GETTING MORE OUT OF

EXCEL 2019

BEN GROENENDIJK

Essential Topics for the Professional

Boom

Getting More Out of Excel 2019

Getting More Out of Excel 2019

Essential Topics for the Professional

Second edition

Ben Groenendijk

Boom

Contents

Preface

Many books on Excel are either limited and cover only the basic concepts in small steps or are exhaustive and explain in great detail all the possible options in the program. This book covers only those topics that are essential for professionals and for students in higher education. It is a practical book, intended for everyone who uses Excel extensively or wants to start using it for their work or studies. After reading this book, professionals already working with the program will be able to get more out of their models.

This book provides step-by-step explanations using concrete practical examples illustrated with screenshots. The example files are available at www.gettingmoreoutofexcel.nl so you can go through these step by step yourself. Full answers to the examples can also be found here. Relevant exercises are included for each topic so you can practice using the knowledge gained from the content. The answers to these exercises can also be found at www.gettingmoreoutofexcel.nl. After studying this book, you will have all the knowledge and tools needed to use Excel in a professional manner.

Getting More Out of Excel 2019 is suitable for both Windows and Mac users, using Excel version 2016 and more recent versions. However, all screenshots come from Excel 2019 (Windows), which may sometimes vary slightly from what Excel 2016 or Mac users see on their screen. Office 365 users always have access to the latest version of Excel. As a result, small differences can occur in that version as regular updates of Office 365 become available. Any larger differences between the versions are explained in the text. Not all components of Excel are available when using a mobile version of Excel (tablet or smartphone).

No prior knowledge of Excel is needed to get started with this book, but you are expected to have basic skills used in apps like Microsoft Word, such as copying, pasting, selecting, opening and saving files, and using italics and boldface. With these skills you won't have any problems with this book.

The expected results of all examples and exercises are given. The full answers of the examples and exercises are available at www.gettingmoreoutofexcel.nl.

Questions, comments, or requests for training courses based on the book are welcome. Please send these to ben.groenendijk@outlook.com.

February 2019
Ben Groenendijk

Chapter 1

Basics

This chapter covers basic Excel skills. Section 1.1 explains how to insert text, numbers, and a calculation in Excel. Next comes Section 1.2 on the different ways to insert a function, Section 1.3 on how to sort, and Section 1.4 on relative and absolute cell references. Section 1.5 looks at how to filter a collection of data and this chapter is concluded in Section 1.6 with how to quickly navigate around a worksheet.

Note
The files mentioned in this chapter and the following chapters can all be found at www.gettingmoreoutofexcel.nl.

1.1 Text, numbers and calculations

▬ **Example 1.1**

1. Open the file *Examples 1.xlsx* and select the worksheet *Example 1.1*. If it is not visible, click the bottom left arrows, next to the worksheet tabs. Worksheets in Excel contain *rows* and *columns*. The intersection of a row and column is called a *cell*. Columns are identified with letters and rows with numbers, for example, column B and row 3. The intersection of those two is called cell B3. When you select a cell, the cell borders are shown in bold. This is called the *cell pointer*. After column Z, the Excel columns are lettered AA, AB, AC etc. There are three main actions you can perform in a cell: enter text, enter numbers and insert calculations.
2. Enter the text **Description** in cell A1, **Quantity** in cell B1, **Unit price** in cell C1 and **Subtotal** in cell D1 (see Figure 1.1). Note that the word *Description* is wider than the width of the column. Once you type *Quantity* in the next column, part of the word *Description* will be hidden. You can easily adjust the column width here by placing the mouse pointer between the column headings A and B (see Figure 1.1) and double clicking. Column A will then be resized to fit the text. You can also drag the mouse in this position to make the column wider.
Also note that by default all text is left aligned in an Excel cell.

