

Intro To Database

(Database Fundamental using MySQL)

Mohamed ELshafei





Agenda

- Relational Database.
- ERD Mapping to Tables
- SQL.
- MYSQL.
- DDL.
- MySQL Data Types
- DCL.
- General Query

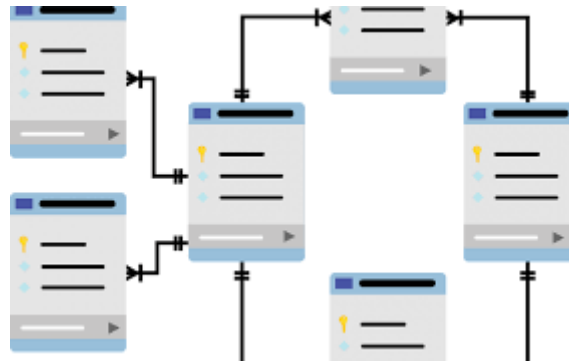


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Relational Database

- A data structure through which data is stored in tables that are related to one another in some way.
- The way the tables are related is described through a relationship.





Basic Database Structure

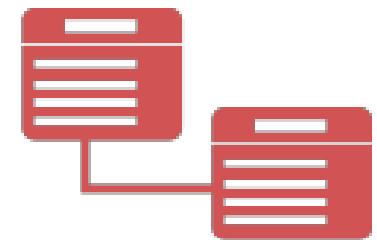
- **Table or entity:** a collection of records
- **Attribute or Column or field:** a Characteristic of an entity
- **Row or Record :** the specific characteristics of one entity
- **Database:** a collection of tables

SSAN	Name	Date of Birth			
		1/1/2012			
		31/12/2012			

Mapping

ERD Mapping to Tables

Steps



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ER-to-Relational Mapping

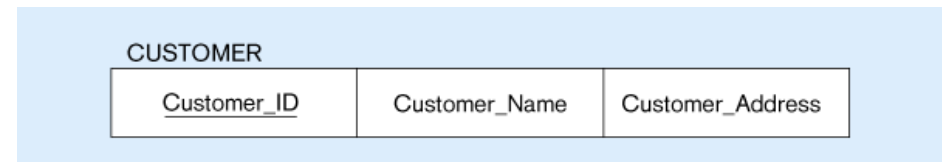
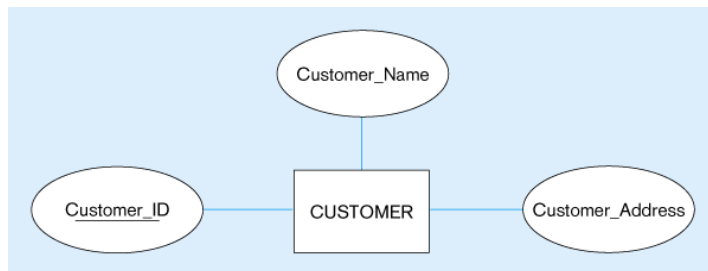
- **Step 1:** Mapping of Regular Entity Types
- **Step 2:** Mapping of Weak Entity Types
- **Step 3:** Mapping of Binary 1:1 Relation Types
- **Step 4:** Mapping of Binary 1:N Relationship Types.
- **Step 5:** Mapping of Binary M:N Relationship Types.
- **Step 6:** Mapping of N-ary Relationship Types.
- **Step 7:** Mapping of Unary Relationship.





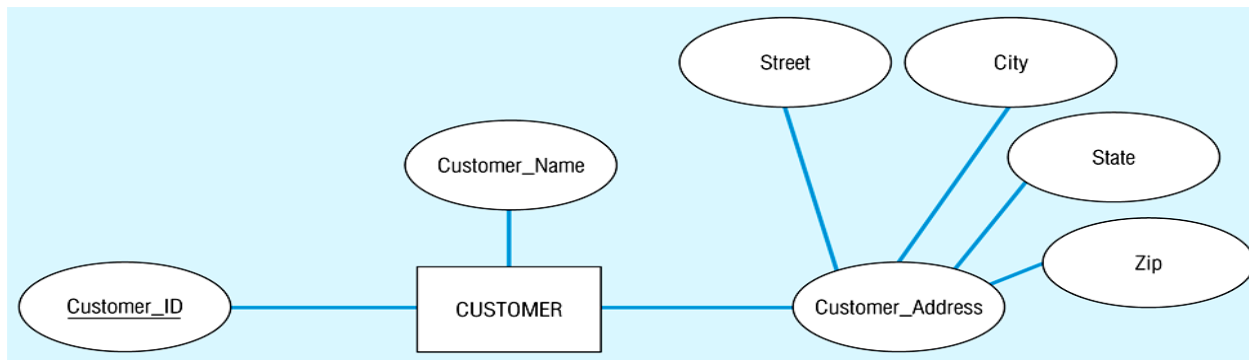
Step 1: Mapping of Regular Entity Types

- Create table for each entity type.
- Choose one of key attributes to be the primary key.





