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Digital Area for Networking
Teachers and Educators

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Data Analysis Using Pivot Tables

Introduction to Pivot Tables

WEEK 8

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Introduction to Pivot Tables

In the previous chapters, in order to calculate an aggregation calculation, you had to know the appropriate function with which the calculation could be calculated. A pivot table is a tool that allows you to calculate aggregation calculations over entire columns of a list without having to write any formulas or know any functions. What is enough is to know the meaning of the four sections of the pivot table: **Values, Rows, Columns, Filters**. The used columns of the source list are called **fields** in the pivot table.

Although we will use an Excel list as our data source, an Excel list is not the only possible pivot table data source. The data source of pivot tables often comes in practice from other sources containing list-type tables, which are most often relational databases (e.g. MS Access or MS SQL Server). Extracting, modifying and loading data from external sources into Excel is ensured by a tool called Power Query.

Let's have the list of sales of dealers and products (left side of the figure):

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Dealer	Type	Product	Quantity	Price	Date		Sum of Quantity						
2	David	Fruits	Apple	37	10	01.01.2016		64551						
3	Pavel	Vegetables	Carrot	36	90	01.01.2016								
4	David	Fruits	Banana	32	20	01.01.2016		Row Labels	Sum of Quantity					
5	David	Vegetables	Tomato	20	80	02.01.2016		David	12668					
6	Pavel	Fruits	Apple	34	10	02.01.2016		Jitka	13959					
7	David	Vegetables	Tomato	22	80	02.01.2016		Milan	13078					
8	Pavel	Fruits	Banana	21	20	03.01.2016		Monika	12506					
9	Pavel	Fruits	Apple	23	10	03.01.2016		Pavel	12340					
10	Jitka	Fruits	Banana	32	20	03.01.2016		Grand Total	64551					
11	Jitka	Fruits	Banana	37	20	04.01.2016								
12	Milan	Fruits	Banana	39	20	04.01.2016		Sum of Quantity	Column Labe					
13	David	Vegetables	Tomato	39	80	04.01.2016		Row Labels	Apple	Banana	Carrot	Potato	Tomato	Grand Total
14	Jitka	Vegetables	Tomato	29	80	05.01.2016		David	2408	2840	2408	2358	2654	12668
15	Pavel	Vegetables	Carrot	31	90	05.01.2016		Jitka	2819	2624	3000	2596	2920	13959
16	David	Vegetables	Potato	32	50	05.01.2016		Milan	1992	2829	2291	3272	2694	13078
17	Pavel	Vegetables	Tomato	39	80	06.01.2016		Monika	2353	2397	2245	3094	2417	12506
18	Jitka	Vegetables	Tomato	28	80	06.01.2016		Pavel	2444	2612	2235	2308	2741	12340
19	David	Fruits	Apple	22	10	06.01.2016		Grand Total	12016	13302	12179	13628	13426	64551

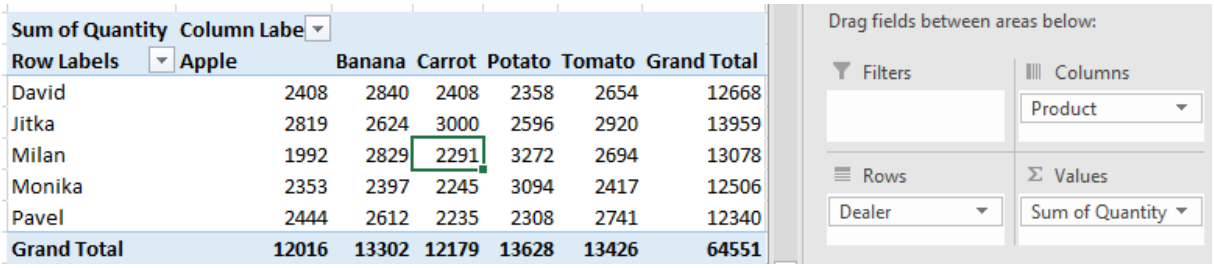
Figure 1 Examples of possible pivot tables created from a list

As can be seen from the right side of the figure, the pivot table can not only calculate the summary for a certain column of the list, here the sum of the Quantity column, but it

can also divide this sum by, for example, individual Dealers, or add another dimension and divide the sum of the Quantity into a two-dimensional tables, for example for Dealers and Products.

A pivot table has four sections where you can place the source list fields. Multiple fields can be placed into one section:

- VALUES – Aggregation calculations will be calculated from the fields placed in this section, e.g. sum, average or count. The default calculation is sum for numeric fields and count for text fields.
- ROWS – fields placed in this section will be row labels.
- COLUMNS – fields placed in this section will be column labels.
- FILTERS – fields placed in this section are used to filter the pivot table, although fields placed in other sections can also often be used to filter the pivot table.



