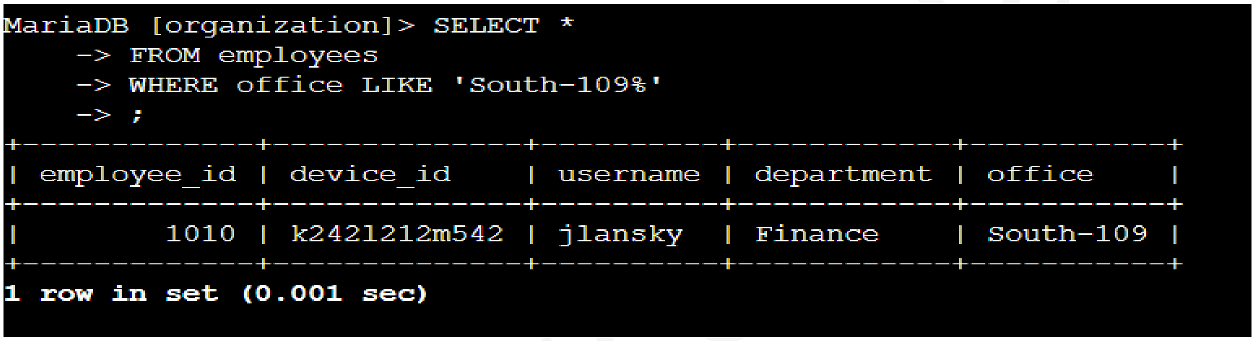
Applying Filters to SQL Queries

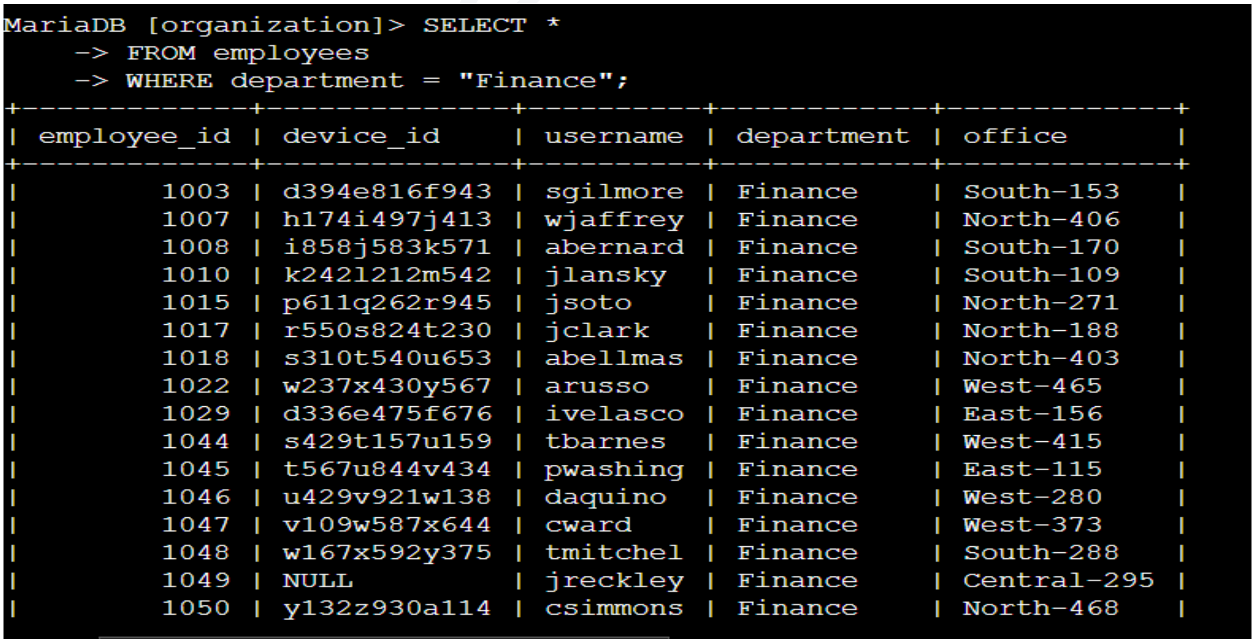
My organization is working to make their system more secure. It is my job as a Cybersecurity analyst to ensure the system is safe, investigate all potential security issues, and update employee computers as needed. The following provides analogy of how I utilized SQL with filters to query data with the primary intention of performing security-related tasks and making precise security decision based on accurate data;

