Apply filters to SQL queries

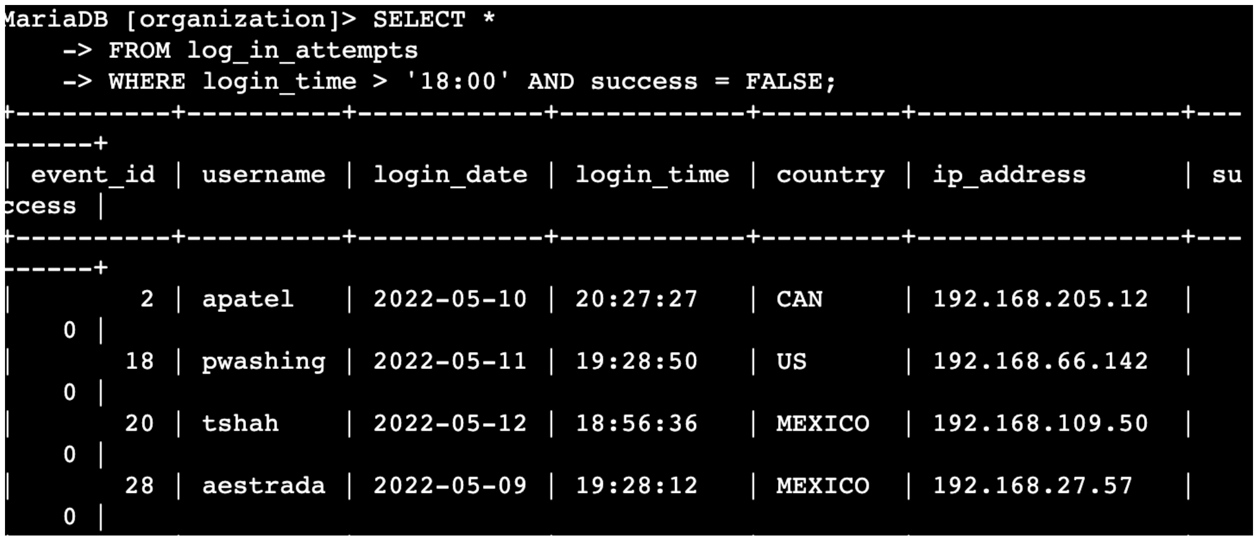
Project description

As a security analyst, I will perform security-related tasks to help keep the system safe. There are a few security issues that involve login attempts and employee machines, and it is my job to investigate all the security issues. I will also need to update employee computers to protect them against security vulnerabilities. The following steps show how I used SQL to query a specific database that contains login information.

Retrieve after hours failed login attempts

The organization noticed a potential security incident that happened after business hours. Login attempts that occurred after business hours and failed need to be queried.

To help investigate this issue, I queried the `log_in_attempts` database using a filter. This filter returns all the login attempts after business hours that failed.

