Exemplar: Filter with AND, OR, and NOT

Activity overview

As a security analyst, you'll likely need to analyze data. And often finding the specific data you'll need depends on more than one factor.

To retrieve specific pieces of information from the database, you can filter for multiple conditions. You can also filter for what does not match a particular condition.

In this lab activity, you'll use the AND, OR, and NOT operators to create more complex filters for SQL queries.

Get ready to practice running a few complex SQL queries!

Scenario

In this scenario, you need to obtain specific information about employees, their machines, and the departments they belong to from the database.

Your team needs data to investigate potential security issues and to update computers.

You are responsible for filtering the required information from the database.

Here's how you'll do this task: **First**, you'll retrieve all failed login attempts after business hours. **Second**, you'll retrieve all login attempts that occurred on specific dates. **Third**, you'll retrieve logins that didn't originate in Mexico. **Fourth**, you'll retrieve information about certain employees in the Marketing department. **Fifth**, you'll retrieve information about employees in the Finance or the Sales department. **Finally**, you'll obtain information about employees who are not in the Information Technology department.

***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 mysql organization command.

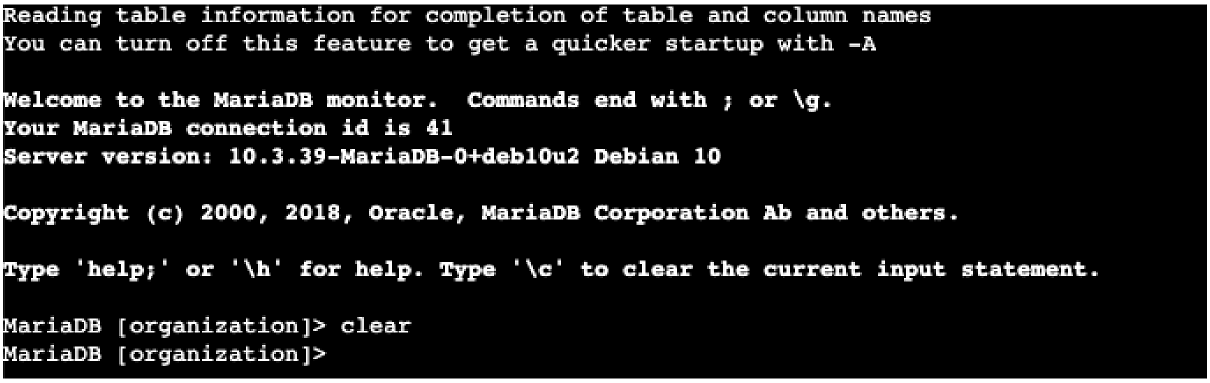
Disclaimer: For optimal performance and compatibility, it is recommended to use either **Google Chrome** or **Mozilla Firefox** browsers while accessing the labs.

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 41
Server version: 10.3.39-MariaDB-0+deb10u2 Debian 10

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. Retrieve after hours failed login attempts

Your team is investigating failed login attempts that were made after business hours. You want to retrieve this information from the login activity. You'll identify all unsuccessful attempts after 18:00.

The login_time column in the log_in_attempts table contains information on when login attempts were made. Office hours end at '18:00'.

The success column in the log_in_attempts table contains values of TRUE or FALSE to indicate whether the login was successful. MySQL stores Boolean values as 1 for TRUE, and 0 for FALSE. This means that TRUE is represented as 1, and FALSE represented as 0 in the success column.

- Use the AND operator to retrieve the failed login attempts that occurred after business hours. Replace the X and Y with the correct values to filter for the records you need:

SELECT *

FROM log_in_attempts

WHERE login_time > 'X' AND success = Y;

Note: *Values of TRUE and FALSE are not placed in single quotes because they are not string data. They are Boolean data, which is another data type.*

The command to complete this step:

```
SELECT *

FROM log_in_attempts

WHERE login_time > '18:00' AND success = FALSE;
```

How many failed login attempts occurred after 18:00?

19

44

39

20

Submit

Answer: There are 19 failed login attempts that occurred after 18:00.

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

Retrieve after hours failed login attempts

Check my progress

Task 2. Retrieve login attempts on specific dates

Your team is investigating a suspicious event that occurred on '2022-05-09'. You want to retrieve all login attempts that occurred on this day and the day before ('2022-05-08').

