

# Database

Dr. Dong-Chul Kim

# Introduction to Database Management Systems

Storing data in traditional text or binary files has its limits

well suited for applications that store only a small amount of data

not practical for applications that must store a large amount of data

simple operations become cumbersome and inefficient as data increases

# Introduction to Database Management Systems

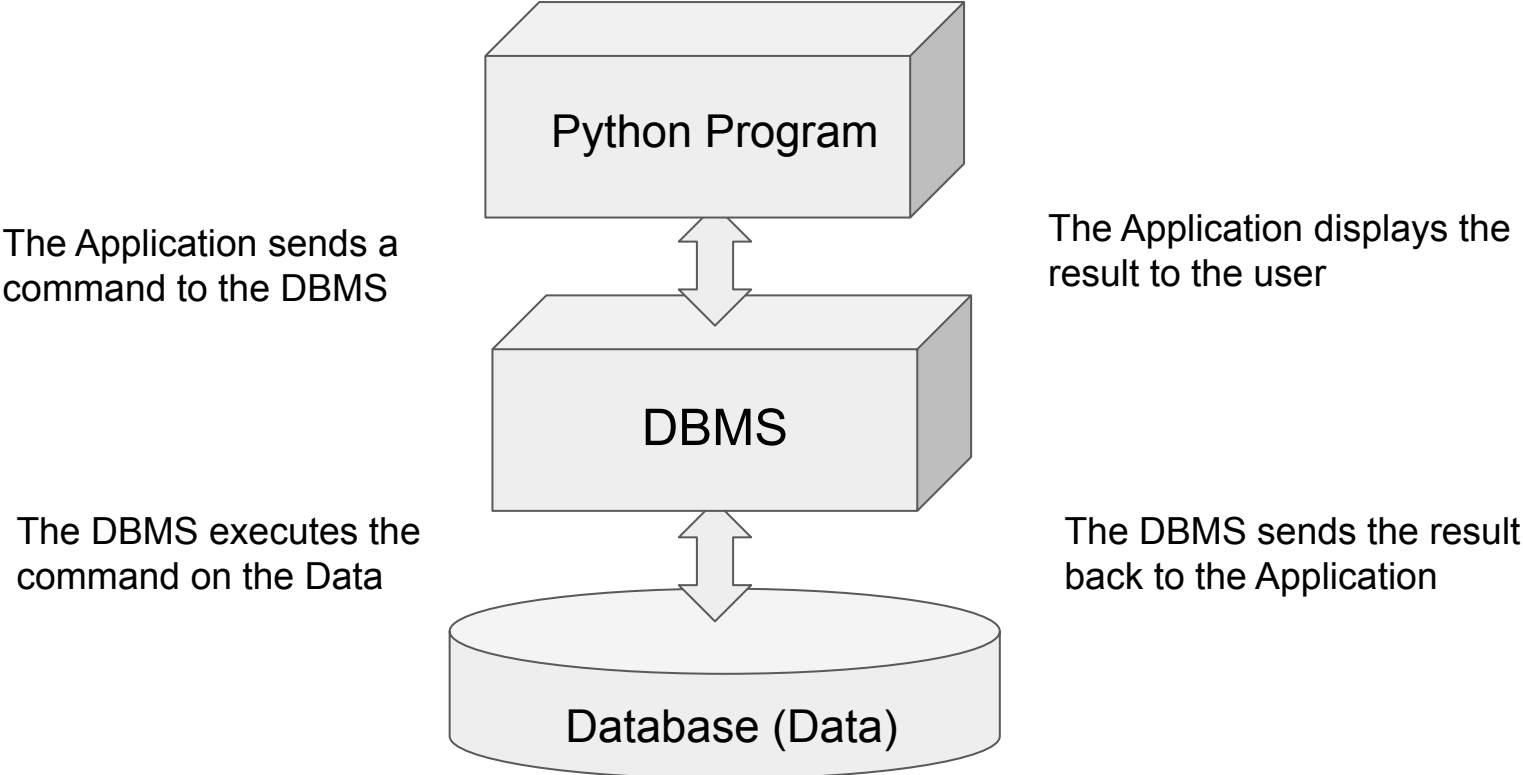
A database management system (DBMS) is software that is specifically designed to work with large amounts of data in an efficient and organized manner

Data is stored using the database management system

Applications written in Python or other languages communicate with the DBMS rather than manipulate the data directly

DBMS carries out instructions and sends the results back to the application

# Introduction to Database Management Systems



# SQL

SQL stands for structured query language

A standard language for working with database management systems

Not used as a general programming language

Consists of several key words, used to construct statements known as queries

Statements or queries are strings passed from the application to the DBMS using API method calls

Serve as instructions for the DBMS to carry out operations on its data

# Using a DBMS

Oracle

Microsoft SQL Server

DB2

**MySQL**

Java DB

# Tables, Rows, and Columns

A database management system stores data in a database

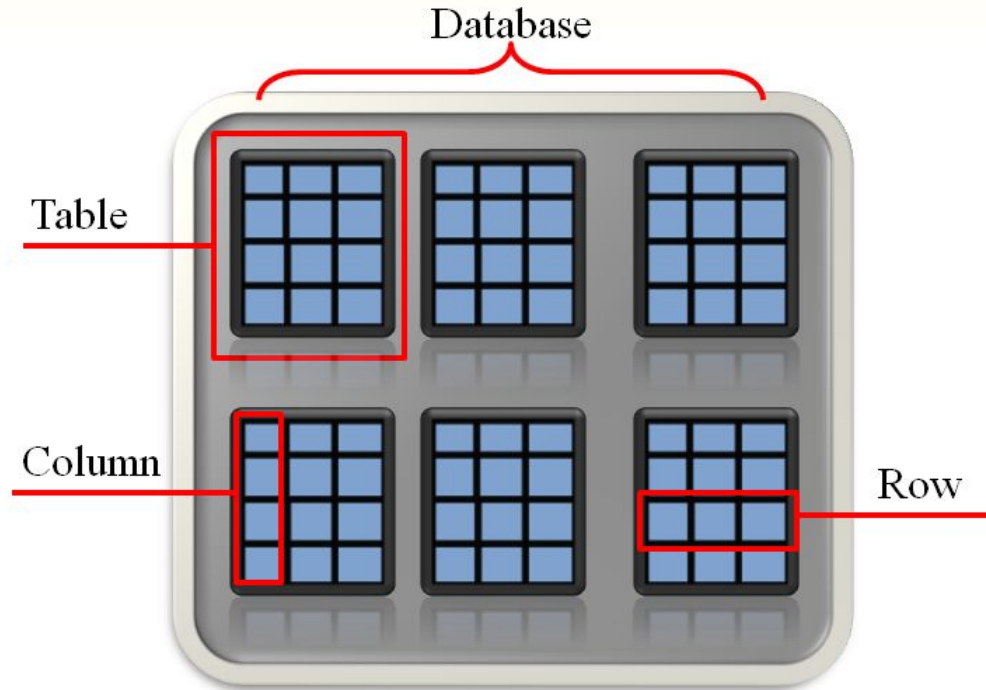
A database is organized into one or more tables

