Day 1

Why learn SQL?

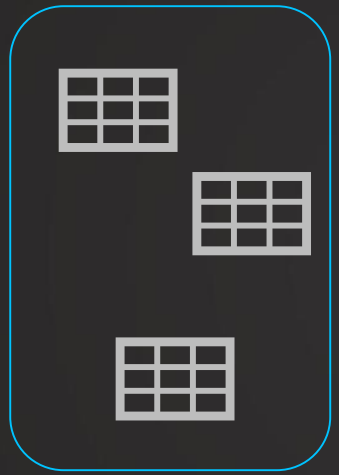
What is SQL?

SQL = **S**tructured **Q**uery **L**anguage

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

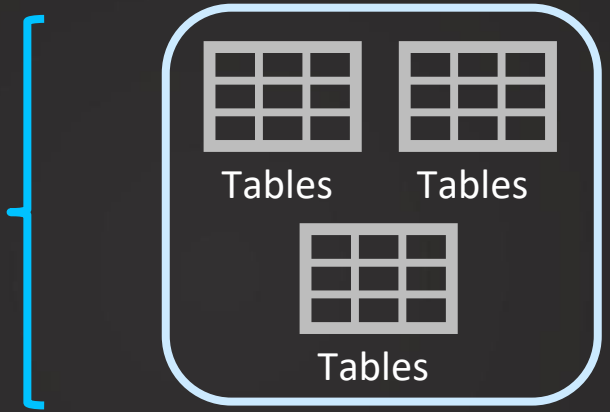
Why learn SQL?

