

SQL Challenge Edition – Tutorial Cheat Sheet

1. SELECT — Retrieving Data

What it does:Tells SQL what columns you want to see and from which table.

Why it matters:Every SQL query begins with SELECT. You're literally selecting what you want to view from a table.

Example:

```
SELECT Name, Genre, Price  
FROM Games;
```

2. WHERE — Filtering Rows

What it does:Limits which rows are returned based on a condition.

Why it matters:Lets you focus on specific data instead of everything in the table.

Example:

```
SELECT *  
FROM Games  
WHERE Price < 30;  
  
SELECT Name, Genre  
FROM Games  
WHERE Rating >= 9;
```

3. ORDER BY — Sorting Data

What it does:Sorts your results alphabetically or numerically.

Choose the appropriate sorting method for data organization.



Alphabetical Sorting

Enhances readability and quick lookup



Numerical Sorting

Facilitates pattern recognition and analysis

Why it matters: It helps you see patterns — like top prices, best ratings, or newest dates.

Example:

```
SELECT Name, Price  
FROM Games  
ORDER BY Price DESC;  
-- or alphabetically ORDER BY Name ASC;
```

4. DISTINCT — Removing Duplicates

What it does: Shows unique values only [no repeats].

Why it matters: Useful for finding categories, cities, or statuses.

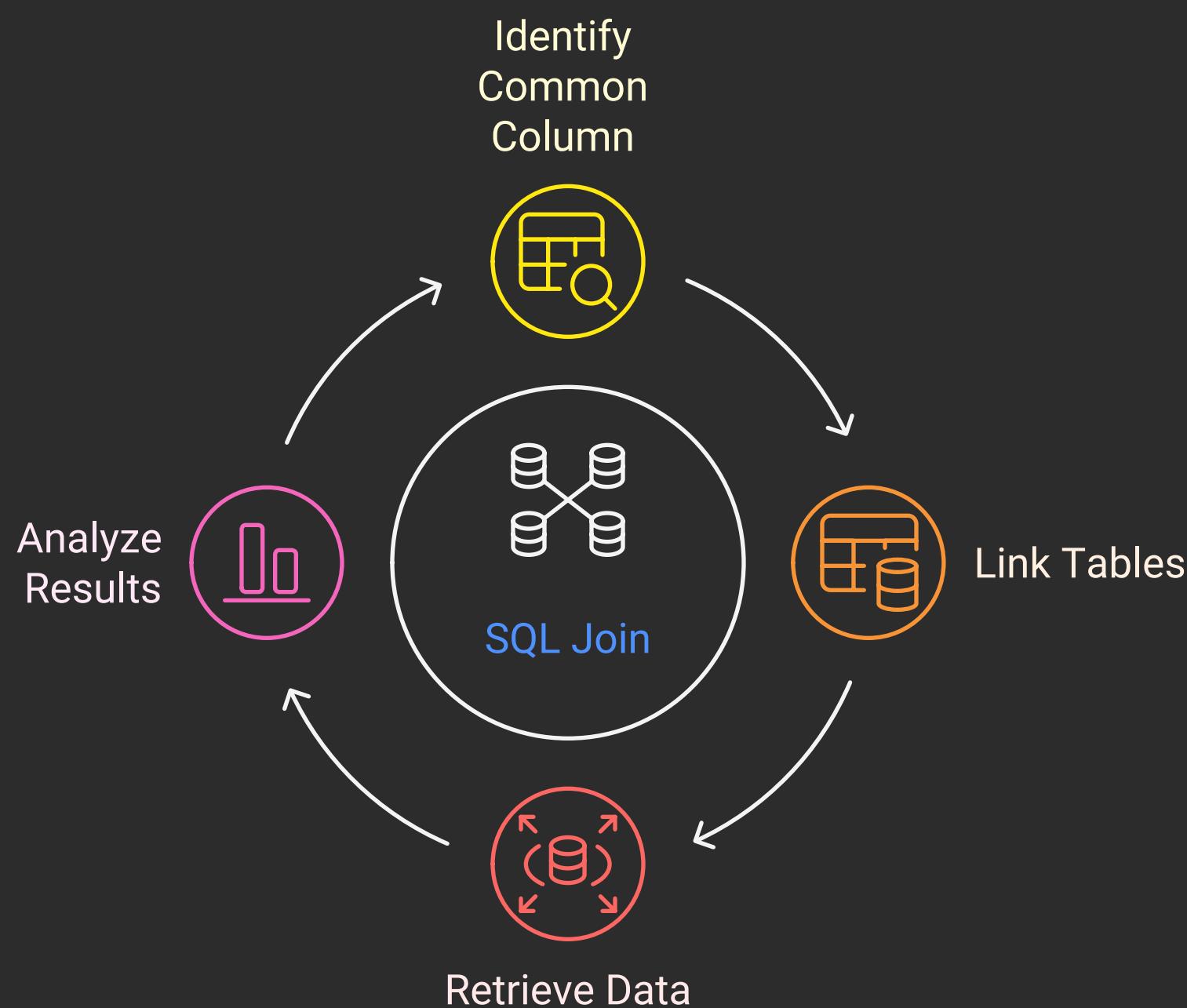
Example:

```
SELECT DISTINCT Genre  
FROM Games;
```

