Start Lab 01:00:00

Exemplar: Filter a SQL query

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★★★★★

This lab may incorporate AI tools to support your learning.

Lab instructions and hints
Activity overview
Scenario
Start the lab
Task 1. List all organization machines
Task 2. Retrieve a list of the machines with OS 2
Task 3. List employees in specific departments
Task 4. Identify employee machines
Conclusion
End your lab

Activity overview

As a security analyst, knowing how to make better queries to retrieve specific pieces of data can help you find security related information you need more efficiently.

In this lab activity, you'll apply basic filters to SQL queries to retrieve information from a MariaDB database.

MariaDB is a popular open-source relational database that is compatible with MySQL.

This activity provides you with a great opportunity to apply what you've learned and add filters to SQL queries.

Note: *The terms* **row** *and* **record** *are used interchangeably in this lab activity.*

Scenario

In this scenario, you need to get specific information about employees, their machines, and the organization's machines. This data is critical to be able to perform various tasks, such as updating patches, ensuring many users in certain departments, and sending an alert to an employee with an issue on a machine.

You are responsible for finding the required information by querying a database. You'll add filters to your queries to locate the information more quickly.

Here's how you'll do this task: **First**, you'll list all organization machines and their operating systems. **Next**, you'll list all machines with the operating system OS 2. **Third**, you'll list all the employees in the Finance and Sales departments. **Fourth**, you'll obtain information about machines.

You're ready to add filters to SQL queries.

Note: *In this lab you'll be working with the organization database and the tables it contains.*

The lab starts with the organization database in the MariaDB shell that is already open. This means you can start with the tasks as soon as you click the **Start Lab** *button.*

If you unintentionally exit the organization database in the MariaDB shell, you can reconnect by running the `sudo mariadb organization` *command.*

Disclaimer: *For optimal performance and compatibility, it is recommended to use either* **Google Chrome** *or* **Mozilla Firefox** *browsers while accessing the lab.*

Start the lab

You'll need to start the lab before you can access the materials. To do this, click the green "Start Lab" button at the top of the screen.

Start Lab

After you click the **Start Lab** button, you will see a shell, where you will be performing further steps in the lab. You should have a shell like this:

```
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 4
Server version: 10.11.14-MariaDB-0ubuntu0.24.04

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

MariaDB [organization]> clear
MariaDB [organization]>
```

When you have completed all the tasks, refer to the **End your Lab** section that follows the tasks for information on how to end your lab.

Task 1. List all organization machines

In this task, you need to get a list of all organization machines and their operating systems. The data is contained in the `machines` table. You'll need to use the `SELECT` keyword to retain specific columns.

- Run a SQL query to retrieve only the `device_id` and `operating_system` columns from the `machines` table.

The command to complete this step:

```
SELECT device_id, operating_system
FROM machines;
```

The output lists only the selected columns from all the rows in the `machines` table:

```
+------------+------------------+
| device_id  | operating_system |
+------------+------------------+
| a1b8d37b7b87 | OS 7             |
| a7b317a7bf8f | OS 2             |
| a2d4b9167d8 | OS 8             |
| a977b8f8c4b4 | OS 7             |
| a4b7b7b7b7b7 | OS 2             |
| a298b47fc373 | OS 5             |
| ...          | ...              |
+------------+------------------+
200 rows in set (0.025 sec)
```

How many rows were returned from the machines table? (You can view the number of rows at the bottom of the output.)

- 200
- 300
- 100
- 250

Submit

Answer: The `machines` table returned 200 rows.

Click **Check my progress** to verify that you have completed this task correctly.

List all organization machines

Check my progress

Task 2. Retrieve a list of the machines with OS 2

In this task, you need to obtain a list of all machines with the `OS 2` operating system because these machines need an update. To get this information, you'll run your first SQL query with a filter.

