

SumProduct

NEWSLETTER #27 - February 2015

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What do you think the most complex Excel function is?

If you answered "Sum" then maybe Excel and Financial Modelling is not for you. We sat down and put our heads together and came up with our suggestions in this month's main technical article – AGGREGATE. It's not pretty but highly useful on occasion.

In other news, we announce the winners of the Christmas Quiz, mention the upcoming European Excel Summit to be held in Amsterdam and celebrate some good news for SumProduct – and our clients – as well.

Until next month. All the best for 2015.

Liam Bastick, Managing Director, SumProduct



The World's Most Complicated Function..?

AGGREGATE() is a relatively new Excel function, first emanating in Excel 2010. Therefore, it cannot be used in spreadsheets which may be opened in Excel 2007 or earlier as it will give rise to #NAME? errors.

For those who desire greater sesquipedalian loquaciousness (look it up!), its syntax may give some comfort as it has two forms:

- Reference: **=AGGREGATE(Function_Number,Options,Ref1,[Ref2],...)**
- Array: **=AGGREGATE(Function_Number,Options,Array,[Optional_Argument])**

Where:

- **Function_Number** denotes function that you wish to use. Similar to **SUBTOTAL**, **Function_Number** allocates integer values to various Excel functions:

Comparison		
SUBTOTAL	AGGREGATE	Function
1	1	AVERAGE
2	2	COUNT
3	3	COUNTA
4	4	MAX
5	5	MIN
6	6	PRODUCT
7	7	STDEV.S
8	8	STDEV.P
9	9	SUM
10	10	VAR.S
11	11	VAR.P
	12	MEDIAN
	13	MODE.SNGL
	14	LARGE
	15	SMALL
	16	PERCENTILE.INC
	17	QUARTILE.INC
	18	PERCENTILE.EXC
	19	QUARTILE.EXC

- **Options** specifies which values may be ignored when applying the chosen function to the range. If the **Options** parameter is omitted, the **AGGREGATE** function assumes that **Options** is set to 0. **Options** can take any of the following values:

Comparison		
SUBTOTAL	AGGREGATE	Function
1	1	AVERAGE
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	13	MODE.SNGL
	14	LARGE
	15	SMALL
	16	PERCENTILE.INC
	17	QUARTILE.INC
	18	PERCENTILE.EXC
	19	QUARTILE.EXC

- **Options** specifies which values may be ignored when applying the chosen function to the range. If the **Options** parameter is omitted, the **AGGREGATE** function assumes that Options is set to 0. **Options** can take any of the following values:

Option	Behaviour
0	Ignore nested SUBTOTAL and AGGREGATE functions
1	Ignore hidden rows, nested SUBTOTAL and AGGREGATE functions
2	Ignore error values, nested SUBTOTAL and AGGREGATE functions
3	Ignore hidden rows, error values, nested SUBTOTAL and AGGREGATE functions
4	Ignore nothing
5	Ignore hidden rows
6	Ignore error values
7	Ignore hidden rows and error values

- **Ref1** is the first numeric argument for the function when using the Reference syntax
- **Ref2**,... is optional. Numerical arguments may number two through 253 for the function when using the Reference syntax
- **Array** is an array, array formula, or reference to a range of cells when using the Array syntax
- **Optional_Argument** is a second argument required if using the **LARGE**, **SMALL**, **PERCENTILE.INC**, **QUARTILE.INC**, **PERCENTILE.EXC**, or **QUARTILE.EXC** when using the Array syntax:

