

Databases Ex1: ER diagrams

Due date: Thursday November 1, 2018, 23:55

Submission instructions:

In this exercise you should create a single zip file named “ex1.zip”. Submit the zip file via the ex1 submission link on the course homepage from **one user only** (even if you are working in pairs). Both users should be written in the README file.

The zip file should contain the following files:

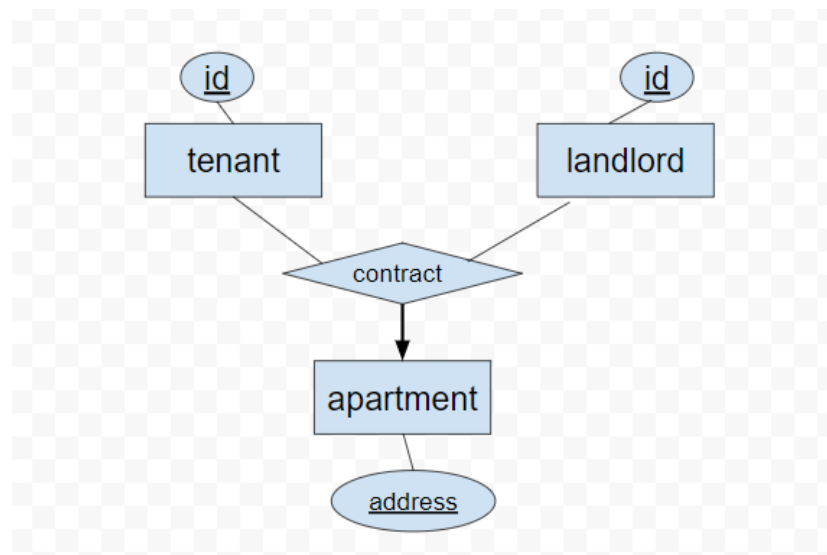
- Ex1.pdf with your written parts of your answers to the questions below
- create.sql
- drop.sql
- README with the following details:
IDNumber1 loginName1
IDNumber2 loginName2

Important: Read the course administration link on the course homepage to see exactly how scanned solutions should be submitted.

Question 1:

In each of the following questions you are given an ER diagram which represents a relation between three entities. Answer the following questions and provide a short explanation.

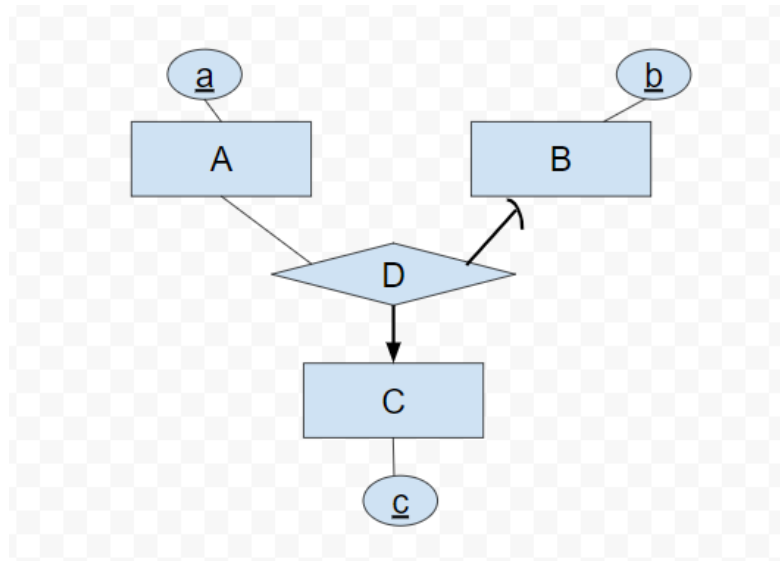
a)



1. Is it possible that there is a tenant who does not live in any apartment?

2. Is it possible that two (different) tenants have a contract with the same landlord, for the same apartment?
3. Is it possible that two (different) tenants have a contract with the same landlord, for different apartments?
4. Is it possible that a specific tenant and a specific landlord will have a contract with two different apartments?

b)

