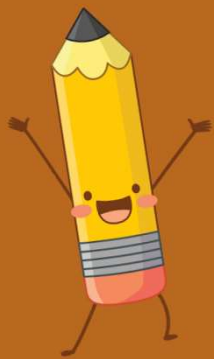


BIG DATA TOOLS FOR MANAGERS (N2MBA07)

Unit -1 : Overview of Database, SQL and MySQL

Database

?



Database

A database is an organized collection of structured information or data, typically stored electronically in a computer system.

Database

A database is an organized collection of structured information or data, typically stored electronically in a computer system.

Or

The database is an organized collection of data so that, it can be easy to access and manipulate stored information.

Database



**Unorganized collection
of data**

Database



**Unorganized collection
of data**

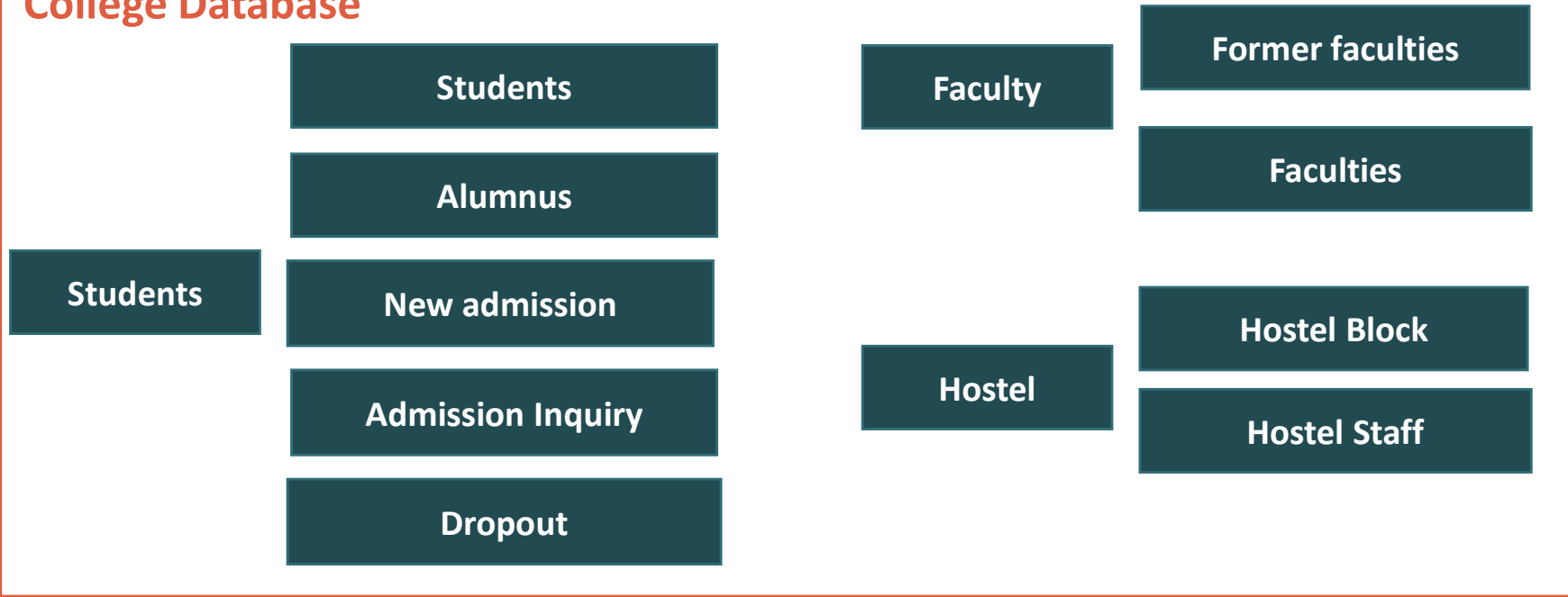


**Organized collection of
data**

Database Example :

- Consider college database organizes the data about the admin, students, libraries, and faculty.
- Using the database, it can be easy to retrieve, insert, and delete information.

College Database



Assume that we have some data how do to manage it ?



Assume that we have some data how do to manage it ?

1. Using File



Assume that we have some data how do to manage it ?

1. Using File
2. Using Database



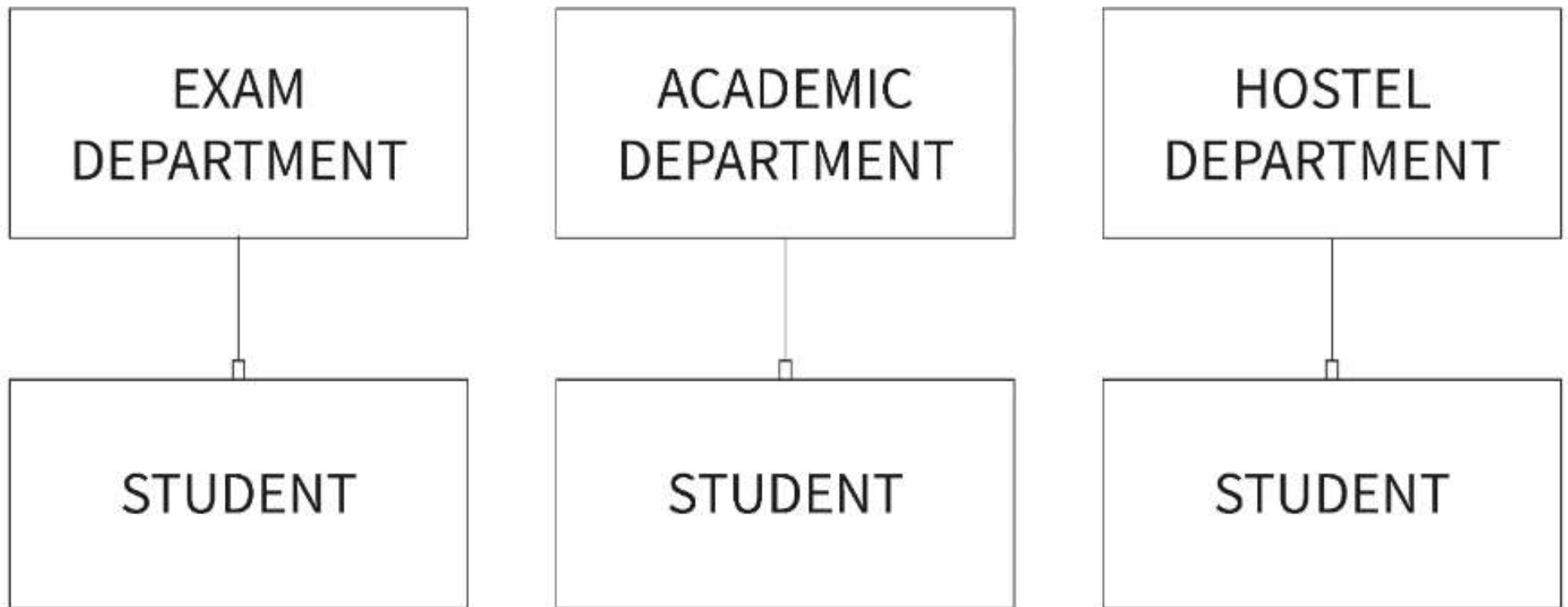
File based approach

File base approach/File Management system used to manage data needed for a specific use case or application.

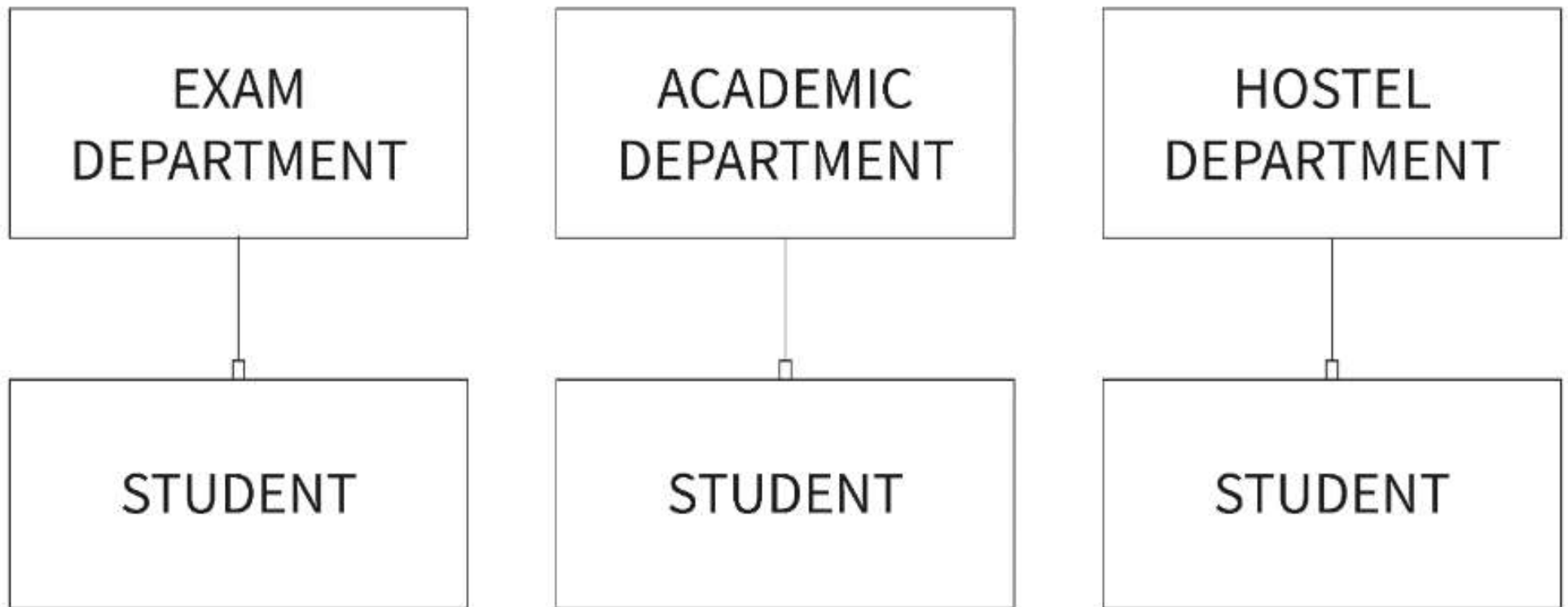
Each user stores separate data for the application even if the same data stored by another user.

- Like College, there are multiple department such as admin, hostel, library, exam each departments are maintaining student details separately
- If there are 100 students and 5 departments then will be storing $5 \times 100 = 500$ records but storing details in 5 different places.

