



Times tables

Time is money for a businessman — Stephen Wells tackles the 40-hour week timesheet. There's lots more on using Lotus 1-2-3 97 and Excel 97, plus a few quick tips for 2000.

Here's an interesting query from a reader who has his own interpretation of the 40-hour week, and who has wandered off into the realms of negative time.

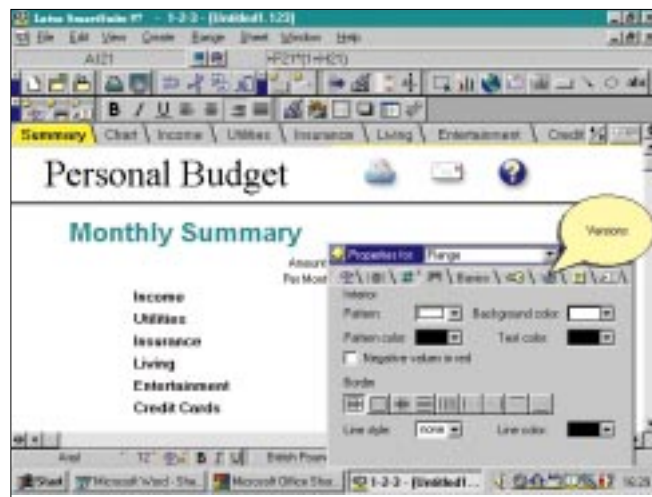
Andrew Fielder writes: "I've been a reader of your column for many a year and have lost count of the number of tips I've been able to adapt for my own use. Now I have a little problem of my own: I want to run a simple timesheet for my staff.

"I would like to total the times as entered and see whether, in each week, more or less than 40 hours have been worked. This would then be passed forward to the next week, so that a running total could be kept to see whether an employee is ahead of, or behind, his contracted hours. The trouble is, I cannot find a way of getting Excel 5 to calculate minus time values."

Part of Andrew's timesheet design is shown in Fig 1. It shows the end of Week 3 and all of Week 4 for a fictional Carol. In Week 3, Carol has worked 38 hours and 45 minutes. This means she's an hour and a

Fig 1 (left) Carrying forward an employee's unworked hours. Time can be added and subtracted with the right formatting

Fig 2 (below) A SmartMaster, the new Infobox, and Bubble Help, displayed by hovering the mouse: all in Lotus 1-2-3 97



quarter under her required 40 hours. Worse, from Weeks 1 and 2 a further two hours have been carried forward, so the poor love is going to have to put in an extra three and a quarter hours in Week 4. However, she comes out square by the end of Week 4.

It's none of my business if Andrew keeps Carol slaving away until 7 o'clock in the evening. My role is to suggest that hours carried forward are just numbers, not time. You'll find the worksheet on our cover-mounted CD this month, in the file Timesht.xls. The solution I suggested uses the functions HOUR(F54) in cell G54 and MINUTE(F58) in H58.

These formulas are replicated as needed, in columns G and H. The numbers

are totalled in G61 and H61. Cell I61 has the formula

=H61+G61*60

In other words, we've now totalled the minutes Carol worked in Week 4.

In cell F62 we insert the formula

=(I61-\$I\$14)/60

Cell I14 just carries the number 2,400 which is 40hrs x 60mins. Cell F63 has =F48, which is the number of unworked

hours carried forward from Week 3.

The formatting is straightforward. Everything that is time (as in the block D54 to F61) has the custom elapsed time format of [h]:mm. Cells in the groups like F62 to F64 are in the Number format, with two decimals. Columns G, H and I are just in the General format.

To emphasise that the numbers in rows 46 to 48, and 62 to 64, are hours and decimal fractions of hours (not minutes), I've emphasised the word and the numbers in green.

1, 2, 3 jump

At the top of the list of things I like about the latest version of Lotus 1-2-3 is that it has been rewritten with 32-bit architecture. Loading 1-2-3 Release 5, which was the 16-bit version that came with SmartSuite 96, seemed to slow down Windows 95 for any 32-bit applications loaded after it, in the same session.

Lotus has dropped the term Release and the new model is called "Lotus 1-2-3 97 Edition". (Microsoft, on the other hand, sometimes refers to "Excel 97" and at other times calls it "Excel Version 8.0".) It appears also to be the senior application in SmartSuite 97. In SmartSuite 96, features like the Infobox were added to other applications but now they're available in 1-2-3. Other features would appear to be have been added to remain competitive with Excel.

The Infobox is a sort of multi-function floating toolbar box with groups of options divided between tabs (Fig 2). This screenshot also shows the Personal Budget SmartMaster, one of a number of new, well-designed templates provided for the most common spreadsheet applications. It also illustrates Bubble Help: hover the mouse over an icon or dialog box tab and up pops a description.

More new features are illustrated in Fig 3. You can create several windows in the same file to facilitate viewing and analysis of worksheets. Outlining has been added, as in Excel. Plus or minus signs appear to the left for demoting rows (and it's not shown here, but can appear above,



Fig 3 Another SmartMaster, and just visible are the new Formula Markers and the Outlining feature. Cell Comments and Multiple Windows are also shown

goes where it logically would be.

You can have up to ten blank rows above the Total label when you sum columns, and up to ten blank columns to the left of the Total label when you sum rows. But frankly, I find it quicker to sweep the mouse along a row and instantly select the cells where I want totals and then click the Sum tool. I rarely use the uninformative label, "Total". I always put "Total Assets", or whatever it is. Often it is conventional to use another term, like Gross Sales or Net Profit.

One feature which I do find helpful is the Quick Demo. These use sample files to show how various procedures are carried out. You watch the mouse arrow select ranges and tools and you can read pop-up explanations: there are five on subjects related to entering, editing and calculating data, one about the Infobox, two on copying and moving data, and three on naming sheets and ranges. In addition, there are five on sizing and hiding columns and rows, four on re-ordering and outlining data, three on creating and displaying versions and version groups, and two on graphic objects (including maps).

If you are a Lotus Notes user with Notes 4.1 or higher, you can create a TeamConsolidate database which lets you distribute workbook sheets in a Lotus Notes

Quick look at a new book

■ Using 1-2-3 97 for Windows

This 984-page tome from Que Corp might have been better entitled "The Complete Lotus 1-2-3 Encyclopedia". Although it covers the latest features introduced in 1-2-3 97, and any of the illustrations which show a complete screen show Lotus SmartSuite 97 in the top line, this book is much more than a manual for the new version of 1-2-3.

All the basic features of 1-2-3 are thoroughly covered and there is a fully-detailed Function Dictionary. But then there is a whole series of excellent articles by a range of well-known spreadsheet experts like Shane Devenshire who has been a long-term contributor of tips to this column. He has written chapters on using 1-2-3 for querying databases and advanced data management.

Sue Plumley provides chapters on linking 1-2-3 with other SmartSuite applications, using 1-2-3 with Lotus Notes, and building complex charts and mapping data. Joyce Nielsen, author of a score of computer books, tells you how to write your first macro. Stan Donerty explains programming with the latest version of LotusScript.

There is a helpful index of common problems, an upgrader's guide and a massive regular index. It makes sense not to confine the book to Lotus 1-2-3 97 features: someone buying the latest version may not be familiar with 1-2-3 at all so will be glad to find everything they need in one place. But one could almost recommend this book also to 1-2-3 users who haven't yet upgraded.

I have been fed up lately with the price increases of computer books but I really think this one is worth its £36.99. It is available from Computer Manuals (see "PCW Contacts", below).

Tips for the year 2000

- Lotus 1-2-3 97 offers you an option. Choose File, User Setup, 1-2-3 Preferences and you can check a box to "Interpret entry of years 00-49 as 21st century".
- Excel 97 assumes by default that if you enter two digits for the year in the range 00-29, that you mean the 21st century. Two-digit year entries in the range 30-99 are assumed to be this century.
- With both spreadsheets, you can override these settings simply by entering a four-digit year. Excel 97 accepts dates entered with four digit years up to 31st December 9999; and Lotus 1-2-3 97 accepts dates up to 31st December 2099.

database to obtain data or modifications from other users. After they have made changes, you can consolidate these sheets into your workbook.

If you were using 1-2-3 to track expenses on a project involving several departments, you could create a workbook containing a sheet for each department. You distribute the sheets using Lotus Notes. The others make their updates and additions and then you can consolidate the changes into the original workbook.

Storing the workbook in a Notes database makes the information available to everyone (even those at different locations) and can help you track changes over time. A TeamConsolidate template comes with 1-2-3 97 and is installed in the Notes data directory. You can use all the TeamConsolidate features without altering the forms and views of a TeamConsolidate database, yet still customise the forms and views of the template in 1-2-3 to tailor it for your needs. For example, you might want to change the user interface to make it easy to distribute workbook documents to the same set of users each month. The forms of the TeamConsolidate database contain scripts created using the LotusScript language. I expect I'll return to 1-2-3 97 next month.

Creating add-Ins in Excel 97

An add-in is just another kind of workbook. It can contain worksheets, charts, VBA macros and functions. But when open, it should not be visible on the screen and you shouldn't be able to unhide it by clicking Unhide on the Window menu. Until Excel 97 it was unnecessary to protect the contents of an add-in file, but now it is, if you don't want others to view or edit the sheets and VB modules in it. Here's the procedure:

1. Activate the Excel 97 workbook you want to convert to an add-in file.
2. Choose Tools, Macro, Visual Basic editor.
3. In the Project Explorer window click the

EXCELlent little formulas

■ **Once is enough** One of the most frequent needs of those who maintain lists on spreadsheets is to check for duplicated items: they might be names, product numbers or prices. Excel 97 offers a simpler way of doing it, using the conditional formatting feature. The first instance will not be affected but the other instances will be highlighted.

Let us say the items are in column A and you want the duplicates to appear in red. Select a range like A2:A50. Choose Format, Conditional formatting, Formula Is. In the next box insert:

```
=ISNUMBER(MATCH(A2,OFFSET($A$1,0,0,ROW(A2)-1,1),0))
```

Select Format, Colour, Red, OK.

■ **Validation** To reassure a user that they have entered a valid number (it might be a product or account number) you can also use conditional formatting to check the entry against a list of acceptable numbers. If the entry cell is B3 and the authorised numbers are in the range F6:F11, then select cell B1 and choose Format, Conditional formatting, Formula Is and insert:

```
=ISERROR(MATCH(B3,$F$6:$F$11,0))
```

Then select the format to be used for unacceptable entries. It might be white bold type on a red background.

■ **Versatility** If you are unsure of the version of Excel which will be running with a macro you have written, you can have it checked automatically. Where xlObj is the name of the Excel object in question, you can use the following line of code:

```
ExcelVersion = Val(xlObj.Application.Version)
```

The value that is returned will be: 5, if Excel 5.0 is running; 7, if Excel 7 for Windows 95; or 8 if Excel 97. Now you can use "If" statements to carry on from there, as with:

```
If ExcelVersion = 8 Then
```

entry <Project name> <File name> where the former is the name of the project and the latter is the name of the workbook to convert.

4. Choose Tools, <Project name> Properties. Click the Protection Tab.
5. Check the "Lock project for viewing" check box. Type a password in the appropriate box.
6. Repeat this in the "Confirm password" box. Click OK.
7. Click "Close and Return to Excel" on the File menu. Choose File, Properties, Summary.
8. In the title field, enter your name for the new add-in. (This will later appear in the Add-Ins dialog box.) If you want to have text that describes your add-in, enter it in the Comments field. Click OK to close the Properties dialog box.
9. Choose File, Save As. Choose "Excel Add-In" in the Save As Type box.
10. Change the file name if you wish. Click Save. At this point Excel creates the add-in. Choose File, Close.

Attaching toolbars in Excel 97

Something else that has changed in Excel 97 is that you can now attach custom

toolbars to a workbook so that they are available to any user of the workbook:

1. Choose View, Toolbars, Customise. Click Attach.
2. In the list of Custom Toolbars, select a toolbar that you want to attach to the active workbook, and click Copy. Repeat this step for each toolbar you want to attach to the workbook.
3. Click OK, and then click Close. But you must save the workbook in the "Microsoft Excel Workbook(*.xls)" file format. If you save the workbook in the "Microsoft Excel 5.0/95 Workbook(*.xls)" file format, the chances are the toolbar(s) will not be attached.

The web toolbar in Excel 97

It is immediately apparent to a new user that Excel 97 is orientated towards saving worksheets as web pages and retrieving data from the internet. What might not be realised as quickly is that

some of the related features can make life easier without connection to the internet. Excel 97 is integrated with the Active Web searching technology. This can allow users to instantaneously retrieve Office or HTML documents anywhere on a corporate network.

Active Web Search is similar to any of the popular internet search engines. Excel 97 has a Web Toolbar that appears whenever a document containing a hyperlink is opened, or can be displayed by choosing View, Toolbars. It is similar to the Microsoft Internet Explorer toolbar. You click on the Search tool and fill in a search form and then find the file for which you are looking, whether the server is on a network or an intranet.

PCW Contacts

Stephen Wells welcomes problems or solutions relating to spreadsheets. Write to him at the usual PCW address or email spreadsheets@pcw.co.uk.

Computer Manuals 0121 706 6000;
www.compman.co.uk



Scouting out a solution

Dyb-dyb-dyb, dob-dob-dob... Stephen Wells presents an unusual spreadsheet for planning Scouting hikes. And, he does his best with a useful guide to helpful web URLs.

Having gained much from my stint as Patrol Leader of the Woodpeckers, years ago, I was delighted to receive an unusual spreadsheet from Mike Foster, who is the treasurer of his local Venture Scouting unit in Staffordshire. (Venture Scouts are the over-16's.)

This spreadsheet isn't for figuring out which scouts are behind with their subs, it's for route-planning when preparing walks — I love these unusual Hands On applications!

I've loaded the spreadsheet into Lotus 1-2-3 R5, as you will see from Fig 1, although Mike wrote it in Release 4. It calculates the average compass bearing in both true and magnetic, and also works out the length of time that each part of the walk should take.

"The time formula assumes a walking speed of 4Km/h," writes Mike, "and adds an extra half hour for every 300m climbed, one minute for every 10m, though you can change this. It then calculates the figures for hours and minutes, converts them to strings and joins them with a colon ':'. In calculating the minutes, I have added a '0' to the front of the string and then taken the right two characters in order that '4' will become '04' but '14' would stay as '14'.

"The bearing formulas use the magnetic offset (westerly) given in B1. I have used three spare columns in calculating these values as the formulas would otherwise exceed the 512-character limit imposed by 1-2-3 Release 4. Columns K, L and M, therefore, give the distance travelled east, the distance travelled north and the angle of the direction of travel from the N/S line respectively. These can either be hidden or just not printed, depending on preference.

"The bearing formula then calculates which direction this is in, and from that the

	A	B	C	D	E	F	G	H
1	Magnetic Deviation (W)	5						
2	From		To		True Bearing	Mag Bearing	Distance	Height Gain
3	Car Park by Ilam	147 508	Dale End	147 595	N	355	11	
4	Dale End	147 595	Footpath	145 599		333	328	0.5
5	Footpath	145 599	Heathcote	147 602		34	29	0.25
6	Heathcote	147 602	Junction	146 606		346	341	0.25
7	Junction	146 606	Tissington Trail	148 609		34	29	0.75
8	Tissington Trail	148 609	Path	142 639		349	344	4.5
9	Path	142 639	A515	144 642		34	29	0.5
10	A515	144 642	C-Road	148 649		30	25	0.5
11	C-Road	148 649	Monyash	150 655		18	13	1.5
12	TOTAL						19.75	
13		Camp at:	Rowson House Farm (155 664)					
14								
15								
16								
17	Monyash	150 665	Path	148 649	187	182	2	
18	Path	148 649	A515	144 642	210	205	0.5	
19	A515	144 642	T. Trail	142 639	214	209	0.5	
20	T. Trail	142 639	Vincent House	137 632	216	211	1	
21	Vincent House	137 632	Pilsbury	116 635	278	273	2	
22	Pilsbury	116 635	Road	115 625	186	181	1	
23	Road	115 625	Path	117 623	135	130	1	
24	Path	117 623	Junction	121 609	164	159	1.5	
25	Junction	121 609	Newfield	114 605	240	235	1	
26	Newfield	114 605	Path	108 606	279	274	0.5	
27	Path	108 606	Ford	098 596	225	220	1.5	
28	Ford	098 596	River - Westside Mill	101 589	157	152	1	
29	River - Westside Mill	101 589	Bend	099 556	183	178	5	
30	Bend	099 556	Wotton	108 554	103	98	1	

Fig 1 An application designed for route planning. It calculates where you should be if you don't get lost

bearing. It then tests to see if you are travelling N,S,E or W and adds letters instead; a touch more friendly than numbers. The magnetic bearing is then calculated from the true bearing and given in column F.

"The formulas rely on you being west of the Greenwich meridian and in the northern hemisphere, but it is easy enough to compensate if this is not the case. All that needs doing is for you to change the sign of the offending result in either K or L: that is, make the answer from K negative if you are east of Greenwich, or make the answer from L negative if you are in the southern hemisphere."

Mike's example is for a short training hike for the Queen's Scout Award, in the

White Peak area, starting a few miles out of Ashbourne, Derbyshire. A typical formula in the Mag Bearing column is:

```
@IF (E3="N",360-A:$B$1,@IF (E3="E",
90-A:$B$1,
@IF (E3="S",180-A:$B$1,
@IF (E3="W",270-A:$B$1,
@IF ((E3-A:$B$1)=0,"N",@IF ((E3-
A:$B$1)=90,"E",
@IF ((E3-A:$B$1)=180,"S",
@IF ((E3-A:$B$1)=270,"W",
(E3-A:$B$1))))))
```

The basic formula used in the Time column is:

```
@STRING (@INT ((G4/$D$1)+(H4/
$F$1)),0)&":"&@RIGHT ("0"&@STRING
((60*((G4/$D$1)+(H4/$F$1))-60*(@INT
((G4/$D$1)+(H4/$F$1))),0),2)
```

Where to find what URLooking for

■ **Baarns Publishing**, Mission Hills, California, is a team (now including the well-known author, Rob Bovey) dedicated to producing productivity enhancements for Microsoft Office Professional products. Baarns offers: a range of Excel books by post; and Excel business, financial, statistical, and home and personal add-ins you can download. There is also an Excel FAQ (Frequently Asked Questions) section. There are shortcuts to the External Microsoft Newsgroup site, the Excel section on the Microsoft web site, and the Excel Knowledge Base.

www.baarns.com

■ **Computer Manuals On-line Bookstore** is a well-established on-line bookshop run from Sparkhill, Birmingham. You'll find illustrations of covers of new books on spreadsheets and reviews, interviews with authors, resource kits, a search function to find subjects of interest among the volumes available, and an ordering service.

www.compman.co.uk

■ **Easter Eggs**: a huge collection (basket?) of Easter Eggs submitted by volunteers is offered by David Nagy-Farkas at Washington University. Everything, from games to pocket calculators, are included (also, see Walkenberg, below). <http://weber.u.washington.edu/~davidnf/egg.html>

■ **Excel Monthly Magazine**: older issues are called "Excel Pages" when you print them out but, strangely, they are called "Tips & Tricks" on the web site. At time of writing the monthly issues available are from August '95 to July '96. www.microsoft.com/excel/work_tips.htm

The most recent issues of Excel Pages magazine, listed as "Tips & Tricks" on-line (though you need Word 97 or its viewer, to read them) are at www.microsoft.com/msexcel/support/content/tips/xlpages.htm

■ **Facts about Lotus 1-2-3 97** for Windows 95 and NT, and links to other Lotus product and service pages, can be found at

www.lotus.com/123/214e.htm

■ **Marchcom** specialises offers a comprehensive on-line service called CAROL (Company Annual Reports On Line). There are separate sections for UK and continental companies. You start by selecting a group like banks, chemical, media or transportation companies, and the available firms in that category are listed. You can download any report, such as a Balance Sheet or P&L Statement. Excel 97 will open an HTML page and display it, properly formatted on a new worksheet, complete with corporate name on the sheet tab. www.carol.co.uk

■ **Microsoft's main page** for Excel tech support, consulting services and pre-sales information. www.microsoft.com/msexcel/support/

■ **Microsoft's "Work with Excel"** page offers Excel patches, fixes, drivers, utilities, virus information, tutorials and links to third-party web sites. www.microsoft.com/msexcel/fs_xl.htm

■ **Microsoft Excel Knowledge Base** contains articles about Excel and particularly its occasional shortcomings. The best way to use this service is to first download the file "index.txt" then use Find to search for the particular subject in which you are interested. Say you want to add labels to data markers in an x-y chart. You might search for "labels" and eventually find "Q161513: Macro to Add Labels to Points in an XY (Scatter) Chart". You can note the reference number, then go back on-line and select directory q161, then directory 5, then the file 13.txt, and download it. [ftp://ftp.microsoft.com/deskapps/excel/kb/](http://ftp.microsoft.com/deskapps/excel/kb/)

■ **Rick's Software Development Center** has a TalkShop, Bulletin Board and Information Center about Excel. Rick Dill worked for Microsoft for 11 years, teaching programming, and lives in Redmond, Washington. <http://forums.msn.com/SOFTWAREDEVELOPMENT/category2/forum3/01c2f3.asp>

■ **J. Walkenberg Associates** is a San Diego consulting firm, run by John Walkenberg in La Jolla, California. His page offers lots of add-ins for Excel, Lotus 1-2-3 and Quattro Pro together with tips and shortcuts and details of his own books. There is also lots of fun stuff like the "Easter Eggs" I mentioned on page 282. www.j-walk.com/ss/

■ **Webzone** is a Midlands public access web server which runs an on-line conference for some 200 web designers. If you are uploading spreadsheets to your own page, some of their code could be very useful. There are generic scripts you can download for operations like adding page counters to your page, or guest books for accepting responses. www.Webzone1.co.uk/www/demo/index.htm#html



Carlton Communications is one of many UK companies which make their financial results available on the CAROL web site

where D1 is walking speed in Km/h and F1 is the number of meters climbed, which cause one hour to be added to your time.

Thanks to Mike for his contribution and he certainly deserves a book token. His spreadsheet is on our cover-mounted CD-ROM this month.

Page break poser

Steven England, of Devon, emails:

"I have test results, on an Excel spreadsheet, for students at the college where I work. The spreadsheet is set up to percentile the marks for a whole year-group, which is split into sets. My query is, how can I get Excel to automatically put in a page break after each set, so that each set's results are printed on separate sheets? I put in the page breaks manually, but this is irritating, particularly when people leave or join the college, because the page

breaks are then in the wrong places and I have to start from scratch, removing the old page breaks and entering new ones."

Steven didn't say which version of Excel he was using, but in my reply I suggested he could start a new worksheet for each set and keep all the worksheets in one workbook. If he wished to write a macro, then in Excel 4 he could use the PAGE.SETUP macro function.

In Excel 97, the following sets a page break above row 25 on Sheet1:

```
Worksheets("Sheet1").Rows(25).
PageBreak = xlPageBreakManual
```

And this example sets a manual page break to the left of column J on Sheet1:

```
Worksheets("Sheet1").Columns("J").
PageBreak = xlPageBreakManual
```

If the set range varies, the range can be given a Name. Any changes in the range will be allowed for by the Name.

Now they tell me!

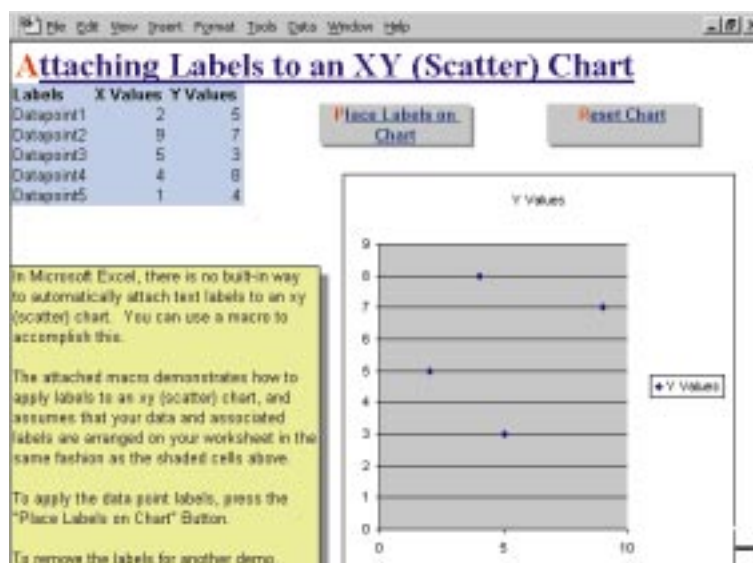
Last month, a reader was asking for a way to add labels automatically to an x-y scatter chart, as you can in Lotus 1-2-3. In other words, the x numbers were in one column of his worksheet, the y numbers in another, and the labels in a third.

Having found no immediate solution to this, I asked a friendly spreadsheet adviser and he knocked up a short macro (which earned him a book token). He also told me about Rob Bovey's utility which does the same thing.

All this bother, yet Microsoft offers three different solutions, none of which are mentioned in the help files. First, if you wander down the right paths from the Microsoft home page you can get to the Power Utility Pak, which is actually published by John Walkenberg. Then, if you patiently trawl through the Excel Knowledge

Fig 2

A macro for attaching data labels which is included in the Excel file, Sample.xls. It is included with Excel 95 and 97



Base you find a comprehensive document, complete with listing for a suitable macro, which I've included on the PCW CD-ROM.

Finally, in an issue of the on-line Excel Pages magazine (in an article which had nothing to do with this subject at all), I found a reference to a Sample.xls file, from the Office suite which contains a similar macro (Fig 2). And it is already on my hard disk! More embarrassing still, I had mentioned this file in my February column and then forgotten all about it.

Belated convert

I found myself with a list of items in one column of a worksheet the other day, and wanted to see if it contained any duplicates of items in a column of another sheet.

I knew very well that there is a way of comparing two columns — I recalled writing about it, but couldn't remember the procedure. Time to try out the PCW CD-ROM. I slipped the latest one in the drive and the main menu appeared. I clicked Hands On Spreadsheets. Acrobat loaded. I clicked the button with the binoculars and a page, then entered "compare two columns" in the Search box, with only the Proximity option checked. Acrobat immediately went to the file for Hands On Spreadsheets, Dec '96, with the chosen words highlighted.

It was one of those helpful tips contributed by Shane Devenshire. Terrific. It still tickles me when something new actually works.

Dates and figs

I've been sitting for far too long on an interesting letter about date formats, from Ian Galpin of Poole. I've mentioned before that as I never issue more than one invoice

a day, I create my invoice numbers by reversing the date of the invoice; so, one raised on 30/9/97 would be numbered 970930. Most of the software on Ian's PC reflects his interest in astronomy and he tells me that astronomers use an International Date Format of the year first in four digits, then the month in two digits (padded zero if necessary) and the day in two digits (likewise).

