MBDA Modelo de bases y bases de datos

Autoestudio 01

Nombres:
Steven Nikolai Bermudez Vega
Santiago Agustín Laiton Cubides

Investigación

A. SQL.

¿Qué es? y Para qué sirve?

Es un lenguaje estructurado de consultas, el cual permite tener acceso y manipulación de datos, además mediante distintos tipos de operaciones" brinda la posibilidad de realizar consultas con el objetivo de recuperar información de las bases de datos de manera sencilla".

DML

Es un lenguaje de manipulación de datos, brinda algunas operaciones con las que podemos realizar una manipulación a una base de datos, como: insertar registros, eliminarlos, actualizarlos y seleccionarlos.

DDL

Es un lenguaje de definición de datos, Se utiliza para alterar la estructura de una base de datos, como: crear tablas, alterarlas o borrar datos existentes de la base de datos.

DCL

Es un lenguaje de control de datos, controla el nivel de accesos que cada usuario tiene sobre la base de datos, se ven dos tipos de usuario: 'Grant' se concede un privilegio y normalmente se almacena en la base de datos como otorgante, 'Revoke' revoca privilegios en una tabla

TCL

Es un lenguaje de control de transacciones, permite controlar y administrar transacciones para mantener la integridad de la base de datos.

¿En este laboratorio, en que escribimos? por qué ?

En este laboratorio escribimos en algebra, calculo y SQL. Para desarrollar competencias básicas al escribir consultas.

B. Motor de bases de datos y bases de datos

¿Que es?

El Motor de base de datos es el servicio principal para almacenar, procesar y proteger los datos.

Motor de base de datos proporciona acceso controlado y procesamiento de transacciones rápido para cumplir con los requisitos de las aplicaciones consumidoras de datos mas exigentes de su empresa.

¿Que motores ofrece sqlzoo.net?

- MySQL
- Oracle
- SQL

¿Qué bases de datos ofrece sqlzoo?

• Las bases de datos que ofrece sqlzoo son las de world y nobel, las cuales son bases de datos relacionales que se organizan en tablas.

Practica

A. PRACTICE

- SELECT
  Select name **from** world
- FUNCTIONS
  Select name , **sum**(population)
  from world
  group by name
- SELECT .. GROUP BY
  Select continent, count(name) as cantidad
  from world
  group by continent
- SELECT SELECT
  select continent, population
  from (**select** continent, **sum**(population) as poblacion
      from world
      group by continent) as ejemplo
  where population <> 5000000

B. REFERENCE

1. ¿ Qué información tiene la tabla WORLD?
   select *
   from world
2. ¿ Qué continentes figuran en esa tabla ?
   select DISTINCT(continent)
   from world
3. ¿Qué países tienen un área menor a 1000?
   select name
   from world
   where area <1000
   order by area
4. ¿Qué continentes tienen países con una población mayor a quinientos mil de habitantes?
   select continent
   from world
   where population>500000
   order by population DESC
5. ¿Qué área tiene cada uno de los continentes?
   select continent,sum(area) as area

from world
group by continent

6. ¿Cuál es la población total?
   select sum(population) as poblacion_total
   from world
7. ¿De cuántos países se tiene información?
   select count(name) as numero_paises
   from world

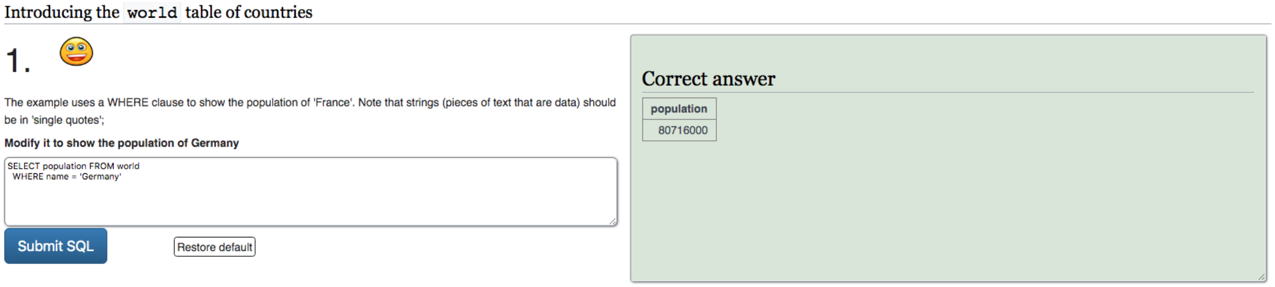
Calculo

- {ns : world |: ns}
- {ns : world |: ns.continent }
- {ns : world | ns.population > 500: ns.name}
- {ns : world | ns.population > 1000000 : ns.continent}
- {ns : world , +sn:world | :ns.continent , sn.area }
- {+ns : world | ns.population }
- {#ns : world | ns.name}

Algebra

- *Π world*
- *Π continent(world)*
- *Π name, area Ó area > 500(world)*
- *Π continent , Ó population > 1000000(world)*
- *Π continent , sum(area)(world)*
- *Π (sum(population)) world*
- *Π (count(name))world*

C. Realicen los ejercicios propuestos en los siguientes tutoriales.



Introducing the `world` table of countries

1.

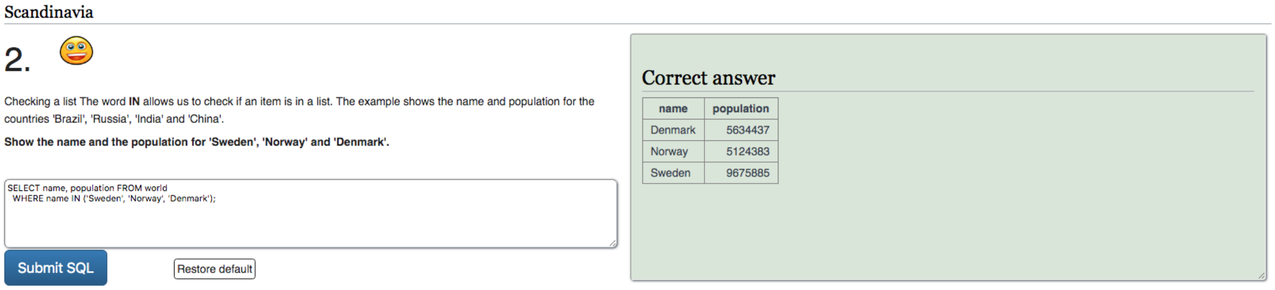
The example uses a WHERE clause to show the population of 'France'. Note that strings (pieces of text that are data) should be in 'single quotes';

Modify it to show the population of Germany

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

Correct answer

population
80716000



Scandinavia

2.

Checking a list The word **IN** allows us to check if an item is in a list. The example shows the name and population for the countries 'Brazil', 'Russia', 'India' and 'China'.

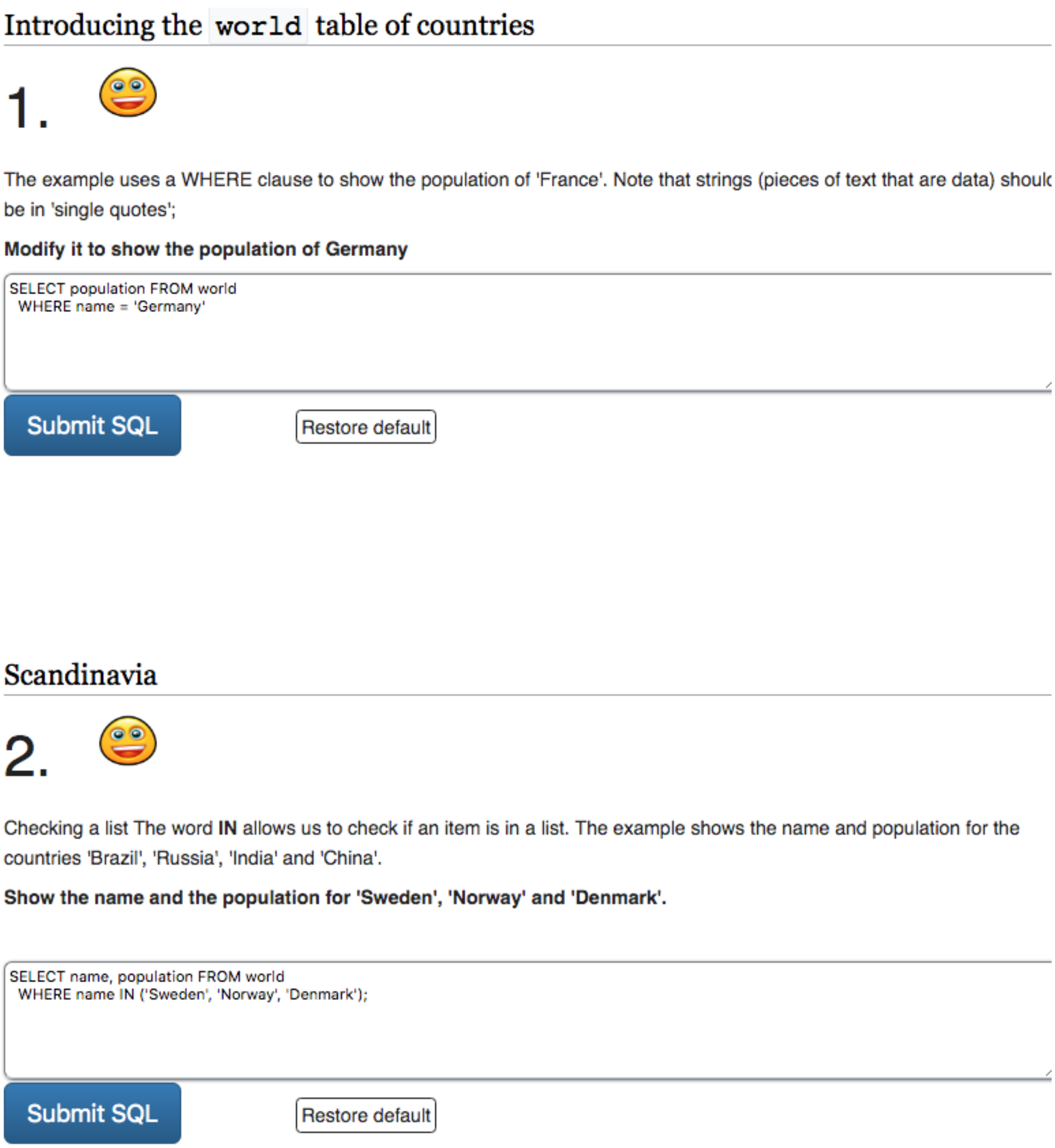
Show the name and the population for 'Sweden', 'Norway' and 'Denmark'.

```
SELECT name, population FROM world
  WHERE name IN ('Sweden', 'Norway', 'Denmark');
```

Correct answer

name	population
Denmark	5634437
Norway	5124383
Sweden	9675885

SELECT BASICS



Introducing the `world` table of countries

1. 😃

The example uses a WHERE clause to show the population of 'France'. Note that strings (pieces of text that are data) shoulc be in 'single quotes';

Modify it to show the population of Germany

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

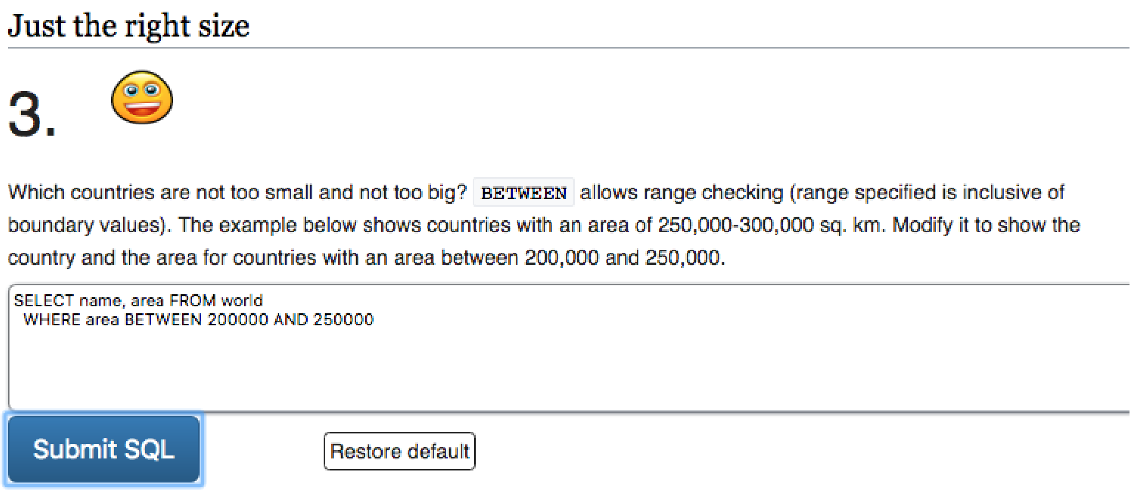
Scandinavia

2. 😃

Checking a list The word **IN** allows us to check if an item is in a list. The example shows the name and population for the countries 'Brazil', 'Russia', 'India' and 'China'.

Show the name and the population for 'Sweden', 'Norway' and 'Denmark'.

```
SELECT name, population FROM world
  WHERE name IN ('Sweden', 'Norway', 'Denmark');
```



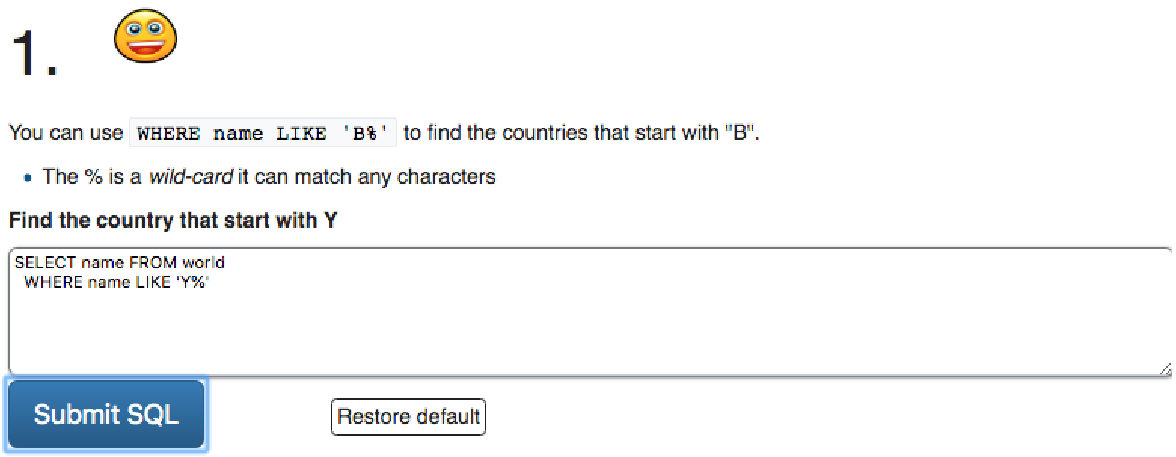
Just the right size

3.

Which countries are not too small and not too big? `BETWEEN` allows range checking (range specified is inclusive of boundary values). The example below shows countries with an area of 250,000-300,000 sq. km. Modify it to show the country and the area for countries with an area between 200,000 and 250,000.

```
SELECT name, area FROM world
 WHERE area BETWEEN 200000 AND 250000
```

Select Names



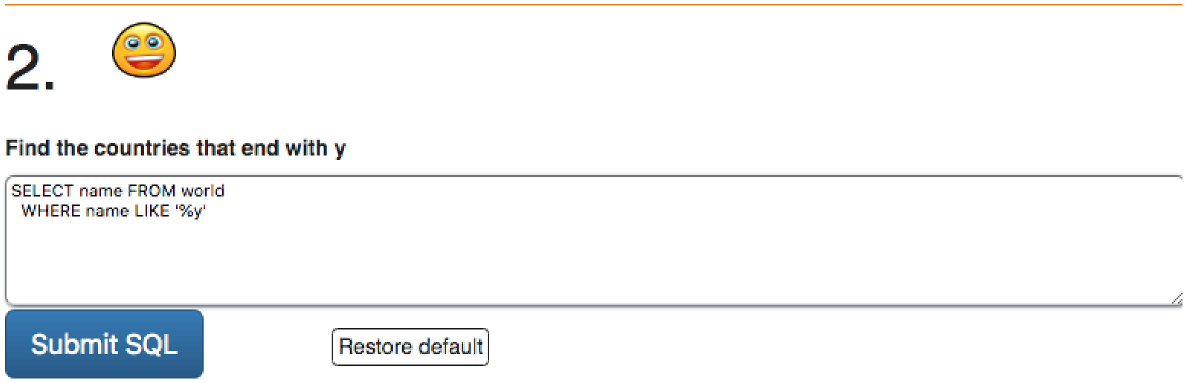
1.

You can use `WHERE name LIKE 'B%'` to find the countries that start with "B".

- The % is a *wild-card* it can match any characters

Find the country that start with Y

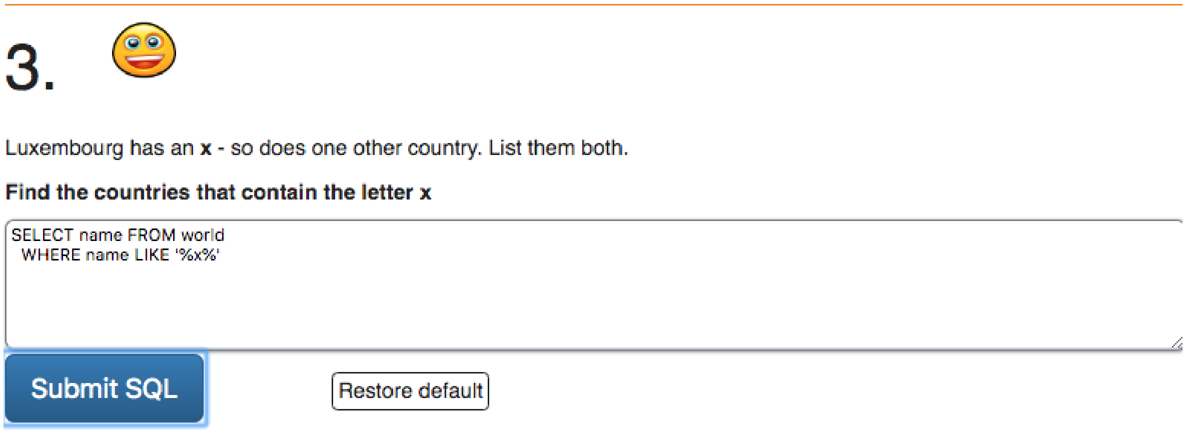
```
SELECT name FROM world
 WHERE name LIKE 'Y%'
```



2.

