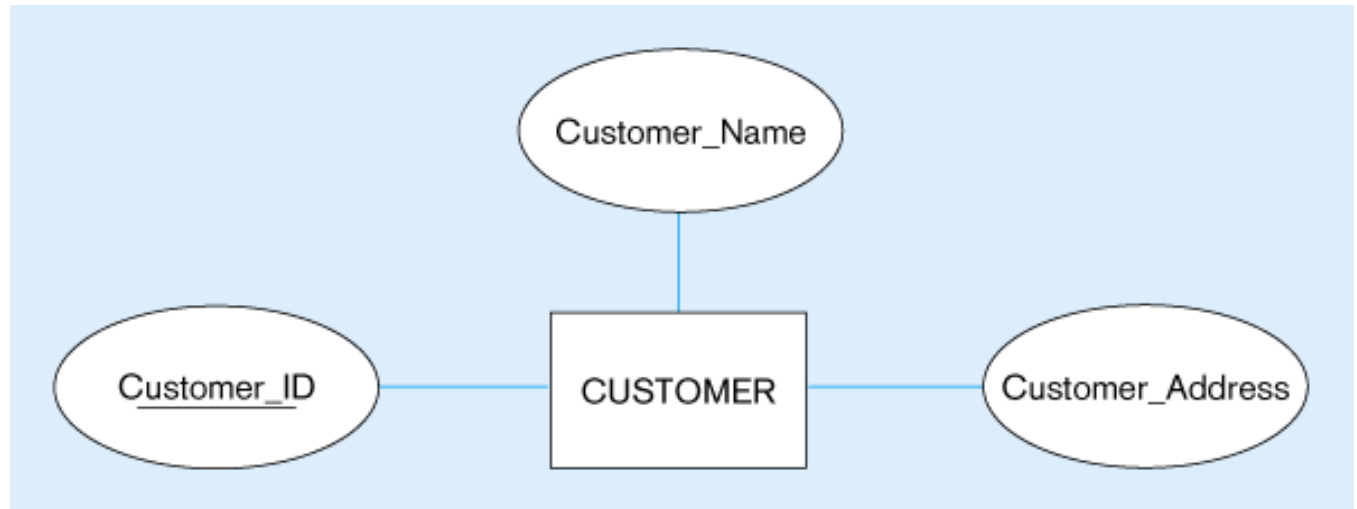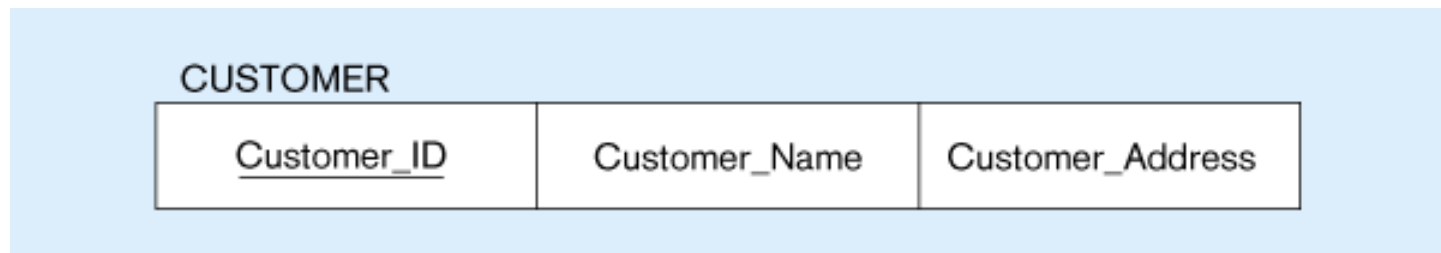# Transforming ERD into Relations

Mapping a regular entity

CUSTOMER entity type with simple attributes
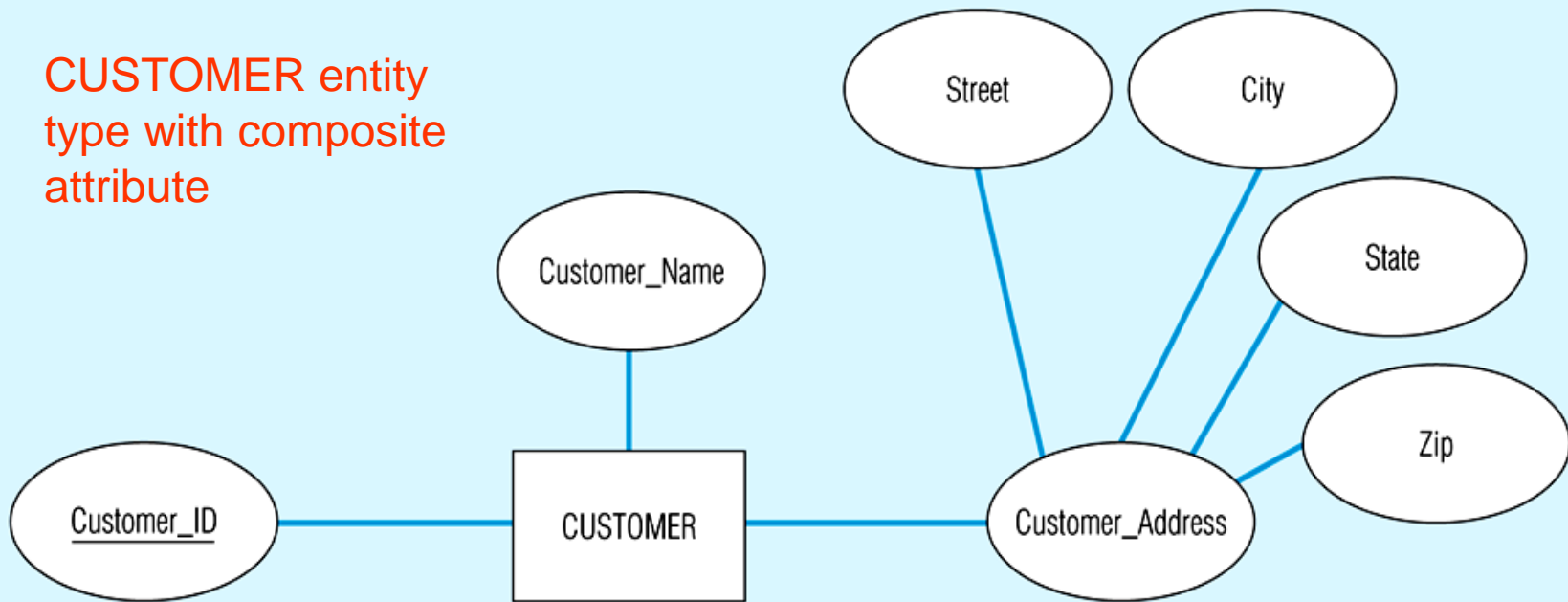

