

# Using MySQL

Here's a step-by-step guide to using MySQL, a popular open-source relational database management system:

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## 1. Installation

- **Windows:** Download the MySQL Installer from [mysql.com/downloads](https://mysql.com/downloads)

- **macOS:**

```
brew install mysql  
brew services start mysql
```

- **Linux** (Debian/Ubuntu):

```
sudo apt update  
sudo apt install mysql-server mysql-client  
sudo systemctl start mysql  
sudo mysql_secure_installation # Run security setup
```

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## 2. Connect to MySQL

- **Default root login:**

```
mysql -u root -p # Enter password when prompted
```

- **Connect to remote server:**

```
mysql -u username -p -h hostname -P 3306
```

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## 3. Basic Database Operations

- **Create User:**

```
CREATE USER 'myuser'@'localhost' IDENTIFIED BY 'mypassword';
```

- **Create Database:**

```
CREATE DATABASE mydb;
GRANT ALL PRIVILEGES ON mydb.* TO 'myuser'@'localhost';
FLUSH PRIVILEGES;
```

- **Basic SQL Commands:**

```
-- Create table
CREATE TABLE users (
    id INT AUTO_INCREMENT PRIMARY KEY,
    name VARCHAR(50),
    email VARCHAR(100) UNIQUE
);

-- Insert data
INSERT INTO users (name, email) VALUES ('Bob', 'bob@example.com');

-- Query data
SELECT * FROM users WHERE name LIKE 'B%';

-- Update data
UPDATE users SET email = 'new@email.com' WHERE id = 1;

-- Delete data
DELETE FROM users WHERE id = 2;
```

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## 4. Advanced Features

- **Joins:**

```
SELECT orders.id, users.name
FROM orders
JOIN users ON orders.user_id = users.id;
```

- **Stored Procedures:**

```
DELIMITER //
CREATE PROCEDURE GetUsers()
BEGIN
    SELECT * FROM users;
END //
DELIMITER ;
```

```
CALL GetUsers();
```

- **JSON Support** (MySQL 5.7+):

```
CREATE TABLE products (  
    id INT PRIMARY KEY,  
    details JSON  
);
```

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## 5. Maintenance

- **Backup:**

```
mysqldump -u root -p mydb > backup.sql
```

- **Restore:**

```
mysql -u root -p mydb < backup.sql
```

- **Optimize Tables:**

```
ANALYZE TABLE users;  
OPTIMIZE TABLE users;
```

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## 6. Security

- **Create Read-Only User:**

```
CREATE USER 'reader'@'localhost' IDENTIFIED BY 'readpass';  
GRANT SELECT ON mydb.* TO 'reader'@'localhost';  
FLUSH PRIVILEGES;
```

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## 7. Useful MySQL Commands

- List databases: SHOW DATABASES;
- Use a database: USE mydb;
- List tables: SHOW TABLES;

- Describe table: `DESCRIBE users;`
  - Show users: `SELECT user FROM mysql.user;`
  - Exit MySQL: `EXIT;` or `QUIT;`
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## 8. GUI Tools

- **MySQL Workbench:** Official GUI tool
  - **phpMyAdmin:** Web-based interface
  - **DBeaver:** Cross-platform database tool
  - **HeidiSQL:** Lightweight Windows client
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## 9. Learning Resources

- Official Documentation: [dev.mysql.com/doc](https://dev.mysql.com/doc)
  - Interactive Tutorial: [mysqldata.com/tutorial](https://mysqldata.com/tutorial)
  - Practice: [sqlzoo.net](https://sqlzoo.net) or [leetcode.com](https://leetcode.com)
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**Key Differences from PostgreSQL:** 1. Uses `AUTO_INCREMENT` instead of `SERIAL` 2. Case-insensitive table names by default 3. Uses `mysqldump` instead of `pg_dump` 4. Default port: **3306** (vs PostgreSQL's 5432) 5. Different authentication system and user management

**Tip:** Always back up databases before major changes. Use transactions (`START TRANSACTION/COMMIT`) for critical operations.