Although this conveniently gets around the topical Year 2000 computer problem, the original intent was to avoid other variances. As he says, 02/04/96 would be 2nd April in the UK and 4th February in the US. Because astronomy is an international science, observations are passed around the world. (Apparently, astronomers also use a common time-zone, but that matters less here.) Another argument for the year-month-day format is that it is consistent with the "largest first" format for time, which is Hours:Minutes:Seconds.

For his DOS software he has COUNTRY=088, instead of 044 in his Config.Sys file, but he warns of Code Page potential problems. In Windows' Control Panel, Regional Settings, you can specify a year-month-day format. And of course in a spreadsheet, it's simple.

With 1-2-3 you can use Style Number Format or Style Worksheet Defaults to specify date formats in a specific worksheet, or use Tools User Set-up International to specify long or short International Date formats by default. In Excel you simply enter any Custom format you like.

Life's little oddities

One of the delights of sharing other users' knowledge via the internet is stumbling

across little oddities. I think of these as the Keith Chegwins of spreadsheeting. One of these I found via John Walkenberg's web page (see "Where to find what URL looking for", page 281). I had been aware that it is possible to display a list of the developers of such software, if you know a series of non-intuitive steps. These displays are sometimes called "Easter Eggs" (more because of Fabergé than Cadbury).

■ To display Excel's 97's Easter Egg: open a new workbook. Press F5. Enter X97:L97 and press Enter. Press Tab. Press Ctrl+Shift and click the Chart Wizard button on the toolbar. Then use the mouse to move around. I found the credits hard to read but the colour and animation is dramatic.

■ If you have Excel 95: open a new workbook. Scroll down and select row 95. Press Tab. Choose the Help / About Microsoft Excel command. Press Ctrl+Shift and click the Tech Support button. You'll be greeted with a new non-Excel window. Explore the window using the arrow keys.

■ To see the Excel 5 Easter Egg: choose the View / Toolbars command. Click the Customise button. Scroll down the Categories list and choose the Custom category. Drag the second button (with a deck of cards image) to any visible toolbar. Click Cancel if you are asked for a macro. Click Close to close the Customise dialogue box. Press Ctrl+Shift+Alt, and then click the new toolbar button.

On the PCW CD-ROM

■ In the Software Library, Hands On, Spreadsheets section this month are examples of some the material about spreadsheets available on the internet (see also, "Where to find what URL looking for", page 281).

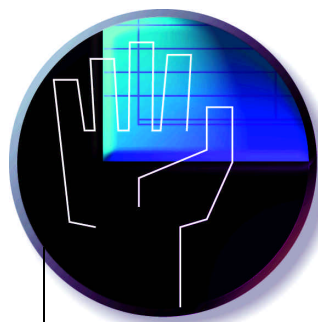
■ The file "labels.txt" is the MS Knowledge Base document, Q161513, which includes the code for a macro to add labels to data markers in an x-y chart.

■ An example of the Knowledge Base index is in "index.txt", although you should go on-line to see the most recent listing of documents.

■ Mike Foster's spreadsheet for planning walks is in the file "walk.wk4". It is in Lotus 1-2-3 R4 format and will import into Excel.

PCW Contacts

Stephen Wells welcomes problems or solutions relating to spreadsheets. Write to him at the usual PCW address or email spreadsheets@pcw.co.uk.



The need for speed

Stephen Wells looks at a new twist on the common problem of achieving raw performance with Excel and how to optimise spreadsheets. And help is at hand for oil men and pilots.

An extreme example of a common problem arrived this month by email from John Ferguson.

"I need to supply an actuarial team with raw performance on Excel. I could ask them to rewrite their spreadsheets in a better fashion (I am sure their spreadsheets are inefficient) but it would be difficult to persuade them to do this. The spreadsheets are about 7Mb in size. Loading takes 30 minutes on a Pentium P75 with 32Mb memory, Windows 3.11 and Excel 5.0c. Changing to NT 3.51 and Excel for NT does not speed up the load or recalc time. I can either supply them with increasingly higher-spec PCs or an alternative system. I could let them use Visual Basic 5, but I do not expect to see any great improvement with this because they expect to take their VBA Excel macros directly to Visual Basic. Essentially, the spreadsheets test profitability."

I have to assume these spreadsheets take 30 minutes to load from an intranet, not a disk. But my reply zeroed in on some key points: developments in Excel and VBA, inefficiency of design, and use of macros.

The calculation engine in Excel 95 was rewritten and is much faster than Excel 5, and the same engine is used in Excel 97. VBA Version 5, which comes with Office 97, is faster than the Excel 4 macro language and earlier versions of VBA.

For one thing, the Visual Basic for Applications object library is no longer a standalone file. It is integrated into the dynamic-link library (DLL). And there are many other efficiencies: for example, in Excel 5, the Names collection is accessed through the Workbook object. Excel 95/7 provides a new Names collection for the Worksheet object as well. I suspect the root problem for John is one of available

expertise. A DTP package does not an art director make, nor Excel an application developer. Optimisation of an Excel spreadsheet starts with better formatting, then more use of Excel functions before macros and then more efficient macros.

Here are some examples. Say cell E1 displays the date of the first day of next month in a normal date format of d/m/yy. In cell D1 you want to show the name of that day. It's not uncommon to use a LOOKUP table. You could have the numbers of the days of the week, 1 to 7, in the range F2 to F8, and the names in G2 to G8. So, in D1, you could have the array formula

```
{=LOOKUP(WEEKDAY(E1),F2:G8)}
```

You use Ctrl+Shift+Enter and Excel adds the curly brackets. WEEKDAY provides the number of the day of the week and the LOOKUP function provides the name from the table. But it is far more efficient of space and memory, and you display the same result, if you simply enter =E1 in cell D1 and custom format the cell as dddd.

Moving back to cell E1: many users would create a function to find the first day of next month like this —

```
Function FirstOfNextMonth()  
    FirstOfNextMonth = _  
        DateSerial(Year(Now), Month(Now)  
            + 1, 1)  
End Function
```

Then they would write a macro to display it in the cell, like this:

```
Private Sub Sheet1()  
    Range("E1").Value =  
        FirstOfNextMonth()  
End Sub
```

Again, it would be more efficient to simply enter in cell E1:

```
=DATE(YEAR(TODAY()), MONTH(TODAY()) +  
1, 1)
```

Obviously there are going to be times when an application needs macros. Microsoft itself makes a number of suggestions for speeding up Visual Basic for Excel. These tips can also save memory.

The first is to streamline any code produced by the macro recorder which is a wonderful device for beginners because it automatically produces code. But it is there for convenience rather than economy. It blindly duplicates the keystrokes you make, but it's not psychic. For one thing, it can't tell which options you've changed in a dialog box so it sets all of them. You might change FontStyle to Italic, but the macro recorder will list every formatting variation, with all the others individually set to False. You can shorten what might be a 13-line macro to one line by eliminating the unnecessary instructions.

Also, following your keystrokes, the macro recorder will activate or select objects before it specifies any action. Again, if you edit the resulting code you can remove all the Select method calls and use a With statement instead.

When you write your own code, it's important to remember that every dot, or full stop, you use is an OLE call for a method or property. Reduce the number of dots and you expedite the code. You can do this not only through With statements, but by setting an object variable or using a For Each...Next loop. Another good tip is to use Excel functions within a macro. Functions that can take a range as an argument, like SUM, MATCH and LOOKUP, are faster than VBA code equivalents.

Getting sorted

In the post this month arrived a letter from G Eames, of Ramsbottom, which I suspect

	A	B	C	D	E
1	HAYDN	SYM 101	VPO	Bern'ein	T
2	HAYDN	SYM 104	BPO	Karajan	BB
3	HAYDN	SYM 104	NYPO	Toscanini	BB
4	HAYDN	SYM 27	A-H HAY	Fischer	I
5	HAYDN	SYM 4	L PHIL	Beecham	I
6	HAYDN	SYM 45	VSO	Moralt	I
7	HAYDN	SYM 48	PH HUNG	Dorati	I
8	HAYDN	SYM 49	St JOHN	Lubbock	I
9	HAYDN	SYM 59	AOSMITF	Marriner	Z
10	HAYDN	SYM 6	PH HUNG	Dorati	I
11	HAYDN	SYM 88	VPO	Fwanger	AA
12	HAYDN	SYM 92	PARIS CO	Walter	BB

Fig 1 How can you sort on column B which has a mix of text and numbers? Format as a number and include the text in a custom format

is more about formatting than sorting.

"Can you please help? The problem is sorting. Using Excel, when preceded by a word, numbers are treated as separate digits so 100 is placed before 4, and so on. I have enclosed a listing to illustrate the effect." (Fig 1)

There are ways around this. You could put the SYM, which I presume is short for symphony, in a separate column from the numbers. But I think you may prefer the idea of formatting this range of cells with the custom format, "SYM" 0. All you enter are the numbers but they will display preceded by a SYM. Then you can sort the whole block, based on Column B, and it will descend from SYM 4 correctly to SYM 104. If, later in the listing, you need, say, CON, for concerto, you just change the formatting for that range of cells.

As this looks like a music collection, you might be interested in the Music Collection Database template which comes with Microsoft Access 95 and 97. Excel is fine for small databases but Access is better designed for the job. Incidentally, until the latest version, Excel displayed dates alphabetically rather than numerically. The new Excel 97 helps solve sorting and formatting by displaying dates as numbers rather than text. When dates are sorted in ascending or descending order, they are listed in appropriate chronological order. It doesn't matter whether the dates are formatted as 6/9/97 or September-97.

Flying high

Here's that old problem again of subtracting times. Ron Whytock emailed me from Singapore, *en route* to Manchester.

"I run quite a large spreadsheet in Excel 7 for my flying logbook. I need to be able to subtract two times (24-hour clock), one from one another."

Fig 2: A macro for changing data point labels on an Excel chart

```
Sub addlabels()  
'assumes labels are in range A2 to A28  
'select the appropriate worksheet first  
Set LabelRange = Range("a2:a28")  
With ActiveSheet.ChartObjects(1).Chart.SeriesCollection(1)  
    .ApplyDataLabels  
    For i = 1 To .Points.Count  
        .DataLabels(i).Text = "=" & LabelRange.Cells(i).Address _  
            (ReferenceStyle:=xlR1C1, external:=True)  
    Next  
End With  
End Sub
```

Regardless of the format used, Excel stores any date as a serial number and it stores any time as a decimal fraction. For instance, 23/6/97 22:20 is stored as 35604.93.

The way that a time or date is displayed on a worksheet depends on the format applied to the cell. When you type a date or time that Excel recognises, the cell's format changes from the General number format to a built-in date or time format. By default, dates and times are right-aligned in a cell. If Excel cannot recognise the date or time format, the date or time is entered as text, which is left-aligned in the cell. Options you can select in the Regional Settings of Control Panel determine the default format for the date and time, and the characters used as date and time separators. To type a date and time in the same cell, separate the date and time with a space.

Excel separates date elements with a slash (/) and time elements with a colon (:). By default, Excel bases the time on the 24-hour clock. If you type 3:00 instead of 3:00PM, the time is stored as 3:00AM. To type a time based on the 12-hour clock, type a space followed by A or P after the time.

To see the underlying serial number which is stored, select the cell, choose Format, Cells, Number tab, General. Times and dates can be added, subtracted, and included in other calculations. To use a date or time in a formula, enter the date or time as text enclosed in quotation marks.

So when I replied to Ron, I suggested that he simply enter the correct date and time when he went on duty, and again when he went off duty, then in a third cell subtract one from the other. So A1 might display 23/6/97 22:20 and B1, 24/6/97 03:25. C1 would have the formula B1 —

A1. It would be formatted as h:mm and the result here would display correctly as 5:05.

Easing into oil

The problem posed by oil consultant Gordon Smith seemed simple enough:

"We use Excel 7 to analyse data for a number of different wells and we want to chart rock porosity against the amplitude of permeability."

"Say we have an X Y data chart made from porosity values listed in column B and the amplitude in column C. What causes a problem is that having created the chart we want to label the points, not with the porosity or amplitude but with the equivalent well names, listed in column A. Typically this would be an alphanumeric field looking like 30/17b-A21Z. How can you easily add this information to the chart? At the moment, we edit each label manually and, faced with 30 or so wells, this is a problem. Is there an easier way?"

Gordon attached a sample Excel file for me to play with. He also said that when his office used Lotus 1-2-3 there had been no problem. So first I imported the file into 1-2-3 Version 5 and, sure enough, there is a dialog box for specifying the range of the worksheet to refer to for the data point labels. Then I opened the file in the feature-packed Excel 97 and, to my surprise, there is no equivalent. You can format data labels every which way from Sunday but to change them you have to do it one label at a time.

"I must be doing something wrong," I thought. Time to consult my friendly guru, Michael Rickard. As usual, he's rescued my rashes. First of all he knocked up the short VBA macro (Fig 2) which worked for me in Gordon's worksheet, first time. But he also

Quick looks at new books

■ Microsoft Excel 97 Worksheet Function Reference

With version 4.0 of Excel you get a two-volume User's Guide and a separate 580-page Function Reference book. For version 8.0, or Excel 97, the book has shrunk to 308 pages and it now costs £22.99.

What's missing? Well, the

Excel 4 macro language functions became redundant, replaced by the properties in VBA v5.0 which comes with Office 97. And, the short lists of related functions which appeared after each function have been dropped. Related to INT, for instance, is CEILING, FLOOR, MOD, MROUND, ROUND and TRUNC. These prompts were useful because they often suggested other ways of doing things. However, the other four main sections for each worksheet function (definition, syntax, remarks and examples) are still there. All the most recently added functions are included, too. All the worksheet functions are grouped by category at the front of the new book, as before, but the previous list of changed functions has been dropped. As has the book's index.

Of course, if you don't have the Excel 4 version on your shelf and you like to sit down with a book instead of working through the on-line function list and help files, this up-to-date version of the *Excel Function Reference* book will be right for you.

■ Microsoft Office 97 Visual Basic Programmer's Guide

With no visible module sheets and a bewildering multi-window opening screen, experienced and neophyte programmers alike may

be initially confused by the Visual Basic Editor in Excel 97. This book is an excellent introduction. It clearly describes, with a mass of examples, how to write, edit, store, run, optimise and debug VBA code. Right at the front there is a detailed illustration, with call-outs, of all the Editor windows and associated boxes and toolbars, which gets you off to a good start.

With VBA Version 5, Microsoft has reduced the differences between VBA for Excel, Word, PowerPoint and Access so the programming environment is now all integrated, including Outlook (the information management program) and Office Assistant (an advanced help system). The sections on creating custom commands, menus, dialog boxes, messages, and buttons, as well as the online help, apply to all these applications. But there are also chapters on the specific objects required in each application. The Excel section details the Workbook and Range objects and their properties as well as support for event-driven programming.

There is everything from programming basics to dealing with the drawing layer, ActiveX Controls and developing applications for the internet and the World Wide Web. A comprehensive appendix details how VBA 5 differs from the Excel 4 macro language.

This book, priced at £32.49, is a first-class introduction to VBA 5 for anyone developing Office 97 under Windows 95, Windows NT or for the Macintosh.

■ Both these books are published by Microsoft Press and are in the *Microsoft Professional Editions* series. They are available from Computer Manuals (see the "PCW Contacts" panel, below).

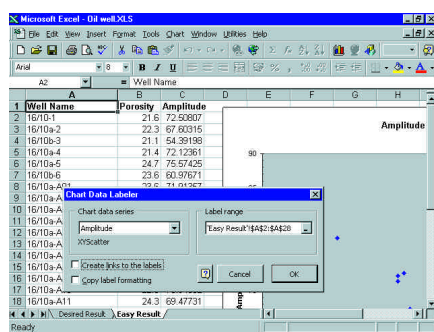
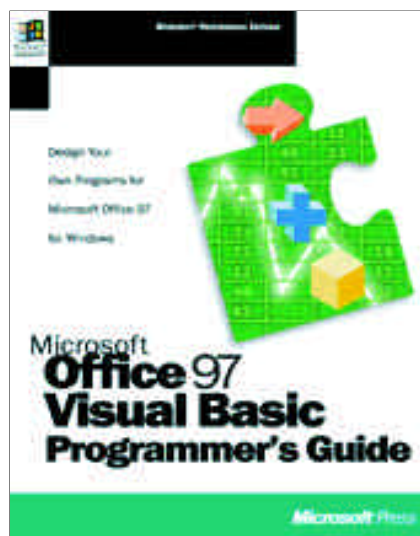


Fig 3 The Chart Data Labeller utility in the registered version of John Walkenbach's Power Utility Pak for Excel 97

recommended Rob Bovey's equivalent utility, a Rolls-Royce job with frills and full documentation. You'll find the Excel 97 version of this on our PCW CD-ROM, in the packed file, label_97.exe. If you want versions designed for Excel 5 and 95,

download them from www.baarns.com/. There is a comparable utility in the registered version of John Walkenbach's Power Utility Pak 97 (Fig 3). The shareware, unregistered version is at www.j-walk.com/ss/pup97.htm. I've put an earlier version of this Pak, which works with Excel 95, on our CD-ROM. Although this version doesn't include the labelling utility, it offers 21 general-purpose utilities, 23 new worksheet functions, and enhanced shortcut menus.

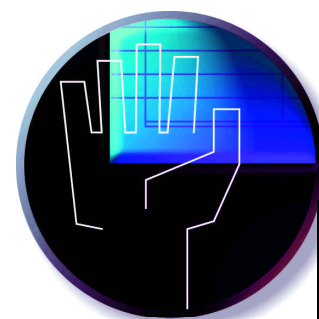
On the PCW CD-ROM

1. In the Software Library, Hands On Spreadsheets section this month is John Walkenbach's Power Utility Pak 2.0a. Click on the file xlpowr2a.exe to unpack it in the directory of your choice.
2. Many loans allow for the early prepayment of the principal at any time. This results in savings of interest and a shorter loan period. Roy Murphy's file, prepay.xls, for Excel 4 and above, is a worksheet which examines the effect on the loan of paying different amounts in each period.
3. The Excel 97 version of Rob Bovey's XY Chart Labeller is in file label_97.exe. Click to unpack. Email addresses for John, Roy and Rob are included in the respective files.

PCW Contacts

Stephen Wells welcomes problems or solutions relating to spreadsheets. Write to him at the usual PCW address or email spreadsheets@pcw.co.uk

Computer Manuals 0121 706 6000;
www.compman.co.uk



A balanced approach

Stephen Wells explains how spreadsheets can be used to create a model for businesses to balance liquidity with profitability. Plus, how to stay sane when moving from 1-2-3 to Excel.

To an accountant, Working Capital is simply defined as a business's current assets minus its current liabilities (current, usually meaning consumed or payable within a year). To a businessman, it is the fuel of the enterprise. Sufficient working capital ensures that a company can pay its creditors, hold adequate stocks and allow debtors reasonable time for payment. The amount required will depend not only on the size of the business, but also the type of industry it is in. But all businesses need to manage their working capital and balance liquidity (the speed of converting into cash) with profitability (the return on idle funds).

Generally speaking, longer-term financial instruments will usually pay a higher rate of return than shorter-term ones. But the responsible manager can't tie up funds for six months when they are needed in 30 days. A spreadsheet can be of help here to create a useful model.

I emphasise that the example shown here is *only* a model and not intended to be incorporated into a company's financial statements. It is concerned only with the cash portion of working capital. This is money which a company might typically roll over in Treasury Reserve accounts, pooled with others to qualify for deposit minimums.

Fig 1 shows the layout. The total interest expected to be earned in the half-year is in cell F5. The current yields of the planned short-term financial instruments are in B3:B5. The starting cash is in B8. After the month-labelling row 7, the six columns B through G show the position at the start of each month; in this case, July through December. Column H shows the position at the end of the last month of the period.

The starting cash is entered in B8. The

Fig 1 (Right)

A worksheet for modelling potential short-term investments to maximise returns on the cash portion of Working Capital

	A	B	C	D	E	F	G	H
2		Yield	Annual % Rate					
3	1-month Inst.	0.6%	7					
4	3-month Inst.	2.0%	8					
5	6-month Inst.	4.5%	9					
6								
7	Month:	July	August	September	October	November	December	Ending
8	Starting Cash:	£ 150,000	£ 90,000	£ 100,146	£ 120,292	£ 40,538	£ 25,683	£ 40,829
9	Matured Inst.		25,000	25,000	30,000	25,000	25,000	40,000
10	Interest:		146	146	246	146	146	696
11	1-month Inst.	25,000	25,000	25,000	25,000	25,000	25,000	
12	3-month Inst.	5,000			5,000			
13	6-month Inst.	10,000						
14	Cash needs:	20,000	-10,000	-20,000	80,000	15,000	-15,000	30,000
15	End Cash:	£ 90,000	£ 100,146	£ 120,292	£ 40,538	£ 25,683	£ 40,829	£ 51,525

Solver Parameters

Set Target Cell: Solve

Equal To: ☐ Max ☐ Min ☐ Value of: Close

By Changing Variable Cells: Guess

Subject to the Constraints:

- Add
- Add
- Add
- Add

Change Delete Reset All Help

Fig 2 (Left)

Establishing the parameters for Solver to follow: the target cell, the cells which can be changed, and the constraints

rest of row 8 shows the cash position at the end of the previous month and the start of the current one, so =B15 is entered in C8, =C15 in D8, and so on.

The initial anticipated investments in one-month, three-month and six-month instruments are entered in B11:B13. Row 14 shows the estimated cash needs of the business for each month. In many months (hopefully!) the business will generate more than its cash needs, and those amounts are entered as negative figures (as in Aug, Sep and Dec).

Row 15 shows the ending cash. C9 is entered in cell =B11 because the one-month deposit has now matured and is thus available if needed. However, it is

turned over or immediately reinvested and entered in C11. At the beginning of October, as recorded in E9, both a one-month and a three-month deposit mature; and at the end of December, H9, all three types of deposit mature.

Row 10 shows the interest earned. So =B11*\$B\$3 is entered in C10, and =D11*\$B\$3+B12*\$B\$4 in E10, and =G11*\$B\$3+E12*\$B\$4+B13*\$B\$5 in H10.

Cell F5 shows the total of this interest: =SUM(B10:H10)

At this point, you could fiddle around with the investments to see if you could

improve on the return. But both Excel and Lotus 1-2-3 offer a Solver tool which rapidly tries out hundreds of options for you.

In a dialog box (Fig 2) you set the Target Cell, in this case F5, and enter the cells which can be changed, here B11:G11,B13,B13,E12.

You can also establish some rules, which both Excel and 1-2-3 call Constraints. Here we've stated that all investments must be greater than, or equal to, zero. Also, it is management policy that the month-end cash balance after all transactions must always be at least £25,000.

If we now run this example using those constraints (Fig 4), Solver says we can earn £3,548 (more than a 130 percent increase) and still satisfy the same cash needs by increasing the six-month investment, not reinvesting the three-month investment in October and not making a one-month deposit in July and November. Who says computers aren't intelligent?

Staying sane

Even though statistically, Excel is currently the leading seller among spreadsheets, it can occasionally confuse people who have been used to Lotus 1-2-3. Take the simple matter of calculating compound growth. Let us say you bought a product for £416.90 in 1989 but the identical product is sold today for £583.66. You want to calculate the average percentage increase of the price each year. We'll enter the £416.90 in C1, £583.66 in C2 and 1997-1989 (or 8) in C3.

Lotus 1-2-3 offers the @RATE function with the arguments: Future Value, Present Value, Term. As far as an investment is concerned, logically £416.90 is the Present Value and £583.66 is the Future Value. So we enter @RATE(C2,C1,C3) in cell B1. The correct answer is displayed: an annual growth rate of 4.3 percent.

Excel also has a RATE function but its arguments are different. They are: NPER, representing the total number of payment periods for a loan or annuity; PMT is the payment made each period ; PV for Present Value; FV for the Future Value; and Type, with a logical value depending on whether the payment is made at the beginning or end of each period.

If you enter the three elements which are known, Excel just returns a #NUM! error. You can enter the 1-2-3 formula, @RATE, and Excel will recognise it, but you'll still get a #NUM! error.

EXCELlent little formulas

■ **Counting occurrences** If the range A1:A100 contains surnames, you can count the number of times that the surname in cell A10 appears in the total range A1:A100 with this formula:

=COUNTIF(A1:A100,A10)

■ **Counting coincidences** Using the same worksheet, now add the names of sports in the range B1:B100. You can count the number of rows in which the same particular surname occurs with the same sport by using

SUM(IF(A1:A\$100="Smithson",IF(B1:B100="Cricket",1,0)))

Enter as an array, using Ctrl+Shift+Enter.

■ **Conditional additions** As above, but add figures for costs in the range C1:C100. You can total the costs for the rows in which the same particular surname occurs with the same sport. Also enter as an array.

=SUM(IF(A1:A100="Smithson",IF(B100:B100="Cricket",C100:C100)))

■ **Joining text** If the surname in A1 is Jones and the sport in B1 is hockey, in another cell you can display Jones plays hockey with this formula:

=A1&" plays "&B1

■ **Joining dates** You can convert a date to text and join it with other text. If the date in cell D17 is 31/8/97 (that is, in the format dd/m/yy) you can display it in another cell as Fixture date: 31/8/97 using this formula:

=&"Fixture date: "&TEXT(D17,"dd/m/yy")

■ **Taking a discount** If there is an amount in cell C30 and you want to show this amount less 15 percent in another cell, you can use this formula:

=C30*(1-15%)

Make sure that this cell is formatted as a decimal or currency, though, not as a percentage.

Fortunately, Excel will calculate it the 1-2-3 way if you choose Tools, Options, Transition and, under Sheet Options, select the Transition formula entry check box. Click OK. Now it's just as though you were using 1-2-3 and you can enter the @RATE function with its three Lotus arguments.

Excel will change it to =RATE(C3,-C1,C2). You'll note that Excel is inserting a minus sign before the Present Value, which is enough to confuse anyone.

If your organisation has moved from 1-2-3 to Excel and you can't find a particular Lotus function that you are used to, it's worth trying this feature. But don't forget to clear the Transition formula entry check box when you're done.

Happy events

In days of yore, you would run a macro manually by pressing a hotkey, like Ctrl+Z, or selecting it from a menu list of macros, or by clicking a custom-made button. But VBA in Microsoft Excel 5.0 offered the opportunity to have events trigger a macro.

There were (and still are) properties like OnEntry. As soon as a user enters data on a worksheet, then a macro can run. Another property is OnUndo which triggers a macro if the Undo command is selected. I

particularly like OnTime which can automatically run a message that it's time to go to lunch at 12.50.

In all there were 14 of these events in Excel 5. Another was added in Excel 95, the OnSave event. It doesn't work if a workbook is saved by a program but is triggered when the user selects the Save or SaveAs commands from the File menu. OnSave might run a macro which simply states that the file has been saved.

