SQL Crash Course — Lesson 4 — Order of Execution vs Order of Writing

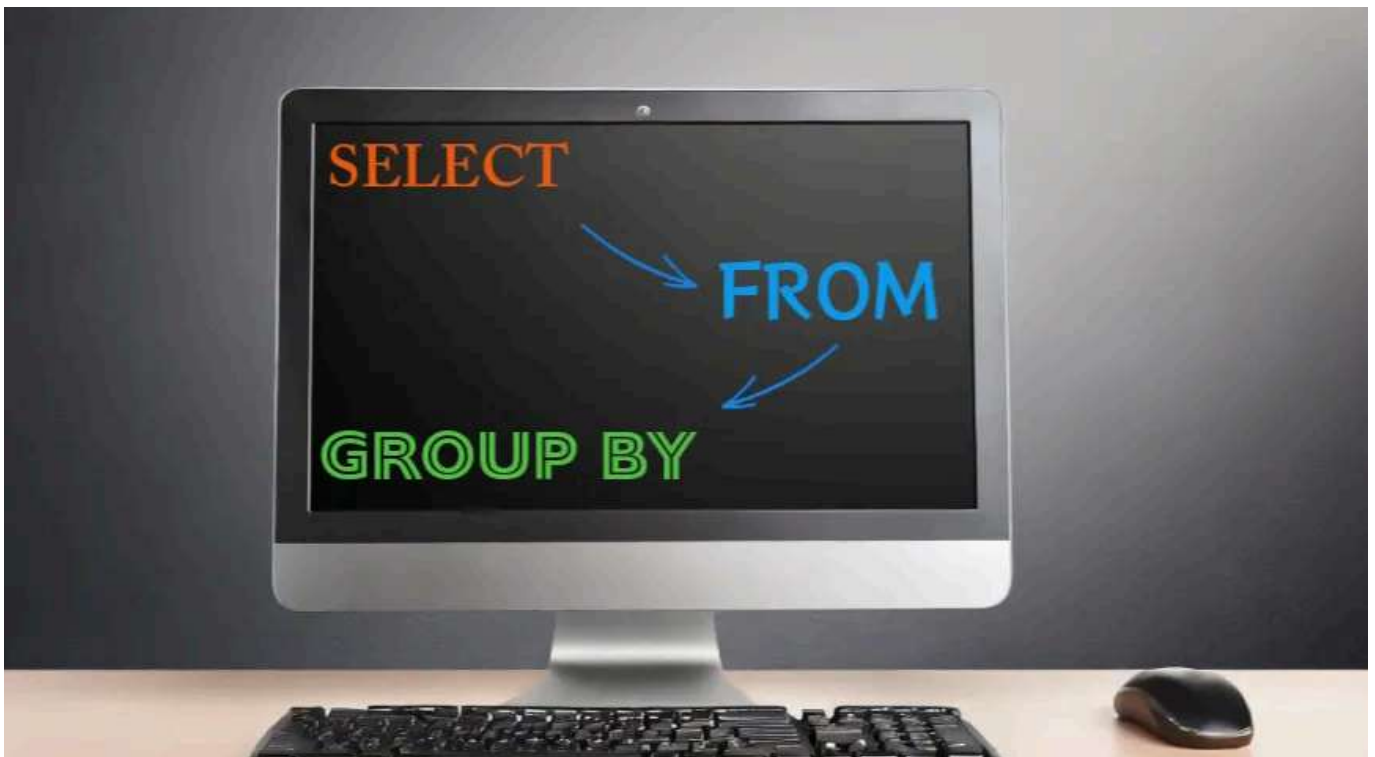Diogo de Bem   (Follow)   3 min read · Jan 8, 2024

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Have you already read the previous two lessons? In case you haven't, you can find them <u>here</u>. I highly encourage you to read them before starting this

lesson.

This will be the most technical, theoretical (and boring) of all the lessons. However, understanding the proper order in which SQL code is written and executed is important. Understanding this concept will help you a lot when developing (and debugging!) your code.

Order of Writing IS DIFFERENT than Order of Execution

1. ORDER OF WRITING

Whenever you are writing an SQL query you must follow the sequence below. This is usually not a concern, since if you try to write something out of this order the system will automatically through an error.

