Excel Basics

Managing data with Excel

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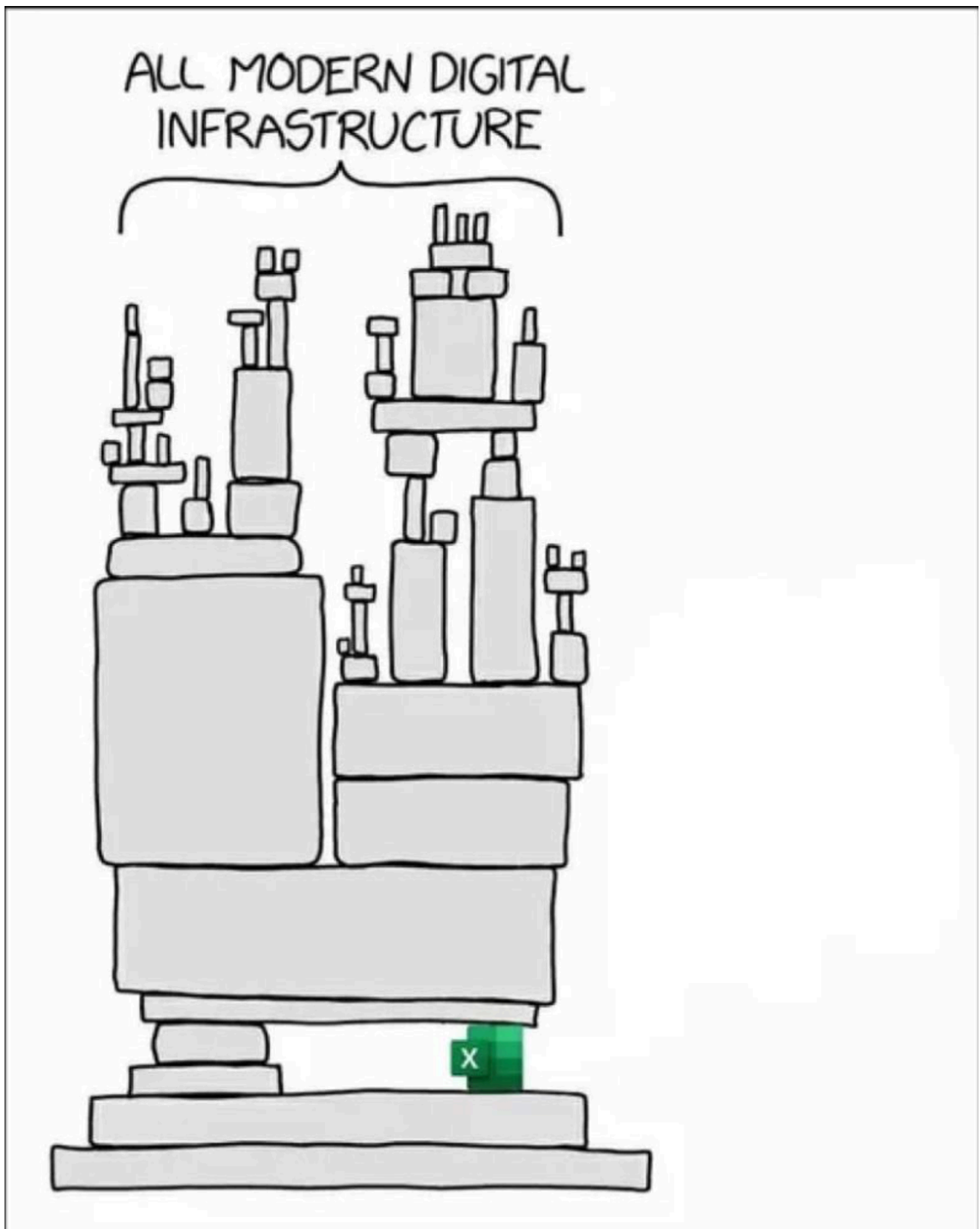

Acknowledgments

Why learn Excel ?

Managing data with Excel

Data types

Excel is a "loosely typed" environment: data type management is rarely a topic of concern in Excel, except when the application does not behave as you would expect.

Excel recognizes four kinds of information:

- Logical values
- Numerical values
- Text values
- Error types

Logical values

Logical values are either TRUE or FALSE.

In most cases, logical values will be present as the result of the evaluation of an expression or function: it indicates whether certain conditions have been met.

You can return a TRUE or FALSE value using the functions: =TRUE ; =FALSE

In arithmetic operations, TRUE is evaluated to 1, FALSE to 0.

