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Co-funded by
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Data Analysis Using Structured Tables

WEEK 7

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Data Analysis Using Structured Tables

Introduction to Structured Tables

A big disadvantage of ordinary tables is that if we calculate some aggregation calculations above their columns, either using formulas or perhaps pivot tables, and we add some additional rows with data back to the table at the end, this data is not included in the existing calculations. Structured tables help us solve this problem and many others.

Structured tables in Excel can be found under the name **Tables**, which is a rather confusing name, because the word "table" is used in Excel for any table, not only the structured one. But sometimes in the literature you will also come across the names **Formatted Tables** or **Smart Tables**.

Structured tables are tables that are similar to relational database tables in their principles of use. In calculations, instead of cell addresses, structured references are used, i.e. references using table column names that Excel creates automatically. You can even create relationships between structured tables using primary and foreign keys, just like in relational databases, creating a so-called data model in Excel.

A structured table can be created in two ways, but always first place the cursor in the prepared ordinary table from which the structured table should be created:

- **HOME** tab - **FORMAT AS TABLE** - when creating, it is necessary to choose the style of the table, but this is often an unnecessary step, so it is more convenient to use the following option.
- **INSERT** tab - **TABLE** - the new structured table is formatted with the default style, but it can be changed at any time.

In both cases, it is necessary to check the data range in the CREATE TABLE dialog box, or check that the table contains headers, see Figure 4-1. If the data area contains only text



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data, Excel will not automatically recognize that the table contains headers and you must select the appropriate check box manually.

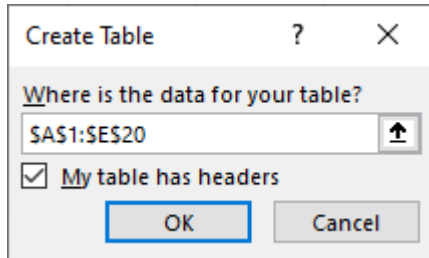


Figure 1 Dialog box Create Table

When creating a structured table, a table name is automatically created with the default value TableX, where X is the serial number of the table, and which includes all columns automatically named according to the table header. If you use multiple tables, the default table names can be confusing, so it's a good idea to rename each table after creation. You can rename the table on the **TABLE DESIGN** context tab in the **TABLE NAME** field.

A structured table can be converted back to a plain table using the **TABLE DESIGN** context tab with the **CONVERT TO RANGE** button. However, the table will retain the defined format.

In the next sections, we will look at the individual advantages of structured tables. But if we should also mention some disadvantages, then it is mainly the impossibility of using array formulas over the data of structured tables.

Automatic Table Format

If you are working in a structured table, you have a **TABLE DESIGN** context tab with additional functions. It is not necessary to select the entire table, just click into it.

On the **TABLE DESIGN** context tab, the **TABLE STYLES** gallery takes the most space. This gallery contains a number of styles, the selection of which will reformat the entire



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structured table. Styles can be further adjusted using the **TABLE STYLE OPTIONS** checkboxes. But there is also an option to create a new style using the **NEW TABLE STYLE** menu, which opens the **NEW TABLE STYLE** dialog box.