CUSTOMER relation

Mapping a composite attribute

CUSTOMER entity type with composite attribute
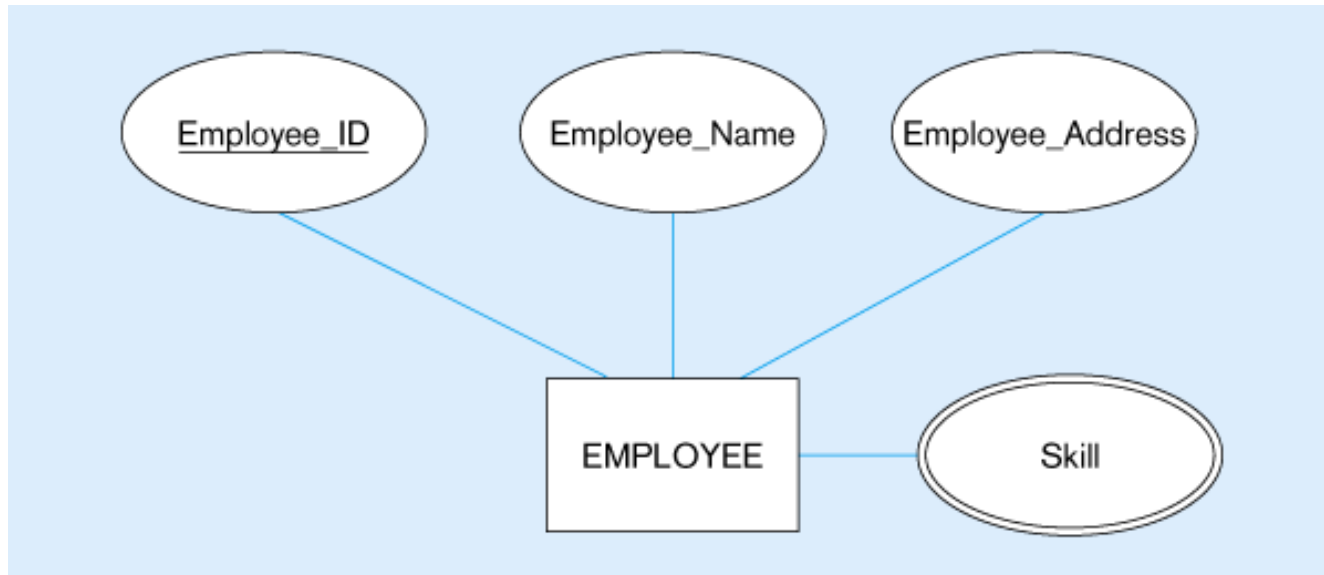
Street

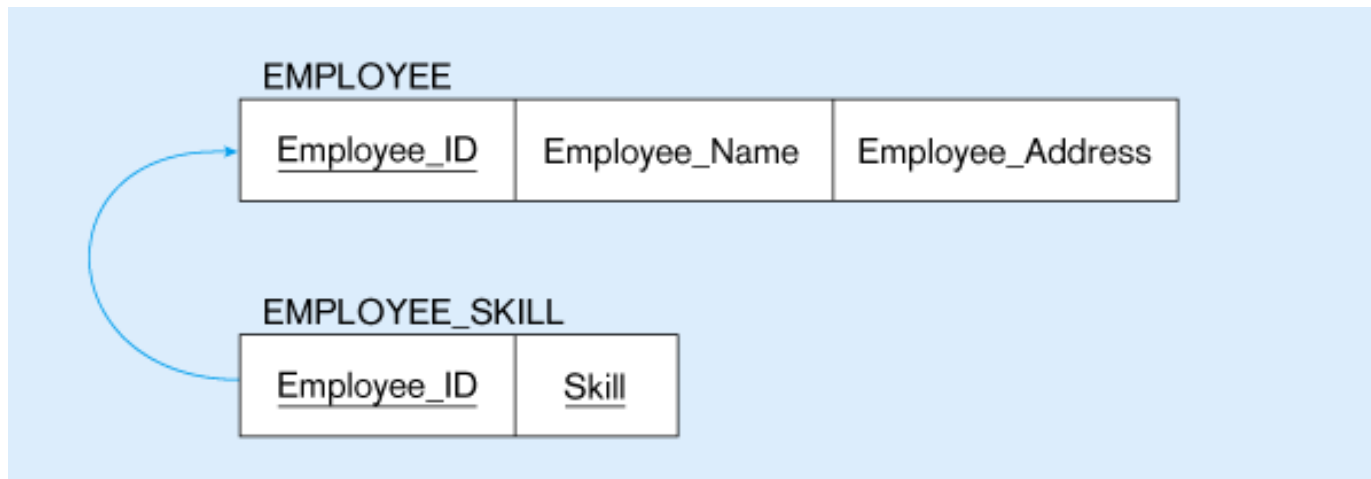City

State

Zip

Customer_Name

Customer_ID

CUSTOMER

Customer_Address

CUSTOMER   CUSTOMER relation with address detail

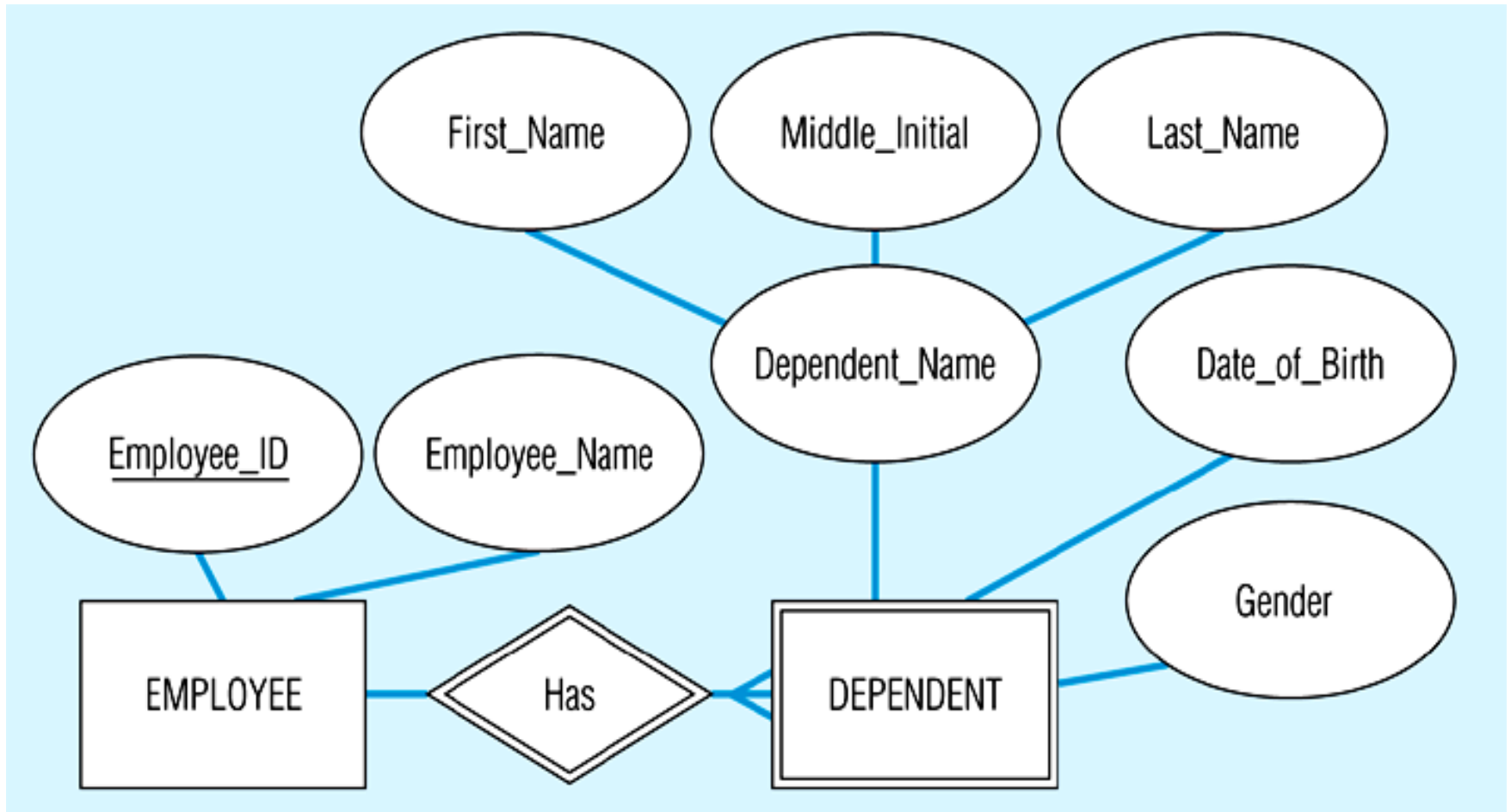| Customer_ID	Customer_Name	Street	City	State	Zip

