

Database Design

CSC4341 Principles of Database Systems

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E/R Diagram

- Identify entities (objects) and their attributes from the problem description
- **The attributes should be just about the entity**
- Identify relationship among the entities
- Identify the types of the relationships
- Follow E/R diagram standard notations
- Revise as needed

Converting into Relational Tables

- Rule 1: **For each entity**, create a new table and include its attributes as columns
- Rule 2: For **1-to-1 relationship**, add the primary key from one table into the other one as a foreign key
- Rule 3: For **1-to-N relationship**, add the primary key from the table on the 1 side of the relationship into the table on the N side as a foreign key

Converting into Relational Tables

- Rule 4: For **M-to-N relationship**, create a new table and include the primary keys from both sides of the relationship into the new table as foreign keys. The combined foreign keys serve as the primary key of the new table. Also add the attributes of the relationship as regular columns.

Converting into Relational Tables

- Rule 5: For an **multi-valued attribute**, create a new table and include the primary key of the original table into the new table as foreign keys. The combined foreign key and multi-value serve as the primary key of the new table.

Converting into Relational Tables

- Rule 6: For an **N-nary relationship** ($N > 2$), create a new table and include the primary key of the participating tables into the new table as foreign keys. The combined foreign keys serve as the primary key of the new table.

Tips

- Don't try to add everything into a table during E/R stage
- The attributes should be just about the entity
- Don't start design from tables until you are mastery
- Foreign keys should not be introduced in a table arbitrarily. They depend on the types of relationships.