

Excel DAX



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About the Tutorial

DAX (Data Analysis Expressions) is a formula language that helps you create new information from the data that already exists in your Data Model. DAX formulas enable you to perform data modeling, data analysis, and use the results for reporting and decision making.

It is a collection of functions, operators, and constants that can be used in a formula or expression to calculate and return one or more values. DAX is the formula language associated with the Data Model of Excel Power Pivot.

Audience

This tutorial has been designed for all those readers who depend heavily on MS-Excel to prepare charts, tables, and professional reports that involve complex data. It will help all those readers who use MS-Excel regularly to analyze data. Professionals who use data modeling and data analysis for reporting and decision-making purposes will benefit from this.

Prerequisites

This tutorial is an extension to Excel Power Pivot tutorial, hence it is a good idea to brush up on the Excel Power Pivot tutorial before you delve into DAX. Knowledge of Excel Functions and Excel Formulas is not necessary for this tutorial, as DAX is entirely for the Data Model in the Power Pivot window.

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1. DAX – OVERVIEW

DAX stands for **Data Analysis Expressions**. DAX is a formula language and is a collection of functions, operators, and constants that can be used in a formula or expression to calculate and return one or more values. DAX is the formula language associated with the Data Model of Excel Power Pivot.

It is not a programming language, but is a formula language that allows the users to define custom calculations in calculated columns and calculated fields (also known as measures). DAX helps you create new information from the data that is already present in your Data Model. DAX formulas enable you to perform data modeling, data analysis, and use the results for reporting and decision making.

DAX includes some of the functions that are used in Excel formulas, but with modified functionality and additional functions that are designed to work with relational data and perform dynamic aggregation.

Importance of DAX

The foundation of DAX is the Data Model that is the Power Pivot database in Excel. Data Model consists of tables between which relationships can be defined so as to combine the data from different sources. The data connections to the Data Model can be refreshed as and when the source data changes. Data Model makes the use of the Power Pivot xVelocity in-memory analytics engine (VertiPaq) that makes the data operations to be as quick as possible in addition to accommodating several thousands of rows of data. For more information on Data Model, refer to the tutorial – Power Pivot.

DAX in conjunction with Data Model enables several power features in Excel – Power Pivot, Power PivotTables, Power PivotCharts and Power View. You can use DAX to solve a number of basic calculations and data analysis problems.

DAX is also useful in Power BI to create a new Power BI Desktop file and import some data into it. Further, DAX formulas provide capabilities such as analyzing growth percentage across product categories and for different date ranges, calculating year-over-year growth compared to market trends and many others as well.

Learning how to create effective DAX formulas will help you get the most out of your data. When you get the information you need, you can begin to solve real business problems that affect your bottom line. This is the power in Power BI and DAX will help you get there.

Prerequisites for this Tutorial

This tutorial is an extension to Excel Power Pivot tutorial, where you have learnt about the Power Pivot feature, Data Model, Relationships, Power PivotTables, Power Pivot Charts, etc.

It would be a good idea to brush up on this tutorial before you delve into DAX as this tutorial is more on the DAX language wherein you write formulas for the analysis of data in the Data Model and report those results.

This tutorial also introduces DAX Functions that are like Excel Functions, but with some variations. A comparison of Excel Functions and DAX Functions is provided to help you distinguish both. Similarly, Excel formulas and DAX formulas are compared and the similarities and differences are discussed. A good understanding of these differences would help you in writing effective DAX formulas efficiently.

Knowledge of Excel Functions and Excel Formulas is not necessary for this tutorial, as DAX is entirely for the Data Model in the Power Pivot window. You will get into an Excel worksheet only to view the Power PivotTables, Power Pivot Charts and Power View visualizations that are based on Data Model. However, if you are an Excel professional with good amount of knowledge in Excel Functions and Formulas, better make a note of what is mentioned in the previous section and the details given in the course of this tutorial.

Calculated Columns

Calculated columns are the columns that you can add to a table in the Data Model, by means of a DAX formula. You have already learnt about them in Excel Power Pivot tutorial, but you will learn in detail in the chapter – Calculated Columns as DAX is all about calculated columns, calculated fields, and DAX functions.

