Lecture 8:

• Creating Tables in SQL

Announcements:

• HW 2 due
• HW 3 out, due Tues
• Note: Project part 1 is due next Thursday (10/5)
Creating Tables in SQL (MySQL/MariaDB)

Basic `create table` syntax:

```sql
CREATE TABLE  tablename (  
    attribute\(_i\)  type\(_i\),
    attribute\(_2\)  type\(_2\),
...
); 
```

where `attribute\(_i\)` is the name and `type\(_i\)` is the data type (e.g., `vt_id INT`)

Can also add various additional information:

- constraints (e.g., NOT NULL, keys, foreign keys, UNIQUE, etc.)
- default values
- plus more (later)

Basic SQL Data Types (supported by MariaDB)

(1) Integer values:

- INT or INTEGER 4 bytes
- MEDIUMINT 3 bytes (not SQL)
- SMALLINT 2 bytes
- TINYINT 1 byte (not SQL)
- BIGINT 8 bytes (not SQL)
- Also UNSIGNED (e.g., INT UNSIGNED)
(2) Floating-point values:

- **FLOAT** 4 bytes
- **DOUBLE** 8 bytes
- **FLOAT\((M, D)\)** and **DOUBLE PRECISION\((M, D)\)**
  - values up to \(M\) digits of which \(D\) may be after the decimal point
  - values (with more precision) are rounded
- Also supports “exact” floating point types (e.g., **DECIMAL\((8,2)\)**)

(3) Boolean and Binary values:

- **BOOL** or **BOOLEAN** 0 is false, not 0 is true
- **BIT\((M)\)** \(M\) binary digits (bits)

(4) String values:

- **CHAR\((N)\)** \(0 \leq N \leq 255\) characters (fixed length)
- **VARCHAR\((N)\)** \(0 \leq N \leq 65,535\) characters (variable length)
- **ENUM(`v1', `v2', . . .)** one of given string values
- **BLOB**
  - “binary large object”
  - can store a variable amount of data (variable length)
  - stored as byte strings (no character set)
  - also **TINYBLOB**, **MEDIUMBLOB**, **LONGBLOB** (different max lengths)
- **TEXT** same as blob for character data
- **TINYTEXT** up to 255 characters
(5) Date and Time values:

- **YEAR**  
  `YYYY` (or `YYYY`) format from 1901 to 2155 (and 0000)

- **DATE**  
  `YYYY-MM-DD` format

- **TIME**  
  multiple formats, e.g., `HH:MM` and `HH:MM:SS`

- **DATETIME**  
  both a date and a time, multiple formats

(6) Others:

- various other string and numeric types

- geometric types

- JSON values

- SET types (e.g., SET(`value1`, `value2`, ...))
**Basic Example**

Defining a (library) branch table:

```
branch(branch_name, address, phone)
```

Q: What would reasonable data types be?

Simple version of the CREATE TABLE statement ...

```sql
CREATE TABLE branch (
    branch_name VARCHAR(50),
    address TINYTEXT,
    phone VARCHAR(12), -- e.g., format: NNN-NNN-NNNN
    PRIMARY KEY (branch_name) -- syntax for one-attribute PK
);
```

In MariaDB, use "EXPLAIN branch;" to see the schema

Use "SHOW CREATE TABLE branch;" to see the SQL
Dropping Tables

Removing a table that already exists

    DROP TABLE account;

Note: this removes the entire table!

Checking table exists before removing it

    DROP TABLE IF EXISTS account;

• only removes table if it has already been created
• good for avoiding errors in a script (e.g., first time run)

Creating a table only if it doesn’t exist

    CREATE TABLE account IF NOT EXISTS (    ...
);  

• can avoid errors if having dropped first
• e.g., to be sure you really want to drop / overwrite a table