It's bits and pieces this month as we look at a great piece of news for 32-bit users of some versions of Excel 2016 (more memory available!). We also take a gander at the Baker's Dozen of Power Query (Excel 2010 and 2013) / Get & Transform (Excel 2016) improvements that have been recently announced too.

And there's more. Let us take you to our take on mistakes as we take a detailed look at common error outputs in Excel and what they mean. Did I take my time over that sentence or am I taking the proverbial..? I suppose you can take it or leave it.
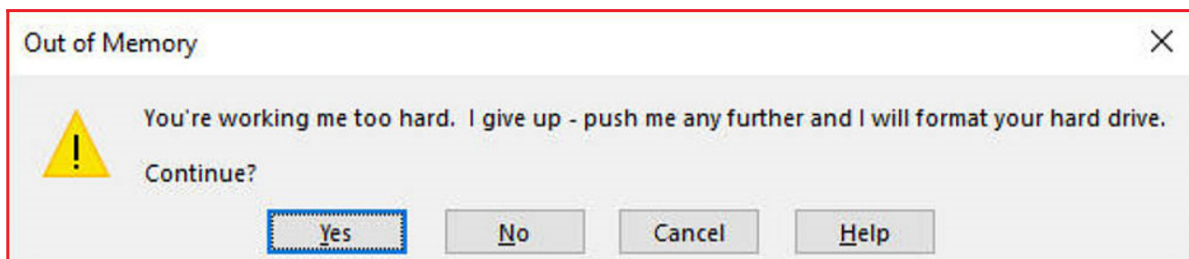
With the usual keyboard shortcuts and links to training and other resources, we hope you take your fill of this month's newsletter.

Until next month.

Liam Bastick, Managing Director, SumProduct

Addressing a memory issue

The 32-bit version of Microsoft Excel 2016 can now take advantage of the Large Address Aware (LAA) functionality after installing the May 2016 update for Office 365 for Windows (build **16.0.6868.2060** for Office 365 Current Channel subscribers). Please note, this does not apply to all version of Excel 2016.

This change lets 32-bit Excel 2016 consume double the memory when users work on a 64-bit Windows operating system, providing capability by increasing the user model virtual memory from two gigabytes to four gigabytes. When users work on a 32-bit Windows system memory increases by 50 percent.

In the Windows 32-bit architecture, the address space for any program is shared between the application (user mode memory) and the operating system (system or kernel memory). For a 32-bit process, the total amount of addressable memory is four gigabytes. By default, this memory is evenly divided between the process and the system. In order to assist programs that may require more memory, Windows supported the LAA memory layout. LAA will automatically allocate more process memory in order to keep less memory for itself.

The maximum memory that Windows can currently provide to the program depends upon the bitness. 32-bit Windows system can allocate no more than 3GB for user mode memory, shrinking available systems memory to 1GB. Moving forward, the 64-bit Windows system allows the addressable memory space for the system to be much larger and for any system memory located outside the 4GB limit. This then ensures a maximum available user memory for a 32-bit process, running on a 64-bit system, to be the full 4GB addressable range. This change only applies to 32-bit programs, affecting only 32-bit versions of Excel.

There will be no need to take any action if you're currently running 64-bit as the change will be automatic. However, if you are running 32-bit this change will require you to manually change the mode in which the operating system runs. In other words, to take advantage of LAA on 32-bit Windows you will need to enable the 3GB boot switch and restart the program. By setting this switch, you reduce system memory resources down to 1GB. At times this may limit your use and could cause issues when running multiple programs at the same time. Expanding to 3GB will expand your memory, it also reduces the memory that's available for system resources. Please be aware of this as this may cause you issues down the track.

Adding more RAM does not affect the maximum addressable memory for LAA programs. If your program requires more memory than the LAA maximums, it is recommended that you move to a 64-bit system and a 64-bit version of Excel.

Code programs may be slightly affected by this change. It is advised that you test any add-ins to make sure that they work correctly. There should be no hard break of compatibility for any functionality. If correctly written add-ins should gain as much benefit from the change as does the host itself.

This change may finally minimise those horrible 'Out of Memory' error messages for many stuck with 32-bit Excel due to IT faculty constraints, policies and / or necessities.