Figure 1.1

3. Enter some text in the cells below *Description* and a few quantities under *Quantity* (see Figure 1.2). Note here that numbers are right aligned in cells by default.
4. Enter the numbers **7.25**, **89.50** and **12.90** under *Unit price* (see Figure 1.2). Note that decimal points should be used in English and also that the final 0 is not shown in the numbers 89.50 and 12.90. Note that whether a decimal point or comma is used in numbers depends on a setting in Windows or macOS.

	A	B	C	D
1	Description	Quantity	Unit price	Subtotal
2	Hammer	12	7.25	
3	Drilling machine	5	89.5	
4	Saw	5	12.9	

Figure 1.2

5. Select the cells C2:C4 (format for the cells C2 to C4), and then go to *Home > Number > Accounting Number Format* (see Figure 1.3). Microsoft calls the tabs along the top "ribbons", as known from other programs like Word. There are the *Home, Insert, Page Layout*, etc. ribbons, each of which contains various command buttons. These buttons are organized in logical groups, for example, the *Home* ribbon contains the *Clipboard, Font, Alignment, Number,* etc. groups. The *Accounting Number Format* button shows the selected numbers as currency, with the $ symbol and two decimal places. The *Accounting Number Format* button actually consists of two parts: a $ symbol and a small triangle directly to the right (arrow pointing down). You can click this icon to select other currencies (see Figure 1.4). Note that the default currency sign displayed depends on a setting in Windows or macOS.
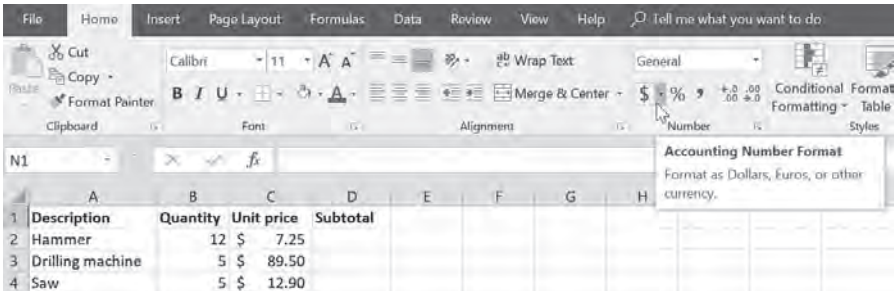

Figure 1.3

Figure 1.4

6. Select cell D2. Say you want to insert a calculation in this cell. Any calculation that can be done on a calculator can also be inserted here. That could be addition, subtraction, multiplication, division, bracket use, square root calculation, or exponential calculation. However, you enter the calculation differently than on a calculator. To calculate the subtotal in cell D2, you would enter the following on a calculator: 12 x 7.25 =. In Excel, a calculation always *starts* with the = symbol. Excel knows this will be followed by a calculation, not text or a number. Also, you do not enter numbers, but you refer to the cells that contain the numbers.

In cell D2 enter **=B2*C2** and press Enter to display the answer.
Select cell D2 again. The answer to the calculation will now be displayed in cell D2 (see Figure 1.5). Cell D2 also displays a number (87.00), but this is a calculation. The calculation for this cell is displayed in the *formula bar, =B2*C2* (see Figure 1.6). The multiplication symbol used here is * instead of the usual x.

	A	B	C	D	E
1	Description	Quantity	Unit price	Subtotal	
2	Hammer	12	$ 7.25	$ 87.00	
3	Drilling machine	5	$ 89.50		
4	Saw	5	$ 12.90		

