Student Name : _____

Student I.D : _____

Lebanese International University- ALL Campus

School of Arts and Sciences

Department of Computer Science

Course Name	: Database Systems	**Course Code**	: CSCI335
Exam	: Exam1	**Section**	: All
Date	: Friday 15 November 2013	**Time**	: 08:00- 09:30
Semester	: Fall	**Year**	: 2013-2014
Instructor	:	**Exam weight**	: 20 %
Auditorium	:	**Seat number**	:

Instructions

- Time allowed: 90 minutes
- Cheating in any way, form or method will be rewarded with an F grade
- Read each question carefully before answering
- Solve the questions that you are confident about their answers first
- This exam consists of **10pages** including this page

Question #	Grade
Problem 1	/10
Problem 2	/10
Problem 3	/10
Problem 4	/15
Problem 5	/15
Problem 6	/40
Total	/100

PROBLEM1 [10 pts.]Answer by True or False:

1. DBMS is the abbreviation of Database Management Software.
2. Derived attribute is an attribute whose value is computed from another attribute or combination of attributes.
3. To create a database, a physical model is converted into logical model.
4. A Primary Key must be a non-null value that identifies just one row in the table.
5. Foreign key should be unique
6. The description of the database is called meta-data.
7. Every relationship in an E-R diagram must translate to an individual relation in the relational model.
8. A NOT NULL constraint cannot have duplicate values.
9. In a table, there is exactly one key, but there can be multiple superkeys.
10. The database and DBMS software together is called as Database system.

PROBLEM1: [1 pt. each] TRUE or FALSE		
Questions	Answers	
1	True	False
2	True	False
3	True	False
4	True	False
5	True	False
6	True	False
7	True	False
8	True	False
9	True	False
10	True	False

PROBLEM2 [10 pts.]Fill-in-the-blank

1. A database Instance is the actual data stored in a database at a particular moment in time
2. In an E-R diagram relationship is represented by _____diamond ◊.
3. The recursive relation type is where both participations are same entity type in different roles.
4. A data model is used to hide storage details and present the users with a conceptual view of the database
5. DBMS catalog stores the description of the database
6. Database approach allows Insulation between programs and data
7. The degree of a relationship type is the number of participating entity types
8. Constraints are conditions that must hold on all valid relation states.
9. The Referential integrity constraint is violated if a foreign key value in the new tuple references a primary key value that does not exist in the referenced relation
10. A _Relationship_ is used to establish a connection between entities.

PROBLEM2: [1pt each] FILL IN THE BLANKS	
Questions	Answers
1	**Instance**
2	**diamond ◊.**
3	**recursive**
4	**data model**
5	**catalog**
6	**Insulation**
7	**degree**
8	**Constraints**
9	**Referential integrity**
10	**Relationship**

PROBLEM3 [10pts]Choose the correct answer.

1. Helping people keep track of things is the purpose of a(n) _____ .
   a. Database
   b. Instance
   c. Table
   d. Relationship

2. A recursive relationship is a relationship between an entity and _____.
   a. Itself
   b. a subtype entity
   c. another entity
   d. an instance entity

3. The sequence to be followed when designing a DBMS should be in this order:
   a. physical model _ conceptual model _ logical model
   b. logical model _ physical model _ conceptual model
   c. conceptual model _ logical model _ physical model
   d. conceptual model _ physical model _ logical model

4. _____ isa collection of interrelated data and a set of programs to access those data.
   a. Database
   b. DBMS
   c. ER diagram
   d. Entities

5. _____ is the number of entity type participating.
   a. Cardinality
   b. Degree of Relationship
   c. 1:n
   d. Binary relationship

PROBLEM3: [1pt each] MULTIPLE CHOICE				
Questions	Answers			
1	a	b	c	d
2	a	b	c	d
3	a	b	c	d
4	a	b	c	d
5	a	b	c	d

6. The lowest level of abstraction describes howdata are stored.
    a. View level
    b. Physical level
    c. Logical level
    d. Relational level

7. What is the degree of the below relationship:
    a. N
    b. 3
    c. 2
    d. None of the above

8. When we have recursive relationship in a relation, this relation has:
    a. More than one primary key
    b. More than one foreign key
    c. More than one role
    d. More than one name

9. The foreign key and the corresponding primary key should:
    a. Have the same name.
    b. Have the same domain.
    c. Belong to the same relation.
    d. Not have the same name.

