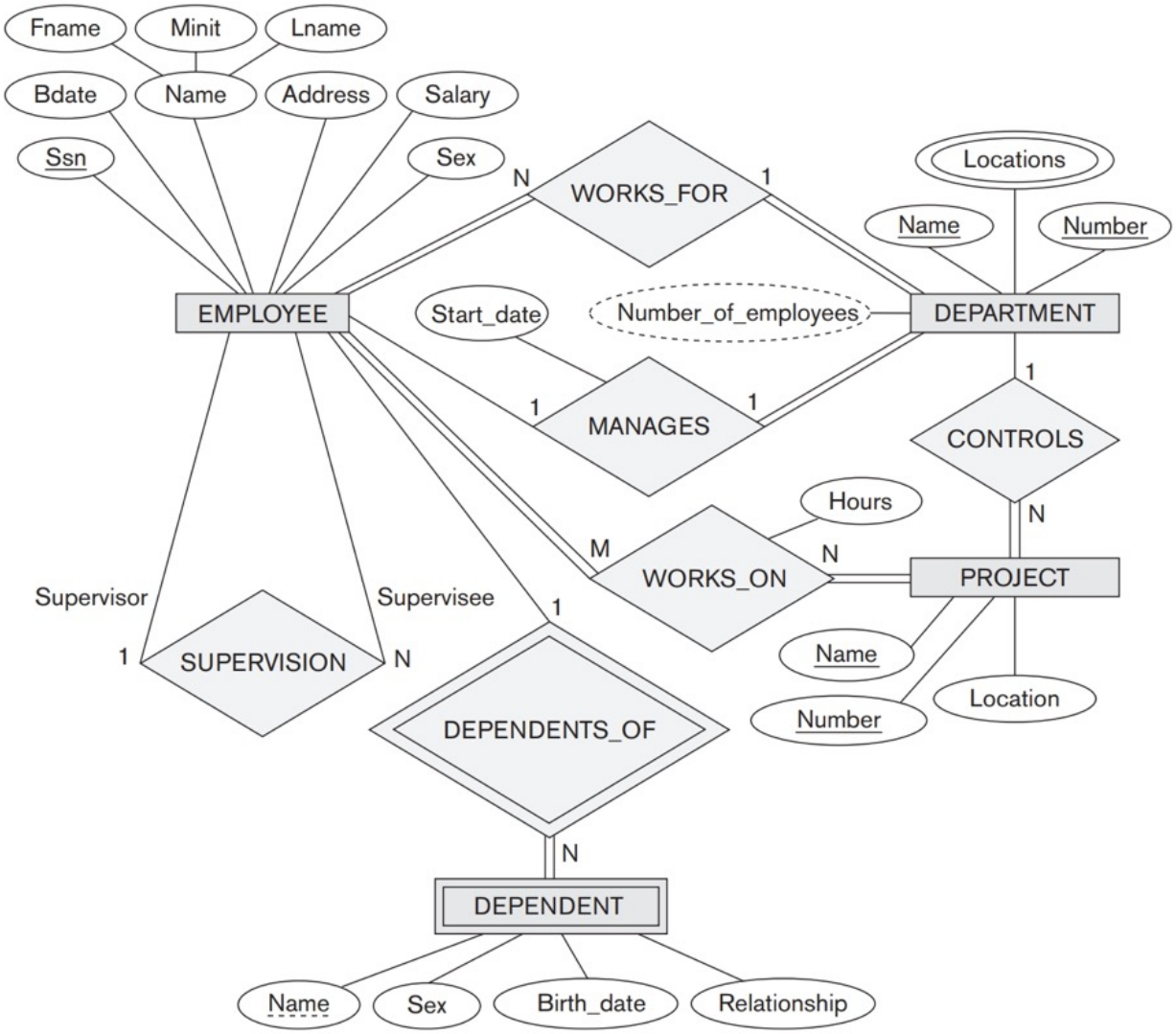


Figure 3.2
An ER schema diagram for the COMPANY database. The diagrammatic notation is introduced gradually throughout this chapter and is summarized in Figure 3.14.

EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
John	B	Smith	123456789	1965-01-09	731 Fondren, Houston, TX	M	30000	333445555	5
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
Alicia	J	Zelaya	999887777	1968-01-19	3321 Castle, Spring, TX	F	25000	987654321	4
Jennifer	S	Wallace	987654321	1941-06-20	291 Berry, Bellaire, TX	F	43000	888665555	4
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000	333445555	5
Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000	333445555	5
Ahmad	V	Jabbar	987987987	1969-03-29	980 Dallas, Houston, TX	M	25000	987654321	4
James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000	NULL	1

WORKS_ON

Essn	Pno	Hours
123456789	1	32.5
123456789	2	7.5
666884444	3	40.0
453453453	1	20.0
453453453	2	20.0
333445555	2	10.0
333445555	3	10.0
333445555	10	10.0
333445555	20	10.0
999887777	30	30.0
999887777	10	10.0
987987987	10	35.0
987987987	30	5.0
987654321	30	20.0
987654321	20	15.0
888665555	20	NULL

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date
Research	5	333445555	1988-05-22
Administration	4	987654321	1995-01-01
Headquarters	1	888665555	1981-06-19

DEPT_LOCATIONS

Dnumber	Dlocation
1	Houston
4	Stafford
5	Bellaire
5	Sugarland
5	Houston

PROJECT

Pname	Pnumber	Plocation	Dnum
ProductX	1	Bellaire	5
ProductY	2	Sugarland	5
ProductZ	3	Houston	5
Computerization	10	Stafford	4
Reorganization	20	Houston	1
Newbenefits	30	Stafford	4

DEPENDENT

Essn	Dependent_name	Sex	Bdate	Relationship
333445555	Alice	F	1986-04-05	Daughter
333445555	Theodore	M	1983-10-25	Son
333445555	Joy	F	1958-05-03	Spouse
987654321	Abner	M	1942-02-28	Spouse
123456789	Michael	M	1988-01-04	Son
123456789	Alice	F	1988-12-30	Daughter
123456789	Elizabeth	F	1967-05-05	Spouse

Figure 5.6 (company DB, textbook)

Discuss all integrity constraints violated by:

a. Insert <'Sophia', 'M', 'Wood', '973442298', '1974-05-21', '23 S Lamar Blvd. Rd, Austin, TX', 'F', 62000, '222445555', 5> into EMPLOYEE.

b. Insert <'6Sigma', 4, 'Austin', 4> into PROJECT.

c. Insert <'Information Technology', 2, '987987987', '2007-10-01'> into DEPARTMENT.

d. Insert <'777624972', 15, '40.0'> into WORKS_ON.

e. Insert <'888665555', 'John', 'M', null, 'Son'> into DEPENDENT.

f. Delete the DEPENDENT tuples with Essn = '987654321'.

g. Delete the DEPARTMENT tuples with Dnumber = 5.

h. Delete the WORKS_ON tuples with Pnoe = 30.

i. Modify the Plocation and Dnum of the PROJECT tuples with Dnum = 5 to 'Houston' and 1, respectively.

j. Modify the Super_ssn attribute of the EMPLOYEE tuple with Ssn = '888665555' to null.

k. Modify the Pnumber attribute of the PROJECT tuple with Pnumber = 30 to 40

Discuss all integrity constraints violated by:

No (22244555?)

a. Insert <'Sophia', 'M', 'Wood', '973442298', '1974-05-21', '23 S Lamar Blvd. Rd, Austin, TX', 'F', 62000, '222445555', 5> into EMPLOYEE.

Yes

b. Insert <'6Sigma', 4, 'Austin', 4> into PROJECT.

Yes

c. Insert <'Information Technology', 2, '987987987', '2007-10-01'> into DEPARTMENT.

No (ESSN?)

d. Insert <'777624972', 15, '40.0'> into WORKS_ON.

Yes

e. Insert <'888665555', 'John', 'M', null, 'Son'> into DEPENDENT.

Yes

f. Delete the DEPENDENT tuples with Essn = '987654321'

g. Delete the DEPARTMENT tuples with Dnumber = 5.

Technically yes – but deal with the consequences.
You can also block this sort of delete.

Yes

h. Delete the WORKS_ON tuples with Pnoe = 30.

Yes

i. Modify the Plocation and Dnum of the PROJECT tuples with Dnum = 5 to 'Houston' and 1, respectively.

