IT 775
Database Technology

ER Modeling
Overview

INTRODUCTION

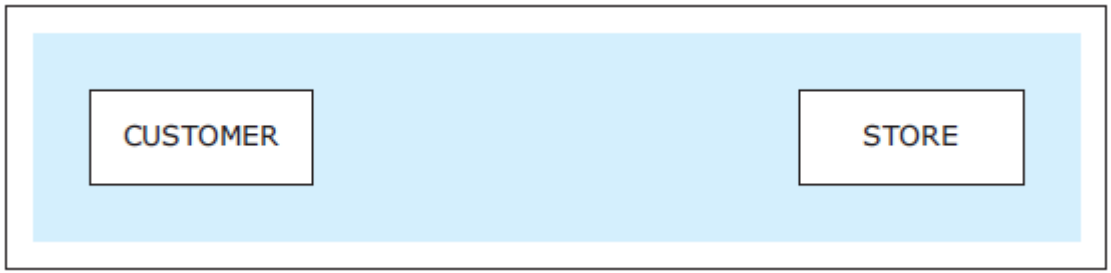
- **Entity-relationship (ER) modeling -** A conceptual database modeling technique
  - Enables the structuring and organizing of the requirements collection process
  - Provides a way to graphically represent the requirements
- **ER diagram (ERD) -** the result of ER modeling
  - Serves as a blueprint for the database

ENTITIES

- **Entities -** constructs that represent what the database keeps track of
  - The basic building blocks of an ER diagram
  - Represent various real world notions, such as people, places, objects, events, items, and other concepts
  - Within one ERD, each entity must have a different name

ENTITIES

Two entities

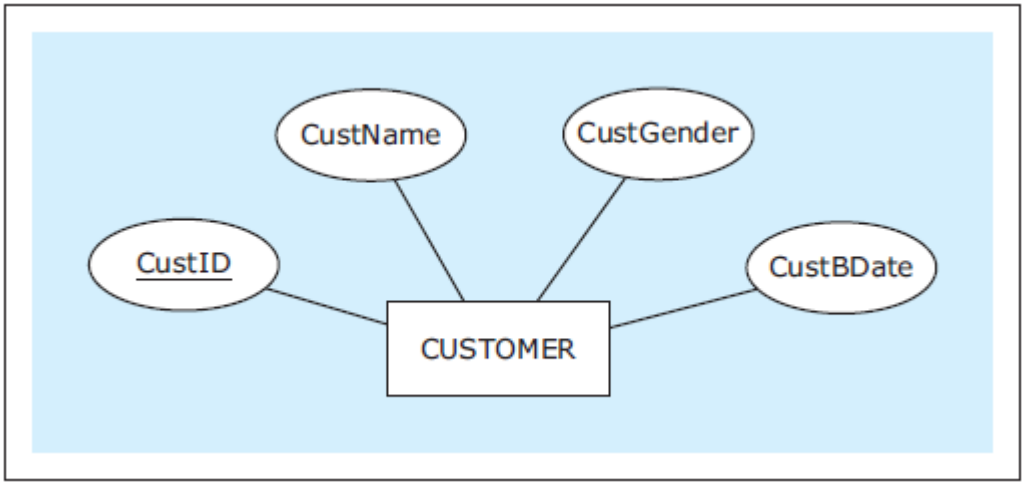


ATTRIBUTES

- **Attribute -** depiction of a characteristic of an entity
  - Represents the details that will be recorded for each entity instance
  - Within one entity, each attribute must have a different name

