

Sum Product

NEWSLETTER #41 - April 2016

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SumProduct's been on the road again

March saw us head for summits, training and client work to Australia (Brisbane, Melbourne, Newcastle and Sydney), New Zealand (Auckland), Philippines (Manila), Thailand (Bangkok) and the United States (Seattle). And yet we can't get our Frequent Flyer statuses sorted (how on earth does two of our team lose their frequent flyer statuses with this level of travel..?).

It's been a month of firsts. The Excel Summit South has been and gone. With good numbers we provide a report back on what happened – and what's next. Microsoft's inaugural Data Insights summit was also held and we summarise that too.

Last month's newsletter came out too soon to give proper justice to the new Excel functions and features so we expand last month's summary with more details – and suggest that Office 365 users may want to explore these new additions through Excel Mobile if nothing else.

Until next month.

Liam Bastick, Managing Director, SumProduct



Excel in 2016: New Functions and Features Revisited

With more and more users migrating to the Office 365 subscription model, some versions of Office 365 Excel 2016 are getting six new functions to play with. The roll-out started in late February – too late for us to fully report in last month's newsletter – but we thought it would be well worth reviewing these new entrants to the Excel family.

Do note we said *some* Excel users are getting these new features. To have access to these functions, you have to meet one of the following requirements:

- You are an Office 365 subscriber and have the latest version of Office installed on your PC
- You are using Excel Online
- You are using Excel Mobile
- You are using Excel for Android phones and tablets.

Just having standalone Office 2016 is insufficient: Microsoft's push to get everyone onto the subscription model continues! Even then, the roll-out will be in stages. Office 365, Home, Personal or University subscriptions will update before other types and businesses may find new features have been restricted by their IT departments. Further, recent discussions on Excel for a suggest PCs may be getting new features ahead of those with Mac's etc.

If you haven't got the update yet, consider downloading Excel Mobile from the App store. Whilst it doesn't have the full functionality of Excel, it does have most of these new functions and features to play with. It's free with an Office 365 subscription.

There are six new Excel functions in Excel 2016 Remixed. Here's our take on them.

IFS

As model developers and reviewers, we must confess we are not convinced about this one. If you have ever used a formula with nested IF statements, e.g.

=IF(IF(IF...

then maybe this function is for you – however, if you have ever written Excel formulae like this, then maybe Excel isn't for you! There are usually better ways of writing the formula using **CHOOSE** or **INDEX(MATCH)** (see www.sumproduct.com/thought/index-match.html for more) for example.

The syntax is as follows:

IFS(logical_test1, value_if_true1, [logical_test2, value_if_true2], [logical_test3, value_if_true3],...)

- **logical_test1** is a logical condition that evaluates to TRUE or FALSE
- **value_if_true1** is the result to be returned if **logical_test1** evaluates to TRUE. This may be empty
- **logical_test2** (and onwards) are further conditions that evaluate to TRUE or FALSE also
- **value_if_true2** (and onwards) are the respective results to be returned if the corresponding **logical_test** evaluates to TRUE. Any or all may be empty.

Since functions are limited to 254 arguments (sometimes known as parameters), the new **IFS** function can contain 127 pairs of conditions and results.

One thing to note is that **IFS** is not quite the same as **IF**. With the **IF** statement, the third argument corresponds to what do if the **logical_test** is not TRUE (*i.e.* it is an ELSE condition). **IFS** does not have an inherent ELSE condition, but it can be easily generated. All you have to do is make the **final logical_test** equal to a condition which is always trues such as TRUE or 1=1 (*say*).

To show how it works, consider the following example.

Here, would-be gurus are graded based on evaluation criteria in the table, applied in a particular order:

=IFS(H13="Yes",I13,H14="Yes",I14,H15="Yes",I15,H16="Yes",I16,TRUE,"Not a Guru")

I think it's safe that although it is reasonably straightforward to follow, it is entirely reasonable to say it's not the prettiest, most elegant formula ever put to Excel paper. In particular, do pay heed to the final **logical_test**: TRUE. This ensures we have an ELSE condition as discussed above.

