Apply filters to SQL queries

Project description

My organization is dedicated to strengthening its system security. I am responsible for identifying and mitigating potential security threats, updating employee computers as needed, and ensuring the overall integrity of our systems.

Retrieve after-hours failed login attempts

I needed to investigate a potential security incident that occurred after business hours which is 18:00. To do this, I needed to check all log-in attempts that failed after business hours. The code below shows how I used the SQL query to filter the failed login attempts after 18:00.

```
MariaDB [organization]> clear
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 |
|       28 | aestrada | 2022-05-09 | 19:28:12   | MEXICO  | 192.168.27.57   |       0 |
|       34 | drosas   | 2022-05-11 | 21:02:04   | US      | 192.168.45.93   |       0 |
|       42 | cgriffin | 2022-05-09 | 23:04:05   | US      | 192.168.4.157   |       0 |
|       52 | cjackson | 2022-05-10 | 22:07:07   | CAN     | 192.168.58.57   |       0 |
|       69 | wjaffrey | 2022-05-11 | 19:55:15   | USA     | 192.168.100.17  |       0 |
|       82 | abernard | 2022-05-12 | 23:38:46   | MEX     | 192.168.234.49  |       0 |
|       87 | apatel   | 2022-05-08 | 22:38:31   | CANADA  | 192.168.132.153 |       0 |
|       96 | ivelasco | 2022-05-09 | 22:36:36   | CAN     | 192.168.84.194  |       0 |
|      104 | asundara | 2022-05-11 | 18:38:07   | US      | 192.168.96.200  |       0 |
|      107 | bisles   | 2022-05-12 | 20:25:57   | USA     | 192.168.116.187 |       0 |
|      111 | aestrada | 2022-05-10 | 22:00:26   | MEXICO  | 192.168.76.27   |       0 |
|      127 | abellmas | 2022-05-09 | 21:20:51   | CANADA  | 192.168.70.122  |       0 |
|      131 | bisles   | 2022-05-09 | 20:03:55   | US      | 192.168.113.171 |       0 |
|      155 | cgriffin | 2022-05-12 | 22:18:42   | USA     | 192.168.236.176 |       0 |
|      160 | jclark   | 2022-05-10 | 20:49:00   | CANADA  | 192.168.214.49  |       0 |
|      199 | yappiah  | 2022-05-11 | 19:34:48   | MEXICO  | 192.168.44.232  |       0 |
+----------+----------+------------+------------+---------+-----------------+---------+
19 rows in set (0.001 sec)
```

This query filtered the failed login attempts that were after 18:00. I selected all the data from the `log_in_attempts` table. I then proceeded to use the `WHERE` and the `AND` operator to filter the results to only give me an output of login attempts after 18:00 using `login_time > '18:00'`. Using `success = FALSE` I was able to filter out only the failed login attempts.

