Nested query

DATA-DRIVEN DECISION MAKING IN SQL

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Nested query

- SELECT block in WHERE or HAVING clauses
- Inner query returns single or multiple values
- Use result from the inner query to select specific rows in another query

The inner query

Step 1: The inner query

```
SELECT DISTINCT customer_id
FROM renting
WHERE rating <= 3
```

```
| customer_id |
|-------------|
| 28          |
| 41          |
| 86          |
| 120         |
```

Result in the WHERE clause

```
SELECT name
FROM customers
WHERE customer_id IN (28, 41, 86, 120);
```

The outer query

Step 2: The outer query

```
SELECT name
FROM customers
WHERE customer_id IN
    (SELECT DISTINCT customer_id
    FROM renting
    WHERE rating <= 3);
```

```
| name             |
|------------------|
| Sidney Généreux  |
| Zara Mitchell    |
```

Nested query in the HAVING clause

Step 1: The inner query

```
SELECT MIN(date_account_start)
FROM customers
WHERE country = 'Austria';
```

```
| min         |
|-------------|
| 2017-11-22 |
```

Nested query in the HAVING clause

Step 2: The outer query

```
SELECT country, MIN(date_account_start)
FROM customers
GROUP BY country
HAVING MIN(date_account_start) <
    (SELECT MIN(date_account_start)
    FROM customers
    WHERE country = 'Austria');
```

```
| country       | min        |
|---------------|------------|
| Spain         | 2017-02-14 |
| Great Britain | 2017-03-31 |
```

Who are the actors in the movie Ray?

```
SELECT name
FROM actors
WHERE actor_id IN
    (SELECT actor_id
     FROM actsin
     WHERE movie_id =
        (SELECT movie_id
         FROM movies
         WHERE title='Ray'));
```

```
| name             |
|------------------|
| Jamie Foxx       |
| Kerry Washington |
| Regina King      |
```

Let's practice!

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Correlated nested queries

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Correlated queries

- Condition in the WHERE clause of the inner query.
- References some column of a table in the outer query.

Example correlated query

- Number of movie rentals more than 5

```
SELECT *
FROM movies as m
WHERE 5 <
  (SELECT COUNT(*)
  FROM renting as r
  WHERE r.movie_id=m.movie_id);
```

Evaluate inner query

```
SELECT COUNT(*)
FROM renting as r
WHERE r.movie_id = 1;
```

```
| count |
|-------|
| 8     |
```

Evaluate outer query

Number of movie rentals larger than 5

```
SELECT *
FROM movies as m
WHERE 5 <
    (SELECT COUNT(*)
    FROM renting as r
    WHERE r.movie_id = m.movie_id);
```

```
| movie_id | title                  | genre   | runtime | year_of_release | renting_price |
|----------|------------------------|---------|---------|-----------------|---------------|
| 1        | One Night at McCool's | Comedy | 93      | 2001            | 2.09          |
| 2        | Swordfish              | Drama  | 99      | 2001            | 2.19          |
```

Less than 5 movie rentals

Select movies with less than 5 movie rentals.

```
SELECT *
FROM movies as m
WHERE 5 >
    (SELECT COUNT(*)
    FROM renting as r
    WHERE r.movie_id = m.movie_id);
```

```
| movie_id | title           | genre               | runtime | year_of_release | renting_price |
|----------|-----------------|---------------------|---------|-----------------|---------------|
| 17       | The Human Stain | Mystery & Suspense | 106     | 2003            | 1.99          |
| 20       | Love Actually   | Comedy              | 135     | 2003            | 2.29          |
```

Let's practice!

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Queries with EXISTS

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EXISTS

- Special case of a correlated nested query.
- Used to check if result of a correlated nested query is empty.
- It returns: TRUE or FALSE
- TRUE = not empty -> row of the outer query is selected.
- FALSE = empty
- Columns specified in SELECT component not considered - use `SELECT *`

Movies with at least one rating

```
SELECT *
FROM movies AS m
WHERE EXISTS
    (SELECT *
     FROM renting AS r
     WHERE rating IS NOT NULL
     AND r.movie_id = m.movie_id);
```

Movies with at least one rating

```
SELECT *
FROM renting AS r
WHERE rating IS NOT NULL
AND r.movie_id = 11;
```

```
| renting_id | customer_id | movie_id | rating | renting_price |
|------- ----|-------------|----------|--------|---------------|
```

Movies with at least one rating

```
SELECT *
FROM renting AS r
WHERE rating IS NOT NULL
AND r.movie_id = 1;
```

```
| renting_id | customer_id | movie_id | rating | renting_price |
|------------|-------------|----------|--------|---------------|
| 71         | 111         | 1        | 5      | 2018-07-21    |
| 170        | 36          | 1        | 10     | 2018-10-18    |
```

