DEVI AHILYA UNIVERSITY

SCHOOL OF ELECTRONICS

DATABASE MANAGEMENT SYSTEMS (EL15104)

TOPIC: AGGREGATE FUNCTIONS

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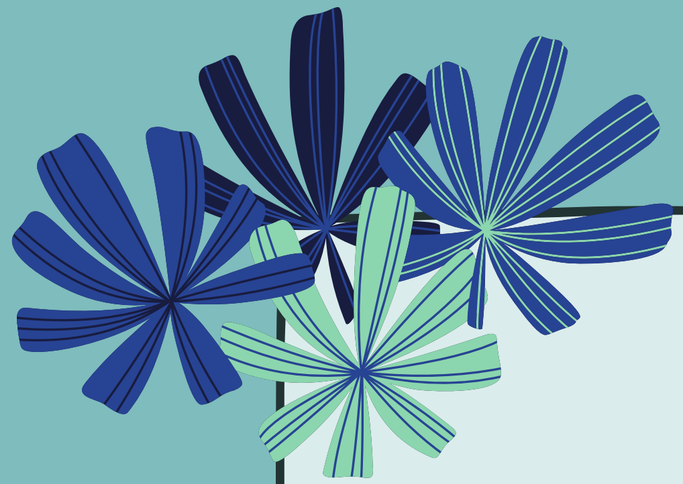


Aggregate

Functions in SQL

Definition

In database management an aggregate function is a function where the values of multiple rows are grouped together as input on certain criteria to form a single value of more significant meaning.