Retrieve login attempts on specific dates

A potentially suspicious event occurred at my company on 2022-05-09 and I need to investigate any activity that happened on that day or 2022-05-08, the day before. The code below shows how I used the SQL query to filter the dates.

```
MariaDB [organization]> SELECT *
    -> FROM log_in_attempts
    -> WHERE login_date = '2022-05-08' OR login_date = '2022-05-09';
+----------+----------+------------+------------+---------+-----------------+---------+
| 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 |
|       12 | dkot     | 2022-05-08 | 09:11:34   | USA     | 192.168.100.158 |       1 |
|       15 | lyamamot | 2022-05-09 | 17:17:26   | USA     | 192.168.183.51  |       0 |
|       24 | arusso   | 2022-05-09 | 06:49:39   | MEXICO  | 192.168.171.192 |       1 |
|       25 | sbaelish | 2022-05-09 | 07:04:02   | US      | 192.168.33.137  |       1 |
|       26 | apatel   | 2022-05-08 | 17:27:00   | CANADA  | 192.168.123.105 |       1 |
|       28 | aestrada | 2022-05-09 | 19:28:12   | MEXICO  | 192.168.27.57   |       0 |
|       30 | yappiah  | 2022-05-09 | 03:22:22   | MEX     | 192.168.124.48  |       1 |
|       32 | acook    | 2022-05-09 | 02:52:02   | CANADA  | 192.168.142.239 |       0 |
|       36 | asundara | 2022-05-08 | 09:00:42   | US      | 192.168.78.151  |       1 |
|       38 | sbaelish | 2022-05-09 | 14:40:01   | USA     | 192.168.60.42   |       1 |
|       39 | yappiah  | 2022-05-09 | 07:56:40   | MEXICO  | 192.168.57.115  |       1 |
|       42 | cgriffin | 2022-05-09 | 23:04:05   | US      | 192.168.4.157   |       0 |
|       43 | mcouliba | 2022-05-08 | 02:35:34   | CANADA  | 192.168.16.208  |       0 |
|       44 | daquino  | 2022-05-08 | 07:02:35   | CANADA  | 192.168.168.144 |       0 |
|       47 | dkot     | 2022-05-08 | 05:06:45   | US      | 192.168.233.24  |       1 |
|       49 | asundara | 2022-05-08 | 14:00:01   | US      | 192.168.173.213 |       0 |
|       53 | nmason   | 2022-05-08 | 11:51:38   | CAN     | 192.168.133.188 |       1 |
|       56 | acook    | 2022-05-08 | 04:56:30   | CAN     | 192.168.209.130 |       1 |
|       58 | ivelasco | 2022-05-09 | 17:20:54   | CAN     | 192.168.57.162  |       0 |
|       61 | dtanaka  | 2022-05-09 | 09:45:18   | USA     | 192.168.98.221  |       1 |
|       65 | aalonso  | 2022-05-09 | 23:42:12   | MEX     | 192.168.52.37   |       1 |
|       66 | aestrada | 2022-05-08 | 21:58:32   | MEX     | 192.168.67.223  |       1 |
|      163 | tmitchel | 2022-05-08 | 09:21:16   | MEX     | 192.168.119.29  |       0 |
|      165 | jreckley | 2022-05-08 | 15:28:43   | MEXICO  | 192.168.34.193  |       0 |
|      168 | jlansky  | 2022-05-08 | 13:25:42   | USA     | 192.168.210.94  |       1 |
|      169 | alevitsk | 2022-05-08 | 08:10:43   | CANADA  | 192.168.210.228 |       0 |
|      170 | sbaelish | 2022-05-09 | 16:43:18   | USA     | 192.168.65.113  |       0 |
|      172 | mabadi   | 2022-05-08 | 08:06:50   | US      | 192.168.180.41  |       1 |
|      178 | sgilmore | 2022-05-08 | 12:27:22   | CAN     | 192.168.52.216  |       0 |
|      184 | alevitsk | 2022-05-08 | 03:09:48   | CAN     | 192.168.33.70   |       0 |
|      186 | bisles   | 2022-05-09 | 04:29:17   | USA     | 192.168.40.72   |       0 |
|      187 | arusso   | 2022-05-09 | 00:36:26   | MEX     | 192.168.77.137  |       0 |
|      189 | nmason   | 2022-05-08 | 05:37:24   | CANADA  | 192.168.168.117 |       1 |
|      190 | jsoto    | 2022-05-09 | 05:09:21   | USA     | 192.168.25.60   |       0 |
|      191 | cjackson | 2022-05-08 | 06:46:07   | CANADA  | 192.168.7.187   |       0 |
|      193 | lrodriqu | 2022-05-08 | 07:11:29   | US      | 192.168.125.240 |       0 |
|      197 | jsoto    | 2022-05-08 | 09:05:09   | US      | 192.168.36.21   |       0 |
+----------+----------+------------+------------+---------+-----------------+---------+
75 rows in set (0.175 sec)
```

The code above shows that there were 75 login attempts between 2022-05-09 and 2022-05-08. I was able to do this using the condition WHERE `login_date = '2022-05-09' OR login_date = '2022-05-08';`