- I used the *SELECT* asterisk (*) to display all data from the employees column. The object of this query was to identify the employee_id, device_id, username and department of the employee in the south-109 office. I successfully identified the employee by using the *'South-109%'* filter to show employees in the specified office.



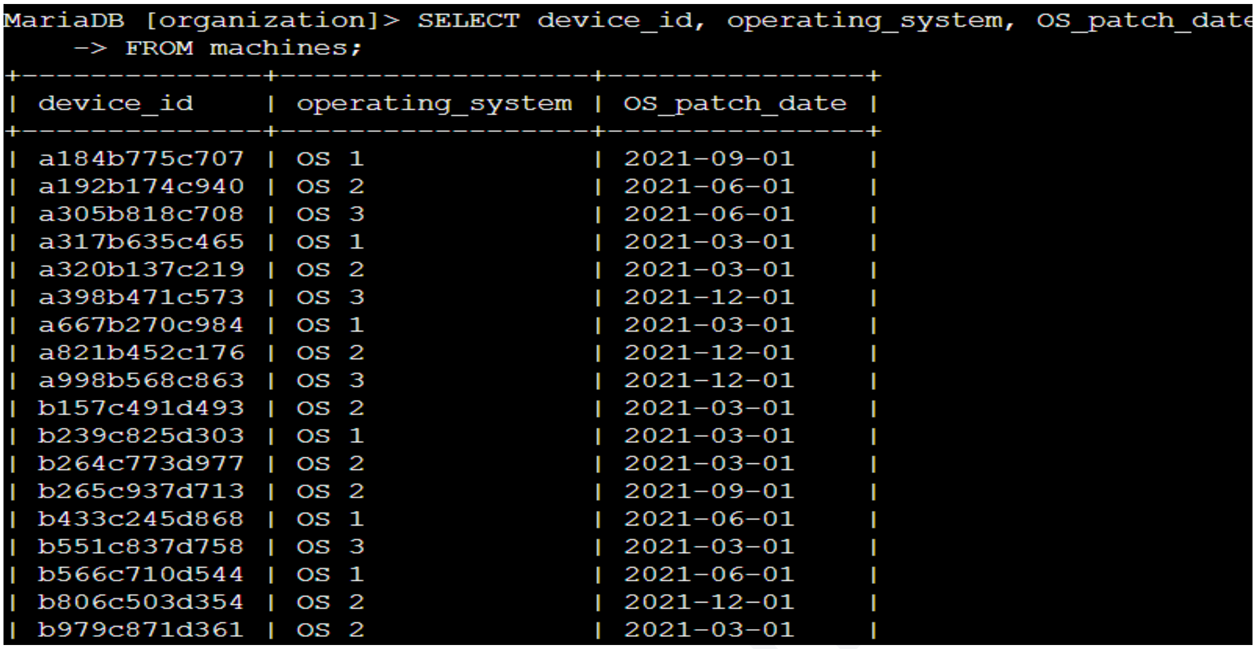
```
MariaDB [organization]> SELECT *
    -> FROM employees
    -> WHERE office LIKE 'South-109%'
    -> ;
+-------------+--------------+----------+------------+-----------+
| employee_id | device_id    | username | department | office    |
+-------------+--------------+----------+------------+-----------+
|        1010 | k242l212m542 | jlansky  | Finance    | South-109 |
+-------------+--------------+----------+------------+-----------+
1 row in set (0.001 sec)
```

- Using the *WHERE* filter to display information about all the employees in the Finance Department.



