Logical Database Design
Mapping Extended-ER Diagram - Part 3

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UCSC

Map Superclass/subclass relationship types

- Identify superclass as parent entity and subclass entity as child entity.
- There are various options for mapping. The two main options are to map the whole specialization into a single relation, or to map it into multiple relations.
- Most appropriate option dependent on number of factors such as:
  - disjointness and participation constraints on the superclass/subclass relationship,
  - whether superclass or subclasses are involved in distinct relationships,

Mapping Superclass / Subclass Relationship

Multiple Relations — For Superclass and each Subclass

Works for :

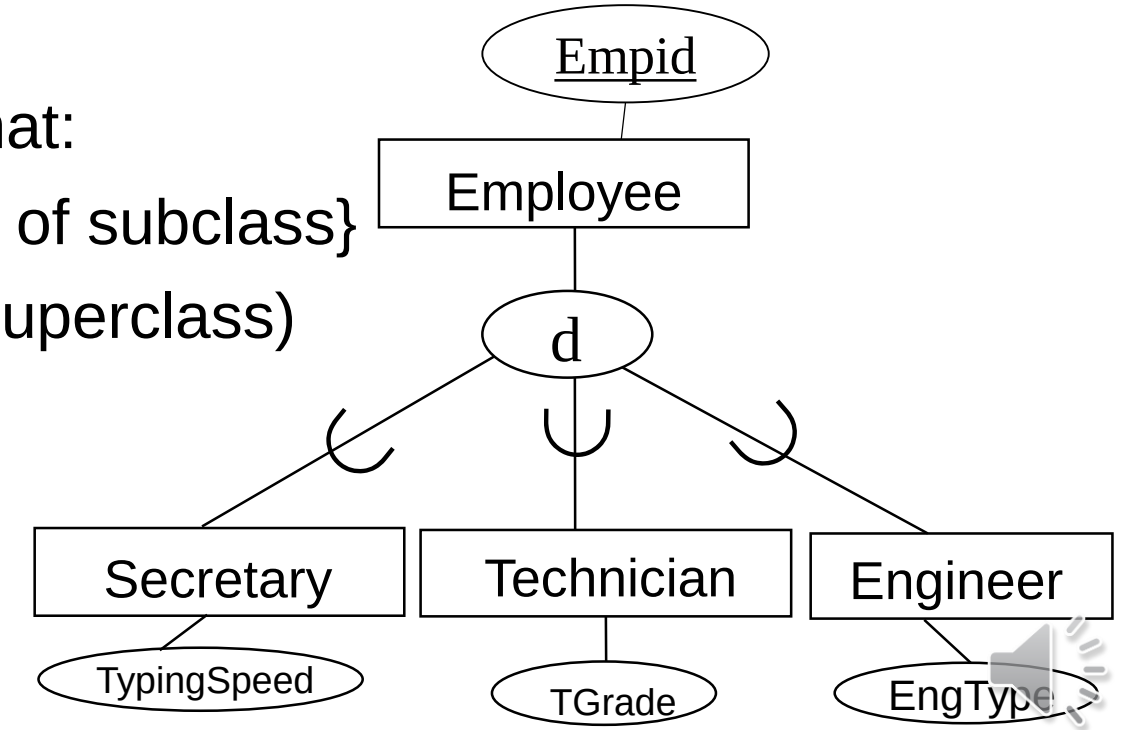
Participation Constraint – Total or Partial,

Disjoint Constraint - Disjoint or Overlapping

- Create a relation for superclass
- Create a relation for each subclass such that:

  {primary_key of superclass} U {attributes of subclass}

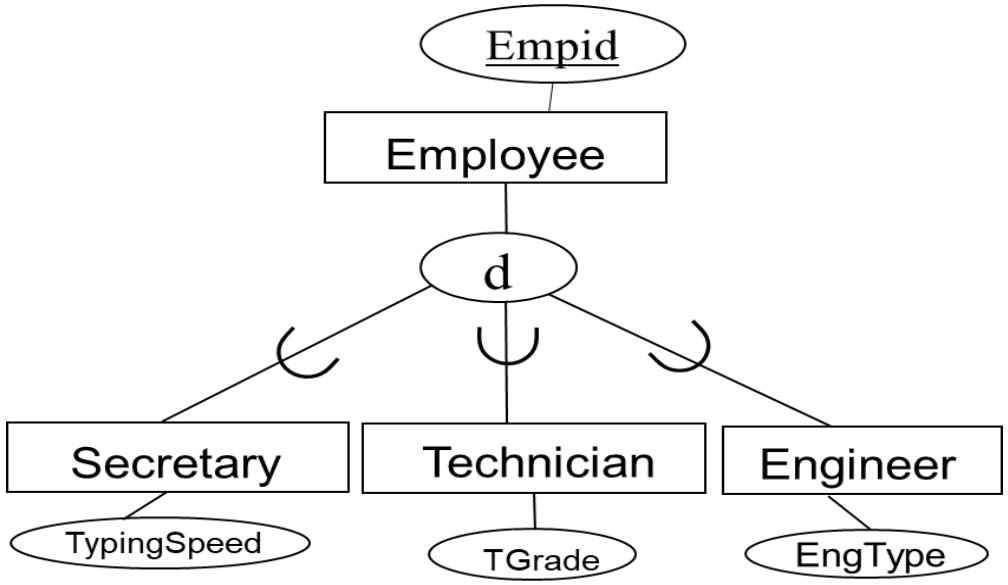
  key for subclass is (primary_key of superclass)



Multiple Relations - For Superclass and Each Subclass

Employee(Empid, Fname, Lname, Bdate, Address, JobType)

Secretary (Empid,TypingSpeed)
Technician (Empid, Tgrade)
Engineer (Empid, EngType)



Mapping Superclass / Subclass Relationship

Multiple Relations— For Subclass Relations Only

Works for :

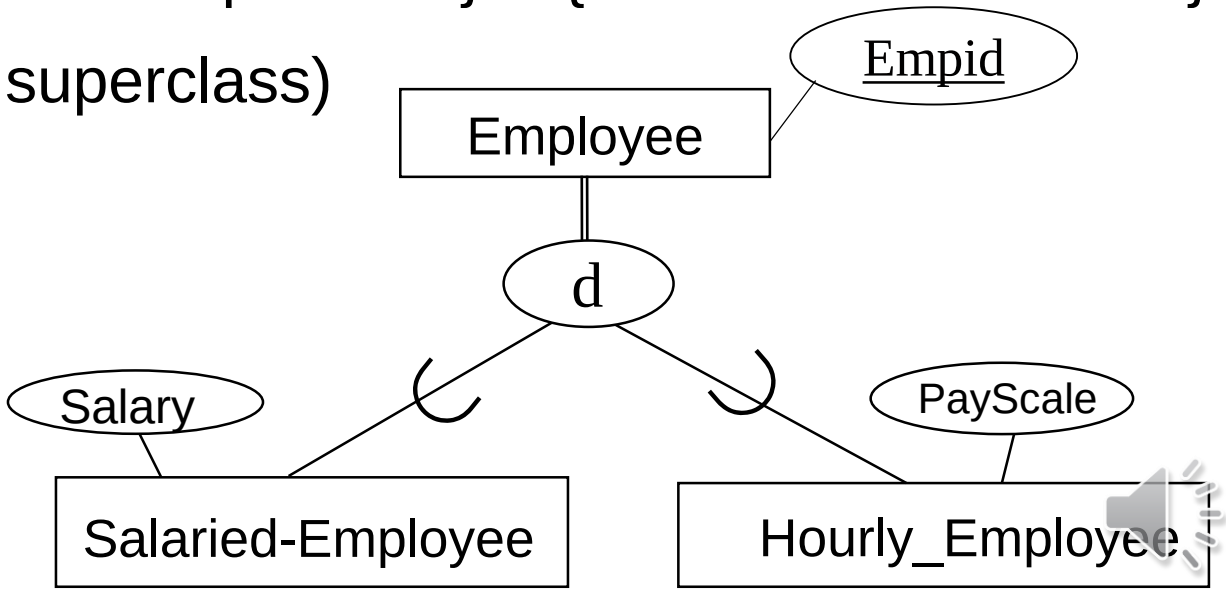
Participation Constraint – Total

Disjoint Constraint - Disjoint

Create a relation for each subclass such that:

{primary_key of superclass} U {attributes of superclass} U {attributes of subclass}

Key for each relation is (primary_key of superclass)



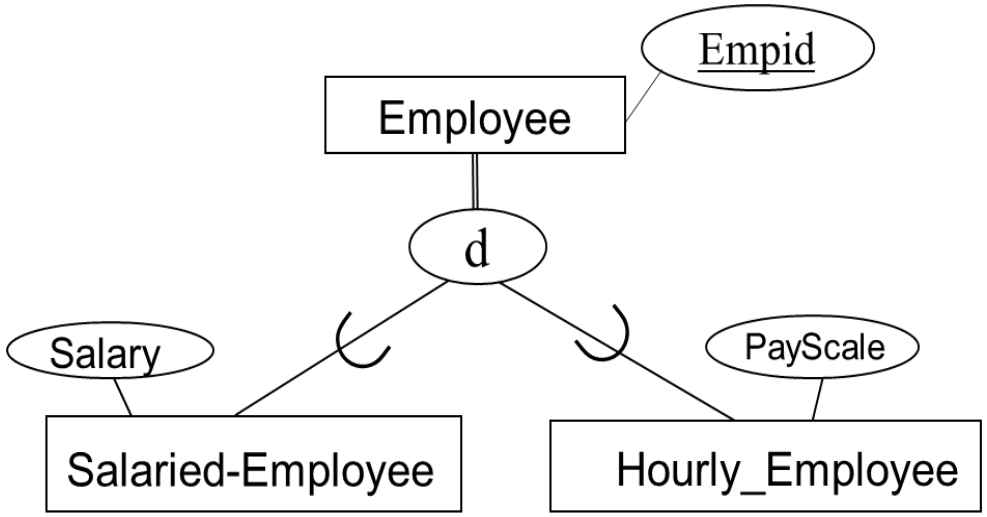
Multiple Relations— For Subclass Relations Only

Participation Constraint – Total

Disjoint Constraint - Disjoint

Salaried_ Employee (Empid, Fname, Lname, Bdate, Address, JobType, Salary)

Hourly_ Employee (Empid, Fname, Lname, Bdate, Address, JobType, Payscale)



Mapping Superclass / Subclass Relationship

Two Relations— For Superclass and One Relation for all Subclasses

Works for :