Each table holds a collection of related data, organized into rows and columns

**Record:** A row is a complete set of information about a single item, divided into columns

**Field:** Each column is an individual piece of information about the item

# Database Organization





# Column Data Types

Columns in a database are assigned an SQL data type

SQL data types are generally compatible with Java data types

SQL Data Type	Description	Corresponding Java Data Type
INTEGER or INT	An integer number	int
CHARACTER ( <i>n</i> ) or CHAR ( <i>n</i> )	A fixed-length string with a length of <i>n</i> characters	String
VARCHAR ( <i>n</i> )	A variable-length string with a maximum length of <i>n</i> characters.	String
REAL	A single-precision floating point number	float
DOUBLE	A double-precision floating point number	double
DECIMAL ( <i>t</i> , <i>d</i> )	A decimal value with <i>t</i> total digits and <i>d</i> digits appearing after the decimal point.	java.math.BigDecimal
DATE	A date	java.sql.Date

# SQL: INSERT

In SQL, the INSERT statement inserts a row into a table

```
INSERT INTO TableName VALUES (Value1, Value2, ...);
```

TableName is the name of the database table

Value1, Value2, ... is a list of column values

Example:

```
INSERT INTO cars VALUES ('3AE9K28734', 'Honda', 'Accord',  
2009, 125434, 9000, 'Silver')
```

Strings are enclosed in single quotes.

Values appear in the same order as the columns in the table

# Inserting Rows

If column order is uncertain, the following general format can be used

```
INSERT INTO TableName (ColumnName1, ColumnName2, ...)  
VALUES (Value1, Value2, ...)
```

ColumnName1, ColumnName2, ... is a list of column names

Value1, Value2, ... is a list of corresponding column values

# SQL: SELECT

The SELECT statement is used to retrieve the rows in a table

```
SELECT Columns FROM Table
```

Columns is one or more column names

Table is a table name

Example 1: `SELECT brand FROM cars`

Example 2: `SELECT VIN, brand, price FROM cars`

Multiple column names are separated with a comma

Example 3: `SELECT * FROM cars`

The \* character can be used to retrieve all columns in the table

# More About SQL Statements

SQL statements are free form.

- tabs, new lines, and spaces between key words are ignored

SQL keywords and table names are case insensitive

Example:

The following statements all work the same:

```
SELECT * FROM cars;
```

```
SELECT
```

```
*
```

```
FROM
```

```
cars;
```

```
select * from cars;
```

# Specifying Search Criteria with the WHERE clause

The WHERE clause can be used with the SELECT statement to specify a search criteria

```
SELECT Columns FROM Table WHERE Criteria
```

Criteria is a conditional expression

Example: `SELECT * FROM cars WHERE Price > 7000`

Only the rows that meet the search criteria are returned in the result set

A result set is an object that contains the results of an SQL statement

# Deleting Rows with the DELETE Statement

In SQL, the DELETE statement deletes one or more rows in a table

```
DELETE FROM Table WHERE Criteria
```

Table is the table name

Criteria is a conditional expression

**Example:** `DELETE FROM cars WHERE brand = 'Honda'`

Deletes a single row in the cars table where the brand name is 'Honda'

**Warning!** `DELETE FROM cars;`

Because this statement does not have a WHERE clause, it will delete every row in the cars table

# Updating an Existing Row

In SQL, the UPDATE statement changes the contents of an existing row in a table

```
UPDATE Table SET Column = Value WHERE Criteria
```

Table is a table name

Column is a column name

Value is the value to store in the column

Criteria is a conditional expression

**Example:**

```
UPDATE cars SET price = 7000 WHERE VIN = 'B30948AC343K'
```



**MySQL**

# MySQL

We are going to install MySQL on Google cloud.

Never use your money to use Google cloud and do not provide your credit card information.

The credit will be provided through a coupon that I will send via email.

Please do not share the coupon with others.

First, create a google account if you don't have.

then go to <https://cloud.google.com/>. Click the link, "Go to console"

# MySQL

After creating your Google account, check UTRGV email.

You are supposed to get an email from me with the coupon.

Then, redeem the coupon. (Follow the link and direction the email includes)

After making sure you can have the \$50 credit,

go to <https://console.cloud.google.com/welcome/new>. Click the link, "Go to console"

Find "Billing" menu



Welcome, D Kim

Create or select a project to start using Google Cloud

[Learn more about projects](#)

CREATE OR SELECT A PROJECT

Experience Gemini, the multimodal model from Google DeepMind, now available in Vertex AI



### Recommended based on your interest in General

#### Pre-built solution templates



Deploy a three-tier web app

Web app, rich media site, ecommerce website, database-backed website



Deploy load balanced managed VMs

Data analysis, data pipeline, application logs, log management, log intelligence



Create a data warehouse with BigQuery

Data warehouse, dashboards, ETL, analytics, data analysis

## Billing

MY BILLING ACCOUNTS

MY PROJECTS

CREATE ACCOUNT

☰ Filter Status : Active Enter property name or value

✕ ? ⬇

<input type="checkbox"/>	Billing account name	Billing account ID	Status	Last 30 days' spend	Account type ? ↑	Organization	Health checks ?
<input type="checkbox"/>	<a href="#">Billing Account for Education</a>	012690-3862B4-3069E8	Active	\$0	Direct	—	💡 2



Select your billing account

Billing

Overview

PAID ACCOUNT

MANAGE BILLING ACCOUNT

LEARN

Billing account  
Billing Account for Education

BILLING ACCOUNT OVERVIEW

Overview

Cost management

Reports

Cost table

Cost breakdown

Budgets & alerts

Billing export

Cost optimization

FinOps hub **NEW**

Committed use discounts (C...