Calculated Fields / Measures

You cannot change the values in the tables in the Data Model by editing. However, you can add calculated fields to a table that can be used in the Power PivotTables. The calculated fields are defined by giving a name and by defining a DAX formula. For details, refer to the chapter – **Calculated Fields**.

The calculated fields were named as measures in the Excel versions prior to Excel 2013. They are renamed back to measures in Excel 2016. In this tutorial, we will refer them as calculated fields. But, note that the terms - calculated fields and measures - are synonymous and refer to the same in all aspects.

You can edit a calculated field after it is defined and stored. You can change the DAX formula used in the definition or you can rename the calculated field. You will learn about this in the chapter – **Editing a Calculated Field**. You can delete a calculated field. Refer to the chapter – **Deleting a Calculated Field**.

DAX Formulas

DAX formulas form the heart of the DAX language. You can create calculated fields and calculated columns by defining them with DAX formulas. You can write DAX formulas for the

data analysis operations. DAX formulas do not refer to the individual cells or range of cells in the table, but refer to the tables and columns in the Data Model. A column in a table in the Data Model must contain the same data type.

DAX formulas contain the tables, columns, calculated columns, calculated fields, DAX operators, and DAX functions. Refer to the chapter – **DAX Formulas** to learn in detail.

DAX Syntax

As is the case with any language, DAX, the formula language also has a syntax. Your DAX formulas should follow DAX syntax, or else, you will either get errors at design time or at run time or you will receive incorrect results.

You will learn the following in the chapter – **DAX Syntax**:

- DAX naming requirements for Tables, Columns
- DAX operators
- DAX special values
- DAX data types
- DAX implicit data type conversions

DAX Operators

DAX is a formula language and hence makes the use of the operators in defining the formulas. DAX has the following types of operators –

- DAX Arithmetic Operators
- DAX Comparison Operators
- DAX Text Concatenation Operator
- DAX Logical Operators

DAX operator precedence order is also defined and varies from Excel operator precedence order. Refer to the chapter – **DAX Operators**.

DAX Standard Parameters

DAX Function syntax has certain requirements on parameters. This is because the DAX function arguments can be tables or columns or calculated fields or other DAX functions. Refer to the chapter - **DAX Standard Parameters**.

DAX Functions

Excel 2013 has 246 DAX functions that you can use in DAX formulas. You will learn about these functions at the category level in the chapter – **DAX Functions**. However, for details

on each DAX function syntax, parameters, usage and return values, you have to refer to our tutorial on – **DAX Functions**. The section names used for the description of each DAX function is given in the chapter – **Understanding DAX Functions**.

As DAX functions are required in writing the DAX formulas and the results of the DAX functions used depend on the context they are used, you might have to go back and forth between these two tutorials to get a grasp on DAX that you will use in Data Modeling with DAX and Power BI.

DAX Special Functions

DAX has some functions that make DAX powerful. These DAX functions come under the categories – DAX time intelligence functions and DAX filter functions and require a special mention. You will learn about DAX time intelligence functions in the chapter – **Understanding DAX Time Intelligence**. You will learn about the usage of DAX filter functions in the chapter – **DAX Filter Functions**.

DAX Evaluation Context

The results of a DAX formula can vary based on the context that is used for evaluation. DAX has two types of evaluation context – Row Context and Filter Context. Refer to the chapter - **DAX Evaluation Context**.

DAX Formulas

DAX is a formula language and you have to get the most of it in writing the DAX formulas. Refer to the chapter - DAX Formulas to learn about the formula syntax and how to create them easily and correctly.

The results of the DAX formulas change whenever the data is refreshed and whenever the DAX formulas are recalculated. You have to understand the difference between data refresh and recalculation. Refer to the chapter - **Updating the Results of DAX Formulas**.

Data in the Data Model is expected and subjected to change from time to time. This is because the data is used for data analysis activities that require up-to-date data at any point of time. To understand the different ways of refreshing data, refer to the chapter - **Updating Data in Data Model**.

You will understand the different types of DAX formula recalculation in the chapter - **Recalculating DAX Formulas**.

DAX formula recalculations have to consider data dependencies and follow a specific order. Otherwise, you might get errors or erroneous results. Refer to the chapter - **Troubleshooting DAX Formula Recalculation for details**.