Mapping a multivalued attribute

Multivalued attribute becomes a separate relation with foreign key

1 – to – many relationship between original entity and new relation
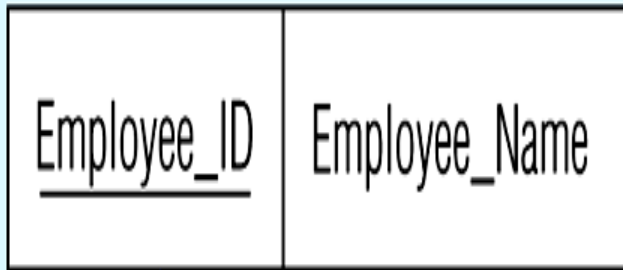
Example of mapping a weak entity

Weak entity DEPENDENT

Relations resulting from weak entity

EMPLOYEE

Employee_ID	Employee_Name

NOTE: the domain constraint for the foreign key should NOT allow *null* value if DEPENDENT is a weak entity

DEPENDENT

Foreign key

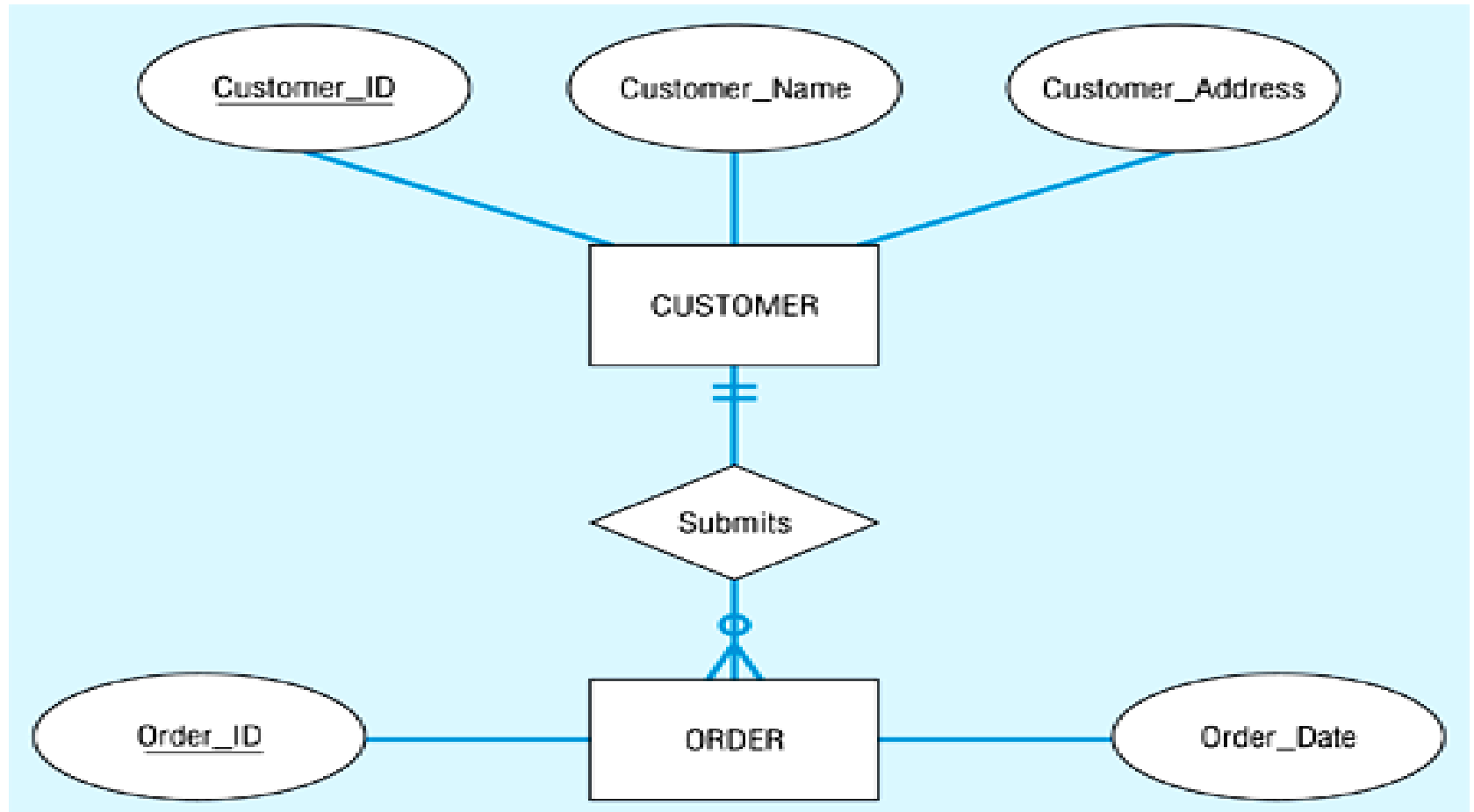| First_Name	Middle_Inital	Last_Name	Employee_ID	Date_of_Birth	Gender
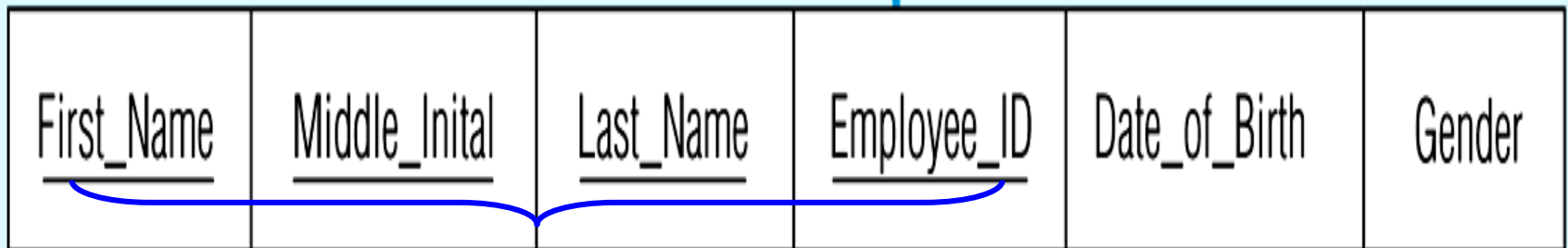
Composite primary key

