

# Day 1



Why learn SQL?



# What is SQL?

**SQL** = Structured Query Language

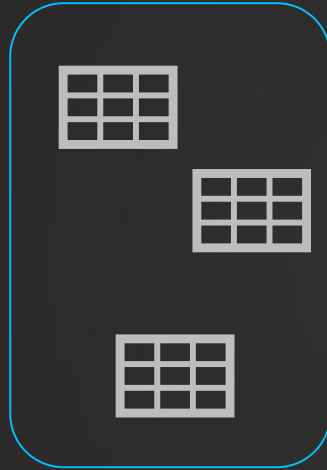
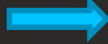
**Interact with databases**



# Using SQL



Database



SQL

Departments

employee_id	entry_date	position_level
1	1/2/2022	HR
2	1/6/2022	IT
3	1/4/2022	IT
4	1/7/2022	UM
5	1/6/2022	PM

- Retrieve data
- Analyze data
- Define data
- Change data

employee_id	entry_date	position_level
1	1/2/2022	HR
2	1/6/2022	IT
3	1/4/2022	IT
4	1/7/2022	UM
5	1/6/2022	PM



+ a b | e a u



# Why learn SQL?

- ✓ Data is everywhere and mostly in databases
- ✓ Maybe the most important skill as
  - Data Analyst,
  - Data Scientist,
  - Business Analyst
- ✓ Learning SQL is easy & intuitive
- ✓ Mastering SQL is a Career Booster



What is a database?



# What is a database?



Database



Tables



Tables

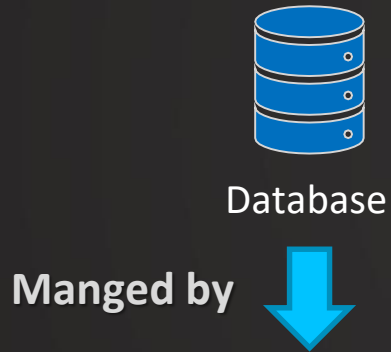


Tables

```
SELECT    <column1>,  
          <column2> , ...  
FROM      <table_name>
```

id	date	product	customer_id
1	1/2/2022	Fulltoss Tangy Tomato	2
2	1/2/2022	Chilli - Green, Organically Grown	2
3	1/2/2022	Masala Powder	5
4	1/2/2022	Cheese Cracker (McVities)	1
5	1/2/2022	Centre Filled Chocolate Cake	5

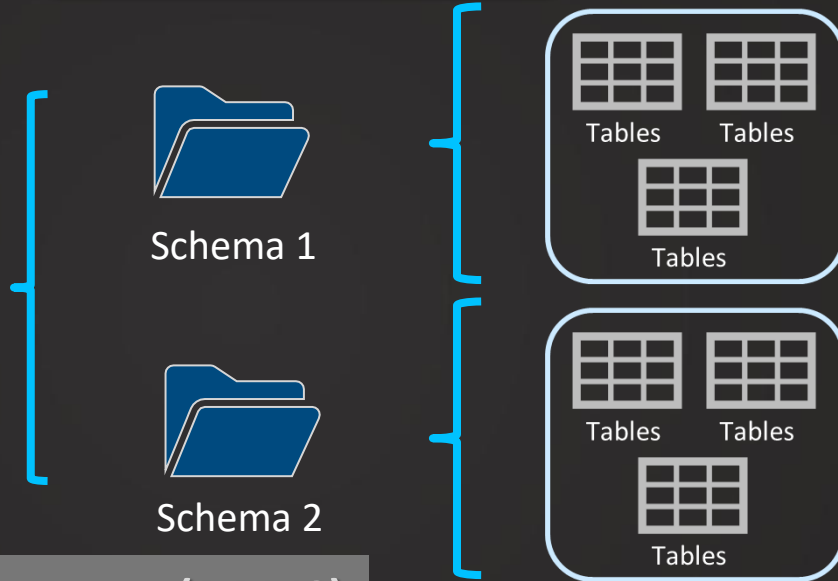
# What is a database?