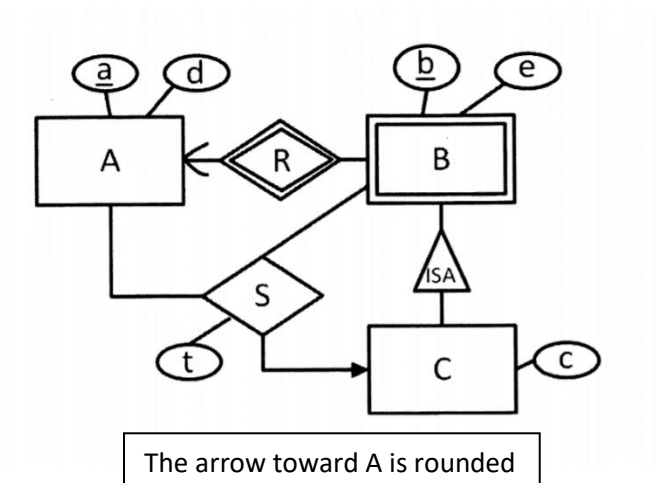


*** The arrow toward B is rounded

1. When translating D into a relation, what will be the relation's key? If there are several options for choosing a key, state them all.
2. Under what condition(s) is it possible that B is an empty entity set?
3. Assume that entity set A contains 3 entities. Is it possible that C contains only one entity? If so, what is the minimum number of entities in entity set B?
4. Assume that entity set C contains 3 entities. Is it possible that A and B each contain only one entity?

Question 2:

You are given an ER diagram. Translate the ER diagram into relations. For each relation indicate the attributes that are keys. If there are several ways to choose a key, write all the options separately.



Question 3:

You got a job planning a database for a youth movement. Your first assignment is to help maintain information about the kids, guides, groups, branches and activity rooms in the youth movement.

- Each member in the youth movement has a unique id number, a name and a phone number.
- Each branch of the movement has a unique location. For each branch, we also store the name and phone number of the branch manager.
- Groups have a name and an age range (a number between 1 and 12). Each group is located in a single branch. Branches cannot have two different groups with the same name. They can have several groups for the same age range. (Two different branches can have groups with the same name.)
- Each group has exactly one guide (מדריך). The youth movement's motto is "every guide is first and foremost a member", which means that every guide in the youth movement is also a member of the movement. Guides must take a guiding course. We store the date on which the guiding course was completed.
- Each member belongs to exactly one group. Each guide guides exactly one group, and each group has exactly one guide.
- There are activity rooms in the branches. Rooms have a room number, and are located in a single branch. In addition, for each room we store the number of chairs in the room.
- Guides can book a room for an activity. At most one room can be booked by a guide on a specific date, and each room can be booked by at most one guide on a single date.

- a) Draw an ER diagram modeling the information. Your model should be as precise as possible in expressing the constraints of the information. If you make additional natural assumptions not specified in the question, state these in your solution.
- b) Translate the ER diagram into relations. For each relation indicate the attributes that are keys. If there are several ways to choose a key, write one option.

For the next part, you will be using the Postgres database. Information about accessing your database account can be found at the end of this exercise. **Make sure to run your files in the lab. No points will be given for answers that do fail upon loading into the database.**

- c) Write DDL statements in a file “create.sql” that creates your tables. In your DDL commands, make sure to include any constraints (key, foreign key, check, etc.) that should be defined over the tables. You can assume that any textual attributes have length at most 50. **Note that in the database, the phone number of the branch manager may be unknown. Also, the number of chairs in a room can be unknown (due to the common problem of chair borrowing).**
- d) Write DDL statements in a file “drop.sql” that drop these tables.

Running create.sql and then drop.sql should cause all tables created to be dropped.

Good luck!

Using Postgres:

You can access your database account with the command:

```
psql -h dbcourse public
```

in the computer labs. After running this command, you can enter queries and DDL commands directly into the command line prompt. In this exercise it will be more useful for you to write your create and drop table commands in a file, and then this file can be loaded into the database for execution. To do so, use the command

```
\i a.sql
```

within the prompt of the database, assuming your commands are in the file “a.sql”. Some other useful commands are:

- `\q` exit psql
- `\h [command]` help about ‘command’
- `\d [name]` describe table/index/... called ‘name’

```
\dt                      list tables
```