File Based Approach



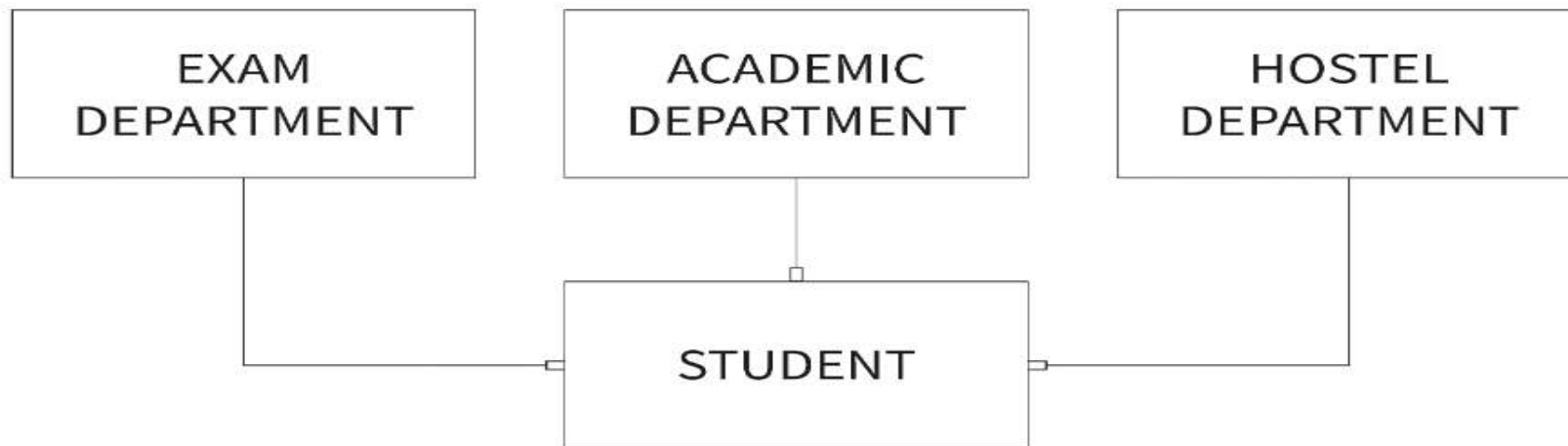
File Based Approach



****Major drawback of the file-based approach is that containing repetition of data and wastage of resources.**

Database Approach

A database is used for storing and maintaining the data where data defined once and stored in single location, it available for multiple users or departments.



A graphic of a spiral-bound notebook with a white page and an orange cover. The spiral binding is at the top. The text is written on the page.

Characteristics of Database approach

- Self-Describing Nature of a Database System

A graphic of a spiral-bound notebook with a white page and an orange cover. The spiral binding is at the top. The title 'Characteristics of Database approach' is written in black text, underlined with a wavy line. Below the title is a bulleted list of two items.

Characteristics of Database approach

- Self-Describing Nature of a Database System
- Insulation between Programs and Data, Data Abstraction and Multi-user Transaction Processing

A graphic of a spiral-bound notebook with a white page and an orange cover. The spiral binding is at the top. The title 'Characteristics of Database approach' is written in black text, underlined with a wavy line. Below the title is a bulleted list of three characteristics.

Characteristics of Database approach

- Self-Describing Nature of a Database System
- Insulation between Programs and Data, Data Abstraction and Multi-user Transaction Processing
- Support of Multiple Views of the Data

A graphic of a spiral-bound notebook with a white page and an orange cover. The spiral binding is at the top. The title 'Characteristics of Database approach' is written in black text, underlined with a wavy line. Below the title is a bulleted list of four characteristics.

Characteristics of Database approach

- Self-Describing Nature of a Database System
- Insulation between Programs and Data, Data Abstraction and Multi-user Transaction Processing
- Support of Multiple Views of the Data
- Data Protection

A graphic of a spiral-bound notebook with a white page and an orange cover. The spiral binding is at the top. The title 'Characteristics of Database approach' is written in black text, underlined with a wavy line. Below the title is a bulleted list of five characteristics of a database system.

Characteristics of Database approach

- Self-Describing Nature of a Database System
- Insulation between Programs and Data, Data Abstraction and Multi-user Transaction Processing
- Support of Multiple Views of the Data
- Data Protection
- Supports Query Language to perform database operation effectively.

Characteristics of Database approach

- Self-Describing Nature of a Database System
- Insulation between Programs and Data, Data Abstraction and Multi-user Transaction Processing
- Support of Multiple Views of the Data
- Data Protection
- Supports Query Language to perform database operation effectively.

Database management system

A database management system (DBMS) is a software tool that helps to organize, store and retrieve data from a database.

It involves several functions that collectively work together to ensure that the data is accurate, available and accessible.



DBMS Elements

Database management system consists of three main elements

1. A physical database that contains the data



DBMS Elements

Database management system consists of three main elements

1. A physical database that contains the data
2. A database engine that helps to access the data and modify its contents.



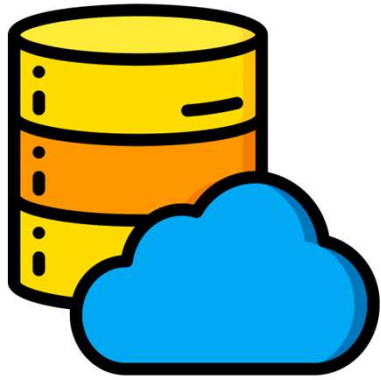
DBMS Elements

Database management system consists of three main elements



1. A physical database that contains the data
2. A database engine that helps to access the data and modify its contents.
3. A database schema which provides the logical structure of the data stored in the database.

Types of Database Management System



1. Relational database management system
2. Distributed database management system
3. Network database management system
4. Object-oriented database management system
5. Hierarchical database management system

Relational Database Management System (RDBMS)

A relational database management system or RDBMS is a database system that stores and fetches data in the form of tables.

Relational Database Management System (RDBMS)

A relational database management system or RDBMS is a database system that stores and fetches data in the form of tables.

How does a Relational database work?



Relational Database Management System (RDBMS)

A relational database management system or RDBMS is a database system that stores and fetches data in the form of tables.

How does a Relational database work?

- ✓ Relational databases use tables to store data about related objects. Each column contains data attributes, whereas each row holds a record of unique data elements.
- ✓ Relational databases or RDBMS are managed using SQL.



RDBMS Software

- MySQL is currently the most popular database management system software used for managing the relational database.
- It is open-source database software, which is supported by Oracle Company.

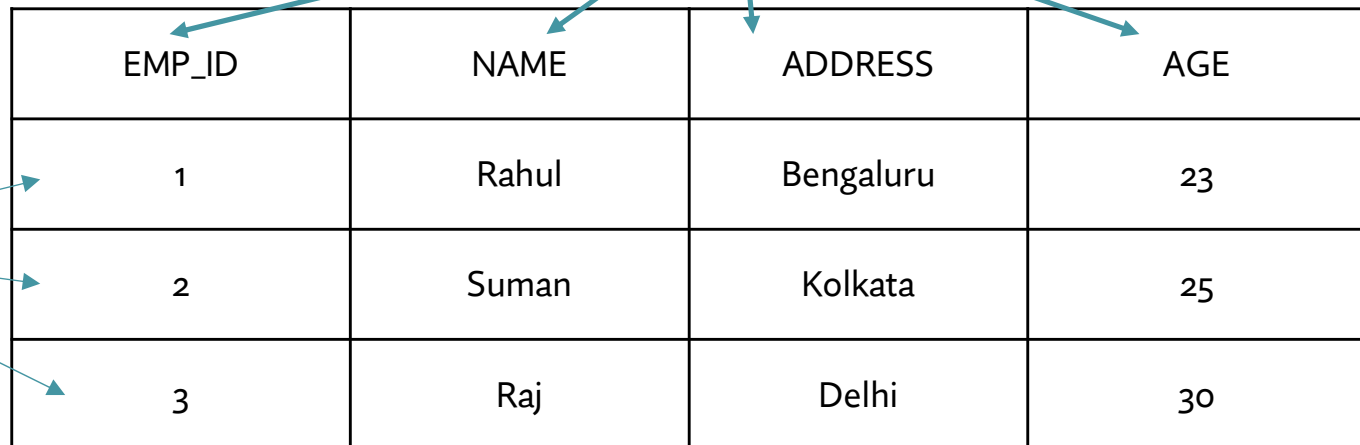


**Other RDBMS Software



In RDBMS terminologies

Columns/Fields/Attributes



EMP_ID	NAME	ADDRESS	AGE
1	Rahul	Bengaluru	23
2	Suman	Kolkata	25
3	Raj	Delhi	30

Records/ Tuples/ Rows

In RDBMS terminologies



Attribute: Attributes are properties that define the relational database. Eg: EMP_ID, NAME etc