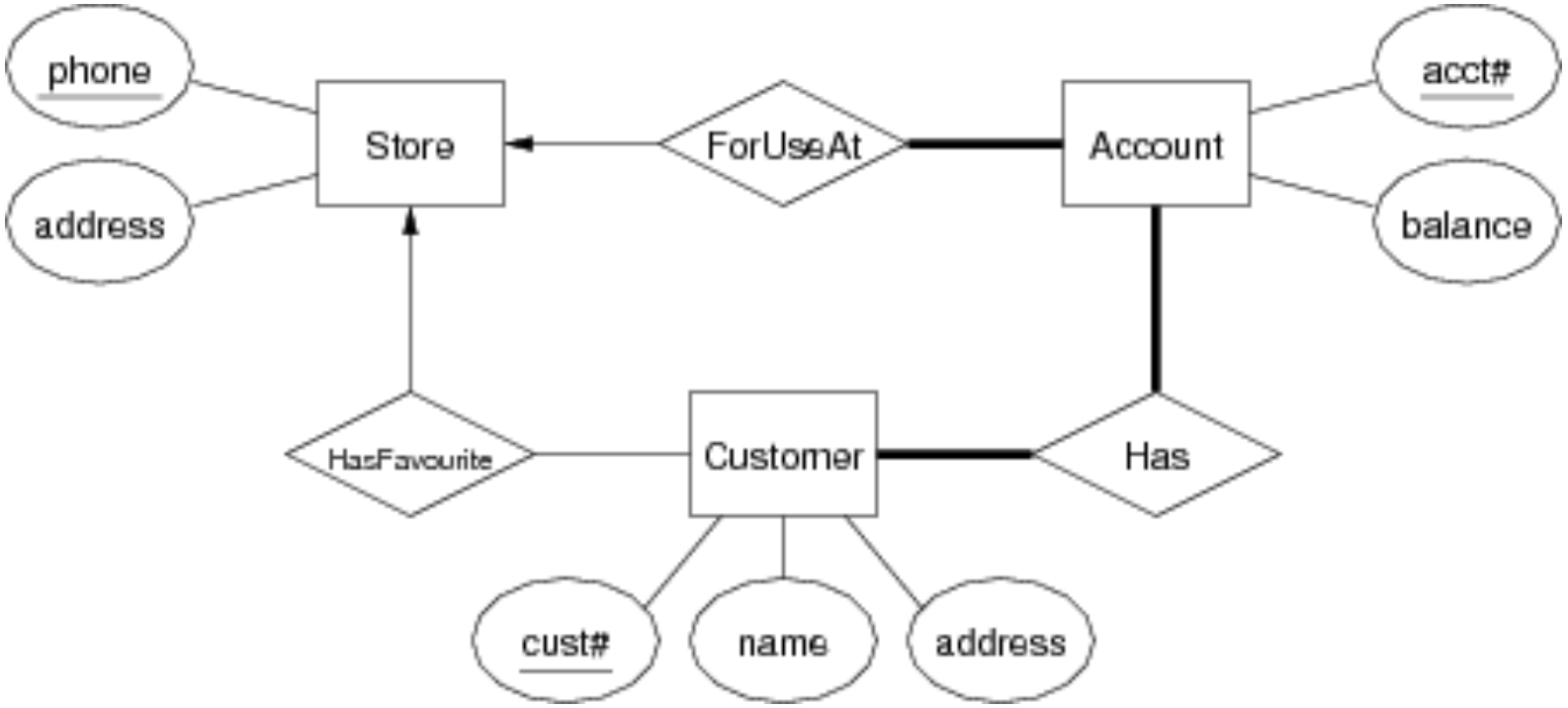
Yes (partial participation)

j. Modify the Super_ssn attribute of the EMPLOYEE tuple with Ssn = '888665555' to null.