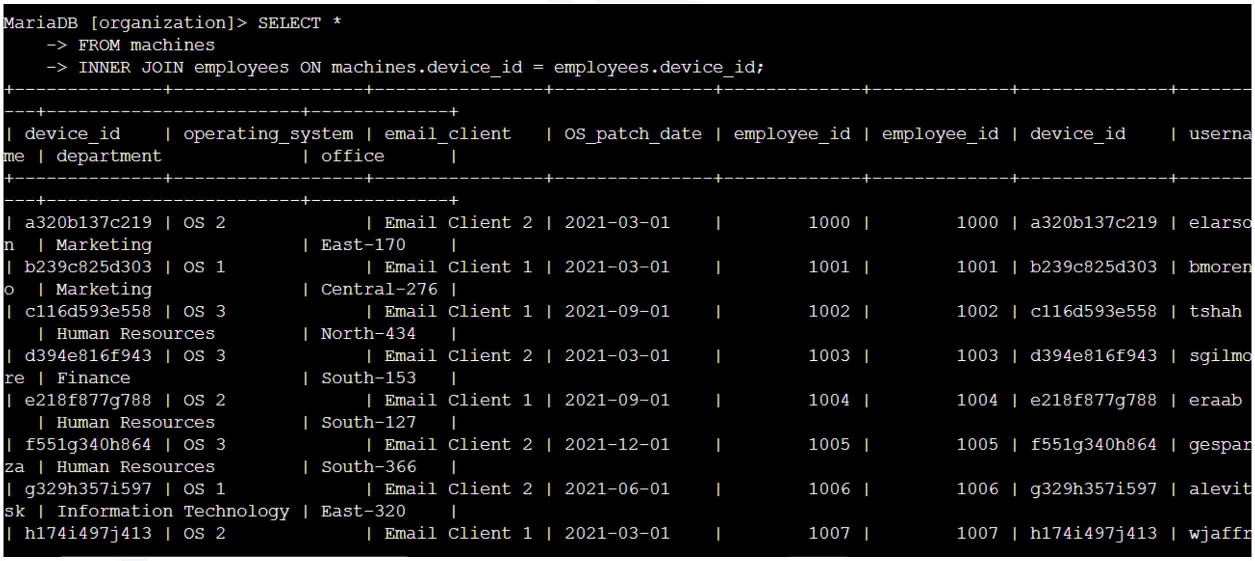
```
MariaDB [organization]> SELECT *
    -> FROM employees
    -> WHERE department = "Finance";
+-------------+--------------+----------+------------+-------------+
| employee_id | device_id    | username | department | office      |
+-------------+--------------+----------+------------+-------------+
|        1003 | d394e816f943 | sgilmore | Finance    | South-153   |
|        1007 | h174i497j413 | wjaffrey | Finance    | North-406   |
|        1008 | i858j583k571 | abernard | Finance    | South-170   |
|        1010 | k242l212m542 | jlansky  | Finance    | South-109   |
|        1015 | p611q262r945 | jsoto    | Finance    | North-271   |
|        1017 | r550s824t230 | jclark   | Finance    | North-188   |
|        1018 | s310t540u653 | abellmas | Finance    | North-403   |
|        1022 | w237x430y567 | arusso   | Finance    | West-465    |
|        1029 | d336e475f676 | ivelasco | Finance    | East-156    |
|        1044 | s429t157u159 | tbarnes  | Finance    | West-415    |
|        1045 | t567u844v434 | pwashing | Finance    | East-115    |
|        1046 | u429v921w138 | daquino  | Finance    | West-280    |
|        1047 | v109w587x644 | cward    | Finance    | West-373    |
|        1048 | w167x592y375 | tmitchel | Finance    | South-288   |
|        1049 | NULL         | jreckley | Finance    | Central-295 |
|        1050 | y132z930a114 | csimmons | Finance    | North-468   |
```

- I used the *SELECT* command to query 3 pieces of information from the database at once.



