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 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.

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

Microsoft Excel - Sailing.xls

File Edit View Insert Format Tools Data Window Help

	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							

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

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 shown in Fig 2.

	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

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

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 contest-ants 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.

```
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

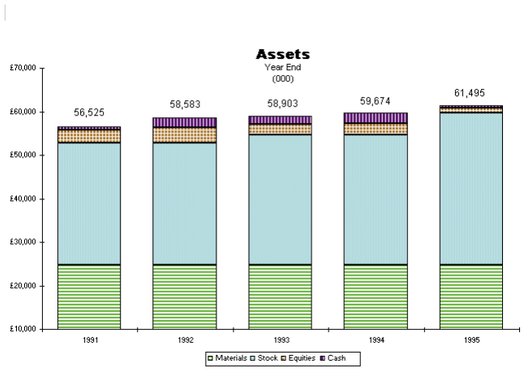

Fig 4 You can add totals to the top of stacked columns of data by creating a dummy series

	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

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

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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 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.

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

```
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

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