

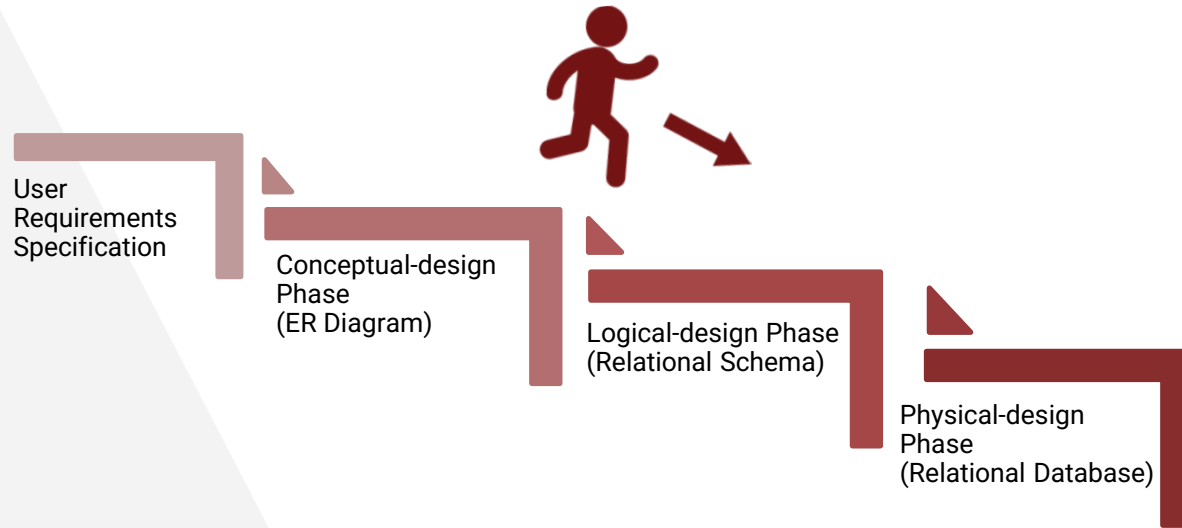


# Database Management System

## ER Diagram → Relational Schema

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# Design Phases



# Database Schema & Data Model

## Database Schema

Describes the overall design of the database at different levels(physical, logical, view)

## Data Model

Describes a way to design database at physical, logical and view level. It is a collection of conceptual tools and languages for describing data, data relationships, data semantics, and consistency constraints.

High-level conceptual data model → ER Model

Record based logical data model → Relational Model

# E-R Diagram vs Relational Schema

## ER Diagram

The main components of ER Model are:

- Entity Set – set of similar entities
- Relationship Set – set of similar relationships
- Attributes – including different types of keys

ER Model describes Mapping Cardinality.

## Relational Schema

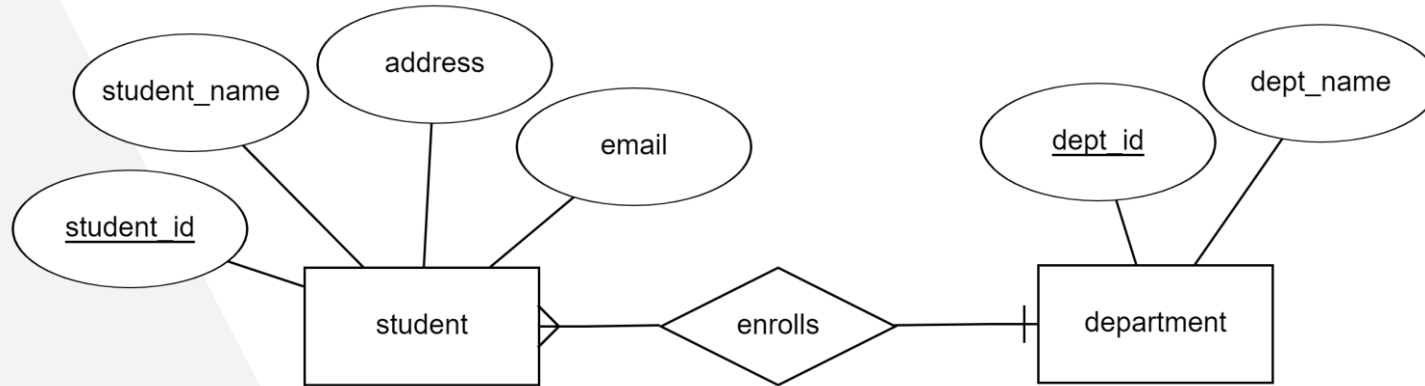
The main components of Relational Model are:

- Relations (tables)
- Tuple (row, unordered)
- Attributes (columns, unordered)
- Domain (column type)
- Primary Key
- Foreign Key

