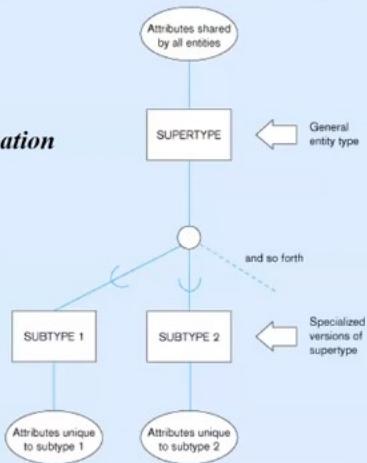Basic notation for supertype/subtype relationships
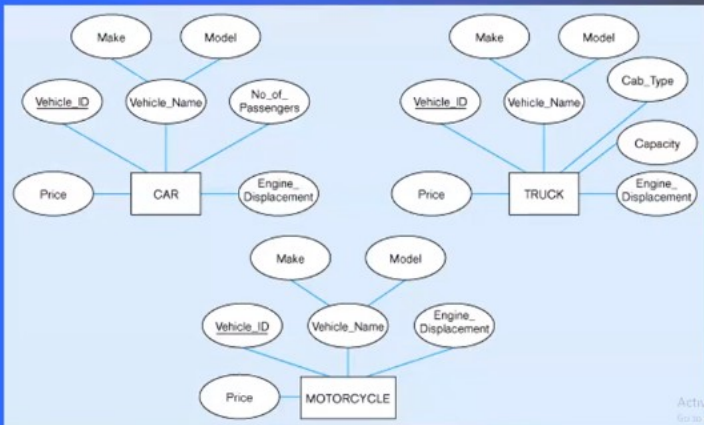
Generalization

Specialization
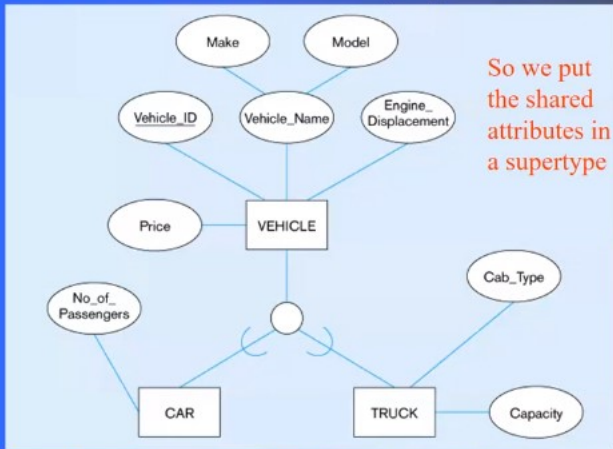
Example of generalization

(a) Three entity types: CAR, TRUCK, and MOTORCYCLE
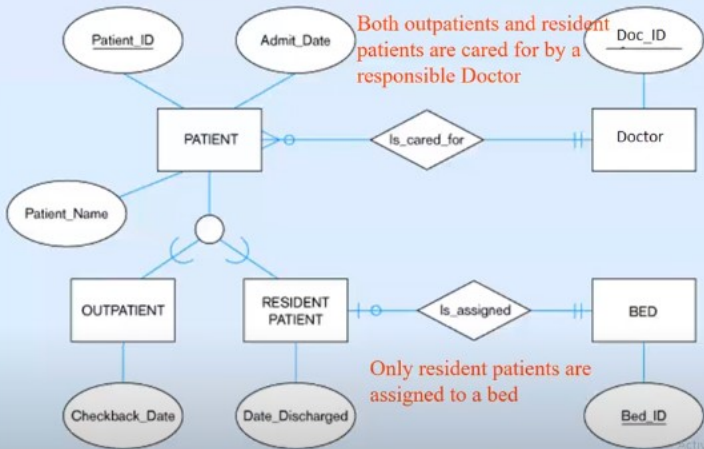
Generalization to VEHICLE supertype

So we put the shared attributes in a supertype

Make Model
Vehicle_ID Vehicle_Name Engine_Displacement
Price VEHICLE
No_of_Passengers Cab_Type
CAR TRUCK Capacity