ATTRIBUTES

An entity with attributes

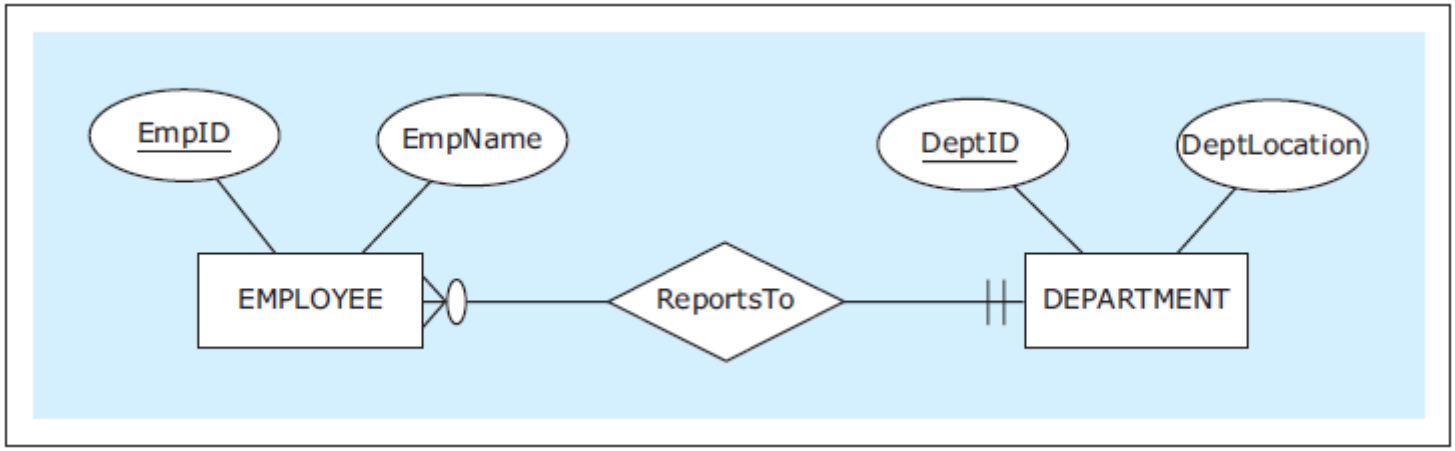


RELATIONSHIPS

- **Relationship -** ER modeling construct depicting how entities are related
  - Within an ER diagram, each entity must be related to at least one other entity via a relationship

RELATIONSHIPS

A relationship between two entities



NAMING CONVENTIONS FOR ER DIAGRAMS

- Entities and Attributes
  - Use singular (rather than plural) nouns
- Relationships
  - Use verbs or verb phrases, rather than nouns

NAMING CONVENTIONS FOR ER DIAGRAMS

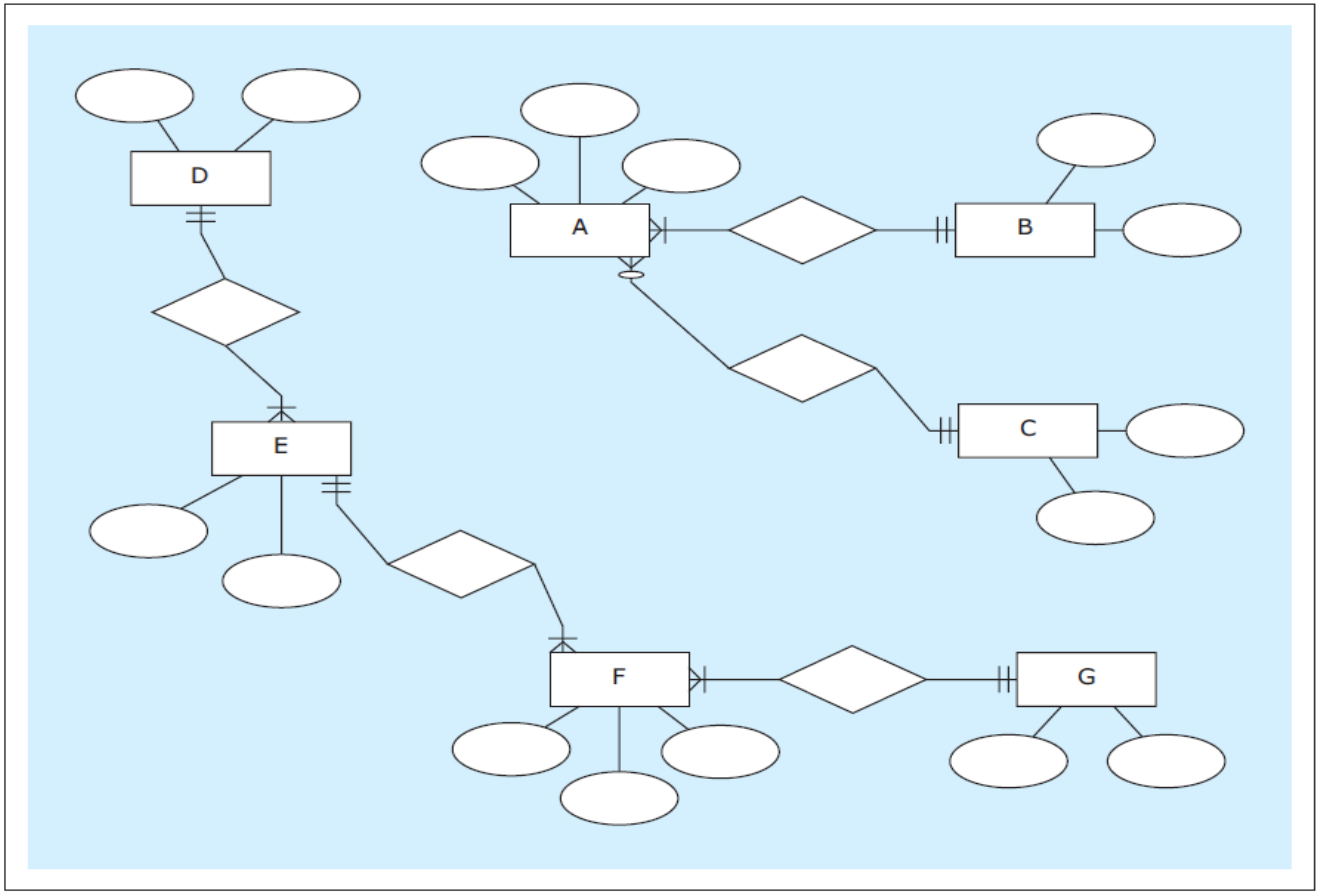
- Names should be as brief as possible, without being too condensed as to obscure the meaning of the construct
- If possible, give all attributes in the entire ER diagram different names