Database management system (DBMS)



PostgreSQL





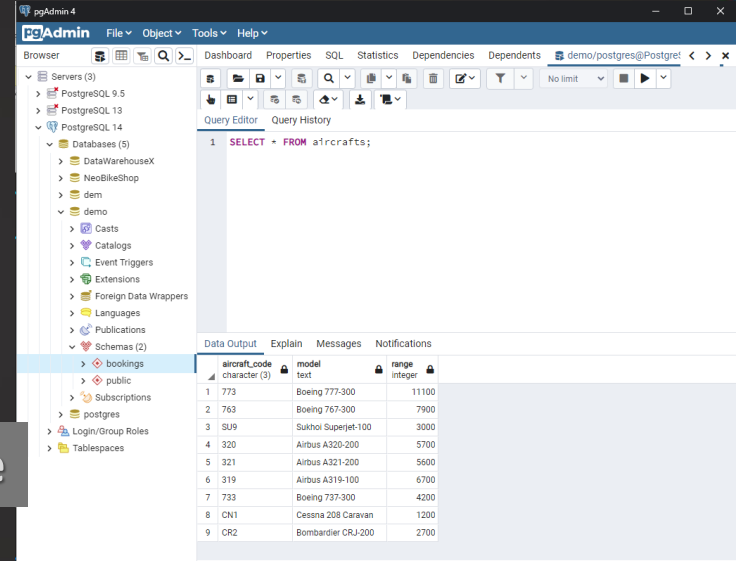
# What is a database?

Database management system (DBMS)



PostgreSQL

Graphical Interface



PgAdmin

# Different DBMS



MongoDB®



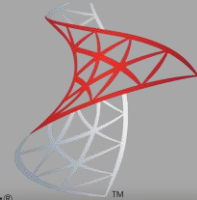
PostgreSQL



MySQL™



MariaDB®



Microsoft®  
SQL Server®



PostgreSQL

# Different dialects

**One language**

**All DBMS have slightly different dialects**

**The differences are small**

**PostgreSQL is the closest to the Standard SQL**



PostgreSQL

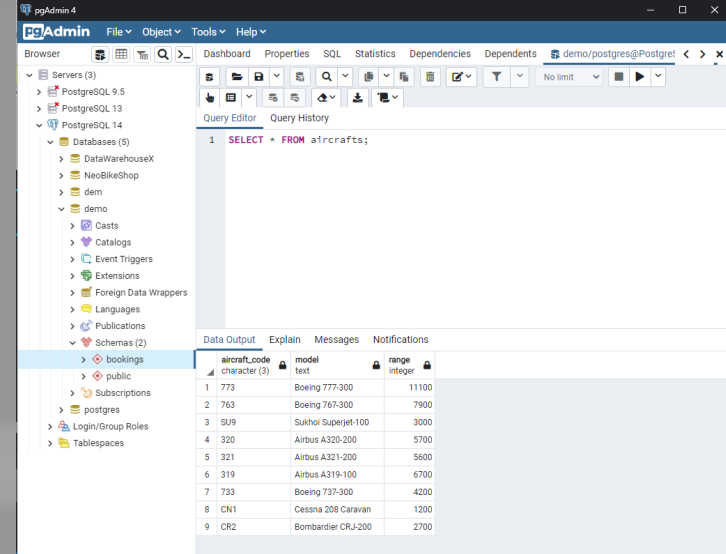
# Why PostgreSQL?

