

MODERN EXCEL REPORTING

with

FILTER



EXCEL
OFF THE GRID

Introduction

Lessons



INTRODUCTION

- #1** Welcome & introduction
- #2** Download the example files

GETTING STARTED

- #3** Getting started - Introduction
- #4** Quick start – Understanding FILTER
- #5** Understanding truth
- #6** Broadcasting basics
- #7** Spilling
- #8** Multiple conditions
- #9** If_empty

SHAPING OUTPUTS

- #10** Shaping outputs - Introduction
- #11** Column selection
- #12** Dynamic column selection
- #13** Blank values
- #14** Total row

ADVANCED FILTER SCENARIOS

- #15** Advanced FILTER Scenarios - Introduction
- #16** Input stacking
- #17** Lookup tables
- #18** Display all of blank
- #19** Partial match
- #20** RegEx
- #21** Based on list
- #22** Using slicers

GROUP FILTER AGGREGATE METHOD

- #23** Group Filter Aggregate Introduction
- #24** Group Filter Aggregate Scenarios
- #25** Financial reports
- #26** Spilling FILTER
- #27** Extending Filter

WRAP UP

- #28** Wrap up
- #29** Feedback

Quick start

FILTER



Filters a range or array based on an **array of TRUE/FALSE** values. Returning only the corresponding values where the array equals **TRUE**.

Array or range to return
values from.

Value(s) to return if no rows
returned.
[Default: N/A]

=FILTER(array, include, [if_empty])

Array of TRUE/FALSE values.
Only TRUE values returned.

Understanding truth

FILTER



Filters a range or array based on an **array of TRUE/FALSE** values. Returning only the corresponding values where the array equals **TRUE**.

Understanding truth



TRUE and **FALSE** are **automatically converted** to **1** or **0** when used in an arithmetic calculation.

Any **non-zero** number is deemed to be **TRUE**, and **zero** is deemed to be **FALSE**.

Text does **not have TRUE or FALSE** properties.

TRUE times tables



And logic

Multiplication	Result (Deemed)	Boolean	Result
TRUE x TRUE	1 (TRUE)	TRUE x TRUE > 0	TRUE
TRUE x FALSE	0 (FALSE)	TRUE x FALSE > 0	FALSE
FALSE x TRUE	0 (FALSE)	FALSE x TRUE > 0	FALSE
FALSE x FALSE	0 (FALSE)	FALSE x FALSE > 0	FALSE

Or logic

Addition	Result (Deemed)	Boolean	Result
TRUE + TRUE	2 (TRUE)	TRUE + TRUE > 0	TRUE
TRUE + FALSE	1 (TRUE)	TRUE + FALSE > 0	TRUE
FALSE + TRUE	1 (TRUE)	TRUE + FALSE > 0	TRUE
FALSE + FALSE	0 (FALSE)	FALSE + FALSE > 0	FALSE

SUMMARY



- ✓ TRUE/FALSE converted to 1 or 0 when used in arithmetic calculations.
- ✓ Any non-zero number is TRUE, zero is FALSE.
- ✓ Multiplication/addition with TRUE and FALSE creates AND/OR type logic.

Broadcasting

Broadcasting



Broadcasting is an array behaviour that occurs where **arrays of varying** sizes are used in calculation.

The **smaller array is expanded** to the size of the larger array to enable **calculation to occur based on relative position**.

SUMMARY



- ✓ Broadcasting in an array behaviour.
- ✓ Arrays calculate based on relative position.
- ✓ The smaller array is expanded to the size of the larger array.
- ✓ Where the values to broadcast are unclear, Excel uses #N/A.

Spilling

Spilling



Spilling occurs when the result of a formula contains **multiple values**.

