

# The Enhanced E-R Model and Business Rules

EERD

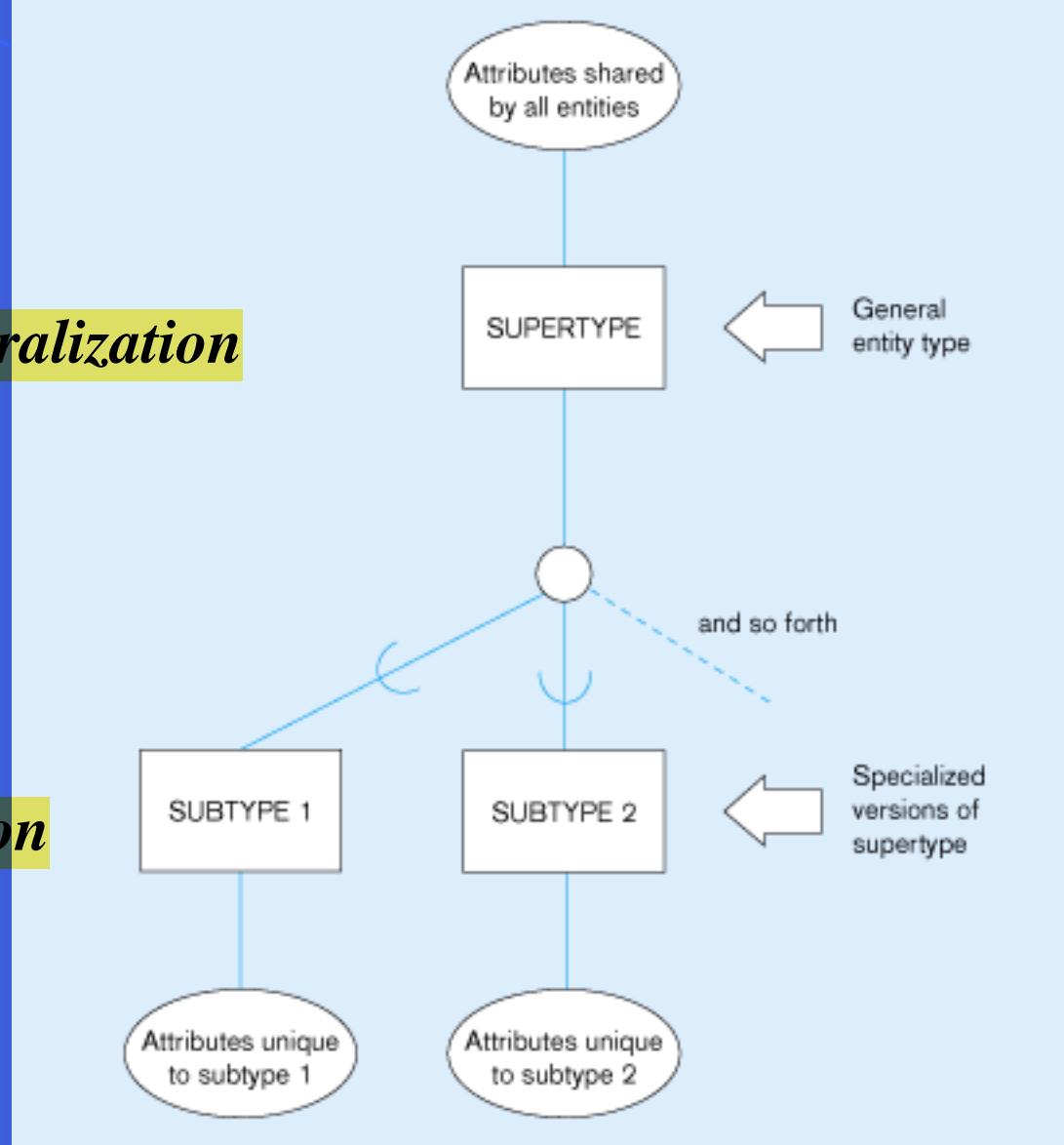
# ✓ Supertypes and Subtypes

- **Subtype:** A subgrouping of the entities in an entity type which has attributes that are distinct from those in other subgroupings
- **Supertype:** An generic entity type that has a relationship with one or more subtypes
- **Inheritance:**
  - Subtype entities inherit values of all attributes of the supertype
  - An instance of a subtype is also an instance of the supertype

