

Slide Set 4: ER Attributes

Conceptual Data Model

- ❖ Relatively simple representation of complex real-world data structures
- ❖ Global view of data
- ❖ Hardware and software independent
- ❖ Enables communication between users, administrators, and designers
- ❖ Facilitates planning and designers' tasks
- ❖ Enables **Business Rules** to be applied in the design of the RDBMS

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ERD Components

- ❖ **Entities**
 - ◆ Refers to the **entity set (table)**
 - ◆ Represented by **rectangle** containing entity's name
- ❖ **Attributes**
 - ◆ Represented by ovals that are connected to the entity with a line
 - ◆ Oval contains name of attribute (field) it represents
 - ◆ Attributes have a **domain** -- the attribute's set of possible values
 - ◆ Primary keys are underlined
- ❖ **Relationships**
 - ◆ Represented by diamonds describing relationship between two Entities

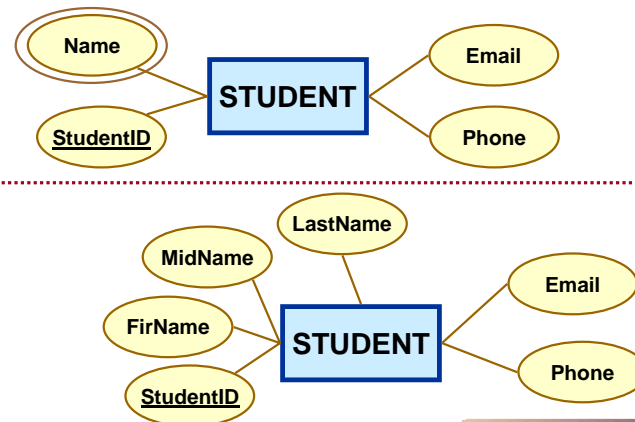
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Single/Composite Attributes

- ❖ A **simple attribute** cannot be subdivided.
 - ◆ Examples: Age, Sex, and Marital status
- ❖ A **composite attribute** can be further subdivided to yield additional attributes.
 - ◆ Examples:
 - ◆ NAME ↘ First, Middle, Last
 - ◆ ADDRESS ↘ Street, City, State, Zip
 - ◆ PHONE NUMBER ↘ Area code, Exchange number

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Entity with Attributes



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Single-valued/Multivalued Attributes

❖ Single-valued attribute has only a single value

◆ Examples:

- ◆ A person can have only one social security number.
- ◆ A manufactured part can have only one serial number.

❖ Multivalued attributes can have many values

◆ Examples:

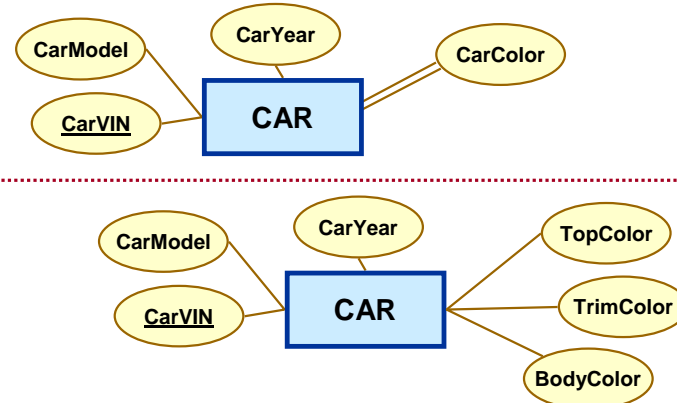
- ◆ A person may have several college degrees.
- ◆ A household may have several phones with different numbers

- ◆ Multivalued attributes are shown by a double line connecting to the entity.