Example of mapping a 1:M relationship

Relationship between customers and orders

Mapping the relationship

CUSTOMER

Customer_ID	Customer_Name	Customer_Address

ORDER
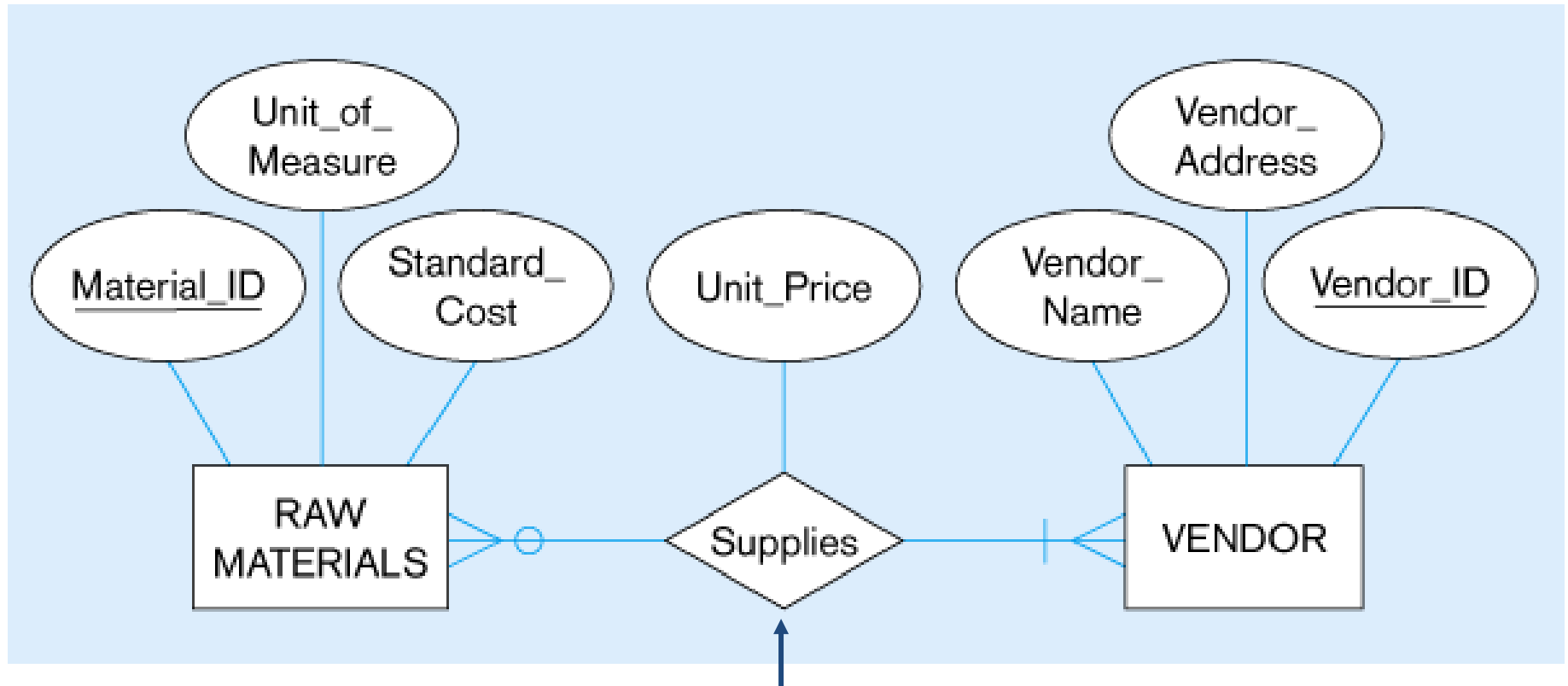
Order_ID	Order_Date	Customer_ID

Foreign key

Example of mapping an M:N relationship

ER diagram (M:N)