CUD analysis

Pricing

Cost estimation

Credits

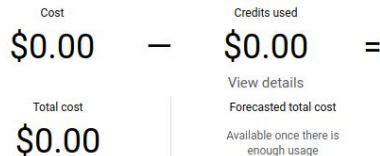
Billing management

Account man...

Your total cost (February 1 - 19, 2024)

LAST 7 DAYS

CURRENT MONTH



View details on Reports

Top projects

February 1, 2023 - February 29, 2024



FinOps hub **NEW**

A single pane of glass for all cost optimization opportunities

Save up to  
\$0.00

0% of last month's total cost

FinOps score

-

FinOps maturity: **Not available**

View details on FinOps hub

Create a budget alert

Set a monthly budget for your billing account. You'll get email notifications as your costs approach and exceed the budget amount.

\$100

\$

CREATE

View budgets and alerts

Billing health checks

Check out your account health results to avoid common billing-related issues and adopt our best practice recommendations. [Learn more](#)

0 2 0

View all health checks



Check your credit

- Billing
- Billing account  
Billing Account for Education
- Overview
- Cost management
  - Reports
  - Cost table
  - Cost breakdown
  - Budgets & alerts
  - Billing export
- Cost optimization
  - FinOps hub **NEW**
  - Committed use discounts (C...
  - CUD analysis
  - Pricing
  - Cost estimation
  - Credits
- Billing management

2

[ALL CREDITS](#)


view and download credit details here. Active committed use discounts are not included here and can be viewed on the [Commitments page](#).

Filter Filter credits

Credit name	Status ↑	Percent remaining	Remaining value	Original value	Type	Credit ID	Scope ⓘ	Start date
CSCI3329 OOP in Python jan24	✓ Available	<div style="width: 100%;"></div> 100%	\$100.00	\$100.00	One-time	HCE1D7GT...	Any service on this billing account.	February 2024

1

Check your credit and then move back to the GCP homepage.

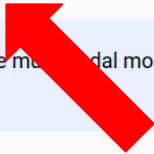
 Welcome, D Kim

Create or select a project to start using Google Cloud

[Learn more about projects](#) ↗

CREATE OR SELECT A PROJECT

Experience Gemini, the multimodal model from Google DeepMind, now available in Vertex AI ↗



**Create a new project**

Recommended based on your interest in General ▾



## Select a project



NEW PROJECT

Search projects and folders



RECENT

STARRED

ALL

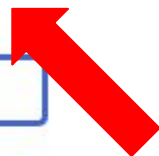
Name

ID



No organization

0



# New Project



You have 25 projects remaining in your quota. Request an increase or delete projects. [Learn more](#)

[MANAGE QUOTAS](#)

Project name \*

CSCI3329



Project ID: csci3329-414817. It cannot be changed later. [EDIT](#)

Location \*

No organization

[BROWSE](#)

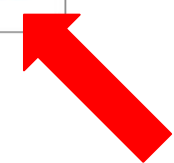
Parent organization or folder

CREATE

CANCEL



1



2



3

# Go to your project

The screenshot shows the Google Cloud console dashboard for project CSCI3329. The browser address bar displays the URL: `console.cloud.google.com/home/dashboard?project=csci3329-414817&organizationId=0`. The top navigation bar includes the Google Cloud logo, the project name "CSCI3329", a search bar, and utility icons. Below the navigation bar, the main content area is divided into three columns. The left column contains a "Project info" card with details such as Project name (CSCI3329), Project number (563350950386), and Project ID (csci3329-414817). A red arrow points to the hamburger menu icon in the top left corner of the dashboard. The middle column displays an "APIs" card with a line chart showing "Requests (requests/sec)" over time, with a message indicating "No data is available for the selected time frame." The right column contains a "Google Cloud Platform status" card showing "All services normal" and a "Billing" card showing "Estimated charges" of USD \$0.00 for the billing period Feb 1 - 19, 2024.

Project info

- Project name: CSCI3329
- Project number: 563350950386
- Project ID: csci3329-414817

[ADD PEOPLE TO THIS PROJECT](#)

[Go to project settings](#)

Resources

APIs

Requests (requests/sec)

No data is available for the selected time frame.

10:30 10:45 11 AM

[Go to APIs overview](#)

Google Cloud Platform status

All services normal

[Go to Cloud status dashboard](#)

Billing

Estimated charges: USD \$0.00  
For the billing period Feb 1 - 19, 2024

[Take a tour of billing](#)

[View detailed charges](#)

Cloud overview >

Products & solutions >

PINNED PRODUCTS

API APIs & Services

Billing

IAM & Admin

Marketplace

Compute Engine

Kubernetes Engine

Cloud Storage

BigQuery

VPC network

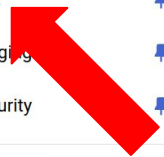
Cloud Run

SQL

Logging

Security

MORE PRODUCTS



RECOMMENDATIONS

API APIs

Requests (requests/sec)

No data is available for the se

10:30 10:45

Go to APIs overview

## Cloud SQL

Cloud SQL offers a fully-managed database service for MySQL, PostgreSQL, and SQL Server, reducing your overall cost of operations and freeing up teams to focus on innovation

[CREATE INSTANCE](#)[↔ MIGRATE DATA](#)

### Steps to get started

- 1 Create an instance**  
Choose your database engine and initial configurations
- 2 Set up networking and connect**  
Explore networking security options, like Cloud SQL Proxy. Then, hook up to a cloud service or your local machine.
- 3 Move in data**  
Import from Cloud Storage, or use Database Migration





### Choose your database engine

#### MySQL

Versions: 8.0, 5.7, 5.6

Choose MySQL

#### PostgreSQL

Versions: 15, 14, 13, 12, 11, 10, 9.6

Choose PostgreSQL

#### SQL Server

Versions: 2022, 2019, 2017

Choose SQL Server

Want more context on the Google Cloud database engines? [Learn more](#)



← Create a MySQL instance

📘 In order to create an instance, you have to enable the Compute Engine API first. [Learn more](#) ↗

ENABLE API



### Create a MySQL instance

#### Instance info

Instance ID \*  
mysqlserver

Use lowercase letters, numbers, and hyphens. Start with a letter.

