



# SQL Functions

# FUNCTIONS IN SQL

## function / argument

A function operates on an expression enclosed in parentheses, called an argument, and returns a value. Usually, the argument is a simple expression, such as a column name or fixed value. Some functions have several arguments, separated by commas, and a few have no arguments at all.

### Function / Argument

- operates on an expression enclosed in parentheses(argument) returning a value

- Numeric
- String
- Date/Time



# NUMERIC FUNCTIONS

Function	Description	Example
<b><i>ABS(n)</i></b>	Returns the absolute value of $n$	<code>SELECT ABS(-5);</code> returns 5
<b><i>LOG(n)</i></b>	Returns the natural logarithm of $n$	<code>SELECT LOG(10);</code> returns 2.302585092994046
<b><i>POW(x, y)</i></b>	Returns $x$ to the power of $y$	<code>SELECT POW(2, 3);</code> returns 8
<b><i>RAND()</i></b>	Returns a random number between 0 (inclusive) and 1 (exclusive)	<code>SELECT RAND();</code> returns 0.11831825703225868
<b><i>ROUND(n, d)</i></b>	Returns $n$ rounded to $d$ decimal places	<code>SELECT ROUND(16.25, 1);</code> returns 16.3
<b><i>SQRT(n)</i></b>	Returns the square root of $n$	<code>SELECT SQRT(25);</code> returns 5

## COMBINING FUNCTIONS:

You can combine these functions for more complex calculations. For example, you could round the result of a logarithm calculation:

**Example: Rounding the logarithm of invoice totals**

```
SELECT InvoiceID, ROUND(LOG(Total), 2) AS RoundedLogTotal
FROM Invoice
WHERE Total > 0;
```

**Explanation:** This query calculates the logarithm of the invoice total and rounds the result to 2 decimal places.

# STRING FUNCTIONS

Function	Description	Example
<b>CONCAT(s1, s2, ...)</b>	Returns the string that results from concatenating the string arguments	<code>SELECT CONCAT('Dis', 'en', 'gage');</code> returns 'Disengage'
<b>LOWER(s)</b>	Returns the lowercase s	<code>SELECT LOWER('MySQL');</code> returns 'mysql'
<b>REPLACE(s, from, to)</b>	Returns the string s with all occurrences of <i>from</i> replaced with <i>to</i>	<code>SELECT REPLACE('This and that', 'and', 'or');</code> returns 'This or that'
<b>SUBSTRING(s, pos, len)</b>	Returns the substring from s that starts at position <i>pos</i> and has length <i>len</i>	<code>SELECT SUBSTRING('Boomerang', 1, 4);</code> returns 'Boom'
<b>TRIM(s)</b>	Returns the string s without leading and trailing spaces	<code>SELECT TRIM(' test ');</code> returns 'test'
<b>UPPER(s)</b>	Returns the uppercase s	<code>SELECT UPPER('mysql');</code> returns 'MYSQL'

# STRING FUNCTION EXAMPLES: CONCAT(), LOWER()

## CONCAT(): Concatenating Strings

The CONCAT() function combines two or more strings into one. It's useful for creating full names from separate FirstName and LastName columns, for example.

**Example: Combining first and last names into a full name**

```
SELECT CustomerID, CONCAT(FirstName, ' ',  
LastName) AS FullName  
FROM VIPCustomer;
```

## LOWER(): Converting Text to Lowercase

The LOWER() function converts all characters in a string to lowercase. This can be useful when comparing text data case-insensitively.

**Example: Converting email addresses to lowercase**

```
SELECT CustomerID, LOWER(Email) AS  
LowercaseEmail  
FROM VIPCustomer;
```

# STRING FUNCTION EXAMPLES: TRIM() AND SUBSTRING()

## TRIM(): Removing Leading and Trailing Spaces

The TRIM() function removes any leading and trailing spaces from a string. It's useful for cleaning up user input or inconsistent data.

**Example: Removing extra spaces from**

```
SELECT CustomerID, TRIM(FirstName) AS  
CleanedFirstName,  
TRIM(LastName) AS CleanedLastName  
FROM VIPCustomer;
```

**Explanation:** This query removes any extra spaces at the beginning or end of the FirstName and LastName fields.

## SUBSTRING(): Extracting Part of a String

The SUBSTRING() function extracts a portion of a string, starting from a given position and extracting a specified number of characters.

**Example: Extracting the first 3 characters of the first name**

```
SELECT CustomerID, SUBSTRING(FirstName, 1, 3)  
AS NamePrefix  
FROM VIPCustomer;
```

**Explanation:** This query extracts the first 3 characters from the FirstName of each customer, which can be useful for generating a prefix or performing partial matches.

# COMBINING STRING FUNCTIONS

You can also combine these functions for more complex string manipulations.

**Example: Concatenating a cleaned full name and lowercased email address**

```
SELECT CustomerID, CONCAT(TRIM(FirstName), ' ', TRIM(LastName)) AS  
    FullName,  
    LOWER(Email) AS LowercaseEmail  
FROM VIPCustomer;
```

**Explanation:** This query trims any extra spaces from FirstName and LastName, concatenates them into a full name, and converts the Email to lowercase.