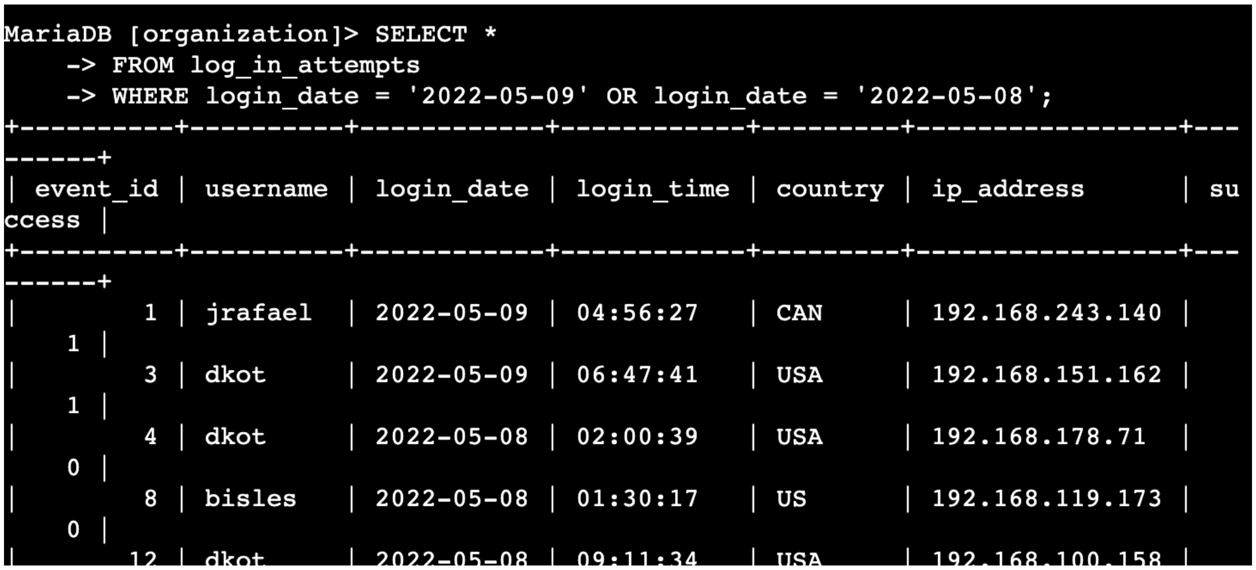


```
lariaDB [organization]> SELECT *
    -> FROM log_in_attempts
    -> WHERE login_time > '18:00' AND success = FALSE;
+----------+----------+------------+------------+---------+-----------------+---
------+
| event_id | username | login_date | login_time | country | ip_address      | su
ccess |
+----------+----------+------------+------------+---------+-----------------+---
------+
|        2 | apatel   | 2022-05-10 | 20:27:27   | CAN     | 192.168.205.12  |
    0 |
|       18 | pwashing | 2022-05-11 | 19:28:50   | US      | 192.168.66.142  |
    0 |
|       20 | tshah    | 2022-05-12 | 18:56:36   | MEXICO  | 192.168.109.50  |
    0 |
|       28 | aestrada | 2022-05-09 | 19:28:12   | MEXICO  | 192.168.27.57   |
    0 |
```

I selected all columns to be displayed so we could get all the information about the log-in attempt. The table that I queried from is the `log_in_attempts` table. Then, I used a filter:
`WHERE login_time > '18:00' AND success = 'FALSE';`
This filter returns all the failed login attempts after 6 PM. There are two filters applied here: the first one represents the after-business-hours filter, and the second one is for a failed attempt.

Retrieve login attempts on specific dates

The organization reported that a suspicious login attempt occurred on 2022-05-09. As a security analyst, I need to investigate all the login attempts on 2022-05-09 and the day before. The screenshot shows how I used an SQL query to filter for login attempts on those specific dates.