Password \*  
1234qwer GENERATE

Set a password for the root user. [Learn more](#)

No password

#### PASSWORD POLICY

Database version \*  
MySQL 8.0

#### SHOW MINOR VERSIONS

#### Choose a Cloud SQL edition

A Cloud SQL edition determines foundational characteristics of your instance and cannot be changed later. Choose based on your price and performance needs. [Learn more](#)

Enterprise Plus

- 99.99% availability for eligible instances
- High-performance machines, up to 128 vCPUs
- Up to 35 days point-in-time recovery
- Data cache (optional)

Enterprise

- 99.95% availability SLA for eligible instances
- General purpose machines, up to 96 vCPUs
- Up to 7 days point-in-time recovery

Choose a preset for this edition. Presets can be customized later as needed.

Sandbox

#### COMPARE EDITION PRESETS

#### Choose region and zonal availability

For better performance, keep your data close to the services that need it. Region is permanent, while zone can be changed any time.

Region  
us-central1 (Iowa)

#### Zonal availability

Single zone  
In case of outage, no failover. Not recommended for production.

Multiple zones (Highly available)  
Automatic failover to another zone within your selected region. Recommended for production instances. Increases cost.

#### SPECIFY ZONES

#### Customize your instance

You can also customize instance configurations later

#### SHOW CONFIGURATION OPTIONS

CREATE INSTANCE CANCEL

#### Pricing estimate

\$0.14 per hour (estimated, without discounts)

That's about \$3.38 per day

Feature usage and traffic costs aren't included in estimate

#### SHOW COST BREAKDOWN

#### Summary

Cloud SQL Edition	Enterprise
Region	us-central1 (Iowa)
DB Version	MySQL 8.0
vCPUs	2 vCPU
Memory	8 GB
Data Cache	Disabled
Storage	10 GB
Connections	Public IP
Backup	Automated
Availability	Single zone
Point-in-time recovery	Enabled
Network throughput (MB/s)	500 of 500
Disk throughput (MB/s)	Read: 4.8 of 240.0 Write: 4.8 of 240.0
IOPS	Read: 300 of 15,000 Write: 300 of 15,000

Please do NOT forget your root password!  
Just put 1234qwer.

Need more configurations



production instances. Increases cost.

▼ SPECIFY ZONES

## Customize your instance

You can also customize instance configurations later

### Machine configuration

Machine has 2 vCPUs and 8 GB of memory.



### Storage

Storage type is SSD. Storage size is 10 GB, and will automatically scale as needed.

Google-managed key enabled (most common).



### Connections

Public IP enabled



### Data Protection

Automatic backups enabled. Point-in-time recovery (via binary logs) enabled.

Instance deletion protection enabled.



### Maintenance

Updates may occur any day of the week. Cloud SQL chooses the maintenance timing.



### Flags

No flags set.



### Query insights

Query insights disabled



### Labels

No labels set



^ HIDE CONFIGURATION OPTIONS

CREATE INSTANCE

CANCEL



## Connections

Choose how you want your source to connect to this instance, then define which networks are authorized to connect. [Learn more](#)

You can use the Cloud SQL Proxy for extra security with either option. [Learn more](#)

### Instance IP assignment

Private IP

Assigns an internal, Google-hosted VPC IP address. Requires additional APIs and permissions. Can't be disabled once enabled. [Learn more](#)

Public IP

Assigns an external, internet-accessible IP address. Requires using an authorized network or the Cloud SQL Proxy to connect to this instance. [Learn more](#)

### Authorized networks

You can specify CIDR ranges to allow IP addresses in those ranges to access your instance. [Learn more](#)



You have not authorized any external networks to connect to your Cloud SQL instance. External applications can still connect to the instance through the Cloud SQL Proxy. [Learn more](#)

[ADD A NETWORK](#)

### Google Cloud services authentication

Enable private path

Allows other Google Cloud services like BigQuery to access data and make queries over Private IP. [Learn more](#)

## Data Protection

Automatic backups enabled. Point-in-time recovery (via binary logs) enabled. 

or the Cloud SQL Proxy to connect to this instance. [Learn more](#)

### Authorized networks

You can specify CIDR ranges to allow IP addresses in those ranges to access your instance. [Learn more](#)



You have added 0.0.0.0/0 as an allowed network. This prefix will allow any IPv4 client to pass the network firewall and make login attempts to your instance, including clients you did not intend to allow. Clients still need valid credentials to successfully log in to your instance.

### New network



Name

all

Use [CIDR notation](#)

Network \*

0.0.0.0/0

Example: 199.27.25.0/24

DONE

[ADD A NETWORK](#)

### Google Cloud services authorization



Enable private path

Allows other Google Cloud services like BigQuery to access data and make queries over Private IP. [Learn more](#)

### Data Protection

- Enable private path  
Allows other Google Cloud services like BigQuery to access data and make queries over Private IP. [Learn more](#) 
- 

### Data Protection

Automatic backups enabled. Point-in-time recovery (via binary logs) enabled.  
Instance deletion protection enabled.

---

### Maintenance

Updates may occur any day of the week. Cloud SQL chooses the maintenance timing.

---

### Flags

No flags set.

---

### Query insights

Query insights disabled

---

### Labels

No labels set

---

[^ HIDE CONFIGURATION OPTIONS](#)

 **CREATE INSTANCE**

CANCEL

It takes about 5 min to create.

All instances &gt; mysqlserver

## mysqlserver

MySQL 8.0

Chart  
CPU utilization

**⚠** No data is available for the selected time frame.

UTC-6 1:00 PM 2:00 PM 3:00 PM 4:00 PM 5:00 PM 6:00 PM 7:00 PM 8:00 PM 9:00 PM 10:00 PM 11:00 PM Feb 19 1:00 AM 2:00 AM 3:00 AM 4:00 AM 5:00 AM 6:00

→ [Go to Query insights for more in-depth info on queries and performance](#)

### Connect to this instance

Public IP address

34.133.146.186

Connection name

csci3329-414817:us-central1:mysqlserver

### Need help connecting?

Review the documentation to learn about the many ways to connect to your instance.