Now Excel 97 has added 62 new events, many of which are very sophisticated. Among those available for use with charts, for instance, is MouseDown which occurs when the user presses the mouse button, and MouseUp when he or she releases it. The syntax includes a number of parts so that you can specify whether we're talking about the left button, right button, or middle button if you've got one. You can also specify if the macro runs with a simple press or when SHIFT, CTRL, SHIFT + CTRL, ALT, ALT + SHIFT, ALT + CTRL, or ALT + SHIFT + CTRL are pressed. Whether anyone would remember which of those variations is needed to run the macro is another matter. Maybe it will remain your little secret that you have to press the right button with ALT+CTRL?

Some of the new events are more refined versions of earlier ones. For example, there was a DoubleClick property which runs macro when the user points to an object and then clicks a mouse button twice. Now there is also the BeforeDoubleClick event which occurs when an embedded chart or worksheet is double-clicked, before the default double-click action. It could be used for overriding the default double-click behaviour in a specific instance, like someone wanting to change an element of a chart.

Data entry control

Excel 97 also offers an easy way to ensure that anyone entering data onto a worksheet follows your rules. Perhaps it would be more diplomatic to say you can be helpful in communicating what is expected. They still have the option of clicking in a list and choosing Data, Form, and an entry form will automatically be created.

Alternatively, you can set up the sheet as in Fig 3 so that a message such as Enter date Use format 00/00/97 automatically appears when a data entry cell is selected. If the user enters something which is not within the defined parameters, they are prevented from going further and an error message appears either as a regular error message box, or within the Office Assistant if it is active (again, as in Fig 3).

This is arranged using a new option, Validation, on the Data menu. You have many options from which to choose. The error message can be Stop, Warning, or Information. You write your own message box title and error message. It is also an option whether a title and input message is

Operating order

To help myself remember the order in which operators take precedence in Excel, I have devised the mnemonic, EMDAS, standing for Exponentiation, Multiplication and Division, Addition and Subtraction.

Lotus 1-2-3 can work differently in some respects but not for the following cases, which give the same results in both spreadsheets:

$2^2 \times 2 + 2 / 2 - 2$	=	7.0
$2^2 / 2 + 2^2 - 2$	=	4.0
$2 / 2^2 - 2 + 2^2$	=	2.5
$2 + 2 / 2^2 \times 2 - 2$	=	1.0
$2 + 2 / 2 - 2^2 \times 2$	=	-5.0

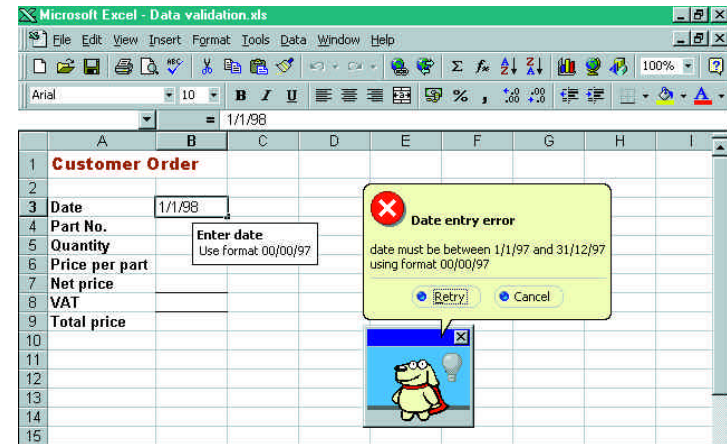


Fig 3 Excel 97 offers automatic data validation. It's easy to create parameters which must be followed and error messages if they aren't. Optional, if you have space...

displayed when a cell is selected.

If you ever have to design a template for any kind of data entry, whether for expenses, invoices, patient reports, ticket sales, you name it, you will find this built-in, easy-to-use feature can save hours of programming time.

Care to share?

With every new version of Excel, it becomes easier to share workbooks with other people on a network. The only limitation is that if a shared workbook were created in Excel 97, you can only make changes to it with Excel 97. But that's not unreasonable. Beyond that, the whole business of sharing is remarkably easy and there is little to be learnt. The intention is that the features be used without instruction from a systems administrator. The typical uses are for budgeting, forecasting, record keeping and project tracking.

Changes can be made in three ways. The first is that a workbook is made available on a network and different people can open it, make changes, and close it. The second is that the file can stay open on a network and several people can make changes simultaneously. The third is that a copy of the workbook can be sent to someone outside the internal network, modified, and the changes merged with the original workbook, together with a revision history.

To get started, all you do is open a workbook, then on the Tools menu choose Share Workbook and click the Edit tab. This is where you choose whether to allow more than one user at a time. Then, you save the workbook on a network location where the users can gain access to it.

Also on the Tools menu, you can select Track Changes, then Accept or Reject changes, and then the When, Who, and Where changes can be made. The When

might be "since a certain date". The Who might be "Everyone" or certain specified personnel. The Where indicates the ranges of the workbook which allow changes.

Under Tools, Track Changes, Highlight Changes, you can specify whether changes are visible on the screen, as a cell tip (when you hover the mouse over a cell), or listed on a separate worksheet, or both.

You can see who made a change, the date and time they made it and what they did (for instance, changed a numerical or text entry, or a formula). Cell borders can even be colour-coded corresponding to the person who made the changes.

On the PCW CD-ROM

■ In the Software Library, Hands On, Spreadsheets section there are two worksheets which are templates for financial analysis. Example.xls is for retail, wholesale or manufacturing companies (which carry stock) and Service.xls is for service companies (which don't). They can be used with Excel 4 and above, and Lotus 1-2-3 versions for Windows 3.1 and above.

■ Requests are again coming in for the templates which accompanied my series on financial analysis (Sept '94-Jan '96). I assume that people have been reading these articles on the various compilation CD-ROMs which have been issued. To satisfy demand I've included the templates on the CD-ROM, but you will have to assemble the back issues containing the explanatory articles if you need them (see "PCW Contacts", below).

PCW Contacts

Stephen Wells welcomes input on all spreadsheet matters. Write to him at PCW, or email spreadsheets@pcw.vnu.co.uk

Back issues of PCW: phone 01483 733870



Linking up

Excel 97 offers a number of ways in which to exchange information between a workbook and a web page; Stephen Wells explains how. Plus, Excel 97's hyperlink capabilities.

A worksheet which is specially designed to accept data from a particular web page is called a Web Query. To run one, you choose Data, Get External Data, Run Web Query, then select the particular Query you wish to run from the Run Query dialog box. Excel 97 includes four of them, as I mentioned last month, but one of these is "Get More Web Queries". At present, if you run that when connected to its source, you can download an active sheet with 36 more Queries.

If you have your own web page, it's easy to add a range of a worksheet:

1. Open the page with your usual browser.
2. Choose View, Source, so you can see the HTML code.

3. Where you want the new worksheet data to appear, insert a blank line and then

```
<- ##Table## ->
```

4. Save this edited file.

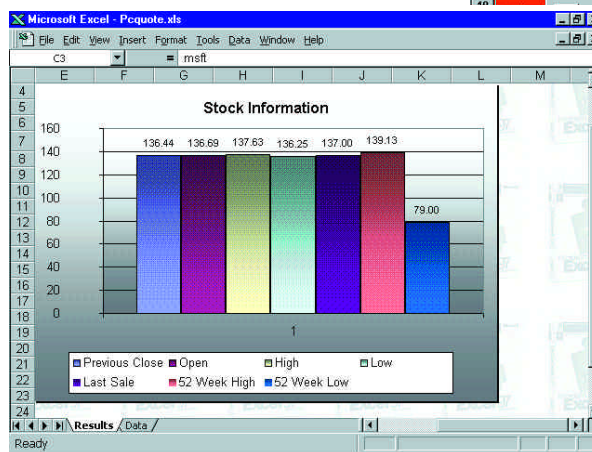
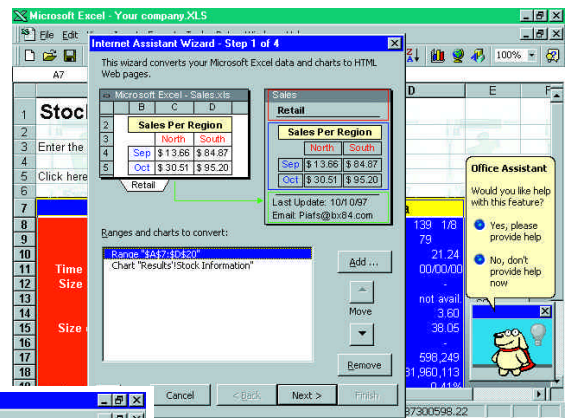
5. Open your worksheet in Excel and select the range you want to add to the web page.

6. Choose File, Save as HTML (Hypertext Mark-up Language). This starts the Internet Assistant Wizard (Fig 1) and you follow a few simple steps. These include browsing to select the .html file you've prepared for accepting the data. When you've finished, the range will appear on the web page.

You also use this Wizard to prepare a worksheet as a web page. It works much better now than when I previewed it last October. If you just accept all the defaults, the Wizard selects enough of the first range of your worksheet to fill a web page, then it

Fig 1 (right) It is easy to save a range of your worksheet as an HTML-coded web page, automatically, using the Internet Asst. Wizard

Fig 2 (below) The Excel 97 Web Connectivity Kit includes a template for converting downloaded data into charts



creates a new HTML-coded page complete with header, footer and table. This can be opened in Microsoft Explorer or your other favourite browser.

Excel 97 also makes it easy to add an Excel form to your web site which can be used for collecting information for a database. This might be for taking orders from users, or requests for information, or just recording comments. You first create the form in Excel with cells where users will enter their data. Then choose Tools, Wizard, Web Form to open the Web Form Wizard which asks you to select those cells on your worksheet that you wish to have

the user fill in, and the labels you wish to give them. It then automatically produces a new .xls file and companion .idc, .htx, and .mdb files. You supply these four files to the web page administrator and you can open the new .xls file, which looks like your original, with a Submit Info button added. This Wizard works best with Microsoft Access 97 and Microsoft Explorer 3.

On this month's cover-mounted CD I've included the complete Excel 97 Web Connectivity Kit. It's the definitive guide to developing sophisticated web sites for Excel users. It also helps you to create special pages on Excel worksheets that will automatically elicit information from company intranets or specific internet web sites. You can learn how to pull daily sales, stock or financial reports from a company intranet server straight onto a worksheet. The Excel 97 Web Connectivity Kit includes an example of converting downloaded data into charts (Fig 2).

Meanwhile, back in the office...

The hyperlink capability of Excel 97 can also be used to improve links with files on an office network, or on your own disks: hard,

or mounted floppy. If you just want a hyperlink from one Excel worksheet to another without the use of a formula, the easiest way is to select the worksheet data in the destination workbook and then use the right mouse button to drag the information to the worksheet cell that contains the text, button or graphic for the hyperlink. When you release the right mouse button, click Create Hyperlink Here on the shortcut menu (Fig 4).

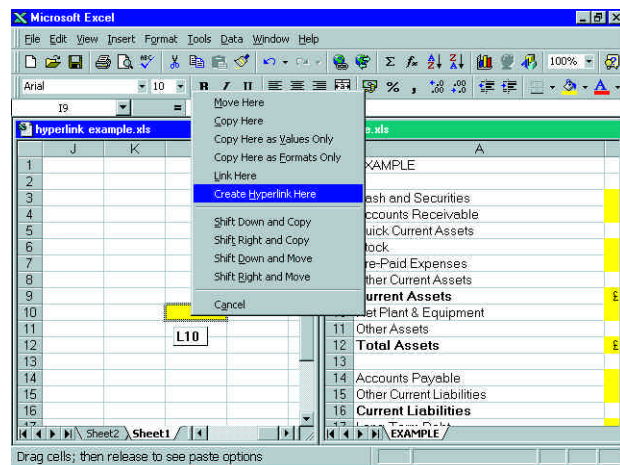
It's also easy to create a hyperlink between a worksheet and a Word document or a PowerPoint slide. Say you have the text, SEE REPORT, in a cell and the report referred to is a Word document. Just select the cell and then click the Insert hyperlink button on the standard Excel 95 toolbar (or press Ctrl+K). This opens a dialog box where you can browse to find the Word file. Click OK and that's all there is to it. The words SEE REPORT are now an automatic link which opens the Word file when you click them.

As you were

Last month I was saying that Excel 97 allows you to use row and column labels as references, assuming that you've checked the "Accept labels in formulas" box under Tools, Options, Calculation.

I mentioned that in the beta version I tried, this feature easily got confused when one of my labels was "Current Assets" and another was "Current". I also said that if the column heading was a formula, like =B1-1, instead of 1995, then I received an error message even though the sheet displayed

Fig 4 You can create direct hyperlinks simply by dragging a cell from one Excel 97 worksheet to another and right-clicking



1995. I've since received the final version (if there ever is a *final* version) and can report that both of these minor problems have been corrected.

VBA changes

The Excel 97 Visual Basic object model has extensive changes to support new and improved features in Visual Basic for Applications in Office 97. Many objects, properties and methods have been replaced. To provide backward compatibility, most of the replaced components have been hidden rather than removed. They don't show up with the object browser although the existing code that uses the hidden components still works. When you write new code you should use the new objects, properties and methods.

The first thing to get used to is that macros are not displayed on module sheets any more although they are still stored with the workbook. To create or edit a macro you choose Tools, Macro, Visual Basic Editor (or press Alt+F11) and three windows open (Fig 3). Visual Basic now features a single, consistent editing environment for Office programs similar to working in standalone Visual Basic 5.0. Each Excel

workbook has a project associated with it. There is an improved code editor, a hierarchical object browser, a multipane debugger, a Properties Window and a Project Explorer to help you view and organise the code and objects in your project.

If you open a workbook created in earlier versions of Excel, Excel 97 preserves macro and dialog sheets and converts module sheets into modules in the workbook's Visual Basic project.

You can run and edit Excel 4.0 macros and Excel 5.0 and 7.0 dialog sheets. To view them, just choose Tools, Macros (or press Alt+F8). You can even add new macro or dialog sheets by right-clicking a sheet tab and then clicking Insert on the shortcut menu. However, it is recommended that you create new macros and dialog boxes in the Visual Basic Editor.

The three largest areas of change in Excel 97 Visual Basic are Shapes, UserForms and Command Bars.

Shapes are drawing objects. The Shape Object is for formatting or modifying a single shape. The Shapes Collection is for modifying all the Shape objects on a specified sheet, such as AutoShape, freeform or OLE objects. The ShapeRange Collection is for modifying a group of Shape objects which you specify.

A UserForm Object is a window or dialog box that makes up part of a custom application's user interface. The UserForms Collection is a collection whose elements represent each loaded UserForm in an application. The UserForms collection has a Count property (which specifies the number of elements in the collection), an Item property (to specify a specific collection member), and an Add method (for placing a new UserForm element in the collection).

CommandBar Objects in Office 97

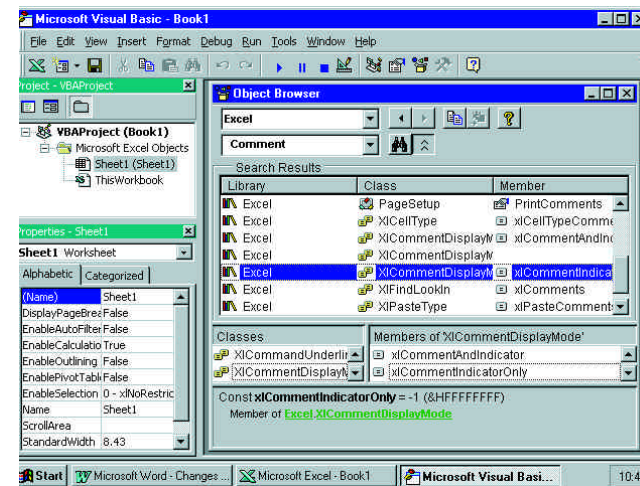


Fig 3 The new Visual Basic editing environment is the same in every Office 97 application and it's all graphically orientated

for your macros in Excel, you can borrow one from Word.

If you have MS Office 95 or 97, start Excel and Word. If you choose View, Toolbars, Customise, Commands, All

Commands in Word, you're offered a wide choice of button designs, any one of which can be dragged onto any toolbar (temporarily).

Right-click on this button and choose Copy Button Image. Drag the button off the toolbar to dispose of it, then switch to Excel. Whenever the Toolbars Customise dialog box is open, the same shortcut menu is available in Excel, so now you can right-click on the button which starts your macro and choose Paste Button Image. This new button will be stored in the Normal.dot template and will stay on the toolbar until you wish to remove it.

A case in point

In his correspondence, Jeff also included a macro for changing the case of selected text. I entered and checked his module and it worked fine, but as I had covered that subject extensively (in my January column), I wasn't going to mention it.

But then I received an email from Andy Male: "I read with interest your article on changing the case of text within Excel. I'm using Excel 5.0 and have successfully created a macro button that will change the case of a single cell. I am trying to amend the macro so that I can change the case of a single cell, or a selected range, but despite hours of effort I have failed. The macro I'm using for the single cell is:

```
Sub titlecasecell()  
    ActiveCell.Value = Application.  
    Proper(ActiveCell)  
End Sub
```

So all of a sudden, Jeff's macro became immediately useful. He had written:

```
Sub MakeProper()  
    Dim myCell As Object  
    For Each myCell In Selection  
        If Left(myCell.Formula, 1) <> "="
```

```
Then  
myCell.Value = Application.Proper  
(myCell.Value)  
End If  
Next myCell  
End Sub
```

I sent this to Andy, who replied: "Thanks for your help — that cracked the problem. I guess it's simple when you know how!" I hope they both see this so that Andy knows where the solution came from and Jeff knows that he did a good deed.

Keyboard conundrum

Roy Small emailed me with an interesting dilemma. "I have a persistent keyboard problem with Excel 7.0 and Word 7.0. When I type a repeating comma (,,,,,) I get repeating (....) full stops. It only happens in these two applications and I have tried reinstalling twice, but to no avail. In the Turnpike editor and in Wordpad there is no problem. My system is an Escom P60 with 16Mb and Win95. Word 5 and Excel 5 did not have this problem. All the country settings are correct.

"I am loathe to delve into the registry unless I know what I'm looking for. I would appreciate a pointer in the right direction if you are aware of this problem."

I replied: "If you're getting correct results with other software, then it can't be a keyboard mapping problem.

"You might check all the AutoCorrect and AutoText options. If anyone else has used your PC, they might have changed something, either consciously or inadvertently. Also (and this is something that often frustrates me) languages are set in every template. You can't just set English (British) once. It can turn back to English (US) or, perhaps in your case, Swedish or something, in different templates.

"If it's any comfort, it's not a bug in Excel 7 or Word 7 as nobody else has had the problem as far as I know."

He responded: "Brilliant, Stephen. I can't thank you enough. It was indeed the AutoCorrect setting. I don't understand why or how it ever got set that way because only I use this machine and I have never found that setting dialog before. Changing the setting in Word also affects Excel."

PCW Contact

Stephen Wells welcomes input on all spreadsheet matters. Write to him at PCW, or email spreadsheets@pcw.vnu.co.uk

EXCELlent changes in Excel 97

- The Chart command on the Insert menu now starts the Chart Wizard. On step four of the Chart Wizard, you can specify whether the chart is inserted as an embedded object on a worksheet or on its own chart sheet.
- The Office Assistant has replaced the TipWizard from versions 5.0 and 95, and includes Answer Wizard IntelliSense technology from version 95. When you need Help, just click the Office Assistant button and ask the Assistant a question in your own words. When a yellow light bulb appears in the Assistant, a program tip is available: click the light bulb to see the tip.
- Cell notes are now called comments. Use the Comment command on the Insert menu to create a comment. You can view comments in the same way that you used to view notes: by resting the pointer over a cell that has a comment indicator (this is a red triangle in version 97) in the upper right-hand

corner of the cell.

- The Info Window feature is no longer available in Excel 97. To locate cells that provide data to formulas, use the Auditing toolbar.
- The Shared List command has gone from the File menu. In Excel 97 you can use shared workbooks to create and edit formulae, change formatting, create and change charts, and even add sheets. To share a workbook, click Share Workbook on the Tools menu.
- Sound notes have also been dropped from Excel 97.
- To start the PivotTable Wizard, choose the PivotTable Report command on the Data menu.
- The View Manager command has disappeared from the View menu. Use the Custom Views command on the View menu to save a custom view of a workbook. Custom views have been integrated into Excel 97 and this command no longer requires an add-in program.



The place to be

This column must be well-read by Microsoft employees because many of your past spreadsheet gripes have been dealt with in the new Excel 97, as Stephen Wells explains.

Coincidence? I don't think so. It's obvious that readers of this column are typical of the Excel users to whom Microsoft claims it listens. Just look at the number of features in Excel 97 that solve problems which have been highlighted in this column in the past.

For instance, last month (*PCW*, Feb) a doctor was asking for ways to immediately draw attention to certain medical conditions on a worksheet: Excel 97 now has a Conditional Formatting dialogue box which offers many more options than previously available. In the example in **Fig 1**, patients' weights are shown in column A. Column B highlights their condition. The cell formula is `=IF (A9>14, "OVERWEIGHT", IF (A9<10, "UNDERWEIGHT", A9))`

In this simple scenario, anyone over 14 stone is considered overweight, anyone under ten stone is deemed underweight, and between those extremes their weight is simply repeated in column B.

The Format menu offers a new option, Conditional Formatting. You can enter up to three options. So, if you include a cell

condition that doesn't meet any of these set criteria, you have (in effect) four options. Each can start with a choice of "Cell Value Is" or "Formula Is". The first depends on the value or formula in the formatted cell. The second allows you to set the formatting, dependent on data or conditions other than in the selected cell. It might be today's date or a total at the foot of the worksheet.

In **Fig 1** there are two "Formula Is" conditions. Condition 1 is

`IF (B9="OVERWEIGHT", A9)`

and Condition 2 is

`IF (B9="UNDERWEIGHT", A9)`

The format set for Condition 1 is a bold font, in red, with a pale yellow cell background. For Condition 2, it is a regular font, in green, with a pale blue background.

Allowing functions to be used to determine formatting will be a popular feature in a wide variety of applications. The content of a cell which is, say, more than 30 percent of the total of a row or column, can be highlighted. If you wanted any even whole number in the range E2:E80 to be purple, you could conditionally format E2 as

follows:

`=MOD (E2, 2) =0`

and then paste that format into the rest of the range. The format formula will be changed appropriately by the

Paste tool. To see which cells on your worksheet have Conditional formatting, choose Edit, Go To, Special, Conditional formats.

A smarter chart

Two other recent requests were for better ways to chart stock and commodity prices (*PCW*, Feb). These investors had to make hundreds of plots and needed a better method of specifying dates along the x-axis. Now Excel 97 comes to the rescue. Previous versions allowed for 4,000 points per data series and a maximum of 32,000 points for all series in one chart. These specs have now been increased to 32,000 for a 2D chart and 256,000 points for the whole chart. And, there is a new option for specifying that an axis refers to dates.

In fact, it has never been easier to make and adjust charts. I must confess that in the past I used to get confused by all the nomenclature of chart objects. Now it's a doddle. Not only does the Chart Wizard now have tabs, but also a small preview window displays changes as you make them (**Fig 2**).

Whether you decide on a High-Low-Close stock chart, with or without the day's sales volume, or an Open-High-Low-Close chart, with or without volume, the new Step 1 dialogue box of the Wizard can show an example using your data. You can also print your worksheet data in a grid at the foot of the chart.

Additionally, Excel 97 offers more chart types in versions for black and white printers as well as some fancy ones for screen display, slides, or colour printers. There are now bubble, pie of pie, and bar of pie charts, and there are pyramid, cone and cylinder shapes for 3D bar and column

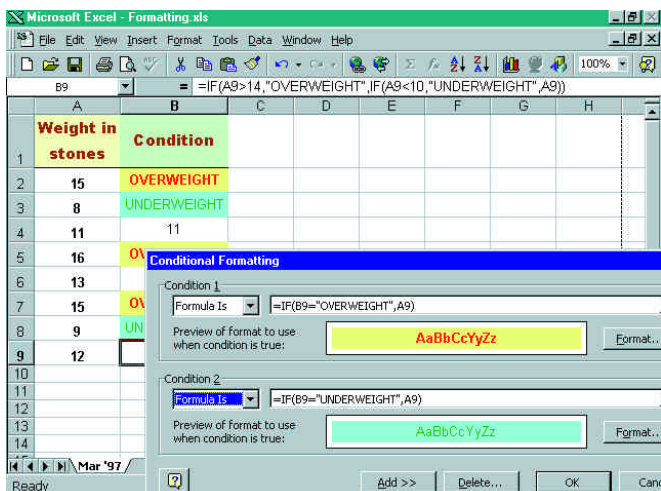


Fig 1 Excel 97 expands the options for conditional formatting. It can control font style, underlining, borders, shading and patterns

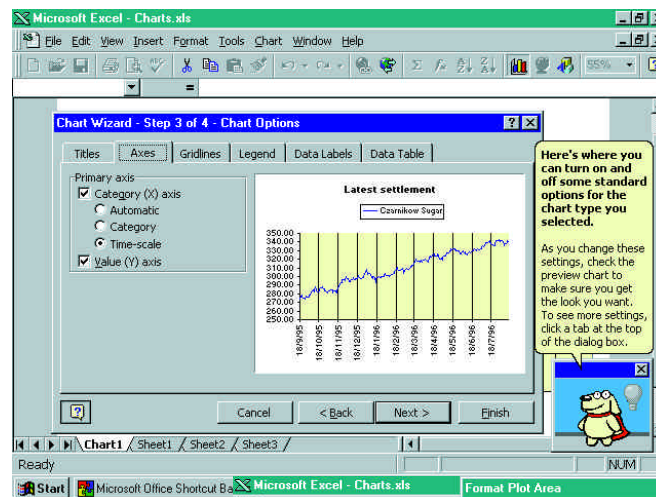


Fig 2 (left) The new Chart Wizard is so easy to use. A canine Office 97 Assistant can be an Excel-user's best friend

Fig 3 (below) Fancier charts for slides, colour printers or your web page. Your bars or background can now be wood, marble, or a picture

charts, as well.

The opportunities for designing custom charts are greatly expanded. If you want to have a green marble effect on the background, or a graduated mahogany effect on your bars, you can. Just choose the Fill Effects dialogue box (Fig 3).

Good intentions

Ever since Dan Bricklin and Bob Franckston designed the first spreadsheet for the Apple II, we have all become used to entering cell references. We might type in cell B5: =B3+B4. With Excel 97, Microsoft allows you to return to the terminology of the accountant's ledger sheet. If the labels in A3, A4 and A5 are Cash and Securities, Accounts Receivable and Quick Current Assets, then in B5 you can actually enter =Cash and Securities+Accounts Receivable. These are called natural-language formulas. No, Excel doesn't automatically create names here. It just lets you use row and column labels as references. This assumes that you've checked the "Accept labels in formulas" box under Tools, Options, Calculation.