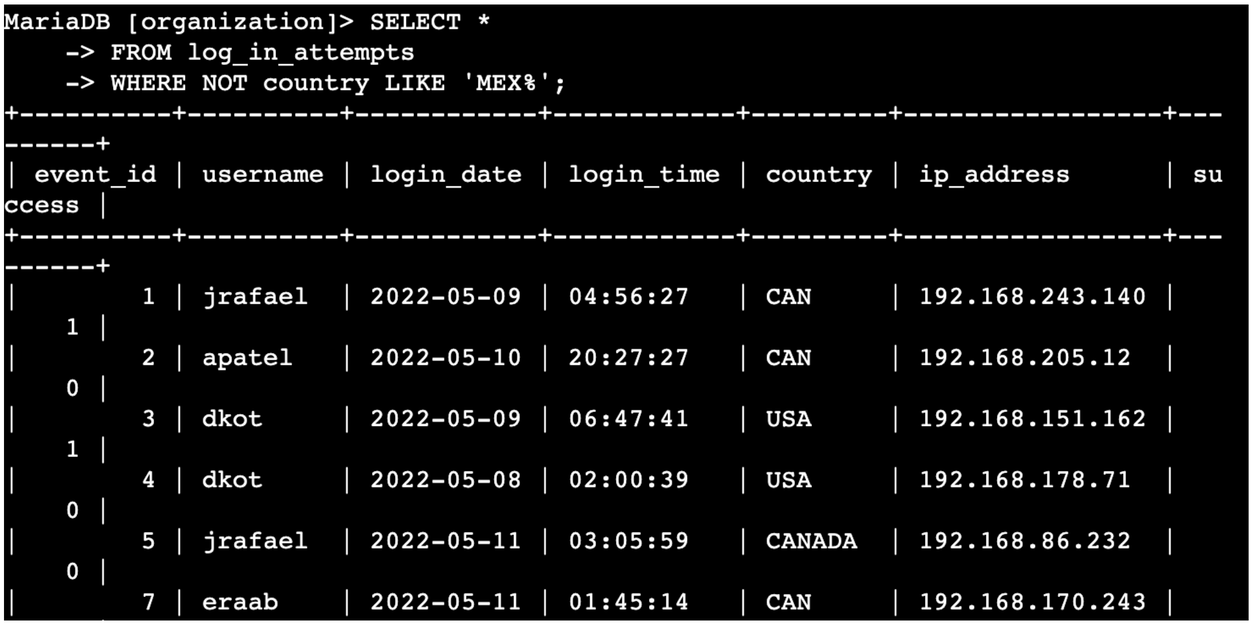


```
MariaDB [organization]> SELECT *
    -> FROM log_in_attempts
    -> WHERE login_date = '2022-05-09' OR login_date = '2022-05-08';
+----------+----------+------------+------------+---------+-----------------+---
------+
| event_id | username | login_date | login_time | country | ip_address      | su
ccess |
+----------+----------+------------+------------+---------+-----------------+---
------+
|        1 | jrafael  | 2022-05-09 | 04:56:27   | CAN     | 192.168.243.140 |
    1 |
|        3 | dkot     | 2022-05-09 | 06:47:41   | USA     | 192.168.151.162 |
    1 |
|        4 | dkot     | 2022-05-08 | 02:00:39   | USA     | 192.168.178.71  |
    0 |
|        8 | bisles   | 2022-05-08 | 01:30:17   | US      | 192.168.119.173 |
    0 |
|       12 | dkot     | 2022-05-08 | 09:11:34   | USA     | 192.168.100.158 |
```

This query returns all the login attempts that happened on 2022-05-09 and 2022-05-08. I selected all the columns from the `log_in_attempts` table to be displayed so we could get more information about the incident. Then I specified what table to query using `FROM`. Then, I performed my filter:
`WHERE login_date = '2022-05-09' OR login_date = '2022-05-08';`
This filter will display login attempts that happened on either 2022-05-09 or 2022-05-08. This simple query will help us investigate the security incident that occurred on 2022-05-09 by reviewing who logged in and from where.

Retrieve login attempts outside of Mexico

After gathering more evidence, we came to know that the login attempt and the security incident did not originate from Mexico. We want to find all of the login attempts that occurred outside of Mexico to investigate them.
The following screenshot shows how I used an SQL query to filter for login attempts outside of Mexico.

