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Lecture 2 Relational Model

3 levels of architecture

Conceptual Level (community logical level)

- What someone at eg. The uni level can see
- What DBA sees – who is getting what data
- Overview of what the system looks like
- Birds eye view
- Big picture

External Level (user logical level)

- How data is viewed by particular users
- Eg. What I can see on my sinet
- Eg. our names and addresses, studies report, my own info

Internal Level (physical level)

- How data is stored in system

ACID

Atomicity

- All or nothing

Consistency

- If something is stored more than once, all must be updated

Isolation

- 2 things can be updated at once but must be separate eg. airline ticket

Durability

- If a transaction is completed it can't be lost even if system fails after

The Relational Model

Objectives

Data-Program independence

- You can run any program on the database without fearing its incompatible
- If you want to change anything in your applications it shouldn't affect anything you already have but in reality it doesn't always happen

Data integrity

- address consistency and redundancy problems
- eg. repeating fields

Set orientation

- we've got sets where we can join tables

Relation

- Table with columns and rows

Candidate key

- Minimum set of attributes that uniquely define row
- Minimal superkey

Composite key

- More than one columns combined to make primary key

Relational integrity

Domain constraints

- Restriction on values of attribute
- Eg. data type: integer, number, date

Set of values

- Gender can only be male or female

Range

- Quantity has to be non-negative

Referential integrity

- Corresponding record must exist in another table

Outer join

- Eg. You have a pool of authorised suppliers you don't always use but still want to know who they are

Importance of the relational model

- Relational databases are important because they created a universal model for storing data
- Supports simple, powerful querying of data

Importance of views

- Security
- Customisation for individual users
- Easier way to query relations
- Restrict users from accessing data they're not supposed to see
- Eg. you may want to allow employees to see other employees' phone number column, but only certain employees to be able to access an employee's salary column