EXISTS query with result

```
SELECT *
FROM movies AS m
WHERE EXISTS
    (SELECT *
     FROM renting AS r
     WHERE rating IS NOT NULL
     AND r.movie_id = m.movie_id);
```

movie_id	title	genre	runtime	year_of_release	renting_price
1	One Night at McCool's	Comedy	93	2001	2.09
2	Swordfish	Drama	99	2001	2.19

NOT EXISTS

- TRUE = table is empty -> row of the outer query is selected.

```
SELECT *
FROM movies AS m
WHERE NOT EXISTS
    (SELECT *
     FROM renting AS r
     WHERE rating IS NOT NULL
     AND r.movie_id = m.movie_id);
```

```
| movie_id | title     | genre   | runtime | year_of_release | renting_price |
|----------|-----------|---------|---------|-----------------|---------------|
| 11       | Showtime | Comedy | 95      | 2002            | 1.79          |
```

Let's practice!

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Queries with UNION and INTERSECT

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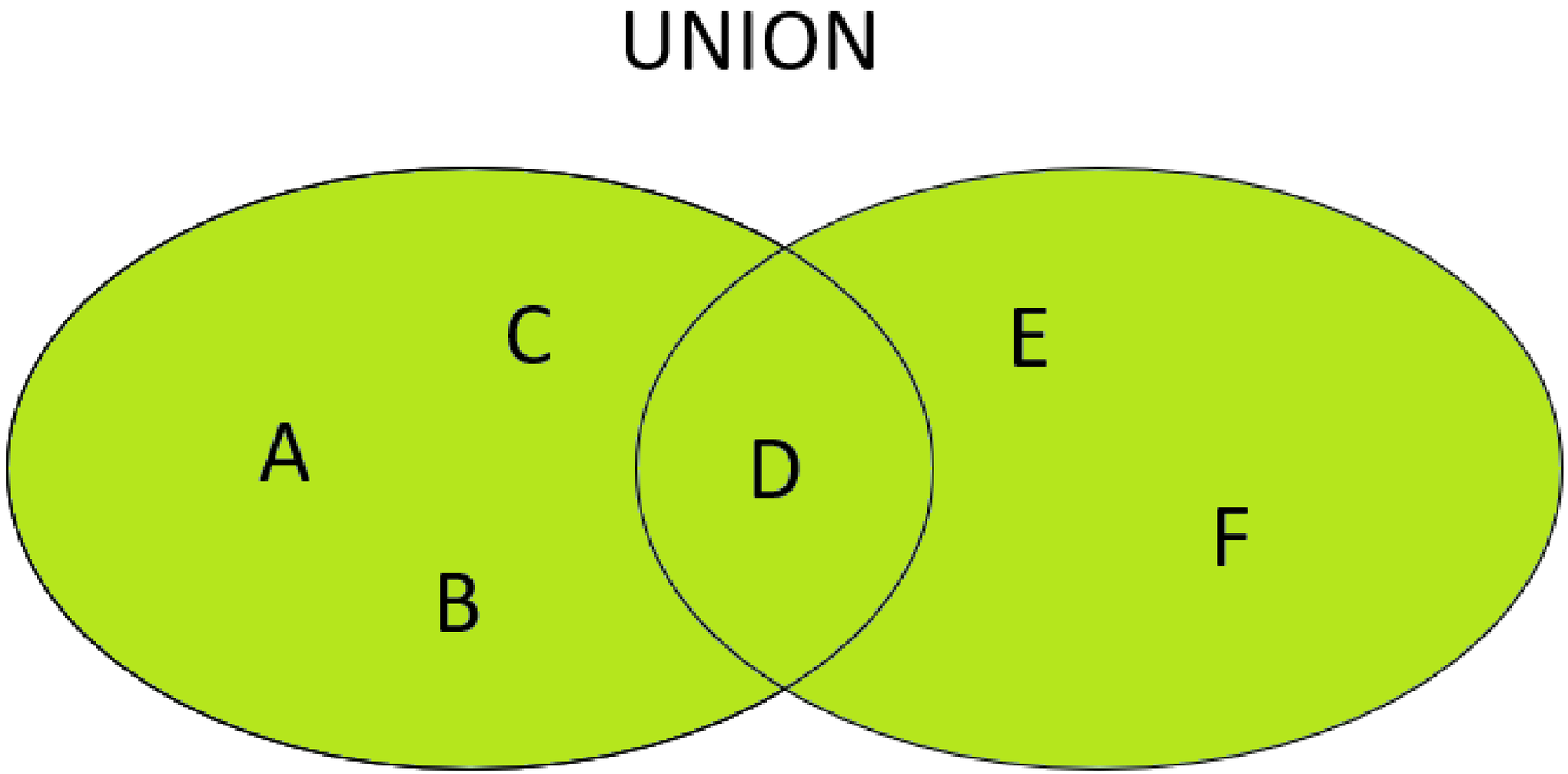
UNION



