Kev's Tips for Excel

Below are a few tips and fancy things that one can do in Excel to make solving problems, particularly those that involve iterative solutions, easier. This guide assumes that the reader is familiar with basic Excel concepts. The screenshots, menus and dialog boxes are all based on Excel 2003.

LOCK THE REFERENCE

The default behavior for copying and pasting cells is for Excel to copy and paste *everything*, values, formulas and formatting. For formulas, any referenced cells are offset appropriately based on where the cell is pasted. For example, if the formula in cell F10 is:

=B2

Then the formula that will result in cell G12 if cell F10 is copied and pasted into G12 will be:

=C4

…since it is one cell to the right and two cells down. If you don't want the cell reference to move, put dollar signs in front of either the letter, number, or both. Below are examples of copies and pastes for different formulas in cell F10 being pasted into G12:

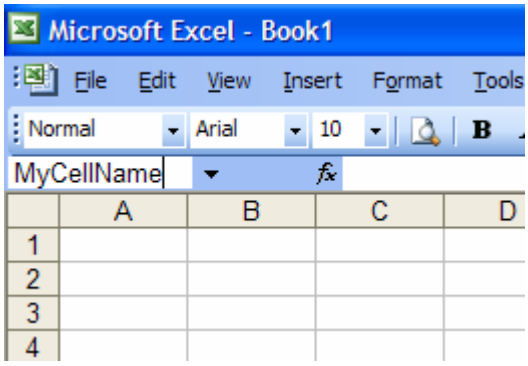
=B2	will paste as:	=C4
=$B2	will paste as:	=$B4
=B$2	will paste as:	=C$2
=$B$2	will paste as:	=$B$2

TIP: When editing a formula, you can hit F4 when the cursor is on a cell reference and Excel will cycle through the four different variations shown above.

NAMING CELLS

Normally, cells have exciting names like B4, G12 or BW1423. You can give cells more appropriate names that make calculations and macros easier (see below). To name a cell, either:

- Choose Insert→Name→Define or…
- Click the space in the upper left with the cell reference and type in the name



You can now use your named cell in formulas, for example: =22.4*MyCellName

CELL FORMATTING

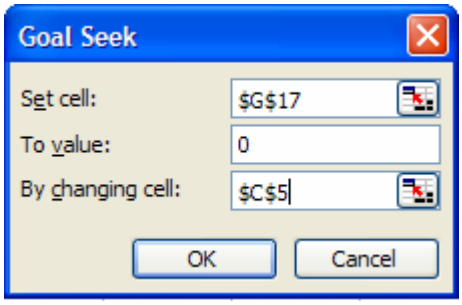
Excel is a powerful calculation tool, but it can be an equally powerful presentation tool. A well-organized, good-looking worksheet is much more user-friendly than a bunch of unnamed cells. What I usually do is create three columns, one relatively wide and two normal size. I then put a description for each cell, the cell value and then its units. My convention is to have input cells with blue, bold font and to highlight cells that contain key values.

Calculations for lock hopper		
Bed diameter	**10**	inches
Bed height (slumped)	**47**	inches
Cooled section above lock hopper - diameter	**1.61**	inches
Cooled section above lock hopper - height	**36.0**	inches
Lock hopper - diameter	**2.1**	inches
Lock hopper -height	**6.0**	inches
Bed solids production rate	**2.2**	lb/hr
Bed solids bulk density (slumped)	**91**	lb/ft3
Dry gas production rate	**260**	scfh
Volume of bed solids	2.14	ft3
Volume of cooled section	0.042	ft3
Volume of lock hopper	0.012	ft3
Solids production rate	0.024	ft3/hr
Solids removal frequency	29	minutes
Solids removal frequency	2.1	times/hr
Number of cycles required to completely dump bed	184	cycles

DRAWING

Sometimes it's useful to have a drawing on an Excel sheet. Excel lets you draw simple figures. You can access a drawing toolbar through View→Toolbars→Drawing. If you're clever (and patient) you can line up the drawing with the cells so that you can put values on the right spot in the drawing.