# Basic notation for supertype/subtype relationships

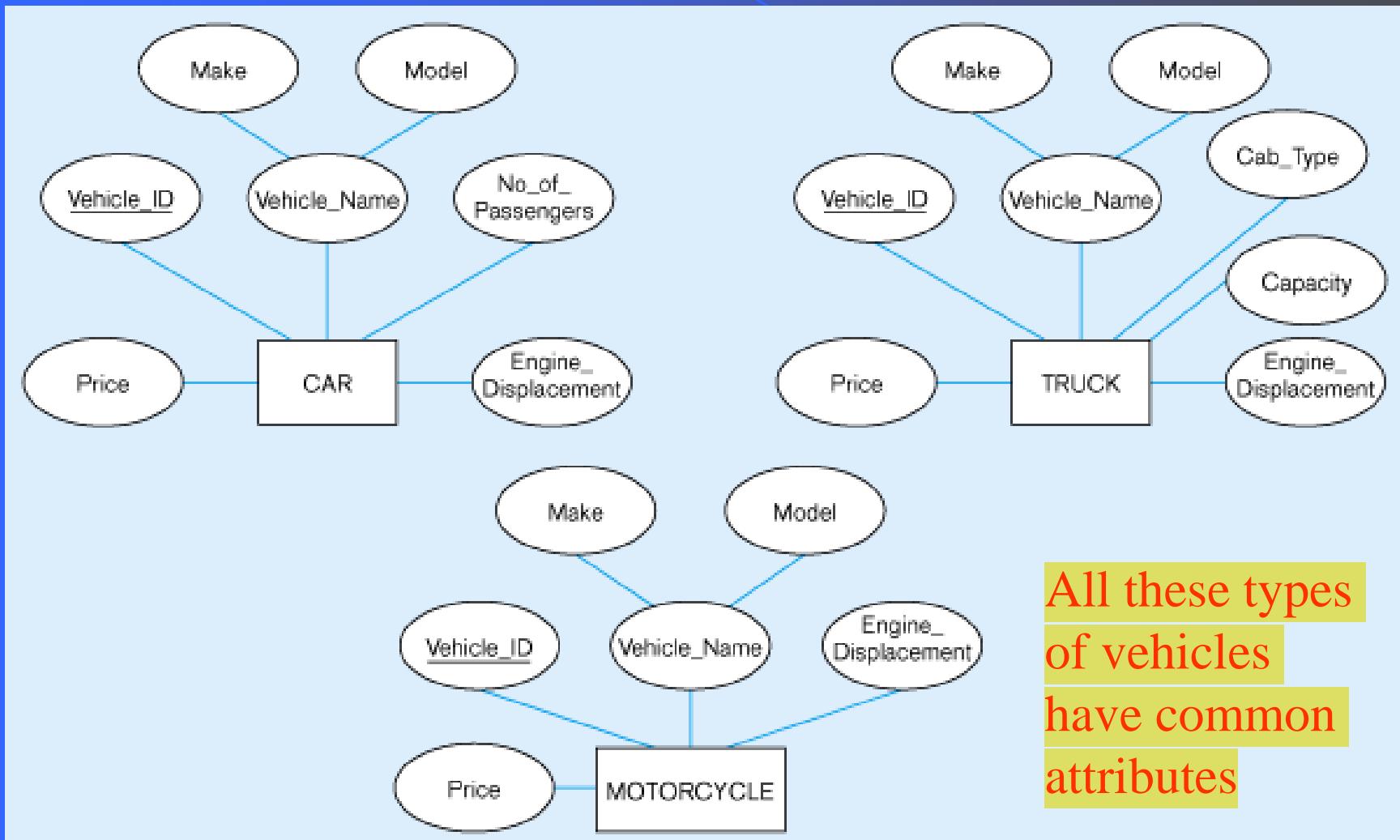
## Generalization

## Specialization



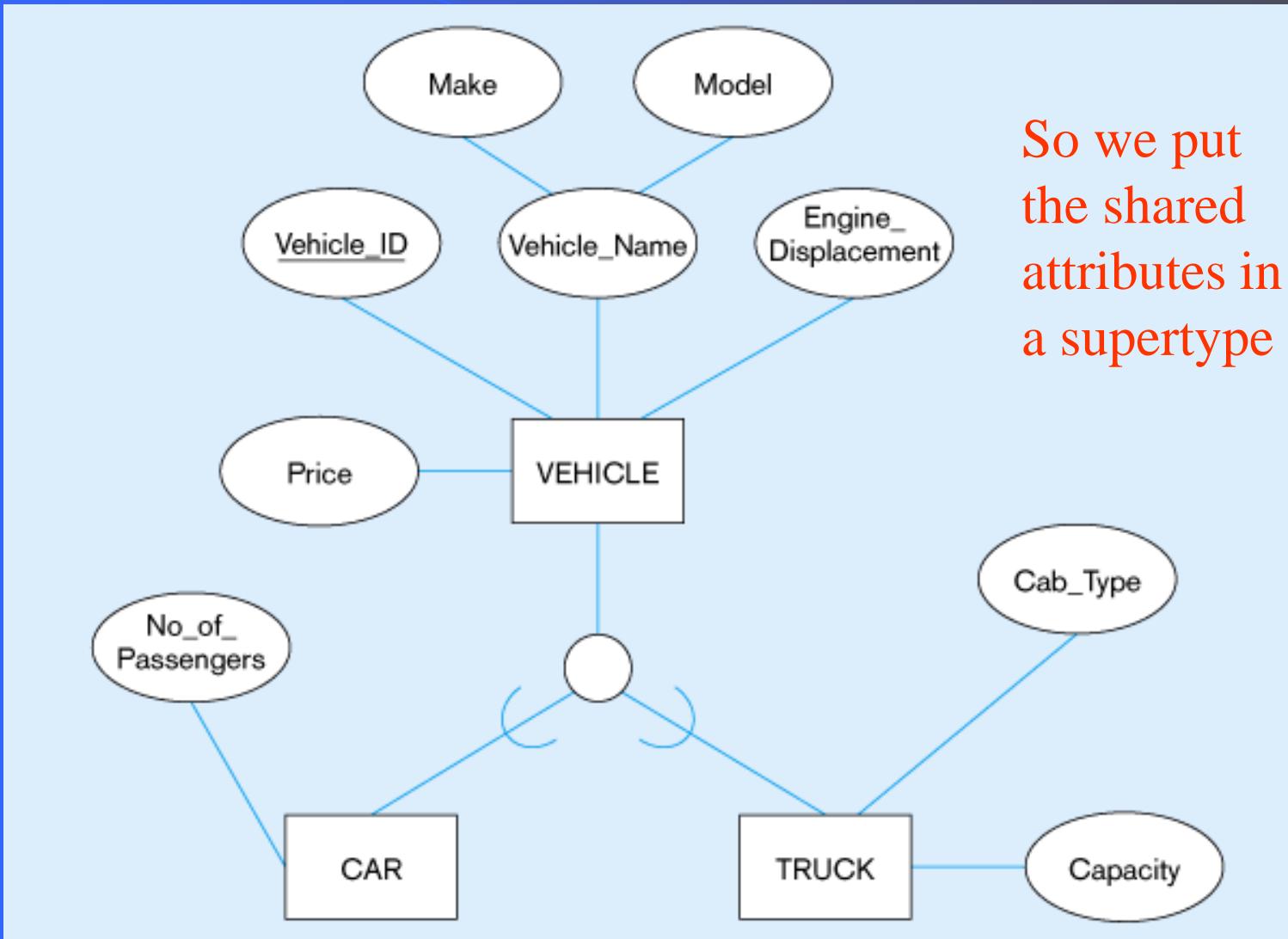
# Example of generalization

(a) Three entity types: CAR, TRUCK, and MOTORCYCLE



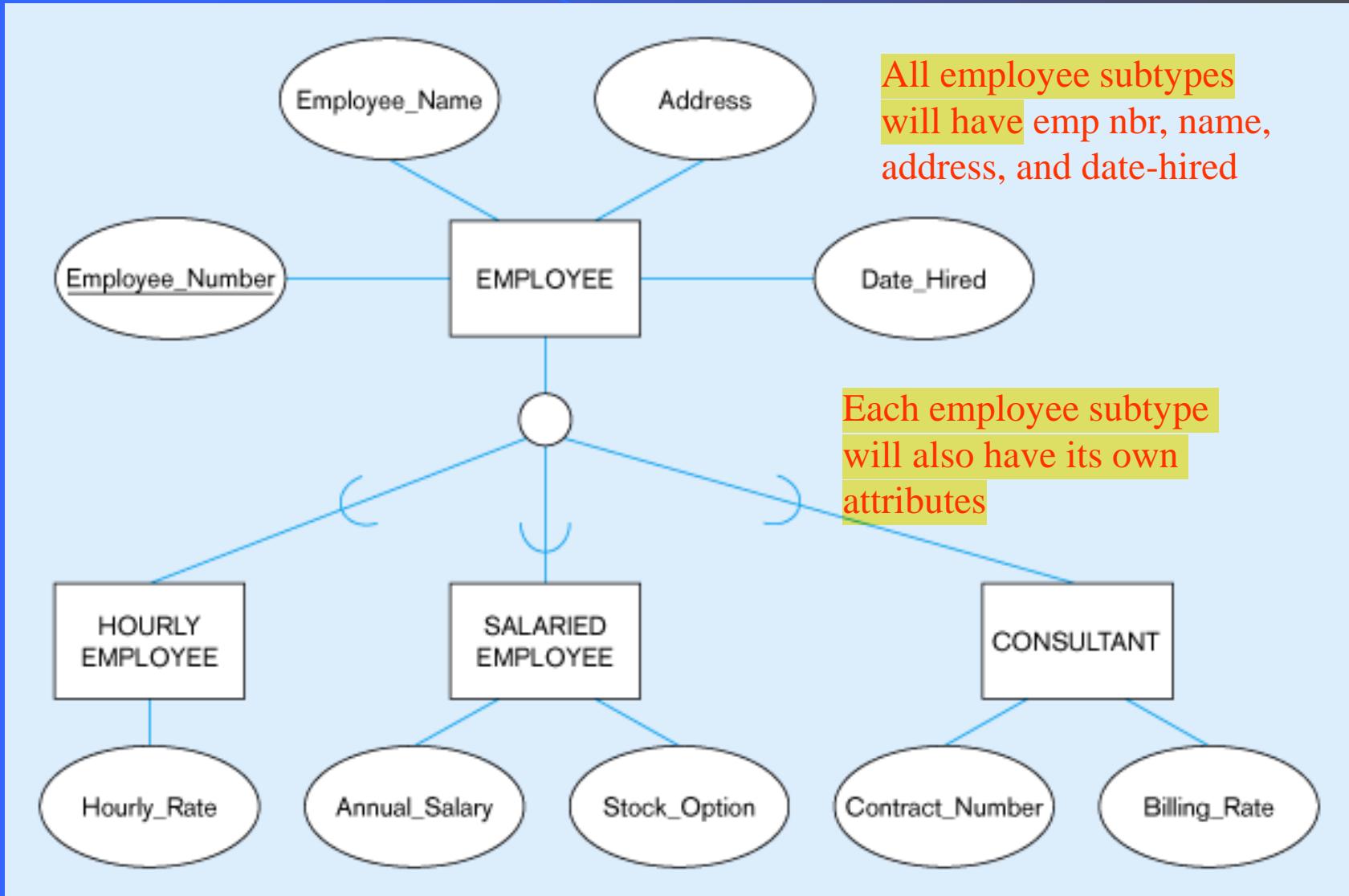


