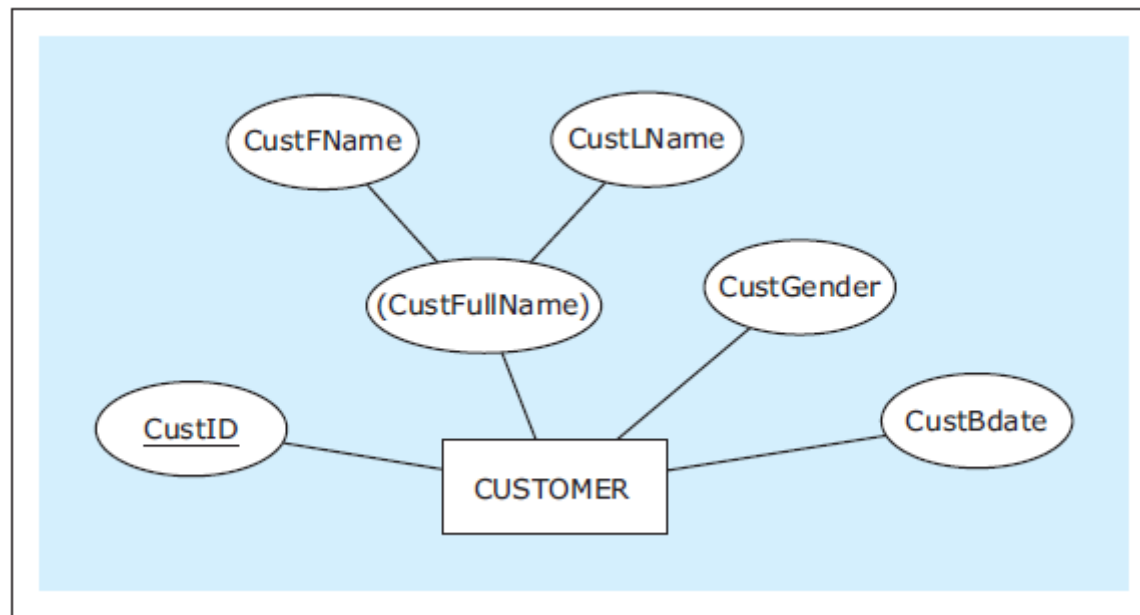# IT 775
Database Technology

ER Modeling

Attributes

ATTRIBUTES

- **Composite attribute –** attribute that is composed of several attributes
  - Not an additional attribute of an entity