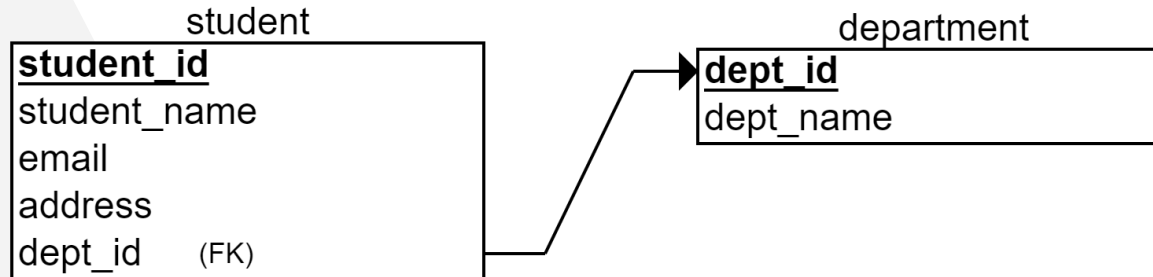
Relational Model does not describe Mapping Cardinality.

# E-R Diagram vs Relational Schema

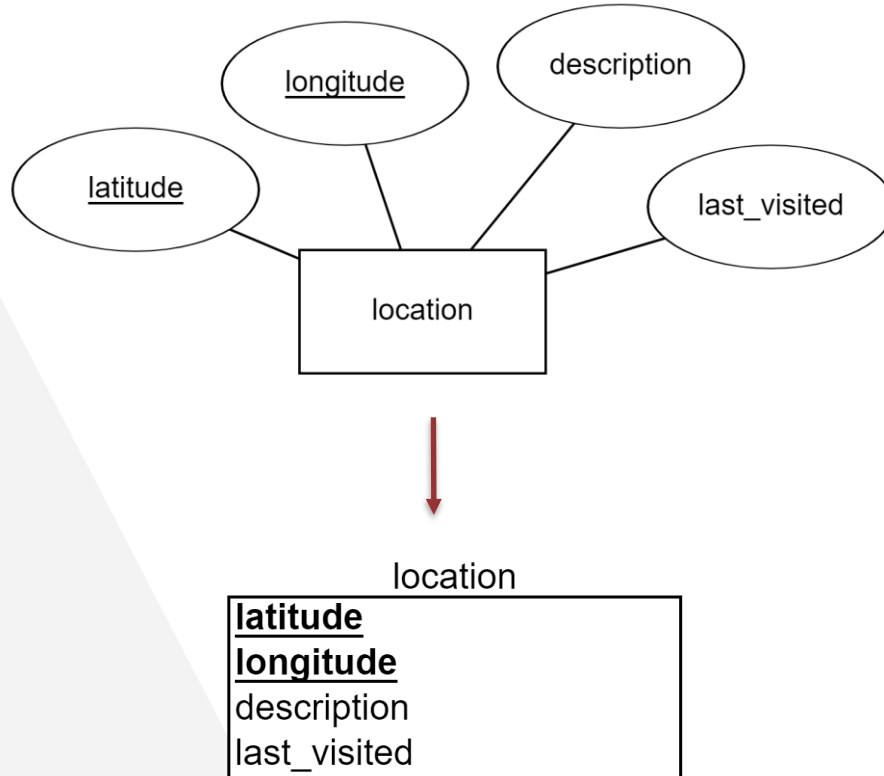
## ER Diagram :