- ◆ Must decompose for RDBMS to implement

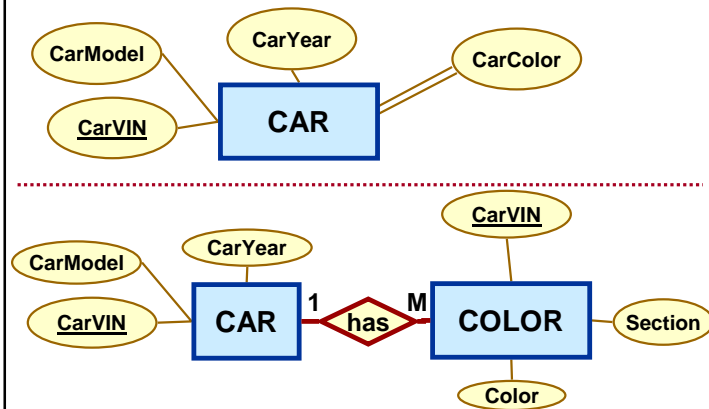
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Figure 3.8,9: Multivalued Attributes



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Figure 3.8,10: Multivalued Attributes

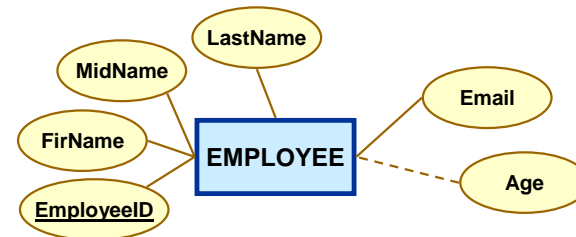


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Derived Attribute

❖ A derived attribute is not physically stored within the database; instead, it is derived by using an algorithm.

- ◆ Example: Age can be derived from the data of birth and the current date.



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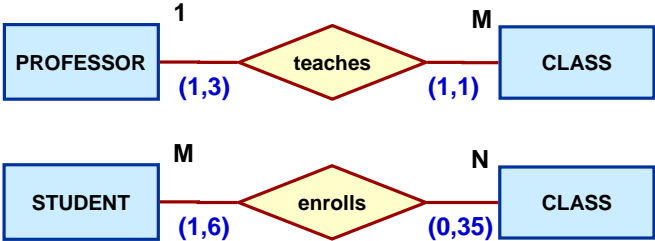
Relationships

- ❖ Association between entities
- ❖ Operates in both directions
- ❖ **Connectivity** describes relationship classification
 - ◆ 1:1, 1:M, M:N
- ❖ **Cardinality**
 - ◆ Expresses number of entity occurrences associated with one occurrence of related entity
- ❖ **Business Rules** applied in establishing Connectivity and Cardinalities

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Relationship Cardinality

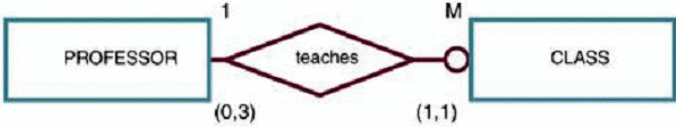
- ❖ **Cardinality** expresses the specific number of entity occurrences associated with one occurrence of the related entity



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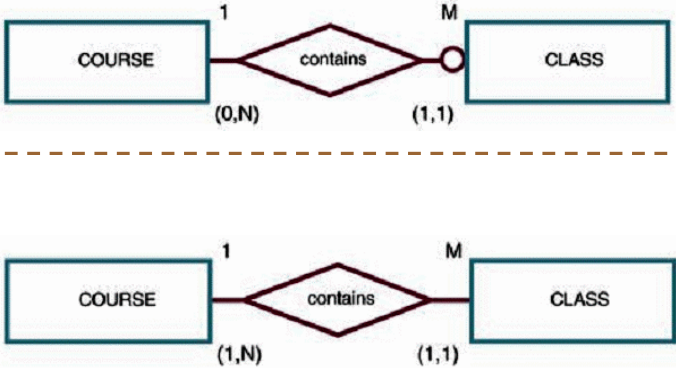
Relationship Participation

- ❖ **Optional participation**
 - ◆ Entity occurrence does not require a corresponding occurrence in related entity
 - ◆ Denoted by small circle on side of optional entity
- ❖ **Mandatory participation**
 - ◆ Entity occurrence requires corresponding occurrence in related entity



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Cardinality & Participation?



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