Table manipulation functions

DAX IN POWER BI

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Table manipulation functions overview

Previously seen functions

```
DISTINCT(<table> | <table>)
```

Removes duplicate rows from a table or values from a column

```
SELECTCOLUMNS(<table>, <name>, <expression>)
```

Returns the selected columns from another table as a new table

New functions

```
ADDCOLUMNS(<table>, <name>, <expression>)
```

Returns the input table appended with the selected columns from another table

```
SUMMARIZE(<table>,
          <groupBy_columnName>,
          <name>,
          <expression>)
```

Returns a summary table for the requested totals over a set of groups

ADDCOLUMNS()

```
ADDCOLUMNS(<table>, <name>, <expression>)
```

Returns the input table appended with the selected columns from another table

```
ADDCOLUMNS(Fact_table,
           "Profit",
           Revenue - Costs)
```

ADDCOLUMNS()

```
ADDCOLUMNS(<table>, <name>, <expression>)
```

Returns the input table appended with the selected columns from another table

```
ADDCOLUMNS(Fact_table,
           "Profit",
           Revenue - Costs)
```

Revenue	Costs	Profit
100	25	**75**
150	25	**125**

ADDCOLUMNS()

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ADDCOLUMNS(<table>, <name>, <expression>)
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Returns the input table appended with the selected columns from another table

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ADDCOLUMNS(Fact_table,
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```
SELECTCOLUMNS(<table>, <name>, <expression>)
```

Returns the selected columns from another table as a new table

```
SELECTCOLUMNS(Fact_table,
              "Profit",
              Revenue - Costs)
```

Profit
75
125

SUMMARIZE()

```
SUMMARIZE(<table>,
          <groupBy_columnName>,
          <name>,
          <expression>)
```

Returns a summary table for the requested totals over a set of groups

SUMMARIZE()

```
SUMMARIZE(<table>,
          <groupBy_columnName>,
          <name>,
          <expression>)
```

Returns a summary table for the requested totals over a set of groups

Year	Category	Amount
2019	Tickets	50
2019	Postcards	500
2020	Tickets	200
2020	Tickets	400

```
SUMMARIZE(Amounts,
          Amounts[Year],
          Amounts[Category],
          "Total Amount",
          SUM(Amounts[Amount]))
```

SUMMARIZE()

```
SUMMARIZE(<table>,
          <groupBy_columnName>,
          <name>,
          <expression>)
```

Returns a summary table for the requested totals over a set of groups

Year	Category	Amount
2019	Tickets	50
2019	Postcards	500
2020	Tickets	200
2020	Tickets	400

```
SUMMARIZE(Amounts,
          Amounts[Year],
          Amounts[Category],
          "Total Amount",
          SUM(Amounts[Amount]))
```

Year	Category	Total Amount
2019	Tickets	50
2019	Postcards	500
2020	Tickets	600

SUMMARIZE() best practices

- Created columns of `SUMMARIZE()` can give unexpected results based on context

```
SUMMARIZE(Amounts,
          Amounts[Year],
          Amounts[Category]),
          "Total Amount",
          SUM(Amounts[Amount])
```

- Best practice is to wrap `ADDCOLUMNS()` around `SUMMARIZE()` when creating new columns