SELECT > DISTINCT > FROM > WHERE > GROUP BY > HAVING > ORDER BY > LIMIT

One example would be

```
SELECT DISTINCT user_job_role, MAX(salary) as Max_Salary from suits_users
WHERE user_job_role IS NOT NULL GROUP BY user_job_role
HAVING MAX(salary)>100000 ORDER BY MAX(salary) DESC LIMIT 2
```

You can run this query **here**, if you want to test it yourself..

2. ORDER OF EXECUTION

→SQL Fiddle for this part of the lesson←

The order of execution, however, is different than the one above.

SQL, in general, executes the query in this following order:

FROM/JOIN > WHERE > GROUP BY > HAVING > SELECT > ORDER BY > LIMIT

As you can notice, the major difference is where the SELECT actually occurs. The data will only be selected after almost everything is executed except the ORDER BY or the LIMIT, which happens **after** the SELECT.

Let's go back to our legal firm (Pearson Specter Litt).

They have a table with all their expenses for office supplies for a given month:

order_id	buyer	product_name	quantity	price
1	Harvey Specter	Pencil	2	10
2	Louis Litt	Pencil	1	10
3	Rachel Zane	Paper	3	20
4	Donna Paulsen	Paperclip	3	30
5	Louis Litt	Pencil	3	10
6	Jessica Pearson	Pencil	3	10
7	Louis Litt	Pen	2	40
8	Dana Scott	Erasor	1	20

office_supplies_expenses

Jessica Pearson wants to analyze this data and she asks you for the list of people who spent more than 25 dollars on a single purchase of pencils.

You right away write this query for that:

```sql
SELECT buyer,
quantity*price AS total_spent
FROM office_supplies_expenses
WHERE product_name = 'Pencil' and total_spent>25
ORDER BY total_spent DESC;
```

However, it doesn't work and you can't understand why, since you have the column name as an alias (total_spent) and there are no misspellings — you triple-checked:

> *Unknown column 'total_spent' in 'where clause'*

That happens because the SELECT statement is only executed **AFTER** the WHERE statement. So, by the time the WHERE runs, the engine doesn't know the alias yet.

It could be solved by replacing the Alias by the calculation itself in the WHERE condition:

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```sql
WHERE product_name = 'Pencil' and quantity*price>25
ORDER BY total_spent DESC;
```

Go ahead and try it out yourself **here**…

That' all for today.. see you in the next lesson…

Written by Diogo de Bem

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What are your thoughts?

Vitor Galarca

Jan 8, 2024

I'm not an expert in databases (yet), but I found this course to be super helpful. thanks for sharing!

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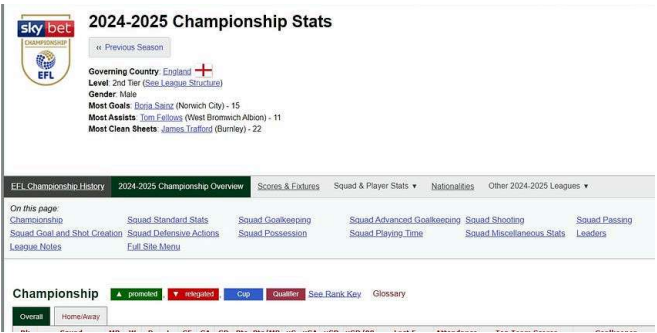## SQL Crash Course—Lesson 8— UNION

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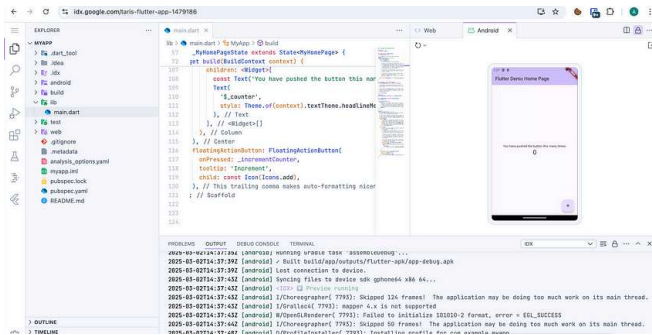## Nested vs. Normalized vs. Denormalized in BigQuery

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