  - Its purpose is to indicate a situation in which a collection of attributes has an additional meaning, besides the individual meanings of each attribute
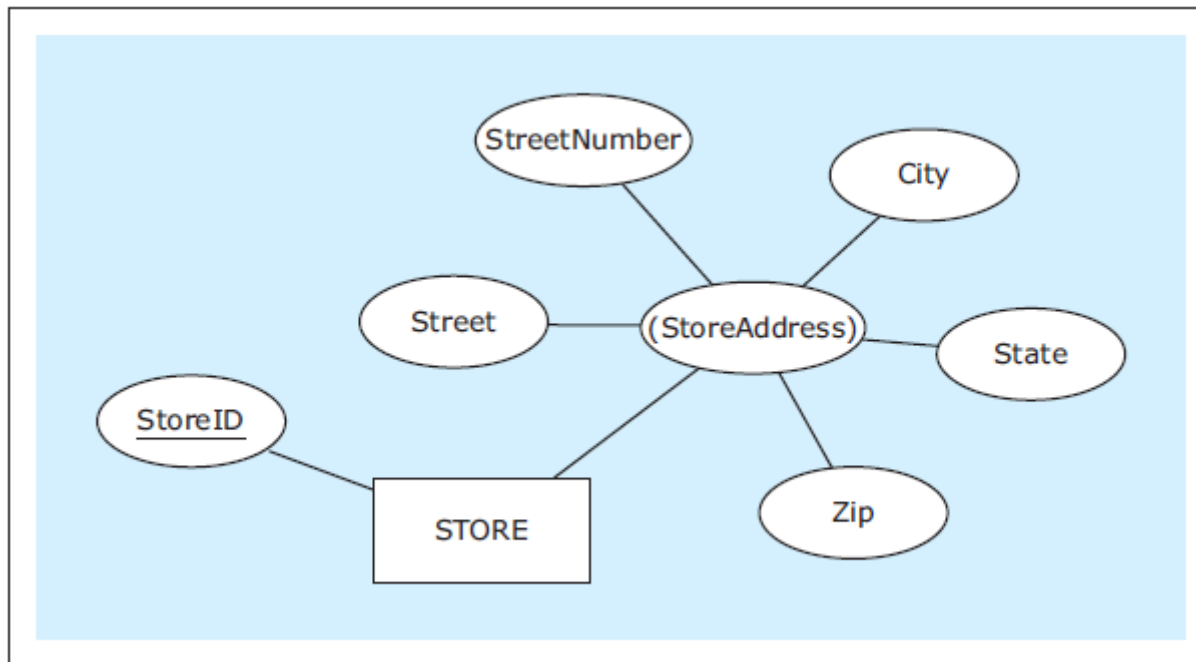
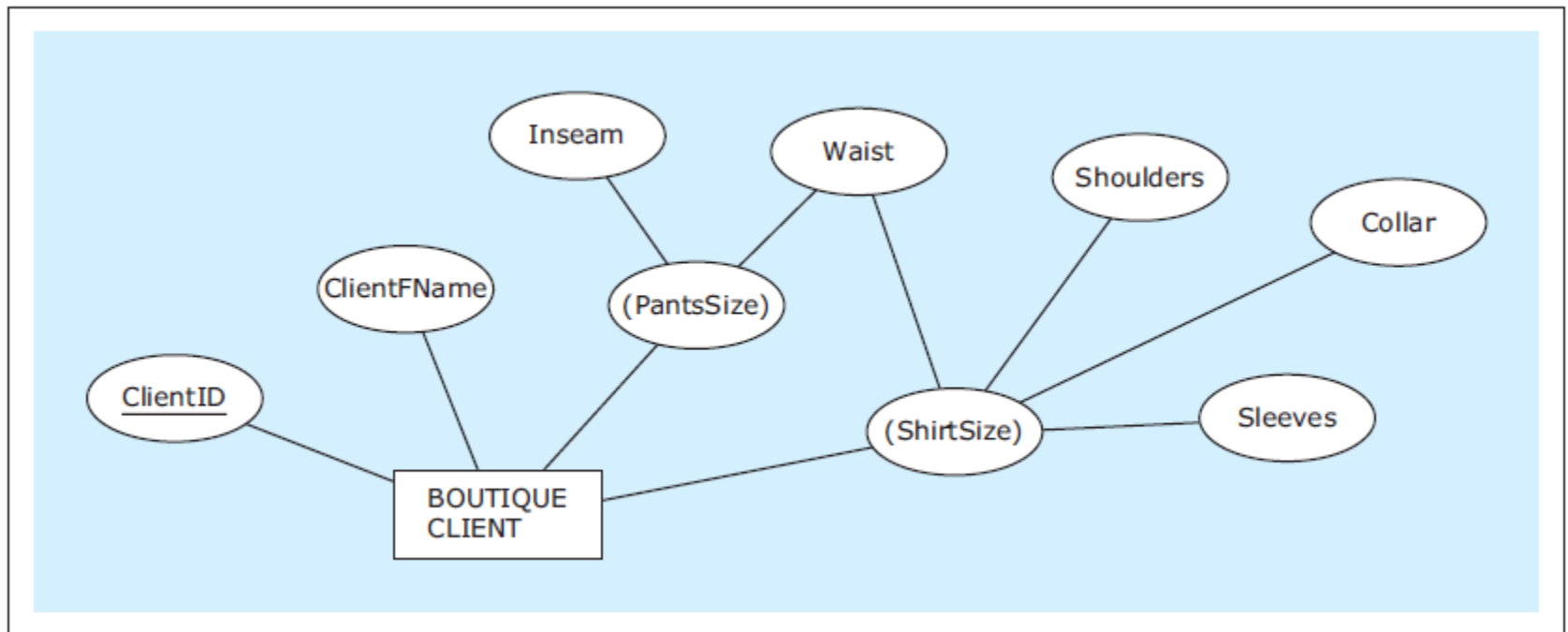# ATTRIBUTES