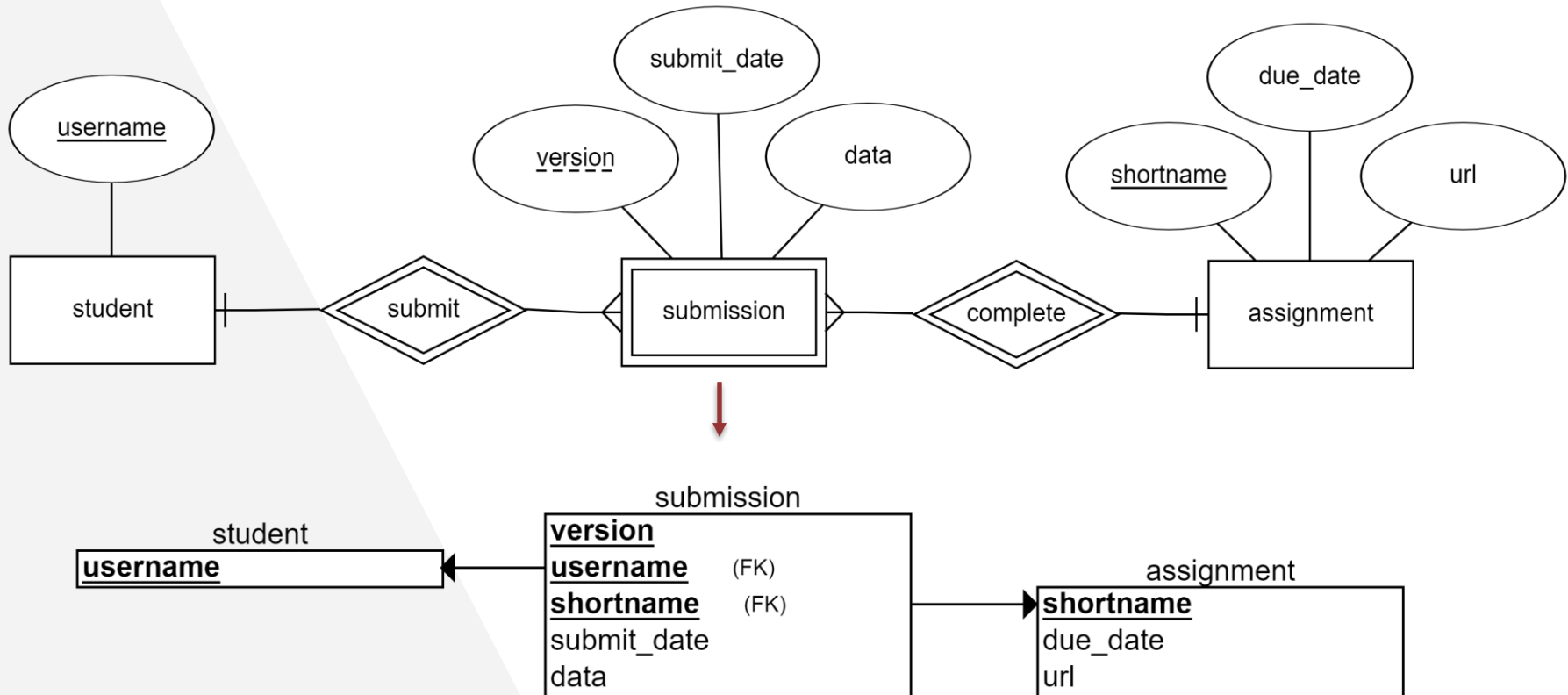
## Relational Schema :



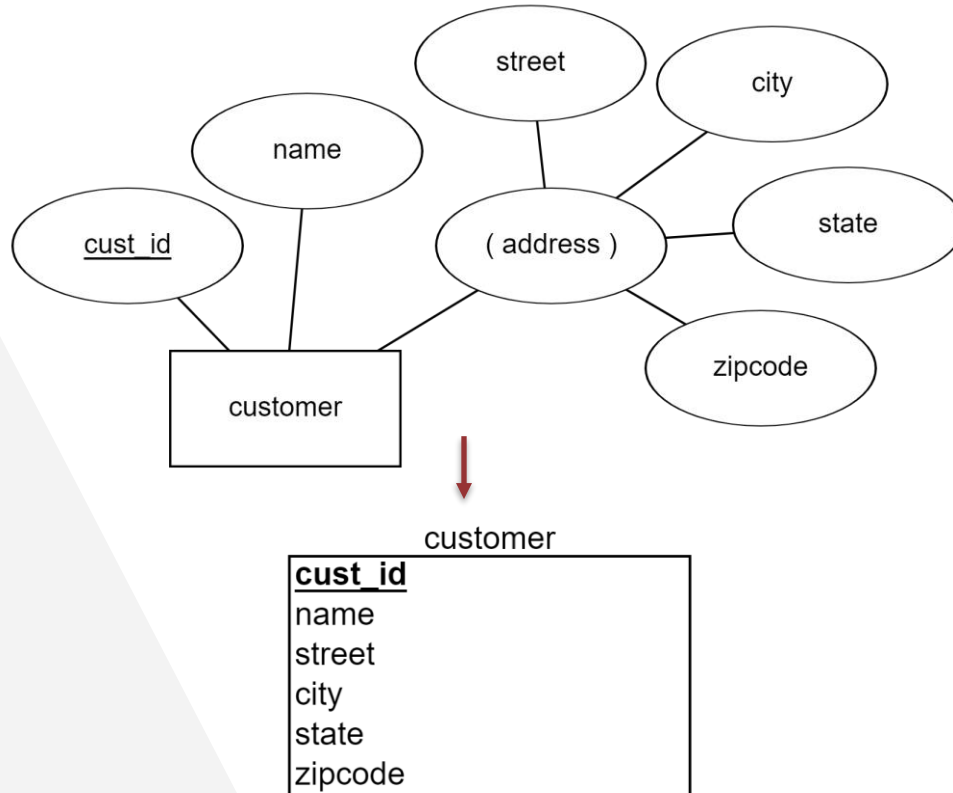
# Relational Schema >> Strong Entity Set