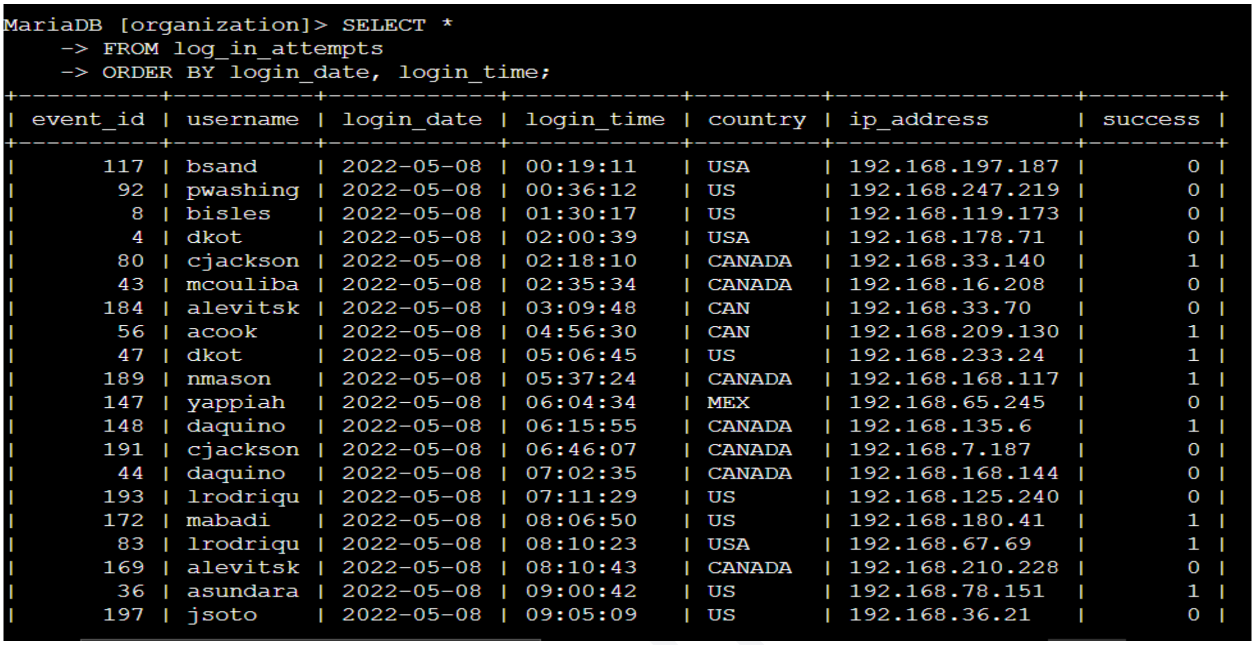
```
MariaDB [organization]> SELECT device_id, operating_system, OS_patch_date
    -> FROM machines;
+--------------+------------------+---------------+
| device_id    | operating_system | OS_patch_date |
+--------------+------------------+---------------+
| a184b775c707 | OS 1             | 2021-09-01    |
| a192b174c940 | OS 2             | 2021-06-01    |
| a305b818c708 | OS 3             | 2021-06-01    |
| a317b635c465 | OS 1             | 2021-03-01    |
| a320b137c219 | OS 2             | 2021-03-01    |
| a398b471c573 | OS 3             | 2021-12-01    |
| a667b270c984 | OS 1             | 2021-03-01    |
| a821b452c176 | OS 2             | 2021-12-01    |
| a998b568c863 | OS 3             | 2021-12-01    |
| b157c491d493 | OS 2             | 2021-03-01    |
| b239c825d303 | OS 1             | 2021-03-01    |
| b264c773d977 | OS 2             | 2021-03-01    |
| b265c937d713 | OS 2             | 2021-09-01    |
| b433c245d868 | OS 1             | 2021-06-01    |
| b551c837d758 | OS 3             | 2021-03-01    |
| b566c710d544 | OS 1             | 2021-06-01    |
| b806c503d354 | OS 2             | 2021-12-01    |
| b979c871d361 | OS 2             | 2021-03-01    |
```

- I matched the Organization’s employees to their computers using the *INNER JOIN* command.



