

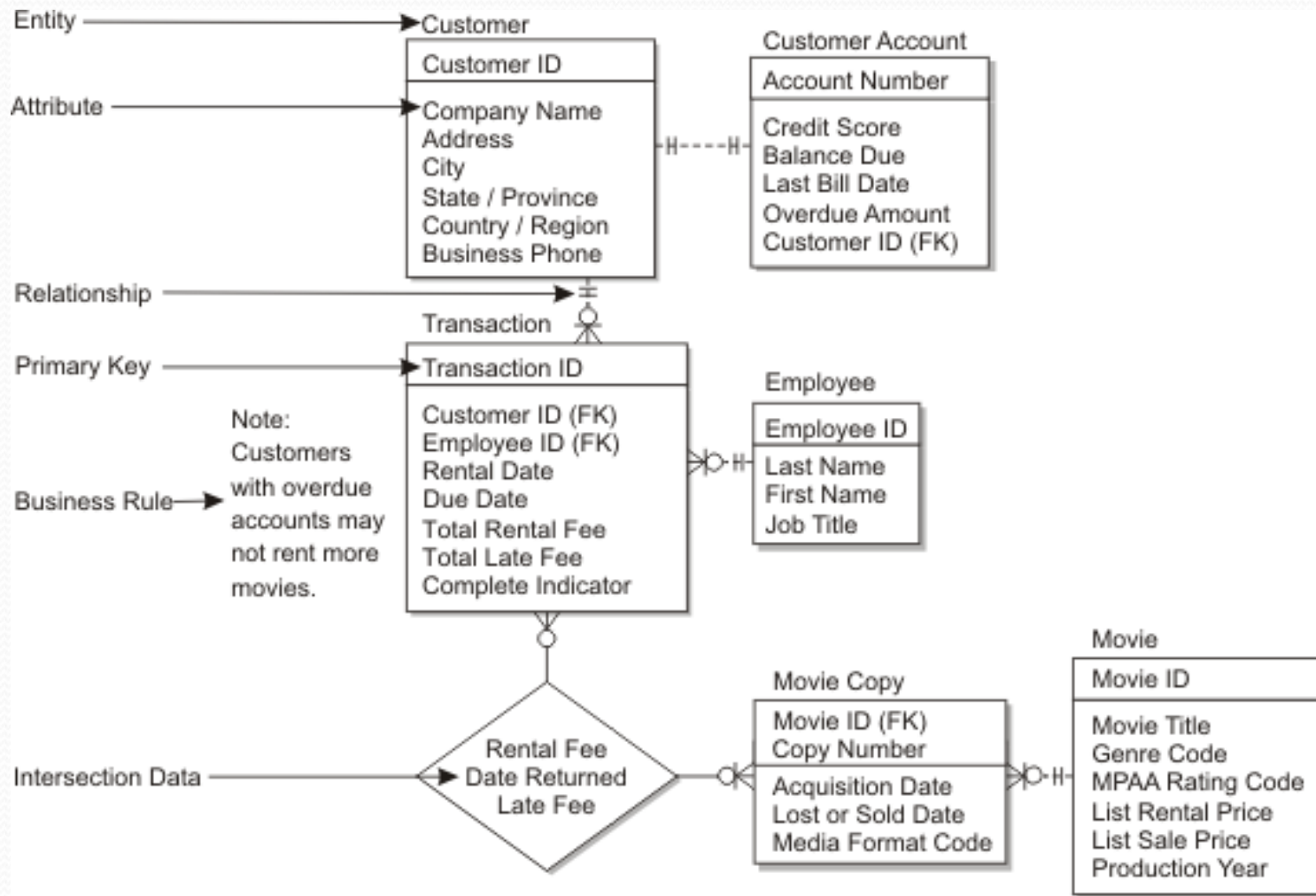
# Relational Model Components

(Class 1, Chapter 2)