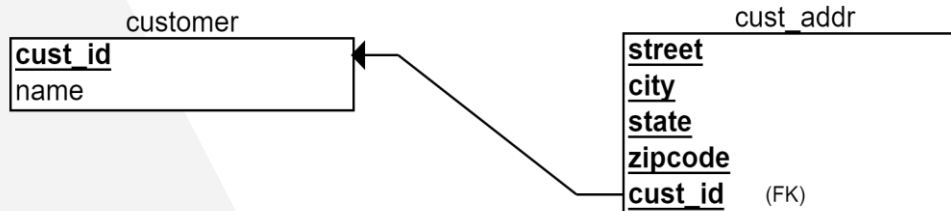
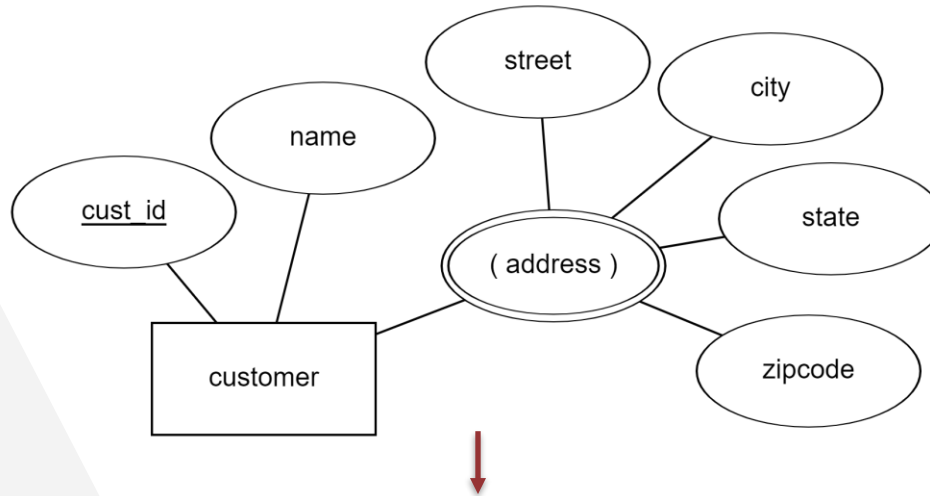
# Relational Schema >> Weak Entity Set



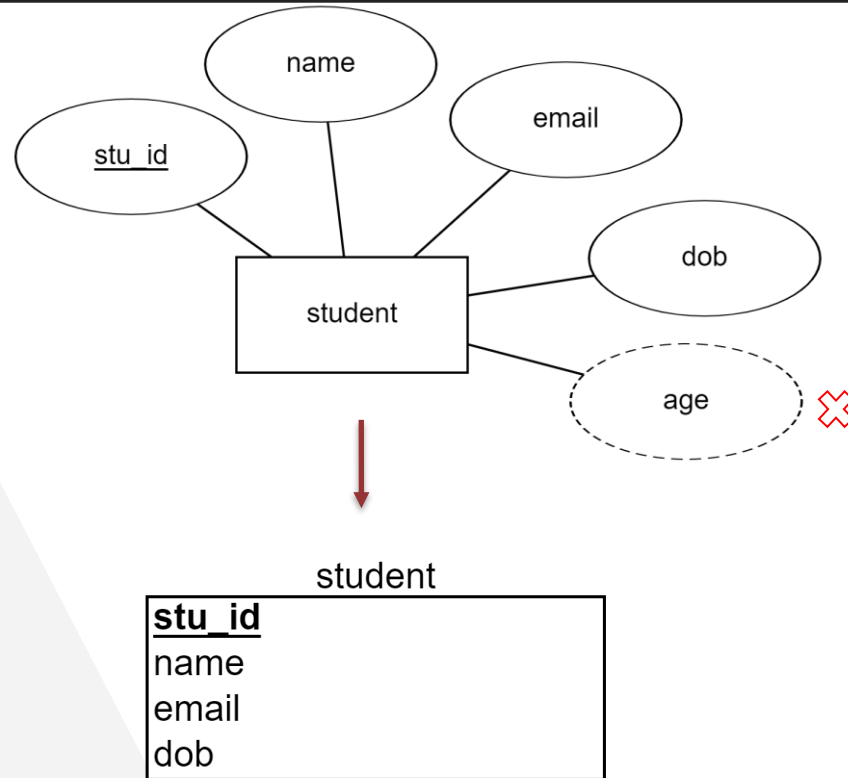
# Relational Schema >> Composite Attribute