- ✓ 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




```
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

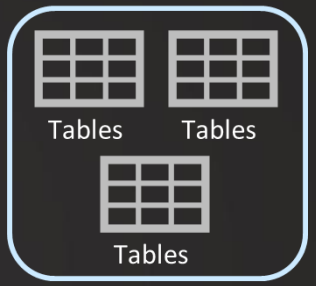
Manged by

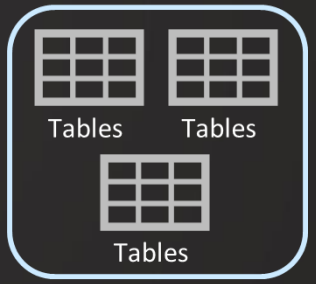
Database management system (DBMS)

PostgreSQL

Schema 1

Schema 2



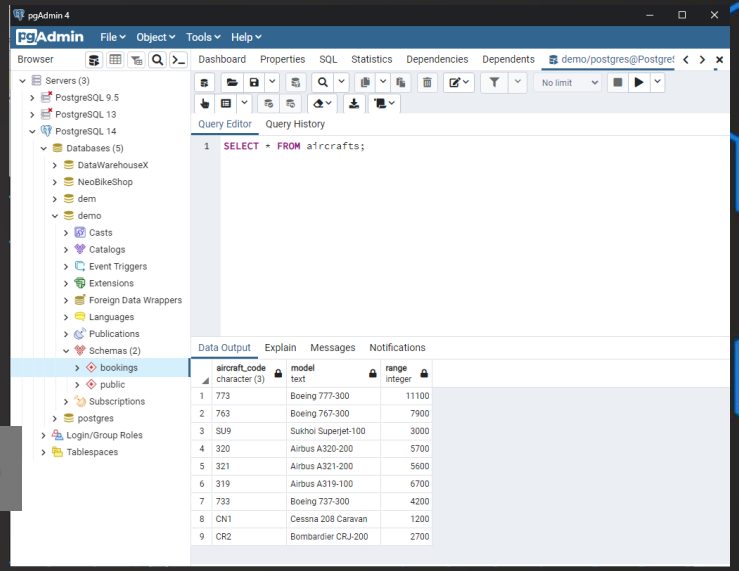


What is a database?

Database management system (DBMS)

PostgreSQL

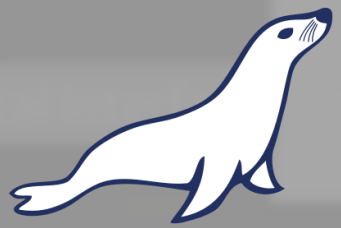
Graphical Interface



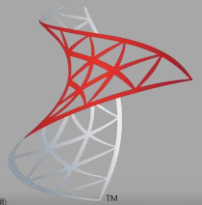
PgAdmin

Different DBMS

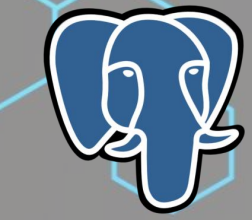
PostgreSQL



MariaDB®



Microsoft® SQL Server®



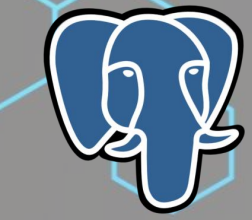
Different dialects

One language

