MySQL-Creating a Database

Lecture 3 Section 4.1

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- Multiple Tables
- MySQL
- Oreating a Database
- MySQL Data Types
- 6 Assignment

Outline

- Multiple Tables
- 2 MySQL
- 3 Creating a Database
- MySQL Data Types
- 5 Assignment

Multiple Tables

- Suppose that we wish to add to the database the information about the departments, the employees' dependents, and the various projects that the employees are working on.
- We need additional information
 - Department's name
 - Department's manager
 - Dependent's name
 - Dependent's sex
 - Dependent's birthday
 - Project's name
 - Project's department
 - Employees working on each project
 - No. of hours worked by employees on each project

 How should we incorporate this additional information into the database?

- To add all of those attributes to the Employees relation would violate the *limited redundancy* principle.
- All of the related data for each department and project would be repeated for each employee working on that project.
- Furthermore, all the related data for each employee would be repeated for each dependent of that employee.

```
Employees
(
fname string,
lname string,
ssn string,
bdate date,
sex string,
salary float,
dept integer
)
```

```
Departments
(
          <u>dept</u> integer,
          dept_name string,
          mgr_ssn string
)
```

```
Projects
(
    proj integer,
    pjoj_name string,
    dept integer
)
```

```
Dependents
(

ssn string,
dep_name string,
dep_sex string,
dep_bdate date
)
```

```
Works
(

ssn string,
proj integer,
hours float
)
```

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MySQL Commands

- MySQL commands may be issued through a command line or from within a program (e.g., C, C++, Java, PHP).
- When issued through the command line, all MySQL commands end with a semicolon.
- When using MySQL through a programming language such as C++, a complication is that the internal structure of MySQL relations does not match any of the built-in datatypes.
- What to do?

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Creating a Database

Creating a Database

CREATE DATABASE db_name;

- The CREATE DATABASE command will create a database.
- This creates a database with the name db_name, but it does not create any content.

Creating a Database

The Current Database

USE db_name;

- To work with a database, we execute the USE command to make it the current database.
- This makes db_name the current database.

Creating a Table

```
CREATE TABLE table_name (attribute_list);
```

- The CREATE TABLE command will create a table (i.e., a relation) within a database.
- This creates the table table_name with the attributes specified in attribute_list.

Creating Attributes

- To specify an attribute, we need to provide the name and the data type.
- These may be followed by a number of modifiers that we will introduce shortly.
- For example, the employees table will have seven attributes:
 - fname first name
 - lname last name
 - ssn social security number
 - bdate birthday
 - sex sex
 - salary salary
 - dept department

Creating Attributes

Creating an Attribute

fname CHAR (20)

- The fname attribute would be described as CHAR (20).
- This states that the value of fname is a character string of length 20.
- We could use VARCHAR (20), which will store up to 20 characters.

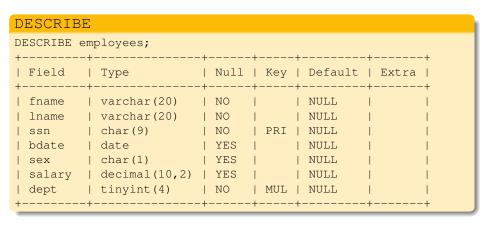
Creating a Table

```
CREATE TABLE employees
    fname VARCHAR (20),
    lname VARCHAR (20),
    ssn CHAR(9),
    bdate DATE,
    sex CHAR(1),
    salary DECIMAL(10, 2),
    dept TINYINT (4),
    PRIMARY KEY (ssn)
);
```

• The other tables may be defined similarly.

```
SHOW TABLES;
+-----+
| Tables_in_company |
+-----+
| employees |
+-----+
```

 We can now use the SHOW TABLES command to see what tables exist.



 We can use the DESCRIBE command to see a detailed description of a table.

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MySQL Data Types

- Categories of data types
 - Integer
 - Fixed point
 - Floating point
 - Boolean
 - String
 - Time/Date
 - Generic

Integer Types

- Standard integer types
 - SMALLINT 2-byte integers.
 - INT 4-byte integers.
- Extended integer types
 - TINYINT 1-byte integers.
 - MEDIUMINT 3-byte integers.
 - BIGINT 8-byte integers.
- Each integer type may be either signed (default) or unsigned.

Fixed-Point Types

- Standard fixed-point types
 - DECIMAL Whole numbers up to 10 digits.
 - DECIMAL (n) Whole numbers up to n digits.
 - DECIMAL (n, d) Real numbers with n digits, d of which are after the decimal point.
- Fixed-point values are stored exactly.

Floating-Point Types

- Standard floating-point types
 - FLOAT 4-byte floating-point numbers.
 - DOUBLE 8-byte floating-point numbers.
- Floating-point values are stored approximately.

Boolean Types

- Standard boolean type
 - BOOL is equivalent to TINYINT (1), i.e., a one-digit integer.
- The values 0 and 1 are interpreted as "false" and "true," respectively.
- The symbols FALSE and TRUE are equivalent to 0 and 1, respectively.

String Types

Standard string types

- CHAR (n) Exactly n characters (0 < $n \le 255$).
- VARCHAR (n) Up to n characters (0 < $n \le 255$).
- BINARY (n) Exactly n bytes.
- VARBINARY (n) Up to n bytes.
- TEXT Arbitrary amount of character data.
- BLOB Arbitrary amount of byte data.
- ENUM Any one string from a specified list.
- SET Any number of strings from a specified list.

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Assignment

- Read Section 4.1, pages 87 94.
- Visit the websites
 - http://dev.mysql.com/doc/refman/5.6/en/create-database.html
 - http://dev.mysql.com/doc/refman/5.6/en/use.html
 - http://dev.mysql.com/doc/refman/5.6/en/create-table.html
 - http://dev.mysql.com/doc/refman/5.6/en/data-types.html