SQL Basics for Business Users

SQL, short for Structured Query Language, is the standard language for asking questions of a database. A relational database stores data in tables, which have columns for the fields and rows for the records, and most relational databases use SQL with some differences between products. The language is described in the international standard ISO/IEC 9075, and a basic query reads almost like an English sentence. We follow Salma, an operations analyst at an online store, who wants answers without waiting for the IT team.

1. Choose Columns with SELECT

The most basic query has two parts. SELECT names the columns that we want to see, and FROM names the table that holds them. A star after SELECT means all columns, which is handy for a quick look but heavy on a large table. A plain SELECT query only reads data, and it does not change anything.

Example: A librarian is asked for the title and author of every book. That is a SELECT of two columns, title and author, FROM the books table.

At work: Salma writes SELECT name and city FROM customers. The result is a list with one row for each customer and only the two columns that she asked for.

2. Filter and Sort

WHERE keeps only the rows that meet a condition, such as an amount above 500 or a city equal to Cairo. ORDER BY then sorts the rows, and we add DESC when we want the largest or newest first. Filtering early keeps the result small and quick to read.

Example: An online shop lets a shopper show only the items under 50 dollars and sort them from the cheapest. The two steps are the same as WHERE and then ORDER BY.

At work: Salma adds WHERE amount above 500 to her orders query, and then ORDER BY order date with DESC for the newest first. Now she sees only the large orders, with the latest ones at the top.

3. Summarise with GROUP BY

GROUP BY collects rows with the same value into groups, and a summary function calculates one number for each group. Common functions are COUNT for the number of rows, SUM for

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a total, AVG for an average, and MIN and MAX for the smallest and largest values. Normally, every column in SELECT must either be in the GROUP BY or be inside a summary function. This is how a long list of orders turns into a short report.

Example: A restaurant manager adds up the sales of each waiter for the week: the waiters are the groups and the total is the summary. A long list of bills becomes one line per waiter.

At work: Salma writes SELECT city and the total amount FROM orders, then GROUP BY city. She gets one row for each city with its total sales. Adding COUNT shows how many orders each city placed.

4. Combine Tables with JOIN

Business data is usually spread across several tables, so JOIN connects them through a matching column, often called a key, such as a customer ID. A plain JOIN keeps only the rows that match in both tables, and a LEFT JOIN keeps all the rows of the first table, even when there is no match. After a JOIN, we should check the number of rows, because a wrong key can repeat or lose rows. Good habits also help: we start with a small preview, read the result critically and ask for permission before touching live data.

Example: A school has one list of students with class codes and another list of class codes with teachers. Matching the codes shows which teacher each student has.

At work: Salma's orders table holds only a customer ID, not a name. She joins it to the customers table on that ID and sees the name next to each amount. She compares the row count with the orders table to make sure that nothing was repeated or lost.

Conclusion

In summary, SQL lets us ask a database questions in clear steps. Four steps put it to work: choose columns with SELECT, filter and sort with WHERE and ORDER BY, summarise with GROUP BY and combine tables with JOIN. With these building blocks, business users can find many answers on their own, and with care.

Sources

• ISO/IEC 9075 - Information technology - Database languages - SQL (the international SQL standard; Part 1: Framework) – https://www.iso.org/standard/63555.html
• PostgreSQL Documentation: Tutorial - The SQL Language (SELECT, WHERE, GROUP BY, JOIN with examples) – https://www.postgresql.org/docs/current/tutorial-sql.html
• SQL - overview of the language and its history (Wikipedia) – https://en.wikipedia.org/wiki/SQL

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