ESCUELA COLOMBIANA DE INGENIERÍA JULIO GARAVITO

GUIA DE AUTOESTUDIO 1

SQL BASICO

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Laboratorio-Modelos de bases de datos
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Investigación guía autoestudio #1:

Parte A

¿Qué es? ¿Para qué sirve?

- SQL son las siglas de las palabras Structured Query Language (Lenguaje de Lectura Estructurado). Es un tipo de lenguaje de programación que permite manipular y descargar datos de una base de datos. Puede realizar cálculos avanzados y álgebra.

- Es el lenguaje de programación más usado para las bases de datos estructurales.

- Utilizado por la mayoría de las empresas que manejan bases de datos.

Fuente: Datademia. (2022, 21 diciembre). *¿Qué es SQL?* Datademia. https://datademia.es/blog/que-es-sql

¿Qué es DML, DDL,DCL,TCL?

- DDL: EL DDL es un lenguaje dado por el sistema de gestión de base de datos, que permite a los usuarios de dicho sistema ejecutar las tareas de definición de las estructuras que van a almacenar los datos, así como de los procedimientos o funciones que permitan consultarlos.

Fuente: *5.2 Lenguaje de Definición de Datos (DDL)*. (s. f.). http://cidecame.uaeh.edu.mx/lcc/mapa/PROYECTO/libro14/52_lenguaje_de_definicin_de_datos_ddl.html#:~:text=Un%20lenguaje%20de%20definici%C3%B3n%20de,como%20de%20los%20procedimientos%20o

- DML: El lenguaje de manipulación de datos es un lenguaje que es proporcionado por el sistema de gestión de bases de datos que otorga a los usuarios la capacidade de manipular las bases de datos.

Fuente: *5.3 Lenguaje de Manipulación de datos (DML)*. (s. f.). http://cidecame.uaeh.edu.mx/lcc/mapa/PROYECTO/libro14/53__lenguaje_de_manipulacin_de_datos_dml.html#:~:text=Un%20lenguaje%20de%20manipulaci%C3%B3n%20de,el%20modelo%20de%20datos%20adecuado.

- DCL: El Lenguaje de Control de Datos permiten al Administrador del sistema gestor de base de datos, controlar el acceso a los objetos, es decir, podemos otorgar o denegar permisos a uno o más roles para realizar determinadas tareas.

Fuente: Segovia, J., & Segovia, J. (2021, 8 marzo). Diferencias entre DDL, DML y DCL - TodoPostgreSQL. *TodoPostgreSQL - Academia Online de PostgreSQL en Español*. https://www.todopostgresql.com/diferencias-entre-ddl-dml-y-dcl/

- TCL: El lenguaje de Control de Transacción son comandos de SQL que permiten manejar transacciones en una base de datos relacional.

Fuente: Dba. (2020, 30 mayo). *Transaction Control Language (TCL) del SQL*. DBA Dixit. https://dbadixit.com/transaction-control-language-tcl-del-

sql/#:~:text=El%20Lenguaje%20de%20control%20de,aclarar%20el%20concepto%20de%20transacci%C3%B3n.

En este autoestudio, ¿en qué escribimos? ¿por qué?

- Vamos a utilizar la plataforma de SQLZoo, que actualmente es uno de los pocos recursos en línea que permite crear y ejecutar consultas en tablas existentes.

- Se utilizará el motor MySQL. Este motor fue creado para el control de bases de datos relacionales. Es uno de los más usados en la actualidad, presentando un crecimiento exponencial en comparación a demás competidores

Fuentes:

- Navarro, S. (2024, 27 junio). ¿Qué son los motores de bases de datos? [6 ejemplos]. KeepCoding Bootcamps. https://keepcoding.io/blog/que-son-los-motores-de-bases-de-datos/

- Project: SQL Zoo | The Odin Project. (s. f.). https://www-theodinproject-com.translate.goog/lessons/databases-sql-zoo?_x_tr_sl=en&_x_tr_tl=es&_x_tr_hl=es&_x_tr_pto=rq

Parte B Motor de bases de datos y bases de datos

¿Qué son?

Los motores de la base de datos

Un motor de base de datos es un programa de software que ayuda a administrar y organizar los datos que se almacenan en una base de datos. Es responsable de procesar consultas y mantener los registros actualizados. En otras palabras, es el cerebro de la base de datos.

Fuentes:

Las bases de datos

Una base de datos es un conjunto de datos organizado que se puede acceder y almacenar electrónicamente. Las bases de datos pueden almacenar grandes cantidades de datos de manera organizada, lo que facilita su acceso, manejo y actualización.

Fuentes:

Navarro, S. (2024, June 27). ¿Qué son los motores de bases de datos? [6 ejemplos]. KeepCoding Bootcamps. https://keepcoding.io/blog/que-son-los-motores-de-bases-de-datos/

Suarez, M. (2022, November 18). Motores de bases de datos: ¿cuáles son los principales y cómo elegirlos? Clase Ejecutiva UC. https://www.claseejecutiva.uc.cl/blog/articulos/motores-de-bases-de-datos/

Motor, C., & Motor, C. (2016, April 19). Motor de Base de Datos: Tipos, Funcionamiento y Consultas. CBJ Motor. https://www.cbjmotor.es/motor-de-base-de-datos/

¿Qué motores ofrece sqlzoo.net?

Entornos de Bases de Datos en SQLZoonet.

- **SQL Server**: Desarrollado por Microsoft, SQL Server es un sistema de gestión de bases de datos relacionales que se caracteriza por su capacidad para administrar grandes volúmenes de datos. Es idóneo para integrarse con otros productos de Microsoft, como Azure y PowerBI.

-**Oracle**: Oracle Database es uno de los sistemas de gestión de bases de datos más utilizados en el sector empresarial. Su robustez, escalabilidad y características avanzadas de seguridad lo convierten en una opción idónea para grandes empresas.

- **MySQL**: Este sistema de gestión de bases de datos relacionales de código abierto es de gran interés en aplicaciones web. Se trata del líder fundamental de grandes plataformas como Facebook y Twitter, conocido por su rapidez y confiabilidad.

- **Dado por IBM**, DB2 es conocido por su capacidad para administrar grandes volúmenes de datos y su excelente desempeño en ámbitos de negocio. Se utiliza con gran frecuencia en áreas como la banca y las telecomunicaciones.

- **PostgreSQL**: Este sistema de gestión de bases de datos relacionales de código abierto es un sistema de gestión de bases de datos relacionales de código abierto que se caracteriza por su conformidad con los estándares SQL y su capacidad de extenderse. Permite a los usuarios establecer tipos de datos y funciones personalizadas, lo cual lo hace ser de gran utilidad.

- **SQLite**: Este sistema de administración de bases de datos relacionales de código abierto se caracteriza por no requerir un servidor separado para funcionar. Es resistente y comúnmente utilizado en aplicaciones móviles y navegadores web.

- **Access**: Microsoft Access fusiona el motor de base de datos relacional Microsoft Jet Database Engine con una interfaz gráfica y herramientas para el desarrollo.

Fuentes:

SQLZoo. (n.d.). https://sqlzoo.net/wiki/SQL_Tutorial

SQL y MOTORES DE BASES DE DATOS - Apuntes - qwewqew. (n.d.). https://www.clubensayos.com/Tecnolog%C3%ADa/SQL-y-MOTORES-DE-BASES-DE-DATOS/3806408.html

¿Qué bases de datos ofrece sqlzoo?

Adventure Works

Adventure Works es una base de datos de ejemplo creada por Microsoft para mostrar cómo se diseña una base de datos en SQL Server. Contiene información sobre ventas, producción y recursos humanos de Adventure Works Cycles, una empresa ficticia dedicada a la fabricación de bicicletas.

University Timetables

La base de datos University Timetables se encarga de almacenar y gestionar los horarios de clases y la asistencia de los estudiantes en una universidad. En esta base de datos, encontrarás tablas relacionadas con cursos, módulos, sesiones, y las conexiones entre ellas.

MusicBrainz

MusicBrainz es una base de datos abierta que recopila y comparte metadatos sobre música. Es una enciclopedia colaborativa donde puedes encontrar información sobre artistas, álbumes y canciones, además de contribuir con datos adicionales.

Dressmaker

La base de datos Dressmaker, disponible en SQLZoo, está diseñada para gestionar los pedidos de prendas de vestir. Incluye tablas que registran órdenes, materiales, estilos de prendas, y las cantidades necesarias para su confección.

Congestion Charging

La base de datos Congestion Charging se utiliza para estudiar y prever los niveles de congestión en las carreteras urbanas. Basada en datos de sensores y dispositivos, esta base de datos ayuda a ofrecer información en tiempo real sobre el tráfico, facilitando la gestión de la movilidad urbana.

Fuentes:

MashaMSFT. (2024, May 9). AdventureWorks sample databases - SQL Server. Microsoft Learn. https://learn.microsoft.com/en-us/sql/samples/adventureworks-install-configure?view=sql-server-ver16&tabs=ssms

Christopher, U. A. (2020, December 20). Relational Database Design to store University timetables and record of students' attendance. DEV Community. https://dev.to/pocharis/relational-database-design-to-store-university-timetables-and-record-of-students-attendance-3jg4

MusicBrainz - the open music encyclopedia. (n.d.). https://musicbrainz.org/

PRÁCTICA

A) SELECT, SELECT … WHERE, SELECT … GROUP BY, SELECT … SELECT

SELECT (Seleccionar algunas columnas e ignorar las otras. PROYECTAR).

CÁLCULO RELACIONAL	ALGEBRA RELACIONAL
{x : games| : yr,city}	$\Pi_{yr,\ city}^{(games)}$

SELECT … WHERE (Devuelve resultados de una tabla. Con la condición Where que solo devuelve algunas filas. RESTRINGIR Y PROYECTAR)

CÁLCULO RELACIONAL	ALGEBRA RELACIONAL
{y : {x : games |: x.yr="2004" : x} : yr,city}	$\Pi_{yr,\ city}\left(\sigma_{yr=2004}^{(games)}\right)$

SELECT … GROUP BY() Se carece conocimiento sobre GROUP BY, por lo tanto no se supo como realizar el Calculo relacional y el Algebra Relacional.

CÁLCULO RELACIONAL	ALGEBRA RELACIONAL

SELECT … SELECT()

1)

CÁLCULO RELACIONAL
{z:{x:{y:|world|:name,gdp/population AS gdp_per_capita}|gdp_per_capita>20000:x}|:name,gdp_per_capita}

Algebra Relacional

$$\pi_{name,\ gdp\_per\_capita}(\sigma_{gdp\_per\_capita>20000}(\rho_{gdp\_per\_capita(gdp/population)}\ (\pi_{name,\ gdp/population}(world))))$$

2)

CÁLCULO RELACIONAL

{x:world| x.continent∈ {t:world| t.name= ′ Bhutan ′ :t.continent}:x.name}

ALGEBRA RELACIONAL

$$\Pi_{name}(\sigma_{continent \in (\Pi_{continent}(\sigma_{name='Bhutan'}(\text{world})))}(\text{world}))$$

3)

CÁLCULO RELACIONAL
{x:bbc| x.population>5×{y:bbc| y.region=x.region:AVG(y.population)}:x.name}

ALGEBRA RELACIONAL

$$\Pi_{b1.\text{name}}(\sigma_{b1.\text{population}>5\times\text{avg\_pop\_region.population}}(b1 \bowtie \text{avg\_pop\_region}))$$

B)

FLOOR(Redondea el número a su parte entera)

```
SELECT description, FLOOR(amount) AS PRECIO
FROM extra
WHERE amount>20
```

1.