An entity with a composite attribute

ATTRIBUTES

Another entity with a composite attribute

ATTRIBUTES

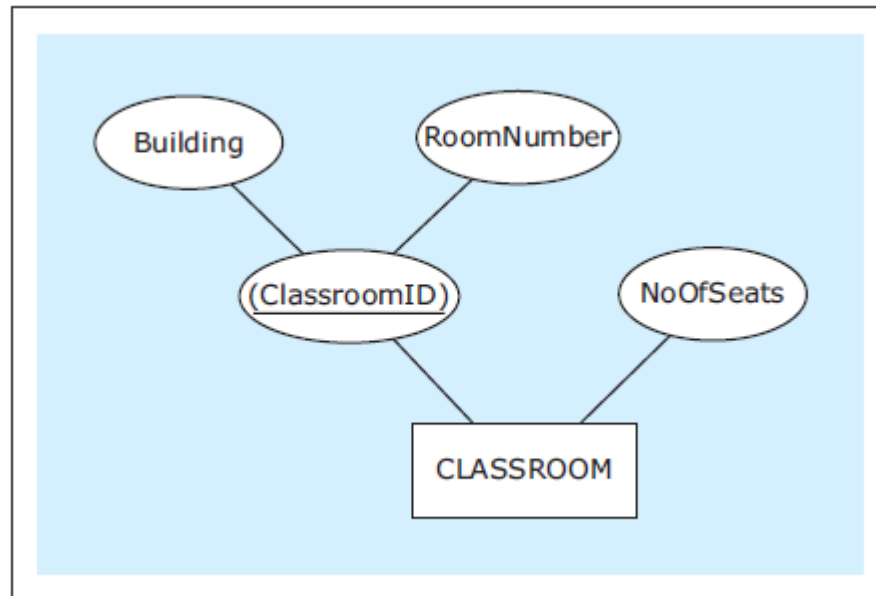## Composite attributes sharing components

ATTRIBUTES

- **Composite unique attribute –** attribute that is composed of several attributes and whose value is different for each entity instance

ATTRIBUTES

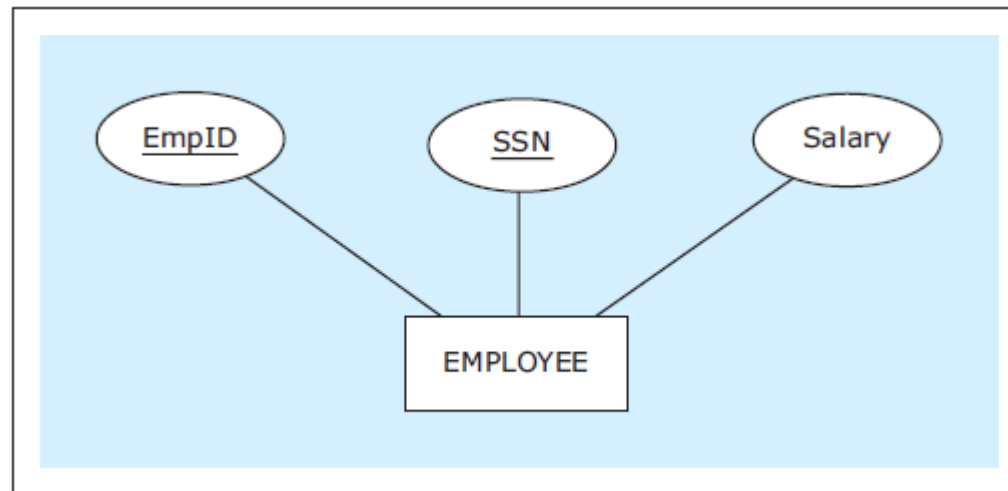An entity with a unique composite attribute