- ✓ PostgreSQL is the closest to the Standard SQL
- ✓ Most flexible & transition will be easiest
- ✓ Free to download & use
- ✓ Very popular
- ✓ The most advanced DBMS in the world

# Installation



PostgreSQL



PgAdmin

# The Project



YOU:  
Data Analyst



**GreenCYCLES**



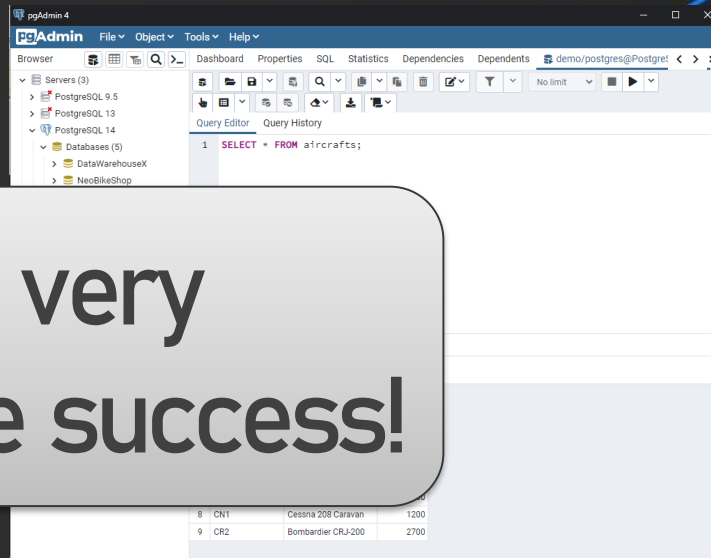
BUSINESS:  
Online Movie Rental Shop

# The Project



Data that is very  
important for the success!