Guest 1183. Give the booking_date and the number of nights for guest 1183.

```
+--------------+--------+
| booking_date | nights |
+--------------+--------+
| 2016-11-27   |      5 |
+--------------+--------+
```

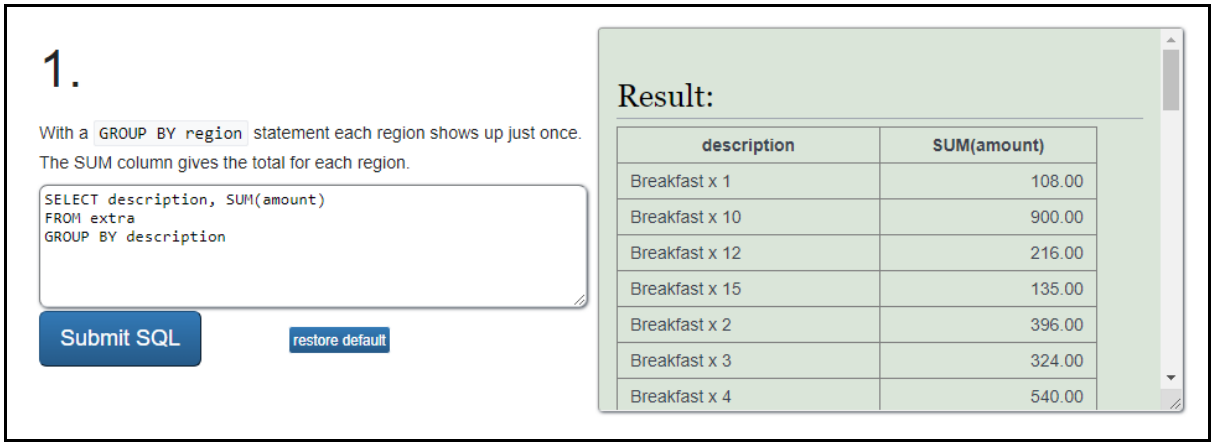
```
SELECT description, FLOOR(amount) AS PRECIO
FROM extra
WHERE amount>20
```

Submit SQL restore default

description	PRECIO
Breakfast x 7	63
Breakfast x 4	36
Breakfast x 8	72
Breakfast x 12	108
Breakfast x 10	90
Breakfast x 6	54
Breakfast x 6	54
Breakfast x 8	72
Breakfast x 10	90
Breakfast x 10	90

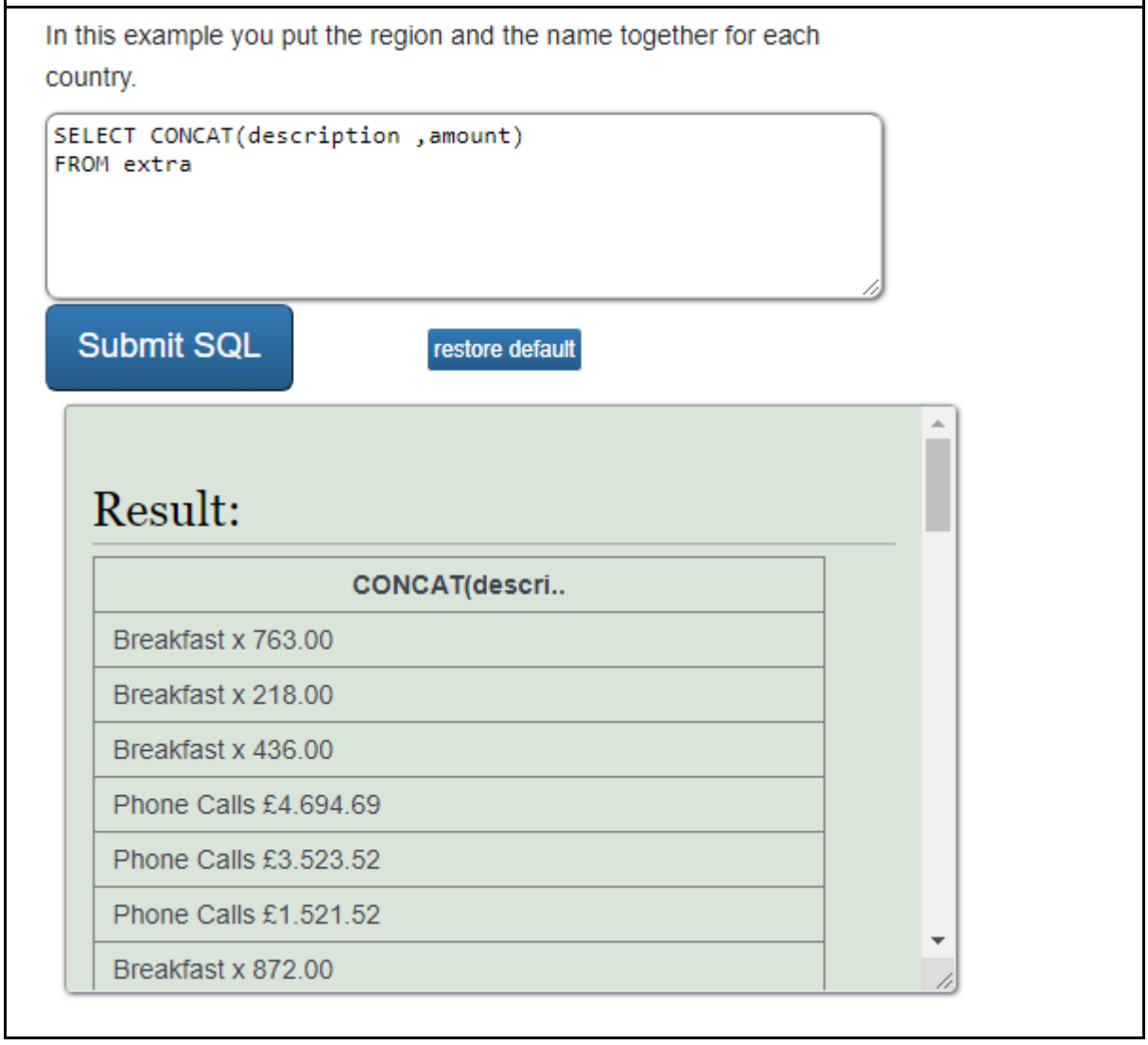
SUM(SUM añade una columna entera de valores. SUM es una función agregada que se utiliza normalmente con GROUP BY.)

```
SELECT description, SUM(amount)
FROM extra
GROUP BY description
```



CONCAT(Permite unir dos o más cadenas.)

SELECT CONCAT(description ,amount)
FROM extra



C) EJERCICIOS PROPUESTOS (TUTORIALES Y QUICES)

TUTORIALES
1)SELECT BASICS

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

1.

The example uses a WHERE clause to show the population of 'France'. Note that strings should be in 'single quotes';

Modify it to show the population of Germany

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

Submit SQL restore default

Correct answer

population
80716000

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

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');
```

Submit SQL restore default

Correct answer

name	population
Denmark	5634437
Norway	5124383
Sweden	9675885

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

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
```

Submit SQL restore default

Correct answer

name	area
Belarus	207600
Ghana	238533
Guinea	245857
Guyana	214969
Laos	236800
Romania	238391
Uganda	241550
United Kingdom	242900

2)SELECT FROM WORLD

SELECT name, continent, population FROM world

Introduction

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
```

Submit SQL restore default

Correct answer

name	continent	population
Afghanistan	Asia	25500100
Albania	Europe	2821977
Algeria	Africa	38700000
Andorra	Europe	76098
Angola	Africa	19183590
Antigua and Barbuda	Caribbean	86295
Argentina	South	42669500

SELECT name FROM world
WHERE population >= 200000000

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
```

Submit SQL restore default

Correct answer

name
Brazil
China
India
Indonesia
United States

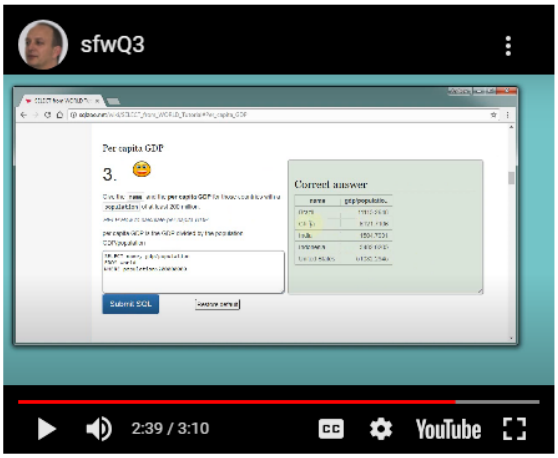
```
SELECT name , gdp/population
FROM world
WHERE population > 200000000
```

Per capita GDP

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
```

Submit SQL restore default

Correct answer

name	gdp/population
Brazil	11115.2648
China	6121.7106
India	1504.7931
Indonesia	3482.0205
United States	51032.2945

```
SELECT name,population/1000000
FROM world
WHERE continent="South America"
```

South America In millions

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"
```

Submit SQL restore default

Correct answer

name	population/10..
Argentina	42.6695
Bolivia	10.0273
Brazil	202.7940
Chile	17.7730
Colombia	47.6620
Ecuador	15.7742
Guyana	0.7849
Paraguay	6.7834

```
SELECT name, population
FROM world
WHERE name="France" or name="Germany" or name="Italy"
```

France, Germany, Italy

5.

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

```
SELECT name, population
FROM world
WHERE name="France" or name="Germany" or name="Italy"
```

Submit SQL restore default

Correct answer

name	population
France	65906000
Germany	80716000
Italy	60782668

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

United

6.

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

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

Submit SQL restore default

Correct answer

name
United Arab Emirates
United Kingdom
United States

```
SELECT name, population, area
From world
Where area > 3000000 or population >250000000
```

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 area > 3000000 or population >250000000
```

Submit SQL restore default

Correct answer

name	population	area
Australia	23545500	7692024
Brazil	202794000	8515767
Canada	35427524	9984670
China	1365370000	9596961
India	1246160000	3166414
Indonesia	252164800	1904569
Russia	146000000	17125242
United States	318320000	9826675

```
SELECT name,population, area
```

FROM world
WHERE area < 3000000 XOR population < 250000000

One or the other (but not both)

8. 

Exclusive OR (XOR). Show the countries that are big by area (more than 3 million) or big by population (more than 250 million) but not both. Show name, population and area.

- Australia has a big area but a small population, it should be **included**.
- Indonesia has a big population but a small area, it should be **included**.
- China has a big population **and** big area, it should be **excluded**.
- United Kingdom has a small population and a small area, it should be **excluded**.