MULTIPLE ER DIAGRAMS

- When depicting multiple ER diagrams, each diagram should be visualized separately
- Instead of multiple ER diagrams in one schema a better choice is to present each ER diagram separately

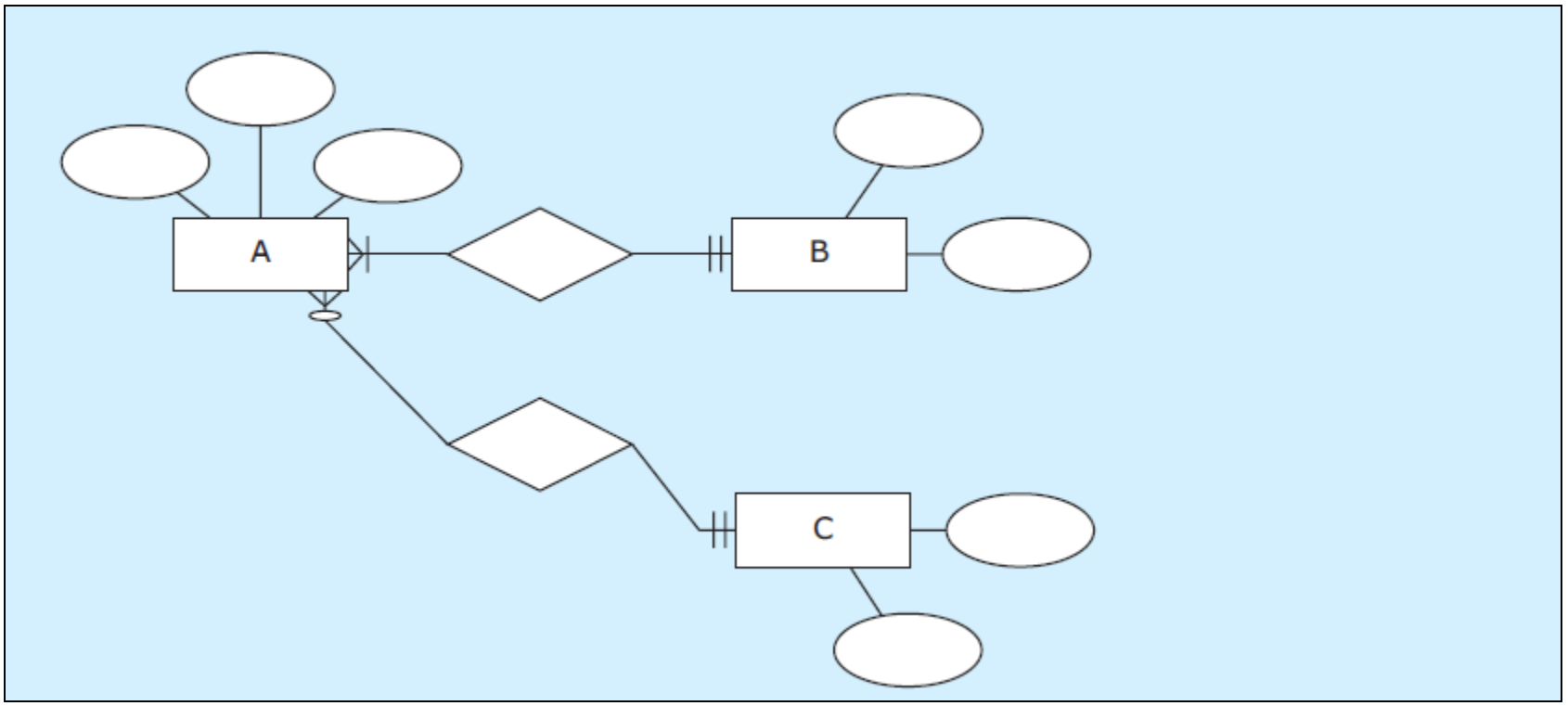
MULTIPLE ER DIAGRAMS

A schema with two separate ER diagrams (potentially misleading)