YOU:  
Data Analyst

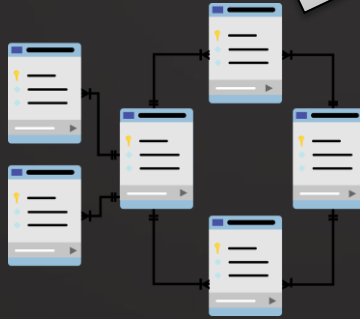




# Your job



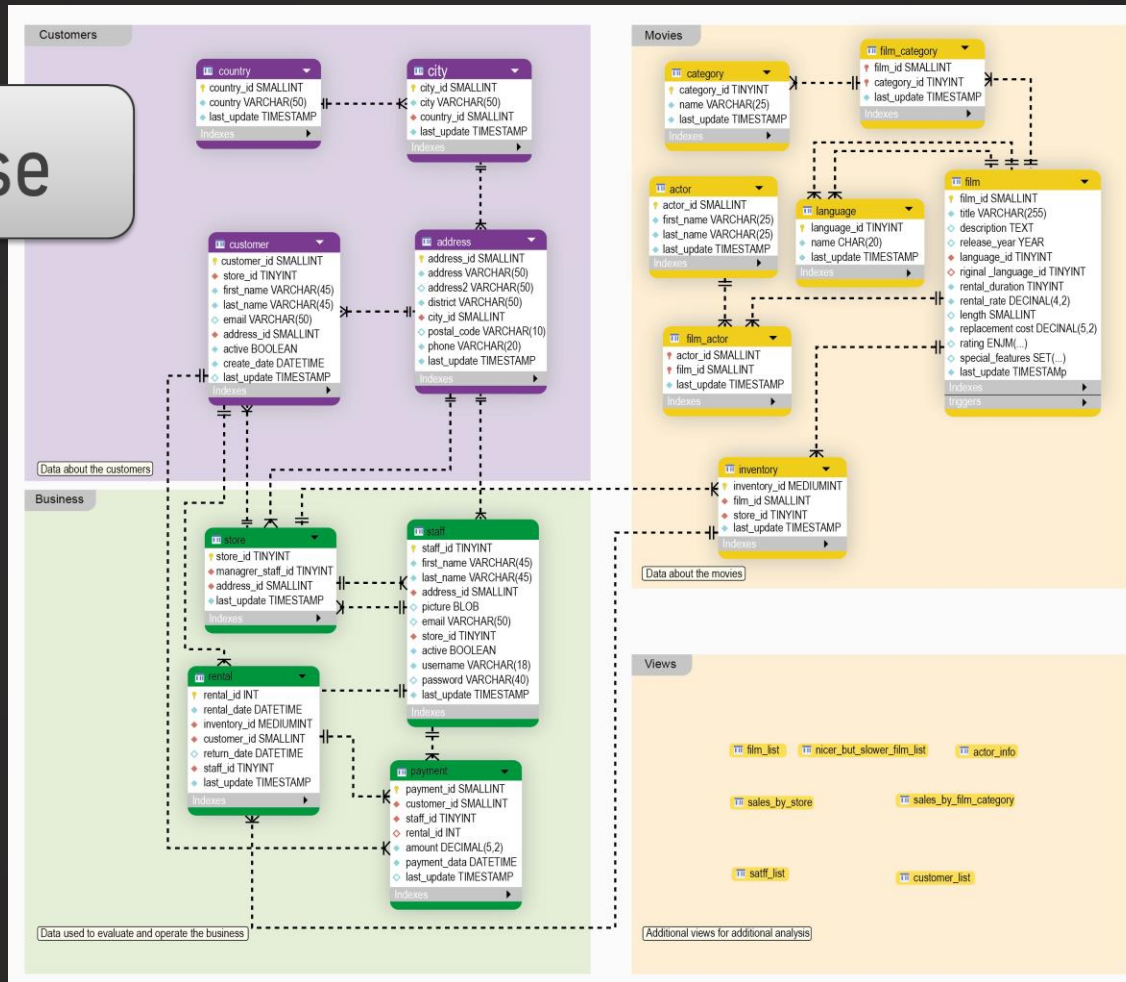
YOU:  
Data Analyst



- ✓ Help the company operate
- ✓ Gain insights
- ✓ Solve problems



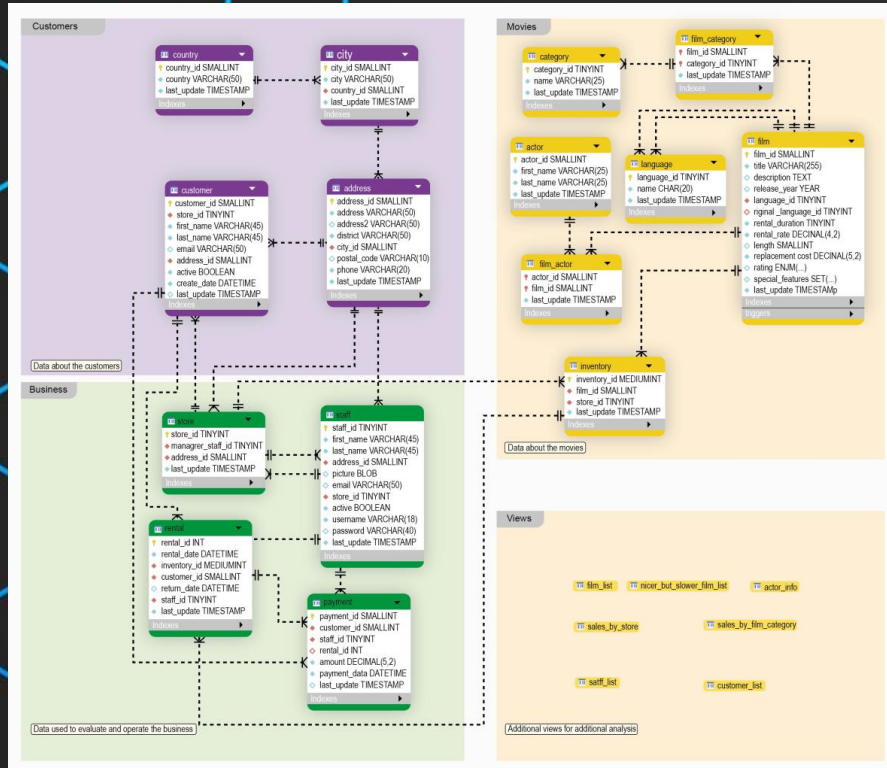
# The database



# Your challenges

- ✓ Explore meaningful data
- ✓ Get insights to make decisions
- ✓ Help to operate & navigate

You are responsible  
for the success!