Example: **=C4:C7**

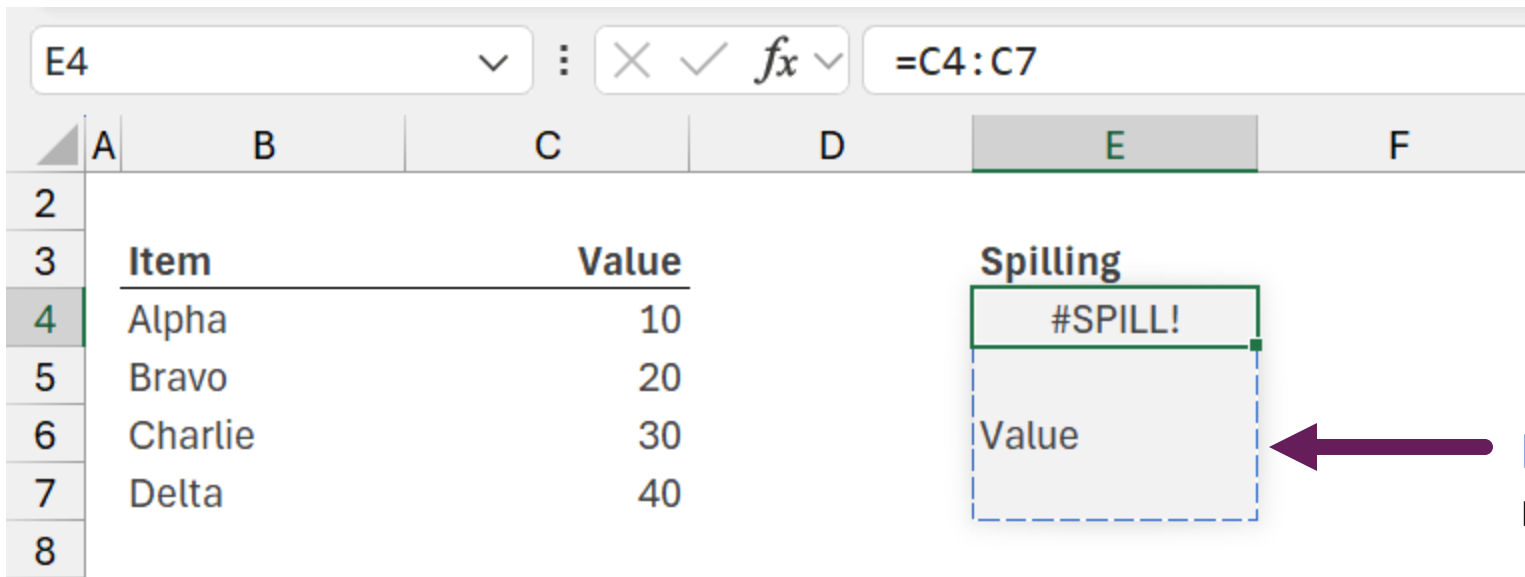
	A	B	C	D	E	F
2						
3		Item	Value		Spilling	
4		Alpha	10		10	
5		Bravo	20		20	
6		Charlie	30		30	
7		Delta	40		40	
8						

← Single formula with multiple results

← Blue box highlights the spill range

#SPILL! Error

Spill Error occurs when another value occupies the spill range.



		E4	
		=C4:C7	
		E	
2			
3	Item	Value	
4	Alpha	10	
5	Bravo	20	
6	Charlie	30	
7	Delta	40	
8			

Dotted blue box highlights the range required to spill.

Spill operator



Using the **spill operator** (#) references all cells within a cell's spill range.

Example: **=E4#**

G4		: ✕ ✓ <i>fx</i> ▾		=E4#				
	A	B	C	D	E	F	G	H
2								
3		Item	Value		Spilling		Spill Range	
4		Alpha	10		10		10	
5		Bravo	20		20		20	
6		Charlie	30		30		30	
7		Delta	40		40		40	
8								

E4# refer

E4# references all the cell in spill range of E4.

SUMMARY



- ✓ Spilling occurs when a formula returns multiple values to the grid.
- ✓ The range that the values occupy is known as the spill range.
- ✓ #SPILL! error occurs when another value occupies the spill range.
- ✓ Using the spill operator (#) references all values in a cell's spill range.

