**MODELOS Y BASES DE DATOS**

**SQL Básico**

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**Guia autoestudio 1/6**

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**INVESTIGACIÓN**

**A. SQL**

* **¿Qué es? ¿Para qué sirve?**

SQL (Structured Query Language) es un lenguaje estándar e interactivo de acceso a bases de datos relacionales que permite especificar diversos tipos de operaciones en ellas, gracias a la utilización del álgebra y de cálculos relacionales, el SQL brinda la posibilidad de realizar consultas con el objetivo de recuperar información de las bases de datos de manera sencilla. Las consultas toman la forma de un lenguaje de comandos que permite seleccionar, insertar, actualizar, averiguar la ubicación de los datos, y más.

* **¿Qué es DML, DLL, DCL,TCL?**

Los datos por sí solos no son nada hasta que se contextualizan. Para realizar operaciones en una base de datos relacional es importante conocer los siguientes conceptos:

Las librerías de enlace dinámico (conocidas por su sigla en inglés **DLL**, abreviatura de Dynamic-Link Libraries) son archivos que contienen un código ejecutable, el cual es cargado mediante el sistema operativo bajo una demanda de uso

**DDL (Data Definition Language):** Permite crear y modificar la estructura de una **base de datos.**

**DML (Data Manipulation Language):** Permite recuperar, almacenar, modificar, eliminar, insertar y actualizar datos de una **base de datos**.

**DCL (Data Control Language):** Permite crear roles, permisos e integridad referencial, así como el control al acceso a la **base de datos**.

**TCL (Transactional Control Language):** Permite administrar diferentes transacciones que ocurren dentro de una **base de datos**.

**B. Motor de bases de datos y bases de datos**

* **¿Qué son?**

**Motor de bases de datos:** Se llama motor, a las herramientas que permiten comunicarse con la base de datos, ejecutan los procesos sobre las tablas y mantienen la integridad de los datos. El motor es quien interpreta y ejecuta las consultas, mantiene los índices, entre muchas otras cosas.

**Bases de datos:** es un conjunto de información organizada de manera que pueda ser utilizada eficientemente. Un directorio telefónico, un diccionario, un calendario o un libro de recetas son ejemplos de bases de datos.

La información en una base está organizada en forma de registros. Cada registro contiene toda la información sobre una persona o un elemento de la base.

El conjunto de registros que utilizan los mismos campos conforma una tabla. Una base de datos puede contener muchas tablas. La siguiente imagen muestra cómo se relacionan estos conceptos.

* **¿Qué motores ofrece sqlzoo.net [http://sqlzoo.net/]?**

Ofrece motores como: SQL Server, Oracle, MySQL, DB2, and PostgreSQL.

* **¿Qué bases de datos ofrece sqlzoo?**

Tablas

**Bibliografía**

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**PRACTICA**

**B.**

**¿Qué información tiene la tabla WORLD?**

* **Calculo relacional:**  {x : world| : x}
* **Algebra relacional:** Π columnas world
* **SQL:** SELECT \* FROM world

**¿Qué continentes figuran en esa tabla ? (Sin repeticiones)**

* **Calculo relacional:**  {x : world| :continent}
* **Algebra relacional:** Π continent world
* **SQL:** SELECT DISTINCT continent FROM world

**¿Qué países tienen un área mayor a 500? (ordenados de mayor a menor)**

* **Calculo relacional:** {x : world | area>500 : country}
* **Algebra relacional:** Π country σ area>500 world
* **SQL:** SELECT name FROM world

WHERE area>500

ORDER BY name desc

**¿Qué continentes tienen países con una población mayor a un millón de habitantes? (ordenados de menor a mayor)**

* **Calculo relacional:** {x : world | population>1000000: continent}
* **Algebra relacional:** Π continentσ population>1000000 world
* **SQL:**

SELECT continent FROM world

WHERE population > 1000000

ORDER BY population asc

**¿Qué área tiene cada una de los continentes?**

* **Calculo relacional:** {x : world| : continente,area}
* **Algebra relacional:** Π continente,area world
* **SQL:**

SELECT continente,area FROM world

GROUP BY continente

**¿Cuál es la población total?**

* **Calculo relacional:** {x : world| : sum(population)}
* **Algebra relacional:** Π sum(population) world
* **SQL:**

SELECT SUM(population) FROM world

**¿De cuántos países se tiene información?**

* **Calculo relacional:** {x : world| : count(name) }
* **Algebra relacional:** Π count(name) World
* **SQL:**

SELECT COUNT(name) FROM world

**C.**

**0. Select basic**

**Modify it to show the population of Germany**

SELECT population FROM world

WHERE name = 'Germany'

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

SELECT name, population FROM world

WHERE name IN('Sweden','Norway','Denmark')

**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

**1. Select name**

**Find the country that start with Y**

SELECT name FROM world

WHERE name LIKE 'Y%'

**Find the countries that end with y**

SELECT name FROM world

WHERE name LIKE '%y'

**Find the countries that contain the letter x**

SELECT name FROM world

WHERE name LIKE '%x%'

**Find the countries that end with land**

SELECT name FROM world

WHERE name LIKE '%land'

**Find the country that has oo in the name**

SELECT name FROM world

WHERE name LIKE '%oo%'

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

SELECT name FROM world

WHERE name LIKE '%a%a%a%'

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

SELECT name FROM world

WHERE name LIKE '\_t%'

ORDER BY name

**Find the countries that have exactly four characters.**

SELECT name FROM world

WHERE name LIKE '\_\_\_\_'