# SELECT



- ✓ Most basic statement SQL
- ✓ Used to **select** and return data

# SYNTAX

```
SELECT  
column_name  
FROM table_name
```




# Example

```
SELECT  
first_name  
FROM actor
```

Data Output			Explain	Messages	Notifications
		first_name text			
1		PENELOPE			
2		NICK			
3		ED			
4		JENNIFER			
5		JOHNNY			

# Multiple columns

```
SELECT  
first_name,  
last_name  
FROM actor
```

	Data Output	Explain	Messages	Notifications
	 first_name text 	last_name text 		
1	PENELOPE	GUINESS		
2	NICK	WAHLBERG		
3	ED	CHASE		
4	JENNIFER	DAVIS		

# All columns

SELECT

\*

FROM actor

Data Output Explain Messages Notifications					
	actor_id [PK] integer	first_name text	last_name text	last_update timestamp with time zone	
1	1	PENELOPE	GUINNESS	2020-02-15 10:34:33+01	
2	2	NICK	WAHLBERG	2020-02-15 10:34:33+01	
3	3	ED	CHASE	2020-02-15 10:34:33+01	
4	4	JENNIFER	DAVIS	2020-02-15 10:34:33+01	



# Remarks!

## 1. Formatting doesn't matter!

```
SELECT  
first_name,  
last_name  
FROM actor
```

```
SELECT first_name,last_name  
FROM actor
```

```
SELECT first_name,last_name  
  
FROM actor
```

```
SELECT first_name,last_name FROM actor
```



The slide features a dark gray background. On the left and right sides, there are decorative patterns of light blue hexagons. These hexagons are arranged in a way that they appear to be part of a larger, continuous structure, with some hexagons overlapping others. The central focus of the slide is a dark gray rectangular box containing the word "Challenge" in a white, cursive script font.

*Challenge*

## Challenge

Your first day as a Data Analyst has started!

The Marketing Manager asks you for a **list of all customers**.

With **first name**, **last name** and the customer's **email address**.

**Write a SQL query to get that list!**

# ORDER BY

✓ Used to **order** results based on a column

✓ Alphabetically, numerically, chronologically etc.

# SYNTAX

SELECT

column\_name1,




column\_name2,

FROM table\_name

ORDER BY column\_name1



# Example

```
SELECT  
first_name,  
last_name  
FROM actor  
ORDER BY first_name
```

	Data Output	Explain	Messages	No
	 first_name text		last_name text	
1	ADAM		HOPPER	
2	ADAM		GRANT	
3	AL		GARLAND	
4	ALAN		DREYFUSS	




# DESC / ASC

```
SELECT  
first_name,  
last_name  
FROM actor  
ORDER BY first_name DESC
```

	Data Output	Explain	Messages	Notifications
	<b>first_name</b> text		<b>last_name</b> text	
1	ZERO		CAGE	
2	WOODY		HOFFMAN	
3	WOODY		JOLIE	



# DESC / ASC

```
SELECT  
first_name,  
last_name  
FROM actor  
ORDER BY first_name ASC
```

	Data Output	Explain	Messages	Nc
	 first_name text		last_name text	
1	ADAM		HOPPER	
2	ADAM		GRANT	
3	AL		GARLAND	
4	ALAN		DREYFUSS	

# Multiple columns




```
SELECT  
first_name,  
last_name  
FROM actor  
ORDER BY first_name, last_name
```

	Data Output	Explain	Messages	Notific
	<b>first_name</b> text		<b>last_name</b> text	
1	ADAM		GRANT	
2	ADAM		HOPPER	
3	AL		GARLAND	