Multiple conditions

if_empty

Column selection

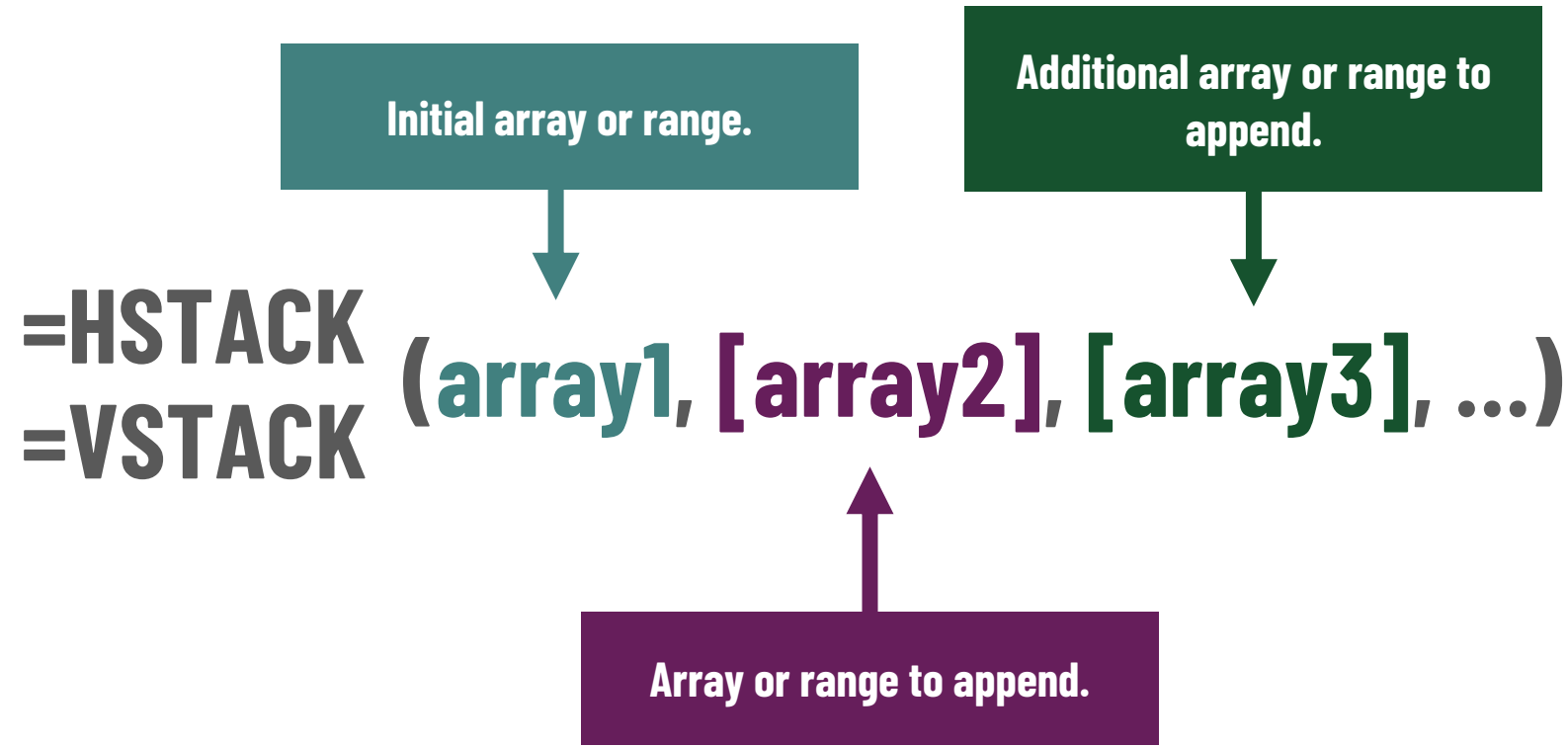
Support functions

- HSTACK / VSTACK
- CHOOSECOLS / CHOOSEROWS
- INDEX
- CHOOSE
- TAKE / DROP

HSTACK / VSTACK



Combine arrays or ranges **horizontally** (HSTACK) **or vertically** (VSTACK) into a single array, where each subsequent array or range is **appended** to the **right or bottom**.



NOTES:

... indicates on-going arrays or ranges to append

CHOOSECOLS & CHOOSEROWS



Return the specified **columns** (CHOOSECOLS) **or** **rows** (CHOOSEROWS) from an array or range.

Array or range to return the
columns/rows from.

Second column/row number to
return.

=CHOOSECOLS
=CHOOSEROWS (array, col_num1, [col_num2], ...)
row_num1, [row_num2], ...)

First column/row number
to return.

NOTES:

... indicates on-going row or column numbers

Can use negative numbers to select columns/rows from the end

The col_num and row_num arguments can include arrays

Dynamic column selection

TOCOL / TOROW



Returns an array or range as a **single column** (TOCOL) **or single row** (TOROW).

Array or range to return as a
column/row.

Determines order of scan.
TRUE: By column
FALSE: By row
[Default: FALSE]

=TOCOL
=TOROW (**array**, **ignore**, **scan_by_column**)

Defines values to ignore.
[Default: 0 – Keep all values]

XMATCH



Searches a range or array for a value and **returns the position** of the matching value.

The value to search for.

Defines the type of match to perform.

[Default: 0 - Exact Match]

=XMATCH(lookup_value, lookup_array, [match_mode], [search_mode])

The array or range to search in.

Defines the direction and type of search.

