Session 2-7 Enhanced ERD

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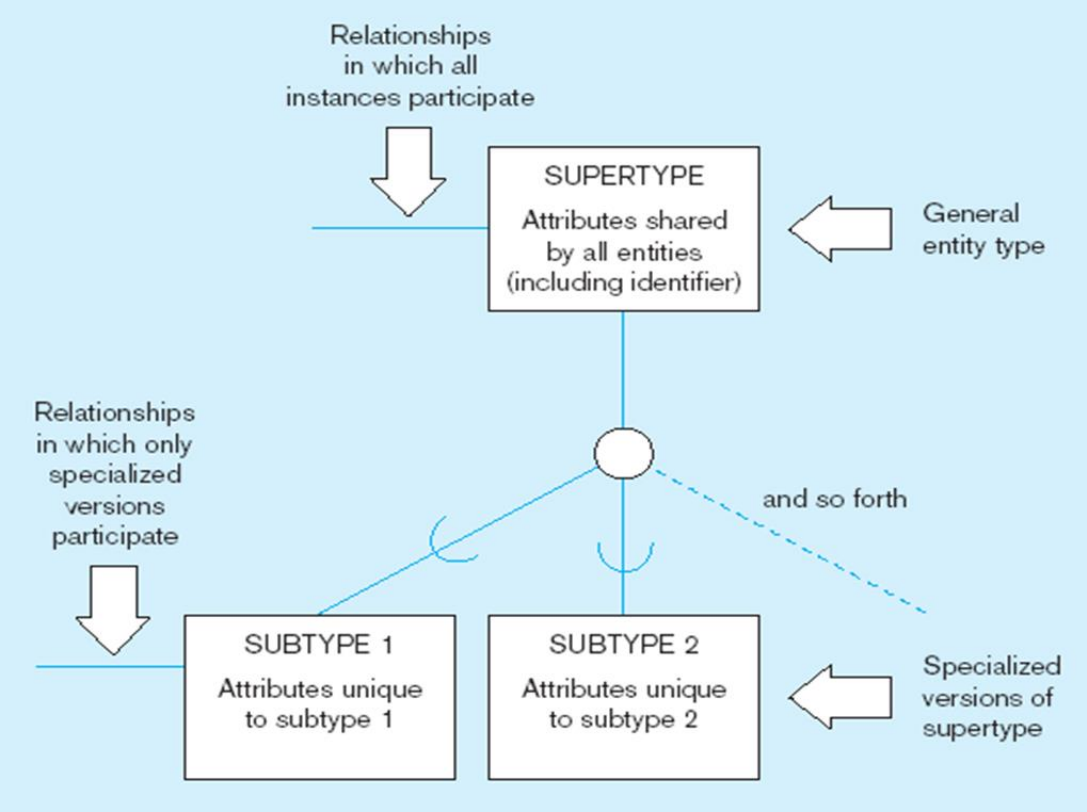
Enhanced ER (EER) Model

- The model that has resulted from extending the original ER model with new modeling constructs
  - Supertype / subtype relationship
  - Constraints in supertype/subtype relationships
  - Entity clustering

