

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 (RDNR, Firstname, Lastname, City, Birthdate)
BOOK (ISBN, Title, Author, NumberOfPages, PublicationYear, PublisherName)
PUBLISHER (PublisherName, PublisherCity)
COPY (ISBN, CopyNumber, Shelf, Position)
BORROW (ReaderNr, ISBN, Copy, 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).



The screenshot shows the NETHZ Admin-Tool interface. At the top left is the ETH zürich logo. At the top right is the NETHZ Admin-Tool logo with the tagline "passwort ändern, email einstellen, services verwalten". Below the logo is a navigation bar with links: "Passwort ändern", "meine Services", "meine Daten", and "Logout". The main content area is titled "Administration Ihrer Services." and contains a list of services:

- **Geheimfrage:** Definieren Sie eine Geheimfrage und eine Handynummer oder E-Mail-Adresse für vergessene nethz-Passwörter.
- **E-Mail Spamfilter:** Alle Einstellungen rund um den E-Mail Spamfilter der ETH.
- **VPP PIN:** Zahlencode zum Auslösen von Druckerjobs an VPP-Druckern. *Code to release printjobs at VPP printers.*
- **Mailbox:** E-Mail-Service für Angehörige der ETH Zürich (MS-Exchange). Zugang zum Active-Directory (Domäne D). Lockout aufheben.
- **Prepay:** nethz Prepay – Guthaben für kostenpflichtige Services wie **VPP-Druck**, **3D-Druck**, **SMS**
- **NAS-DFS:** Verteiltes Dateisystem.
- **Phone:** Telefon-Beantworter (Unified Messaging Service), Anschlussinformationen
- **MySQL:** MySQL Datenbank - Konto mit 50MB Speicherplatz, mit wenigen Klicks eingerichtet
- **polybox:** Speicher-Dienstleistung der ETH im Stile von Dropbox
- **Homepage:** Hier können Sie Ihre öffentliche Homepage registrieren.
- **Tagesgast:** Ermöglichen Sie einem Gast für kurze Zeit den Zugriff auf das ETH-Netzwerk.
- **Lync:** Kommunikations-Plattform von Microsoft
- **CMN Corporate Mobile Network:** Daten- und Voice-Abo-Service.

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.

```
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.

```
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".

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