

SQL and MySQL , Installation

Introduction to SQL and MySQL

What is SQL?

SQL (Structured Query Language) is a standard language used to manage and manipulate relational databases. It allows you to:

- Create and modify tables
- Insert, update, delete, and retrieve data
- Manage user access and control permissions
- Perform complex queries, joins, aggregations, and transactions

SQL is the foundation for working with **Relational Database Management Systems (RDBMS)** such as MySQL, PostgreSQL, Oracle, and SQL Server.





What is MySQL?

MySQL is a popular open-source RDBMS that uses SQL as its query language. It is:

- Free and open-source (also has an enterprise edition by Oracle)
- Widely supported across operating systems and programming languages
- Known for its **speed**, **reliability**, and **ease of use**

MySQL stores data in **tables** and supports relationships between tables using **foreign keys**.

Advantages of MySQL

Feature	Benefit
 Open Source	Free to use, with a strong community and plenty of learning resources
 Cross-Platform	Works on Windows, Linux, macOS
 Easy to Learn	Beginner-friendly with clear syntax and tools like MySQL Workbench
 High Performance	Optimized for read-heavy applications

✓ Secure	Supports user roles, encryption, SSL, and more
✓ Spring Boot Integration	Supported out of the box via Spring Data JPA, Hibernate
✓ Scalable	Works well for small apps to large-scale systems with replication and sharding

⚠ Disadvantages of MySQL

Limitation	Explanation
✗ Limited SQL Compliance	Some advanced SQL features (e.g., full joins, window functions) may not behave identically to other RDBMS
✗ Write Performance in Large Scale	Not ideal for very write-heavy applications at massive scale (compared to NoSQL or newer RDBMS)
✗ Lack of Built-In Features for Complex Analytics	Lacks features like materialized views, full data warehousing support
✗ Concurrency Bottlenecks	In some high-concurrency scenarios, locks can become a bottleneck
✗ Sharding and Clustering	Requires additional configuration and expertise for horizontal scaling

🧩 MySQL + Spring Boot

Spring Boot integrates seamlessly with MySQL using:

- `spring-boot-starter-data-jpa` for ORM (Object Relational Mapping)
- Hibernate (default JPA provider)
- Auto-configuration of `DataSource`, `EntityManager`, and repositories

🎯 When to Use MySQL

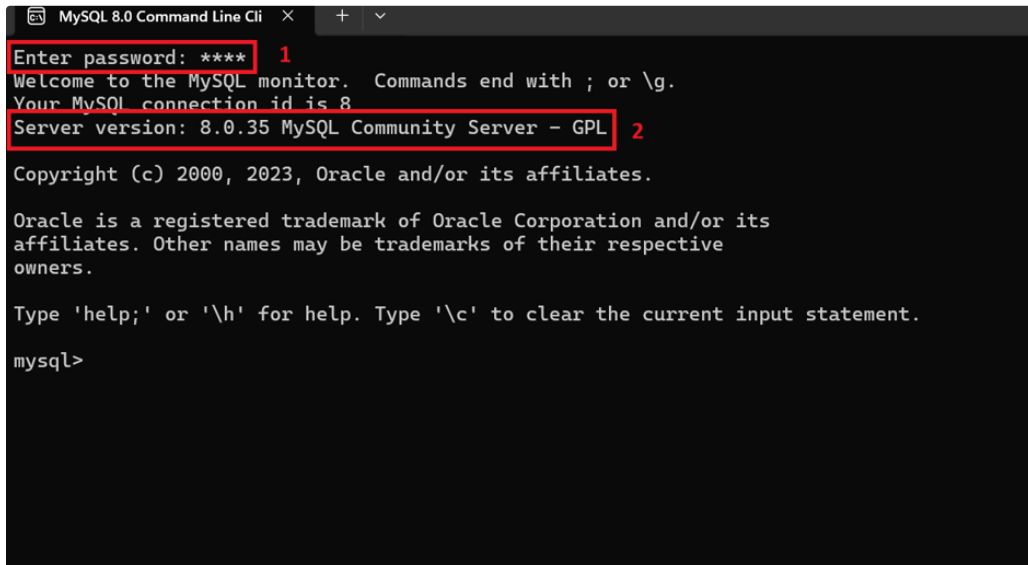
Use MySQL when:

- You need strong data consistency and relationships

- The data structure is well-defined and rarely changes
- You want to use SQL for complex queries, joins, and transactions
- You're building traditional web apps, admin panels, or enterprise systems

Installation of MySQL

- In order to install MySQL use following Youtube link and follow steps -
[📺 Download and install MYSQL Command Line Client on Windows 11](#)
- To check if it is properly installed, open “MySQL command Line client”
- Enter password and installed version will be visible on screen.



```
MySQL 8.0 Command Line Cli  X  +  v
Enter password: **** 1
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.35 MySQL Community Server - GPL 2

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Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
```