Find the countries that end with y

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

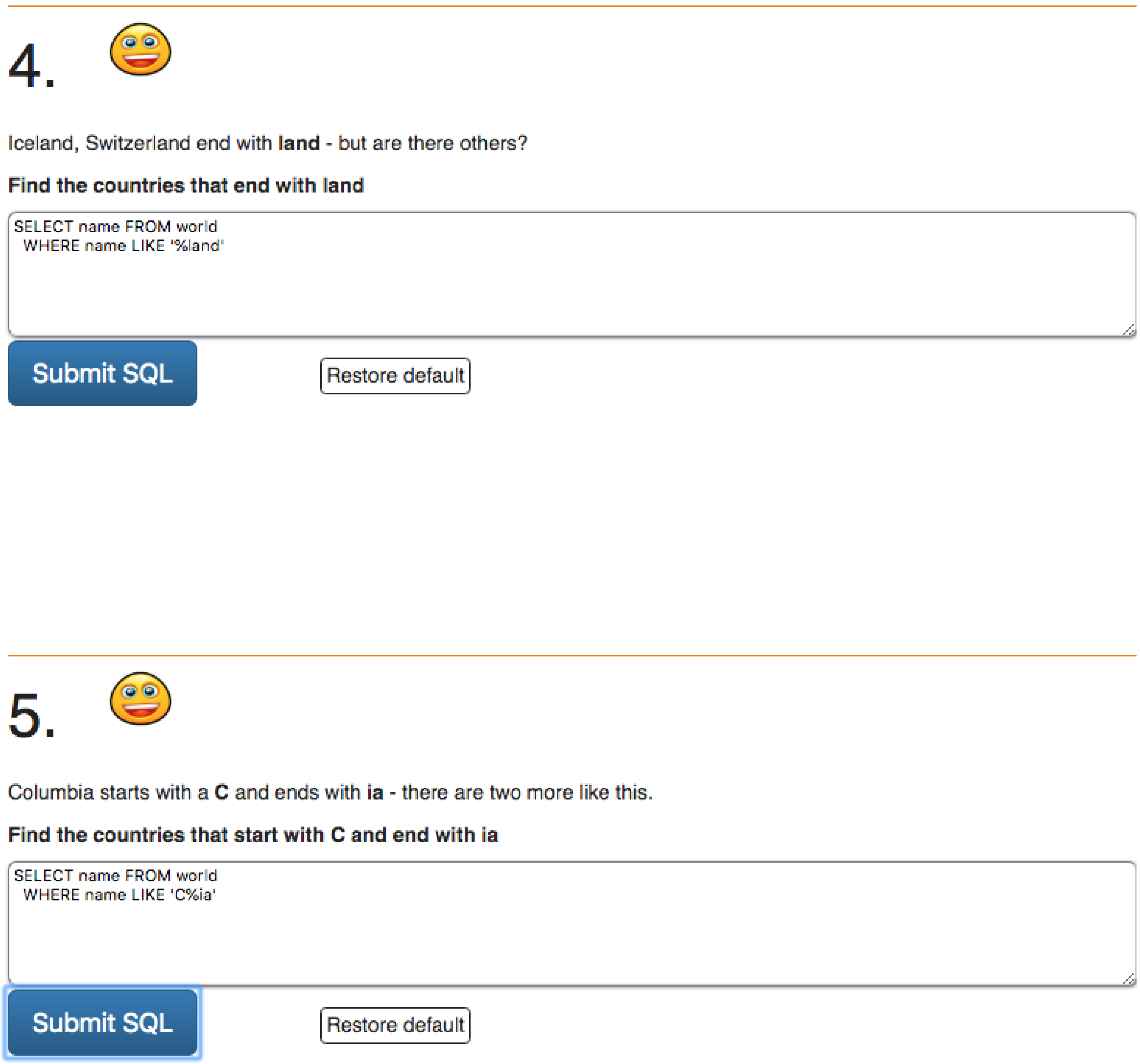


3.

Luxembourg has an **x** - so does one other country. List them both.

Find the countries that contain the letter x

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



4.

Iceland, Switzerland end with **land** - but are there others?

Find the countries that end with land

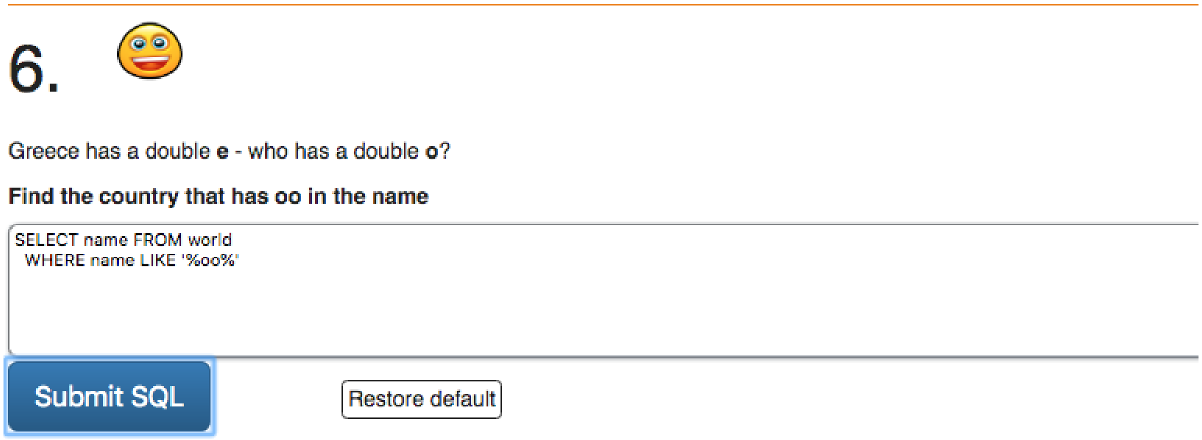
```
SELECT name FROM world
  WHERE name LIKE '%land'
```

5.

Columbia starts with a **C** and ends with **ia** - there are two more like this.

Find the countries that start with C and end with ia

```
SELECT name FROM world
  WHERE name LIKE 'C%ia'
```

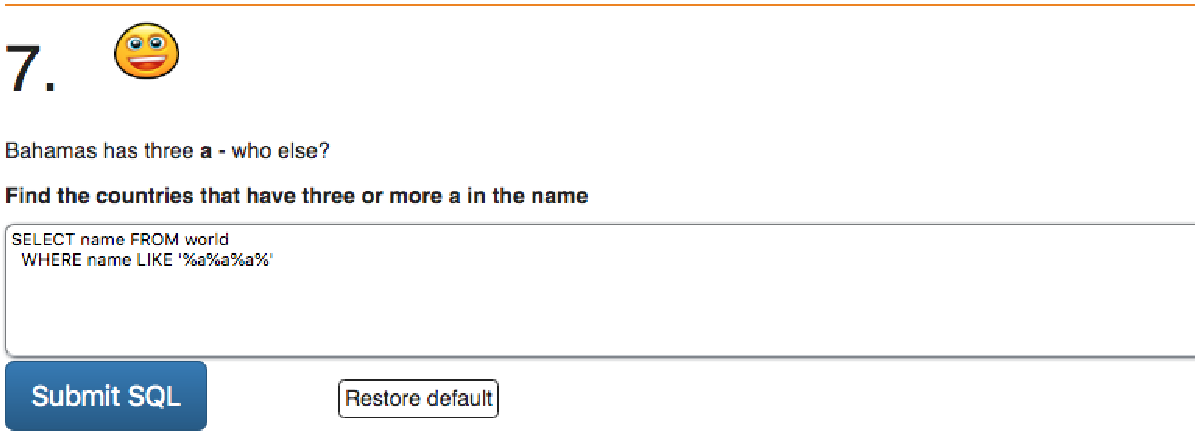


6.

Greece has a double **e** - who has a double **o**?

Find the country that has oo in the name

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

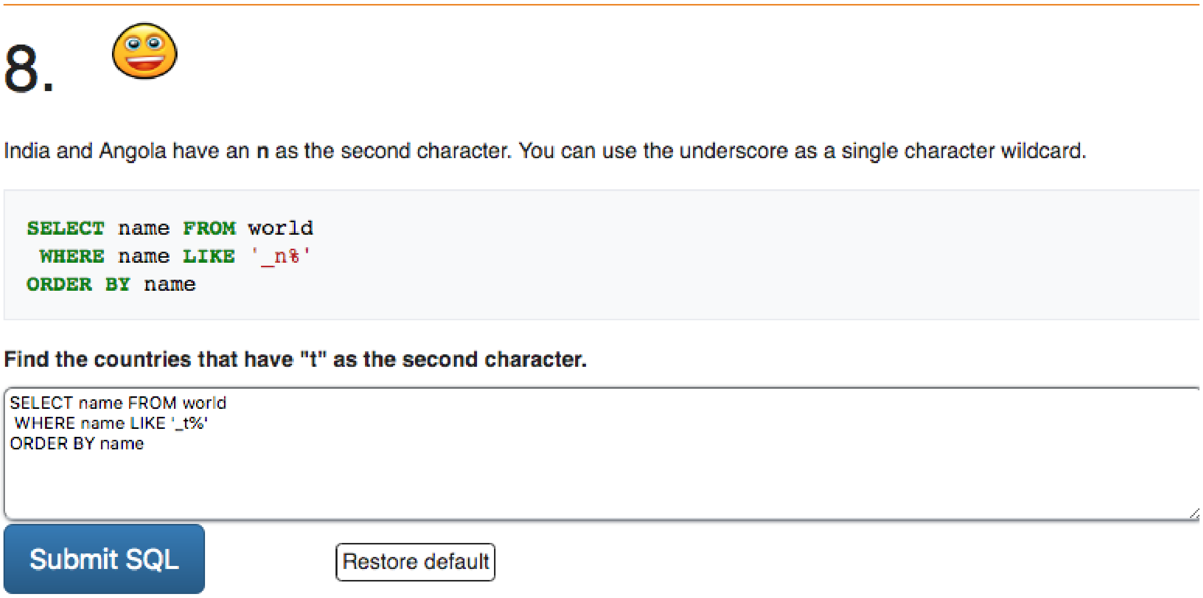


7.

Bahamas has three **a** - who else?

Find the countries that have three or more a in the name

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



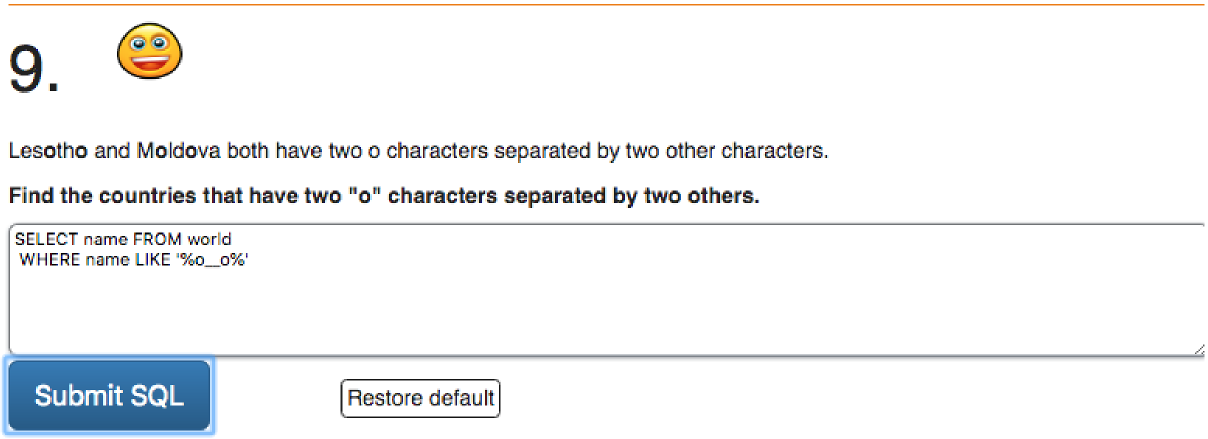
8.

India and Angola have an **n** as the second character. You can use the underscore as a single character wildcard.

```
SELECT name FROM world
 WHERE name LIKE '_n%'
ORDER BY name
```

Find the countries that have "t" as the second character.

```
SELECT name FROM world
 WHERE name LIKE '_t%'
ORDER BY name
```

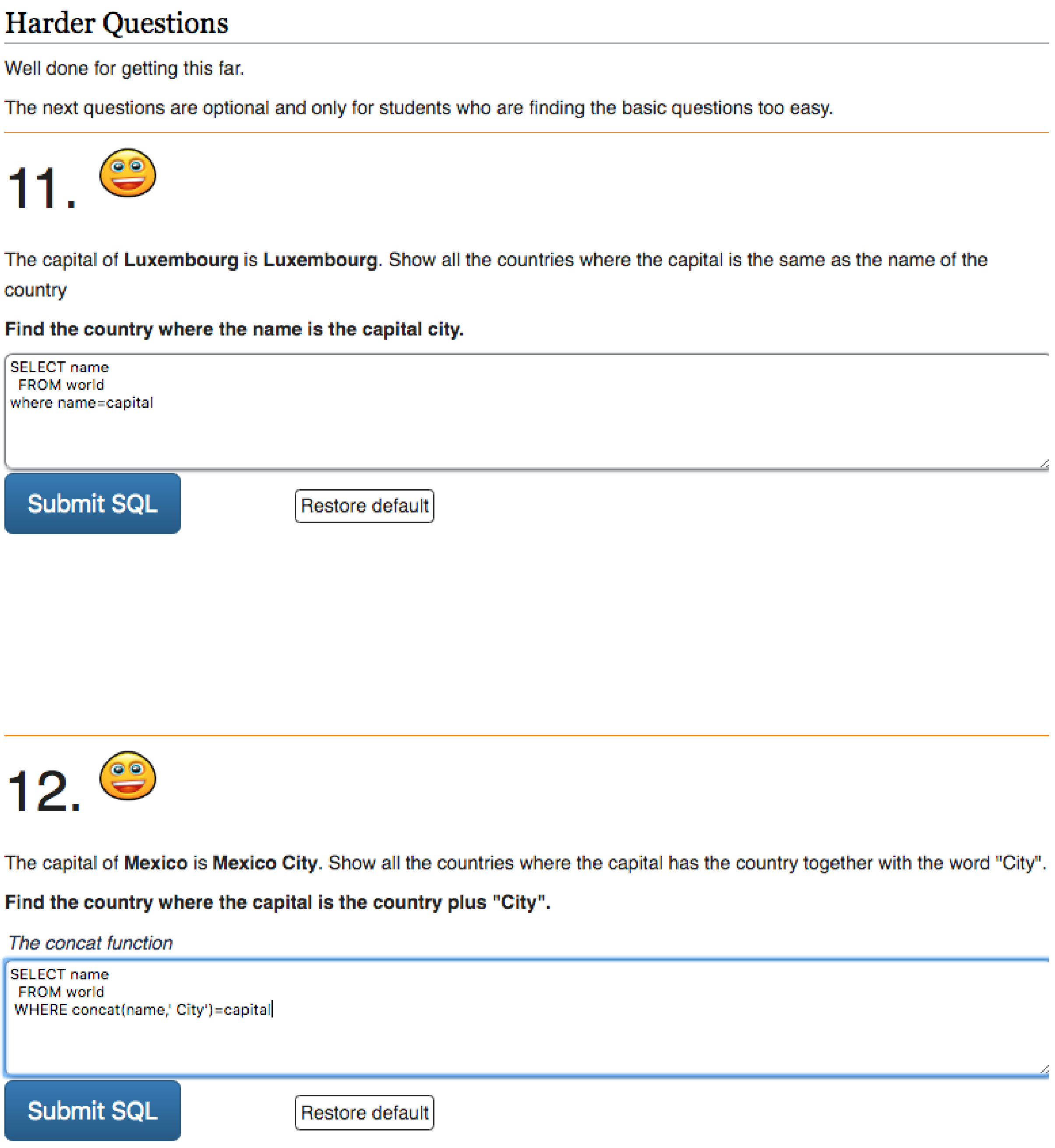


9.

Lesotho and Moldova both have two o characters separated by two other characters.

Find the countries that have two "o" characters separated by two others.

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



Harder Questions

Well done for getting this far.

The next questions are optional and only for students who are finding the basic questions too easy.

11.

The capital of **Luxembourg** is **Luxembourg**. Show all the countries where the capital is the same as the name of the country

Find the country where the name is the capital city.

```
SELECT name
 FROM world
where name=capital
```

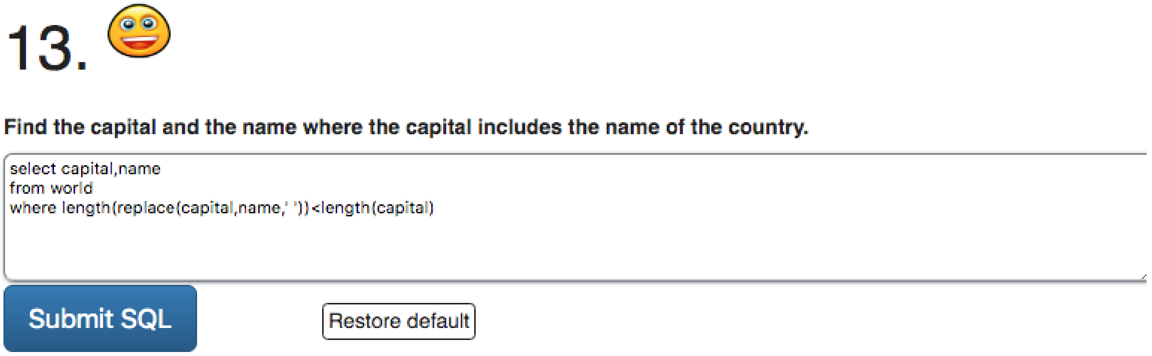
12.