10. Usually it is recommended to:
    a. Fill data in the referenced relation first.
    b. Fill data in the referencing relation first.
    c. Fill data randomly.
    d. Fill data column by column.

PROBLEM3: [1pt each] MULTIPLE CHOICE				
Questions	Answers			
6	a	b	c	d
7	a	b	c	d
8	a	b	c	d
9	a	b	c	d
10	a	b	c	d

PROBLEM4 [15pts.]

Map the ER (Entity-Relationship) schema below into a relational schema. For each table, specify the primary keys and the foreign key(s) if any.

Note: Use a solid line to underline a **primary key** and a dashed line to underline a **foreign key**.

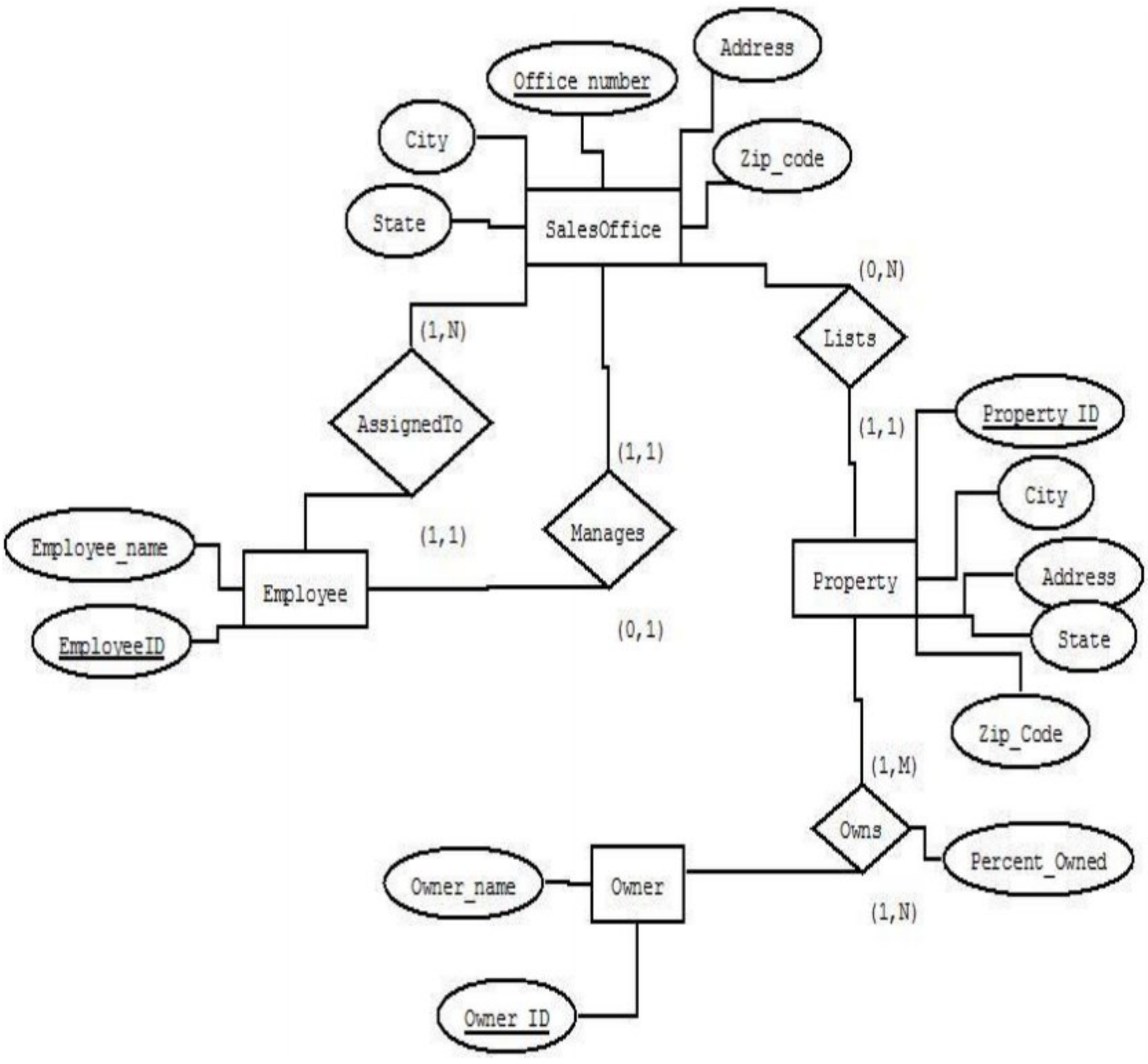
Employee(**EmployeeID 1pt**, EmployeeName,**officeNb 2pts**)