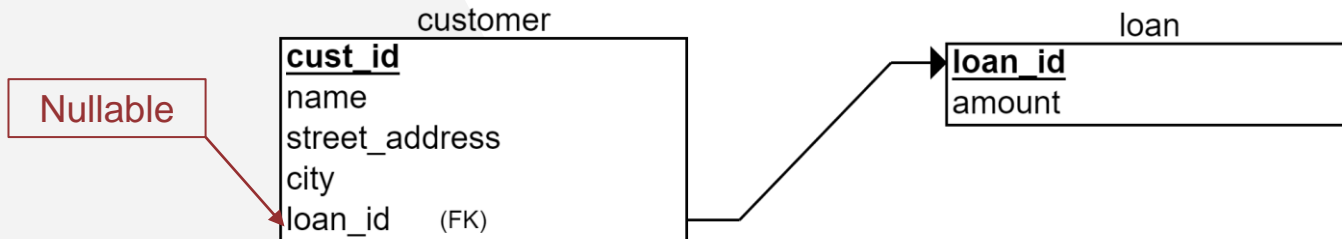
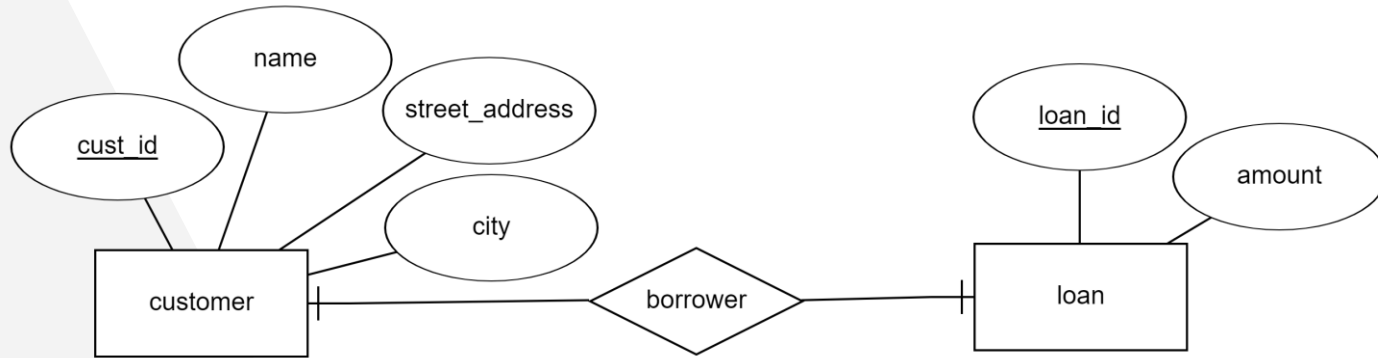
# Relational Schema >> Multivalued Attribute



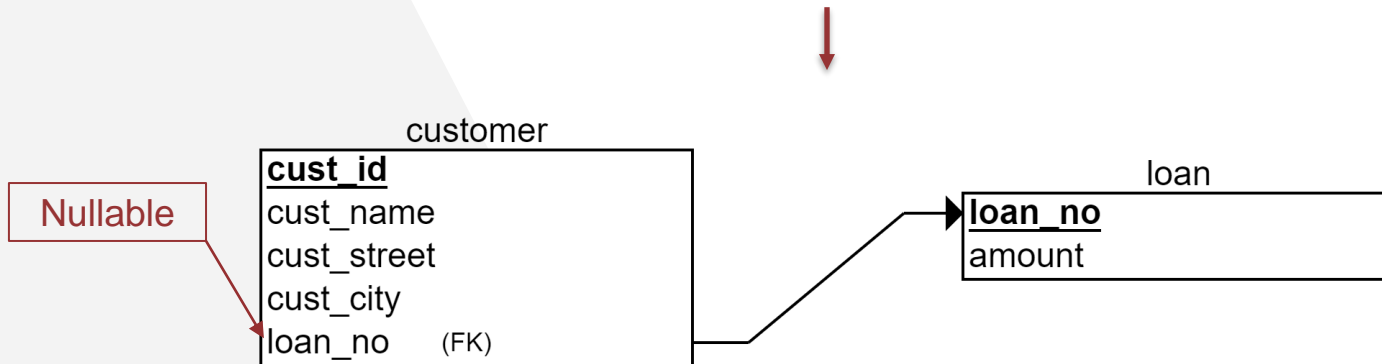
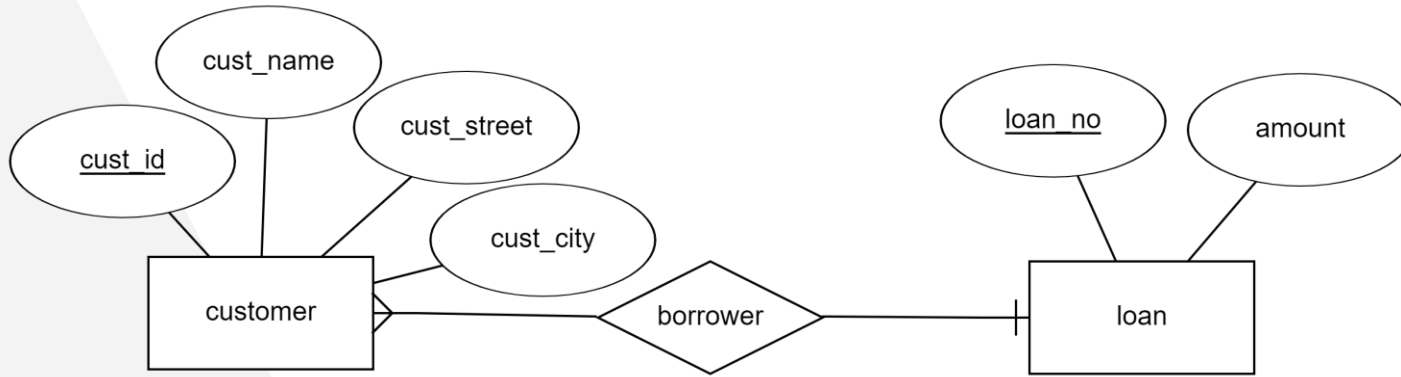
# Relational Schema >> Derived Attribute