MULTIPLE ER DIAGRAMS

Separate ER diagrams in separate schemas



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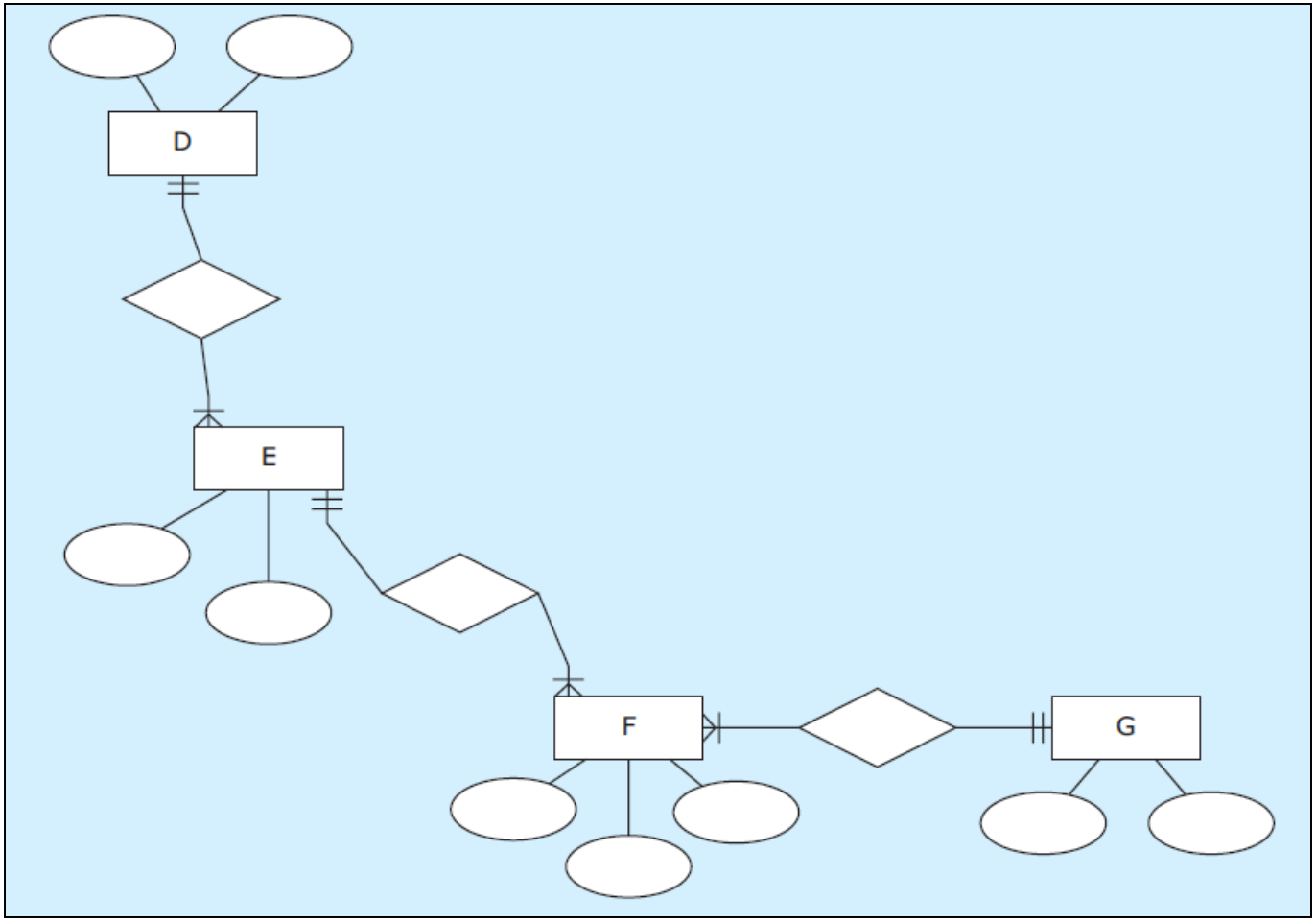
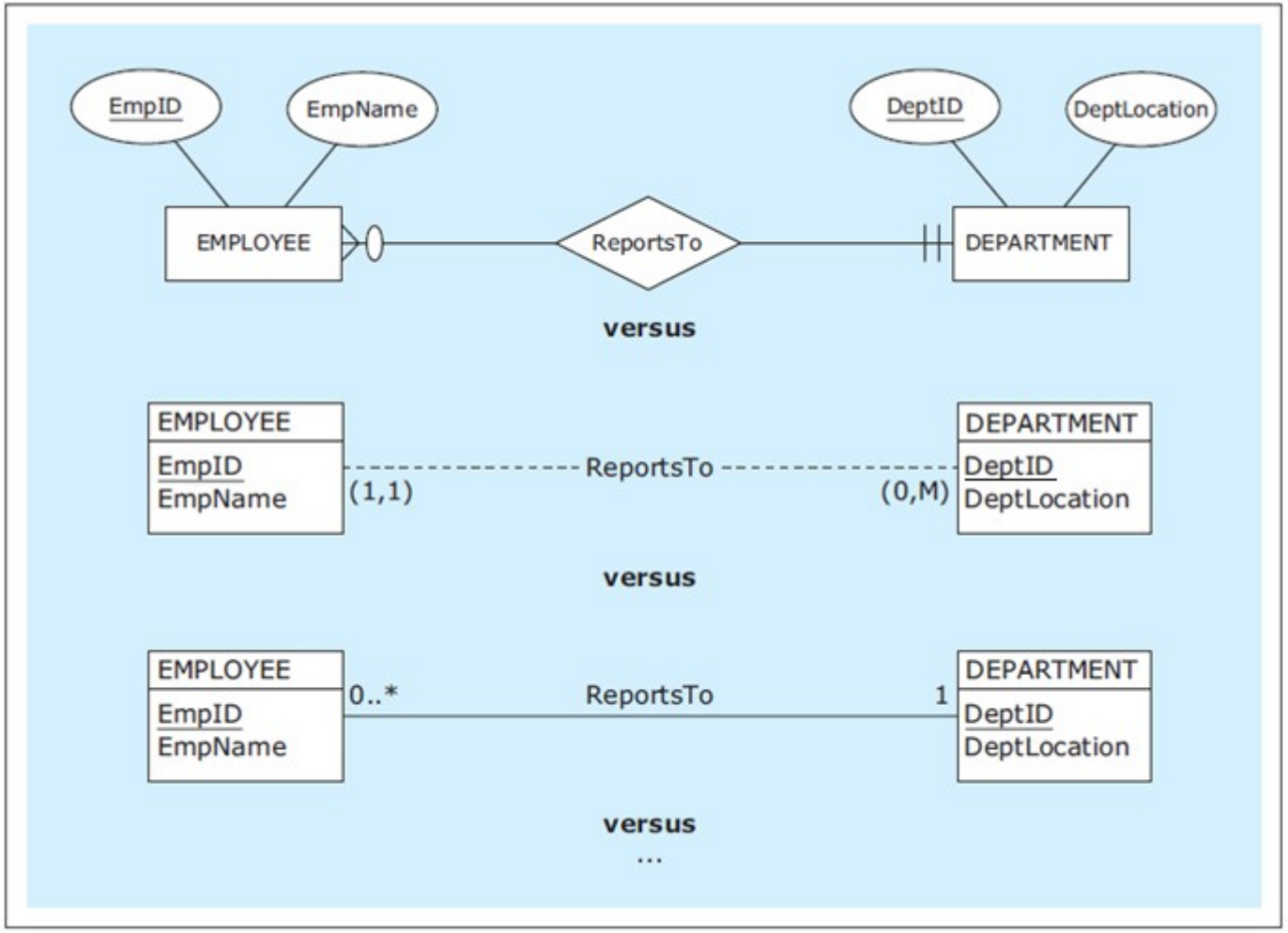