Figure 1.5

D2					fx	=B2*C2

Figure 1.6

7. Manually inserting formulas is time-consuming and error prone, especially with a formula such as *=A123*D141*. It is best to learn not to type in the cells, but to select the cells with the cursor keys or with a mouse or by touch if you are using a touch screen.
   Remove the formula in cell D2 (with the Del key or by going to *Home > Editing > Clear > Clear All*). Type in the = symbol, then select cell B2 using the cursor keys, mouse or touch, then type in the * symbol and select cell C2 with the cursor keys or mouse. Then press Enter to display the answer. Naturally the result will be the same. Use this method to insert calculations from now on. It takes a little getting used to, but in time will become automatic.
   This book is based on the use of a keyboard and mouse, but readers with a touch screen can use the equivalent touch commands.
8. You could repeat this process for the other two rows, but here is the great thing about Excel. Select cell D2. The cell border will be displayed in bold, which is called the cell pointer. There is a small square in the lower-right corner, *the fill handle* (see Figure 1.7). If you hover the mouse over the square, your mouse pointer will change to a black + sign and you can drag the cell (including the formula) down into the next two rows. The formulas for the other two cells will automatically be adjusted. You can use these quick and simple steps to calculate a number of rows with just one single formula. This way it does not matter whether you need to create three of the same calculations, as in the example, or three hundred!

Figure 1.7

9. Type the text **Total** in cell C6 and the calculation **=D2+D3+D4** in cell D6, which will calculate the total amount (599.00). This is one way to insert the calculation, but a better method is to: press **=**, select cell D2, press **+**, select cell D3, press **+**, select D4 and press Enter.
10. Change the number for Hammer to 14. This will immediately adjust the subtotal and total amount.
11. Make sure the headers *Description* up to *Subtotal* are in bold.

Excel has a number of unconventional characters for calculations, for example, you use the * sign for multiplication instead of the x sign that you see on your calculator (see Figure 1.8).

Editing	Excel symbol	Example
Addition	+	=A13+C15
Subtraction	-	=A13-C15
Multiplication	*	=A13*C15
Division	/	=A13/C15
Exponentiation	^	=A13^3
Square root calculation	^0.5	=A13^0.5

Figure 1.8

Another example is given here for more practice with inserting a formula in Excel.

▬ **Example 1.2**

What would the future value be if you deposited capital in the bank for a number of years at a fixed interest rate? This would involve compound interest (interest on interest). The formula for this is:

$$FV = PV * (1 + i)\, n$$

where:
FV: future value
PV: the present value of the investment
i: interest rate earned each period
n: number of periods capital is invested.

1. Open the file *Examples 1.xlsx* and select the worksheet *Example 1.2*.
2. Select cell B7 and the following formula: **=B4*(1+B5)^B6**. Enter this with cell reference, so first type in the = symbol, point to cell B4, then type *(**1+**, select B5), type **^)**, select B6 and then finally press Enter. Note that if nothing happens when you type in the ^ symbol, you can press the space bar. The answer is: 1410.59876.
3. Select cell B7, click the *Home* ribbon, go to the *Number* group and click the currency button (Accounting Number Format).
4. Enter a number of values for capital (PV), interest and investment term to automatically calculate a new future value.

Exercise 1.1
1. Open the file *Exercises 1.xlsx* and select the worksheet *Exercise 1.1*. If it is not visible, click the bottom left arrows, next to the worksheet tabs.
2. Make the columns wider so the column headers are fully readable.
3. Make sure the *Rent/Month* column is displaying dollars.
4. Calculate the subtotal for cell D2 (uses (number/month) x rent/month) and automatically copy that formula to the three other rows by using the fill handle.
5. Make sure the total of the four rows is shown in cell D7.
6. The column headers *Container type* through to *Subtotal* should be in bold.

Exercise 1.2
1. Open the file *Exercises 1.xlsx* and select the worksheet *Exercise 1.2*.
2. In inventory management, the total cost for holding stock can be calculated with the following formula: Total cost = D /Q* CO + (Q / 2 + SS) *Cs. D: annual demand, Q: order quantity, CO: ordering cost, SS: safety stock, Cs: stock costs per unit. Calculate the total cost in cell B8. The answer is: $32,062,500.00. You will initially see ###########, because column B is not wide enough to display the whole amount. So you need to widen column B (see Figure 1.1).

1.2   Inserting functions

Excel has many different functions. This section looks at a number of these functions and how to use them. Many other functions will be discussed in the following chapters.