The capital of **Mexico** is **Mexico City**. Show all the countries where the capital has the country together with the word "City".

Find the country where the capital is the country plus "City".

The concat function

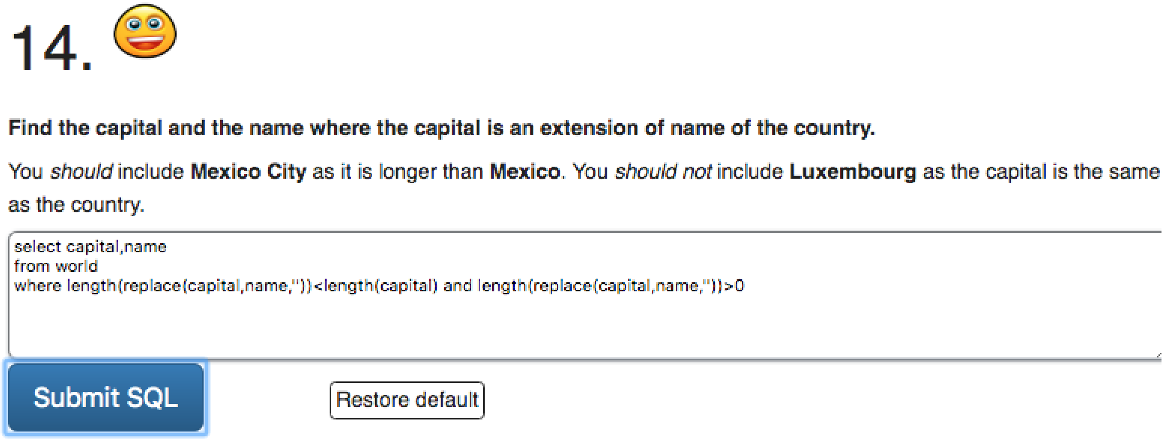
```
SELECT name
 FROM world
 WHERE concat(name,' City')=capital
```



13.

Find the capital and the name where the capital includes the name of the country.

```
select capital,name
from world
where length(replace(capital,name,' '))<length(capital)
```

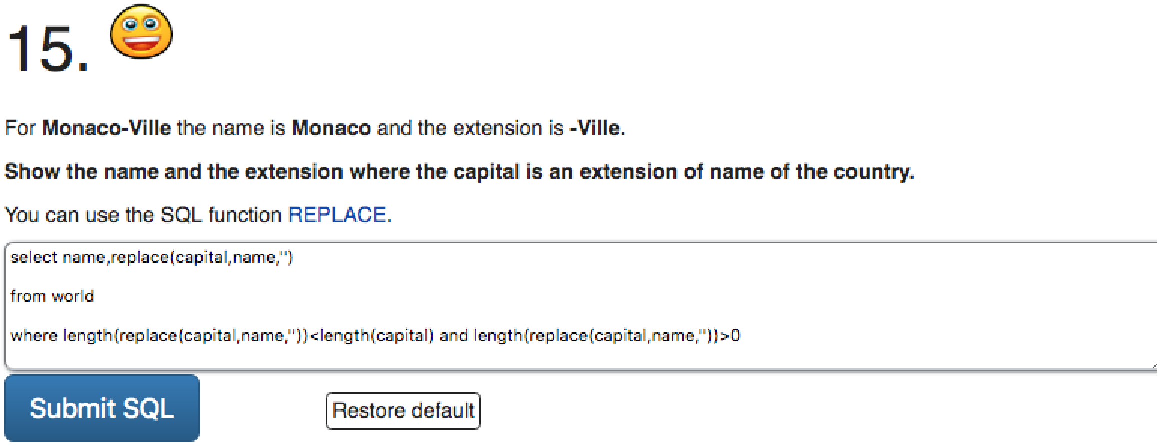


14.

Find the capital and the name where the capital is an extension of name of the country.

You *should* include **Mexico City** as it is longer than **Mexico**. You *should not* include **Luxembourg** as the capital is the same as the country.

```
select capital,name
from world
where length(replace(capital,name,''))<length(capital) and length(replace(capital,name,''))>0
```



15.

For **Monaco-Ville** the name is **Monaco** and the extension is **-Ville**.

Show the name and the extension where the capital is an extension of name of the country.

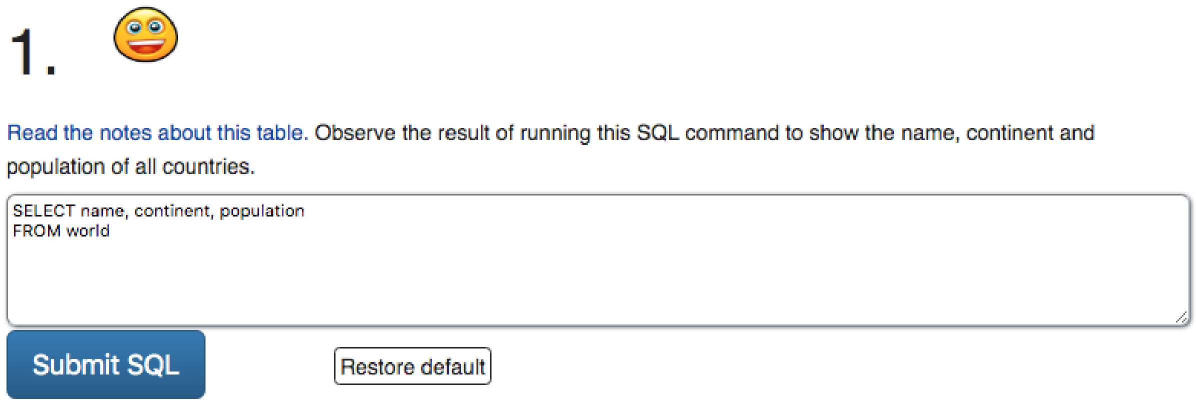
You can use the SQL function REPLACE.

```
select name,replace(capital,name,'')

from world

where length(replace(capital,name,''))<length(capital) and length(replace(capital,name,''))>0
```

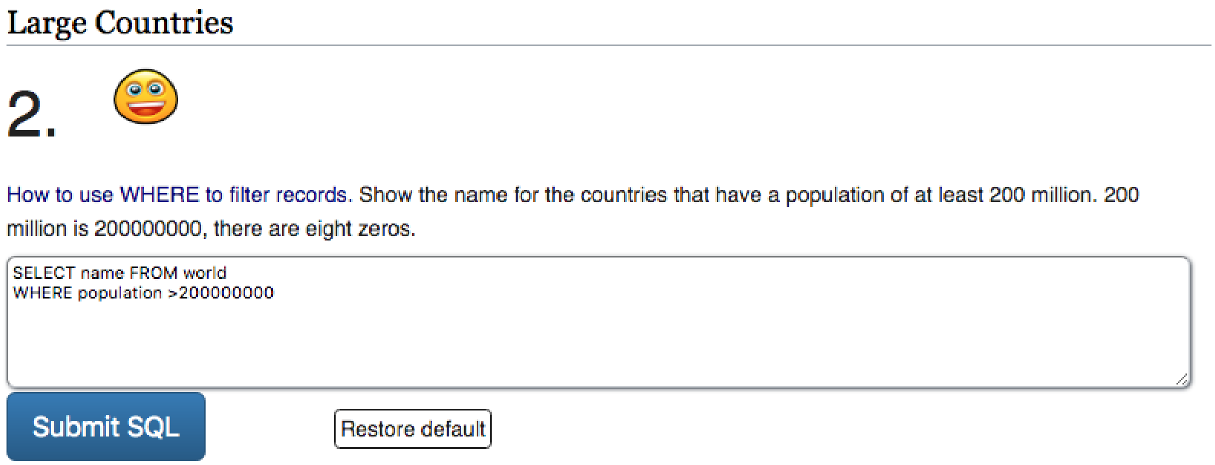
Select from world



1.

Read the notes about this table. Observe the result of running this SQL command to show the name, continent and population of all countries.

```
SELECT name, continent, population
FROM world
```

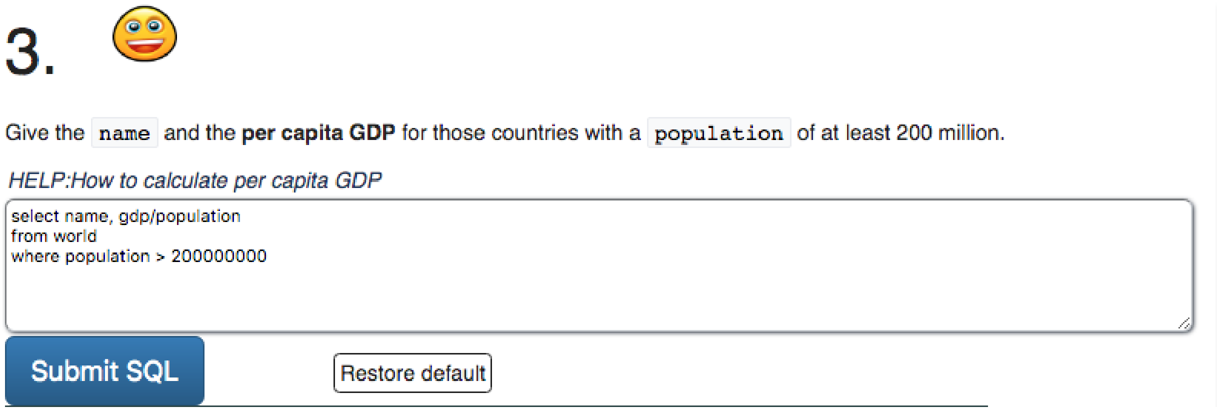


Large Countries

2.

How to use WHERE to filter records. Show the name for the countries that have a population of at least 200 million. 200 million is 200000000, there are eight zeros.

```
SELECT name FROM world
WHERE population >200000000
```

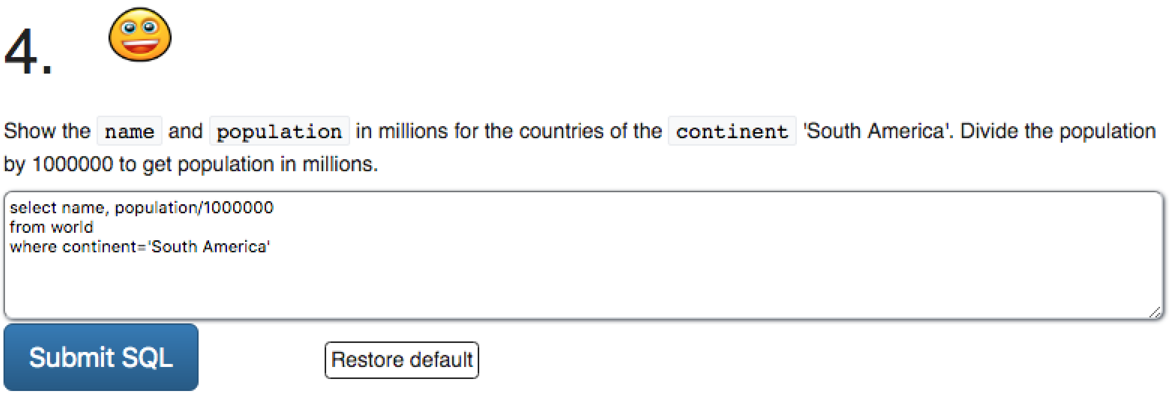


3.

Give the `name` and the **per capita GDP** for those countries with a `population` of at least 200 million.

HELP:How to calculate per capita GDP

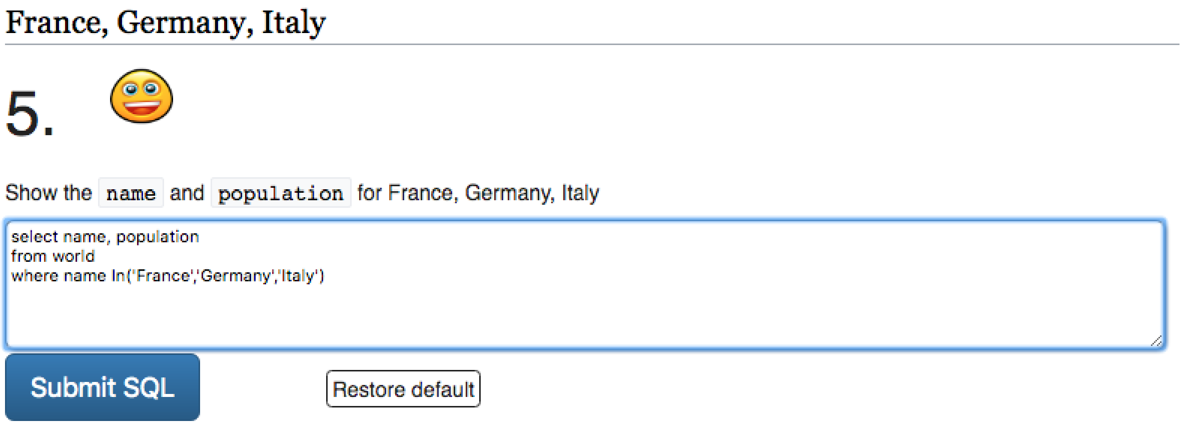
```
select name, gdp/population
from world
where population > 200000000
```



4.

Show the `name` and `population` in millions for the countries of the `continent` 'South America'. Divide the population by 1000000 to get population in millions.

```
select name, population/1000000
from world
where continent='South America'
```

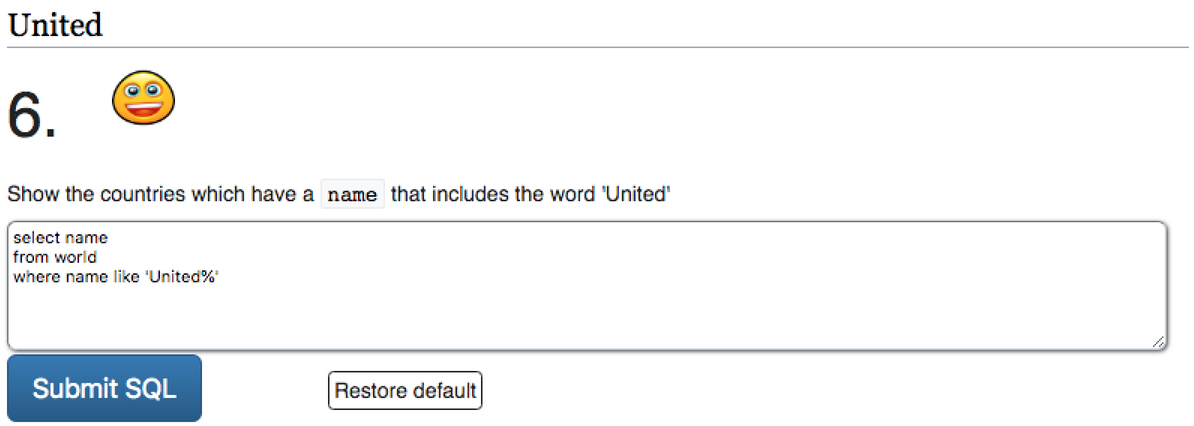


France, Germany, Italy

5.

Show the `name` and `population` for France, Germany, Italy

```
select name, population
from world
where name In('France','Germany','Italy')
```

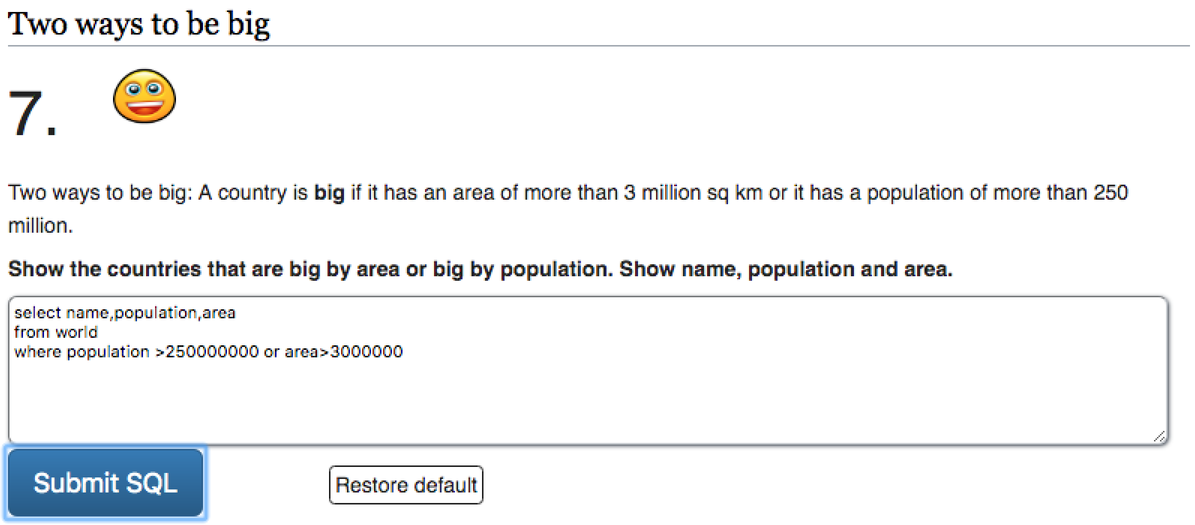


United

6.