Numerical values

Excel stores all numbers as Double-Precision Floating Point values:

- max = 1.79768×10^{308} ; min = 2.2250×10^{-308}

To Excel, all of the following are numbers: 15,000; 100; $50; $50.00; 75%; 0.5; 5.35E+04 - and also: 12/25/2023.

Dates and Times

Dates are stored as the number of days since the date 1/1/1900. In other words, January 1, 1900 is considered by Excel to be 1. Therefore, 1/2/1900 would be stored as 2, 1/3/1900 as 3, and so on. Note that Excel does not recognize dates BEFORE 1/1/1900.

Excel treats Times as fractions of days. Since a day is 24 hours in length, then 1/4th of a day (0.25) would be 6 hours. Since each day begins at 0 hours and ends 24 hours later, Excel would store the date and time for 6:00 AM on 1/1/1900 as 1.25.

Values vs. Formats

When managing a number, you need to manage its value separately from the way it is displayed (aka "formatting").

The following are all representations of the same value (1.05):

Value in Cell	Format	Display
1.05	General	1.05
1.05	Number (6 digit decimal precision)	1.050000
1.05	Currency	$1.05
1.05	Percent	105%
1.05	Date	1/1/1900
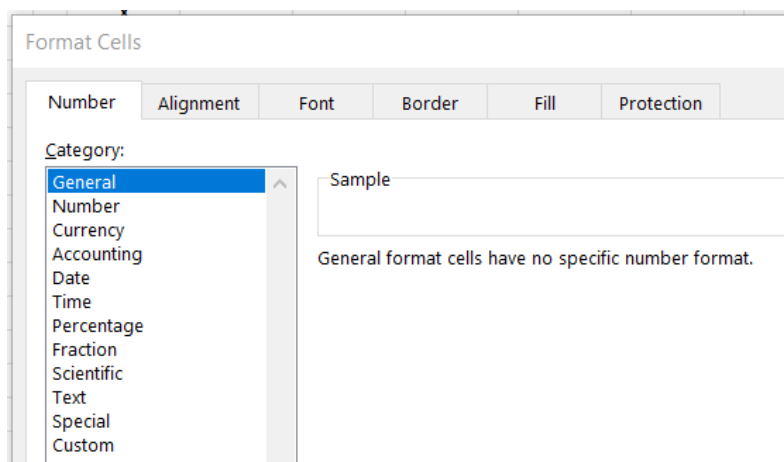
Text values

Excel regards text as strings of characters. The letters of the alphabet, numerical characters, symbols such as % and $, as well as spaces and tabs are all valid text.
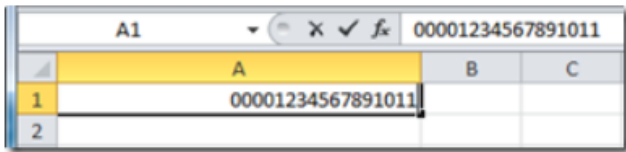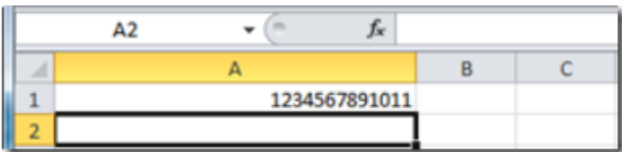
Excel will recognize a text string of up to 32,768 characters. However, only 1024 can be displayed in a cell.

Text by default: In cases where Excel cannot distinguish a value as either a number type, a logical type, or an error type, the value will be treated as text by default.

💡 **Beware of leading zeros:** Excel will treat the value as a number and trim them:

| Leading zeros before enter: | No more leading zeros! |

To force Excel to treat the data as text, prepend a single-quote character before the text we wish to enter, or apply the text format to the cell through the cell formatting menu.

Conversion using functions

The following formulas can be used to convert text to numbers:

- NUMBERVALUE() : converts text to a number, in a locale-independent way.

- DATEVALUE() : converts a date that is stored as text to a serial number that Excel recognizes as a date.

- * 1 : a simple trick to convert text to a number.

Or numbers to text:

- TEXT() : converts a number to text, and applies the format of your choosing to it

- DOLLAR() : converts a number to text using currency format,

Or numbers to dates:

- DATE() : combines three separate integers to form a valid date value

Excel functions

Excel offers a total of ~ 500 built-in functions. The Microsoft documentation lists them under 14 different categories.

You may never know them all. Your objectives should be (1) to master the small set of functions that you regularly need and (2) to learn new functions as new needs come up.