You will get an insight into some of the common DAX formula errors and you will learn how to fix those errors, in the chapter - **DAX Formula Errors**.

DAX Scenarios

If you start learning a new language, the best way of getting acquainted to the language is by understanding where to use what. Similarly, DAX being a formula language meant for data analysis, you need to understand the various scenarios where it can be used.

Refer to the following chapters to get details on this.

- DAX Scenarios
- Scenarios - Performing Complex Calculations
- Scenarios - Working with Text and Dates
- Scenarios - Conditional Values and Testing for Errors
- Scenarios - Using Time Intelligence
- Scenarios - Ranking and Comparing Values

2. DAX – CALCULATED COLUMNS

A **calculated column** is a column that you add to an existing table in the Data Model of your workbook by means of a DAX formula that defines the column values. Instead of importing the values in the column, you create the calculated column.

You can use the calculated column in a PivotTable, PivotChart, Power PivotTable, Power PivotChart or Power View report just like any other table column.

Understanding Calculated Columns

The DAX formula used to create a calculated column is like an Excel formula. However, in DAX formula, you cannot create different formulas for different rows in a table. The DAX formula is automatically applied to the entire column.

For example, you can create one calculated column to extract Year from the existing column – Date, with the DAX formula –

```
=YEAR ([Date])
```

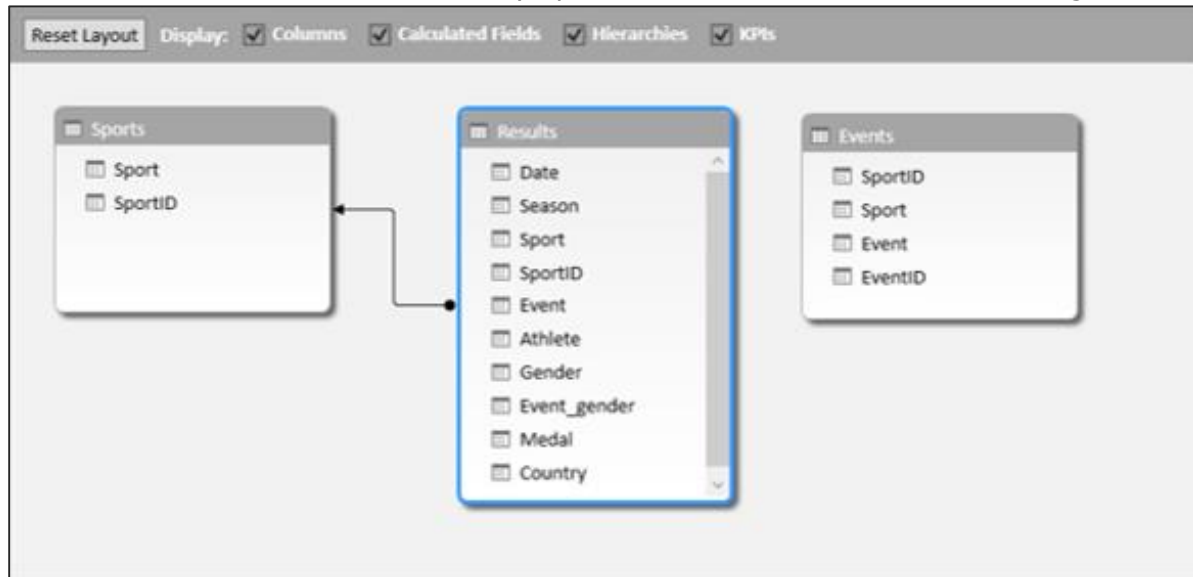
YEAR is a DAX function and Date is an existing column in the table. As seen, the table name is enclosed in brackets. You will learn more about this in the chapter – DAX Syntax.

When you add a column to a table with this DAX formula, the column values are computed as soon as you create the formula. A new column with the header CalculatedColumn1 filled with Year values will get created.

Column values are recalculated as necessary, such as when the underlying data is refreshed. You can create calculated columns based on existing columns, calculated fields (measures), and other calculated columns.

Creating a Calculated Column

Consider the Data Model with the Olympics Results as shown in the following screenshot.



- Click the Data View.
- Click the Results tab.

You will be viewing the Results table.