# Conceptual and Logical Model Components

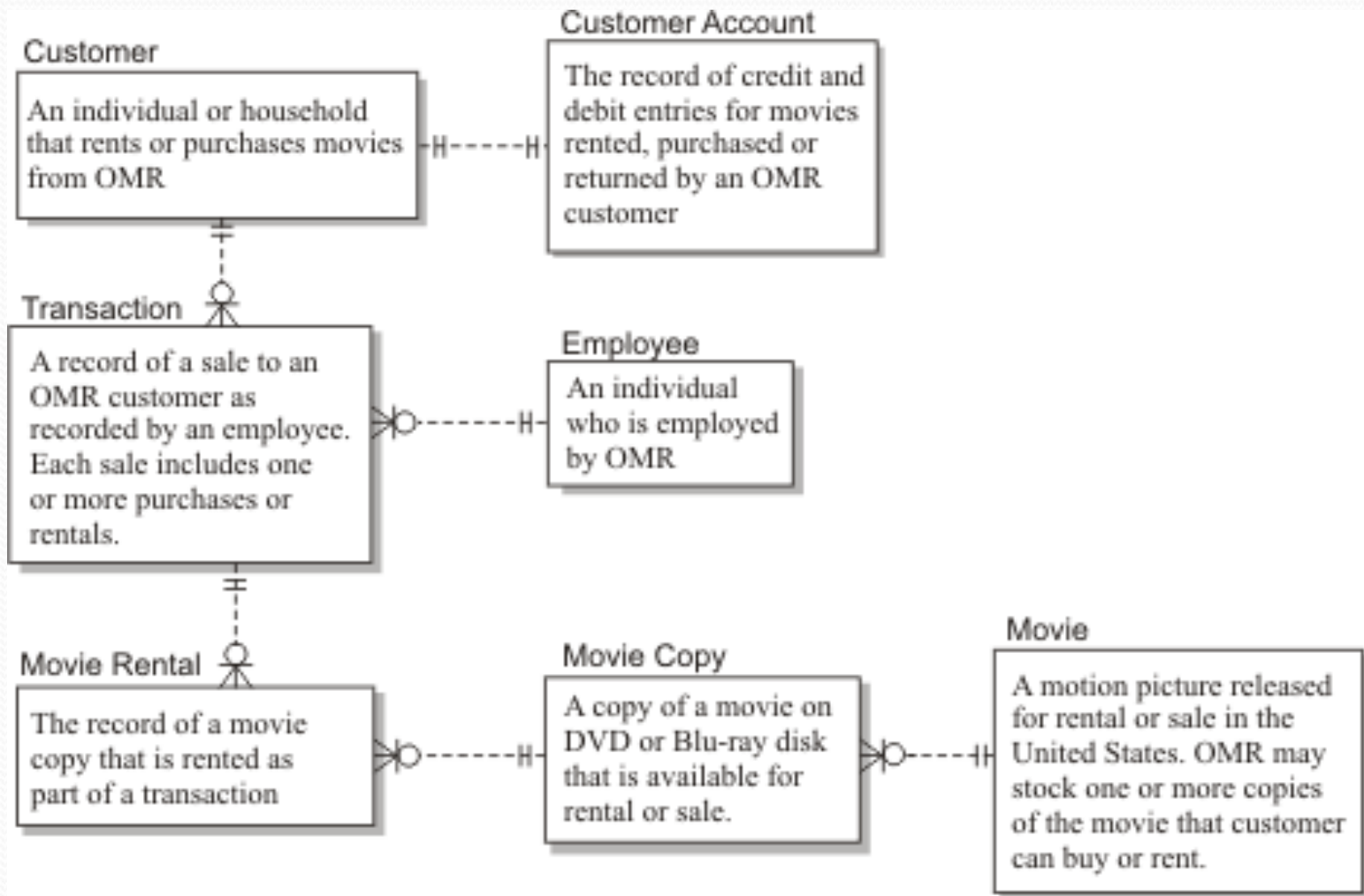
- Entities: An *entity* is person, place, thing, event or concept about which data is collected
  - Represented as rectangles
  - Uniquely named and given a written definition
- Attributes: An *attribute* is a unit fact that characterizes or describes an entity in some way
  - Represented as names within the entity rectangles (unique identifier above the horizontal line)
  - Uniquely named and given a written definition
- Relationships: associations among the entities
  - Represented as lines with symbols drawn between entities
- Business Rules (optional)

