Computer Science II, D-BAUG FS 2015

Departement of Computer Science

ETH Zurich

Assignment 11

Out: 13th of May 2015

Due: 20th of May 2015

1 ER Modeling

1.1 People and Traveling

Create an ER model of the following mini-world:

- A person has a name, an age and an email address.

- People like to visit foreign cities.

- Cities have a name and are located in a specific country.

- In order to travel to these cities, people always travel in groups.

- A travel group can have multiple participants, but only one destination.

- A trip to a city requires a start and an end date.

1.2 Library

Assume you are creating a system to manage a library. Give an ER model with the following properties:

- The library contains one or several books.

- Every book is located at a specific location in a shelf and is identified by the copy number and the ISBN number.

- In addition, a book has a publication year, a title and an author.

- Books are published by publishers.

- A publisher has a name and as a location.

- Each reader needs to provide his/her family name, his/her first name and his/her city of residence in order to register at the library.

- Readers borrow books.

- Upon borrowing a book, a return date is stored.

2 Relational Model

2.1 ER to Relational Model

For each of the ER models from exercises 1.1 and 1.2, create a corresponding relational schema.

2.2 Relational Algebra

Given the following relational schema:

READER (<u>RDNR</u>, Firstname, Lastname, City, Birthdate)
BOOK (<u>ISBN</u>, Title, Author, NumberOfPages, PublicationYear, PublisherName)
PUBLISHER (<u>PublisherName</u>, PublisherCity)
COPY (<u>ISBN</u>, <u>CopyNumber</u>, Shelf, Position)
BORROW (<u>ReaderNr</u>, <u>ISBN</u>, <u>Copy</u>, ReturnDate)

Write the following queries in relational algebra:

- Which are the last names of all the readers living in Zurich?

- Which books (Title, Author) have their publisher located in Zurich?

- Which books (Title, Author) have been borrowed by the reader "John Doe"?

3 Installing mySQL

ETH offers a hosted mySQL Database service for all students, which you can access within the ETH network. Thus, you do not need to install your mySQL on your own machine.

To create a database, log into your NETHZ account at https://password.ethz.ch and go to the *My Services* tab. Here you can select *mySQL* (see Figure 1). On the next page you have to set a password for your database. After the database has been created, write down the hostname of the database server (e.g., *mysqlweb1.ethz.ch*) and remember the password you have chosen. The database name corresponds to your NETHZ username.

Using the PhpMyAdmin tool you can administer the database. Log in to https://phpmyadmin.ethz.ch/ using your NETHZ username and the password defined above and click on *MySQL V4.*

3.1 Test your database

To test your database, we will create a simple 'Person' table in which we will store the first name, last name and email address of a person (Step 1). Next, we will populate (Step 2) and query the database (Step 3).

Figure 1: NETZ Administration

You will learn SQL in the second database lecture. For now, you can copy the statements provided below.

Step 1: To create a table for storing data about people, we use the 'CREATE TABLE' command.

```sql
CREATE TABLE person (
 id INT(6) UNSIGNED AUTO_INCREMENT PRIMARY KEY,
 firstname VARCHAR(30) NOT NULL,
 lastname VARCHAR(30) NOT NULL,
 email VARCHAR(50) NOT NULL
)
```

Step 2: Insert values into the newly created table is done via the 'INSERT INTO' command.

```sql
INSERT INTO  person ( 'id','firstname','lastname' ,'email')
VALUES
 (NULL, 'Donald', 'Duck', 'donald.duck@disney.com'),
 (NULL, 'Mickey', 'Mouse', 'mickey.mouse@disney.com');
```

Step 3: Query the database to get the email address of "Mickey Mouse".

```sql
SELECT email
FROM person
WHERE firstname = 'Mickey' AND lastname='Mouse';
```