The screenshot shows the PowerPivot for Excel interface with a data table. The ribbon is set to the Design tab. The table has the following columns: Date, Season, Sport, Sp..., Event, Athlete, Gender, Event_gender, Medal, Country, and Add Column. The data rows show a consistent record of Gold medals for Canada in Ice Hockey events from 1924 to 1932.

Date	Season	Sport	Sp...	Event	Athlete	Gender	Event_gender	Medal	Country	Add Column
1/1/1924 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/2/1924 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/3/1924 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/4/1924 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/5/1924 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/6/1924 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/7/1924 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/8/1924 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/1/1928 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/2/1928 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/3/1928 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/4/1928 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/5/1928 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/6/1928 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/7/1928 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/8/1928 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/1/1932 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/2/1932 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	

As seen in the above screenshot, the rightmost column has the header – Add Column.

- Click the Design tab on the Ribbon.
- Click Add in the Columns group.

The screenshot shows the 'Design' tab in the PowerPivot for Excel ribbon. The 'Columns' group is selected, and the 'Add' button is being clicked. The data table below shows columns for Date, Season, Sport, Sp..., Event, Athlete, Gender, Event_gender, Medal, and Country. The 'Add Column' column is currently empty.

Date	Season	Sport	Sp...	Event	Athlete	Gender	Event_gender	Medal	Country	Add Column
1/1/1924 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/2/1924 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/3/1924 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/4/1924 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/5/1924 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/6/1924 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/7/1924 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/8/1924 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/1/1928 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/2/1928 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/3/1928 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/4/1928 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/5/1928 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/6/1928 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/7/1928 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/8/1928 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/1/1932 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	
1/2/1932 12:00:0...	Winter	Ice Hoc...	532	ice hock...		Men	M	Gold	CAN	

The pointer will appear in the formula bar. That means you are adding a column with a DAX formula.

- Type =YEAR ([Date]) in the formula bar.

The screenshot shows the PowerPivot for Excel interface. The 'Advanced' tab is active, and the formula bar contains the DAX formula `=YEAR([Date])`. The data table below has columns: Date, Season, Sport, Sp..., Event, Athlete, Gender, Event_gender, Medal, Country, and Add Column. The 'Add Column' header is highlighted in green.

Date	Season	Sport	Sp...	Event	Athlete	Gender	Event_gender	Medal	Country	Add Column
1/1/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/2/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/3/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/4/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/5/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/6/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/7/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/8/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/1/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/2/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/3/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/4/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/5/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/6/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/7/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/8/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/1/1932 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	
1/2/1932 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	

As can be seen in the above screenshot, the rightmost column with the header – Add Column is highlighted.

- Press Enter.

It will take a while (few seconds) for the calculations to be done. Please wait.

The new calculated column will get inserted to the left of the rightmost Add Column.

Date	Season	Sport	Sp...	Event	Athlete	Gender	Event_gender	Medal	Country	CalculatedColumn1	Add Column
1/1/1924 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/2/1924 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/3/1924 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/4/1924 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/5/1924 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/6/1924 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/7/1924 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/8/1924 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/1/1928 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/2/1928 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/3/1928 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/4/1928 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/5/1928 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/5/1928 12:00:00 AM	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/7/1928 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/8/1928 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/1/1932 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1932	
1/2/1932 12:00:00...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1932	

As shown in the above screenshot, the newly inserted calculated column is highlighted. Values in the entire column appear as per the DAX formula used. The column header is CalculatedColumn1.

Renaming the Calculated Column

To rename the calculated column to a meaningful name, do the following –

- Double-click on the column header. The column name will be highlighted.

Date	Season	Sport	Sp...	Event	Athlete	Gender	Event_gender	Medal	Country	CalculatedColumn1	Add Column
1/1/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/2/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/3/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/4/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/5/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/6/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/7/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/8/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/1/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/2/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/3/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/4/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/5/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/6/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/7/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/8/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/1/1932 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1932	
1/2/1932 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1932	

- Select the column name.
- Type Year (the new name).

Date	Season	Sport	Sp...	Event	Athlete	Gender	Event_gender	Medal	Country	Year	Add Column
1/1/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/2/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/3/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/4/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/5/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/6/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/7/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/8/1924 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1924	
1/1/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/2/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/3/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/4/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/5/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/6/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/7/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/8/1928 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1928	
1/1/1932 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1932	
1/2/1932 12:00:0...	Winter	Ice Hoc...	S32	ice hock...		Men	M	Gold	CAN	1932	

As seen in the above screenshot, the name of the calculated column got changed.