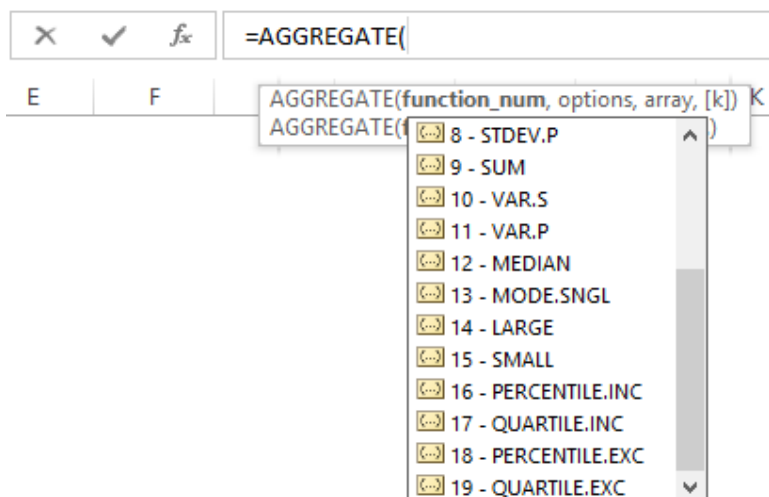
Function	Optional Argument Required
LARGE	LARGE(Array,k)
SMALL	SMALL(Array,k)
PERCENTILE.INC	PERCENTILE.INC(Array,k)
QUARTILE.INC	QUARTILE.INC(Array,Quart)
PERCENTILE.EXC	PERCENTILE.EXC(Array,k)
QUARTILE.EXC	QUARTILE.EXC(Array,Quart)

It just all sounds, well, tremendously complicated. In practice, it's not that bad. This is because since this function was created for Excel 2010 and later, screen tips will appear as you type in order to nudge you in the right direction. For example, let's say you wanted the third largest number in the following list:

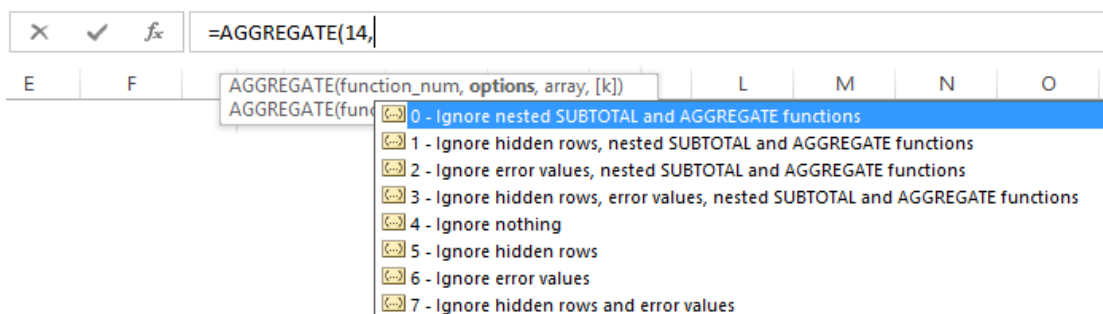
	A
1	List
2	5
3	-2
4	12
5	#REF!
6	dog
7	#DIV/0!
8	#NAME?
9	4
10	11
11	

From inspection, the third largest value is the amount in cell **A2** (the value '5'), but if you use the usual formula for this **=LARGE(A2:A10,3)** you will get the value **#REF!** as this is the first error that Excel comes across as it works down the list.

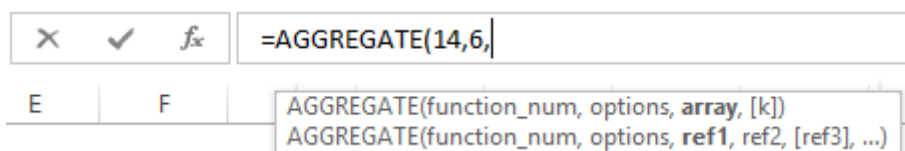
This is where you can use **AGGREGATE()** to ignore these errors. If you type in **=AGGREGATE(** you will get the following screen tip scroll list:



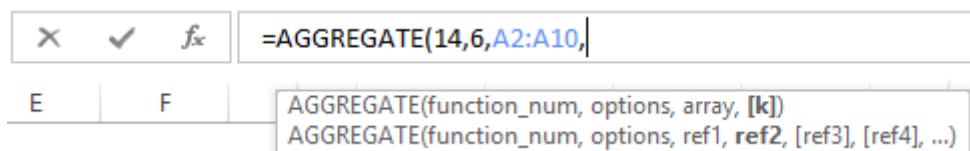
By typing '14' or selecting '14 – LARGE' from the pop-up list, you now know you are on the right track. After typing a 'comma', Excel then continues to help you:



Again by either typing a number or pointing and clicking an appropriate choice may be made. I want to ignore errors, so I need to choose '2', '3', '6' or '7', depending upon what else should be ignored. I will choose '6' – ignore error values only and then type another comma so that the screen tips keep coming thick and fast:



Now, Excel is seeking the references for evaluation. It appears to be possible that this can be in the form of a list (the array) or else discrete cell references and / or values. In this example, I will enter the range and type another comma:



Now, Excel appears to be looking for the other argument for **LARGE()** or else another reference. This is not correct. The screen tip does not update automatically. The syntax required is now just as it would if we had typed in the underlying function, i.e. **=LARGE(Array,k)**. In this instance, this syntax always requires the fourth value to be **k**, the integer denoting the **k**th largest item in the list.

