Module 04 – SQL Functions

Module Objectives

Discuss the basic data type available in each SQL dialect

Identify the basic single row functions available in each SQL dialect

Identify the basic multiple row functions available

Group data using the GROUP BY clause

Include or exclude grouped data by using the HAVING clause

NUMBERS		
	INT	Numeric data from -2,147,483,648 to 2,147,483,647
	FLOAT	Numeric data supporting up to 23 positions in size (4-bytes)
	DOUBLE	Numeric data supporting up to 53 positions in size (8-bytes)
DATE		
	DATE	A date (YYYY-MM-DD)
	TIME	A time (HH:MI:SS)
	DATETIME	A date and time combination (YYYY-MM-DD HH:MI:SS)
CHARACTERS		
	CHAR	Used for fixed size text up to 255 characters
	VARCHAR	Used for text up to 255 characters
	TEXT	Used for text up to 65,535 characters
	LONGTEXT	Used for text up to 4,294,967,295 characters
	LONGBLOB	Used to hold up to 4,294,967,295 of data

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NUMBERS		
	NUMBER	Numeric data that can be represented to full 38-digit precision
DATE		
	DATE	A date (DD-MON-YY)
CHARACTERS		
	CHAR	Used for fixed size text up to 2000 characters
	VARCHAR2	Used for text up to 4000 characters
	BLOB	Used to hold up to 4,294,967,295 of binary data
	CLOB	Used to hold up to 4,294,967,295 of character data

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NUMBERS		
	INT	Numeric data from -2,147,483,648 to 2,147,483,647
	DECIMAL	Numeric data that can be represented to full 38-digit precision
	NUMERIC	Numeric data that can be represented to full 38-digit precision
	MONEY	Monetary data from -922,337,203,685,477.5808 to 922,337,203,685,477.5807
DATE		
	DATE	A date only (YYYY-MM-DD)
	TIME	A time only (HH:MM:SS)
	DATETIME	A date and time combination (YYYY-MM-DD HH:MM:SS)
CHARACTERS		
	CHAR	Used for fixed size text up to 8000 characters
	VARCHAR	Used for text up to 1,073,741,824 characters
	TEXT	Used to hold up to 2,147,483,648 of character data
	VARBINARY	Used to hold up to 2,147,483,648 of binary data

MySQL

Character Functions		
	CONCAT	Returns a concatenated string.
	INSTR	Returns the index of the first occurrence of the second expression, located in the first expression.
	LENGTH	Returns the length of a string.
	LOWER	Converts alphabetic character values to lowercase.
	LPAD	Returns the string argument, left-padded with the specified string.
	REPLACE	Replaces all occurrences of a specified string value with another string value.
	RPAD	Returns the string argument, right-padded with the specified string.
	SUBSTR	Returns specified characters from character value starting at character position, for the specified length of characters.
	TRIM	Trims heading or trailing characters (or both) from a character string.
	UPPER	Converts alphabetic character values to uppercase.
Date Functions		
	CURDATE	Returns the current date.
	CURTIME	Returns the current time.
	DATE	Extracts the date part of a date or datetime expression.
	DATE_ADD	Adds time values (intervals) to a date value.
	DATEDIFF	Subtracts one date from a second date.
	DAYNAME	Returns the name of the weekday.
	DAYOFMONTH	Returns the day of the month (0-31).
	DAYOFWEEK	Returns the weekday index of the argument.
	DAYOFYEAR	Returns the day of the year (1-366).
	HOUR	Extracts the hour of an argument.
	LAST_DAY	Returns the last day of the month for the argument.

	MONTH	Returns the month from the date passed.
	MONTHNAME	Returns the name of the month.
	TIMEDIFF	Subtracts second time value from first time value.
Numerical Functions		
	MOD	Returns the remainder of a first value divided by a second value.
	ROUND	Rounds the value to the number of decimal places.
	TRUNCATE	Truncates the value to the number of decimal places.
Logical Functions		
	CASE	Cast a value as a certain type.
	IFNULL	If the first expression is not NULL, then the first expression is returned, otherwise the second expression is returned.