ATTRIBUTES

- **Multiple unique attributes (candidate keys) -** when an entity has more than one unique attribute each unique attribute is also called a candidate key
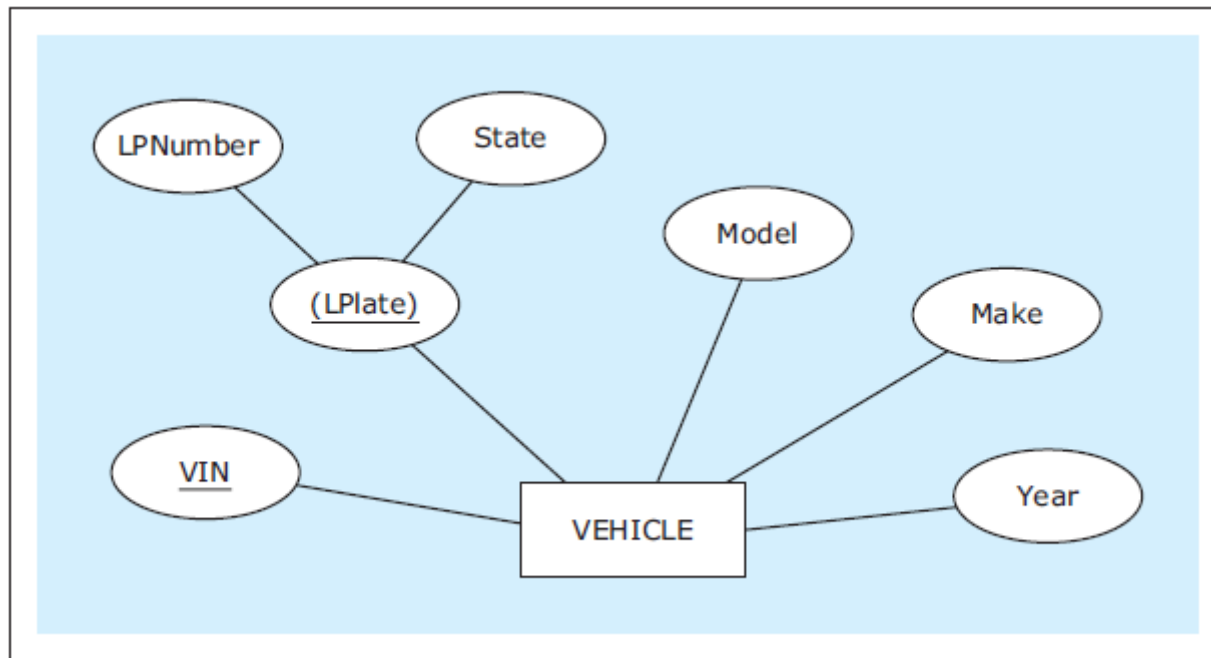
ATTRIBUTES

Multiple unique attributes (candidate keys)

ATTRIBUTES

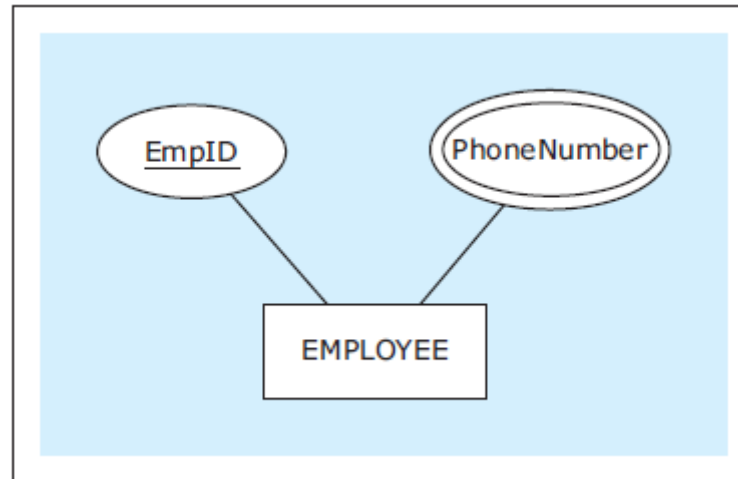## With regular and composite candidate key