- Select all the records from the `machines` table with a value of `'OS 2'` in the `operating_system` column. Replace the value `1` with the correct string:

```
SELECT device_id, operating_system
FROM machines
WHERE operating_system = '1';
```

The command to complete this step:

```
SELECT device_id, operating_system
FROM machines
WHERE operating_system = 'OS 2';
```

The output displays the selected columns of the `machines` table, filtered by the operating system:

```
+------------+------------------+
| device_id  | operating_system |
+------------+------------------+
| a7b317a7bf8f | OS 2             |
| a2d4b9167d8 | OS 2             |
| a4b7b7b7b7b7 | OS 2             |
| a298b47fc373 | OS 2             |
| b2bb4775b877 | OS 2             |
| ...          | ...              |
+------------+------------------+
80 rows in set (0.264 sec)
```

How many machines in the database use the OS 2 operating system?

- 80
- 300
- 44
- 90

Submit

Answer: There are 80 machines in the database that use the OS 2 operating system.

Click **Check my progress** to verify that you have completed this task correctly.

Retrieve a list of the machines with OS 2

Check my progress

Task 3. List employees in specific departments

In this task, you need to retrieve a list of all the employees in the Finance and Sales departments to obtain their office numbers. A notice about handling confidential financial information will be posted to these offices.

1. Filter the rows returned from `department` column in the `employees` table to include only employees from the `'Finance'` department. Replace `1` with the appropriate column name and `2` with the appropriate value to complete the filter:

```
SELECT *
FROM employees
WHERE 2='1';
```

The correct query to solve this step:

```
SELECT *
FROM employees
WHERE department = 'Finance';
```

The output displays the contents of the `employees` table, including only employees in the Finance department.

What is the employee_id of the first row returned?

- 1000
- 1116
- 1001
- 1049

Submit

Answer: The `employee_id` of the first row returned is 1000.

2. Modify the previous query so that it returns employees who are in the `'Sales'` department.

The correct query to solve this step:

```
SELECT *
FROM employees
WHERE department = 'Sales';
```

The output will display the contents of the `employees` table, including only employees in the Sales department.

How many employees work in the Sales department?

- 37
- 42
- 13
- 33

Submit

Answer: There are 33 employees who work in the Sales department.

Click **Check my progress** to verify that you have completed this task correctly.

List employees in specific departments

Check my progress

Task 4. Identify employee machines

Your team recently discovered that there are issues with machines in the South building. In this task, you need to obtain certain employee and computer information.

A machine in `'South-101'` has an issue. You need to determine which employee uses that computer so you can send them an alert.

1. Write a query to identify which employee uses the office in `'South-101'`. (The data must be returned from the `office` column in the `employees` table.)

The correct query to solve this step:

```
SELECT *
FROM employees
WHERE office = 'South-101';
```

Which of the following employees uses the computer with the issue?

- tomichell
- jhensley
- harmon
- jhill

Submit

Answer: The user ID of the employee with the computer issue is jhensley.

Now, your team has determined that there is an issue with all the machines in the South building. Offices in the organization are named with the building name, a hyphen, and the office number in that building (for example, `'South-101'`).

2. Modify the query you used in the previous step so that it returns information on all the employees in the `'South'` building. Use the `LIKE` operator with `%` in this query.

The correct query to solve this step:

```
SELECT *
FROM employees
WHERE office LIKE 'South%';
```

Note: *The* `%` *LIKE keyword in SQL performs simple string matches. The matching pattern may include the wildcard* `%` *to represent a string of any length. The wildcard may be placed both before and after the targeted substring.*

Which department does the first employee listed in the South building belong to?

- Information Technology
- Marketing
- Sales
- Finance

Submit

Answer: The first employee on the list returned works in the Finance department.

Click **Check my progress** to verify that you have completed this task correctly.

Identify employee machines

Check my progress

Conclusion

Great work!

You now have practical experience in using SQL to:

- apply the `WHERE` clause to filter what a SQL query returns and
- use the `LIKE` operator to filter for patterns.

You're well on your way to running SQL queries to get specific data from a database.

End your lab

Before you end the lab, make sure you're satisfied that you've completed all the tasks, and follow these steps:

1. Click **End Lab**. A pop-up box will appear. Click **Submit** to confirm that you've done. Ending the lab will remove your access to the Slash shell. You won't be able to access the work you've completed in a lab.
2. Another pop-up box will ask you to rate the lab and provide feedback comments. You can complete this if you choose to.
3. Close the browser tab containing the lab to return to your course.
4. Refresh the browser tab for the course to mark the lab as complete.