Exemplar: Perform a SQL query

Lab · 1 hour · No cost · Introductory

★★★★★

This lab may incorporate AI tools to support your learning.

Lab overview and tasks
Activity overview
Scenario
Start the lab
Task 1. Retrieve employee device data
Task 2. Investigate login activity
Task 3. Order login attempts data
Conclusion
End your lab

Activity overview

Previously, you learned how to use basic SQL queries to retrieve information from a database. You have also learned about using the `ORDER BY` keyword to sort data returned in an ascending or a descending order.

In this lab activity, you'll use `SELECT` and `FROM` in SQL to return the information you need from a database. You'll also use the `ORDER BY` keyword to sequence the information returned by a query based on a specified column.

It's important to know how to query information from a database because this is a common task you might encounter as a security analyst. You should know how to get the information you need to improve security and keep data safe.

With that in mind, it's time to explore the scenario.

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

Scenario

In this scenario, you have to determine which employee devices must be updated. You also need to investigate user login activity to explore if any unusual activity has occurred.

The information you need is located in the `machines` and `login_attempts` tables in the `organization` database.

Here's how you'll do this task: **First**, you'll obtain information on the employee devices that must be updated. **Next**, you'll examine the login attempts for unusual activity. **Finally**, you'll use the `ORDER BY` keyword to sort the data returned by your SQL queries.

OK, let's get ready to practice running your very first 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 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:

```
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 3
Server version: 10.3.39-MariaDB-0ubuntu0.20.04.1

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 employee device data

In this task, you need to obtain information on employee devices because your team needs to update them. The information you need is in the `machines` table in the `organization` database.

First, you need to retrieve all the information about the employee devices.

1. Run the following query to select all device information from the `machines` table:

```
SELECT *
FROM machines;
```

Note: *Using the asterisk (`*`) returns all data from the specified table. table names in MySQL are case-sensitive.*

The output returns all the contents of the `machines` table:

```
+------------+-----------+-------------+-----------+-------------+-------+
| device_id  | operating_system | email_client | OS_patch_date | employee_
+------------+-----------+-------------+-----------+-------------+-------+
| a7bb77fc7b7f | OS 7      |             | Email Client 1 | 2021-09-01  |       |
| a7bb78fc7b80 | OS 8      |             | Email Client 2 | 2021-09-02  |       |
| a8f8b9d7b7b8 | OS 2      |             | Email Client 2 | 2021-06-07  |       |
| a57fb6b2c4e5 | OS 1      |             | Email Client 3 | 2021-05-01  |       |
| a23f8b7257f8 | OS 3      |             | Email Client 2 | 2021-05-07  |       |
+------------+-----------+-------------+-----------+-------------+-------+
308 rows in set (0.236 sec)
```

2. Run the following query to select only the `device_id` and `email_client` columns from the `machines` table. Replace `*` with `device_id` and `*` with `email_client`:

```
SELECT *, * FROM machines;
```

The correct query to solve this step:

```
SELECT device_id, email_client
FROM machines;
```

The output should return only the selected columns of the `machines` table:

```
+------------+-------------+
| device_id  | email_client |
+------------+-------------+
| a7bb77fc7b7f | Email Client 1 |
| a7bb78fc7b80 | Email Client 1 |
| a8f8b9d7b7b8 | Email Client 2 |
| a57fb6b2c4e5 | Email Client 2 |
| a23f8b7257f8 | Email Client 2 |
+------------+-------------+
308 rows in set (0.072 sec)
```

What email client is returned in the third row?

- Email Client 2
- Email Client 3
- Email Client 1
- Email Client 3

Submit

Answer: The email client returned in the third row is Email Client 2.

Now, you need information on the operating systems used on various devices and their last patch date.

3. Complete the query to return only the `device_id`, `operating_system`, and `OS_patch_date` columns from the `machines` table. Replace `*`, `*`, and `*` with the columns that you need to return:

```
SELECT *, *, * FROM machines;
```

The correct query to solve this step:

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

What is the patch date of the first entry?

- 2021-09-01
- 2021-06-01
- 2021-03-01
- 2021-10-01

Submit

Answer: The patch date of the first entry is 2021-09-01.

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

Retrieve employee device data

Check my progress

Task 2. Investigate login activity

In this task, you need to analyze the information from the `log_in_attempts` table to determine if any unusual activity has occurred.

First, you need to investigate the locations where login attempts were made to ensure that they're in expected areas (the United States, Canada, or Mexico).

1. Write a SQL query to select the `event_id` and `country` columns from the `log_in_attempts` table.

The correct query to solve this step:

```
SELECT event_id, country
FROM log_in_attempts;
```

Were any login attempts made from Australia?

- No
- Yes

Submit

Answer: No. Login attempts were not made from Australia.

Next, you need to check if login attempts were made outside of the organization's working hours.

2. Write a SQL query that selects the `username`, `login_date`, and `login_time` columns from the `log_in_attempts` table.

The correct query to solve this step:

```
SELECT username, login_date, login_time
FROM log_in_attempts;
```

What username is returned in the fifth row?

- jrahad
- apatel
- dkot
- mrah

Submit

Answer: The username returned in the fifth row is jrahad.

Now, you need to get a complete picture of all login attempts.

3. Write a SQL query that selects all columns from the `log_in_attempts` table, using a single combined after the `SELECT` keyword.

The correct query to solve this step:

```
SELECT *
FROM log_in_attempts;
```

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

Investigate login activity

Check my progress

Task 3. Order login attempts data

In this task, you need to use the `ORDER BY` keyword. You'll sequence the data that your query returns according to the login date and time.

First, you need to sort the information by date.

1. Run the following query, which orders `log_in_attempts` data by `login_date`:

```
SELECT *
FROM log_in_attempts
ORDER BY login_date;
```

What are the username and login date of the first record returned?

- sbanksh on 2022-05-10
- lwilkerso on 2022-05-08
- dsquires on 2022-05-08
- mabadi on 2022-05-10

Submit

Answer: The first record returned contains a username of lwilkerso and a login date of 2022-05-08.

Now, you need to further organize the previous results by ordering them by `login_time`:

2. Modify the query from the previous step by adding the login time to the `ORDER BY` clause. You must replace `*` with the appropriate column name:

```
SELECT *
FROM log_in_attempts
ORDER BY login_date, *;
```

The correct query to solve this step:

```
SELECT *
FROM log_in_attempts
ORDER BY login_date, login_time;
```

What are the username and login time of the first record returned by the above query?

- wpatley at 00:13:55
- gmorse at 07:48:55
- pwashing at 09:06:12
- lisand at 08:19:11

Submit

Answer: The first record returned contains a username of lisand and a login time of 00:19:11.

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

Order login attempts data

Check my progress

Conclusion

Great work!

You have completed this activity, and you now have practical experience in running basic SQL queries to:

- select specific columns from a table,
- select all columns from a table by using an asterisk (`*`), and
- sort query results using the `ORDER BY` keyword.

These basic queries form the foundation for running more advanced queries and applying filters next.

End your lab

Before you end this 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 this lab will remove your access to the Bash shell. You won't be able to access the work you've completed if it again.
2. Another pop-up box will appear. 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.