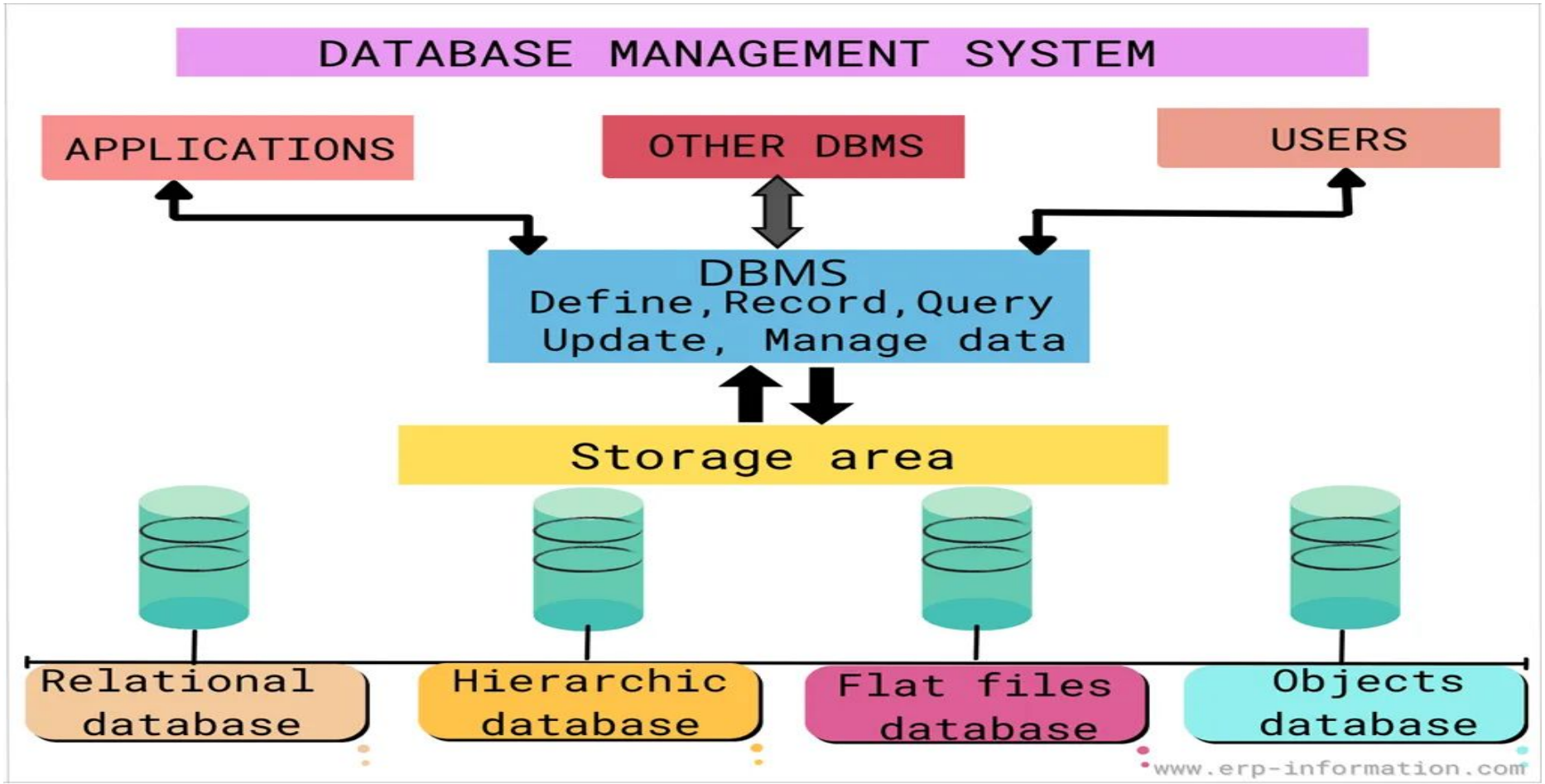
Database connectivity with mysql

DBMS

- DBMS- DataBase Management System
- It refers to the technology of storing and retrieving usersí data with utmost efficiency along with appropriate security measures.

