

ACID properties – key for a DBMS to maintain

● Atomic

- ▶ The transaction cannot be subdivided. It is either complete done or no part is done.

● Consistent

- ▶ Any database constraint / property / relation that existed before the transaction must also exist after the transaction

● Isolated

- ▶ Changes to the database are not revealed to users until the transaction is committed

● Durable

- ▶ Changes are permanent

ACID properties

- **The "transaction" model of SQL lets the DBMS manage the ACID properties**
 - ▶ Require some locking and failure handling in a DBMS with concurrent users/transactions
 - ▶ Tricky to ensure over distributed or federated databases
- **Transaction designers must also be thinking of the ACID properties as they choose which commands to include**
 - ▶ Must ensure that all business constraints are consistent at the end of the transaction

Describing the database

Entity Relation Diagrams (ER Diagrams or ERD)

- **A representation of the tables in a database and the relations between the tables**
 - ▶ Derived from Entity Relation Models (ERM - business models)
 - ▶ ERD and ERM may be used synonymously in some contexts
- **Includes**
 - ▶ Entities – a person, place, object, event, or concept in the user environment about which the organization wishes to maintain data
 - ▶ Relations – a meaningful association between or among entities

Entities

- **Aim for:**
 - ▶ A singular noun – helps to keep it to a single concept
 - ▶ Something specific to the organization
 - ▶ Something concise
 - ▶ Named for a result/artefact, not a process or procedure
- **Comprised of attributes**

Attributes

- **A property or characteristics of an entity or relationship type that is of interest to the organization**
 - ▶ **Required attribute – must always have a value for every entity**
 - ▶ **Optional attribute – may not have a value for every entity**
 - ▶ **Atomic attribute – an attribute that cannot be broken down into smaller components that are meaningful to the organization**
 - Eg. age
 - ▶ **Composite attribute – an attribute that has meaningful component parts**
 - Eg. Address has city, province, ...

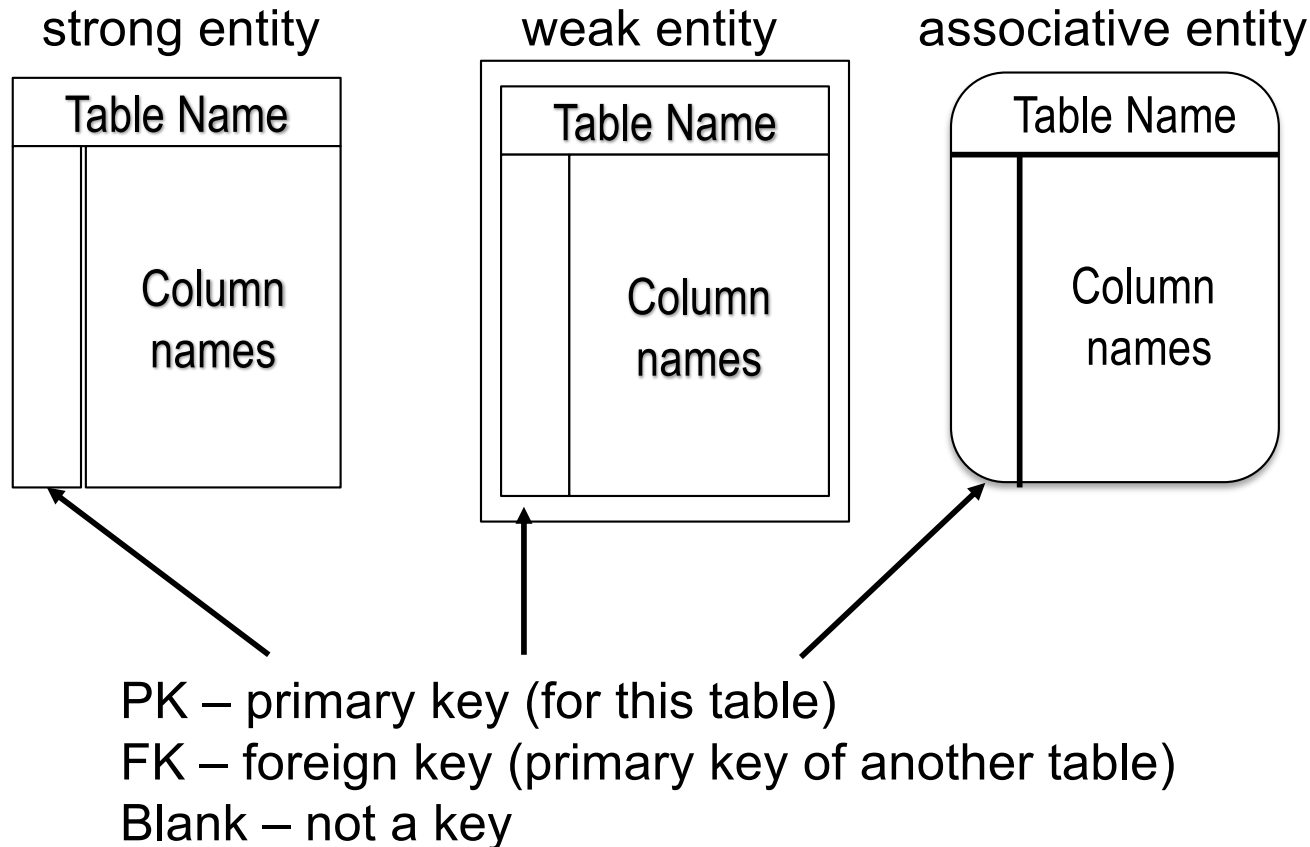
Attributes

- **A property or characteristics of an entity or relationship type that is of interest to the organization**
 - ▶ **Multivalued attribute – an attribute that may take on more than one value for a given entity**
 - Eg. Set of skills for a person
 - Named in {...} brackets
 - ▶ **Derived attribute – an attribute whose value can be calculated from related attribute values**
 - Named in [...] brackets

Attributes

- **A property or characteristics of an entity or relationship type that is of interest to the organization**
 - ▶ **Identifier – an attribute (or combination of attributes) whose value distinguishes instances of an entity type**
 - Become our primary keys in the database
 - ▶ **Composite identifier – an identifier that consists of a composite attribute**
 - Become composite keys

ERM symbols – entities



Strong entity – stands on its own

Weak entity – doesn't make sense if alone

Associative entity – associates the instances of one or more entity types and contains attributes that are peculiar to the relationship