Analiza

Intelligence - Cyber - Data

SQL - DDL (Data Definition Language)

Creating & Editing Tables

Kodkod 4

Overview

- Use DDL commands to define and manage tables.
- Define columns, data types, and constraints.
- Modify and delete tables safely.
- Plan and build a small relational database from scratch.

From Data to Structure

- Until now, we worked with existing databases - tables were already created for us.
- Now, we'll learn how to create those tables ourselves using DDL commands (Data Definition Language).
- We have raw data from CSV files:

  `students.csv`, `courses.csv`, `lecturers.csv`, `classes.csv`, `study_hours.csv`.
- But before we can query this data, we need to define its structure - that means creating the tables, columns, and relationships.

Why DDL?

- **DDL allows us to:**
  - Define what data exists (`CREATE TABLE`)
  - Modify the structure if needed (`ALTER TABLE`)
  - Remove outdated structures (`DROP TABLE`)
  - Clear data without deleting the table (`TRUNCATE TABLE`)

CREATE DATABASE and CREATE TABLE

- `CREATE DATABASE` - before creating tables, we need to create a database to store them.
- `CREATE TABLE` is used to create a new table in the database.
- You define the table name, its columns, data types, and constraints.

```
CREATE DATABASE school;
```

```
CREATE TABLE students (
    student_id INT PRIMARY KEY,
    first_name VARCHAR(50),
    last_name VARCHAR(50),
    email VARCHAR(100),
    course_id INT
);
```

ALTER TABLE

Modify an Existing Table

- `ALTER TABLE` is used to change the structure of an existing table without deleting or recreating it.
- With `ALTER` you can:
  - Add new columns
  - Modify existing columns
  - Rename columns or the table itself
  - Delete (drop) columns

```sql
-- Add a new column
ALTER TABLE students
ADD phone VARCHAR(20);
```

```sql
-- Modify column type
ALTER TABLE students
MODIFY email VARCHAR(150);
```

```sql
-- Rename a column
ALTER TABLE students
RENAME COLUMN last_name TO family_name;
```

DROP TABLE

Delete a Table

- DROP TABLE permanently deletes a table and all the data inside it.
- Once a table is dropped, it cannot be recovered.
- DROP TABLE removes:
  - All data
  - All columns and constraints
  - Any relationships (foreign keys)

```
DROP TABLE students;
```

Data Types

- When creating a table, each column must have a data type - it defines what kind of data can be stored in that column.
- Choosing the right data type helps keep the database efficient and accurate.

Type	Description	Example
INT	Whole numbers	student_id INT
DECIMAL(p, s)	Numbers with decimals (precision, scale)	grade DECIMAL(4,2)
VARCHAR(n)	Text up to n characters	name VARCHAR(50)
TEXT	Long text	comments TEXT
DATE	Calendar date	birth_date DATE
DATETIME	Date and time together	created_at DATETIME
BOOLEAN	True/False values	is_active BOOLEAN

Class Exercises

1. Create the database **school** (if it doesn't exist yet).
2. Create a table named **courses**:
    a. **id** - integer as primary key.
    b. **course_name** - text up to 100 characters can’t be null.
    c. **building** - decimal number.
3. Create a table named **lectures_new**:
    a. **id** - integer as primary key.
    b. **lectureName** - text up to 100 characters can’t be null.
4. Create a table named **buildings**:
    a. **id** - integer as primary key.
    b. **buildingName** - text up to 100 characters can’t be null.

Class Exercises

4. In table **courses**:
    a. Rename the column **course_name** to **courseName**.
    b. Delete the column **building**.
5. In table **lectures_new**:
    a. Rename the table to lectures.
    b. Modify the column lectureName so it cannot be null.
6. Delete the table **buildings** completely.

Import Data from CSV Files

CSV to dosen’t Table

If the table doesn’t exist yet:

- In phpMyAdmin, select the database school on the left panel.
- At the top menu, click Import.
- Click Browse and choose the correct file (e.g. students.csv).
- Activate the option “The first line of the file contains the table column names.”
- Scroll to the bottom and click Import to execute the process.

Useful Resources — MySQL & Table Management

- https://dev.mysql.com/doc/refman/8.4/en/create-table-select.html
- https://docs.oracle.com/cd/E17952_01/mysql-5.7-en/create-table-select.html
- https://www.w3schools.com/mysql/mysql_insert_into_select.asp
- https://www.techonthenet.com/mysql/tables/create_table_as.php
- https://www.dbvis.com/thetable/how-to-create-a-table-like-another-table-in-mysql/
- https://www.geeksforgeeks.org/mysql/mysql-insert-into-select-statement/

Summary

- Use DDL commands to define and manage database structures.
- Define tables, columns, data types, and constraints.
- Work with the main DDL commands: CREATE, ALTER, and DROP.
- Understand common data types — INT, VARCHAR, DECIMAL, DATE.
- Import real data from CSV files into tables using phpMyAdmin.