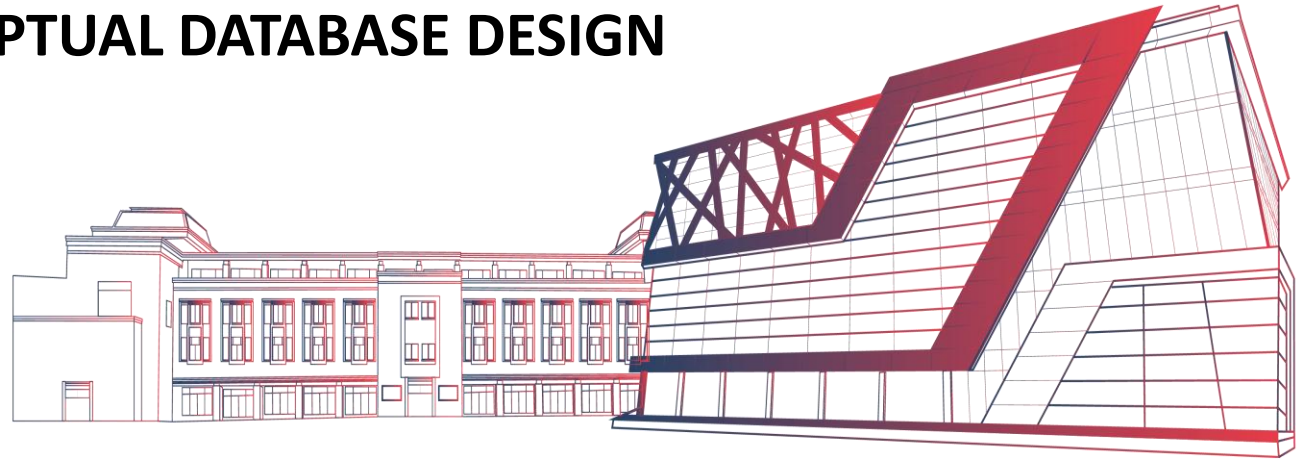


UNIT II

CONCEPTUAL DATABASE DESIGN



Mapping EER Model into a Logical Design

Mapping EER Model Constructs to Relations

- **Step 8: Options for Mapping Specialization or Generalization.**

Convert each specialization with m subclasses $\{S_1, S_2, \dots, S_m\}$ and generalized superclass C , where the attributes of C are $\{k, a_1, \dots, a_n\}$ and k is the (primary) key, into relational schemas using one of the **four following options**:



8A: Options for Mapping Specialization/ Generalization

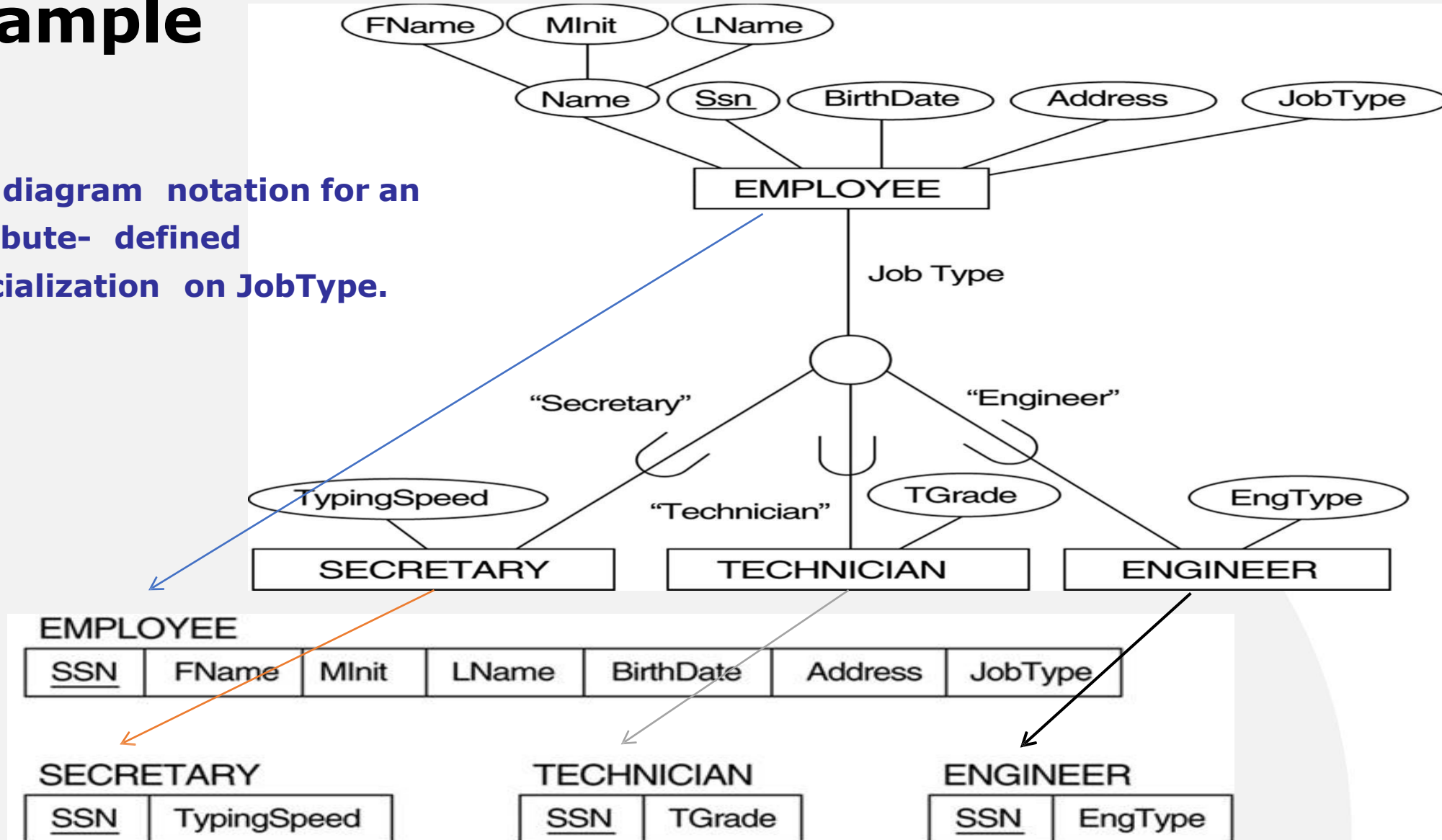
8A: Multiple relations-Superclass and subclasses.