# DESC / ASC

```
SELECT  
first_name,  
last_name  
FROM actor  
ORDER BY first_name DESC, last_name
```

	Data Output	Explain	Messages	N
	 first_name text 		last_name text 	
1	ZERO		CAGE	
2	WOODY		HOFFMAN	
3	WOODY		JOLIE	



Challenge

# SELECT DISTINCT

✓ Used to **SELECT** the **DISTINCT** values in a table

# SYNTAX

```
SELECT DISTINCT  
column_name1  
FROM table_name
```

# Example

```
SELECT DISTINCT  
first_name  
FROM actor
```

Data Output		Explain
	first_name text	🔒
1	SIDNEY	
2	WOODY	
3	GOLDIE	
4	CHRIS	

# Example

```
SELECT DISTINCT  
first_name  
FROM actor  
ORDER BY first_name
```




Data Output		Explain
	<b>first_name</b> text	
1	ADAM	
2	AL	
3	ALAN	
4	ALBERT	

# Multiple columns

```
SELECT DISTINCT  
first_name,  
last_name  
FROM actor  
ORDER BY first_name
```



Note!

Distinct in terms of  
all selected columns!

	Data Output	Explain	Messages	Not
	 first_name text		last_name text	
1	ADAM		GRANT	
2	ADAM		HOPPER	
3	AL		GARLAND	
4	ALAN		DREYFUSS	

# Multiple columns

```
SELECT  
first_name,  
last_name  
FROM actor  
ORDER BY first_name, last_name
```

	Data Output	Explain	Messages	Notific
	<b>first_name</b> text		<b>last_name</b> text	
1	ADAM		GRANT	
2	ADAM		HOPPER	
3	AL		GARLAND	





Challenge

## Challenge

A marketing team member asks you about the different prices that have been paid.

To make it easier for them order the prices from high to low.

**Write a SQL query to get the different prices!**

## Result

Data Output		Explain
	amount numeric (5,2)	
1	11.99	
2	10.99	
3	9.99	
4	9.98	
5	8.99	
6	8.97	
7	7.99	
8	7.98	

# LIMIT

- ✓ Used to **LIMIT** the number of rows in the output
- ✓ Always at the very end of your query
- ✓ Can help to get a quick idea about a table

# SYNTAX

```
SELECT  
column_name1,  
column_name2  
FROM table_name  
LIMIT n
```

# SYNTAX

```
SELECT  
first_name  
FROM actor  
LIMIT 4
```

Data Output		Explain
	first_name text	
1	PENELOPE	
2	NICK	
3	ED	
4	JENNIFER	

# Example

```
SELECT  
first_name  
FROM actor  
ORDER BY first_name  
LIMIT 4
```




Data Output		Explain
	first_name text	
1	ADAM	
2	ADAM	
3	AL	
4	ALAN	

# Multiple columns

```
SELECT DISTINCT  
first_name,  
last_name  
FROM actor  
ORDER BY first_name
```

Note!

Distinct in terms of  
all selected columns!

	Data Output	Explain	Messages	Not
	 first_name text		last_name text	
1	ADAM		GRANT	
2	ADAM		HOPPER	
3	AL		GARLAND	
4	ALAN		DREYFUSS	



Challenge



## Challenge

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Data Output		Explain
	amount numeric (5,2)	
1	11.99	
2	10.99	
3	9.99	
4	9.98	
5	8.99	
6	8.97	
7	7.99	
8	7.98	

# COUNT

✓ Used to **COUNT** the number of rows in a output

✓ Used often in combination with grouping & filtering

# SYNTAX

```
SELECT  
COUNT(*)  
FROM table_name
```

# SYNTAX

```
SELECT  
COUNT(column_name)  
FROM table_name
```

Note!

Nulls will not be  
counted in that case!