In this example, I will just type the value '3' and close brackets. Therefore, we arrive at the following formula,

=AGGREGATE(14,6,A2:A10,3)

which generates the correct answer '5'. The formula might look counterintuitive, but Excel has helped us every step of the way. As my oft-misquoted English teacher always used to say, practice makes perfect.

Please see the <http://www.sumproduct.com/thought/aggregate> for further details, more examples and a free Excel file to download.

MVP 2015

SumProduct is pleased to announce that our MD, Liam Bastick, has been re-awarded Microsoft's Most Valuable Professional (MVP) award for Excel for 2015. This award recognises exceptional technical community leaders from around the world who voluntarily share their high quality, real world expertise with others. Microsoft MVPs are a highly select group of experts representing technology's best and brightest who share a deep commitment to community and a willingness to help others.

Worldwide, there are over 100 million participants in technical communities; of these participants, there are fewer than 4,000 active Microsoft MVPs. In Excel, c.120 people have received this award. Microsoft's MVP Award evaluates technical expertise and voluntary community contributions for the past year, considering

the quality, quantity and level of impact of contributions. It's a difficult award to attain and just as difficult to retain. This is Liam's fourth consecutive award.

At SumProduct, you can rely on our experience and willingness to help.



Amsterdam Excel Summit: April 13 and 14, 2015



It has been a busy time for us over the Christmas and New Year period with various meetings / discussions held around the globe in London, Los Angeles, Rome and Melbourne amongst others, to name drop a few places. Indeed, Liam Bastick caught up with fellow Excel Microsoft MVPs Jan Karel (pictured left above) and Tony de Jonker (centre) in Amsterdam to discuss the forthcoming European Excel Summit recently.

For our readers based in Europe, coordinators Jan Karel and Tony have been scheduling a two day event in Amsterdam. It will consist of a series of 75-minute interactive sessions presented by various MVPs from around the globe on Monday 13 April and Tuesday 14 April. The final set list is expected to include contributions from an array of MVPs

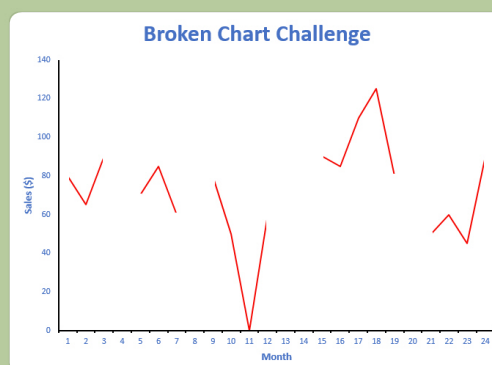
(is that the appropriate collective noun for Excel MVPs?) Yigal Edery, Roger Govier, Jon Peltier, Ken Puls, Henk Vlootman, Charles Williams, Jan Karel, Tony and Liam. It is possible others will be presenting also as full details have not been finalised at the time of writing. Topics will include sessions on Charting, Checking Your Excel Models, PivotTables, Power BI, Power Pivot, Power Query, Power BI, SQL, Valuation Modelling, VBA and Working with Multiple Criteria.

The 2014 Summit proved to be a sell-out and early indications are that 2015 will be even bigger and better. If you are interested to learn more, check out their website at <http://topexcelclass.com/index.php/amsterdam-excel-summit/>.