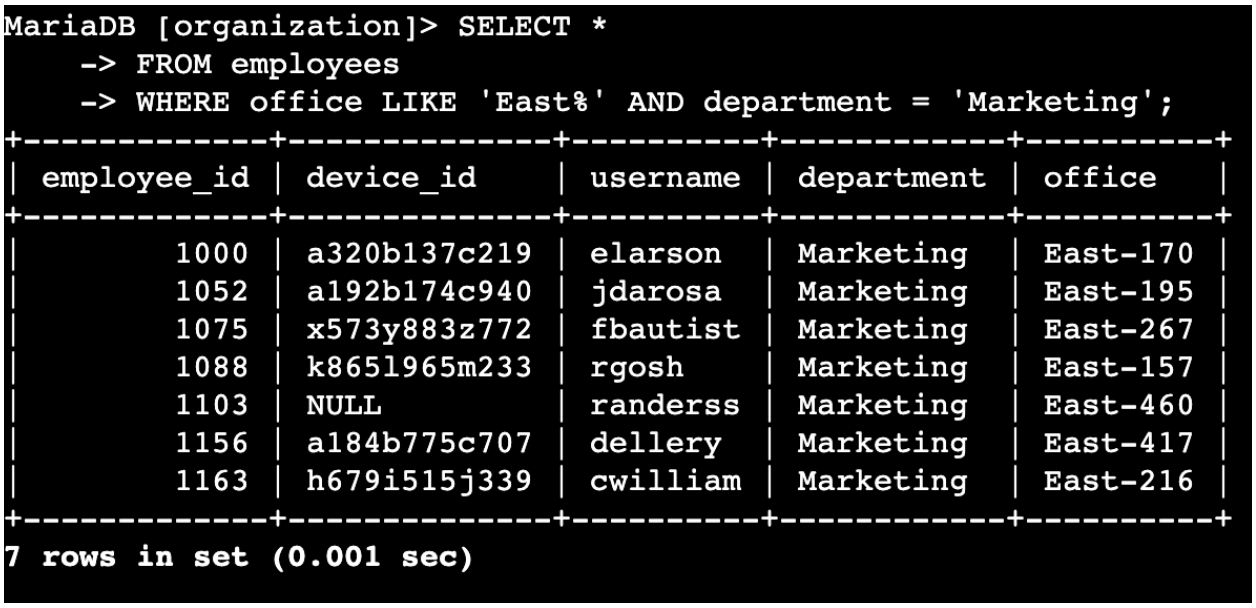


```
MariaDB [organization]> SELECT *
    -> FROM log_in_attempts
    -> WHERE NOT country LIKE 'MEX%';
+----------+----------+------------+------------+---------+-----------------+---
------+
| event_id | username | login_date | login_time | country | ip_address      | su
ccess |
+----------+----------+------------+------------+---------+-----------------+---
------+
|        1 | jrafael  | 2022-05-09 | 04:56:27   | CAN     | 192.168.243.140 |
    1 |
|        2 | apatel   | 2022-05-10 | 20:27:27   | CAN     | 192.168.205.12  |
    0 |
|        3 | dkot     | 2022-05-09 | 06:47:41   | USA     | 192.168.151.162 |
    1 |
|        4 | dkot     | 2022-05-08 | 02:00:39   | USA     | 192.168.178.71  |
    0 |
|        5 | jrafael  | 2022-05-11 | 03:05:59   | CANADA  | 192.168.86.232  |
    0 |
|        7 | eraab    | 2022-05-11 | 01:45:14   | CAN     | 192.168.170.243 |
```

This query returns all of the login attempts that did not originate from Mexico. I wanted to display all the columns for the resulting data, so I chose to use `*`. This will let me know more about each login attempt. Then I specified the table I am querying from, which is the `log_in_attempts` table. Next, I applied my filter:
`WHERE NOT country LIKE 'MEX%';`
This filter uses the `NOT` operator because we want to get all the login attempts from countries that are not Mexico. This query does not use an equals operator, but uses `LIKE` to identify patterns. For example, any country that does not start with "MEX" will be displayed. This way, we can investigate login attempts that did not occur in Mexico.

Retrieve employees in Marketing

My organization wants to perform security updates on specific employee machines in the Marketing department. I need to gather information about which employee machines to update.
This screenshot shows how I used an SQL query to filter for employee machines belonging to employees in the Marketing team whose office is in the East building.