Mapping Composite attribute



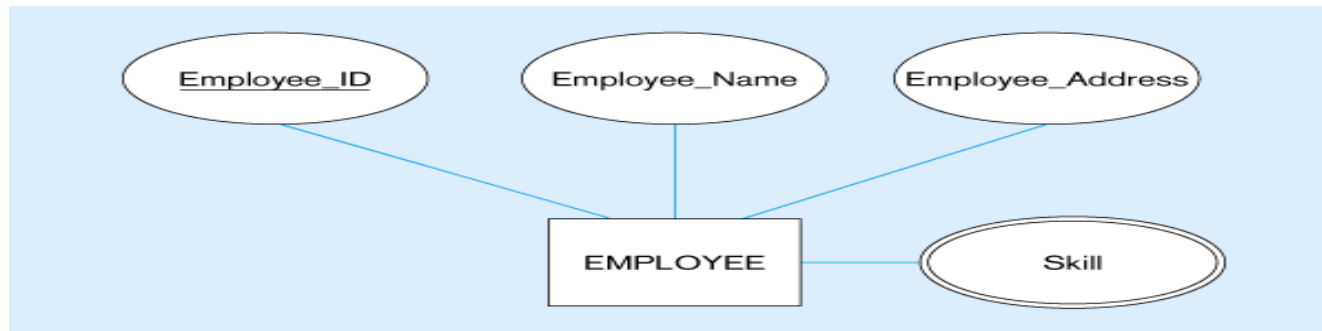
CUSTOMER relation with address detail

<u>Customer_ID</u>	Customer_Name	Street	City	State	Zip
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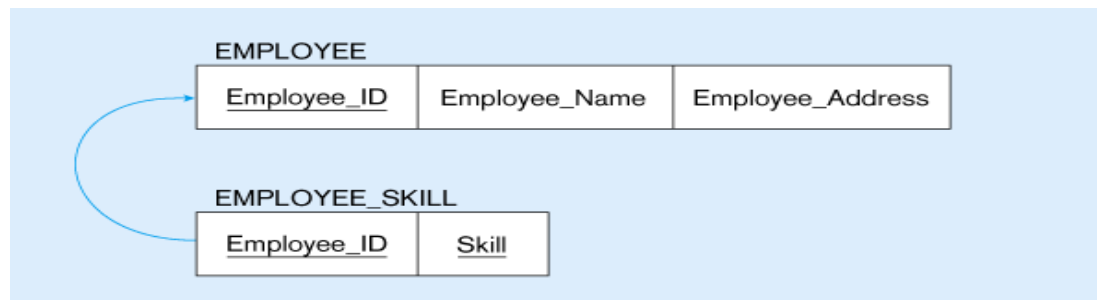
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Mapping Multivalued Attribute