Create a relation L for C with attributes $\text{Attrs}(L) = \{k, a_1, \dots, a_n\}$ and $\text{PK}(L) = k$. Create a relation L_i for each subclass S_i , $1 < i < m$, with the attributes $\text{Attrs}(L_i) = \{k\} \cup \{\text{attributes of } S_i\}$ and $\text{PK}(L_i) = k$.

This option works for any specialization (total or partial, disjoint or over-lapping).

Example

EER diagram notation for an attribute- defined specialization on JobType.



8B: Options for Mapping Specialization/ Generalization

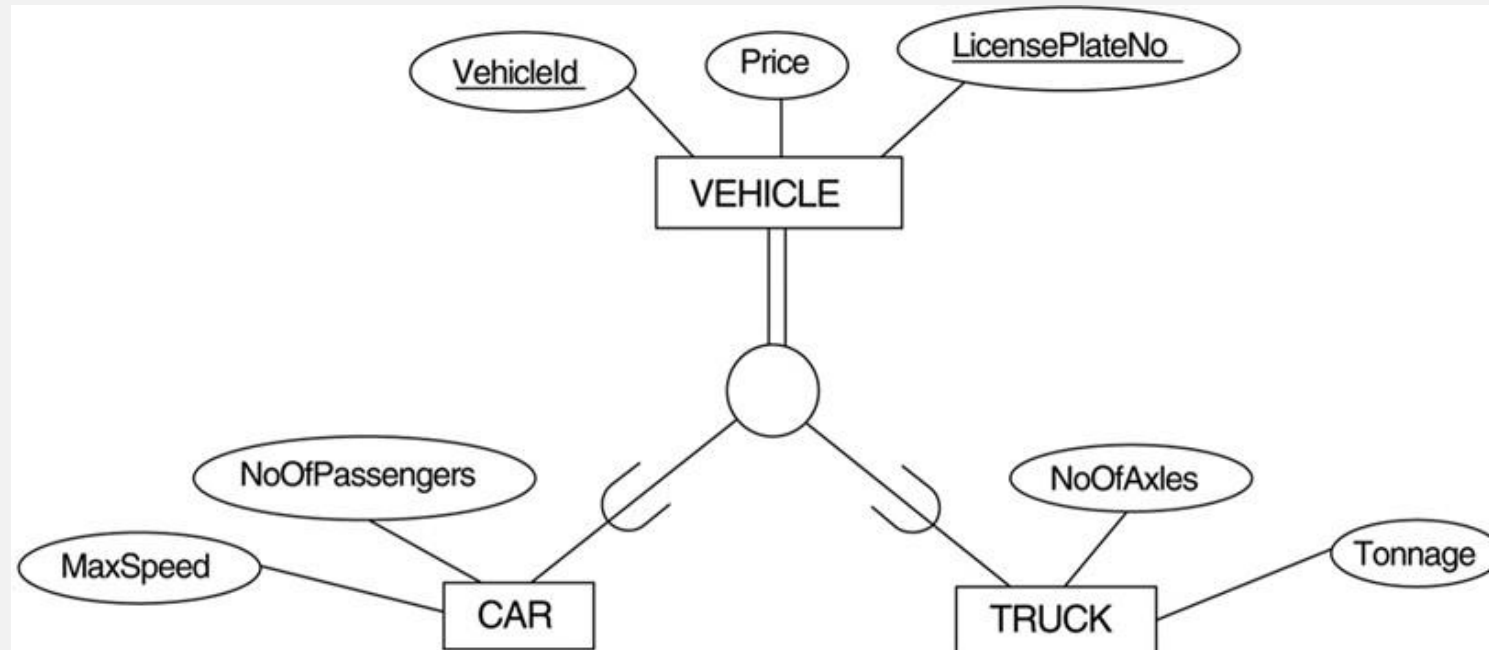
8B: Multiple relations-Subclass relations only