Other issues to consider:

- Whilst the **value_if_true** may be empty, it must not be omitted. Having an odd number of arguments in an **IFS** statement would give rise to the "You've entered too few arguments for this function" error message.
- If a **logical_test** is not actually a logical test (*e.g.* it evaluates to something other than TRUE or FALSE, the function returns an **#VALUE!** error. Numbers still appear to work though: any number than zero evaluates as TRUE and zero is considered to be FALSE.
- If no TRUE conditions are found, this function returns the **#N/A!** error.

To be fair, one similar solution using legacy Excel functions isn't any better:

=IF(H13="Yes",I13,IF(H14="Yes",I14,IF(H15="Yes",I15,IF(H16="Yes",I16,"Not a Guru"))))

Lovely.

SWITCH

SWITCH is already available in many alternative programming languages and can simplify potentially horrible formulae. This function evaluates an expression against a list of values and returns the result corresponding to the first matching value. If there is no match, an optional default value may be returned. The syntax is as follows:

SWITCH(expression, value1, result1, [default or value2, result2],...[default or valueN, resultN])

where:

- **expression** is the value that will be compared against the values (value1 to valueN) cited
- **value1** to **valueN** are the values that will be compared against the expression
- **result1** to **result** are the values, references or formulae results to be returned when the corresponding **valueN** argument matches the **expression**. The **result** must be supplied for each corresponding **valueN** argument
- **default** is an optional value to return in case no matches are found in the **valueN** expressions. The **default** argument is identified by having no corresponding **result** expression, *i.e.* it must be the final argument in the function where the function contains an **odd**, rather than an even, number of arguments. If no **default** argument is supplied and no match is found this function returns the **#N/A!** error.

To illustrate, consider the following painful formula:

=SWITCH(MID(\$G13,SEARCH("-", \$G13)+1,SEARCH("-", \$G13,(SEARCH("-", \$G13)+1))-SEARCH("-", \$G13)-1),"XS","ExtraSmall","S","Small","M","Medium","L","Large","XL","Extra Large","Not Specified")

H13 X ✓ fx =SWITCH(MID(\$G13,SEARCH("-", \$G13)+1,SEARCH("-", \$G13,(SEARCH("-", \$G13)+1))-SEARCH("-", \$G13)-1), "XS", "Extra Small", "S", "Small", "M", "Medium", "L", "Large", "XL", "Extra Large", "Not Specified")

Item Code	Size	Alternative
38370-XL-Yellow	Extra Large	Extra Large
62141-L-Red	Large	Large
88756-XL-Blue	Extra Large	Extra Large
25110-XS-Black	Extra Small	Extra Small
63333-S-Blue	Small	Small
64794-XL-Blue	Extra Large	Extra Large
87168-XS-Green	Extra Small	Extra Small
60786-XL-Yellow	Extra Large	Extra Large
97198-L-Red	Large	Large
16592-L-White	Large	Large
31352-M-Yellow	Medium	Medium
30466-2XL-White	Not Specified	Not Specified
51887-XS-Black	Extra Small	Extra Small
55233-XL-Yellow	Extra Large	Extra Large
79163-S-Blue	Small	Small
33154-XL-Green	Extra Large	Extra Large
73618-XS-Black	Extra Small	Extra Small
46011-M-Red	Medium	Medium
35653-XL-Black	Extra Large	Extra Large
32210-S-Blue	Small	Small
24501-L-Red	Large	Large
41877-XL-Yellow	Extra Large	Extra Large
25117-XS-Green	Extra Small	Extra Small
79749-L-Red	Extra Large	Extra Large
93833-L-Green	Large	Large
24112-S-Blue	Small	Small
21479-M-White	Medium	Medium
98718-XL-Yellow	Extra Large	Extra Large
28012-L-White	Large	Large

The **expression** here is

MID(\$G13,SEARCH("-", \$G13)+1,SEARCH("-", \$G13,(SEARCH("-", \$G13)+1))-SEARCH("-", \$G13)-1)

which is determining what is contained between the two hyphens (for more on text string functions, please see www.sumproduct.com/thought/text-messages.html). It is horrible, and that's the point. The formula then considers what the values may be ("XL", "M") and what value should be returned as a consequence ("Extra Large", "Medium").

