User:A3nm/SD202 2021 ex1

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Welcome to the first lab of the SD202 class! The goal of this lab is to learn how to query data using an SQL database.

In this first exercise, we will query a single `world` table. The table contains information about the world's countries. The table has the following fields:

- `name varchar(50)`: the English name of the country (primary key)
- `continent varchar(60)`: the English name of the continent
- `area decimal(10,0)`: the area in square kilometers
- `population decimal(11,0)`: the population
- `gdp decimal(14,0)`: the GDP (we will not use it in the exercise)
- `capital varchar(60)`: the English name of the capital of the country
- `tld varchar(5)`: the Top Level Domain associated to the country (we will not use it)
- `flag varchar(255)`: the URL to the flag (we will not use it)

Here is an excerpt of the first 5 rows of the table:

name	continent	area	population	gdp	capital	tld	flag
Afghanistan	Asia	652230	25500100	20364000000	Kabul	.af	//upload.wikimedia.org/wikipedia/commons/9/9a/Flag
Albania	Europe	28748	2821977	12044000000	Tirana	.al	//upload.wikimedia.org/wikipedia/commons/3/36/Flag
Algeria	Africa	2381741	38700000	207021000000	Algiers	.dz	//upload.wikimedia.org/wikipedia/commons/7/77/Flag
Andorra	Europe	468	76098	3222000000	Andorra la Vella	.ad	//upload.wikimedia.org/wikipedia/commons/1/19/Flag
Angola	Africa	1246700	19183590	116308000000	Luanda	.ao	//upload.wikimedia.org/wikipedia/commons/9/9d/Flag

Warning: contrary to what the SQL standard prescribes, table names are case-sensitive in the SQL engine used in this website. So the table must be called `world`, **not** `World`, otherwise the evaluation will fail (with the error: Table 'gisq.World' doesn't exist).

Using the `world` table, your task will be to write queries satisfying some requirements. Sometimes, an example query is provided for yo Cheat mode en submitting a query, you will get its result, and you can compare it to the expected result if the two do not match. **Warning:** the orde of columns) is taken into account when checking an answer.

Contents

Basics: Countries and continents

1.

Modify the query below to select the name of all countries in Europe. Hint: use the WHERE clause:

```
SELECT name FROM world WHERE continent = 'Europe'
```

Submit SQL

Restore default

result

Cheat mode

2.

Select all DISTINCT continents in the database:

```
SELECT DISTINCT continent FROM world
```

Submit SQL

Restore default

result

Cheat mode

Filtering names

3.

Select all country names that start with an 'F'. Hint: use LIKE. Note: in the SQL implementation used in this website, the LIKE operator is case-insensitive.

```
SELECT name FROM world WHERE name LIKE 'F%'
```

Submit SQL

Restore default

result

Cheat mode

4.

Select all country names containing the letter 'z':

```
SELECT name FROM world WHERE name LIKE '%z%'
```

Submit SQL

Restore default

result

Cheat mode

Population

5.

Select all country names having at most one million inhabitants:

```
SELECT name FROM world WHERE population <= 1000000
```

Submit SQL

Restore default

Cheat mode

result

6.

Write a query returning the name and population of all European countries:

```
SELECT name, population FROM world WHERE continent = 'Europe'
```

Submit SQL

Restore default

Cheat mode

result

7.

Write a query returning the country name and population of France, Germany, and Italy (in that order):

```
SELECT name,population FROM world WHERE name IN ('France','Germany' ,'Italy')
```

Submit SQL

Restore default

result

Cheat mode

8.

Write a query returning the population of France:

```
SELECT population FROM world WHERE name = 'France'
```

Submit SQL

Restore default

result

Cheat mode

Boolean conditions

9.

Write a query selecting the name, population, and area of all countries that have at least 100 million inhabitants or have an area of at least 3 million square kilometers (or both). Order the results by name.

```
SELECT name, population, area FROM world WHERE population >= 100000000 OR area >=3000000 ORDER BY name
```

Submit SQL

Restore default

Cheat mode

result

10.

Write a query selecting the name, population, and area of all European countries which have population greater than 50 million or area greater than 500000 square kilometers (or both), ordered by name. Hint: be careful!

Cheat mode

```
SELECT name, population, area FROM world WHERE continent = 'Europe' AND (population >= 50000000 OR area >= 500000) ORDER BY name
```

Submit SQL

Restore default

result

11.

Cheat mode

Write a query selecting the name, population, and area of all countries that are either large in population or large in size, but not bo ct
countries that have at least 100 million inhabitants OR have an area of at least 3 million square kilometers, but not both. Order the results by name

```
SELECT name, population, area FROM world WHERE population >= 100000000 XOR area >= 3000000 ORDER BY name
```

Submit SQL

Restore default

result

String operations

12.

Cheat mode

Write a query selecting the country names that are the same as that country's capital, sorted by name.

```
SELECT name FROM world WHERE name = capital ORDER BY name
```

Submit SQL

Restore default

result

13.

Cheat mode

Write a query selecting the country names and capital names where both names have the same length. E.g., "Greece" and "Athens" both have length 6. Exclude the cases from the previous question, i.e., those where the country name is the same as the capital, and sort the results by country name. Hint: search the Internet for a function to compute the length of a string.

```
SELECT name, capital FROM world WHERE LENGTH(name)=LENGTH(capital) AND NOT name = capital ORDER BY name
```

Submit SQL

Restore default

result

Cheat mode

Ordering

14.

Write a query returning the country name with the least population, along with its population.

```
SELECT name, population FROM world ORDER BY population LIMIT 1
```

Submit SQL

Restore default

result

Cheat mode

15.