ATTRIBUTES

- **Multivalued attribute -** attribute for which instances of an entity can have multiple values for the same attribute
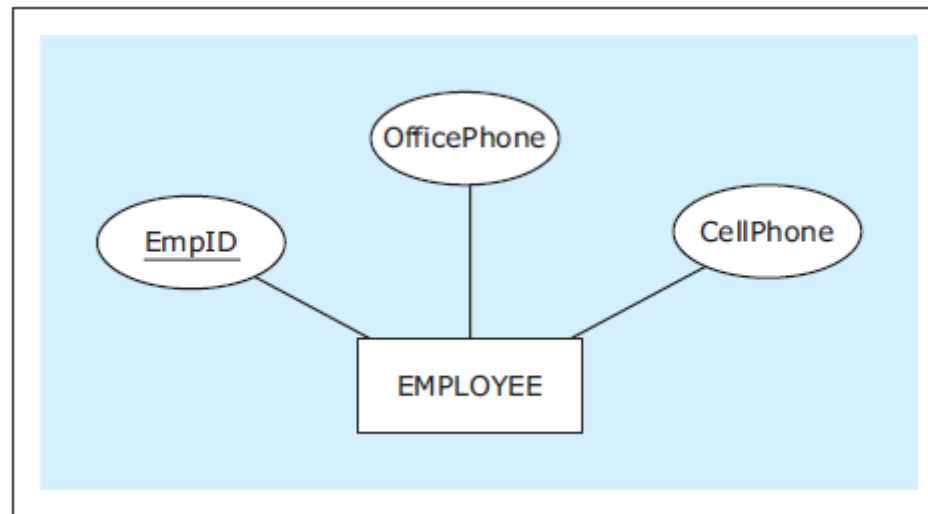
ATTRIBUTES

A multivalued attribute

ATTRIBUTES

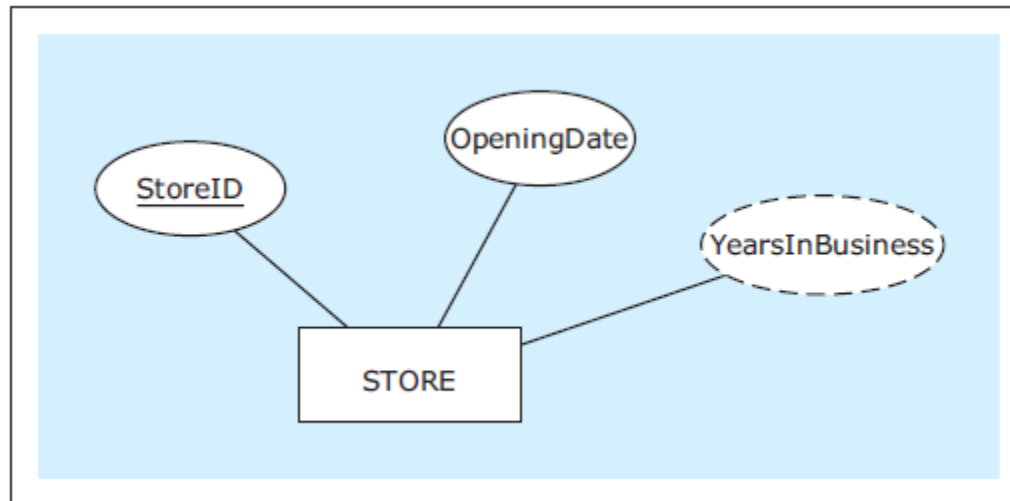A scenario not using multivalued attributes