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

Three resulting relations

RAW MATERIALS

Material_ID	Standard_Cost	Unit_of_Measure

Composite primary key

QUOTE

Material_ID	Vendor_ID	Unit_Price

Foreign key

New intersection relation

Foreign key

VENDOR

Vendor_ID	Vendor_Name	Vendor_Address
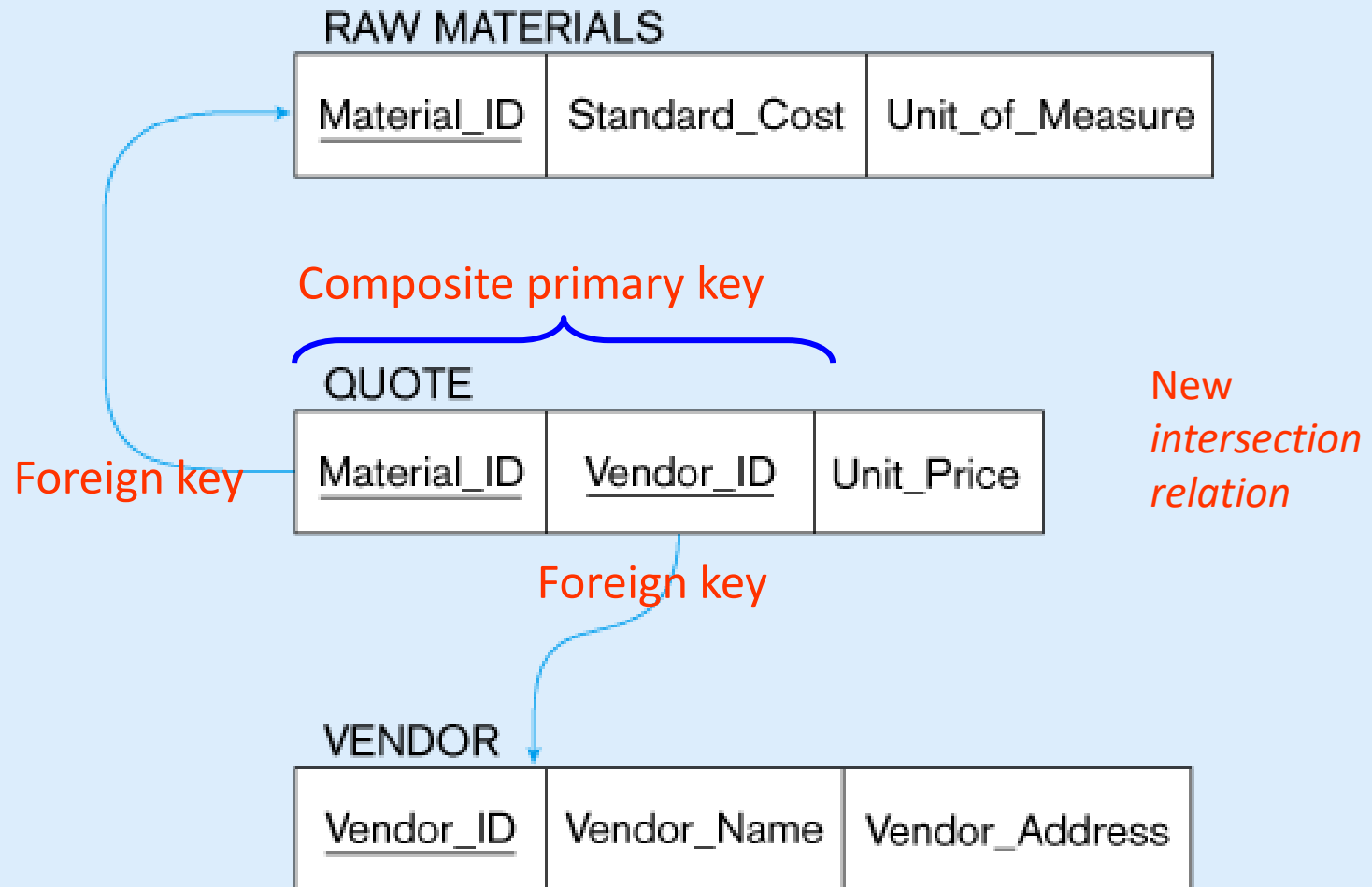
Mapping a unary 1:N relationship
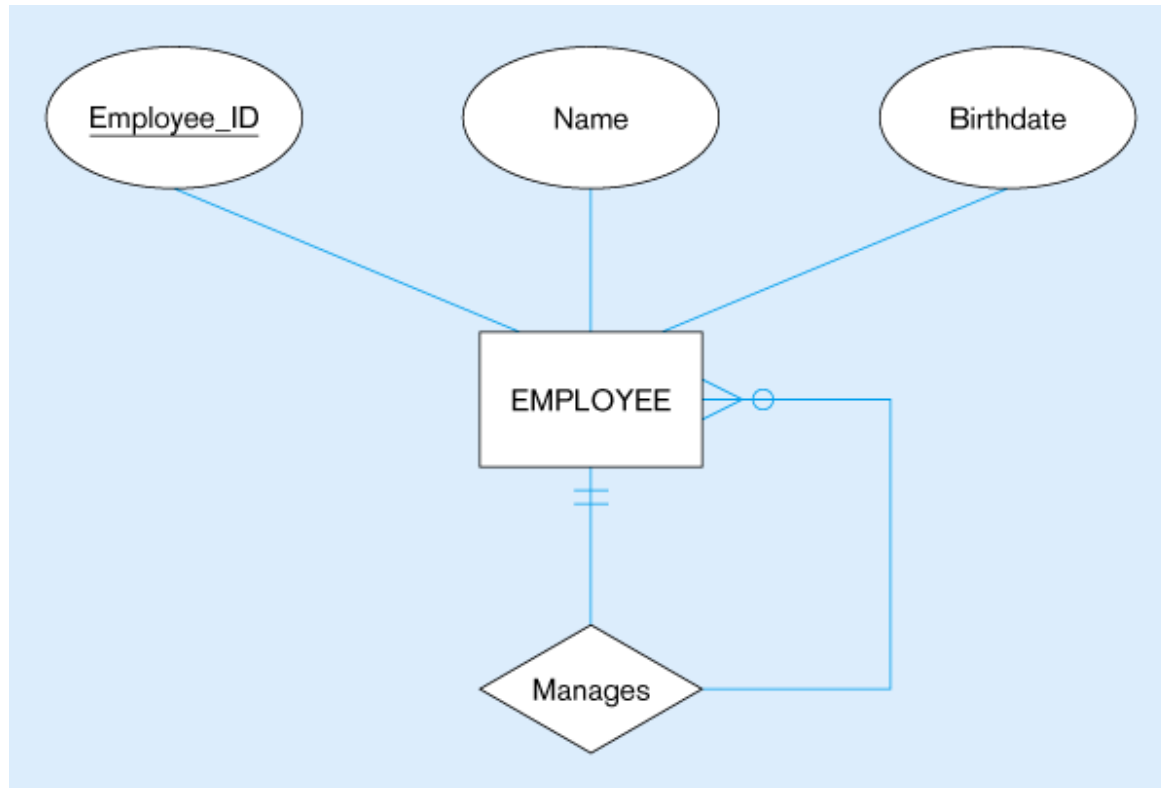
EMPLOYEE

Employee_ID	Name	Birthdate	Manager_ID

Find the minimum number of tables required for the following ER diagram in relational model
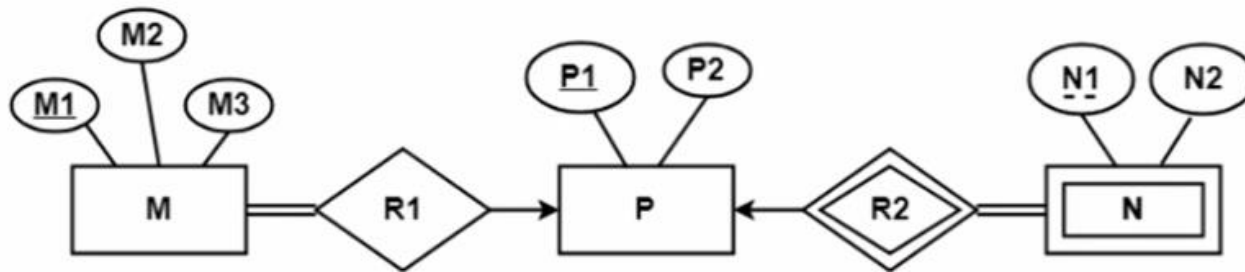
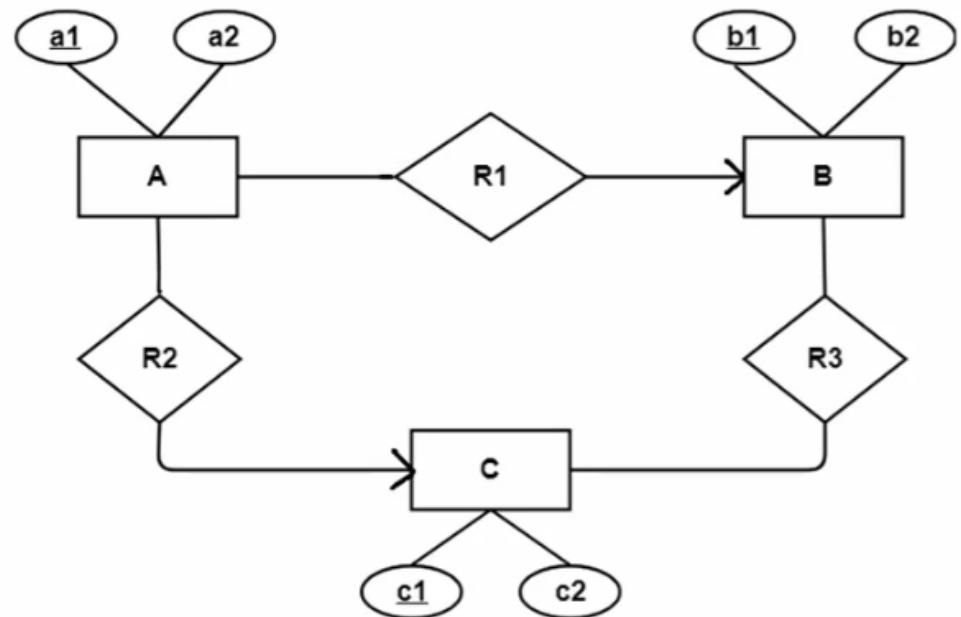Minimum 3 tables will be required-