Show the countries which have a `name` that includes the word 'United'

```
select name
from world
where name like 'United%'
```



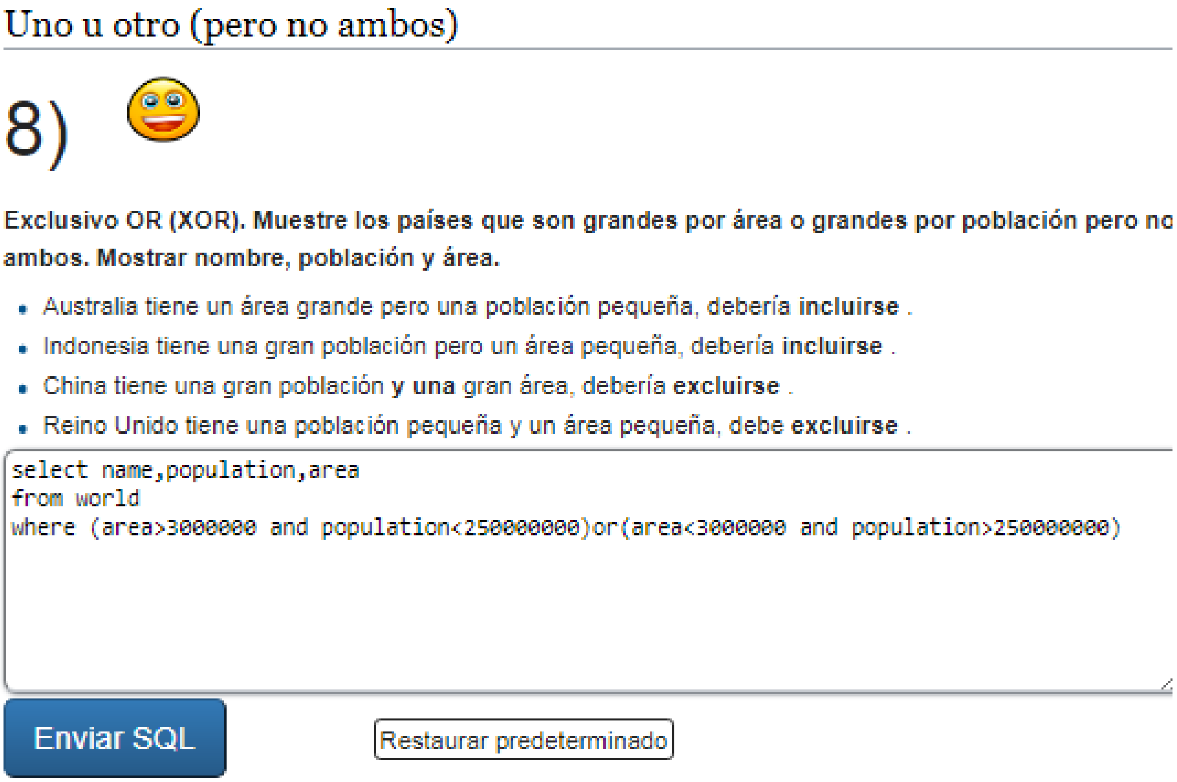
Two ways to be big

7.

Two ways to be big: A country is **big** if it has an area of more than 3 million sq km or it has a population of more than 250 million.

Show the countries that are big by area or big by population. Show name, population and area.

```
select name,population,area
from world
where population >250000000 or area>3000000
```



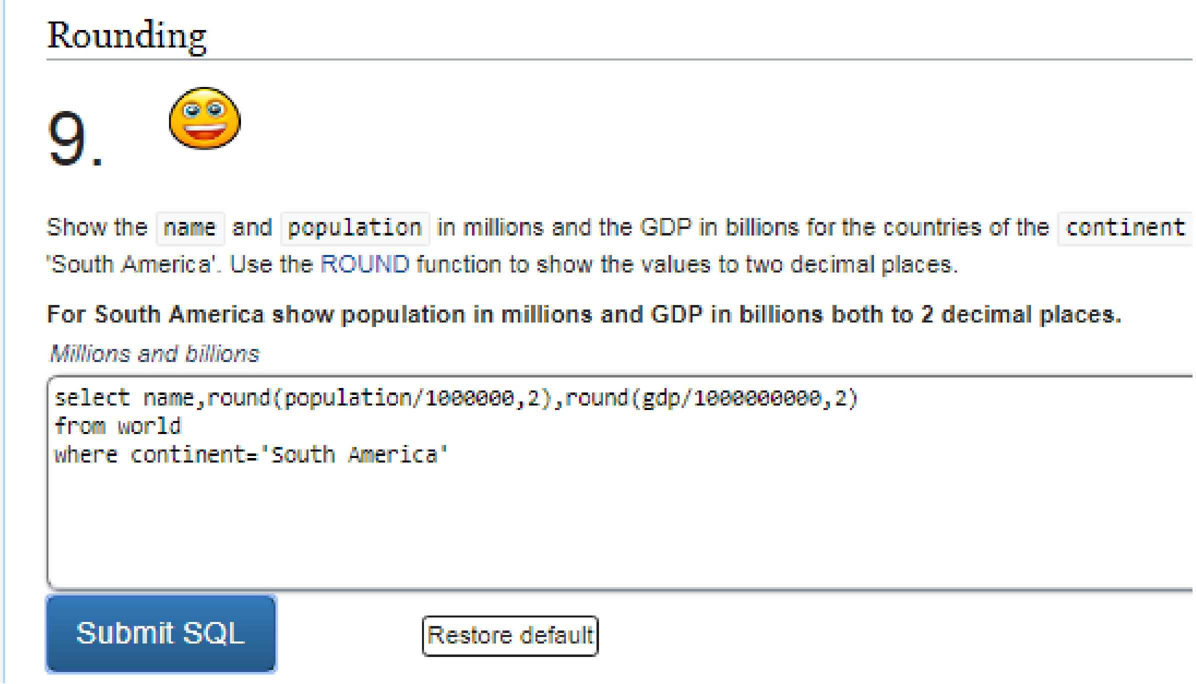
Uno u otro (pero no ambos)

8)

Exclusivo OR (XOR). Muestre los países que son grandes por área o grandes por población pero no ambos. Mostrar nombre, población y área.

- Australia tiene un área grande pero una población pequeña, debería **incluirse** .
- Indonesia tiene una gran población pero un área pequeña, debería **incluirse** .
- China tiene una gran población **y una** gran área, debería **excluirse** .
- Reino Unido tiene una población pequeña y un área pequeña, debe **excluirse** .

```
select name,population,area
from world
where (area>3000000 and population<250000000)or(area<3000000 and population>250000000)
```



Rounding

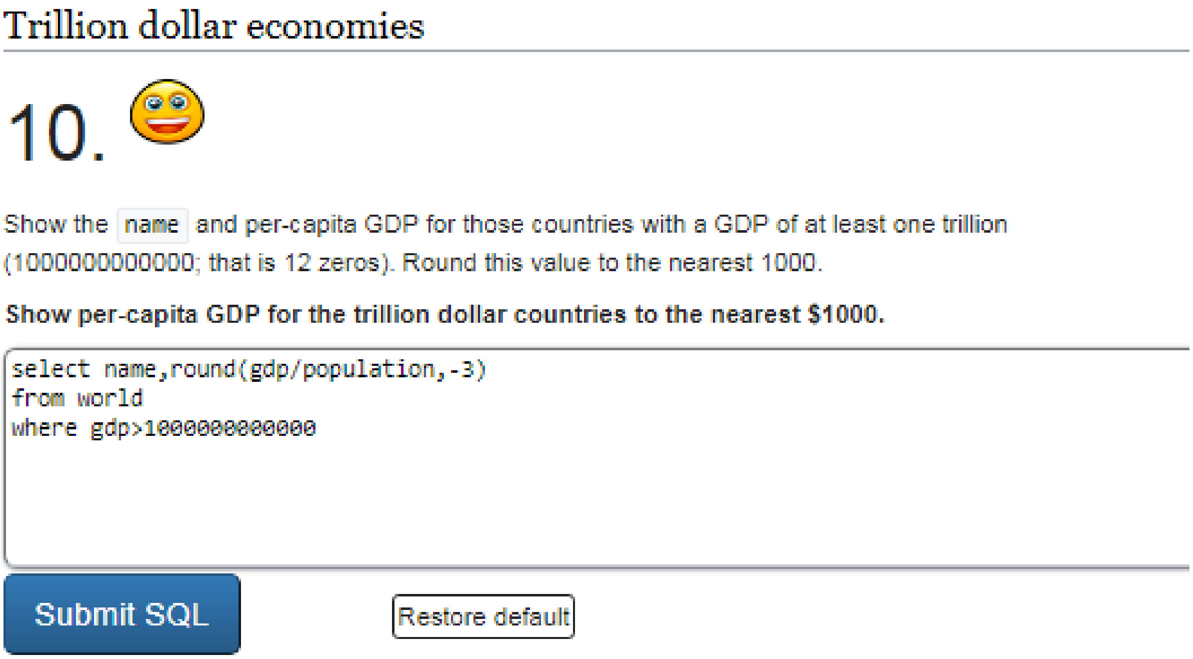
9.

Show the `name` and `population` in millions and the GDP in billions for the countries of the `continent` 'South America'. Use the ROUND function to show the values to two decimal places.

For South America show population in millions and GDP in billions both to 2 decimal places.

Millions and billions

```
select name,round(population/1000000,2),round(gdp/1000000000,2)
from world
where continent='South America'
```



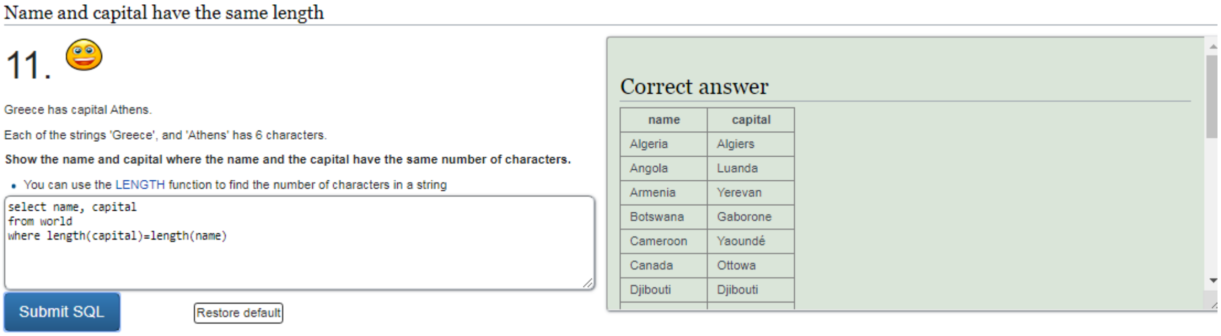
Trillion dollar economies

10.

Show the `name` and per-capita GDP for those countries with a GDP of at least one trillion (1000000000000; that is 12 zeros). Round this value to the nearest 1000.

Show per-capita GDP for the trillion dollar countries to the nearest $1000.

```
select name,round(gdp/population,-3)
from world
where gdp>1000000000000
```



Name and capital have the same length

11.

Greece has capital Athens.

Each of the strings 'Greece', and 'Athens' has 6 characters.

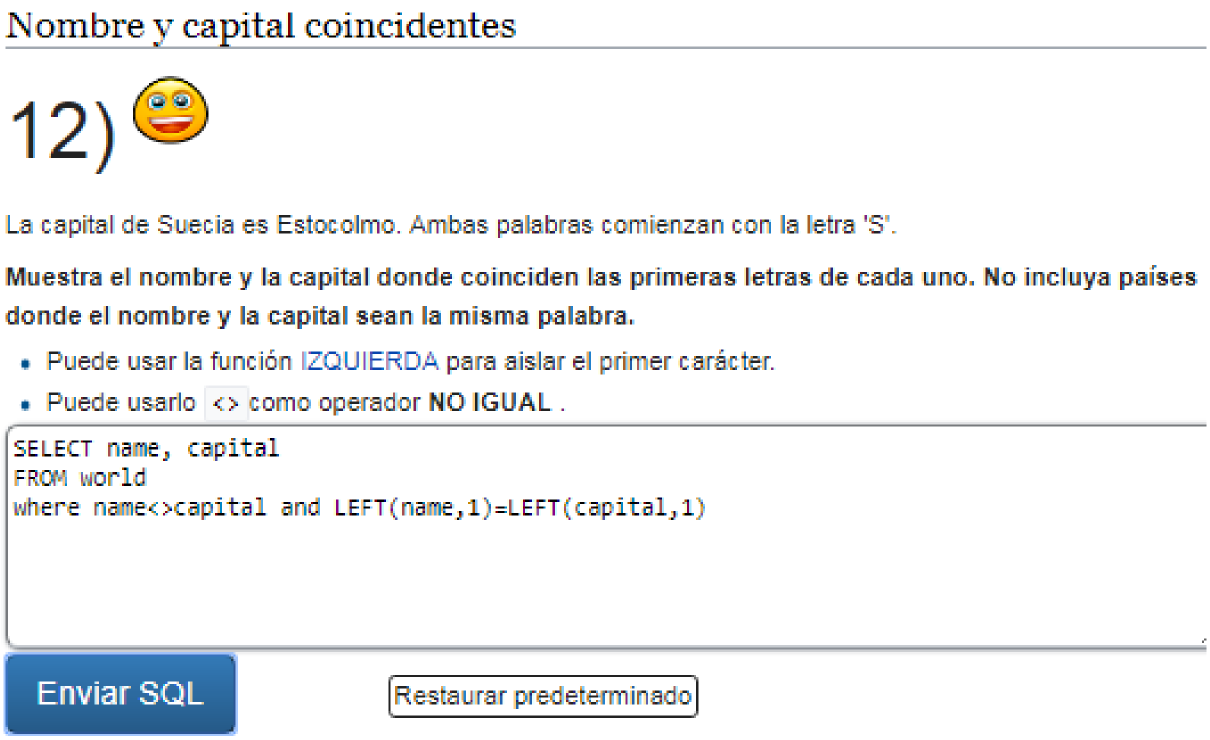
Show the name and capital where the name and the capital have the same number of characters.

- You can use the LENGTH function to find the number of characters in a string

```
select name, capital
from world
where length(capital)=length(name)
```

Correct answer

name	capital
Algeria	Algiers
Angola	Luanda
Armenia	Yerevan
Botswana	Gaborone
Cameroon	Yaoundé
Canada	Ottowa
Djibouti	Djibouti



Nombre y capital coincidentes

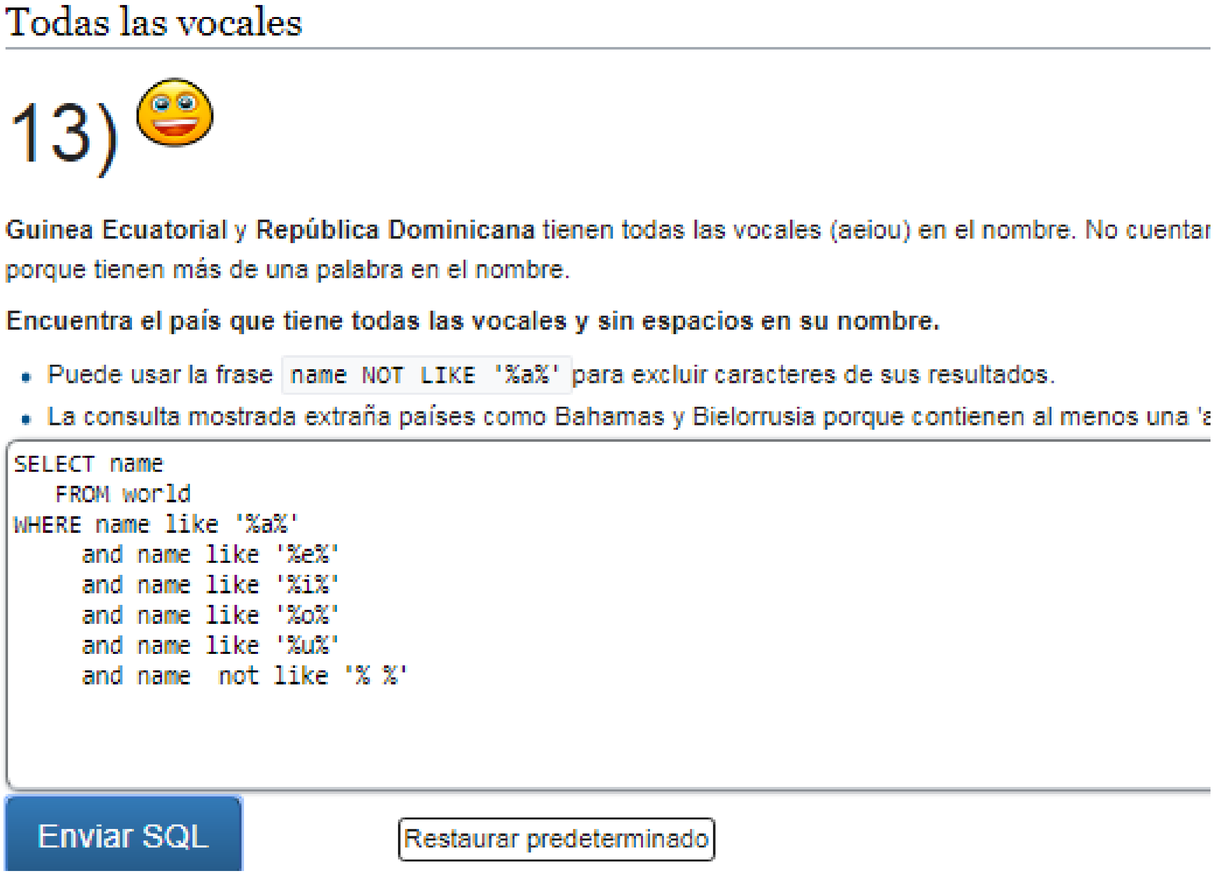
12)

La capital de Suecia es Estocolmo. Ambas palabras comienzan con la letra 'S'.