The example in the previous section calculated the sum of a few numbers. The method used there is time-consuming if you have more than three numbers. Another option is to use the *=SUM()* function, which allows you to sum up a series of numbers.

▬ **Example 1.3**

1. Open the file *Examples 1.xlsx* and select the worksheet *Example 1.3*.
2. Select cell H2 and then type **=SUM(**, and then select cells **A2:G2** , and press Enter. This will calculate the sum of the numbers in the range A2 to G2 (254).
3. Select cell H2 again. The formula bar now contains the function *=SUM(A2:G2)*. Note that you do not need to add the closing bracket – Excel automatically does this for you. A function always has a name and two brackets (...). You specify what the function does between the brackets. The *SUM()* function calculates the sum of a range of cells. That range of cells is called the function argument. In this example that is to sum up the numbers in cells A2 to G2 (addition).
4. Also calculate the sum of the numbers for the other three rows by using the *inserted* function and dragging the fill handle (see Figure 1.7).
5. Type the text **Total** in cell G7. Select cell H7 and calculate the sum of all cells, **=SUM(A2:G5)**. Answer: 1706. We see here that the argument can be a row or column, but can also be a block of numbers (array). You can also sum up the cells H2:H5 for the same result of course.

> **Tip**
> This example shows only four rows of numbers, which makes it easy to drag the formula with the fill handle. However, with 300 rows of numbers that's a lot of dragging. Another solution is to double click the fill handle, which copies the formula to all underlying rows (and then no dragging is needed). Delete the formulas in cell H3:H5. Select cell H2, and then double click the fill handle. This immediately inserts the formulas into cells H3:H5.

Excel has many more functions. A number of the formulas are listed below:

= AVERAGE()	This formula calculates the average of a range of numbers.
=*MAX()*	Gives the largest value in a range of cells. Works with both numbers and text (alphabetic) or dates.
=MIN()	The same as MAX(), but gives the smallest value in a range of cells.
=SQRT()	Calculates the square root of a number. Can also be calculated with ^0.5 (see Figure 1.8).

▬ **Example 1.4**

1. Open the file *Examples 1.xlsx* and select the worksheet *Example 1.4*.
2. You want to calculate the students' grade point averages. Select cell F2. Select the *Home* ribbon, go to the *Editing* group and click the arrow next to the summation symbol (∑AutoSum) for the drop-down menu (see Figure 1.9). This menu lists a number of commonly used functions. Select *Average*. The function will suggest a series of numbers, C2:E2. The suggestion is correct, so you can press Enter for the answer. (Answer: 5.) If the suggested series of numbers is incorrect, you need to se-

lect the correct series before you press Enter. Note that this is an alternative method for inserting a function. You can also insert the function yourself by inserting the = symbol and then the first letters of the word *average*. Excel will give you a list box with possible functions, and then you can double click *AVERAGE*. You still need to select the series of numbers.
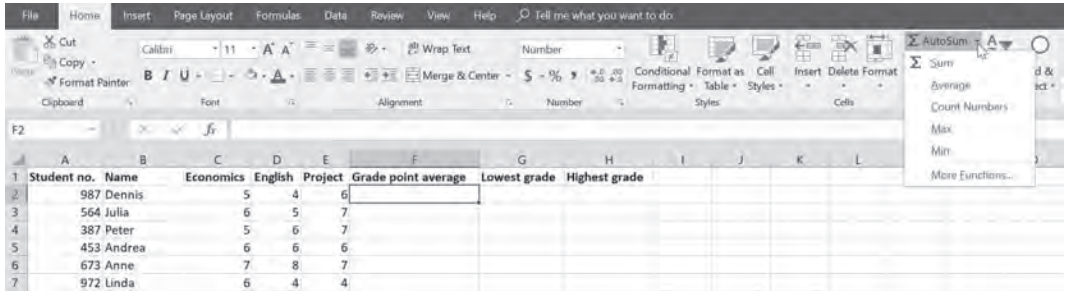