## Generalization to VEHICLE supertype



Note: no subtype for motorcycle, since it has no unique attributes

# Employee supertype with three subtypes



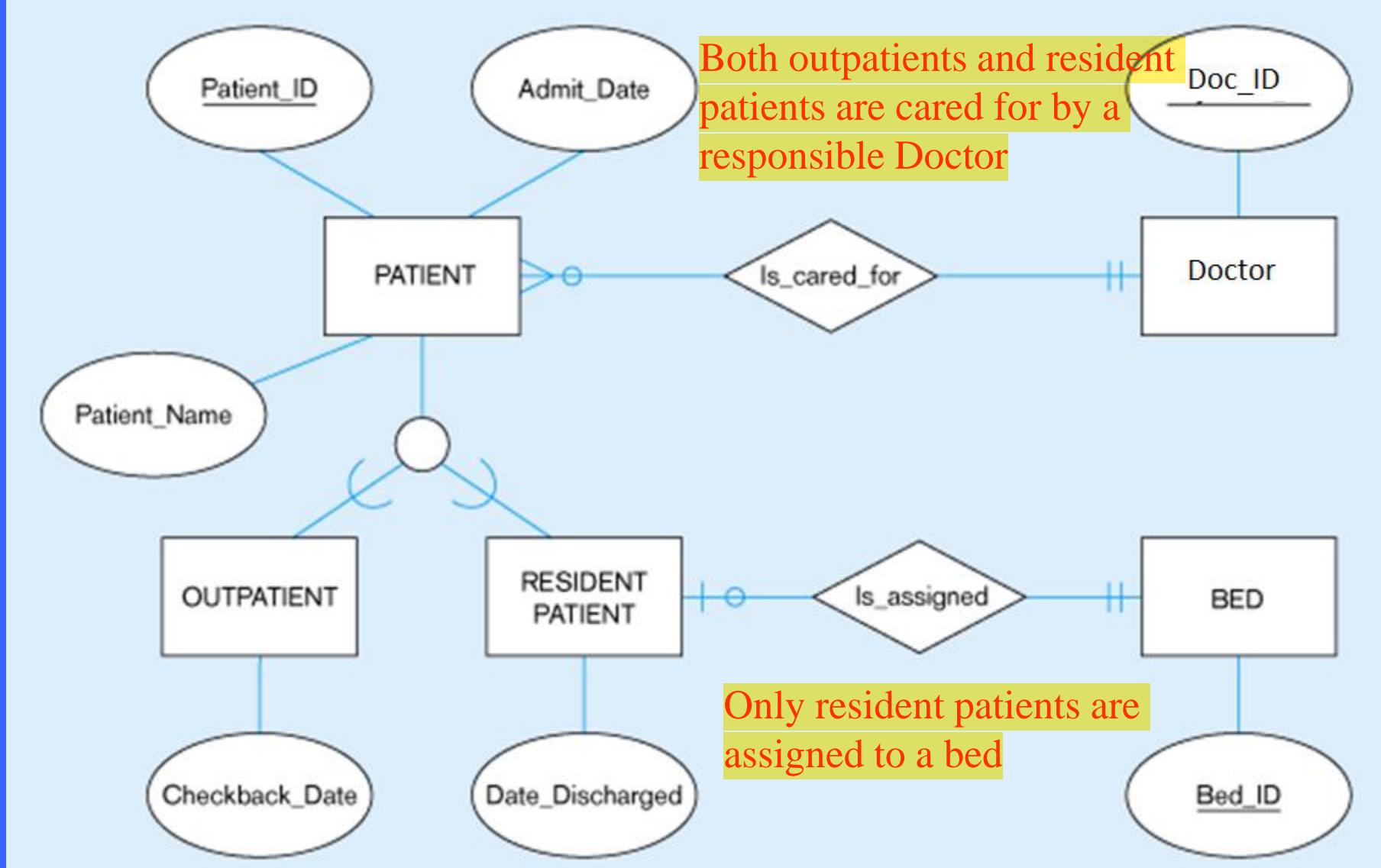


# Relationships and Subtypes

Relationships at the *supertype* level indicate that all subtypes will participate in the relationship

The instances of a *subtype* may participate in a relationship