Selecting Data from a Database

Scenario

The database operations team has created a relational database named **world** containing three tables: **city**, **country**, and **countrylanguage**. Based on specific use cases defined in the lab exercise, your write a few queries using database operators and the **SELECT** statement.

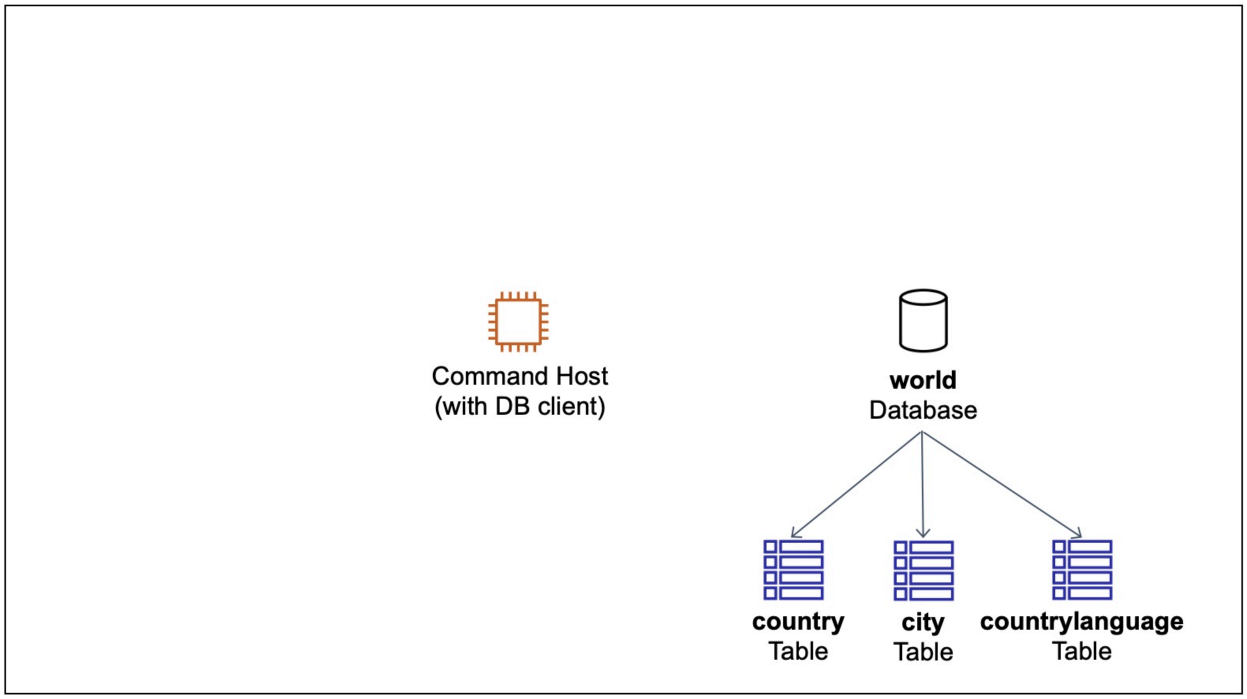
Lab overview and objectives

This lab demonstrates how to use some common database operators and the **SELECT** statement.

