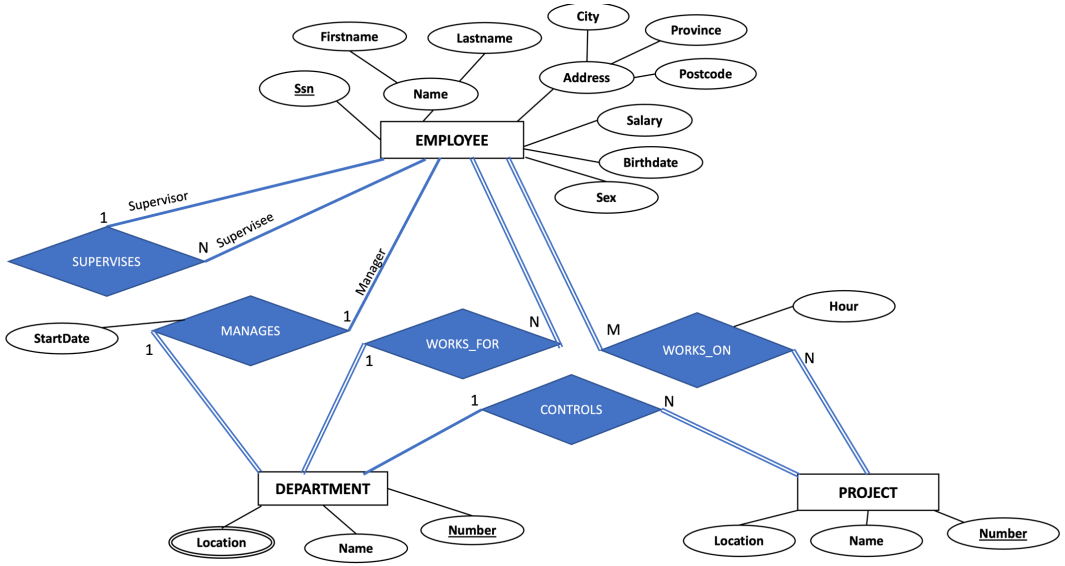
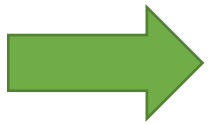
ER Diagram to Relational Schema Mapping

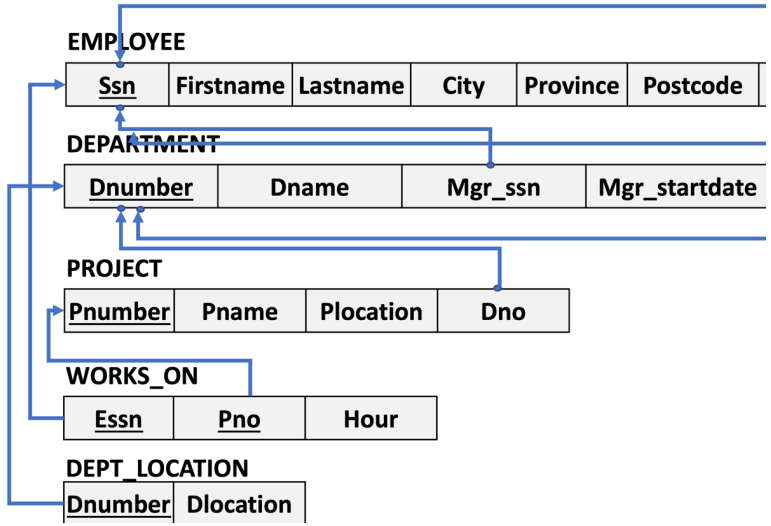
Database Management System (DBMS) and Programming