Figure 1.9

3. Select cell F2. The cell shows the value 5, but the formula bar shows the *AVERAGE(C2:E2)*. Use the fill handle to calculate the grade point averages of the other students (see the tip given with example 1.3).
4. The grade point averages are displayed in a number of different ways. The first four without decimal places and the last two with lots of decimal places. There is a simple solution here. Select the cells F2:F7, and then go to *Home > Number > Decrease Decimal* (see Figure 1.10). The numbers will now be shown with only one decimal place (you will need to click several times). You can use the icon next to the Decrease Decimal icon if you want to show more decimal places .
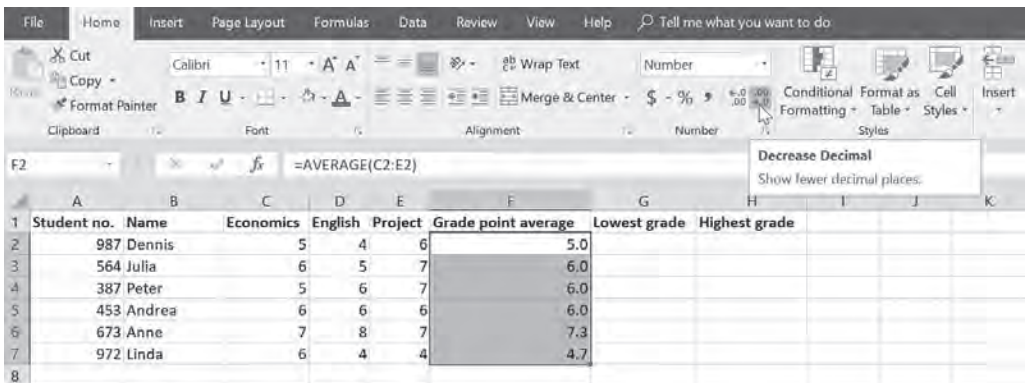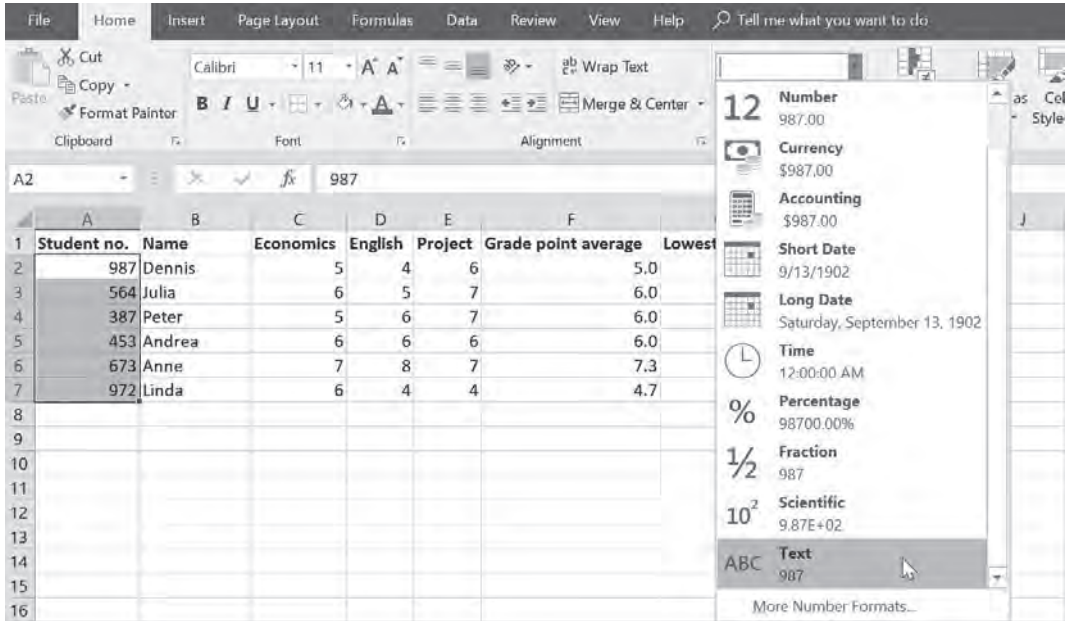

Figure 1.10

Figure 1.11

5. Type **Lowest grade** in cell G1 and adjust the width of the column to fit. Then select cell G2 and click the *Min* function (see Figure 1.9). Note that the suggested series of numbers is incorrect, and needs to be selected again, *=MIN(C2:E2)*. The student's lowest grade will now be displayed. Also calculate the lowest grade for the other students, using the fill handle.

