

Apply filters to SQL queries

Project description

My company is attempting to increase the security of their system. My responsibility is to ensure the security of the system, look into any potential security concerns, and upgrade employee computers as necessary. Examples of how I carried out security-related tasks using SQL and filters are shown in the steps that follow.

Retrieve after hours failed login attempts

After business hours (after 18:00), there was a possible security incident. All failed after-hours login attempts must be looked into.

The SQL query I made to look for failed login attempts that happened outside business hours is shown in the following code.

My query is shown in the first part of the screenshot, and some of the output is shown in the second. This search restricts its results to failed login attempts that had place after 18:00.

```
MariaDB [organization]> SELECT *  
-> FROM log_in_attempts  
-> WHERE login_time > '18:00' AND success = FALSE;
```

event_id	username	login_date	login_time	country	ip_address	success
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

I began by choosing all of the information from the log_in_attempts table. Then, I filtered my data using a WHERE clause and an AND operator to output only failed login attempts that took place after 18:00. Login attempts made after 18:00 are filtered out by the first criteria, login_time > '18:00'. Success = FALSE, the second criterion, screens out unsuccessful login attempts.

Retrieve login attempts on specific dates

A suspicious event occurred on 2022-05-09. Any login activity that happened on 2022-05-09 or on the day before needs to be investigated.

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

After investigating the organization's data on login attempts, I believe there is an issue with the login attempts that occurred outside of Mexico. These login attempts should be investigated.

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 update the computers for certain employees in the Marketing department. To do this, I have to get information on which employee machines to update.

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

The machines for employees in the Finance and Sales departments also need to be updated. Since a different security update is needed, I have to get information on employees only from these two departments.

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

My team needs to make one more security update on employees who are not in the Information Technology department. To make the update, I first have to get information on these employees.

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.