

Relational Model

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Relational Model

The Relational Model:

[Codd, 1970]

- Data model on which most DBMS implementations are based.
- Very simple: Everything is a **relation** (\approx table).
- Simplicity \Rightarrow eases implementation of DBMSs. Close to physical representation of data.
- Powerful queries still possible.

Note: Relational model \neq Entity-Relationship model.

There are standard ways to convert from the E-R model (used for conceptual modelling) to the relational model (used for physical modelling).

Relations

Relation \approx table

Relation schema

- Fields (= attributes = columns).
- Field names, field domains

Relation instance

- Set of tuples (= rows = records).

Theory: Relation is set of tuples

Reality (actual DBMSs): Relation is multi-set of tuples

Relational database schema = collection of relation schemas.

Constraints

- Keys
 - Set of fields unique for each tuple in relation.
 - Minimal.
- Foreign keys
 - Set of fields of one relation related to a similar set of fields in another relation. For any value of fields appearing in first relation, some tuple in the other relation must contain the same values.
- Arbitrary types of constraints
 - Can be specified by queries. Later.

Conversion Rules

Conversion from E-R Model to Relational model.

- Entities
- Relationships
 - Many-to-many
 - One-to-many/one
- Weak entity sets
- ISA-hierarchies
- Aggregations