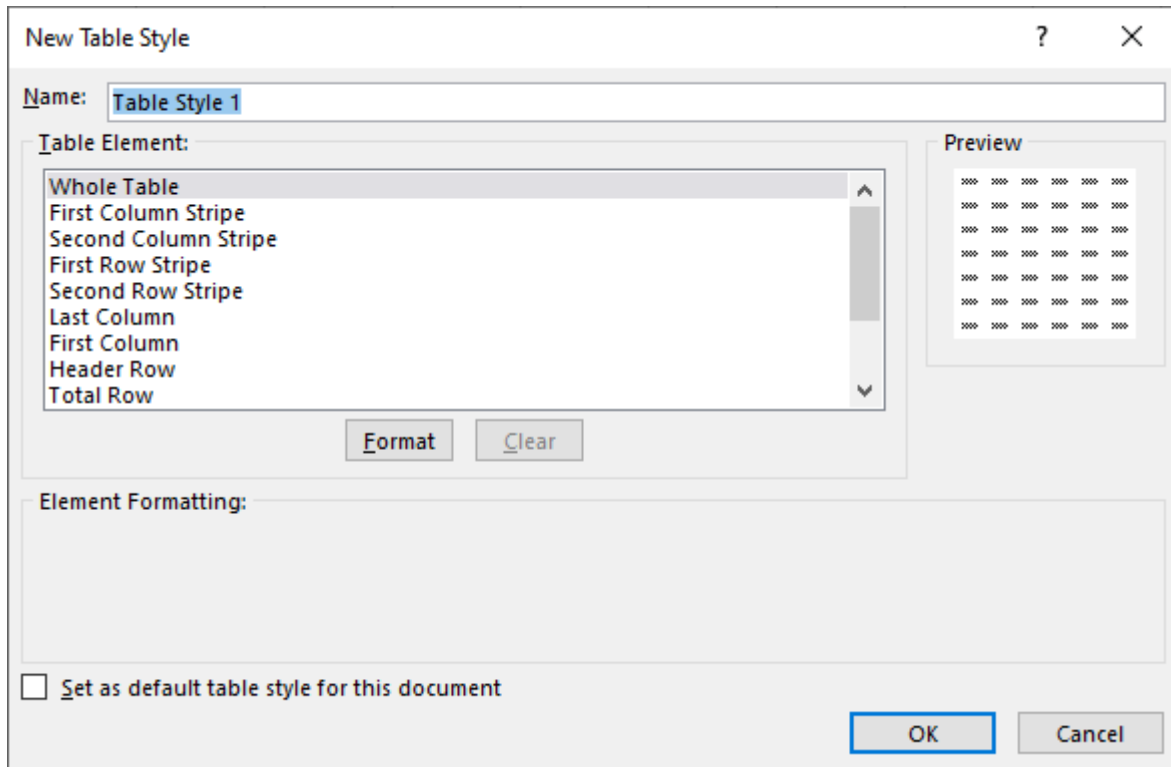


Figure 2 Dialog box New Table Style

But in order to create a new structured table style, it is necessary to format many elements of the structured table. Therefore, it is often better not to create a new style from scratch, but to create it by duplicating an existing style that most closely matches our requirements for the new style. To duplicate a style, right-click on an existing style and select **DUPLICATE**. In the **MODIFY TABLE STYLE** dialog box, add the required formats for the new style. The new style will be placed in the top section called **CUSTOM** in the style gallery.

Unlike standard styles, which cannot be changed or deleted, custom styles can be changed or deleted. You can find all the options in the context menu of the given style. Once you remove the custom style, the table will be formatted again with the default standard style.



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Automatic Filter and Slicers

After creating a structured table, the automatic filter is automatically turned on in the table. However, if you never want to filter the data, it is possible to turn off the automatic filter by default on the DATA tab, without affecting the other functionality of the structured tables.

But if you want to filter the data in an even simpler and more visually interesting way, then structured tables offer so-called slicers, which cannot be used with ordinary tables. We will meet them again at the pivot tables.

Slicer is a list of unique values of a selected column, where selecting those values filters the table. You can insert the slicer of a structured table using the **INSERT SLICER** button on the **TABLE DESIGN** context tab. In the **INSERT SLICER** dialog, you must select which columns you want to create slicers for, and after confirming the dialog, the slicers are created.