k. Modify the Pnumber attribute of the PROJECT tuple with Pnumber = 30 to 40

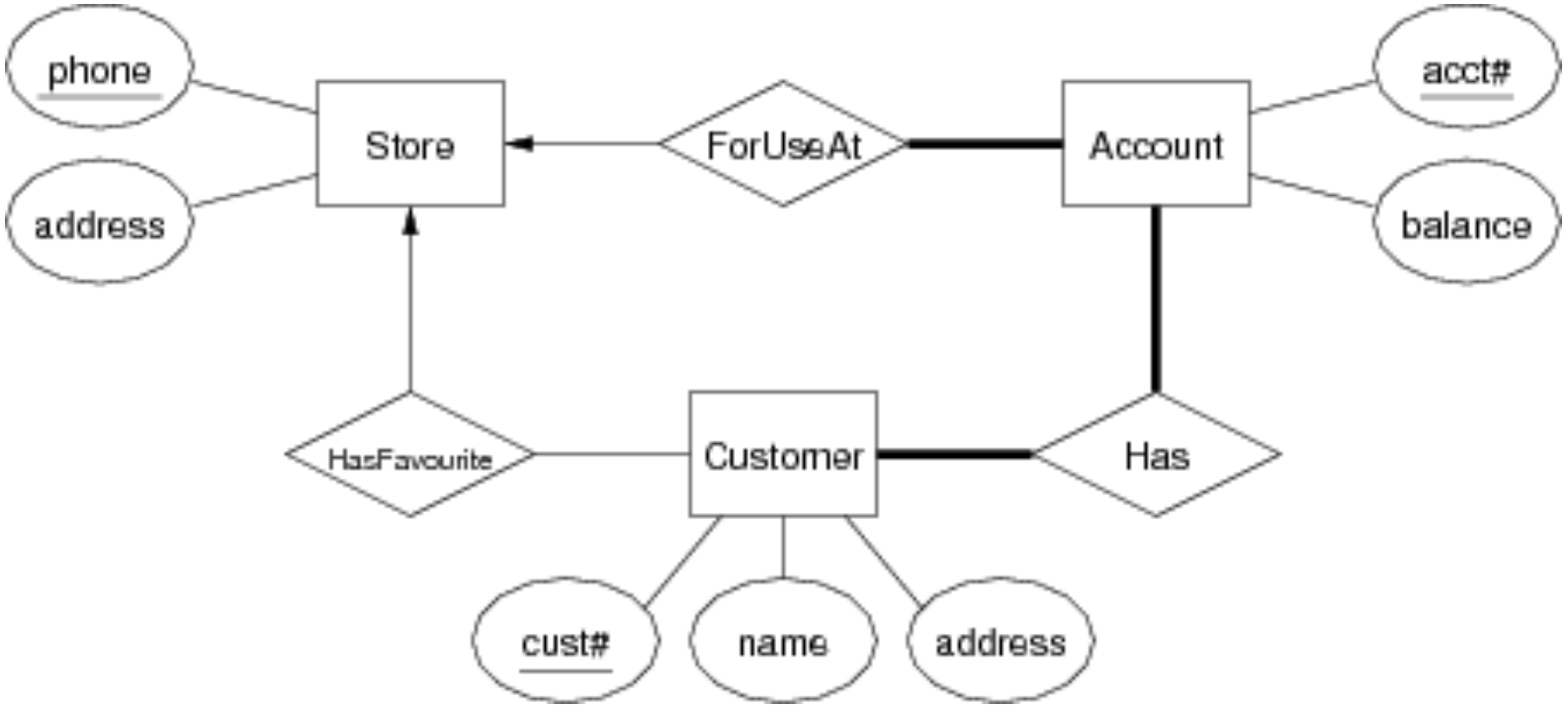
Technically yes – but careful with the consequences.
You can also block this sort of update. Depends on your application requirements.

Exercise 1 - Translate the ER to relational form



Exercise 1

ACCOUNT (Acct#, Balance, Used_Store)
FK: Used_Store references Store (Phone), Not NULL