Create a relation L_i for each subclass S_i , $1 < i < m$, with the attributes $\text{Attr}(L_i) = \{\text{attributes of } S_i\} \cup \{k, a_1, \dots, a_n\}$ and $\text{PK}(L_i) = k$.



This option only works for a specialization whose subclasses are total (every entity in the superclass must belong to (at least) one of the subclasses).

Example



CAR

<u>VehicleId</u>	LicensePlateNo	Price	MaxSpeed	NoOfPassengers
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TRUCK

<u>VehicleId</u>	LicensePlateNo	Price	NoOfAxes	
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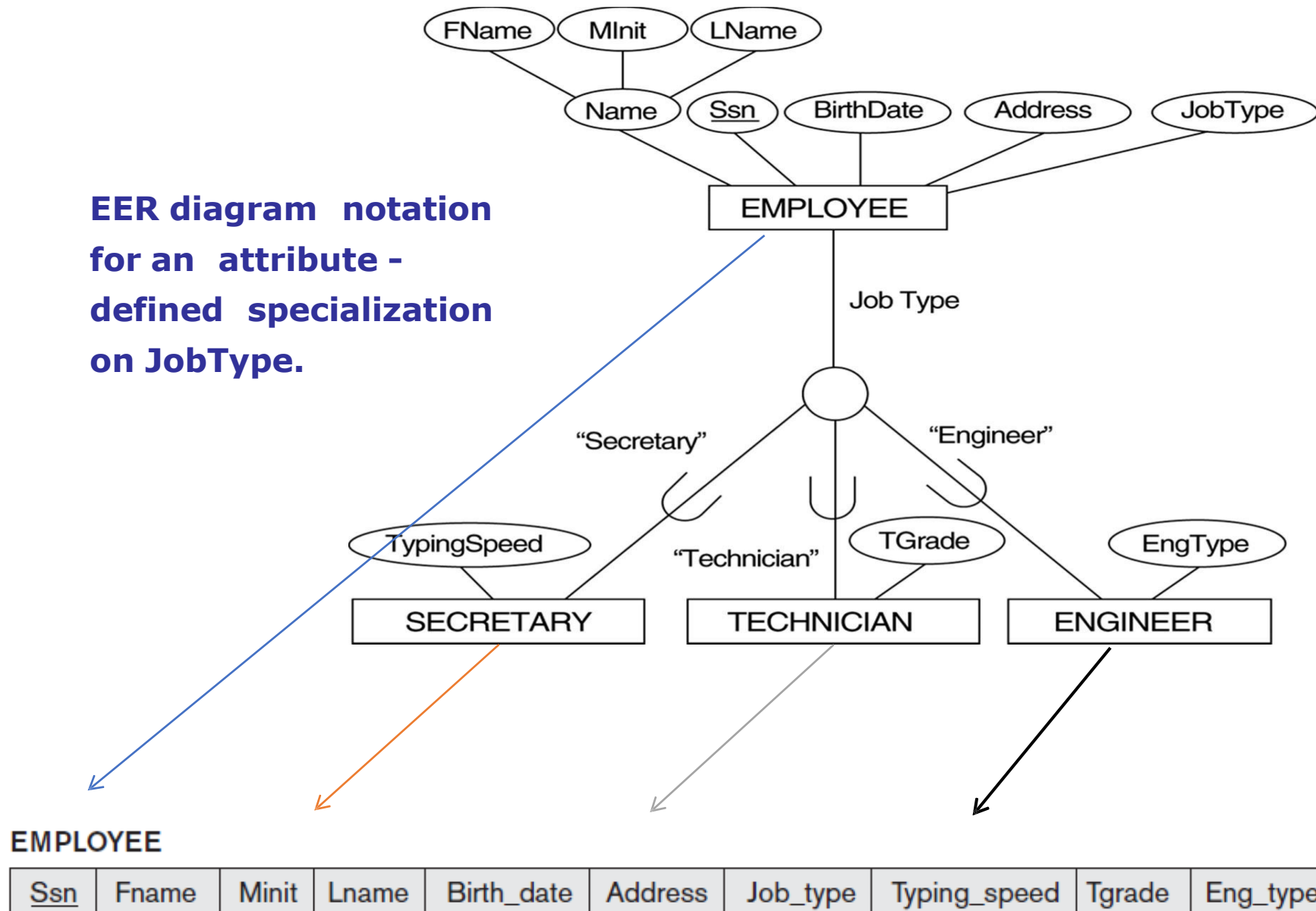
8C: Options for Mapping Specialization/Generalization