# Sample Conceptual Model

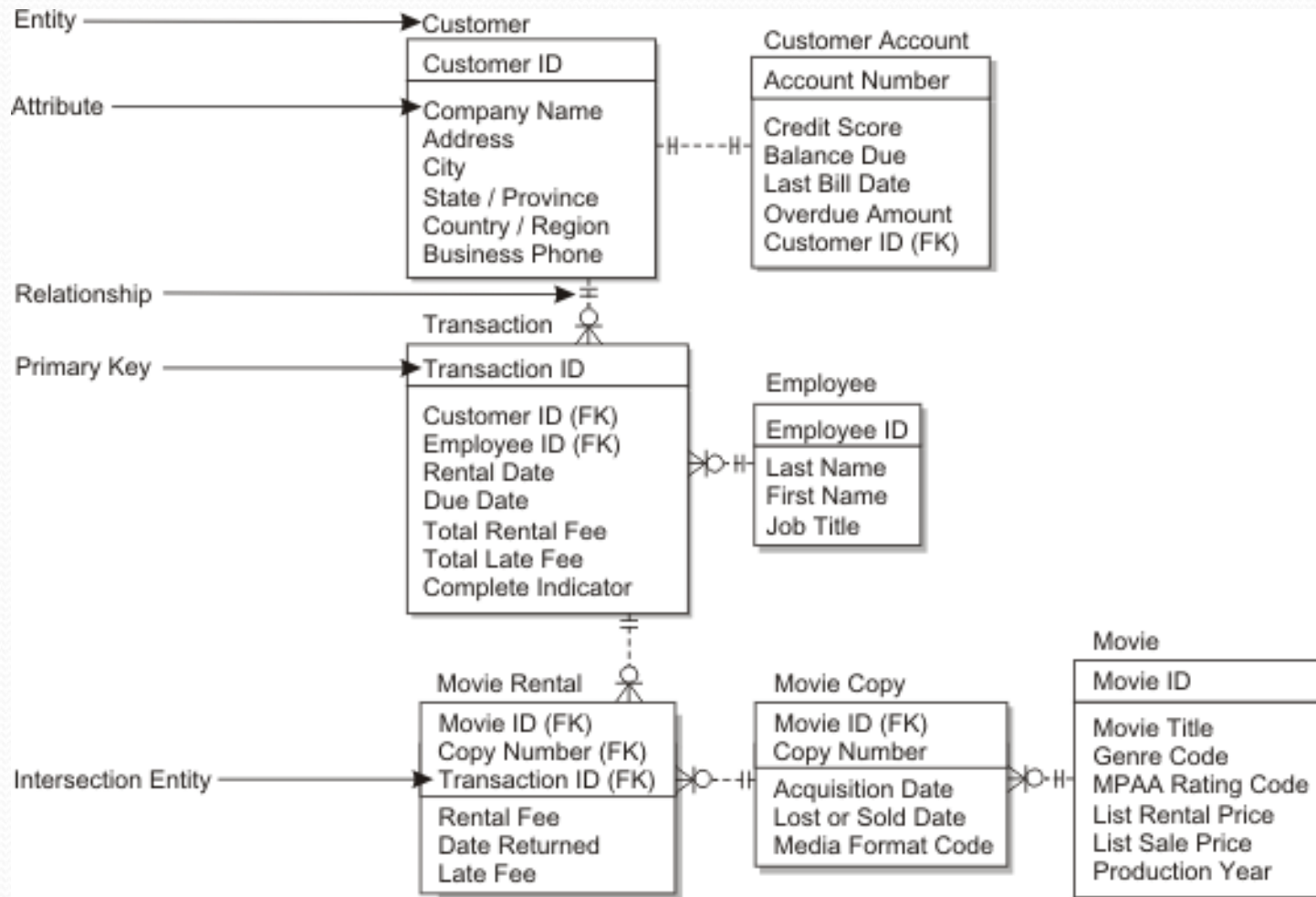




# Alternative Conceptual Model Notation



# Sample Logical Model





# Entity Names

- Use unique names
- Avoid technical jargon
- Use singular names
- Avoid attribute names
- Avoid limiting terms
- Avoid unnecessary abbreviations and acronyms

# Entity Definitions

- Avoid technical jargon (use business terms)
- Distinguish the entity from all others
- Distinguish each occurrence from another



# Attribute Naming

- Avoid technical jargon (use business terms)
- Use singular names
- Avoid unnecessary abbreviations and acronyms
- Use class words