unique to that subtype. In this situation, the relationship is shown at the subtype level

# ✓ Supertype/subtype relationships in a hospital



# Constraints in Supertype

## Completeness Constraints:

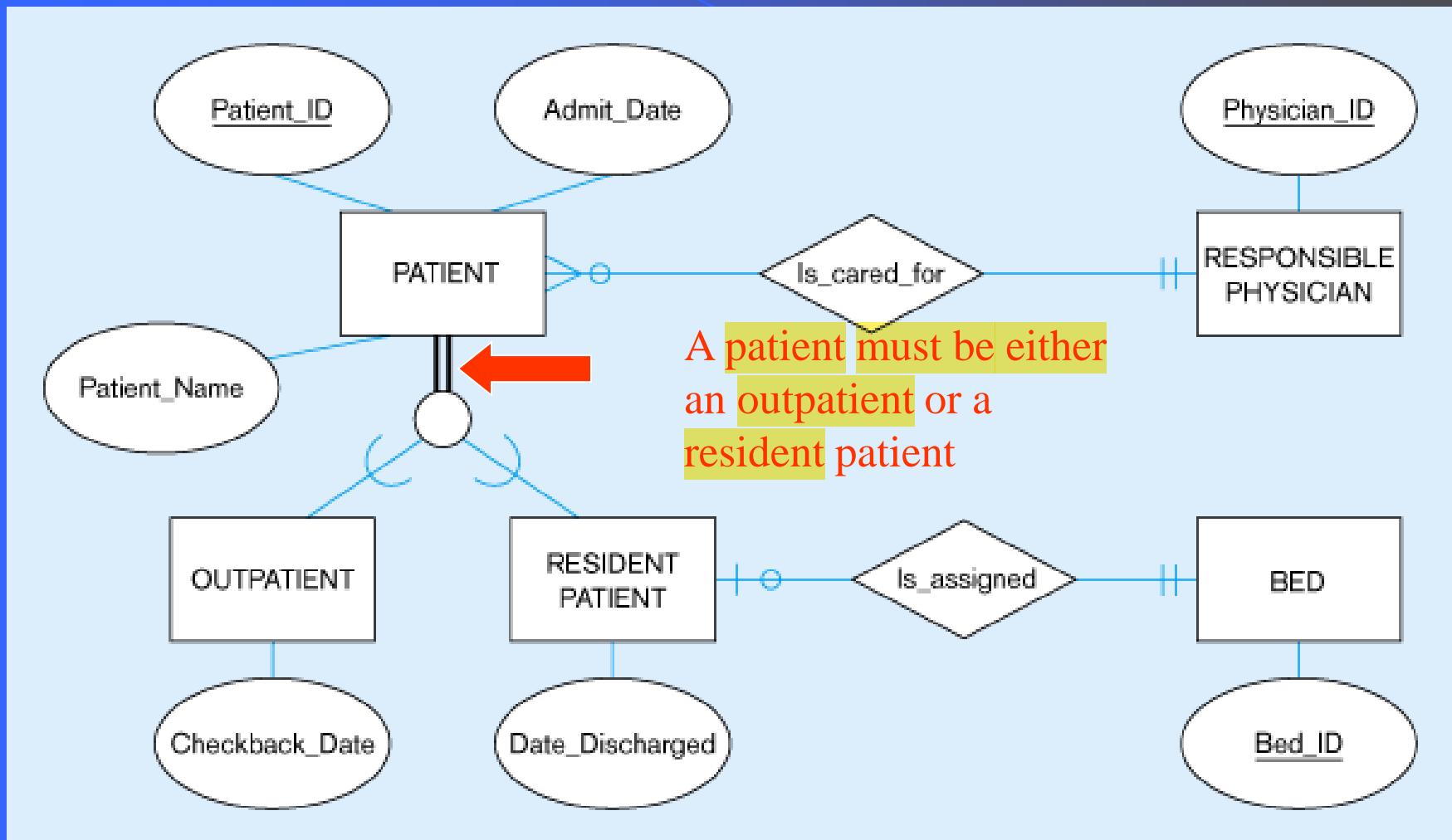
- Total Specialization Rule: Yes (double line)
- Partial Specialization Rule: No (single line)