8C: Single relation with *one type attribute*.

Create a single relation L with attributes $\text{Attrs}(L) = \{k, a_1, \dots, a_n\} \cup \{\text{attributes of } S_1\} \cup \dots \cup \{\text{attributes of } S_m\} \cup \{t\}$ and $\text{PK}(L) = k$. The attribute t is called a **type (or discriminating) attribute** that indicates the subclass to which each tuple belongs

Example

**EER diagram notation
for an attribute -
defined specialization
on JobType.**



8D: Options for Mapping Specialization/Generalization

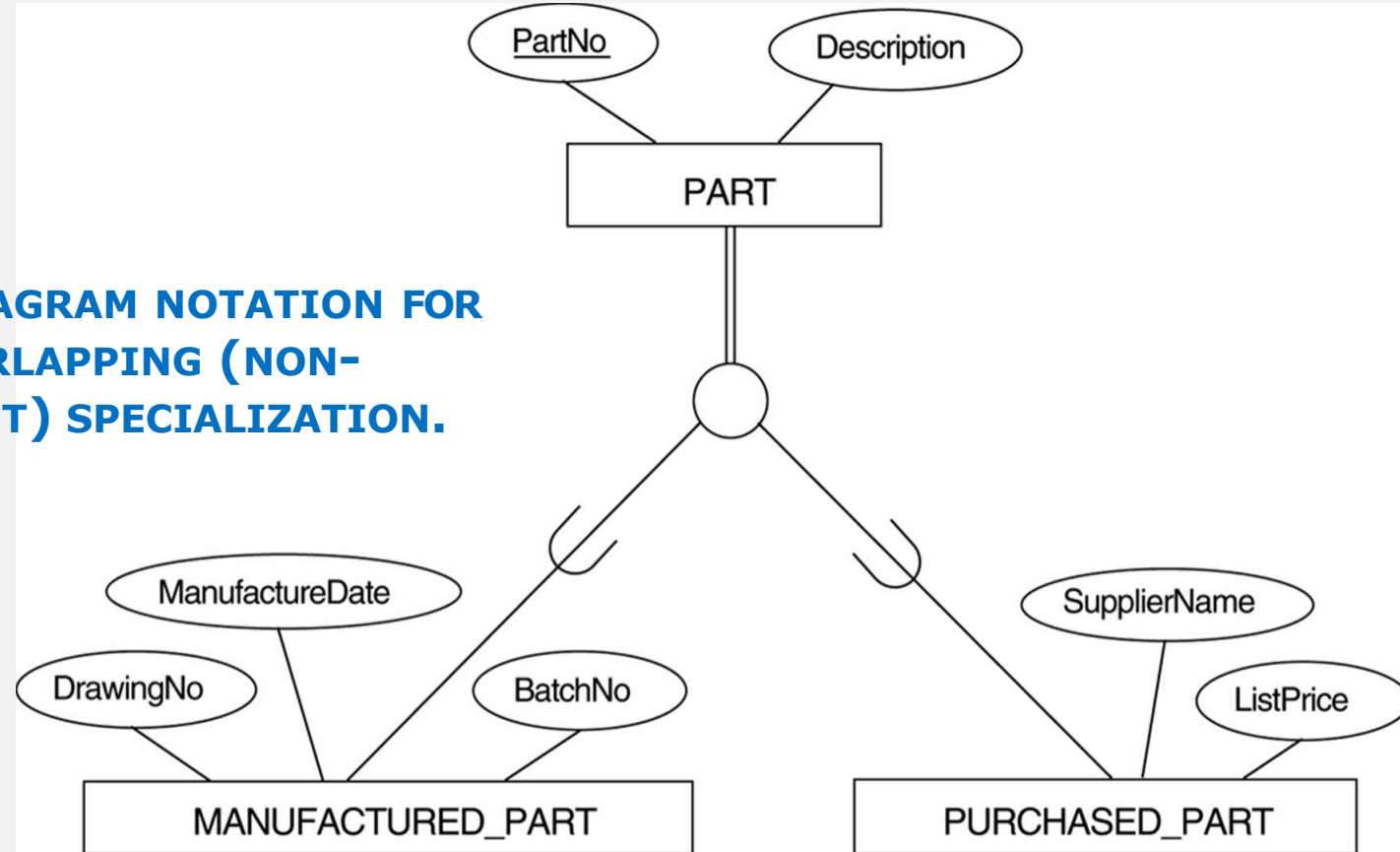
8D: Single relation with multiple type attributes.