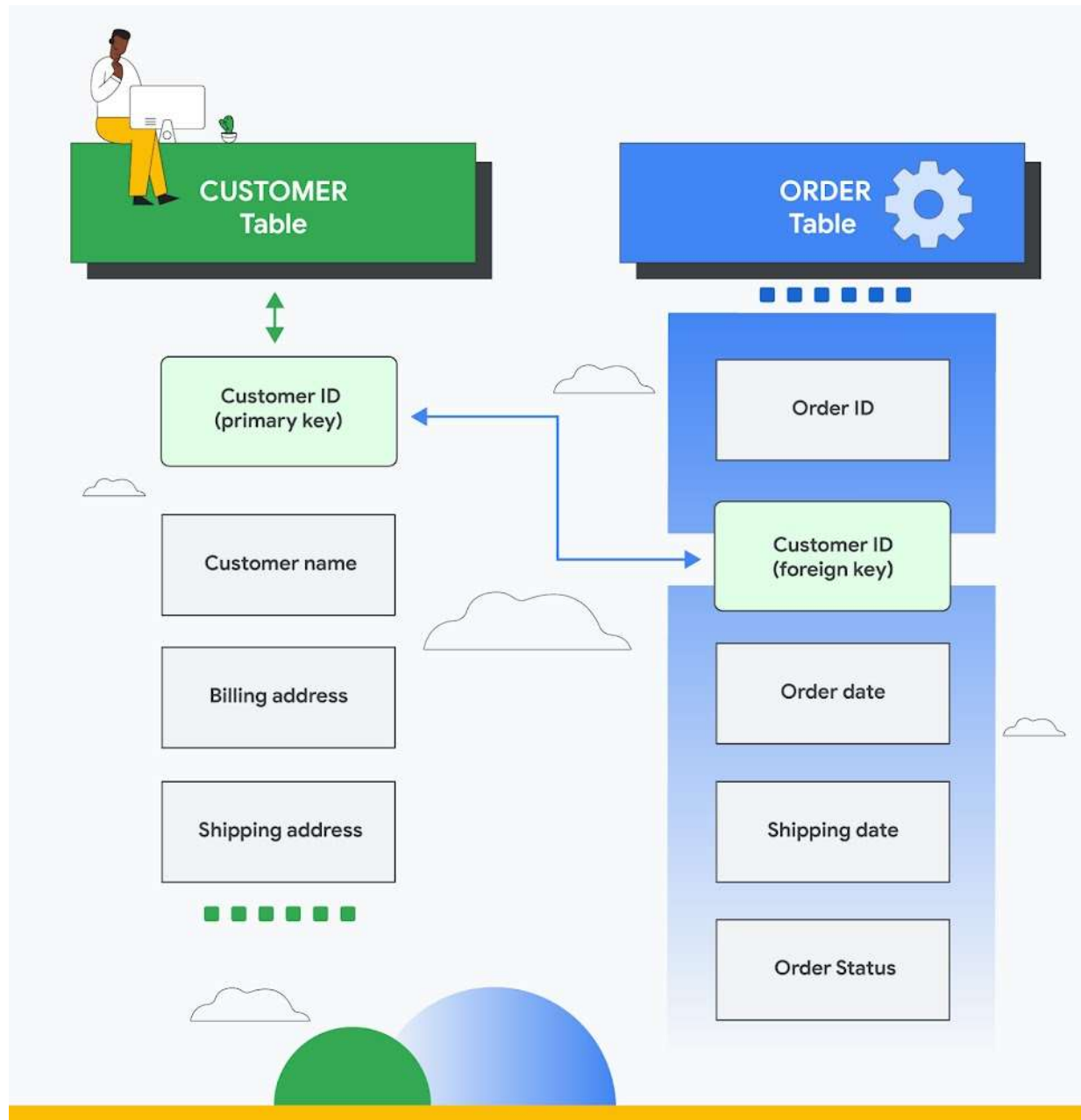
In RDBMS terminologies



Attribute: Attributes are properties that define the relational database. Eg: EMP_ID, NAME etc



Relation Schema: A relational schema defines its relationship with other attributes altogether. E.g., EMPLOYEE (EMP_ID, NAME, ADDRESS, AGE)



In RDBMS terminologies



Attribute: Attributes are properties that define the relational database. Eg: EMP_ID, NAME etc



Relation Schema: A relational schema defines its relationship with other attributes altogether. E.g., EMPLOYEE (EMP_ID, NAME, ADDRESS, AGE)



Degree: Degree is defined by several attributes we have in a relational table. E.g., The degree of the EMPLOYEE table is 4

In RDBMS terminologies



Attribute: Attributes are properties that define the relational database.
Eg: EMP_ID, NAME etc



Relation Schema: A relational schema defines its relationship with other attributes altogether. E.g., EMPLOYEE (EMP_ID, NAME, ADDRESS, AGE)



Degree: Degree is defined by several attributes we have in a relational table. E.g., The degree of the EMPLOYEE table is 4



Cardinality: Cardinality is defined by the number of tuples in a relation.
E.g., The cardinality of the EMPLOYEE table is 3.

In RDBMS terminologies



Attribute: Attributes are properties that define the relational database.
Eg: EMP_ID, NAME etc



Relation Schema: A relational schema defines its relationship with other attributes altogether. E.g., EMPLOYEE (EMP_ID, NAME, ADDRESS, AGE)



Degree: Degree is defined by several attributes we have in a relational table. E.g., The degree of the EMPLOYEE table is 4



Cardinality: Cardinality is defined by the number of tuples in a relation.
E.g., The cardinality of the EMPLOYEE table is 3.



NULL Values: The values or data which are unknown are kept as NULL.

SQL

- SQL is a standard programming language used to operate Relational databases and carry out various operations such as inserting, manipulating, updating, and retrieving data from relational databases.
- SQL is not a database system, but it is a query language.
- SQL is a short-form of the structured query language, and it is pronounced as S-Q-L or sometimes as See-Quell.

SQL

- SQL is a standard programming language used to operate Relational databases and carry out various operations such as inserting, manipulating, updating, and retrieving data from relational databases.
- SQL is not a database system, but it is a query language.
- SQL is a short-form of the structured query language, and it is pronounced as S-Q-L or sometimes as See-Quell.

OR

- **This database language is mainly designed for maintaining the data in relational database management systems.**
- **It is a special tool used by data professionals for handling structured data (data which is stored in the form of tables)**

Features of SQL

- RDBMS only understand SQL command and instruction to perform any kind of operation.
- SQL is used to access data within the relational database.
- SQL is very fast in extracting large amounts of data very efficiently.
- SQL is flexible as it works with multiple database systems from Oracle, IBM, Microsoft, etc.
- SQL helps to manage databases without knowing a lot of coding.

Some SQL Commands

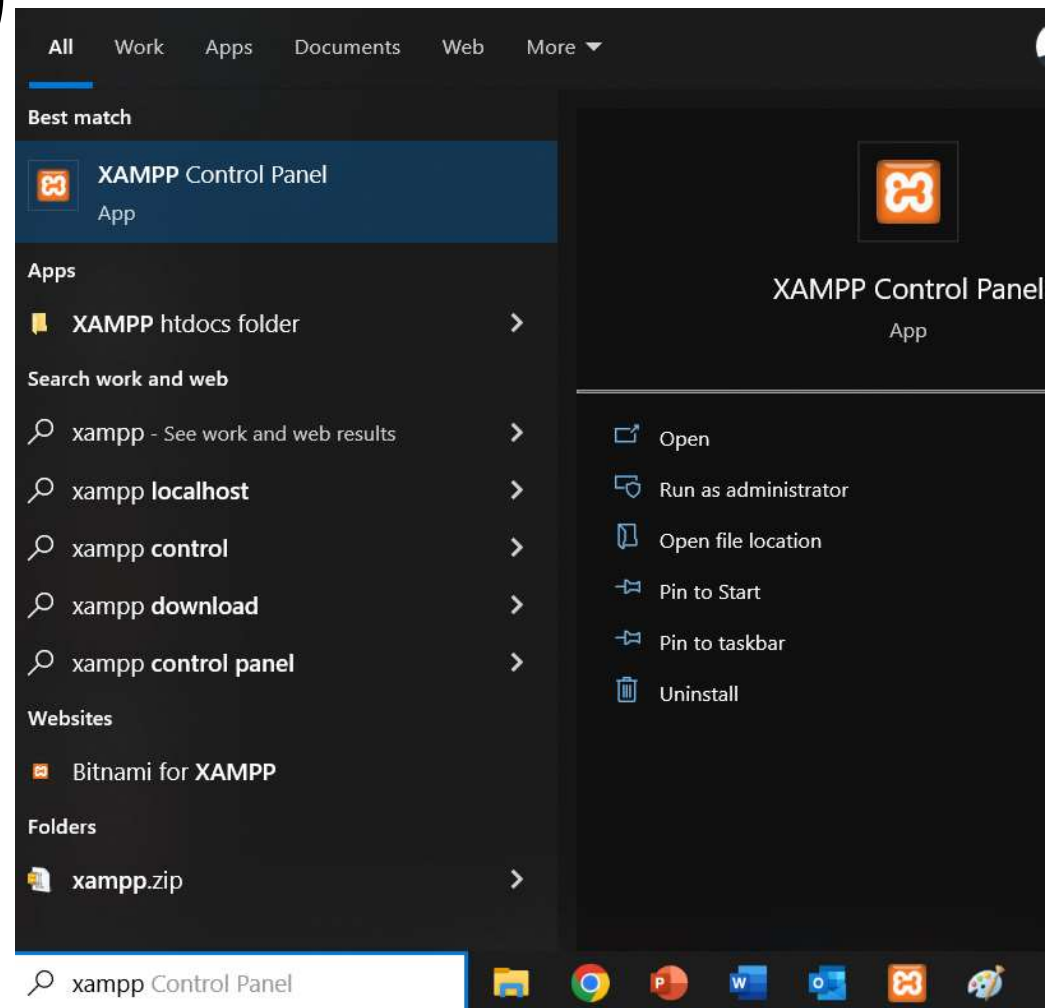
The SQL commands help in creating and managing the database.

The most common SQL commands which are highly used are mentioned below:

- CREATE command
- INSERT command
- SELECT command
- UPDATE command
- DELETE command
- DROP command

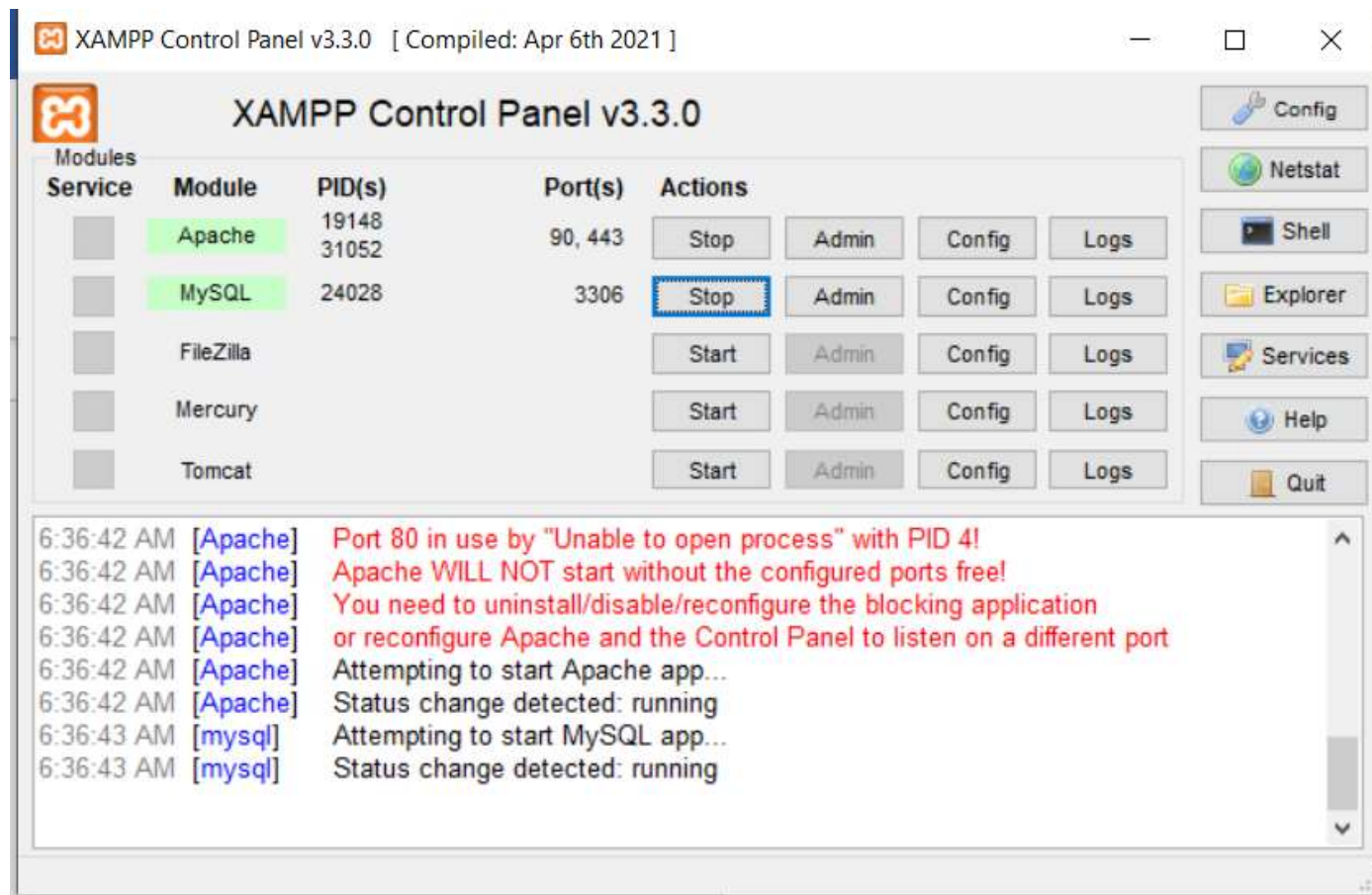
Working with MYSQL (XAMPP phpMyAdmin)