[Learn more](#)

To connect using a cloud.

### Configuration

vCPUs  
2Memory  
8 GB

Enterprise edition [UPGRADE](#)

Database version is MySQL 8.0.31

Auto storage increase is enabled

Automated backups are enabled

# Install MySQL Workbench



The world's most popular open source database



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• [MySQL Database Service](#)

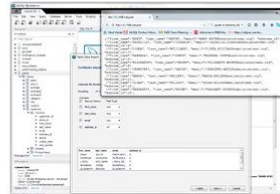
• [MySQL Enterprise Edition](#)

- [Datasheet \(PDF\)](#)
- [Technical Specification](#)
- [MySQL Database](#)
- [MySQL Document Store](#)
- [Oracle Enterprise Manager](#)
- [Enterprise Monitor](#)
- [Enterprise Backup](#)
- [Enterprise HA](#)
- [Enterprise Scalability](#)
- [Enterprise Authentication](#)
- [Enterprise TDE](#)
- [Enterprise Encryption](#)
- [Enterprise Masking](#)
- [Enterprise Firewall](#)

## MySQL Workbench

Enhanced Data Migration

[Download Now »](#)



MySQL Workbench is a unified visual tool for database architects, developers, and DBAs. MySQL Workbench provides data modeling, SQL development, and comprehensive administration tools for server configuration, user administration, backup, and much more. MySQL Workbench is available on Windows, Linux and Mac OS X.

### Design

MySQL Workbench enables a DBA, developer, or data architect to visually design, model, generate, and manage databases. It includes everything a data modeler needs for creating complex ER models, forward and reverse engineering, and also delivers key features for performing difficult change management and documentation tasks that normally require much time and effort.

[Learn More »](#)

### Develop

MySQL Workbench delivers visual tools for creating, executing, and optimizing SQL queries. The SQL Editor provides color syntax highlighting, auto-complete, reuse of SQL snippets, and execution history of SQL. The Database Console provides a visual interface to work with standard database operations. Includes MySQL Shell.

### MySQL Workbench Home



[View Screenshot:](#)  
[Windows, Linux, OS X](#)

# Welcome to MySQL Workbench

MySQL Workbench is the official graphical user interface (GUI) tool for MySQL. It allows you to design, create and browse your database schemas, work with database objects and insert data as well as design and run SQL queries to work with stored data. You can also migrate schemas and data from other database vendors to your MySQL database.

[Browse Documentation >](#)

[Read the Blog >](#)

[Discuss on the Forums >](#)

## MySQL Connections

MySQL Workbench could not detect any MySQL server running.  
This means that MySQL is not installed or is not running.

[Rescan servers](#)



## Setup New Connection



Connection Name:  Type a name for the connection

Connection Method:  Method to use to connect to the RDBMS

Parameters SSL Advanced

Hostname:  Port:  Name or IP address of the server host - and TCP/IP port.

Username:  Name of the user to connect with.

Password:   The user's password. Will be requested later if it's not set.

Default Schema:  The schema to use as default schema. Leave blank to select it later.

## Connect to MySQL Server

Please enter password for the following service:



Service: Mysql@104.197.75.126:3306

User: root

Password:

.....



Save password in keychain

OK

Cancel



### Successfully made the MySQL connection

Information related to this connection:

Host: 104.197.75.126

Port: 3306

User: root

SSL: enabled with ECDHE-RSA-AES128-GCM-SHA256

A successful MySQL connection was made with the parameters defined for this connection.

OK

# Welcome to MySQL Workbench


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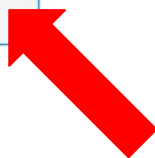
[Browse Documentation >](#)[Read the Blog >](#)[Discuss on the Forums >](#)

## MySQL Connections

google cloud mysql server

 root

 104.197.75.126:3306



**MANAGEMENT**

- Server Status
- Client Connections
- Users and Privileges
- Status and System Variable
- Data Export
- Data Import/Restore

**INSTANCE**

- Startup / Shutdown
- Server Logs
- Options File

**PERFORMANCE**

- Dashboard
- Performance Reports
- Performance Schema Setup



1



Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

No object selected

# Create a database

```
CREATE DATABASE database_name;
```

For example,

```
CREATE DATABASE carmax;
```



google cloud mysql server

File Edit View Query Database Server Tools Scripting Help



Administration Schemas

Query 1

**MANAGEMENT**

- Server Status
- Client Connections
- Users and Privileges
- Status and System Variable
- Data Export
- Data Import/Restore

**INSTANCE**

- Startup / Shutdown
- Server Logs
- Options File

**PERFORMANCE**

- Dashboard
- Performance Reports
- Performance Schema Setup



Limit to 1000 rows

```
1 • CREATE DATABASE carmax;
```

Object Info Session

No object selected

SQL Editor Opened.

# How to run SQL statements

After that, if you press the "lightning" button, it would all the code inside the text-area box. Otherwise, you can highlight and press the lightning button to execute only specific portions of the script.

If you want to run a single statement which your cursor is pointing, press the second lightning button.