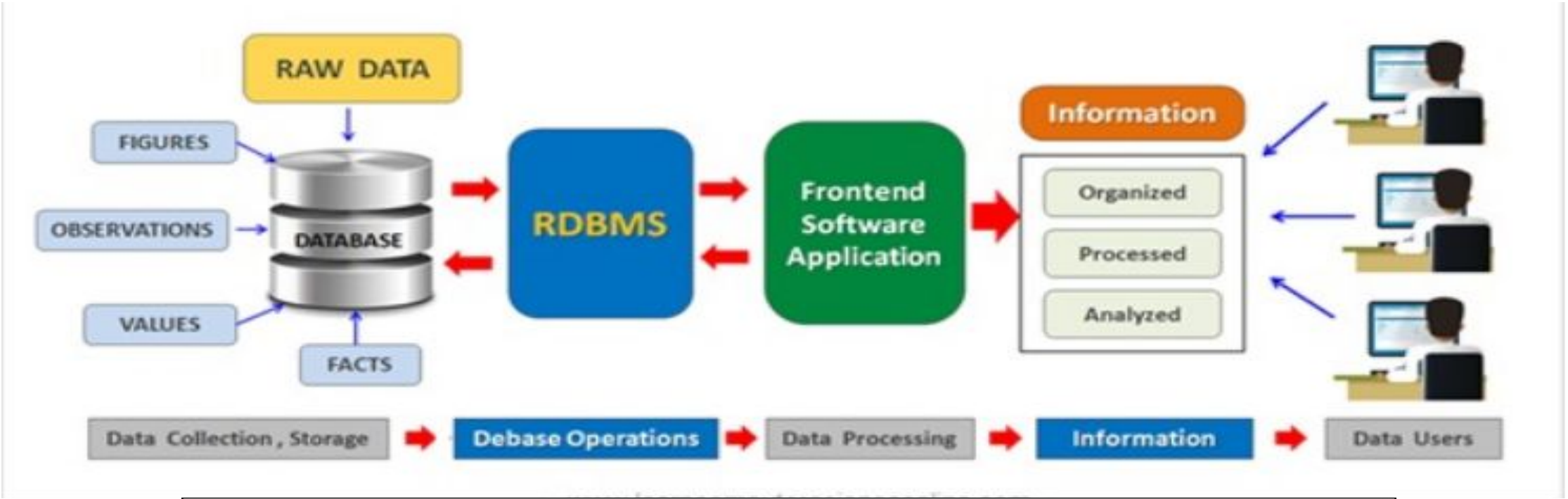


Difference between DBMS and SQL

Database management system (DBMS)	Structured Query Language (SQL)
1. It is used to manage the database. For example:- MYSQL, oracle.	1. It is a query language not a database.
2. It performs various operation like database creation, storing data, updating data.	2. It performs various operation on a database like creation, deletion and modification.
3. It provides security to the database.	3. It is designed for managing data in RDMS (Relational database management system)
4. It contains automatic backup and database recovery.	4. It allows the user to create a view stored procedure function in database.
5. It can control data redundancy (i.e. it stores all the data in one single database file.)	5. It helps in creating, updating , deleting data from the database.
6. It can reduce complex relationship between data	6. It consists of different types of SQL languages

RDBMS

- RDBMS – Relational DataBase System
- A relational database management system (RDBMS) is a collection of programs and capabilities that enable IT teams and others to create, update, administer and otherwise interact with a relational database.
- RDBMSes store data in the form of tables, with most commercial relational database management systems using Structured Query Language (SQL) to access the database.
- However, since SQL was invented after the initial development of the relational model, it is not necessary for RDBMS use.


