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Excel hell: how simple checksums can ease the pain of financial modelling

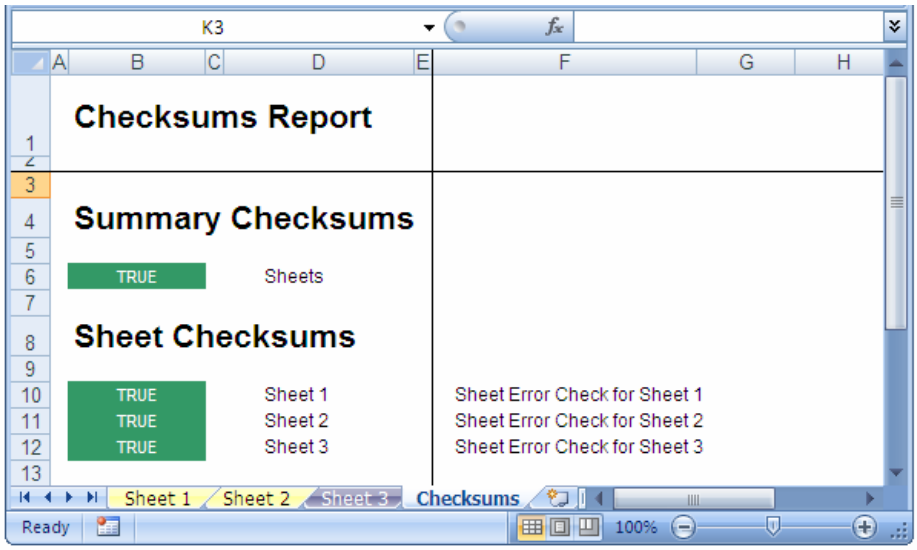
Cell-based modelling is a root cause of Excel hell. Some of the unavoidable issues include:

- Simple errors in formula construction, returning error values such as #VALUE!; #REF!; #NAME?; #N/A, and so on.
- Errors in formulas dependent on other feeder cells that only become apparent later on, usually in different tabs to the tab you are currently working on, but missed because you cannot see them or you are not alerted to them.
- Changing the spreadsheet structure frequently creating errors containing the notation #REF! that ripples through financial statement rollups, thus making them unreadable.

At the most basic level, even very simple checksums can help you to maintain the integrity of every spreadsheet you construct. However, most people fail to plan this aspect, usually due to time pressures, but also because of a lack of expertise or even pure laziness. Therefore, why not build every new spreadsheet from a template already containing a basic checksum structure?

Here's how to do this.

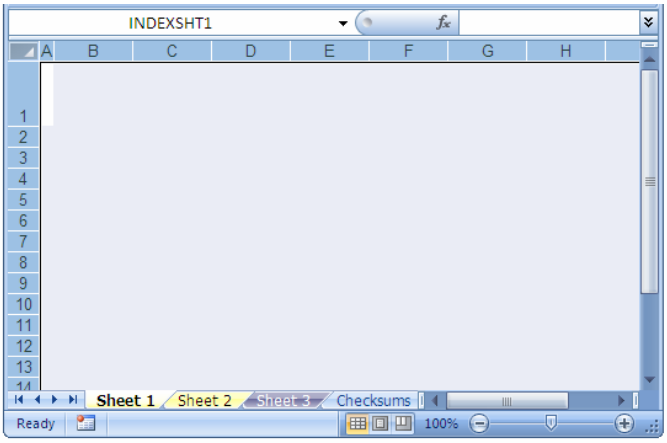
Step 1: Create a page purely for checksums. It can look something like this:



Each worksheet in the workbook must have a checksum. We will deal with the formula for each checksum shortly, because first you need to create some named ranges in your workbook, which constitutes Step 2.

Step 2: For each sheet in your workbook (except the checksums sheet, because this will give you a circular reference), go to the arrow situated between the A and the 1 of each sheet and click on it so that it selects the whole sheet range. Then give this range a name similar to 'INDEXSHT1', as per the example below. You

now have a named range that will detect any formula errors in the whole sheet, eg, #VALUE!; #REF!; #NAME?; #N/A, and so on.



Step 3: Now for the checksum formula. Following our example, in Cell B10 on the checksums page, write the formula:

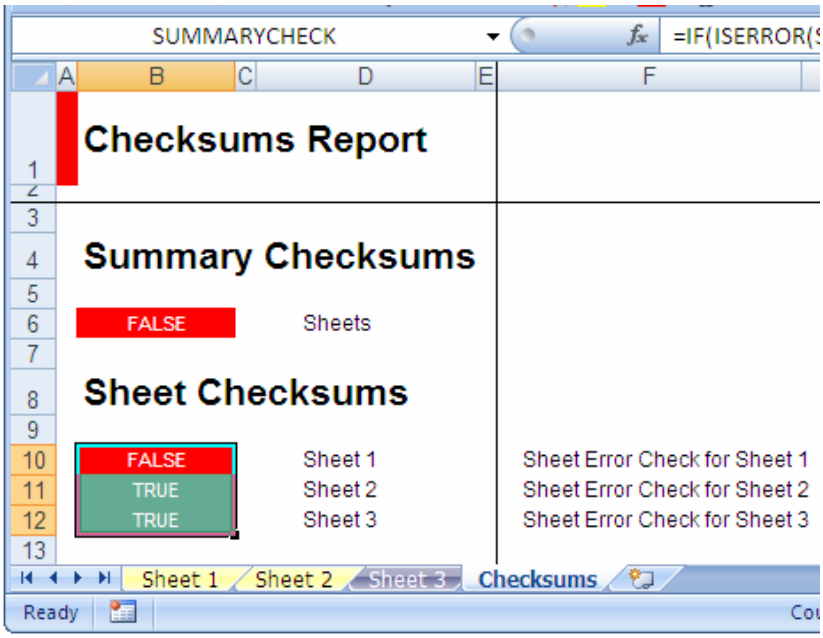
=IF(ISERROR(SUM(INDEXSHT1)),FALSE,TRUE).