5. JOIN — Combining Tables

What it does: Connects rows from different tables based on a shared column [usually a Primary Key  Foreign Key].

SQL Join Cycle



Why it matters: Real data is split across tables — joins let you combine it.

Example:

```
SELECT g.Name, s.SaleDate, s.Quantity
FROM Games g
JOIN Sales s ON g.GameID = s.GameID;
```

INNER JOIN — Only Matching Rows

Shows rows where there's a match in **both tables**.

Example:

```
SELECT g.Name, s.SaleDate, s.Quantity
FROM Games g
INNER JOIN Sales s
ON g.GameID = s.GameID;
```

Explanation:

- Only returns games that have sales.
- If a game hasn't been sold, it won't appear.

Result Example:

Name	Sale Date	Quantity
Elden Ring	2025-09-01	2
Hades	2025-09-07	2

LEFT JOIN — All from Left, Matches from Right

Returns **all rows from the left table (Games)** and the matching ones from **Sales**. If no match, it fills in NULL.

Example:

```
SELECT g.Name, s.SaleDate, s.Quantity
FROM Games g
LEFT JOIN Sales s
ON g.GameID = s.GameID;
```

Explanation:

- Every game appears, even if it has no sales.
- Missing sales data will show as NULL.

Result Example:

Name	Sale Date	Quantity
Elden Ring	2025-09-01	2
Celeste	NULL	NULL

RIGHT JOIN — All from Right, Matches from Left

Returns **all rows from the right table (Sales)** and the matching rows from **Games**. If a sale refers to a missing game, it'll still appear with NULLs for game info.

Example:

```
SELECT s.SaleID, g.Name, s.SaleDate, s.Quantity
FROM Games g
RIGHT JOIN Sales s
ON g.GameID = s.GameID;
```

Explanation:

- All sales show up, even if their corresponding game record doesn't exist.
- Used less often, but useful for data validation.

Result Example:

SaleID	Name	SaleDate	Quantity
1	Elden Ring	2025-09-01	2

FULL OUTER JOIN — Everything Combined

Returns **all rows from both tables**, matched or not. Rows without matches will show NULLs on the side they don't exist.

Example:

```
SELECT g.Name, s.SaleDate, s.Quantity
FROM Games g
FULL OUTER JOIN Sales s
ON g.GameID = s.GameID;
```

Explanation:

- Includes every game and every sale.
- If a game has no sale → NULL in sales columns.
- If a sale's game is missing → NULL in game columns.

Result Example:

Name	SaleDate	Quantity
Elden Ring	2025-09-01	2
Celeste	2025-09-01	NULL
NULL	2025-09-01	2

Which SQL join type should be used?

RIGHT JOIN

Returns all rows from the right table and matching rows from the left, suitable for showing all sales even if a game is missing.