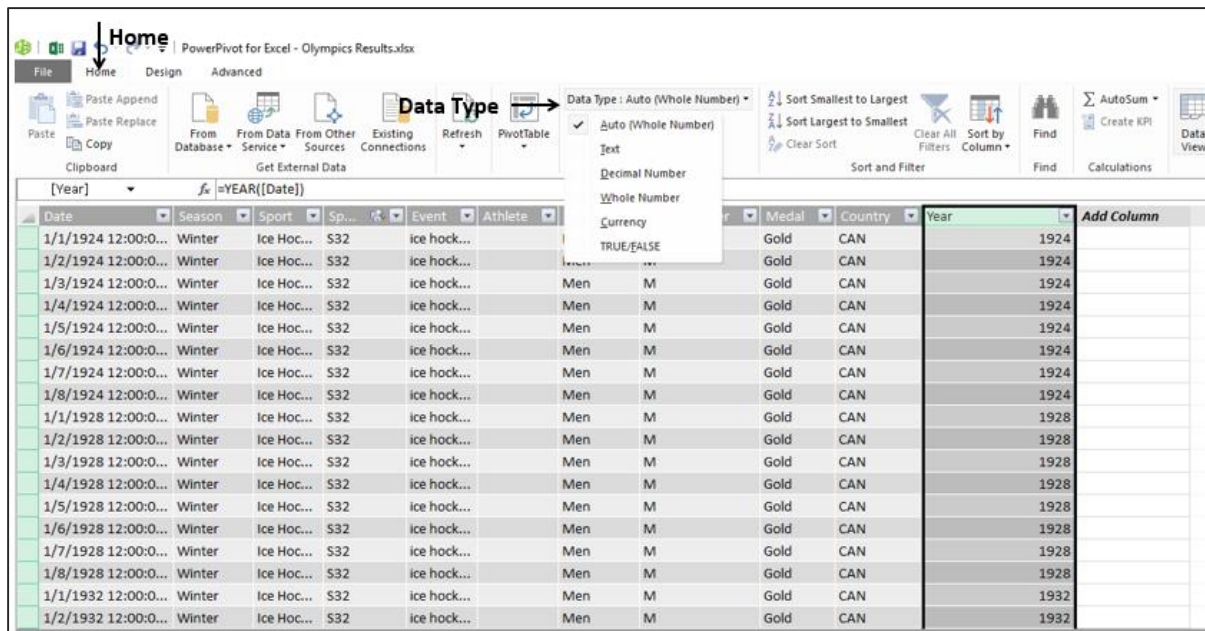
You can also rename a calculated column by right-clicking on the column and then clicking on Rename in the dropdown list.

Just make sure that the new name does not conflict with an existing name in the table.

Checking the Data Type of the Calculated Column

You can check the data type of the calculated column as follows –

- Click the Home tab on the Ribbon.
- Click the Data Type.



As you can see in the above screenshot, the dropdown list has the possible data types for the columns. In this example, the default (Auto) data type, i.e. the Whole Number is selected.

Errors in Calculated Columns

Errors can occur in the calculated columns for the following reasons -

- Changing or deleting relationships between the tables. This is because the formulas that use columns in those tables will become invalid.
-
- The formula contains a circular or self-referencing dependency.

Performance Issues

As seen earlier in the example of Olympics results, the Results table has about 35000 rows of data. Hence, when you created a column with a DAX formula, it had calculated all the 35000+ values in the column at once, for which it took a little while. The Data Model and the tables are meant to handle millions of rows of data. Hence, it can affect the performance when the DAX formula has too many references. You can avoid the performance issues doing the following –

- If your DAX formula contains many complex dependencies, then create it in steps saving the results in new calculated columns, instead of creating a single big formula at once. This enables you to validate the results and assess the performance.
-
- Calculated columns need to be recalculated when data modifications occur. You can set the recalculation mode to manual, thus saving frequent recalculations. However, if any values in the calculated column are incorrect, the column will be grayed out, until you refresh and recalculate the data.

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