# Built-in Database Functions

Data Science Program

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# Built-in Database Functions

Most databases come with built-in function. This functions can be included in SQL statements. It will be significantly reduce the amount of data that needs to be retrieved, and also speed up data processing.

- **Aggregate Functions**: This function will perform on collection of values or entire column. The output is single value. Example functions: SUM, MIN, MAX, AVG.

- **Scalar Function**: This function will perform operations on every individual value. Example functions: ROUND, LENGTH, UCASE, LCASE.

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# AGGREGATE FUNCTIONS

## SUM

The SUM() function returns the total sum of a numeric column.

SELECT SUM(column_name)

FROM table_name

WHERE condition;

Example:

SELECT SUM(Population) AS

Total_Population

FROM City

WHERE CountryCode = 'IND';

```
mysql> SELECT SUM(Population) as Total_Population
    -> FROM City
    -> WHERE CountryCode = 'IND';
+------------------+
| Total_Population |
+------------------+
|        123298526 |
+------------------+
```

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## COUNT

The COUNT() function returns the number of rows that matches a specified criterion.

SELECT COUNT(column_name)

FROM table_name

WHERE condition;

Example:

SELECT COUNT(name) AS

Total_City

FROM City

WHERE CountryCode = 'IDN';

```
mysql> SELECT COUNT(Name) AS Total_City
    -> FROM CITY
    -> WHERE CountryCode = 'IDN';
+------------+
| Total_City |
+------------+
|         85 |
+------------+
```

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## AVG

The AVG() function returns the average value of a numeric column.

SELECT AVG(column_name)

FROM table_name

WHERE condition;

Example:

SELECT AVG(Population) AS

Avg_Population

FROM City

WHERE CountryCode = 'IDN';

```
mysql> SELECT AVG(Population) AS Avg_Population
    -> FROM City
    -> WHERE CountryCode = 'IDN';
+----------------+
| Avg_Population |
+----------------+
|     441008.1765 |
+----------------+
```

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## MIN

The MIN() function returns the smallest value of the selected column.

SELECT MIN(column_name)

FROM table_name

WHERE condition;

Example:

SELECT MIN(Population) AS

Min_Population

FROM City

WHERE CountryCode = 'IDN';

```
mysql> SELECT MIN(Population) AS Min_Population
    -> FROM City
    -> WHERE CountryCode = 'IDN';
+----------------+
| Min_Population |
+----------------+
|          89900 |
+----------------+
```

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## MAX

The MAX() function returns the largest value of the selected column.

SELECT MAX(column_name)

FROM table_name

WHERE condition;


Example:

SELECT MAX(Population) AS

Max_Population

FROM City

WHERE CountryCode = 'IDN';

```
mysql> SELECT MAX(Population) AS Max_Population
    -> FROM City
    -> WHERE CountryCode = 'IDN';
+----------------+
| Max_Population |
+----------------+
|        9604900 |
+----------------+
```

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# SCALAR FUNCTIONS

## ROUND

The ROUND() function rounds a number to a specified number of decimal places.

ROUND(*number, decimals*)

- **Number:** Required. The number to be rounded

- **Decimal:** Optional. The number of decimal places to round *number* to. If omitted, it returns the integer (no decimals)

```
+----------------+------------------------+
| NAME           | ROUND(LifeExpectancy)  |
+----------------+------------------------+
| Aruba          |                     78 |
| Afghanistan    |                     46 |
| Angola         |                     38 |
| Anguilla       |                     76 |
| Albania        |                     72 |
+----------------+------------------------+
```

SELECT NAME,

ROUND(LifeExpectancy)

FROM Country;

## ROUND

- Show population density (Population/Surface Area) only in Southeast Asia Region.
  The value of population density is rounded 2 decimal after coma.

```
+-------------+----------------+--------------------+
| NAME        | REGION         | Population_Density |
+-------------+----------------+--------------------+
| Brunei      | Southeast Asia |              56.90 |
| Indonesia   | Southeast Asia |             111.37 |
| Cambodia    | Southeast Asia |              61.69 |
| Laos        | Southeast Asia |              22.94 |
| Myanmar     | Southeast Asia |              67.41 |
| Malaysia    | Southeast Asia |              67.46 |
| Philippines | Southeast Asia |             253.22 |
| Singapore   | Southeast Asia |            5771.84 |
| Thailand    | Southeast Asia |             119.66 |
| East Timor  | Southeast Asia |              59.50 |
| Vietnam     | Southeast Asia |             240.68 |
+-------------+----------------+--------------------+
```

SELECT NAME, REGION,

ROUND(Population/SurfaceArea, 2)

AS Population_Density

FROM Country

WHERE Region = 'Southeast Asia';

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## LENGTH

The LENGTH() function returns the length of a string (in bytes).

LENGTH(string)

- **String:** Required. The string to count the length for

```
+----------------+-------------+
| Name           | Length_Name |
+----------------+-------------+
| Philippines    |          11 |
| East Timor     |          10 |
| Indonesia      |           9 |
| Singapore      |           9 |
| Cambodia       |           8 |
| Malaysia       |           8 |
| Thailand       |           8 |
| Myanmar        |           7 |
| Vietnam        |           7 |
| Brunei         |           6 |
| Laos           |           4 |
+----------------+-------------+
```

SELECT Name, LENGTH(Name) AS Length_Name

FROM Country

WHERE Region = ' Southeast Asia'

ORDER BY Length_Name DESC;

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## UCASE

The UCASE() function converts a string to upper-case. This function is equal to the UPPER() function.

UCASE(text)

- **String:** Required. The string to convert

```
+----------------+------------+
| UCASE(Name)    | Population |
+----------------+------------+
| INDONESIA      | 212107000  |
| VIETNAM        |  79832000  |
| PHILIPPINES    |  75967000  |
| THAILAND       |  61399000  |
| MYANMAR        |  45611000  |
| MALAYSIA       |  22244000  |
| CAMBODIA       |  11168000  |
| LAOS           |   5433000  |
| SINGAPORE      |   3567000  |
| EAST TIMOR     |    885000  |
| BRUNEI         |    328000  |
+----------------+------------+
```

SELECT UCASE(Name), Population

FROM Country

WHERE Region = 'Southeast Asia'

ORDER BY Population DESC;

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## LCASE

The LCASE() function converts a string to lower-case. The LOWER() function is a synonym for the LCASE() function.

LCASE(text)

- **String:** Required. The string to convert

```
+-----------------+------------+
| LCASE(Name)     | Population |
+-----------------+------------+
| indonesia       |  212107000 |
| vietnam         |   79832000 |
| philippines     |   75967000 |
| thailand        |   61399000 |
| myanmar         |   45611000 |
| malaysia        |   22244000 |
| cambodia        |   11168000 |
| laos            |    5433000 |
| singapore       |    3567000 |
| east timor      |     885000 |
| brunei          |     328000 |
+-----------------+------------+
```

SELECT LCASE(Name), Population

FROM Country

WHERE Region = 'Southeast Asia'

ORDER BY Population DESC;

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## Reference

- https://www.w3schools.com/sql/sql_count_avg_sum.asp

- https://www.w3schools.com/sql/sql_min_max.asp

- https://www.w3schools.com/sql/func_mysql_round.asp

- https://www.w3schools.com/sql/func_mysql_ucase.asp

- https://www.w3schools.com/sql/func_mysql_lcase.asp

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