**Find the country where the name is the capital city.**

SELECT name

FROM world

WHERE name LIKE capital

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

SELECT name

FROM world

WHERE capital LIKE concat(name,' City')

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

SELECT capital,name

FROM world

WHERE capital LIKE concat(name,'%')

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

SELECT capital,name

FROM world

WHERE capital LIKE concat(name,'\_%\_')

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

SELECT name,(replace(capital,name,''))

FROM world

WHERE capital LIKE concat(name,'%\_')

**2. Select From World Tutorial**

**Show the name, continent and population of all countries.**

SELECT name, continent, population FROM world

**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

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

SELECT name,GDP/population

FROM world

WHERE population>200000000

**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'

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

SELECT name,population

FROM world

WHERE name IN ('France','Germany','Italy')

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

SELECT name

FROM world

WHERE name LIKE '%United%'

**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

**Show the countries that are big by area or big by population but not both. Show name, population and area.**

SELECT name,population,area

FROM world

WHERE population>250000000 xor area>3000000

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

SELECT name, ROUND(population/1000000,2), ROUND(GDP/1000000000,2)

FROM world

WHERE continent='South America'

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

SELECT name,round(GDP/population,-3)

FROM world

WHERE GDP>1000000000000

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

SELECT name,capital

FROM world

WHERE LENGTH(name) LIKE LENGTH(capital)

**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.**

SELECT name, capital

FROM world

WHERE LEFT(name,1) LIKE LEFT(capital,1) AND name <> capital

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

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 '% %'

**3. Nobel Laureates**

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

SELECT yr, subject, winner

FROM nobel

WHERE yr = 1950

**Show who won the 1962 prize for Literature.**

SELECT winner

FROM nobel

WHERE yr = 1962 AND subject = 'Literature'

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

SELECT yr,subject

FROM nobel

Where winner='Albert Einstein'

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

SELECT winner

FROM nobel

WHERE yr>1999 AND subject='Peace'

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

SELECT yr,subject,winner

FROM nobel

WHERE yr>1979 and yr<1990 and subject='Literature'

**Show all details of the presidential winners:**

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

SELECT \*

FROM nobel

WHERE winner IN ('Theodore Roosevelt', 'Woodrow Wilson', 'Jimmy Carter', 'Barack Obama')

**Show the winners with first name John**

SELECT winner FROM nobel

WHERE winner LIKE 'John%'

**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 (subject='Physics' and yr=1980) OR (subject='Chemistry' and yr=1984)

**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'

**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='Literature' and yr>=2004) OR (subject='Medicine' and yr<1910)

**Find all details of the prize won by PETER GRÜNBERG**

SELECT \*

FROM nobel

WHERE winner='PETER GRÜNBERG'

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

SELECT \*

FROM nobel

WHERE winner='EUGENE O''NEILL'

**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

**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 CASE WHEN subject IN ('Chemistry','Physics') THEN 1 ELSE 0 END,subject, winner

**4. SELECT within SELECT**

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

SELECT name FROM world

WHERE population > (SELECT population FROM world

WHERE name='Russia')

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

SELECT name

FROM world

WHERE continent='Europe' AND gdp/population>

(SELECT gdp/population FROM world

WHERE name='United Kingdom')

**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 asc

**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')

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

SELECT name,CONCAT(ROUND(100\*population/(SELECT population FROM world WHERE name='GERMANY')),'%')

FROM world

WHERE continent='EUROPE'

**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 )

**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)

Problemas que en los que no logramos escribir alguna sentencia

8, 9 y 10

**5. SUM AND COUNT**

**Show the total population of the world**

SELECT SUM(population)

FROM world

**List all the continents - just once each**

SELECT DISTINCT continent

FROM world

**Give the total GDP of Africa**

SELECT SUM(GDP)

FROM world

WHERE continent='Africa'

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

SELECT COUNT(name)

FROM world

WHERE area>1000000

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

SELECT SUM(population)

FROM world

WHERE name IN ('Estonia', 'Latvia', 'Lithuania')

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

SELECT continent,COUNT(name)

FROM world

GROUP BY continent

**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

**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.**

**Consultas por tipo de operador**

**Numérico : El área que tiene Asia (Expresarlo en forma de porcentaje):**

SELECT DISTINCT CONCAT(100\*(SELECT SUM(AREA)

FROM world WHERE continent='ASIA')/(SELECT SUM(AREA) FROM world),'%')

FROM world

**Lógico : Muestre todos los países que no estén en Africa.**

SELECT name FROM world

WHERE not continent = 'Africa'

**De comparación : Muestre todos los países que tengan entre 1000000 y 2000000 de área.**

SELECT name FROM world

WHERE area BETWEEN 1000000 and 2000000

**Cadenas : Todos los países que contengan menos de 5 letras.**

SELECT name FROM world

WHERE LENGTH(name )<5

**Agrupamiento : Muestre el país con el nombre más largo.**

SELECT name From world

WHERE LENGTH(NAME)= (SELECT max(length(name)) FROM world)

**Consultas anidadas**

**Find the largest country in the world, by area with this query.**

SELECT name

FROM world

WHERE area >= ALL(SELECT area FROM world

WHERE area>0)

**Find the country with more population in the world, by countries of Asia continent with this query.**

SELECT name

FROM world

WHERE population >= ALL(SELECT population FROM world

WHERE continent='Asia')

**Find the shortest country (by area) in each continent, show the name, the continent and the area with this query.**

SELECT name, continent,area FROM world x

WHERE area <= ALL (SELECT area FROM world y

WHERE y.continent=x.continent AND area>0)