Supertypes and Subtypes

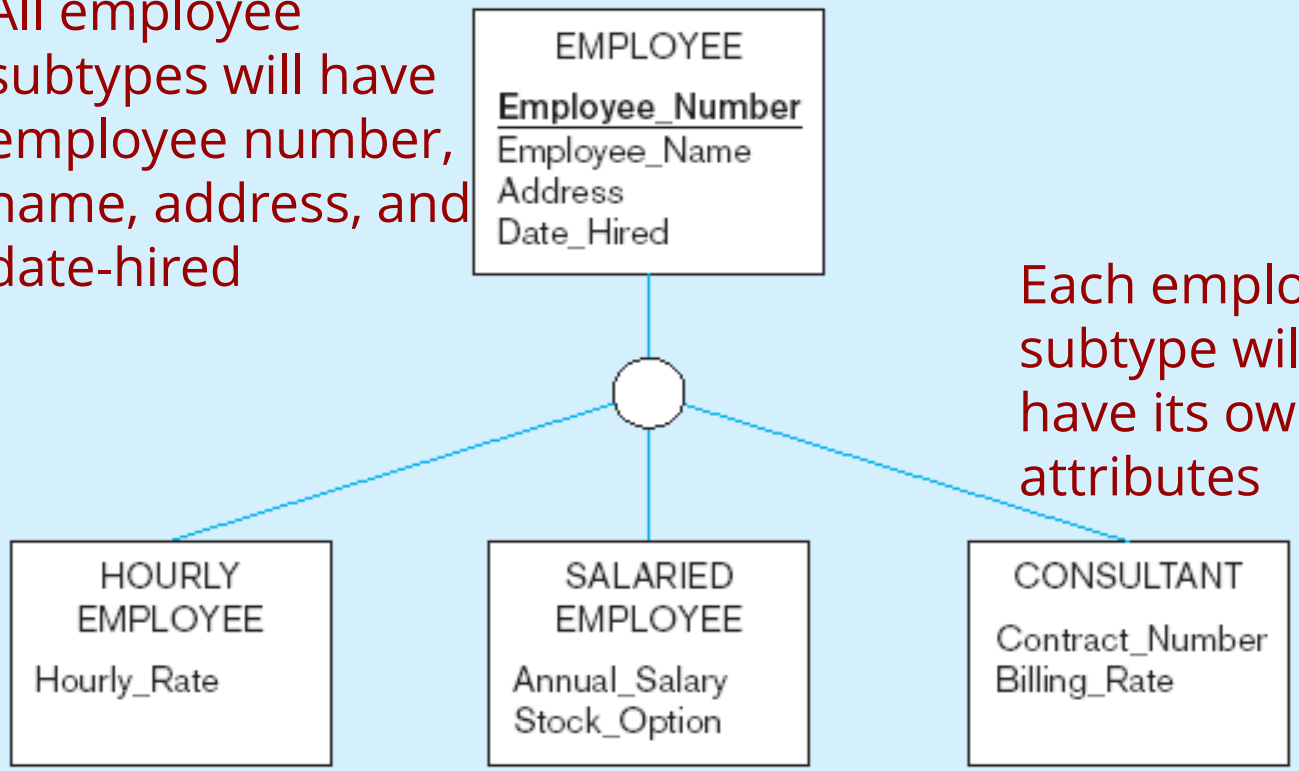
- Supertype: A general entity type
- Subtype: A subgrouping of the entities in an entity type (specialized entities) that has attributes distinct from those in other subgroupings
- Attribute inheritance
  - Subtype entities inherit values of all attributes and instances of all relationships of the supertype

Basic EER Notation for Supertype and Subtype



Employee Supertype with Three Subtypes

All employee subtypes will have employee number, name, address, and date-hired



Each employee subtype will also have its own attributes

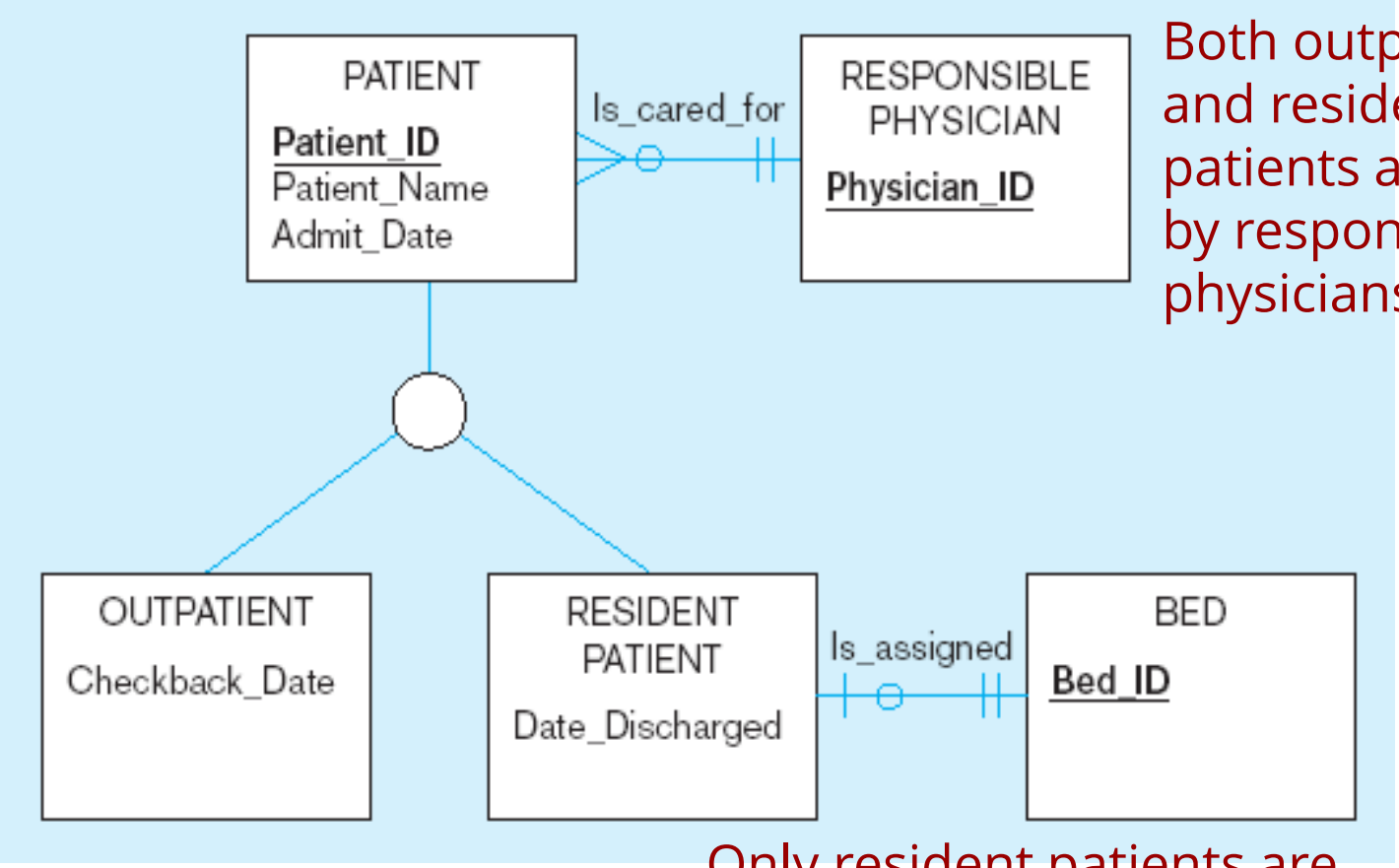
When to Use Supertype/Subtype?