ER to Relational Mapping

- Convert this ER-Diagram to Relational Schema

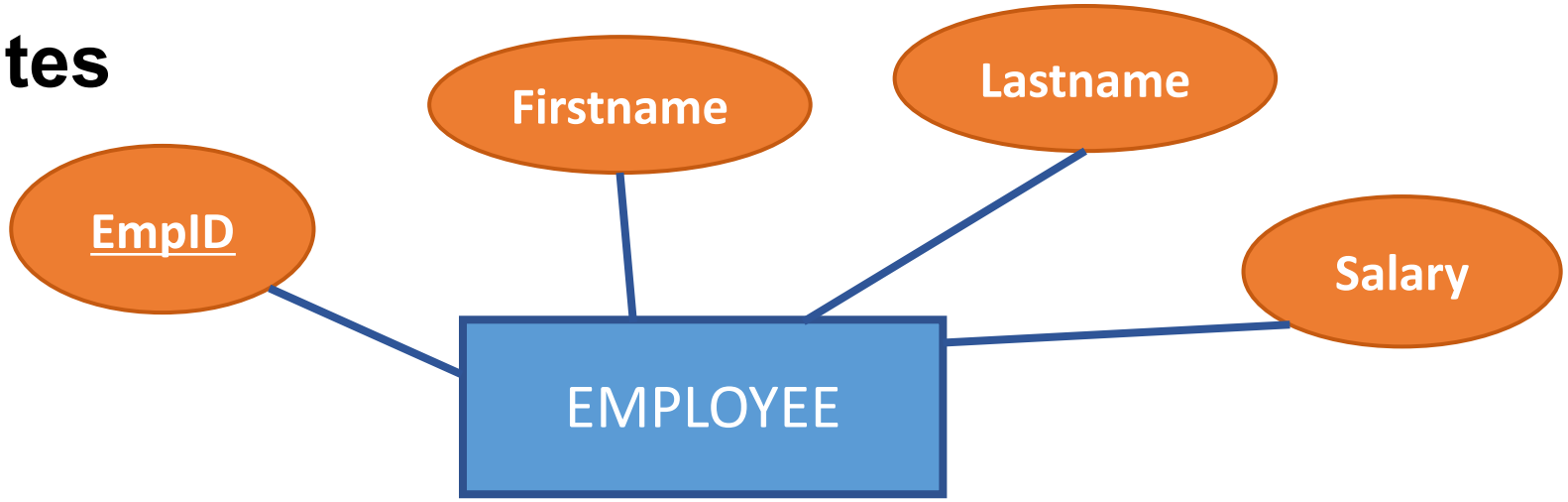






ER to Relational Mapping

- **Simple (atomic) attributes**



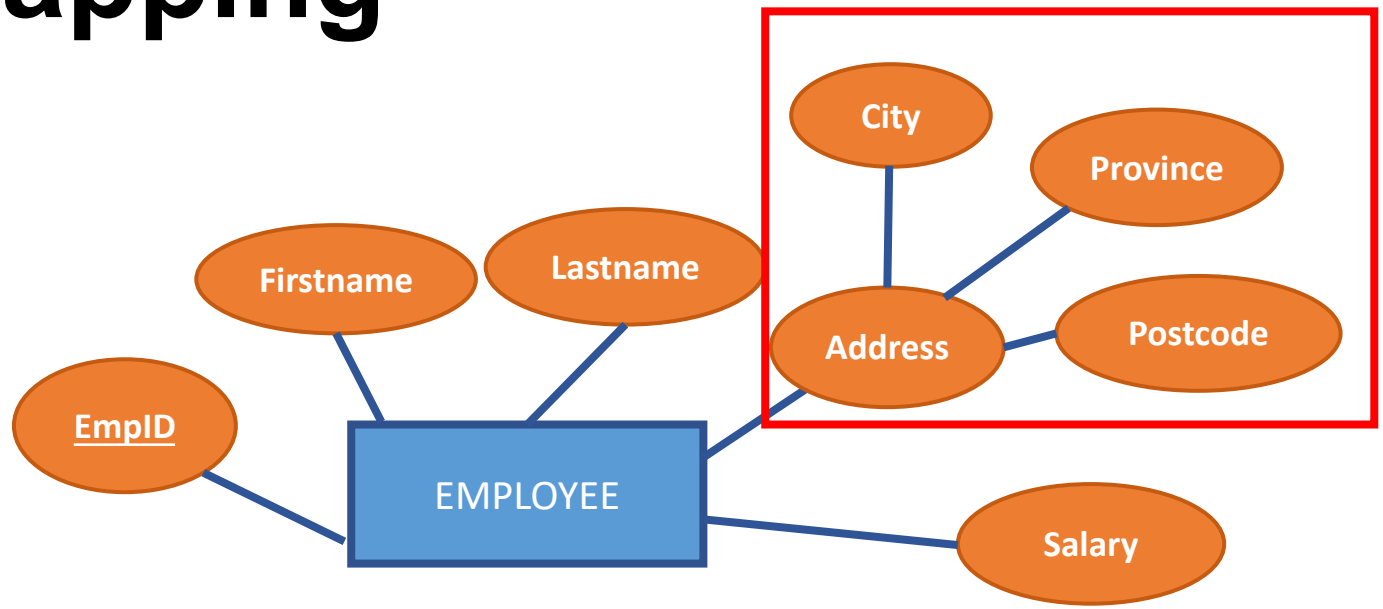
Employee

EmpID	Firstname	Lastname	Salary

`EMPLOYEE(EmpID, Firstname, Lastname, Salary)`

ER to Relational Mapping

- **Composite attributes**



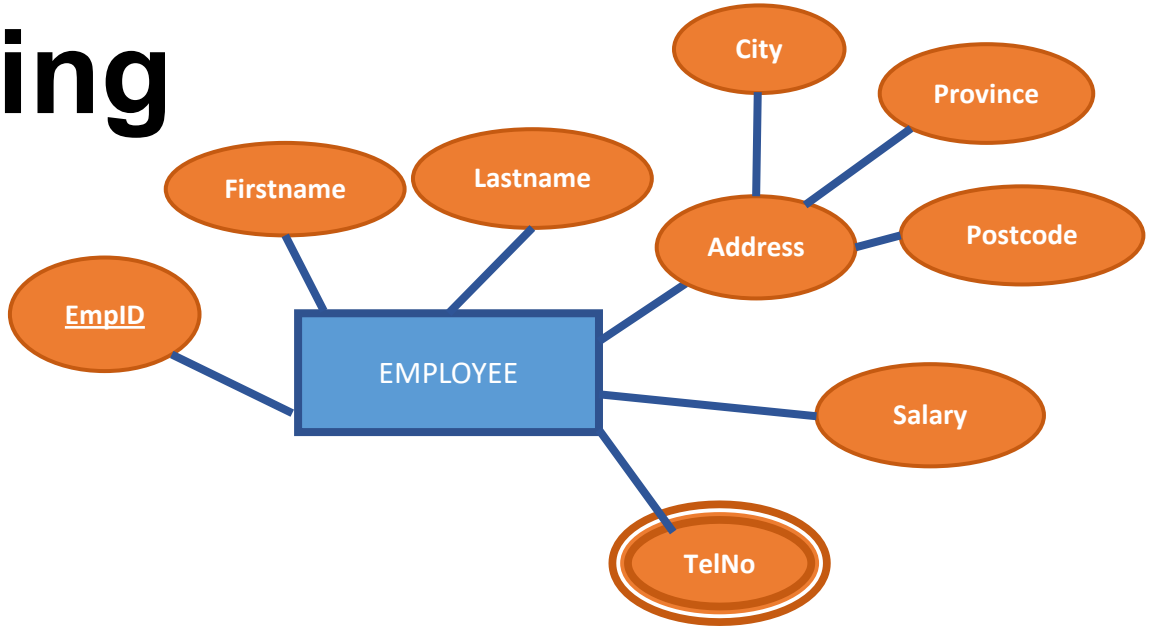
Employee

EmpID	Firstname	Lastname	Salary	City	Province	Postcode

`EMPLOYEE(EmpID, Firstname, Lastname, Salary, City, Province, Postcode)`

ER to Relational Mapping

- **Multivalued**
  - The multivalued attributes of a relation and the entity key become their own relation.