```
ADDCOLUMNS(
    SUMMARIZE(Amounts,
                Amounts[Year],
                Amounts[Category]),
    "Total Amount",
    SUM(Amounts[Amount])
)
```

Let's practice!

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Table manipulations using DAX

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Time intelligence functions

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Time intelligence functions

- Manipulate and compare data using time periods

- Compare current period with previous period
- Estimate monthly/quarterly/yearly goals
- Many time intelligence functions exist

Time intelligence functions returning a date

- `NEXTDAY(<dates>)`
  - *Returns the next day*

dates	NEXTDAY
2009-07-07	2009-07-08
2009-07-08	2009-07-09
2009-07-09	2009-07-10

Time intelligence functions returning a date

- `NEXTDAY(<dates>)`
  - *Returns the next day*
- `SAMEPERIODLASTYEAR(<dates>)`
  - *Returns the last year*

dates	NEXTDAY	LASTYEAR
2009-07-07	2009-07-08	2008-07-07
2009-07-08	2009-07-09	2008-07-08
2009-07-09	2009-07-10	2008-07-09

- `DATESBETWEEN(<dates>, <start_date>, <end_date>)`
  - *Returns dates between start and end date*

Time intelligence functions returning a date

- `NEXTDAY(<dates>)`
  - *Returns the next day*
- `SAMEPERIODLASTYEAR(<dates>)`
  - *Returns the last year*

dates	NEXTDAY	LASTYEAR
2009-07-07	2009-07-08	2008-07-07
2009-07-08	2009-07-09	2008-07-08
2009-07-09	2009-07-10	2008-07-09

- `DATESBETWEEN(<dates>, <start_date>, <end_date>)`
  - *Returns dates between start and end date*

dates	DATESBETWEEN
2009-07-07	
2009-07-08	2009-07-08
2009-07-09	2009-07-09
2009-07-10	

Time intelligence functions returning a date

```
Mid Season Sales =
CALCULATE(
    SUM(Fact_Table[Sales]),
    DATESBETWEEN(Dim_Date[Date Key],
                 DATE(2014, 10, 04),
                 DATE(2014, 10, 26)
                 )
)
```

Time intelligence functions returning a value

```
TOTALYTD(<expression>, <dates> [,<filter>])
TOTALQTD(<expression>, <dates> [,<filter>])
TOTALMTD(<expression>, <dates> [,<filter>])
```

Returns the year, quarter, or month to date value of the expression.

```
Sum_YTD =
TOTALYTD(
    SUM(Fact_Table[Value]),
    Dim_Date[Date Key]
)
```

Time intelligence functions returning a value

```
TOTALYTD(<expression>, <dates> [,<filter>])
TOTALQTD(<expression>, <dates> [,<filter>])
TOTALMTD(<expression>, <dates> [,<filter>])
```

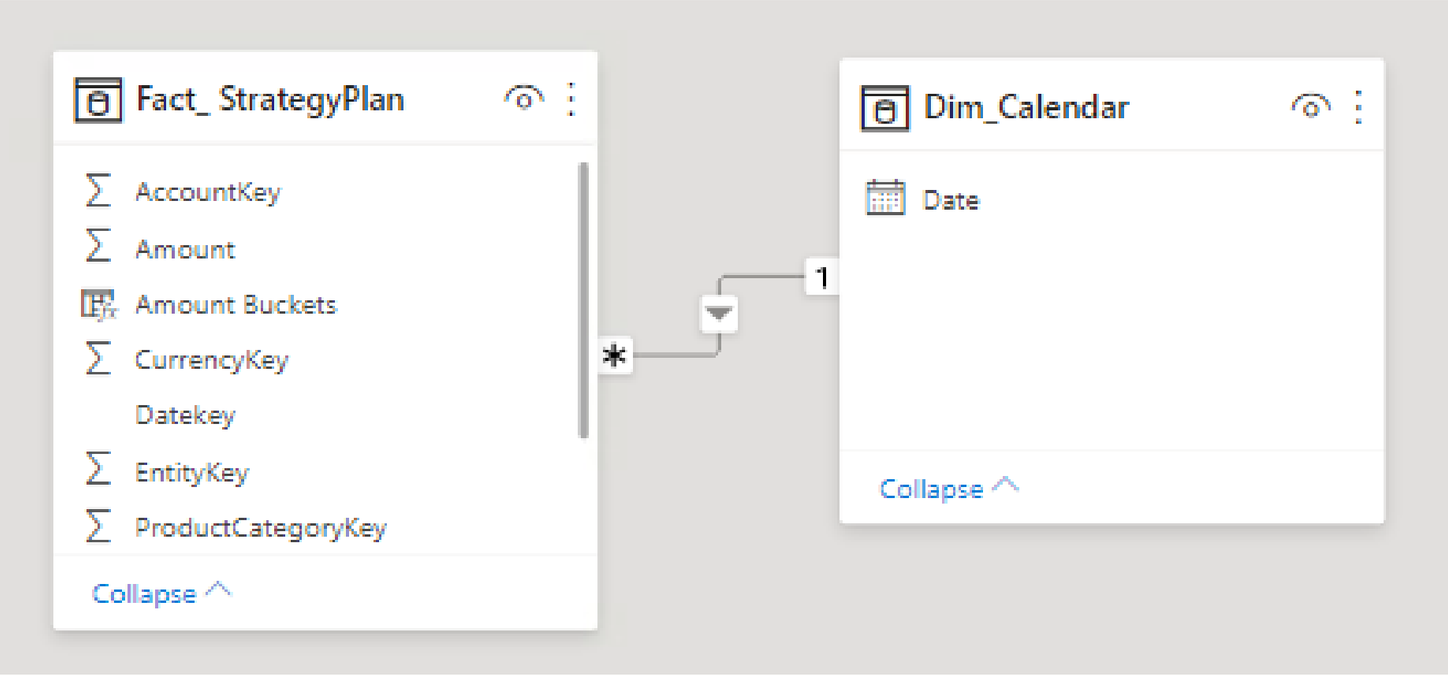
Returns the year, quarter, or month to date value of the expression.