The corresponding Excel formula before **SWITCH** would have been a nightmare:

=IF(MID(\$G13,SEARCH("-", \$G13)+1,SEARCH("-", \$G13,(SEARCH("-", \$G13)+1))-SEARCH("-", \$G13)-1)="XS", "Extra Small", IF(MID(\$G13,SEARCH("-", \$G13)+1,SEARCH("-", \$G13,(SEARCH("-", \$G13)+1))-SEARCH("-", \$G13)-1)="S", "Small", IF(MID(\$G13,SEARCH("-", \$G13)+1,SEARCH("-", \$G13,(SEARCH("-", \$G13)+1))-SEARCH("-", \$G13)-1)="M", "Medium", IF(MID(\$G13,SEARCH("-", \$G13)+1,SEARCH("-", \$G13,(SEARCH("-", \$G13)+1))-SEARCH("-", \$G13)-1)="L", "Large", IF(MID(\$G13,SEARCH("-", \$G13)+1,SEARCH("-", \$G13,(SEARCH("-", \$G13)+1))-SEARCH("-", \$G13)-1)="XL", "Extra Large", "Not Specified"))))

CONCAT

This function replaces the **CONCATENATE** function (see www.sumproduct.com/thought/concatenation.html).

The **CONCAT** function combines the text from multiple ranges and / or text strings:

CONCAT(text1, [text2],...)

where:

- **text1** is the text item to be joined
- **text2** (onwards) are the additional items to be joined.

For example, consider the following illustration:

	C	D	E	F	G	H	I	J	K	L	M	N	O	P
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														

Illustration

Words
Red
Orange
Yellow
Green
Blue
Indigo
Violet

CONCATENATE	Red, Orange, Yellow, Green, Blue, Indigo, Violet	=CONCATENATE(G13, , G14, , G15, , G16, , G17, , G18, , G19)
&	Red, Orange, Yellow, Green, Blue, Indigo, Violet	=G13&","&G14&","&G15&","&G16&","&G17&","&G18&","&G19
CONCAT	Red, Orange, Yellow, Green, Blue, Indigo, Violet	=CONCAT(G13, , G14, , G15, , G16, , G17, , G18, , G19)
CONCATENATE	#VALUE!	=CONCATENATE(G13:G19)
CONCAT	RedOrangeYellowGreenBlueIndigoViolet	=CONCAT(G13:G19)

Upon first glance, **CONCAT** does the same thing as the legacy **CONCATENATE** function or **&** (ampersand) operator, but is just easier to spell. However, it is a little more than that: **CONCATENATE** will not cope with highlighting a contiguous range (it will just return the **#VALUE!** error); **CONCAT** will concatenate them all.

TEXTJOIN

The **TEXTJOIN** function combines the text from multiple ranges and / or text strings and includes a delimiter to be specified between each text value to be combined. If the delimiter is an empty text string, this function will effectively concatenate the ranges similarly to the **CONCAT** function. Its syntax is

TEXTJOIN(delimiter, ignore_empty, text1, [text2], ...)

where:

- delimiter** is a text string (which may be empty) with characters contained within inverted commas (double quotes). If a number is supplied, it will be treated as text
- ignore_empty** ignores empty cells if TRUE or the argument is unspecified (*i.e.* is blank)
- text1** is a text item to be joined
- text2** (onwards) are additional items to be joined up to a maximum of 252 arguments. If the resulting string contains more than 32,767 characters **TEXTJOIN** returns the **#VALUE!** error.