Retrieve login attempts outside of Mexico

After my investigation on the companys login attempts on two specific days, I spotted an issue with some other login attempts. However, these login attempts occurred outside Mexico, meaning that I had to filter the login attempts to exclude Mexico from the result.

```
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 |
|        7 | eraab    | 2022-05-11 | 01:45:14   | CAN     | 192.168.170.243 |       1 |
|        8 | bisles   | 2022-05-08 | 01:30:17   | US      | 192.168.119.173 |       0 |
|       10 | jrafael  | 2022-05-12 | 09:33:19   | CANADA  | 192.168.228.221 |       0 |
|       11 | sgilmore | 2022-05-11 | 10:16:29   | CANADA  | 192.168.140.81  |       0 |
|       12 | dkot     | 2022-05-08 | 09:11:34   | USA     | 192.168.100.158 |       1 |
|       13 | mrah     | 2022-05-11 | 09:29:34   | USA     | 192.168.246.135 |       1 |
|       14 | sbaelish | 2022-05-10 | 10:20:18   | US      | 192.168.16.99   |       1 |
|       15 | lyamamot | 2022-05-09 | 17:17:26   | USA     | 192.168.183.51  |       0 |
|       16 | mcouliba | 2022-05-11 | 06:44:22   | CAN     | 192.168.172.189 |       1 |
|       17 | pwashing | 2022-05-11 | 02:33:02   | USA     | 192.168.81.89   |       1 |
|       18 | pwashing | 2022-05-11 | 19:28:50   | US      | 192.168.66.142  |       0 |
|       19 | jhill    | 2022-05-12 | 13:09:04   | US      | 192.168.142.245 |       1 |
```

```
|      179 | jclark   | 2022-05-12 | 04:08:17   | CAN     | 192.168.232.93  |       0 |
|      181 | abellmas | 2022-05-10 | 13:37:05   | CAN     | 192.168.60.111  |       0 |
|      182 | lyamamot | 2022-05-10 | 06:01:31   | USA     | 192.168.106.52  |       0 |
|      183 | nmason   | 2022-05-11 | 05:29:36   | CANADA  | 192.168.137.147 |       0 |
|      184 | alevitsk | 2022-05-08 | 03:09:48   | CAN     | 192.168.33.70   |       0 |
|      185 | jsoto    | 2022-05-10 | 13:34:58   | USA     | 192.168.151.91  |       0 |
|      186 | bisles   | 2022-05-09 | 04:29:17   | USA     | 192.168.40.72   |       0 |
|      188 | jsoto    | 2022-05-11 | 00:39:09   | USA     | 192.168.21.88   |       0 |
|      189 | nmason   | 2022-05-08 | 05:37:24   | CANADA  | 192.168.168.117 |       1 |
|      190 | jsoto    | 2022-05-09 | 05:09:21   | USA     | 192.168.25.60   |       0 |
|      191 | cjackson | 2022-05-08 | 06:46:07   | CANADA  | 192.168.7.187   |       0 |
|      192 | bisles   | 2022-05-10 | 08:32:03   | USA     | 192.168.201.40  |       1 |
|      193 | lrodriqu | 2022-05-08 | 07:11:29   | US      | 192.168.125.240 |       0 |
|      194 | jclark   | 2022-05-12 | 14:11:04   | CAN     | 192.168.197.247 |       0 |
|      195 | alevitsk | 2022-05-11 | 06:59:13   | CANADA  | 192.168.236.78  |       1 |
|      196 | acook    | 2022-05-10 | 09:56:48   | CAN     | 192.168.52.90   |       0 |
|      197 | jsoto    | 2022-05-08 | 09:05:09   | US      | 192.168.36.21   |       0 |
|      200 | jclark   | 2022-05-12 | 01:11:45   | CANADA  | 192.168.91.103  |       1 |
+----------+----------+------------+------------+---------+-----------------+---------+
144 rows in set (0.001 sec)
```

I started by selecting all data from the `log_in_attempts` table. I proceeded to use the `WHERE` clause with `NOT` to filter for countries other than Mexico. Using `LIKE` with `MEX%` was the best way to filter out Mexico as `MEX` and `MEXICO` because the data might have been stored in both ways.

Retrieve employees in Marketing

The IT team wants to update the computers for specific employees in the Marketing Department in the East building. For this to be done, I had to filter employee machines to suit that criteria. The code below shows the process of how this was done.

```
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 | 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)
```

I used a `WHERE` clause with `AND` to filter for employees who work in the Marketing department in the East building. I used `office LIKE` with `East%` to bring out data in the `office` column because every office in the East building has numbers after the word 'East'. Additionally, the condition `department = 'Marketing'` filters employees in the Marketing department.