```
Sum_YTD =
TOTALYTD(
    SUM(Fact_Table[Orders]),
    Dim_Date[Date Key]
)
```

Year	Month	Value	Sum_YTD
2021	Jan	6,532	6,532
2021	Feb	4,263	10,795
2021	Mar	1,256	12,051
Total		**12,051**	**12,051**

Best practices for time intelligence functions

- Use a separate date dimension table



A date column in the fact table could contain missing dates!

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Time intelligence in Power BI

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Congratulations!

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DAX opens doors

- DAX formulas are used in:
  - Measures
  - Calculated columns
  - Calculated tables
  - Row-level security

Course overview

Chapter 1

- Row vs. query vs. filter context
- Implicit vs. explicit measures
- Use of variables with `VAR`

Chapter 2

- Filtering functions: `CALCULATE()`, `FILTER()`
- Counting functions: `COUNT()`, `DISTINCTCOUNT()`, `COUNTROWS()`

Chapter 3

- Logical functions: `IF()`, `SWITCH()`
- Row-level security: `USERPRINCIPALNAME()`

Chapter 4

- Table manipulation functions: `ADDCOLUMNS()`, `SUMMARIZE()`
- Time intelligence functions: `SAMEPERIODLASTYEAR()`, `TOTALYTD()`

Use it or lose it

Download our cheat sheet on the course landing page!

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Glossary of DAX functions and operators

> Math & statistical functions

- **SUM(<column>)**
  Adds all the numbers in a column.
- **AVERAGE(<column>)**
  Returns the average (arithmetic mean) of all the numbers in a column.
- **SUMX(<table>, <expression>)**
  Returns the sum of an expression evaluated for each row in a table.
- **COUNTX(<table>, <expression>)**
  Counts the number of rows from an expression that evaluates to a non-blank value.
- **AVERAGEX(<table>, <expression>)**
  Calculates the average (arithmetic mean) of a set of expressions evaluated over a table.
- **DIVIDE(<numerator>, <denominator> [,<alternateresult>])**
  Performs division and returns alternate result or BLANK() on division by 0.
- **MIN(<column>)**
  Returns a minimum value of a column.
- **MAX(<column>)**
  Returns a maximum value of a column.
- **COUNTROWS([<table>])**
  Counts the number of rows in a table.
- **DISTINCTCOUNT(<column>)**
  Counts the number of distinct values in a column.
- **RANKX(<table>, <expression>[, <value>[, <order>[, <ties>]]])**
  Returns the ranking of a number in a list of numbers for each row in the table argument.

> Filter functions

- **FILTER(<table>, <filter>)**
  Returns a table that is a subset of another table or expression.
- **CALCULATE(<expression>[, <filter1> [, <filter2> [, …]]])**
  Evaluates an expression in a filter context.
- **HASONEVALUE(<columnName>)**
  Returns TRUE when the context for columnName has been filtered down to one distinct value only. Otherwise it is FALSE.
- **ALL([<table> | <column>[, <column>[, <column>[,…]]]])**
  Returns all the rows in a table, or all the values in a column, ignoring any filters that might have been applied.

> Logical functions

- **IF(<logical_test>, <value_if_true>[, <value_if_false>])**