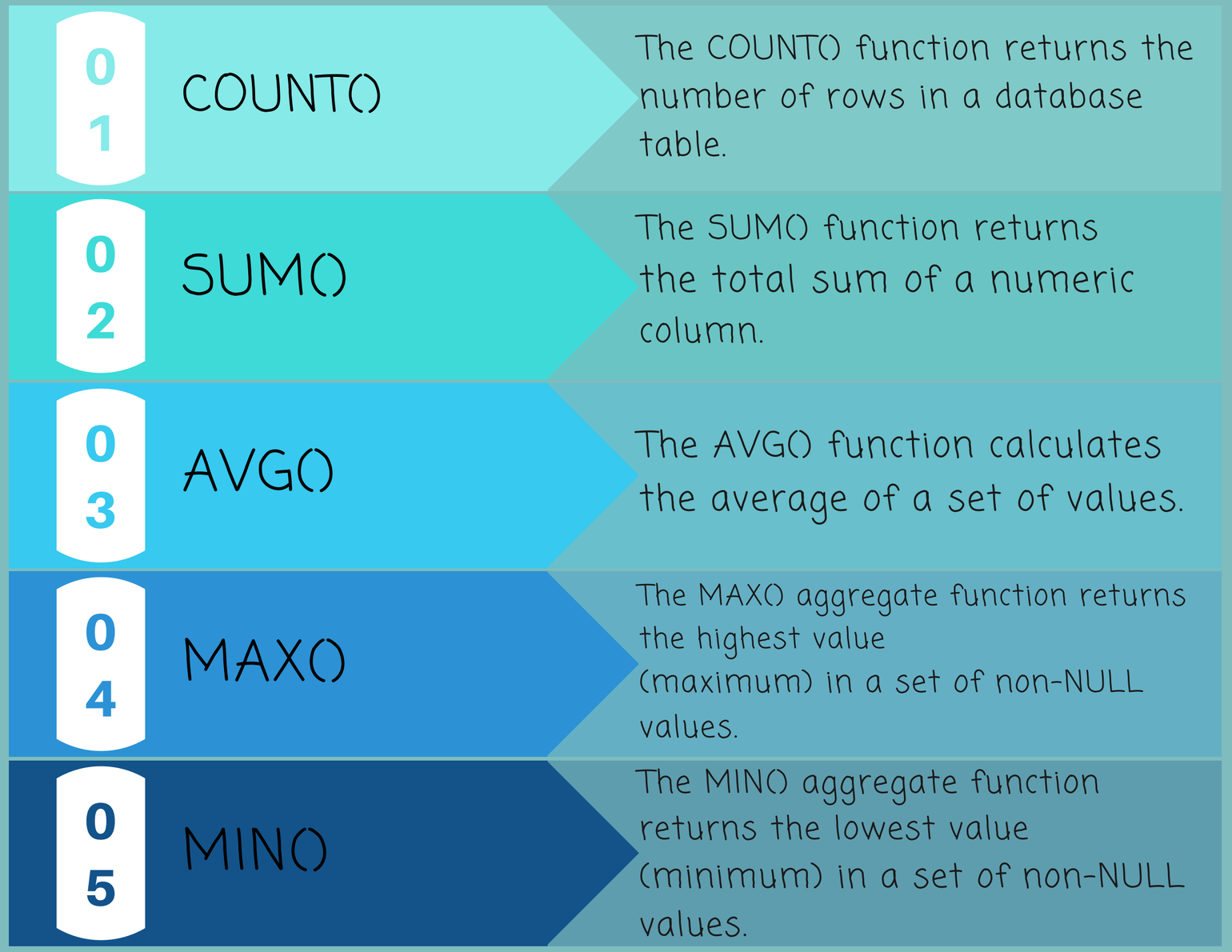
Meaning

Formed or calculated by the combination of several separate elements

Use of aggregate functions

We often use aggregate functions with the GROUP BY and HAVING clauses of the SELECT statement.

Various types of SQL aggregate functions



To understand Aggregate function, consider an student_record table, which is having the following records

S_No	Name	Course	Enrollment_No	Year	Fees
5	Minakshi	M_Sc	200545	2021	33000
2	Ashok Raj Choudhary	iMtech	200519	2020	55000
3	Virat Sharma	EPM	200119	2020	21000
6	Adarsh Kumar mishra	M_Sc	200014	2021	33000
4	Ajay Devda	EPM	200012	2020	21000
7	Ambika Rathore	ECM	200018	2020	25000
8	Aksa Mary Daniel	ECM	200011	2020	25000
1	Praveen Malviye	iMtech	200545	2020	55000
9	Dolly Jadhav	EPM	200876	2020	NULL
10	Ruhi Gayakwad	ECM	200006	NULL	25000
11	Atul	M_Sc	200099	NULL	33000
12	Riya Khare	iMtech	200226	2020	NULL
13	NULL	NULL	NULL	NULL	NULL

Count()

SQL COUNT function is the simplest function and very useful in counting the number of records, which are expected to be returned by a SELECT statement.

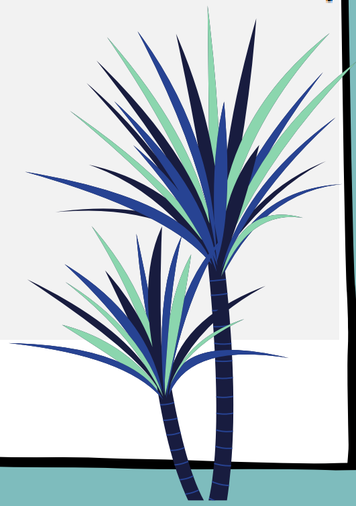
Now suppose based on the above table you want to count total number of rows in this table, then you can do it as follows

Syntax

```
SELECT COUNT(column_name)
FROM table_name;
```

Code

```
mysql> select count(Fees) from student_record;
+--------------+
| count(Fees) |
+--------------+
|           10 |
+--------------+
```



```
mysql> select count(*) from student_record;
+----------+
| count(*) |
+----------+
|       13 |
+----------+
```

SUMO

SQL SUM function is used to find out the sum of a field in various records. which are expected to be returned by a SELECT statement.