- When there are attributes that apply to some (but not all) instances of an entity type
- When the instances of a subtype participate in a relationship unique to that subtype.

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 in a Hospital



Both outpatients and resident patients are cared by responsible physicians

Only resident patients are assigned to beds

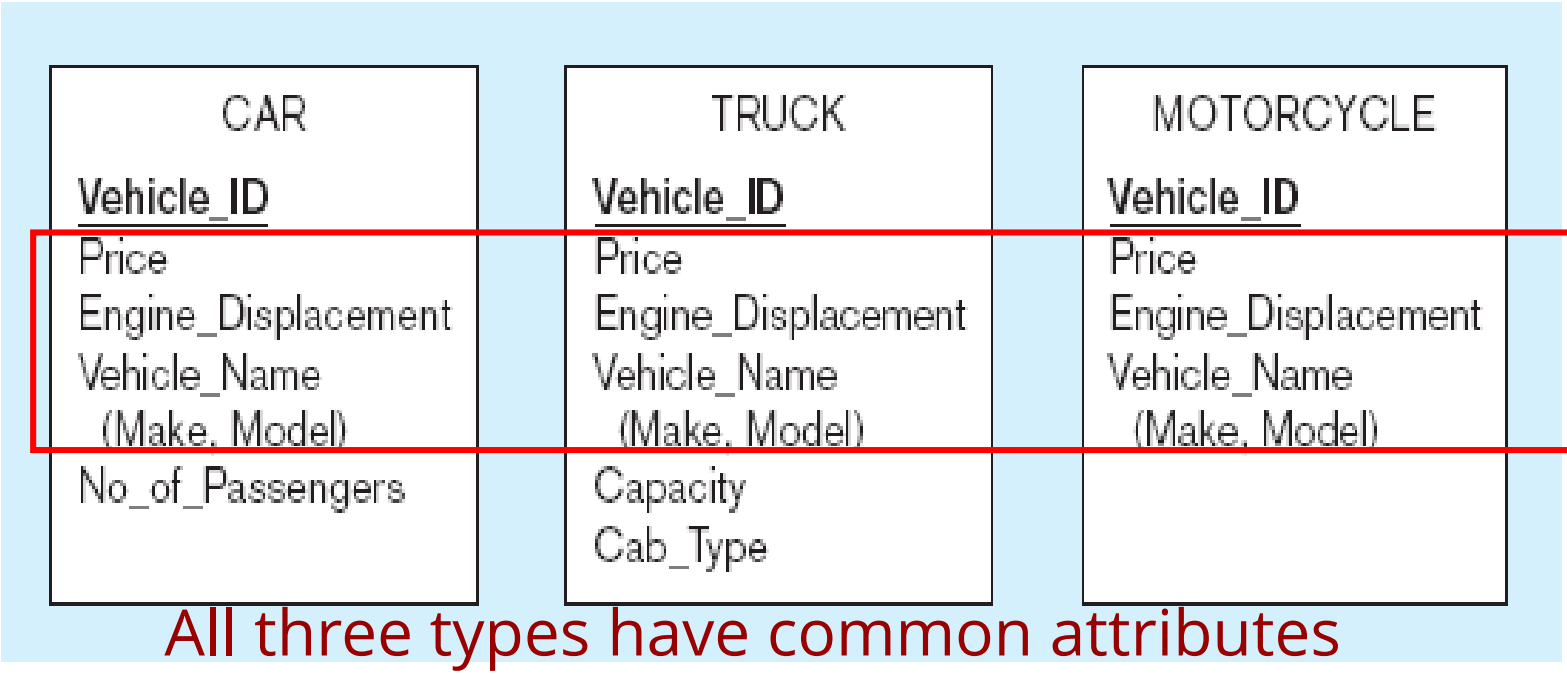
Generalization and Specialization

- Generalization (Bottom-up)
  - The process of defining a more general entity type from a set of more specialized entity types

- Specialization (Top-down)
  - The process of defining one or more subtypes of the supertype and forming supertype/subtype relationships

