Grouping movies

DATA-DRIVEN DECISION MAKING IN SQL

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GROUP BY Applications

- Preferences of customers by country or gender.
- The popularity of movies by genre or year of release.
- The average price of movies by genre.

Table: movies_selected

title	genre	renting_price
Fight Club	Drama	2.49
The Lord of the Rings: The Fellowship of the Ring	Fantasy	2.59
The Lord of the Rings: The Two Towers	Fantasy	2.69
The Lord of the Rings: The Return of the King	Fantasy	2.79
The Prestige	Sci-Fiction	2.85
Ratatouille	Animation	2.89
WALL.E	Animation	2.89
Inception	Sci-Fiction	2.89
The Big Shot	Drama	2.99
The Imitation Game	Drama	2.99
Moonlight	Drama	2.99
LaLaLand	Romance	2.99
Zootopia	Animation	2.99

GROUP BY

```
SELECT genre
FROM movies_selected
GROUP BY genre;
```

```
| genre       |
|-------------|
| Drama       |
| Fantasy     |
| Sci-Fiction |
| Animation   |
| Romance     |
```

Average renting price

```
SELECT genre,
       AVG(renting_price) AS avg_price
FROM movies_selected
GROUP BY genre;
```

```
| genre       | avg_price   |
|-------------|-------------|
| Drama       | 2.865       |
| Fantasy     | 2.69        |
| Sci-Fiction | 2.87        |
| Animation   | 2.923333333 |
| Romance     | 2.99        |
```

movies_selected table

title	genre	renting_price
Fight Club	Drama	2.49
The Lord of the Rings: The Fellowship of the Ring	Fantasy	2.59
The Lord of the Rings: The Two Towers	Fantasy	2.69
The Lord of the Rings: The Return of the King	Fantasy	2.79
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The Big Shot	Drama	2.99
The Imitation Game	Drama	2.99
Moonlight	Drama	2.99
LaLaLand	Romance	2.99
Zootopia	Animation	2.99

movies_selected table split

title	genre	renting_price
The Lord of the Rings: The Fellowship of the Ring	Fantasy	2.59
The Lord of the Rings: The Two Towers	Fantasy	2.69
The Lord of the Rings: The Return of the King	Fantasy	2.79

title	genre	renting_price
Fight Club	Drama	2.49
The Big Shot	Drama	2.99
The Imitation Game	Drama	2.99
Moonlight	Drama	2.99

title	genre	renting_price
LaLaLand	Romance	2.99

title	genre	renting_price
The Prestige	Sci-Fiction	2.85
Inception	Sci-Fiction	2.89

title	genre	renting_price
Ratatouille	Animation	2.89
WALL.E	Animation	2.89
Zootopia	Animation	2.99

Average rental price and number of movies

```
SELECT genre,
       AVG(renting_price) AS avg_price,
       COUNT(*) AS number_movies
FROM movies_selected
GROUP BY genre
```

```
| genre       | avg_price     | number_movies |
|-------------|---------------|---------------|
| Drama       | 2.865         | 4             |
| Fantasy     | 2.69          | 3             |
| Sci-Fiction | 2.87          | 2             |
| Animation   | 2.923333333   | 3             |
| Romance     | 2.99          | 1             |
```

HAVING

```
SELECT genre,
       AVG(renting_price) avg_price,
       COUNT(*) number_movies
FROM movies
GROUP BY genre
HAVING COUNT(*) > 2;
```

```
| genre     | avg_price     | number_movies |
|-----------|---------------|---------------|
| Drama     | 2.865         | 4             |
| Fantasy   | 2.69          | 3             |
| Animation | 2.923333333   | 3             |
```

Let's practice!

