Apply filters to SQL queries

Project description

I am part of a large organization, and my role is to keep this organization secured from any potential security issues. I recently discovered some security issues that involve login attempts and employee machines. The following steps are the ways I ensure the security of my team.

Retrieve after hours failed login attempts

There was a potential security issue involving the login activity after hours (after 18:00).

```
MariaDB [organization]> SELECT *
    -> FROM log_in_attempts
    -> WHERE login_time > '18:00' AND success = 0
    -> ORDER BY login_time;
+----------+----------+------------+------------+---------+-----------------+---------+
| event_id | username | login_date | login_time | country | ip_address      | success |
+----------+----------+------------+------------+---------+-----------------+---------+
|      104 | asundara | 2022-05-11 | 18:38:07   | US      | 192.168.96.200  |       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 |
|       18 | pwashing | 2022-05-11 | 19:28:50   | US      | 192.168.66.142  |       0 |
|      199 | yappiah  | 2022-05-11 | 19:34:48   | MEXICO  | 192.168.44.232  |       0 |
|       69 | wjaffrey | 2022-05-11 | 19:55:15   | USA     | 192.168.100.17  |       0 |
|      131 | bisles   | 2022-05-09 | 20:03:55   | US      | 192.168.113.171 |       0 |
|      107 | bisles   | 2022-05-12 | 20:25:57   | USA     | 192.168.116.187 |       0 |
|        2 | apatel   | 2022-05-10 | 20:27:27   | CAN     | 192.168.205.12  |       0 |
|      160 | jclark   | 2022-05-10 | 20:49:00   | CANADA  | 192.168.214.49  |       0 |
|       34 | drosas   | 2022-05-11 | 21:02:04   | US      | 192.168.45.93   |       0 |
|      127 | abellmas | 2022-05-09 | 21:20:51   | CANADA  | 192.168.70.122  |       0 |
|      111 | aestrada | 2022-05-10 | 22:00:26   | MEXICO  | 192.168.76.27   |       0 |
|       52 | cjackson | 2022-05-10 | 22:07:07   | CAN     | 192.168.58.57   |       0 |
|      155 | cgriffin | 2022-05-12 | 22:18:42   | USA     | 192.168.236.176 |       0 |
|       96 | ivelasco | 2022-05-09 | 22:36:36   | CAN     | 192.168.84.194  |       0 |
|       87 | apatel   | 2022-05-08 | 22:38:31   | CANADA  | 192.168.132.153 |       0 |
|       42 | cgriffin | 2022-05-09 | 23:04:05   | US      | 192.168.4.157   |       0 |
|       82 | abernard | 2022-05-12 | 23:38:46   | MEX     | 192.168.234.49  |       0 |
+----------+----------+------------+------------+---------+-----------------+---------+
19 rows in set (0.033 sec)
```

The first part of the screenshot is my query, and the second part is a portion of the output. This query filters for failed login attempts that occurred after 18:00 and ordered by `login_time`. First, I started by selecting all data from the `log_in_attempts` table. Then, I used a `WHERE` clause with an `AND` operator to filter my results to output only login attempts that occurred after 18:00 and were unsuccessful. The first condition is `login_time > '18:00'`, which filters for the login attempts that occurred after 18:00. The second condition is `success = FALSE`, which filters for the failed login attempts. The final operation is to ordered by

Retrieve login attempts on specific dates

A recent event occurred on 2022-05-09. To investigate the suspicious events, I will be looking into the day the event occurred and the day before.