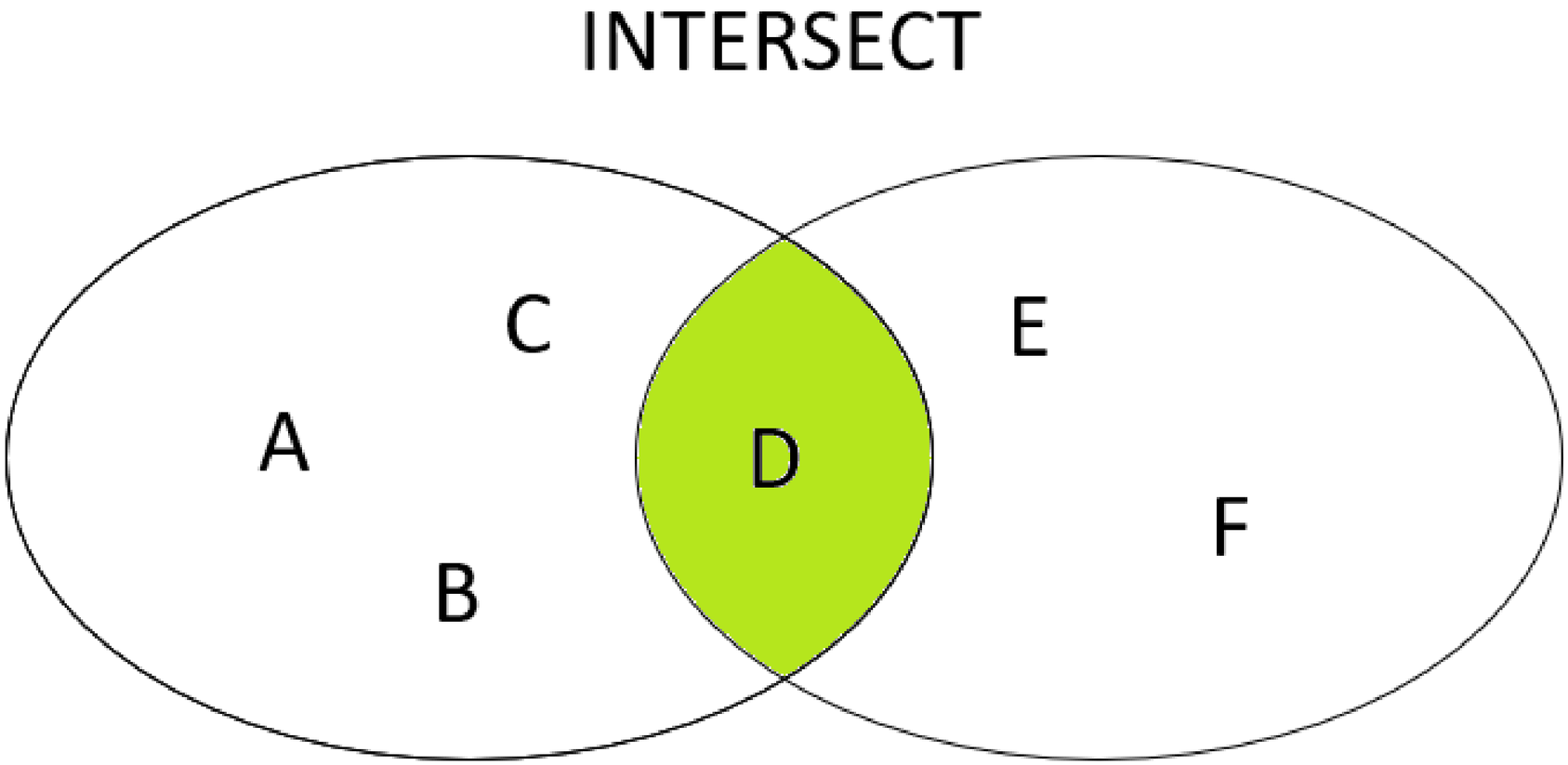
Example - UNION

```
SELECT title,
       genre,
       renting_price
FROM movies
WHERE renting_price > 2.8
UNION
SELECT title,
       genre,
       renting_price
FROM movies
WHERE genre = 'Action & Adventure';
```

```
SELECT title,
       genre,
       renting_price
FROM movies
WHERE renting_price > 2.8
UNION
SELECT title,
       genre,
       renting_price
FROM movies
WHERE genre = 'Action & Adventure';
```

```
| title       | genre                | renting_price |
|-------------|----------------------|---------------|
|Fool's Gold | Action & Adventure | 2.69          |
|Astro Boy   | Action & Adventure | 2.89          |
|Fair Game   | Drama              | 2.89          |
```

INTERSECT



Example - INTERSECT

```
SELECT title,
       genre,
       renting_price
FROM movies
WHERE renting_price > 2.8
INTERSECT
SELECT title,
       genre,
       renting_price
FROM movies
WHERE genre = 'Action & Adventure';
```

```
| title     | genre                | renting_price |
|-----------|----------------------|---------------|
| Astro Boy | Action & Adventure | 2.89          |
```

Let's practice!

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