# LIKE

The SQL LIKE clause is used in a WHERE statement to search for a specified pattern in a column. It's commonly used with string data types to find rows where a column matches a particular pattern. Wildcards are often used with LIKE to specify patterns:

%: Represents zero or more characters.

\_: Represents a single character.

## Syntax:

```
SELECT column1, column2, ...  
FROM table_name  
WHERE column LIKE pattern;
```

Let's say we have a Customer table with the following columns: CustomerID, FirstName, LastName, and Email. We can use the LIKE clause to perform different types of pattern matching on this data.

**Find customers with first names that start with 'A':**

```
SELECT CustomerID, FirstName, LastName  
FROM Customer  
WHERE FirstName LIKE 'A%';
```

**Find customers with a last name that starts with 'S' and has 5 letters:**

```
SELECT CustomerID, FirstName, LastName  
FROM Customer  
WHERE LastName LIKE 'S_____';
```

**Find customers whose email starts with 'a' and ends with '.com':**

```
SELECT CustomerID, FirstName, LastName, Email  
FROM Customer  
WHERE Email LIKE 'a%@%.com';
```

# DATE/TIME FUNCTIONS

Function	Description	Example
<b>CURDATE()</b> <b>CURTIME()</b> <b>NOW()</b>	Returns the current date, time, or date and time in 'YYYY-MM-DD', 'HH:MM:SS', or 'YYYY-MM-DD HH:MM:SS' format	<b>SELECT CURDATE();</b> returns '2019-01-25' <b>SELECT CURTIME();</b> returns '21:05:44' <b>SELECT NOW();</b> returns '2019-01-25 21:05:44'
<b>DATE(expr)</b> <b>TIME(expr)</b>	Extracts the date or time from a date or datetime expression <i>expr</i>	<b>SELECT DATE('2013-03-25 22:11:45');</b> returns '2013-03-25' <b>SELECT TIME('2013-03-25 22:11:45');</b> returns '22:11:45'
<b>DAY(d)</b> <b>MONTH(d)</b> <b>YEAR(d)</b>	Returns the day, month, or year from date <i>d</i>	<b>SELECT DAY('2016-10-25');</b> returns 25 <b>SELECT MONTH('2016-10-25');</b> returns 10 <b>SELECT YEAR('2016-10-25');</b> returns 2016
<b>HOURL(t)</b> <b>MINUTE(t)</b> <b>SECOND(t)</b>	Returns the hour, minute, or second from time <i>t</i>	<b>SELECT HOUR('22:11:45');</b> returns 22 <b>SELECT MINUTE('22:11:45');</b> returns 11 <b>SELECT SECOND('22:11:45');</b> returns 45
<b>DATEDIFF(expr1, expr2)</b> <b>TIMEDIFF(expr1, expr2)</b>	Returns <i>expr1</i> - <i>expr2</i> in number of days or time values, given <i>expr1</i> and <i>expr2</i> are date, time, or datetime values	<b>SELECT DATEDIFF('2013-03-10', '2013-03-04');</b> returns 6 <b>SELECT TIMEDIFF('10:00:00', '09:45:30');</b> returns 00:14:30

# CURTIME(): RETRIEVES THE CURRENT TIME

The CURTIME() function returns the current time (without the date) in the format HH:MM:SS or HHMMSS depending on the query context.

**Example: Retrieve the current time and check which invoices were created today at that time**

```
SELECT InvoiceID, Total, CURTIME() AS CurrentTime  
FROM Invoice  
WHERE CURDATE() = InvoiceDate;
```

**Explanation:** This query shows the InvoiceID and Total of invoices created today, along with the current time. It uses CURTIME() to retrieve the current time and CURDATE() to compare only the date part of the InvoiceDate.

# NOW():RETRIEVES THE CURRENT DATE AND TIME

The NOW() function returns the current date and time in the format YYYY-MM-DD HH:MM:SS. It's useful when you need to log timestamps or compare data based on both date and time.

**Example: Retrieve all invoices created in the last hour**

```
SELECT InvoiceID, Total, InvoiceDate
FROM Invoice
WHERE InvoiceDate >= NOW() - INTERVAL 1 HOUR;
```

**Explanation:** This query retrieves all invoices created in the last hour. It uses the NOW() function to get the current date and time and compares it with the InvoiceDate column to filter invoices created within the last hour.

## DATEDIFF() CALCULATES THE DIFFERENCE BETWEEN TWO DATES

The DATEDIFF() function returns the difference in days between two dates. It's commonly used to calculate time intervals, such as how long a customer has been a VIP or the number of days since an invoice was issued.

**Example: Calculate how many days have passed since each customer joined**

```
SELECT CustomerID, FirstName, LastName,  
DATEDIFF(NOW(), JoinDate) AS DaysSinceJoined  
FROM VIPCustomer;
```

**Explanation:** This query calculates the number of days since each customer joined the VIP program by subtracting the JoinDate from the current date and time (NOW()).

**Example 2: Find overdue invoices (overdue by more than 30 days)**

```
SELECT InvoiceID, CustomerID,  
Total, DATEDIFF(NOW(),  
InvoiceDate) AS DaysOverdue  
FROM Invoice  
WHERE DATEDIFF(NOW(),  
InvoiceDate) > 30;
```

**Explanation:** This query identifies invoices that are overdue by more than 30 days by calculating the difference between the current date (NOW()) and the InvoiceDate.