The login_date column in the log_in_attempts table contains information on the dates when login attempts were made.

- Use the OR operator to retrieve the failed login attempts on the specified days. Replace the X and Y with the correct values to filter for the records you need:

```
SELECT *

FROM log_in_attempts

WHERE login_date = 'X' OR login_date = 'Y';
```

The correct query to solve this step:

```
SELECT *

FROM log_in_attempts

WHERE login_date = '2022-05-09' OR login_date = '2022-05-08';
```

How many login attempts were made on these two days?

67

44

75

89

Submit

Answer: There are 75 login attempts in these two days.

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

Retrieve login attempts on certain dates.

Check my progress

Task 3. Retrieve login attempts outside of Mexico

Now, your team is investigating logins that did not originate in Mexico, and you need to find this information. Note that the country field includes entries with 'MEX' and 'MEXICO'. You should use the NOT and LIKE operators and the matching pattern 'MEX%'.

- Run the following SQL query to retrieve login attempts that did not originate in Mexico. Replace X with the correct operator and Y with the correct pattern to filter for the information you need:

```
SELECT *

FROM log_in_attempts

WHERE X country LIKE 'Y';
```

The correct query to solve this step:

```
SELECT *

FROM log_in_attempts

WHERE NOT country LIKE 'MEX%';
```

How many login attempts were made outside of Mexico?

194

73

122

144

Submit

Answer: There are 144 login attempts made outside of Mexico.

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

Retrieve login attempts outside of Mexico

Check my progress

Task 4. Retrieve employees in Marketing

For tasks 4, 5 and 6 you need to retrieve the information from the department and office columns in the employees table.

You can run the following SQL query if you need to view the columns and values in the employees table:

```
SELECT *

FROM employees;
```

Your team is updating employee machines, and you need to obtain the information about employees in the 'Marketing' department who are located in all offices in the East building (such as 'East-170' or 'East-320').

- Write a SQL query to retrieve this information from the employees table. Select all columns and include filters on the department and office columns to return only the needed records.

***Note:** You'll need to use the AND and LIKE operators to satisfy both of these criteria.*

The correct query to solve this step:

```
SELECT *

FROM employees

WHERE department = 'Marketing' AND office LIKE 'East%';
```

What is the username of the first employee in the Marketing department in the East building?

elarson

fbautist

jclark

alevitsk

Submit

Answer: The username of the first employee in the Marketing department in the East building is elarson.

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

Retrieve employees in Marketing.

Check my progress

Task 5. Retrieve employees in Finance or Sales

Now, your team needs to perform a different update to the computers of all employees in the Finance or the Sales department, and you need to locate information on these employees.

- Write a SQL query to retrieve records for employees in the 'Finance' or the 'Sales' department.

Note: *Even though both conditions are based on the same column, you need to write out both full conditions. This means that you must specify department as the column in both conditions.*

The correct query to solve this step:

```
SELECT *

FROM employees

WHERE department = 'Finance' OR department = 'Sales';
```

What is the username of the first employee in the Sales department returned by the query?

lrodriqu

bisles

sgilmore

tbarnes

Submit

Answer: The username of the first employee in the Sales department is lrodriqu.

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

Retrieve employees in Finance or Sales

Check my progress

Task 6. Retrieve all employees not in IT

Your team needs to make one more update. This update was already made to employee computers in the Information Technology department. The team needs information about employees who are not in that department. You should use the NOT operator to identify these employees.

- Write a SQL query to retrieve records for employees who are not in the 'Information Technology' department.

The correct query to solve this step:

```
SELECT *

FROM employees

WHERE NOT department = 'Information Technology';
```

How many employees are not in the Information Technology department?

122

161

188

170

Submit

Answer: There are 161 employees who aren’t in the Information Technology department.

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

Retrieve all employees not in IT.

Check my progress

Conclusion

Great work!

You now have practical experience in using SQL to

- run SQL queries to retrieve information from a database and
- apply AND, OR, and NOT operators to filter SQL queries.

You're well on your way to running complex 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're done. Ending the lab will remove your access to the Bash shell. You won't be able to access the work you've completed in it again.
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.