Participation Constraint – Partial

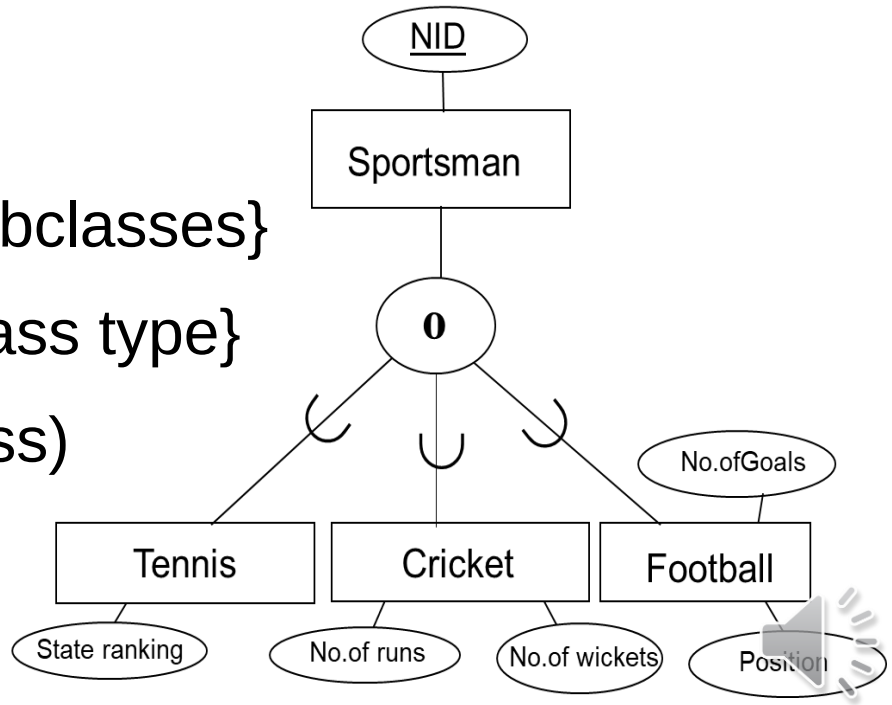
Disjoint Constraint - Overlap

- Create a relation for superclass
- Create a relation for all subclasses such that:

{primary_key of superclass} U {attributes of all subclasses}

U {with discriminator(s) to distinguish the subclass type}

key for each relation is (primary_key of superclass)



Two Relations— For Superclass and One Relation for all Subclasses

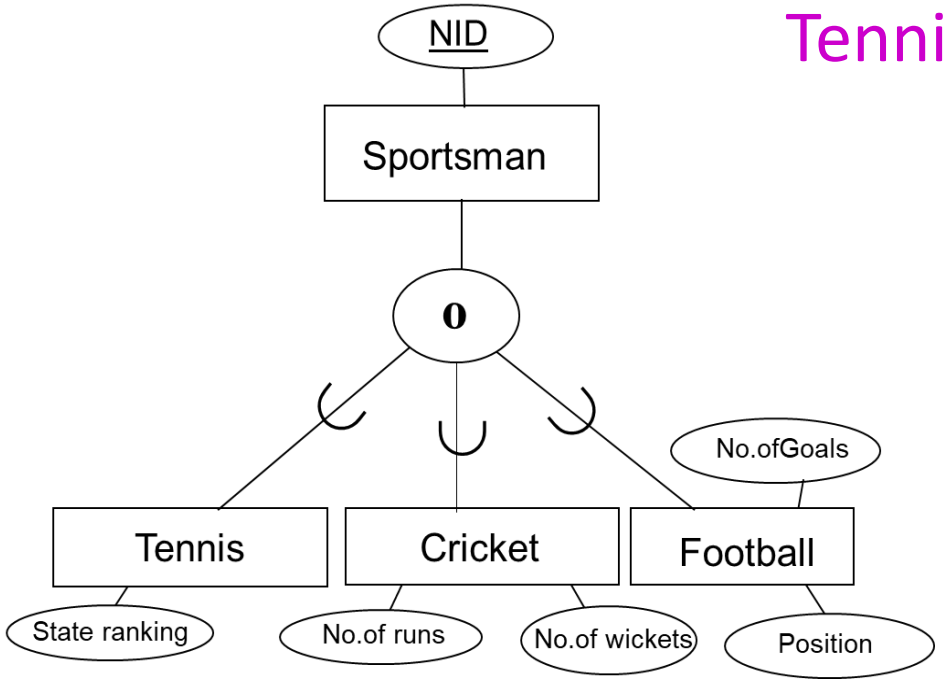
Participation Constraint – Partial

Disjoint Constraint - Overlap

Sportsman (NID, Fname, Lname, Bdate, Gender, Address)

TCF(NID, _Ranking, NoOfRuns, NoOfWickets, Position, NoOfGoals,

Tennis_Flag, Cricket_ Flag, Football_Flag)



Mapping Superclass / Subclass Relationship

Single Relation with Multiple Type Attributes

Works for :