ATTRIBUTES

- **Derived attribute -** attribute whose values are calculated and not permanently stored in a database
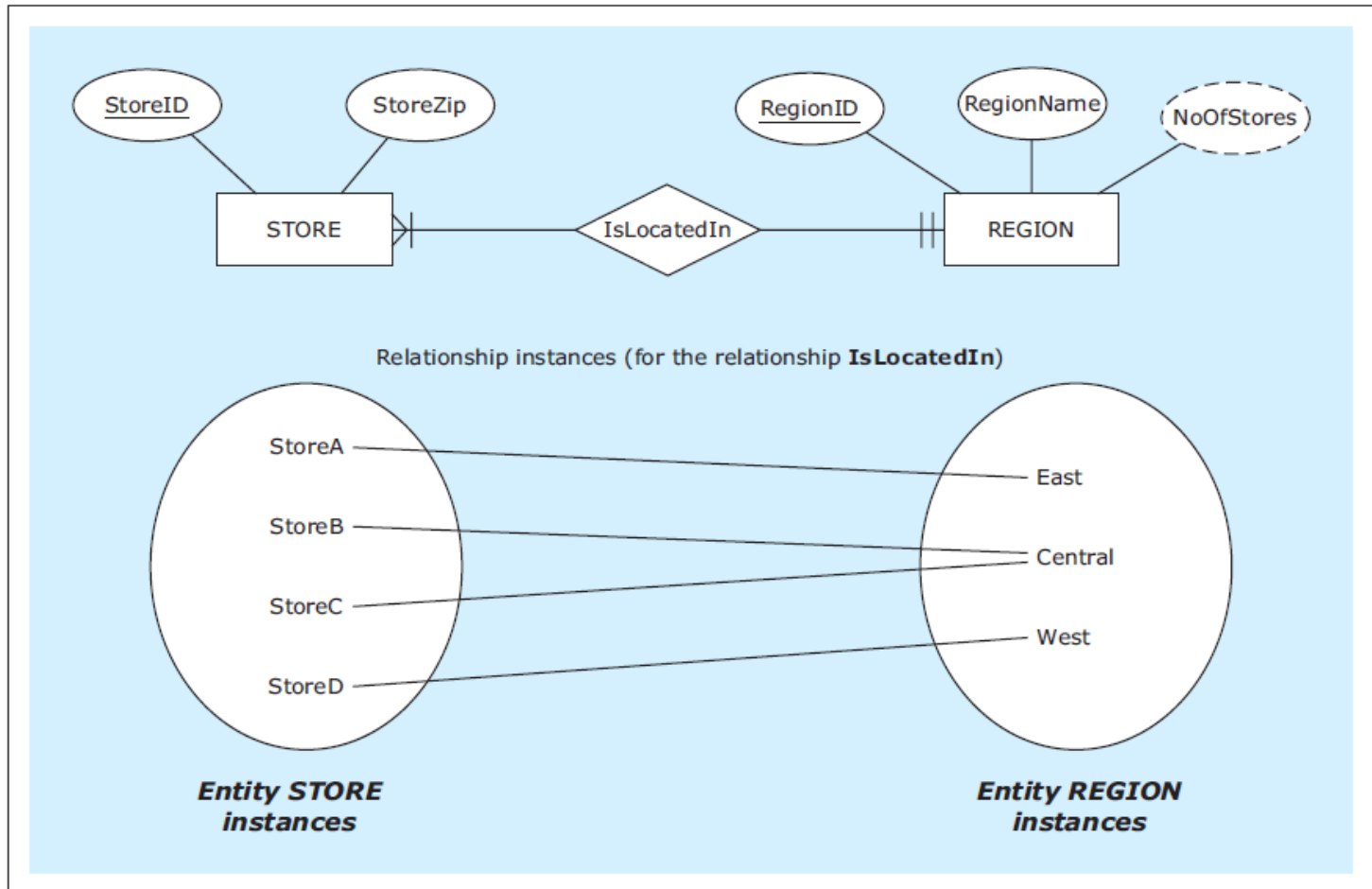
ATTRIBUTES

