# Mastering SQL: Aggregation Functions & GROUP BY

Welcome to Chapter2ofour SQLjourney!Today, we'll dive into the powerful world ofaggregation functionsand the crucial GROUP BY clause. These tools are fundamental for summarizing and analyzing data in your dat ab ases.

# Introduction to Aggregation Functions

Aggregation functionsperformcalculations onaset ofrows and return asingle summary value. They are essential for gaining insights from large datasets, allowing us to answer questions like "how many?" or "what's the average?"

## ☐ Our Sample Data: The Article Table

Throughout this presentation, we will be using the following Article table for our SQL examples:

| 1 | Introduction SQL | 1 | 2024-01-10 | 120 |
|---|---|---|---|---|
| 2 | Fonctions SQL | 1 | 2024-01-15 | 90 |
| 3 | JOIN en SQL | 2 | 2024-02-01 | 150 |
| 4 | GROUP BY expliqué | 1 | 2024-02-10 | 200 |
| 5 | Base de données | 3 | 2024-02-20 | 70 |
| 6 | HAVING en SQL | 3 | 2024-02-25 | 110 |

# COUNT(): Counting Rows

## Explanation

The COUNT() function is used to count the number of rows that match a specified criterion. When used with an asterisk (*), it counts all rows in the table or group, including duplicates and NULL values.

## SQL Application

```
SELECT COUNT(*) AS total_articles
FROM Article;
```

## SQL Screen Result

6

# MAX(): Finding the Maximum Value

## Explanation

The MAX() function retrieves the highest value within a specified column. This is particularly useful for identifying the latest date, largest number, or alphabetically last string in a dataset.

## SQL Application

```
SELECT MAX(date_pub) AS
derniere_publication FROM
Article;
```

## SQL Screen Result

2024-02-25

# AVG(): Calculating the Average

### Explanation

The AVG() function computes the average (mean) of the numeric values in a column. It ignores NULL values by default, providing an accurate average of the available data.

### SQL Application

```
SELECT AVG(nb_vues) AS
moyenne_vues FROM Article;
```

### SQL Screen Result

123.33

# MIN(): Identifying the Minimum Value

## Explanation
The MIN() function returns the smallest value in a selected column. Similar to MAX(), it can be used with numeric, string, or date data types to find the earliest, smallest, or alphabetically first value.

## SQL Application

```
SELECT MIN(nb_vues) AS
moins_vues FROM Article;
```

## SQL Screen Result

70

# HAVING: Filtering Groups

**Explanation**

The HAVING clause is used to filter results based on aggregate functions. Unlike WHERE, which filters individual rows, HAVING applies conditions to groups created by GROUP BY.

**SQL Application**

SELECT id_utilisateur, COUNT(*) AS nb_articles FROM Article GROUP BY id_utilisateur HAVING COUNT(*) >= 2;

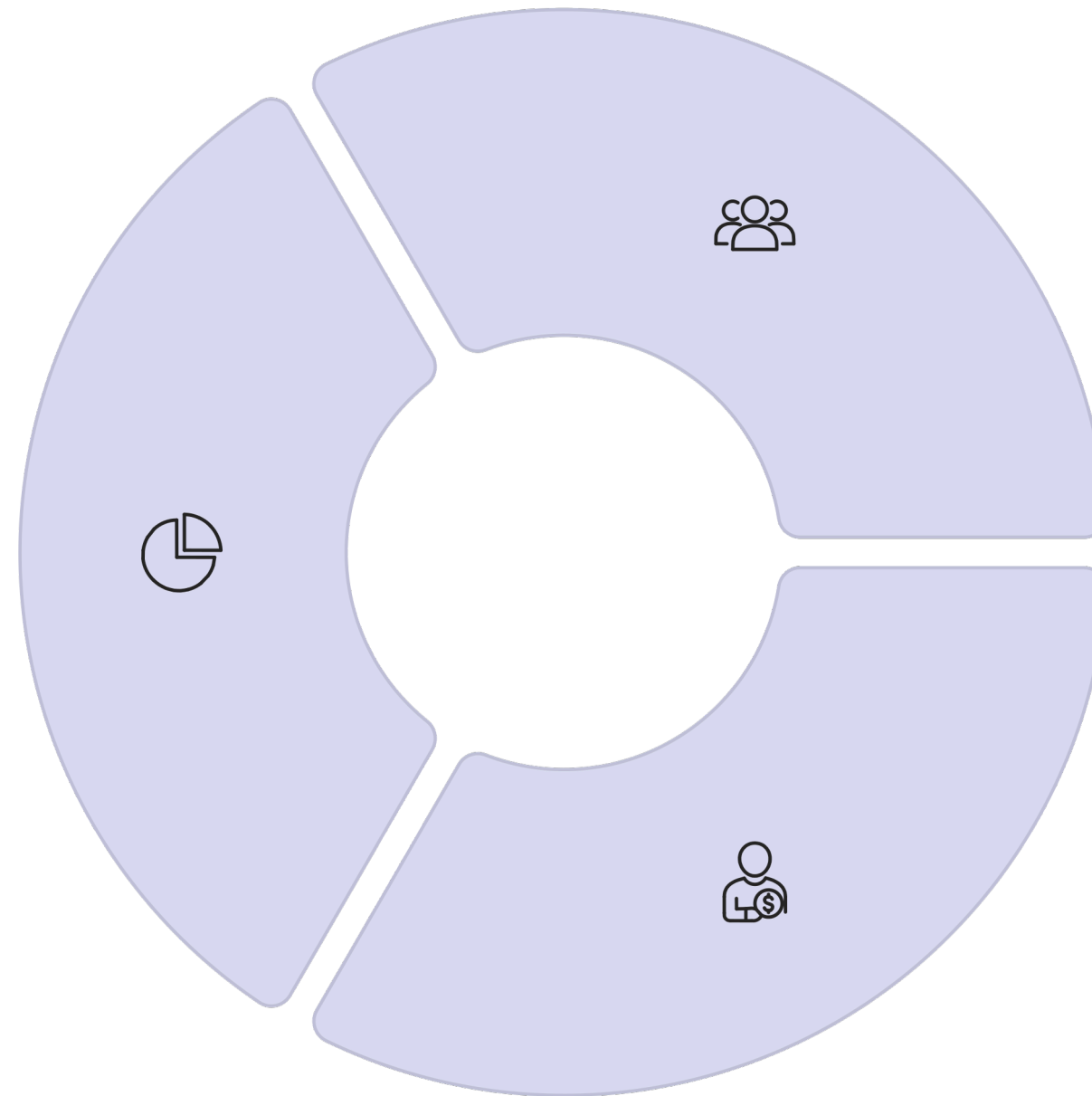**SQL Screen Result**

| | |
|---|---|
| 1 | 3 |
| 3 | 2 |

# Chapter 2 Summary: Key Takeaways

## Aggregation Functions

- COUNT(): Total items
- SUM(): Total value
- AVG(): Average value
- MIN(): Smallest value
- MAX(): Largest value

### GROUP BY

Organizes rows into groups based on specified column(s) for aggregate c alculations.

### HAVING

Filters groups based on conditions applied to aggregate function results.

By mastering these concepts, you can perform powerful data analysis and extraction, transforming raw data into meaningful insights. Keep practicing!