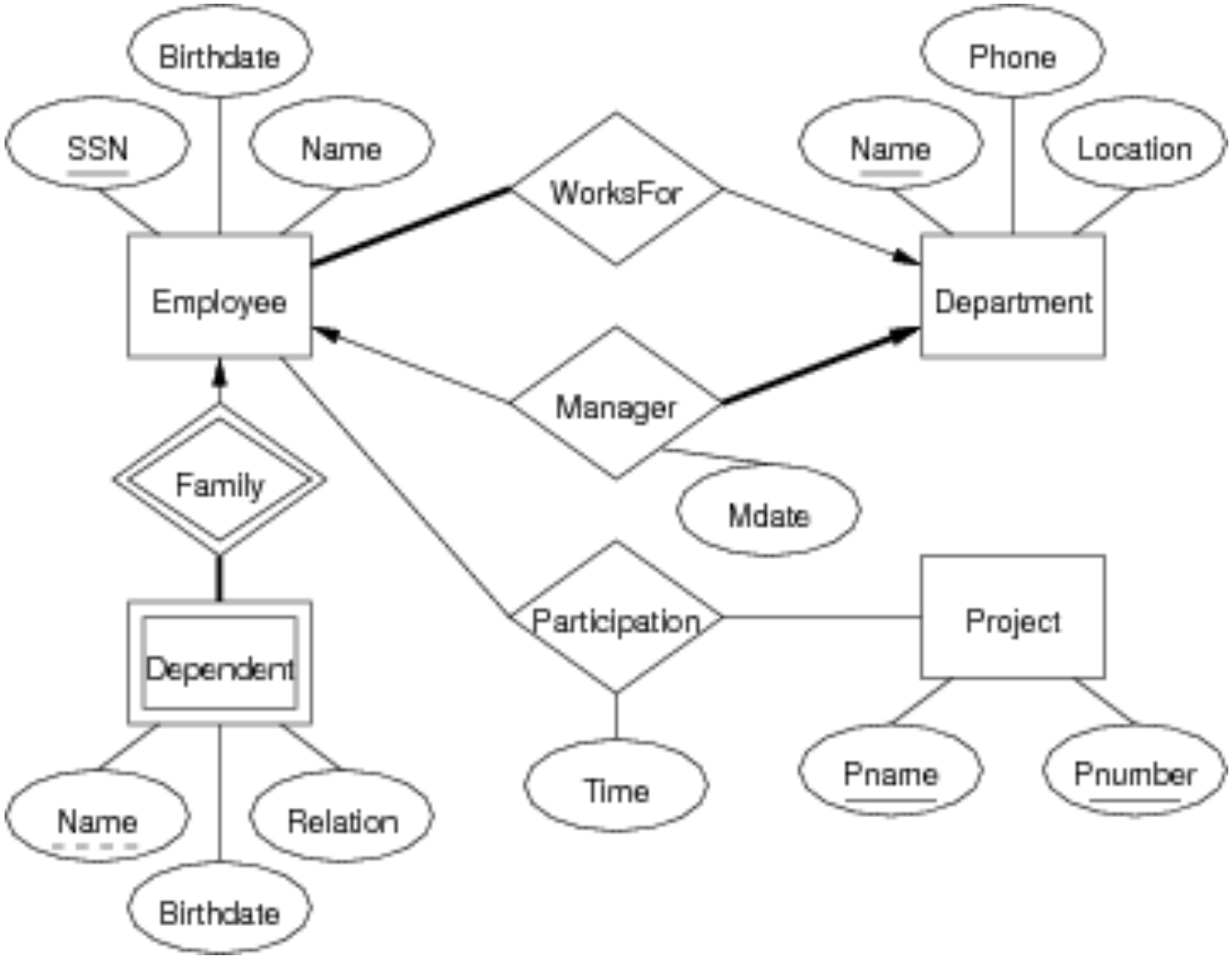


STORE (Phone, Address)

CUSTOMER (Cust#, Name, Address, Fav_Store)
FK: Fav_Store references STORE (Phone)

CUST_ACCT (Cust#, Acct#)
FK: Cust# references Customer(Cust#) NOT NULL
FK: Acct# references Account (acct#) NOT NULL