Generalization

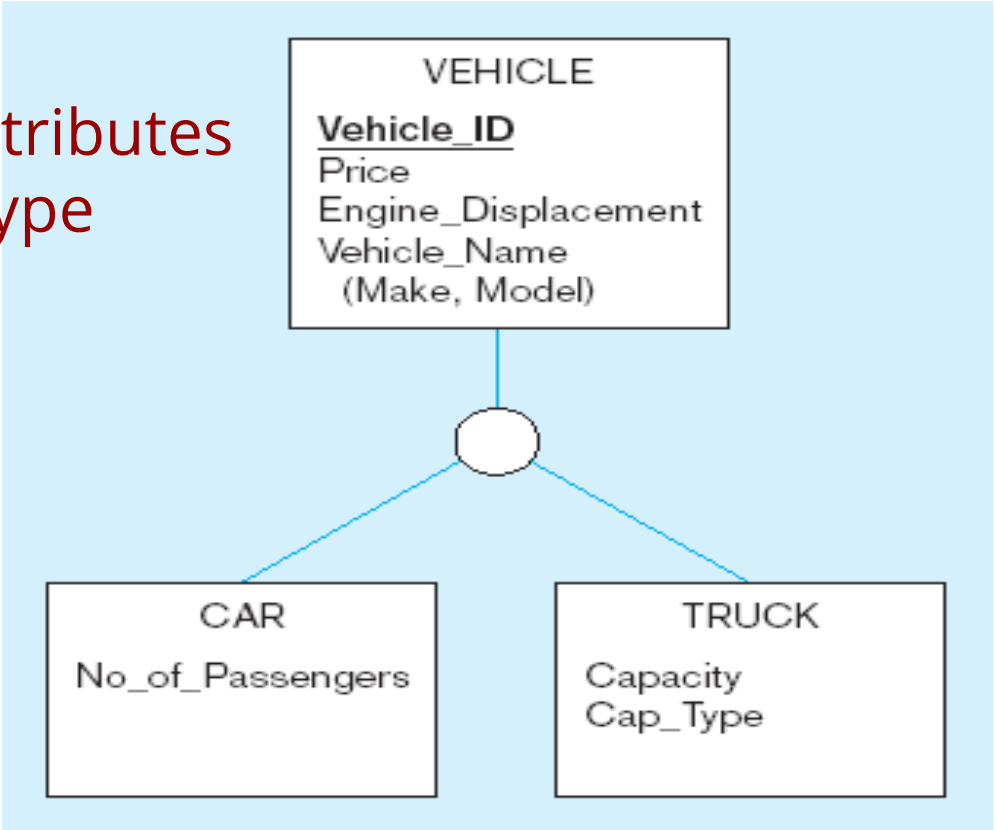
- CAR, TRUCK, and MOTORCYCLE



All three types have common attributes

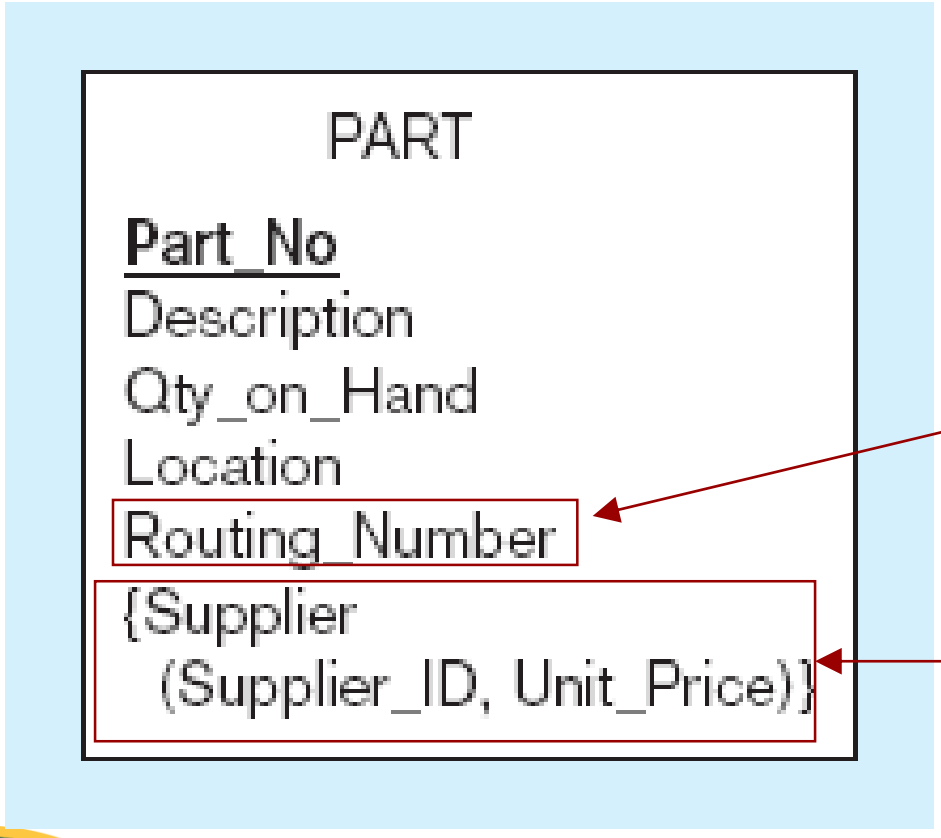
Generalization (cont'd)