All DBMS have slightly different dialects

The differences are small

PostgreSQL is the closest to the Standard SQL

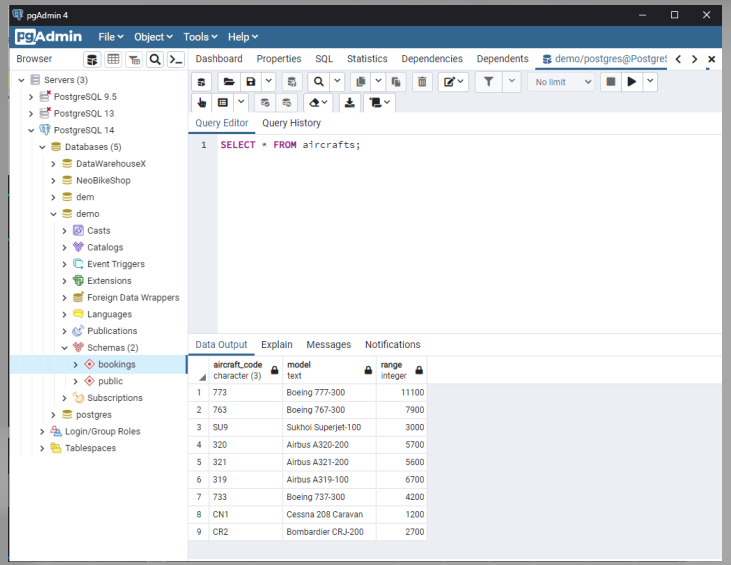


Why PostgreSQL?

- ✓ 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

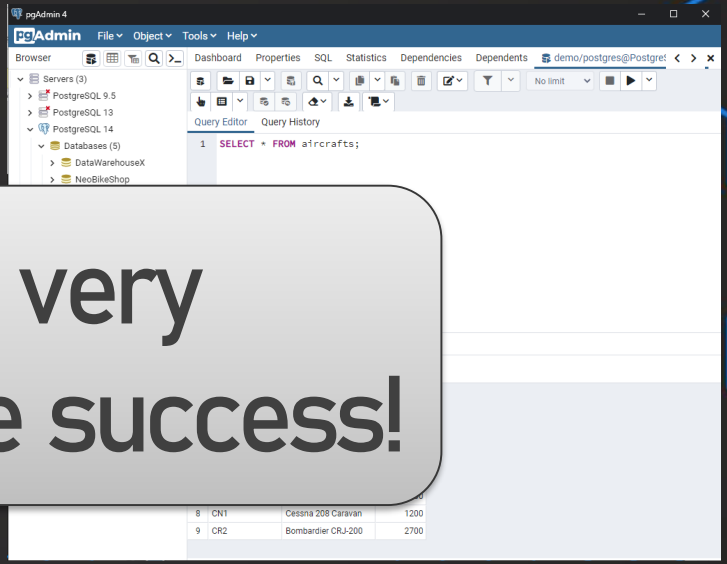
The Project

YOU:
Data Analyst

GreenCYCLES

BUSINESS:
Online Movie Rental Shop

The Project



Data that is very important for the success!

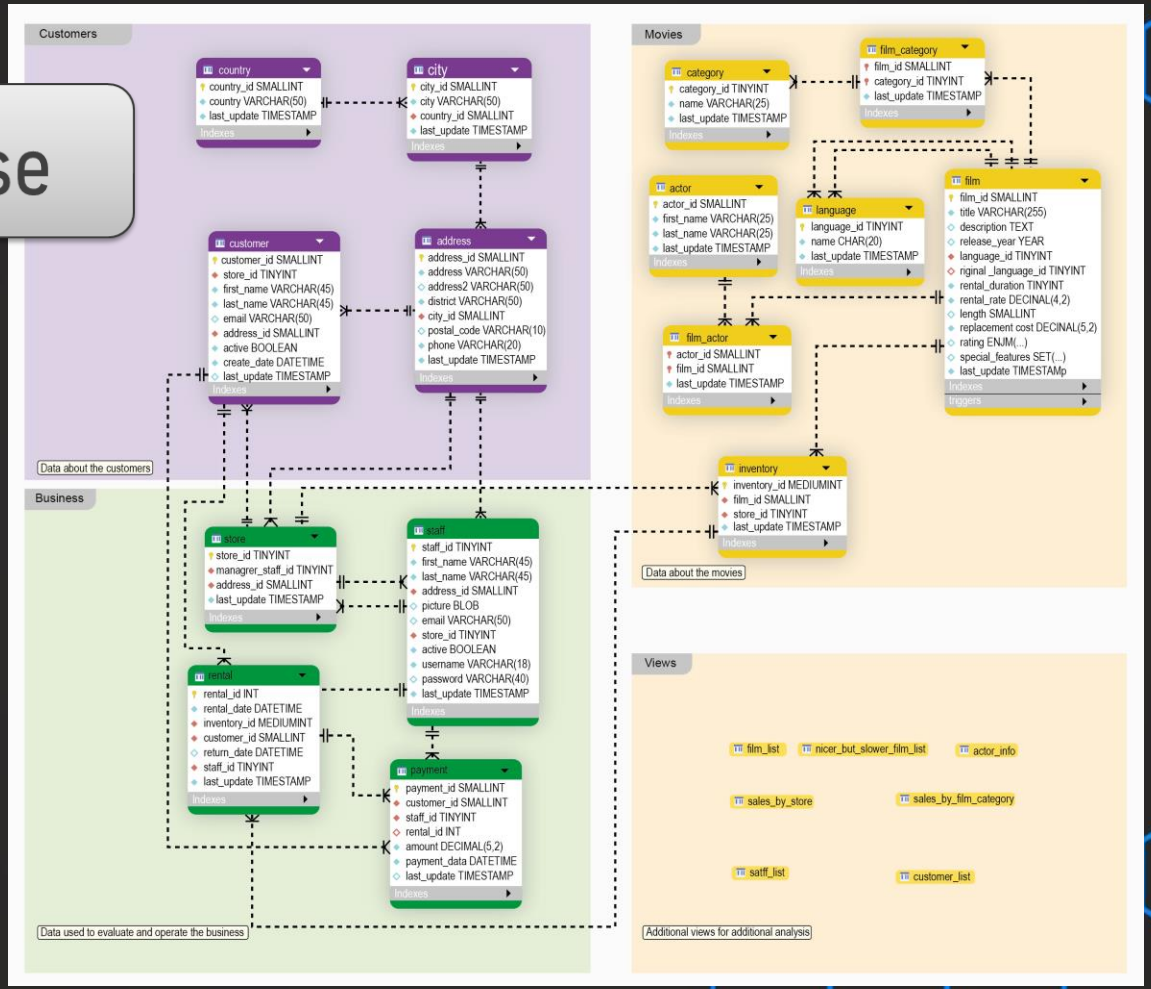
YOU:
Data Analyst

Your job

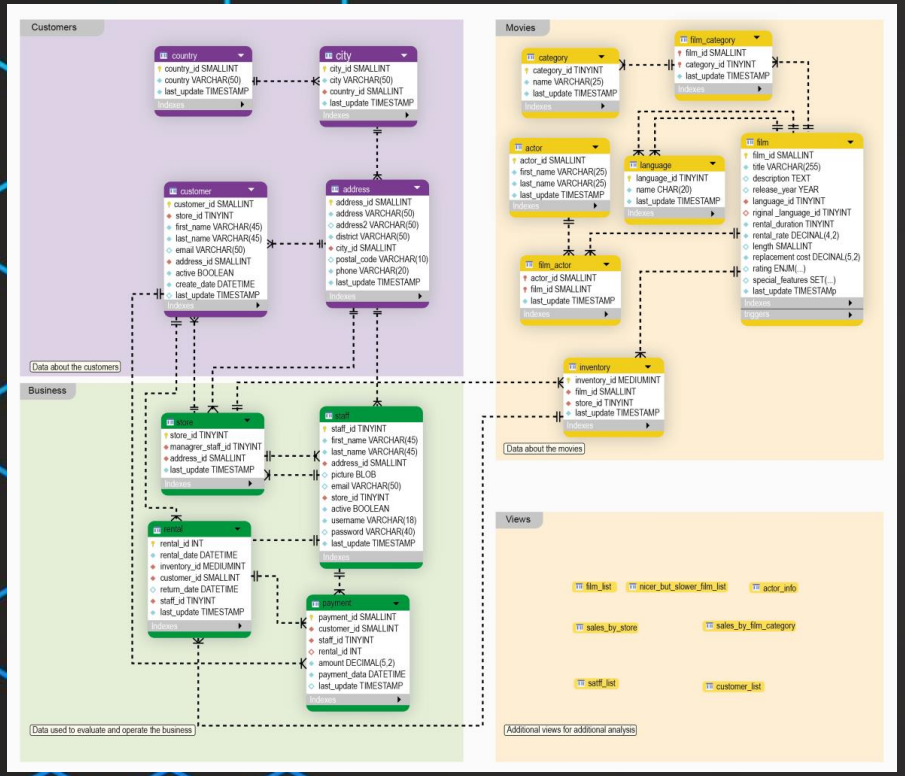
YOU:
Data Analyst

- ✓ 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

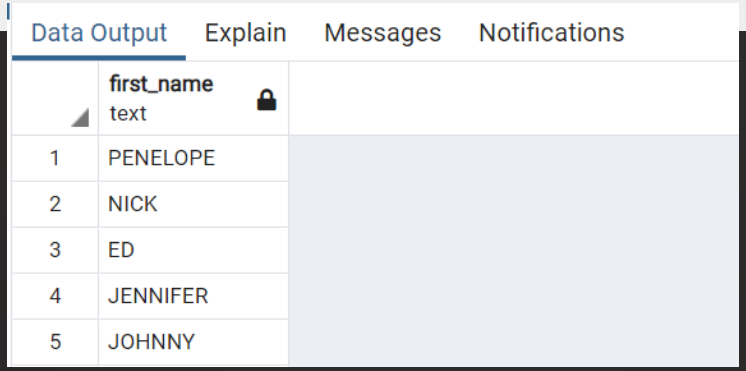
- ✓ Most basic statement SQL
- ✓ Used to select and return data

SYNTAX