If you want to make constant progress with Excel:

- **Challenge yourself**: progress is only possible if you are willing to get out of your comfort zone.

- **Aim at continuous improvement:** mistakes are in fact learning opportunities.

- **Be curious**: when solving a problem, explore and evaluate alternative solutions.

- **Be social**: learn from others, whether on the internet or around the office.

Think about the explore/ exploit tradeoff: the less you know, the more you should explore.

✍ Tutorial : Excel functions

1. Browse randomly over the full list of functions in the [Excel functions documentation](#).

2. Take a closer look at the documentation, focusing on the following categories:

- Date and time functions
- Information functions
- Logical functions
- Text functions

3. Study the following lessons in the "EXPERT - Learn Excel 365 - Mike Smart" reference book:

Topic	References
Text functions	Lessons 3-18 to 3-21
Logical functions	Lessons 3-5, 3-6, 3-16, 3-28
Date and time functions	Lessons 3-7 to 3-15

Tip: for those needing a translator of Excel functions from English to other languages, see [here](#).

✍ Tutorial : Filters (simple, custom, advanced)

1. Study **lessons 1-5 to 1-8** in the "EXPERT - Learn Excel 365 - Mike Smart" reference book.

These filters are a useful tool to explore the data. They can also be confusing:

- Keeping control over a complex set of filters is challenging.

- Copy, cut and paste can have unintended consequences when filters are in place.

- Depending how you program calculations over the data, filtered rows can either be included or excluded - this can be misleading.

- Can you be sure that the filtered data reflects the most updated version of the source data?

- They make it hard to isolate the data, business logic and presentation layers.

Excel tables

The Excel table is a must-use: it makes managing and analyzing a group of related data easier and much safer. You can easily convert a range of cells into an Excel table, or vice versa.

Tables are awesome! I recommend always using a table over a range.

Structure

A table can include the following elements:

- **Header row**: by default, a table has a header row. Every table column has filtering enabled in the header row so that you can filter or sort your table data quickly.

- **Banded rows**: alternate shading or banding in rows helps to better distinguish the data.

- **Calculated columns**: by entering a formula in one cell in a table column, you can create a calculated column in which that formula is instantly applied to all other cells in that table column.

- **Total row**: once you add a total row to a table, Excel gives you an AutoSum drop-down list to select from functions such as SUM, AVERAGE, and so on. When you select one of these options, it will be converted to a SUBTOTAL function, which will ignore rows that have been hidden with a filter by default (you can change that).

- **Sizing handle**: a sizing handle in the lower-right corner of the table allows you to drag the table to the size that you want.

Naming and structured referencing

When you create an Excel table, a name is automatically assigned to the table and to each column header in the table. You can easily change the table's name.

When you add formulas to an Excel table, those names can appear automatically as you enter the formula and select the cell references in the table. For example: =SUM(DeptSales[Sales Amount])

That combination of table and column names is called a structured reference. The names in structured references adjust whenever you add or remove data from the table. Refer to the [documentation](#) for more information.

Removing duplicate values from a table

To automatically remove duplicates from a table:

- Click any cell inside the table, then click: Table Design→Tools→Remove Duplicates

✍ Tutorial : Excel tables

Study lessons **1-13, 1-14, 1-16** and **1-19 to 1-22** of the "EXPERT" book.

✍ Exercise : Land Speed Records

1. Open the Land Speed Records Excel file and read the instructions to complete the exercise.

✍ Tutorial : Understanding error values

1. Study **lessons 5-9 and 5-10** in the "EXPERT - Learn Excel 365 - Mike Smart" reference book.

✍ Tutorial : Error checking and auditing formulas

1. Study **lessons 5-12 to 5-15** in the "EXPERT - Learn Excel 365 - Mike Smart" reference book.

2. Study **lesson 3-24** in the "EXPERT - Learn Excel 365 - Mike Smart" reference book.

✍ Tutorial : VLOOKUP

1. Refer to this [tutorial](#) to learn about joining tables with the VLOOKUP function.

2. Study **lessons 3-22 and 3-25** in the "EXPERT - Learn Excel 365 - Mike Smart" reference book.

💡 **VLOOKUP is commonly used to join tables.** It will fit your needs in most circumstances, although it is somewhat quirky: make sure to read its [documentation](#)!

✍ Exercise : Employee Summary

1. Open the Employee Summary Excel file and read the instructions to complete the exercise.

Putting it all together

✍ Exercise : Darts L2

Additional resources

- Microsoft Excel Tutorial for Beginners - Full Course, freeCodeCamp.org - watch video [here](#)