For further information, please feel free to read Microsoft article on the subject here: https://support.microsoft.com/en-us/kb/3160741

Get & Transform Transformed

Microsoft's Get & Transform functionalities have gone through a slight makeover recently, with a number of updated and improved features and functions in Excel 2016 – along with their counterpart Power Query add-ins for Excel 2010 and Excel 2013. We thought you might appreciate the Key Note Summary.

1. Appending multiple tables

Users can now simply append more than two tables within a single Append operation. For those of you are not aware of this capability, this has been an invaluable method of linking two or more tables with similar column headings from different sources / locations. Further, the end user now has the ability to append "three or more tables", suited to a more advanced query.
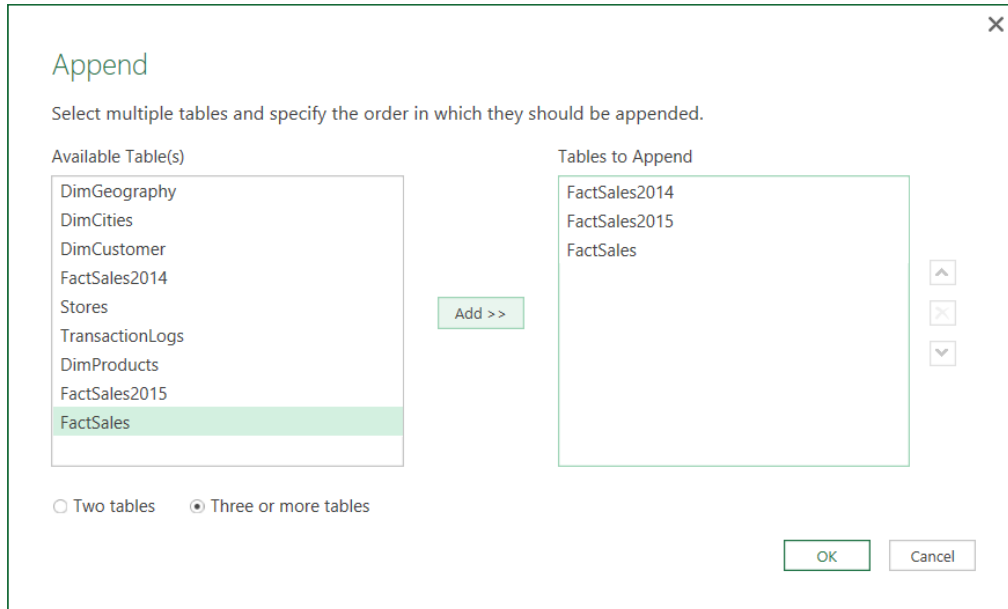
2. Sorting of Choose Columns builder

In the Transformation builder, users now have the ability to "Choose Columns" that may be organised either alphabetically or by natural (occurring) order.
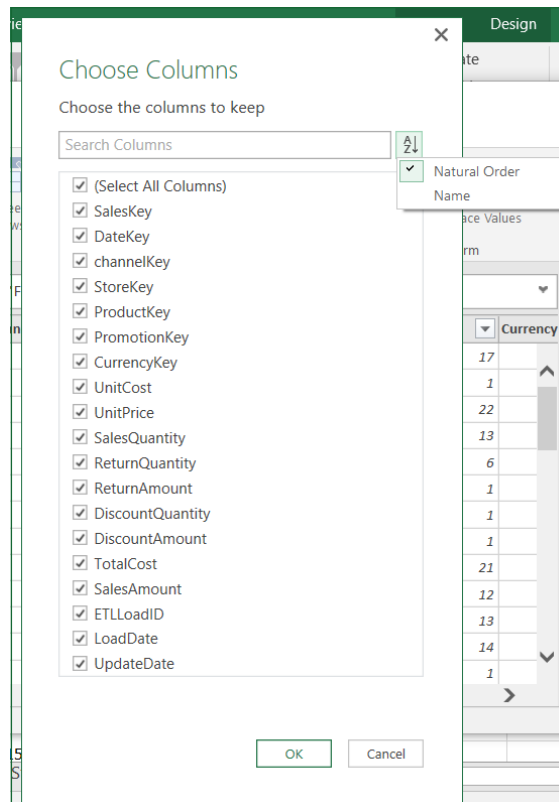
3. Renaming, Removing and Reordering Columns

Another revision concerns some of the common transformation operations within the Query Editor. The Rename Columns, Remove Columns and Reorder Columns have all been improved making for much easier use. Rather than needing a reload of data from the remote data source, these operations are now performed locally.

