

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

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

Multivalued 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

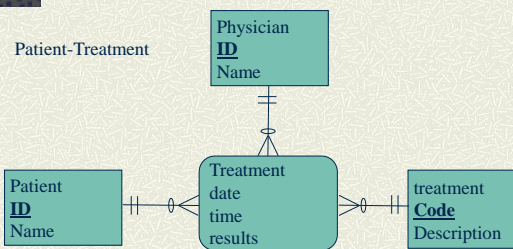
n-ary Relations

- 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

n-ary Relations Example



Summary

1. Map entities, first strong entities, then weak entities owned by already mapped entities, and so on. Map multi-valued attributes.
2. Map relationships, first 1:1 and 1:M, then M:M and so on.

Examples

- The art museum's miniworld
- The banker's world
- Lee Anne Vineyard