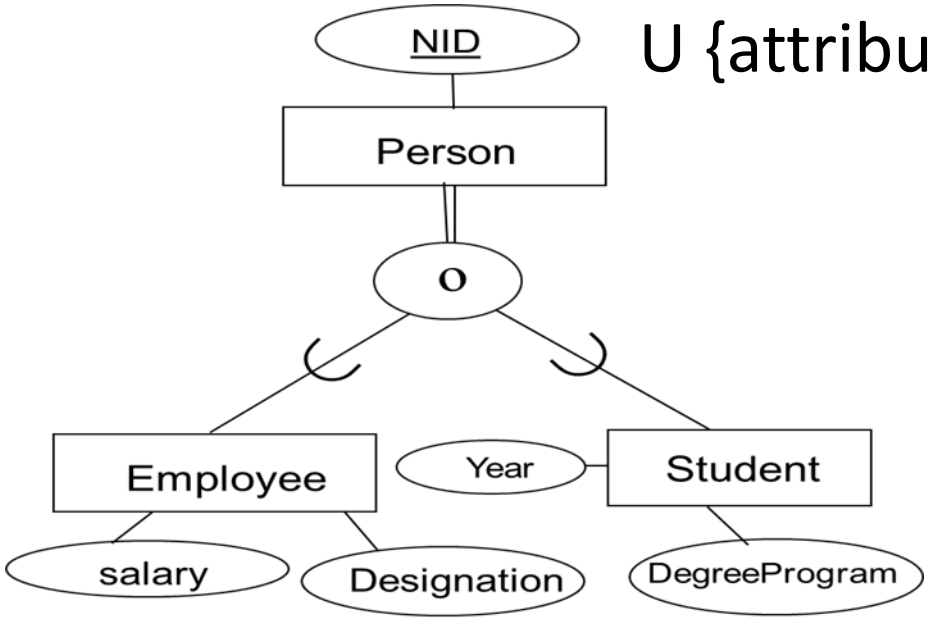
Participation Constraint – Total

Disjoint Constraint - Overlap

Create one relation such that:

{primary_key of superclass attributes} U {attributes of superclass}

U {attributes of all subclasses} U {type attribute}

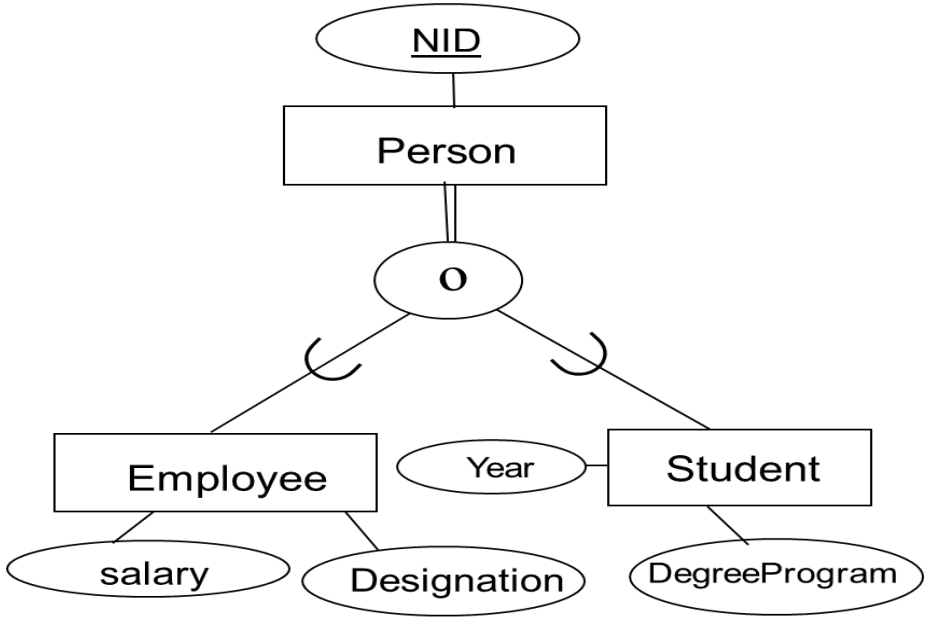


Mapping Superclass /Subclass Relationship

Participation Constraint – Total

Disjoint Constraint - Overlap

Emp_Stud (NID, Fname, Lname, Bdate, Gender, Address Salary,
Designation, DegreeProgram, Year, Emp_Flag, Student_ Flag)