4. Calculating Percentages

Calculating percentages has been made simpler. Add Column > Standard > Percentage will automatically insert a new column with the results from your calculation.
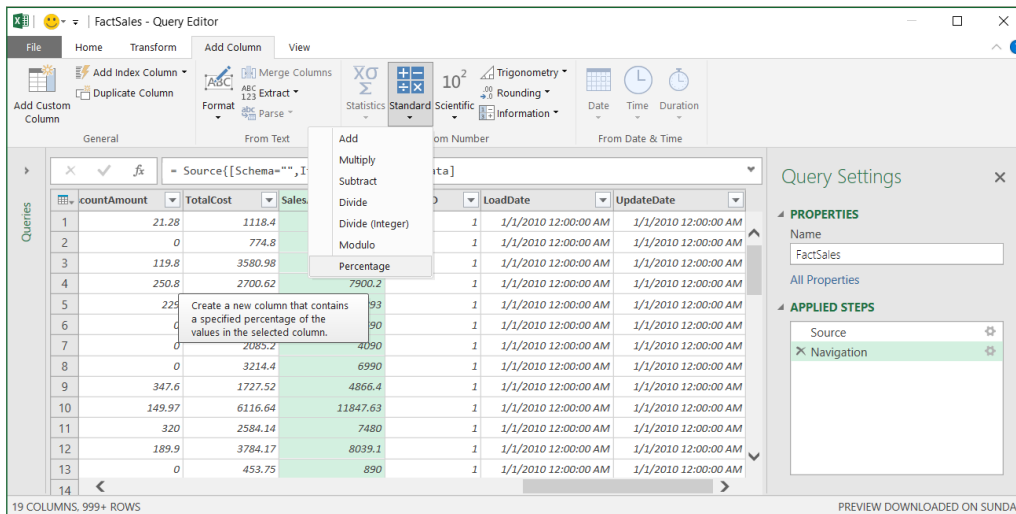