Character Functions		
	CONCAT	Concatenates the first character value to the second character value.
	INITCAP	Converts alphabetic character values to uppercase for the first letter of each word, all others letters to lowercase.
	INSTR	Returns the numeric position of a named character.
	LENGTH	Returns the number of characters in a value.
	LOWER	Converts alphabetic character values to lowercase.
	LPAD	Returns the string argument, left-padded with the specified string.
	RPAD	Returns the string argument, right-padded with the specified string.
	SUBSTR	Returns specified characters from character value starting at character position, for the specified length of characters.
	TO_CHAR	Converts a number or date value to a VARCHAR2 character string.
	TRIM	Trims heading or trailing characters (or both) from a character string.
	UPPER	Converts alphabetic character values to uppercase.
Date Functions		
	ADD_MONTHS	Add calendar months to a date.
	LAST_DAY	Last day of the month.
	MONTHS_BETWEEN	Number of months between two dates.
	NEXT_DAY	Next day of the date specified.
	TO_DATE	Converts a character string representing a date to a date value according to the specified format
Numerical Functions		
	MOD	Returns the remainder of a first value divided by a second

		value.
	ROUND	Rounds the value to the number of decimal places.
	TO_NUMBER	Converts a character string containing digits to a number in the specified format.
	TRUNC	Truncates the value to the number of decimal places.
Logical Functions		
	DECODE	Facilitates conditional inquiries by doing the work of a CASE or IF-THEN-ELSE statement.
	NVL	Converts NULL to an actual value.

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Character Functions		
	CONCAT	Returns a string that is the result of concatenating two or more string values.
	LEN	Returns the number of characters of the specified string expression, excluding trailing blanks.
	LOWER	Converts alphabetic character values to lowercase.
	REPLACE	Replaces all occurrences of a specified string value with another string value.
	STUFF	Inserts a string into another string by deleting a specified length of characters in the first string at the start position, then inserting the second string into the first string at the start position.
	SUBSTRING	Returns specified characters from character value starting at character position, for the specified length of characters.
	TRIM	Trims heading or trailing characters (or both) from a character string.
	UPPER	Converts alphabetic character values to uppercase.
Date Functions		
	DATEADD	Returns a specified date with the specified number interval added to a specified datepart of that date.
	DATEDIFF	Returns the count of the specified datepart boundaries crossed between the specified start date and end date.
	DATENAME	Returns a character string that represents the specified datepart of the specified date
	DATEPART	Returns an integer that represents the specified datepart of the specified date.
	DAY	Returns an integer representing the day (day of the month) of the specified date.
	EOMONTH	Returns the last day of the month that contains the specified date.
	MONTH	Returns an integer that represents the month of the specified

		date.
	SYSDATETIME	Returns a datetime value that contains the date and time of the server on which SQL Server is running.
	YEAR	Returns an integer that represents the year of the specified date.
Numerical Functions		
	ROUND	Returns a numeric value, rounded to the specified length or precision.
Logical Functions		
	CASE	Evaluates a list of conditions and returns one of multiple possible result expressions.
	IIF	Returns one of two values, depending on whether the Boolean expression evaluates to true or false in SQL Server.

Identify the basic multiple row functions available

Multiple Row Functions		
	AVG	Returns average value of expression, ignoring null values.
	COUNT	Returns number of rows where the expression evaluates to something other than null. If all rows are selected with *, COUNT returns number of rows including duplicate rows and null values.
	MAX	Returns the maximum value of expression, ignoring null values.
	MIN	Returns the minimum value of expression, ignoring null values.
	SUM	Returns the sum of value of expression, ignoring null values.

Group data using the GROUP BY clause

Use the GROUP BY clause to divide the rows in a table into groups. Once this is done, you can use the multiple row functions, also known as group functions, to return summary information for each group.

Guidelines to follow when working with GROUP BY and group functions:

If you include a group function in a SELECT clause, you cannot select individual results as well unless the individual column appears in the GROUP BY clause. You will receive an error if you fail to include the column list.

Using a WHERE clause, you can preexclude rows before dividing them into groups.

You must include the columns in the GROUP BY clause.

You cannot use the column alias in the GROUP BY clause.

By default, rows are sorted by ascending order of the columns included in the GROUP BY list. You can override this by using the ORDER BY clause.

The GROUP BY column does not have to be in the SELECT clause.

You can use the same group function in the SELECT clause in the ORDER BY clause.

You can return summary results for groups and subgroups by listing more than one GROUP BY column.

When you use a mixture of individual items and group functions in the same SELECT statement, you must include a GROUP BY clause that specifies the individual items.

The WHERE clause cannot be used to restrict groups.

Group functions can be nested to a depth of two.

Include or exclude grouped data by using the HAVING clause

In the same way that you use the WHERE clause to restrict the rows that you select, you can use the HAVING clause to restrict groups.

You restrict groups based on aggregate information.

Groups are formed and group functions are calculated before the HAVING clause is applied in the SELECT list.

If you restrict rows based on the result of a group function, you must have a GROUP BY clause as well as the HAVING clause.