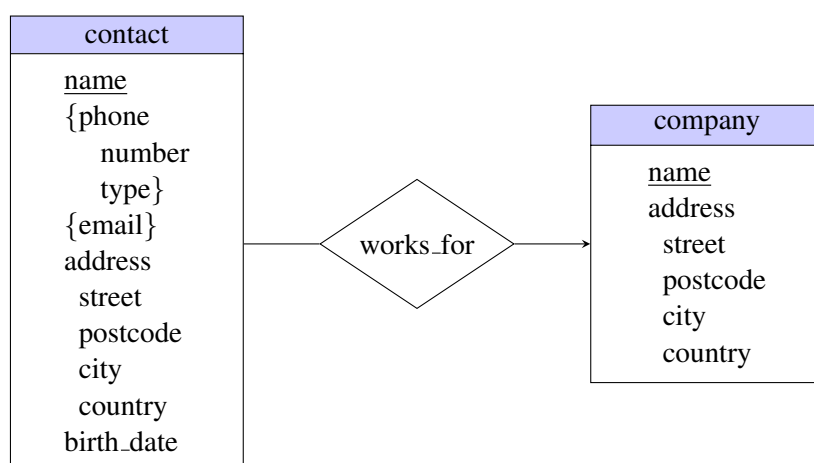


SQL basics

In this homework, we will work on a partial implementation of the mobile-phone contacts database described by the following E-R diagram:



Note that we went a bit creative with the `phone` attribute, and made it multi-valued and composite. We also model a bit of information where we record which companies people work for. Note that our design allows only a single address to be entered for a contact or company, and it does not allow a contact to work for two companies.

1. Create the required tables for this partial design. Include the `create table` statements required for creating each table in your report. Do not forget to specify the constraints that you think necessary. Avoid creating tables if you can. You may want to have a look at the data in question 3 before deciding for your primary keys.

Note that if you like MySQL to enforce your foreign key constraints, you need to append `engine=InnoDB` at the very end of your `create table` command. Here is an example:

```

create table authors2 (ISBN char(10),
                      author varchar(20),
                      primary key (ISBN, author),
                      foreign key (ISBN) references books2 (ISBN)
                      on delete restrict on update cascade) engine=InnoDB;
  
```

2. You want to restrict the `types` that can be assigned to a phone. A constraint like `check (type in('home', 'work', 'mobile'))` should do the job. Modify your `create table` command to include this constraint if you have not done so already. Include the modified statement in your report.
3. Insert the information about the following contacts to your database:

```

name           = Donald Duck
email(s)       = donald@example.com
phone(s)       = 111-2222 (home), 555-5555 (work)
address        = 1313 Webfoot Walk, Duckburg, Calisota, USA
company        = Disney
birth date     = June 9, 1934
work address   = 2100 Riverside Drive Burbank, CA 91506, USA

name           = Sherlock Holmes
  
```

```
email(s)      = sherlock@example.co.uk
phone(s)      = 333-3333 (home)
address       = 221B Baker Street, London, UK
company       = none (freelancer, works from home)
birth date    = January 1, 1887
```

```
name          = Clark Kent
email(s)      = clark@example.com
phone(s)      = 123-4567 (mobile)
address       = 221B Baker Street, London, UK
company       = none (freelancer, works from home)
birth date    = June 1, 1938
```

Include the commands you used to populate these tables in your report.

4. Write an **insert** statement that would violate the **check** condition mentioned in question 2. Test the statement on the relevant table you have created. What does MySQL do? Is it what you were expecting?
5. Identify three possible problems with this design.
6. Add an additional attribute **age** which holds the current age of the contact to your contacts table. And update the column to contain the ages of your contacts as of 2012.
Note that this is a bad idea (derived/calculated values should not go into a database). It is not a bad exercise, though.
7. Add one more contact (imaginary or real, but try not to violate anyone's privacy) to your database.
8. Write down the SQL queries to retrieve the following information:
 - (a) all information in contacts table.
 - (b) all phone numbers in your database.
 - (c) all 'mobile' phone numbers.
 - (d) all contacts less than 100 years of old.
 - (e) list of contacts who do not live in the USA.
9. Write down the SQL queries to retrieve the following information:
 - (a) all information in contacts table, sorted by name.
 - (b) all phone numbers and types, sorted by first the type, and the phone number.
 - (c) name of your oldest contact.
 - (d) average ages of your contacts.
 - (e) number of phone numbers you have in your database.
 - (f) number of phone numbers for each type.
10. Write down the SQL queries to retrieve the following information:
 - (a) a list of contact names and phone numbers.
 - (b) ages of contacts who have a mobile phone listed in your database.
 - (c) list of contacts that live or work in the USA.