TEXTJOIN is more powerful than **CONCAT**. To highlight this, consider the following examples:

	C	D	E	F	G	H	I	J	K	L	M	N	O	P
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53														
54														
55														
56														

Here, in the formulae on rows 53 and 54, empty cells in a contiguous range may be ignored and delimiters only need to be specified once. When you compare to **CONCAT**, you do begin to wonder why you need it – perhaps to soften the demise of **CONCATENATE**..?

MAXIFS and MINIFS

The last two new functions I am going to combine – and not with **TEXTJOIN**!

MAXIFS(max_range, criterion_range1, criterion1, [criterion_range2, criterion2], ...)

returns the maximum value among cells specified by a given set of conditions or criteria, where:

- max_range** is the actual range of cells in which the maximum is to be determined
- criterion_range1** is the set of cells to evaluate with the criterion specified
- criterion1** is the criterion in the form of a number, expression or text that defines which cells will be evaluated as a maximum
- criterion_range2** (onwards) and **criterion2** (onwards) are the additional ranges and their associated criteria. 126 range / criterion pairs may be specified. All ranges must have the same dimensions otherwise the function returns an **#VALUE!** error.

MINIFS behaves similarly but returns the minimum rather than the maximum value among cells specified by a given set of conditions or criteria.

This example is preferable to its standard Excel counterpart:

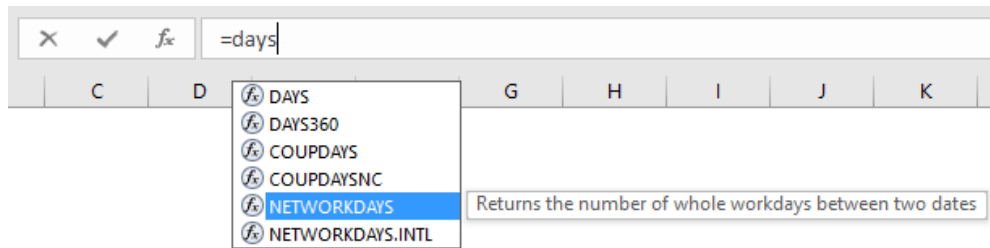
{=MAX(IF(G13:G31=H34,IF(H13:H31=H35,IF(I13:I31=H36,J13:J31))))}

Array formulae (see www.sumproduct.com/thought/array-of-light.html for more information) are cumbersome and not readily understood.

	C	D	E	F	G	H	I	J	K
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
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24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									

Other Updates

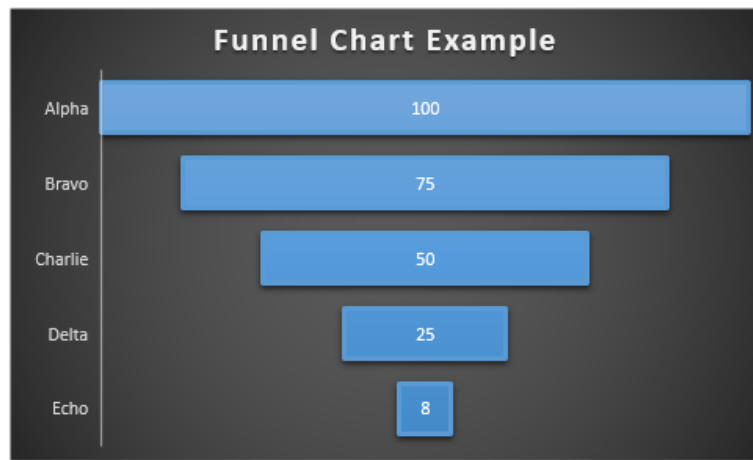
The recent update didn't end with the six new functions. Microsoft improved the AutoComplete functionality in that you no longer need to be so precise to find what you are looking for, e.g.



Excel will now look for functions or range names that contain the phrase sought. This will help immensely when you cannot quite remember what it was you are looking for.

