

IMPORTANT FUNCTIONS

USED IN DATA ANALYSIS



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SQL FUNCTIONS

- **SELECT:** Used to retrieve data from a database.
- **WHERE:** Filters data based on specified conditions.
- **GROUP BY:** Groups rows that have the same values into summary rows.
- **HAVING:** Filters records returned by a GROUP BY clause.
- **ORDER BY:** Sorts the result set in ascending or descending order.
- **JOIN:** Combines rows from two or more tables based on a related column.
- **DISTINCT:** Returns unique values in a specified column or expression.
- **COUNT():** Returns the number of rows in a specified table or view.
- **SUM():** Calculates the sum of a set of values.
- **Avg():** Calculates the average of a set of values.
- **CASE Statement:** Allows conditional logic within SQL queries.
- **UNION:** Combines the result sets of two or more SELECT statements.
- **CTE (Common Table Expressions):** Temporary result sets that can be referenced within a SELECT, INSERT, UPDATE, or DELETE statement.
- **Window Functions (e.g., ROW_NUMBER, RANK, etc.):** Perform calculations across a set of rows that are related to the current row.
- **INDEX:** Improves the speed of data retrieval operations on a database table at the cost of additional space and decreased performance for insert, update, and delete operations.
- **TRIGGER:** A database object that automatically performs an action in response to certain events on a particular table or view.
- **EXISTS:** Tests for the existence of any rows in a subquery and returns true if the subquery returns one or more rows.
- **ROLLUP:** Generates subtotal values for the data, based on one or more columns.



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EXCEL FUNCTIONS

- **VLOOKUP:** Searches for a value in the first column of a table array and returns a value in the same row from another column.
- **HLOOKUP:** Similar to VLOOKUP but searches for a value in the first row of a table array and returns a value in the same column.
- **SUMIF/SUMIFS:** Adds the cells specified by a given condition or criteria.
- **COUNTIF/COUNTIFS:** Counts the number of cells specified by a given condition or criteria.
- **AVERAGEIF/AVERAGEIFS:** Calculates the average of cells specified by a given condition or criteria.
- **INDEX/MATCH:** Returns the value in a cell at the intersection of a particular row and column, based on matching a criteria.
- **PivotTables:** Summarizes, sorts, and filters data in Excel.
- **IF/IFERROR:** Executes a specific action based on a condition or returns a value if an error occurs.
- **CONCATENATE/ CONCAT:** Joins two or more strings together.
- **TEXT/DATEVALUE:** Converts text to date values.
- **INDEX/MATCH Combination:** Provides more flexibility than VLOOKUP and HLOOKUP for searching values in a table.
- **Conditional Formatting:** Allows formatting cells based on certain conditions, making data visualization more intuitive.
- **Data Validation:** Restricts the type of data that users can enter into a cell, ensuring data integrity.
- **Array Formulas:** Perform multiple calculations on one or more items in an array.
- **Solver:** An Excel add-in used for optimization and what if analysis.
- **Pivot Charts:** Visual representations of PivotTable data.
- **Goal Seek:** Finds the input needed to achieve a desired result in a formula.
- **Advanced Filter:** Allows filtering data by multiple criteria and copying the filtered results to another location.
- **Text Functions (e.g., LEFTO, RIGHTO, MID, etc.):** Extract or manipulate text data in cells.
- **Data Tables:** Allows performing sensitivity analysis by calculating multiple versions of a formula with different input values.



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STATISTICAL FUNCTIONS

- **mean()**: Central average of values.
- **median()**: Middle value of sorted data.
- **mode()**: Most frequent value.
- **variance()**: Measures data spread.
- **std()**: Standard deviation of dataset.
- **percentile()**: Finds value at a specific percentile.
- **quantile()**: Divides data into quantile groups.
- **corr()**: Measures correlation between variables.
- **cov()**: Finds covariance, relation strength.
- **z_score()**: Detects distance from mean, useful for outliers.
- **t_test()**: Compares means of two groups.
- **chi_square()**: Tests independence between categorical variables.
- **anova()**: Compares means across multiple groups.
- **p_value()**: Measures statistical significance.
- **confidence_interval()**: Range in which true value likely lies.
- **skewness()**: Measures distribution asymmetry.
- **kurtosis()**: Measures tail heaviness of distribution.
- **hypothesis_test()**: Validates assumptions with sample data.
- **pdf()**: Probability density function for continuous distributions.
- **cdf()**: Cumulative probability up to a value.