  Checks a condition, and returns a certain value depending on whether it is true or false.
- **AND(<logical 1>, <logical 2>)**
  Checks whether both arguments are TRUE, and returns TRUE if both arguments are TRUE. Otherwise, it returns FALSE.
- **OR(<logical 1>, <logical 2>)**
  Checks whether one of the arguments is TRUE to return TRUE. The function returns FALSE if both arguments are FALSE.
- **NOT(<logical>)**
  Changes TRUE to FALSE and vice versa.
- **SWITCH(<expression>, <value>, <result>[, <value>, <result>…[, <else>]])**
  Evaluates an expression against a list of values and returns one of multiple possible result

> Date & time functions

- **CALENDAR(<start_date>, <end_date>)**
  Returns a table with a single column named "Date" that contains a contiguous set of dates.

> Time intelligence functions

- **TOTALYTD(<expression>,<dates>[,<filter>][,<year_end_date>])**
  Evaluates the year-to-date value of the expression in the current context.
- **SAMEPERIODLASTYEAR(<dates>)**
  Returns a table that contains a column of dates shifted one year back in time.

> Relationship functions

- **CROSSFILTER()**
  Specifies the cross-filtering direction to be used in a calculation.
- **RELATED()**
  Returns a related value from another table.

> Table manipulation functions

- **SUMMARIZE(<table>, <groupBy_columnName>[, <groupBy_columnName>]…[, <name>, <expression>]…)**
  Returns a summary table for the requested totals over a set of groups.
- **DISTINCT(<table>)**
  Returns a table by removing duplicate rows from another table or expression.
- **ADDCOLUMNS(<table>, <name>, <expression>[, <name>, <expression>]…)**
  Adds calculated columns to the given table or table expression.
- **SELECTCOLUMNS(<table>, <name>, <expression>[, <name>, <expression>]…)**
  Selects calculated columns from the given table or table expression.

> Text functions

- **SUBSTITUTE(<text>, <old_text>, <new_text>, <instance_num>)**
  Replaces existing text with new text in a string.

> Information functions

- **USERPRINCIPALNAME()**
  Returns the user principal name or email address. This function has no arguments.

> DAX statements

- **VAR(<name> = <expression>)**
  Stores the result of an expression as a named variable. To return the variable, use RETURN after the variable is defined.

> Other functions

- **BLANK()**
  Returns a blank.

> DAX Operators

Comparison operators	Meaning
=	Equal to
= =	Strict equal to
>	Greater than
<	Smaller than
> =	Greater than or equal to
= <	Smaller than or equal to
< >	Not equal to

Text operator	Meaning	Example
&	Concatenates text values	Concatenates text values | [City]&", "&[State]

Logical operator	Meaning	Example
&&	AND condition	([City] = "Bru") && ([Return] = "Yes"))
||	OR condition	([City] = "Bru") || ([Return] = "Yes"))
IN {}	OR condition for each row	Product[Color] IN {"Red", "Blue", "Gold"}

Can't find the function you're looking for?
Take a look at the Microsoft documentation

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See you soon!

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