5. Detecting jagged CSV files

The CSV file connector has also been updated, now having the ability to detect jagged CSVs automatically (we will pretend we know what they are, but we don't think they are smooth operators so Sade will probably have no interest). Jagged CSV's will now be defined by having multiple amounts of columns across rows.
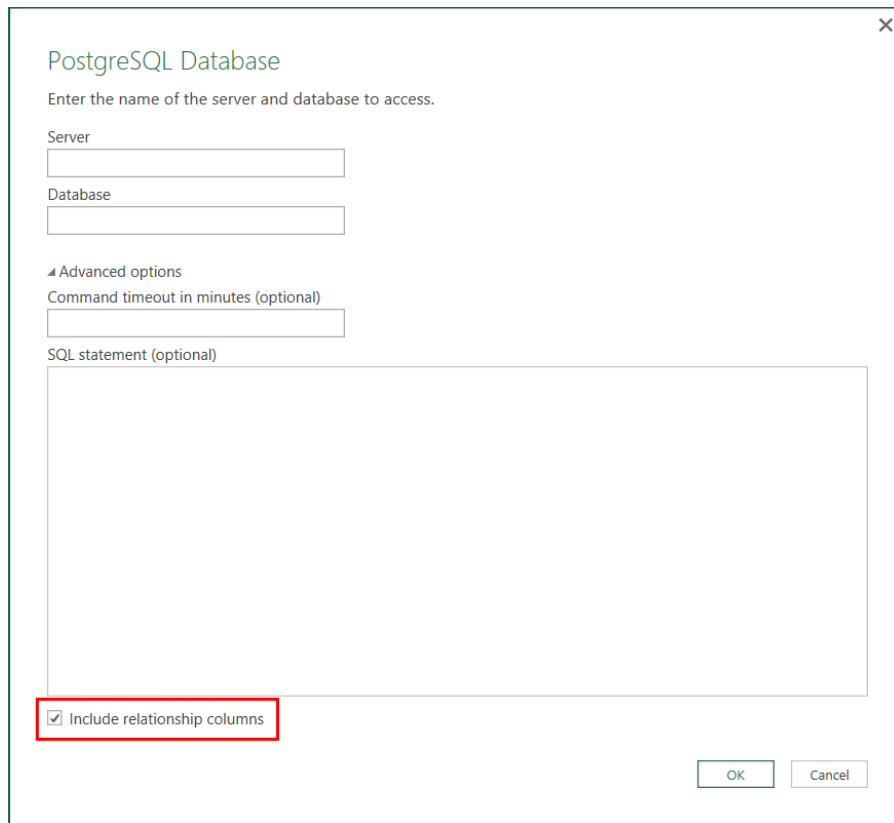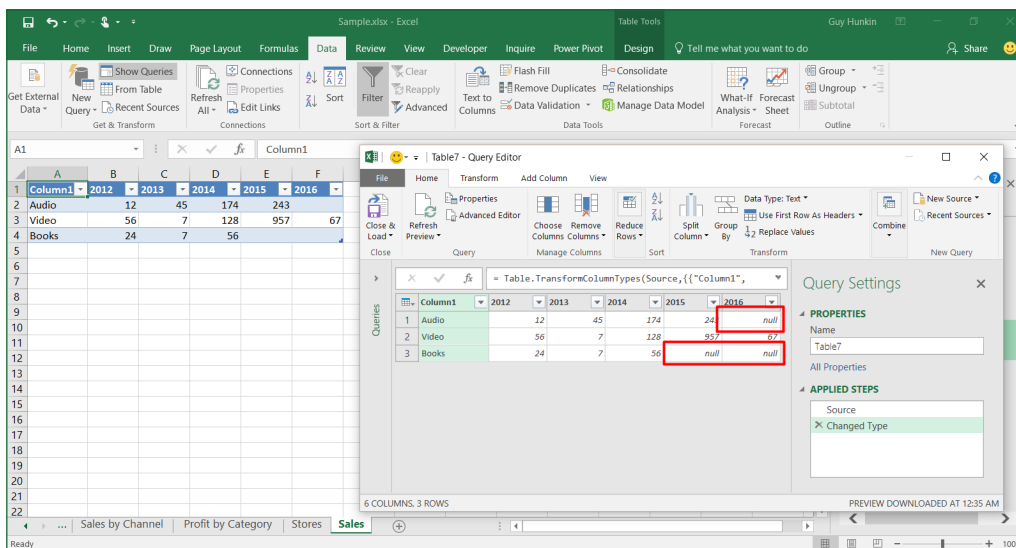

6. Exchange connector

The Exchange connector has also been improved, with the additional support for authenticating while using a Microsoft organisational account.
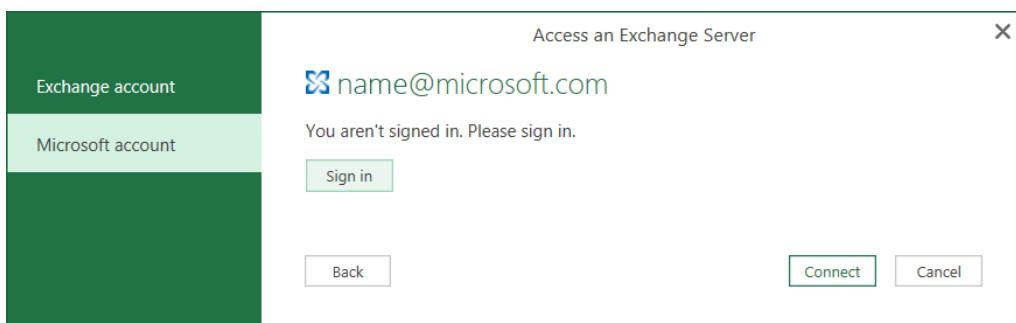
7. Database connectors