Start XAMPP application
from all programs in
Windows laptop



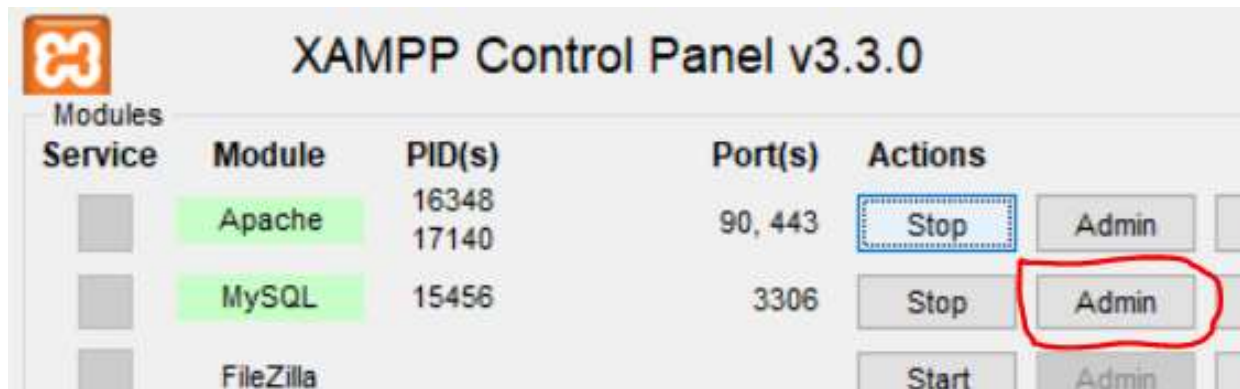
Working with MYSQL (XAMPP phpMyAdmin)

Start **Apache** & **MySQL** services on XAMPP control panel



Working with MYSQL (XAMPP phpMyAdmin)

Start **Apache** & **MySQL** services on XAMPP control panel



Once both services are running click on **Admin** button of **MySQL** services. It will take you on web browser with URL like

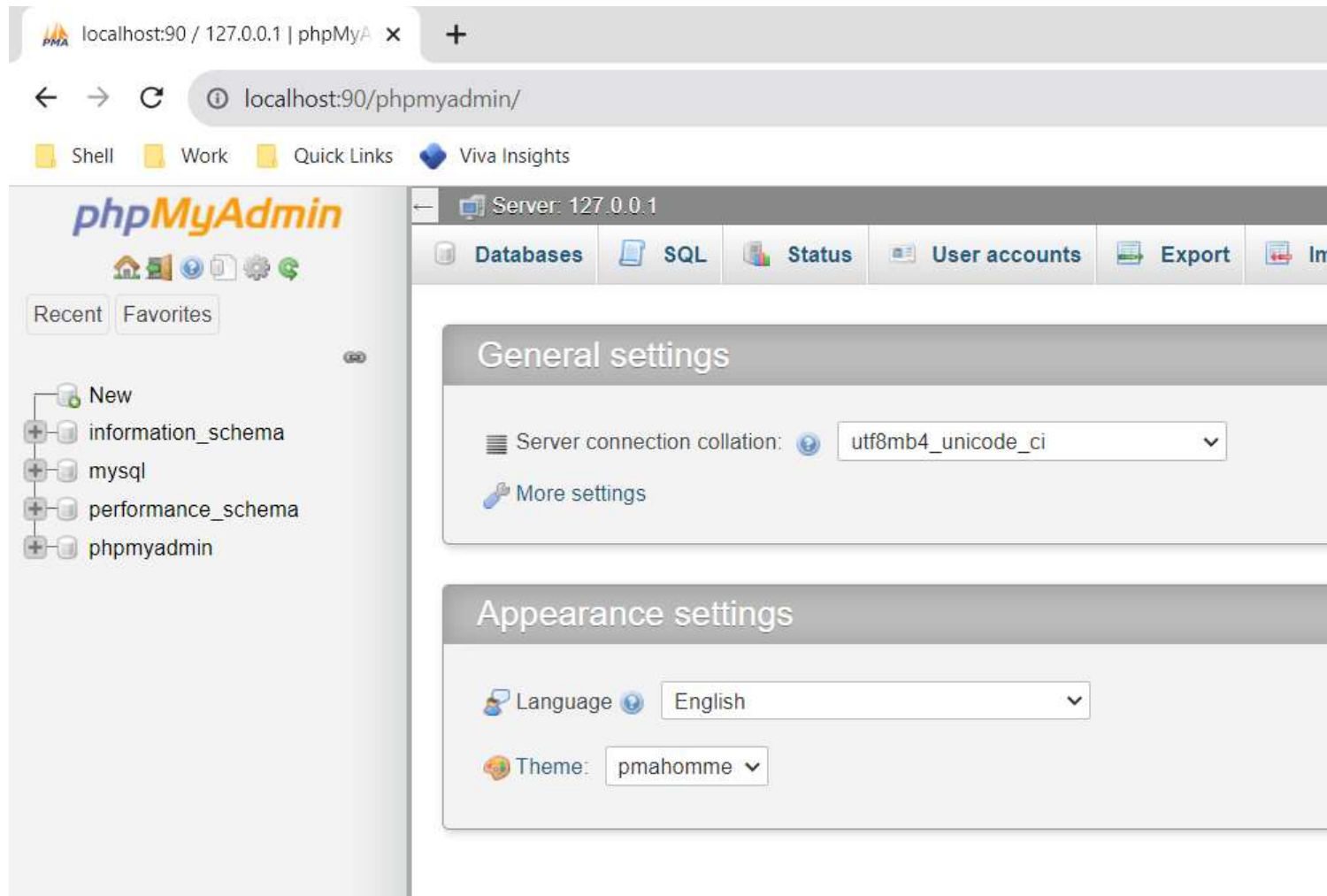
<http://localhost/phpmyadmin>

<http://localhost:8080/phpmyadmin>

<http://localhost:90/phpmyadmin>

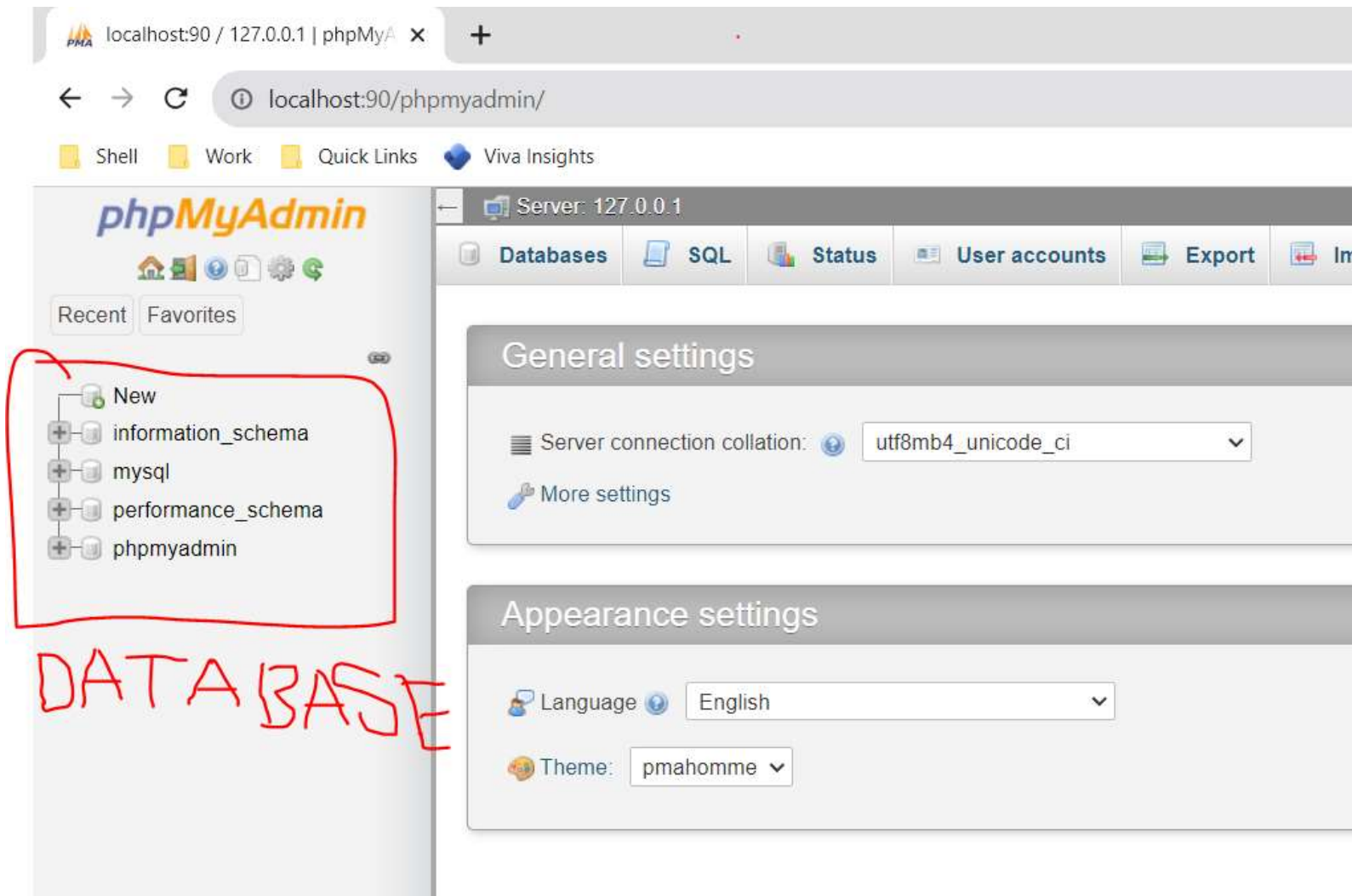
Working with MYSQL (XAMPP phpMyAdmin)