RAW DATA
FIGURES
OBSERVATIONS
VALUES
FACTS
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Frontend Software Application
Information
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Data Collection , Storage
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Data Processing
Information
Data Users

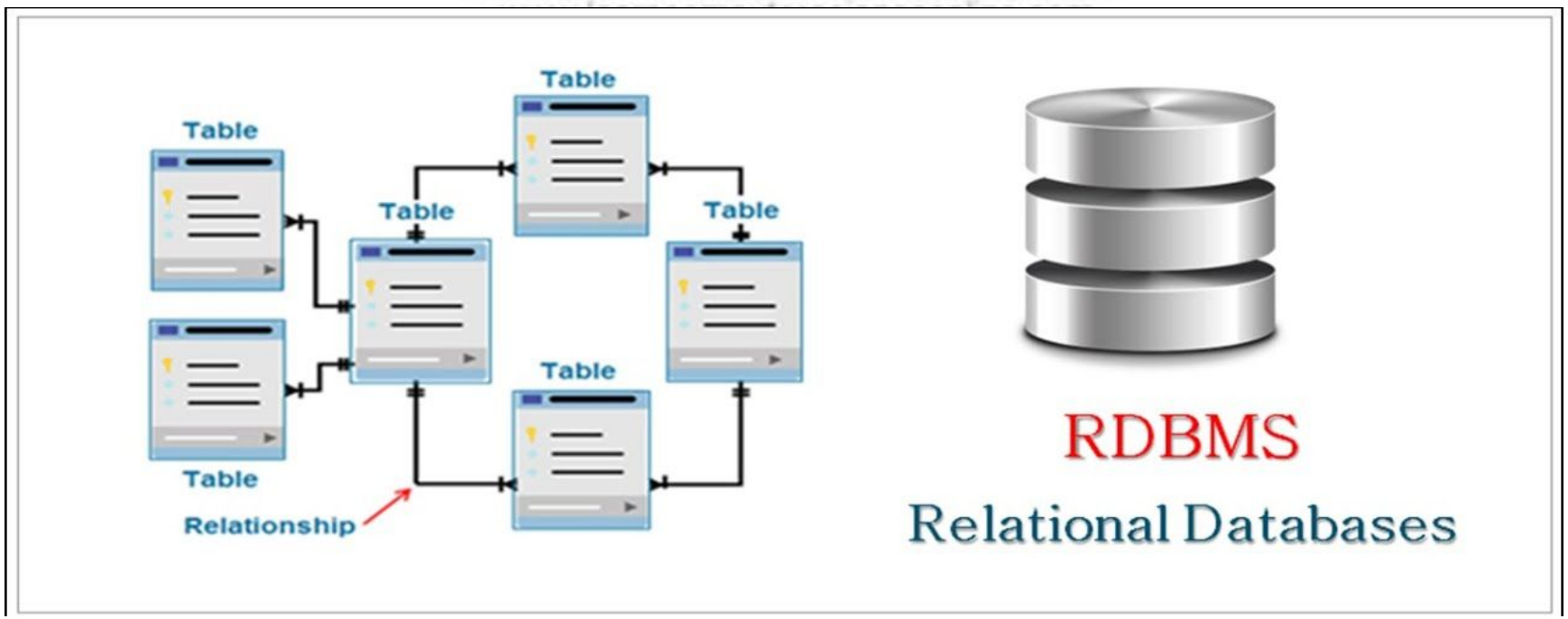


Table
Table
Table
Table
Table
Table
Relationship
RDBMS
Relational Databases

DBMS v/s RDBMS

No.	DBMS	RDBMS
1)	DBMS applications store **data as file**.	RDBMS applications store **data in a tabular form**.
2)	In DBMS, data is generally stored in either a hierarchical form or a navigational form.	In RDBMS, the tables have an identifier called primary key and the data values are stored in the form of tables.
3)	**Normalization is not** present in DBMS.	**Normalization is** present in RDBMS.
4)	DBMS does **not apply any security** with regards to data manipulation.	RDBMS **defines the integrity constraint** for the purpose of ACID (Atomocity, Consistency, Isolation and Durability) property.
5)	DBMS uses file system to store data, so there will be **no relation between the tables**.	in RDBMS, data values are stored in the form of tables, so a **relationship** between these data values will be stored in the form of a table as well.
6)	DBMS has to provide some uniform methods to access the stored information.	RDBMS system supports a tabular structure of the data and a relationship between them to access the stored information.
7)	DBMS **does not support distributed database**.	RDBMS **supports distributed database**.
8)	DBMS is meant to be for small organization and **deal with small data**. it supports **single user**.	RDBMS is designed to **handle large amount of data**. it supports **multiple users**.
9)	Examples of DBMS are file systems, **xml** etc.	Example of RDBMS are **mysql**, **postgre**, **sql server**, **oracle** etc.