## Disjointness Constraints:

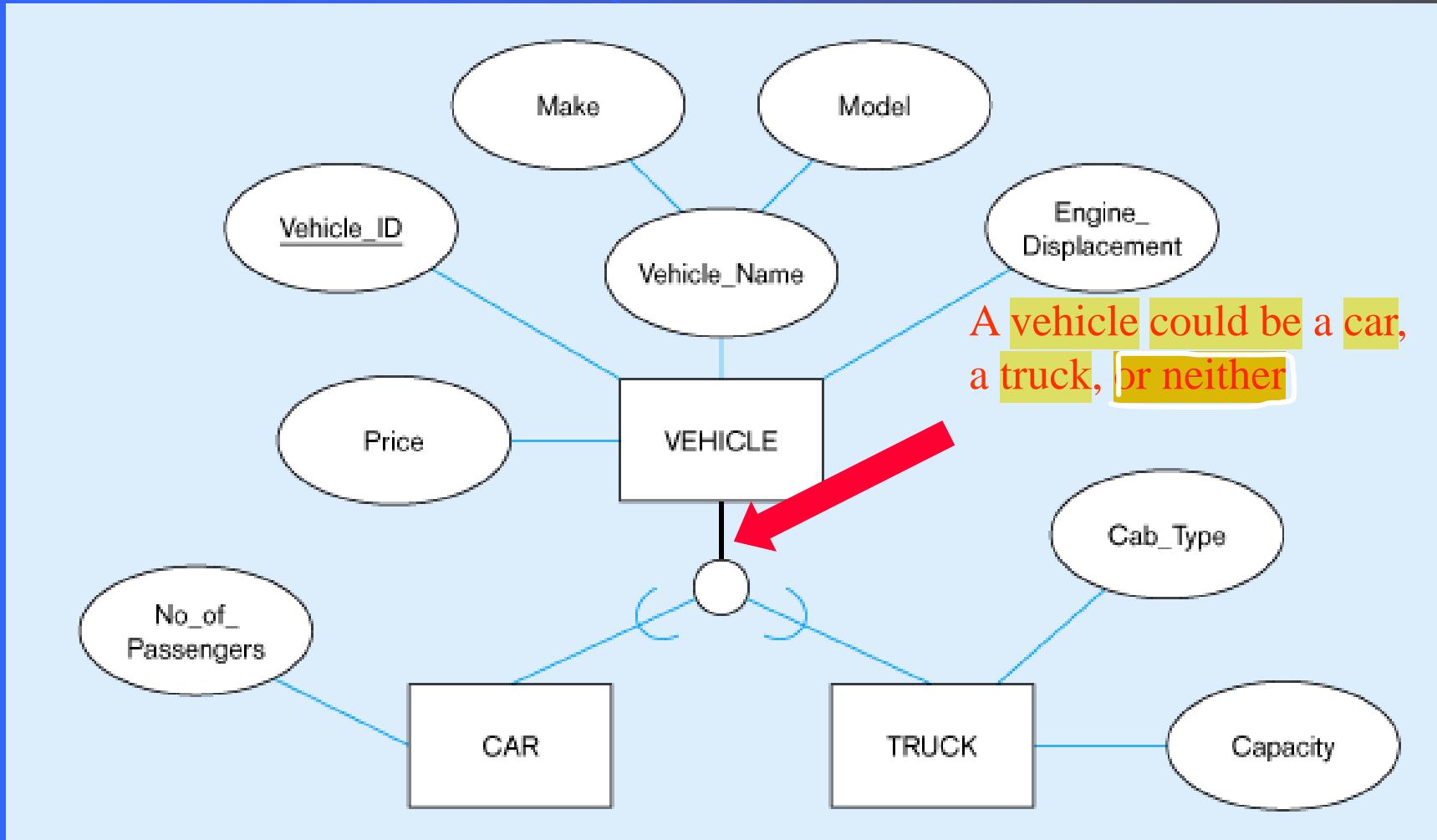
- Total Disjoint (d)
- Overlap Rule (o)