Retrieve employees in Finance or Sales

The machines in the Finance and Sales department also need to be updated and I need to make sure only employees in these two departments get the updates. The code below shows how I did it.

```
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 | 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 | jhill    | Sales      | North-115   |
|        1029 | d336e475f676 | ivelasco | Finance    | East-156    |
|        1035 | j236k3031245 | bisles   | Sales      | South-171   |
|        1039 | n253o917p623 | cjackson | Sales      | East-378    |
|        1041 | p929q222r778 | cgriffin | Sales      | North-208   |
|        1142 | m674n127o823 | lsilva   | Finance    | East-440    |
|        1144 | NULL         | erobinso | Finance    | Central-266 |
|        1147 | r454s225t299 | tvega    | Finance    | West-177    |
|        1148 | s328t505u907 | dharvey  | Finance    | South-181   |
|        1159 | d881e710f732 | jshen    | Finance    | East-193    |
|        1164 | i682j513k442 | fsmeltz  | Finance    | North-163   |
|        1169 | NULL         | mmitchel | Sales      | Central-250 |
|        1174 | s371t911u987 | eortiz   | Finance    | North-428   |
|        1175 | t959u687v394 | jclark2  | Finance    | North-194   |
|        1176 | u849v569w521 | nliu     | Sales      | West-220    |
|        1181 | z803a233b718 | sessa    | Finance    | South-207   |
|        1185 | d790e839f461 | revens   | Sales      | North-330   |
|        1186 | e281f433g404 | sacosta  | Sales      | North-460   |
|        1187 | f963g637h851 | bbode    | Finance    | East-351    |
|        1188 | g164h566i795 | noshiro  | Finance    | West-252    |
|        1195 | n516o853p957 | orainier | Finance    | East-346    |
+-------------+-------------+----------+------------+-------------+
71 rows in set (0.001 sec)
```

After filtering, I got 71 different employees from both departments who needed the new security update. To attain this, the first thing I did was use a `WHERE` clause with `OR` to filter for employees who are in the Finance and Sales departments because I wanted to filter out employees in EITHER department. The condition `department = 'Finance'` filters out

employees from the Finance department and `department = 'Sales'` filters out employees from the Sales department.

Retrieve all employees not in IT

My team and I needed to make a final security update for all employees who are not in the Information Technology Department. To do this, I have to get the details of all these employees.

```
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 | k242l212m542 | jlansky  | Finance         | South-109   |
|        1011 | l748m120n401 | drosas   | Sales           | South-292   |
|        1015 | p611q262r945 | jsoto    | Finance         | North-271   |
|        1185 | d790e839f461 | revens   | Sales           | North-330   |
|        1186 | e281f433g404 | sacosta  | Sales           | North-460   |
|        1187 | f963g637h851 | bbode    | Finance         | East-351    |
|        1188 | g164h566i795 | noshiro  | Finance         | West-252    |
|        1189 | h784i120j837 | slefkowi | Human Resources | West-342    |
|        1190 | NULL         | kcarter  | Marketing       | Central-270 |
|        1191 | NULL         | shakimi  | Marketing       | Central-366 |
|        1194 | m340n287o441 | zwarren  | Human Resources | West-212    |
|        1195 | n516o853p957 | orainier | Finance         | East-346    |
|        1198 | q308r573s459 | jmartine | Marketing       | South-117   |
|        1199 | r520s571t459 | areyes   | Human Resources | East-100    |
+-------------+-------------+----------+-----------------+-------------+
161 rows in set (0.001 sec)
```

I simply selected all data from the `employees` table. Then, I used the `WHERE` and `NOT` clause to filter for employees not in the Information Technology department.

Summary

I utilized SQL query filters to extract specific information regarding login attempts and employee machines. By leveraging two distinct tables, `log_in_attempts,` and `employees`, I employed `AND`, `OR`, and `NOT` operators to refine the data for each task. Additionally, I used the `LIKE` operator and the percentage sign (`%`) wildcard to easily identify pattern matches.