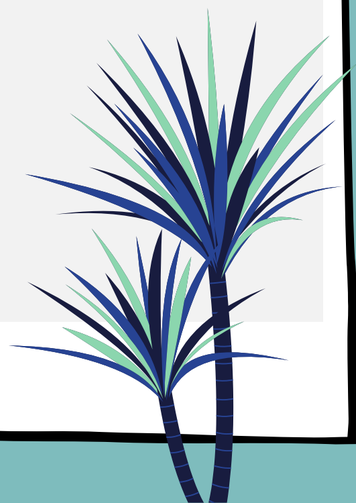
Now suppose based on the above table you want to calculate the total of all the Fees, then you can do so by using the following command -

Syntax

```
SELECT SUM(column_name)
FROM table_name;
```

Code

```
mysql> select sum(Fees) from student_record;
+-----------+
| sum(Fees) |
+-----------+
|    326000 |
+-----------+
```



AVG()

SQL AVG function is used to find out the average of a field in various records.
which are expected to be returned by a SELECT statement.

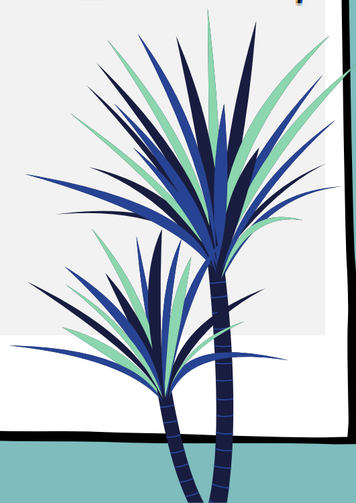
Now suppose based on the above table you want to calculate average of all the Fees, then you can do so by using the following command --

Syntax

```
SELECT AVG(column_name)
FROM table_name;
```

Code

```
mysql> select avg(Fees) from student_record;
+-------------+
| avg(Fees)   |
+-------------+
| 32600.0000 |
+-------------+
```



MAXO

SQL MAX function is used to find out the record with the maximum value among a record set. which are expected to be returned by a SELECT statement.

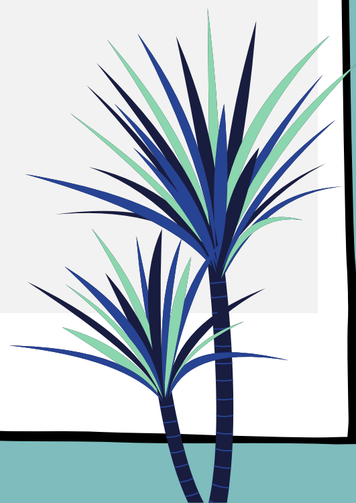
Now suppose based on the above table you want to fetch maximum value of Fees, then you can do so simply using the following command –

Syntax

```
SELECT MAX(column_name)
FROM table_name;
```

Code

```
mysql> select max(Fees) from student_record;
+-----------+
| max(Fees) |
+-----------+
|     55000 |
+-----------+
```



MINO

SQL MIN function is used to find out the record with the minimum value among a record set. which are expected to be returned by a SELECT statement.

Now suppose based on the above table you want to fetch the minimum value of Fees, then you can do so simply using the following command –

Syntax

```
SELECT MIN(column_name)
FROM table_name;
```

Code

```
mysql> select min(Fees) from student_record;
+-----------+
| min(Fees) |
+-----------+
|     21000 |
+-----------+
```

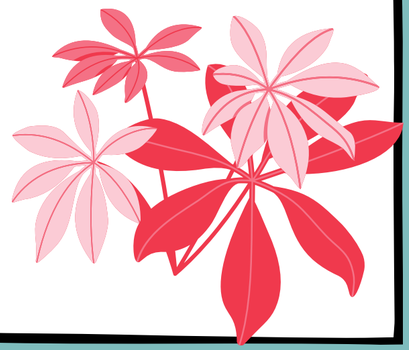
Group by and Having Function

```
mysql> select count(Name), Year from student_record group by Year;
+-------------+------+
| count(Name) | Year |
+-------------+------+
|           2 | 2021 |
|           8 | 2020 |
|           2 | NULL |
+-------------+------+
3 rows in set (0.00 sec)

mysql> select count(Name), Year from student_record group by Year having count(Name) > 2;
+-------------+------+
| count(Name) | Year |
+-------------+------+
|           8 | 2020 |
+-------------+------+
1 row in set (0.00 sec)

mysql> select count(Name), Year from student_record group by Year having count(Name) = 2;
+-------------+------+
| count(Name) | Year |
+-------------+------+
|           2 | 2021 |
|           2 | NULL |
+-------------+------+
2 rows in set (0.00 sec)

mysql> select count(Name), Year from student_record group by Year having count(Name) < 2;
Empty set (0.00 sec)
```



WHERE CLAUSE

The SQL WHERE clause is used to specify a condition while fetching the data from a single table or by joining with multiple tables. If the given condition is satisfied, then only it returns a specific value from the table. You should use the WHERE clause to filter the records and fetch only the necessary records.