The problem is you can't paste labels in to create a formula. You have to type them in, which can take forever. Personally, I create formulas just by typing an "equals" sign and then pointing to the cells to use.

I also found, in the beta version I tried, that this feature easily got confused. My worksheet included a list of ratios, one of which was named Current. I wanted to add

Net Plant & Equipment to Current Assets to produce Total Assets. When I tried to type in Current Assets, Excel used the Current result instead. The workaround was to lengthen the first label to Current Ratios.

Also, in columns headed with years, I could refer in a distant cell to Net Sales 1996. But if the column heading was a formula, like =B1-1, instead of 1995, then I received an error message even though the sheet displayed 1995. One solution here is to create the column headings with AutoFill. Select the first or last cell in the range you want to fill and enter the starting value for the series. If you hold down the right mouse button as you drag the fill handle over the range, to the right or left, you're offered a wide range of options on the shortcut menu.

Incidentally, if you've got Excel 2.1, 3.0, 4.0 or 5.0 worksheets that you want to try out under Excel 97, it will not only load them, but you can also save them again in the original format. These saved files won't include a lot of Excel 97 features but at least it means you can still run them with the more familiar version. Excel 97 will save in lots of other formats, too.

Some features in Excel 97 are there because they've been introduced to all

Office 97 applications. One of these is more animation. If you like Lotus SmartSuite's way of dropping down menus you can choose Tools, Customise, Slide. Alternatively, you can check Unfold and the menus swoop down and out to the right. No swooshing noises, though, as with Lotus.

Common Outlook

Another common Office 97 feature is that the Journal in Outlook can record your daily activity. If you wish, it will record when you first opened a workbook, subsequent activity and the total time you have spent on it. This has a number of uses. Some professionals will use it for billing time to clients. If you're looking for an Excel file that you know you worked on last Friday, go to that day in the Journal and there is a path to the file.

Some new features have been brought across from Word and extended. Excel's AutoCorrect for text has a lot of built-in corrections, for instance "annual" is automatically changed to "annual", and you can add your own frequent mistakes and replacements. The extension is that if you enter a formula incorrectly (forgetting a bracket, for instance) Excel will now offer to correct it for you. Another addition from Word is multiple levels of Undo, and there is also a drop-down list of recent actions so you can choose which to undo.

Some features are replacements. The Function Wizard (with the Fx button) has been superseded by the Formula Palette. Click the new = button. The box to the left, which normally shows the current cell reference or Names, now offers a drop-down list of functions. Click on one and a dialogue box appears which displays the name of the function, each of its arguments, a description of the function and each argument, the current result of the function, and the current result of the entire formula.

The new Fx button on the Standard toolbar works like Shift+F3 and is used for pasting functions.

There are new features for improving worksheet presentation. One is that you can run column heading labels at any angle. Another is that you can merge cells. You may not want to centre a heading across the whole worksheet but, say, across columns B through F in one row. You select the cells, then right-click and choose Format cells, Alignment, Merge Cells and this group of cells is treated as one. Yet another new feature is easier printing. On

the View menu, there is a new Page Break Preview command. I love this: it shows your whole sheet with the default printing page breaks; you can drag them where you want, so you can easily set the page breaks to logical places in your work; and if it's more important to you to get everything on one page, Excel 97 will automatically scale everything down to fit.

Some new features are things which just needed fixing. Before, if you gave a Pivot Table fancy formatting in Excel 7, for instance, you lost it when you rearranged the data to another view. But now your formatting is retained and you can include calculated fields as well. (Incidentally, although Microsoft is calling this Excel 97, the version number, under Properties, is Excel 8.)

Some existing functions have been supplemented with a new version. Included in its calculations are cells which contain text or the values TRUE and FALSE. These include MINA, MAXA, VARA and VARPA.

I've never been one for overly-large

Fig 4 If you have room, Office 97 offers Web Query forms which enable you to quickly download data from the internet to your Excel 97 worksheet

single worksheets but Microsoft says a lot of its customers want them bigger than ever; so Excel 97 increases the maximum number of rows from 16,384 to 65,536. This will be good news for Excel database users, of course.

Scenario Manager on CD

Scenario Manager is a powerful Excel tool for analysing complicated problems. A Scenario is a named combination of up to 34 variable cells. The built-in tool enables you to consolidate multiple "what-if?" models in one spreadsheet, and switch between the Scenarios to see the impact of various assumptions on your model.

On this month's cover-mounted CD, go to Software, Hands On, Spreadsheets, and you'll find Scenario.exe. Copy it to a disk, then open Excel (v5 or higher) and minimise it. In File Manager or Explorer, double-click on Scenario.exe. It will maximise Excel and offer an interactive demonstration of Excel's built-in Scenario Manager. The example provided is for the owner of a small coffee shop who wants to analyse various business scenarios.

EXCELlent shortcuts in Excel 97

- If you double-click a cell which contains a formula, any cell references in the formula change to different colours. The cells referred to are highlighted on the worksheet in those same colours. This new feature is called the Range Finder. To include more or fewer cells in a range reference, use the drag-handle in the lower-right corner of the border to select more or fewer cells. The formula will change correspondingly. (If you can't make a cell active for editing by double-clicking on it, choose Tools, Options, Edit tab and select the first Settings check box, "Edit directly in cell".)
- If you double-click the border of a selected cell, you can move automatically to the corresponding edge of a block of data. Click the top of the cell to go to the top of the block and so on. This is similar to Ctrl + arrow key.
- It's easy to list all your Outlook or Schedule + contacts on a worksheet. Open Outlook. Choose File, Import and Export, and click Export. In the Import Export Wizard, select the Contacts folder and the file type MS Excel. Name a new workbook, or browse existing workbooks and add a worksheet to one of them. You can either map the fields between the Outlook list and worksheet columns yourself, or the Wizard will do it.
- You can create hyperlinks without using your modem. Choose any cell on your worksheet. Click on the Insert Hyperlink button on the Standard toolbar and then browse for a file. This will make a link to that file. The default display in the cell is the file name but you can change it to something else or use a picture instead. The file might be a text scrap on your Desktop, or in any Office application.

A feature which I expect to use a lot is data validation.

You can easily specify the type of data allowed in a cell and have a custom message displayed if a user tries to enter anything else. You could restrict the entry to a date, for instance, or a number below a certain amount. The Auditing toolbar has an additional helpful Circle Invalid Data button, too, which helps you find invalid data.

On the web

The most dramatic changes to Excel in this new version

are the ways you can link beyond your own workbooks. You can create hyperlinks which jump to other Office files on your system, your network, your organisation's intranet or the internet.

Excel 97 offers so many features in this area that I'll expand on them in next month's column, but here's one example. You can easily run queries to retrieve data available on the web. Microsoft Office 97 provides several sample Web Queries that you can run. I was amazed at how easy it is to access this information. I put the cursor on a new worksheet and clicked successively: Data, Get External Data and Run Web Query. This presented four pre-written Web Query files which are included with Office 97. I chose "Dow Jones Stocks by PC Quote, Inc".

One more click on the Connect button in Internet Explorer, which starts in the background automatically, then my worksheet was loaded with ten columns of data about each of the Dow Jones industrial stocks (see Fig 4; prices are current except for a legally-required 20-minute delay behind the New York stock exchange, US Eastern time). The Query form even has AutoFilter set, so that you can drop down an alternative list of transportation or utilities stocks; or you could filter out all but the top ten in terms of sales volume or Net Change for the day. When Microsoft localises this feature, we'll be able to access London's FTSE 100 just as easily.

PCW Contact

Stephen Wells welcomes input on all spreadsheet matters. Write to him at PCW, or email spreadsheets@pcw.vnu.co.uk



Trading places

Stephen Wells shares his stock of spreadsheet knowledge to help you chart your investments

Paulo Freitas Tavares (MD), emails: "I have a small problem. It extends for dozens of sheets and many parameters but let us suppose it is only one sheet and one parameter.

"In column B I have weeks; in C I have weights of patients; in column J I have 'alerts' for a quick visualisation if something goes wrong. Suppose that the criteria for 'going wrong' is losing or gaining more than 10 percent weight in one week. The aim is to get the word ALERT in red or the word OK, in blue, in column J — I can't make Excel 7 do it."

As regular readers know, I am not a big fan of unnecessary macros and always try to find a built-in Excel solution before using them. In this case, Dr Tavares may be able to take advantage of the extraordinary flexibility of Excel's Custom Number format.

In Excel 4, you can enter the following as a Custom Number format:

```
[>1000] [Blue] #,##0; [<-1000] [Red] #,##0; [Green] #,##0
```

Excel assumes that the first section is for positive numbers, the second for negative

ones, and the third is anything else. You can't write IF statements, but you can use a condition value symbol. So in this example, any entry in the cell greater than 1,000 is displayed in blue, less than -1,000 turns red, and anything else is green.

Interestingly, you can enter the same custom format in Excel 7 but it will automatically shuffle the description around to:

```
[Blue] [>1000] #,##0; [Red] [<-1000] (#,##0); [Green] #,##0
```

In this example I've added parentheses, so numbers less than -1000 have brackets as well as being in red.

You can also make text appear even though you have entered a number, or the cell contains a formula which produces a number. Let's say the cell A9 contains the simple formula:

```
=C9-C10
```

We can format A9 with this Custom Number format:

```
[Blue] [>14] "OK"; [Red] [<10] "ALERT"; "Other"
```

If the answer to C9-C10 is 15, the acronym "OK" will display in blue; for 8, it will display "ALERT" in red; for 11, it will display "Other" in black.

Previously, I said that the second section of the Custom Number format is for negative numbers. But there is an exception, as in this example. When the first section is conditional (as it is here because it only applies to numbers bigger than 14) then the second section formats other numbers, whether positive or negative. Here the second section ([Red][<10]"ALERT";) is also conditional. So then the third section applies. In this case, if the number in the cell is between ten and 14, then the word "Other" prints, using the default formatting

for the cell. The only problem here is that Dr Tavares says that there are many parameters in his actual workbook. Other readers may also like to have Excel automatically change the font of a warning word, or the background colour of its cell.

So, for those who need it, I'm providing a macro in VBA for Excel on the cover CD in the workbook file, ChangeColour.xls. See also Fig 1 (page 272). In this instance, the word to be emphasised is decided on the worksheet by an IF function, like this one:

```
=IF (C15<10, "ALERT", IF (C15>=14, "OK", "Other"))
```

There is a button on the worksheet which runs a macro called Changing(). This specifies a range, although you could use a Name, and the macro runs through that range looking for words which the IF statement has entered. With a macro, you can have as many keywords to look for as you like. It then uses the IF THEN WITH statement to abbreviate font references.

The ColorIndex statement refers to the standard Excel palette box. If you count colours from left to right, and top to bottom, you'll find that 2 is white, 3 is red, 5 is blue and 27 is an off-yellow. So looking at the listing, you'll see the word OK will appear in white on blue and the word ALERT will be red on off-yellow.

ALERT is in Arial Black Bold Italic. OK is in Roman (not italic). You have to include the instruction

```
Italic.False
```

for the word OK because after the macro has run, the font will be set to italic by the instruction,

```
.FontStyle = "Bold Italic"
```

for the word ALERT.

EXCELlent shortcuts and longshots

1. Worksheets saved in the MSOFFICE\TEMPLATES folder will behave like an XLT file and open as a copy, without having to be saved as a template file.
2. Many useful macros, which you can copy into your workbooks, can be found in the SAMPLES.XLS file located in the MSOFFICE\EXCEL\EXAMPLES folder. They include error trappers and default resetters.
3. You can copy colour palettes between workbooks: open the workbook with the colour palette you want. Switch to the workbook to which you want to copy the colour palette. Choose Tools, Options, Colour tab. In the Copy Colours From box, select the workbook that contains the colour palette you want to copy.
4. Right-click the mouse on the AutoSum feature in the Excel Status bar. Change Sum to Average, Count, Count numbers, or find the Max or Min of a selected range of cells.

Up and down the City road

Chris Pack emails: "I often need to chart market prices, which involves a long series. Daily prices over two or more years can be some 500 plots. It would be nice to label the months along the x axis but calendar months are not evenly spaced and this seems to make them difficult for Excel to display. I have set a column for these labels, but with so many plots Excel appears to be reserving space for the blanks." Chris then described all the tricks he's tried, and ended "...The whole hit-and-miss process seems so time-consuming. I feel sure there must be a

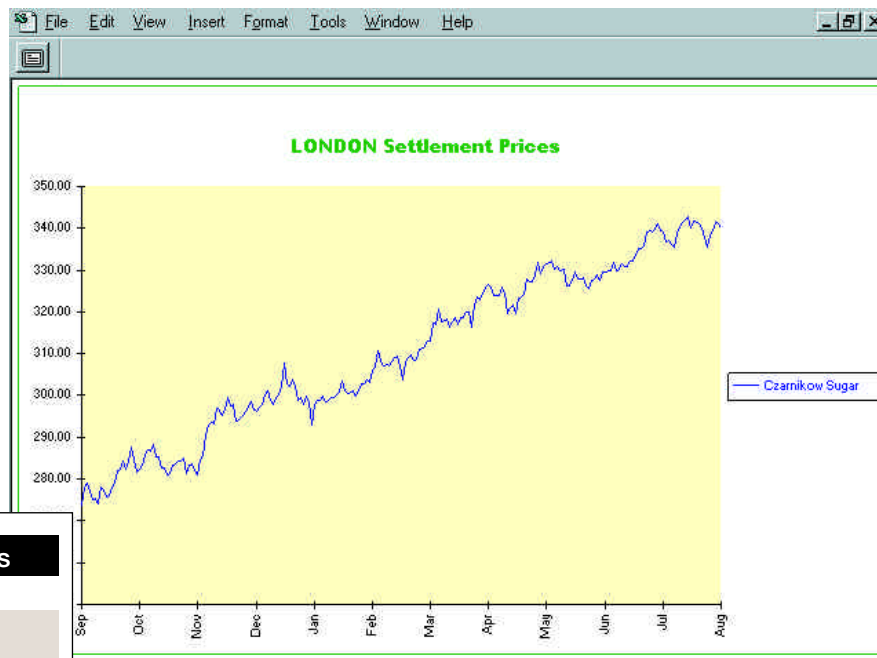


Fig 2 You can format the labelling for axes of an Excel chart on the data source worksheet

simpler way of formatting such X axis labels. Any suggestions?"

Fig 2 shows a part of one of these charts. It covers just under a year with 233 quoted prices from 18th September 1995 to the following 15th August. Column A just has a list of dates. The adjacent column has the relevant prices. In the worksheet Chris sent me, he had an extra column between the dates and the prices where he had entered the names of the months.

I returned Chris's workbook with an alternative worksheet and chart. First, I eliminated the extra column. Column A still has all the dates but I used the Custom date format mmm. Column B has all the prices. I let the chart wizard make a new chart. Then I opened the Format Axis dialogue box, for the x axis. In the Scale section of this box you can choose individually the "No. of categories between Tick-Marks" and the "No. of categories between Tick-Mark labels". I experimented with different numbers until there was just one label and one tick mark for each month (as in Fig 2). The number happened to be 21, which is probably the average number of trading days each month. I

accepted the defaults for the other four options in this useful box. So now, as required, the x axis is labelled only with the name of each month.

Playing footsie

In my October issue column last year, I encouraged readers to write to me with their experiences of downloading information into spreadsheets and how they used spreadsheets to aid with investments. So I was glad to conduct the above exchange with Chris, as well as to receive an email from Keith Bladon, who downloads share prices via a Teletext card and a package called Udata Teleshare. He uses Excel to analyse the FTSE 100 index. He looks at a 201-day centred average of the FTSE within a channel plus and minus 150.

Investors who use technical analysis, agreeing with Shakespeare that past is prologue, look at historical results. This is opposed to fundamental analysts who keep abreast of things like new products and management changes. Within these two major approaches are multitudes of different theories, often based on the expectations of various cycles.

Keith is a 201-day man. His 1,700-row datasheet records the FTSE for every trading day from 1st January, 1990 to 28th August, 1996. Additional columns make calculations based on percentages and other statistical changes. Another sheet in

the workbook file he attached for me has a graph of these results. And then there is a long VBA macro.

His problem is: "When I want to look at different periods of time, adjusting the graph's normal facilities is time consuming." After entering a start and end date, the macro finds the correct cell references and then amends the graph properties.

Keith's question is: "Because I am using Active-Sheet, the display jumps to the various parts of the graph. I have tried to access the graph's properties without using Active.Properties but have been unable to do this. Is there a way?"

The objects in Excel spread out much like a tree, going from the trunk to the boughs, to the branches, to the twigs. There is an established hierarchy of the 128 programmable data objects in Excel 5 and the 162 objects in Excel 7. You tie them together using Visual Basic for Applications (VBA), Excel's programming language. A full hierarchical path might read like this:

Application.Workbooks(1).Worksheets(1).Range("A1").Value = 1

It is not always necessary to detail the entire object path when setting a property, or calling a method, on a particular object. It depends on the context. To start with, Application refers to Excel, so if you're in Excel you don't need to reference the Application object. But although defaults can often obviate entering any step in a macro, Excel can't get from here to there without traversing the steps between.

However, you don't have to watch all the changes taking place to the objects in

your chart, one by one. Do you recall how, in the old days, we used to avoid seeing DOS batch files running on the screen by using ECHO OFF and ECHO ON? There is an equivalent command in VBA. Near the top of your macro just insert:

Application.ScreenUpdating = False

Your macro will run but the results won't display until it's finished and then they will all show at once.

Inspired by Keith's efforts, I wrote the small Excel 7 application, "Bulls 'n' Bears", which is on this month's cover-mounted CD. But it deploys little VBA. The eight charts it includes were made using Excel's charting wizard.

Something in the City

Probably the best news for those interested in the stock market is that Microsoft is in the process of localising Microsoft Investor 2.0 for the UK market. You can view this comprehensive product at www.investor.msn.com. It includes a number of related tools.

The Portfolio Manager helps users to create and track multiple stock portfolios. It recognises stock splits and multiple purchase dates and tracks commissions. You can change columns with right-click menus, or double-click columns to "AutoFit" them, just like in Excel. It offers automatic notification when there is news on any stock in your portfolio.

For those into technical analysis, Investor 2.0 supplies historical charts, for any time period, on every listed stock. They can be overlaid with market indices or compared with other securities and downloaded (Fig 3). The product also provides business and financial news from MSNBC, PR Newswire and Business Wire for fundamental analysts.

The Market Summary feature provides up-to-the-minute information on the leading

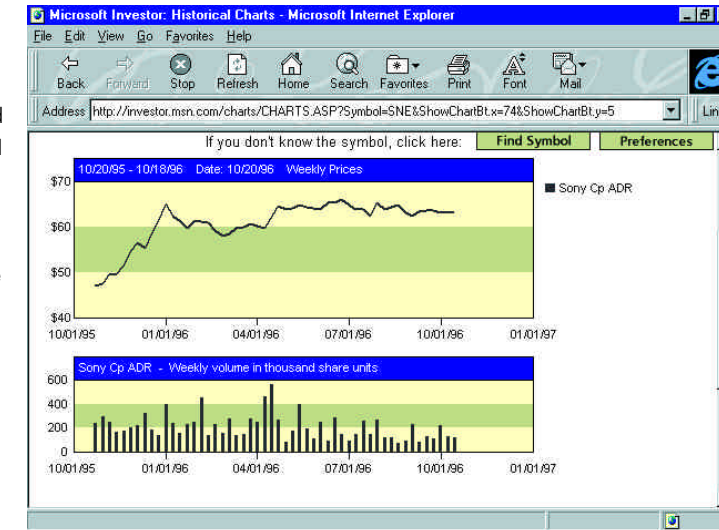


Fig 3 Using Microsoft Investor 2.0, you can download historical data on any listed US stock

US and foreign markets and currency rates and displays top-ten lists with the market's best and worst performers. Users can look up prices for specific securities by ticker symbol, company name or fund name.

Although Microsoft stresses the integration of Investor 2.0 with Microsoft Money, much of the data can be just as easily imported into Excel. Roll on the day when Investor 2.0 shows the FTSE 100 and other UK listed stocks.

I think we should be told

You may recall the discussion in past columns about calculating the years and fully-completed calendar months between any two dates. It appeared to be easier to find the required solution in Lotus 1-2-3, using the @DATEDIF function, as Excel doesn't offer an equivalent.

But now comes an email from Paul Bloomfield who points out that although it's not listed in the Function Wizard, nor mentioned in the documentation, Excel will indeed accept and correctly use a DATEDIF function — I tried it and he's right. The only possible reason I can think of for this is that Excel is always keen to be able to import 1-2-3 files and so makes allowances.

PCW Contacts

Stephen Wells welcomes comments on spreadsheets, and solutions to be shared, at spreadsheets@pcw.vnu.co.uk

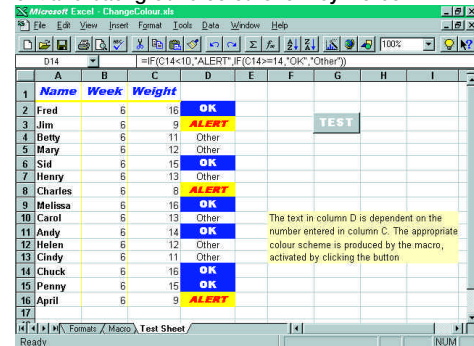
Udata Teleshare from Udata Software, Udata House, Old York Road, London SW18 1TG. Phone 0181 874 4747; email Sales@updtsoft.demon.co.uk

Microsoft Investor 2.0: www.investor.msn.com

Fig 1 Macro — a few colourful words

```
Function Changing( )
Dim Cell As Range
Worksheets("Test Sheet").Select
For Each Cell In Range("D2:D16")
If Cell.Value = "OK" Then
With Cell.Font
.Name = "Arial Black"
.Bold = True
.Italic = False
.Size = 10
.ColorIndex = 2
Cell.Interior.ColorIndex = 5
End With
End If
If Cell.Value = "ALERT" Then
With Cell.Font
.Name = "Arial Black"
.Size = 10
.FontStyle = "Bold Italic"
.ColorIndex = 3
Cell.Interior.ColorIndex = 27
End With
End If
Next
End Function
```

Fig 1 A macro, started with the button, changes the font and background colours for key words





Taking the register

Stephen Wells dips into the Registry to remove troublesome messages. Plus, adding background graphics to a worksheet, and problems with bins and cases.

These days, many Excel 7 add-ins have their own uninstall program. But when you start Excel after deleting an add-in, you may see a warning notice that such-and-such a file cannot be found.

If you right-click on the Start button and choose Explore, you'll find a program called Regedit.exe in the C:\Windows directory. If you can't find it, click the Name column and it will list the files in alphabetical order. Double-click Regedit to start it. Under the displayed MyComputer root directory you'll see several sub-directories starting with HKEY. You want HKEY_CURRENT_USER. Click on this to expand it, then successively expand Software; Microsoft; Excel; 7.0; Microsoft Excel. You are now six levels down from MyComputer. Go down to the sections with names starting with OPEN. If you double-click the first one it should read:

```
C:\MSOFFICE\EXCEL\LIBRARY\ANALYSIS
\ATPVBAEN.XLA
```

Go down to the last OPEN item. It may be OPEN4 or OPEN5. Click that and you'll probably see an entry like:

```
/F C:\MSOFFICE\EXCEL\
LIBRARY\Program.xla
```

The F switch simply tells Excel to add custom functions among the Insert, Functions menu items. An R switch would open the file as read only. If Program.xla is actually the name of the add-in you're trying to get rid of, just delete OPEN4 or OPEN5 entirely. Close Regedit. You won't have to restart Windows for the change to take effect. Just start Excel and the troublesome message will be removed.

This procedure is much like removing an entry to an .INI (initialisation) file.

Applications, like Excel 7, which only run under Windows 95, don't use .INI files. Everything they need to know is stored in the Registry.

Obviously, Windows 95 can run 16-bit software, like Lotus 1-2-3 Release 5 for Windows. What happens is that when Windows 95 is booted, it examines the WIN.INI, SYSTEM.INI and any additional .INI files, like 123R5.INI, to see if any unique device drivers need to be loaded. Then it moves on and takes its orders from the Registry, which could be defined as a database of everything Windows needs to know.

Look under User and you'll probably see your name. Font sets the default font which might be Times New Roman 10 or Ariel 10. Pos shows the co-ordinates, top, left, width and height of the opening position of the Excel application window. If Basics reads 0, the tutorial runs when Excel is started. If it reads 1, then the tutorial does not run. It's set at 0 when Excel is installed and changes to 1 after the first use.

The Options section offers numbers in hexadecimal and decimal. Choose decimal and it probably reads 87. This is the sum of the following values: 1 to show scroll bars, 2 to show the formula bar, 4 to show the status bar, 16 to use A1-style cell references (rather than Row 1 Column 1), and 64 enables DDE (Dynamic Data Exchange).

But I only pass on these additional details because they're interesting: the average user is well-advised to stay out of the Registry. Generally speaking, it's best to make everyday changes by choosing options in an application, or using Control

Panel, as Microsoft recommends.

By design

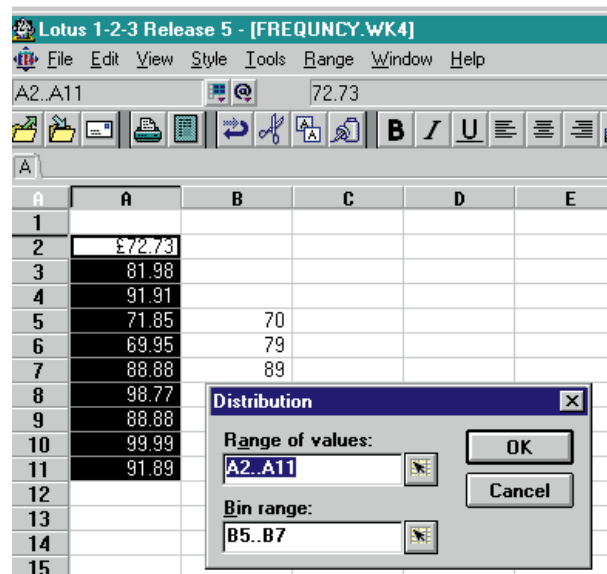
It's always my little asides which get me into trouble. In a recent column I wrote that you can dress up your displayed worksheets by choosing Format, Sheet Background and selecting a graphic file. I should have left it there, but I slipped in the parenthetical thought that you could print sheets with a background if you have a colour printer. Wrong.

I didn't try it until Peter King emailed that only his worksheet would print. No background. Belatedly, I found Article Q134212 of 28/8/96, entitled Can't Print Background Graphic Included on Worksheet in the Microsoft Knowledge Base. It states: Although you can add a background graphic to a worksheet, this graphic will not be visible when you view your document in print preview or when you print it. The information in this article applies to Excel for Windows 95, version 7.0. And it goes on: This behaviour is by design of Microsoft Excel, because printing a background is extremely slow on most standard printers.