Mysql database

- 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
- MySQL is named after co-founder Monty Widenius's daughter: My

- 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.
- Databases are useful for storing information categorically.
- Example

A company may have a database with the following tables:

I. Employees
II. Products
III. Customers
IV. Orders

Connection with mysql database

- Opening a Database Connection PHP provides mysql_connect function to open a database connection.
- This function takes five parameters and returns a MySQL link identifier on success, or FALSE on failure.

- Syntax

connection mysql_connect(server,user,passwd,new_link,client_flag)

server

- Optional − The host name running database server. If not specified, then default value is localhost:3306.

user

- Optional − The username accessing the database. If not specified, then default is the name of the user that owns the server process.

passwd

- Optional − The password of the user accessing the database. If not specified then default is an empty password.

new_link

- Optional − If a second call is made to mysql_connect() with the same arguments, no new connection will be established; instead, the identifier of the already opened connection will be returned.

client_flags

- Optional − A combination of the following constants −
- MYSQL_CLIENT_SSL − Use SSL encryption
- MYSQL_CLIENT_COMPRESS − Use compression protocol
- MYSQL_CLIENT_IGNORE_SPACE − Allow space after function names
- MYSQL_CLIENT_INTERACTIVE − Allow interactive timeout seconds of inactivity before closing the connection

- NOTE − You can specify server, user, passwd in php.ini file instead of using them again and again in your every PHP scripts. Check php.ini fileconfiguration.

Closing Database Connection

- Its simplest function mysql_close PHP provides to close a database connection.
- This function takes connection resource returned by mysql_connect function.
- It returns TRUE on success or FALSE on failure.

- Syntax

bool mysql_close (resource $link_identifier);

- If a resource is not specified, then the last opened database is closed.

Example

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

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

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

Creating database

- To create and delete a database, you should have admin privilege. It’s very easy to create a new MySQL database.
- PHP uses mysql_query function to create a MySQL database.
- This function takes two parameters and returns TRUE on success or FALSE on failure.

- Syntax

bool mysql_query(sql, connection);

sql

- Required - SQL query to create a database

connection

- Optional - if not specified, then the last opened connection by mysql_connect will be used.

Example

```
<?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);
}

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

$conn->close();
?>
```

Selecting database

- Once you establish a connection with a database server, then it is required to select a particular database with which all your tables are associated.
- This is required because there may be multiple databases residing on a single server and you can do work with a single database at a time.
- PHP provides function mysql_select_db to select a database.
- It returns TRUE on success or FALSE on failure.
- Syntax

bool mysql_select_db(db_name, connection)

db_name

- Required - Database name to be selected

connection

- Optional - if not specified, then the last opened connection by mysql_connect will be used.

Example

```
<?php
 $dbhost = 'localhost:3036';
 $dbuser = ‘username';
 $dbpass = ‘password';
 $conn = mysql_connect($dbhost, $dbuser, $dbpass);
if(! $conn ) {
die('Could not connect: ' . mysql_error());
 }
  echo 'Connected successfully';

 mysql_select_db( 'test_db' );
 mysql_close($conn);

?>
```

Create table

- To create tables in the new database, you need to do the same thing as creating the database.
- First create the SQL query to create the tables, then execute the query using mysql_query() function.
- For example

```
CREATE TABLE employee (
id INT(6) UNSIGNED AUTO_INCREMENT,
firstname VARCHAR(30) NOT NULL,
lastname VARCHAR(30) NOT NULL,
email VARCHAR(50)
)
```

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

Each table should have a primary key column (in this case: the "id" column). Its value must be unique for each record in the table.