The SharePoint List connector has been revised. Moving forward, the SharePoint List connector can now perform a validation of the URL provided by the user to connect to their SharePoint List and consider relationship columns.
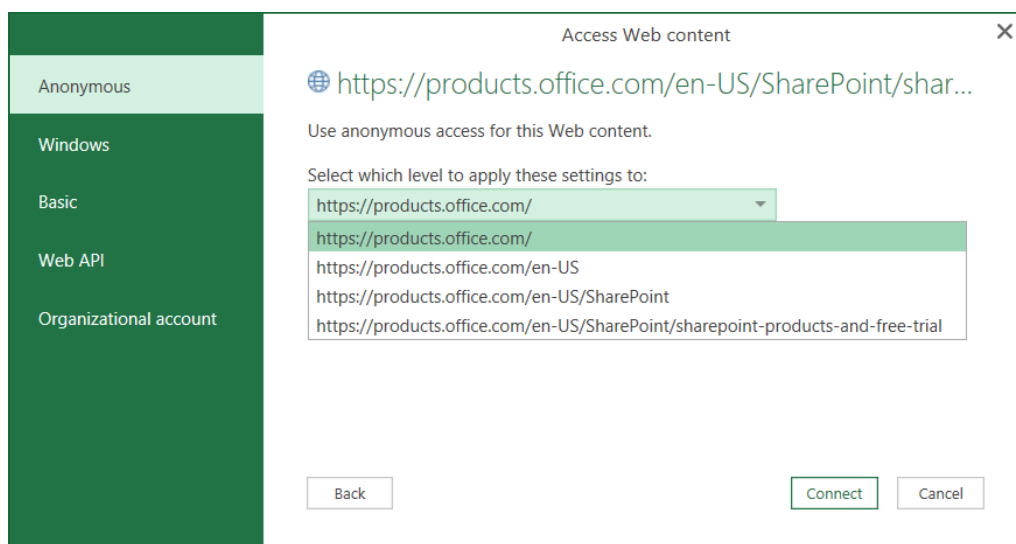

8. Database connectors – Disabling Navigation Columns in Query Previews

When connecting to a database, you now have the ability to disable Navigation Columns. Microsoft has now introduced a new option in the Source dialog, allowing users to disable importing relationships or navigational columns. We understand that this option is available for all relational database connectors except for SQL Server Azure SQL Database and SQL Server Analysis Services.

9. Web Connector – Scoping of Credentials

The Credentials prompt has been enhanced, now giving users the ability to specify the scope to which they would like the credentials to apply. Any of the levels within the URL can now be selected by the user.

10. Preview in Query Editor

The Query Editor can now provide a data preview, maximising the display to show as many columns and rows as are present in the table. Limitations have been removed and users have the capability to scroll in the table previews of the entire contents. It's noted that prior to this update the greatest number of cells available in the display was 3,000 and the greatest number of columns was 100.

11. Disabling background downloading

A workbook-level option to disable downloading data previews in the background has been added. This will assist with the amount of data being processed in the background and reduce the activity. This function can be found under the current Workbook Section on the Data Ribbon in New Query > Query Option > Data load.
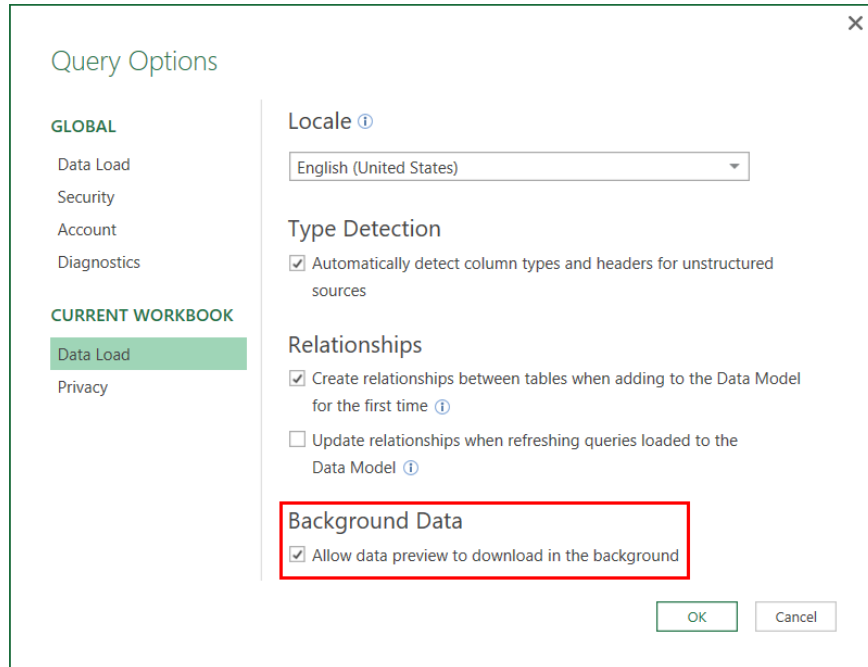