```
SELECT name,population, area
FROM world
WHERE area < 3000000 XOR population < 250000000
```

Submit SQL restore default

Correct answer

name	population	area
Australia	23545500	7692024
Brazil	202794000	8515767
Canada	35427524	9984670
Indonesia	252164800	1904569
Russia	146000000	17125242

SELECT name, round(population/1000000,2),round(gdp/1000000000,2)
FROM world
WHERE continent="South America"

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 Americas show population in millions and GDP in billions both to 2 decimal places.

Millions and billions

Divide by 1000000 (6 zeros) for millions. Divide by 1000000000 (9 zeros) for billions.

Missing decimals

For some version of SQL the division of an integer by an integer will be an integer. One way to prevent this is to divide by a floating point number such as 1000000.0.

```
SELECT name,
round(population/1000000,2),round(gdp/1000000000,2)
FROM world
WHERE continent="South America"
```

Submit SQL restore default

Correct answer

name	round(populat..	round(gdp/100..
Argentina	42.67	477.03
Bolivia	10.03	27.04
Brazil	202.79	2254.11
Chile	17.77	268.31
Colombia	47.66	369.81
Ecuador	15.77	87.50
Guyana	0.78	2.85

SELECT name, round(gdp/population,-3)
FROM world
WHERE gdp>=1000000000000

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
```

Submit SQL restore default

Correct answer

name	round(gdp/pop..
Australia	66000
Brazil	11000
Canada	45000
China	6000
France	40000
Germany	42000
India	2000
Italy	33000

```
SELECT name, capital
  FROM world
 WHERE LENGTH(name)=LENGTH(capital)
```

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(name)=LENGTH(capital)
```

Submit SQL restore default

Correct answer

name	capital
Algeria	Algiers
Angola	Luanda
Armenia	Yerevan
Botswana	Gaborone
Canada	Ottowa
Djibouti	Djibouti
Egypt	Cairo

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

Matching name and capital

12.

The capital of Sweden is Stockholm. Both words start with the letter 'S'.

Show the name and the capital where the first letters of each match. Don't include countries where the name and the capital are the same word.

- You can use the function LEFT to isolate the first character.
- You can use `<>` as the **NOT EQUALS** operator.

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

Submit SQL restore default

Correct answer

name	capital
Algeria	Algiers
Andorra	Andorra la Vella
Barbados	Bridgetown
Belize	Belmopan
Brazil	BrasÃlia
Brunei	Bandar Seri Begawan
Burundi	Bujumbura

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 "% %"

All the vowels

13.

Equatorial Guinea and **Dominican Republic** have all of the vowels (a e i o u) in the name. They don't count because they have more than one word in the name.

Find the country that has all the vowels and no spaces in its name.

- You can use the phrase `name NOT LIKE '%a%'` to exclude characters from your results.
- The query shown misses countries like Bahamas and Belarus because they contain at least one 'a'

```
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 "% %"
```

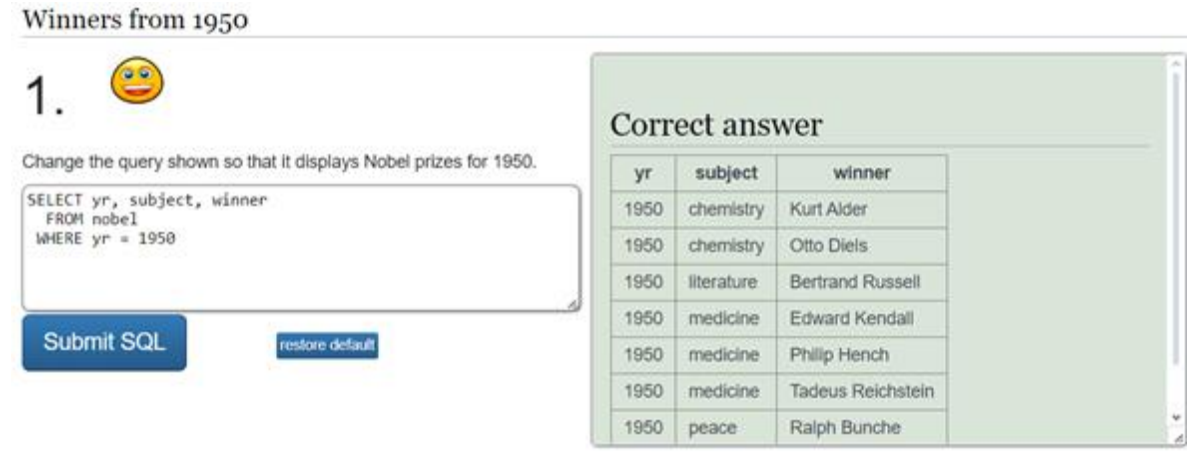
Submit SQL restore default

Correct answer

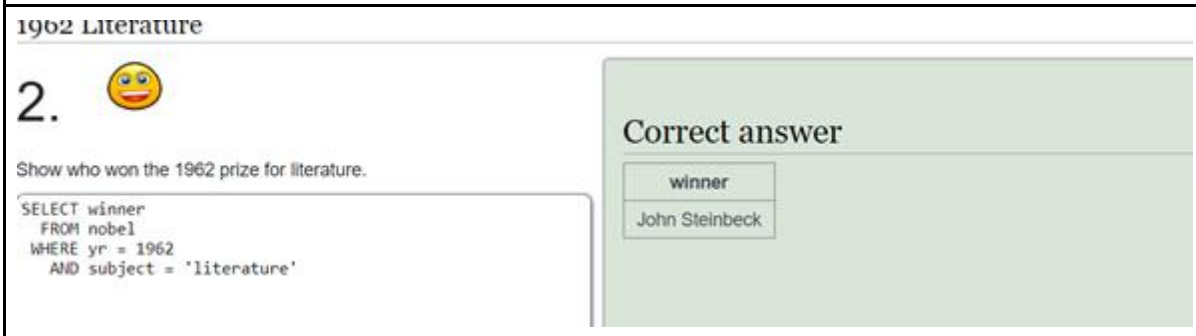
name
Mozambique

3)SELECT FROM NOBEL

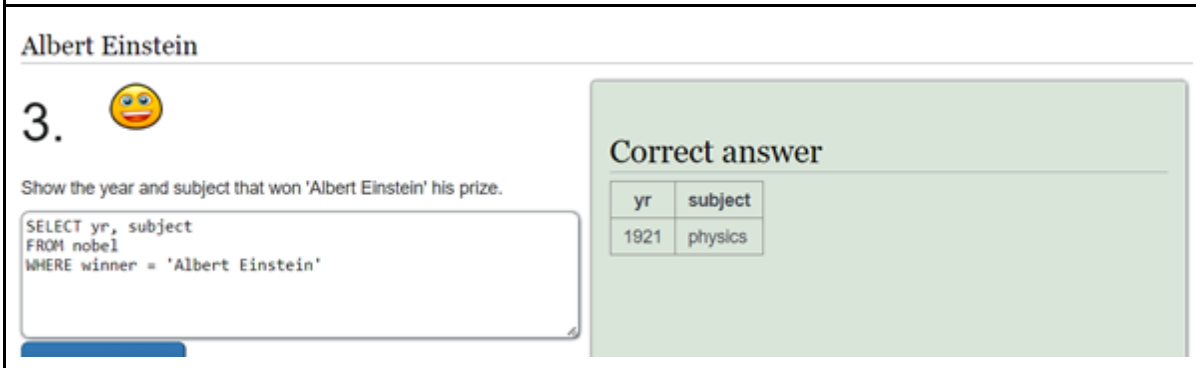
SELECT yr, subject, winner
FROM nobel
WHERE yr = 1950



SELECT winner
FROM nobel
WHERE yr = 1962
AND subject = “literature”



SELECT yr, subject
FROM nobel
WHERE winner = “Albert Einstein”



SELECT winner
FROM nobel
WHERE yr >= 2000 AND subject = “Peace”

Recent Peace Prizes

4.

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

```
SELECT winner
FROM nobel
WHERE yr >= 2000 and subject = 'peace'
```

Submit SQL restore default

Correct answer

winner
Kim Dae-jung
Kofi Annan
United Nations
Jimmy Carter
Shirin Ebadi
Wangari Maathai
International Atomic Energy Agency

SELECT yr, subject, winner
FROM nobel
WHERE yr BETWEEN 1980 AND 1989 AND subject = “literature”

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 yr BETWEEN 1980 and 1989 and subject = 'literature'
```

Submit SQL restore default

Correct answer

yr	subject	winner
1980	literature	Czes?aw Mi?osz
1981	literature	Elias Canetti
1982	literature	Gabriel Garcia Márquez
1983	literature	William Golding
1984	literature	Jaroslav Seifert
1985	literature	Claude Simon
1986	literature	Wole Soyinka

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

Only Presidents

6.

Show all details of the presidential winners:

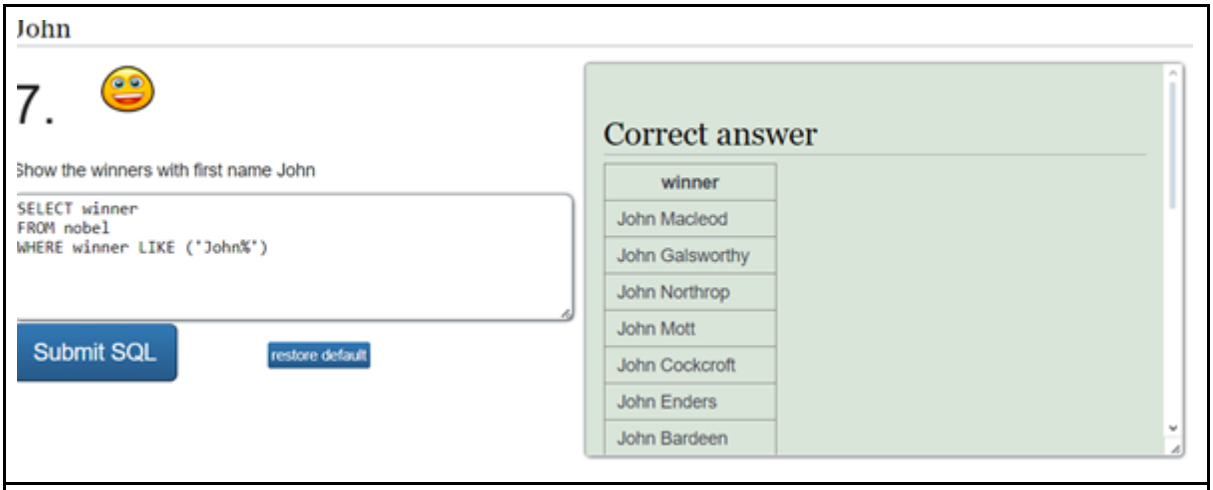
- Theodore Roosevelt
- Thomas Woodrow Wilson
- Jimmy Carter
- Barack Obama