Sum of Quantity	Column Labe					
Row Labels	Apple	Banana	Carrot	Potato	Tomato	Grand Total
David	2408	2840	2408	2358	2654	12668
Jitka	2819	2624	3000	2596	2920	13959
Milan	1992	2829	2291	3272	2694	13078
Monika	2353	2397	2245	3094	2417	12506
Pavel	2444	2612	2235	2308	2741	12340
Grand Total	12016	13302	12179	13628	13426	64551

Figure 2 Example of pivot table sections

Creating Pivot Tables

If you wish to create a basic pivot table with sums of values from the VALUES field, proceed as follows:

- Select one cell of the list to be the pivot table's data source.
- On the INSERT tab, select the PIVOT TABLE button. Check the setting in CREATE PIVOT TABLE dialog box and confirm the dialog box.

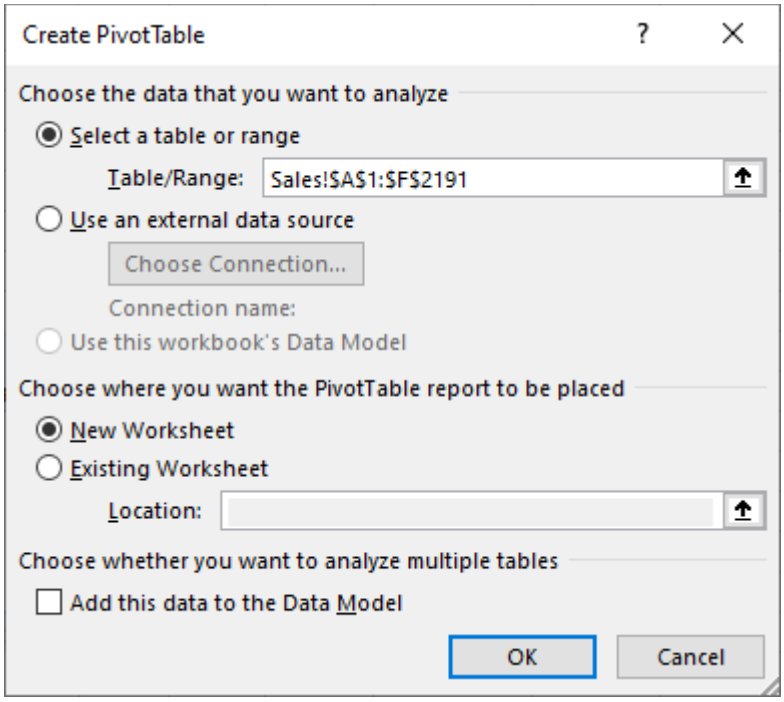


Figure 3 Dialog box Create Pivot Table

- Use the mouse to drag the fields into the individual sections of the pivot table (VALUES, ROWS, COLUMNS or FILTERS). But some sections can also remain empty.

If you would like to remove some fields from a section of the pivot table, this can be done by simply dragging the filed outside any section of the pivot table. To delete all sections of the pivot table at once, use the **CLEAR - CLEAR ALL** menu on the **PIVOT TABLE ANALYZE** context tab.

Double-clicking a summary value in a pivot table creates a new sheet with those rows from the original data source from which the summary value was calculated.

Updating the Pivot Table

In Excel, users are used to automatically updating formulas when input data changes. But this is not the case with pivot tables, because pivot tables do not contain any formulas. If the data in the pivot table data source changes, the pivot table is not automatically updated and must be updated in some way:

- Most often it will be a manual update using the **PIVOT TABLE ANALYZE** context tab with the **REFRESH** button.
- If you would like to partially automate the update of the pivot table, it is possible to update it automatically when you open the workbook containing the pivot table using the **PIVOT TABLE ANALYZE** context tab and the **OPTIONS** button and in the dialog box of the **PIVOT TABLE OPTIONS** on the **DATA** tab, you can check **REFRESH DATA WHEN OPENING THE FILE** checkbox.

If the data source of the pivot table is a simple Excel list (not a structured table), a bigger problem occurs when new rows are added at the end of the list. In this case, it is also necessary to update the source data range using the **PIVOT TABLE ANALYZE** context tab and the **CHANGE DATA SOURCE** button.

Deleting the Pivot Table

There are several ways to delete an existing pivot table:

- First, select the entire pivot table, preferably using the **CTRL+A** key shortcut, and then delete it with the **DELETE** key.
- Delete entire columns or rows containing the pivot table.
- Another option is to delete the entire sheet containing the pivot table. Just be aware with this operation that deleting a sheet is an irreversible action.

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