phpMyAdmin home page on web browser



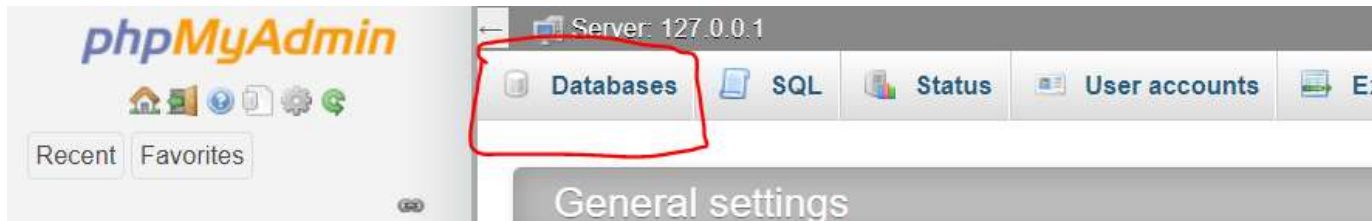
Working with MYSQL (XAMPP phpMyAdmin)

On left panel it contains all the database available on MySQL server.

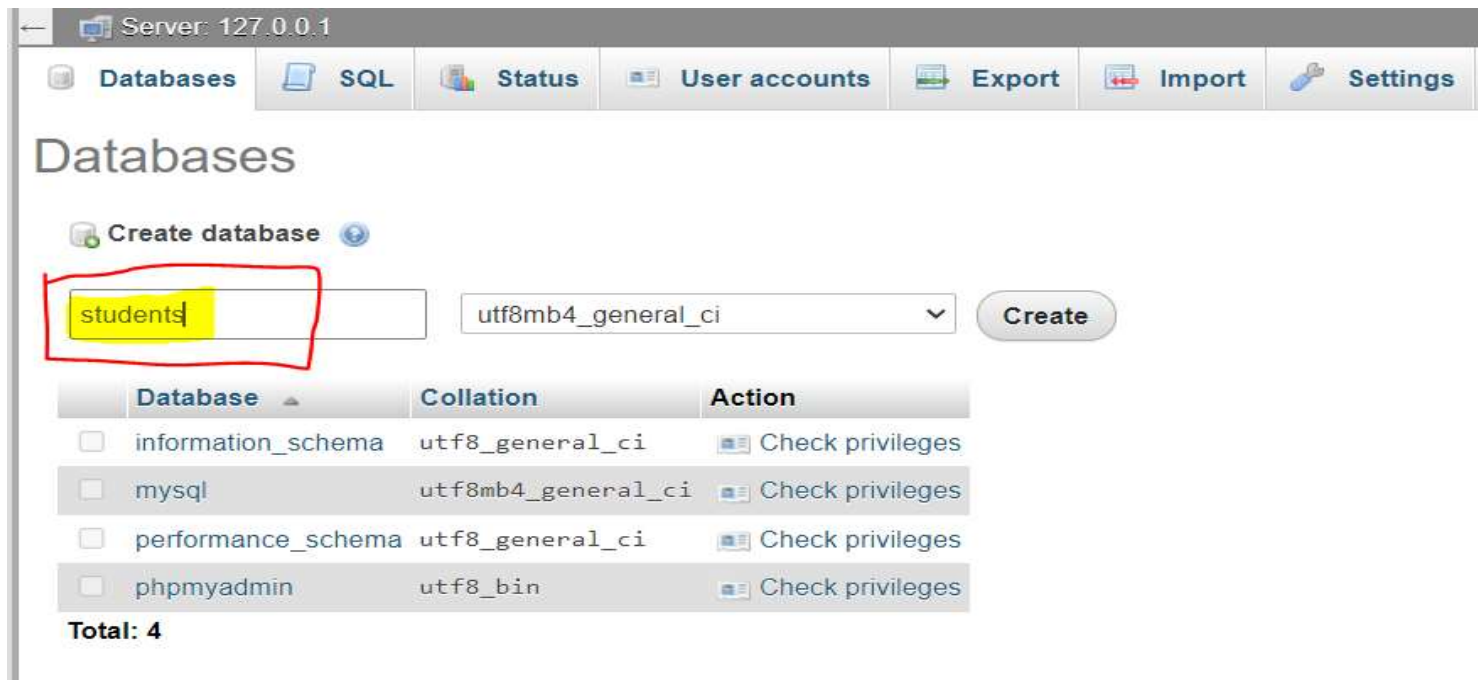


Working with MYSQL (XAMPP phpMyAdmin)

Creation of Database: Click on database on top row of phpMyAdmin



Type database name and click on **Create** button



Working with MYSQL (XAMPP phpMyAdmin)

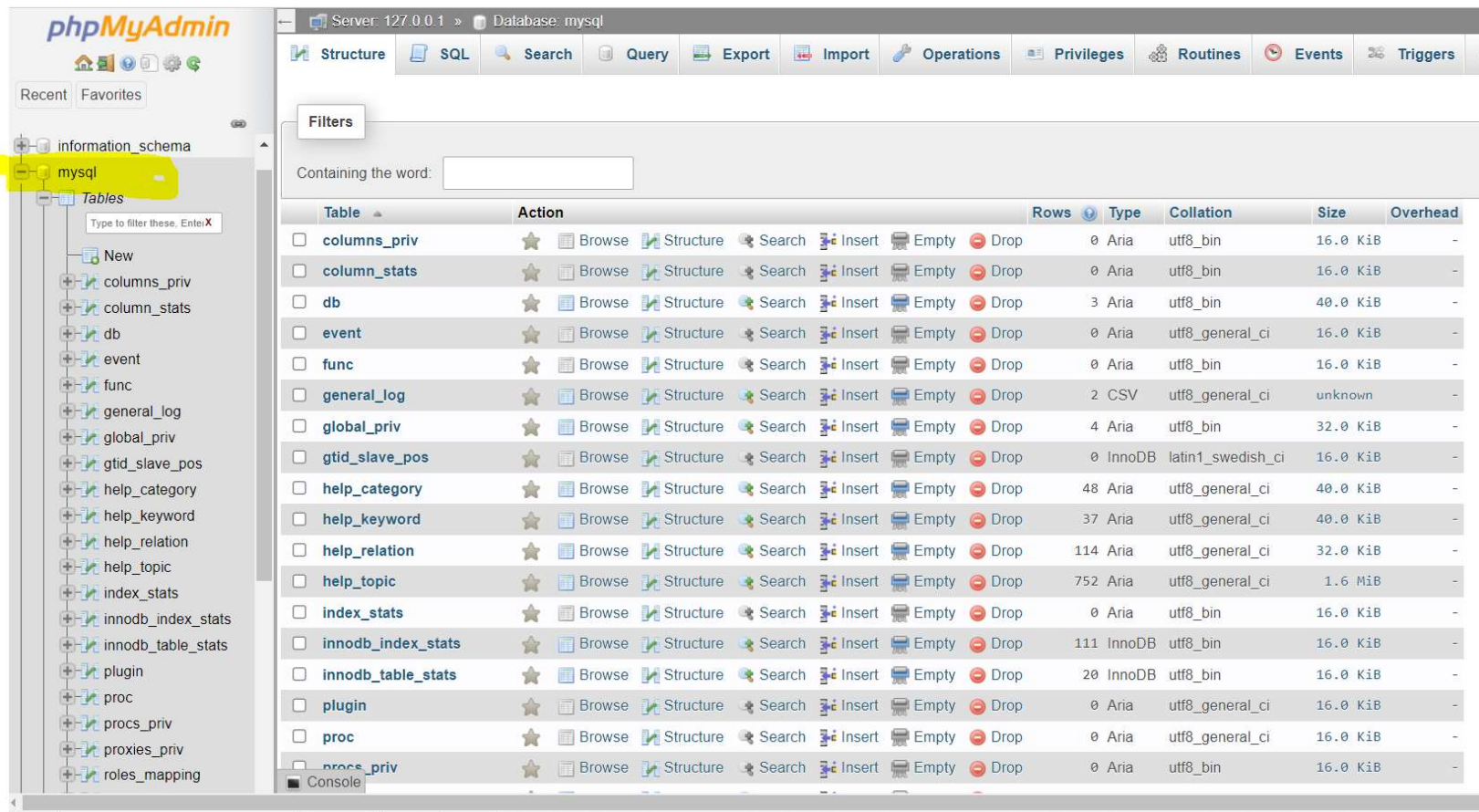
Once database created it will show in left panel windows.



Working with MYSQL (XAMPP phpMyAdmin)

Selecting Databases

Clicking on database name it will get selected for data manipulation, and display lists of tables available in selected database.