Employee

EmpID	Firstname	Lastname	Salary	City	Province	Postcode

Employee_TelNo

EmpID	TelNo

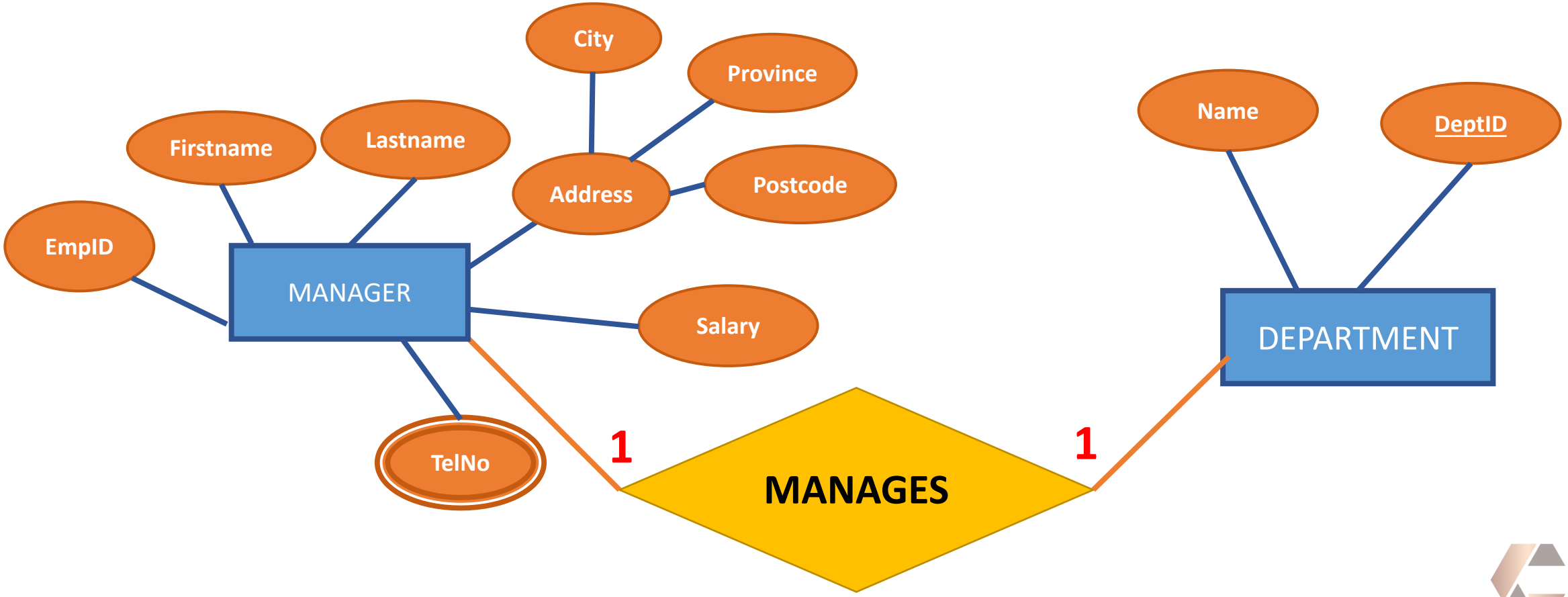
```
EMPLOYEE(EmpID, Firstname, Lastname, Salary, City, Province, Postcode)
EMPLOYEE_TELNO(EmpID, TeLNo)
```

ER to Relational Mapping

- **Derived Attribute**
  - Coded separately in SQL as a **view**.
  - They are not an attribute in a basic relation table