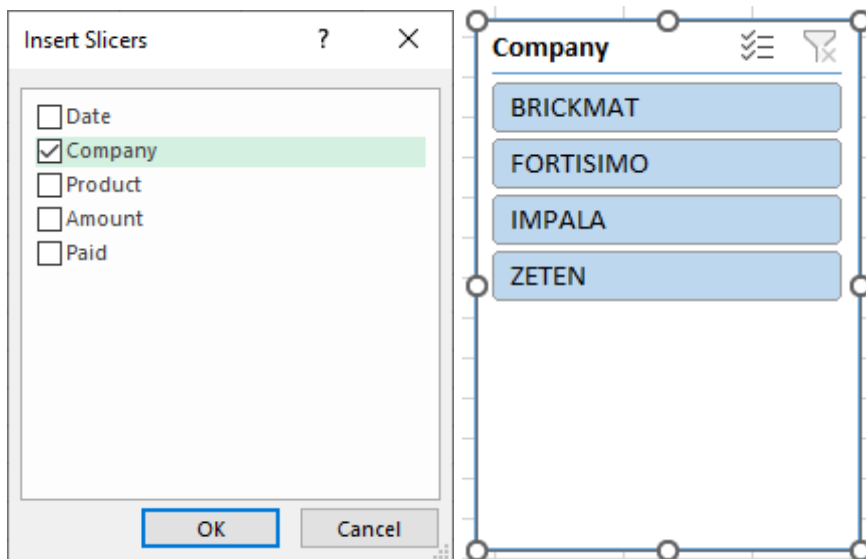


Figure 3 Dialog box Insert Slicers and an example of slicer

Filtering the table is then carried out in the slicers by selecting individual items of the slicer. If you want to select more than one slicer item, you can select a contiguous block



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of items using the **SHIFT** key or a non-contiguous block of items using the **CTRL** key. Another way how to perform multiple selection of items is to use the button **MULTI SELECT**. If you filter a structured table using multiple slicers, a logical AND is used between them.

Selecting all items or clicking the **CLEAR FILTER** button of slicer clears the filter. It is of course also possible to clear the filter by default on the **DATA** tab.

You can delete a slicer by selecting it and simply deleting it with the **DEL** key. However, the used filter will not be cleared.

Using Structured References in Formulas And the Total Row.

When calculating from ordinary table data, formulas use references using cell addresses. In calculations from structured table data, structured references are used, i.e. table names that also include column names. If you perform the calculation directly in a structured table, it is not necessary to use the table name, just use the column name. For calculations outside of a structured table, the name of the table must be used.

An example of a calculation in a structured table can be the aggregation of the values of one column placed below the given column. It is not necessary to write such a formula manually, but just check the **TOTAL ROW** check box on the **TABLE DESIGN** context tab.



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	Date	Company	Product	Amount	Paid	F	G
19	10.10.2017	IMPALA	X	8560	yes		
20	11.10.2017	FORTISIMO	X	9900	no		
21	Total			156770			

Figure 4 Using total row

The total row can be cancelled by unchecking the **TOTAL ROW** checkbox.

If we want to perform a calculation from structured table data outside the structured table, we must also use the name of the structured table itself in the structured reference. The following table shows which parts of the structured table can be referenced and how:

Table 1 Examples of using table names

Structured reference	Meaning
=Table or =Table[#Data]	Reference to all table data (without header)
=Table[Column] or =Table[[#Data],[Column]]	Reference to the data of a single table column (without header)
=Table[#All]	Reference to full tables (including headers)
=Table[#Headers]	Reference to table header only
=Table[[#All],[Column]]	Reference to full column (including header and total row if applicable)
=Table[[#Headers],[Column]]	Reference to single column header only
=Table[[#Totals],[Column]]	Reference to single column summary (if there is no summary, the error #REFERENCE is displayed)



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Inserting a New Row or Column into Structured Table with Auto-expanding

Another significant advantage of structured tables is the simple inserting of new rows or columns to the end of the table with automatic table expansion. This means that if there are any calculations in the workbook with structured references to a structured table, those calculations are always up to date even after adding new rows to the end of the table. This behaviour is not possible with regular tables, here the formula references must be modified by the inserted cells.

Other Advantages of Structured Tables

So far, we have described the fundamental advantages of structured tables over normal tables. Structured tables also have other advantages, but they are not so fundamental. These are for example:

- **Table header freezing** – As you scroll vertically in a structured table, the table header will replace the Excel column headers, similar to the header freezing. The fact that we no longer see the Excel column names doesn't matter because structured tables use structured references in the formulas and they don't use cell addresses, so it's not necessary to know the Excel column names.
- **Simple change the order of columns by simply dragging the mouse** – select a column header cell and drag its edge to move it to a different position in the header. The entire column will automatically be moved.
- **Creating data models** - this is definitely a fundamental advantage and will be covered in the last chapter later.



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Project Number: 2020-1-CZ01-KA226-HE-094368