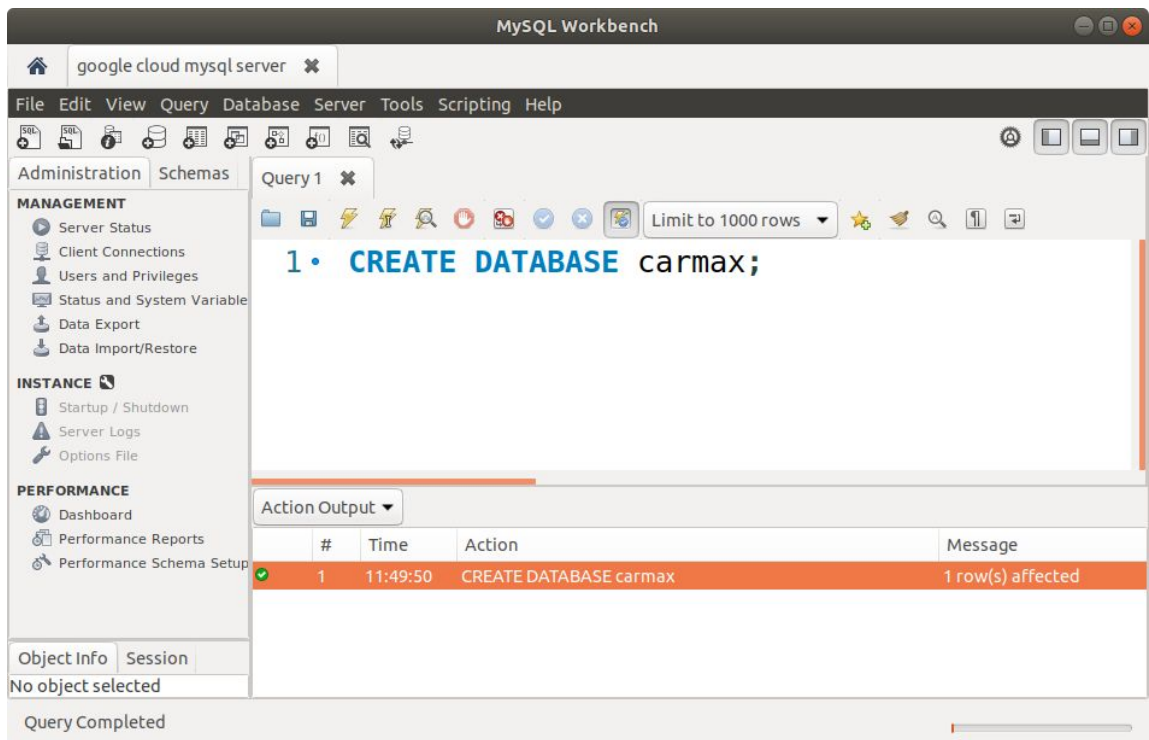


# How to run SQL statements

The green light means that your SQL statement is successfully processed.

Let's double-check if carmax is created or not using the command below.

```
SHOW DATABASES;
```



The screenshot shows the MySQL Workbench interface. The main window displays a query editor with the following SQL statement:

```
1 • CREATE DATABASE carmax;
```

Below the query editor, the Action Output window shows the execution results:

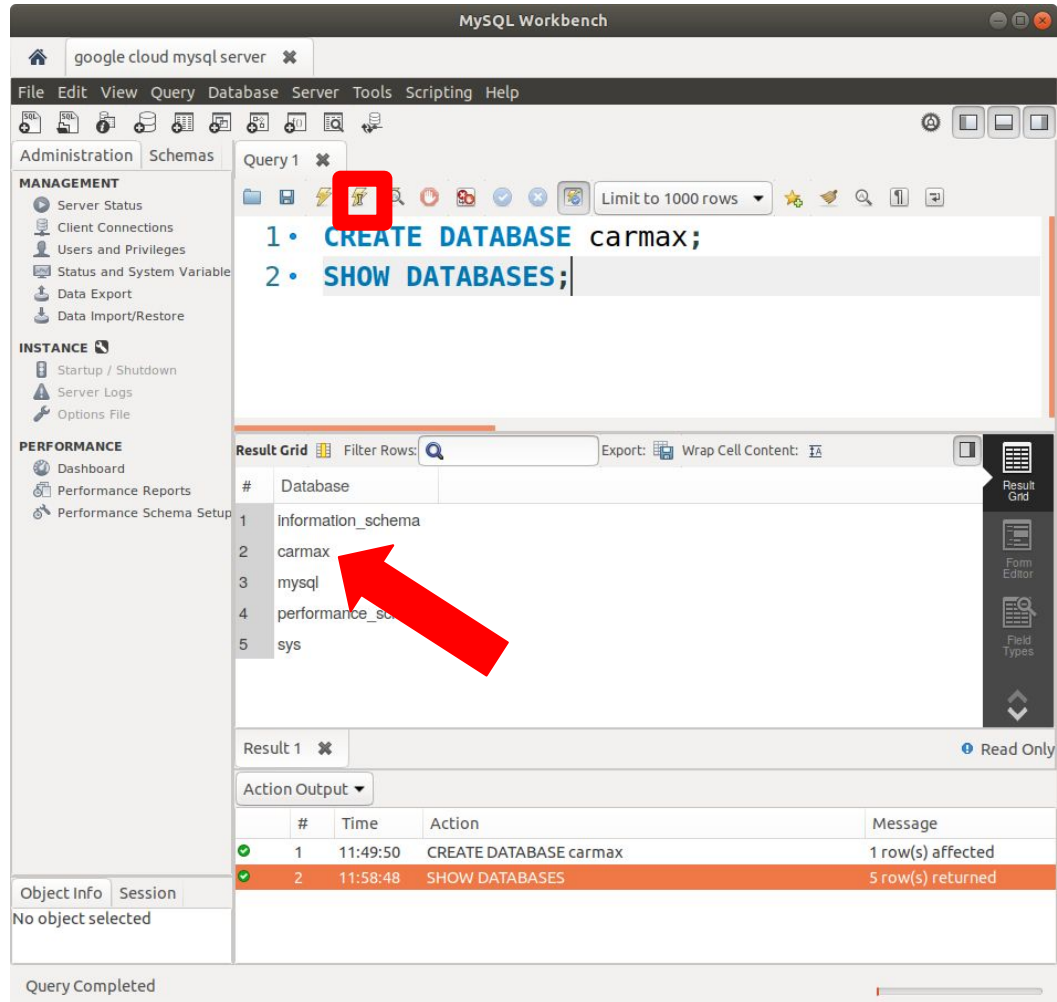
#	Time	Action	Message
✓ 1	11:49:50	CREATE DATABASE carmax	1 row(s) affected

The status bar at the bottom of the window indicates "Query Completed".

# SHOW DATABASES;

Don't forget to click the second lightning button for executing only a single statement (`SHOW DATABASES;`), which is on the current cursor.

The result shows that there is a new database, `carmax`.



The screenshot shows the MySQL Workbench interface. The query editor contains two statements: `1 • CREATE DATABASE carmax;` and `2 • SHOW DATABASES;`. The second statement is highlighted with a red box. Below the query editor, the 'Result Grid' shows the output of the `SHOW DATABASES;` command, listing five databases: `information_schema`, `carmax`, `mysql`, `performance_schema`, and `sys`. A red arrow points to the `carmax` entry. The 'Action Output' pane at the bottom shows the execution log for both statements, with the second statement's output highlighted in orange.