Muestra el nombre y la capital donde coinciden las primeras letras de cada uno. No incluya países donde el nombre y la capital sean la misma palabra.

- Puede usar la función IZQUIERDA para aislar el primer carácter.
- Puede usarlo `<>` como operador **NO IGUAL** .

```
SELECT name, capital
FROM world
where name<>capital and LEFT(name,1)=LEFT(capital,1)
```



Todas las vocales

13)

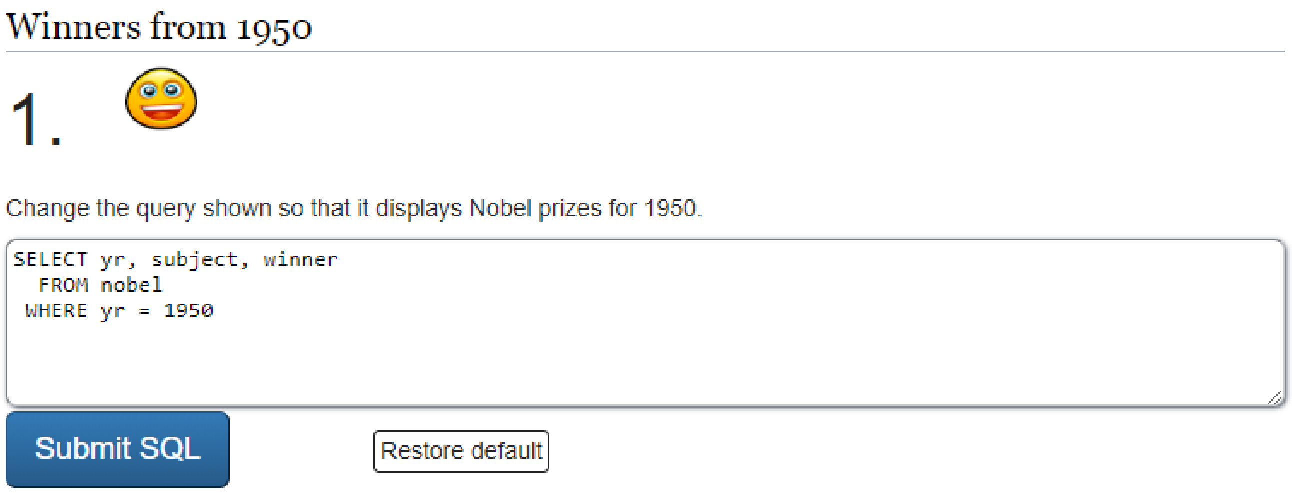
Guinea Ecuatorial y **República Dominicana** tienen todas las vocales (aeiou) en el nombre. No cuentar porque tienen más de una palabra en el nombre.

Encuentra el país que tiene todas las vocales y sin espacios en su nombre.

- Puede usar la frase `name NOT LIKE '%a%'` para excluir caracteres de sus resultados.
- La consulta mostrada extraña países como Bahamas y Bielorrusia porque contienen al menos una '

```
SELECT name
   FROM world
WHERE name like '%a%'
     and name like '%e%'
     and name like '%i%'
     and name like '%o%'
     and name like '%u%'
     and name  not like '% %'
```

Nobel

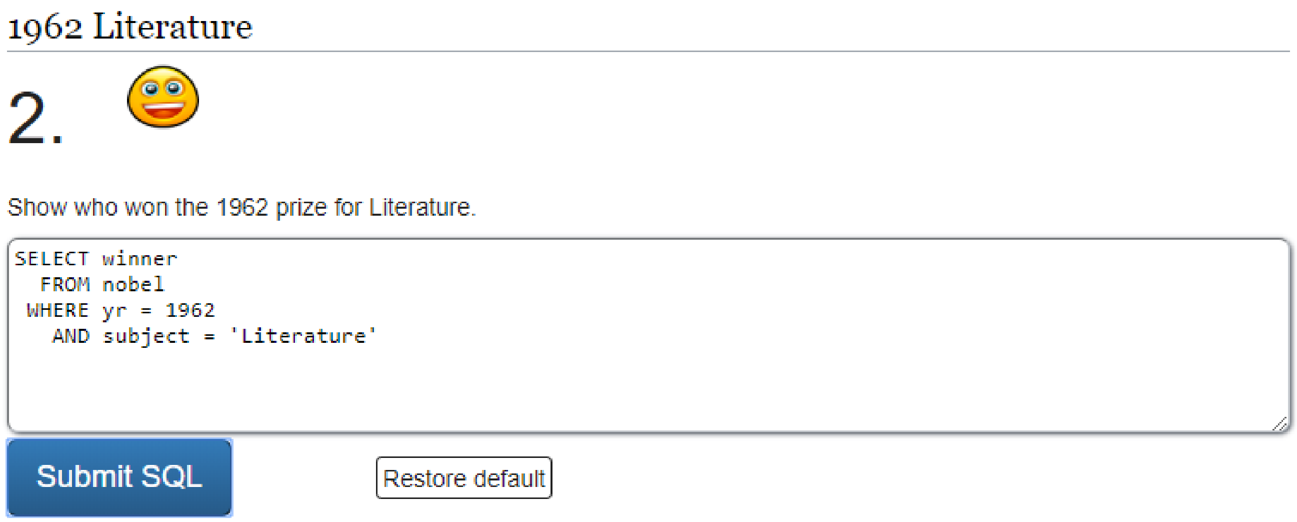


Winners from 1950

1.

Change the query shown so that it displays Nobel prizes for 1950.

```
SELECT yr, subject, winner
  FROM nobel
 WHERE yr = 1950
```

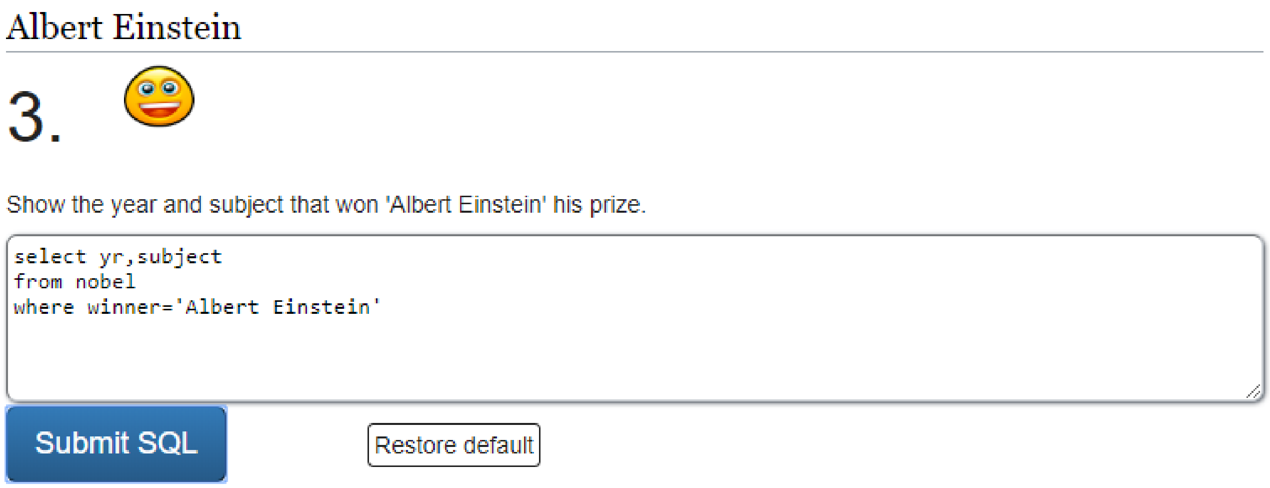


1962 Literature

2.

Show who won the 1962 prize for Literature.

```
SELECT winner
  FROM nobel
 WHERE yr = 1962
   AND subject = 'Literature'
```

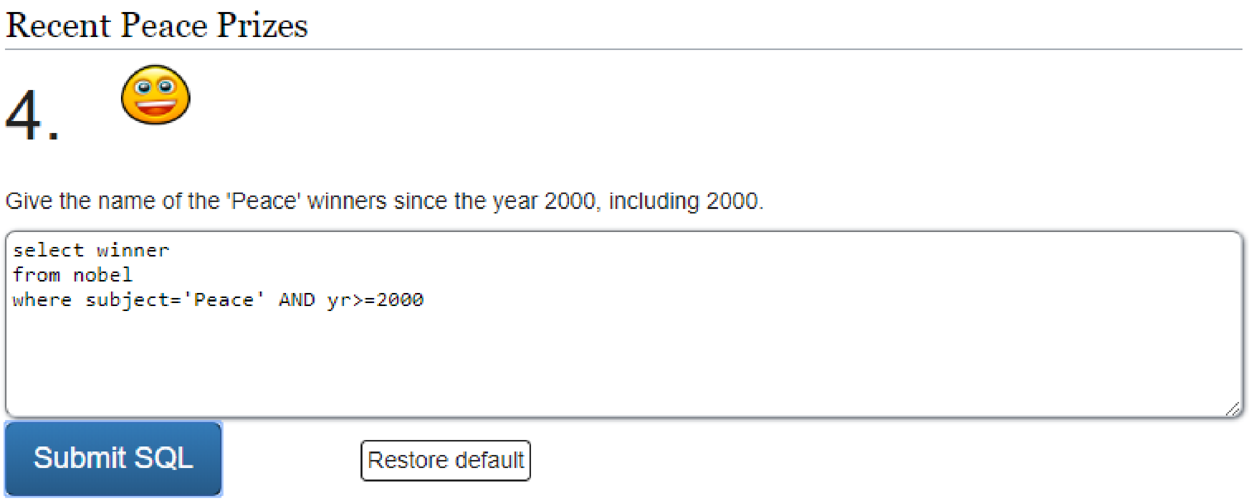


Albert Einstein

3.

Show the year and subject that won 'Albert Einstein' his prize.

```
select yr,subject
from nobel
where winner='Albert Einstein'
```

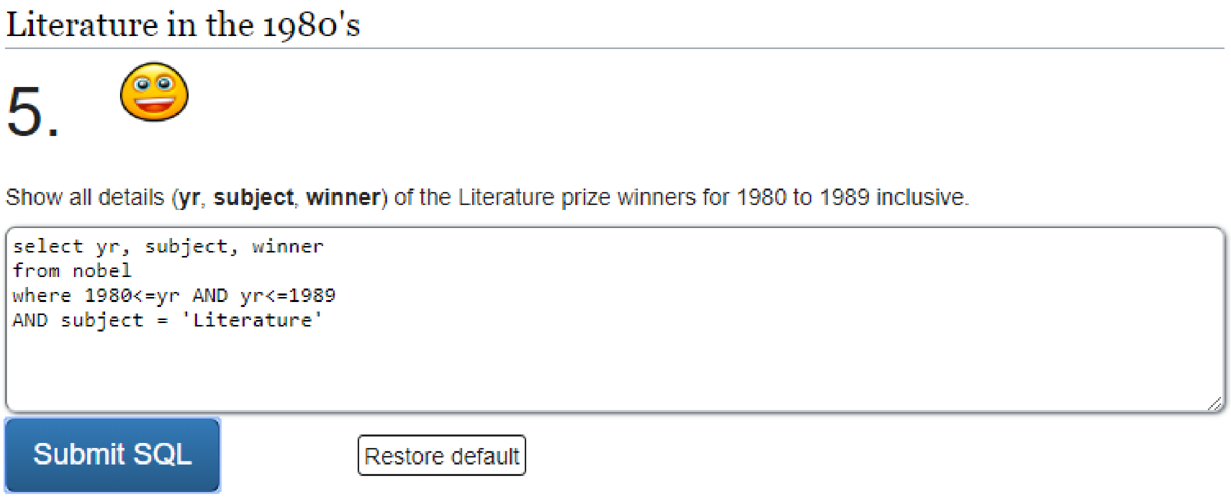


Recent Peace Prizes

4.

Give the name of the 'Peace' winners since the year 2000, including 2000.

```
select winner
from nobel
where subject='Peace' AND yr>=2000
```

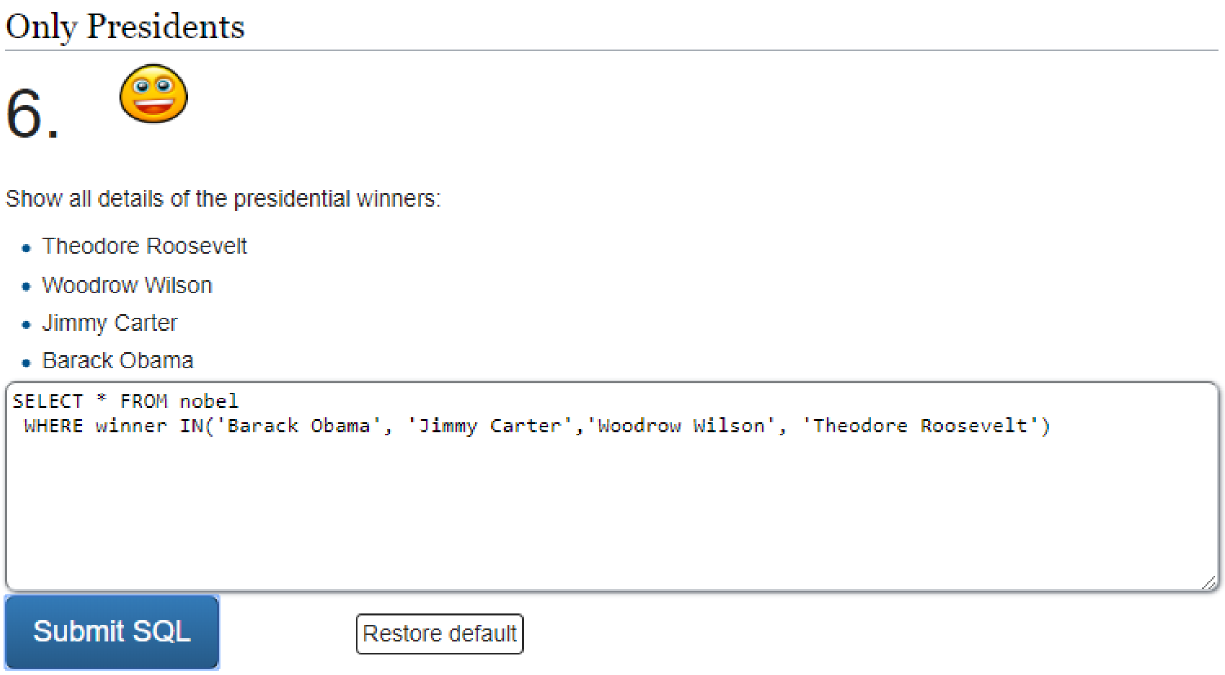


Literature in the 1980's

5.

Show all details (**yr**, **subject**, **winner**) of the Literature prize winners for 1980 to 1989 inclusive.

```
select yr, subject, winner
from nobel
where 1980<=yr AND yr<=1989
AND subject = 'Literature'
```



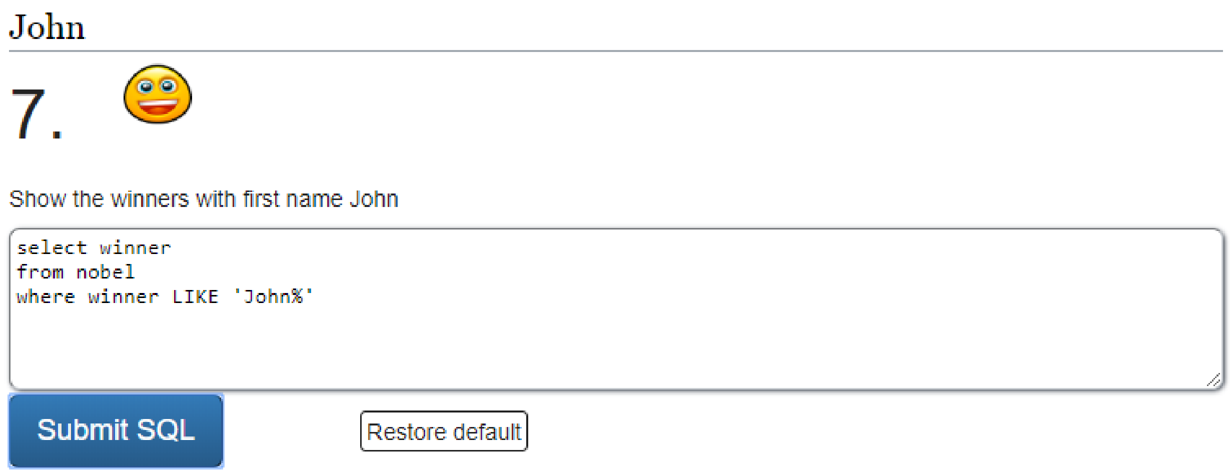
Only Presidents

6.

Show all details of the presidential winners:

- Theodore Roosevelt
- Woodrow Wilson
- Jimmy Carter
- Barack Obama

```
SELECT * FROM nobel
 WHERE winner IN('Barack Obama', 'Jimmy Carter','Woodrow Wilson', 'Theodore Roosevelt')
```

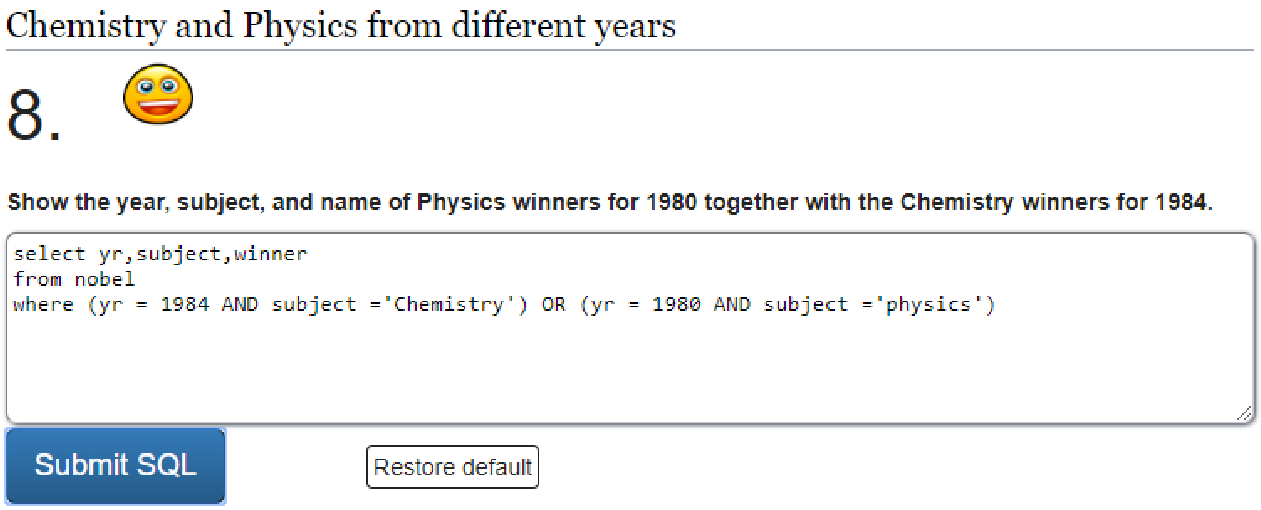


John

7.

