Multimedia im Netz (Online Multimedia)  
Wintersemester 2014/15  

Übung 03 (Nebenfach)
Databases and SQL

• Data can be stored permanently in databases

• There are a number of database management systems (DBMS). In this lecture & tutorial we use MySQL

• SQL (= Structured Query Language) is a language that allows us to access databases. We can retrieve and manipulate data with it.

• With SQL you can:
  – Create databases
  – Create tables
  – Retrieve data from a database
  – Store data in a database
  – ...

Tables in relational databases

- A relational database usually consists of one or more tables
- Each table has a unique name with one or more columns
- Each table can have multiple entries (or none).
- A table row represents an entry

<table>
<thead>
<tr>
<th>PersonID</th>
<th>FirstName</th>
<th>LastName</th>
<th>PhoneNumber</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Max</td>
<td>Mustermann</td>
<td>089455544431</td>
</tr>
<tr>
<td>2</td>
<td>Laura</td>
<td>Stern</td>
<td>070815643593</td>
</tr>
<tr>
<td>3</td>
<td>Tanja</td>
<td>Baumann</td>
<td>0895673138</td>
</tr>
<tr>
<td>4</td>
<td>Felix</td>
<td>Maurer</td>
<td>0894562897</td>
</tr>
</tbody>
</table>

Table: Contacts
MySQL at the CIP-Pool

- Create a new account (required)
- Create a new database (required)
- Connect to db2.cip.ifi.lmu.de
MySQL at the CIP-Pool (II)

• To work with the database, you have to connect to the database server:
  1. Start a SHELL (Ctrl+Alt+T)
  2. Enter the following command:
     `mysql -h db2.cip.ifi.lmu.de -u [username] -p`
  3. Provide your password
  4. If successfull you should see something like this:
MySQL with your local database(I)

- XAMPP lets you work with your own, local MySQL database
- Make sure you start the MySQL Service in the control center
MySQL with your local database (II)

- Connect to a local database server:
  1. Change to the „.../xampp/mysql/bin“ directory
  2. Enter the following command:
     `mysql -h localhost -u [username] -p`
  3. Enter the password (usually “root”, “admin”, “password” or none)
  4. You should see something like the following:

```
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 4
Server version: 5.5.34 Source distribution

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Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
```
MySQL with your local database (III)

- You can perform work with MySQL through a very common web interface: phpMyAdmin
- Once you’ve started the Apache & MySQL Servers in XAMPP, enter the following URL in a web browser:
  - http://localhost/phpmyadmin
SQL: Creating a database

• Get an overview on all existing databases:
  SHOW DATABASES;

• Create a new database:
  CREATE DATABASE mydb;

• Select a database for further usage:
  USE mydb;

• Delete a database (be careful!):
  DROP DATABASE mydb;
SQL: Creating a table (I)

• Get an overview on all existing tables (of a database):
  
  ```sql
  SHOW TABLES;
  ```

• Create a new table
  
  ```sql
  CREATE TABLE myTable
  (column_name1 data_type(size) ,
column_name2 data_type(size),
column_name3 data_type(size),
...);
  ```

<table>
<thead>
<tr>
<th>column_name1</th>
<th>column_name2</th>
<th>column_name3</th>
<th>...</th>
</tr>
</thead>
</table>

Table: myTable
SQL: Creating a table(II)

• Problems with the statement from previous slide:
  – You can add empty entries to the table
  – Entries could be duplicates

• Solution: Create a table with certain constraints. Thus, you define certain rules for columns

• Most important constraints (among many others):
  – NOT NULL
  – PRIMARY KEY [often in conjunction with] AUTO INCREMENT
SQL: Creating a table (III)

- Tabelle anlegen mit Constraints

```sql
CREATE TABLE myTable
(
  column_name1 data_type(size) NOT NULL
  PRIMARY KEY
  AUTO_INCREMENT,
  column_name2 data_type(size) NOT NULL,
  column_name3 data_type(size),
  ...
);
```
Example: Creating a table

CREATE TABLE Contacts
(
  PersonID int NOT NULL PRIMARY KEY AUTO_INCREMENT,
  FirstName varchar(255) NOT NULL,
  LastName varchar(255) NOT NULL,
  PhoneNumber int NOT NULL,
);

Table: Contacts

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SQL: Adding & Retrieving data

• Add entries:
  ```sql
  INSERT INTO myTable
  (column_name1, column_name2, ...)
  VALUES
  (value1, value2, ...);
  ```

• Retrieve all entries from a table:
  ```sql
  SELECT * FROM myTable;
  ```

• Retrieve only a subset of entries
  – Entries that fulfill certain conditions with the **WHERE** keyword
    ```sql
    SELECT * FROM myTable WHERE column_name=value;
    ```
  – Entries from specific columns:
    ```sql
    SELECT column_name1 FROM myTable;
    SELECT column_name1, column_name2 FROM myTable;
    ```
Example: Add an entry

```
INSERT INTO Contacts
    (FirstName, LastName, PhoneNumber)
VALUES
    ("Max", "Mustermann", 089455544431);
```

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Table: Contacts
Example: Read data

• Retrieve all data from a table
  SELECT * FROM Contacts

• Retrieve entries that fulfill a certain condition:
  SELECT * FROM Contacts WHERE FirstName="Laura";

Table: Contacts

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Assignment 3

• **Topic:** Address-book with SQL Queries
• **Due in:** 1 Week
• **Due date:** 03.11.2014 14:00h
Thanks!

What are your questions?