Write a query returning the name and population of the 5 countries with the greatest population (ordered by descending population, i.e., from greatest to least population).

```
SELECT name, population FROM world ORDER BY population DESC LIMIT 5
```

Submit SQL

Restore default

result

Cheat mode

16.

Write a query returning the name, population, and area of the 42nd country in alphabetical order.

```
SELECT name, population, area FROM world ORDER BY name LIMIT 1 OFFSET 41
```

Submit SQL

Restore default

result

Cheat mode

17.

Write a query returning the name and population of the 10 most *populous* countries among the 20 countries with the greatest *area*. Hint: use a subquery, and remember to give an alias to its result!

```
SELECT name, population FROM (SELECT name,population FROM world ORDER BY area DESC LIMIT 20) AS target ORDER BY population DESC LIMIT 10
```

Submit SQL

Restore default

result

Cheat mode

Computation and aggregation

18.

Write a query returning the name and *population density* of the Asian countries. The *population density* is the population divided by the area. Order the results by name.

```
SELECT name,population/area AS 'population_density' FROM world WHERE continent = 'Asia' ORDER BY name
```

Submit SQL

Restore default

result

Cheat mode

19.

Write a query returning the name of Asian countries with a new column `dense` containing "yes" for countries with density at least 100 inhabitants per square kilometer, and "no" otherwise. Sort the results to have first the dense countries, then the non-dense countries, and then order the countries in each group by name. Hint: use UNION.

```
SELECT name,'yes' AS 'dense' FROM world WHERE continent = 'Asia' AND population/area >= 100 UNION SELECT name,'no' AS 'dense' FROM world WHERE continent = 'Asia' AND population/area < 100
```

Submit SQL

Restore default

result

Cheat mode

20.

Write a query returning the number of countries in the database. Hint: use `COUNT(*)`.

```
SELECT COUNT(name) FROM world
```

Submit SQL

Restore default

result

Cheat mode

21.

Write a query returning the total world population. Hint: use `SUM`.

```
SELECT SUM(population) FROM world
```

Submit SQL

Restore default

result

Cheat mode

22.

Write a query returning the continent names and, for each continent, the number of countries in that continent. Hint: use aggregation. In this question and the next ones, unless otherwise stated, order the results by continent.

```
SELECT continent, COUNT(name) FROM world GROUP BY continent ORDER BY continent
```

Submit SQL

Restore default

result

Cheat mode

23.

Write a query returning the continent names and, for each continent, the total population and total area of the countries in that continent.

```
SELECT continent, SUM(population),SUM(area) FROM world GROUP BY continent ORDER BY continent
```

Submit SQL

Restore default

result

Cheat mode

24.

Show the name and total population of continents having total population at least 100 million.

```
SELECT continent,SUM(population) FROM world GROUP BY continent HAVING SUM(population) > 100000000 ORDER BY continent
```

Submit SQL

Restore default

result

Cheat mode

25.

Show the name of continents and the number of countries in that continent that have population at least 1 million.

```
SELECT continent, COUNT(name) FROM world WHERE population >= 1000000 GROUP BY continent
```

Submit SQL

Restore default

result

Cheat mode

26.

Compute the average population of the world's countries. Unfortunately, the AVERAGE command is unavailable, but find a way to do it nevertheless. ;)

```
SELECT SUM(population)/COUNT(name) AS average FROM world
```

Submit SQL

Restore default

result

Cheat mode

Advanced queries

27.

Compute, for every continent name, its population density (i.e., the continent's population divided by the continent's area), and the average of the population densities of its countries. Do you understand why the two values are different?

```
SELECT * FROM (SELECT continent, SUM(population)/SUM(area) as density1 FROM world GROUP BY continent) as group1
LEFT JOIN
(SELECT continent ,group2.density2 as density3  FROM (SELECT continent,  SUM(population/area)/COUNT(*) AS density2 FROM world GROUP BY continent) as group2 )
as group3 ON group1.continent = group3.continent
```

Submit SQL

Restore default

result

Cheat mode

28.

Return a table with a column `alpha` containing the first letter of country names (ordered alphabetically) and a column `total` with the total population of countries whose name starts with that letter. Hint: use SUBSTR as in the example.

```
SELECT SUBSTR(name, 1, 1) AS alpha, SUM(population) AS total FROM world GROUP BY alpha
```

Submit SQL

Restore default

result

Cheat mode

29.

Compute, for every continent name, its country having the largest area, and its country having the greatest population. Order the result by continent. Hint: this is a complicated task, use subqueries and/or join the `world` table with itself. Note: It is normal that Kazakhstan appears as a country in Europe.

```
SELECT continent, name AS area_name FROM world ORDER BY area DESC
```

Submit SQL

Restore default

result

Cheat mode

30.

Compute, for every continent name, a count of how many countries in the continent are strictly more populous that the continent's largest country (by area). Order the results by continent, and do not omit results where the count is zero.

```
SELECT continent,SUM(group2.density2)/COUNT(group2.name) FROM (SELECT continent, name, population/area AS density2 FROM world) as group2
Group by continent
```

Submit SQL

Restore default

result

Cheat mode

Acknowledgements

This exercise is inspired by the exercises SELECT_from_WORLD_Tutorial, SELECT_within_SELECT_Tutorial, and SUM_and_COUNT. If you reach the end of this exercise and still have time, you can complete the questions in these three tutorials that are not the same as the ones covered here.

Thanks to Andrew Cumming for his great work in maintaining SQLZoo!

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