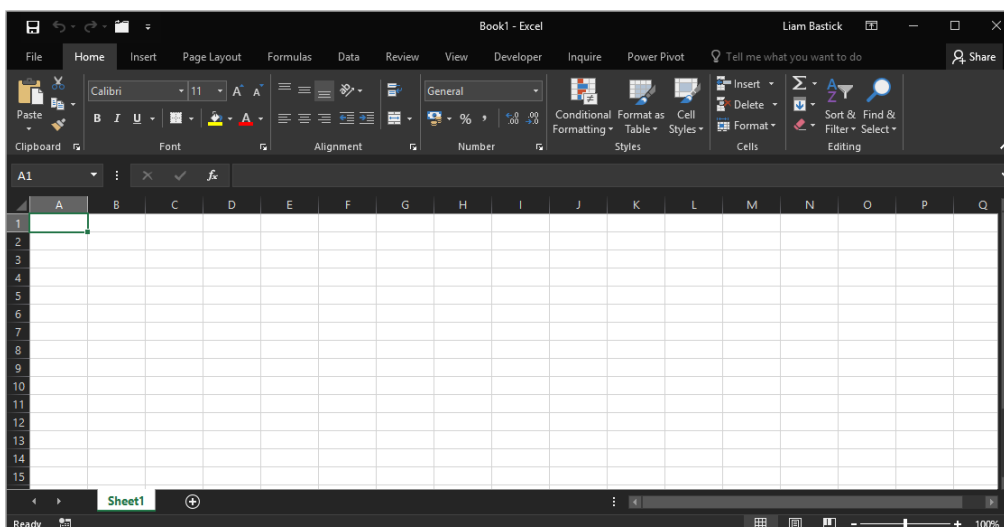
A new chart type has been added too:

Alpha	100
Bravo	75
Charlie	50
Delta	25
Echo	8



Funnel charts are a type of symmetrical bar chart. They were easy to construct before and slightly easier now. I don't wish to sound churlish, but it's not quite a waterfall chart!

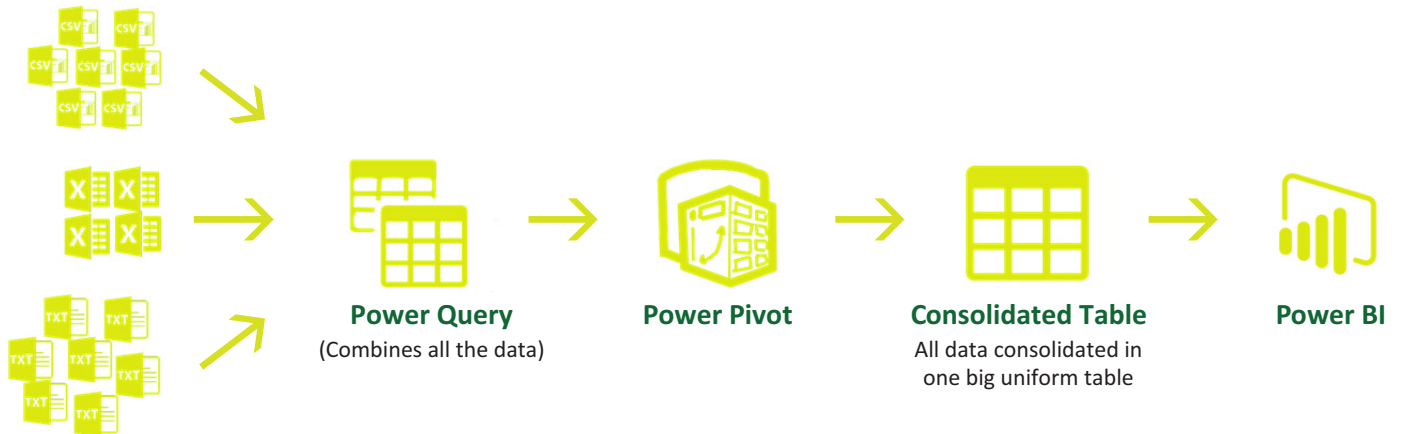
And finally, something I think the majority of readers will possibly agree they may well be able to live without. Let me introduce you to Office 2016's brand new Black theme:



Perfect for hangovers and for reflecting your mood when you have to work late, we are not quite sure this is going to catch on. In fact, we are so convinced we are not even bothering explaining how to get it!!

