

Database Management Systems

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ER Model and External View

- Something about the external view being the conceptual model?
- ER Model only to gain requirements, it's a **design tool** describing data and relationships among data at a high level
 - ER = entity relationships
 - An ER diagram is a graph describing data and its relationships
 - DBMS independent, all about the application
- The ER model is more expressive than the relational model because it shows us which entities have relationships

ER Diagrams

- Rectangles represent entity sets
 - entities have names that go at the top of the rectangle
- Diamonds represent relationship sets
 - The thing that ties the entities together, i.e. instructors (entity) and students (entity) are tied together by advisors (relationship set)
- Attributes are listed inside the entity table
 - ID, name, and salary are all attributes of an instructor
 - You **cannot** have an empty entity set
- Underline indicates primary key attributes
 - I think this is the attributes that the two entities have in common?

Attribute Shit

- Composite and Simple Attributes
- Composite attributes are attributes that have sub-attributes
 - The lowest level of sub-attributes are simple. Being a sub-attribute doesn't make it composite, you have to *have* the sub-attributes to be composite.
- Simple attributes are attributes that don't have sub-attributes
- An attribute surrounded by {} are multi-value attributes
 - This means that you can have more than one of these things (like you can have more than one phone number, a mobile and an office)
- An attribute with () after it is a derived attribute, I didn't catch its definition
- Relationship sets can have attributes too
 - Relationship set attributes are shown in a rectangle above the relationship, connected with a dotted line

Role Indicator (recursive relationship)

- Entity sets of a relationship don't need to be distinct

- each occurrence of an entity set plays a “role” in the relationship
- I think this is just when a relationship shares more than one role with an entity
 - A role goes on the line connecting the entity set and relationship set
- Example:
 - you have an entity set called course with attributes course_id, title, and credits
 - You have a relationship set called prereq with no attributes
 - you have two roles that connect the relationship set to the entity set, these roles are called course_id and prereq_id

One to Many Relationship

- An example is that an instructor can have many students, this is represented by an arrow pointing towards instructor in the ER Diagram

Many to One Relationships

- An example is that a student can have many instructors, this is represented by an arrow pointing towards the student in the ER diagram

Many to Many Relationships

- A student can have many (including 0) professors, an instructor can have many (including 0) students. This is represented by no arrows and an m on either side of the line near the entity