SalesOffice (**OficeNumber 1pt**, city,state,address,zip,**managerId 2pts**)

Property(**propertyId 1pt**, city,address,state,zip, **officeNb 2pts**)

Owner(**OwnerId 1pt**, OwnerName)

Owns(owid **2pts** , pid **2pts, percenowned**) **1pt** for underling both owid and pid



PROBLEM5 [15pts.]

The following tables form part of a database for a worldwide hotel chain held in a relational DBMS:

Hotel	(hotelNo, hotelName, city)
Room	(roomNo, hotelNo, type, price)
Booking	(hotelNo, guestNo, roomNo,dateFrom, dateTo)
Guest	(guestNo, guestName, guestAddress)

1. Identify the primary key for each table in this schema.
2. Identify the foreign keys in this schema.

Hotel (**hotelNo**, hotelName, city)
1pt for the PK=hotelNo

Room (**roomNo, *hotelNo***, type, price)
2pts for PK = roomNo+hotelNo
1pt for the FK hotelNo

Booking (***hotelNo, guestNo, roomNo*,dateFrom**, dateTo)
4 pts for PK= hotelNo+ guestNo+ roomNo+dateFrom
1 pt for the FK = hotelNo
1 pt for the FK = roomNo
1pt for the FK= guestNo

Guest (**guestNo**, guestName, guestAddress)
1 pt for PK = (guestNo)

3. Explain how the entity and referential integrity rules apply to the relation Booking

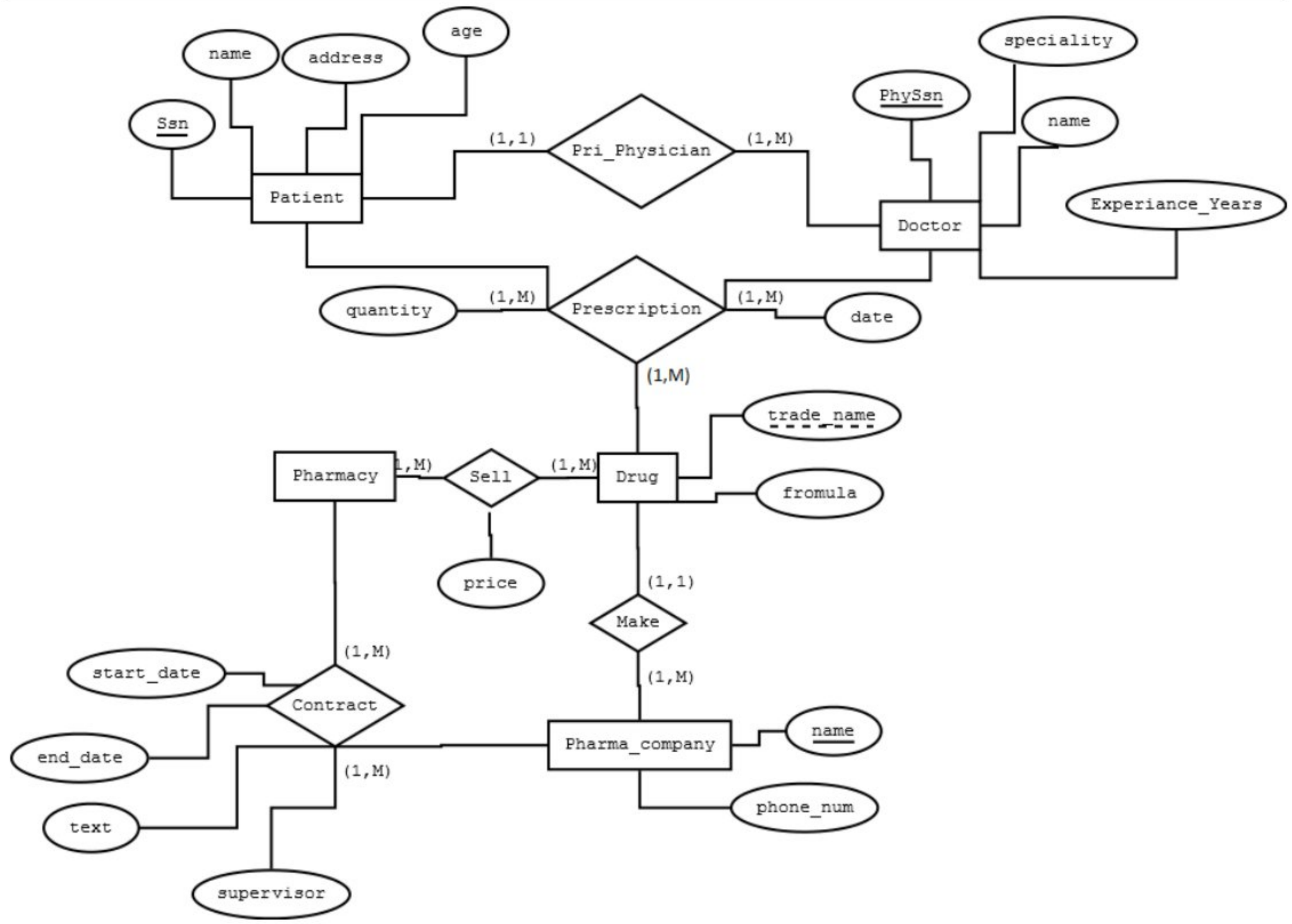
3 pts for the explanation here. Students should explain with an example how the referential integrity is applied for the relation Booking.