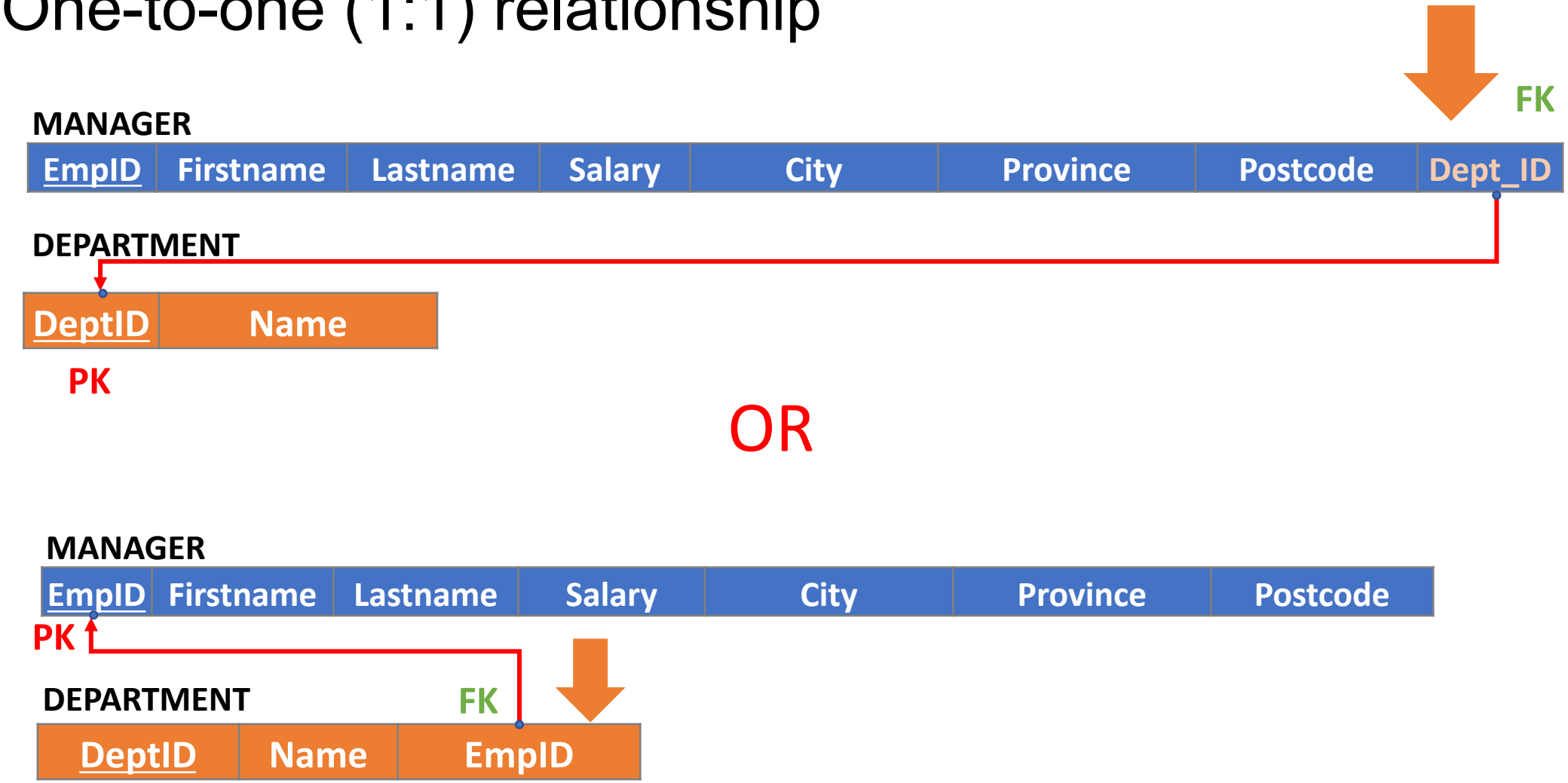
ER to Relational Mapping

- One-to-one (1:1) relationship
  - Mapping One-to-one relationship ER diagram to Relation (Table)



ER to Relational Mapping

- One-to-one (1:1) relationship



ER to Relational Mapping

One-to-one (1:1) relationship

MANAGER(<u>EmpID</u>, Firstname, Lastname, Salary, City, Province, Postcode, DeptID)

DEPARTMENT(<u>DeptID</u>, Name)

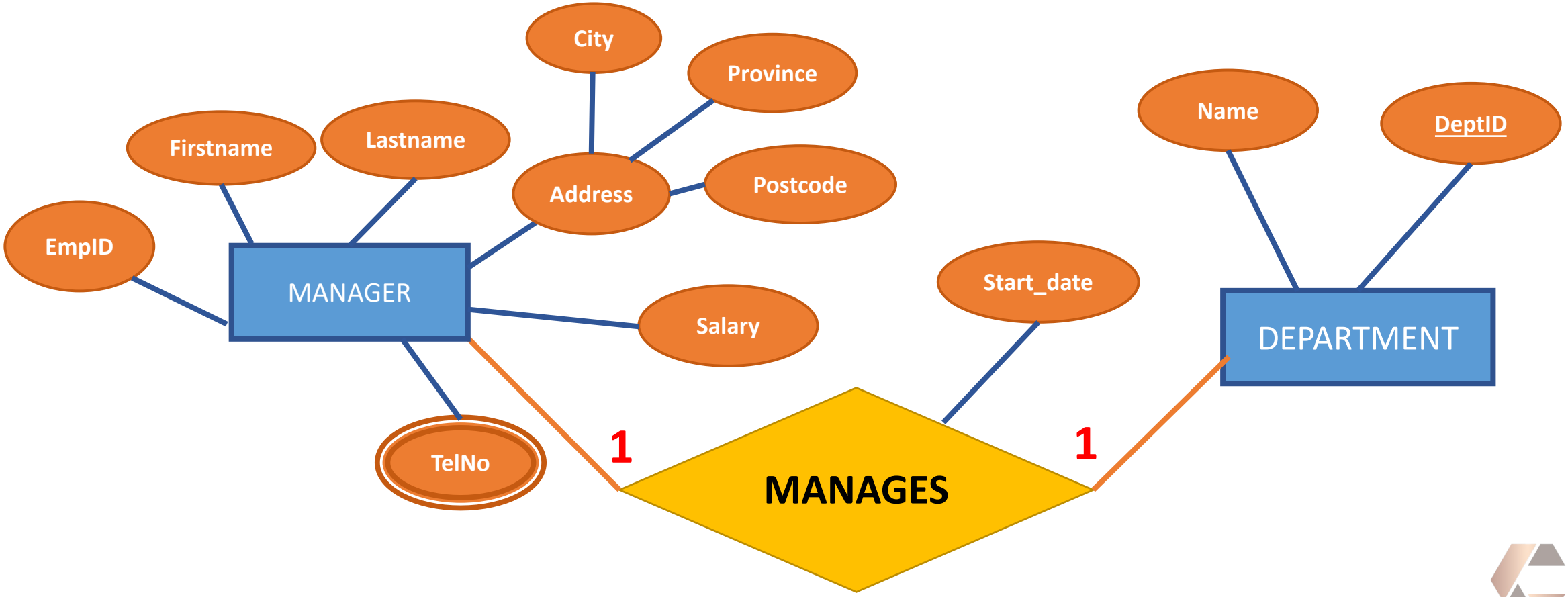
OR

MANAGER(<u>EmpID</u>, Firstname, Lastname, Salary, City, Province, Postcode)

DEPARTMENT(<u>DeptID</u>, Name, EmpID)

