# 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 |
| The Prestige | Sci-Fiction | 2.85 |
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| 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 |

# 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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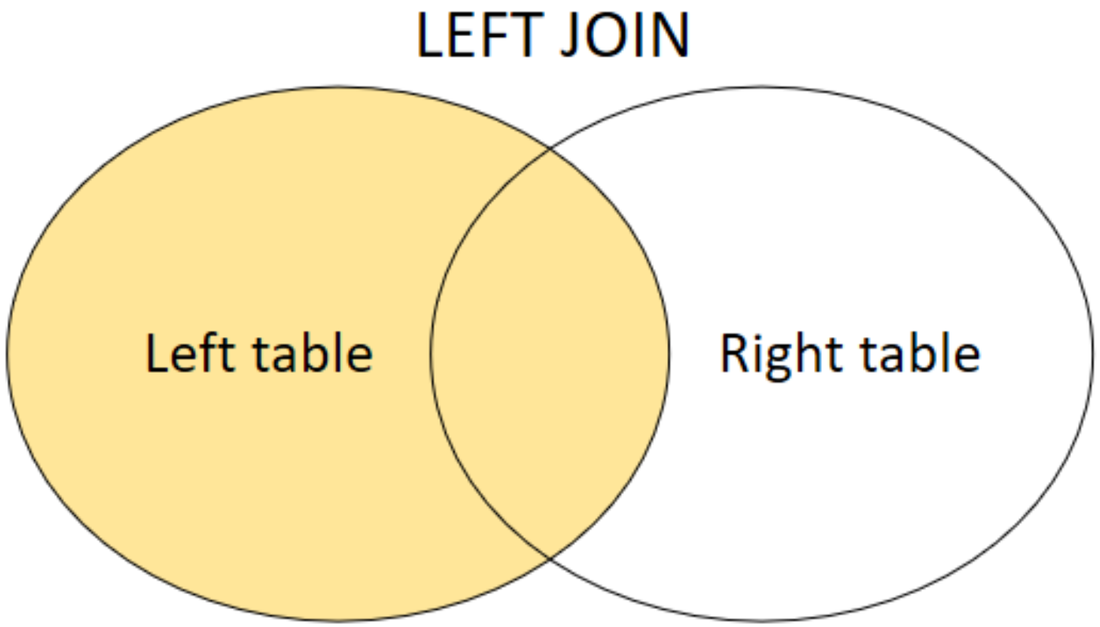
# JOIN

- **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**
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# 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**
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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!

## DATA-DRIVEN DECISION MAKING IN SQL