PROBLEM6 [40pts.]

The Prescriptions-R-X chain of pharmacies has offered to give you a free lifetime supply of medicine if you design its database. Given the rising cost of health care, you agree. Here's the information that you gather:

- Patients are identified by an SSN, and their names, addresses, and ages must be recorded.
- Doctors are identified by an SSN. For each doctor, the name, specialty, and years of experience must be recorded.
- Each pharmaceutical company is identified by name and has a phone number.
- For each drug, the trade name and formula must be recorded. Each drug is made by a given pharmaceutical company, and the trade name identifies a drug uniquely from among the products of that company. If a pharmaceutical company is deleted, you need not keep track of its products any longer.
- Each pharmacy has a name, address, and phone number.
- Every patient has a primary physician. Every doctor has at least one patient.
- Each pharmacy sells several drugs and has a price for each. A drug could be sold at several pharmacies, and the price could vary from one pharmacy to another.
- Doctors prescribe drugs for patients. A doctor could prescribe one or more drugs for several patients, and a patient could obtain prescriptions from several doctors. Each prescription has a date and a quantity associated with it. You can assume that, if a doctor prescribes the same drug for the same patient more than once, only the last such prescription needs to be stored.
- Pharmaceutical companies have long-term contracts with pharmacies. A pharmaceutical company can contract with several pharmacies, and a pharmacy can contract with several pharmaceutical companies. For each contract, you have to store a start date, an end date, and the text of the contract.
- Pharmacies appoint a supervisor for each contract. There must always be a supervisor for each contract, but the contract supervisor can change over the lifetime of the contract.

Draw the corresponding E/R diagram by using the (min, max) notation. Make sure to show which attribute (or collection of attributes) is (are) the identifier. State all assumptions you make



5 Entities => 5 points (remove 1 pt if missing to underline an identifier, remove it once)

4 attributes for Patient =>		**2pts**
4 attributes for Doctor=>		**2pts**
2 attributes for Drug=>		**1pt**
2 attributes for Pharma-Company	**=>**	**1pt**
price	**=>**	**2pts**
date	**=>**	**2pts**
Contract with 4 attributes	**=>**	**2 pts**
		Total = 12pts

Relationships:

Pri_Physicins =>	**2 pts**
Make=>	**2pts**
Sell =>	**2pts**
Contract=>	**2 pts**
Prescription (ternary)=>	**4 pts**
	Total = 12pts

11 cardinalities => 11pts