1. MR1 (<u>M1</u> , M2 , M3 , P1)

2. P (<u>P1</u> , P2)

3. NR2 (<u>P1</u> , <u>N1</u> , N2)

Find the minimum number of tables required for the following ER diagram in relational model

Minimum 4 tables will be required:

1. AR1R2 ($\underline{a1}$, a2, b1, c1)

2. B ($\underline{b1}$, b2)

3. C ($\underline{c1}$, c2)

4. R3 ($\underline{b1}$, $\underline{c1}$)

Find the minimum number of tables required for the following ER diagram in relational model

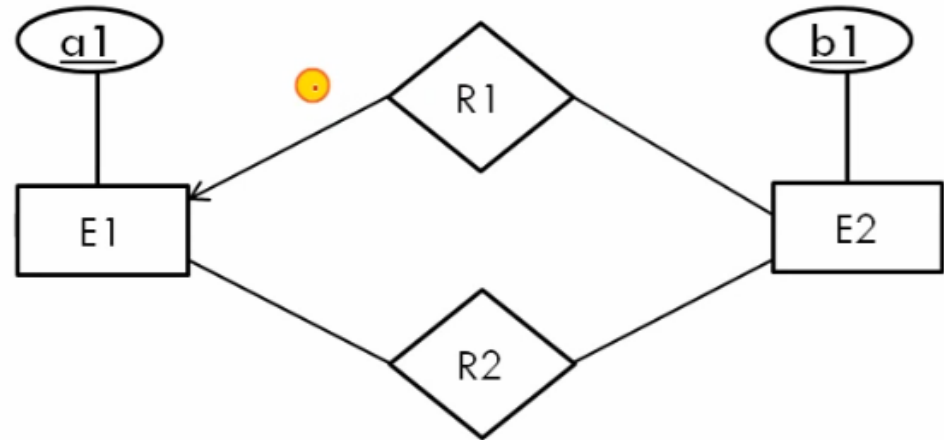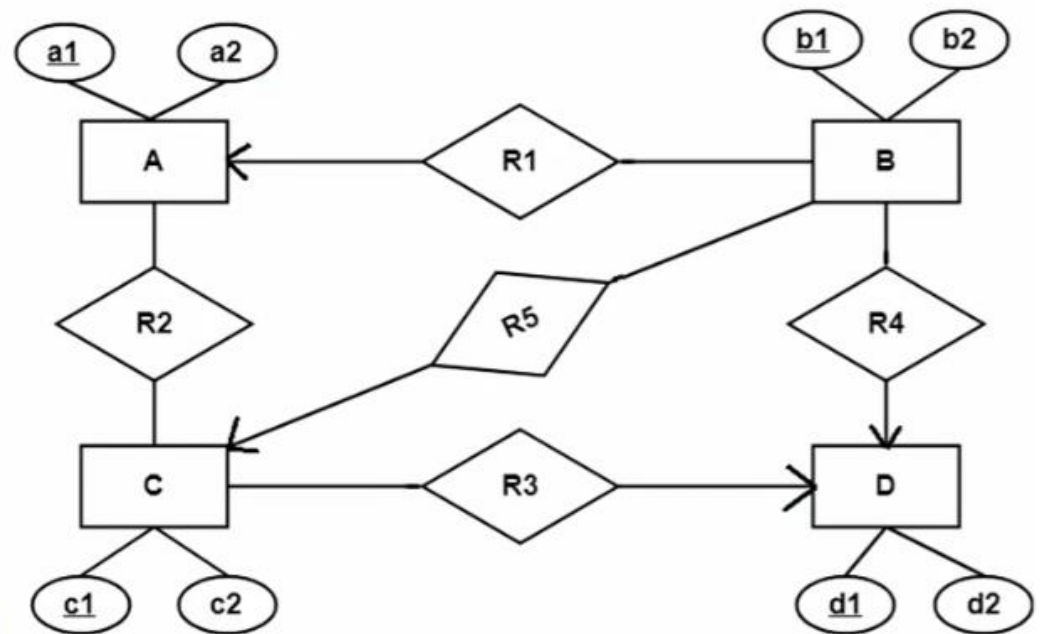Three tables will be formed

1. E1(a1)

2. E2R1 (b1, a1)

3. R2 (a1, b1)

Find the minimum number of tables required for the following ER diagram in relational model

Minimum 5 tables will be required:

1. BR1R4R5 ($\underline{b1}$, b2 , a1 , c1 , d1)

2. A ($\underline{a1}$, a2)

3. R2 ($\underline{a1}$, $\underline{c1}$)

4. CR3 ($\underline{c1}$, c2 , d1)

5. D ($\underline{d1}$, d2)

Find the minimum number of tables required for the following ER diagram in relational model

Minimum 3 tables will be required:

1. E1 ($\underline{a1}$, a2)

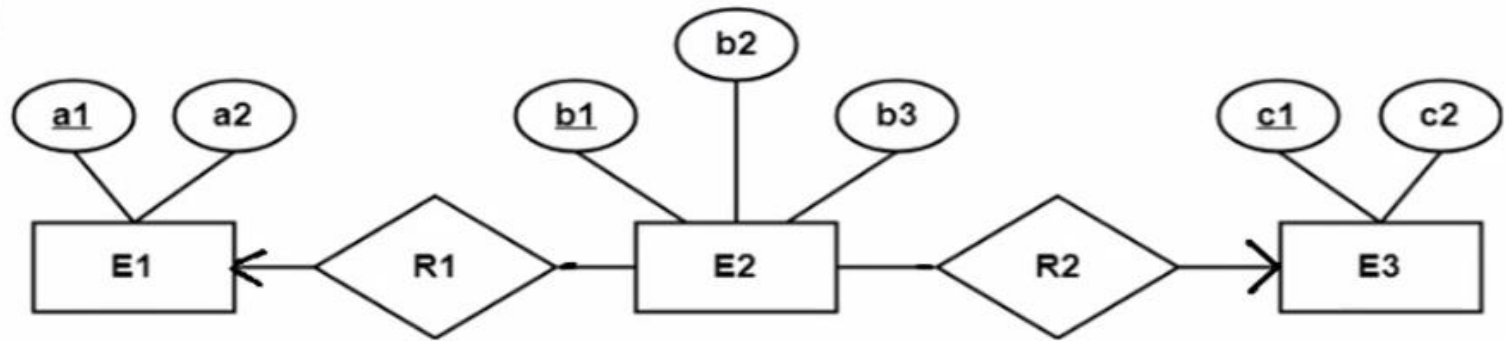2. E2R1R2 ($\underline{b1}$, b2 , b3, a1 , c1)