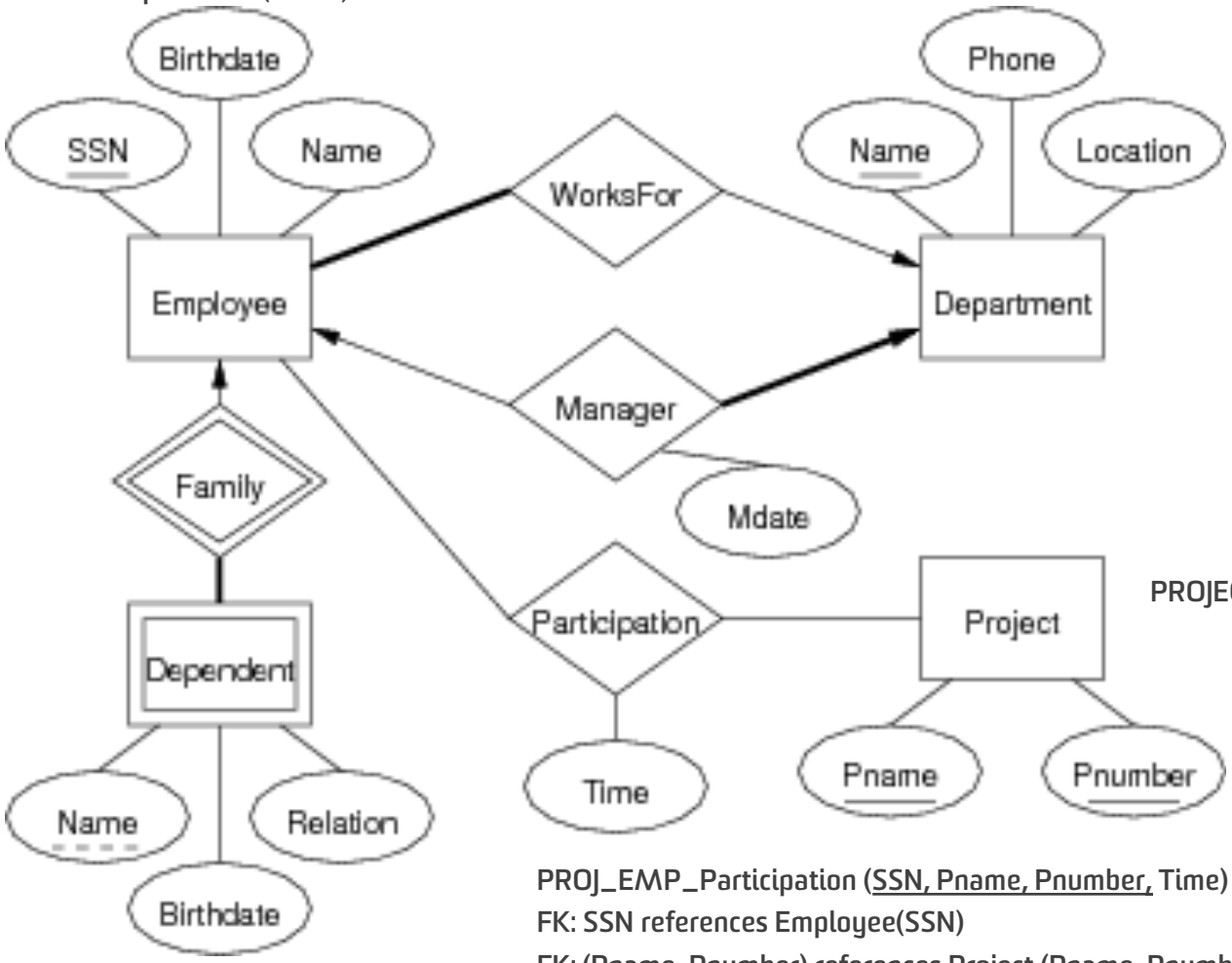
Exercise 2 - Translate the ER to relational form



Exercise 2

DEPARTMENT (Name, Phone, Location, Manager, Mdate)
FK: Manager references Employee (SSN)

EMPLOYEE (SSN, Birthdate, Name, Department)
FK: Department references Department (Name) NOT NULL

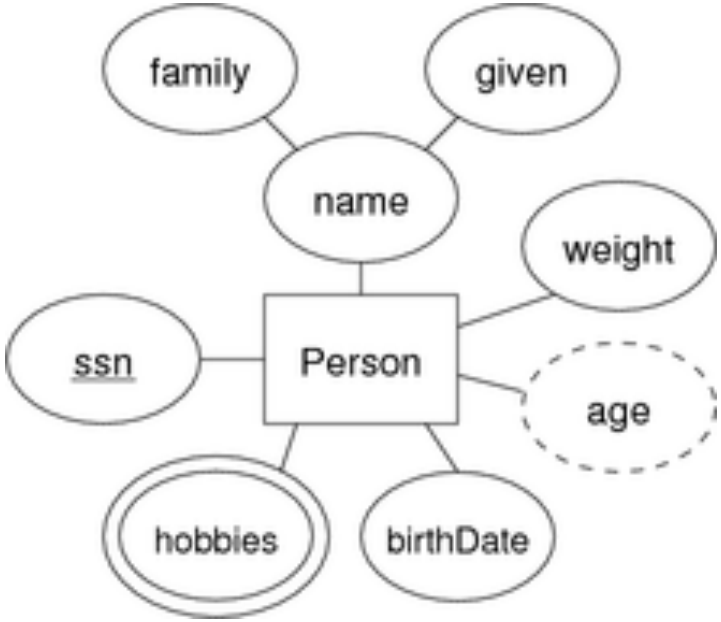


PROJECT (Pname, Pnumber)