Multivalued attribute becomes a separate relation with foreign key





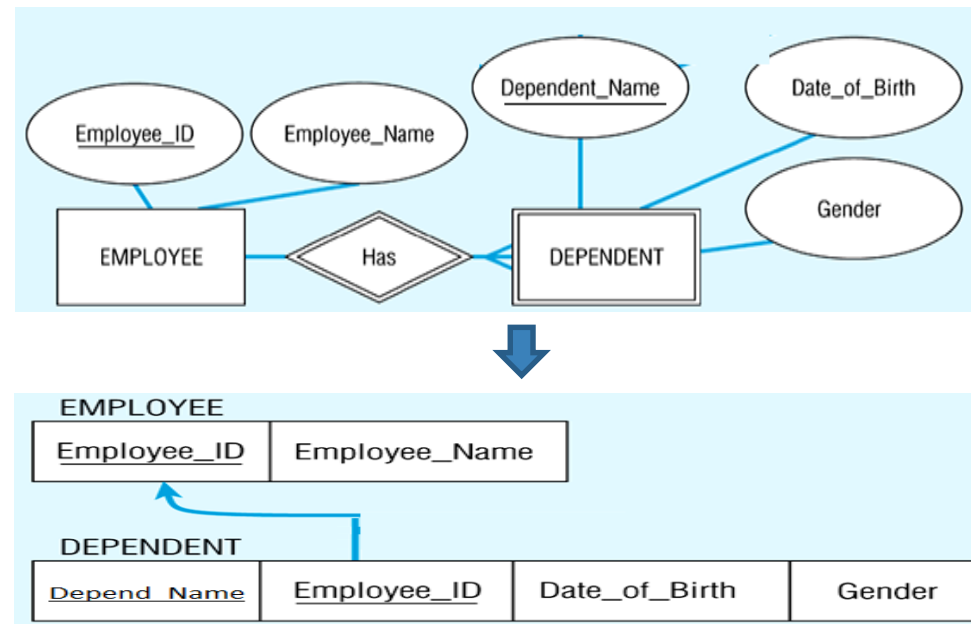
Mapping Derived & Complex

- In the most cases **Derived** attribute not be stored in DB.
- Mapping **Complex** Like Mapping Multivalued attribute then including parts of the multivalued attributes as columns in DB



Step 2: Mapping of Weak Entity Types

- Create table for each weak entity.
- Add foreign key that correspond to the owner entity type.



Primary key composed of:

- Partial identifier of weak entity
- Primary key of identifying relation (strong entity)



Step 3: Mapping of Binary 1:1 Relation Types

- Merged two tables if both sides are Mandatory.
- Add FK into table with the total participation relationship to represent optional side.
- Create third table if both sides are optional.



One To One 2 Mandatory

One-to-One

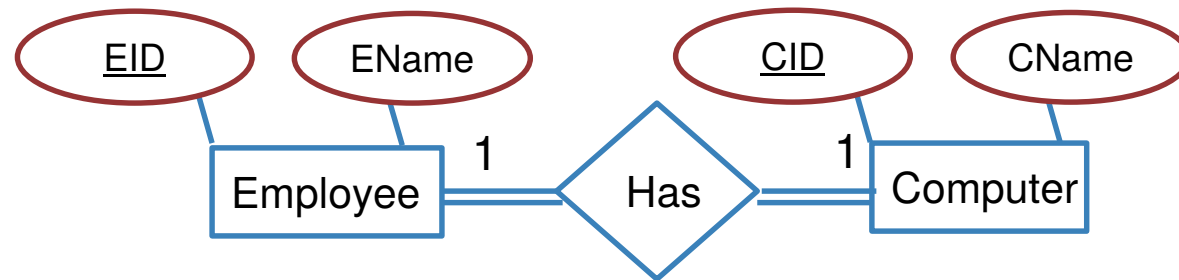
2 Mandatory



1 table

tbl_xy (PK,.....,.....)

PK = PKx or PKy



Emp(EID, Ename, Cname, **CID**)



One To One Optional-Mandatory

One-to-One

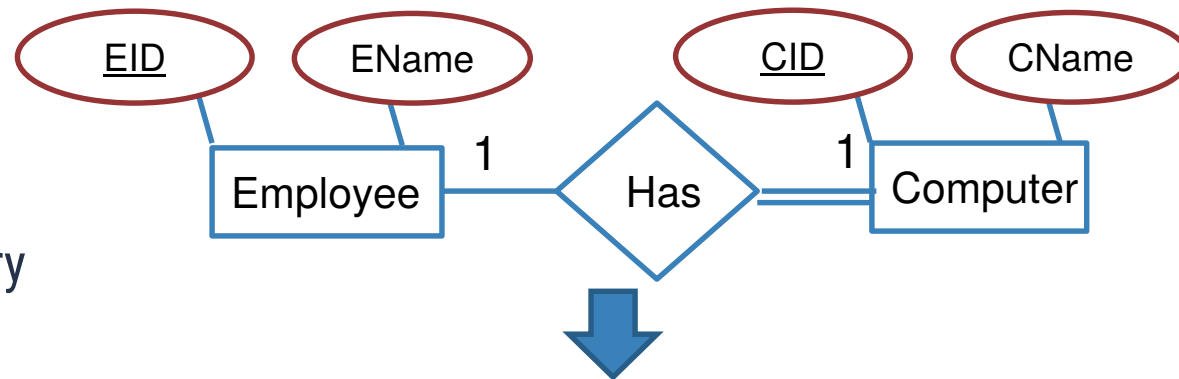
X optional – Y mandatory



2 tables

tbl_x (PKx,.....)

tbl_y (PKy,.....,PKx.....)