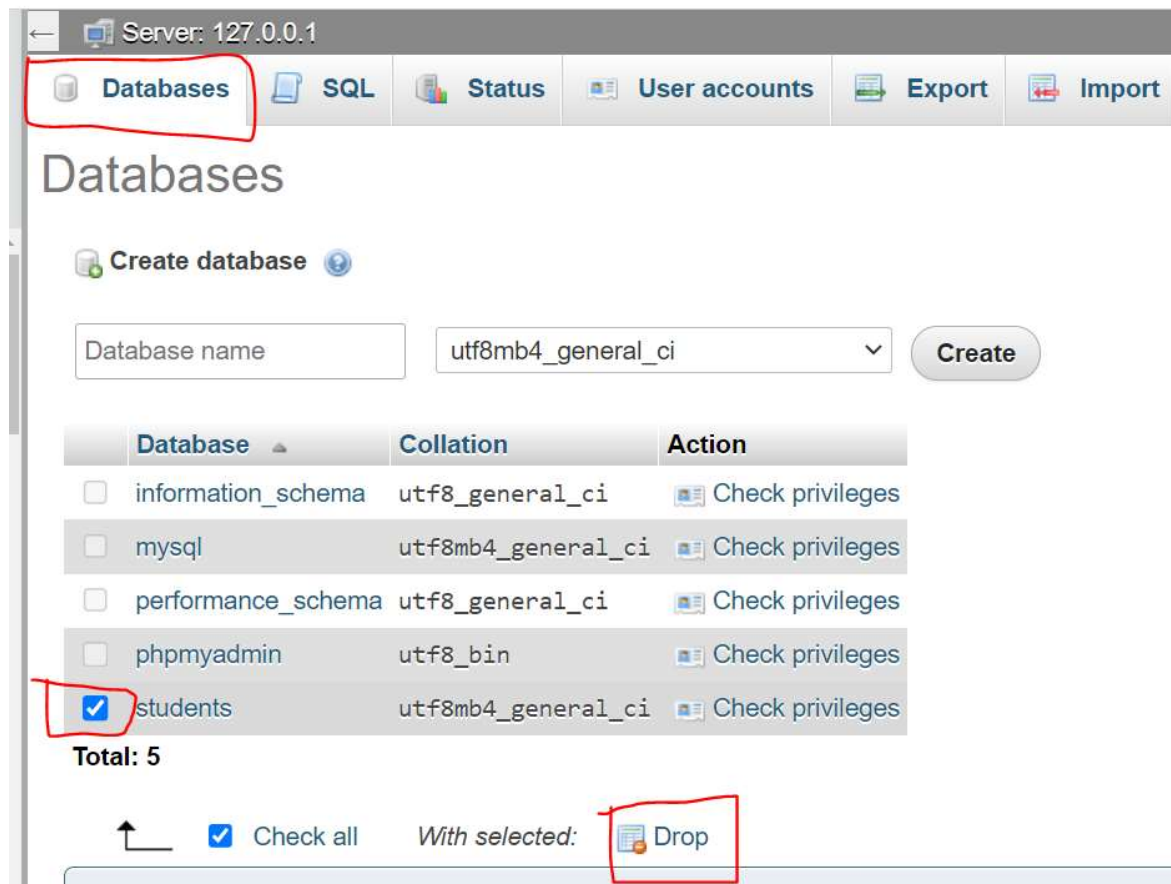
The screenshot shows the phpMyAdmin interface. On the left sidebar, the 'mysql' database is highlighted. The main panel displays a list of tables for the 'mysql' database. The tables are listed in a table with columns: Table, Action, Rows, Type, Collation, Size, and Overhead. The tables include columns_priv, column_stats, db, event, func, general_log, global_priv, gtid_slave_pos, help_category, help_keyword, help_relation, help_topic, index_stats, innodb_index_stats, innodb_table_stats, plugin, proc, procs_priv, proxies_priv, and roles_mapping.

Table	Action	Rows	Type	Collation	Size	Overhead
columns_priv	★ Browse Structure Search Insert Empty Drop	0	Aria	utf8_bin	16.0 KiB	-
column_stats	★ Browse Structure Search Insert Empty Drop	0	Aria	utf8_bin	16.0 KiB	-
db	★ Browse Structure Search Insert Empty Drop	3	Aria	utf8_bin	40.0 KiB	-
event	★ Browse Structure Search Insert Empty Drop	0	Aria	utf8_general_ci	16.0 KiB	-
func	★ Browse Structure Search Insert Empty Drop	0	Aria	utf8_bin	16.0 KiB	-
general_log	★ Browse Structure Search Insert Empty Drop	2	CSV	utf8_general_ci	unknown	-
global_priv	★ Browse Structure Search Insert Empty Drop	4	Aria	utf8_bin	32.0 KiB	-
gtid_slave_pos	★ Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	16.0 KiB	-
help_category	★ Browse Structure Search Insert Empty Drop	48	Aria	utf8_general_ci	40.0 KiB	-
help_keyword	★ Browse Structure Search Insert Empty Drop	37	Aria	utf8_general_ci	40.0 KiB	-
help_relation	★ Browse Structure Search Insert Empty Drop	114	Aria	utf8_general_ci	32.0 KiB	-
help_topic	★ Browse Structure Search Insert Empty Drop	752	Aria	utf8_general_ci	1.6 MiB	-
index_stats	★ Browse Structure Search Insert Empty Drop	0	Aria	utf8_bin	16.0 KiB	-
innodb_index_stats	★ Browse Structure Search Insert Empty Drop	111	InnoDB	utf8_bin	16.0 KiB	-
innodb_table_stats	★ Browse Structure Search Insert Empty Drop	20	InnoDB	utf8_bin	16.0 KiB	-
plugin	★ Browse Structure Search Insert Empty Drop	0	Aria	utf8_general_ci	16.0 KiB	-
proc	★ Browse Structure Search Insert Empty Drop	0	Aria	utf8_general_ci	16.0 KiB	-
procs_priv	★ Browse Structure Search Insert Empty Drop	0	Aria	utf8_general_ci	16.0 KiB	-
proxies_priv	★ Browse Structure Search Insert Empty Drop	0	Aria	utf8_general_ci	16.0 KiB	-
roles_mapping	★ Browse Structure Search Insert Empty Drop	0	Aria	utf8_bin	16.0 KiB	-

Working with MYSQL (XAMPP phpMyAdmin)

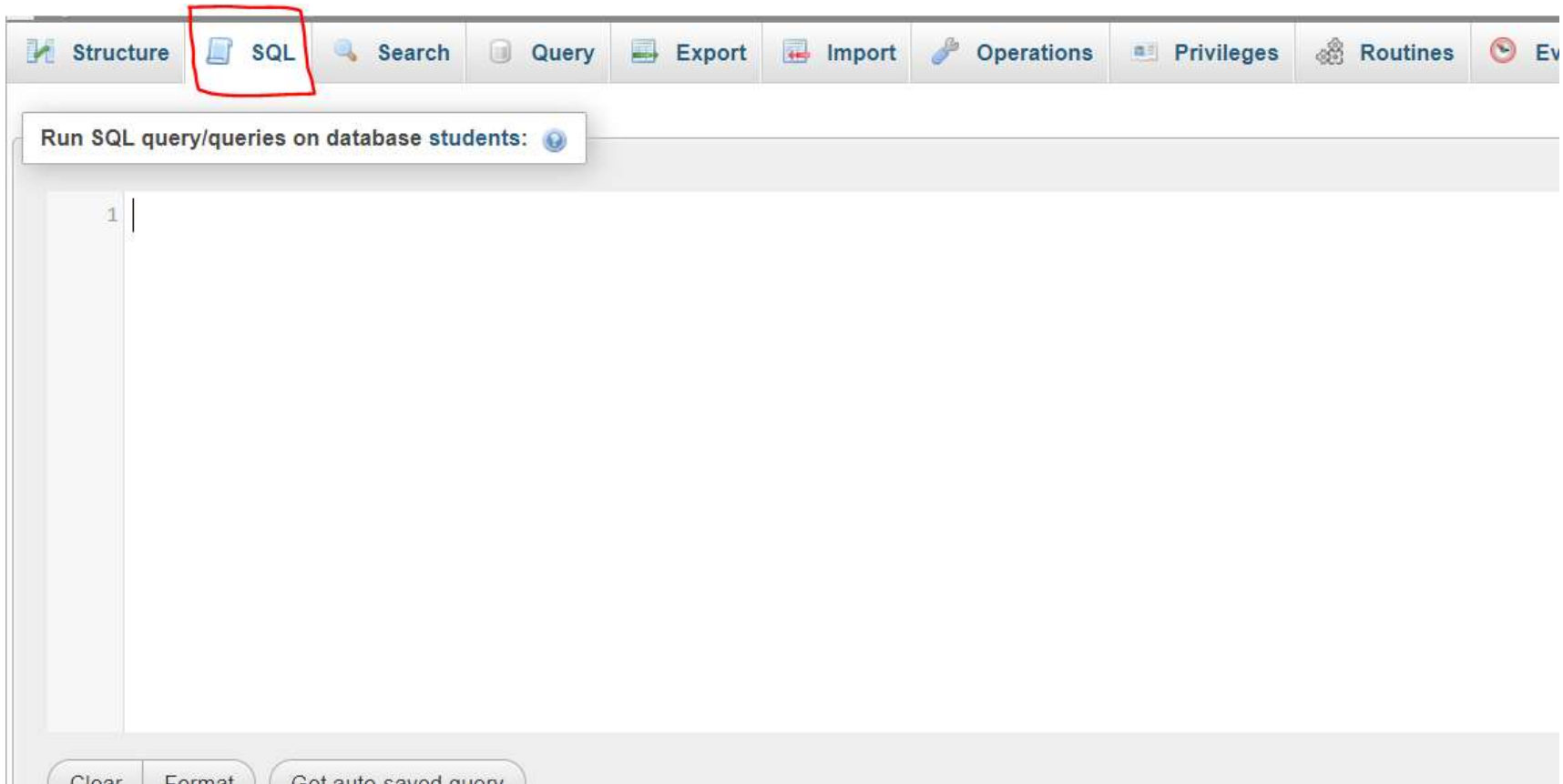
Drop Databases

Dropping database means deleting database from MySQL software.



XAMPP - SQL Window

On top row of phpMyAdmin SQL button is available, click on SQL button gives SQL windows to write SQL commands / statements/ instructions.



XAMPP - SQL Window

SQL Statement execution

SHOW DATABASES;

The screenshot shows the XAMPP SQL window interface. At the top is a toolbar with icons for Structure, SQL, Search, Query, Export, Import, Operations, Privileges, Routines, Events, Triggers, Tracking, and Designer. The 'SQL' icon is highlighted with a red rectangle. Below the toolbar is a text area containing the SQL statement '1 SHOW DATABASES;'. Underneath the text area are buttons for 'Clear', 'Format', and 'Get auto-saved query'. There is a checkbox for 'Bind parameters' which is unchecked. Below that is a 'Bookmark this SQL query:' label followed by an empty text input field. At the bottom of the window is a footer bar containing a 'Delimiter' dropdown set to ';', several checkboxes for 'Show this query here again', 'Retain query box', 'Rollback when finished', and 'Enable foreign key checks' (which is checked), and a 'Go' button. The 'Go' button is highlighted with a red rectangle.

Run SQL query/queries on database mysql: ?

```
1 SHOW DATABASES;
```

Clear Format Get auto-saved query

☐ Bind parameters ?

