

Aggregates & grouping

SQL Reference

Aggregate functions

An aggregate function 聚合函数 turns many rows into one summary 汇总 value. Wrap an average in `ROUND(x, 2)` to tidy it.

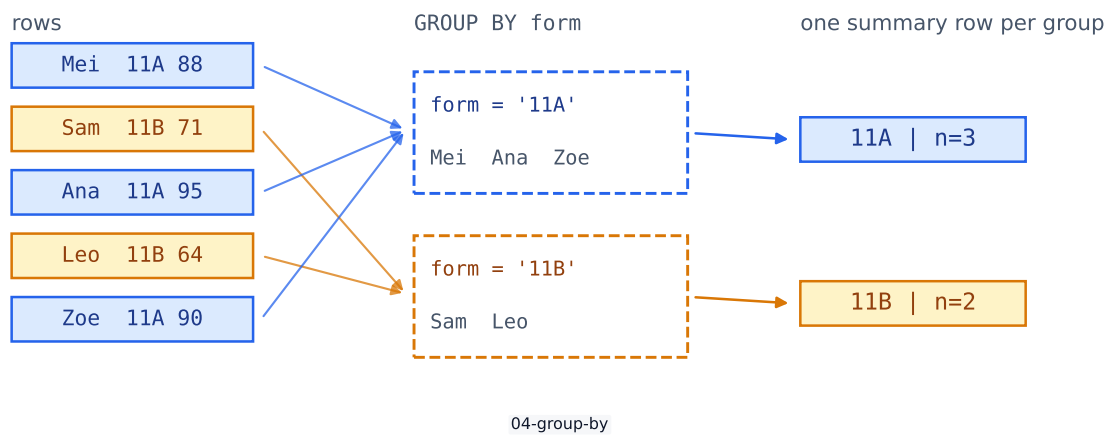
Function	Gives
<code>COUNT(*)</code>	how many rows
<code>SUM(col)</code>	the total
<code>AVG(col)</code>	the mean average
<code>MIN(col) / MAX(col)</code>	the smallest / largest value

```
CREATE TABLE student (id INTEGER, name TEXT, form TEXT, score INTEGER);
INSERT INTO student VALUES
  ↪ (1, 'Mei', '11A', 88), (2, 'Sam', '11B', 71), (3, 'Ana', '11A', 95);
SELECT COUNT(*), ROUND(AVG(score), 2), MAX(score) FROM student;
```

GROUP BY and HAVING

GROUP BY makes one summary row per group 组. HAVING filters those groups — it is like WHERE, but it runs after grouping.

```
CREATE TABLE student (id INTEGER, name TEXT, form TEXT, score INTEGER);
INSERT INTO student VALUES
  ↪ (1, 'Mei', '11A', 88), (2, 'Sam', '11B', 71), (3, 'Ana', '11A', 95);
SELECT form, COUNT(*) AS n, ROUND(AVG(score), 2) AS avg_score
FROM student
GROUP BY form
HAVING COUNT(*) > 1;
```



GROUP BY collects rows into one bucket per value; each bucket becomes one summary row

Whatever order you write them in, SQL always runs the clauses of a query in the same fixed order:

Step	Clause
1	FROM (and any JOIN)
2	WHERE — filter rows
3	GROUP BY — form groups
4	HAVING — filter groups
5	SELECT — compute the output columns
6	ORDER BY, then LIMIT

Common mistakes

- You cannot select a plain column beside an aggregate unless it is in GROUP BY.
- Filter rows with WHERE (before grouping) and filter groups with HAVING (after).

- `COUNT(*)` counts rows; `COUNT(col)` skips NULLs in that column.