Employee(EID, Ename)

Computer(CID, Cname, **EID_FK**)



One To One 2 Optional

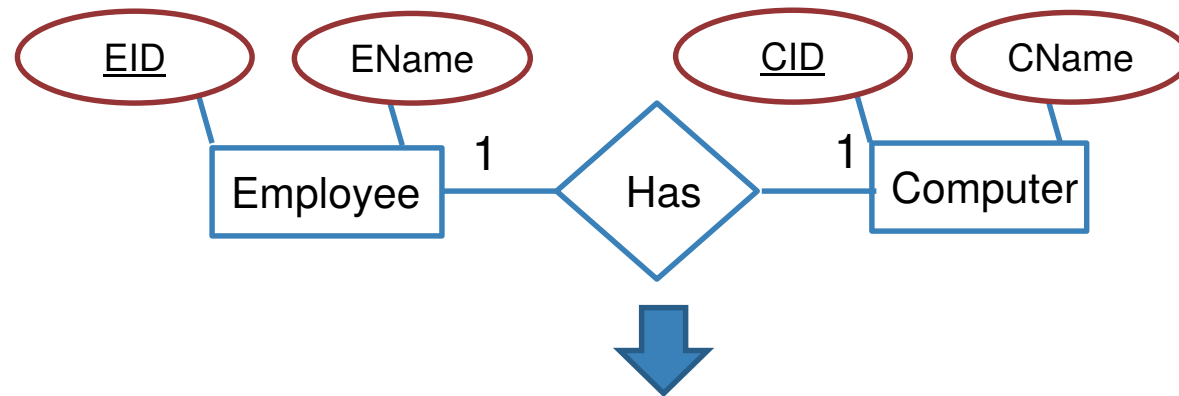
One-to-One

2 Optional



3 tables

tbl_x (PKx,.....)
tbl_y (PKy,.....)
tbl_xy (PKxy,.....,FKxy,....)
PKxy = PKx or PKy



Employee(EID, Ename)

Car(CID, CType)

Emp_Car(EID, CID_FK)

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Step 4: Mapping of Binary 1:N Relationship Types

- Add FK to N-side table if N-Side mandatory
- Add any simple attributes of relationship as column to N-side table.



One To Many (Many is Mandatory)