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

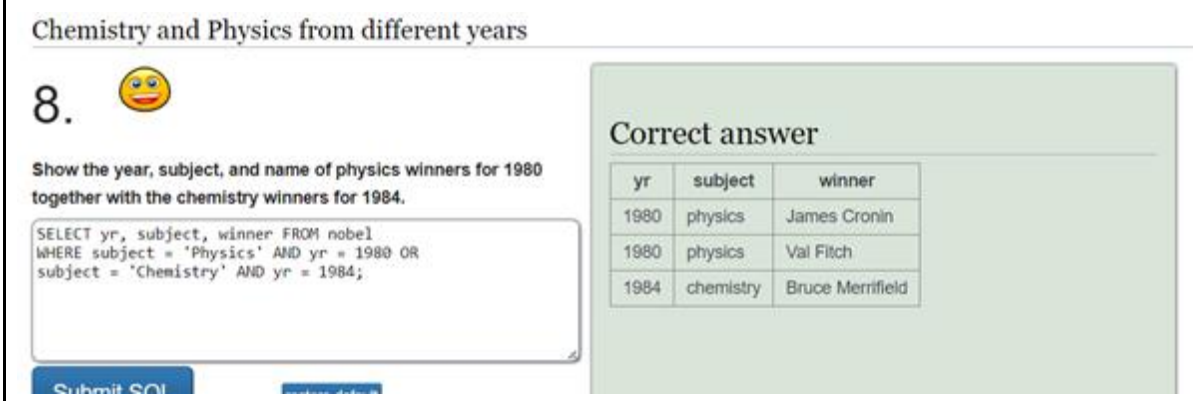
Correct answer

yr	subject	winner
1906	peace	Theodore Roosevelt
1919	peace	Woodrow Wilson
2002	peace	Jimmy Carter
2009	peace	Barack Obama

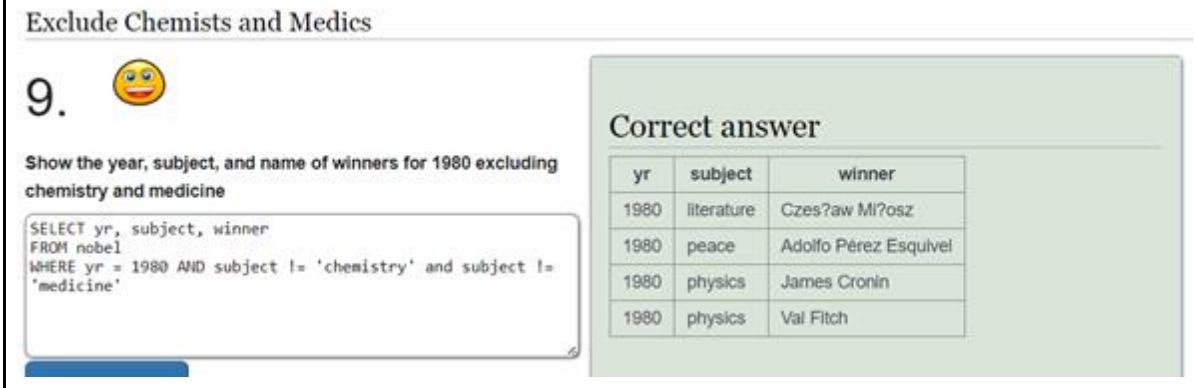
SELECT winner
FROM nobel
WHERE winner LIKE (“John%”)



SELECT yr, subject, winner FROM nobel
WHERE subject = “Physics” AND yr = 1980 OR subject = “Chemistry” AND yr = 1984



SELECT yr, subject, winner
FROM nobel
WHERE yr = 1980 AND subject != “Chemistry” and subject != “medicine”



SELECT yr, subject, winner
FROM nobel
WHERE yr < 1910 AND subject = “medicine” OR yr >= 2004 AND subject = “literature”

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 yr < 1910 and subject = 'medicine' OR yr >= 2004 and
subject = 'literature'
```

Submit SQL restore default

Correct answer

yr	subject	winner
1901	medicine	Emil von Behring
1902	medicine	Ronald Ross
1903	medicine	Niels Ryberg Finsen
1904	medicine	Ivan Pavlov
1905	medicine	Robert Koch
1906	medicine	Camillo Golgi
1906	medicine	Santiago Ramón y Cajal

SELECT yr, subject, winner
FROM nobel
WHERE winner = “PETER GRÜNGBERG”

Umlaut

11.

Find all details of the prize won by PETER GRÜNBERG

Non-ASCII characters

```
SELECT yr, subject, winner
FROM nobel
WHERE winner = 'PETER GRÜNBERG'
```

Correct answer

yr	subject	winner
2007	physics	Peter Grünberg

SELECT yr, subject, winner
FROM nobel
WHERE winner = “EUGENE O´NEILL”

Apostrophe

12.

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

Escaping single quotes

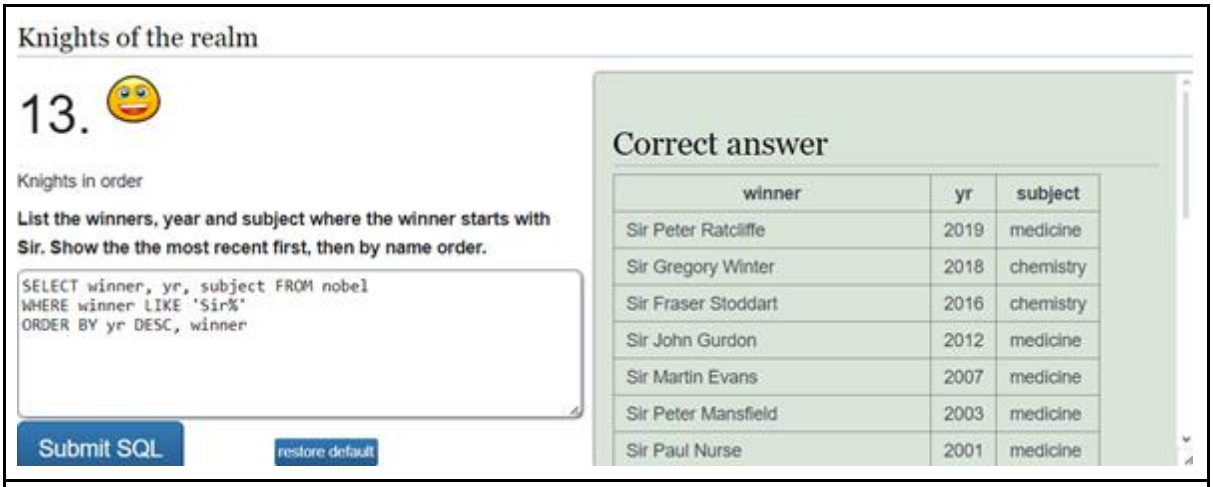
You can't put a single quote in a quote string directly. You can use two single quotes within a quoted string.

```
SELECT yr, subject, winner
FROM nobel
WHERE winner = 'EUGENE O''NEILL'
```

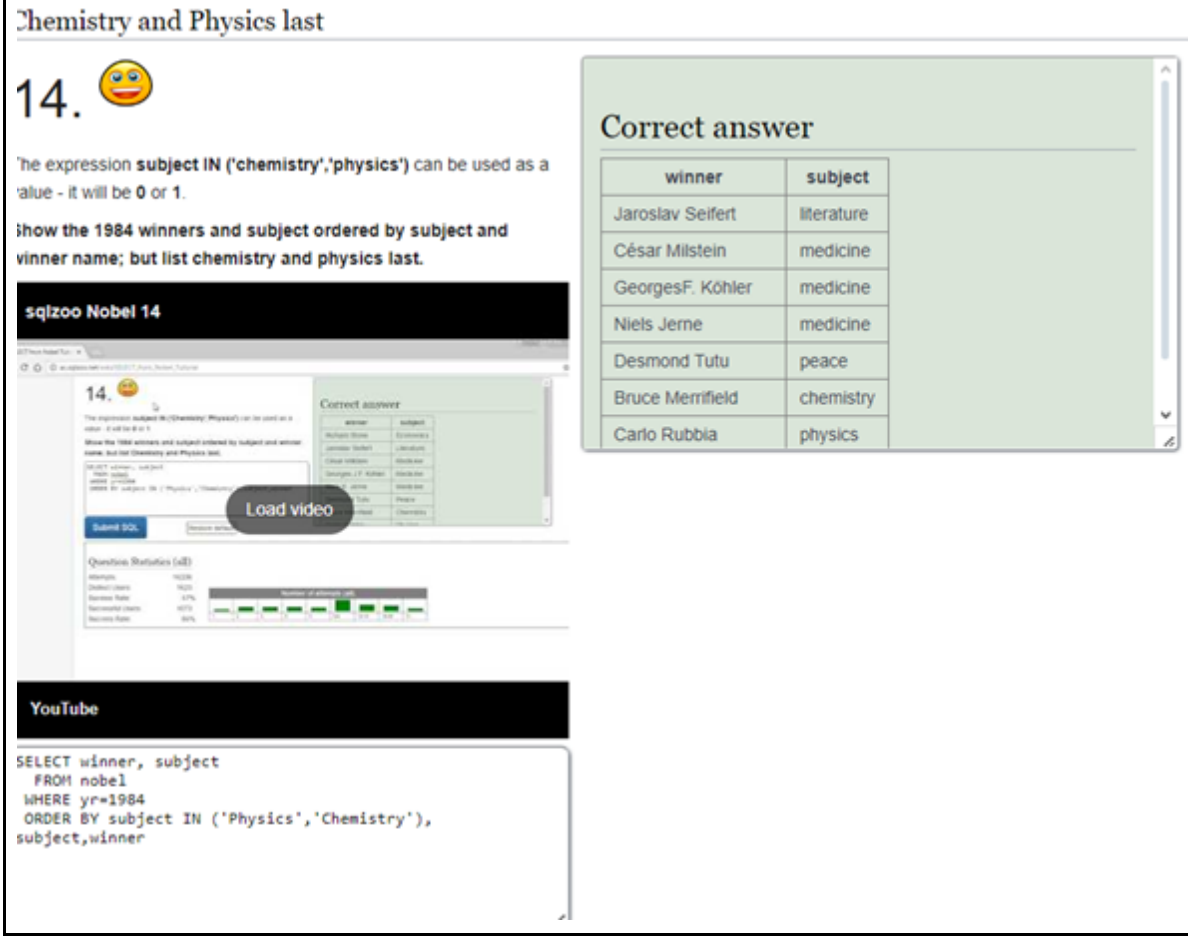
Correct answer

yr	subject	winner
1936	literature	Eugene O'Neill

SELECT winner, yr, subject FROM nobel
WHERE winner LIKE “SIR%”
ORDER BY DESC, winner



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



4)SELECT in SELECT

SELECT name FROM world
WHERE population >
(SELECT population FROM world
WHERE name = "Russia")

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')
```

Correct answer

name
Bangladesh
Brazil
China
India
Indonesia
Nigeria
Pakistan

SELECT name FROM world
WHERE continent = “Europe” AND gpd/population >
(SELECT gpd/population FROM world
WHERE name=”United Kingdom”)

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')
```

Submit SQL restore default

Correct answer

name
Andorra
Austria
Belgium
Denmark
Finland
France
Germany

SELECT name, continent
FROM world
WHERE continent IN (
SELECT continent
FROM world
WHERE name IN (“Argentina”,”Australia”))
ORDER BY name

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 IN (
  SELECT continent
  FROM world
  WHERE name IN ('Argentina', 'Australia'))
ORDER BY name
```

Correct answer

name	continent
Argentina	South America
Australia	Oceania
Bolivia	South America
Brazil	South America
Chile	South America
Colombia	South America
Ecuador	South America

```
SELECT name,population
FROM world
WHERE population  > (
SELECT population
FROM world
WHERE name = “United Kingdom”)
AND population  < (
SELECT population
FROM world
WHERE name = “Germany”)
```

Between Canada and Poland

4.