Create a single relation schema L with attributes $\text{Attrs}(L) = \{k, a_1, \dots, a_n\} \cup \{\text{attributes of } S_1\} \cup \dots \cup \{\text{attributes of } S_m\} \cup \{t_1, t_2, \dots, t_m\}$ and $\text{PK}(L) = k$.

Each t_i , $1 < i < m$, is a Boolean type attribute indicating whether a tuple belongs to the subclass S_i .

Example

**EER DIAGRAM NOTATION FOR
AN OVERLAPPING (NON-
DISJOINT) SPECIALIZATION.**



PART

<u>Part_no</u>	Description	Mflag	Drawing_no	Manufacture_date	Batch_no	Pflag	Supplier_name	List_price
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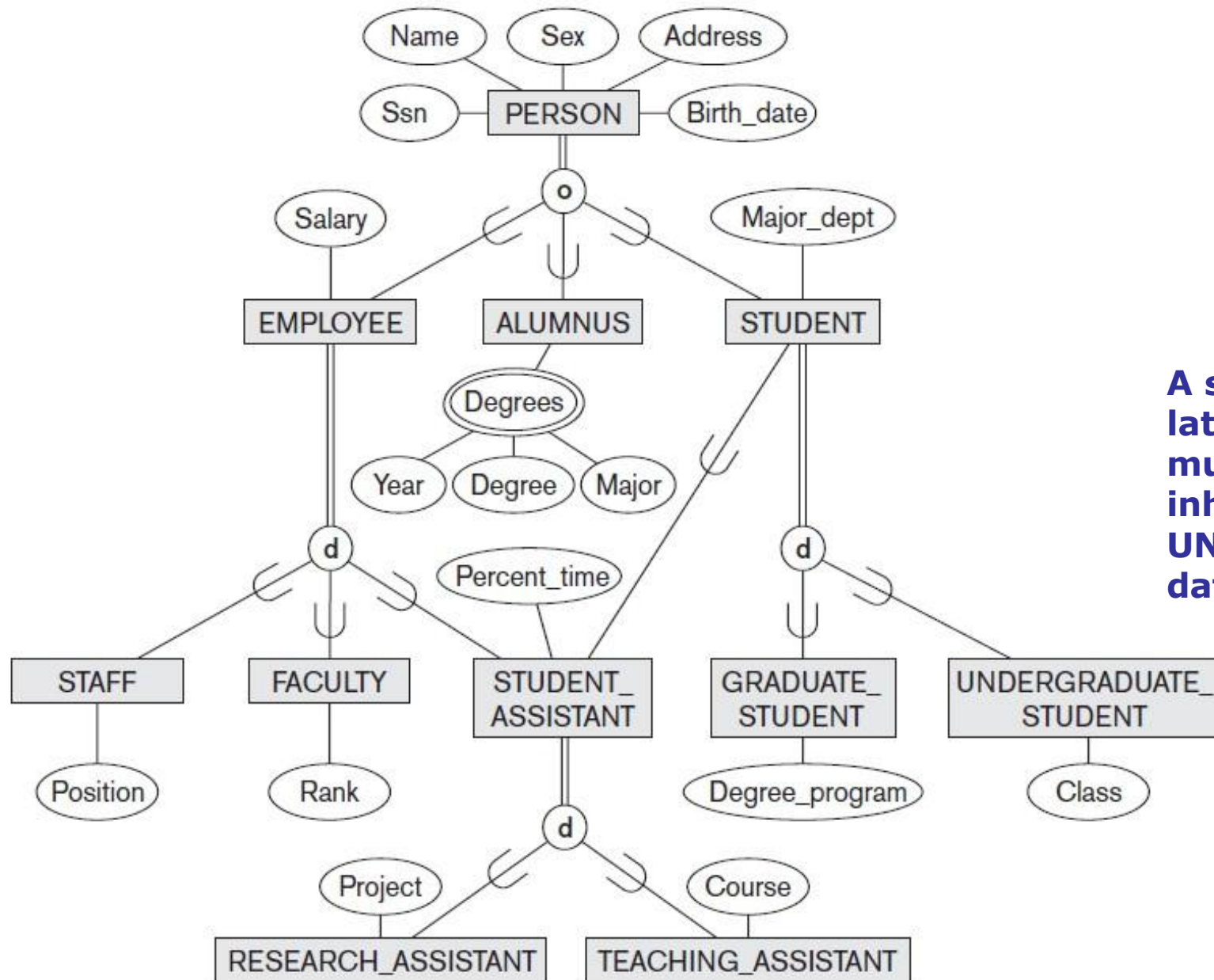
Mapping EER Model Constructs to Relations (Cont.)