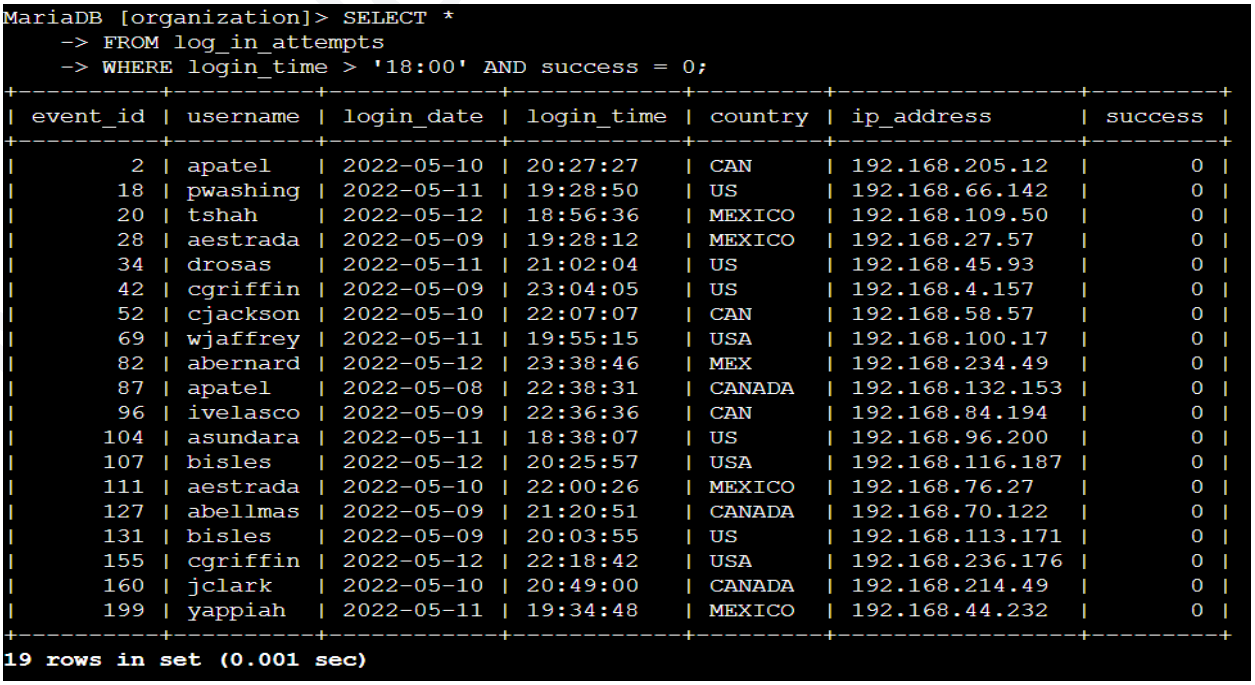
```
MariaDB [organization]> SELECT *
    -> FROM machines
    -> INNER JOIN employees ON machines.device_id = employees.device_id;
+--------------+------------------+----------------+---------------+-------------+-------------+--------------+-------
---+------------------------+-------------+
| device_id    | operating_system | email_client   | OS_patch_date | employee_id | employee_id | device_id    | userna
me | department             | office      |
+--------------+------------------+----------------+---------------+-------------+-------------+--------------+-------
---+------------------------+-------------+
| a320b137c219 | OS 2             | Email Client 2 | 2021-03-01    |        1000 |        1000 | a320b137c219 | elarso
n  | Marketing              | East-170    |
| b239c825d303 | OS 1             | Email Client 1 | 2021-03-01    |        1001 |        1001 | b239c825d303 | bmoren
o  | Marketing              | Central-276 |
| c116d593e558 | OS 3             | Email Client 1 | 2021-09-01    |        1002 |        1002 | c116d593e558 | tshah
   | Human Resources        | North-434   |
| d394e816f943 | OS 3             | Email Client 2 | 2021-03-01    |        1003 |        1003 | d394e816f943 | sgilmo
re | Finance                | South-153   |
| e218f877g788 | OS 2             | Email Client 1 | 2021-09-01    |        1004 |        1004 | e218f877g788 | eraab
   | Human Resources        | South-127   |
| f551g340h864 | OS 3             | Email Client 2 | 2021-12-01    |        1005 |        1005 | f551g340h864 | gespar
za | Human Resources        | South-366   |
| g329h357i597 | OS 1             | Email Client 2 | 2021-06-01    |        1006 |        1006 | g329h357i597 | alevit
sk | Information Technology | East-320    |
| h174i497j413 | OS 2             | Email Client 1 | 2021-03-01    |        1007 |        1007 | h174i497j413 | wjaffr
```