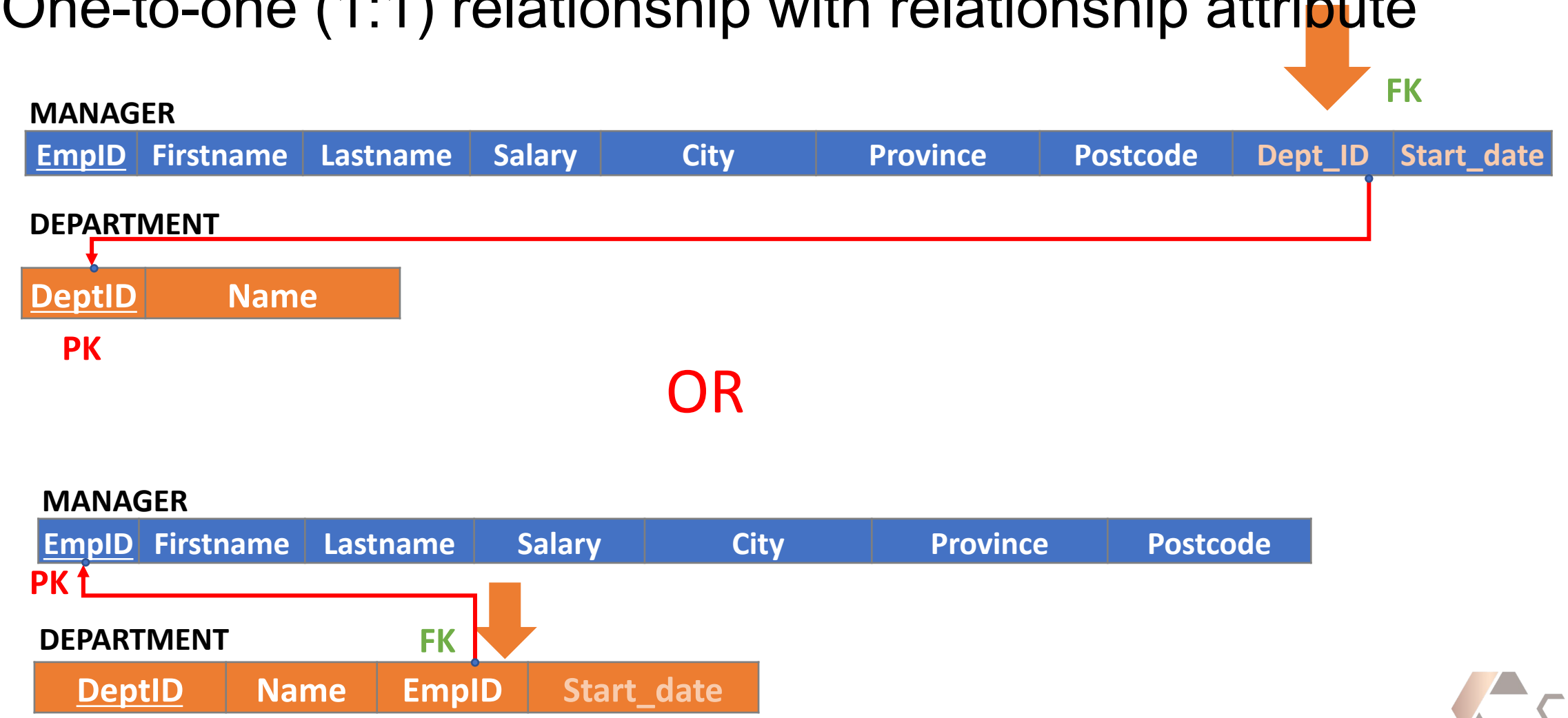
ER to Relational Mapping

- One-to-one (1:1) relationship with relationship attribute



ER to Relational Mapping

- One-to-one (1:1) relationship with relationship attribute



ER to Relational Mapping

One-to-one (1:1) relationship with relationship attribute

MANAGER(<u>EmpID</u>, Firstname, Lastname, Salary, City, Province, Postcode, DeptID, Start_date)

DEPARTMENT(<u>DeptID</u>, Name)

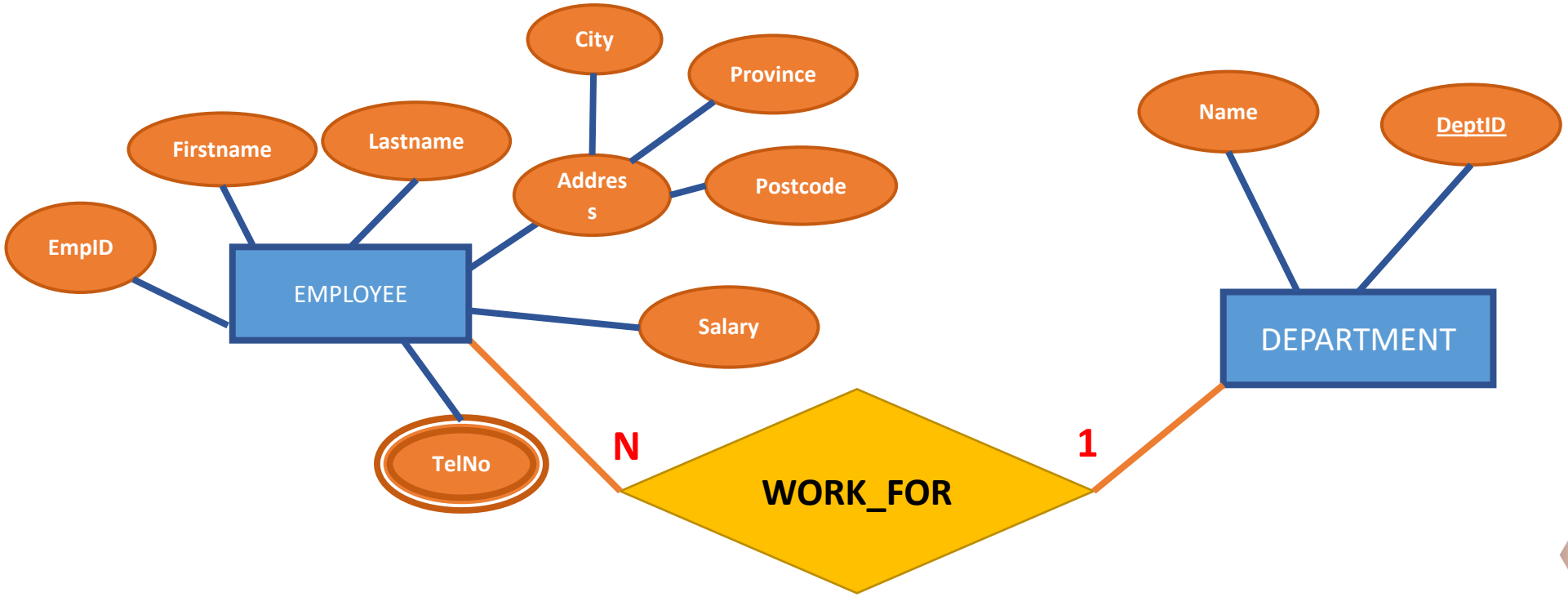
OR

MANAGER(<u>EmpID</u>, Firstname, Lastname, Salary, City, Province, Postcode)