12. Improved ODBC Connector

One frustration for Open Database Connectivity (ODBC) end users has been ended. Microsoft now allows the ODBC Connector to select from a list of available data source names (DSNs) on their machine when specifying the connection details in the Import from ODBC wizard in Power Query in Excel:
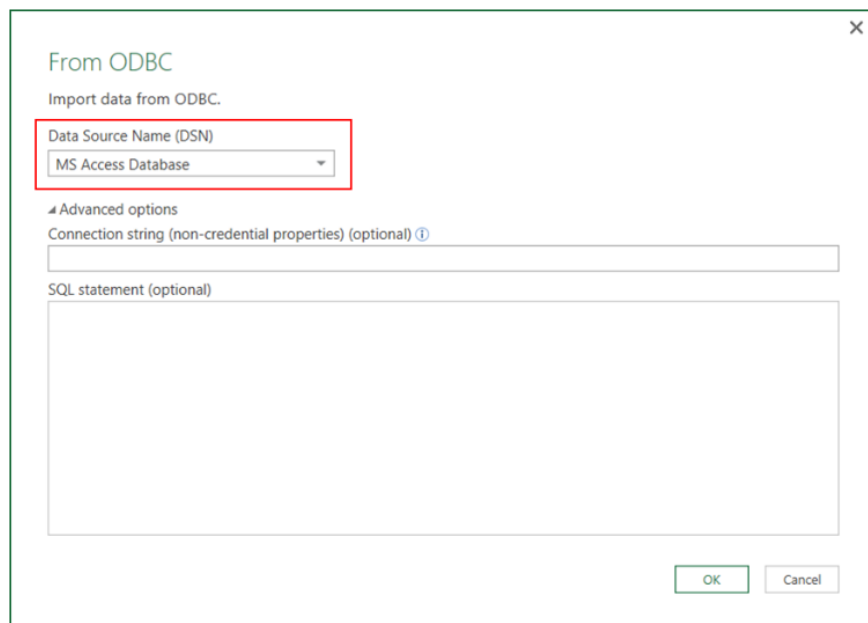
In this update, Microsoft has added a new drop-down menu so users can select an existing DSN from the list of available User / System DSNs on their machine. In addition to selecting an existing DSN, users can specify additional Connection String details or select "None" in the DSN drop-down to specify a full Connection String independently from any existing DSNs.

13. Improved CSV Connector

The Source dialog for the CSV Connector has also been modified so that users can customise the Column Delimiter option rather than through modifying M code (James Bond will be pleased).
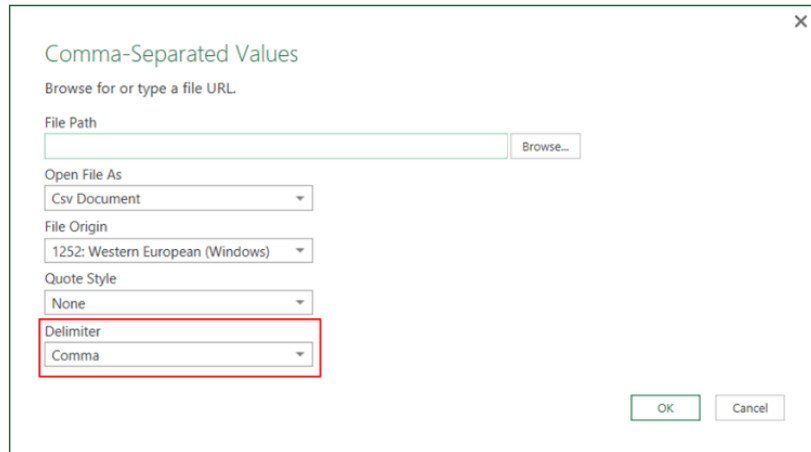
These updates for Excel 2016 are available as part of Microsoft's Office 365 subscription only presently. It's hoped these improvements will be rolled out to other versions shortly. For Excel 2010 and Excel 2013 users, it's easier – simply download and install the latest Power Query add-in from the Microsoft website (https://www.microsoft.com/en-us/download/details.aspx?id=39379).