Mapping of Shared Subclasses (Multiple Inheritance)

A **shared subclass**, such as STUDENT_ASSISTANT, is a subclass of several classes, indicating **multiple inheritance**. **These classes must all have the same key attribute; otherwise, the shared subclass would be modeled as a category.**

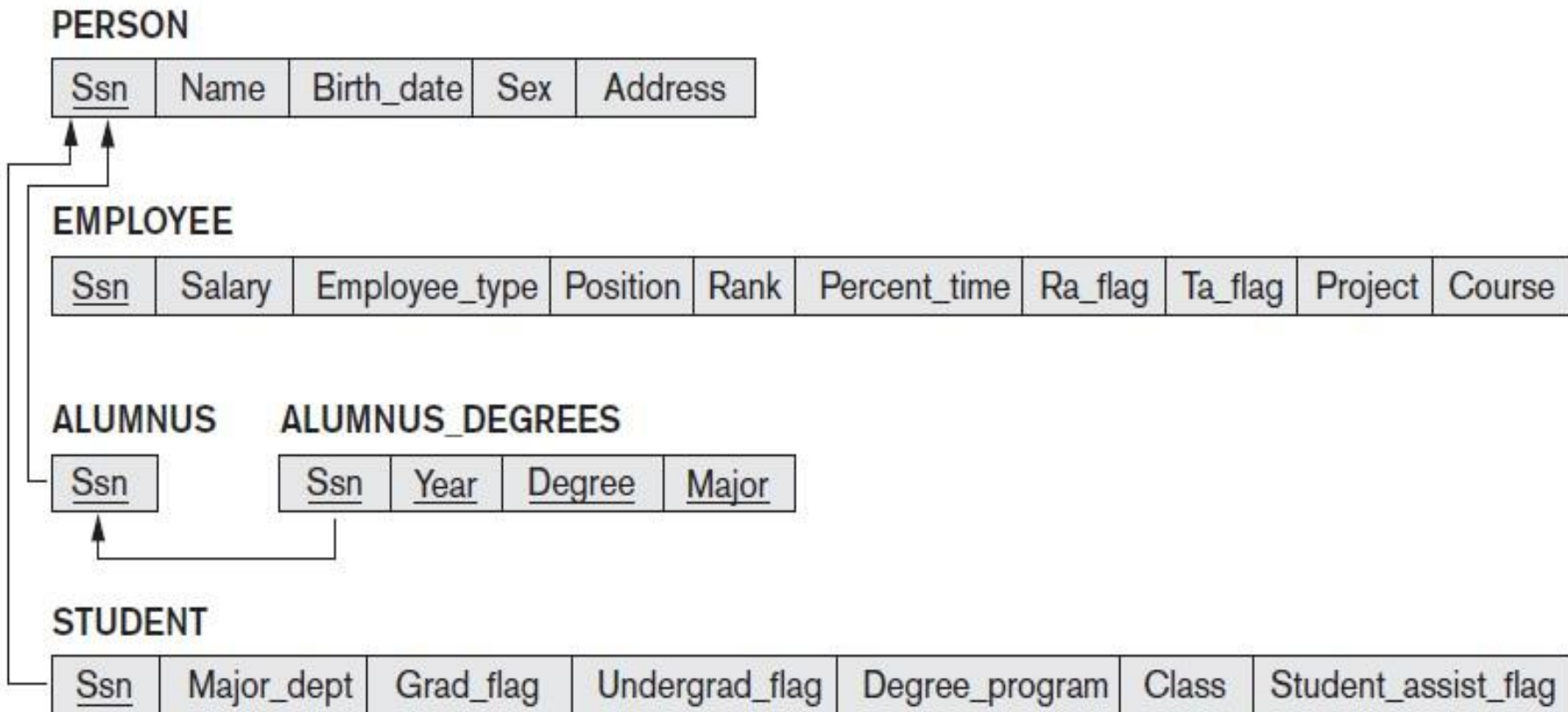
Can apply any of the options discussed in Step 8 to a shared subclass, subject to the restriction discussed in Step 8 of the mapping algorithm.