Show the winners with first name John

```
select winner
from nobel
where winner LIKE 'John%'
```

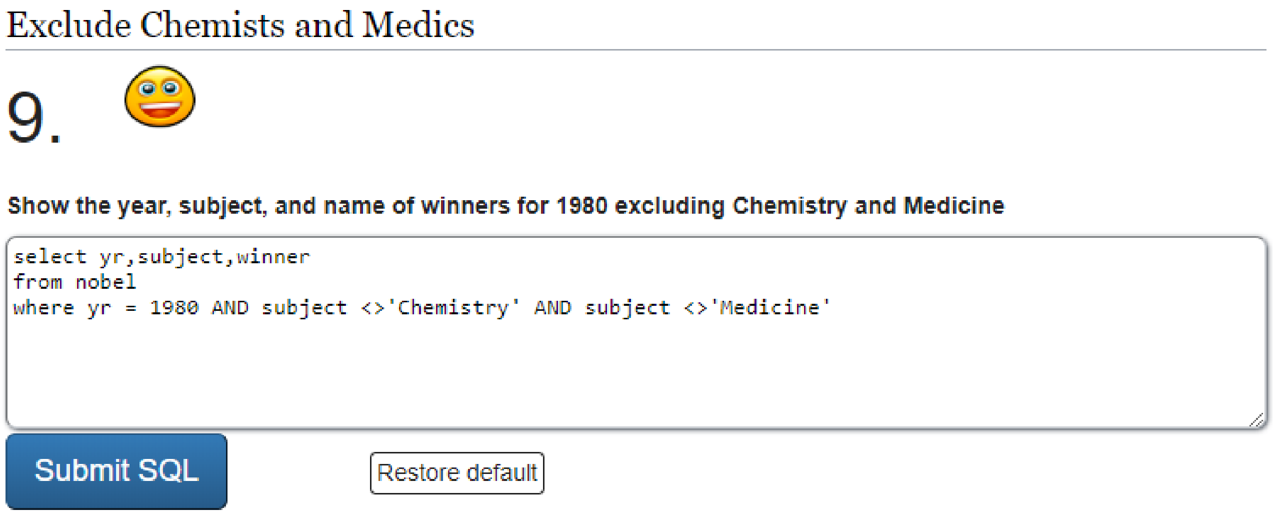


Chemistry and Physics from different years

8.

Show the year, subject, and name of Physics winners for 1980 together with the Chemistry winners for 1984.

```
select yr,subject,winner
from nobel
where (yr = 1984 AND subject ='Chemistry') OR (yr = 1980 AND subject ='physics')
```

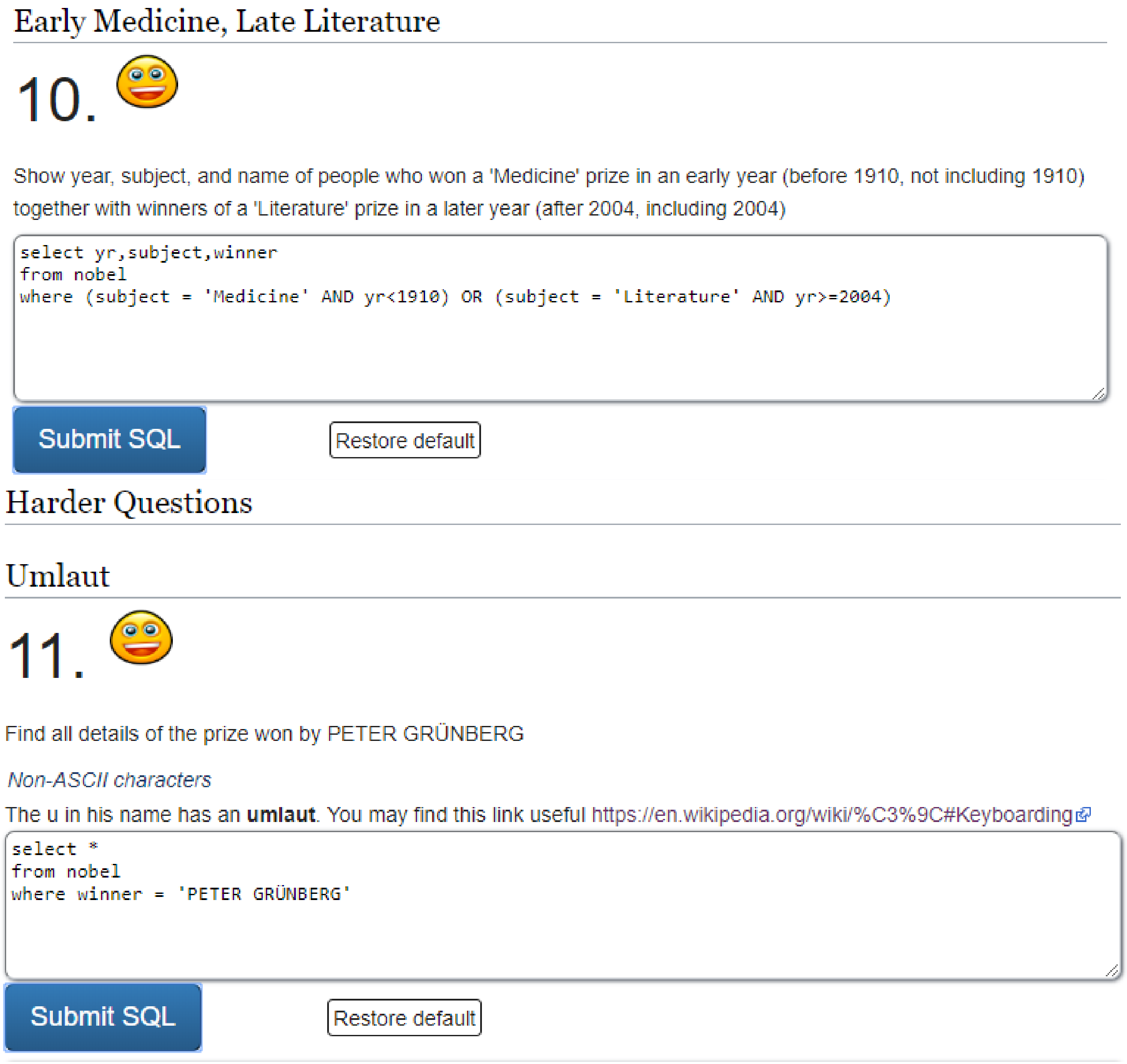


Exclude Chemists and Medics

9.

Show the year, subject, and name of winners for 1980 excluding Chemistry and Medicine

```
select yr,subject,winner
from nobel
where yr = 1980 AND subject <>'Chemistry' AND subject <>'Medicine'
```



Early Medicine, Late Literature

10.

Show year, subject, and name of people who won a 'Medicine' prize in an early year (before 1910, not including 1910) together with winners of a 'Literature' prize in a later year (after 2004, including 2004)

```
select yr,subject,winner
from nobel
where (subject = 'Medicine' AND yr<1910) OR (subject = 'Literature' AND yr>=2004)
```

Harder Questions

Umlaut

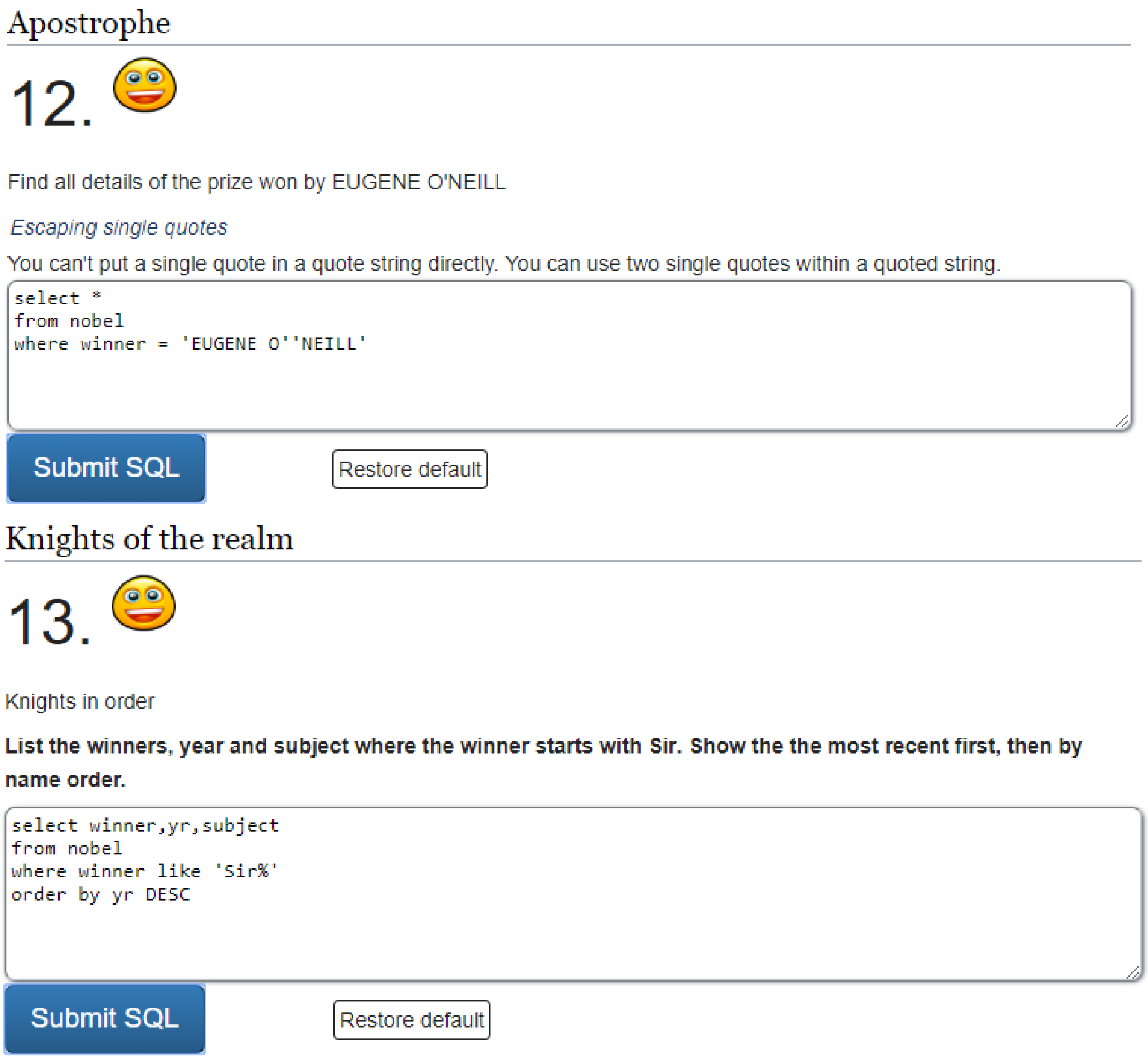
11.

Find all details of the prize won by PETER GRÜNBERG

Non-ASCII characters

The u in his name has an **umlaut**. You may find this link useful https://en.wikipedia.org/wiki/%C3%9C#Keyboarding

```
select *
from nobel
where winner = 'PETER GRÜNBERG'
```



Apostrophe

12.

Find all details of the prize won by EUGENE O'NEILL

Escaping single quotes

You can't put a single quote in a quote string directly. You can use two single quotes within a quoted string.

```
select *
from nobel
where winner = 'EUGENE O''NEILL'
```

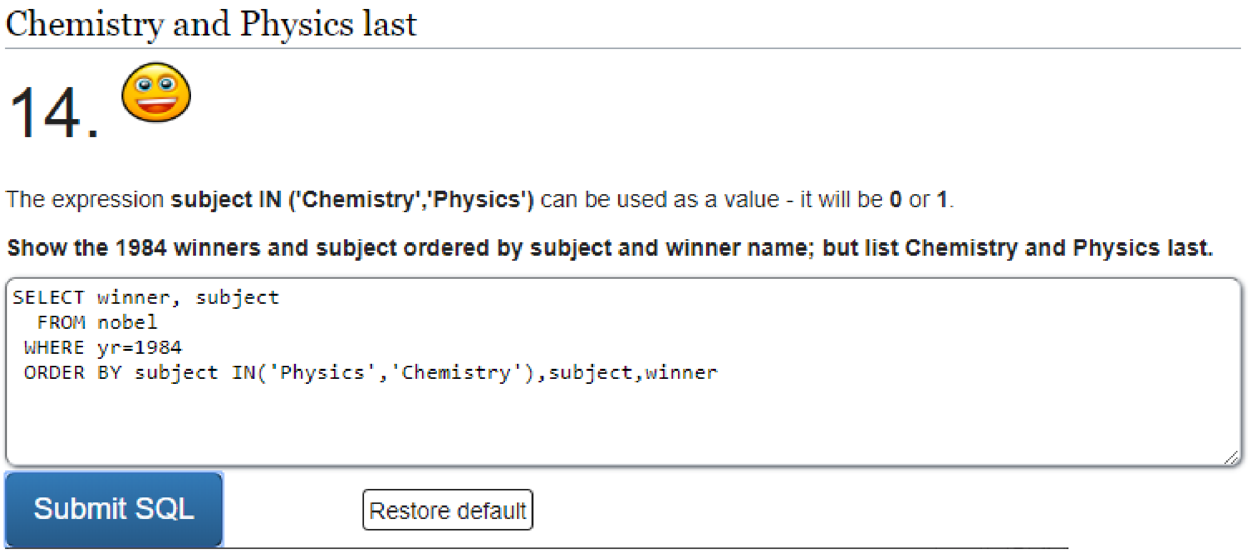
Knights of the realm

13.

Knights in order

List the winners, year and subject where the winner starts with Sir. Show the the most recent first, then by name order.

```
select winner,yr,subject
from nobel
where winner like 'Sir%'
order by yr DESC
```



Chemistry and Physics last

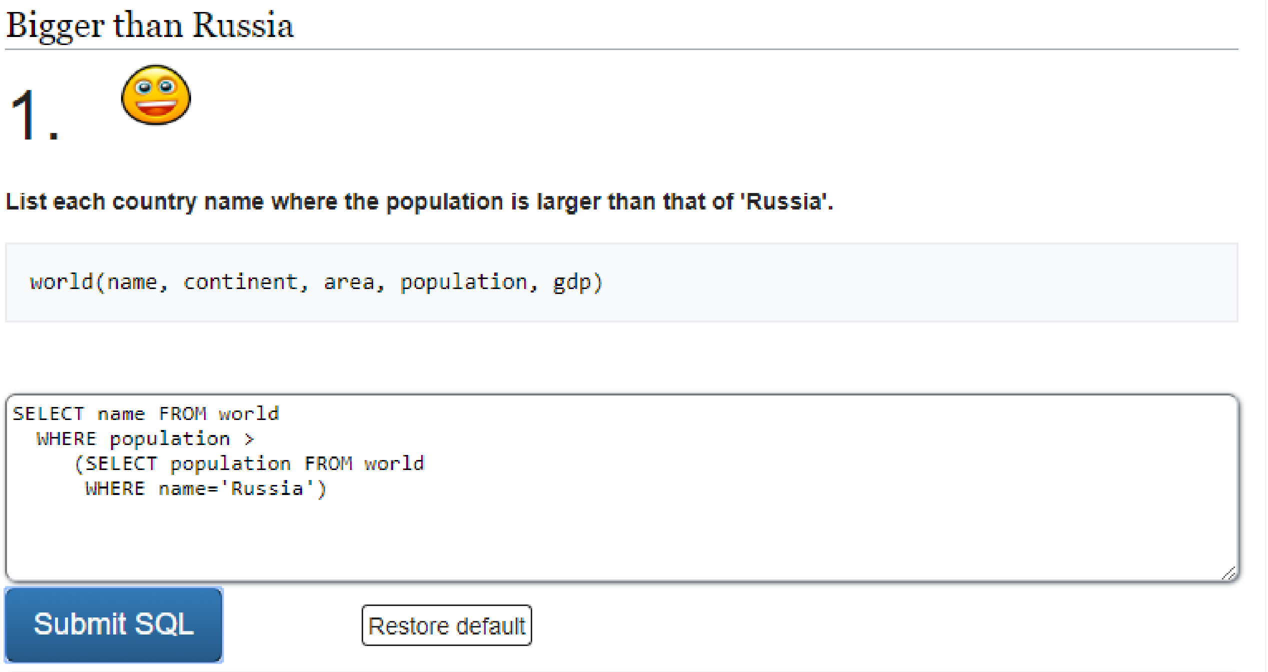
14.

The expression **subject IN ('Chemistry','Physics')** can be used as a value - it will be **0** or **1**.