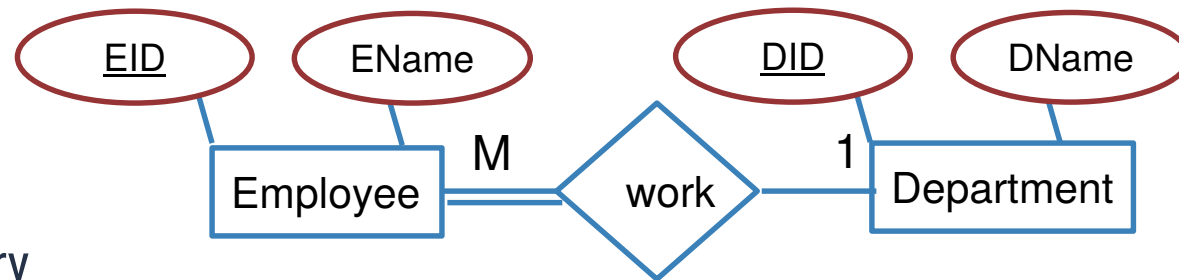
One-to-Many

X whatever– Y mandatory



2 tables

tbl_x (PKx,.....)
tbl_y (PKy,.....,FKy.....)
FKy= PKx



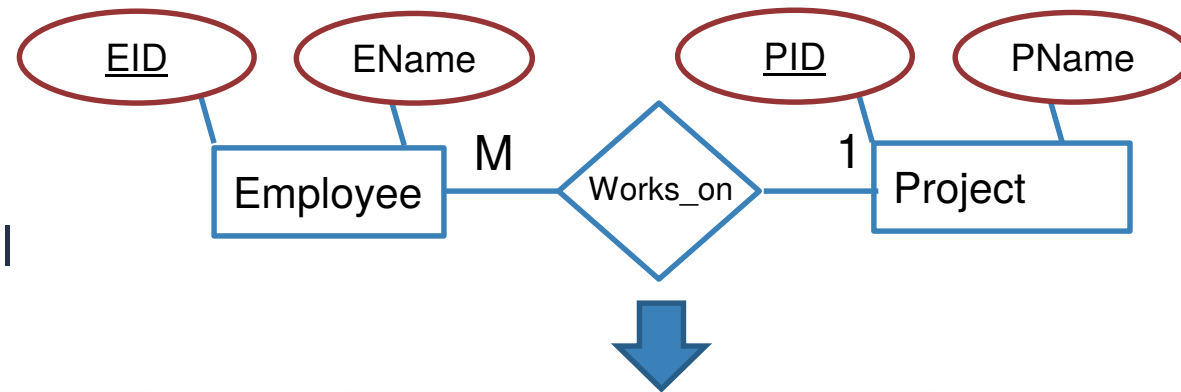
Department(DID, Dname)
Employee(EID, Ename, **DID**)



One To Many (Many is Optional)

One-to-Many

X whatever— Y Optional



3 tables

```
tbl_x (PKx,...,.....)
tbl_y (PKy,...,.....)
tbl_xy (PKxy,...,.....)
      PKxy = PKy
```

Project(PID, Pname)

Employee(EID, Ename)

Proj_Emp(EID, PID_FK)



Step 5: Mapping of Binary M:N Relationship Types.

- Create a new third table
- Add FKs to the new table for both parent tables
- Add simple attributes of relationship to the new table if any .



Many To Many

Many-to-Many

X whatever– Y whatever



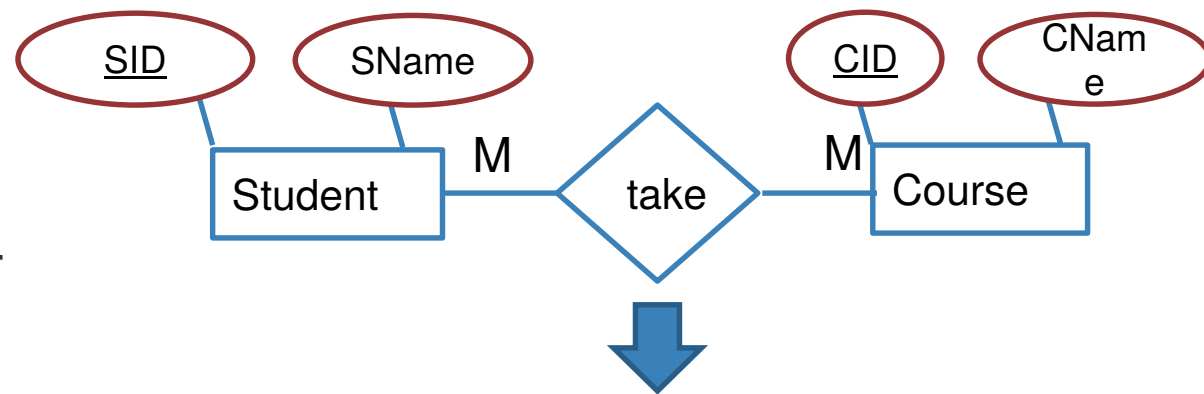
3 tables

tbl_x (PK_x,.....)

tbl_y (PK_y,.....)

tbl_xy (PK_x ,PK_y,,.....)

PK_{xy}=_PK_x+PK_y



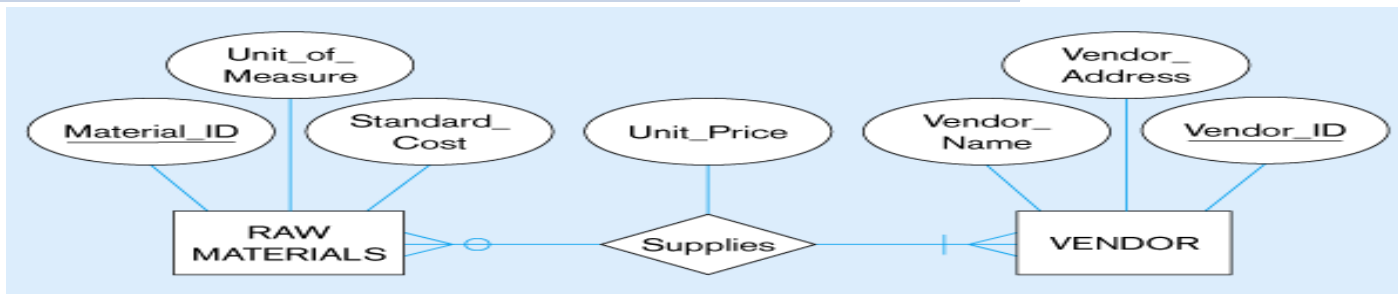
Student(SID, Sname)