Example – Shared Subclass



A specialization lattice with multiple inheritance for a UNIVERSITY database.

Example – Shared Subclass Solution



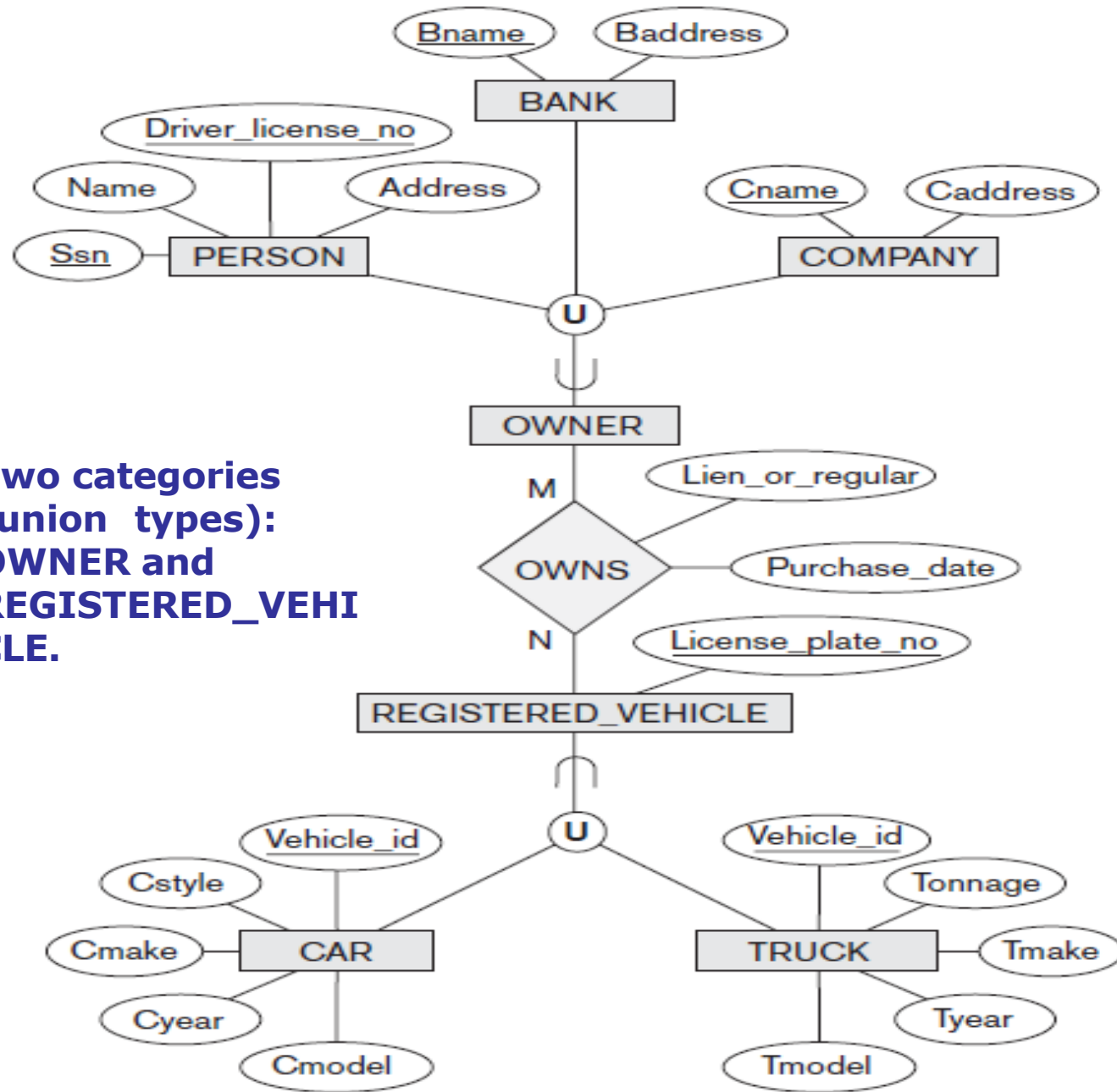
Mapping EER Model Constructs to Relations (Cont.)