Mapping Superclass /Subclass Relationship

Participation Constraint – Total

Disjoint Constraint - Overlap

Emp_Stud (NID, Fname, Lname, Bdate, Gender, Address Salary,
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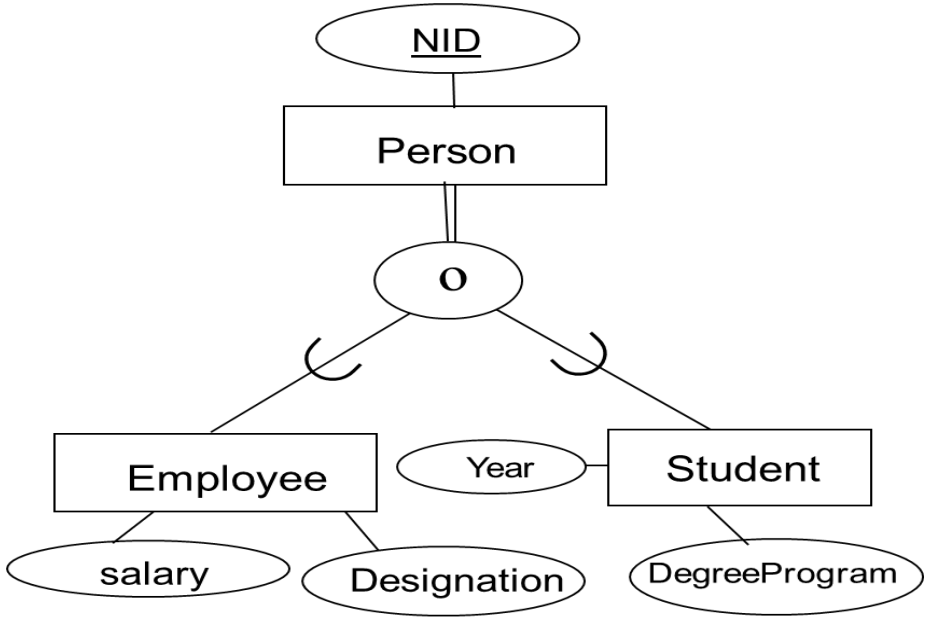