Show the 1984 winners and subject ordered by subject and winner name; but list Chemistry and Physics last.

```
SELECT winner, subject
  FROM nobel
 WHERE yr=1984
 ORDER BY subject IN('Physics','Chemistry'),subject,winner
```

Select



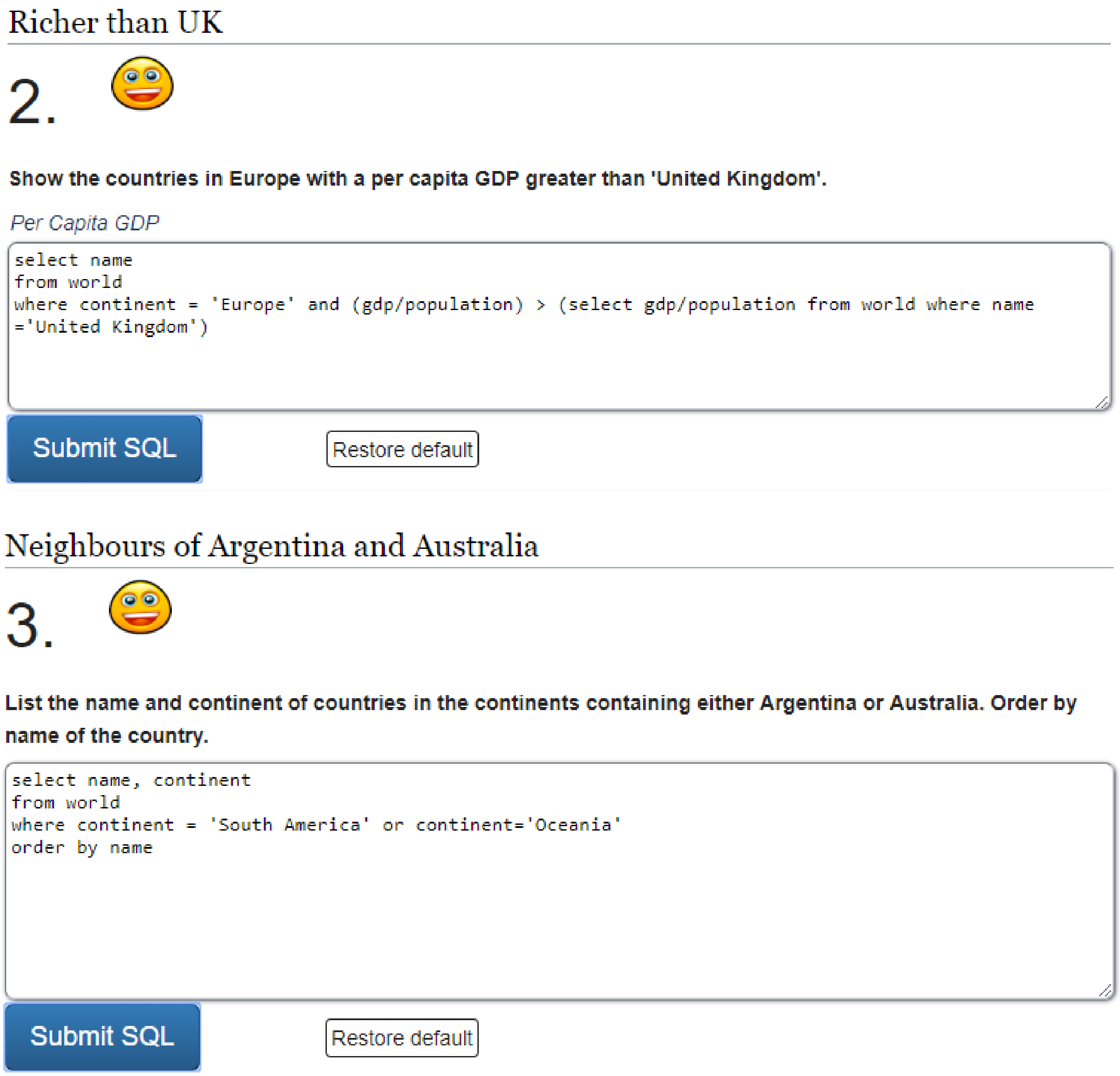
Bigger than Russia

1.

List each country name where the population is larger than that of 'Russia'.

```
world(name, continent, area, population, gdp)
```

```
SELECT name FROM world
  WHERE population >
     (SELECT population FROM world
      WHERE name='Russia')
```



Richer than UK

2.

Show the countries in Europe with a per capita GDP greater than 'United Kingdom'.

Per Capita GDP

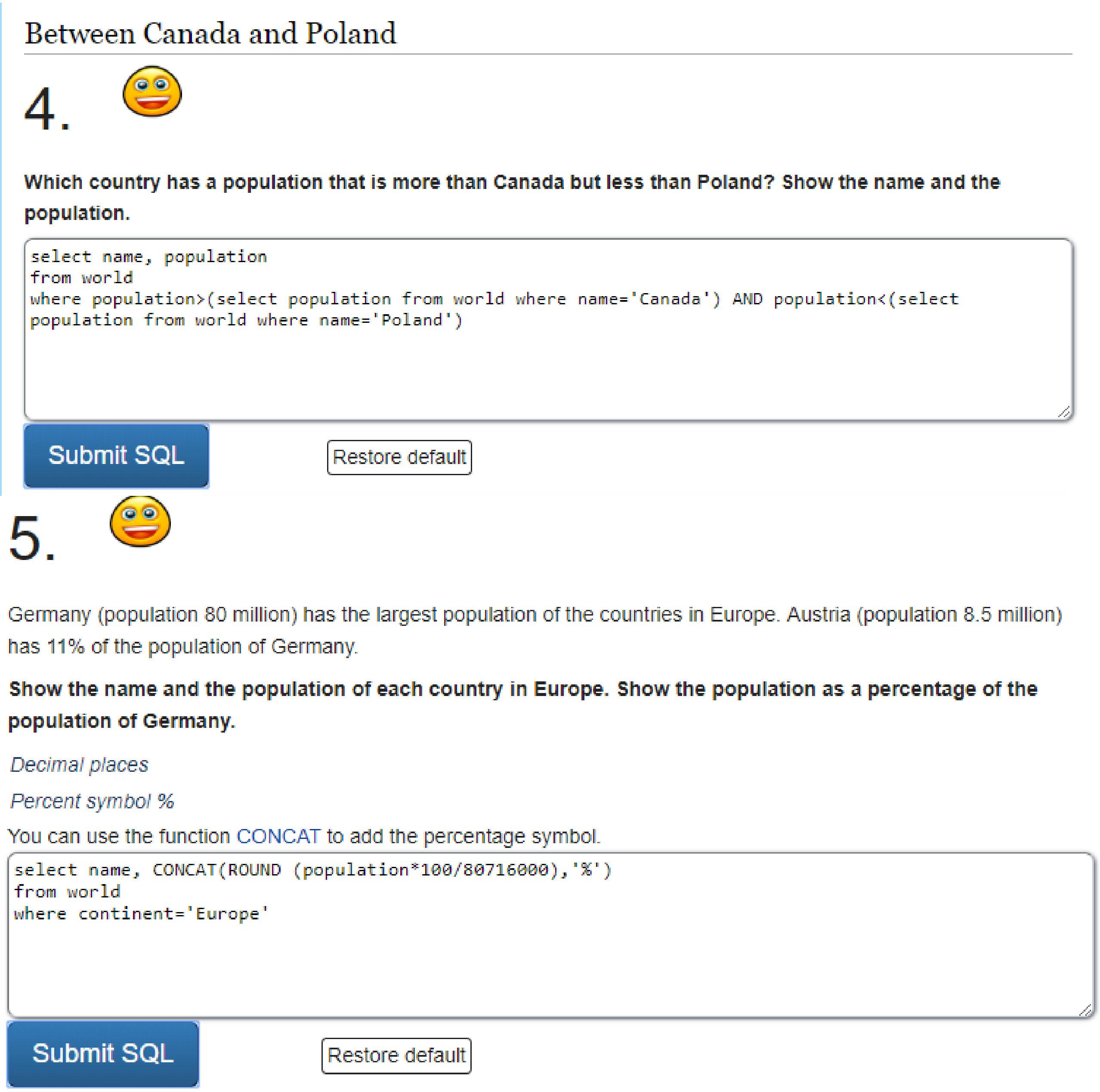
```
select name
from world
where continent = 'Europe' and (gdp/population) > (select gdp/population from world where name
='United Kingdom')
```

Neighbours of Argentina and Australia

3.

List the name and continent of countries in the continents containing either Argentina or Australia. Order by name of the country.

```
select name, continent
from world
where continent = 'South America' or continent='Oceania'
order by name
```



Between Canada and Poland

4.

Which country has a population that is more than Canada but less than Poland? Show the name and the population.

```
select name, population
from world
where population>(select population from world where name='Canada') AND population<(select
population from world where name='Poland')
```

5.

Germany (population 80 million) has the largest population of the countries in Europe. Austria (population 8.5 million) has 11% of the population of Germany.

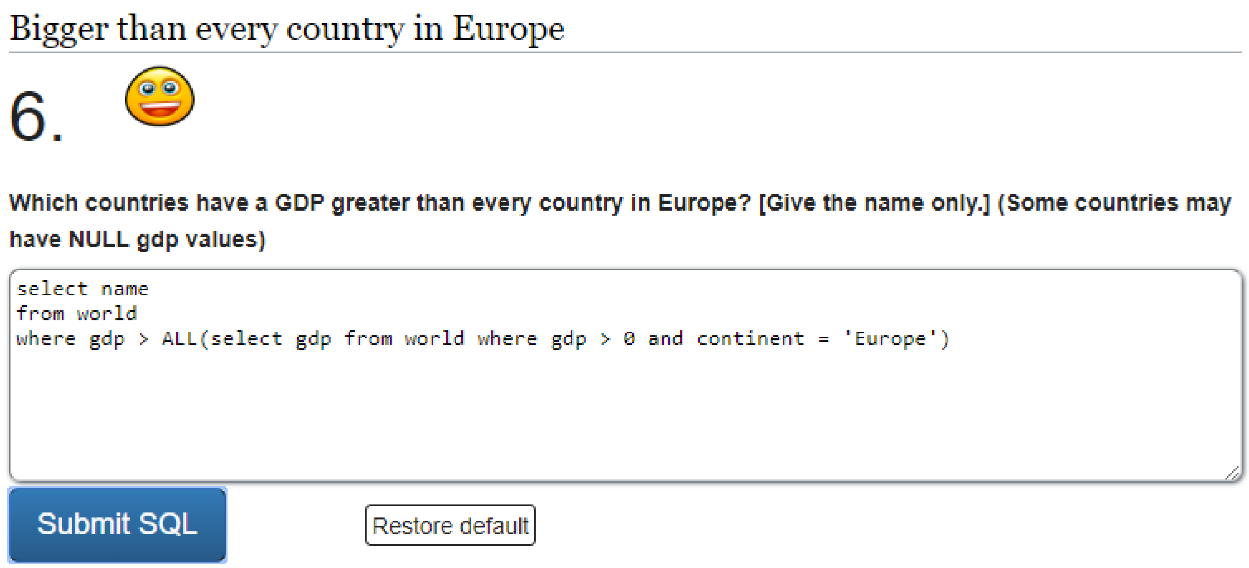
Show the name and the population of each country in Europe. Show the population as a percentage of the population of Germany.

Decimal places

Percent symbol %

You can use the function CONCAT to add the percentage symbol.

```
select name, CONCAT(ROUND (population*100/80716000),'%')
from world
where continent='Europe'
```

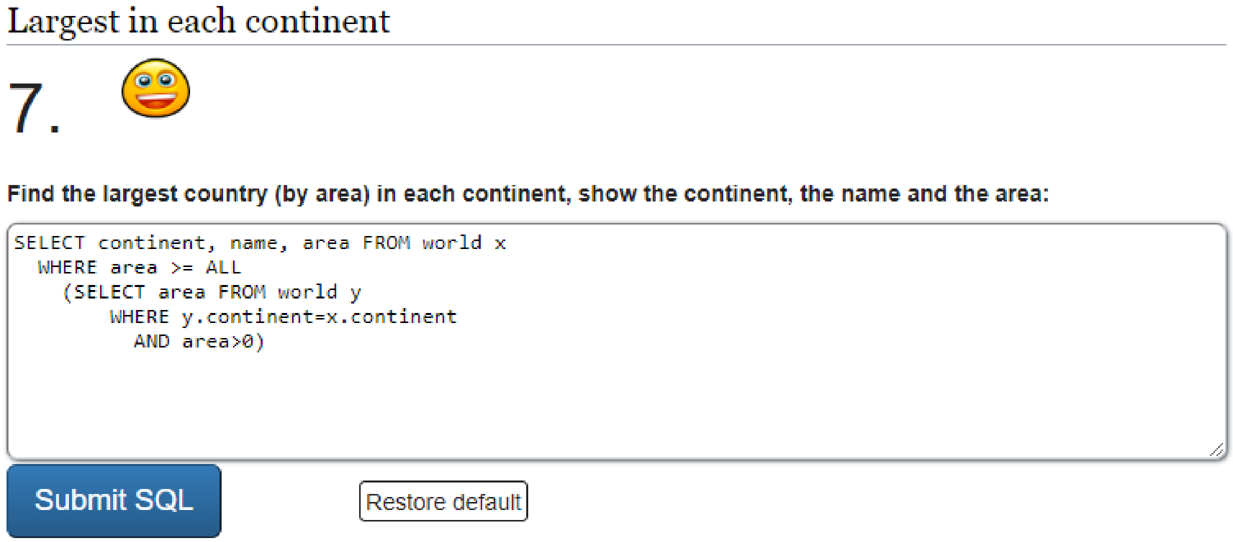


Bigger than every country in Europe

6.

Which countries have a GDP greater than every country in Europe? [Give the name only.] (Some countries may have NULL gdp values)

```
select name
from world
where gdp > ALL(select gdp from world where gdp > 0 and continent = 'Europe')
```

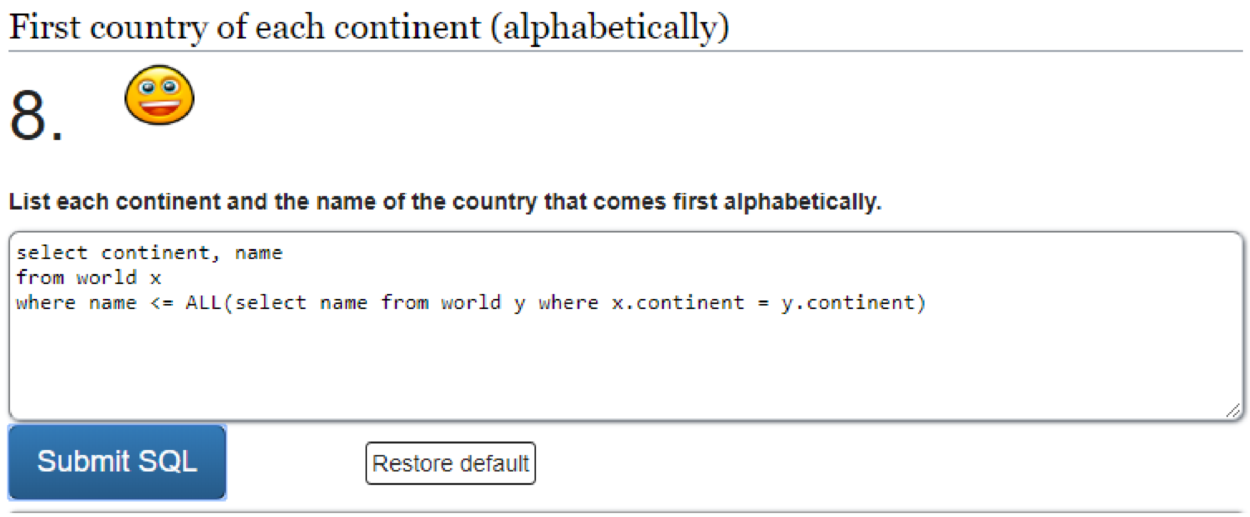


Largest in each continent

7.

Find the largest country (by area) in each continent, show the continent, the name and the area:

```
SELECT continent, name, area FROM world x
  WHERE area >= ALL
    (SELECT area FROM world y
        WHERE y.continent=x.continent
          AND area>0)
```

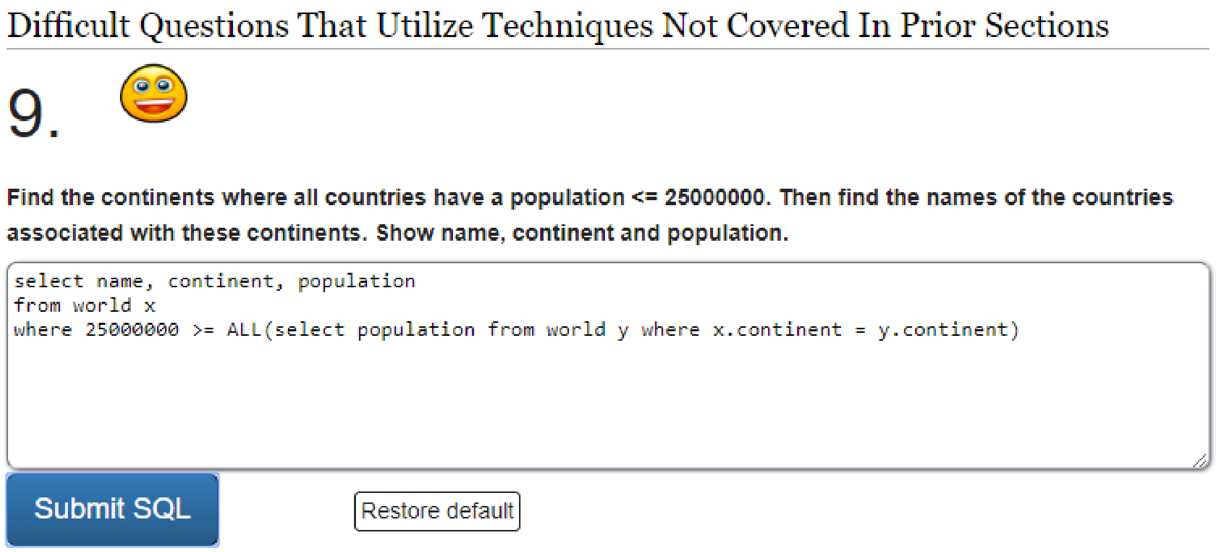


First country of each continent (alphabetically)

8.