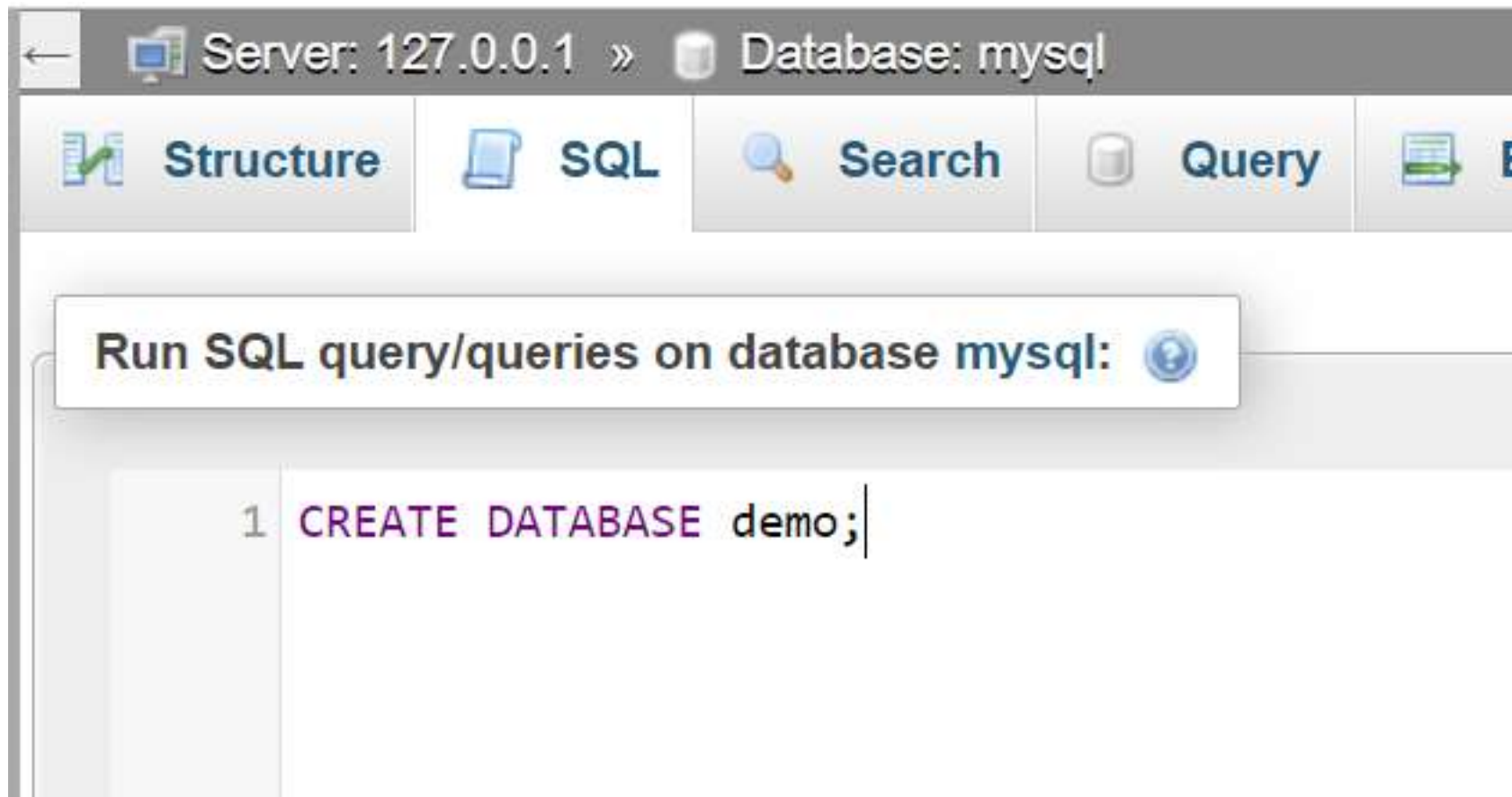
Bookmark this SQL query:

Delimiter ; ☐ Show this query here again ☐ Retain query box ☐ Rollback when finished ☒ Enable foreign key checks

XAMPP - SQL Window

SQL Statement – Create new database “demo” using SQL command/statement in MySQL

CREATE DATABASE demo;



XAMPP - SQL Window

SQL Statement – Select “demo” database using SQL command/statement in MySQL

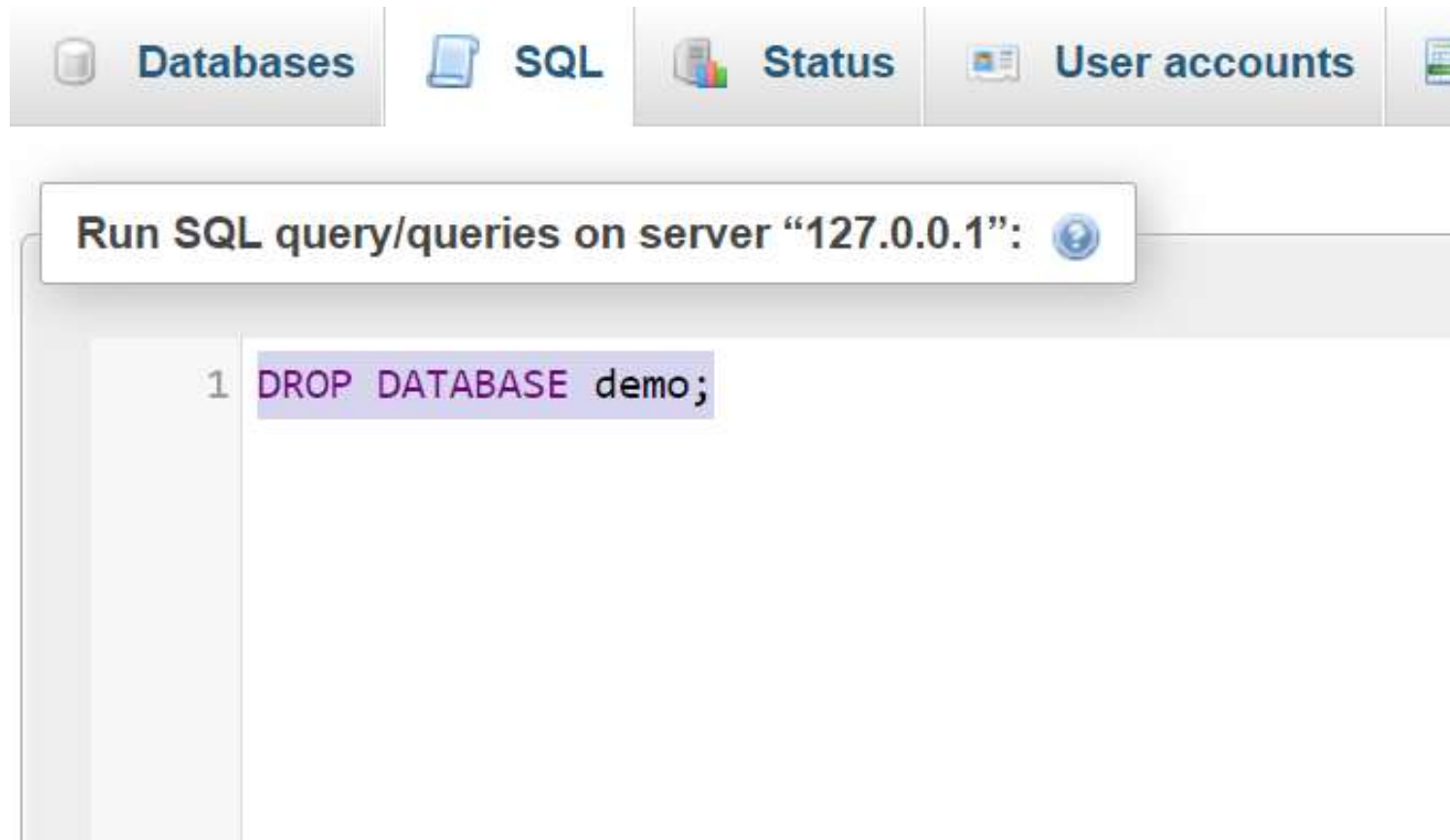
USE demo;



XAMPP - SQL Window

SQL Statement – Delete/Drop “demo” database using SQL command in MySQL

DROP DATABASE demo;



Recap

- . Getting familiar with XAMPP → MySQL
(Start & Stop services)

Recap

- . Getting familiar with XAMPP → MySQL (Start & Stop services)
- . Getting familiar with phpMyAdmin(MySQL) windows.

Recap

- Getting familiar with XAMPP → MySQL (Start & Stop services)
- Getting familiar with phpMyAdmin(MySQL) windows.
- Creating/Selecting/Deleting database using Navigation as well as SQL statement.

Exercises

Create EMPLOYEE database using SQL Statements/Command, write all the commands in a notebook and then execute in SQL windows.

- a. LIST ALL the Database available in MySQL
- b. CREATE EMPLOYEE statement
- c. LIST ALL Database available in MySQL
- d. USE EMPLOYEE statement
- e. LIST ALL TABLE present in EMPLOYEE database

Exercises

Create MOVIE database using phpMyAdmin Navigation bar, create document file and copy paste the screenshot for each point.

- a. CREATE MOVIE database
- b. SELECT MOVIE database
- c. Check are there any tables for MOVIE database

Till now.....

Database

Till now.....

Database

Example:

- **EMPLOYEE**
- **MOVIE**
- **demo**
- **students**

Till now.....

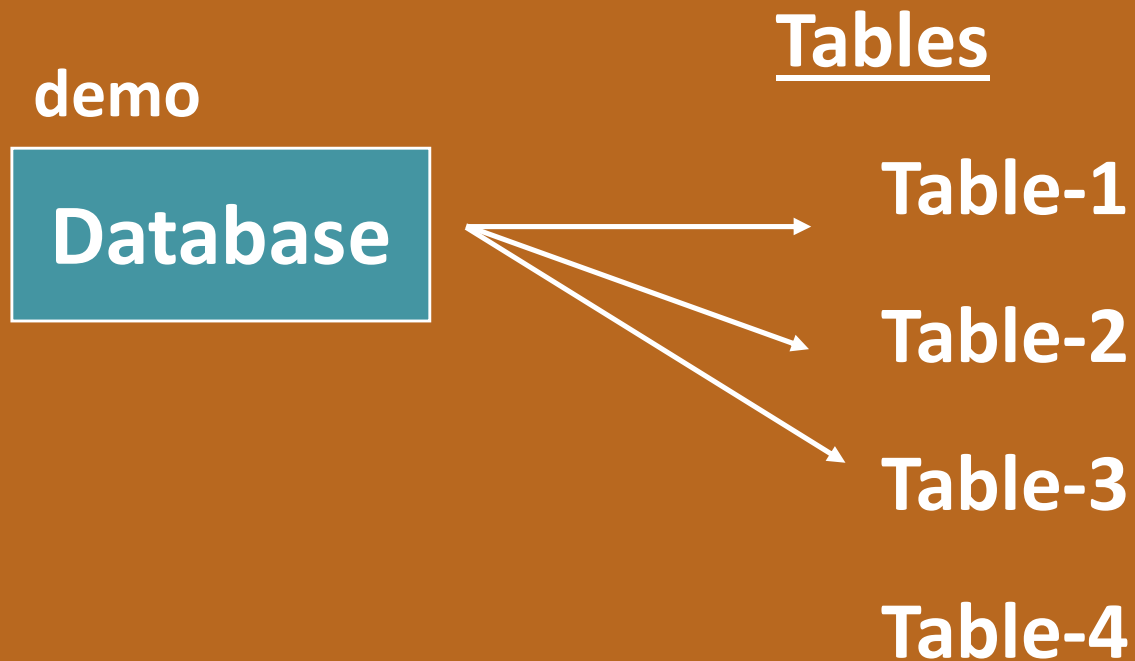
Database

Example:

- **EMPLOYEE**
- **MOVIE**
- **demo**
- **students**

What Next ?