Insert data into database

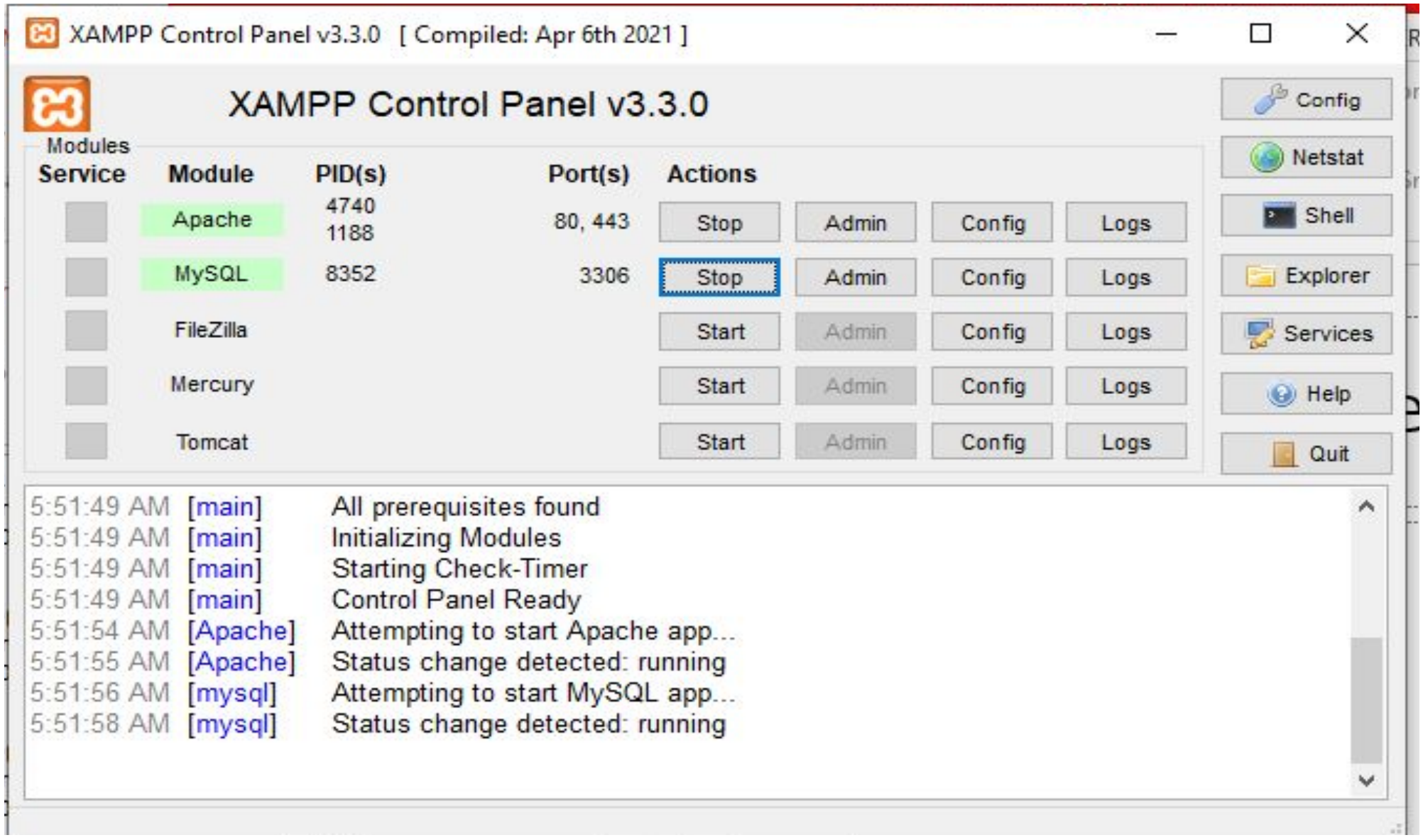
- After a database and a table have been created, we can start adding data in them.
- Here are some syntax rules to follow:
- The SQL query must be quoted in PHP
- String values inside the SQL query must be quoted
- Numeric values must not be quoted
- The word NULL must not be quoted
- The INSERT INTO statement is used to add new records to a MySQL table:

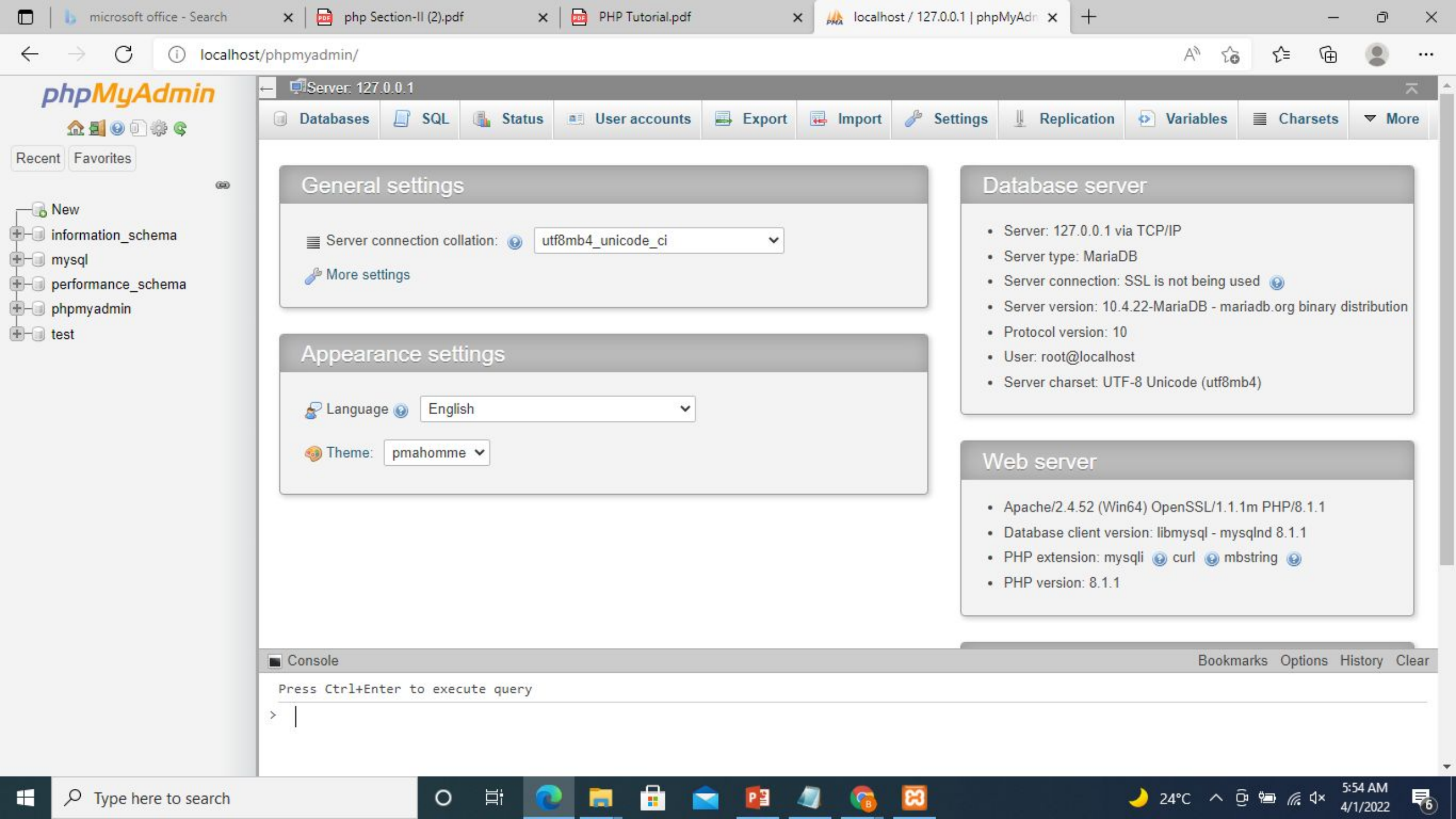
```
INSERT INTO table_name (column1, column2, column3,...)
VALUES (value1, value2, value3,...)
```

- If a column is AUTO_INCREMENT (like the "id" column) or TIMESTAMP with default update of current_timesamp (like the "reg_date" column), it is no need to be specified in the SQL query; MySQL will automatically add the value.