# Example

```
SELECT  
COUNT(first_name)  
FROM actor
```

Data Output		Expla
	count bigint	
1	200	


# Example

```
SELECT  
COUNT(*)  
FROM actor
```

Data Output		Expla
	count bigint 	
1	200	

# Example

```
SELECT  
COUNT(DISTINCT first_name)  
FROM actor
```




Data Output	
	count bigint 
1	128

# Multiple columns

```
SELECT DISTINCT  
first_name,  
last_name  
FROM actor  
ORDER BY first_name
```

Note!

Distinct in terms of  
all selected columns!

	Data Output	Explain	Messages	Not
	 first_name text		last_name text	
1	ADAM		GRANT	
2	ADAM		HOPPER	
3	AL		GARLAND	
4	ALAN		DREYFUSS	





Challenge  
for today

## Challenge for today

1. Create a list of all the **distinct districts** customers are from.
2. What is the **latest rental date**?
3. **How many films** does the company have?
4. **How many distinct last names** of the customers are there?



## Results

Result 1

Data	Output	Explain	Me
	district text		
1	Aden		
2	Eastern Visayas		
3	Vaduz		
4	Tokat		
5	Anzotegui		
6	Saint-Denis		
7	Chollanam		
8	Chihuahua		

Result 2

Data Output		Explain	M
	rental_date		
	timestamp with time zone		
1	2020-02-14 16:16:03+01		

Result 3

Data Output		
<table><thead><tr><th>count</th></tr></thead><tbody><tr><td>1000</td></tr></tbody></table>	count	1000
count		
1000		

Result 4

Data Output		
<table><thead><tr><th>count</th></tr></thead><tbody><tr><td>599</td></tr></tbody></table>	count	599
count		
599		



## Solution 1

1. Create a list of all the **distinct districts** customers are from.

```
SELECT DISTINCT
district
FROM address
```

## Solution 2

2. What is the **latest rental date**?

```
SELECT
rental_date
FROM rental
ORDER BY rental_date DESC
LIMIT 1
```



# Challenge

for today



1. Create a list of all the **distinct districts** customers are from.
2. What is the **latest rental date**?
3. **How many films** does the company have?
4. **How many distinct last names** of the customers are there?

# Results



Result 1

	Data Output	Explain	Me
	 <b>district</b> text 		
1	Aden		
2	Eastern Visayas		
3	Vaduz		
4	Tokat		
5	Anzotegui		
6	Saint-Denis		
7	Chollanam		
8	Chihuahua		



Result 2

	Data Output	Explain	Me
	 <b>rental_date</b> timestamp with time zone 		
1	2020-02-14 16:16:03+01		

Result 3

	Data Output	
	 <b>count</b> bigint 	
1	1000	

Result 4

	Data Output	
	 <b>count</b> bigint 	
1	599	

# Solution 1

1. Create a list of all the [distinct districts](#) customers are from.

```
SELECT DISTINCT  
district  
FROM address
```

## Solution 2

2. What is the latest rental date?

```
SELECT  
rental_date  
FROM rental  
ORDER BY rental_date DESC  
LIMIT 1
```

## Solution 2

3. How many films does the company have?

```
SELECT  
COUNT (*)  
FROM film
```

## Solution 2

4. How many distinct last names of the customers are there?

```
SELECT  
COUNT(DISTINCT last_name)  
FROM customer
```



## Challenge

A marketing team member asks you about the different prices that have been paid.

To make it easier for them order the prices from high to low.

**Write a SQL query to get the different prices!**

## Result

Data Output		Explain
	amount numeric (5,2)	
1	11.99	
2	10.99	
3	9.99	
4	9.98	
5	8.99	
6	8.97	
7	7.99	
8	7.98	

## Challenge

You need to help the Marketing team to work more easily.

The Marketing Manager asks you to order the customer list by the **last name**.

The want to start from "Z" and work towards "A".

In case of the same last name the order should be based on the first name – also from "Z" to "A".

**Write a SQL query to get that list!**