

## DataBase:

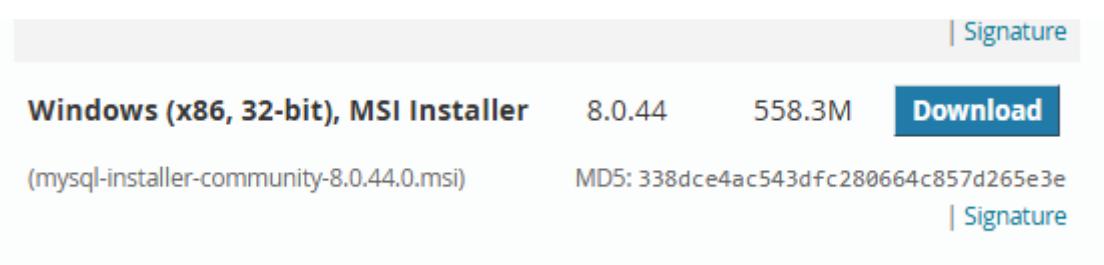
A database is an organized collection of structured information, or data, typically stored electronically to make it easier to manage, access, and update.

## MySQL Workbench

The MySQL Workbench is a visual database design and management tool that provides a GUI for interacting with MySQL databases.

## Download MySql Workbench:

<https://dev.mysql.com/downloads/workbench/>



## **What is SQL?**

SQL (Structured Query Language) is a standardized programming language used to manage and manipulate relational databases. It allows users to perform operations such as storing, retrieving, updating, and deleting data in a structured format.

Various DBMS : MySQL, PostgreSQL, Microsoft SQL Server, and Oracle.

## Common SQL Commands:

**Data Definition Language (DDL):** Commands like CREATE, ALTER, and DROP define or modify database structures.

**Data Manipulation Language (DML):** Commands like INSERT, UPDATE, and DELETE handle data within tables.

**Data Query Language (DQL):** The SELECT command retrieves data from the database.

**Data Control Language (DCL):** Commands like GRANT and REVOKE manage user permissions.

**Transaction Control Language (TCL):** Commands like COMMIT and ROLLBACK manage database transactions

## SQL Data Types:

### **MySQL Data Types with Examples**

MySQL provides a variety of data types to store different kinds of data. These are broadly categorized into **Numeric**, **String**, **Date/Time**, **Spatial**, and **JSON** types. Here's a concise overview with examples:

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## 1. Numeric Data Types

Used for storing numbers, both integers and decimals.

Data Type	Description	Example
INT	Integer values (whole numbers).	age INT → 25
DECIMAL(p, s)	Fixed-point numbers.	price DECIMAL(10, 2) → 99.99
FLOAT	Approximate floating-point numbers.	rating FLOAT → 4.5
TINYINT	Small integers (-128 to 127).	is_active TINYINT → 1
BIGINT	Large integers.	population BIGINT → 1500000000

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## 2. String Data Types

Used for storing text, characters, or binary data.

Data Type	Description	Example
VARCHAR(n)	Variable-length string (up to n chars).	name VARCHAR(50) → 'John'
CHAR(n)	Fixed-length string (exactly n chars).	code CHAR(5) → 'A1234'
TEXT	Large text data.	description TEXT → 'This is a long text.'
BLOB	Binary large objects (e.g., images).	image BLOB
ENUM	Predefined list of values.	status ENUM('active', 'inactive') → 'active'

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## 3. Date and Time Data Types

Used for storing dates, times, or both.

Data Type	Description	Example
DATE	Stores date (YYYY-MM-DD).	birth_date DATE → 1990-05-15
DATETIME	Stores date and time.	created_at DATETIME → 2025-11-24 14:30:00
TIME	Stores time (HH:MM:SS).	duration TIME → 02:30:00
TIMESTAMP	Stores date and time with timezone.	updated_at TIMESTAMP → 2025-11-24 14:30:00
YEAR	Stores year (4 digits).	year YEAR → 2025

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## 4. Spatial Data Types

Used for geographic or geometric data.

Data Type	Description	Example
POINT	Stores a single point (x, y).	location POINT

<b>Data Type</b>	<b>Description</b>	<b>Example</b>
GEOMETRY	Stores geometric data.	shape GEOMETRY

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## **5. JSON Data Type**

Used for storing JSON-formatted data.

<b>Data Type</b>	<b>Description</b>	<b>Example</b>
JSON	Stores JSON objects.	data JSON → {"key": "value"}

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### **General Syntax Rules:**

**Case Insensitivity (for keywords):** MySQL keywords like SELECT, FROM, WHERE are typically case-insensitive, but table and column names might be case-sensitive depending on the operating system and server configuration.

**Statement Terminator:** Each SQL statement must end with a semicolon (;).

### **Comments:**

**Single-line comments:** -- followed by a space or control character, or # to the end of the line.

**Multi-line comments:** /\* ... \*/.