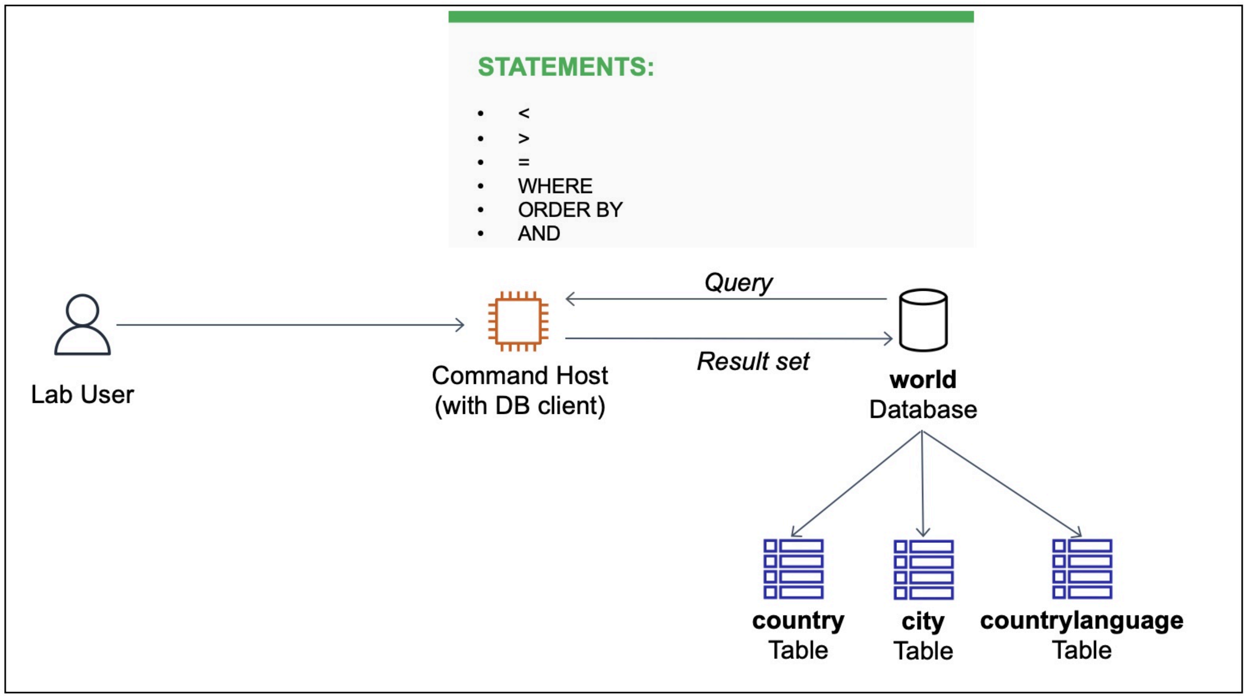
After completing this lab, you should be able to:

- Use the **SELECT** statement to query a database
- Use the **COUNT()** function
- Use the following operators to query a database:
  - **<**
  - **>**
  - **=**
  - **WHERE**
  - **ORDER BY**
  - **AND**

When you start the lab, the following resources are already created for you:



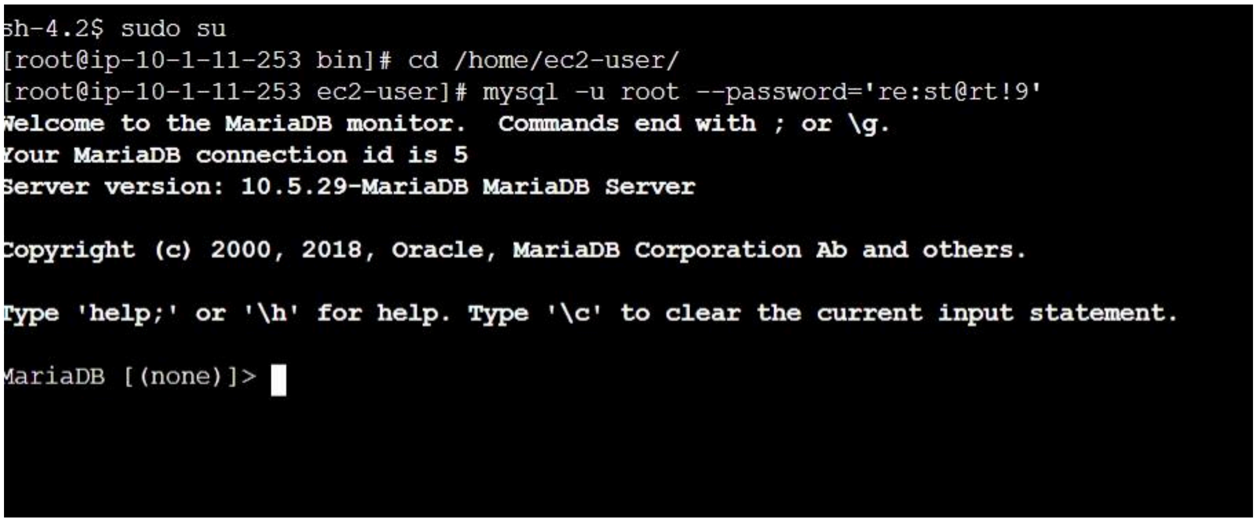
At the end of this lab, you will have used the **SELECT** statement and some common database operators:



Task 1: Connect to the Command Host

In this task, you connect to an instance containing a database client, which is used to connect to a database. This instance is referred to as the Command Host.

