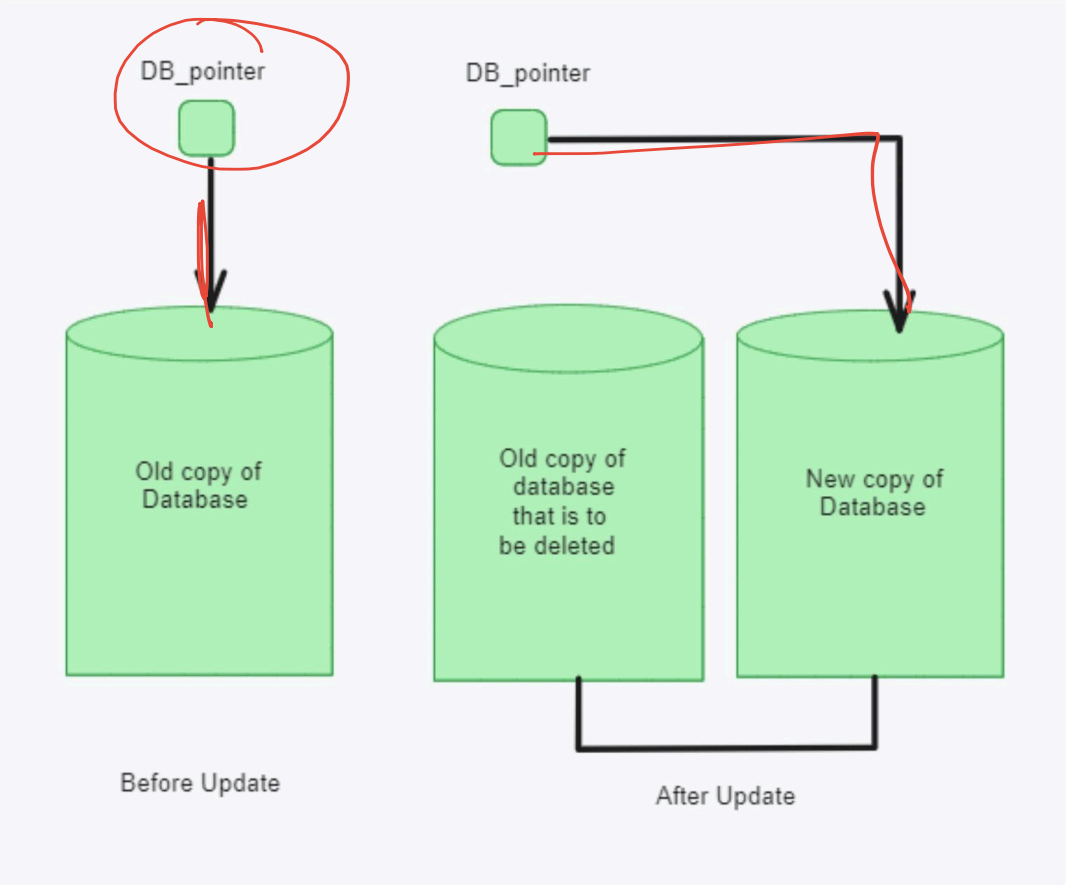
That happens due to **schedule** concurrent accesses to data so as to improve:

1. Preformance

When several users access the database concurently the DBMS must order their requests carefully to **avoid conflicts** using the locking protocol .

Transactions

Update
add
delete
change



People Who Work With Databases

1. End users
2. Application programmers
3. Database Administrators (DBAs)
4. Implementers
5. Researchers