- Use entity name prefixes consistently
- Use attribute names consistently





# Relationship Properties

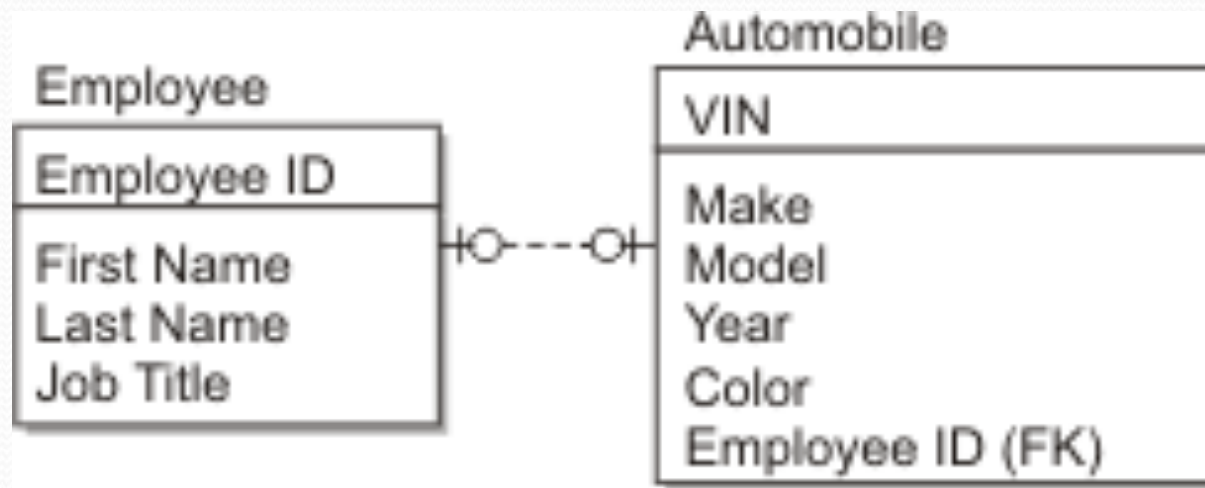
- **Mandatory:** each instance of one entity must be associated with at least one instance of the other (e.g. an Order must have an associated Customer)
- **Optional:** each instance of one entity can exist without a corresponding instance of the other (e.g. A Customer can exist with no associated Orders)
- **Transferability:** an instance of an entity that is associated with one instance of the other entity can be changed to be associated with a different instance (e.g. An Employee can change Departments)