New Business Intelligence using Excel Course

We have been busy putting together a new “Power” course together, combining the best bits of Power BI, Power Query and Power Pivot (or whatever they happen to be called this week in later versions of Excel). Aimed at Excel 2013 users, we intend to roll this course out from June. It will be a three-day course: Part 1 consists of the first day and Part 2 consists of two days, so that attendees do not have to be out of the office too long in one go.



Part 1 will introduce Power Query, explaining how analysts can clean up and interpret their own data. The course provides a simple introduction to the 'M' language and shows how easy it is to update data and perform repetitive tasks in minutes rather than hours or days.

Part 2 will revisit Power Pivot and show how cleaned-up data can then be interrogated using the Data Model and DAX measures, providing

self-service analysis to all Excel users in a timely fashion. This course culminates with a summary of Power BI, demonstrating how this data may then be summarised to identify trends and construct interactive dashboards that may be used by all key stakeholders.

Drop us a line now at training@sumproduct.com for more information, further details and to register your interest.



Did you come? Did you enjoy it? Did you miss it?



March saw the first-ever Excel Summit South, with the two-day events being held in Auckland (pictured), Sydney and Melbourne. Many modelling and Excel professionals turned out for all three locations and listened to tips and tricks from seven MVPs (Bill Jelen, Charles Williams, Jon Peltier, Ingeborg Hawighorst, Ken Puls, our own Liam Bastick and Zack Barresse), with Bill (Mr. Excel) and Jon (Mr. Charts) in particular seemingly singled out for votes of thanks from grateful readers over the years.

Whilst Inge's presentation on Power BI was particularly well received, Microsoft speakers Ben Rampson and Carlos Ortera stole the show discussing what's coming in Excel and what the software is used for (who would have thought 0.02% of users create workbooks with no worksheets!). The Q&A sessions saw the two men from Redmond earn their money (hang on a minute, did anyone pay them??) as they were grilled on the 20,000 new features everyone wanted to be available yesterday in Excel.

They were extremely good sports and we hope Microsoft will send such friendly, entertaining and knowledgeable ambassadors to future events.

There were other speakers too: sponsors PwC's speakers Smita Baliga discussed spreadsheet management and Ian Bennett introduced us to the accounting firm's Axis of Spreadsheet Evil. We are not sure we are in full agreement with all the "roots of evil", but hey, variety is the spice of life and there certainly was a lively debate on the matter. With Andrew Revfeim discussing FAST

modelling standards, Excel4Apps showing off their software wares, the event also had Félicie Hermans providing a very, very boring presentation on Methods of Testing Spreadsheets. Oh no, wait, she was particularly insightful and funny... Apologies, Félicie, we now understand why error legend Professor Raymond Panko views you as one of the world experts on modelling errors.

Overall, it was a successful event, enthusiastically attended. Never has anyone asked our MD for his autograph before (other than for overdue bills): it felt like a Comic Con event, but for geeks...

Microsoft Data Insights Summit

Last month, it's been a little quieter in the SumProduct Sydney office. Not just because we've been out running training and presenting at CAANZ conferences (though there's that too!), but Director of the Sydney office Tim Heng has just spent the better part of a week over in Seattle

(technically Bellevue), attending Microsoft's inaugural Data Insights Summit. The event was extremely well attended with over 1,200 people at the event. Hmm, sounds like one of our creditor meetings...



Pictured above: It looks like Microsoft can afford the most spacious corporate jets, but in actuality it's various Microsoft executives talking about Power

Microsoft has been talking this up as a general data summit with two primary streams: Power BI and Excel (focused on tools that overlap with Power BI such as Power Pivot and Power Query). For those who aren't aware of this relatively new product, Power BI is a business intelligence tool that combines the best parts of Power Pivot and Power Query, culminating in a data model platform that can be easily shared between users across an organisation.