5. In the AWS Management Console, choose the **Services** menu. Choose **Compute**, and then choose **EC2**.
6. In the left navigation menu, choose **Instances**.
7. Next to the instance labelled **Command Host**, select the check box and then choose **Connect**.
   Note: If you do not see the **Command Host**, the lab is possibly still being provisioned, or you may be using another Region.
8. For **Connect to instance**, choose the **Session Manager** tab.
9. Choose **Connect** to open a terminal window.
   Note: If the **Connect** button is not available, wait for a few minutes and try again.
10. To configure the terminal to access all required tools and resources, run the following command:
11.
    ```
    sudo su
    cd /home/ec2-user/
    ```
12. **Tips**:
    - Copy and paste the command into the Session Manager terminal window.
    - If you are using a Windows system, press Shift+Ctrl+v to paste the command.
13. To connect to the database server, run the following command in the terminal. A password was configured when the database was installed.
14.
    ```
    mysql -u root --password='re:St@rt!9'
    ```
15. **Tip**: At any stage of the lab, if the Sessions Manager window is not responsive or if you need to reconnect to the database, then follow these steps:
    - Close the Sessions Manager window, and try to reconnect using the previous steps.
    - Run the following commands in the terminal.
16.
    ```
    sudo su
    cd /home/ec2-user/
    mysql -u root --password='re:St@rt!9'
    ```



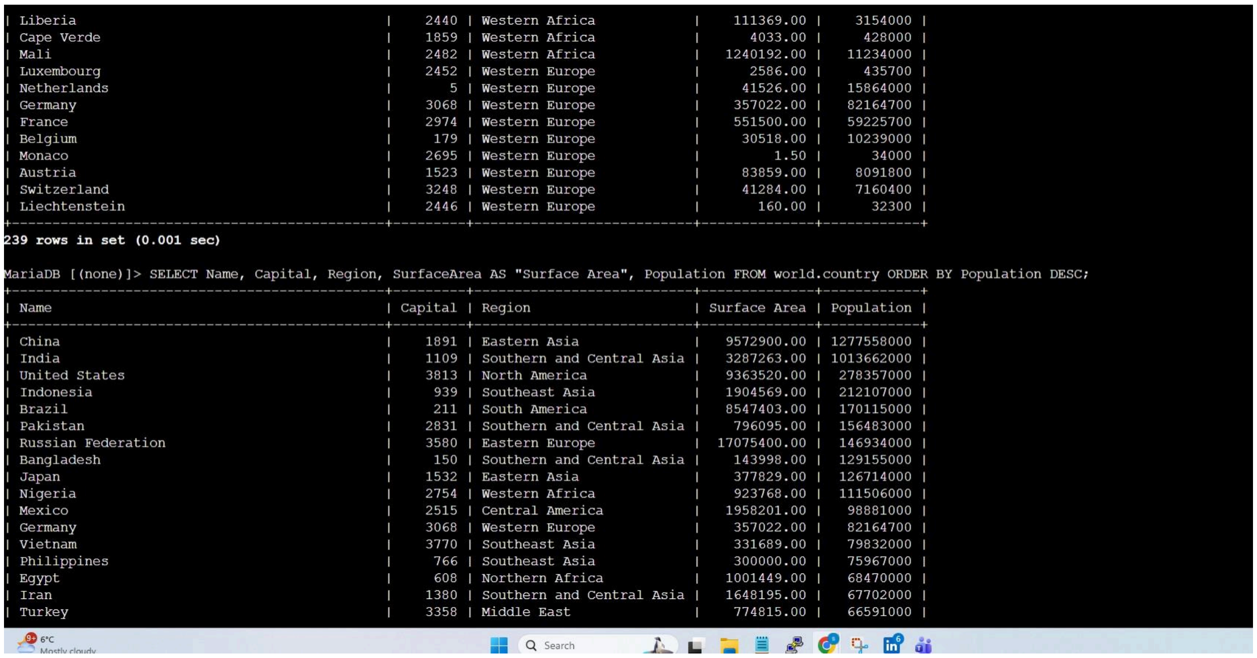
```
sh-4.2$ sudo su
[root@ip-10-1-11-253 bin]# cd /home/ec2-user/
[root@ip-10-1-11-253 ec2-user]# mysql -u root --password='re:st@rt!9'
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 5
Server version: 10.5.29-MariaDB MariaDB Server

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]>
```

Task 2: Query the world database

In this task, you query the **world** database using various **SELECT** statements and database operators.