DATA-DRIVEN DECISION MAKING IN SQL

Joining movie ratings with customer data

DATA-DRIVEN DECISION MAKING IN SQL

Irene Ortner
Data Scientist at Applied Statistics

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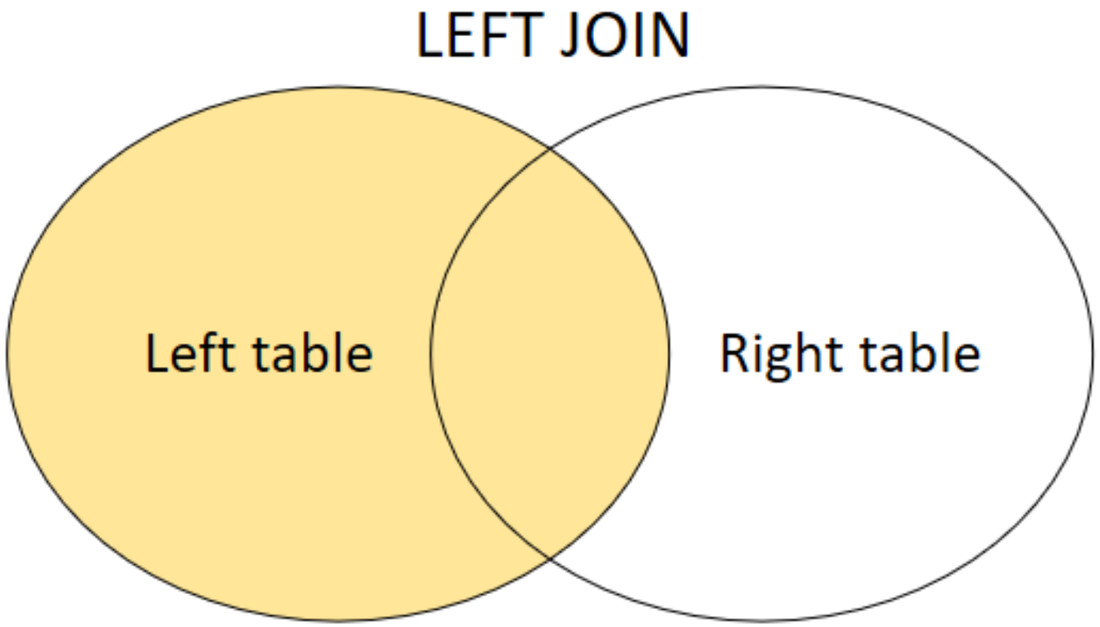
JOIN

- **Prerequisite course about joining data in SQL**

LEFT JOIN

- `LEFT JOIN` is an outer join.
- Keep all rows of the left table, match with rows in the right table.
- Use identifier to define which rows of two tables can be matched.



Giving a table a name

```
SELECT *
FROM customers AS c
WHERE c.customer_id = 1;
```

Tables for LEFT JOIN

Left table: `renting_selected`

renting_id	customer_id	rating
518	1	`null`
203	2	6
478	4	7
292	4	8
477	5	`null`
400	6	`null`

Right table: `customers_selected`

customer_id	name	gender
1	Robert Bohm	male
2	Wolfgang Ackermann	male
3	Daniela Herzog	female
4	Julia Jung	female

LEFT JOIN example

```
SELECT *
FROM renting_selected AS r
LEFT JOIN customers_selected AS c
ON r.customer_id = c.customer_id;
```

renting_id	customer_id	rating	customer_id	name	gender
518	1	`null`	1	Robert Bohm	male
203	2	6	2	Wolfgang Ackermann	male
478	4	`null`	4	Julia Jung	female
292	4	8	4	Julia Jung	female
477	5	7	`null`	`null`	`null`

More than one JOIN

```
SELECT m.title,
       c.name
FROM renting AS r
LEFT JOIN movies AS m
ON r.movie_id = m.movie_id
LEFT JOIN customers AS c
ON r.customer_id = c.customer_id;
```

Let's practice!

DATA-DRIVEN DECISION MAKING IN SQL

Money spent per customer with sub-queries

DATA-DRIVEN DECISION MAKING IN SQL

Tim Verdonck
Professor Statistics and Data Science

Subsequent SELECT statements - actresses

Query 1:

```
SELECT *
FROM actors
WHERE gender = 'female';
```

```
| actor_id | name           | year_of_birth | nationality | gender |
|----------|----------------|---------------|-------------|--------|
| 1        | Abbie Cornish | 1982          | Australia   | female |
| 4        | Amy Adams      | 1974          | USA         | female |
```

Subsequent SELECT statements - actresses

```
SELECT * -- Query 1
FROM actors
WHERE gender = 'female';
```