#	Time	Action	Message
1	11:49:50	CREATE DATABASE carmax	1 row(s) affected
2	11:58:48	SHOW DATABASES	5 row(s) returned

# USE database\_name;

In order to use a database, you have to specify which database you want to use.

Note that you can create multiple databases in a DBMS.

```
USE database_name;
```

For example,

```
USE carmax;
```

MySQL Workbench

google cloud mysql server

File Edit View Query Database Server Tools Scripting Help

Administration Schemas Query 1

**MANAGEMENT**

- Server Status
- Client Connections
- Users and Privileges
- Status and System Variable
- Data Export
- Data Import/Restore

**INSTANCE**

- Startup / Shutdown
- Server Logs
- Options File

**PERFORMANCE**

- Dashboard
- Performance Reports
- Performance Schema Setup

Limit to 1000 rows

1. **CREATE DATABASE** carmax;
2. **SHOW DATABASES;**
3. **USE** carmax;

Action Output

#	Time	Action	Message
✓ 1	11:49:50	CREATE DATABASE carmax	1 row(s) affected
✓ 2	11:58:48	SHOW DATABASES	5 row(s) returned
✓ 3	12:06:11	USE carmax	0 row(s) affected

Object Info Session

No object selected

Query Completed

# Create a table

```
CREATE TABLE table_name (column_name type, column_name type);
```

For example,

```
CREATE TABLE cars (vin VARCHAR(5), brand VARCHAR(20),  
model VARCHAR(20), year INT, mileage INT, price INT,  
color VARCHAR(20)  
);
```

MySQL Workbench

google cloud mysql server

File Edit View Query Database Server Tools Scripting Help

Administration Schemas Query 1

MANAGEMENT

- Server Status
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- Status and System Variable
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- Data Import/Restore

INSTANCE

- Startup / Shutdown
- Server Logs
- Options File

PERFORMANCE

- Dashboard
- Performance Reports
- Performance Schema Setup

Limit to 1000 rows

```

1 • CREATE DATABASE carmax;
2 • SHOW DATABASES;
3 • USE carmax;
4 • CREATE TABLE cars
5 (vin VARCHAR(5),
6 brand VARCHAR(20),
7 model VARCHAR(20),
8 year INT,
9 mileage INT,
10 price INT,
11 color VARCHAR(20)
12 );

```

Action Output

#	Time	Action	Message
1	11:49:50	CREATE DATABASE carmax	1 row(s) affected
2	11:58:48	SHOW DATABASES	5 row(s) returned
3	12:06:11	USE carmax	0 row(s) affected
4	12:33:13	CREATE TABLE cars (vin VARCHAR(5), brand VARCHAR(20), model VARCHAR(20), year INT, mileage INT, price INT, color VARCHAR(20))	0 row(s) affected

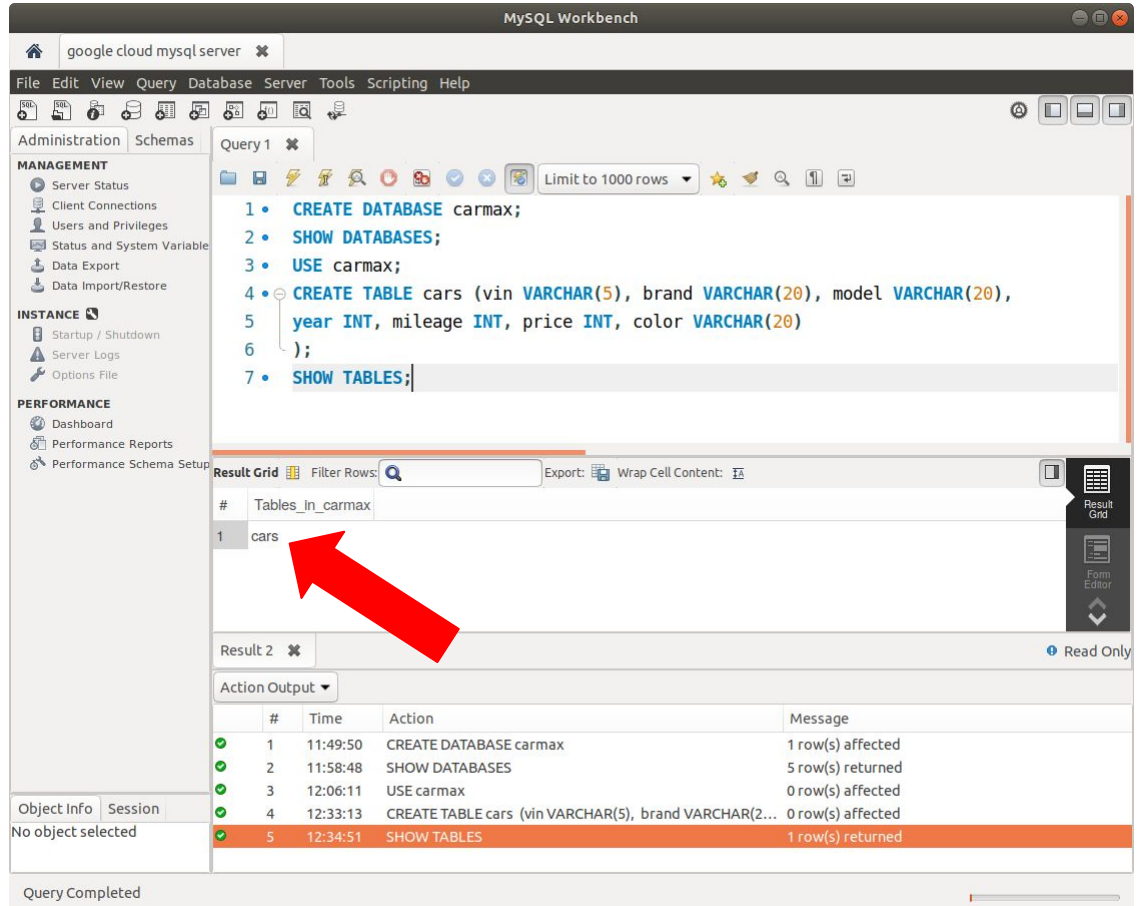
Object Info Session

No object selected

Query Completed

# SHOW TABLES;

SHOW TABLES; statement returns the list of tables in the database you are using currently.



