

10 SQL - Built-In Functions

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- SQL provides a variety of built-in functions that allow you to perform operations on data, such as calculations, string manipulations, and data aggregation
- These functions can be broadly classified into five categories:
 1. **Aggregate Functions**
 2. **String Functions**
 3. **Date Functions**
 4. **Mathematical Functions**
 5. **Conversion Functions**

1. Aggregate Functions

Aggregate functions perform a calculation on a set of values and return a single value

- **COUNT()** : Returns the number of rows that match a specified criterion.

```
SELECT COUNT(*) AS FROM employees WHERE department = 'Sales';
```

- **SUM()** : Returns the total sum of a numeric column

```
SELECT SUM(salary) FROM employees WHERE department = 'Sales';
```

- **AVG()** : Returns the average value of a numeric column

```
SELECT AVG(salary) FROM employees WHERE department = 'Sales';
```

- **MIN()** and **MAX()** : Return the minimum and maximum values in a column

```
SELECT MIN(salary), MAX(salary) FROM employees WHERE department = 'Sales';
```

2. String Functions

String functions are used to manipulate text strings

- **LENGTH()** : Returns the length of a string

```
SELECT LENGTH('Hello World');
```

- **UPPER()** and **LOWER()** : Convert a string to uppercase or lowercase

```
SELECT UPPER('hello world'), LOWER('HELLO WORLD');
```

- **CONCAT()** : Concatenates two or more strings

```
SELECT CONCAT(first_name, ' ', last_name) AS full_name FROM employees;
```

- **SUBSTRING()** : Extracts a substring from a string.

```
SELECT SUBSTRING('Hello World', 1, 5);
```

This query extracts 'Hello' from the string 'Hello World'

- **TRIM()** : Removes leading and/or trailing spaces (or other specified characters) from a string

```
TRIM([leading | trailing | both] [remstr] FROM str);
```

- **LEADING** : Removes characters from the beginning of the string
- **TRAILING** : Removes characters from the end of the string
- **BOTH** : Removes characters from both the beginning and the end of the string. This is the default

```
SELECT TRIM(BOTH 'x' FROM 'xxxHello Worldxxx') AS trimmed_string;
```

3. Date Functions

Date functions are used to perform operations on date and time values

- **NOW()** : Returns the current date and time

```
SELECT NOW();
```

- **CURDATE()** and **CURTIME()** : Return the current date and time, respectively

```
SELECT CURDATE(), CURTIME();
```

- **DATEDIFF()** : Returns the number of days between two dates.

```
SELECT DATEDIFF('2024-12-31', '2024-01-01');
```

- **DATE_ADD()** and **DATE_SUB()** : Add or subtract a specified time interval to a date

```
SELECT DATE_ADD('2024-01-01', INTERVAL 10 DAY);  
SELECT DATE_SUB('2024-01-01', INTERVAL 10 DAY);
```

These queries add and subtract 10 days to/from January 1, 2024

- The **TO_DAYS()** function in SQL converts a date to the number of days since the year 0 (0000-00-00)

```
SELECT TO_DAYS('2024-09-03');
```

4. Mathematical Functions

Mathematical functions are used to perform calculations

- **ROUND()** : Rounds a number to a specified number of decimal places

```
SELECT ROUND(123.4567, 2);
```

- **ABS()** : Returns the absolute value of a number

```
SELECT ABS(-123.45);
```

- **CEIL()** and **FLOOR()** : Round a number up or down to the nearest integer

```
SELECT CEIL(123.45), FLOOR(123.45);
```

This query returns 124 for **CEIL** and 123 for **FLOOR**

- **POWER()** : Returns the value of a number raised to a power

```
SELECT POWER(2, 3);
```

- **SQRT()** function returns the square root of a given number.

```
SELECT SQRT(25) AS square_root;
```

5. Conversion Functions

Conversion functions convert a value from one data type to another

- **CAST()** : Converts a value to a specified data type

```
SELECT CAST(123.45 AS CHAR);
```

- **CONVERT()** : Similar to **CAST**, but with a different syntax

```
SELECT CONVERT(123.45, CHAR);
```