12. To show the existing databases, enter the following command in the terminal.
13. `SHOW DATABASES;`
14. Verify that a database named **world** is available. If the **world** database is not available, then contact your instructor.
13. To list all rows and columns in the **country** table, run the following query.
14. `SELECT * FROM world.country;`
15. To query the number of rows in a table, you can use the **COUNT()** function in a **SELECT** statement. To count all the rows in table, you can use **COUNT(*)**. To count the number of rows that have a value in a specific column, include the column name as a parameter in the COUNT() function: for example, COUNT(Population). To list the number of rows in the **country** table, run the following query.
16. `SELECT COUNT(*) FROM world.country;`
17. To list all columns in the **country** table, run the following query. You run this query to understand the table schema.
18. `SHOW COLUMNS FROM world.country;`

19. To query specific columns in the **world** table, run the following query to return a result set that includes the Name, Capital, Region, SurfaceArea, and Population columns.
20. `SELECT Name, Capital, Region, SurfaceArea, Population FROM world.country;`
21. Database column names are sometimes not user friendly. To add a more descriptive column name to the query output, you can use the **AS** option. Run the following query that includes this option.
22. `SELECT Name, Capital, Region, SurfaceArea AS "Surface Area", Population FROM world.country;`
23. If required, scroll to the top of the query results, and observe that the **SurfaceArea** column is displayed as **Surface Area**.
24. Ordered result sets are easier to view and work with. If you would like to order the output based on a column, you can use the **ORDER BY** option. In this example, you order the output based on the population.
25. `SELECT Name, Capital, Region, SurfaceArea AS "Surface Area", Population FROM world.country ORDER BY Population;`
26. The **ORDER BY** option orders data in ascending order.
27. To order data in descending order, use the **DESC** option with **ORDER BY**. Run the following command with this option.
28. `SELECT Name, Capital, Region, SurfaceArea AS "Surface Area", Population FROM world.country ORDER BY Population DESC;`
29. You can add conditions to **SELECT** statements by using the **WHERE** clause. For example, to list all rows with a population greater than 50,000,000, run the following query.
30. `SELECT Name, Capital, Region, SurfaceArea AS "Surface Area", Population FROM world.country WHERE Population > 50000000 ORDER BY Population DESC;`
31. You have used the **>** comparison operator. Similarly, you can use other comparison operators to compare values.
32. You can construct a **WHERE** clause by using a number of conditions and operators.
    The following query uses two conditions: all rows with a population greater than 50,000,000 and all rows with a population less than 100,000,000. The query includes the **AND** operator to indicate that both the conditions must be true. Run the following query in your terminal.
33. `SELECT Name, Capital, Region, SurfaceArea AS "Surface Area", Population FROM world.country WHERE Population > 50000000 AND Population < 100000000 ORDER BY Population DESC;`
34. For more information about comparison operators, see the **Additional resources** section at the end of the lab.



```
| Liberia                                      |    2440 | Western Africa            |    111369.00 |    3154000 |
| Cape Verde                                   |    1859 | Western Africa            |      4033.00 |     428000 |
| Mali                                         |    2482 | Western Africa            |   1240192.00 |   11234000 |
| Luxembourg                                   |    2452 | Western Europe            |      2586.00 |     435700 |
| Netherlands                                  |       5 | Western Europe            |     41526.00 |   15864000 |
| Germany                                      |    3068 | Western Europe            |    357022.00 |   82164700 |
| France                                       |    2974 | Western Europe            |    551500.00 |   59225700 |
| Belgium                                      |     179 | Western Europe            |     30518.00 |   10239000 |
| Monaco                                       |    2695 | Western Europe            |         1.50 |      34000 |
| Austria                                      |    1523 | Western Europe            |     83859.00 |    8091800 |
| Switzerland                                  |    3248 | Western Europe            |     41284.00 |    7160400 |
| Liechtenstein                                |    2446 | Western Europe            |       160.00 |      32300 |
+----------------------------------------------+---------+---------------------------+--------------+------------+
239 rows in set (0.001 sec)

MariaDB [(none)]> SELECT Name, Capital, Region, SurfaceArea AS "Surface Area", Population FROM world.country ORDER BY Population DESC;
+----------------------------------------------+---------+---------------------------+--------------+------------+
| Name                                         | Capital | Region                    | Surface Area | Population |
+----------------------------------------------+---------+---------------------------+--------------+------------+
| China                                        |    1891 | Eastern Asia              |   9572900.00 | 1277558000 |
| India                                        |    1109 | Southern and Central Asia |   3287263.00 | 1013662000 |
| United States                                |    3813 | North America             |   9363520.00 |  278357000 |
| Indonesia                                    |     939 | Southeast Asia            |   1904569.00 |  212107000 |
| Brazil                                       |     211 | South America             |   8547403.00 |  170115000 |
| Pakistan                                     |    2831 | Southern and Central Asia |    796095.00 |  156483000 |
| Russian Federation                           |    3580 | Eastern Europe            |  17075400.00 |  146934000 |
| Bangladesh                                   |     150 | Southern and Central Asia |    143998.00 |  129155000 |
| Japan                                        |    1532 | Eastern Asia              |    377829.00 |  126714000 |
| Nigeria                                      |    2754 | Western Africa            |    923768.00 |  111506000 |
| Mexico                                       |    2515 | Central America           |   1958201.00 |   98881000 |
| Germany                                      |    3068 | Western Europe            |    357022.00 |   82164700 |
| Vietnam                                      |    3770 | Southeast Asia            |    331689.00 |   79832000 |
| Philippines                                  |     766 | Southeast Asia            |    300000.00 |   75967000 |
| Egypt                                        |     608 | Northern Africa           |   1001449.00 |   68470000 |
| Iran                                         |    1380 | Southern and Central Asia |   1648195.00 |   67702000 |
| Turkey                                       |    3358 | Middle East               |    774815.00 |   66591000 |
```