```
SELECT
column_name
FROM table_name
```

Example

```
SELECT
first_name
FROM actor
```



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	GUINESS	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
```

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 | Nc

	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

	first_name text	last_name 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

	first_name text	last_name 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

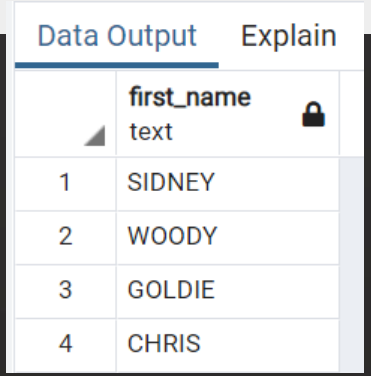
- ✓ **Used to `SELECT` the `DISTINCT` values in a table**

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 | M

	first_name 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

	first_name text	last_name 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

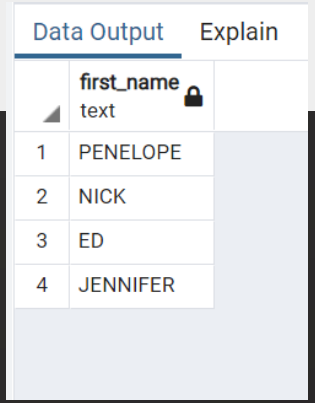
- ✓ Used to `LIMIT` the number of rows in the output
- ✓ Always at the very end of your query
- ✓ Can help to get a quick idea about a table

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
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4	ALAN	DREYFUSS

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

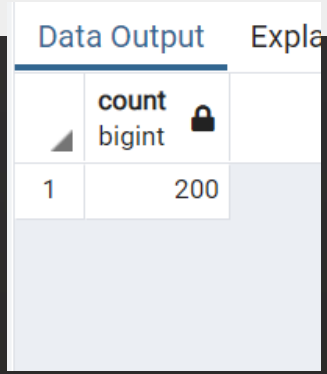
```
SELECT
COUNT(column_name)
FROM table_name
```

Note!

Nulls will not be counted in that case!

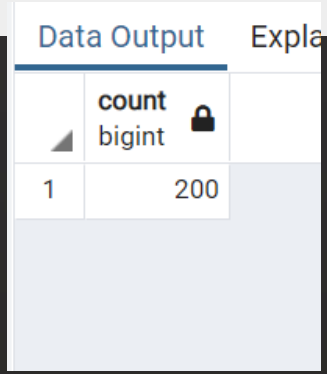
Example

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



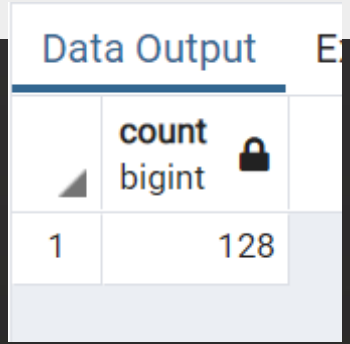
Example

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



Example

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



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

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

	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 | Me

	rental_date timestamp with time zone
1	2020-02-14 16:16:03+01

Result 3

Data Output

	count bigint
1	1000

Result 4

Data Output

	count 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!