LEFT JOIN

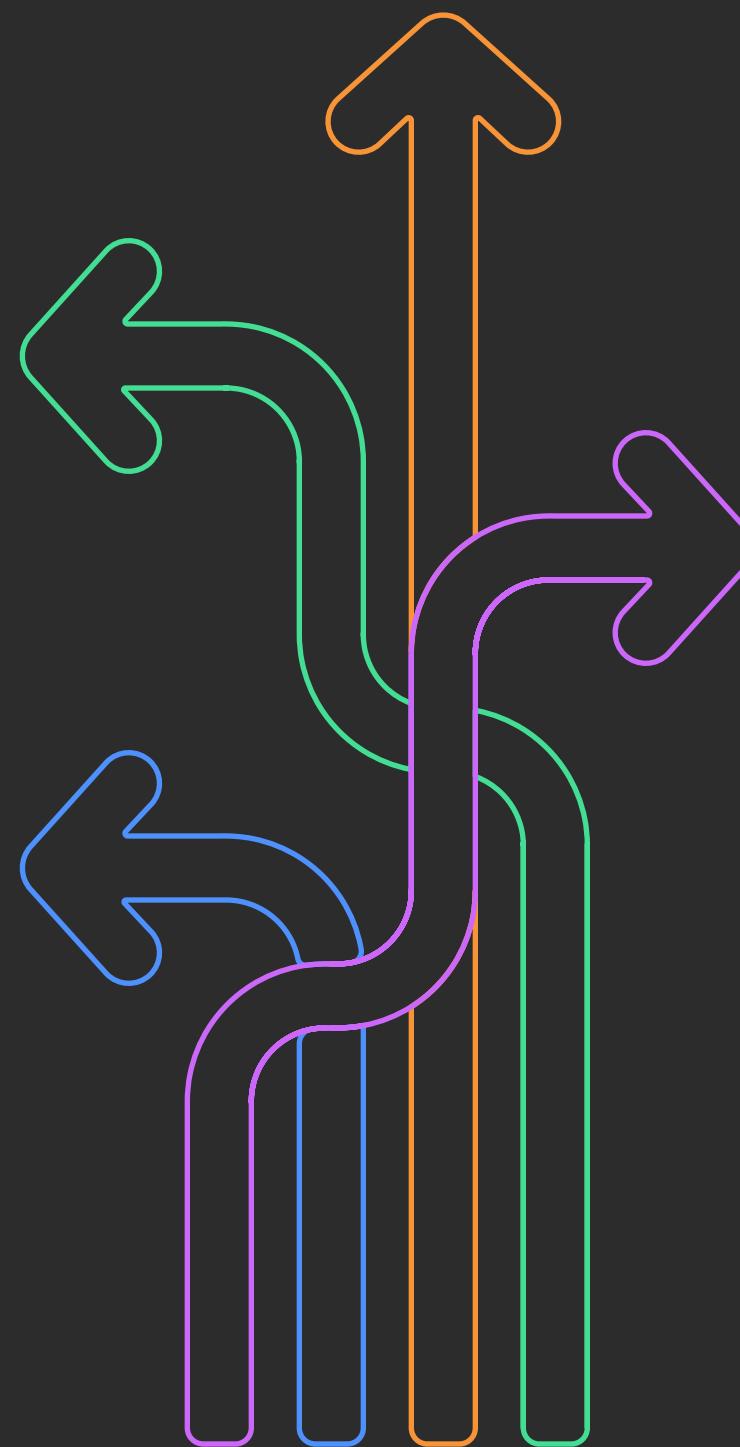
Returns all rows from the left table and matching rows from the right, useful for showing all games even unsold ones.

INNER JOIN

Returns only matching rows from both tables, ideal for showing games with sales.

FULL OUTER JOIN

Returns all rows from both tables, whether matching or not, providing a comprehensive view.