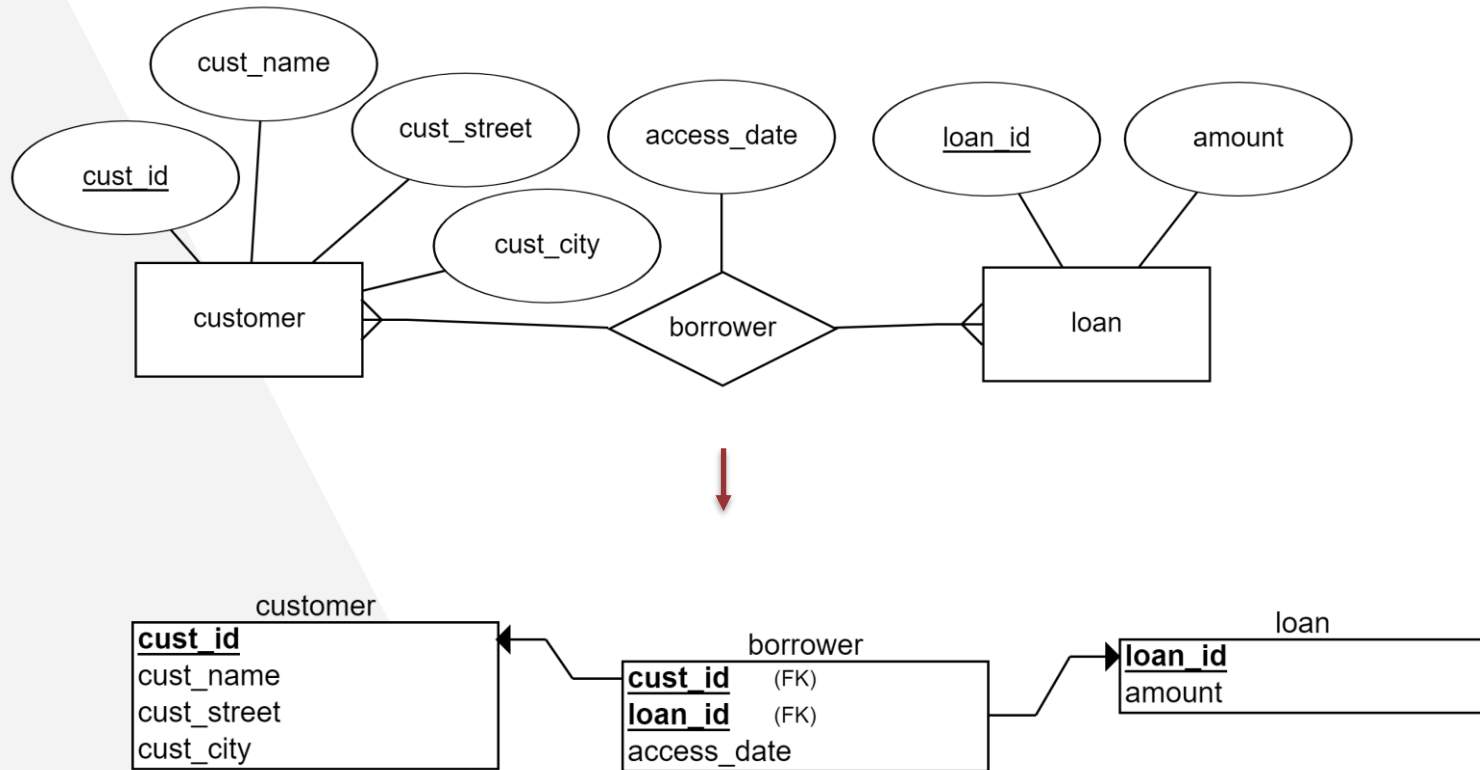
# Relational Schema >> One to One Relationship Set