Which country has a population that is more than United Kingdom but less than Germany? Show the name and the population.

```
WHERE population > (
SELECT population
FROM world
WHERE name = 'United Kingdom')
AND population < (
SELECT population
FROM world
WHERE name = 'Germany')
```

Correct answer

name	population
Congo, Democratic Republic of	69360000
France	65906000
Iran	77552000
Thailand	64456700
Turkey	76667864

Percentages of Germany

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.

The format should be *Name, Percentage* for example:

name	percentage
Albania	3%
Andorra	0%
Austria	11%
...	...

Decimal places

Percent symbol %

```
SELECT name,
       CONCAT(CAST(ROUND(population * 100 / (SELECT
population
                                        FROM world
                                        WHERE name =
'Germany'), 0) AS CHAR), '%')
```

Correct answer

name	CONCAT(CAST(R..
Albania	3%
Andorra	0%
Austria	11%
Belarus	12%
Belgium	14%
Bosnia and Herzegovina	5%
Bulgaria	9%

```
SELECT name
FROM world
WHERE gdp > ALL(
SELECT gdp
FROM world
WHERE continent = “Europe” and gdp>0)
```

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 continent = 'Europe' and gdp >0)
```

Correct answer

name
China
Japan
United States

```
SELECT x.continent, x.name, x.name
FROM world AS x
WHERE x.area = (
SELECT MAX (y.area)
FROM world AS y
WHERE x.continent = y.continent)
```

Largest in each continent

7.

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

The above example is known as a **correlated** or **synchronized** sub-query.

Using correlated subqueries

```
SELECT x.continent, x.name, x.area
FROM world AS x
WHERE x.area = (
  SELECT MAX(y.area)
  FROM world AS y
  WHERE x.continent = y.continent)
```

Correct answer

continent	name	area
Africa	Algeria	2381741
Oceania	Australia	7692024
South America	Brazil	8515767
North America	Canada	9984670
Asia	China	9596961
Caribbean	Cuba	109884
Europe	Kazakhstan	2724900

SELECT continent, name
FROM world x
WHERE name <= ALL
(SELECT name
FROM world y
WHERE x.continent = y.continent)

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)
```

Submit SQL restore default

Correct answer

continent	name
Africa	Algeria
Asia	Afghanistan
Caribbean	Antigua and Barbuda
Eurasia	Armenia
Europe	Albania
North America	Belize
Oceania	Australia

SELECT name, continent, population FROM world WHERE continent IN (SELECT continent FROM world x WHERE 25000000 >=(select MAX(population) 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 WHERE
continent IN (SELECT continent FROM world  x WHERE 25000000
>= (SELECT MAX(population) FROM world y WHERE x.continent =
y.continent))
```

Submit SQL restore default

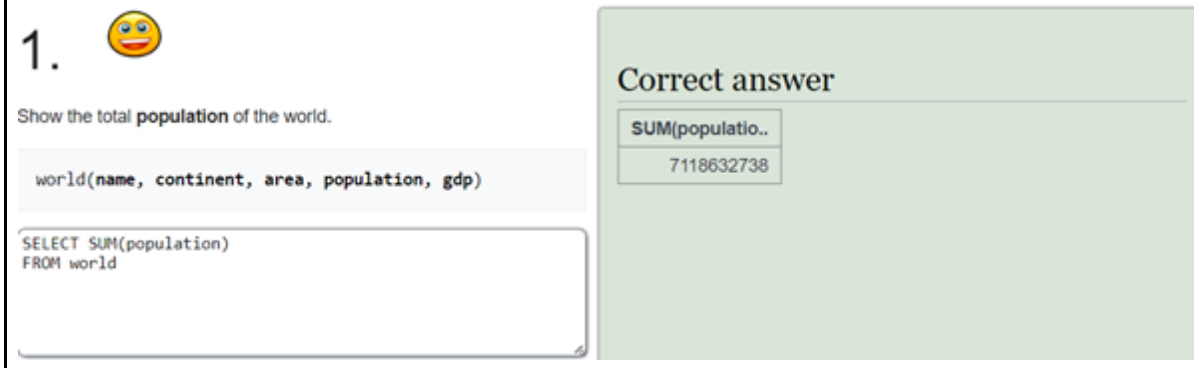
Correct answer

name	continent	population
Antigua and Barbuda	Caribbean	86295
Australia	Oceania	23545500
Bahamas	Caribbean	351461
Barbados	Caribbean	285000
Cuba	Caribbean	11167325
Dominica	Caribbean	71293
Dominican Republic	Caribbean	9445281

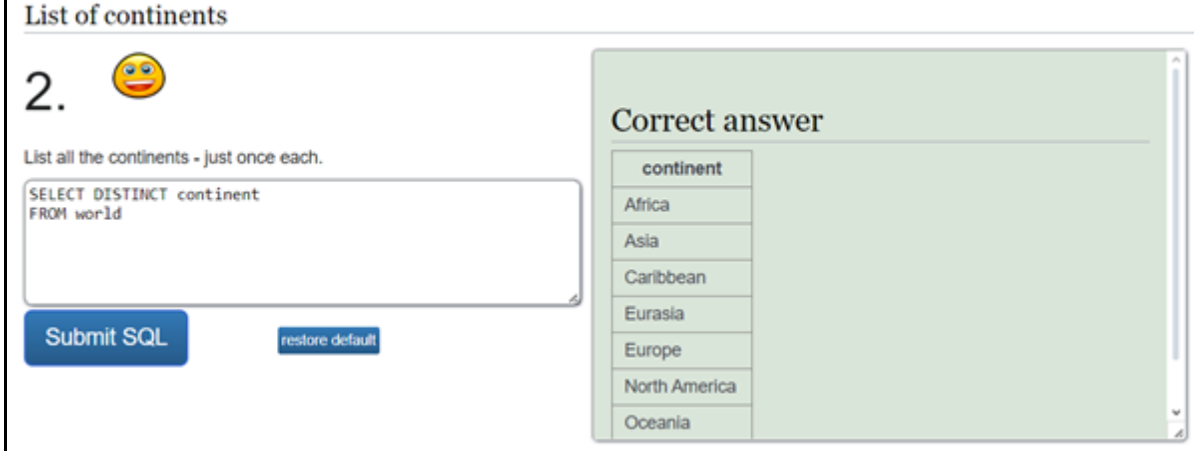
```
SELECT name, continent FROM world x
WHERE population > ALL(SELECT 3*population FROM world Y
where X.continent = Y.continent and X.name <> y,name)
```

5)SUM and COUNT

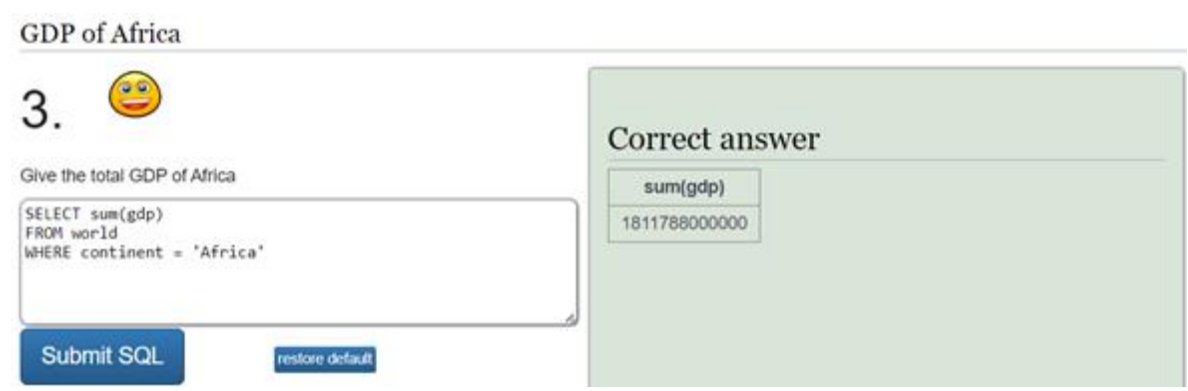
```
SELECT SUM(population)
FROM world
```



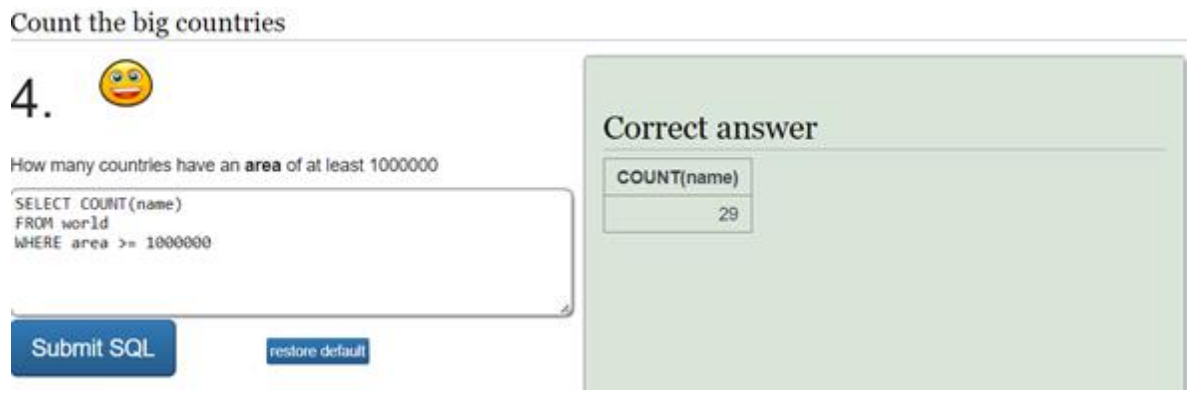
SELECT DISTINCT continent
FROM world




```
SELECT SUM(gdp)
FROM world
WHERE continent = “Africa”
```



SELECT COUNT(name)
FROM world
WHERE area >= 1000000



SELECT SUM(population)
FROM world
WHERE name IN ("Estonia","Latvia","Lithuania")

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

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
```

Submit SQL restore default

Correct answer

continent	COUNT(name)
Africa	53
Asia	47
Caribbean	11
Eurasia	2
Europe	44
North America	11
Oceania	14

```
SELECT continent, COUNT(name)
FROM world
WHERE population >= 10000000
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
```

Submit SQL restore default

Correct answer

continent	COUNT(name)
Africa	29
Asia	26
Caribbean	2
Eurasia	1
Europe	14
North America	4
Oceania	1

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

Counting big continents

8.