# Relationship Types

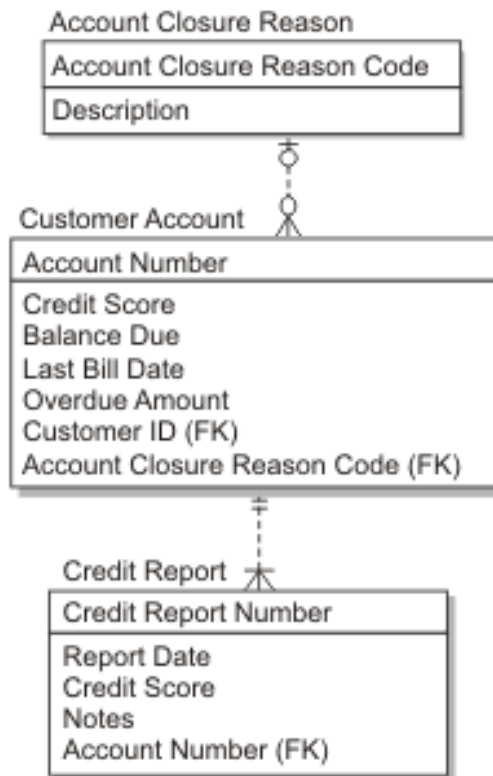
- One-to-One: an instance of an entity may be associated with at most one instance of the other and vice versa (Surprisingly rare in practice)
- One-to-Many: any instance of the first entity may be associated with one or more instances of the second entity, but each instance of the second entity can be associated to at most one instance of the first entity
- Many-to-Many: any instance of the first entity may be associated with one or more instances of the second entity and vice versa
- Recursive: Relationships between entities of the same type



# Sample One-to-One Relationship

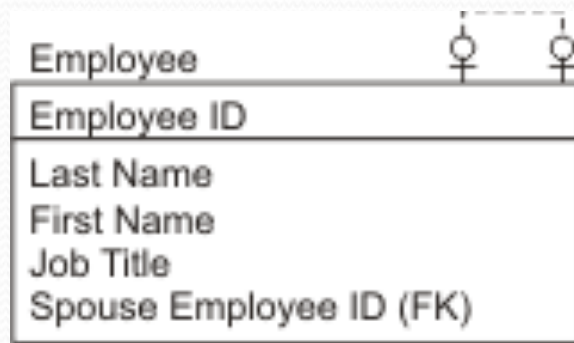


# Sample One-to-Many Relationships

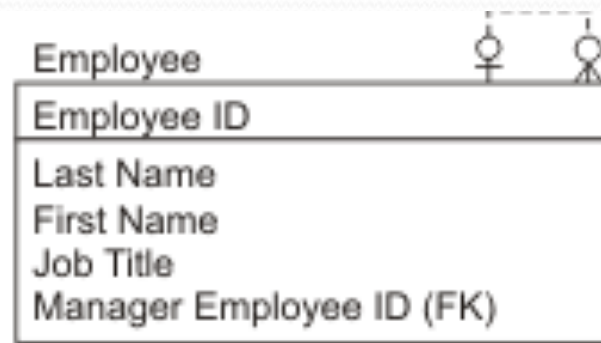




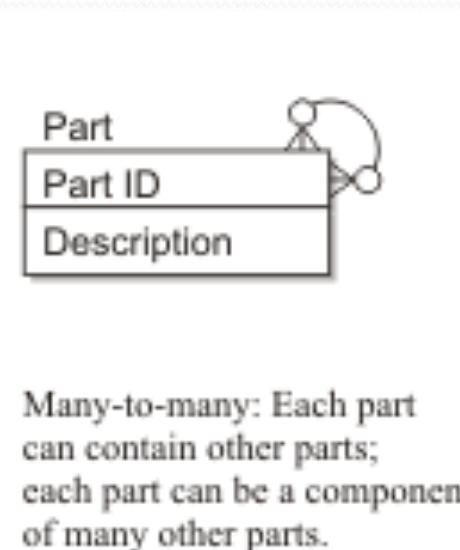
# Recursive Relationships



One-to-one: Each employee can be married to another employee or not.



One-to-many: An employee can manage other employees.



Many-to-many: Each part can contain other parts; each part can be a component of many other parts.

# Physical Model Components (RDBMS)

- Tables (including intersection tables)
- Columns and Data Types
- Constraints
  - Primary Key
  - Unique
  - Referential
  - Integrity
    - NOT NULL
    - CHECK
    - Triggers
  - Views



# Sample Physical Model