The following code demonstrates how I created a SQL query to filter for login attempts that occurred on 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      | success |
+----------+----------+------------+------------+---------+-----------------+---------+
|        1 | jrafael  | 2022-05-09 | 04:56:27   | CAN     | 192.168.243.140 |       0 |
|        3 | dkot     | 2022-05-09 | 06:47:41   | USA     | 192.168.151.162 |       0 |
|        4 | dkot     | 2022-05-08 | 02:00:39   | USA     | 192.168.178.71  |       0 |
```

The first part of the screenshot is my query, and the second part is a portion of the output. This query returns all login attempts that occurred on 2022-05-09 or 2022-05-08. First, I started by selecting all data from the `log_in_attempts` table. Then, I used a `WHERE` clause with an `OR` operator to filter my results to output only login attempts that occurred on either 2022-05-09 or 2022-05-08. The first condition is `login_date = '2022-05-09'`, which filters for logins on 2022-05-09. The second condition is `login_date = '2022-05-08'`, which filters for logins on 2022-05-08.

Retrieve login attempts outside of Mexico

There were suspicious login attempts, but we came to the conclusion that they were outside of Mexico. We are gonna investigate login attempts outside of Mexico.

The following code demonstrates how I created a SQL query to filter for login attempts that occurred 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      | success |
+----------+----------+------------+------------+---------+-----------------+---------+
|        1 | jrafael  | 2022-05-09 | 04:56:27   | CAN     | 192.168.243.140 |       0 |
|        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 |       0 |
```

The first part of the screenshot is my query, and the second part is a portion of the output. This query returns all login attempts that occurred in countries other than Mexico. First, I started by selecting all data from the `log_in_attempts` table. Then, I used a `WHERE` clause with `NOT` to filter for countries other than Mexico. I used `LIKE` with `MEX%` as the pattern to match because the dataset represents Mexico as `MEX` and `MEXICO`. The percentage sign (`%`) represents any number of unspecified characters when used with `LIKE`.

Retrieve employees in Marketing

My team wants to ensure the security of employees in each department is secured and safe. Therefore, next we have to perform routine updates on the machines for employees. Next to receive these updates is the Marketing department.

The following code demonstrates how I created a SQL query to filter for employee machines from employees in the Marketing department in the East building.

```
MariaDB [organization]> SELECT *
    -> FROM employees
    -> WHERE department = 'Marketing' AND office LIKE 'East%';
+-------------+--------------+----------+------------+----------+
| 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 |
```

The first part of the screenshot is my query, and the second part is a portion of the output. This query returns all employees in the Marketing department in the East building. First, I started by selecting all data from the `employees` table. Then, I used a `WHERE` clause with `AND` to filter for employees who work in the Marketing department and in the East building. I used `LIKE` with `East%` as the pattern to match because the data in the `office` column represents the East building with the specific office number. The first condition is the `department = 'Marketing'` portion, which filters for employees in the Marketing department. The second condition is the `office LIKE 'East%'` portion, which filters for employees in the East building.

Retrieve employees in Finance or Sales

Now, we want to perform updates on machines for employees that are from the Sales and Financial departments.

Therefore, the following code demonstrates how I created a SQL query to filter for employee machines from employees in the Finance or Sales departments.

```
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   |
```

The first part of the screenshot is my query, and the second part is a portion of the output. This query returns all employees in the Finance and Sales departments. First, I started by selecting all data from the `employees` table. Then, I used a `WHERE` clause with `OR` to filter for employees who are in the Finance and Sales departments. I used the `OR` operator instead of `AND` because I want all employees who are in either department. The first condition is `department = 'Finance'`, which filters for employees from the Finance department. The second condition is `department = 'Sales'`, which filters for employees from the Sales department.

Retrieve all employees not in IT

The employees from the IT department have already received the newest updates. Now, we want to perform the same update to all the machines for employees that are not from the IT department. Therefore, we have to receive all the data about the company's employees so we can determine who needs the updates.

The following demonstrates how I created a SQL query to filter for employee machines from 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   |
```

The first part of the screenshot is my query, and the second part is a portion of the output. The query returns all employees not in the Information Technology department. First, I started by selecting all data from the `employees` table. Then, I used a `WHERE` clause with `NOT` to filter for employees not in this department.

Summary

I applied filters to SQL queries to get specific information on login attempts and employee machines. I used two different tables, `log_in_attempts` and `employees`. I used the `AND`, `OR`, and `NOT` operators to filter for the specific information needed for each task. I also used `LIKE` and the percentage sign (`%`) wildcard to filter for patterns.