- I arranged queried data by ordering the arrangement of the displayed data with the login_date and login_time by using the *ORDER BY* filter.



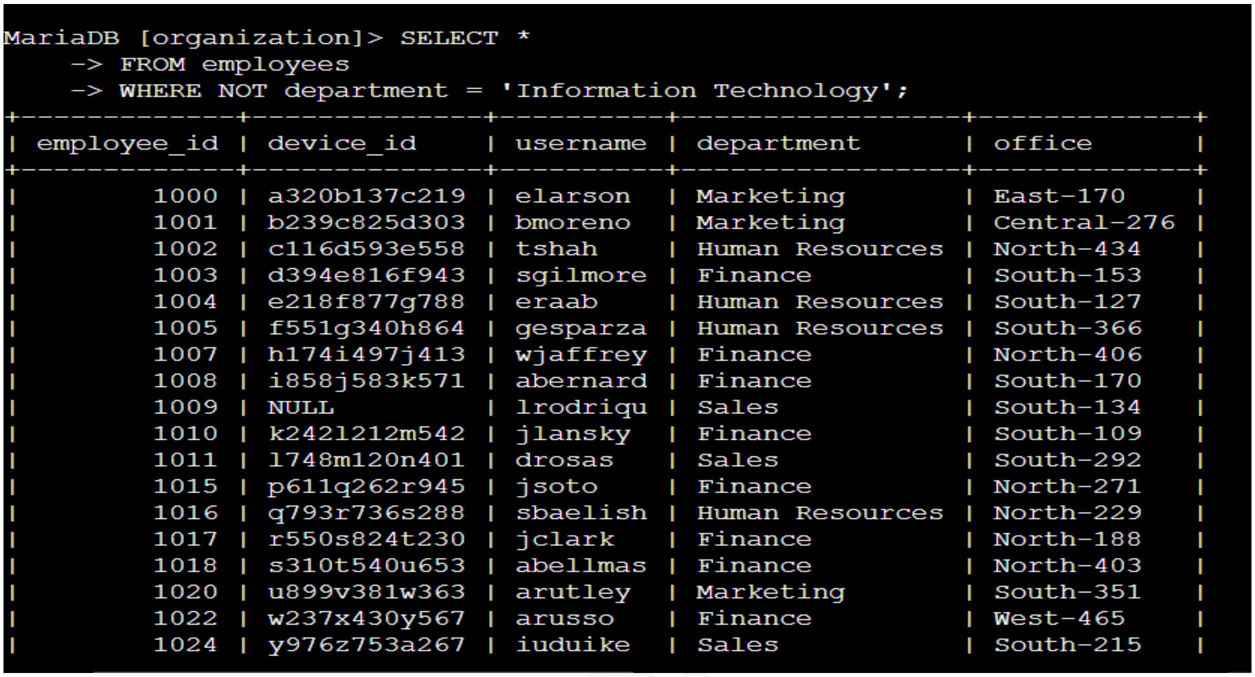
```
MariaDB [organization]> SELECT *
    -> FROM log_in_attempts
    -> ORDER BY login_date, login_time;
+----------+----------+------------+------------+---------+-----------------+---------+
| event_id | username | login_date | login_time | country | ip_address      | success |
+----------+----------+------------+------------+---------+-----------------+---------+
|      117 | bsand    | 2022-05-08 | 00:19:11   | USA     | 192.168.197.187 |       0 |
|       92 | pwashing | 2022-05-08 | 00:36:12   | US      | 192.168.247.219 |       0 |
|        8 | bisles   | 2022-05-08 | 01:30:17   | US      | 192.168.119.173 |       0 |
|        4 | dkot     | 2022-05-08 | 02:00:39   | USA     | 192.168.178.71  |       0 |
|       80 | cjackson | 2022-05-08 | 02:18:10   | CANADA  | 192.168.33.140  |       1 |
|       43 | mcouliba | 2022-05-08 | 02:35:34   | CANADA  | 192.168.16.208  |       0 |
|      184 | alevitsk | 2022-05-08 | 03:09:48   | CAN     | 192.168.33.70   |       0 |