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

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Supertype/subtype relationships in a hospital

Both outpatients and resident patients are cared for by a responsible Doctor

Only resident patients are assigned to a bed

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Constraints in Supertype
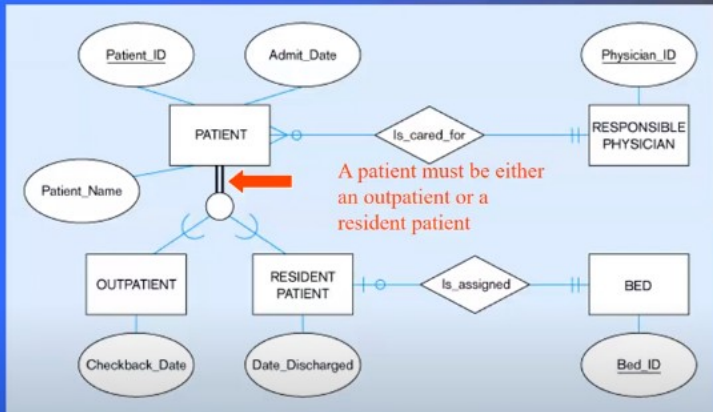
Completeness Constraints:

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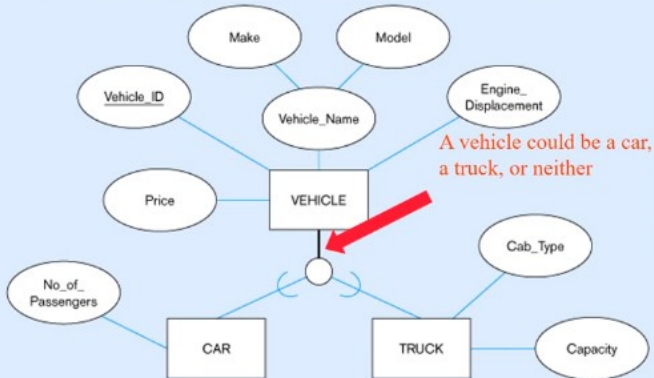- Partial Specialization Rule: No (single line)

Disjointness Constraints:

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

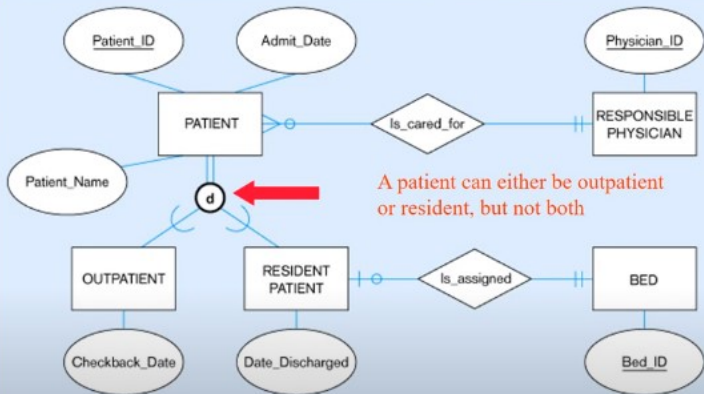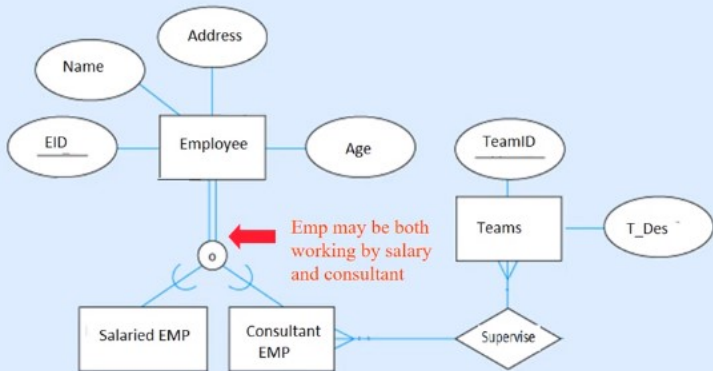# Examples of completeness constraints
Total specialization rule