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

Submit SQL restore default

Correct answer

continent
Africa
Asia
Eurasia
Europe
North America
South America

QUICES

1)quiz SELECT basics

2)quiz SELECT from world

3)quiz SELECT from nobel

4) quiz SELECT in SELECT

5)quiz SUM and COUNT

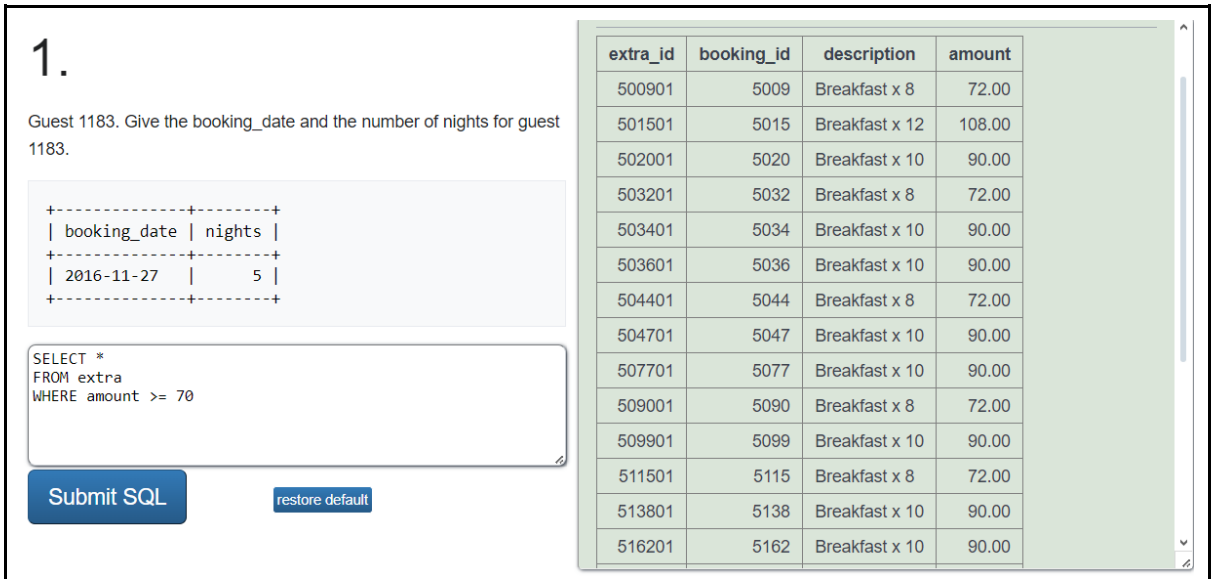
D) De las consultas anteriores, escriban 1 en álgebra y 1 en cálculo.

CÁLCULO RELACIONAL **"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)"**	**ALGEBRA RELACIONAL** **"Find all details of the prize won by PETER GRUNBERG"**
{y: {x : nobel | yr > 1910 and subject = 'medicine' or yr >= 2004 and subject = 'literature':x}:yr, subject, name}	$\Pi_{yr,subject,winner}{}^{(\sigma_{winner='PETER\ GRUNBER')}}$

E) Propongan consultas que cumplan los siguientes requerimientos. Usen extra de la base de datos Guest House

Se va a utilizar el motor de MySQL, debido a que fue el que se trabajó en el punto C, y hasta el momento es el motor del cual tengo conocimiento.

- **8 consultas: Una para cada uno de los tipos de operadores para expresiones.**



1.

Guest 1183. Give the booking_date and the number of nights for guest 1183.

```
+--------------+--------+
| booking_date | nights |
+--------------+--------+
| 2016-11-27   |      5 |
+--------------+--------+
```

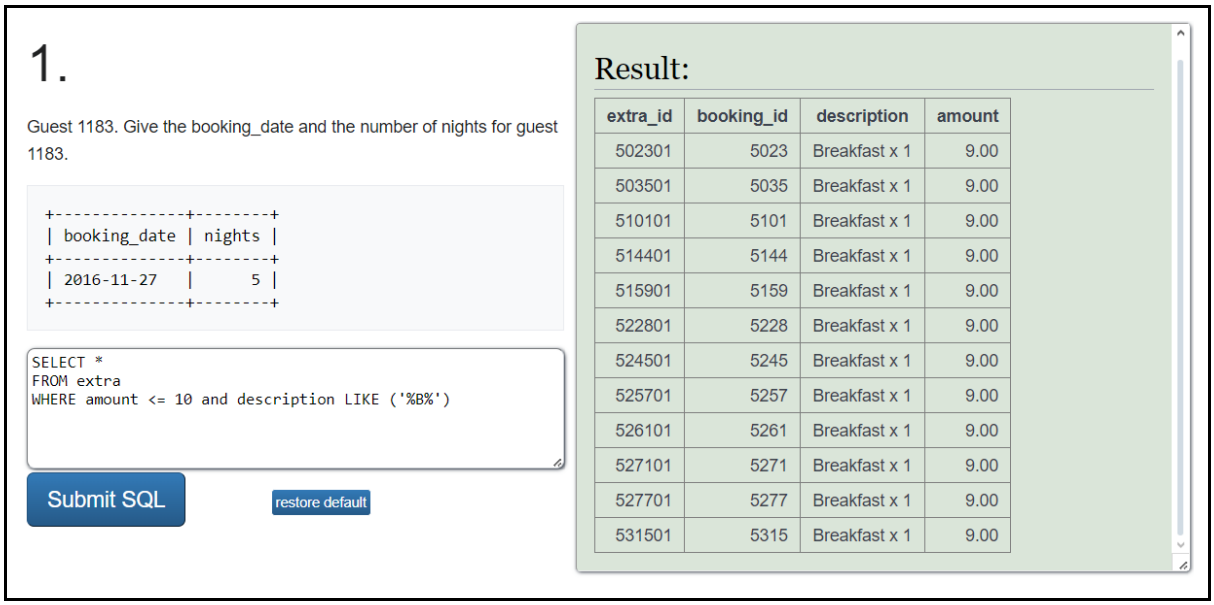
```
SELECT *
FROM extra
WHERE amount >= 70
```

Submit SQL restore default

extra_id	booking_id	description	amount
500901	5009	Breakfast x 8	72.00
501501	5015	Breakfast x 12	108.00
502001	5020	Breakfast x 10	90.00
503201	5032	Breakfast x 8	72.00
503401	5034	Breakfast x 10	90.00
503601	5036	Breakfast x 10	90.00
504401	5044	Breakfast x 8	72.00
504701	5047	Breakfast x 10	90.00
507701	5077	Breakfast x 10	90.00
509001	5090	Breakfast x 8	72.00
509901	5099	Breakfast x 10	90.00
511501	5115	Breakfast x 8	72.00
513801	5138	Breakfast x 10	90.00
516201	5162	Breakfast x 10	90.00

Operador de comparación: Se está utilizando el >= para solo conocer los valores que son iguales o mayores a 70$

Consulta:
SELECT *
FROM extra
WHERE amount >= 70



1.

Guest 1183. Give the booking_date and the number of nights for guest 1183.

```
+--------------+--------+
| booking_date | nights |
+--------------+--------+
| 2016-11-27   |      5 |
+--------------+--------+
```

```
SELECT *
FROM extra
WHERE amount <= 10 and description LIKE ('%B%')
```

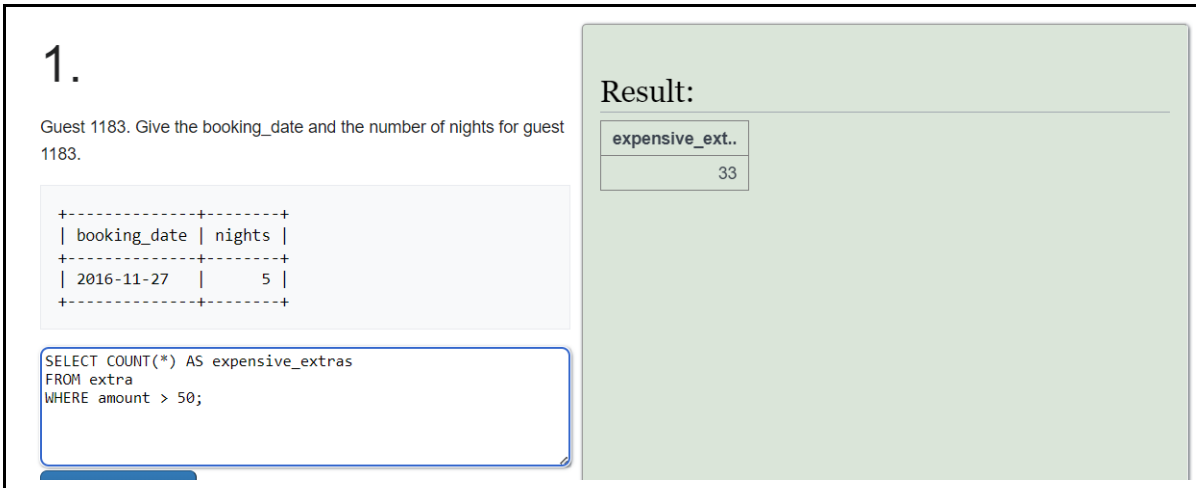
Submit SQL restore default

Result:

extra_id	booking_id	description	amount
502301	5023	Breakfast x 1	9.00
503501	5035	Breakfast x 1	9.00
510101	5101	Breakfast x 1	9.00
514401	5144	Breakfast x 1	9.00
515901	5159	Breakfast x 1	9.00
522801	5228	Breakfast x 1	9.00
524501	5245	Breakfast x 1	9.00
525701	5257	Breakfast x 1	9.00
526101	5261	Breakfast x 1	9.00
527101	5271	Breakfast x 1	9.00
527701	5277	Breakfast x 1	9.00
531501	5315	Breakfast x 1	9.00

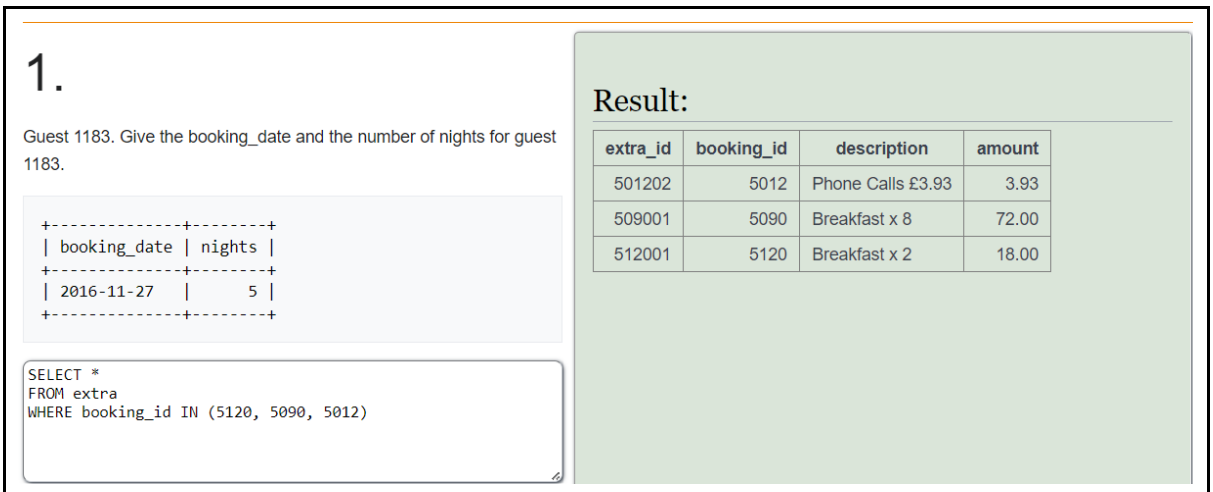
Operador lógico: Se está utilizando el 'AND' para conocer los valores menores a 10$ que correspondan a desayunos. Al mismo tiempo se está usando un operador de cadenas, que es el 'LIKE (%_%) para buscar patrones en la columna 'descripción'.

