Excel Pivot Tables & Charts

A Step By Step Visual Guide

Excel 2016/2013

Practice Projects & Solutions Included for Beginners

By

A. J. Wright

Excel Pivot Tables & Charts
A Step By Step Visual Guide

AB Prominent Publisher
ISBN: 9781089457688

First published: **February 2018**
Updated: **January 2021**

Table of Contents

How to Use This Book

This book can be used as a tutorial or quick reference visual guide. It is intended for users who are comfortable with the basics of Microsoft® Excel® and are now ready to build upon this skill by learning ***Pivot Tables and Charts***.

This book assumes you already know how to create, open, save, and modify an Excel® workbook and have a general familiarity with the Excel® toolbar (Ribbon).

Most of the examples in this book use **Microsoft Excel 2016**. However, the functionality and formulas can be applied with **Microsoft Excel version 2013**. Although the screenshots in this book use Microsoft Excel 2016, functionality and display are not very much different if you are using Excel 2013.

Please always back-up your work and save often as we go. A good best practice when attempting any new functionality is to create a copy of the original spreadsheet and implement your changes on the copied spreadsheet. Should anything go wrong, you then have the original spreadsheet to fall back on.

Download Link for Exercise Files

The exercise files we will use later in this book are available for download at the following website: **https://goo.gl/e1SsZV**.

Chapter 1: Introduction to Pivot Tables

Databases contain raw data on various topics, and are usually arranged in a tabular form. In many cases, data overload may make it difficult to use the information and convert it into relevant knowledge.

What is A Pivot Table?

A pivot table is a simple, yet powerful, technique which enables Excel users to turn the data overload into well-organized and meaningful knowledge.

By using a pivot table, users can perform various calculations on their data, such as calculating the average, counting, finding the minimum and the maximum values and so on.

Furthermore, the pivot table enables us to filter and sort the data easily and quickly. Users may focus on some or all parts of the data, even when the data tables are huge (some databases may contain a million or more records); thus users can obtain their desired data clearly and concisely.

A single data table can be used to create dozens of reports and charts for analyzing the data, with many cross-sections, simply by dragging fields to the appropriate locations.

Thus, the pivot table enables us to better understand processes and trends. It is also a useful tool for decision making. The pivot table data can be based on an existing Excel file or on other databases (i.e. Access or an SQL-based database).

Since a picture is worth a thousand words, here are some examples of pivot tables, derived from the same database of Fig. 1.0 showing the details of factory employees:

Employee No.	Start Date	Section	Department	Role	Gender	City	Monthly Salary
W1331	02/01/2005	Sales and Marketing	Marketing	Person Marketing	Female	Detroit	2,875
W1332	09/09/2005	Sales and Marketing	Marketing	Person Marketing	Female	Detroit	3,031
W1333	09/02/2009	Sales and Marketing	Marketing	Person Marketing	Female	Los Angeles	3,035
W1334	06/07/2007	Sales and Marketing	Marketing	Person Marketing	Female	Detroit	3,293
W1335	12/11/2009	Sales and Marketing	Marketing	Person Marketing	Female	Detroit	3,253
W1336	06/05/2005	Sales and Marketing	Marketing	Person Marketing	Female	Los Angeles	3,136
W1337	02/05/2002	Sales and Marketing	Marketing	Person Marketing	Female	Detroit	3,346
W1338	01/03/2003	Sales and Marketing	Marketing	Person Marketing	Male	Miami	2,864
W1339	03/10/2006	Sales and Marketing	Marketing	Person Marketing	Male	San Diego	3,178
W1340	04/11/2005	Sales and Marketing	Marketing	Person Marketing	Female	Detroit	3,007
W1341	11/05/2006	Sales and Marketing	Marketing	Person Marketing	Female	Los Angeles	3,027
W1112	02/12/2003	Sales and Marketing	Sales	salesperson	Male	New Jersey	3,741
W1113	04/09/2011	Sales and Marketing	Sales	salesperson	Male	Miami	4,015
W1114	06/08/2005	Sales and Marketing	Sales	salesperson	Female	Los Angeles	4,189
W1115	05/07/2008	Sales and Marketing	Sales	salesperson	Male	San Diego	3,651
W1116	04/06/2009	Sales and Marketing	Sales	salesperson	Male	Detroit	3,906
W1117	03/08/2004	Sales and Marketing	Sales	salesperson	Male	New Jersey	3,785
W1118	08/06/2011	Sales and Marketing	Sales	salesperson	Female	Detroit	3,707
W1119	02/05/2004	Sales and Marketing	Sales	salesperson	Female	New Jersey	3,916
W1120	07/12/2007	Sales and Marketing	Sales	salesperson	Female	Los Angeles	4,085
W1121	03/12/2010	Sales and Marketing	Sales	salesperson	Male	New Jersey	4,250
W1122	10/10/2001	Sales and Marketing	Sales	salesperson	Male	San Diego	4,241
W1123	02/01/2011	Sales and Marketing	Sales	salesperson	Male	Miami	3,666
W1124	04/01/2003	Sales and Marketing	Sales	salesperson	Female	Detroit	4,397
W1125	01/05/2011	Sales and Marketing	Sales	salesperson	Male	Los Angeles	3,662
W1126	08/11/2008	Sales and Marketing	Sales	salesperson	Female	Detroit	4,349
W1127	06/04/2008	Sales and Marketing	Sales	salesperson	Male	Miami	3,973
W1128	02/10/2006	Sales and Marketing	Sales	salesperson	Female	Los Angeles	3,661
W1129	12/04/2011	Sales and Marketing	Sales	salesperson	Female	Los Angeles	3,682
W1130	01/12/2002	Sales and Marketing	Sales	salesperson	Female	New Jersey	4,276