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NUMPY FUNCTIONS

- **np.array()**: Creates a numpy array.
- **np.mean(), np.median(), np.std()**: Basic statistics.
- **np.sum(), np.min(), np.max()**: Aggregation functions.
- **np.unique()**: Returns unique values.
- **np.reshape()**: Reshapes array.
- **np.where()**: Conditional selection.
- **np.linspace(), np.arange()**: Generates numeric sequences.
- **np.random.rand(), np.random.randint()**: Random number generation.
- **np.argsort()**: Returns the indices that would sort an array.
- **np.sort()**: Sorts array values.
- **np.vstack(), np.hstack()**: Stack arrays vertically or horizontally.
- **np.concatenate()**: Joins arrays along an axis.
- **np.transpose()**: Transposes or swaps axes of an array.
- **np.dot()**: Performs matrix multiplication.
- **np.round()**: Rounds array elements to given decimals.
- **np.log(), np.exp()**: Common mathematical operations.
- **np.argmin(), np.argmax()**: Returns indices of min or max values.
- **np.clip()**: Limit values to a given range.



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PANDAS FUNCTIONS

- **read_csv():** Reads a CSV file into a DataFrame.
- **head():** Returns the first n rows of a DataFrame.
- **info():** Provides a concise summary of a DataFrame, including data types and non-null values.
- **describe():** Generates descriptive statistics of the DataFrame.
- **loc[]:** Accesses a group of rows and columns by label(s) or a boolean array.
- **iloc[]:** Accesses a group of rows and columns by integer position (s).
- **merge():** Combines two DataFrames by a common column.
- **groupby():** Groups DataFrame using a mapper or by a Series of columns.
- **pivot_table():** Creates a spreadsheet-style pivot table as a DataFrame.
- **to_csv():** Writes DataFrame to a CSV file.
- **pd.concat():** Concatenates pandas objects along a particular axis with optional set logic along the other axes.
- **pd.melt():** Unpivots DataFrame from wide to long format.
- **pd.pivot_table():** Creates a spreadsheet-style pivot table as a DataFrame.
- **pd.cut():** Bin values into discrete intervals.
- **pd.qcut():** Quantile-based discretization function.
- **pd.merge():** Combines DataFrame objects by performing a database-style join operation.
- **pd.DataFrame.apply():** Applies a function along an axis of the DataFrame.
- **pd.DataFrame.groupby():** Groups DataFrame using a mapper or by a Series of columns.
- **pd.DataFrame.drop_duplicates():** Removes duplicate rows from the DataFrame.
- **pd.DataFrame.to_excel():** Writes DataFrame to an Excel file.



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MATPLOTLIB FUNCTIONS

- **plt.plot():** Creates a line plot.
- **plt.scatter():** Creates a scatter plot.
- **plt.bar():** Creates a bar plot.
- **plt.hist():** Creates a histogram.
- **plt.boxplot():** Creates a boxplot.
- **plt.xlabel():** Sets the label for the x-axis.
- **plt.ylabel():** Sets the label for the y-axis.
- **plt.title():** Sets the title of the plot.
- **plt.legend():** Adds a legend to the plot.
- **plt.show():** Displays the plot.
- **plt.savefig():** Saves the plot to a file.
- **plt.subplots():** Creates a figure and a set of subplots.
- **plt.figure():** Creates a new figure.
- **plt.xticks():** Sets the tick labels on the x-axis.
- **plt.yticks():** Sets the tick labels on the y-axis.
- **plt.grid():** Adds grid lines to the plot.
- **plt.xlim():** Sets the limits for the x-axis.
- **plt.ylim():** Sets the limits for the y-axis.
- **plt.annotate():** Adds annotations to the plot.
- **plt.subplots_adjust():** Adjusts the spacing between subplots.



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POWER BI DAX FUNCTIONS

- **CALCULATE()**: Core function used to change or control filter context.
- **FILTER()**: Filters a table based on conditions.
- **SUMX()**: Row by row calculation over a table.
- **AVERAGEX()**: Average values iteratively across rows.
- **RELATED()**: Pulls related table values in a model.
- **ALL()**: Removes filters to return overall totals.
- **DIVIDE()**: Handles division without zero errors.
- **RANKX()**: Creates ranking based on a measure or column.
- **DISTINCT()**: Returns unique values.
- **SWITCH()**: Cleaner alternative to nested IF conditions.
- **IF()**: Basic conditional logic.
- **SAMEPERIODLASTYEAR()**: Time comparison with previous year.
- **TOTALYTD()**: Year to date calculation.
- **VALUES()**: Returns unique values, often used inside CALCULATE for context.
- **SUMMARIZE()**: Creates grouped summary tables.
- **ADDCOLUMNS()**: Adds calculated columns in a table expression.
- **CALCULATETABLE()**: Like CALCULATE but returns a table instead of a value.
- **REMOVEFILTERS()**: Clears filters from specific columns or entire table.
- **VAR**: Helps write clean and optimized measures by storing reusable values.
- **FORMAT()**: Converts numbers into readable formats like percent or currency.
- **DATEADD()**: Shifts dates forward or backward for time intelligence.
- **USERELATIONSHIP()**: Activates inactive relationships in a model.
- **TOPN()**: Returns top rows based on logic, used a lot in dashboards.



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