DEPARTMENT(<u>DeptID</u>, Name, EmpID, Start_date)

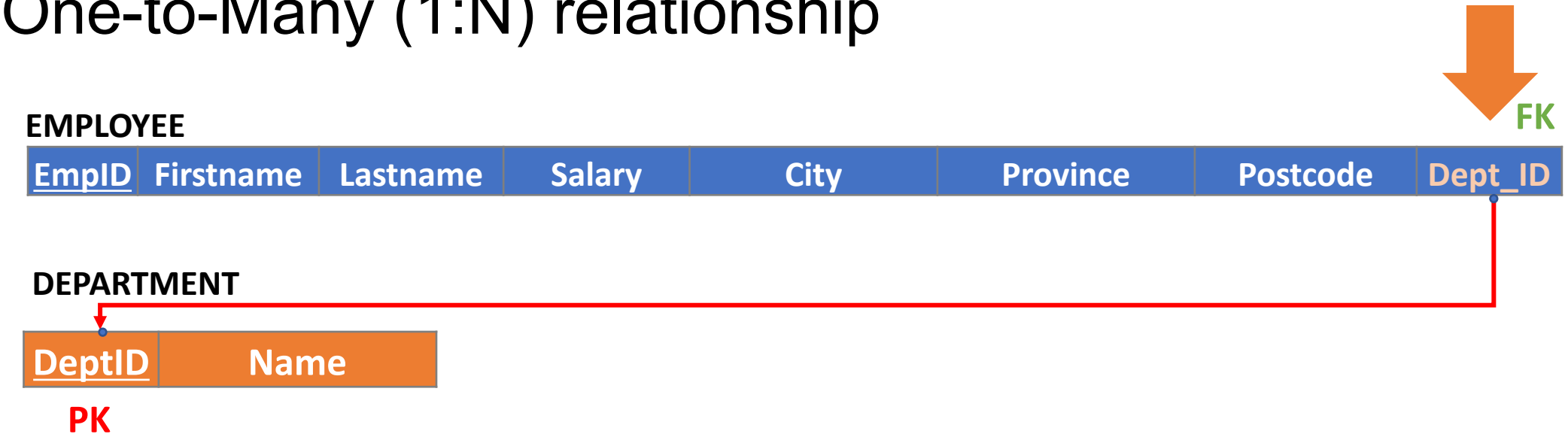
ER to Relational Mapping

- One-to-Many (1:N) relationship
  - Mapping One-to-Many relationship ER diagram to Relation (Table)
  - The primary key attributes of the **1** relation become foreign key attributes of the **many** relation



ER to Relational Mapping

- One-to-Many (1:N) relationship

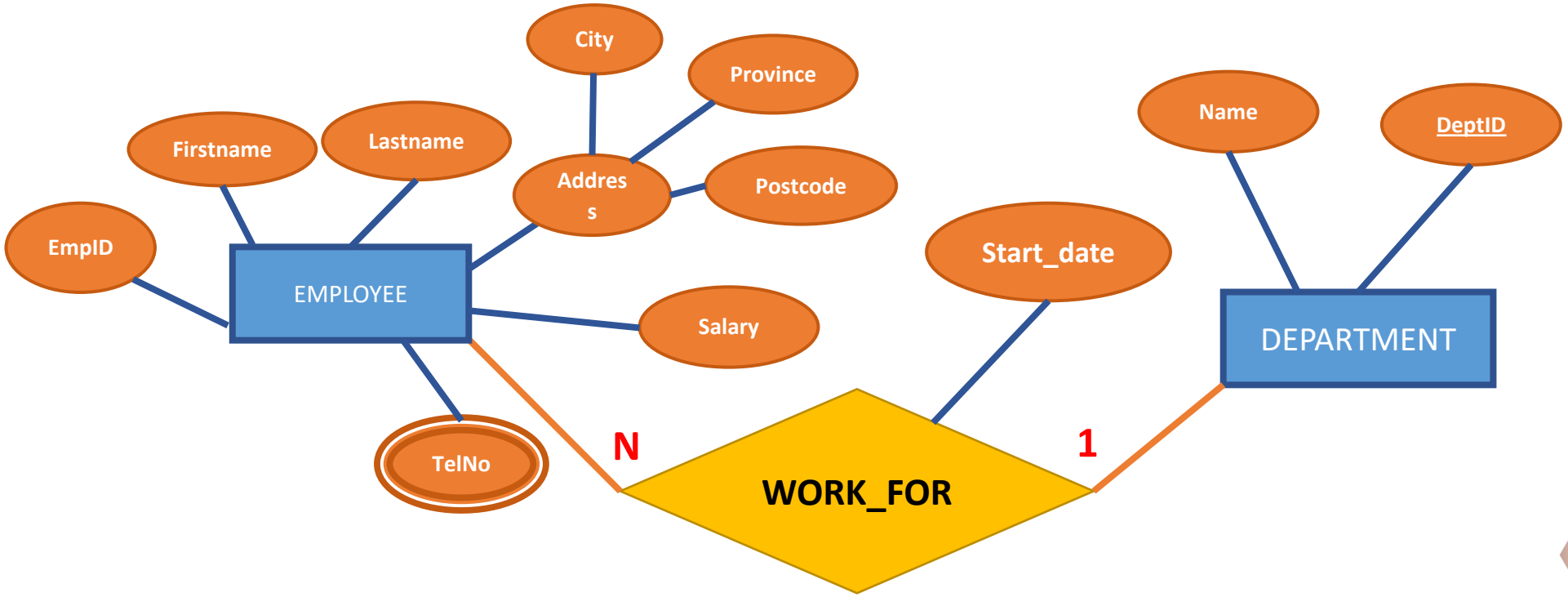


EMPLOYEE(EmpID, Firstname, Lastname, Salary, City, Province, Postcode, DeptID)

