Web Applications Development I

Lecture 11: MySQL Database

Outline

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➢ PHP Connect to MySQL

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➢ MySQL Create Table

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What is MySQL?

- MySQL is a database system used on the web
- MySQL is a database system that runs on a server
- MySQL is ideal for both small and large applications
- MySQL is very fast, reliable, and easy to use
- MySQL uses standard SQL
- MySQL compiles on a number of platforms
- MySQL is free to download and use
- MySQL is developed, distributed, and supported by Oracle Corporation

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What is MySQL? (Cont.)

- The data in a MySQL database are stored in tables. A table is a collection of related data, and it consists of columns and rows.
- PHP combined with MySQL are cross-platform (you can develop in Windows and serve on a Unix platform)
- MySQL is the de-facto standard database system for web sites with HUGE volumes of both data and end-users (like Facebook, Twitter, and Wikipedia).
- Another great thing about MySQL is that it can be scaled down to support embedded database applications.

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PHP Connect to MySQL

- PHP 5 and later can work with a MySQL database using:
  - **MySQLi extension** (the "i" stands for improved)
  - **PDO (PHP Data Objects)**
- Earlier versions of PHP used the MySQL extension. However, this extension was deprecated in 2012.
- **Should I Use MySQLi or PDO?**
- If you need a short answer, it would be "Whatever you like".
- Both MySQLi and PDO have their advantages:
- PDO will work on 12 different database systems, whereas MySQLi will only work with MySQL databases.

PHP Connect to MySQL (Cont.)

- So, if you have to switch your project to use another database, PDO makes the process easy. You only have to change the connection string and a few queries. With MySQLi, you will need to rewrite the entire code - queries included.

- Both are object-oriented, but MySQLi also offers a procedural API.

- Both support Prepared Statements. Prepared Statements protect from SQL injection, and are very important for web application security.

Open a Connection to MySQL

• Example (MySQLi Object-Oriented)

```php
<?php
$servername = "localhost";  $username = "username";
$password = "password";

// Create connection
$conn = new mysqli($servername, $username, $password);

// Check connection
if ($conn->connect_error)
  die("Connection failed: " . $conn->connect_error);
else
echo "Connected successfully";
?>
```

Open a Connection to MySQL (Cont.)

• Example (MySQLi Procedural)

```php
<?php
$servername = "localhost"; $username = "username";
$password = "password";
// Create connection
$conn = mysqli_connect($servername, $username, $password);
// Check connection
if (!$conn)
  die("Connection failed: " . mysqli_connect_error());
else
  echo "Connected successfully";
?>
```

Open a Connection to MySQL (Cont.)

• Example (PDO)

```php
<?php
$servername = "localhost"; $username = "username"; $password = "password";

try {
  $conn = new PDO("mysql:host=$servername;dbname=myDB", $username, $password);
  // set the PDO error mode to exception
  $conn->setAttribute(PDO::ATTR_ERRMODE, PDO::ERRMODE_EXCEPTION);
  echo "Connected successfully";
} catch(PDOException $e) {
  echo "Connection failed: " . $e->getMessage();
}
?>
```

Open a Connection to MySQL (Cont.)

• **Tip:** A great benefit of PDO is that it has an exception class to handle any problems that may occur in our database queries.

• If an exception is thrown within the try{ } block, the script stops executing and flows directly to the first catch(){ } block.

Close the Connection

- The connection will be closed automatically when the script ends. To close the connection before, use the following:
- MySQLi Object-Oriented: $conn->close();
- MySQLi Procedural: mysqli_close($conn);
- PDO: $conn = null;

Create a MySQL Database

- A database consists of one or more tables.
- The **CREATE DATABASE** statement is used to create a database in MySQL.
- Example (MySQLi Object-oriented)

```php
// Create database
$sql = "CREATE DATABASE myDB";
if ($conn->query($sql) === TRUE) {
  echo "Database created successfully";
} else {
  echo "Error creating database: " . $conn->error;
}
```

Create a MySQL Database (Cont.)

- **Note:** When you create a new database, you must only specify the first three arguments to the mysqli object (servername, username and password).
- **Tip:** If you have to use a specific port, add an empty string for the database-name argument, like this:
  new mysqli("localhost", "username", "password", "", port)
- Example (MySQLi Procedural)

```
// Create database
$sql = "CREATE DATABASE myDB";
if (mysqli_query($conn, $sql))
  echo "Database created successfully";
  else
  echo "Error creating database: " .
mysqli_error($conn);
```

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Create a MySQL Database (Cont.)

- Example (PDO)

```php
<?php
$servername = "localhost"; $username = "username"; $password = "password";

try {
  $conn = new PDO("mysql:host=$servername", $username, $password);  $conn-
>setAttribute(PDO::ATTR_ERRMODE, PDO::ERRMODE_EXCEPTION);
  $sql = "CREATE DATABASE myDBPDO";
  // use exec() because no results are returned
  $conn->exec($sql);
  echo "Database created successfully<br>";
} catch(PDOException $e) {
  echo $sql . "<br>" . $e->getMessage();
}
$conn = null;
?>
```

MySQL Create Table

- A database table has its own unique name and consists of columns and rows.

- The CREATE TABLE statement is used to create a table in MySQL.

- We will create a table named "MyGuests", with five columns: "id", "firstname", "lastname", "email" and "reg_date":

```
CREATE TABLE MyGuests (
id INT(6) UNSIGNED AUTO_INCREMENT PRIMARY KEY,
firstname VARCHAR(30) NOT NULL,
lastname VARCHAR(30) NOT NULL,
email VARCHAR(50),
reg_date TIMESTAMP DEFAULT CURRENT_TIMESTAMP
)
```

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MySQL Create Table (Cont.)

- The data type specifies what type of data the column can hold.
- After the data type, you can specify other optional attributes for each column:
  - NOT NULL - Each row must contain a value for that column, null values are not allowed
  - DEFAULT value - Set a default value that is added when no other value is passed
  - UNSIGNED - Used for number types, limits the stored data to positive numbers and zero
  - AUTO INCREMENT - MySQL automatically increases the value of the field by 1 each time a new record is added
  - PRIMARY KEY - Used to uniquely identify the rows in a table. The column with PRIMARY KEY setting is often an ID number, and is often used with AUTO_INCREMENT

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Questions?

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