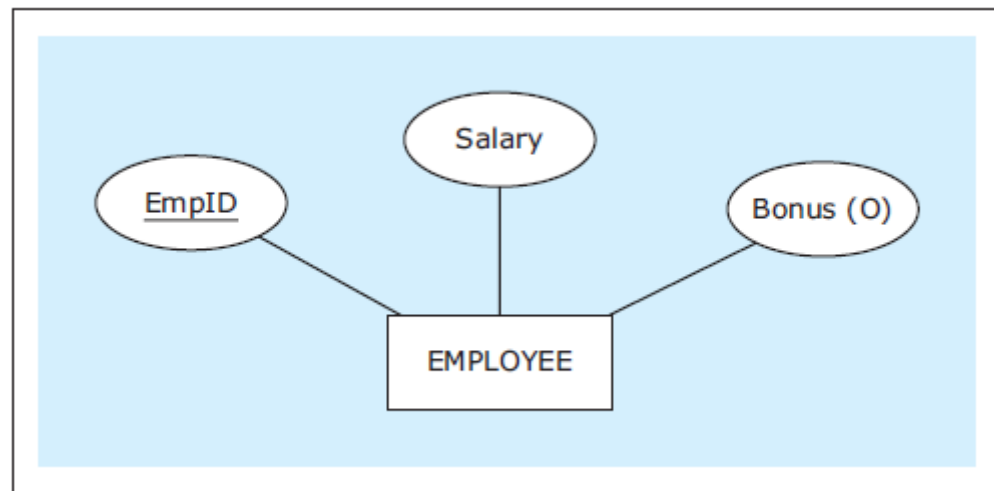## A derived attribute example

ATTRIBUTES

Another derived attribute example

ATTRIBUTES

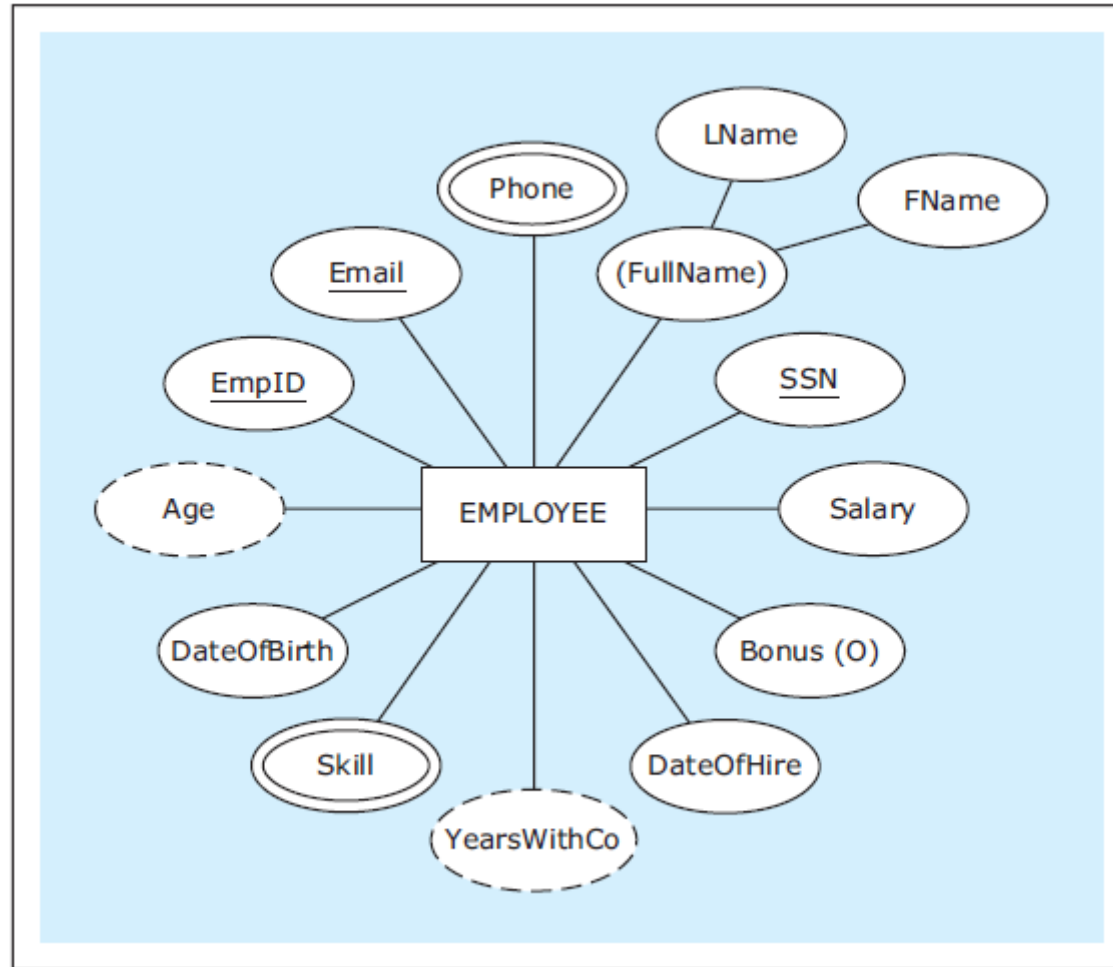- **Optional attribute -** attribute that is allowed to not have a value