A patient must be either an outpatient or a resident patient

Partial specialization rule

A vehicle could be a car, a truck, or neither

Make

Model

Vehicle_ID

Vehicle_Name

Engine_Displacement

Price

VEHICLE

No_of_Passengers

CAR

Cab_Type

TRUCK

Capacity

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Examples of disjointness constraints
Disjoint rule

A patient can either be outpatient or resident, but not both

Emp may be both working by salary and consultant

Overlap rule

Introducing a subtype discriminator (*disjoint* rule)

A simple attribute with different possible values indicating the subtype
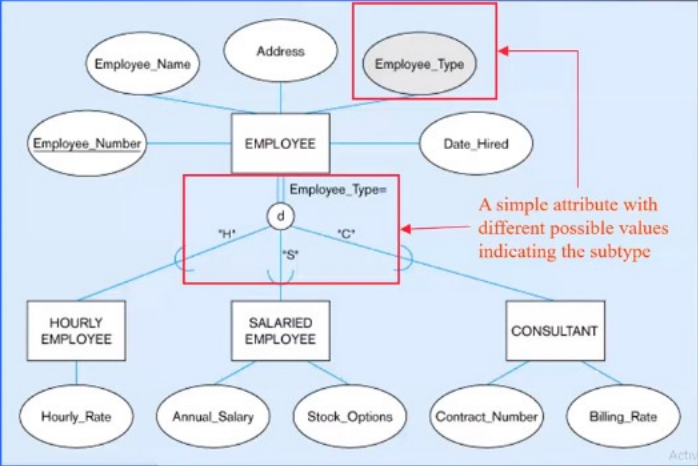
Subtype discriminator (*overlap* rule)

A composite attribute with sub-attributes indicating "yes" or "no" to determine whether it is of each subtype
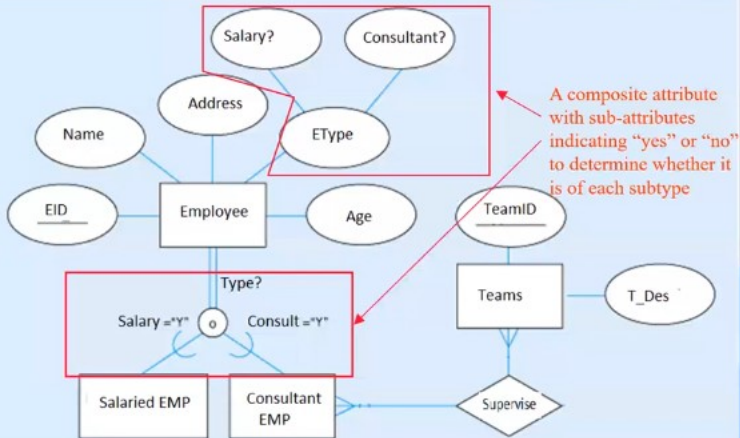
Transforming EER Diagrams into Relations
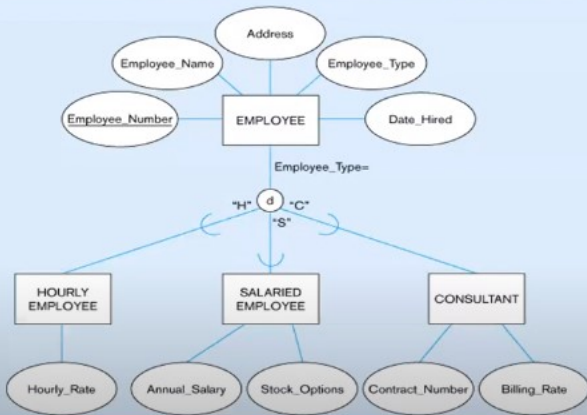
Mapping Supertype/subtype relationships to relations

EMPLOYEE

Employee_Number	Employee_Name	Address	Employee_Type	Date_Hired

HOURLY_EMPLOYEE

H_Employee_Number	Hourly_Rate

SALARIED_EMPLOYEE

S_Employee_Number	Annual_Salary	Stock_Options

CONSULTANT

C_Employee_Number	Contract_Number	Billing_Rate