Time to call on Michael Rickard, an Excel guru at a leading West Coast university who has bailed me out before. He came back with a workaround. His instructions were in shorthand, so I'll spell out the steps I took to make it work.

Let's say you want to print the range A1 to H16 in OLDFILE over Microsoft's familiar Clouds bitmap:

- First make the Camera tool visible. (It's probably on the Utility toolbar.)
- Open OLDFILE.
- Now open a new worksheet. Select the empty range, A1:H16.



● Now choose Tools, Options, View, No Gridlines. Then cell A1, Insert, Picture, Windows Directory, Clouds.bmp.

● Save this file as NEWFILE. (This is the equivalent of a background picture.)

● Choose Window menu, OLDFILE. Select A1:H16. Click the Camera tool.

● Choose Window, NEWFILE, cell A1. (This pastes a linked picture of your data on top of the clouds image.) Drag this object the last little bit into the top left corner of the sheet.

● Right click and choose Format Object on the shortcut menu, then select No Border, No Fill. Click OK.

That's it. You can now view the combined image under Print Preview and print out a hard copy. I must send Michael a long overdue book token.

Binning it

I've got so used to all this column's enquiries arriving by email that it was almost a shock to receive a nice, old-fashioned, typed letter from Alistair P Campbell of West Sussex: "I think I have found a bug in Excel for Windows 95. When the Frequency function is selected to display the distribution of a data array, the only result is in the first bin. The remaining bins remain blank. I am using a new Dell Dimension XPS P166s and Dell agrees that there appears to be a bug. Your opinion would

be welcome. I use frequency distributions a lot, and am having to revert to my older Lotus 1-2-3 spreadsheet to provide results for this function."

I've discussed before how some 1-2-3 functions differ from Excel. What we have here is a very easy-to-use menu item in 1-2-3 being replaced by a function in Excel, which takes a bit of getting used to.

Let's say that in the range A2 to A11 you have ten prices. They are in no particular order and there might be duplicates, but they are all below £100. The objective is to see how many prices fall in the ranges £0 to £70, and £70.01 to £79, £79.01 to £89, and £89.01 to £100.

In either 1-2-3 or Excel, you indicate these groups — or bins, as both spreadsheets call them — by simply entering 70, 79, and 89. For this example, we'll enter those numbers in B5 to B7.

In Lotus 1-2-3 Version 5, as shown in Fig 1, you don't have to select any particular cell. You just choose Range, Analyse, Distribution, and a dialogue box invites you

to enter, or select with the mouse, the range of values (here, A2 to A11) and the bin range (here, B5 to B7). Then as soon as you click OK, 1-2-3 automatically puts the answers into the column next to the bin array — easy.

Excel's methodology would confuse anyone until they had become familiar with the full procedure. What you have to do, if you have four bins, is to select any four successive blank cells in any one column. I selected D5 to D8.

Click in the formula bar, then the fx (function) button. Select the Frequency function. This opens a similar dialogue box to the Lotus one.

Again you enter, or select with the mouse, the range of values (A2 to A11 again) and the bin range (B5 to B7). But when you click OK, you find yourself back in the formula bar at the end of the new formula.

Now you have to press Ctrl+Shift+Enter. Only then will you get the right answers, as shown in Fig 2. As this is an array, you don't enter the curly brackets which appear around the formula; you just press, all together, the three keys mentioned.

I sent a demo of this on a disk to Alistair. He graciously replied: "Success! I'm beginning to appreciate Excel more and more. Thank you for your help." Good. Another satisfied reader!

On the case

John Young, of the UAE, asks: "Could you advise if there is an easy way to change the characters in Excel from lower case to upper case on multiple cells, on a spreadsheet? The format menu for fonts does not have the case change as an option. I have found this problem in both Excel 4 and 5, and it can arise when different people have input data to a spreadsheet using a different case (upper or lower). To ensure uniform presentation, I find that it is necessary to adjust each cell and that there is no quick method."

John doesn't specify which version of Excel he is currently using, nor whether he wants to end up with all lower case or all capitals, so I'll discuss a couple of approaches.

One solution for versions 4, 5 or 7 is to use the LOWER, UPPER or PROPER functions. They don't reformat text but will redisplay it in another cell in lower case, capitals, or by capitalising the first letter of

each word respectively. All three functions ignore characters which are not letters. An example is often the best way of clarifying usage:

If cell A5 holds the phrase *There are 2 Brown foxes*. In any cell, =LOWER(A5) would display, *there are 2 brown foxes*; =UPPER(A5) would display, *THERE ARE 2 BROWN FOXES*; and =PROPER(A5) would display, *There Are 2 Brown Foxes*.

The only way I know to change the actual text in place (that is, not repeat it in another cell) is to run a macro. But if you're going to do that, you may as well enter the text, initially in a dialogue box. Then it can be translated before it's used. To broaden the interest for other readers, let's say the text to be entered is a special password.

The regular way of protecting an Excel file with a password is via File, Save As, Options. But suppose you have prepared your own application and want to use a password to protect a part of it. If it's for internal company use, you could make it easier to remember the password by letting the staff member enter it in upper or lower case. You could even give them the first letter as a prompt.

As a gateway, the starting point could be to create a button, which can be done automatically from the Drawing toolbar. You can then assign a macro to it. In other words, the user clicks the button and the macro runs. If the macro is written in VBA, you can use two of its standard functions, Lcase and InputBox. See Fig 3 for the listing.

The password I've used is "mchenry", but because the user-defined GetTheWord function incorporates Lcase, it can be

Dear Santa...

Obviously you read PCW or you wouldn't see all these notes in the Hands On section, so look in the Spreadsheets section of our CD-ROM for pressie hints. Click on Excel 97 demo.exe and you'll see how the coming version of Excel can include hyperlinks to import data from web pages and send mail.

Yes, I'd like a beta copy of Office 97. It will have a new, improved Excel as well as updated versions of Word, Access and PowerPoint. It will also include the web authoring and management application, FrontPage (which I've raved about before), and Publisher, the easy-to-use DTP package. In Excel, the AutoCorrect feature (which irritates me but is beloved by many, I'm sure) will be even more intelligent: popping brackets in formulas if you forget them, for instance.

Microsoft's gone internet bonkers, so the latest Office will be supplemented by a wide range of animations, audio files, clip-art, fonts, help files and templates downloadable free from the MSOffice web site.

After a year, I've still never totally mastered Exchange and Schedule+, so I will welcome the new program, Outlook, which will replace both of them. Maybe the new Office Assistant animated wizards will make things clearer for me, too.

In the same section of our CD, have a look also at the files 123p1.pdf and 123p2.pdf, which run under Acrobat. These will remind you that I'm dying to see the new 32-bit Lotus 1-2-3 97. It, too, will feature shortcuts to the internet, as well as automated demonstrations of common tasks, enhanced printing facilities, new autototalling, and an easier way to create dialogue boxes.

The third present is not for me, but the people who write manufacturers' service contracts: a good pocket dictionary. My current PC came with a one-year free Next Business Day Repair Service Warranty, on-site at their discretion. Or, you could buy two- or three-year warranties. When the year was over, I wanted to pay for an annual renewal, but they've since dropped the one- and two-year options. I was told I could only buy a three-year warranty, which, amazingly, starts from date of purchase. So by purchasing that, I lost my first free year. They also have a Lifetime Return to Factory Warranty; but lifetime isn't defined in the way you or I would. And the right is retained to send parts and tell you, over the phone, how to replace them. They are entitled to offer any services they like, but I wish they wouldn't redefine simple words like "three", "lifetime" and "return".

entered as McHenry, or MCHENRY, or any other case combination. The InputBox function takes a number of arguments, but here I've used the first three and let the defaults be used for the remainder. The prompt in the input box asks "What is your password?", and the title of the box is Password. The third argument here is, M. This means that when the box appears,

application", and can continue.

The button and the macro are in the Excel 7 file, Passes.xls, in the Hands On Spreadsheets section of our cover-mounted CD this month.

On the PCW CD-ROM

The *Hands On Spreadsheets* section has a short animated file, Excel 97 demo.exe, which previews the availability of hyperlinks in the forthcoming Excel 97. The files 123p1.pdf and 123p2.pdf are Acrobat files which give some details of the anticipated 32-bit Lotus 1-2-3 97, designed to run under Windows 95 and Windows NT. The Excel 7 file, Passes.xls, has the macro shown on these pages as Fig 3 and a button for running it.

*PCW Contacts

Stephen Wells welcomes comments on spreadsheets, and solutions to be shared, via PCW at the usual address or at Stephen.Wells@msn.com. Files can be attached with MAPI-compliant software. The UAE program, XferPro, works. It can be downloaded from the CompuServe Internet Resource Forum.

Fig 3 Assigning a macro

```
Sub Entering()  
    Dim TheWord As String  
    TheWord = GetTheWord  
    If TheWord = "mchenry" Then  
        MsgBox "Welcome to this application."  
    Else MsgBox "Sorry. Wrong password."  
        ActiveWindow.WindowState = xlMinimized  
    End If  
End Sub  
  
Function GetTheWord()  
    GetTheWord = LCase(InputBox("What is your  
                                password?", "Password", "M"))  
End Function
```

the first letter (here, M as a capital) is displayed at the start of the password entry line.

If the user enters Matthew or MacHenry, or makes some other mistake, they receive the message "Sorry. Wrong Password". When the user clicks the OK button in this message box, the workbook is minimised in this macro to symbolise no entry.

If the correct password is entered, the user sees the greeting, "Welcome to this



Fair and square

The complicated task of allocating work shift and holiday rosters that are fair to all can be eased by using a spreadsheet. Stephen Wells shows how.

Andy Christou works for one of the largest companies in the country. At least, it was until it was denationalised and thousands of people were made redundant. But that's an interpolated comment of mine.

Andy's problem is as follows: "We used to work a normal five-day, 40-hour week. To improve service to our customers it was decided to extend the working day but at no cost. The method chosen was to only work for nine out of the ten business days in a fortnight so that at the end of two weeks each person had still put in only 80 hours. This was christened the 'nine-day fortnight'.

"In order that Mondays and Fridays were shared fairly, we had a 'rolling day off' pattern: if you had a Monday off, your next day off would be two weeks and a day away, i.e. Tuesday. This created another problem because after nine periods of having a day off, you ended up with the Friday of one fortnight being next to the Monday of the next fortnight which was not acceptable to our managers.

"The final method was as follows: if the last day off was a Monday, then the next day off would be Tuesday fortnight,

i.e. 15 days away; if the day off was Tuesday, the next day off would be Wednesday fortnight, i.e. 15 days away; if the day off was Wednesday, the next day off would be Thursday week, i.e. eight days

move the cursor along as appropriate and mark the cell. All the initial days would be entered manually."

I asked Andy to lay out a dummy worksheet to illustrate what he hopes to

WEEK	W/C 30/12/95							W/C 6/1/96							W/C	
Day	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Date	30	31	01	02	03	04	05	06	07	08	09	10	11	12	13	14
DILIP			SDO													
JAY				SDO												
TREVOR					SDO								SDO			
BRIAN						SDO										
FRED							SDO									
JOHN										SDO						
ANDY											SDO					
TONY												SDO				
JIM													SDO			
PAUL														SDO		
PETER			SDO													

Fig 1 The first two weeks (starting 30/12/95) of part of a schedule for employees' special days off

Wrong number

You may recall from an earlier column that a reader emailed me to inquire whether I was the same Stephen Wells who wrote for *New Musical Express*. Now I've received a wedding invitation from someone who's seen my name here. Not that I know the couple... nor do I have a partner called Quiana. What I'm hoping for is third time lucky: it would be very nice if a solicitor were looking for a Stephen Wells who is a major legatee.

away; if the day off was Thursday, the next day off would be Friday fortnight, i.e. 15 days away; and if the day off was Friday, the next would be Monday fortnight, that is 17 days away.

"My problem is, given a starting point of 1st January 1996, how do I implement the above so that a worksheet calculates the next day off due and then marks the relevant cell with 'SDO'?

"I realise that I have to carry out a test to see what the day of the week is and then

achieve. The starting corner of Andy's worksheet is shown in **Fig. 1**.

In the Navy

Another staff-scheduling problem is posed by Malcolm Campbell: "I work at a large Naval establishment where we use lieutenants, sub-lieutenants and warrant officers as duty personnel. I organise a work roster in three month blocks, for out-of-hours managerial duty cover for every day of the week (including weekday

evenings, weekends and national holidays) for 30-35 managers.

"We don't get extra pay or time off for these duties and we have to sleep on site, so you can imagine how unpopular this duty is! I come up against the human factor: people are away travelling; some people wish to do extra WDs (work days) to get WEs (weekends) off; others can't do particular days due to outside commitments; some are away travelling so much in previous periods that they are granted a reduced number of duties this period, and so on.

"In an effort to be fair to all, I try to spread the load, i.e. give everyone the same number of WDs and WEs. This is fantastically difficult and I revert to graph paper, eraser and pencil. It would seem logical to assign a weighting to each type of day, say two for a WD, three for a Friday and four for a WE or national holiday. Ideally, the spreadsheet would work out an average score and then try many permutations to get everyone's score as close as possible to each other (for the ones on full duties only)."

I asked Malcolm to supply a dummy worksheet and he provided Fig 2. Both

Microsoft Excel - ooorst5.xls															
	A	B	C	D	E	F	G	H	I	J	K	L	M		
1															
2	SURNAME	RANK	TITLE			Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon		
3					Total	26-Aug	27-Aug	28-Aug	29-Aug	30-Aug	31-Aug	1-Sep	2-Sep		
4				(Daily Total ->)		2	2	2	2	3	4	4	2		
5	COAKER	SLT	ASEC	No relief WD	8										
6	MOODY	LT	EW04	WD Only	10										
7	TARRY	WO	RT0(AWT)	WD Only	10										
8	WILMOT	WO	TACLINK	WD Only	10										
9	BACON	WO	EQC0		8			2							
10	BOULTON	WO	WG2		6										
11	BYWATER	LT	FTR(CBT)		7					3					
12	ARNOLD	LT	SOPCR		6										
13	CAMPBELL	LT	IS02		6										
14	ALLEN	WO	COOK1		7	2									
15	CORRIGAN	WO	FDD AW		8					4					
16	DAGENS	WO	EW011		7										
17	DAVIES	WO	SSCS0		7										
18	EVANS	LT	CC0		7										
19	FLETCHER	LT	FT0(X)		6										
20	HALL	WO	EW011		6										
21	HAWKES	LT	PTRO		8										
22	HILL	LT	MW2DG												
23	HITCHCOCK	WO	TS(TD)		8										
24	HOOD	WO	RTUW1		7										
25	HORROCKS	WO	CHAM1		7										

Fig 2 The start of a holiday schedule for Navy managers. It's based on many ifs, ands, and buts

Andy and Malcolm are in very different situations but from a spreadsheet point-of-view, their problems have a common thread. What they're both trying to do is prepare a holiday schedule with many variables and a number of constraints.

We know what's best

Malcolm had posted his problem to several newsgroups and a chap called Euan in New Zealand said that such preferred assignment schedule riddles are technically known as linear optimising problems. He raved about an Excel add-in called What'sBest! — I love these worldwide conversations, and to think I remember the time when you had to make a booking to talk to relatives overseas at busy times!

What'sBest! (Fig 3) is a well-established product which I hadn't used it before so I tracked down the US publisher and UK distributor and was sent the professional version of What'sBest! Release 2.1. This release supports Excel 3, 4, and 5 (and Lotus 1-2-3 Release 4 and 5) running in Windows 3.x, Windows 95, or Windows NT. Excel 7 is supported only on Windows 95. The product is also available for Quatro Pro and Symphony.

Delivered on two 3.5in disks, What'sBest! is easy to install and use. There is an excellent, well-indexed 256-page manual with a good tutorial. There are lots of sample worksheets covering everything from bond portfolio optimisation to hogfeed mixes and truck loading. There are three staff-scheduling templates included.

This spreadsheet add-in can solve both linear and non-linear optimisation problems and can be restricted to whole units so you don't schedule 3.29 persons or 4.9 days.

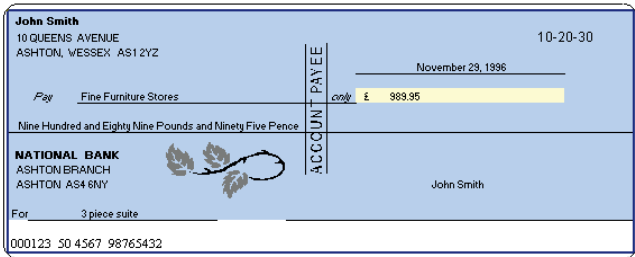
You start in the way I always recommend: set up a worksheet with the answers missing, then go through the three steps called ABCs. A is for Adjustable Cells, B stands for Best, and C is for Constraints. The Adjustable Cells are those where you would enter your guesses if you were trying to solve your problem manually. In some industries they are called decision variables. These are the cells with which What'sBest! can play about, to come up with the solution. The Best is the goal of your solution. It might be to maximise or minimise an adjustable cell. No Best is needed when goal-seeking.

The Constraints are the limitations. A Constraint might be: that the number of employees scheduled for each day must be at least equal to the staffing needs for that day; or that preference for days off is ranked by seniority; or that nobody can work more than five consecutive days.

The number of variables and constraints which What'sBest! can handle depends on the version. The bottom-of-the-line personal version can handle 400 variables and 200 constraints. It needs only 640K of memory under DOS, or 4Mb under Windows. The middle-level professional version copes with 4,000 variables, and 2,000 constraints and needs 8Mb of memory under Windows. The high-end extended version copes with 32,000 variables and 16,000 constraints and

On the CD

This month, in the Hands On Spreadsheets section of our cover-mounted CD, there is a worksheet template for printing cheques. The clever stuff in it, which automatically writes the amount in words after you've entered it in figures, was written by veteran contributor Shane Devenshire of Walnut Creek, California. I had to anglicise much of his design for the cheque, though. Although I lived in the US for many years, I'd forgotten how much their banking



conventions differ. They don't just spell cheque differently and use dollar signs, the wording and reference number arrangements are not the same. It is easy to substitute your own personal and bank details in this template, so you can print custom-designed cheques. I've provided the file in two formats: CHEQUE.xls and CHEQUE.wk4. The 1-2-3 file doesn't have the drawing objects which are in the Excel version but all the formulas work.

needs 32Mb of memory under Windows. What'sBest! writes it's own formulas but you can program it and write your own if you prefer. You can also use macros written in Excel 4 or 1-2-3-macro languages or Visual Basic to execute any of its commands. Simple folk like me can start by selecting one of the sample files and modifying it to fit. What'sBest! can also be used by experienced programmers to build a fancy application.

■ If you would like to suggest alternative ways of solving Andy's or Malcolm's problem, do let me know. An elegant solution (emailed as an attached file or sent on a disk) that works straight away for me, could win you a book token.

Shortcuts follow-up

In the EXCELent Shortcuts section of my September issue column, I mentioned that the F4 key will change a cell reference from relative to absolute. But reader Chris Vivian expands on this by pointing out that F4 actually toggles and will cycle through

relative column and absolute row, absolute column and relative row, and so on.

Chris additionally reminds us that you can check how Excel utilises all the function keys by choosing Help, Topics, Index and then entering Shortcut. Then choose built-in keyboard shortcuts. This offers eight categories of shortcuts.

The last option is Function Keys. This not only shows what the function keys do by themselves, but also in combination with the Shift, Ctrl, Ctrl+Shift and Alt+Shift keys. For example, F1 is Help but Alt+Shift+F1 inserts a new worksheet. F3, F6 and F12 each offer four different functions if you can remember the combinations.


Also in the September issue, I described how to make a pick list in Excel 7. One reader, Kelvin Syrett, asked how he could construct one in Excel 4, so I drew his attention to the Dialogue Editor which comes as an accessory with Excel 4. A list box is one of the many features you can create with this editor. To find out how it is done, see Chapter 8 of Book 2 of the Excel 4 User's Guide.

What'sBest! Solver Status

1

2

3



What'sBest! 2.1

Professional / PC

Copyright (C) 1996

LINDO Systems, Inc.

Model Type:

State: Indeterminate

Tries: 0

Infeasibility: 0

Objective: 0

Best Integer: N/A

Theoretical: N/A

Elapsed Runtime (hh:mm:ss)

00:00:01

Classification Statistics

Category	Current	Max
Numeric	374	16000
Memory	334	4096
Optimizable:	0	4000
Formulas:	0	2000
Integers:	0	
Nonlinear:	0	
Coefficients:	0	
Instructions:	492	

Classifying Variables

HELP

Interrupt Solver

Fig 3 What's Best! offers this continually updated report of what's going on while it calculates

EXCELent shortcuts and longshots

1. UNDERCOVER To hide data in cells, select the cells. Choose Format, Cells, Number. In the Category box, click Custom. In the Type box, enter three semicolons (;;). The data contained in the cells will appear in the formula bar, or in a cell if you press F2 and edit within the cell. The data in the cell will not be printed.
2. GETTING A DATE To find a date in a range of dates that's closest to a specified date, you can use this formula:

```
{=IF (ISNA (VLOOKUP (Date - MIN (ABS (Table - Date)) , Table , 1 , 0)) , VLOOKUP (Date + MIN (ABS (Table - Date)) , Table , 1 , 0)) , VLOOKUP (Date - MIN (ABS (Table - Date)) , Table , 1 , 0)) }
```

It assumes that the range of dates has been named Table and the cell containing the specified date is named Date. The curly brackets are not entered. This is an array formula and the brackets will appear when you press Ctrl+Shift+Enter.

3. WHO'S THERE? It is easy to compare two columns of text and find matches and mismatches. Say you have a list of names in the range, A9 to A14, and another in C9 to C14. In cell D9 put:

```
{=IF (OR (A9=$C$9:$C$14) , A9 , "" ) }
```

Again, this is entered as an array formula. Then copy this formula down to D14. Column D will then show any names which appear both in columns A and C. In cell E9 enter another array formula:

```
{=IF (AND (A9<>$C$9:$C$14) , A9 , "" ) }
```

Copy this down to E14. Column E will then display any names in column A which are not in column C. Finally, in F9 the array formula is:

```
{=IF (AND (C9<>$A$9:$A$14) , C9 , "" ) }
```

Copy this down to F14. Column F will then display any names which appear in column C but not in column A.

(Tips 2 and 3 are courtesy of Shane Devenshire.)

PCW Contacts

Stephen Wells welcomes comments on spreadsheets, and solutions to be shared, via PCW at the usual address or Stephen_Wells@msn.com. Excel files can be attached with MAPI-compliant software.

What's Best! from Eastern Software 01206 44456; www.ip7.co.uk/eastern; email eastern@cix.compulink.co.uk (Personal version £295, professional version £995, extended version £3,995 (all prices exclude postage and VAT).



Two sheets to the wind

Hello sailor! Our very own old seadog, Stephen Wells, navigates the choppy waters of a reader's sailing handicaps. That old pension problem welcomed him back to dry land.

It is a pet theory of mine that 12-year-olds are more at home with computers than 42-year-olds because they like simple answers: yes and no, right and wrong, black and white. I often find that spreadsheeters write VBA macros when a spreadsheet's functions will do the job faster, or struggle with functions when the problem can be solved by formatting.

Take weekend sailor Michael Samuelson of the Isle of Wight. Seldom known to get his sheets in a twist when tacking across to Cherbourg, Excel 4 gave him mal de mer when he tried to calculate sailing handicaps.

I've dressed up his worksheet a bit using Excel 7 (Fig 1), but it illustrates his problem and the solution. What he wants to do is subtract a Start Time from a Finish Time and get an Elapsed Time. And then multiply that by a Time Correction Factor and produce a Corrected Time.

Mike was trying to separately multiply the hours, minutes and seconds and getting nowhere. Let go of the tiller and trust Excel, I said, when I tracked him down at his sailing club. Just format every column that has Time in the heading in a time format, and format the correction factor column in a number format. Then make a simple



Fair set the wind for Excel, which sailed the calm waters of Elapsed Time and Corrected Time

subtraction for the Elapsed Time and a multiplication for the Corrected Time. In Fig 1, the formats and entries are spelled out in rows eight and nine. Another happy buoy.

That pension problem

In the August column I reported the long, complicated IF statement formulas that pensions consultant Richard Jones is using in Excel 5 to define the number of years and calendar months between two dates. The complicating factor is that his company only wishes complete months to be counted. I asked readers for more simple solutions and received many responses. I checked all of those which were actually shorter, and not wrapped in pages of explanatory notes. If a solution produced the same answers as Richard, I deemed it successful. The example periods and Richard's answers are

Fig 2 The test start and end dates, and the required answers to the pension periods problem

	A	B	C	D
1	START DATE	END DATE	YEARS	MONTHS
2	1-Mar-82	20-May-96	14	2
3	1-Sep-23	1-Jan-97	73	4
4	6-Jan-35	13-Apr-96	61	3
5	30-Sep-46	7-Jan-96	49	3
6	1-Sep-49	1-Jul-99	49	10

shown in Fig 2.

The neatest and most simple solution came from Paul Carter, headteacher of Frithville Primary School, Boston, Lincolnshire. He easily earns a book-token prize (which he's giving to his school) because his formulas were easy to enter and worked first time, and his email of explanation was so brief I can quote it in its entirety: "I use these formulae to calculate chronological ages for comparing test results for the children I teach. The first gives whole years and the second gives

completed months."

```
@INT (@DATEDIF ((A2), (B2), "m") / 12)
@MOD (@DATEDIF ((A2), (B2), "m"), 12)
```

Ironically, this doesn't help Richard Jones, who uses Excel 5. I can't find any equivalent to the @DATEDIF function in Excel.

As I obviously couldn't specify that Excel had to be used, and many other contestants apart from Mr Carter provided Lotus 1-2-3 solutions, I'm going to call that the 1-2-3 prize and award a second book token to the best of the many Excel solutions.

That came from Bill Bridge. Whether he

knew it or not, he created an Excel function that replaces the @DATEDIF function.

Note how similar the formulas used in the years and months cells are to Mr Carter's:

```
=INT (elapsedMonths (StartDate,
EndDate) / 12)
=MOD (elapsedMonths (StartDate,
EndDate), 12)
```

The block of cells used for entering Start Dates are named StartDate. The block of cells used for entering End Dates are named EndDate. The formatting for the years and months columns is just General.

The listing for the created function is shown in Fig 3. I know what I said at the beginning about VBA macros, but they have their place and this is one of them.

Bill created the module in Excel 5 under Windows 3.11 but he sent it as part of a workbook file attached to his email, and it opened for me with Excel 7 under Windows 95. I am most grateful to all the readers who sent in other solutions and ask you not to be discouraged — all your contributions are appreciated.