VARIOUS ER NOTATIONS

- There is no universally adopted ER notation to which all database projects conform
- Instead, there is a variety of available ER notations in use
- However, if a designer is familiar with one ER notation, other alternative ER notations are easy to understand and use

VARIOUS ER NOTATIONS

Examples of various ER notations



DATABASE REQUIREMENTS AND ER MODEL USAGE

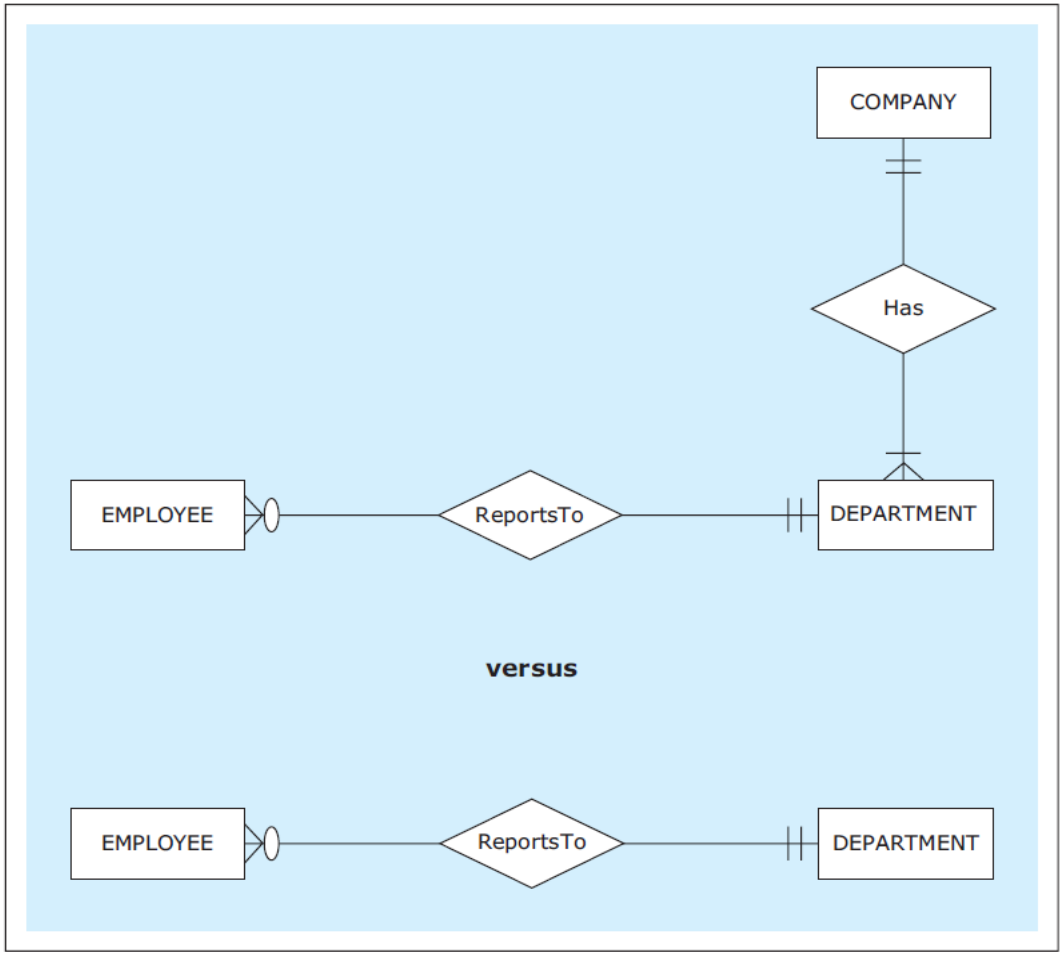
- ER modeling provides a straightforward technique for collecting, structuring, and visualizing requirements
- An understanding of ER modeling is crucial, not just for creating ER models based on the requirements, but also during the requirements collection process itself
- It helps keep the focus on asking or seeking answers to the right questions in order to establish the relevant facts about entities, attributes, and relationships