6. Create another column, and call this one *Highest grade* and calculate the highest grade for each student.

7. Make sure all numbers are shown with one decimal place. Select the cells C2:H7 and click *Increase Decimal* (see Figure 1.10).

8. The student numbers actually start with a zero, so Dennis's student number is 0987. However, if you enter that number, the zero will disappear (called trimming). Try it to see what happens. Excel determines the data type (text, number, date, etc.) by default. Since a number never starts with a zero, the zero is automatically removed. The data type for Student no. is *Number*. Since the student numbers are not used to make calculations, the data type needs to be changed to *Text*. Select the cells *A2:A7*, go to the *Home* ribbon, then *Number* group and then click the list box (see Figure 1.11). Choose the option *Text* from the list box.

> **Note**
> You can also change the data type by selecting the cells and then right-clicking and selecting *Format Cells*. This list box gives many more options you can select for cell formatting.

9. The student numbers are automatically aligned to the left. Now you can manually add 0 in front of each student number. Select the cell and insert the 0 in the formula bar in front of the number.

> **Note**
> 1. After entering the 0 in front of the student numbers, a small green triangle will appear in the top left corner of the cells. This is a small warning symbol. Excel is warning you here that there is a possible error in the cell. The cell values in our example are correct, so you can ignore this warning. If you want to remove these warnings, select the cells concerned, *A2:A7*, then click the exclamation mark that will appear alongside the selected cells (see Figure 1.12). The possible error, *Number Stored as Text*, will be displayed. The numbers in our example are correct, so select *Ignore Error*.
> Those green warning symbols will appear again if any changes are made, so they can be annoying. You can permanently disable them by going to *File > Options > Formulas* and unselecting *Enable Background Error Checking*.
> 2. You can also add the leading zero automatically. See Examples 1.8 and Exercise 1.9 if you want to know how this works.

Figure 1.12

Exercise 1.3
1. Open the file *Exercises 1.xlsx* and select the worksheet *Exercise 1.3*.
2. Calculate the average grades for each course in cells C9:E9.
3. Calculate the highest grades for each course in cells C10:E10.
4. Calculate the lowest grades for each course in cells C11:E11.
5. Calculate the average grade for all three courses in cell C12. (Answer: 5.83.)

Many books on Excel are either limited and cover only the basic concepts in small steps or are exhaustive and explain in great detail everything the program can do. This book covers only those topics that are essential for professionals and for students in higher education. It is a practical book, intended for everyone who uses Excel extensively or wants to start using it for their work or studies. After reading this book, professionals already working with the program will be able to get more out of their models.

This book provides step-by-step explanations using concrete practical examples illustrated with screenshots. Exercises are included for each topic so that the content can be applied in practice. After studying this book, the user will have all the knowledge and tools needed to use Excel in a professional manner.

Getting More Out of Excel 2019 is suitable for both Windows and Mac users of Excel 2016 or higher and Office 365. No prior knowledge of Excel is needed, although the user is expected to be proficient in basic skills such as copying, pasting, selecting, opening and saving files, and using italics and boldface.

The complete answers to the examples and exercises are available on www.gettingmoreoutofexcel.nl.

Ben Groenendijk teaches Information Technology at Rotterdam University of Applied Sciences. He has published several books on topics such as databases and Access.

9 789024 402281

www.gettingmoreoutofexcel.nl
www.boomhogeronderwijs.nl