# Examples of completeness constraints

## Total specialization rule

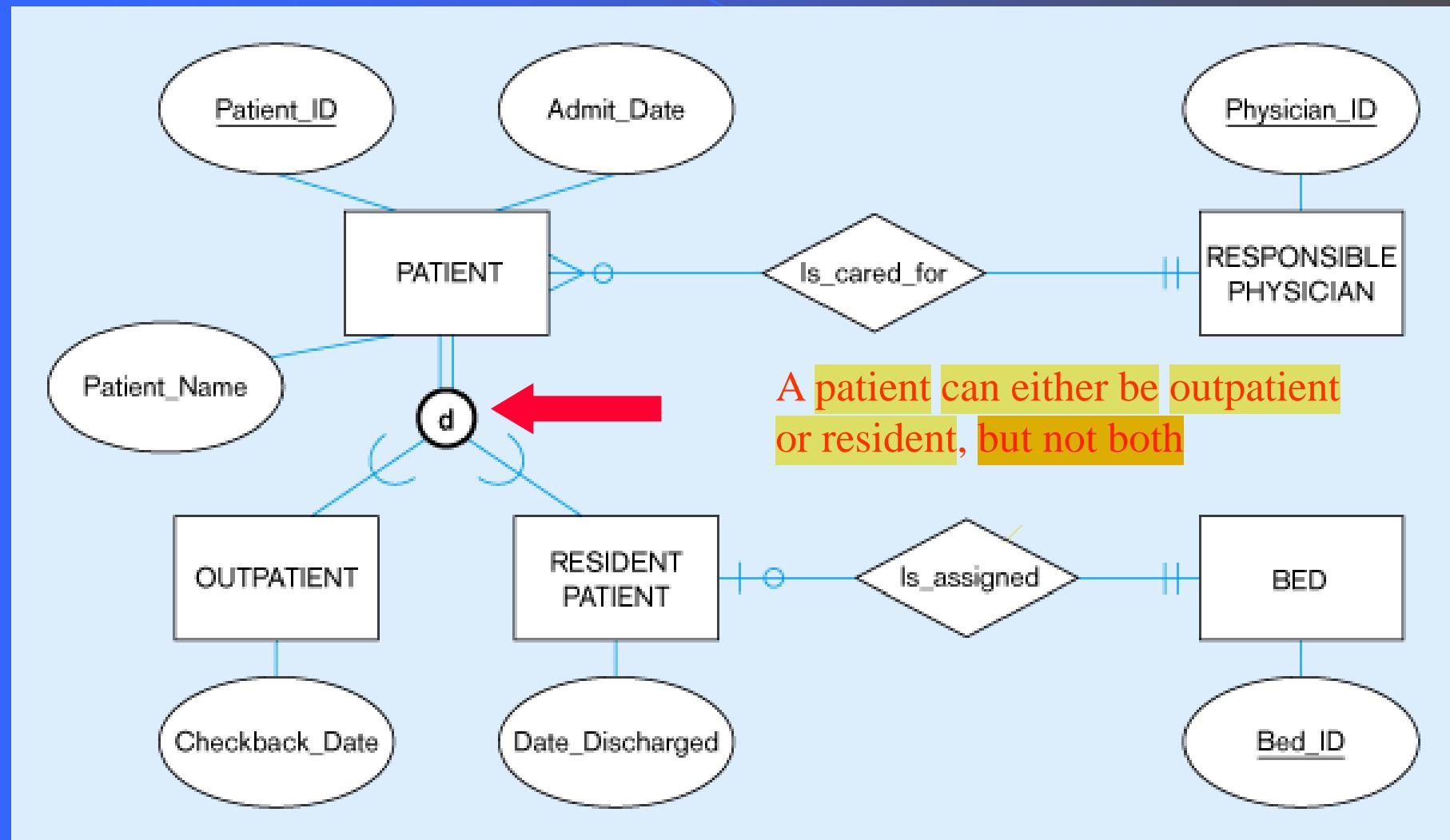


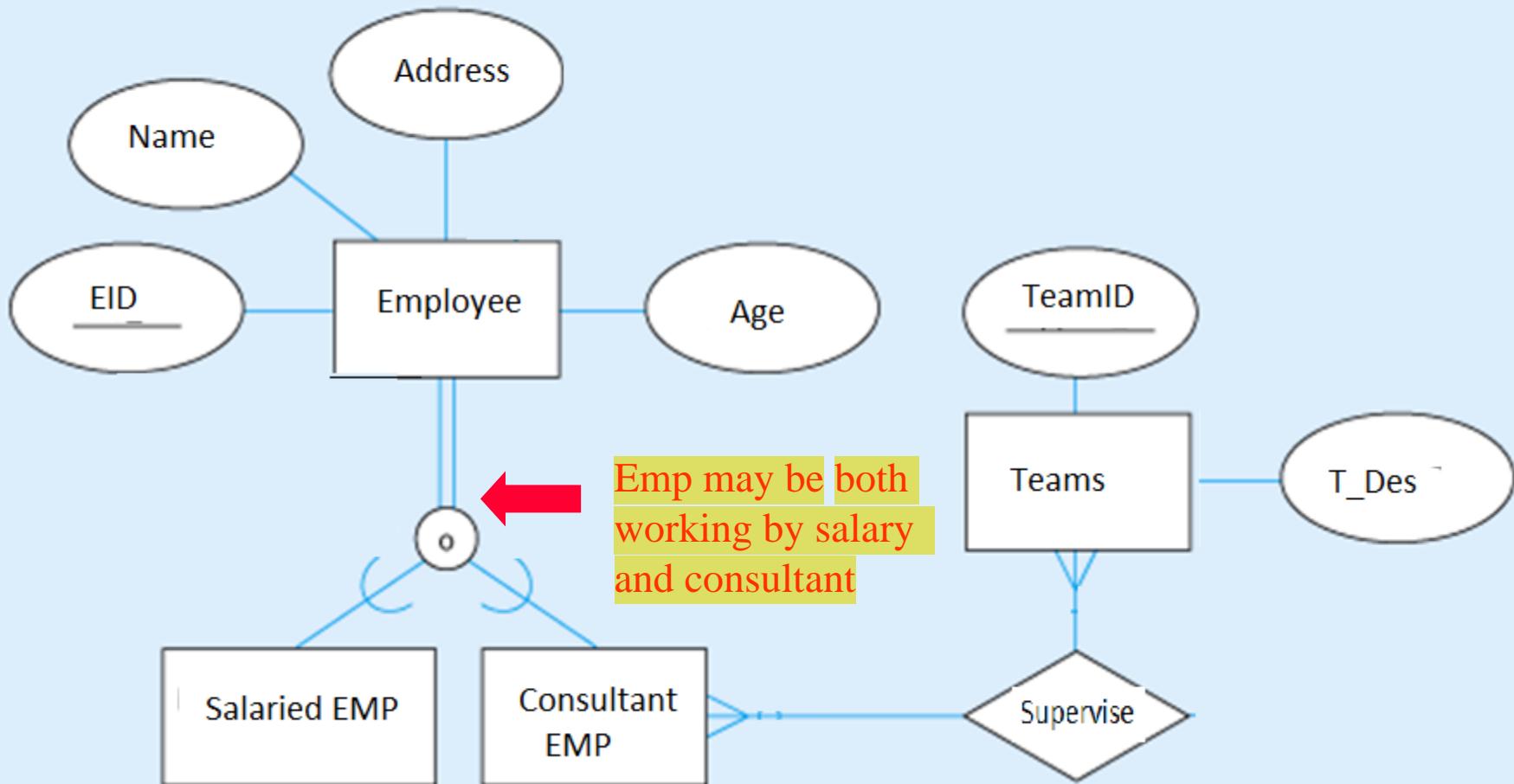
# Partial specialization rule



# Examples