DEPARTMENT(DeptID, Name)

ER to Relational Mapping

- One-to-Many (1:N) relationship with Relationship attribute
  - Relationship attribute attached to the "many" relation



ER to Relational Mapping

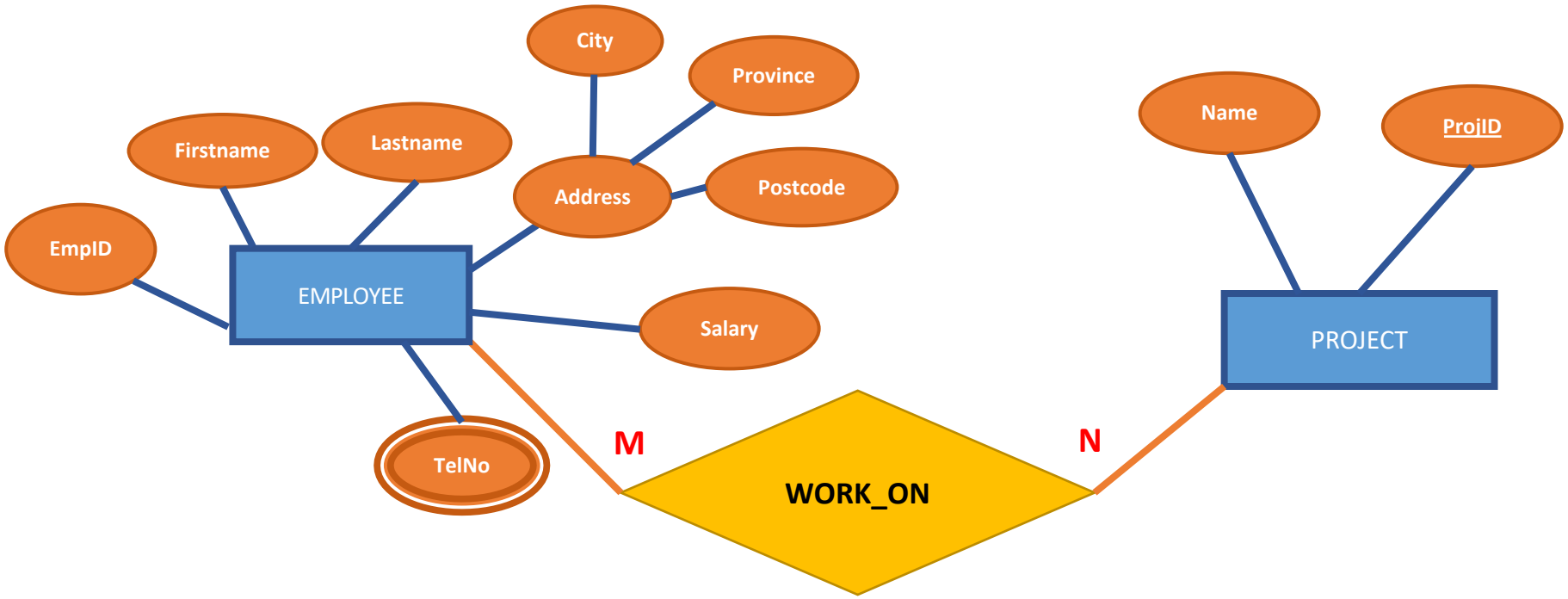
- One-to-Many (1:N) relationship

EMPLOYEE(EmpID, Firstname, Lastname, Salary, City, Province, Postcode, DeptID, Start_date)

DEPARTMENT(DeptID, Name)

ER to Relational Mapping

- Many-to-Many (M:N) relationship
  - Mapping Many-to-Many relationship ER diagram to Relation (Table)
  - Relationships are always mapped to a separate relation



ER to Relational Mapping

- Many-to-Many (M:N) relationship

EMPLOYEE

EmpID	Firstname	Lastname	Salary	City	Province	Postcode	Dept_ID
1	John	Smith	30000	Mueang	Chiang Mai	50100	1
2	Franklin	Wong	40000	Khlong Toei	Bangkok	10100	1
3	Alicia	Zelaya	29000	Bang Rak	Bangkok	10200	2
4	Jennifer	Wallace	43000	Mueang	Chiang Mai	50000	3