What Next?



Working with Tables

Step-1 : Create EMPLOYEE database

CREATE DATABASE EMPLOYEE;

Step-2 : Select EMPLOYEE database

USE EMPLOYEE;

Working with Tables

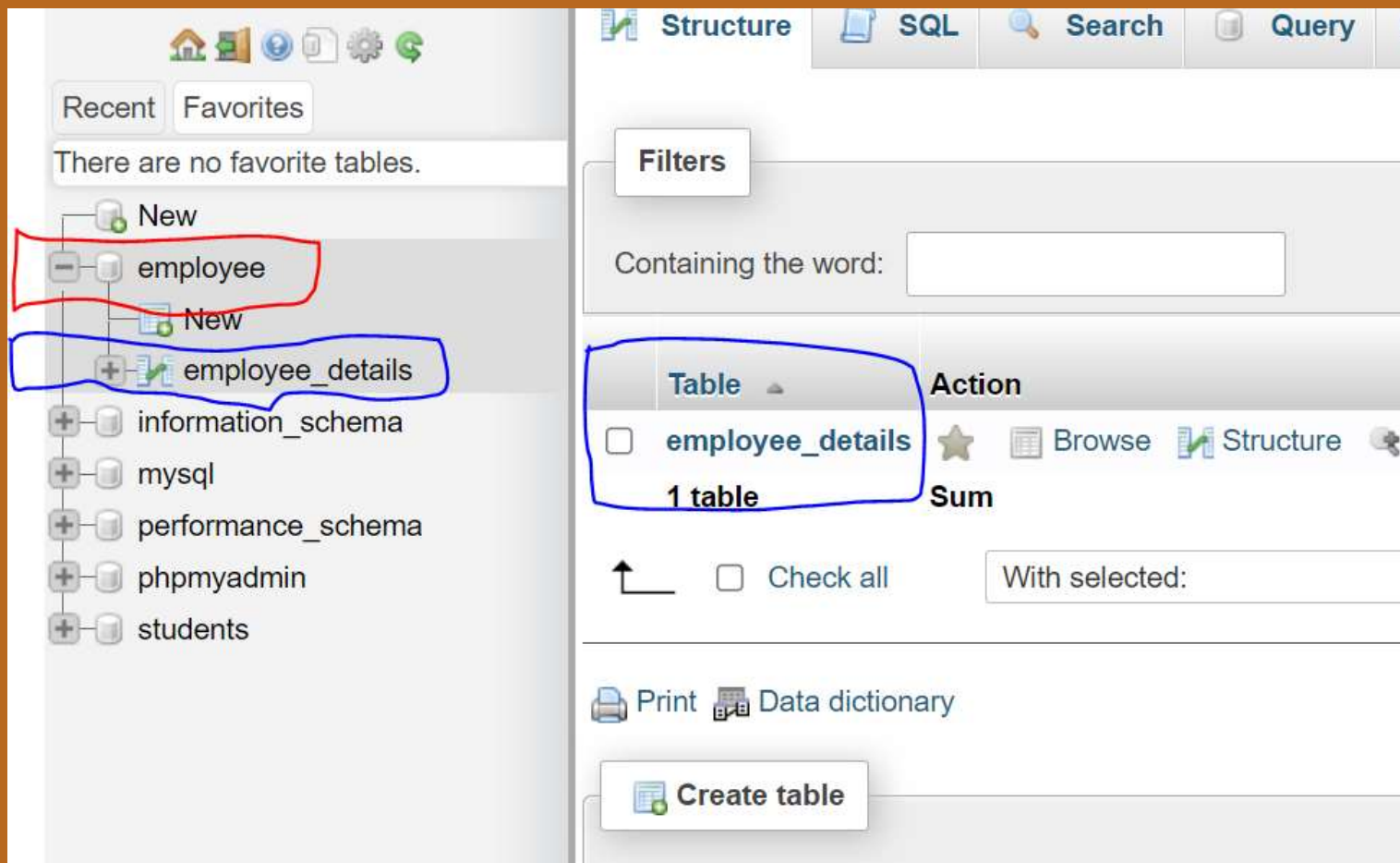
Step-3 : Create employee_details table in EMPLOYEE database.

```
USE EMPLOYEE;
```

```
CREATE TABLE employee_details  
(  
    ID          text ,  
    NAME       text ,  
    MOBILE    text ,  
    CITY      text  
);
```

Working with Tables

Step-4 : Select **EMPLOYEE** database on left panel, **employee_details** table will be available



Working with Tables

Step-5 : Insert records in Table, select insert link on Table list.

Filters

Containing the word:

Table	Action	Rows	Type
<input type="checkbox"/> employee_details 1 table	Browse Structure Search Insert Empty Drop	0	InnoDB u

☐ Check all

With selected:

Print Data dictionary

Working with Tables

Step-6: Enter the data for Table, and click on Go button to insert data into Table

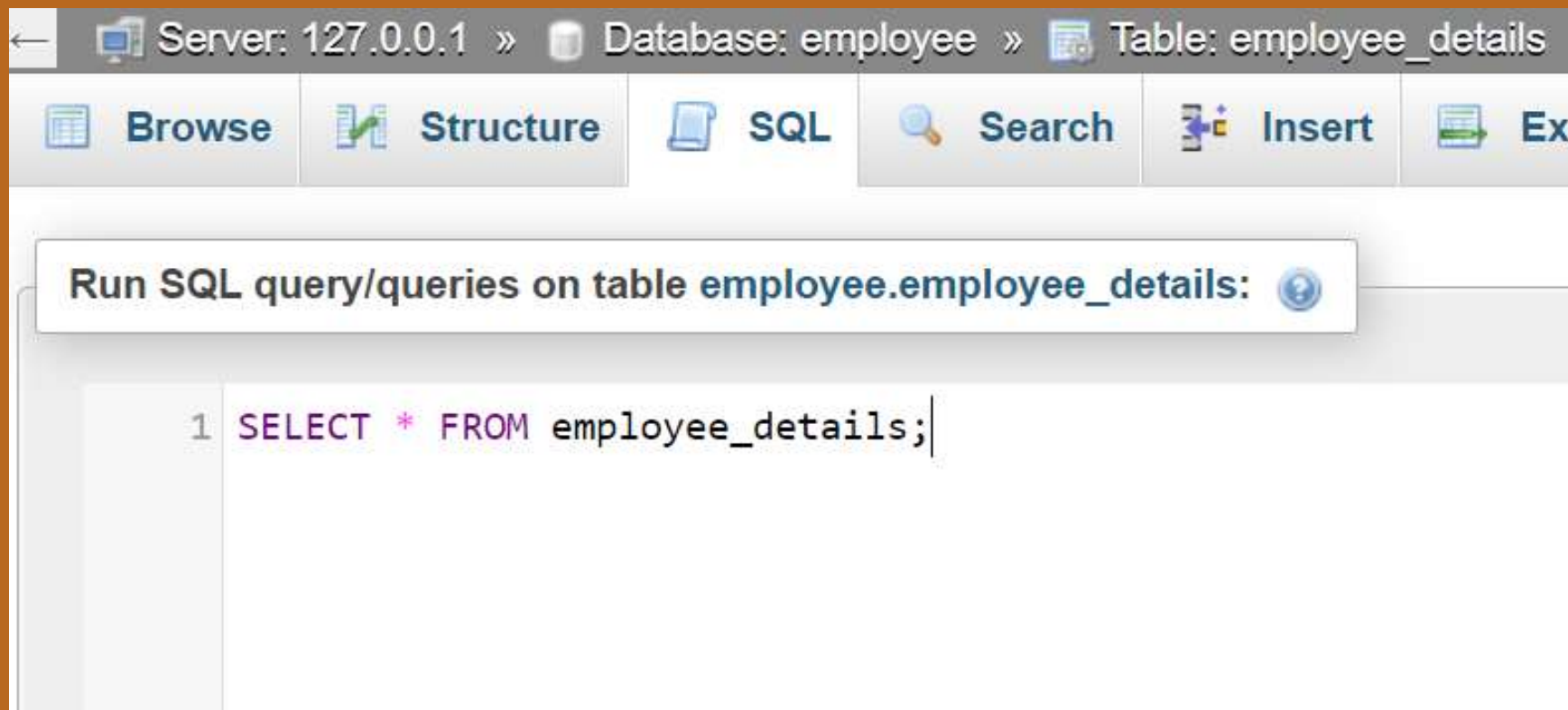
Column	Type	Function	Null	Value
ID	text	<input type="text"/>	<input type="checkbox"/>	EMP_01
NAME	text	<input type="text"/>	<input type="checkbox"/>	John
MOBILE	text	<input type="text"/>	<input type="checkbox"/>	9911419711
CITY	text	<input type="text"/>	<input type="checkbox"/>	Bangalore

Go

Working with Tables

Step-7: Display data from Table

SELECT * FROM employee_details;



Exercises

Create COLLEGE database using phpMyAdmin Navigation bar, create document file and copy paste the screenshot for each point.

- a. CREATE COLLEGE database
- b. CREATE student_details table in COLLEGE database
- c. INSERT some records in student_details table
- d. DISPLAY records from student_details table

Exercises

student_details table data

ROLL_NO	NAME	ADDRESS	PHONE	Age
1	Ram	Delhi	XXXXXXXXXX	18
2	RAMESH	GURGAON	XXXXXXXXXX	18
3	SUJIT	ROHTAK	XXXXXXXXXX	20
4	SURESH	Delhi	XXXXXXXXXX	18
3	SUJIT	ROHTAK	XXXXXXXXXX	20
2	RAMESH	GURGAON	XXXXXXXXXX	18