of disjointness constraints

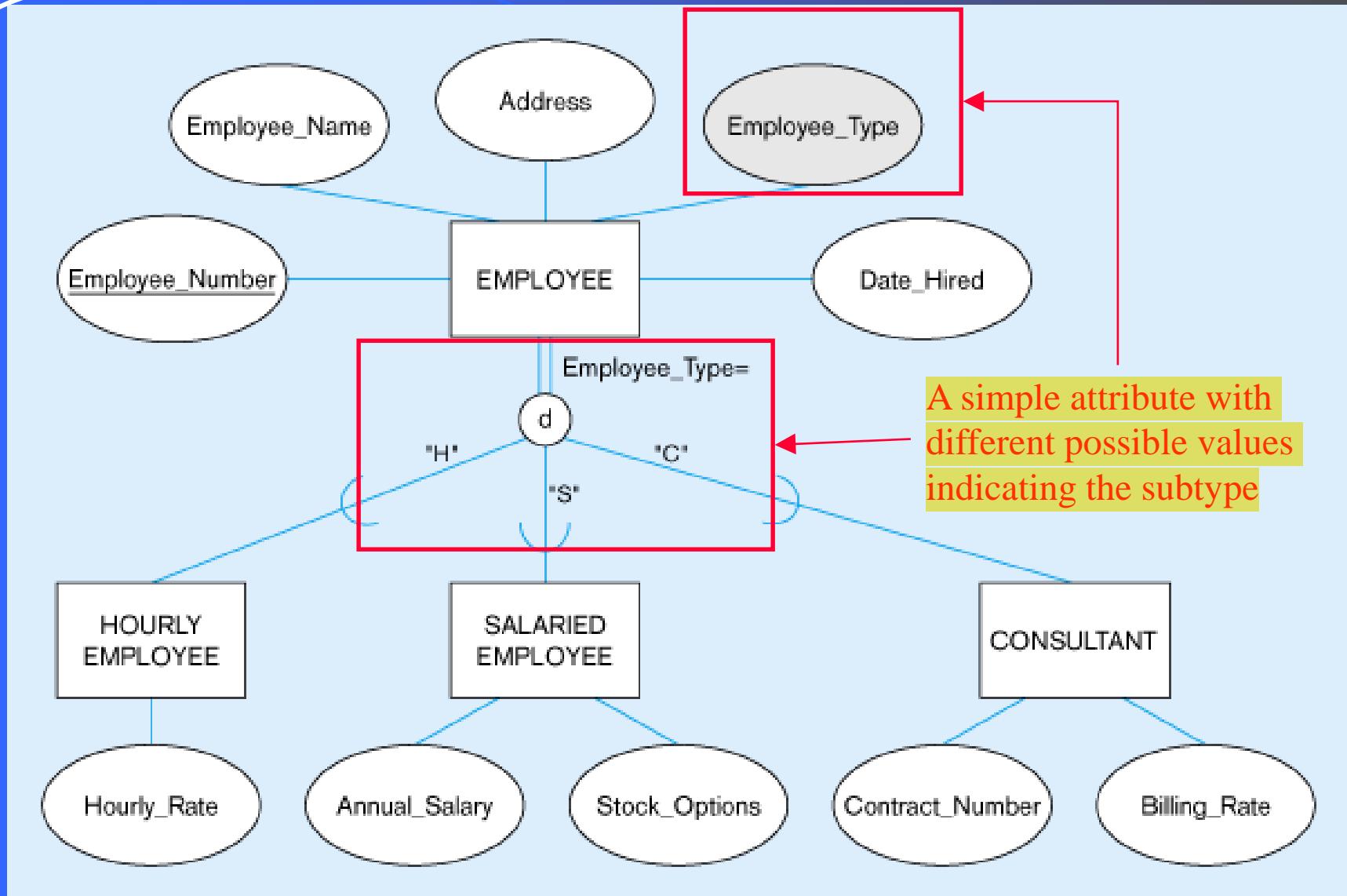
## Disjoint rule



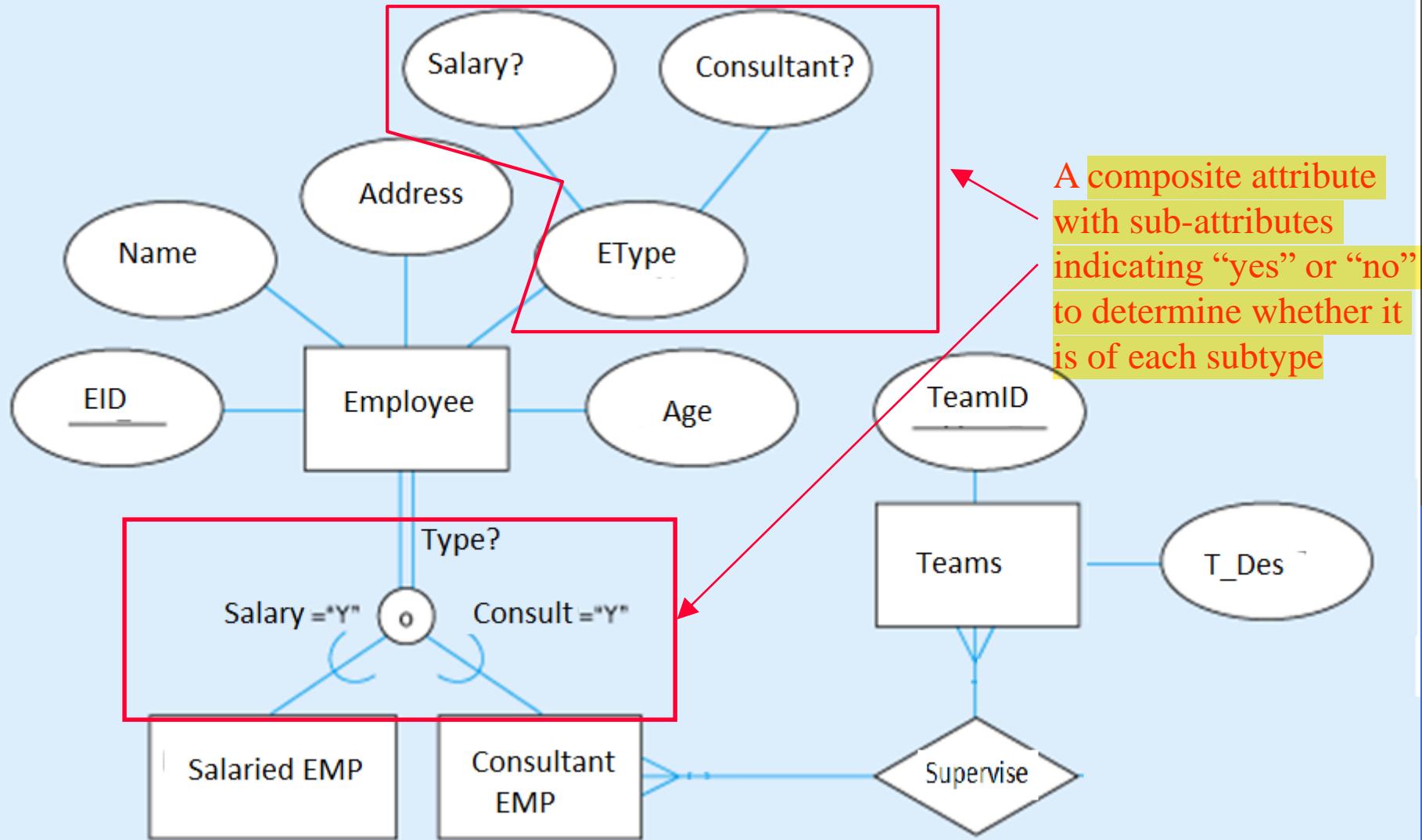


Overlap rule

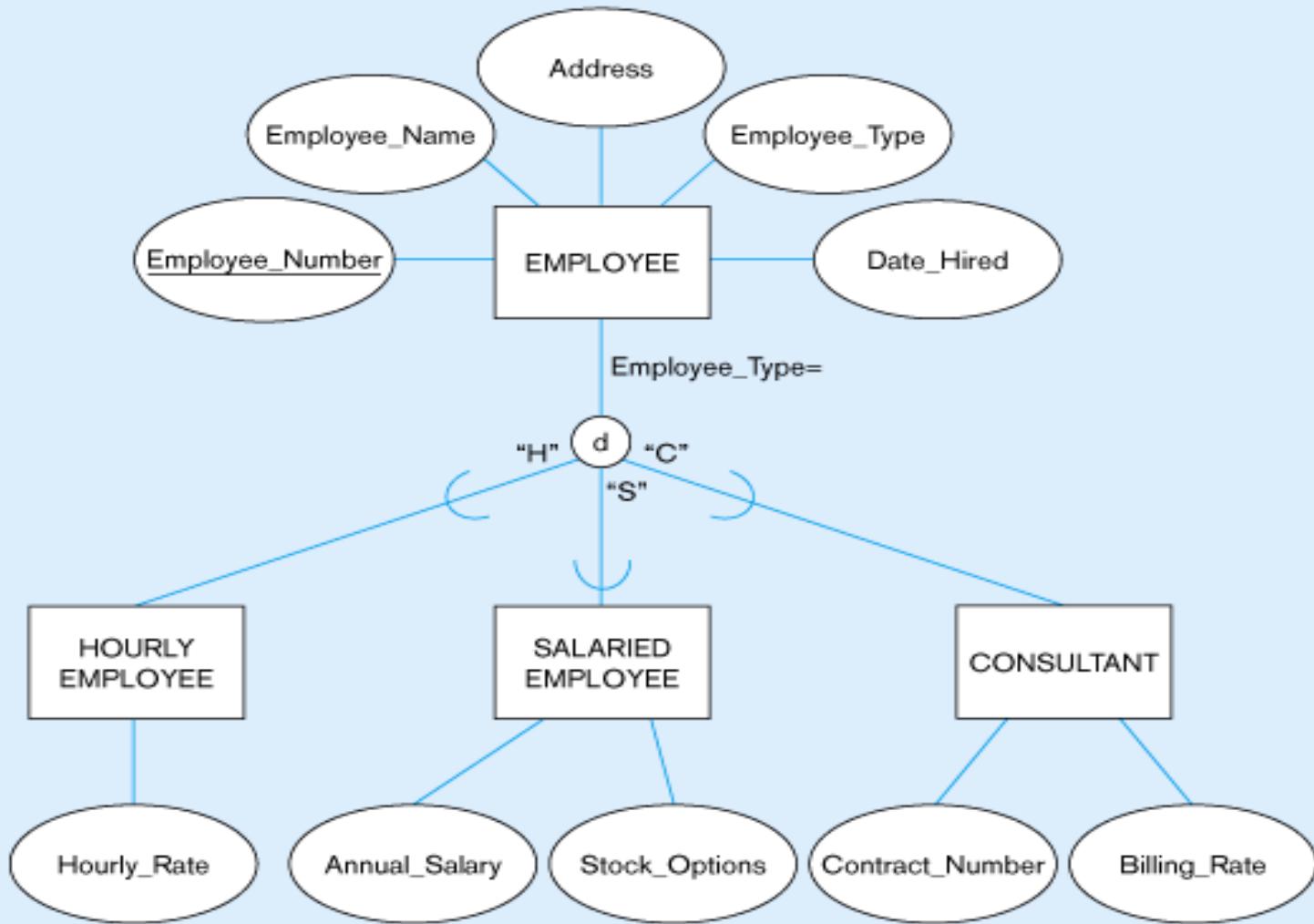
# Introducing a subtype discriminator (*disjoint* rule)



## ✓ Subtype discriminator (**overlap** rule)



# Transforming EER Diagrams into Relations



# Mapping Supertype/subtype relationships to relations