Just a dummy

Here's a neat trick for adding totals to a stacked column chart in Excel as in Fig 4.

Add a totalling row to your data table, Fig 5. Select this complete block, including labels and totals. Then choose Insert, Chart, As New Sheet. In Step 2 of the displayed Chart Wizard select Column, then Type 3. Accept the defaults in Step 4 and add a title in Step 5.

Right click on the top data series. Choose Format Data Series, Data Labels, Show Value. Your totals will appear, but your columns are twice the height they should be. Choose Patterns, Border, None, and Area None. This will conceal the extra dummy data series.

Right click on the Y-axis, choose Format Axis, Scale and pick appropriate Maximum, Major and Minor unit values (instead of the default, Auto). If your new totals disappear, choose View, Sized with Window. They'll reappear above the chart title. Drag them down into position.

Finally, format the placement of the legend, if you wish, and add a clarifying subtitle. Make any improvements you like to the width, colour or pattern of the columns by selecting Format Data Series on the shortcut menu.

I've used Excel 7 here, but with slightly different menu options, you can accomplish this in versions 4 and 5 too. Once you're

p272 ➤

Microsoft Excel - Sailing.xls

	A	B	C	D	E	F	G
1							
2							
3		Boat Name	Start Time	Finish Time	Elapsed Time	Correction Factor	Corrected Time
4							
5		Flyspray	14:10:10	16:13:14	2:03:04	1.046	2:08:44
6							
7							
8							
9							

Fig 1 If you get the formatting right, Excel will calculate elapsed periods of time and correct them with factors

```
Function elapsedMonths(fromDate As Date, toDate As Date)
Do While toDate >= DateSerial
(Year(fromDate), Month(fromDate) + elapsedMonths, Day(fromDate))
elapsedMonths = elapsedMonths + 1 Loop
elapsedMonths = elapsedMonths - 1End Function
```

Fig 3 The VBA module listing to create the elapsedMonths function used for calculating periods

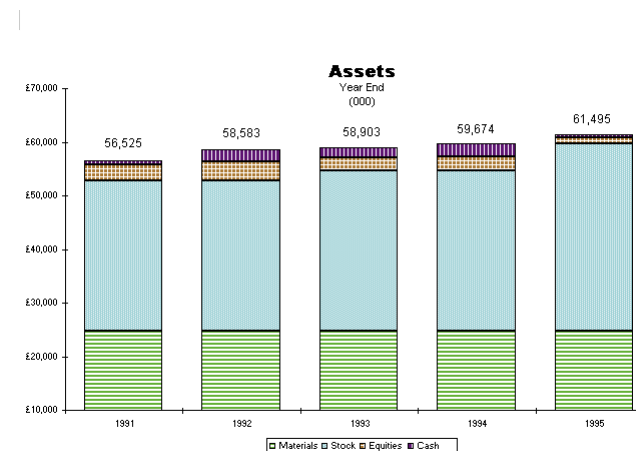


Fig 4 You can add totals to the top of stacked columns of data by creating a dummy series

	1991	1992	1993	1994	1995
Materials	24,750	24,750	24,750	24,750	24,750
Stock	28,000	28,000	30,000	30,000	35,000
Equities	3,022	3,558	2,306	2,524	1,006
Cash	753	2,275	1,847	2,401	739
	56,525	58,583	58,903	59,674	61,495

Fig 5 The data used to create the chart in Fig 4. Totals have been added to each column

familiar with the method, you can produce the result in less than a minute.

Accounting for inflation

I recently had to create a small database of household valuables for insurance purposes. This takes a certain amount of guesstimating for current value, but a small spreadsheet helped (Fig 6).

I've added notes to show the formulas and formatting used in Column B. The average rate of applicable inflation varies by type of item. The formula in cell B10 will work with depreciation as well as inflation, so you can enter a negative inflation rate in B4. You need this with computer hardware! Subject to judgement and advice you might use three percent inflation for some classes of books and furniture. This worksheet doesn't substitute for expertise: it just saves a lot of individual entries on a calculator.

Excel offers functions for calculating depreciation. DDB returns the depreciation of an asset for a specified period using the double-declining balance method. You can calculate the straight-line depreciation of an asset for one period with SLN. SYD uses the sum-of-years' digits method.

Lotus 1-2-3 offers these three functions plus DB which uses the fixed-declining balance method of calculating depreciation. But I've spent my money so wisely that, apart from PCs and printers, clothes and lawnmowers, everything I've bought has gone up in value not down.

Growth of investments

Suppose you are offered a choice of investments. They might be in property or savings accounts. You know how much you have to invest, and how much you expect to receive from each investment at the end of differing periods. What you need is a consistent method of estimating your return. In some industries this is called the average growth rate. In others, it's the annual yield rate or the average rate of return.

The variables can be defined as FV for future value, PV for present value, N for the number of investment periods (meaning the number of times the yield is added to the capital and compounded, or carried forward) and P for periods (or how many Ns

EXCELlent shortcuts and longshots

DISPLAYING MULTIPLE SHEETS To view more than one sheet of your workbook at a time, click the tab of the first sheet to view, choose Window, New Window. Then Window, Arrange. Select Tiled, and check the Windows Of Active Workbook option; OK. The title bars will show the name of your workbook and a number, based on the number of open windows. If tabs were visible before, they will still be visible, so you can change sheets in each window.

FINDING FILES Excel 7, like all Windows 95 applications, offers sophisticated search facilities. Say you know you have a file called Expenses 95 somewhere but can't find it. Choose File, Open, Advanced. Delete the default search criteria. In the Look-in box choose C: D: or A:. In the Property box choose File name. In the Condition box choose Includes. In the Value box enter Expenses. Check the Search subfolders box. All files with Expenses in the name will now be listed. You could also narrow the search by a date or choose from many other search options.

A	B	ENTER	FORMAT
2 Purchase Price		£72.50	Currency
3 Purchase Date		22/6/65	d/m/yy
4 Ave. inflation per yr. (%)		3	Number
	FORMULA		RESULT
6 Today	=TODAY()	2/10/96	d/m/yy
7 Purchase Year	=C3	1965	yyyy
8 This Year	=C6	1996	yyyy
9 Years Old	=YEAR(C8)-YEAR(C7)	31	Number
10 Value Price	=C2*(1+C4/100)^C9	£181.26	Currency

Fig 6 A simple worksheet for calculating present estimated values for insurance coverage

there are in a year).

To clarify that, I'll give some examples. If you invested £1,000, stood to collect £10,000 after 10 years, and the investment was compounded annually, then

FV=£10,000; PV=£1,000; N=10; and P=1

If you invested £1,000, were promised £5,000 after 5 years, and the investment was compounded monthly, then

FV=£5,000; PV=£2,000; N=60; and P=12

Leaving aside factors like risk or patience, which would be the most rewarding investment? Well, the first example would need an annual yield rate of 25.89 percent, and the second 20.11 percent.

The formula is $=((FV/PV)^(1/N))^P-1$. If you might use it a lot, it's easy to create a function. In Excel 7, just right-click on a tab in your workbook and choose Insert, Module. Enter the brief listing in Fig 7.

When you need it in your worksheet, put an equals sign in the selected cell (which has been formatted as percentage), click

the fx button, and the Function Wizard will offer you the new function under the User Defined category.

You can call the new function anything you wish, but don't call it GROWTH like I did. I couldn't understand why the formula worked but the function didn't. I emailed Michael Rickard, a friendly occasional VBA adviser, who pointed out that Excel already has a GROWTH function (for fitting exponential curves). Microsoft should include a trap so that Excel tells you when you've picked the name of an existing function.

Covering myself

Back issues of this column are now included on the cover CD. Starting this month, worksheets which include macros and formulas are there too. Under Resources, look for the Excel 7 files: Sailing.xls, Periods.xls, Assets.xls, Inflation.xls, Growth.xls; and the Lotus 1-2-3 file, Periods in 1-2-3 V5.WK4.

Function AYR(FV, PV, N, P AsInteger)

AYR = ((FV / PV) ^ (1 / N)) ^ P - 1 **End Function**

Fig 7 The VBA module listing to create the AYR (Annual Yield Rate) function used for comparing investments

PCW Contacts

Stephen Wells welcomes comments on spreadsheets and solutions to be shared, via PCW Editorial at the usual address or at **Stephen_Wells@msn.com**.

Files can be attached if you're on MSN or Demon.



Two web feats

Look what the web has turned up — another add-in, Internet Assistant Wizard, which converts Excel worksheets into web pages. Stephen Wells strides out.

I mentioned four add-ins last month which are compatible with Excel 5 and 7, and which you can download with a mouse-click from www.microsoft.com/msexcel/fs_x1.htm

I concentrated on the Lookup Wizard, recounted my dilemma with it, and gave the formula that you can use instead.

Another of the four add-ins is the Internet Assistant Wizard which converts an Excel worksheet into a web page. I'll tell you how it's supposed to work, the problems I had, and give you an alternative solution.

There was a time when people just used their copper line connection to the world for a telephone. A postal strike some years ago spurred the growth of home fax machines. Then came the eagerness for email. Now it seems that everybody is preparing their own web page.

You might ask why anyone in this country would display a photo of their caravan for sale, or news of their hiking club, to people in Pakistan, Poland and Peru? But that's what media types would call "throw-away circulation". With services like CompuServe's Our World, it can be so inexpensive to have a personal web page that it doesn't matter that you reach millions of extra people who don't share your interests.

The Our World Home Page Project is included in CompuServe membership although you are limited to 1Mb of disk space when uploading your web pages, but there is no additional cost involved to publish and maintain them. Additional space can be leased.

The basic language of the web is HTML (HyperText Markup Language) and if you

have the patience, there is no reason why you shouldn't use it if you want to. You can precede a line of text with and end it with and it appears in bold. The slash mark signifies the end of any formatting, so <i> and </i> start and end an italicised word or phrase.

Just as Windows started as a shell over DOS, rather than the programming language it is today, so HTML editors now make it possible to create a web page without writing any of this code. The old battles are being fought again. The experienced web page designers say the editors are for newbies, while the latest editors permit special effects which are hard

to create from scratch in standard code.

The Internet Assistant Wizard for Excel is installed just like any other add-in. This one downloads to the desktop. Then you just choose Tools, Add-Ins, Browse and select this new .XLA file. After that, the name Internet Assistant Wizard appears at the bottom of the Tools menu.

My worksheet (Fig 1) shows a menu for a fictional café. There is an embedded Word Picture logo then several headings and entrées, formatted in various sizes and colours. No worksheet gridlines or row and column headings are displayed. To use the Wizard, you select the required range of your worksheet then start the new add-in. It has five steps.

Step One simply confirms the selected range and gives you the opportunity to change it. Step Two offers you the choice of creating a complete web page or copying just a table into an existing HTML template.

If the first option is taken, Step Three will ask you to enter header and footer information such as a title and description text, the update date, your name and email address (if you want them on the page). If the second option is taken in Step Two, enter the path and filename of the template you wish to amend with the new data. Step Four lets you convert the table with or without formatting. Step Five is for entering the name of the new file to save to.

The first thing I found was that the Wizard ignored my graphic — maybe it's only meant to be used for text? The bigger

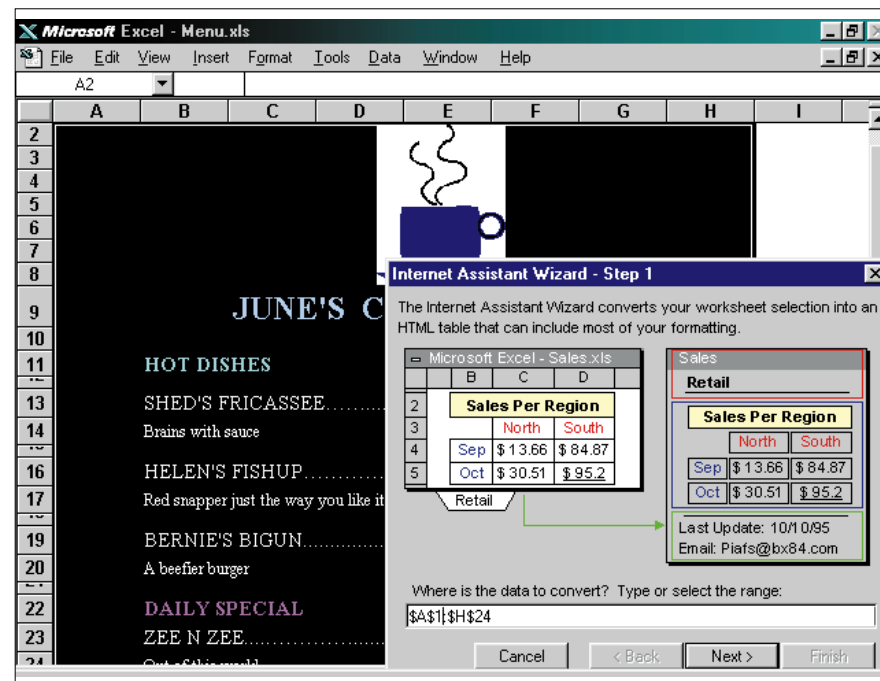


Fig 1 The Internet Assistant Wizard is intended to translate an Excel worksheet into an HTML document

problem was that the web page had visible web page cells in odd-sized columns and the Wizard stacked the main heading in three rows. While Excel will run a heading into adjacent blank cells, this Wizard doesn't appear to.

The kindest thing to say is that the Wizard is insufficiently intuitive and can only cope with simpler worksheets than the one I used. Or that it takes more training time than I allowed for. It may be unfair to compare this simple little Wizard with a serious piece of kit, but then I tried the Microsoft FrontPage Editor. At the time of writing, a free trial copy was also downloadable. Well, free after the hour of download time, that is.

FrontPage really is intuitive. I didn't read any of its help files or anything else of an instructional nature. I just minimised my Excel worksheet and FrontPage onto the Windows 95 Taskbar and switched between them.

I successfully transferred everything on the worksheet by copying and pasting (Fig 2). The graphic was no problem. FrontPage recognises all the most common graphic file types and converts them to 8-bit GIF (Graphic Image File) or 24-bit JPEG (Joint Photographic Experts Group), which are the formats acceptable for servers and browsers at present.

I could rave on about FrontPage for the rest of this column, but I must get into my second web subject this month.

Fair shares

Several readers have asked me about downloading stock price information into spreadsheets. Spreadsheets are the primary software tool for recording results of personal portfolios and can help with one aspect of stock analysis. Although many traders lean towards fundamental research, like new products, management, or acquisitions when evaluating companies, others put great store in technical data. This depends on the availability of historical pricing and sales volumes as well as access to realtime stockmarket prices.

One of the first companies to offer this information, plus individual trading in UK shares through an authorised broker over the internet, is Electronic Share Information (ESI). Its URL is <http://www.esi.co.uk>

I have found Debbie Reay (in ESI's technical support department) to be most efficient and genuinely helpful, responding to emails with alacrity. After registering,

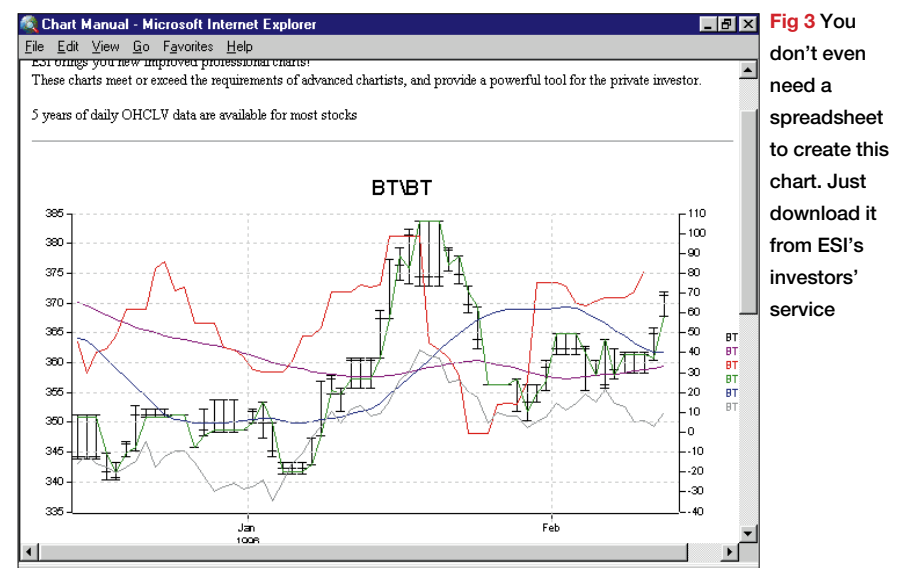
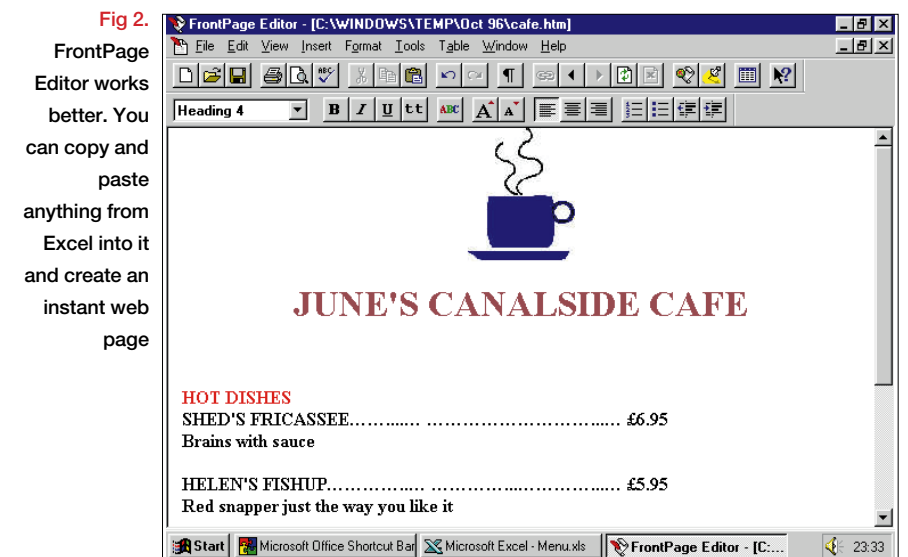


Fig 3 You don't even need a spreadsheet to create this chart. Just download it from ESI's investors' service

which is free for some basic services and inexpensive for others, you can download data in a choice of formats, including CSV, and then load this straight into an Excel worksheet. You can see a lot of information already in chart form (Fig 3), and this can save a lot of time.

For unit and investment trust information, as well as PEPs and offshore funds, try the Interactive Investor at <http://www.iii.co.uk>

For no charge, you can view its Micropal fund league tables which show the top performing funds over one, three and five years.

If you are interested in currency information, the ECU Group is at <http://www.bogo.co.uk/ecu/ecu/8charts.htm>

ECU offers data on short term interest rates, the bond markets and global stock market prices from Investment Data Service. The data is not currently importable

to a spreadsheet but the pages are worth viewing because they are so beautifully designed.

A prime source for fundamental information is the *Financial Times*. Following (free) registration, you can look at that paper's main daily business news stories at <http://www.ft.com>

A comprehensive personal finance site is MoneyWeb, run by Ian Dickson at <http://www.demon.co.uk/moneyweb>

Ian also takes the time to answer individual questions on his specialist subject — you meet the nicest people on the internet!

I'd like to hear from more readers about their experiences of downloading information of any kind into spreadsheets, and also about using spreadsheets to help with investments.

It's a mystery

A reader says he saves his Excel workbook

files to his hard disk during the day, then, come the hush of eventide, he tries to save to a floppy and there is no sign of yesterday's version of the files. If he saves the files anyway, and later, with Explorer, looks at the files, he finds they have been updated properly.

A little investigation reveals that, out of habit from using earlier versions, he calls his files NAME.XLW. There was a time when worksheet files used the .XLS extension and workbooks were .XLW. These days there are only two workbook types, the .XLS and .XLA (a fully-compiled add-in). You can call a normal workbook whatever you like and Excel will save it and load it in that name, but it treats it as it would an .XLS file. A worksheet file is now a workbook with one sheet in it.

If you choose File, Save As, the default type is "Microsoft Excel Workbook (*.XLS)." Any file called NAME.XLW in the selected directory or disk doesn't appear in the Name column above. But you can save your file with that name.

I suggested to this reader that either he uses the .XLS extension or none at all, from now on.

Calculated criteria

Shane Devenshire, of California, has been kind enough to send me another stack of helpful spreadsheet hints, so I'll pass on a couple here. The first is a group of formulas which you can apply when using Excel as a database.

Excel's criteria ranges are not case sensitive. If your criteria cell contains Melissa, it would report melissa, Mellssa or Melissa Jane as true when it should return false. If your criteria cell is B2, the following calculated criteria will solve the problem:

```
=EXACT(B2,"Melissa")
```

If you want to check that your criteria cell entry begins with a capital letter use:

```
=AND(CODE(LEFT(B2,1))>64,CODE(LEFT(B2,1))<91)
```

That formula checks to see whether all the characters are in the ASCII code range 65 to 90, which represent the capital letters A to Z.

Similarly, the following formula will see if the first letter is lower case.

```
=AND(CODE(LEFT(B2,1))>96,CODE(LEFT(B2,1))<123)
```

If you want to see if it's true or false that the first letter in your criteria cell agrees with the same letter in another cell, you could use the following formula:

```
=EXACT(LEFT(B2,1),B$3)
```

EXCELlent shortcuts and longshots

■ What's happening?

With Excel 7, choose Help, About Microsoft Excel, System Info.

This opens a special file, MS System Info Version 2.0, which tells you everything you could wish to know about your system right now, including physical and disk memory available, swap-file size, and your temporary directory.

Other categories give the details of available printers and their drivers; system DLLs (dynamic link libraries); available fonts; dictionaries; graphic filter settings (which applications are associated with every file extension); text converters (associated extensions again); and lists all applications running.

■ Copycat

Any changes made to Page Setup for one worksheet in a workbook can easily be applied to another. It might be the margins, headers, or orientation (portrait

versus landscape).

Select the settings you want on one sheet, click the tab of another sheet and press F4. You can make the same changes to several worksheets by holding down the Ctrl key as you click on the appropriate worksheet tabs.

■ More data series?

To create a chart that has more data series than categories in Excel 5 or 7, select the cells that contain the data and labels to plot.

Choose Insert, Chart, As New Sheet. The Chart Wizard dialogue box appears. Click Next until Step Four appears.

Under Data Series In, click Rows. In the Use First Row(s) For Category (X) Axis Labels box, accept the default of 1, or insert it.

Under Use First Column(s) for Legend Text also insert 1. Click Finish for Step Four, then Finish for Step Five.

The initial letter to check for is in cell B3.

You could even check to see whether a name has a capital P as the third letter, as in McPherson. Put a P in cell B3 and this is the formula:

```
=EXACT(MID(B2,3,1),B$3)
```

New sheets

The basic way to add a new worksheet in Excel is to choose Insert, Worksheet. You can also right-click a sheet tab and be offered the same choice.

Shane reminds us that you can also press Shift+F11 or add the Insert Worksheet button to one of your toolbars. Each of these methods only adds one worksheet, so he has written a VBA subroutine which displays an Input Box so that you can create a dozen or more in one go.

Just choose Input, Macro, Module and then enter the listing below. It will automatically be added to the Tools, Macro menu. From there you can choose Options

and then specify a shortcut key if you wish. The error message runs if you press Cancel in the Input Box instead of OK.

Personally, I use a couple of other methods. Say you have six sheets. Hold down Shift and then click the far left and right sheet tabs. Then right-click, choose Insert, and six new sheets will be added.

My other method of doing this, if I know that I want to have a lot of worksheets when I start a new workbook, is to choose Tools, Options, General Sheets in New Workbook, then twiddle the arrows to the number I want. As every sheet adds memory, the normal default I maintain here is one worksheet.

•PCW Contacts

Stephen Wells welcomes comments on spreadsheets and solutions to be shared, via PCW Editorial at the usual address or at Stephen_Wells@msn.com. Files can be attached if you're on MSN or Demon.

```
Sub NewSheets()
```

```
On Error GoTo ErrorMessage
```

```
Answer = InputBox("How many sheets do you want?")
```

```
If Answer = "" Then Exit Sub
```

```
ActiveWorkbook.Sheets.Add Count:=Answer
```

```
Exit Sub
```

```
ErrorMessage: MsgBox "You must enter a number"
```

```
End Sub
```




Name dropping

Stephen Wells creates a drop-down list of names for automatic addressing, and looks at Add-Ins for Excel.

Following all the exotic applications for spreadsheets described by readers this year, it's refreshing to receive a request for a bread and butter requirement.

Andy French emails: "I have been asked by a friend to create an invoice spreadsheet. He would like a drop-down list containing his customers' names so that he can click on a name and the address will be automatically entered. Additionally, he would like to be able to enter addresses manually, so I have also created an invoice list for him which stores the invoice details, but I would like to delete entries of a certain age and move the remaining entries up to fill the empty cells."

Right, then. Let us begin with the data list. Whether this is off to one side of the invoice on a separate worksheet, stored in another file, or even in another application such as Access, the principle remains the same.

For this example we will enter the company name, address, town, county, postcode, and phone number in columns A through to F respectively from Sheet 1, which we'll rename; Customers.

- The first seven customers will be on rows 7 through to 13 — mark this whole range, plus a row,

`A7:F14`

and name it Customerlist.

- Insert the appropriate labels (Name, Address, etc.) in cells A6 to F6.

- Also mark the range

`A7:A14`

and name it Company. These are the

presently listed company names, plus a row.

- Now rename Sheet 2; Invoice. Name the cell L1 on that; Current.

- Refer to Fig 1 and insert

`=Customers!A6` in cell B4,

`=Customers!B6` in cell B5

and so on.

The top of the invoice itself you lay out to match your other stationery. In Fig 1 I've added a few arbitrary borders and colour patterns to show an example. In use, you would hide the row and column headers but they are shown here for explanatory purposes.

To create the pick list, first right-click on the Standard Toolbar and left-click on Forms, to display the Forms Toolbar. I'm using Excel 7 but there is nothing here which can't be recreated in Excel 4 or 5. Click the Drop-Down button on the Toolbar and drag a rectangle on your worksheet in an area like F3 to H4 (it's not

critical because you can resize the box and move it later).

