

Machine Learning Assignment 71

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Problem 2

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 |

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 | 25690023 | 7692024 |
| Brazil | 211442625 | 8515767 |
| Canada | 38007166 | 9984670 |
| China | 1402378640 | 9596961 |
| India | 1361503224 | 3166414 |
| Indonesia | 266911900 | 1904569 |
| Russia | 146745098 | 17125242 |

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 | 25690023 | 7692024 |
| Brazil | 211442625 | 8515767 |
| Canada | 38007166 | 9984670 |
| Indonesia | 266911900 | 1904569 |
| Russia | 146745098 | 17125242 |

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) as population, ROUND(GDP/1000000000, 2) as GDP FROM world
WHERE continent = 'South America'
```

Submit SQL

Restore default

Correct answer

| name | population | GDP |
|-----------|------------|---------|
| Argentina | 44.94 | 637.49 |
| Bolivia | 11.47 | 37.51 |
| Brazil | 211.44 | 2055.51 |
| Chile | 19.11 | 277.08 |
| Colombia | 49.4 | 309.19 |
| Ecuador | 17.47 | 104.3 |
| Guyana | 0.78 | 3.09 |

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 | 5500 |
| Brazil | 1000 |
| Canada | 4300 |
| China | 900 |
| France | 3900 |
| Germany | 4400 |
| India | 200 |

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 |
| Cameroon | Yaoundé |
| Canada | Ottawa |
| Djibouti | Djibouti |

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 LEFT(name, 1) = LEFT(capital, 1) AND name <> capital
```

Submit SQL

Restore default

Correct answer

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

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 |

Problem 3

(aa)

$$P_X(k) = \begin{cases} \frac{1}{3} & \text{for } k = 3 \\ \frac{1}{6} & \text{for } k = 2 \\ \frac{1}{6} & \text{for } k = 1 \\ \frac{1}{3} & \text{for } k = 0 \\ 0 & \text{otherwise} \end{cases}$$

(ba)

$$\begin{aligned} P(X \leq 2 \text{ and } Y \leq 2) &= \left(\frac{1}{4} + \frac{1}{8}\right) \left(\frac{1}{6} + \frac{1}{6}\right) \\ &= \frac{1}{4} \end{aligned}$$

(bb)

$$\begin{aligned}
 P(X > 2 \text{ or } Y > 2) &= \left(\frac{1}{8} + \frac{1}{2}\right) + \left(\frac{1}{3} + \frac{1}{3}\right) - \left(\frac{1}{8} + \frac{1}{2}\right) \left(\frac{1}{3} + \frac{1}{3}\right) \\
 &= \frac{5}{8} + \frac{2}{3} - \frac{5}{12} \\
 &= \frac{7}{8}
 \end{aligned}$$

(bc)

$$\begin{aligned}
 P(X > 2 | Y > 2) &= P(X > 2) \\
 &= \frac{5}{8}
 \end{aligned}$$

(bd)

$$\begin{aligned}
 P(X < Y) &= \frac{1}{3} * \frac{1}{2} + \frac{1}{3} * \frac{3}{8} + \frac{1}{6} * \frac{1}{4} + \frac{1}{6} * 0 \\
 &= \frac{1}{3}
 \end{aligned}$$

(c)

$$\begin{aligned}
 P(2 \text{ aces} | 1 \text{ ace}) &= \frac{P(2 \text{ aces and at least 1 ace})}{P(\text{at least 1 ace})} \\
 &= \frac{P(2 \text{ aces})}{P(\text{at least 1 ace})} \\
 &= \frac{10 \frac{4}{52} \frac{3}{51} \frac{48}{50} \frac{47}{49} \frac{46}{48}}{1 - \frac{48}{52} \frac{47}{51} \frac{46}{50} \frac{45}{49} \frac{44}{48}} \\
 &= \frac{1081}{9236}
 \end{aligned}$$