DATABASE REQUIREMENTS AND ER MODEL USAGE

- One of the common mistakes that beginners make when engaging in ER modeling for the first time is not recognizing the difference between an entity and the ER diagram itself

DATABASE REQUIREMENTS AND ER MODEL USAGE

An ER diagram incorrectly and correctly interpreting requirements



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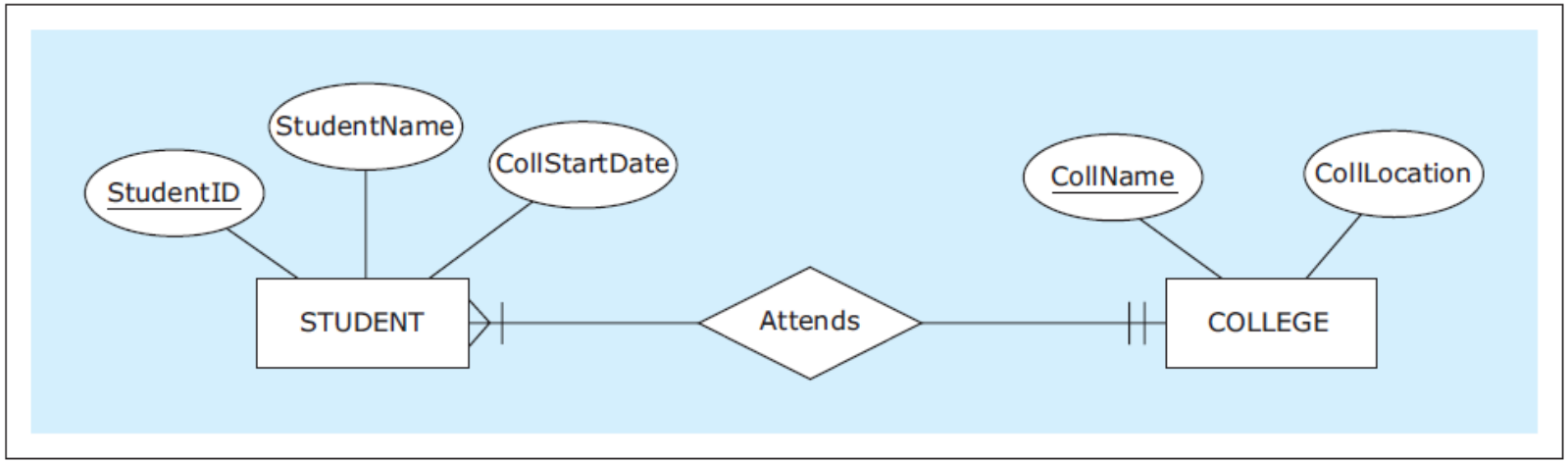

DATABASE REQUIREMENTS AND ER MODEL USAGE

- Another common database requirements collection and ER modeling mistake made by novices is not distinguishing between:

  Modeling of the data that is wanted and can be kept track of

  versus

  Modeling of everything that takes place in an organization

DATABASE REQUIREMENTS AND ER MODEL USAGE

An ER diagram based on unfeasible and proper requirements