|       56 | acook    | 2022-05-08 | 04:56:30   | CAN     | 192.168.209.130 |       1 |
|       47 | dkot     | 2022-05-08 | 05:06:45   | US      | 192.168.233.24  |       1 |
|      189 | nmason   | 2022-05-08 | 05:37:24   | CANADA  | 192.168.168.117 |       1 |
|      147 | yappiah  | 2022-05-08 | 06:04:34   | MEX     | 192.168.65.245  |       0 |
|      148 | daquino  | 2022-05-08 | 06:15:55   | CANADA  | 192.168.135.6   |       1 |
|      191 | cjackson | 2022-05-08 | 06:46:07   | CANADA  | 192.168.7.187   |       0 |
|       44 | daquino  | 2022-05-08 | 07:02:35   | CANADA  | 192.168.168.144 |       0 |
|      193 | lrodriqu | 2022-05-08 | 07:11:29   | US      | 192.168.125.240 |       0 |
|      172 | mabadi   | 2022-05-08 | 08:06:50   | US      | 192.168.180.41  |       1 |
|       83 | lrodriqu | 2022-05-08 | 08:10:23   | USA     | 192.168.67.69   |       1 |
|      169 | alevitsk | 2022-05-08 | 08:10:43   | CANADA  | 192.168.210.228 |       0 |
|       36 | asundara | 2022-05-08 | 09:00:42   | US      | 192.168.78.151  |       1 |
|      197 | jsoto    | 2022-05-08 | 09:05:09   | US      | 192.168.36.21   |       0 |
```