List each continent and the name of the country that comes first alphabetically.

```
select continent, name
from world x
where name <= ALL(select name from world y where x.continent = y.continent)
```

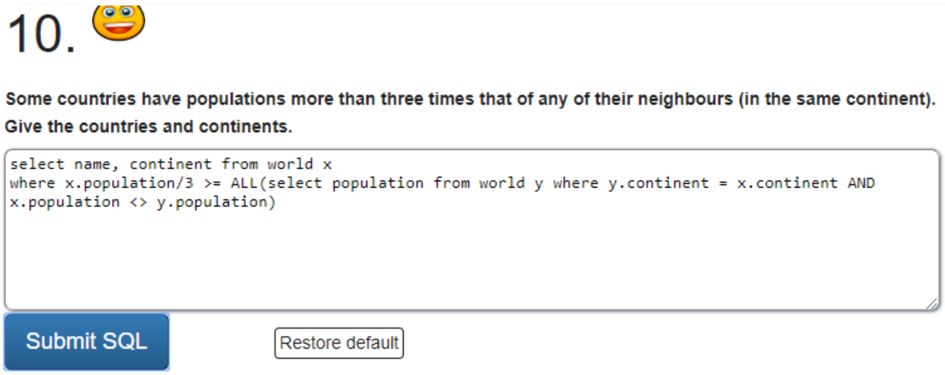


Difficult Questions That Utilize Techniques Not Covered In Prior Sections

9.

Find the continents where all countries have a population <= 25000000. Then find the names of the countries associated with these continents. Show name, continent and population.

```
select name, continent, population
from world x
where 25000000 >= ALL(select population from world y where x.continent = y.continent)
```

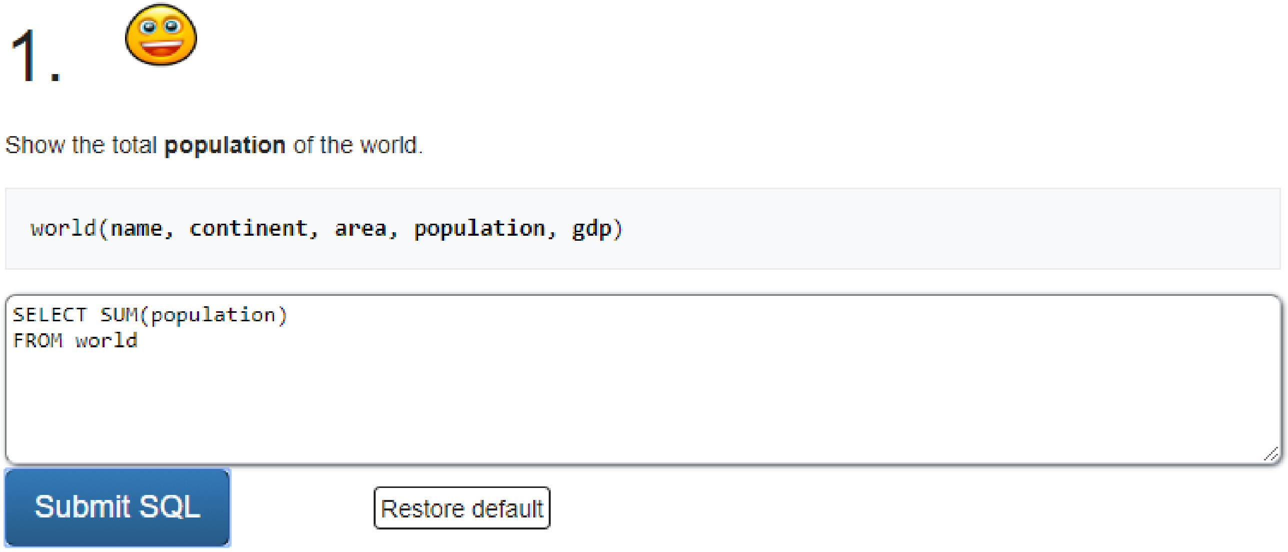


10.

Some countries have populations more than three times that of any of their neighbours (in the same continent). Give the countries and continents.

```
select name, continent from world x
where x.population/3 >= ALL(select population from world y where y.continent = x.continent AND
x.population <> y.population)
```

Sum and Count

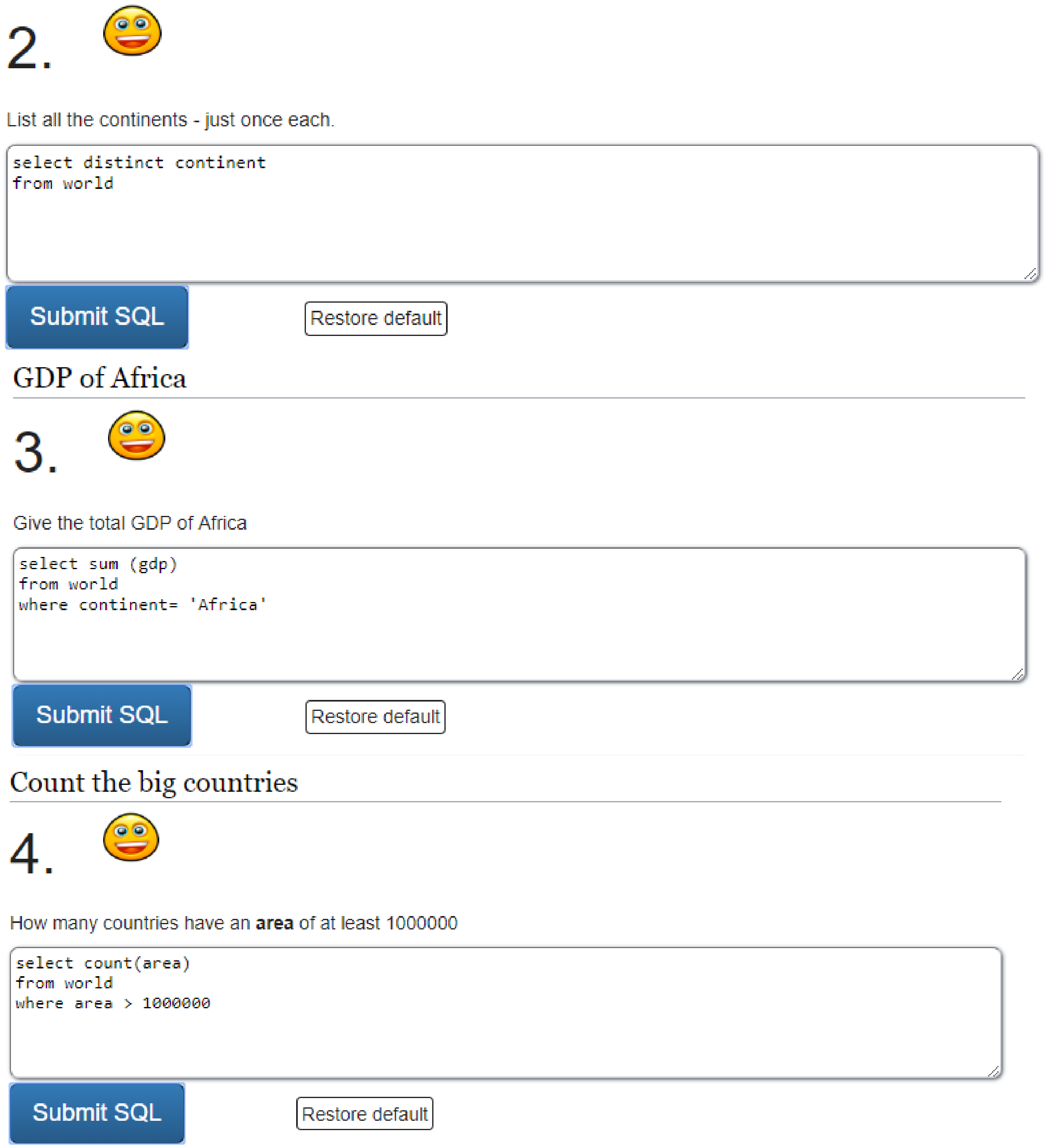


1.

Show the total **population** of the world.

```
world(name, continent, area, population, gdp)
```

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



2.

List all the continents - just once each.

```
select distinct continent
from world
```

GDP of Africa

3.

Give the total GDP of Africa

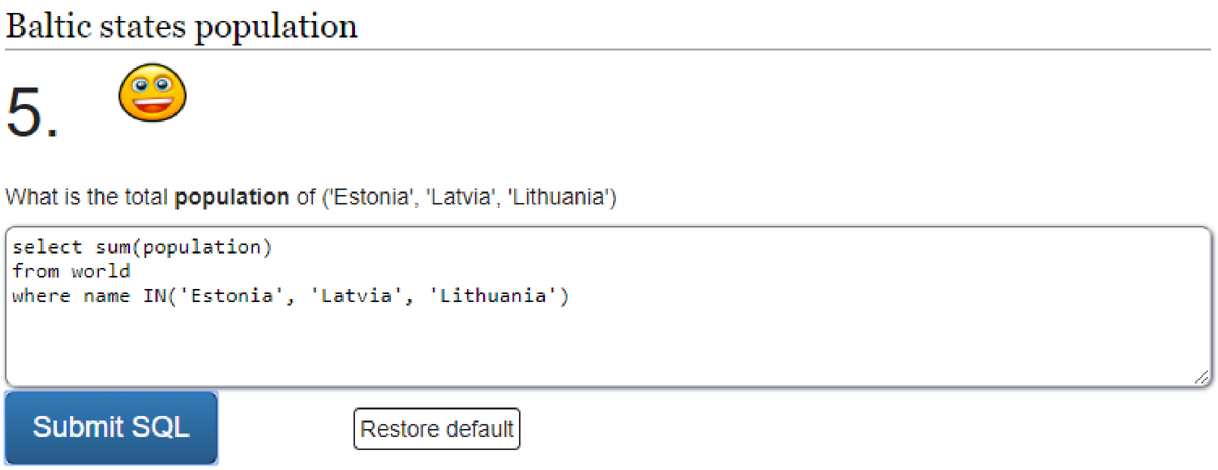
```
select sum (gdp)
from world
where continent= 'Africa'
```

Count the big countries

4.

How many countries have an **area** of at least 1000000

```
select count(area)
from world
where area > 1000000
```

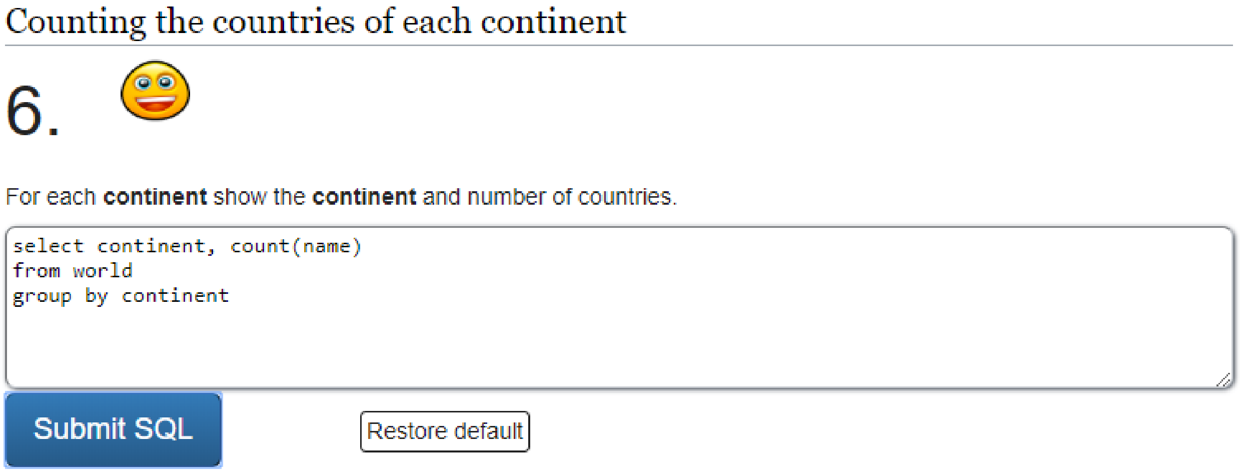


Baltic states population

5.

What is the total **population** of ('Estonia', 'Latvia', 'Lithuania')

```
select sum(population)
from world
where name IN('Estonia', 'Latvia', 'Lithuania')
```

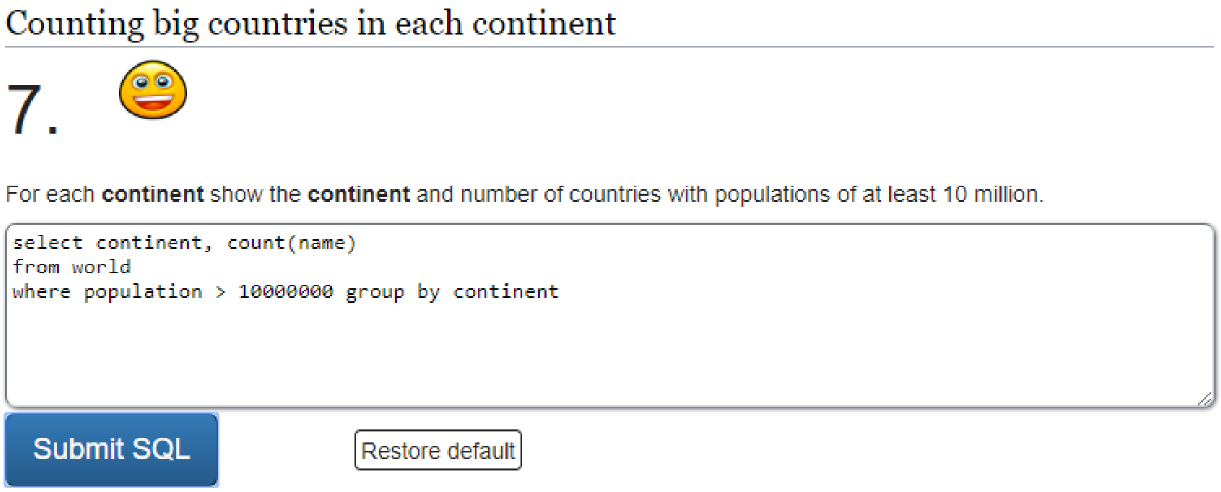


Counting the countries of each continent

6.

For each **continent** show the **continent** and number of countries.

```
select continent, count(name)
from world
group by continent
```

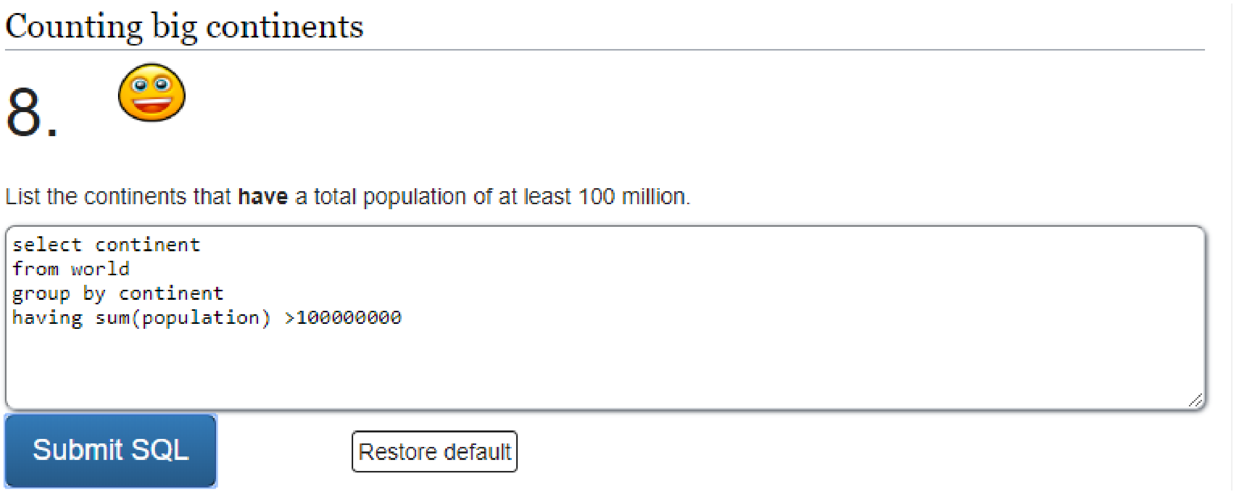


Counting big countries in each continent

7.

For each **continent** show the **continent** and number of countries with populations of at least 10 million.

```
select continent, count(name)
from world
where population > 10000000 group by continent
```



Counting big continents

8.

List the continents that **have** a total population of at least 100 million.

```
select continent
from world
group by continent
having sum(population) >100000000
```

D. Crear consultas utilizando operadores

- Ver la toma la poblacion que existe en el mundo

```
select sum(population)as POBLACION_TOTAL
from world
```

- Ver los paises que la letra inicial es Sa

```
select name
from world
where name like 'Sa%'
```

- Ver los paises que tienen area entre 1000 y 1000000

```
select name
from world
where area between 1000 and 1000000
```

- Ordenar los paises deacuerdo a la poblacion ordenado de mayor a menor

```
select name, population
from world
order by population DESC
```

- Ver los paises que tienen las vocales ‘aeiou’

```
Select name
From world
Where name like '%a%'
and name like '%e%'
and name like '%i%'
and name like '%o%'
and name like '%u%'
```

- Cual es el area total del mundo

```
Select sum(area) as area_total
From world

Select name,cast(area/11 as int)as area
```

from world