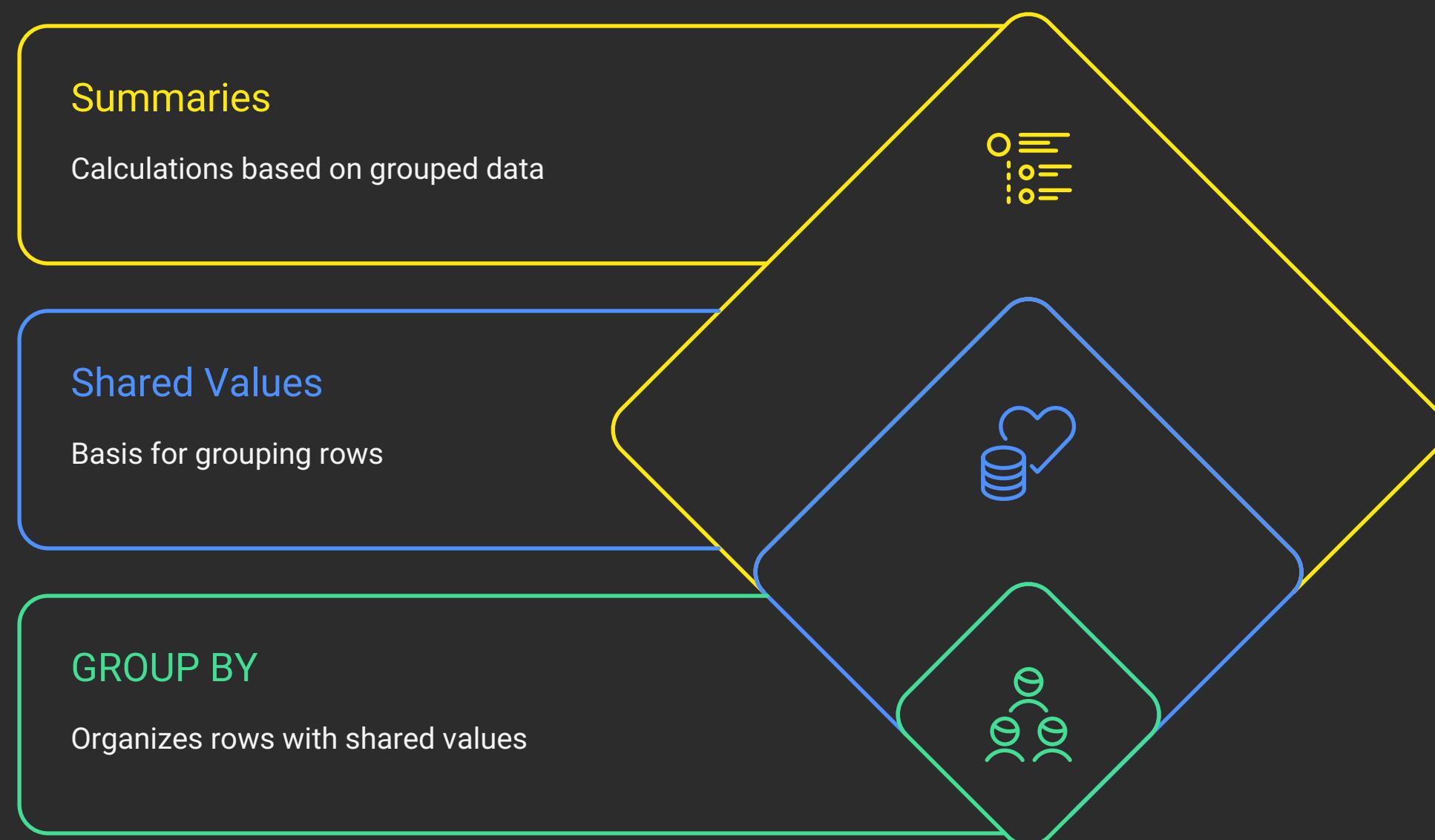


Made with  Napkin

6. GROUP BY — Summarizing Data

What it does: Groups rows that share a common value so you can calculate summaries.

SQL GROUP BY Function



Made with Napkin

Why it matters: It turns raw data into insights [e.g. total sales per game or per genre].

Example:

```
SELECT g.Name, SUM(s.Quantity) AS TotalSold  
FROM Games g  
JOIN Sales s ON g.GameID = s.GameID  
GROUP BY g.Name;
```

7. HAVING — Filtering Grouped Results

What it does: Filters the summarized results after GROUP BY.

Why it matters:

WHERE can't filter aggregated results — HAVING can.

Example:

```
SELECT g.Name, SUM(s.Quantity) AS TotalSold  
FROM Games g  
JOIN Sales s ON g.GameID = s.GameID  
GROUP BY g.Name  
HAVING SUM(s.Quantity) > 2;
```

8. TOP / LIMIT — Restricting Results

WHAT IT DOES: SHOWS ONLY A CERTAIN NUMBER OF RESULTS.

Why it matters: Perfect for “Top 3 best-selling” or “5 most recent” queries.

Example (SQL Server):

```
SELECT TOP 3 Name, Price  
FROM Games  
ORDER BY Price DESC;
```

9. Real-World Examples (Mini Challenges)

1. Total revenue per game → SUM[Quantity * Price] + JOIN
2. Games sold more than 2 copies → GROUP BY + HAVING
3. Top 2 best-selling genres → GROUP BY + LIMIT
4. Games never sold → LEFT JOIN + IS NULL

10. SQL Flow Recap

SQL reads like a sentence — start with what you want, then where it comes from, and finally how to shape it.

SQL Query Refinement Process