Course(CID, Cname)

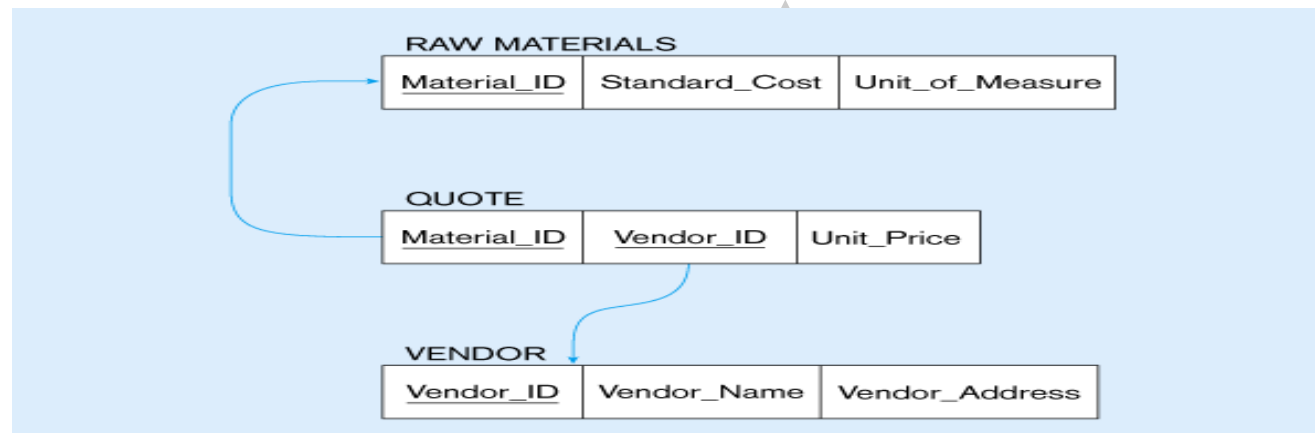
Stud_Course(SID, CID)