This will tell Excel to search for any error in the whole of Sheet 1. For cells B11 and B12, obviously you will need to substitute the named range INDEXSHT1 for the corresponding ranges in the other sheets (eg, INDEXSHT2, INDEXSHT2, and so on).

Step 4: Add a summary checksum for all the individual sheet checksums (cCell B6 in the example below). This is important as we will see later. This is done by selecting all the cells with the sheet checksum formulas (B10:B12 in the example), and giving them a named range – such as 'SUMMARYCHECK'. We also give a name to cell B6 (I have called it 'SUMMARY').

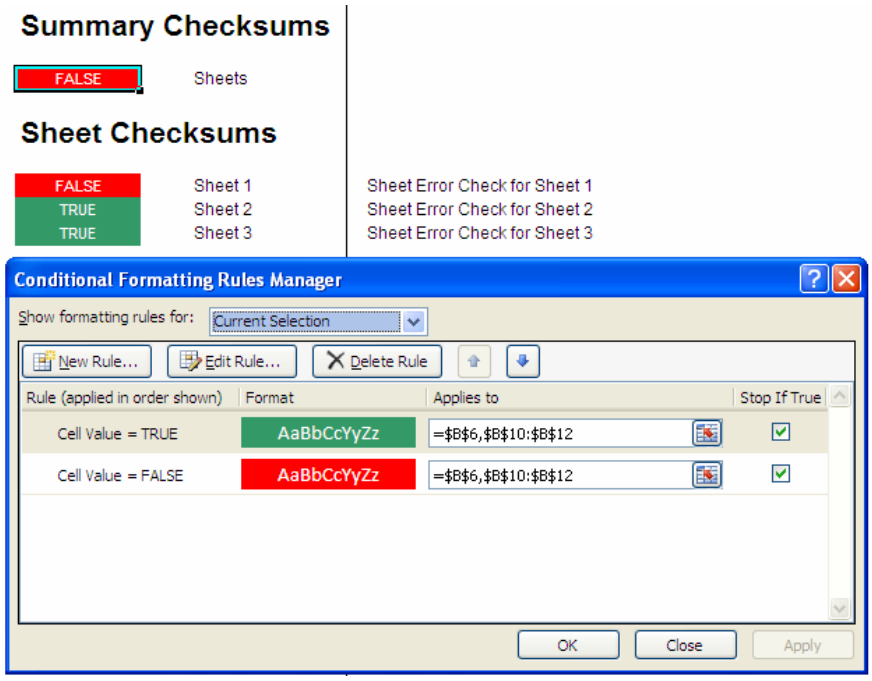
Now, add the formula to cell B6:

=IF(COUNTIF(SUMMARYCHECK,FALSE),FALSE,TRUE).



Thus, when you get any error in the relevant sheets, you will see the checksum turn from TRUE to FALSE and from green to red, as shown in the above examples.

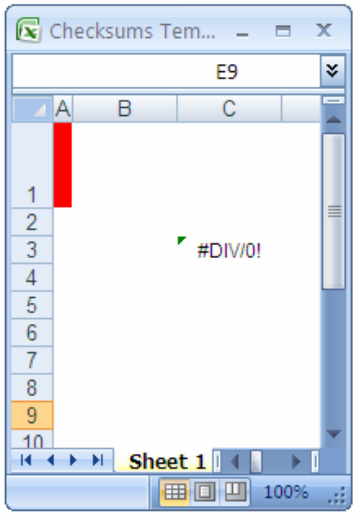
Now add some simple conditional formats to the checksum cells (green for TRUE, red for FALSE) to make them more visibly identifiable. The next screenshot shows you how to do this.



But how do we get alerted to errors in other sheets that are due to formulas dependent on other feeder cells in different tabs (the second bullet at the beginning of this article)?

Again, this is a very simple conditional formatting exercise. In the same way that we conditionally formatted the checksum cells containing our checksum formulas, we do something similar for all the sheets in the workbook.

We select cell A1 in each of the worksheets in the workbook and we conditionally format it to turn red if there are errors in any of the sheets. The formula, which involves cell B6 (which we have already named 'SUMMARY') and which is a sum of all the checksums in our range 'SUMMARYCHECK', is:



=IF(SUMMARY=FALSE,TRUE,FALSE).

We now get a very visible 'red flag' in cell A1 on each sheet if there happens to be an error in any part of the workbook, irrespective of what sheet it may be located on.

These are checksums in their simplest format. You can use them at a more advanced level by creating multiple checksums for a single sheet, perhaps referencing various important ranges rather than whole sheet ranges. This will help to pinpoint errors much more quickly and effectively. Furthermore, you can include any kind of formula such as those to identify mistakes or to aid reconciliations:

=IF(SUM(RANGE1)<>SUM(RANGE2),FALSE,TRUE).

I personally use a pre-designed template for every spreadsheet that I construct to combat the laziness or time-pressured requirements that, as a rule, normally stop people from implementing checksums.

The template that I use is similar to the one that is used in this example, but has the added benefit of a macro linked to a button on the checksums page. When clicked, the macro adds a sheet to the book and automatically carries out the steps discussed above – ie, names the range for the new sheet range, inserts a new checksum for that page in the range B10:B12 or 'SUMMARYCHECK', and conditionally formats cell A1 of the new sheet. Adding a new sheet using my template with checksums pre-incorporated actually now takes me less than a second. So no more excuses!

For further help or to request a free copy of the checksums template (with macros) for your own use, please contact James Power.

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