

# SQL Tutorial

*Basic SQL Commands*

# MATHEMATICAL FUNCTIONS

SQL has built-in mathematical functions to allow us to perform mathematical operations on the data.

Common mathematical functions include:

- SUM
- AVG
- COUNT
- MAX
- MIN

# GROUP BY

To find the highest Sales\_Amount across all stores, we use the MAX( ) function in the following SQL:

SALES\_HISTORY

Date	Store	Sales_Amount
------	-------	--------------

```
SELECT MAX(Sales_Amount)
FROM SALES_HISTORY;
```

# GROUP BY

To find the highest Sales\_Amount for each store, we change the SELECT portion to include “Store”:

SALES\_HISTORY

Date	Store	Sales_Amount
------	-------	--------------

```
SELECT Store, MAX(Sales_Amount)  
FROM SALES_HISTORY;
```

# GROUP BY

However, this `SELECT` statement by itself is not enough. To allow SQL to correctly calculate what we want, we need to use the `GROUP BY` keyword. In the following example, the `Store` column after `GROUP BY` tells SQL to apply the `MAX` function for each `Store`.

SALES\_HISTORY

Date	Store	Sales_Amount
------	-------	--------------

```
SELECT Store, MAX(Sales_Amount)
FROM SALES_HISTORY
GROUP BY Store;
```

# GROUP BY

To summarize, the syntax for GROUP BY is as follows:

```
SELECT "COLUMN_NAME_1",  
       FUNCTION("COLUMN_NAME_2")  
FROM "TABLE_NAME"  
WHERE "CONDITION"  
GROUP BY "COLUMN_NAME_1"
```

# HAVING

Previously we had talked about using the WHERE keyword to filter results.

We cannot use WHERE to filter based on the result of a function, because we need to specify the filtering condition after SQL has calculated the function, and consequently any filtering condition based on the function needs to be specified after the GROUP BY phrase. So we cannot use the WHERE keyword because it is always used before GROUP BY.

HAVING is used to filter based on the result of a function.

# HAVING

The syntax for HAVING is as follows:

```
SELECT "COLUMN_NAME_1",  
       FUNCTION("COLUMN_NAME_2")  
FROM "TABLE_NAME"  
GROUP BY "COLUMN_NAME_1"  
HAVING (CONDITION based on  
        FUNCTION)
```



# HAVING

Using the SALES\_HISTORY table we had earlier. If we want to sum the sales amount for each store, but only want to see results for stores with total sales amount greater than 100, we use the following SQL:

SALES\_HISTORY

Date	Store	Sales_Amount
------	-------	--------------

```
SELECT Store, SUM(Sales_Amount)
FROM SALES_HISTORY
GROUP BY Store
HAVING SUM(Sales_Amount) > 100;
```

# Order of SQL Commands

A SELECT statement has the following order:

- SELECT ... FROM
- WHERE
- GROUP BY
- HAVING
- ORDER BY

THANK YOU