

Apply filters to SQL queries

Project description

My organization is working to make their system more secure. It is my job to ensure the system is safe, investigate all potential security issues, and update employee computers as needed. The following steps provide examples of how I used SQL with filters to perform security-related tasks.

Retrieve after hours failed login attempts

There was a potential security incident that occurred after business hours (after 18:00). All after hours login attempts that failed need to be investigated.

The following code demonstrates how I created a SQL query to filter for failed login attempts that occurred after business hours.

```
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

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. 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.

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	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

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	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

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
1088	k865l965m233	rgosh	Marketing	East-157
1103	NULL	randerss	Marketing	East-460
1156	a184b775c707	dellery	Marketing	East-417
1163	h679i515j339	cwilliam	Marketing	East-216

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
1009	NULL	lrodriqu	Sales	South-134
1010	k242l212m542	jlansky	Finance	South-109
1011	l748m120n401	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
1024	y976z753a267	iuduike	Sales	South-215
1025	z381a365b233	ihill	Sales	North-115

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 |
| 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 |

```

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.