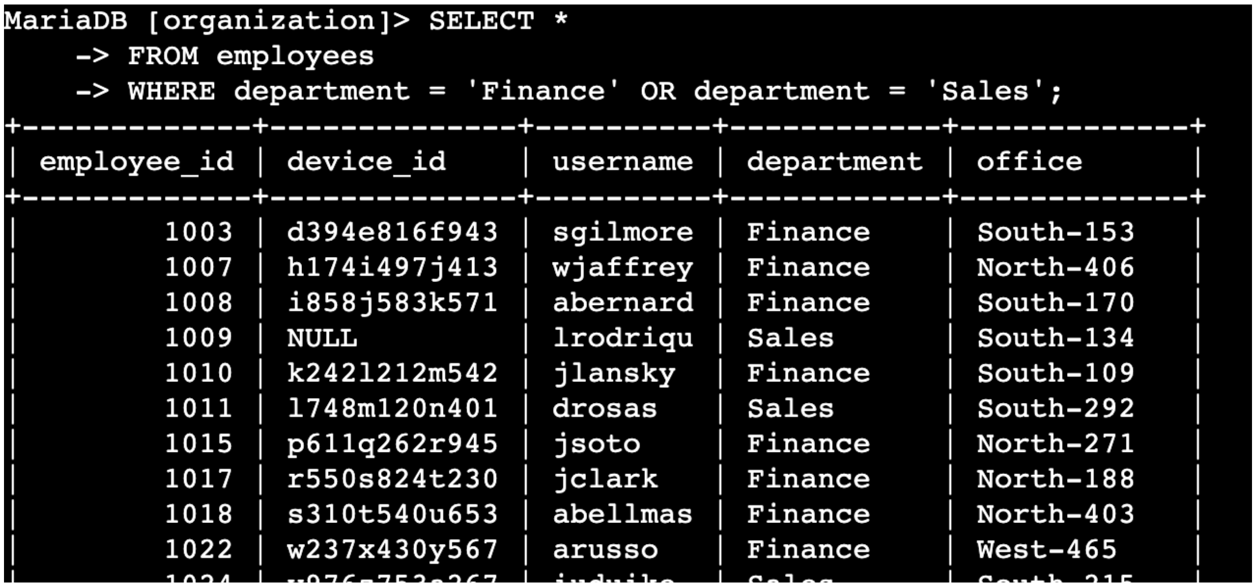


```
MariaDB [organization]> SELECT *
    -> FROM employees
    -> WHERE office LIKE 'East%' AND department = 'Marketing';
+-------------+---------------+----------+------------+----------+
| employee_id | device_id     | username | department | office   |
+-------------+---------------+----------+------------+----------+
|        1000 | a320b137c219  | elarson  | Marketing  | East-170 |
|        1052 | a192b174c940  | jdarosa  | Marketing  | East-195 |
|        1075 | x573y883z772  | fbautist | Marketing  | East-267 |
|        1088 | k8651965m233  | rgosh    | Marketing  | East-157 |
|        1103 | NULL          | randerss | Marketing  | East-460 |
|        1156 | a184b775c707  | dellery  | Marketing  | East-417 |
|        1163 | h679i515j339  | cwilliam | Marketing  | East-216 |
+-------------+---------------+----------+------------+----------+
7 rows in set (0.001 sec)
```

The resulting query returns all the employee machines from employees in the Marketing team whose office is in the East building. The first line of the query says that I want all the columns to be displayed. The second line specifies the table I want to query, which is the `employees` table. Next, I applied my filter:
`WHERE office LIKE 'East%' AND department = 'Marketing';`
This query first specifies that all offices starting with 'East' should be filtered, then it applies an additional filter to include only employees in the 'Marketing' department. This is a double filter, and the result contains information about Marketing department employees whose office is in the East building. This way, we can get the `machine_id` and perform the updates easily.

Retrieve employees in Finance or Sales

My organization needs to perform security updates for employees' machines in the Sales and Finance departments. My job is to gather information about employees from these two departments.
The following screenshot shows how I used an SQL query to get employees who work in the Finance or Sales department. From there, we could easily get the `employee_id` to patch the machines.