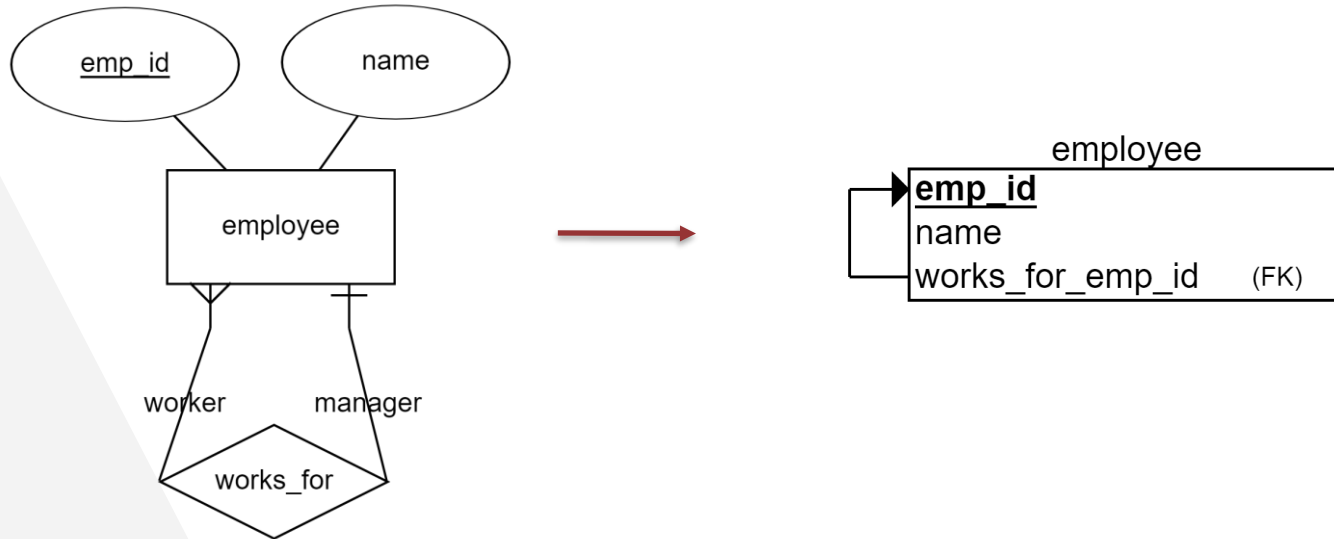
# Relational Schema >> One to Many Relationship Set



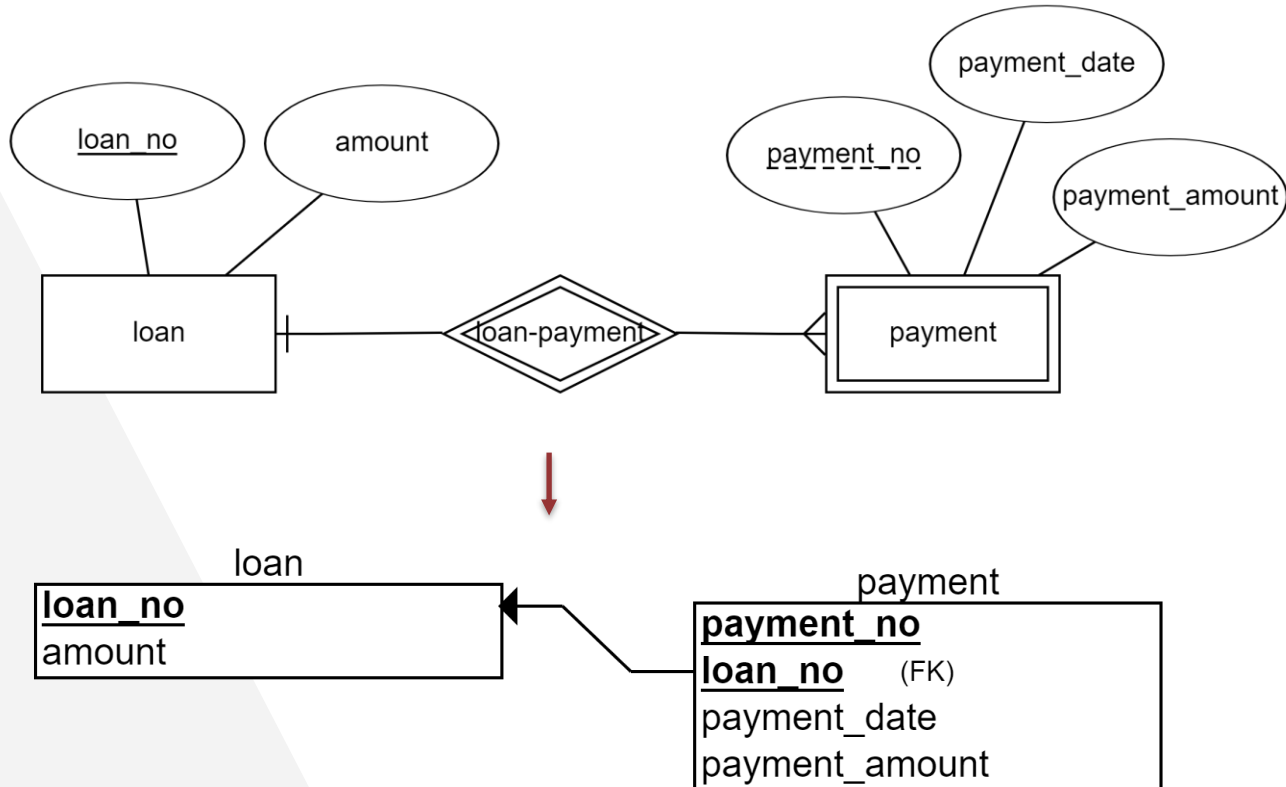
# Relational Schema >> Many to Many Relationship Set