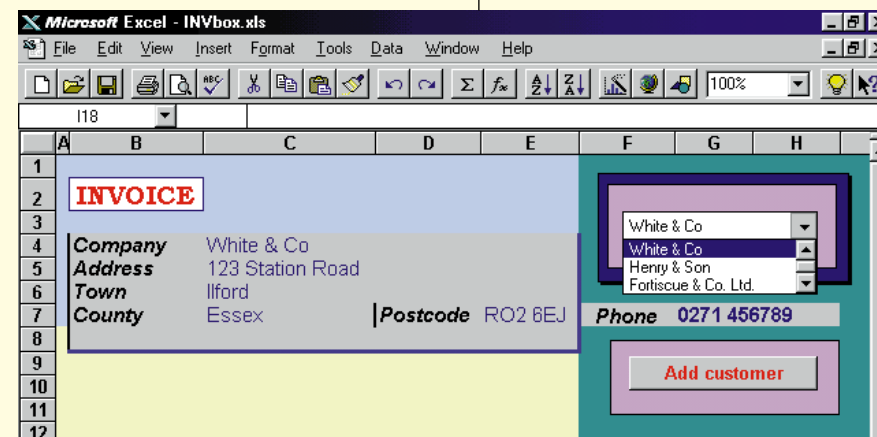
You now have an empty box with an arrow. Right-click on the box and choose, Format Object, Control, Input Range and enter Company. In the box below, labelled Cell Link, enter Current; and next to Drop Down Lines initially enter 3. This means when you click on the name in the box, or the arrow, three names will drop down and appear, as shown in Fig 1.

At this point, you now have the drop down list of customer names. The two colour panels behind it are simply Filled Rectangles produced with a click of the right button on the Drawing Toolbar.

The next job is to automatically make the correct address details appear once a name has been selected. My philosophy is never to write macro code when Excel formulas and functions will do the job. They'll always run faster than Visual Basic, anyway. Here, we can do the job with one simple function. No, not the universally loved LOOKUP, but INDEX.

In its basic reference form (there's also an array form but we don't need that here) INDEX has three essential parameters: the reference, a row number and a column number. A fourth, optional parameter is called area but, again, we don't need it here. The way in which we're using the function here is that we're saying the

Fig 1 On an invoice, it's easy to add a Drop-Down text box for selecting existing customers



reference is the range covered by the name, Customerlist. The row number is dictated by cell L1 (see above) which we've named Current because it names the number of the current customer. The column number on the Customers worksheet is 1 if we want the company name, 2 for the address, 3 for the town, and so on up to 6 for the phone number.

Right, now we're in business. To put the selected customer's company name in cell C4 we enter

`=INDEX(Customerlist,Current,1)`

In use, this cell simply repeats in the printing area whatever customer name is showing over in the Drop-Down box. You don't have to enter anything in cell L1. The DropDown Object will automatically put in it the number of the selected company. So if you pick the first name in the list, L1 will display 1. If you pick the sixth name in the list, L1 will show 6.

To put the address in cell C5 we enter

`=INDEX(Customerlist,Current,2)`

The town goes in C6 using

`=INDEX(Customerlist,current,3)`

and so on to

`=INDEX(Customerlist,Current,6)`

which puts the phone number in G7.

Once everything's working well, this worksheet can be saved as a template because this is an ordinary worksheet and no macros are involved.

If the user wants to enter an address manually, as per Andy's second request, he can simply click the Address tab, insert a row and type the details in: or choose Data, Form and a ready-labelled dialogue box would be created automatically, (Fig 2). It displays the same labels as in the headings row 6.

You could also add a button like the one labelled "Add customer" in Fig 1. It can be created automatically from the Forms Toolbar as easily as the DropDown box. If this button starts a macro with the line Worksheets(1) ShowDataForm in it, it would do the same job as turning to the Customers worksheet and choosing Data, Form.

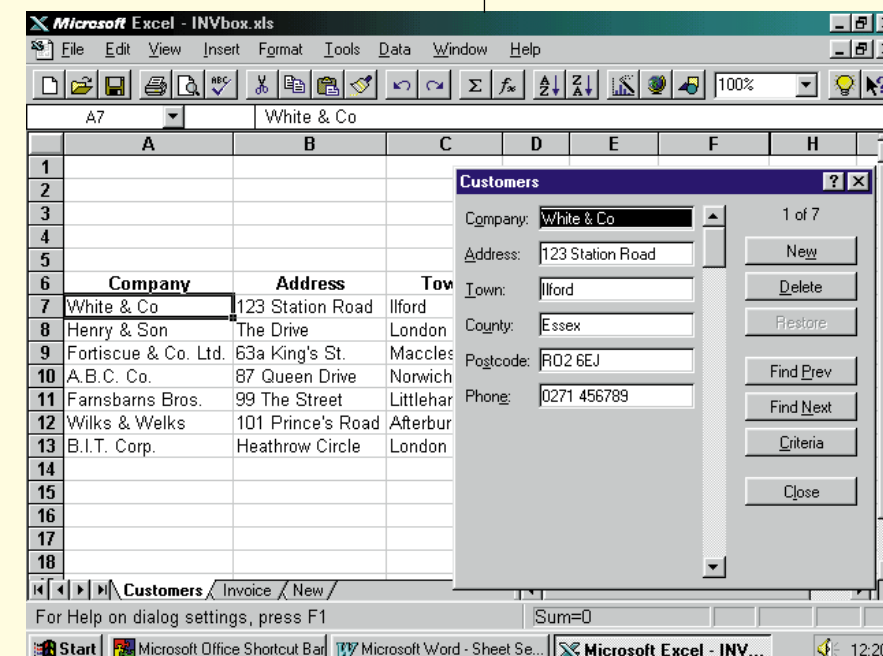
As to Andy's request for a way to clean up a list of recorded invoice details, I'd recommend Excel's AutoFilter. The list must have column labels like company, date of invoice etc. Select a cell in the list. Click Data, Filter, AutoFilter. Click the arrow in the column containing the data you want to filter and then, Custom. In the first box, click the arrow and pick the < (less than) sign. In the second box, choose a date (from the presented list of dates in the column). Once the list has been filtered, delete the rows (records) you wish to eliminate. Or, you could just print the reduced list of invoices and then redisplay the full list if you wanted to keep them on file.

Making it simple

You may recall in the June column that I wrote about a materials resource planning spreadsheet used by a Welsh medical products company. It calculated the component parts which would be needed in a period for assembling the company's products. The key formula was

`=SUM((L$6*C16)+(L$7*D16)+(L$8*E16)+(L$9*F16)+(L$10*G16)+(L$11*H16)+(L$12*I16))`

Fig 2 Choosing Data, Form automatically creates a dialogue box using the labels from the column headers



I commented in passing: "I can't help thinking there should be some way of multiplying named ranges as an array and simplifying that formula."

During the few days following publication, my email box filled up as suggestions came in. For all of them, note that an array is entered by pressing [Ctrl]+[Shift]+[Enter].

One proposal was from Peter Forty who suggested assigning the name month1_prod to the range \$L4:\$L\$12 and then using two functions in this formula:

`=SUM(C16:I16*TRANSPOSE(month1_prod))`

At first, I couldn't get this to work. But then I realised the arrays were of different lengths. When I trimmed the named range down to \$L4:\$L\$12 the formula worked fine. Both arrays now referred to seven cells. If you're not familiar with TRANSPOSE, what it does is shift the orientation of an array from vertical to horizontal and vice versa. Just the job, here.

Paul Bloomfield suggested a variation that eliminates the multiplication sign:

`=SUMPRODUCT(C16:I16,TRANSPOSE(L$6:L$12))`

Paul also suggested

`=MMULT(L$6:L$12,C16:I16)`

but I couldn't get it to work properly. Pity, really, as he told me that his name had first appeared in PCW in 1981. I was deeply impressed.

Then I received a lengthy email from James Talbut, in Belgium. He firstly pointed out that there was a redundancy in the original. You can either use the plus signs or the SUM function, but you don't need both — quite right. Then he suggested all of the above formulas and his version of the MMLT function worked. He wrote it as

`=MMULT(C16:I16,L$6:L$12)`

So did Jim Tavendale of Horndon-on-the-Hill which, if you don't know this charming village, is between Mucking and Ockendon, in Essex.

I couldn't understand why the formula worked one way around yet not the other. The Function Wizard in Excel 7 makes no distinction between the arrays. Then I checked in the indispensable Function Reference book which is Volume 3 of the Excel 4 documentation and found that the first array refers only to columns and the second array to rows.

So, grateful as I am to the other loyal and helpful readers, for accuracy, comprehensiveness and speed of response, the prize must in all fairness go to James Talbut: if you could send me your postal address, James, I'll arrange for a book token, or equivalent, for overseas winners.

Finding a data entry

Microsoft's Excel development team has introduced four new Add-Ins. They are compatible with Excel 7 and the Mac, Windows 3.x, and Windows NT 3.x versions of Excel 5. You can download them from <http://www.microsoft.com/msexcel>; or Go MSEXCEL on the CompuServe Information Service.

The File Conversion Wizard will be popular, considering the amount of mail I receive on the subject. There is an internet Assistant Wizard which converts Excel data into an HTML table and a Conditional Sum Wizard, which helps you create SUM-IF formulas.

But the Add-In which I suspect will appeal most of all to readers of this column is called the Lookup Wizard. What it does is to create a formula which finds the value at the intersection of a column and a row.

An example is shown in Fig 3. Column A has a series of date entries. Rows B through E represent regions with their labels in row 1. The block B2: E10 has simple numerical data entries. After installation, the Lookup Wizard will be found listed at the foot of the Tools menu.

In Step 1 you enter the range to search. In this case it's A1:E10. If you mark this range before starting the Wizard, the "Range to search" box will already be filled in.

Step 2 is shown in the illustration (Fig 3). It offers drop down lists of the row and column labels. I've selected the date which is the label for row 8 and the East region which is the label for column D.

Step 3 offers a choice: you can either copy the lookup formula to the worksheet; or you can copy the formula and the

EXCELlent shortcuts and longshots

● **New folder:** you don't have to use Explorer or File Manager if you want to open a new folder before you save a file in Excel 7. Just choose File, Save As, and then hover the mouse over the offered buttons until "Create New Folder" appears. Click that button and enter the new folder's name. Click Save.

● **Fancy backgrounds:** you can dress up your displayed worksheets (and your hard copy, too, if you have a colour printer) by choosing Format, Sheet, Background. Select any directory with graphics files in it and pick your preference. Such backgrounds look best if you also choose Tools, Options and empty the Gridlines box under the View tab.

● **Absolutely:** if you press the F4 key before ENTER when entering a relative cell reference it will change automatically to an absolute reference. Example: C4 becomes \$C\$4.

● **Save memory and disk space:** by initially opening your workbooks with fewer sheets. Choose Tools, Options, General,

"Sheets in New Workbook". You can easily add sheets as you need them by right-clicking on a sheet tab and selecting Insert, Worksheet.

● **Writing macros:** as easily as you can insert functions on a worksheet using the Function Wizard, you can insert object names on a module sheet. Just click the Object Browser button on the Visual Basic Toolbar. Then select Excel under "Libraries/Workbooks". Following the selection of an object in the "Objects/Modules" list box you can view all the properties and methods for that object in an adjacent list box. Choose one and click the Paste button — it's immediately copied into your macro.

● **Imported data:** can easily be divided into columns using the Text to Columns Wizard. Whether the data is separated by commas, semicolons, tabs or any other delimiter which you specify, Excel will cut it up into columns for you. Select the cells to convert. Choose Data, Text To Columns. Specify how you want the text divided into columns.

values of the lookup parameters. This allows the values of the lookup parameters to be changed on the worksheet without running the Wizard again.

If you take the first option, then in Step 4 you simply specify which cell is to contain the formula. If you plump for the

second option, you still pick one cell but the Wizard will also use the next two cells for the lookup parameter values.

The Wizard wigs out

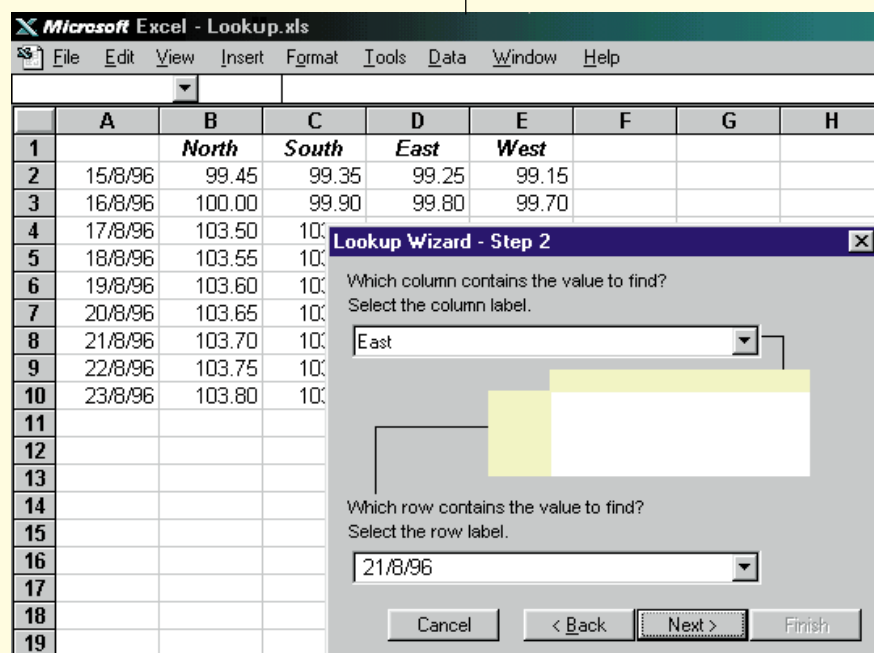
Actually, this is how it's *supposed* to work but in fact, after Step 2, I couldn't get past an error message box that stated: "The cell found by the Wizard contains a formula returning an error. Please exit the Wizard and fix your table." The fact is, my table didn't contain any formulas so what the Wizard's problem was, I do not know. Hopefully, by the time you read this and have downloaded the Add-In, Microsoft will have had the bug sorted out.

However, all the Wizard does with choice 1 is to write a formula which you can enter yourself in the cell of your choice. First, make three Names. Call A1:E1 Columns. Call A1:A10 Rows. Call A1:E10 Table. To reproduce the value for East on 21/8/96 in, say, cell F15 then in that cell you enter this formula:

```
=INDEX(Table,MATCH(DATEVALUE("21/8/96"),Rows),MATCH("East",Columns,))
```

And that should solve the problem.

Fig 3 *The new Lookup Wizard Add-In will find a value at the intersection of a column and row*



PCW Contacts

Stephen Wells welcomes comments on spreadsheets, and solutions to be shared, via PCW Editorial at the usual address or at Stephen_Wells@msn.com. Files can be attached if you are on MSN.



Making a date

Supplying a pensions provider with precise dates to retirement is trickier than it sounds. Stephen Wells cogitates possible spreadsheet solutions.

It is singularly unfortunate that the world wobbles about in its path around the sun. Life would be much simpler for many spreadsheet users if there were a constant number of days in a month and a year.

Take the case of pensions consultant Richard Jones of Forest Hill. As I understand it, when a client of his wants to sensibly prepare for old age, R.J. has to calculate how long they have to wait for their gold watch.

Other clients have been paying premiums since bath-water was heated in kettles and similarly he has to advise the insurance company as to what he thinks they are now entitled. Richard gathers his data in Access, then for calculations transfers it to Excel 5.

Over at the insurance company, these matters are in the hands of the actuaries — people who practice a strange art not far removed from astrology. They use historic tables based on algorithms.

Whether looking backwards or forwards, when defining the life of a pension Richard has to supply the companies with the number of years and the precise number of calendar months between two dates. This is trickier than it sounds: for a period ending on 30th April or

Fig 1 The pension programme as presented. The actual years and months of the period are calculated using an intermediary step

	A	B	C	D	E	F
1	START DATE	END DATE	TEMP YEARS	TEMP MONTHS	ACTUAL YEARS	ACTUAL MONTHS
2	1-Mar-82	20-May-96	14	2	14	2
3	1-Sep-23	1-Jan-97	74	8	73	4
4	6-Jan-35	13-Apr-96	61	3	61	3
5	30-Sep-46	7-Jan-96	50	8	49	3
6	1-Sep-49	1-Jul-99	50	2	49	10
7						

Fig 2 Three new ways of solving the pension programme problem. But will the actuaries be happy?

	A	B	C	D	E	F	G
1	STARTS	ENDS	PERIOD	YEARS	MONTHS	YEARS	MONTHS
2	1-Mar-82	20-May-96	14 years 3 months	14	3	14	3
3	1-Sep-23	1-Jan-97	73 years 5 months	73	5	73	5
4	6-Jan-35	13-Apr-96	61 years 4 months	61	4	61	4
5	30-Sep-46	7-Jan-96	49 years 4 months	49	4	49	4
6	1-Sep-49	1-Jul-99	49 years 10 months	50	10	50	10
7							

Fig 3 Complicated function formulas

E2 to E6 is
=IF(MONTH(END_DATE)<MONTH(START_DATE),
TEMP_YEARS-1,IF(AND(MONTH(END_DATE)=MONTH(START_DATE),
DAY(END_DATE)<DAY(START_DATE)),TEMP_YEARS-1,TEMP_YEARS))

F2 to F6 is
=IF(AND(MONTH(END_DATE)<MONTH(START_DATE),
DAY(END_DATE)=DAY(START_DATE)),TEMP_MONTHS+12,
IF(AND(MONTH(END_DATE)=MONTH(START_DATE),
DAY(END_DATE)<DAY(START_DATE)),TEMP_MONTHS+11,
IF(AND(MONTH(END_DATE)>MONTH(START_DATE),
DAY(END_DATE)<DAY(START_DATE)),
TEMP_MONTHS-1,IF(AND(MONTH(END_DATE)<MONTH(START_DATE),
DAY(END_DATE)<DAY(START_DATE)),TEMP_MONTHS+11,TEMP_MONTHS))))

September for instance, the company would count April and September as months. But a period ending on 30th May or July wouldn't count May or July. A calendar year ending on 30th December is only 11 months to them. Not that there is anything unfair in this. As long everybody is subject to exactly the same rules then it's "perfectly equitable, Henry".

Richard's solution is shown in Fig 1. Column A shows the start date of the pension programmes and column B the end date. The range A2:A6 is named START_DATE, and the range B2:B6 is named END_DATE.

Columns C and D are initial temporary calculations. C2 to C6 has =YEAR(END_DATE) - YEAR(START_DATE) and D2:D6 has =MONTH(END_DATE) - MONTH(START_DATE)

In Row 2, C2 and D2 hold the right answer. But in Row 3, where the period starts in a September and ends in a January, D3 is wrong because it shows minus eight months.

So Richard has named the range C2:C6 TEMP_YEARS and the range D2:D6, TEMP_MONTHS and pressed on to solve the problem with some complicated IF and AND function formulas (see Fig 3). Trying to focus on that is too much for me, but I'll take his word for it that the answers in Columns E and F are actuality for the actuaries.

I've talked to Richard on the phone and he obviously is not sending this in as a solution to share but almost a moan that Excel doesn't offer a simple way of doing this.

• There is a book token in this for anyone who can find a shorter solution.

I've come up with three ways of doing it but none of them offer exactly the same answer for every date combination.

Fig 4 The numbers you've entered

	B	C	D			
1	1998	1997	1996			
	E	F	G	H	I	J
1	1995	1994	1993	1992	1991	1990
2	£393,233	£311,878	£453,987	£292,111	£323,876	£234,567

Fig 2 uses the same dates as in Richard's example. My first solution is simply to use formatting. Column A is named STARTS and Column B is named ENDS. Column C is simply =ENDS-STARTS. But the column has this custom format: yy "years" m "months"

Excel stores the answer to the subtraction formula as a date serial number. The years in that number are displayed by the yy in the format definition (followed by any label you like — I've used "years"), and the months are displayed by the m in the format definition (followed here by "months").

I would maintain that this is the "correct" answer. But if the insurance companies are not satisfied by anything less than complete calendar months, they're going to have to take a month off in most cases.

Column D uses the YEARFRAC function. It returns the fraction of the year which represents the number of days between a start date and an end date. So cell D2 has =YEARFRAC(A2,B2).

If you can't find this function listed, you probably don't have the Analysis ToolPak installed. You'll find this useful macro on your original Excel installation disks or CD.

E2 has the formula:
=(PERIOD/30.416666667)-INT(D2)*12
I've named the block C2:C6 PERIOD. So in E2, cell C2 is divided by the average number of days in a month and from this is deducted the integer of the number of years in cell D2, multiplied by 12.

F2 uses the CONVERT function which converts a number from one unit to another. The formula is:
=CONVERT(C2,"day","yr")

All it does is convert the number of days

in C2 to whole years.

G2 works like E2 and is
=(PERIOD/30.416666667)-INT(F2)*12
I look forward to receiving readers' solutions to this problem.

Future perfect

Past is prologue, said The Bard in The Tempest, and once you've collected a lot of data on a spreadsheet it can be very tempting to project future results from it.

Whether this extensibility is plausible is a determination which can only be made by somebody skilled in the pertinent profession or industry. But if it is, then I can suggest the functions to use.

If all you need is a chart and you have Excel 7, then you can project data lines automatically with a few mouse clicks.

As an example, let's use some annual sales figures for a product. In 1990 the total was £234,567. Sales go up and down and were £393,233 in 1995. We'll put the years in row 1 (formatted as a custom Date, yyyy), with the most recent year to the left, and the amounts in row 2.

If you feel it's reasonable to project from these figures for three years in the future, then insert three columns with the years labelled in B1:D1 and blank cells in B2:D2.

Now select the complete block (in our example this is A1:J2) and click the Chart Wizard button. Pick a Line chart in Step 2, and Type 4 in Step 3; Data Series in Rows, in Step 4; and add a chart title in Step 5.

Select the resultant drawn line and then click the right mouse button. This will now offer a changed list of options. Select

Stuffed dates

As a pensions consultant, Richard Jones' life isn't made any easier by two other Excel idiosyncrasies. If you enter a date prior to 1/1/20 Excel will add a century. In other words, if you enter 31/12/19 Excel initially assumes you mean 31/12/2019, not 31/12/1919. At least you can correct this on the edit line. But the other problem requires a bigger work-around. Excel only recognises dates between Jan. 1st. 1900 and Dec. 31st. 2078. It stores them as the equivalent serial date numbers 1 to 65380.

I'm not going to live to 2078 myself but somebody born this year quite likely will and Richard could well be asked to think about lifetime financial investment plans for them. Fortunately VBA (Visual Basic for applications) for Excel 7 recognises date values from Jan. 1st 100 (which was before Hadrian started his wall) to Dec. 31st. 9999 (when the Chunnel debt will have been paid off). So Richard could put all his dates in a macro.

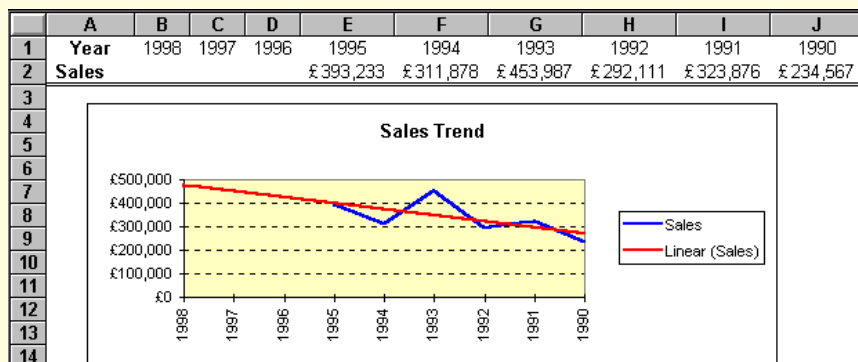


Fig 5 Excel looks at six years' sales results and projects the trend for a further three years

Trendline, Linear. (There are also five other types: Logarithmic, Polynomial, Power, Exponential and Moving Average). You can now double-click on any item (the axis labels, lines, plot area, and so on) and change colours or weights to suit. You'll now have a chart as shown in Fig 5.

This gives you the big picture but it doesn't tell you exactly what the projected sales are for '96 to '98. You can see from the chart that all three years are expected to have sales of the product between £400,000 and £500,000; and '97 looks like it will repeat the peak of '93. Of course, Excel knows what the numbers are because it has used the TREND function to calculate them. You can, too. The numbers you've entered so far are shown in Fig 4.

The TREND function has the syntax (Known y's, Known x's, New x's). Referring to the chart, it's the sales amounts which rise up the vertical or y scale, and the years which are along the horizontal or x scale. So the known y's are in the range E2:J2 and the known x's are in the range E1:J1. The new x's (1996, 1997, 1998) are in cells D1, C1, B1.

Understanding this, we can now enter in cell D2 the completed function:

```
=TREND(E2:J2,E1:J1,D1).
```

Similarly,

```
=TREND(E2:J2,E1:J1,C1)
```

goes in cell C2 and

```
=TREND(E2:J2,E1:J1,B1)
```

is entered in B2.

This produces the exact figures and confirms our rough guesses:

	B	C	D
1	1998	1997	1996
2	£479,643	£453,321	£426,926

It is easy to install and adds a new "S.P." option to the menu bar. Once the worksheet(s) you wish to check have been loaded, you click on the additional menu item and are offered a new drop-down menu with all the program's tools.

The first is the Calculation Checker, Fig 6. If you start at cell A1, the Checker will go through the sheet, stopping at each "potential error". This doesn't mean there's necessarily an error in a formula. It could be a harmless matter, or a number in a formula which was a quick-fix that wasn't

corrected later. When the suspicious cell is pointed out, a dialogue box offers several buttons including a Show Precedents option which displays the Reference Translation box (also Fig 6). Another button in the Calculation Checker offers a full explanation of the rule being contravened. A third lets you look at all the rules and choose which ones to ignore.

The second main menu option is a toggle to enable or disable the Cell Translator. Another

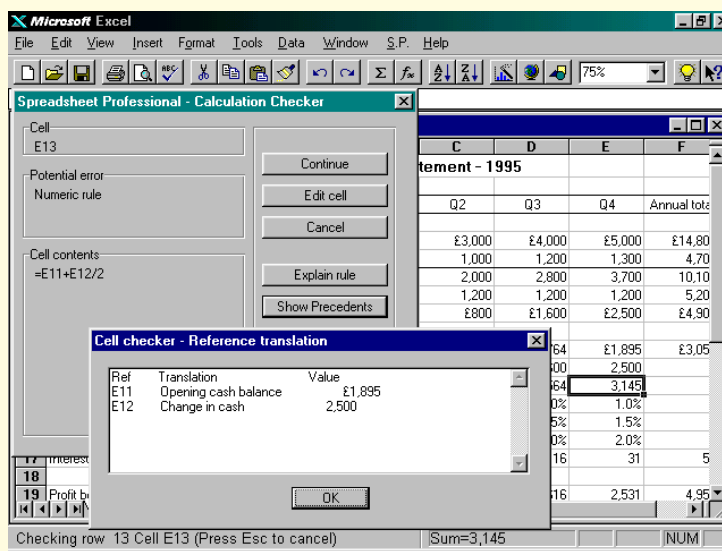


Fig 6 Spreadsheet Professional is an add-in for Excel or Lotus 1-2-3 which checks worksheets for potential errors

TREND is probably the most useful function in this area, to business people, but readers with scientific or statistical problems to solve might also use some of Excel's related built-in formulas.