Challenge

Query the **country** table to return a set of records based on the following question.

Which country in Southern Europe has a population greater than 50,000,000?

```
SELECT Name, Capital, Region, SurfaceArea AS "Surface Area", Population from
world.country WHERE Population > 50000000 AND Region = "Southern Europe";
```

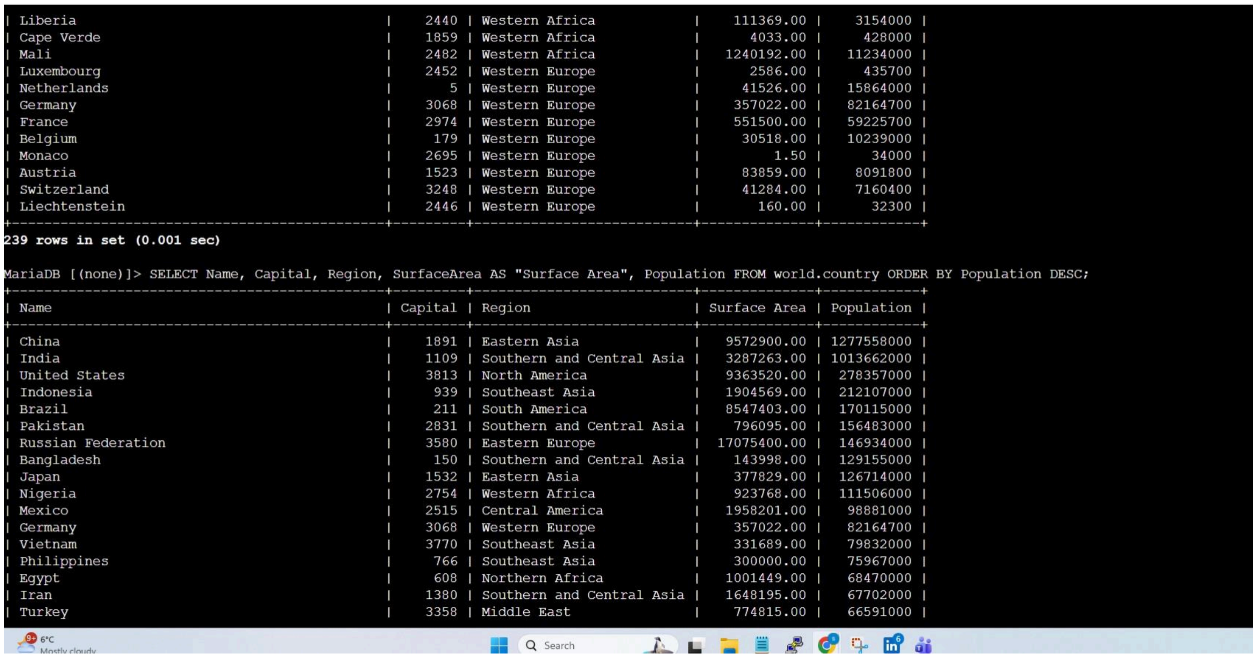
Tip: Expand the question to reveal the solution.

Conclusion

Congratulations! You have now successfully:

- Used the **SELECT** statement to query a database
- Used the **COUNT()** function
- Used the following operators to query a database:
    - **<**
    - **>**

- **=**
- **WHERE**
- **ORDER BY**
- **AND**



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| Cape Verde                                    |    1859 | Western Africa            |      4033.00 |     428000 |
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| Germany                                       |    3068 | Western Europe            |    357022.00 |   82164700 |
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MariaDB [(none)]> SELECT Name, Capital, Region, SurfaceArea AS "Surface Area", Population FROM world.country ORDER BY Population DESC;
+-----------------------------------------------+---------+---------------------------+--------------+------------+
| Name                                          | Capital | Region                    | Surface Area | Population |
+-----------------------------------------------+---------+---------------------------+--------------+------------+
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