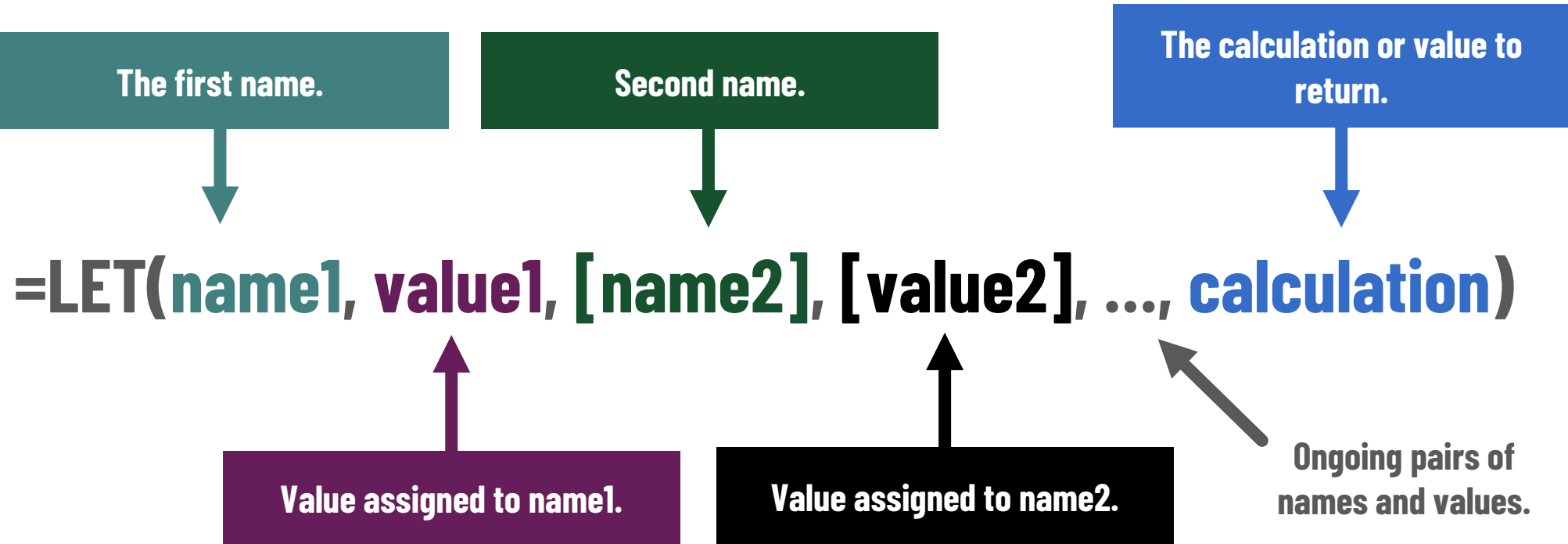
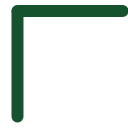
[Default: 1 - First-to-last]

NOTES:

If no match found, returns #N/A

Return blank

Assigns calculation results to names that can be reused within a formula.



NOTES:

Names must start with a letter, or an underscore, and cannot conflict with other name or range references (e.g. A1 is not a valid name)

Total row

Input stacking

Lookup tables

XLOOKUP



Searches a range or array for a value, if a matching value exists, it **returns** the **corresponding value** from another range or array.

The value to search for.

The array or range to search in.

The array or range to return the value from.

=XLOOKUP(lookup_value, lookup_array, return_array,
[if_not_found], [match_mode], [search_mode])

Value to return if no match found.

[Default: #N/A]

Defines the type of match to perform.

[Default: 0 - Exact Match]

Defines the direction and type of search.

[Default: 1 - First-to-last]

Display all if blank

ISBLANK



Checks if a **cell is blank** and returns
TRUE or **FALSE**.

Partial match

SEARCH



Returns the **character position** at which a **text string is found** within another text string.

The text to search for.

The character position to start
the search.

=SEARCH(find_text, within_text, [start_num])

The text to search within.

NOTES:

If the string is not found, the function returns #VALUE!

SEARCH is case insensitive; use FIND for a case-sensitive search.

ISNUMBER



Checks if a **value is a number** and returns **TRUE** or **FALSE**.

RegEx

REGEXTEST



Checks if a **value matches a pattern** and returns **TRUE** or **FALSE**.

The text to search within.

0 = Case Sensitive
1 = Case Insensitive
[Default: 0]

=REGEXTEST(text, pattern, [case_sensitivity])

The pattern to find.

Based on a list

Using slicers

SUBTOTAL



Returns the **subtotal** of a range based on **visible cells**.

Calculation to perform.

Second range of cells.

=SUBTOTAL(function_num, ref1, [ref2], ...)

Range of cells to calculate.

Group / Filter / Aggregate

Group / Filter / Aggregate Method



SORT



Sorts an array or range in **ascending or descending order**, by row or column, based on values within the array or range.

Array or range to return values
from.

Sort in ascending (1) or
descending (-1) order.
[Default: 1]

=SORT(array, [sort_index], [sort_order], [by_col])

The column/row index
number(s) to sort by.
[Default: 1]

Perform sort by column (TRUE)
or by row (FALSE).
[Default: FALSE]

Group Filter Aggregate Scenarios

Financial reporting

Spilling FILTER

Extending FILTER

Wrap Up