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

// Create connection
$conn = new mysqli($servername, $username, $password, $dbname);
// Check connection
if ($conn->connect_error) {
  die("Connection failed: " . $conn->connect_error);
}
$sql = "INSERT INTO employee (firstname, lastname, email)
VALUES ('John', 'Doe', 'john@example.com')";
if ($conn->query($sql) === TRUE) {
  echo "New record created successfully";
} else {
  echo "Error: " . $sql . "<br>" . $conn->error;
}
$conn->close();
?>
```


XAMPP Control Panel v3.3.0 [Compiled: Apr 6th 2021]
XAMPP Control Panel v3.3.0
Modules
Service
Module
PID(s)
Port(s)
Actions
Apache
4740
1188
80, 443
Stop
Admin
Config
Logs
MySQL
8352
3306
Stop
Admin
Config
Logs
FileZilla
Start
Admin
Config
Logs
Mercury
Start
Admin
Config
Logs
Tomcat
Start
Admin
Config
Logs
Config
Netstat
Shell
Explorer
Services
Help
Quit
5:51:49 AM [main] All prerequisites found
5:51:49 AM [main] Initializing Modules
5:51:49 AM [main] Starting Check-Timer
5:51:49 AM [main] Control Panel Ready
5:51:54 AM [Apache] Attempting to start Apache app...
5:51:55 AM [Apache] Status change detected: running
5:51:56 AM [mysql] Attempting to start MySQL app...
5:51:58 AM [mysql] Status change detected: running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Server: 127.0.0.1
Databases
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Replication
Variables
Charsets
More
General settings
Server connection collation:
utf8mb4_unicode_ci
More settings
Appearance settings
Language
English
Theme:
pmahomme
Database server
Server: 127.0.0.1 via TCP/IP
Server type: MariaDB
Server connection: SSL is not being used
Server version: 10.4.22-MariaDB - mariadb.org binary distribution
Protocol version: 10
User: root@localhost
Server charset: UTF-8 Unicode (utf8mb4)
Web server
Apache/2.4.52 (Win64) OpenSSL/1.1.1m PHP/8.1.1
Database client version: libmysql - mysqlnd 8.1.1
PHP extension: mysqli curl mbstring
PHP version: 8.1.1
Console
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Clear
Press Ctrl+Enter to execute query
Type here to search
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localhost/phpmyadmin/index.php?route=/database/structure&server=1&db=mydb

phpMyAdmin

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Server: 127.0.0.1 » Database: mydb

Structure | SQL | Search | Query | Export | Import | Operations | Privileges | Routines | Events | Triggers | More

No tables found in database.

Create table

Name: Number of columns: 4

Go

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Press Ctrl+Enter to execute query

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phpMyAdmin

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- mydb
- mysql
- performance_schema
- phpmyadmin
- test

Server: 127.0.0.1 » Database: mydb » Table: employee

Browse | Structure | SQL | Search | Insert | Export | Import | Privileges | Operations | Tracking | Triggers

Table name: employee Add 1 column(s) Go

Name	Type	Length/Values	Default	Collation	Attributes	Null	Index
Pick from Central Columns	INT		None				---
Pick from Central Columns	INT		None				---
Pick from Central Columns	INT		None				---
Pick from Central Columns	INT		None				---

Structure

Table comments: Collation: Storage Engine: InnoDB

Console Bookmarks Options History Clear

Press Ctrl+Enter to execute query

>

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phpMyAdmin

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- mysql
- performance_schema
- phpmyadmin
- test

Server: 127.0.0.1 » Database: mydb » Table: employee

Browse | Structure | SQL | Search | Insert | Export | Import | Privileges | Operations | Tracking | Triggers

Table name: employee Add 1 column(s) Go

Name	Type	Length/Values	Default	Collation	Attributes	Null	Index
id (Pick from Central Columns)	INT	6	CURRENT_TIME		UNSIGNED		PRIMARY (PRIMARY)
firstname (Pick from Central Columns)	VARCHAR	30	None				---
lastname (Pick from Central Columns)	VARCHAR	30	None				---
email (Pick from Central Columns)	VARCHAR	50	None				---

Structure

Table comments: Collation: Storage Engine: InnoDB

Console Bookmarks Options History Clear

Press Ctrl+Enter to execute query

>

phpMyAdmin

Recent Favorites

- New
- information_schema
- mydb
  - New
  - employee
- mysql
- performance_schema
- phpmyadmin
- test

Server: 127.0.0.1 » Database: mydb » Table: employee

Browse | Structure | SQL | Search | Insert | Export | Import | Privileges | Operations | Tracking | Triggers

Table structure | Relation view

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	id	int(6)		UNSIGNED	No	current_timestamp()			Change Drop More
2	firstname	varchar(30)	utf8mb4_general_ci		No	None			Change Drop More
3	lastname	varchar(30)	utf8mb4_general_ci		No	None			Change Drop More
4	email	varchar(50)	utf8mb4_general_ci		No	None			Change Drop More

Check all With selected: Browse Change Drop Primary Unique Index Spatial Fulltext

Add to central columns Remove from central columns

Print Propose table structure Track table Move columns Normalize

Add 1 column(s) after email Go

Indexes

Action	Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
Edit Rename Drop	PRIMARY	BTREE	Yes	No	id	0	A	No	

Console Bookmarks Options History Clear