- Step 9: Mapping of Union Types (Categories).
- For mapping a category whose defining superclass have different keys, it is customary to specify a new key attribute, called a surrogate key, when creating a relation to correspond to the category.

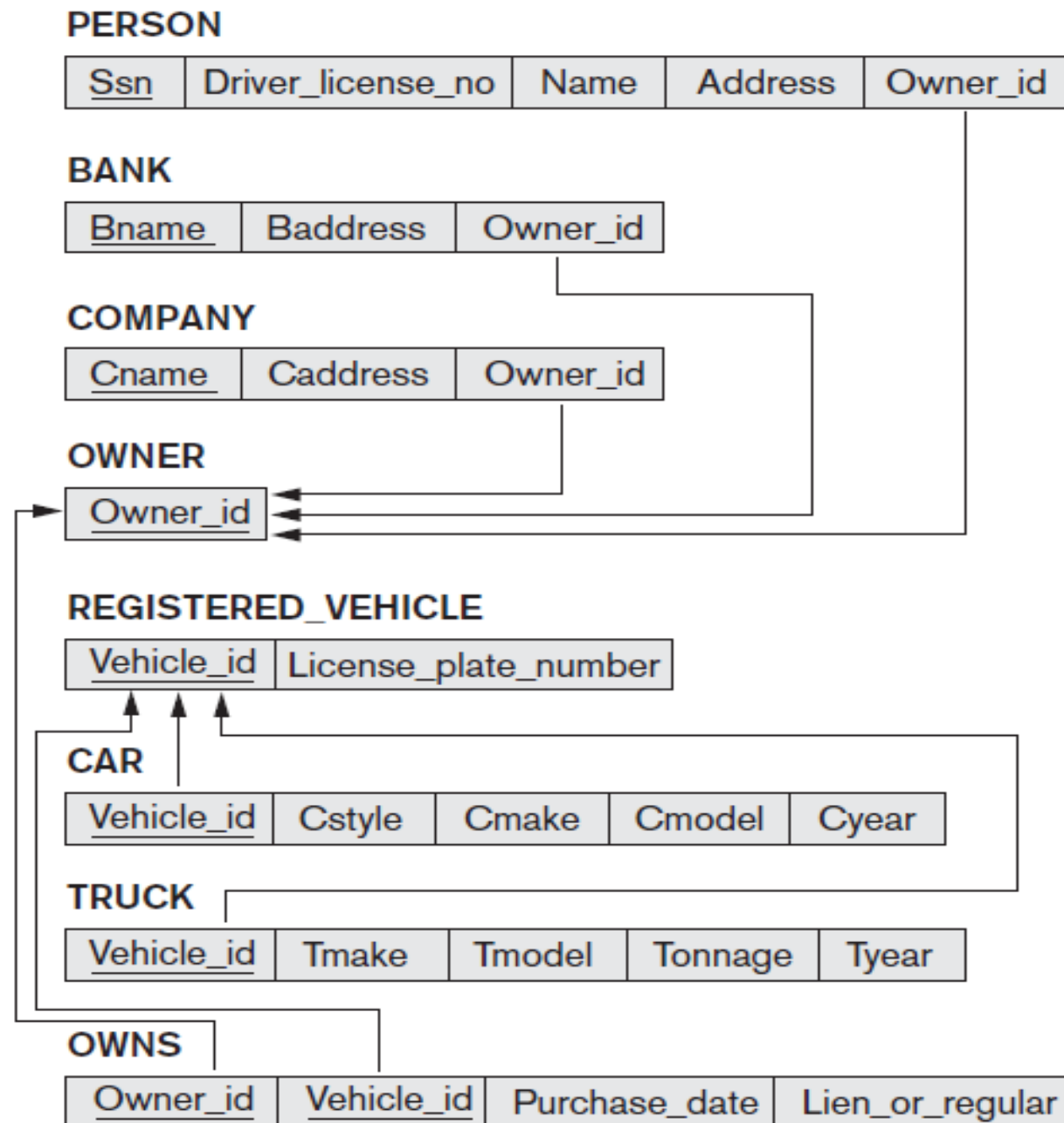


Example: Union (Category)

Two categories
(union types):
OWNER and
REGISTERED_VEHICLE.



Example: Union (Category) Solution



Thanks!!