

ER Mapping

ER Mapping turns an ER diagram into a relational database schema.

Basic Idea:

1. Entities become relations, their attributes become fields in the relations. One key is selected as primary key.
2. Relations become relations between the primary keys of the relations corresponding to the entities in the relation.

Covers many situations, but not all.

Strong Entities

Turn every strong entity into a relation on its *simple*, nonderived attributes. Choose one of the keys (unique identifiers) as the primary key of the relation.

Examples

employee
department
project

Weak Entities

- Turn every weak entity into a relation on its simple, non-derived attributes.
- Include foreign key referencing the primary key of the owner entity (the owner entity itself might be weak, in that case you need to process the weak entities in the right order).
- As the primary key choose the combination of the foreign key referencing the owner entity, and the partial key.

Examples

dependent
department, course, section

Binary 1:1 Relations

- For every binary 1:1 relation between two entities connect the corresponding entity relations by adding to one of them a foreign key referencing the primary key of the other. If one of the entities has total participation in the relation, add the foreign key to that table (so you can enforce total participation using non null constraint).
- Move all relationship attributes to total participation table (if exists). (If both relations have total participation, they can be combined into a single relation.)

Examples

manages
car containing engine
nurse in charge of care center
Figure 5-14, page 203)

Binary 1:N Relations

For every binary 1:N relation between two entities connect the corresponding entity relations by adding a foreign key to the entity representing the N side referencing the primary key of the entity representing the 1 side.

Examples

works_for
controls
supervision

Binary M:N Relations

- For every binary M:N relation create a new relation containing foreign keys pointing at primary keys of all entities involved.
- Also, include simple, non-derived attributes of relationship.
- As the primary key, choose the combination of foreign keys.

Examples

works_on
prerequisite
supplies (Figure 5-13, page 202)

Associative Entities

- Deal with an associative entity as if it was a M:N relation
- If associative entity does has a key, use it (rather than using the combination of foreign keys)

Example

Figure 5-16, page 205

Attributes

- Multivalued attributes are turned into relations containing the simple attributes contained in the multivalued attribute. Also included is a foreign key referencing the primary key of the relation the multivalued attribute is used in.
- The primary key of the new relation is the combination of all its attributes.

Examples

locations
email
telephone number

n-ary Relations

- Each n-ary relation is represented by a new relation including foreign keys referencing the primary keys of the entities involved.
- Also include all simple, non-derived attributes.
- The primary key is the combination of the n foreign keys. From this we except entities that participate with a cardinality constraint of 1 (since their value is uniquely determined).

Examples

supply
teaches with entities: time_slot, teacher, location
Patient-Treatment (Figure 5-19, page 208)

EER Mapping

- If you have superentities and subentities, map them like regular entities.
- To every superentity add a discriminator field.
- If several entities are subentities of a superentity, add the primary key of the superentity as a primary key to all the subentities (replacing any original primary key which becomes a candidate key).
- The new primary key of every subentity also is a foreign key referencing the primary key of the superentity.

Note: there are other solutions

Examples

employee(technician, secretary,engineer)

Figure 5-20, page 210

Examples

- The art museum's miniworld
- Pine Valley Furniture
- Lee Anne Vineyard
- Wright Technical Institute
