



# MySQL - RDBMS

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# Agenda

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- SQL Functions
  - String Functions
  - Numeric Functions
  - Date and Time Functions
  - Flow Control Functions
  - Group Functions
- Group BY Clause
- Having Clause



# Seeking HELP

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- HELP is client command to seek help on commands/functions.
  - HELP SELECT;
  - HELP Functions;
  - HELP SIGN;



# SQL functions

- RDBMS provides many built-in functions to process the data.
- These functions can be classified as:
  - Single row functions
    - One row input produce one row output.
    - e.g. ABS(), CONCAT(), IFNULL(), ...
  - Multi-row or Group functions
    - Values from multiple rows are aggregated to single value.
    - e.g. SUM(), MIN(), MAX(), ...
- These functions can also be categorized based on data types or usage.
  - Numeric functions
  - String functions
  - Date and Time functions
  - Control flow functions
  - Information functions
  - Miscellaneous functions



# Numeric & String functions

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- ABS()
- POWER()
- ROUND(), FLOOR(), CEIL()
  
- ASCII(), CHAR()
- CONCAT()
- SUBSTRING()
- LOWER(), UPPER()
- TRIM(), LTRIM(), RTRIM()
- LPAD(), RPAD()
- REGEXP\_LIKE()



# Date-Time and Information functions

- VERSION()
- USER(), DATABASE()
- MySQL supports multiple date time related data types
  - DATE (3), TIME (3), DATETIME (5), TIMESTAMP (4), YEAR (1)
- SYSDATE(), NOW()
- DATE(), TIME()
- DAYOFMONTH(), MONTH(), YEAR(), HOUR(), MINUTE(), SECOND(), ...
- DATEDIFF(), DATE\_ADD(), TIMEDIFF()
- MAKEDATE(), MAKETIME()



# Control and NULL and List functions

- NULL is special value in RDBMS that represents absence of value in that column.
- NULL values do not work with **relational operators** and need to use special operators.
- Most of functions return NULL if NULL value is passed as one of its argument.
- ISNULL()
- IFNULL()
- NULLIF()
- COALESCE()
- GREATEST(), LEAST()
- IF(condition, true-value, false-value)



# Group functions

- Work on **group of rows of table**.
- Input to function is data from **multiple rows & then output is single row**. Hence these functions are called as "**Multi Row Function**" or "**Group Functions**".
- These functions are used to perform aggregate ops like sum, avg, max, min, count or std dev, etc. Hence these fns are also called as "**Aggregate Functions**".
- Example: SUM(), AVG(), MAX(), MIN(), COUNT().
- **NULL values are ignored by group functions**.
- Limitations of GROUP functions:
  - Cannot select group function along with a column.
  - Cannot select group function along with a single row fn.
  - Cannot use group function in **WHERE clause/condition**.
  - **Cannot nest a group function in another group fn.**





# GROUP BY clause

- GROUP BY is used for analysis of data i.e. generating reports & charts.
- When GROUP BY single column, generated output can be used to plot 2-D chart. When GROUP BY two column, generated output can be used to plot 3-D chart and so on.
- GROUP BY queries are also called as **Multi-dimensional / Spatial queries**.
- Syntactical Characteristics:
  - If a column is used for GROUP BY, then it may or may not be used in SELECT clause.
  - If a column is in SELECT, it must be in GROUP BY.
- When GROUP BY query is fired on database server, it does following:
  - Load data from **server disk** into **server RAM**.
  - **Sort** data on group by **columns**.
  - Group similar records by **group columns**.
  - Perform given aggregate ops on each column.
  - Send result to client.





Thank you!

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