Fig. 1.0: Database of factory employees

The following pivot tables were derived from the database above:
Number of employees in each department:

Department	Count of Employee No.
Accounting	3
accounting department	6
Engraving	453
headquarters	3
Human Resources	9
Marketing	12
Sales	204
Welding	310
Grand Total	**1000**

Fig. 1.1: Number of employees in each department

Distribution of genders in each department:

Count of Employee No.	Gender	
Department	Female	Male
Accounting	2	1
accounting department	4	2
Engraving	226	227
headquarters	2	1
Human Resources	4	5
Marketing	9	3
Sales	106	98
Welding	144	166

Fig. 1.2: Distribution of genders in each department

Average salary in each department:

Average of Monthly Salary Department	Total
Accounting	4,551.00
Accounting department	2,947.67
Engraving	2,027.04
Headquarters	4,730.33
Human Resources	3,037.22
Marketing	3,195.75
Sales	3,999.12
Welding	2,127.72
Grand Total	**2,504.88**

Fig. 1.3: Average salary in each department

Average salary in each section, by role:

Average of Monthly Salary Role	Section Management	Manufacturing	Sales and Marketing
Accountant	4,551		
Bookkeeper	2,773		
Department Manager	5,140	4,602	4,449
Engineer		7,474	
Manager	3,864	3,920	4,206
Person Marketing			3,095
Practical Engineer		7,385	
Production Worker		1,827	
Recruitment Coordinator	1,843		
salesperson			3,999
Senior Recruitment Coordinator	4,737		
Grand Total	**3,359**	**2,071**	**3,957**

Fig. 1.4: Average salary in each section by role

Basic Concepts

This chapter presents basic concepts relating to pivot tables. While studying and practicing, the following concepts will become clearer:

Data Table: A raw data set, arranged in a table. This can be used as the source of a pivot table.

Pivot Table: A table that displays data in different intersections, as described in this book.

Column: A vertical section of the table consisting of data of the same type, i.e. first name, ID, city etc.

Field: The column's header is called a "field".

Cell: The cell is the intersection of a row and a column, and contains the data of the table.

Item: The data in a cell. For example, New York and Detroit are items in the "City" field.

Record: A data collection which appears in one row and belongs to the same entity, e.g. all the table data which displays information regarding one person.

Conditions to Create a Pivot Table

Necessary Conditions:

- Each column must have a title.
- The title should be written in a single row.
- In a column, all the items should be of the same data type (numbers, dates or strings).
- The data table should not contain any merged cells.
- The data table should not contain subtotals or grand totals.
- Empty rows or columns should not remain within the table (if an empty row or column remains, Excel will treat the table as two different ones).
- After creating a pivot table, do not change the titles of the fields, otherwise the pivot table values will be deleted.

Desirable Conditions

- Unique names for each column (when two fields are given the same name, the title of the second field will be appended at end with 2, e.g. "salary2").
- Complete data for all records (when data is missing, the calculations will only be applied to the available records. This can be observed in the cases of calculations such as averages, etc).

Limitations of a Pivot Table

- Number of pivot table reports in the worksheet: Limited by the available memory.
- Unique items for each field.
- Row fields or column fields in the pivot table report: Limited by the available memory.
- Report filter in the pivot table report: 256 (May be limited by the available memory).
- Value fields in the pivot table report: 256.
- Formulas for calculated items in the pivot table report: Limited by the available memory.

Important Note: Due to the limitations of the pivot table, and depending on your personal computer data, you may prefer to save the exercises appearing in this book in a separate file or worksheet for each chapter.