Summary of DAX categories of functions

Introduction to DAX

When you create a Pivot Table report using PowerPivot, you are usually joining several tables together to analyze the data in all the tables and generate results from all the information. When you link tables together in **Pivots**, you create what is called a **Data Model** and when you are working in PowerPivot you are working directly in this **Data Model**. Creating formulas in the **Data Model**, requires you to use a specialized language and syntax. The language you use to create formulas in a **Data Model** Is **DAX**.

A significant difference between a **DAX Function** and an **Excel function** is that **DAX Functions** will always refer to a complete row, column, or table. On the other hand, **Excel Functions** refer to a single cell or range of cells. This allows for **DAX Functions** to return an entire table of results.

In **Pivots**, you can use advanced formulas called **Measures**. They can only be created after a **PivotTable** or **PivotChart** has been added to a workbook. They will provide you with results dynamically and are dependent upon any filters that have been applied to the **PivotTable** or **PivotChart**. For example, if you wanted to find the number of products that a single warehouse has that are worth over $500, you could use a measure to find that information. **Measures** are often created using **DAX**.

Variables can also be used in a formula created with **DAX** which increases the flexibility of the formula. By declaring a **Variable** first, the **Variable** name can be inserted in more complex expressions to make them more readable. When a **Variable** is being defined, the definition begins with an equals sign followed by “var”. The **Variable** name is then inserted followed by an expression. The syntax is as follows:
VAR <variable name> = <expression>.

The results of the expression are stored as a **Named Variable**. Once the **Named Variable** is declared, it can be used in many other expressions.

While there are lots of **DAX Functions** that you can choose from, each function will be classified under one of the following categories:

- **Data and Time functions**: Functions of this type are used to manipulate date and time values. As such, they are like the data and time functions that can be used in Excel.
- **Filter functions**: These functions are used to manipulate data and filter it dynamically.
- **Information functions**: This type of function is used to scan the values inside a cell range and match them against an expected data type.
- **Logical functions**: Typically, these functions are used to validate expressions and values, and then work with other data that is based upon the evaluation.
- **Math and Trigonometric functions**: Functions of this type are used to perform mathematical calculations.
- **Statistical functions**: These functions are used to generate statistical data such as minimum and maximum values, as well as averages.
- **Time Intelligence functions**: This type of function is used to manipulate data using time periods. It can be used to compare data of one time-period against another.

Aggregate Functions are also more powerful in **DAX**. The standard **Aggregate Functions** in **Excel** can be used in **Excel** spreadsheets, **Pivot Tables**, and **PowerPivot Tables**. **DAX Aggregate Functions** address many of the shortcomings of standard functions by providing a means to aggregate data across columns and tables instead of just cells and groups of cells.

Below you will see the types of **Aggregate Functions** that are available and what they do:

AVERAGE	This function returns an average of all the numerical data in a column
AVERAGEA	This function returns an average of all the numerical data in a column, but it can also work with non-numerical data as well.
COUNT	This function returns a count of the number of cells in a column that contain numerical data.
COUNTA	This function returns a count of the number of cells in a column that contain any data (numerical or otherwise).
MIN	This function returns the smallest number value that was found in a column.
MINX	Returns the smallest value from a set of expressions evaluated over a table.
MAX	This function returns the largest number value that was found in a column.
MAXX	Returns the largest value from a set of expressions evaluated over a table.
SUM	This function will add and display the total of all numbers in a column.

In addition to these functions, there are additional functions that are available in the DAX language only. These functions include the following.

AVERAGEX	Averages a set of expressions evaluated over a table.

COUNTAX	Counts a set of expressions evaluated over a table.
COUNTX	Counts the total number of rows in a table.
COUNTROWS	Counts the number of rows returned from a nested table function, such as filter function.
SUMX	Returns the sum of a set of expressions evaluated over a table.

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