

Introduction to Databases

MySQL

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Agenda

1. Definition
2. SQL Commands
3. Constraints

1. Definition

- **SQL** is Structured Query Language, which is a computer language for storing, manipulating and retrieving data stored in **relational database**.
- SQL is the standard language for Relation Database System. All relational database management systems like “MySQL, MS Access, Oracle, Sybase, Informix, postgres and SQL Server” use SQL as standard database language.

1. Definition

- What do you think is a „**database**“?
- What do you think means „**relational**“?
- What do you think is a „**relational database**“?

1. Definition

- Database: At its core, a place on your hard-drive or in your memory where data is stored.

- JSON flatfiles, CSV-files, Textfiles, Binary Files (Images...)

Usually, a system is wrapped around and gives users access to this data, which is stored in database specific format.

- MySQL
 - MS-SQL
 - Oracle
 - Postgres
 - ...

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- **MySQL** ← we learn this
 - MS-SQL
 - Oracle
 - Postgres
 - ...

1. Definition

Firstname	Lastname	Age
Max	Müller	30
Sandra	Meier	25

Column Names: Firstname, Lastname, Age

Column Values Row 1: Max, Müller, 30

Column Values Row 2: Sandra, Meier, 25

How would you represent that in JSON ?

1. Definition

- Relational: Concerning the way two or more things (more concrete: tables) are connected with each other

1. Definition

- Relational Database: A database, where one data-entity can be connected to another data-entity
- Example:
 - A customer has one address.
 - What, if he has two addresses?

Max has one address

Firstname	Lastname	Street	Postal	City
Max	Müller	Lychener Straße 1	10403	Berlin

Max has two addresses

Firstname	Lastname	Street	Postal	City
Max	Müller	Lychener Straße 1	10403	Berlin
Max	Müller	Karl-Marx-Allee 18	10243	Berlin

Problem?

Max has **two** addresses

Firstname	Lastname	Street	Postal	City
Max	Müller	Lychener Straße 1	10403	Berlin
Max	Müller	Karl-Marx-Allee 18	10243	Berlin

Problem = Redundancy. Max Müller exists twice. Having millions of customers uses too much disk-space.

Max has two addresses

Table: Customers

Id	Firstname	Lastname
1	Max	Müller

Table: Addresses

CustomerId	Street	Postal	City
1	Lychener Straße 1	10403	Berlin
1	Karl-Marx-Allee 18	10243	Berlin

Task

Take a blank piece of paper and think of your own web-project that you would like to implement.

1. What data would you store on your server?
2. How would you name your tables?

If you dont come up with an own idea of a web project, think of an online-shop.

2. SQL

- SQL stands for Structured Query Language, which is a computer language for storing, manipulating and retrieving data stored in relational databases.
- It is grouped into four language areas:
 - Data Definition Language (DDL)
 - Data Manipulation Language (DML)
 - Data Query Language (DQL)

2. SQL

- Data Definition Language (DDL)

Command	Description
CREATE	Creates a new table
ALTER	Modifies the structure of a table
DROP	Deletes a table

2. SQL

- Data Manipulation Language (DML)

Command	Description
INSERT	Creates a new row
UPDATE	Updates a row
DELETE	Deletes a row

2. SQL

- Data Query Language (DML)

Command	Description
SELECT	Selects a row