Shared attributes in Supertype

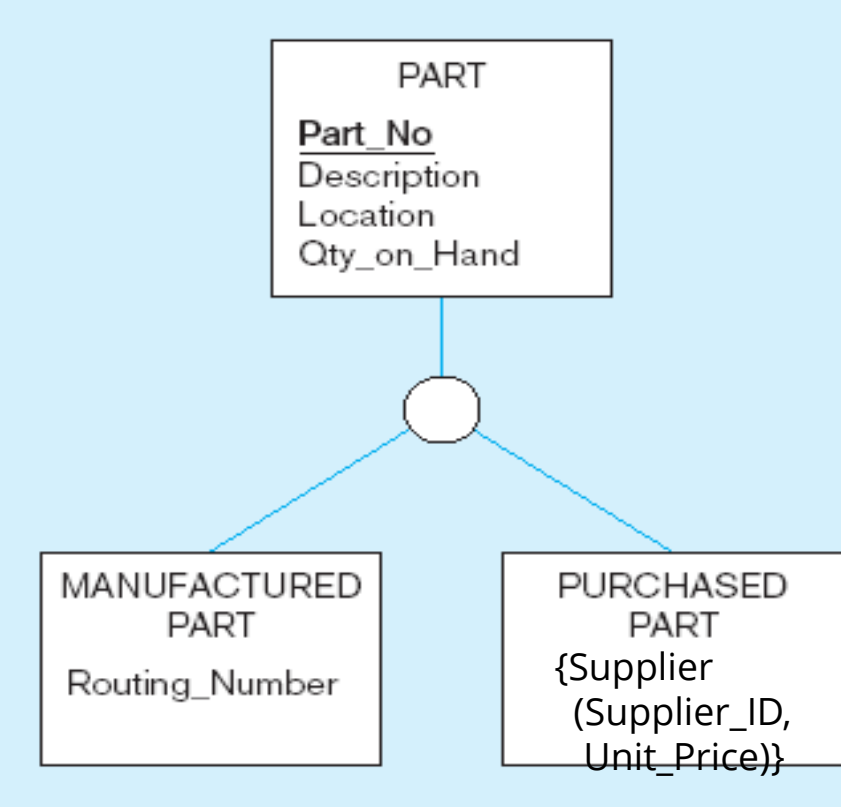


Motorcycle?

Specialization



Specialization (cont'd)



Wrap-Up

- Supertype/Subtype
- Generalization
- Specialization