4.

First, define a relation for each entity set for the ER diagram

1. sales\_office( office\_number , location)
2. property(number,street,city,state,zip\_code)
3. owner(ID, name)
4. employee(ID, name)

Second, Then define a relation for each relationship set in ER diagram

manage(ID, office\_number)

assigned(ID, office\_number)

listed(number,street,city,state,zip\_code,office\_number)

own(number,ID,percentage\_of\_own)

Third, modify keys of relations for mapping constraints

Many to one:

listed(number,street,city,state,zip\_code,office\_number)

assigned(ID, office\_number)

Many to Many:

own(number,ID,percentage\_of\_own)

One to One:

manage(ID, office\_number UNIQUE)

Fourth, Merge relations for the constraints

No relationship: do nothing

sales\_office and owner, owner and employee

Partial participation: no change

property and sales\_office, sales\_office and employee

Total participation part, merge relations and define foreign key NOT NULL

N/A

Fifth, final relational schema for ER diagram:

1. sales\_office( office\_number , location)
2. property(number,street,city,state,zip\_code)
3. owner(ID, name)
4. employee(ID, name)

Six, check all forms, and relations.

**SQL CREATE TABLE statements:**

create table sales\_office ( office\_number varchar(30) not null, location varchar(60), primary key(office\_number));

create table employee( ID varchar(30) not null, name varchar(50), primary key (ID), foreign key (ID) references sales\_office (office\_number) on delete no action on update cascade);

create table owner( ID varchar(30) not null, name varchar(20), primary key (ID));

create table property( number varchar(30) not null, street varchar(30) not null, city varchar(10) not null, state varchar(10) not null, zip\_code int not null, primary key (number,street,city,state,zip\_code), foreign key (number) references sales\_office(office\_number) on delete no action on update no action, foreign key (number) references owner(ID) on delete no action on update no action, foreign key (number) references employee(ID) on delete no action on update no action );

create table manage( office\_number varchar(30) unique, emp\_ID varchar(30) unique, office\_no varchar(30) unique, primary key (office\_number,emp\_ID), foreign key (office\_number) references sales\_office(office\_number) on delete no action, foreign key (emp\_ID) references employee(ID) on delete no action);

create table assigned( office\_number varchar(30) not null, emp\_ID varchar(30) not null, primary key (emp\_ID), foreign key (office\_number) references sales\_office(office\_number) on delete no action, foreign key (emp\_ID) references employee(ID) on delete no action);

create table listed( office\_number varchar(30) not null, propt\_number varchar(30) not null, primary key (office\_number,propt\_number), foreign key (office\_number) references sales\_office(office\_number) on delete cascade, foreign key (propt\_number) references property(number) on delete cascade);

create table own( percentage\_of\_own varchar(10) not null,propt\_number varchar(30) not null, owner\_ID varchar(30) not null, primary key (propt\_number,owner\_ID), foreign key (propt\_number) references property(number) on delete no action, foreign key (owner\_ID) references owner(ID) on delete no action);

5.

(a)

1.sales\_office.office\_number-> sales\_office.office\_number, sales\_office.location

2.employee.ID-> employee.ID, employee.name

3.owner.ID->owner.ID, owner.name

4.property.number,property.street,property.city,property.state,property.zip\_code,owner.ID->percentage\_of\_own

5.property.number,property.street,property.city,property.state,property.zip\_code->sales\_office.office\_number

6.employee.ID-> sales\_office.office\_number

(b)

1.skill.name-> skill.name, skill.description

2.employee.emp\_number-> employee.emp\_number,employee.name,employee.date\_birth,employee.if\_spouse\_Emp,employee.title

3.project.proj\_number-> project.proj\_number,project.est\_cost

4.city.city\_name-> city.city\_name,city.U.S.state

5.department.dept\_name-> department.dept\_name,department.phone\_number

6.department.dept\_name,vendor.name->date\_of \_the\_last\_meetting

7.employee.emp\_number->department.dept\_name

8.project.proj\_number->employee.emp\_number,city.city\_name

(c)

1.product.SKU\_code->product.SKU\_code,product.description,product.finish, product.stand\_price

2.raw\_material.ID->raw\_material.ID,raw\_material.unit\_measure, raw\_material.material\_name, raw\_material.stand\_cost

3.product\_line.SKU\_code->product\_line.SKU\_code,product\_line.name

4.employee.ID->employee.ID,employee.name,employee.address

5.customer.ID->customer.ID,customer.name,customer.address,customer.zip\_code

6.order.ID->order.ID,order.date\_placed

7.product.SKU\_code->product\_line.SKU\_code

8.employee.ID->supervisor.ID

9.order.ID->customer.ID/salespeople.ID/employee.ID