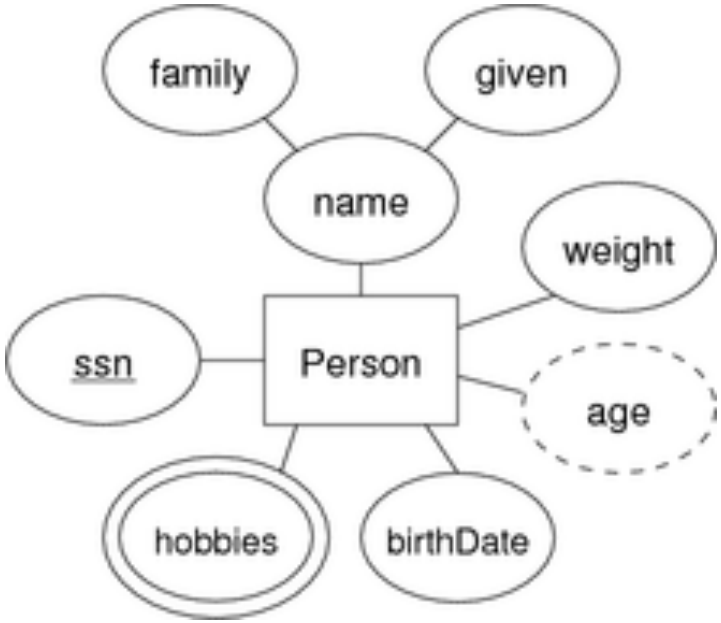
PROJ_EMP_Participation (SSN, Pname, Pnumber, Time)
FK: SSN references Employee(SSN)
FK: (Pname, Pnumber) references Project (Pname, Pnumber)

Dependent (SSN, Name, Birthdate, Relation)
FK: SSN references Employee (SSN) NOT NULL

Exercise 3: Translate this entity to relational form



Exercise 3: Translate this entity to relational form



Person(SSN, family_name, given_name, weight, birthdate)

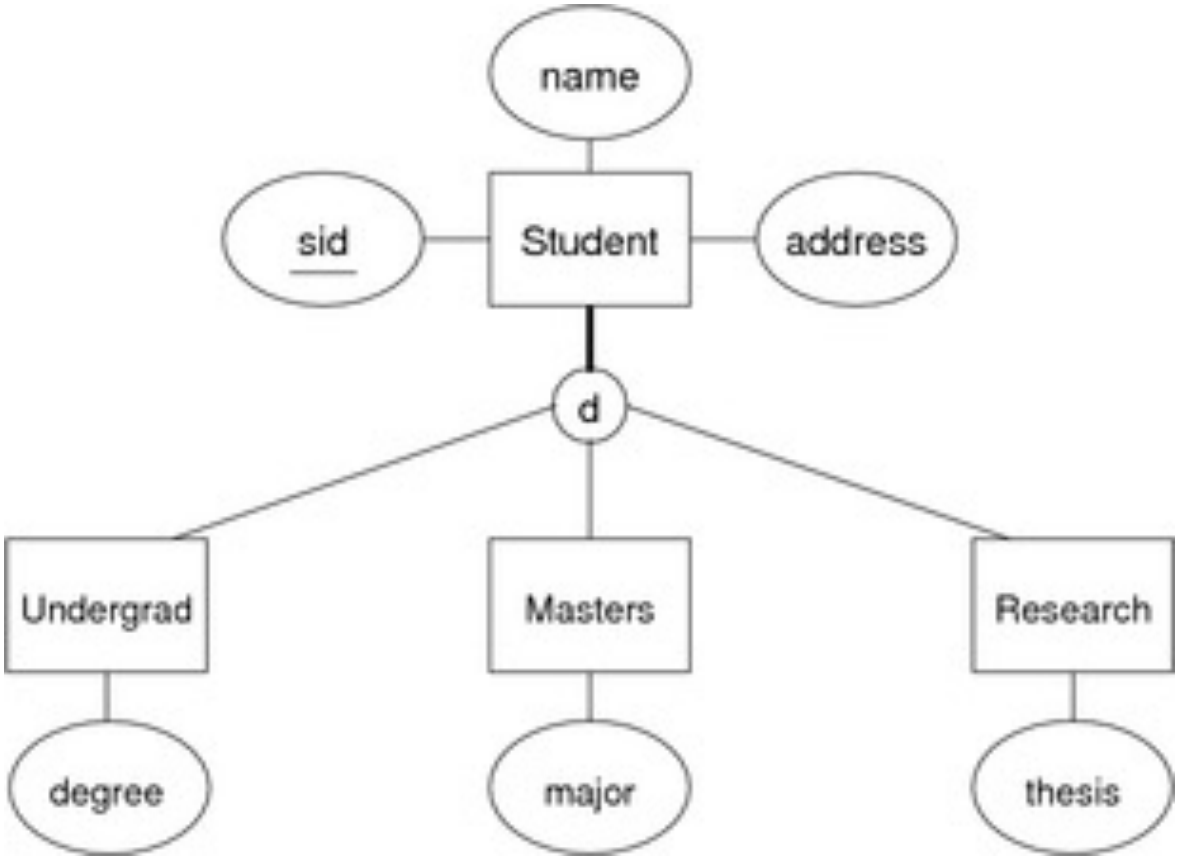
Hobbies(SSN, Hobby_Name)

