Comprehensive Guide to Database Functions: MySQL, PostgreSQL, Hive, and MSSQL

Contents

1 Introduction

This document provides a comprehensive overview of the major and minor functions used in four popular database management systems: MySQL, PostgreSQL, Apache Hive, and Microsoft SQL Server (MSSQL). Each section categorizes functions by type (e.g., string, numeric, date/time, aggregate, etc.) and provides tables with function names, descriptions, syntax, and examples for each database system where applicable. The goal is to serve as a reference for developers and database administrators working across these platforms.

2 MySQL Functions

MySQL provides a wide range of built-in functions for data manipulation, aggregation, and control flow.

2.1 String Functions

Function	Description	Syntax	Example
CONCAT	Concatenates strings	CONCAT(str1, str2, ...)	CONCAT('Hello', ' ', 'World') □ 'Hello World'
SUBSTRING	Extracts a substring	SUBSTRING(str, pos, len)	SUBSTRING('Hello', 2, 3) □ 'ell'
LENGTH	Returns string length	LENGTH(str)	LENGTH('Hello') □ 5
UPPER	Converts to uppercase	UPPER(str)	UPPER('hello') □ 'HELLO'
LOWER	Converts to lowercase	LOWER(str)	LOWER('HELLO') □ 'hello'
TRIM	Removes leading/trailing spaces	TRIM(str)	TRIM(' Hello ') □ 'Hello'
REPLACE	Replaces substrings	REPLACE(str, from, to)	REPLACE('Hello', 'l', 'x') □ 'Hexxo'
LOCATE	Finds substring position	LOCATE(substr, str)	LOCATE('lo', 'Hello') □ 4

2.2 Numeric Functions

Function	Description	Syntax	Example
ABS	Returns absolute value	ABS(num)	ABS(-10) □ 10
ROUND	Rounds a number	ROUND(num, decimals)	ROUND(3.14159, 2) □ 3.14

Function	Description	Syntax	Example
CEIL	Rounds up to nearest integer	CEIL(num)	CEIL(3.2) → 4
FLOOR	Rounds down to nearest integer	FLOOR(num)	FLOOR(3.7) → 3
POW	Returns power of a number	POW(base, exp)	POW(2, 3) → 8
SQRT	Returns square root	SQRT(num)	SQRT(16) → 4

2.3 Date and Time Functions

Function	Description	Syntax	Example
NOW	Returns current date and time	NOW()	NOW() → '2025-06-26 11:49:00'
DATE_ADD	Adds time interval	DATE_ADD(date, INTERVAL expr unit)	DATE_ADD('2025-06-26', INTERVAL 1 DAY) → '2025-06-27'
DATEDIFF	Returns days between dates	DATEDIFF(date1, date2)	DATEDIFF('2025-06-26', '2025-06-20') → 6
DAY	Extracts day of month	DAY(date)	DAY('2025-06-26') → 26
MONTH	Extracts month	MONTH(date)	MONTH('2025-06-26') → 6

2.4 Aggregate Functions

Function	Description	Syntax	Example
COUNT	Counts rows	COUNT(expr)	COUNT(*) → Total rows
SUM	Sums values	SUM(expr)	SUM(salary) → Total salary
AVG	Computes average	AVG(expr)	AVG(salary) → Average salary
MAX	Finds maximum value	MAX(expr)	MAX(salary) → Highest salary
MIN	Finds minimum value	MIN(expr)	MIN(salary) → Lowest salary

3 PostgreSQL Functions

PostgreSQL offers robust functions, including advanced features like JSON and window functions.

3.1 String Functions

Function	Description	Syntax	Example
CONCAT	Concatenates strings	CONCAT(str1, str2, ...)	CONCAT('Hello', ' ', 'World') → 'Hello World'
SUBSTRING	Extracts a substring	SUBSTRING(str FROM pos FOR len)	SUBSTRING('Hello' FROM 2 FOR 3) → 'ell'
LENGTH	Returns string length	LENGTH(str)	LENGTH('Hello') → 5
UPPER	Converts to uppercase	UPPER(str)	UPPER('hello') → 'HELLO'
LOWER	Converts to lowercase	LOWER(str)	LOWER('HELLO') → 'hello'
TRIM	Removes leading/trailing characters	TRIM(BOTH char FROM str)	TRIM(BOTH ' ' FROM ' Hello ') → 'Hello'
REPLACE	Replaces substrings	REPLACE(str, from, to)	REPLACE('Hello', 'l', 'x') → 'Hexxo'
POSITION	Finds substring position	POSITION(substr IN str)	POSITION('lo' IN 'Hello') → 4