```
Press Ctrl+Enter to execute query
>CREATE TABLE `mydb`.`employee` ( `id` INT(6) UNSIGNED NOT NULL DEFAULT CURRENT_TIMESTAMP , `firstname` VARCHAR(30) NOT NULL , `lastname` VARCHAR(30)…
>
```

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

  // Create connection
  $conn = new mysqli($servername, $username, $password, $dbname);
  // Check connection
  if ($conn->connect_error) {
    die("Connection failed: " . $conn->connect_error);
  }

  $sql = "INSERT INTO MyGuests (firstname, lastname, email)
  VALUES ('John', 'Doe', 'john@example.com')";

  if ($conn->query($sql) === TRUE) {
    echo "New record created successfully";
  } else {
    echo "Error: " . $sql . "<br>" . $conn->error;
  }

  $conn->close();
  ?>
  ```
  ```

Insert data through form

```
<!DOCTYPE html>
<html>
<head>
   <title>GFG- Store Data</title>
</head>
 <body>
   <center>
      <h1>Storing Form data in Database</h1>
       <form action="insert.php" method="post">
          <p>
            <label for="firstName">First Name:</label>
            <input type="text" name="first_name" id="firstName">
         </p>
<p>
            <label for="lastName">Last Name:</label>
            <input type="text" name="last_name" id="lastName">
         </p>
<p>
<label for="emailAddress">Email Address:</label>
  <input type="text" name="email" id="emailAddress">
     </p>
<input type="submit" value="Submit">
      </form>
   </center>
</body>
 </html>
```

Insert.php

```
<?php

    // servername => localhost
    // username => root
    // password => empty
    // database name => myDB
    $conn = mysqli_connect("localhost", "root", "", “myDB");

    // Check connection
    if($conn === false){
        die("ERROR: Could not connect. "
            . mysqli_connect_error());
    }
```

```
// Taking all 5 values from the form data(input)
      $first_name =  $_REQUEST['first_name'];
      $last_name = $_REQUEST['last_name'];
      $email = $_REQUEST['email'];
      // Performing insert query execution
      // here our table name is employee
      $sql = "INSERT INTO employee  VALUES ('$first_name',  '$last_name‘ ,'$email')";
              if(mysqli_query($conn, $sql)){
         echo "<h3>data stored in a database successfully."
            . " Please browse your localhost php my admin"
            . " to view the updated data</h3>";
          echo nl2br("\n$first_name\n $last_name\n  $email");
      } else{
         echo "ERROR: Hush! Sorry $sql. "
            . mysqli_error($conn);
      }
      // Close connection
      mysqli_close($conn);
      ?>
```