Many To Many with attribute



The *Supplies* relationship will need to become a separate relation





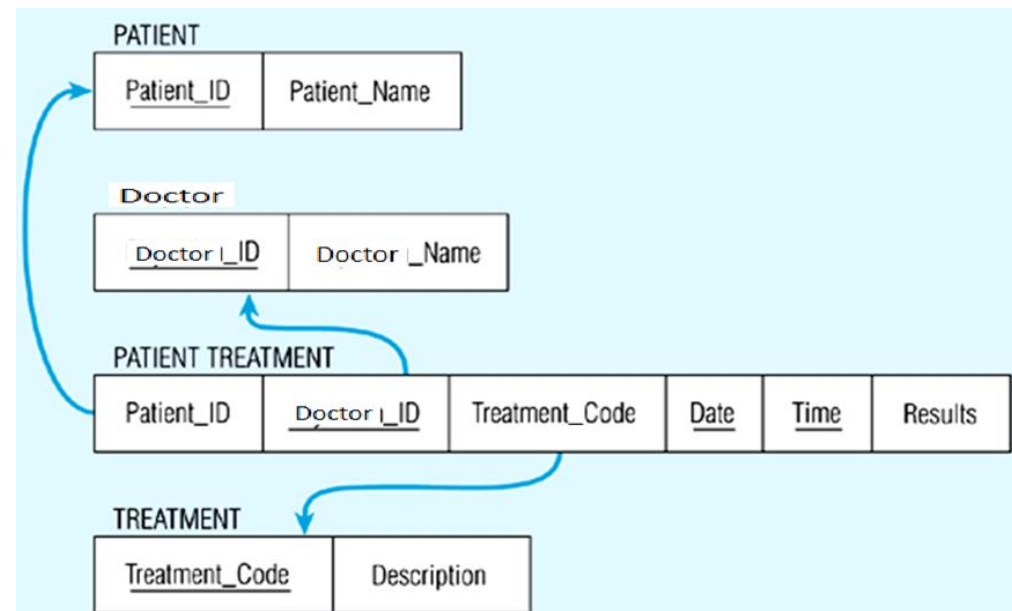
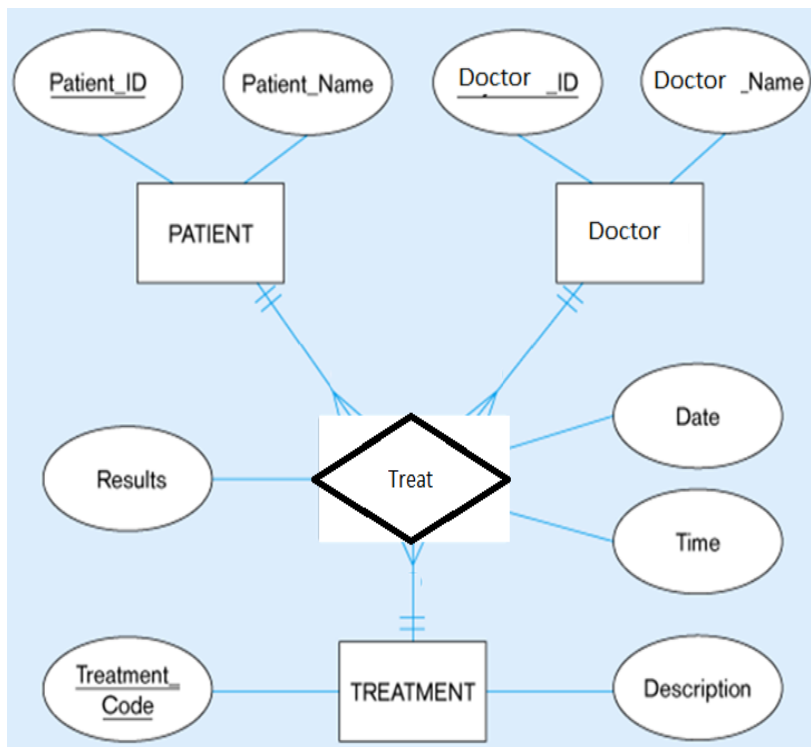
Step 6: Mapping of N-ary Relationship Types.

If $n > 2$ then :

- Create a new third table.
- Add FKs to the new table for all parent tables.
- Add simple attributes of relationship to the new table if any .

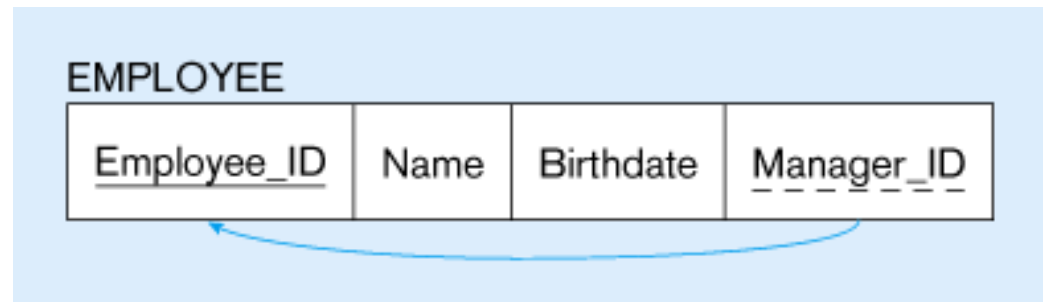
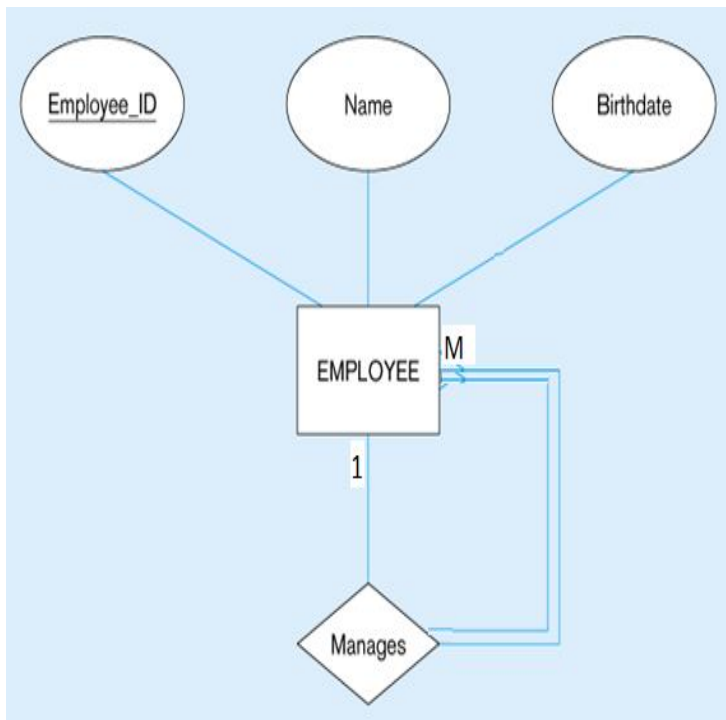