3.2 Numeric Functions

Function	Description	Syntax	Example
ABS	Returns absolute value	ABS(num)	ABS(-10) → 10
ROUND	Rounds a number	ROUND(num, decimals)	ROUND(3.14159, 2) → 3.14
CEIL	Rounds up to nearest integer	CEIL(num)	CEIL(3.2) → 4
FLOOR	Rounds down to nearest integer	FLOOR(num)	FLOOR(3.7) → 3
POWER	Returns power of a number	POWER(base, exp)	POWER(2, 3) → 8
SQRT	Returns square root	SQRT(num)	SQRT(16) → 4

3.3 Date and Time Functions

Function	Description	Syntax	Example
NOW	Returns current timestamp	NOW()	NOW() → '2025-06-26 11:49:00+05:30'

Function	Description	Syntax	Example
DATE_PART	Extracts part of a date	DATE_PART('part', date)	DATE_PART('day', '2025-06-26') → 26
AGE	Calculates interval between dates	AGE(date1, date2)	AGE('2025-06-26', '2025-06-20') → '6 days'
EXTRACT	Extracts field from date	EXTRACT(field FROM date)	EXTRACT(MONTH FROM '2025-06-26') → 6

3.4 Aggregate Functions

Function	Description	Syntax	Example
COUNT	Counts rows	COUNT(expr)	COUNT(*) → Total rows
SUM	Sums values	SUM(expr)	SUM(salary) → Total salary
AVG	Computes average	AVG(expr)	AVG(salary) → Average salary
MAX	Finds maximum value	MAX(expr)	MAX(salary) → Highest salary
MIN	Finds minimum value	MIN(expr)	MIN(salary) → Lowest salary
STRING_AGG	Concatenates strings with delimiter	STRING_AGG(expr, delimiter)	STRING_AGG(name, ', ') → 'John, Jane'

3.5 Window Functions

Function	Description	Syntax	Example
ROW_NUMBER	Assigns unique number to rows	ROW_NUMBER() OVER (PARTITION BY col ORDER BY col2)	ROW_NUMBER() OVER (PARTITION BY dept ORDER BY salary)
RANK	Assigns rank with gaps	RANK() OVER (PARTITION BY col ORDER BY col2)	RANK() OVER (ORDER BY salary)
DENSE_RANK	Assigns rank without gaps	DENSE_RANK() OVER (PARTITION BY col ORDER BY col2)	DENSE_RANK() OVER (ORDER BY salary)

4 Apache Hive Functions

Hive, built for big data processing, includes functions optimized for distributed environments.

4.1 String Functions

Function	Description	Syntax	Example
CONCAT	Concatenates strings	CONCAT(str1, str2, ...)	CONCAT('Hello', ' ', 'World') → 'Hello World'
SUBSTR	Extracts a substring	SUBSTR(str, pos, len)	SUBSTR('Hello', 2, 3) → 'ell'
LENGTH	Returns string length	LENGTH(str)	LENGTH('Hello') → 5
UPPER	Converts to uppercase	UPPER(str)	UPPER('hello') → 'HELLO'
LOWER	Converts to lowercase	LOWER(str)	LOWER('HELLO') → 'hello'
TRIM	Removes leading/trailing spaces	TRIM(str)	TRIM(' Hello ') → 'Hello'
REGEXP_REPLACE	Replaces using regex	REGEXP_REPLACE(str, regex, repl)	REGEXP_REPLACE('Hello', 'l', 'x') → 'Hexxo'

4.2 Numeric Functions

Function	Description	Syntax	Example
ABS	Returns absolute value	ABS(num)	ABS(-10) → 10
ROUND	Rounds a number	ROUND(num, decimals)	ROUND(3.14159, 2) → 3.14
CEIL	Rounds up to nearest integer	CEIL(num)	CEIL(3.2) → 4
FLOOR	Rounds down to nearest integer	FLOOR(num)	FLOOR(3.7) → 3
POW	Returns power of a number	POW(base, exp)	POW(2, 3) → 8
SQRT	Returns square root	SQRT(num)	SQRT(16) → 4

4.3 Date and Time Functions

Function	Description	Syntax	Example
CURRENT_DATE	Returns current date	CURRENT_DATE()	CURRENT_DATE() → '2025-06-26'
UNIX_TIMESTAMP	Returns Unix timestamp	UNIX_TIMESTAMP()	UNIX_TIMESTAMP() → 1756274940