Get & Transform Transformed

If SumProduct had a dollar for every time we encounter an error in an Excel spreadsheet, wow, we'd have *#REF!* by now… Error messages are never welcome in modelling, but they can be career-threatening when scattered like confetti over a key dashboard or output summary. But do you know what all of them mean? We think most users understand the common messages, but we thought we would take this opportunity to summarise them:

- *VALUE!* is a very common error. It occurs whenever the data type a function is given doesn't match what it is expecting. A simple example arises when using text as a number, *e.g.*

  ="Dog"/4

  We all know the correct answer is "kebab".

- *#REF!* errors occur when a cell reference is deleted or moved. Excel tries to automatically update all references, but when it can't do so, it replaces the actual cell reference with this error. For example, if we added the contents of cells **A1** and **A2**, the summation formula would be

  =A1+A2

  but if we then deleted row 2, we would be left with the formula

  =A1+#REF!

  which would give rise to the result *#REF!* too.

- **#DIV/0!** happens when a mathematical operation attempts to divide by zero (this value is mathematically indeterminate). This is common in division formulae and may be avoided by using the error trap

    =IF(Denominator=0,0,Numerator/Denominator)

    #NAME? appears when Excel cannot find an implied named range. Excel assumes that any text not in inverted commas or missing parentheses is a range name. You will most likely encounter this when you forget to quote a string, mis-type a cell reference or forget the brackets on an Excel function, *e.g.*

    =Guest+1

- **#NULL!** Refers to the empty set (i.e. nothing to be found). It usually arises from inadvertent intersect operations, most commonly involving an accidental space in a formula (space is not just the final frontier, it is also the intersect operator in Excel. To find out more simply Google " "…). An example might be:

    =SUM(A1:A4 B1:B4) (*e.g.* comma has been omitted)

- **#N/A** happens when Excel encounters a Bono formula (i.e. it still hasn't found what it's looking for). This tends to occur in lookup-type functions such as

    =MATCH("Monsters",{"Charlies","Angels"},0)

    These types of errors are often found in the cell **U2** ☺

- **#NUM!** occurs when a formula or function contains numerical values that are not valid. For example, you can't enter the value **$1,000,000** in currency format as dollar signs are absolute reference indicators and commas are argument separators. This would give rise to an *#NUM!* error. Maintaining the U2 theme, we guess they'd feel *#NUM! (You are such a Lemon – Editor.)*

- **#GETTING_DATA** is a message that can appear in Excel when a large or complex worksheet is being calculated. In Excel 2007 and later versions, operations are grouped so more complicated cells may finish after earlier ones do. While the calculations are still processing, the unfinished cells may display #GETTING_DATA. However, this message is essentially temporary and should vanish once all calculations are complete. In essence, this isn't really an error, more a status report.

Error types can also be determined with the, er, **ERROR.TYPE** function. Using the formula **=ERROR.TYPE(Cell_Reference)**, Excel will return the error type as a number:

Error Value	Error Type
1	*#NULL!*
2	*#DIV/0!*
3	*#VALUE!*
4	*#REF!*
5	*#NAME?*
6	*#NUM!*
7	*#N/A*
8	*#GETTING_DATA*

Like #GETTING_DATA described above, not all errors are errors. One very common error is

########

which sometimes expands to ### as the column is widened. There are two reasons you could see a string of hash / pound symbols (#) in a cell:

1. The first is that the cell column is too narrow to display the value. This is easy to fix: widen the column!

2. The second is if a date-formatted cell becomes negative. Usually this happens when dates are subtracted from each other.

In both instances, the data is still available in the cell, it is simply a formatting issue. Since other formulae referencing the affected cells can still read and incorporate these values, neither of these instances are true errors.

Upcoming SumProduct Training Courses

Location	Course	Date	Duration
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. This month, we thought we would start a NEW:

Keystroke	What it does
ALT + F1	Excel 2007 onwards: insert chart as an object. Excel 2003 and earlier: insert chart sheet
F11	Insert chart on new sheet

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 a www.sumproduct.com/thought/keyboard-shortcuts. Also, check out our new daily **Excel Tip of the Day** feature on the www.sumproduct.com homepage.

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· **M&A work**
· **Model scoping**
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· **Project finance**
· **Real options analysis**
· **Refinancing / restructuring**
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· **Valuations**
· **Working capital management**

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Link to Others

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