Database Design and Query

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Section 1 : Introduction

- What is database ?
- MySQL Overview
- PHP & MySQL
  - Connecting from PHP to MySQL
  - Selecting and Displaying data
  - Inserting, Updating and Deleting data

What is Database ?

- A database is an **“Collection of Data”** that is organized so that it can be easily accessed, managed and updated.
  - It doesn’t have to be MySql or other database management system, it can be just a simple .txt file.

Database Management System (DBMS)

- A **“DBMS”** is software that is designed to model data and provide interaction with a user.
  - Data is normally stored in one or more files
  - Data usually stored in **tables**
  - Table contains **rows** and **columns** much like a **spreadsheet**
  - Data can be cross referenced among tables. This functionality is used in **“Relational Database”** such a MySQL.

Simple Example

- Here is an example of a very simple table inside of a database :

id	productName	price
1	Product 1	10.000
2	Product 2	4.500
3	Product 3	12.350

Database Name : MyStore

Table Name : Product

Column / fields : id, productName, price

Rows / Records : 3 product

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Popular DBMS

- MySQL
- Microsoft SQL Server
- Oracle
- PostgreSQL
- SQLite
- MariaDB
- Etc..

Interacting With a Database

- Same commons functions when working with a database :
  - Create
  - Insert
  - Update
  - Delete
  - Select

What is SQL ?

- **SQL (Structured Query Language)** is a special purpose programming language that allows developers to interact with the data in database
  - **Data Definition** and **data manipulation** language
  - Perform **CRUD (Create, Read, Update, Delete)**

MySQL Overview

- **MySQL** is a popular open source relational database management, that is powerful, reliable and scalable
- **MySQL** can be integrated into web applications written in multiple languages

MySQL Features

- Complete foreign key support
- Triggers
- Stored Procedures
- Full text indexing and searching
- Query caching
- Replication
- Security
- Seamless integrated with PHP and other languages

Applications that use MySQL

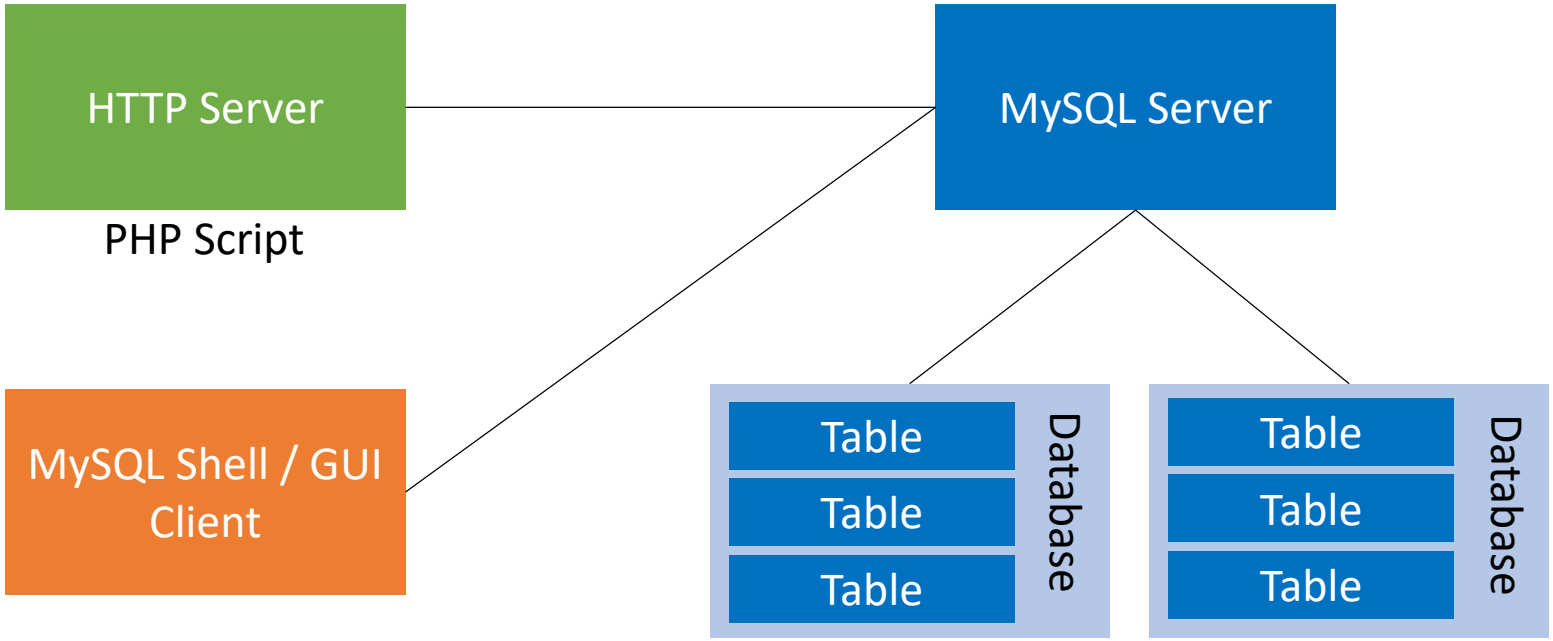
- MySQL is used in many popular open source applications
  - Joomla
  - Wordpress
  - Drupal
  - Etc ...

Client / Server Architecture

MySQL uses a client / server model with 3 general program categories :

1. **The Server – mysqld** is the program that manages the database and tables. It is the only program that touches the actual database.
2. **Clients –** A client is a program that you can use to communicate with the MySQL server (mysqld). There are many to choose from both **GUI** and **command line** format.
3. **Utilities –** Usually used for special purpose. An example is **mysqld_safe** which starts up and monitors the server

Client / Server Diagram



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PHP and MySQL

- One of the main reasons the businesses choose PHP / MySQL Application Development is its simplicity and ease of use.
- In this section, we will find out how to connect PHP to MySQL.

Connecting PHP to MySQL

```php
// Declare variable
$db_host = 'localhost';
$db_user = 'root';
$db_pass = '';
$db_name = 'mystore';

// Create mysqli Object
$mysqli = new mysqli($db_host, $db_user, $db_pass, $db_name);
if (mysqli_connect_error()) {
    echo "Error : ", mysqli_connect_error();
    die();
}
else{
    echo "Success !!"
}
```

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Selecting and Displaying Data

```
if (mysqli_connect_error()) {
    echo “Error : ”, mysqli_connect_error();
    die();
}
else{
    $query = "Select * from product";
    $result = $mysqli->query($query) or die($mysqli->error.__Line__);

    while ($row = $result->fetch_assoc()) {
       echo "Product Name : ", $row['productName'], '<br />';
    }
}
```

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Inserting Data

```
if (mysqli_connect_error()) {
    echo "Error : ", mysqli_connect_error();
    die();
}
else{
    $productName = "";
    $price = 20500;
    $query = "insert into product(productName, price)
              values ('$productName','$price')";
    $mysqli->query($query) or die($mysqli->error.__Line__);
}
```

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Updating Data

```
if (mysqli_connect_error()) {
    echo "Error : ", mysqli_connect_error();
    die();
}
else{
    $id = 1;
    $price = 100;
    $query = "update product set price = '$price' where id = '$id'";
    $mysqli->query($query) or die($mysqli->error.__Line__);
}
```

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Deleting Data

```
if (mysqli_connect_error()) {
    echo "Error : ", mysqli_connect_error();
    die();
}
else{
    $id = 1;
    $query = "delete from product where id = '$id'";
    $mysqli->query($query) or die($mysqli->error.__Line__);
}
```

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