GOAL SEEK



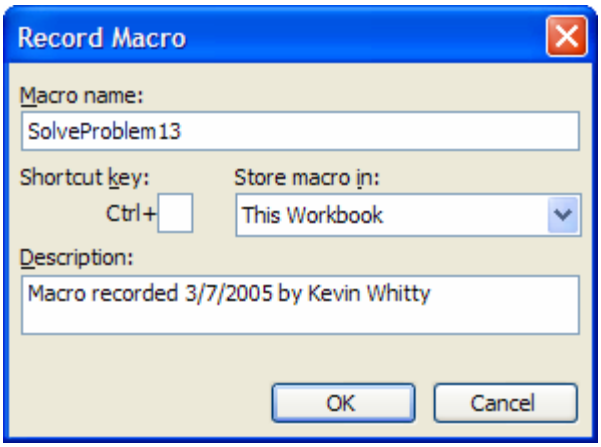
Excel has a powerful solver built in. This solver is frequently overkill for simple iterations. Instead, use the simpler "Goal Seek" tool in the "Tools" menu. You pick a cell that you want set to a known value, input that value and then choose which cell should be adjusted to make this happen. Excel will do the rest. Often, it is best to set the problem up so that you compare a calculated result to a known value and have a cell that computes the difference between the two. When they match, this cell should equal zero, so you can set up Goal Seek to make this cell equal to zero. If you multiply the difference by 1000 or even 10^6, it gives better precision. For example, Cell D24 might be:

=(D22–D23)*1000

If you set cell D24 to zero, you'll get better match between the calculated value and the target value.

MACROS

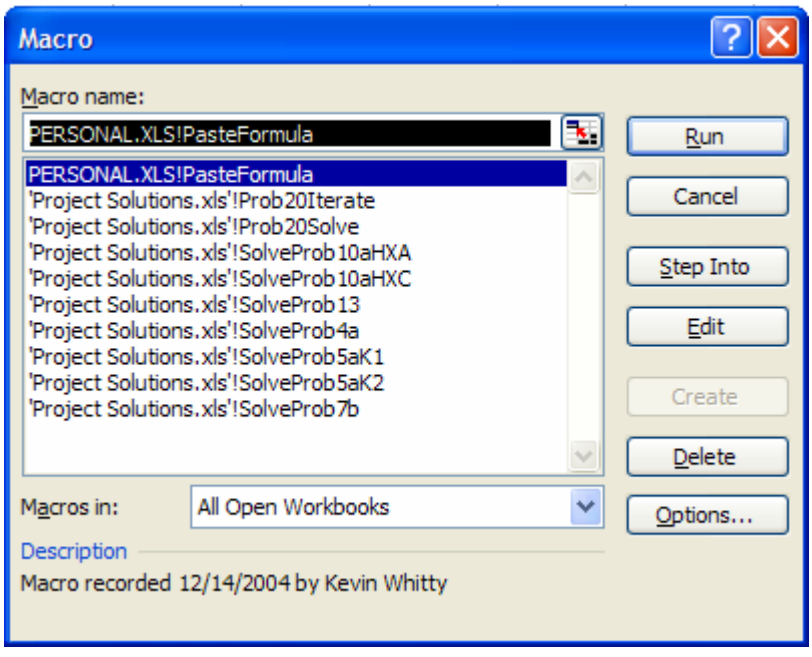
Macros are a very powerful element of Excel, and can simplify and speed up repetitive tasks. However, macros can be tricky to set up, write and modify. Excel has a "Record Macro" feature that removes a lot of the burden of writing macros.



To record a macro, get the worksheet set up just like you want it before you begin the repetitive task (such as Goal Seek, copy/paste, etc.).

- Go to the Tools→Macros and pick "Record New Macro…"
- Give the Macro a reasonable name, such as SolveProblem13.
- Make sure the macro is stored in "This Workbook" (unless you want a macro that will work in any existing or future Excel workbook, in which case you should choose to store it in the "Personal Macro Workbook").
- If you want to add a shortcut key, go ahead and choose the letter.

Once you hit OK, the macro will begin recording, so be careful that you perform the action just right. If you make a mistake, that will get recorded too, even if you correct it! When you are done performing the action, BE SURE TO STOP THE MACRO by choosing Tools→Macro→Stop Recording.



To run the macro, go to Tools→Macro→Macros. Select the macro you want and hit the "Run" button. Yay!

One big caveat to this is that macros record absolute references. For example, if you have a macro that uses cell B22, the macro isn't smart enough to adjust it to B23 if you move the cell down or insert a row of cells above. A slick way around this is to name the cells of interest for the macro (see section on naming above). Then, edit the macro (Tools→Macro→Macros→Edit) and change all places where it says Range("B22") to Range("MyNamedCell").

LINKING BUTTONS TO MACROS

This is a nice trick to make macros and solving iterative problems much easier. Open the "Forms" toolbox by choosing View→Toolbars→Forms. The little dialog box has a button icon. Click that, then click somewhere on the worksheet. You will be asked to associate a macro with the button. Choose the one you want and viola – a button for your macro. Now, you can just click the button instead of doing the repetitive action over and over.

To resize, move or change the text of the button, click it once to highlight it, then place the cursor over the text (to change the text), click on the outline and drag to move it, or click the circles on the outline to resize it.