- Group result table of query 1 by nationality.
- Report year of birth for the oldest and youngest actress in each country.

```
SELECT af.nationality,
       MIN(af.year_of_birth),
       MAX(af.year_of_birth)
FROM
    (SELECT *
    FROM actors
    WHERE gender = 'female') AS af
GROUP BY af.nationality;
```

Result subsequent SELECT statement - actresses

```
SELECT af.nationality,
       MIN(af.year_of_birth),
       MAX(af.year_of_birth)
FROM
    (SELECT *
    FROM actors
    WHERE gender = 'female') AS af
GROUP BY af.nationality;
```

```
| nationality | min  | max  |
|-------------|------|------|
| Italy       | 1976 | 1976 |
| Iran        | 1952 | 1952 |
| USA         | 1945 | 1993 |
```

How much money did each customer spend?

- First step: Add `renting_price` from `movies` to table `renting`.

```
SELECT r.customer_id,
       m.renting_price
FROM renting AS r
LEFT JOIN movies AS m
ON r.movie_id=m.movie_id;
```

```
| customer_id | renting_price |
|-------------|---------------|
| 41          | 2.59          |
| 10          | 2.79          |
| 108         | 2.39          |
| 39          | 1.59          |
| 104         | 1.69          |
```

How much money did each customer spend?

- Second step:
  - group result table from first step by `customer_id`
  - take the sum of `renting_price`

```
SELECT rm.customer_id,
           SUM(rm.renting_price)
FROM
       (SELECT r.customer_id,
               m.renting_price
       FROM renting AS r
       LEFT JOIN movies AS m
       ON r.movie_id=m.movie_id) AS rm
GROUP BY rm.customer_id;
```

How much money did each customer spend?

customer_id	sum
116	7.47
87	17.53
71	6.87
68	1.59
51	4.87

Let's practice!

DATA-DRIVEN DECISION MAKING IN SQL

Identify favorite actors of customer groups

DATA-DRIVEN DECISION MAKING IN SQL

Irene Ortner
Data Scientist at Applied Statistics

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Combining SQL statements in one query

- LEFT JOIN
- WHERE
- GROUP BY
- HAVING
- ORDER BY

From renting records to customer and actor information

Our question: Who is the favorite actor for a certain customer group?

Join table `renting` with tables

- `customers`
- `actsin`
- `actors`

```
SELECT *
FROM renting as r
LEFT JOIN customers AS c
ON r.customer_id = c.customer_id
LEFT JOIN actsin as ai
ON r.movie_id = ai.movie_id
LEFT JOIN actors as a
ON ai.actor_id = a.actor_id;
```

Male customers

- Actors which play most often in movies watched by male customers.

```
SELECT a.name,
       COUNT(*)
FROM renting as r
LEFT JOIN customers AS c
ON r.customer_id = c.customer_id
LEFT JOIN actsin as ai
ON r.movie_id = ai.movie_id
LEFT JOIN actors as a
ON ai.actor_id = a.actor_id

WHERE c.gender = 'male'
GROUP BY a.name;
```

Who is the favorite actor?

- Actor being watched most often.
- Best average rating when being watched.

```
SELECT a.name,
       COUNT(*) AS number_views,
       AVG(r.rating) AS avg_rating
FROM renting as r
LEFT JOIN customers AS c
ON r.customer_id = c.customer_id
LEFT JOIN actsin as ai
ON r.movie_id = ai.movie_id
LEFT JOIN actors as a
ON ai.actor_id = a.actor_id

WHERE c.gender = 'male'
```

Add HAVING and ORDER BY

```
SELECT a.name,
       COUNT(*) AS number_views,
       AVG(r.rating) AS avg_rating
FROM renting as r
LEFT JOIN customers AS c
ON r.customer_id = c.customer_id
LEFT JOIN actsin as ai
ON r.movie_id = ai.movie_id
LEFT JOIN actors as a
ON ai.actor_id = a.actor_id

WHERE c.gender = 'male'
GROUP BY a.name
HAVING AVG(r.rating) IS NOT NULL
ORDER BY avg_rating DESC, number_views DESC;
```

Add HAVING and ORDER BY

name	number_views	avg_rating
Ray Romano	3	10.00
Sean Bean	2	10.00
Leonardo DiCaprio	3	9.33
Christoph Waltz	3	9.33

Let's practice!

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