Function	Description	Syntax	Example
FROM_UNIXTIME	Converts Unix timestamp to date	FROM_UNIXTIME(unixtime)	FROM_UNIXTIME(1756274940) → ’2025-06-26 11:49:00’
DATEDIFF	Returns days between dates	DATEDIFF(date1, date2)	DATEDIFF(’2025-06-26’, ’2025-06-20’) → 6
MONTH	Extracts month	MONTH(date)	MONTH(’2025-06-26’) → 6

4.4 Aggregate Functions

Function	Description	Syntax	Example
COUNT	Counts rows	COUNT(expr)	COUNT(*) → Total rows
SUM	Sums values	SUM(expr)	SUM(salary) → Total salary
AVG	Computes average	AVG(expr)	AVG(salary) → Average salary
MAX	Finds maximum value	MAX(expr)	MAX(salary) → Highest salary
MIN	Finds minimum value	MIN(expr)	MIN(salary) → Lowest salary
COLLECT_LIST	Collects values into a list	COLLECT_LIST(expr)	COLLECT_LIST(name) → [’John’, ’Jane’]

5 MSSQL Functions

Microsoft SQL Server provides a rich set of functions for various data operations.

5.1 String Functions

Function	Description	Syntax	Example
CONCAT	Concatenates strings	CONCAT(str1, str2, ...)	CONCAT(’Hello’, ’ ’, ’World’) → ’Hello World’
SUBSTRING	Extracts a substring	SUBSTRING(str, start, len)	SUBSTRING(’Hello’, 2, 3) → ’ell’
LEN	Returns string length	LEN(str)	LEN(’Hello’) → 5
UPPER	Converts to uppercase	UPPER(str)	UPPER(’hello’) → ’HELLO’
LOWER	Converts to lowercase	LOWER(str)	LOWER(’HELLO’) → ’hello’
TRIM	Removes leading/trailing spaces	TRIM(str)	TRIM(’ Hello ’) → ’Hello’

Function	Description	Syntax	Example
REPLACE	Replaces substrings	REPLACE(str, from, to)	REPLACE('Hello', 'l', 'x') → 'Hexxo'
CHARINDEX	Finds substring position	CHARINDEX(substr, str)	CHARINDEX('lo', 'Hello') → 3

5.2 Numeric Functions

Function	Description	Syntax	Example
ABS	Returns absolute value	ABS(num)	ABS(-10) → 10
ROUND	Rounds a number	ROUND(num, decimals)	ROUND(3.14159, 2) → 3.14
CEILING	Rounds up to nearest integer	CEILING(num)	CEILING(3.2) → 4
FLOOR	Rounds down to nearest integer	FLOOR(num)	FLOOR(3.7) → 3
POWER	Returns power of a number	POWER(base, exp)	POWER(2, 3) → 8
SQRT	Returns square root	SQRT(num)	SQRT(16) → 4

5.3 Date and Time Functions

Function	Description	Syntax	Example
GETDATE	Returns current date and time	GETDATE()	GETDATE() → '2025-06-26 11:49:00'
DATEADD	Adds time interval	DATEADD(unit, num, date)	DATEADD(day, 1, '2025-06-26') → '2025-06-27'
DATEDIFF	Returns difference in time units	DATEDIFF(unit, date1, date2)	DATEDIFF(day, '2025-06-20', '2025-06-26') → 6
DAY	Extracts day of month	DAY(date)	DAY('2025-06-26') → 26
MONTH	Extracts month	MONTH(date)	MONTH('2025-06-26') → 6

5.4 Aggregate Functions

Function	Description	Syntax	Example
COUNT	Counts rows	COUNT(expr)	COUNT(*) → Total rows

Function	Description	Syntax	Example
SUM	Sums values	SUM(expr)	SUM(salary) Total salary
AVG	Computes average	AVG(expr)	AVG(salary) Average salary
MAX	Finds maximum value	MAX(expr)	MAX(salary) Highest salary
MIN	Finds minimum value	MIN(expr)	MIN(salary) Lowest salary
STRING_AGG	Concatenates strings with delimiter	STRING_AGG(expr, delimiter)	STRING_AGG(name, ', ') 'John, Jane'

6 Conclusion

This guide covers the major and commonly used functions in MySQL, PostgreSQL, Apache Hive, and MSSQL. Each database system has unique strengths, and their function sets reflect their design purposes, from MySQL's simplicity to PostgreSQL's advanced features, Hive's big data capabilities, and MSSQL's enterprise integration. Refer to official documentation for additional functions and updates.