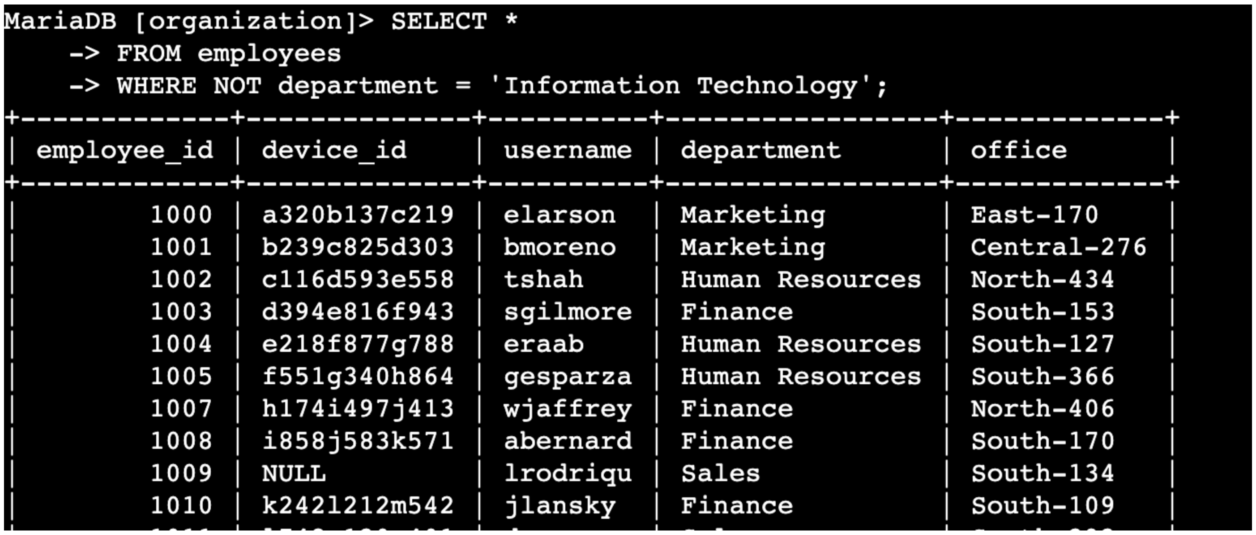
```
MariaDB [organization]> SELECT *
    -> FROM employees
    -> WHERE department = 'Finance' OR department = 'Sales';
+-------------+-------------+----------+------------+-------------+
| employee_id | device_id   | username | department | office      |
+-------------+-------------+----------+------------+-------------+
|        1003 | d394e816f943 | sgilmore | Finance    | South-153   |
|        1007 | h174i497j413 | wjaffrey | Finance    | North-406   |
|        1008 | i858j583k571 | abernard | Finance    | South-170   |
|        1009 | NULL         | lrodriqu | Sales      | South-134   |
|        1010 | k2421212m542 | jlansky  | Finance    | South-109   |
|        1011 | 1748m120n401 | drosas   | Sales      | South-292   |
|        1015 | p611q262r945 | jsoto    | Finance    | North-271   |
|        1017 | r550s824t230 | jclark   | Finance    | North-188   |
|        1018 | s310t540u653 | abellmas | Finance    | North-403   |
|        1022 | w237x430y567 | arusso   | Finance    | West-465    |
```

The resulting query displays all the employees in the Finance and Sales departments. First, I wanted all the columns to be displayed, so I specified that with `*`. Then, I specified the table I want to query, which is the `employees` table. Next, I applied my filter:
`WHERE department = 'Finance' OR department = 'Sales';`
This filter gets all employees from the Finance and Sales departments. From the result, we can get all the `machine_ids` to patch the machines.

Retrieve all employees not in IT

My organization also needs to perform a security update to the employees not in the IT department. My job is to get information about those employees and their machines.

The following screenshot shows how I used a SQL query to filter employees not in the Information Technology department.



```
MariaDB [organization]> SELECT *
    -> FROM employees
    -> WHERE NOT department = 'Information Technology';
+-------------+-------------+----------+-----------------+-------------+
| employee_id | device_id   | username | department      | office      |
+-------------+-------------+----------+-----------------+-------------+
|        1000 | a320b137c219 | elarson  | Marketing       | East-170    |
|        1001 | b239c825d303 | bmoreno  | Marketing       | Central-276 |
|        1002 | c116d593e558 | tshah    | Human Resources | North-434   |
|        1003 | d394e816f943 | sgilmore | Finance         | South-153   |
|        1004 | e218f877g788 | eraab    | Human Resources | South-127   |
|        1005 | f551g340h864 | gesparza | Human Resources | South-366   |
|        1007 | h174i497j413 | wjaffrey | Finance         | North-406   |
|        1008 | i858j583k571 | abernard | Finance         | South-170   |
|        1009 | NULL         | lrodriqu | Sales           | South-134   |
|        1010 | k2421212m542 | jlansky  | Finance         | South-109   |
```

This query returns all employees who are not in the IT department. I first selected all the data from the `employees` table. Then, I applied my filter:
`WHERE NOT department = 'Information Technology';`
This filter uses the `NOT` operator, which acts as a negation. So, in this example, the filter specifies to exclude employees from the IT department.

Summary

In this activity, I gained hands-on experience with SQL by performing various queries with filters. I used two tables in this activity: `log_in_attempts` and `employees`. Some of my queries involved mathematical operators like = and `>`, while others used characters like % to look for patterns in the database. I also used the `AND`, `OR`, and `NOT` operators to apply filters to my queries.