Step 6: Mapping of N-ary Relationship Types.





Step 7: Mapping Unary Relationship



- EMPLOYEE relation with recursive foreign key



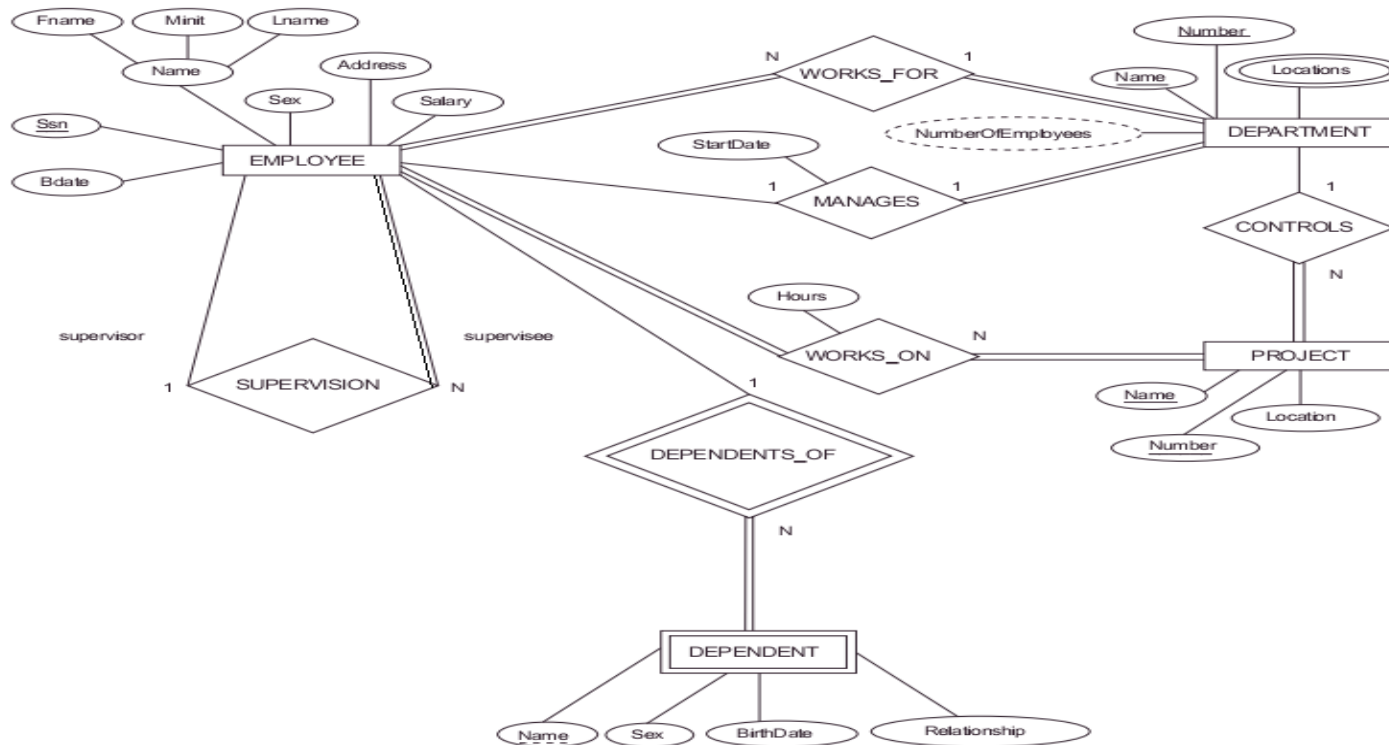
Case Study

Company

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Case study



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