- I retrieved failed login attempts after office hours by using the *WHERE login_time > ‘18:00’ AND success = 0* filter. To simplify this, the greater than sign (>) in the login_time is used to display login attempts after the 18:00 time which is the business hours. Also, login success is identified with 1 while login failure is identified with 0, the *success = 0* filter is primarily used to display failed login attempts.



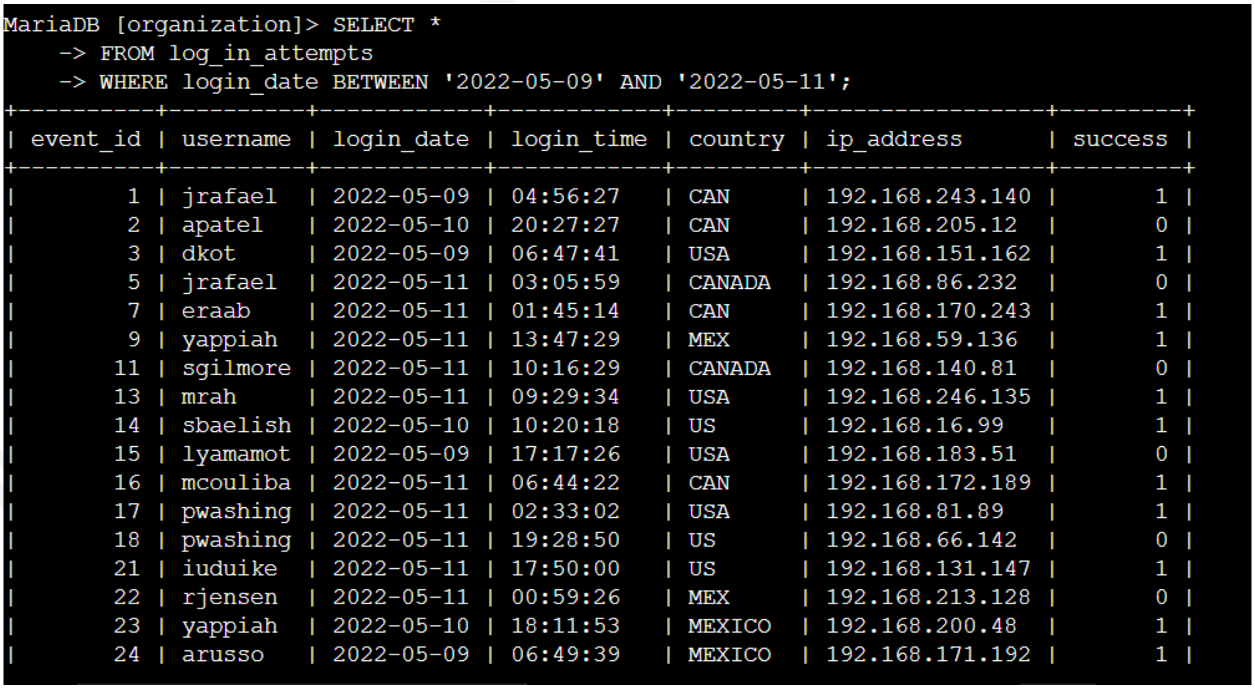
```
MariaDB [organization]> SELECT *
    -> FROM log_in_attempts
    -> WHERE login_time > '18:00' AND success = 0;
+----------+----------+------------+------------+---------+-----------------+---------+
| event_id | username | login_date | login_time | country | ip_address      | success |
+----------+----------+------------+------------+---------+-----------------+---------+
|        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)
```

- Retrieving all employees not in the Informations Technology department by using the *NOT* filter.



```
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   |
|        1011 | 1748m120n401 | drosas   | Sales           | South-292   |
|        1015 | p611q262r945 | jsoto    | Finance         | North-271   |
|        1016 | q793r736s288 | sbaelish | Human Resources | North-229   |
|        1017 | r550s824t230 | jclark   | Finance         | North-188   |
|        1018 | s310t540u653 | abellmas | Finance         | North-403   |
|        1020 | u899v381w363 | arutley  | Marketing       | South-351   |
|        1022 | w237x430y567 | arusso   | Finance         | West-465    |
|        1024 | y976z753a267 | iuduike  | Sales           | South-215   |
```

- Retrieving login attempts from a specified date range by using the *BETWEEN & AND* filter.



```
MariaDB [organization]> SELECT *
    -> FROM log_in_attempts
    -> WHERE login_date BETWEEN '2022-05-09' AND '2022-05-11';
+----------+----------+------------+------------+---------+-----------------+---------+
| 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 |
|        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 |
|        9 | yappiah  | 2022-05-11 | 13:47:29   | MEX     | 192.168.59.136  |       1 |
|       11 | sgilmore | 2022-05-11 | 10:16:29   | CANADA  | 192.168.140.81  |       0 |
|       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 |
|       21 | iuduike  | 2022-05-11 | 17:50:00   | US      | 192.168.131.147 |       1 |
|       22 | rjensen  | 2022-05-11 | 00:59:26   | MEX     | 192.168.213.128 |       0 |
|       23 | yappiah  | 2022-05-10 | 18:11:53   | MEXICO  | 192.168.200.48  |       1 |
|       24 | arusso   | 2022-05-09 | 06:49:39   | MEXICO  | 192.168.171.192 |       1 |
```