

# Phase 7

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PREPARED BY BRIJESH KAMANI

Brijesh Kamani

FULL STACK DEVELOPER TRAINEE | RKIT

## Contents

<b>28. Database .....</b>	<b>2</b>
<b>28.1. MYSQL.....</b>	<b>2</b>
<b>28.2. Workbench Overview.....</b>	<b>3</b>
MySQL workbench- Modeling and Design Tool .....	3
MySQL workbench – SQL development tool.....	4
How To Use MySQL Workbench – Administration tool .....	4
How to Install MySQL workbench (for Windows).....	5
<b>28.3. CRUD Operation .....</b>	<b>6</b>
Create DataBase .....	6
Create Table.....	7
Read Data .....	7
Insert Or Update Data .....	7
Delete Table.....	7

## 28. Database

✚ A database is an organized collection of structured information, or data, typically stored electronically in a computer system. A database is usually controlled by a database management system (DBMS). Together, the data and the DBMS, along with the applications that are associated with them, are referred to as a database system, often shortened to just a database.

### 28.1. MYSQL

- MySQL is an open-source relational database.
- MySQL is cross-platform which means it runs on several different platforms such as Windows, Linux, and Mac OS etc.
- There are several relational database management systems on the market.
- Examples of relational databases include Microsoft SQL Server, Microsoft Access, Oracle, DB2 etc.

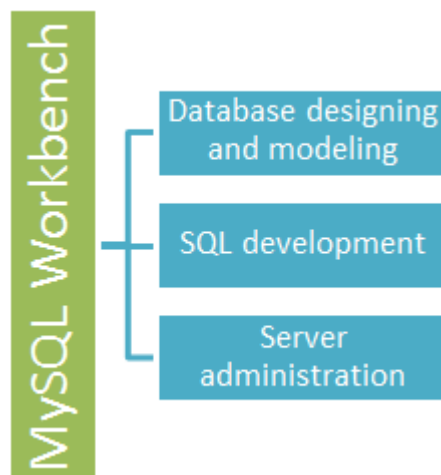
**Let's look at the strengths of MySQL compared to other relational databases such as SQL Server–**

- MySQL supports multiple storage engines each with its specifications while other systems like SQL servers only support a single storage engine. To appreciate this statement, let's look at two of the storage engines supported by MySQL.
  - InnoDB: – its default storage engine provided with MySQL as of version 5.5. InnoDB supports foreign keys for referential integrity and also supports ACID-standard transactions.
  - MyISAM: – it was the default storage engine for MySQL before version 5.5. MyISAM lacks support for transactions. Its advantages over InnoDB include simplicity and high performance.
- MySQL has high performance compared to other relational database systems. This is due to its simplicity in design and support for multiple-storage engines.
- Cost-effective, it's relatively cheaper in terms of cost when compared to other relational databases. The community edition is free. The commercial edition has a licensing fee which is also cost-effective compared to licensing fees for products such as Microsoft SQL Server.

- *Cross-platform – MySQL works on many platforms which means it can be deployed on most machines. Other systems such as MS SQL Server only run on the Windows platform.*

## 28.2. Workbench Overview

- **MySQL Workbench** is a **visual database designing and modelling** access tool for MySQL server relational database. It facilitates the creation of new physical data models and modification of existing MySQL databases with reverse/forward engineering and change management functions. The purpose of MySQL workbench is to provide the interface to work with databases more easily and in a more structured way.



### MySQL workbench- Modeling and Design Tool

- *Models are at the core of most valid and high-performance databases. MySQL workbench has tools that allow developers and database administrators to visually create physical database design models that can be easily translated into MySQL databases using forward engineering.*
- *MySQL workbench supports the creation of multiple models in the same environment.*
- *It supports all objects such as tables, views, stored procedures, triggers, etc. that make up a database.*
- *MySQL workbench has a built-in model validating utility that reports any issues that might be found to the data modeller.*

- *It also allows for different modelling notations and can be extended by using LUA a scripting language.*

## **MySQL workbench – SQL development tool**

- *Structured Query Language (SQL) allows us to manipulate our relational databases. SQL is at the heart of all relational databases.*
- *MySQL workbench has a built-in SQL visual editor.*
- *The Visual SQL editor allows developers to build, edit and run queries against MySQL server databases. It has utilities for viewing data and exporting it.*
- *Its syntax colour highlighters help developers easily write and debug SQL statements.*
- *Multiple queries can be run and results are automatically displayed in different tabs.*
- *The queries are also saved in the history panel for later retrieval and running.*