The screenshot shows the MySQL Workbench interface. The query editor contains the following SQL statements:

```
1 • CREATE DATABASE carmax;
2 • SHOW DATABASES;
3 • USE carmax;
4 • CREATE TABLE cars (vin VARCHAR(5), brand VARCHAR(20), model VARCHAR(20),
5   year INT, mileage INT, price INT, color VARCHAR(20)
6   );
7 • SHOW TABLES;
```

The results pane shows the output of the `SHOW TABLES;` statement:

#	Tables_in_carmax
1	cars

A red arrow points to the 'cars' table in the results grid.

The Action Output pane shows the execution log:

#	Time	Action	Message
1	11:49:50	CREATE DATABASE carmax	1 row(s) affected
2	11:58:48	SHOW DATABASES	5 row(s) returned
3	12:06:11	USE carmax	0 row(s) affected
4	12:33:13	CREATE TABLE cars (vin VARCHAR(5), brand VARCHAR(20), model VARCHAR(20), year INT, mileage INT, price INT, color VARCHAR(20))	0 row(s) affected
5	12:34:51	SHOW TABLES	1 row(s) returned

Query Completed

Insert a row  
(see the  
slide page  
10)

The screenshot shows the MySQL Workbench interface with a query window containing the following SQL code:

```
1 • CREATE DATABASE carmax;
2 • SHOW DATABASES;
3 • USE carmax;
4 • CREATE TABLE cars (vin VARCHAR(5), brand VARCHAR(20), model VARCHAR(20),
5   year INT, mileage INT, price INT, color VARCHAR(20)
6   );
7 • SHOW TABLES;
8 • INSERT INTO cars VALUES ('684YT', 'Toyota', 'Camry', 2016, 40000, 8000, 'Black');
```

The Action Output window displays the results of the queries:

#	Time	Action	Message
✓ 1	11:49:50	CREATE DATABASE carmax	1 row(s) affected
✓ 2	11:58:48	SHOW DATABASES	5 row(s) returned
✓ 3	12:06:11	USE carmax	0 row(s) affected
✓ 4	12:33:13	CREATE TABLE cars (vin VARCHAR(5), brand VARCHAR(20), model VARCHAR(20), year INT, mileage INT, price INT, color VARCHAR(20))	0 row(s) affected
✓ 5	12:34:51	SHOW TABLES	1 row(s) returned
✓ 6	12:44:07	INSERT INTO cars VALUES ('684YT', 'Toyota', 'Camry', 2016, 40000, 8000, 'Black')	1 row(s) affected

At the bottom of the window, it says "Query Completed".

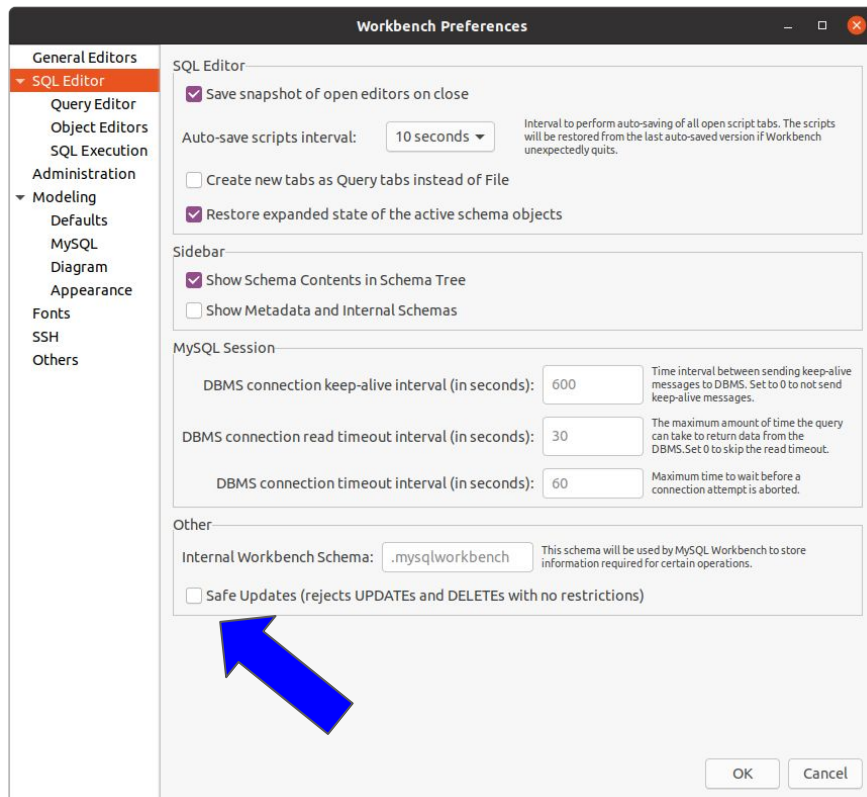


# delete

To delete a record, first you have to uncheck an special option on MySQL.

In MySQL Workbench, go to preference/setting and select SQL Editor on the left side menu. Then, find out “safe UPDATES (rejects UPDATES and DELETES with no restrictions)” on “Other” part and uncheck it.

\*you have to reconnect to the server after unchecking.



# Lab 20

Add five entries to the "**cars**" table using MySQL Workbench and SQL commands.

Execute the SQL query: "**SELECT \* FROM cars;**"

Provide a screenshot displaying the result of the executed SQL query.

# Hint

```
INSERT INTO cars VALUES ('GT123', 'Toyota', 'Camry', 2008, 70000, 8000, 'Black');
```

```
INSERT INTO cars VALUES ('AB382', 'Honda', 'Accord', 2014, 10000, 18000, 'White');
```

```
INSERT INTO cars VALUES ('Y3829', 'Hyundai', 'Sonata', 2013, 20000, 17000, 'Silver');
```

```
INSERT INTO cars VALUES ('P3726', 'BMW', 'E350', 2009, 60000, 25000, 'Silver');
```

```
INSERT INTO cars VALUES ('4TX88', 'Ford', 'F150', 2017, 12, 38500, 'Red');
```