* SSN + Hobby_Name should be unique (primary key of the relation)

Exercise 4: mapping subclasses

Use (a) ER-mapping, (b) OO-mapping, **(c) 1-table-mapping**

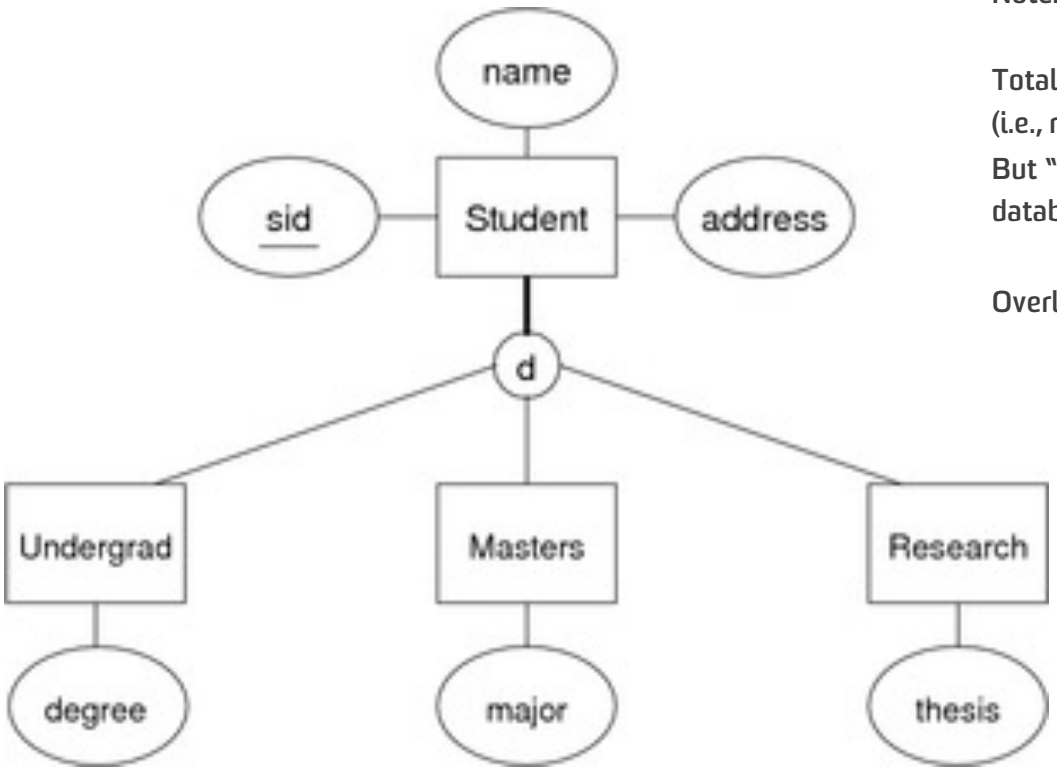
Are there aspects of the ER design that can't be mapped?



Exercise 4: mapping subclasses

Use (a) ER-mapping, (b) OO-mapping, **(c) 1-table-mapping**

Are there aspects of the ER design that can't be mapped?



ER Style

STUDENT (Sid, Name, Address)
Undergrad (Sid, degree)
Masters (Sid, major)
Research(Sid, thesis)

Note: Sid in the subclasses reference Student.Sid

Total participation/disjoint, both possible
(i.e., records can be stored to satisfy this condition)
But "enforcing" them are difficult without using
database triggers or other available means at the database level

Overlapping possible ...

STUDENT (Sid, name, address, degree, major, thesis, stud_type)

Disjoint possible, - as only one Sid entry per table would be allowed.
Total participation possible – make stud_type Not NULL and one of the subclass attribute should have a value

Overlapping possible – make Sid and Stud_Type a combined key