ATTRIBUTES

An optional attribute example

ATTRIBUTES

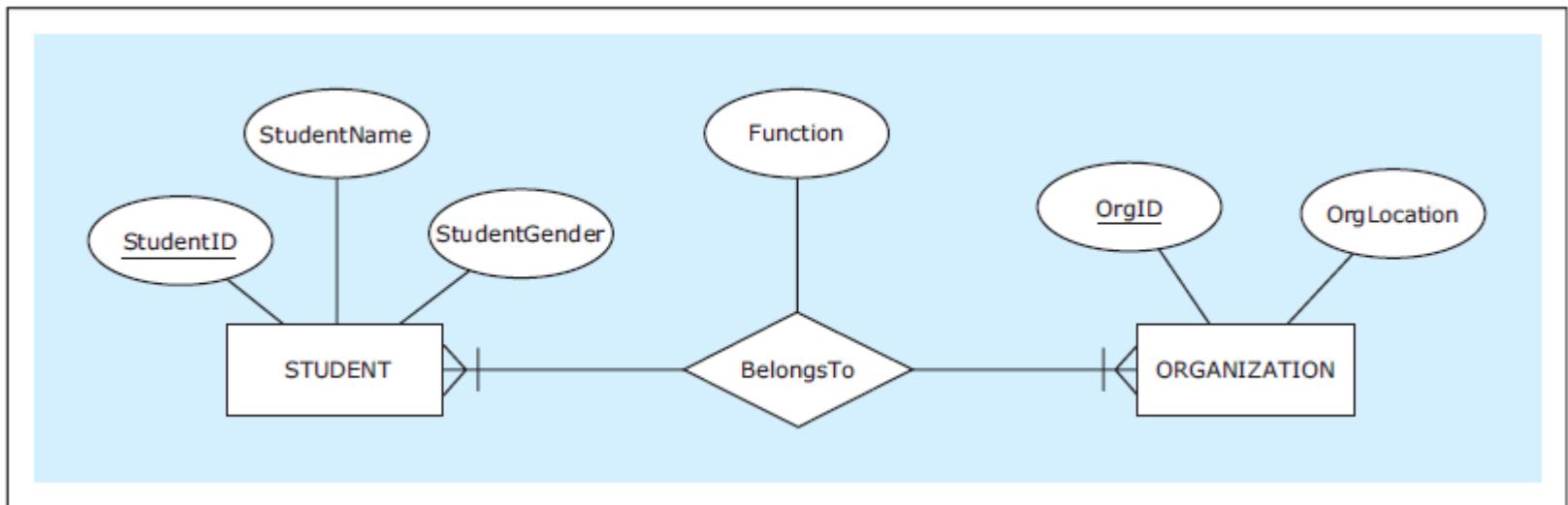## EXAMPLE: An entity with various types of attributes

Attributes

- **Relationship attributes**
  - In some cases M:N relationships can actually have attributes of their own

Attributes

A M:N relationship with an attribute

Attributes

A 1:M relationship with and without an attribute