Congratulations

SumProduct, in conjunction with the Chartered Institute of Management Accountants (CIMA), is pleased to announce the winners of the annual Xmas quiz. Congratulations to **Prashant Jaiswal, John Jackson and Brian Canes** for their winning solutions. Each of them won Amazon gift vouchers (that's the web site not the rainforest). It's SumProduct's sixth competition in conjunction with CIMA and we're pretty sure there shouldn't be a seven year itch. We'll give notice of the next one in due course right here in a forthcoming issue of our Newsletter. In the meantime, you can check out the discussion on the Excel challenge in this month's (February) issue of *Insight* at <http://www.cimaglobal.com/Thought-leadership/Newsletters/Insight-e-magazine/Insight-2015/>.

Month	Sales
1	80
2	65
3	90
4	
5	70
6	85
7	60
8	
9	80
10	50
11	0
12	60
13	
14	
15	90
16	85
17	110
18	125
19	80
20	
21	50
22	60
23	45
24	90



Key Strokes

Each newsletter, we'd like to introduce you to several useful keystrokes you may or may not be aware of. This month we thought we thought we'd see if you knew your alphabet:

Keystroke	What it does
CTRL + A	Select all
CTRL + B	Bold (toggle)
CTRL + c	Copy
CTRL + D	Fill down
CTRL + F	Find dialog box
CTRL + G	Go To dialog box
CTRL + H	Replace dialog box
CTRL + I	Italic (toggle)
CTRL + K	Insert hyperlink
CTRL + L	Create Table (Excel 2007 onwards) / Create List (Excel 2003)
CTRL + N	New workbook
CTRL + O	Open workbook
CTRL + P	Print
CTRL + R	Fill right
CTRL + S	Save
CTRL + T	Insert Table (Excel 2007 onwards)
CTRL + U	Underline (toggle)
CTRL + V	Paste
CTRL + W	Close Window
CTRL + X	Cut
CTRL + Y	Redo
CTRL + Z	Undo

Not all letters have actions allocated (CTRL + Q sounds like crowd control..?).

There are over 540 keyboard shortcuts in Excel. For a comprehensive list, please download our Excel file at <http://www.sumproduct.com/thought/keyboard-shortcuts>.



Oops

Well done to all our eagle-eyed readers who spotted our first deliberate mistake of the New Year. Yes, we have welcomed in the New Year. Apologies for getting the date wrong on our January newsletter – and thanks for all of you who wrote in to highlight our faux pas. Our proof reader has been duly executed.

Upcoming SumProduct Training Courses

Dubai 21st - 23rd Mar 2015:

Strategic Planning, Forecasting and Budgeting

Hong Kong 5th - 8th May 2015:

Strategic Planning, Forecasting and Budgeting

London 18th - 20th May 2015:

Strategic Planning, Forecasting and Budgeting

Singapore 26th - 29th May 2015:

Strategic Planning, Forecasting and Budgeting

New York 31st Aug - 2nd Sep 2015:

Strategic Planning, Forecasting and Budgeting

London 19th - 21st Oct 2015:

Strategic Planning, Forecasting and Budgeting

Hong Kong 26th - 29th Oct 2015:

Strategic Planning, Forecasting and Budgeting

Dubai 8th - 10th Dec 2015: Strategic Planning, Forecasting and Budgeting

Our Services

We have undertaken a vast array of assignments over the years, including:

- Business planning
- Building three-way integrated financial statement projections
- Independent expert reviews
- Key driver analysis
- Model reviews / audits for internal and external purposes
- M&A work
- Model scoping
- Project finance
- Real options analysis
- Refinancing / restructuring
- Strategic modelling
- Valuations
- Working capital management

If you require modelling assistance of any kind, please do not hesitate to contact us at contact@sumproduct.com.

Link to Others

These newsletters are not intended to be closely guarded secrets. Please feel free to forward this newsletter to anyone you think might be interested in converting to "the SumProduct way".

If you have received a forwarded newsletter and would like to receive future editions automatically, please subscribe by completing our newsletter registration process found at the foot of any www.sumproduct.com web page.

Any Questions?

If you have any tips, comments or queries for future newsletters, we'd be delighted to hear from you. Please drop us a line at newsletter@sumproduct.com.

Training

SumProduct offers a wide range of training courses, aimed at finance professionals and budding Excel experts. Courses include Excel Tricks & Tips, Financial Modelling 101, Introduction to Forecasting and M&A Modelling.

Check out our more popular courses in our training brochure:



Drop us a line at training@sumproduct.com for a copy of the brochure or download it directly from <http://www.sumproduct.com/training>.

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