If you're not familiar with Power BI, then it's something that you might want to look into, especially if you're tasked with running reports and distributing outputs across an organisation. The summit has been focusing on many of the abilities of Power BI, including:

- Importing data from external data sources using the same interface and format as Power Query (or Get and Transform, for those using Excel 2016)
- Link tables for Power Pivot analysis, but in a more advanced form (including bi-directional many-to-many relationships between tables, which Excel Power Pivot can't do)
- Generate customisable dashboards that can simultaneously drill down into data results as filters are applied
- Incorporate existing Excel outputs into dashboards to avoid recreating the wheel
- Have both desktop and web-based tools to access your live data
- Being able to simply type in real-language business questions (e.g. "Account balance by state and month") and generating charts and outputs in real-time
- Allow users in an organisation to access and analyse the dashboard results and functionality, whilst maintaining data security and being able to limit user access to pre-defined subsets of data (for example, a division manager may only be able to see their division's data)

Does this sound like something you want to know more about? In case you're still not tempted, sessions from the Data Insights Summit suggest that it's all about to get even more powerful, as it evolves: e.g. additional charts created by the Power BI user community and R data analytics tied in with Microsoft's Azure machine learning services, along with regular weekly releases of new content and features.

As mentioned above, SumProduct is going to be running Power BI courses to help showcase how this tool can help your business, along with Power Query and Power Pivot courses to help you make the most of both Excel and Power BI. Of course, if you need something sooner rather than later, feel free to get in touch at contact@sumproduct.com to see how we can tailor a course for you or assist in developing a solution for your business.

Upcoming SumProduct Training Courses

Location	Course	Date	Duration
Sydney	Excel Tips & Tricks	18th Apr 2016	1 day
Sydney	Financial Modelling	19th - 20th Apr 2016	2 days
Sydney	Mergers & Acquisitions Modelling	21st - 22nd Apr 2016	2 days
Brisbane	Excel Tips & Tricks	16th May 2016	1 day
Brisbane	Financial Modelling	17th - 18th May 2016	2 days
Singapore	Excel Tips & Tricks	23rd May 2016	1 day
Singapore	Financial Modelling	24th - 25th May 2016	2 days
Singapore	Power of Power Pivot	26th - 27th May 2016	2 days
Melbourne	Excel Tips & Tricks	6th Jun 2016	1 day
Melbourne	Financial Modelling	7th - 8th Jun 2016	2 days
Melbourne	Mergers & Acquisitions Modelling	9th - 10th Jun 2016	2 days
Melbourne	Power of Power Pivot	14th - 15th Jun 2016	2 days
Auckland	Excel Tips & Tricks	20th Jun 2016	1 day
Auckland	Financial Modelling	21st - 22nd Jun 2016	2 days

Key Strokes

Each newsletter, we'd like to introduce you to several useful keystrokes you may or may not be aware of. To commemorate the first ever Excel Summit South, we thought we would look at just one feature this month. In one of Bill Jelen's sessions, he invited attendees to describe how they would paste values into an Excel spreadsheet. Here are some of their responses:

Keystroke	What it does
ALT + E + S + V + ENTER	Paste Special as Values.
CTRL + ALT + V + V + ENTER	Paste Special as Values.
ALT + H + V + V	Paste Special as Values.
ALT + <i>Number</i>	Paste Special as Values (after adding the Paste Special as Values icon to Quick Access Toolbar; the number will differ depending upon how the Quick Access Toolbar has been customised).
F4	Paste Special as Values (if already performed).

And these alternatives don't begin address mouse-related solutions!

There are over 540 keyboard shortcuts in Excel. For a comprehensive list, please download our Excel file at www.sumproduct.com/thought/keyboard-shortcuts. Also, check out our new daily **Excel Tip of the Day** feature on the www.sumproduct.com homepage.

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**
- **Power BI, Power Query & Power Pivot**
- **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".

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Any Questions?

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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.

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