Consulta:
SELECT *
FROM extra
WHERE amount <= 10 and description LIKE ('%B%')



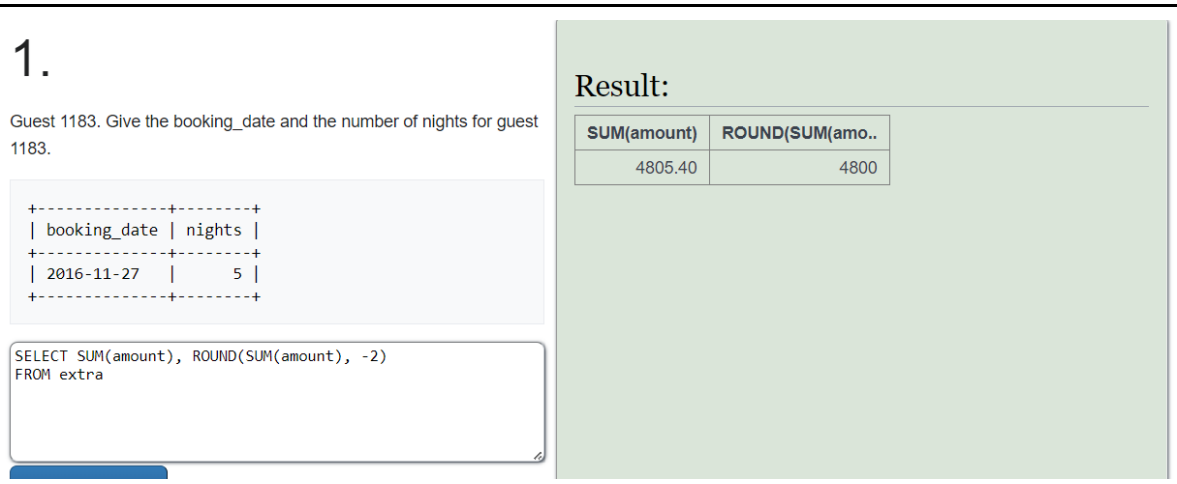
Operador de agrupamiento: Se está utilizando el 'COUNT' para agrupar todos los elementos de la tabla extra de la columna amount que superen los 50$.

Consulta:
SELECT COUNT(*) AS expensive_extras
FROM extra
WHERE amount > 50



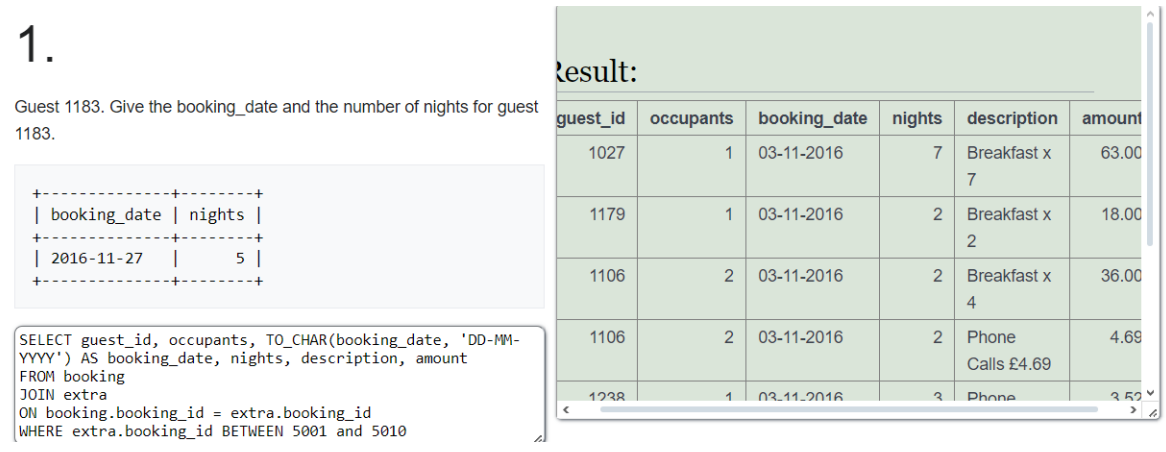
Operador de cadena: Se está utilizando el 'IN' para realizar una búsqueda de varios valores, no solo de uno, por eso no se utiliza algún comparador lógico.

Consulta:
SELECT *
FROM extra
WHERE booking_id IN (5120, 5090, 5012)



Operador numérico: Se está utilizando el 'ROUND' para realizar la aproximación del valor total que nos dió de la suma de toda la columna amount. También se utilizó el operador de agrupamiento SUM para ejecutar la suma de la columna amount.

Consulta:
SELECT SUM(amount), ROUND(SUM(amount),-2)
FROM extra



Operador de tiempo: Se está utilizando el 'TO_CHAR' para modificar el dato de salida de la fecha al formato elegido. Se está utilizando también el join para trabajar con las listas booking y extra.

Consulta:
SELECT guest_id, occupants, TO_CHAR(booking_date, 'DD-MM-YYYY') AS booking_date, nights, description, amount
FROM booking
JOIN extra

```
ON booking.booking_id = extra.booking_id
WHERE extra.booking_id BETWEEN 5001 and 5010
```

1.

Guest 1183. Give the booking_date and the number of nights for guest 1183.

```
+--------------+--------+
| booking_date | nights |
+--------------+--------+
| 2016-11-27   |      5 |
+--------------+--------+
```

```
SELECT *,
CASE
    WHEN amount <= 5.00 THEN 'muy poco'
    WHEN amount BETWEEN 6.00 AND 20.00 THEN 'poco'
    WHEN amount BETWEEN 21.00 AND 50.00 THEN 'promedio'
    ELSE 'mucho'
END AS description_amount
FROM extra
```

Result:

extra_id	booking_id	description	amount	description_a..
500101	5001	Breakfast x 7	63.00	mucho
500201	5002	Breakfast x 2	18.00	poco
500301	5003	Breakfast x 4	36.00	promedio
500302	5003	Phone Calls £4.69	4.69	muy poco
500402	5004	Phone Calls	3.52	muy poco

Operadores condicionales: Se está utilizando el 'CASE' como condicional en la columna 'amount', en donde se describe el gasto de cada persona hospedada entre muy poco hasta mucho en la nueva columna llamada 'description_amount'

Consulta:

```
SELECT *,
CASE
    WHEN amount <= 5.00 THEN 'muy poco'
    WHEN amount BETWEEN 6.00 AND 20.00 THEN 'poco'
    WHEN amount BETWEEN 21.00 AND 50.00 THEN 'promedio'
    ELSE 'mucho
END AS description_amount
FROM extra
```

1.

Guest 1183. Give the booking_date and the number of nights for guest 1183.

```
+--------------+--------+
| booking_date | nights |
+--------------+--------+
| 2016-11-27   |      5 |
+--------------+--------+
```

```
SELECT
    extra_id,
    CAST(amount AS INTEGER) AS amount_integer
FROM
    extra
```

Result:

extra_id	amount_integer
500101	63
500201	18
500301	36
500302	5
500402	4
500802	2
500901	72
500902	3

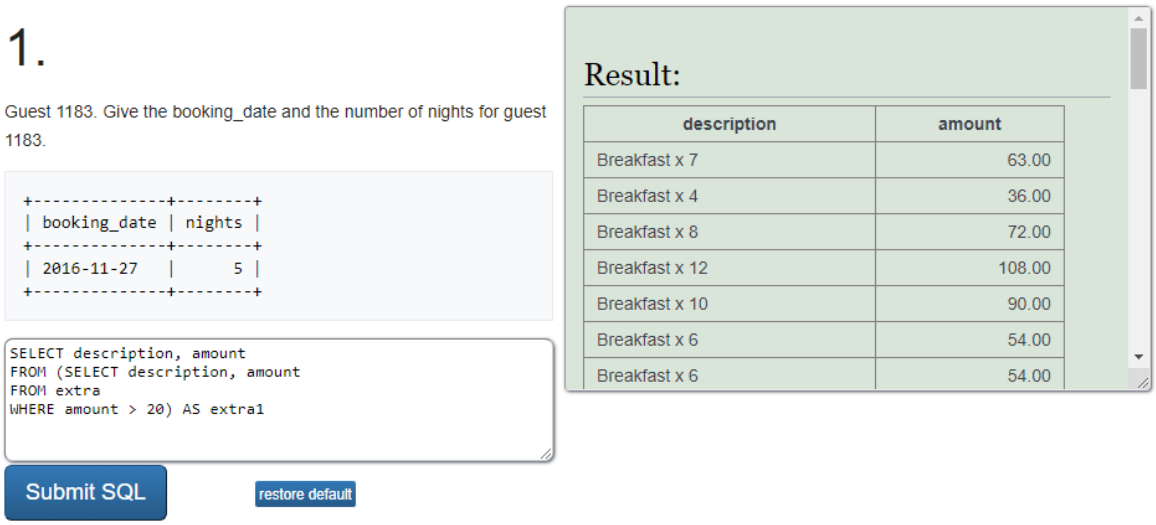
Operadores de cambio de tipo: Se está utilizando el 'CAST' para convertir el tipo de dato a otro tipo de caso, dentro de la tabla 'extra' se está cambiando los valores de 'amount' de decimal a entero.