The WHERE clause is not only used in the SELECT statement but it is also used in the UPDATE, DELETE statement, etc.

You can specify a condition using the comparison or logical operators like >, <, =, LIKE, NOT, etc.

SYNTAX

SELECT column1, column2 FROM table_name WHERE column_name CONDITION;

CODE

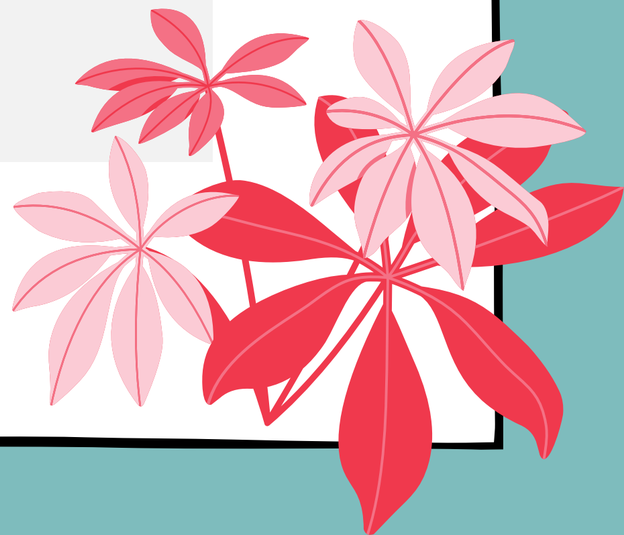
```
mysql> select S_No, Name, Fees from student_record where Fees> 30000 order by S_no;
+------+--------------------+-------+
| S_No | Name               | Fees  |
+------+--------------------+-------+
|    1 | Praveen Malviye    | 55000 |
|    2 | Ashok Raj Choudhary | 55000 |
|    5 | Minakshi           | 33000 |
|    6 | Adarsh Kumar mishra | 33000 |
|   11 | Atul               | 33000 |
+------+--------------------+-------+
```

Group by VS where

- WHERE clause filters individual rows, whereas the HAVING clause filters groups instead of one row at a time
- We cannot use the WHERE clause with aggregate functions because it works for filtering individual rows. In contrast, HAVING can works with aggregate functions because it is used to filter groups
- Row operations are handled by the WHERE clause, while the HAVING clause handles column operations to summarize rows or groups.
- We can combine the WHERE and HAVING clauses together in a SELECT query. In this case, the WHERE clause is used first to filter individual rows. The rows are then grouped, perform aggregate calculations, and finally, the HAVING clause is used to filter the groups.

```
mysql> select count(Name), Fees from student_record group by Fees having count(Name) > 2;
+-------------+-------+
| count(Name) | Fees  |
+-------------+-------+
|           3 | 33000 |
|           3 | 25000 |
+-------------+-------+
2 rows in set (0.00 sec)

mysql> select count(Name), S_no, Fees from student_record group by Fees having count(Name) > 2;
+-------------+------+-------+
| count(Name) | S_no | Fees  |
+-------------+------+-------+
|           3 |    5 | 33000 |
|           3 |    7 | 25000 |
+-------------+------+-------+
```



KEY POINTS

- All the SQL queries are case insensitive, so it does not make any difference if you give count or COUNT in the SQL command.
- Aggregate functions cannot be nested.
- Aggregate functions can be used only in SELECT or HAVING clauses.
- All aggregate function except count(*) ignores NULL values.
- Count of NULL values defined as 0 and other function return as 'NULL'.

Thank You