3. E3 ($\underline{c1}$, c2)

Find the minimum number of tables required for the following ER diagram in relational model
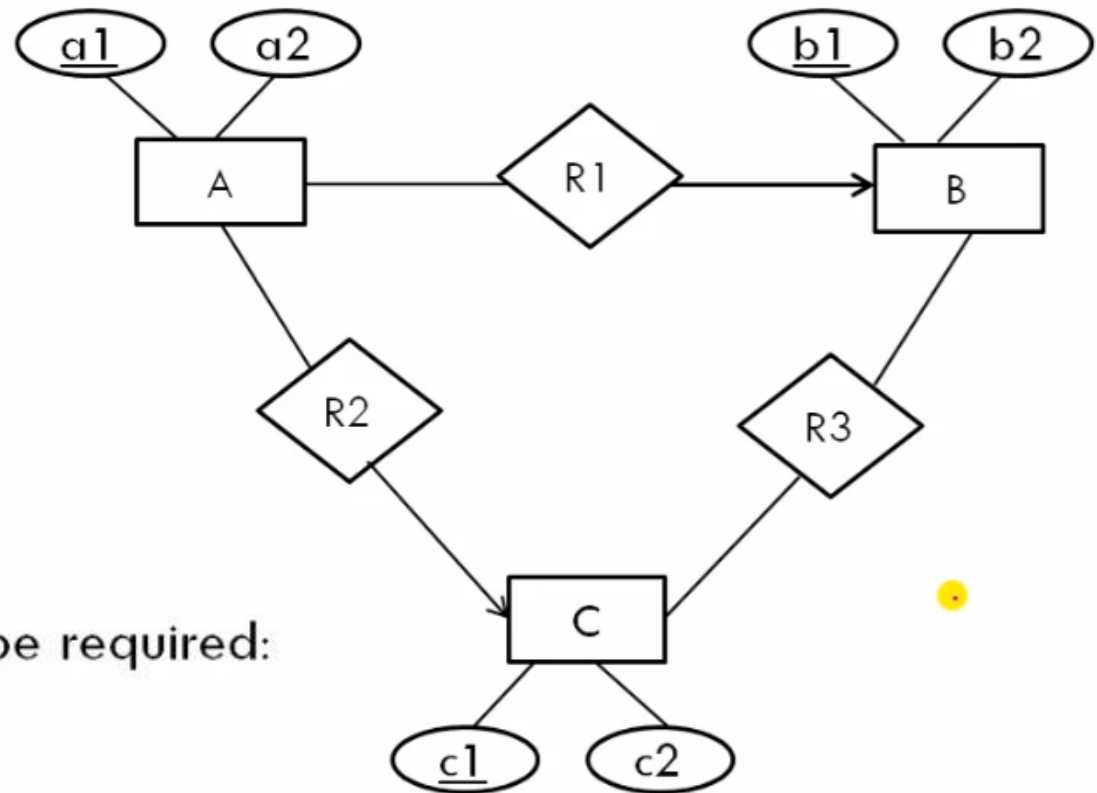
Minimum 4 tables will be required:

1. B ($\underline{b1}$, b2)

2. C ($c\underline{1}$, c2)

3. R3($\underline{b1}$, $\underline{c1}$)

4. AR1R2 ($\underline{a1}$, a2, b1, c1)

Mapping of Binary 1:1 Relationship Types

- For each binary 1:1 relationship type R in the ER schema, identify the relations S and T that correspond to the entity types participating in R.

- There are three possible approaches:
  1. **Foreign Key approach:** Choose one of the relations-say S-and include a foreign key in S the primary key of T. It is better to choose an entity type with total participation in R in the role of S.
     - Example: 1:1 relation MANAGES is mapped by choosing the participating entity type DEPARTMENT to serve in the role of S, because its participation in the MANAGES relationship type is total.
  2. **Merged relation option:** An alternate mapping of a 1:1 relationship type is possible by merging the two entity types and the relationship into a single relation. This may be appropriate when both participations are total.
  3. **Cross-reference or relationship relation option:** The third alternative is to set up a third relation R for the purpose of cross-referencing the primary keys of the two relations S and T representing the entity types.

Quiz
Transform ERD into Relations
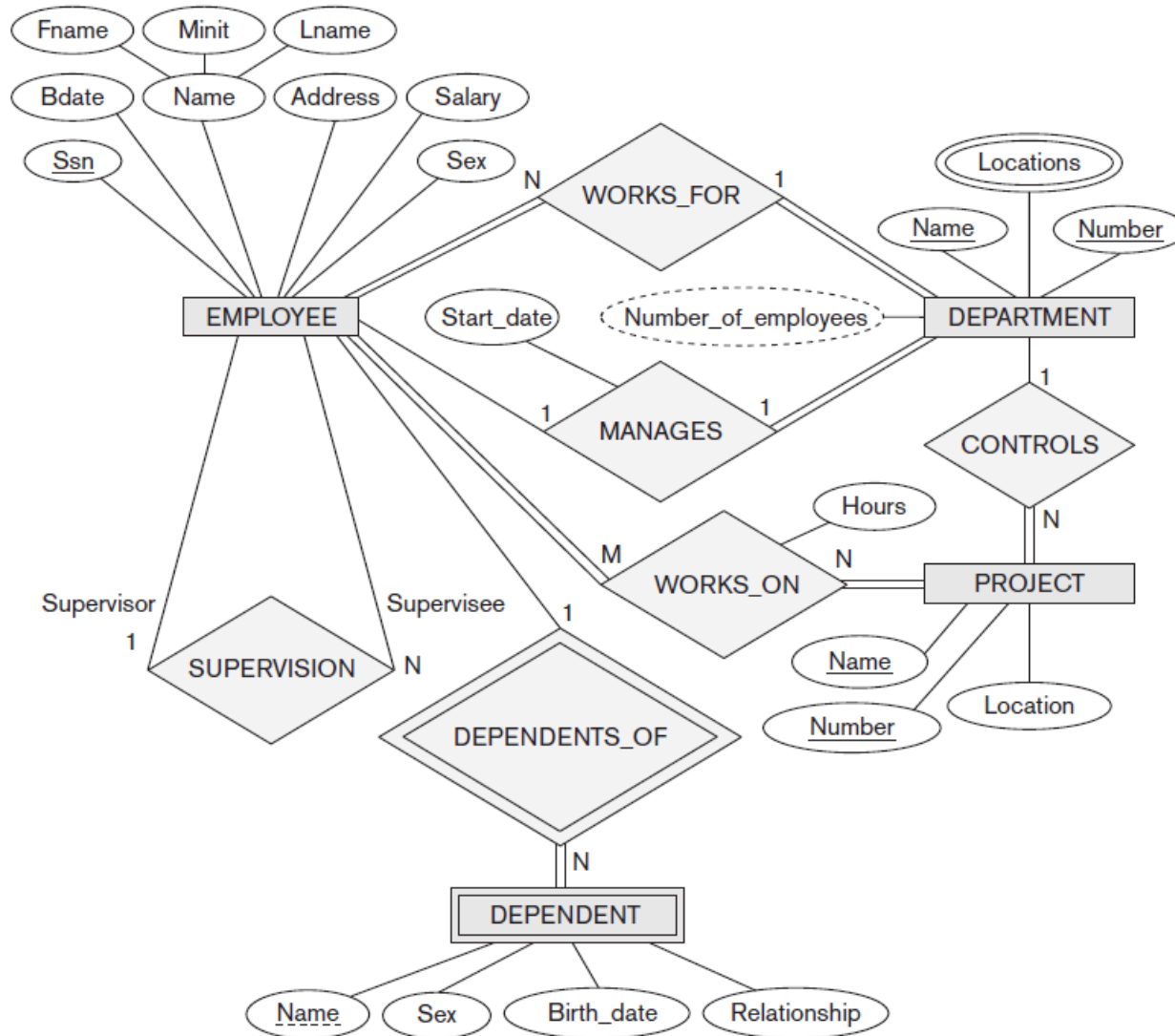
Solution

EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date

DEPT_LOCATIONS

Dnumber	Dlocation

PROJECT

Pname	Pnumber	Plocation	Dnum

WORKS_ON

Essn	Pno	Hours

DEPENDENT

Essn	Dependent_name	Sex	Bdate	Relationship
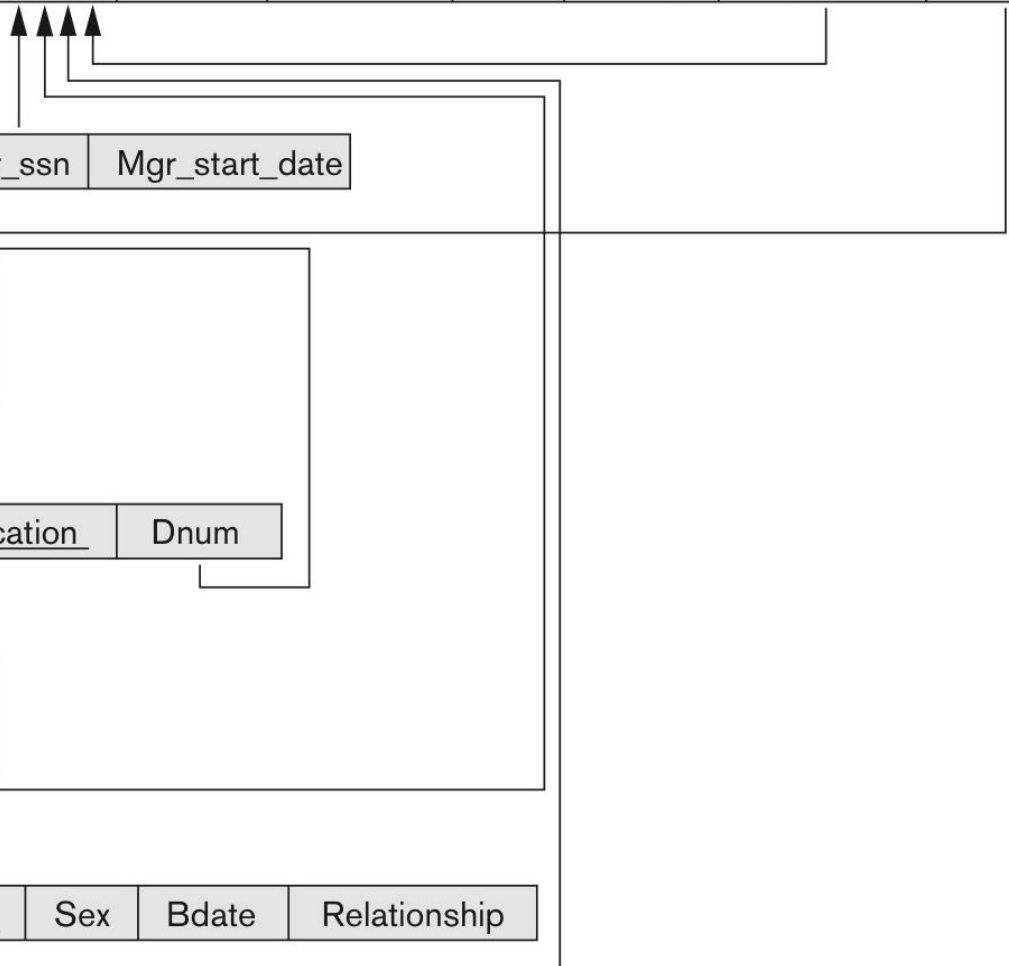
TERNARY RELATIONSHIP: SUPPLY
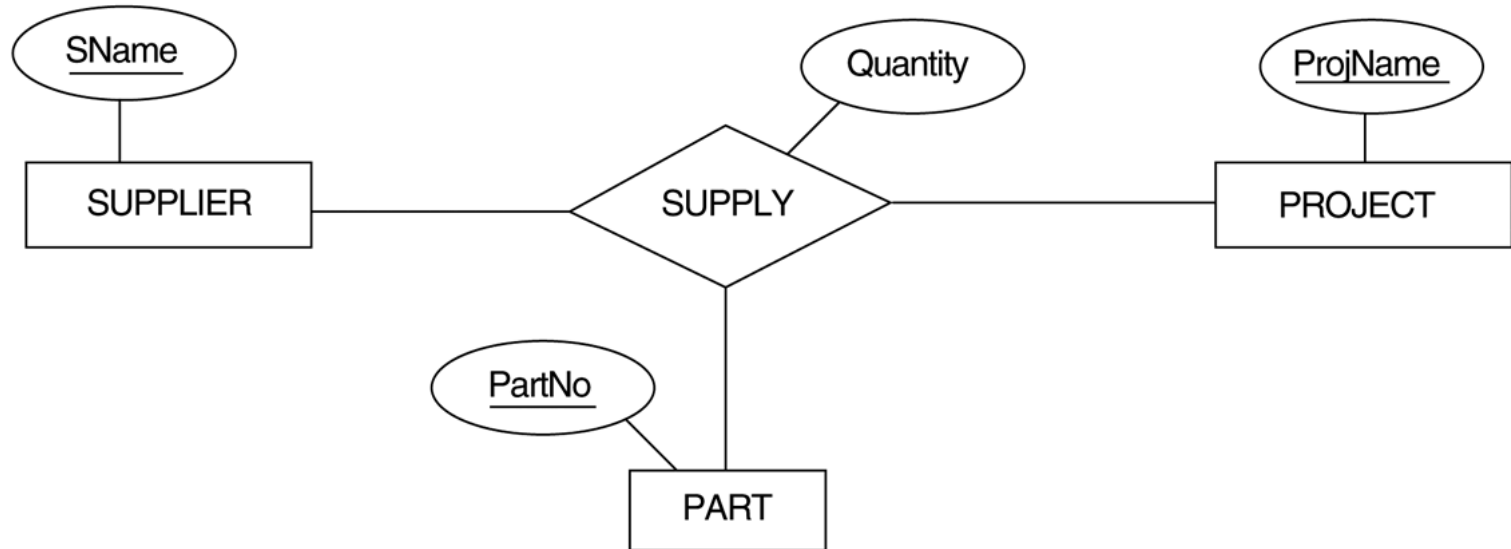
Mapping the *Ternary* relationship type SUPPLY