PROJECT

ProjID	Name
1	Product X
2	Alpha
3	Beta
4	Charlie

EMPLOYEE_PROJECT

EmpID	ProjID
1	1
2	2
2	3
2	4
3	4
3	1

ER to Relational Mapping

- Many-to-Many (M:N) relationship

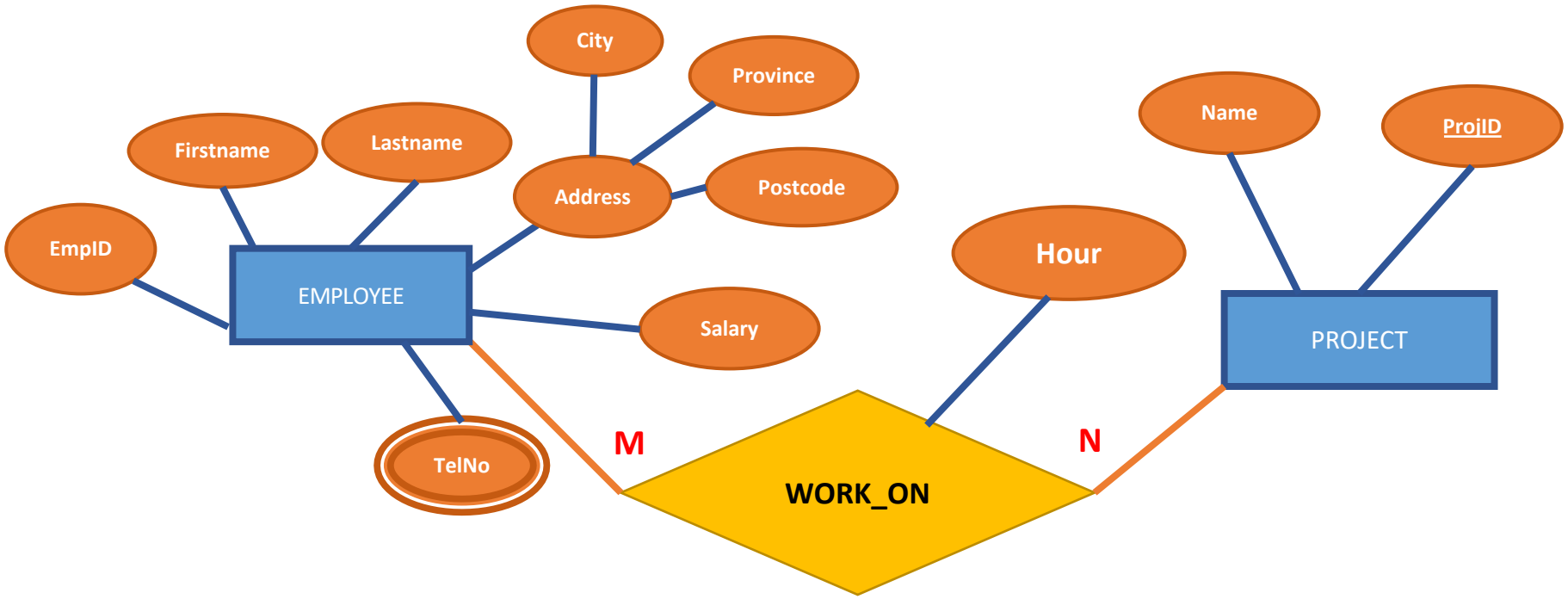
EMPLOYEE(EmpID, Firstname, Lastname, Salary, City, Province, Postcode, DeptID)

PROJECT(ProjID, Name)

EMPLOYEE_PROJECT (EmpID, ProjID)

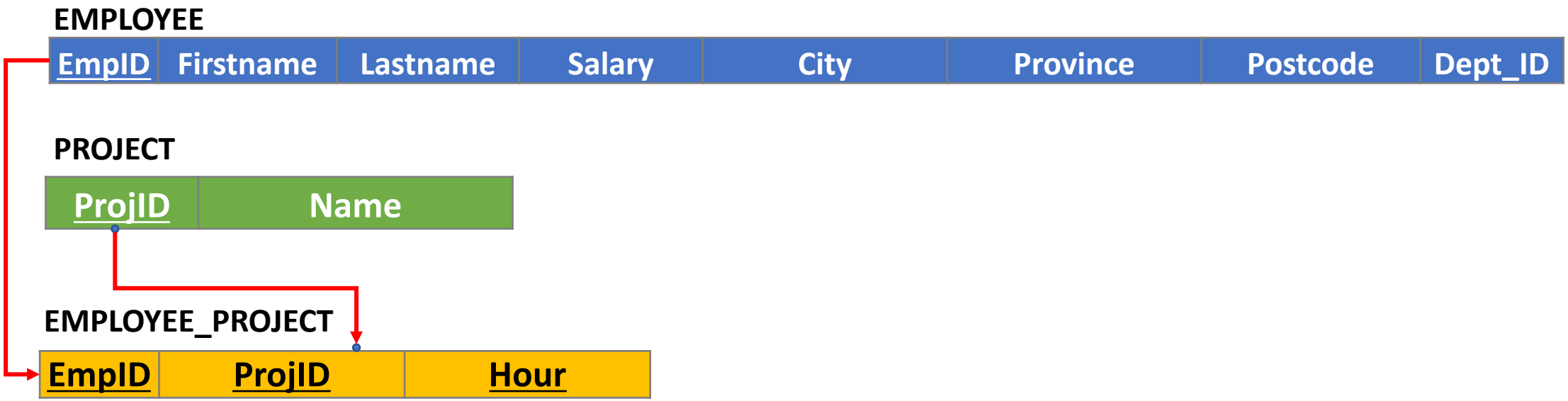
ER to Relational Mapping

- Many-to-Many (M:N) relationship with Relationship attribute
  - Relationship attribute become part of the relationship type relation



ER to Relational Mapping

- Many-to-Many (M:N) relationship



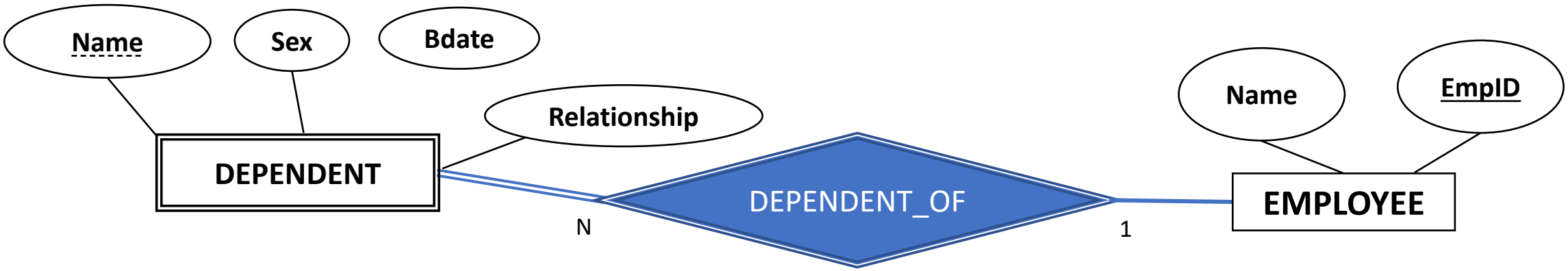
EMPLOYEE(EmpID, Firstname, Lastname, Salary, City, Province, Postcode, DeptID)

PROJECT(ProjID, Name)

EMPLOYEE_ PROJECT (EmpID, ProjID, Hour)

ER to Relational Mapping

- Weak Entity and Identifying Relationship



ER to Relational Mapping

- Weak Entity and Identifying Relationship