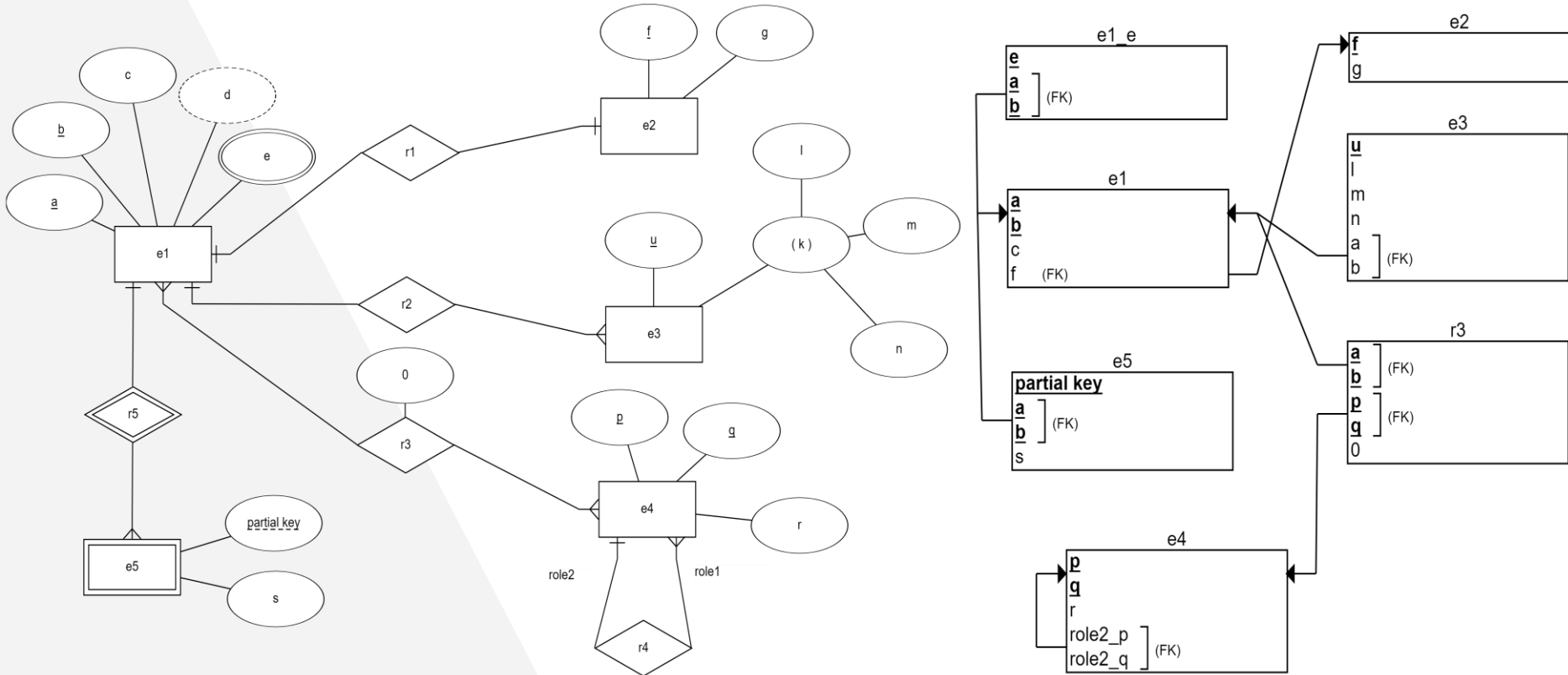
# Relational Schema >> Recursive Relationship Set



# Relational Schema >> Identifying Relationship Set



# E-R Diagram → Relational Schema



# THANKS!

**Any questions?**

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## References:

- Database System Concepts by S. Sudarshan, Henry F. Korth, Abraham Silberschatz
- Database Systems The Complete Book by Ullman, Widom and Hector
- <https://www.lucidchart.com/pages/er-diagrams>
- <https://www.vertabelo.com/blog/chen-erd-notation/>