Mapping Superclass /Subclass Relationship

Participation Constraint – Total

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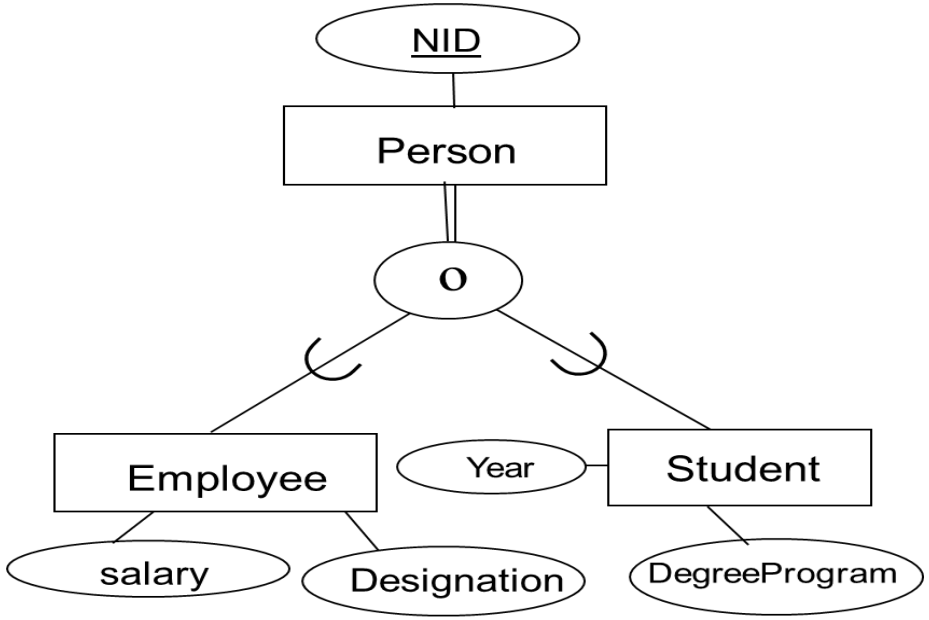
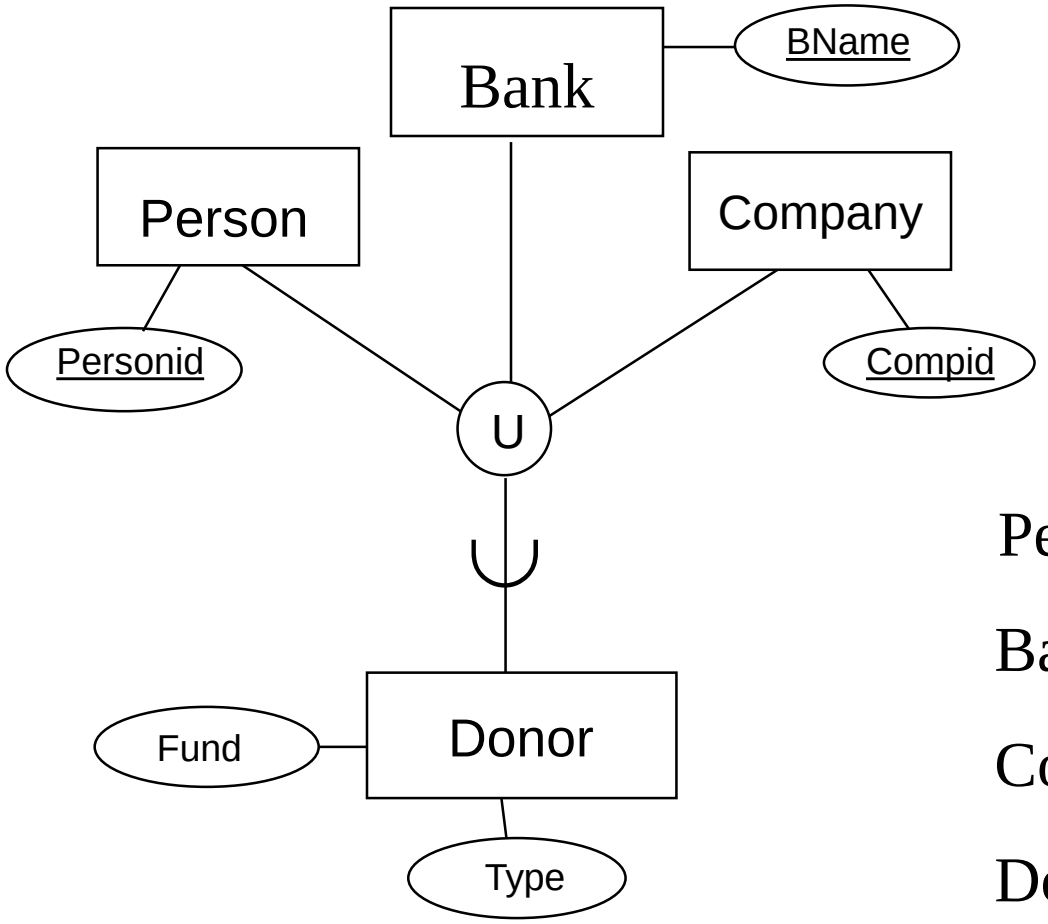


Mapping of Categories

- If the super-classes have different keys it is necessary to define a new key attribute called a '**surrogate key**' when creating a relation to correspond to the category.
- Create a relation to correspond to the category, include any attributes of the category. The primary key is the surrogate key.
- Each super-class is also mapped into a relation with its own primary key, the surrogate key becomes a foreign key for this.
- For a category whose superclasses have the same key, there is no need for a surrogate key.

Mapping of Categories



Person(PersonID, Pname…,DonorID)

Bank(Bname,…,DonorID)

Company(CompID, Cname,…,DonorID)

Donor(DonorID, DonorType, Fund)

Mapping of Categories

Car (Vehicle_id, Cstyle, Cmake,…)

Truck (Vehicle_id, Tonnage, Tmake,……)

Registered_Vehicle (Vehicle_id, License_plate_no)