## **How To Use MySQL Workbench – Administration tool**

- *Server administration plays a critical role in securing the data of the company. The major issues concerning server administration are users' management, server configuration, server logs and many more. Workbench MySQL has the following features that simplify the process of MySQL server administration;*
- ***User administration*** – *visual utility for managing users that lets database administrators easily add new and remove existing users if the need arises, grant and drop privileges and view user profiles.*
- ***Server configuration*** – *allows for advanced configuration of the server and fine-tuning for optimal performance.*
- ***Database backup and restorations*** – *visual tool for exporting/importing MySQL dump files. MySQL dump files contain SQL scripts for creating databases, tables, views, stored procedures and insertion of data.*
- ***Server logs*** – *visual tool for viewing MySQL server logs. The logs include error logs, binary logs and InnoDB logs. These logs come in handy when performing diagnoses on the server. The figure shown below shows the modelling window for MySQL Workbench.*

## How to Install MySQL workbench (for Windows)

- *In this MySQL Workbench tutorial for beginners, we will learn how to install and use MySQL Workbench.*
- *Install MySQL workbench is a 2 step process.*
  - 1) *Install MySQL Community Server*
  - 2) *Install MySQL workbench – You can install the workbench using a zip file or an MSI installer (recommended)*
- *Note: You will require Administrator or Power User Privileges to perform the installation.*

### Getting Started

*Once you have finished installing the above you need to set up MySQL Workbench as shown below-  
Following is a step by step process on How to Install MySQL workbench.*

#### **Step 1) Open Home Window**

*The first step is launching the Workbench MySQL. What you see is called **Home Window***

#### **Step 2) Open New Connection Wizard**

*Next, you need to create your MySQL Server Connection which contains details about the target database server including how to connect to it. Click ” + “ in MySQL Workbench Home Window. This will open **Setup New Connection**. Wizard*

#### **Step 3) Click Configure Server Management button**

*As a beginner, you can create a connection for a locally installed server. Click **Configure Server Management** button in the **Setup New Connection** window to check the configuration of the MySQL server.*

#### **Step 4) Click the Next button to continue**

*A new window opens named **Configure Local Management**. Click the Next button to continue.*

#### **Step 5) Enter your password and press OK**

*Next, the Wizard will test connections to the database. If the test fails, go back and correct database connection parameters.5. Next, it will open a pop-up window asking your root password to test your connection with the*

local MySQL server instance. The password is the one you set during the installation of MySQL Workbench. Enter your password and press **OK**

**Step 6)** Click Next to continue

Next, the Wizard will test connections to the database. If the test fails, go back and correct database connection parameters. Else if all tests are successful click Next to continue.

**Step 7)** Click Next

After that a new wizard will open about Local Service Management – It lets you switch between multiple MySQL servers installed on one machine. As a beginner, you can bypass this and click **Next** to continue.

**Step 8)** Select MySQL Server Configuration File

The Wizard will then check the ability to access MySQL Server Configuration File, and test start/stop commands.

**Step 9)** Click Finish to finish server configuration

Next, you can review current configurations. After reviewing the configurations, Click Finish to finish server configuration

**Step 10)** Click on Test Connection

The Next Step is to set up a connection, which can be used to connect to the server. If you have not created a connection already, you can use the default values given. Click on Test Connection [ 2 ] after entering the Connection Name [ 1 ].

**Step 11)** Click OK

A new dialogue box will open asking you the password to root/selected user. If your MySQL root user has a password, you can enter that using the Store in Vault feature. Click OK.

Click on **both OK** buttons and you will be good to go. A new instance is shown on the homepage. Double click and start querying.

## 28.3. CRUD Operation

### Create DataBase

- 1) Open Local Server Connection by Entering the password
- 2) Create Database by clicking on Icon or Executing Query

```
CREATE SCHEMA `new_schema` ;
```

## Create Table

- 1) *Select Database from SCHEMAS*
- 2) *Expand the Database and create a Table by right click on Tables.*
- 3) *Fill Table Details Or Execute Query*

```
CREATE TABLE `mydatabase`.`new_table` (  
  `idnew_table` INT NOT NULL,  
  `new_tablecol` VARCHAR(45) NULL,  
  PRIMARY KEY (`idnew_table`),  
  UNIQUE INDEX `new_tablecol_UNIQUE` (`new_tablecol`  
ASC) VISIBLE);
```

## Read Data

- 1) *By Right Clicking on table\_name and selecting the first option*

## Insert Or Update Data

- 1) *First Select Data using Select query or using GUI*
- 2) *Insert or Edit Data from Result shown using Select Query*

## Delete Table

- 1) *Right Click on Table and select Drop Table and Click Drop Now.*