Consulta:

```
SELECT extra_id, CAST(amount AS INTEGER) AS amount_integer
FROM extra
```

- **3 consultas anidadas que usen otra consulta:**

SELECT en FROM

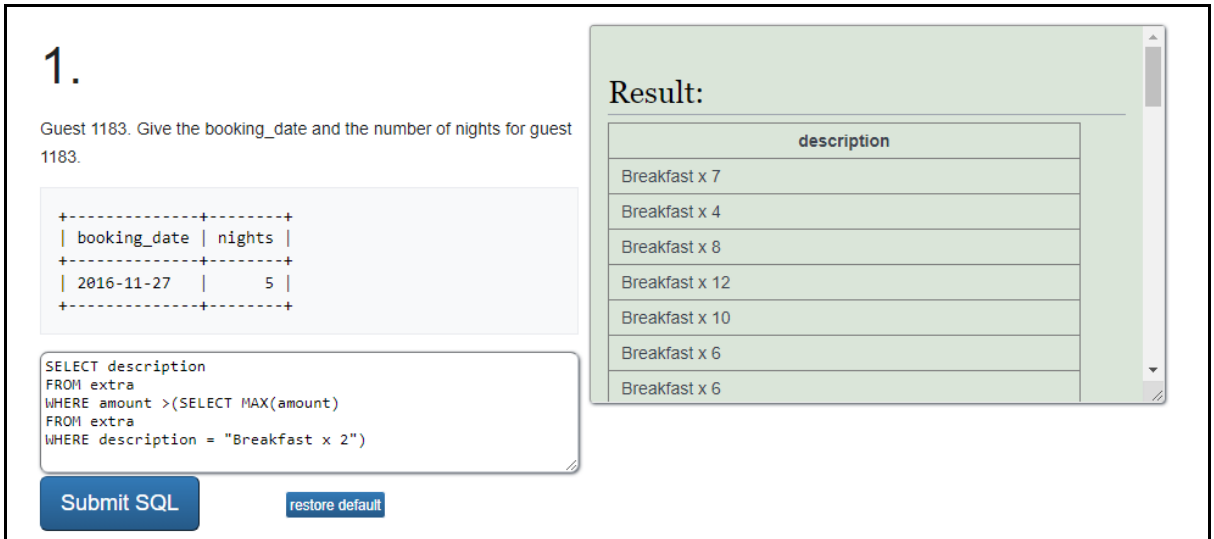


Selecciona la descripción y el monto de una tabla derivada que contiene todas las filas de la tabla extra donde el monto es mayor que 20. Luego, muestra la descripción y el monto de esa tabla derivada.

Consulta:

```
SELECT description, amount
FROM (SELECT description, amount
FROM extra
WHERE amount > 20) AS extra1
```

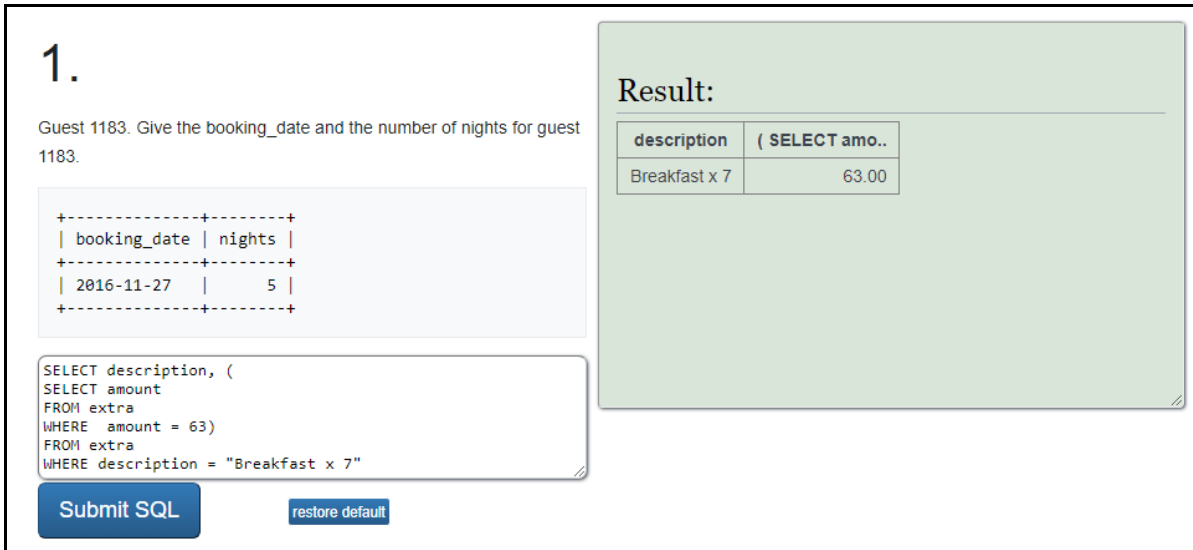
SELECT en WHERE



Selecciona la descripción de todas las filas en la tabla extra donde el monto es mayor que el monto máximo asociado con la descripción 'Breakfast x 7' en la misma tabla.

Consulta:
SELECT description
FROM extra
WHERE amount >(SELECT MAX(amount)
FROM extra
WHERE description = "Breakfast x 7")

SELECT en SELECT



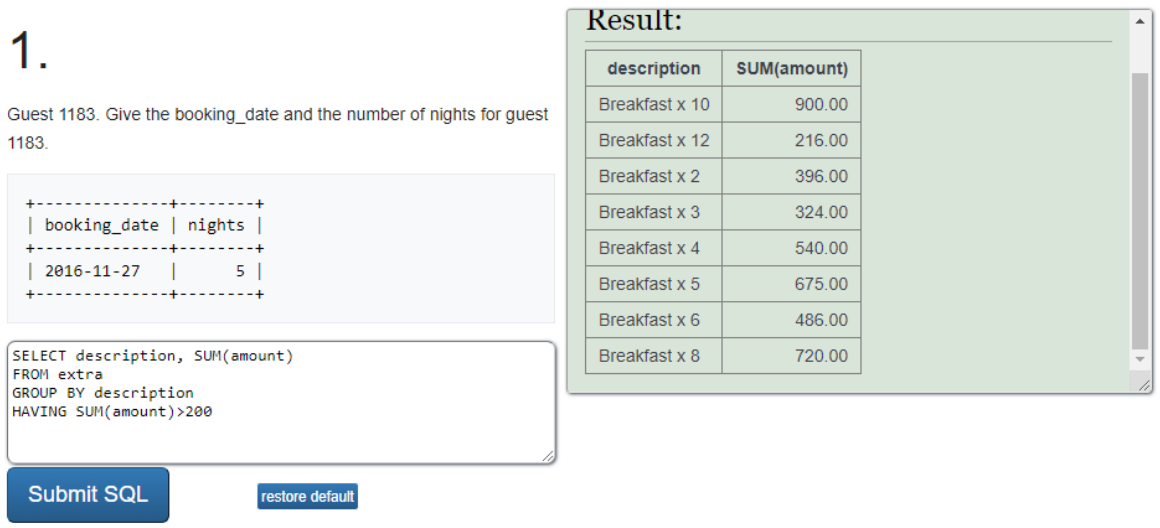
Selecciona la descripción y el monto de la tabla extra para todas las filas donde la descripción sea 'Breakfast x 7'. Además, muestra el monto de la fila en la tabla extra donde el valor de amount sea igual a 63.

Consulta:
SELECT description, (
SELECT amount

```
FROM extra
WHERE  amount = 63)
FROM extra
WHERE description = "Breakfast x 7"
```

- **3 consultas con el siguiente esquema:**

GROUP BY … HAVING

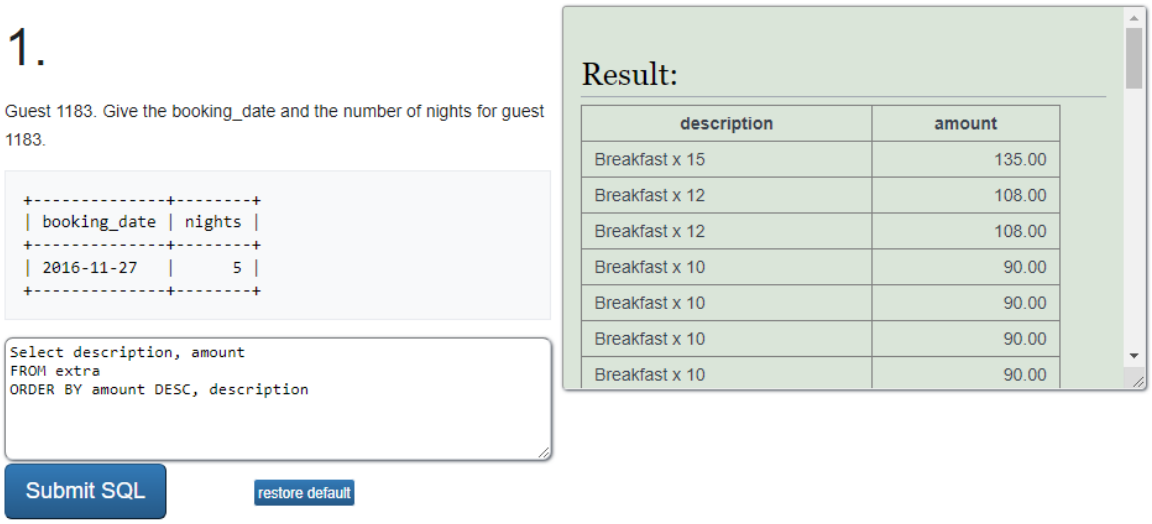


Selecciona la descripción y la suma de los montos para cada descripción en la tabla extra, pero solo muestra aquellas descripciones donde la suma total de los montos es mayor que 200.

Consulta:

```
SELECT description, SUM(amount)
FROM extra
GROUP BY description
HAVING SUM(amount)>200
```

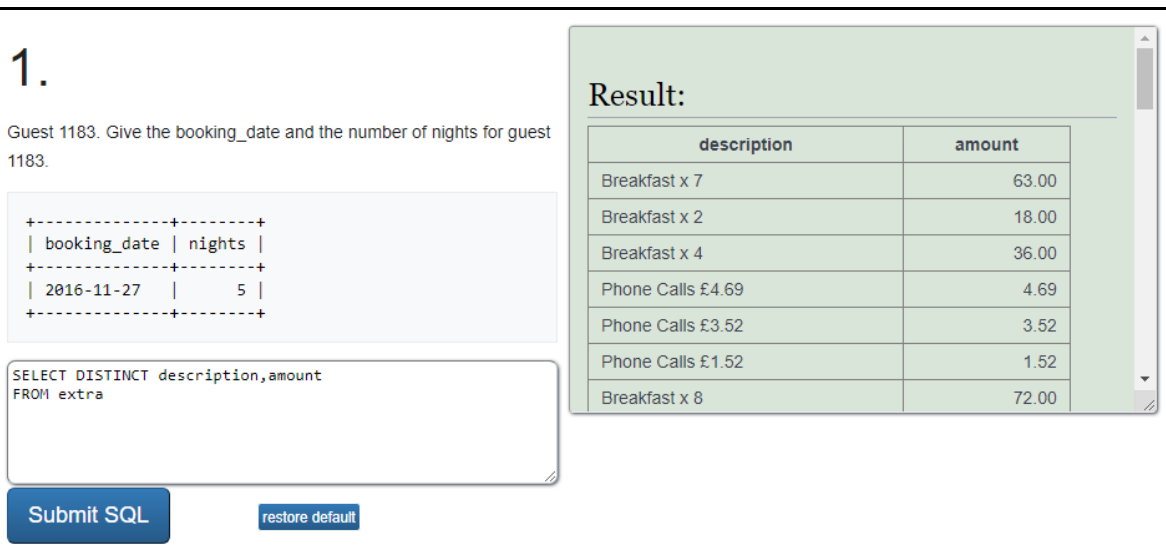
ORDER BY



Selecciona la descripción y el valor de la tabla extra. Organiza el valor de forma descendente y lo muestra.

Consulta:
Select description, amount
FROM extra
ORDER BY amount DESC, description

DISTINCT



Selecciona todas las combinaciones únicas de descripción y monto de la tabla extra. Es decir, muestra solo las filas donde cada combinación de description y amount sea distinta, eliminando duplicados.

Consulta:
SELECT DISTINCT description,amount
FROM extra