The LINEST function also calculates a line but provides the parameters of the line instead of one or more y values. The GROWTH function creates an exponential curve instead of a straight line. And the LOGEST function provides the parameters of an exponential trend. In other words, LOGEST is to GROWTH what LINEST is to TREND.

Having a check-up

I have come across a spreadsheet add-in, called Spreadsheet Professional, designed to test worksheets and document the results. I looked at Version 2.07 for Excel 7 but there are variations available for Excel 5 and any version of Lotus 1-2-3 which produces .wk3 files.

major tool is the Documentation Generator which offers you a huge variety of ways of testing your range, worksheet or workbook and producing a comprehensive report and full explanation of the audit.

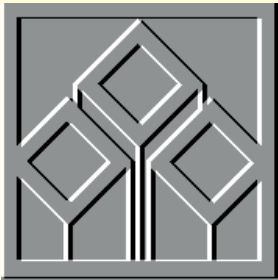
Finally, another tool lets you make a comparison between two worksheets. This can be very useful when you're developing a worksheet and want to check on the differences between various versions.

Compared with the cost of Excel, the price of £295 (plus VAT) for a single user copy seems a bit steep, but Spreadsheet Innovations is not selling to chaps like me but to institutions which have massive spreadsheets and short development deadlines.

PCW Contacts

Stephen Wells welcomes comments on spreadsheets, and solutions to be shared, via PCW Editorial at the usual address or Stephen_Wells@msn.com. Files can be attached if you're on MSN.

Spreadsheet Innovations
0171 424 0101; email 73064.3550@compuserve.com



It never rains

An everyday story of Met Office folk, told by Stephen Wells. Plus, at last, some good moos about cows...

On the clifftop near where I live is a brightly-painted box on legs. Every day, a man on a bicycle arrives to open it up and take readings from the instruments inside. There are hundreds of these volunteers across the country, all feeding in valuable information to the Met Office. I received an email from one who runs a West Midlands co-operating station within the Met voluntary network.

Cedric Geoffrey Roberts wrote: "I have been watching comments in your column on importing SuperCalc data into Excel. I have been well satisfied with SuperCalc 5.5 for DOS. It has given me an ideal base for producing data analysis. But I have been increasingly worried about the eventual demise of DOS. I would like to move over to Excel which is extensively used by the Met Office but have been put off by the prospect of having to redo all of my spreadsheet files to comply with the new software. When I had to move over from BBC to PC, I had to re-plan the whole system.

"Each month I complete an 11-page spreadsheet with rows for each day. Pages 1 and 2 are the main data pages which are entered manually or filled with logged information imported from CSV files. The other nine pages analyse this data with scores of formulae. They calculate the MSL (Mean Sea Level) pressures from the station level barometer readings, humidity, dew points, and numbers of days of snow, sleet, frost and much more.

"As a pensioner, I'm dubious about spending over £200 on Excel if it will not work with most of the formula. I'm particularly concerned about SC5.5 DCOUNT formulas. Data for just one year is broken down into four seasons, and then every month has an 11-page spreadsheet."

I suggested that he send me a range of his spreadsheet including all the formulas which bothered him. I asked him which

version of Excel the Met is using and queried if they didn't have a technical support service or help group for their volunteer stations.

When the disk arrived — accompanied by the widest print-out I've ever seen, consisting of two pieces of 14.5in continuous listing paper stuck together — I ran it on my old 386SX which has SC5.5 loaded.

There were DCOUNT formulas like: DCOUNT(\$BB\$1:\$BB\$11,0,BE1:BE2)

A lot of AND statements, like: AND(BB2>=-15,BB2<=-10)

And some daunting IF statements like: IF(U17>=0,AN17-(.000799*1000*(T17-U17)),AN(17-(.00072*1000*(T17-U17)))

There were also a lot of formulas with ^ (to the power of) signs in them.

But it's seldom because of complex maths that you run into import/export problems. It's the translation of dates, some functions or names. And Mr Roberts is not using any date-formatted cells, unusual functions nor any range names.

Fig 1 shows an example of some of the categories, though I've moved things around and reformatted some revised data in Excel 7 because these days even the weather is probably copyrighted.

As documented in the CA-SuperCalc Version 5.1 User's Guide, you save in the normal way but, when the file name appears on the edit line say, JAN.CAL, you just edit it to JAN.WKS and press Enter. No special exporting: just a save with a different extension. SuperCalc on

A tiny section of a very large spreadsheet used by someone who is trying to do something about the weather

its own initiative goes into Export mode and translates the file. Now it will be recognised by any version of Excel or Lotus 1-2-3.

Then I loaded the file into Excel Version 4 on my old machine and Excel 7 on my new one and checked that the formulas were producing the same results as before. No problem. As a reader has previously mentioned, the type comes out in blue, but it's easy to change that by selecting Format, Font, Color (sic), Black.

I was able to email back to Mr Roberts that I could foresee no translation problems other than that separate SC5 pages would have to be saved as individual files. But I suggested that his biggest expense was going to be the hardware for running the latest version of Excel. At the moment, apparently, the Met is using Excel 5 but, like the weather, I expect they'll change soon.

Anyway, the final word from Mr Roberts suggested he is moving on up. He said he

Date	Fat	Lact	Prot	FPD	Urea %	Cells	TBC	Anti-Biotic
1-Feb-96	3.63	4.71	3.36	543	0.0310	165	5	pass
8-Feb-96	3.75	4.65	3.35	538	0.0350	191	14	pass
12-Feb-96	3.52	4.67	3.43	544	0.0260	238	12	pass
23-Feb-96	3.62	4.69	3.37	546	0.0310	241	20	pass
28-Feb-96	3.47	4.70	3.35	544				
Ave	3.60	4.68	3.37	543				

Excel will automatically create a useful form for data entry. It can also be used for searching

Feb96

Date: 28/2/1996 6 of 6

Fat: 3.47 New

Lact: 4.7 Delete

Prot: 3.35 Restore

FPD: 544 Find Prev

Urea %: 0.032 Find Next

Cells: 180 Criteria

TBC: 7 Close

Anti-Biotic: pass

has ordered Excel and looks forward to analysing the 40 years of data held at his station.

The cows came home

I blame myself for leading Farmer John astray. In the April column I talked about three ways of creating a custom dialogue box in Excel 7. All of them involved using VBA (Visual Basic for Applications).

I received an email from Mr JA Page asking how you persuade an Excel worksheet to display the data you've already entered in such a home-made dialogue box. "I have spent hours searching for the required command to no avail." Ah — the guilt one feels on receiving such heart-rending appeals.

In a follow-up email he sent a listing for his macro and a further query: "How do I clear the data entry boxes, hopefully after the data has passed to the spreadsheet?"

Fortunately, John is on the Microsoft Network so I was able to get him to send me his complete Excel 7 workbook without posting a disk in.

The first page of his workbook gave the annual averages of eight different tests on his cows' milk. These were calculated from the next 30 pages which give the monthly results of those tests, all through

Down the wire

In the February issue, I illustrated the MS Excel 95 Forum page which you can access via the Help option in Excel 7, assuming you're on the Microsoft Network.

Time moves on. With Microsoft's Internet Explorer 2 (which you can download for free from MSN), or the Beta Version 3, you can now reach the Excel Web page which is just a click away from the MS Office Web site.

Finding the information you need is now so much easier, with clearer groupings and better indexing. Downloading is easier too. Icons we can all understand appear by each item. A document item is obviously one you can read online or download with the familiar File, Save As action. Free macros and things have a little disk-drive icon. Click one of those and the item is downloaded. Finally, comms is almost as easy as switching on a TV set.

You don't have to worry about paying BT for all those Web page graphics to come down the line. After the first time you view a page, you can save it in the Favourite Folders file (along with the PCW Web site) and open it up in a flash.

To think: all those years I never owned a modem and now I use it more often than my CD drive. I expect I'll be buying a microwave oven next.

The Excel Web page: just a click away



'94, '95 and to date in '96.

Then he had a series of DialogSheets showing graphic designs of individual dialogue boxes for each milk test item. And finally, some module pages with Show statements in them.

With further communication, I discovered that John had no real desire to start a DIY training scheme in VBA but just needed a quick solution for entering the milk samples to help in his everyday work. So, although to answer his specific questions, I told John about changing the Value property of the target cell, and defaults in the EditBox object, I also made him up a new sample workbook with the simple instructions for creating and using a Data Form.

Fig 2 shows John's basic table for February this year with a data entry form which Excel will create instantly for you. In Excel 4, you had to define a database before you could make a data entry form. But since Excel 5 you've been able to create one for an ordinary worksheet.

Assuming there is no blank row between the entered results and the heading labels, you can click in the first blank cell below the entered results and press Alt+d,o (or choose Data, Form on the menu bar). If there is a blank row below the labels, as in the illustration, just choose the first cell in that blank row. Not only does this immediately produce a data entry form with labels for each item, but it gives you some options which it would take you a long time to program on your own.

Now you can press Alt+w (or choose the New button) to enter a new record and press Ctrl+; (semi-colon) for today's date. Press Tab to go on to the next data item (Fat, here). And so on to end of the Form. Then click New. Enter the next date. And so on to the end. When you've finished entering the records you just click Close.

At any time you can show in the boxes the previous or next record. You can also click Criteria and enter a filtering formula like >15/2/96 in the Date box to just show those records dated after Feb. 15th.

As John said in his final email, "Why use a sledgehammer to crack a nut?" I could tell he was happy to get the good moos.

Weeding out

Speaking of writing unnecessary macros: I have received several emails on the theme of "How do I check an Excel database for duplicate records?"

If you have Excel 5 or 7, it's easy. All three of the following options start out by choosing Data, Filter.

TO FILTER OUT DUPLICATES you then

Another planet

Email from Stephen Kennedy. Subject: Split identity?
I'm a subscriber to PCW so I often see your name in print. I also read NME weeks and seeing your name always makes me wonder: you're not the same Stephen Wells (SWells) who writes for NME are you? :-) Please put me out of my misery...

To S.K. from S.W. Subject: Doppelgangers
In a word, no. But they are both common names. What is NME? New Microsoft Exchange? Nice Mothers of Ecuador?

To S.W. from S.K. Subject: Identities
NME is New Musical Express —what planet have you beamed in from? :-)

The logical response was the one word, Uranus. But I kept schtum, believing in turning the other cheek.

choose, "Advanced Filter", "Filter the List, in-place", and "Unique Records Only".

TO RETURN ALL RECORDS you choose "Show All".

TO TRANSFER A CLEAN LIST you choose "Copy to Another Location", "Unique Records Only", and insert a cell address in the "Copy to" box.

Putting it on the map

I'm going to make a prediction. At the time of writing, there are seven Hands On columns in the Applications group. I have no inside knowledge but I would bet in less than a year there will be one for mapping.

Both of the leading spreadsheets, Excel 7 for Windows 95 and Lotus 1-2-3 Release 5.01 for SmartSuite 96, include mapping features in their extensive packages. That's a logical marriage. To navigators of the sea or air, a map is called a chart. And charts have long been a way of graphically illustrating the tabular data in a spreadsheet.

In its simplest form, you might have a text list of the names of countries of Europe in one column, with the numerical values of the populations of each in the adjacent column. It's logical that a traditional atlas map could be drawn from this with colours used as a key, say red for countries of 50 - 55 million people, blue for 55-60 million, and so on.

Immediately, your mind will race ahead to many other possibilities. The map itself is a constant graphic. You might zoom in and out, but the shape of a continent, a country or a county must always remain the same. And yet there are so many things we can communicate with a map.

A travel agent could show her clients

the routes of different holiday packages. An advertising agent could show his clients which areas of a country have the biggest concentrations of particular target markets. A commercial radio station could illustrate its strongest reception area. A fast-food franchise could pinpoint its outlets on one map and on an overlay show the catchment area of each. A hospital authority could superimpose its defined service region over a map of actual or projected traffic accident blackspots and environmentally hazardous areas.

The fact is, a map can be just as important a tool for data analysis as a financial statement is. And it can be used in so many areas of endeavour. It has been estimated that almost 90% of business data contains reference to a location. That's what business growth is all about. One corner shop might provide six jobs and serve a village. A chain of shops might employ 6,000 and serve a country.

It doesn't have to be a huge company to do business over a wide area. A group of local newspapers could depict circulation trends and show where their concentrations of readership are. To project new subscription sales, they could have an overlay using demographic information about income, food sales and travel expenditures.

Mapped data not only allows you to visualise data in a geographic context, but to correlate the data threads that unify different regions.

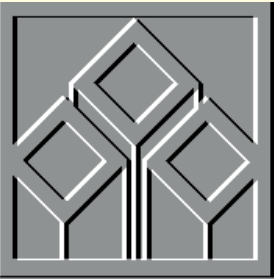
There are two reasons why I think it will become an important application in its own right. One is that there is so much information which is affected by a geographic context. The other is that there is a huge potential for a wide variety of software publishers. Route information, demographic data, rates of employment, crime statistics and heritage sites are only some of the innumerable databases which could be supplied for map users.

Then there's the use of satellite imagery to show weather patterns or air pollution concentrations. And some vehicle navigation systems include a portable PC with a CD drive.

Until that new column appears, you can be sure your humble correspondent will be keeping an eye on this application for you and reporting developments.

PCW Contacts

Stephen Wells welcomes comments on spreadsheets, and solutions to be shared, via PCW Editorial at the usual address or **Stephen.Wells@msn.com**. Files can be attached if you're on MSN.



Just in time

Without a big computerised system, how do you keep track of your business? Stephen Wells has a suggestion. Plus, Excel's Camera gets cute.

Excess warehousing is anathema to manufacturing companies. Having raw materials, parts or finished product sitting around is not an efficient use of assets. Storing, insuring, and handling depreciating stock just adds to costs. That's why the theory of Just In Time became popular. In large companies, MRP (Materials Resource Planning) is considered a vital element of manufacturing. They want new supplies to arrive in the nick of time, but not before.

But what of small companies? They can't afford massive computerised systems. No problem, while there are resourceful managers like Steve Evans who works for a company near Pontypridd, Mid Glamorgan, that makes a highly specialised medical product. I won't

tell you what it is or you'll feel queasy. But the relevant point is that the component parts are expensive and date quickly, so he's devised an Excel worksheet which tells him when to order them (Fig 1).

The original covers six months and includes a long list of component parts. I've just shown a snippet or you wouldn't be able to read it.

Cell A7 has the TODAY() function. The rest of column A is for the part numbers that require tracking. Column B displays the parts descriptions.

C14 to I14 are the codes for the products to be built. C16 to I22, in this brief example, contain the number of each part contained within each of the products — effectively a parts list. Thus products A, V and O each need one of the first

four listed parts.

J16 to J22 contain the current stock levels for each part. These are typed in by hand. M4 contains a date within the first month of production being monitored. The following five months run on out to the right in a similar fashion.

K6 to L12 contain the products to be built again (with a fuller description) and L6 to L12 the quantity planned to be built. This is repeated in the following periods.

K16 calculates the total number of the part on row 16 required during the period. The formula is

=SUM((L\$6*C16)+(L\$7*D16)+(L\$8*E16)+(L\$9*F16)+(L\$10*G16)+(L\$11*H16)+(L\$12*I16))

The quantity to be built is given in absolute terms so the formula can be dragged down the column.

Incidentally, I can't help thinking there should be some way of multiplying named ranges as an array and simplifying that formula. If any reader has an idea on that I'd be glad to hear from them.

L16 is a simple calculation of the current stock levels minus the quantity required that period:

=SUM(\$J16-\$K16)

The formatting is in red to show up when to order, and in this case they are short of 427 parts.

In the next column, M16 looks at the value in L16 by the function

=IF(L16 < 1, M\$4-56, "")

If it is less than 1 (negative) then this part needs to be ordered. The date the order should be placed allows for a delivery time from the supplier of 8 weeks. So, 56 days are subtracted from the date in M4. If the value in L16 is greater than 1, then no date is displayed. This is repeated for the remainder of the parts for that period and subsequent periods.

Staffing up

The second spreadsheet from Steve Evans reminded me of a song from The Pyjama Game, the musical about factory unions: "Seven and a half cents doesn't seem a helluva lot..."

They were fighting for higher rates paid per hour. Today, the negotiation is over the number of hours worked. Fortunately for manufacturers, there are more people today who want to work part-time. In this factory, Steve tells me, about 20% of the employees do not work full time, so he also uses a spreadsheet to calculate

Calculating the number of parts to order and when to order them for a specialised medical manufacturing company

Microsoft Excel - Production Plan.xls													-	5	×
File Edit View Insert Format Tools Data Window Help													-	5	×
M22		=IF(L22 < 1,M\$4-56,"")													
	A	B	C	D	E	F	G	H	I	J	K	L	M		
4											Month 1		6/6/96		
5											Prod Qty				
6	Run on										Audio	50			
7	30/3/96										2KHz Pr	25			
8											5KHz Pr	25			
9											Vert	50			
10											Obscure	400			
11											FM10	30			
12											FM60	30			
13	Parts	Description	Qty per product			Stock			Prod Qty	Stock	Date to				
14	Req'd		A	2	5	V	O	10	60			left	Order		
15															
16	1020-1003	Front Cover Stainless	1	0	0	1	1	0	0	73	500	-427	11/4/96		
17	1020-1004	Rear Cover Stainless	1	0	0	1	1	0	0	11	500	-489	11/4/96		
18	1020-1005	Blanking Plate	1	0	0	1	1	0	0	1911	500	1,411			
19	1020-1100	Pocket clip	1	0	0	1	1	0	0	436	500	-64	11/4/96		
20	1020-1300	Vascular faceplate	0	0	1	1	0	0	0	631	75	556			
21	1020-1310	Vascular nose cone	0	0	1	1	0	0	0	486	75	411			
22	1020-3276	Probe Cable clamp	0	1	1	1	1	1	1	1,428	560	868			

Calculating the number of part-time workers who will be needed during specified periods in the same company

Microsoft Excel - Staffing.xls												
File Edit View Insert Format Tools Data Window Help												
A4												
1	Production Plan											
2	Run on											
3	4/2/96											
4	and orders as at 10/05/96											
5	Product	1'ducer PCB	Assy	Test								
6		Time	Time	Time	Time	Period 1	June			Period 2	July	
7	08	0.1125	0.525	1.15	0.25	200	22.5	105	230	50	450	50.625
8	VA5	0.225	1.125	1.313	0.25	0	0	0	0	0	0	0
9	Audio	0.9	0.625	0.25	40	0	36	25	10	25	0	22.5
10	2MHz Pr	0.1125	0.275	0.65	0.1	40	4.5	11	26	4	15	1.6875
11	4.5MHz Pr	0.225	0.225	0.51	0.1	25	5.625	5.625	12.75	2.5	0	0
12	8MHz Pr	0.25	0.225	0.61	0.2	0	0	0	0	0	0	0
13												
14												
15	1'ducer Total					32.625					52.313	
16	PCB Total					157.6						262.9
17	Assy Total						293.8					
18	Test Total							66.5				
19												
20	Total Hrs							550.5				
21												
22	Losses											
23	Sickness							75				
24	Holidays							100				
25	Tea-breaks							90				
26												
27	People Req'd						0.7	1.5	2.4	5.4367		
28	In each section									0.9	0.7	2.2
29												
30												
31												
32												
33												

staffing requirements (Fig 2). I've had to eliminate a lot of his attractive spacing and formatting to capture all the essential parts in one screen.

In the block B7:E17 is recorded the time, in parts of an hour, it takes to make, assemble and test each part or sub-assembly. The quantity of each assembly needed in the first period is recorded in column F. In columns G to J are the total hours to be taken for each type of work. The same calculations for further periods continue in columns out to the right.

In rows 19 to 22 it is therefore possible to total the number of hours of work required in the period for each speciality. The total hours to be worked is given in row 24.

To this has to be added a weighting for typical sickness, holidays and the traditional tea-breaks here entered in rows 27 to 29.

The sum of all these hours is now divided by 150 in row 31. This is the figure that they use as total working hours in the month. (They must spend Friday afternoons at choir practice.)

And so it is that row 31 indicates that, arithmetically, 5.4367 people are required for these duties in this month. This is then broken down into the number of people required in each production section and displayed in cells G33 to J33. The formula in G32, for instance, is

=SUM((G19+(I27+I28+I29)/4)/150)

The system has also been used to calculate the effect of changing the batch size of various products. This has required the expansion of each of the sub-assembly times to include setup time and run time.

Setup will usually take the same amount of time regardless of how many products are required to be made, whether 1 or 1,000. Run time is directly related to how many are required; therefore, changing the batch size has a direct relationship to the productivity of the manufacturing unit.

I've included these two spreadsheets this month not because they make any startling breakthroughs in application development, but, their very existence is indicative of the advances which have been made in the last decade. Now we

have managers in small companies showing initiative and using spreadsheets to improve their efficiency.

Meanwhile, back at the hospital

Speaking of things medical, I've received a follow-up email from Dr H Baillie-Johnson whom you met in the March column. He had asked for a macro for entering and shifting data, and I gave him an auto-recorded one as it's the fastest way to program in VBA (Visual Basic for Applications). I was grateful at the time to the smart sub-editor who italicised my comment that, medically speaking, the example I gave was nonsense.

I'm even more grateful now when I find out what Dr B-J does with his spreadsheet. After praising my "elegant solution", he says he uses it to help calculate doses for ten different drug cocktails used in cancer chemotherapy. I tell you, I went cold. I didn't know whether to be honoured to have made a minuscule contribution to medical science, or scared witless in case I'd made a mistake. There are times, dear readers, when I'd rather not know what you're doing.

A reader who has concealed his application well is Mark Campbell, an NHS unit manager in Newcastle. He emailed a problem with an attached file to illustrate it.

Mark's using Excel 5. His nose is out of joint because the Apply-to-all checkbox option in Excel 4's Format, Patterns dialogue box has disappeared in version 5. He wants to be able to create a multiple-series line chart with all the markers the same size, shape and colour. Goodness knows why, but with these medical chaps I don't ask.

"I can Format, Patterns as many times as needed, but this is tedious when we often have more than 60 series," he says.

Well, what I'd do is select Tools, Record New Macro, then go through it once. Apply a shortcut key to the macro. Then, in future, you just have to double-



click the chart to select it, and press Ctrl+f or whatever you've chosen.

That's how I initially produced the following macro to do the job. Then I tightened it up by putting the main routine in a GoSub statement and substituting the variable X for the number of the series.

When viewing the module sheet, you can see all the possible colour reference numbers, from 1 to 56, by clicking on the keyword,

MarkerBackgroundColorIndex and pressing F1. Similarly, you can see the descriptions of all the shapes available for Markers by clicking on MarkerStyle and pressing F1.

To use this macro, just choose Insert, Macro, Module then type in the listing. The new sheet will appear as the last tab but you can move it up front easily with a right-click. And you can rename it with a double-click.

The listing is shown in Fig 3.

Photo fit

Here's the cutest idea I've seen in a long time. I downloaded the gist of it from the Excel Forum, though I've refined the idea.

I've always known that if I made an entry into an Excel spreadsheet cell, any

existing content would be deleted. Also, a function statement always has to refer to any other cell(s) than the one it is in. I was wrong on both counts.

Supposing you want a form just to display capitals. If the user enters n, for no, or y for yes, then the cell would display N or Y.

You could write a macro but it's not necessary. What you need is the Camera tool. If you can't find it, go to View, Toolbars, Customise, Utility. Then drag and drop it on to any toolbar.

Let's assume you want the entry cell to be D7. Go to some distant cell, say AZ90, and enter =UPPER(D7). Then select cell AZ90 and click the Camera button, hold down the Alt key and click on cell D7. What you're doing is creating a picture of the formula.

Now, while the object is still selected, choose Format, Object, Border - None; and Fill - None. This conceals the object.

Click elsewhere on the sheet to de-

Fig 3 Medical checkbox macro

```
Option Explicit
' Formatting Macro
' Keyboard Shortcut: Ctrl+f
Sub Formatting()
Dim X
X = 0
For X = 1 To 60
ActiveChart.SeriesCollection(X).Select
GoSub Routine
Next
Exit Sub
Routine:
With Selection
.MarkerBackgroundColorIndex = 5
.MarkerForegroundColorIndex = 5
.MarkerStyle = xlCircle
End With
Return
End Sub
```

select the object, and then select cell D7 and choose Format, Font, Colour - White. This hides the new entry so if you enter any lower-case letters, they only display as capitals.

A variation is to use another formula. For instance,

=IF(D7="y","Y",IF(D7="n","N",D7)) would only capitalise those two letters and not any others. You could as easily turn an entered "n" into "NO" or any word.

Ain't misbehaving

Ask not why your spreadsheet is messing you up. Ask if you're messing up your spreadsheet.

The cursor moves to the right after you've made an entry and pressed Enter. In Excel, you can clear the Move Selection After checkbox under Tools, Options, Edit in Excel. In practically any spreadsheet, you can press the arrow key for the direction of your choice after entry. It will also finalise the entry.

Your printout is not as you intended. Always mark the Print Area before you start; and go through the many options under File, Page Set-up carefully. Check the orientation, margins, scaling, headers and footers. Also, check the Black and White option if you don't have a colour printer but are displaying colour formatting. It can speed things up.

Converting from 1-2-3 to Excel

In the March column, Denzyl Pereira requested a macro to make a bulk conversion of *.wks files to *.xls and frankly I wasn't that helpful. Now to the rescue comes Chris McCarthy of Birmingham, who has emailed a solution that I've tried and it works for me. The macro found the right files and did the business, as they say in some parts of the capital. Here's the listing:

```
Option Explicit

Dim FileToConvert As String
Dim FileConverted As String

Sub MultipleConvert()
ChDir "C:\windows\temp"
FileToConvert = Dir "*.wks"
While FileToConvert <> ""
Workbooks.Open FileToConvert
FileConverted = Left(FileToConvert, Len(FileToConvert) - 3) & "xls"
ActiveWorkbook.SaveAs Filename:=FileConverted, FileFormat:=xlNormal
ActiveWorkbook.Close saveChanges:=False
Kill FileToConvert
FileToConvert = Dir "*.wks"
Wend
MsgBox "All *.wks files in temp directory converted"
End Sub
```

You can either adjust the instruction to change directories, or copy the files you want to convert in to that directory. I would add that the conversion of the files is done automatically when the macro opens the Lotus 1-2-3 file and uses the SaveAs function to save it in the Excel format. It works just the same as if you did it manually.

As Excel will automatically open files in numerous formats, there are many other options for you than the .wks extension; and you can save the file in a myriad formats by changing the .xlNormal extension.

PCW Contacts

Stephen Wells welcomes comments on spreadsheets, and solutions to be shared, via PCW Editorial at the usual address or Stephen.Wells@msn.com. Files can be attached if you're on MSN.