



Is time money, or what?

Stephen Wells gives tips on preparing billing facilities in Excel and creates a button box in Office 95.

“I enjoy reading your articles and cut them out to keep,” emails Bernard Harrison (we hope he similarly saves other pieces in the magazine). “I’m a relative newcomer to Excel but I want to prepare my own billing facility, recording the time a task was started, finished, and the total time spent on a job. There would be a payment rate and the amount to bill the client. However, I can’t get Excel to multiply minutes by £s and give me a sensible answer.”

I’ve previously written about calculating time and formatting of all types but as I receive more questions relating to these two areas than any other subject, I’m confident that you won’t mind my answering Bernard’s question.

The first point to grasp is that Excel looks at what you enter into a cell, intelligently — it tries to figure out what you want. It does this by associating certain punctuation marks with certain formats. A slash (/) or a hyphen (-) makes Excel think of dates. Use a colon (:) and Excel thinks of hours, minutes and seconds.

If you enter a space after a number, then an “a” or a “p”, Excel not only assumes you mean AM or PM but that you want to display the 12-hour clock rather than the 24-hour clock which is its default.

Ctrl+; enters today’s date and Ctrl+: enters the current time. If Excel is confused by your entry it makes it text. To display hours greater than 24, or minutes or seconds greater than 60, place brackets around the left-most part of the time format code. For example, the time code [h]:mm:ss allows the display of hours greater than 24.

I emphasise the word

Fig 1 Just a minute!

	A	B	C	D	E	F	G
1	CLIENT	IN	OUT	HRS	MINS.	RATE	INVOICE
2	B Bloggs	9:30 am	11:45 am	2	15:00	£9.50	£21.38
3	J Jones	1:30 pm	3:55 pm	2	25:00	£9.50	£22.96

“display” because dates are not stored as they are shown. They are converted to a number, with the number 1 representing January 1st 1900 as the default in Windows and Lotus 1-2-3; and January 2, 1904 in Microsoft Excel for the Macintosh.

If you open a worksheet, created on a Mac, on a PC Excel recognises the file format and changes dates to the 1900 date system for you. Similarly, if you open a Microsoft Excel for Windows file on a Mac, Excel changes dates to the 1904 date system.

On either platform, you can optionally override the default and use the other system. The times of day (hours, minutes, seconds) are represented as decimal fractions. If we change our entry from 1 to 1.3 then that represents 7.12am on January 1st 1900. Similarly, noon on December 12th 1996 is stored as 35411.5.

If you subtract one date from another, Excel displays the difference as a number. A whole number means the number of days between the two dates. Subtracting a later

date results in a negative number: so, 30-Jun-96 minus 31-Dec-96 gives the answer -184. With another minus sign and a couple of parentheses in our formula, however, we could produce a positive answer.

Now we’ve covered the basics, we can return to Bernard’s question. There are many ways of producing what he wants but here’s one simple method (see Fig 1). The time his tasks start and finish will be in columns B and C respectively. The hourly rate charged will be entered in column F. Excel calculates the hours and minutes spent, divided between columns C and D. It totals the amount to be billed for the job in column G. The formulas are simple enough and are repeated down their columns.

D2=C2-B2
E2=D2-HOUR(D2)
G2=HOUR(D2)*F2+MINUTE(D2)*F2/60

The formatting is of critical importance. I’ve used one of the regular time formats for columns B and C, shown in the dialogue box options as 1:30 PM. Column D is the custom format h. Column E is the custom format mm:ss. Columns F and G are the standard currency format using the £ sign and two decimals.

The point to remember is

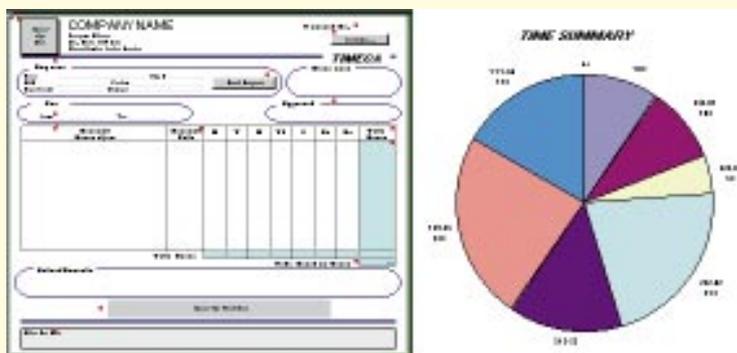


Fig 2 An employee Time Card macro is included with Excel 7; it produces a pie chart summary of the week’s productivity

How to make a button box

If you have the complete Office 95 suite, you can group shortcuts to all your current workbooks and commonly-used applications in a neat little box. The default position of the Microsoft Office Shortcut Bar is at the top of your screen. But drag it down onto the desktop a little and it will turn into a box.

This box can have several sliding doors which can open up with an animated movement and a satisfying little "whoosh" sound. At least, they look like doors to me. Bill Gates likes to say he's got bars on his Windows — I'd better stick to his terminology.

● **To add a bar** right-click the mouse on the background of the Office bar. Choose Customize, Toolbars, Add Toolbar.

Type a name for the new toolbar in the "Create a new blank Toolbar called..." box — in the example below, I've called it

Spreadsheets.

Go to View and select the colour of your choice, whether you want large or small buttons, or sound and animation. Click OK. (You might have to drag this dialogue box up a bit to find the OK button).

● **To add shortcut buttons** to your new toolbar you can choose Customize, Buttons, Add File and pick your documents from an Explorer-type list; or just drag existing shortcuts from the desktop; or press Alt and drag buttons from other toolbars in the Office Shortcut box.

● **To hide a button** on the toolbar, right-click and choose Hide Button.

● **To remove a button** choose Customize, Buttons, and then put a checkmark against the button to remove, and choose Delete.



that although only "2" is displayed here in D2 and D3, Excel is actually carrying a long number which has to be translated. That is why we have to use the HOUR and MINUTE functions in column E and column G.

If your company has a number of employees needing to divide their time between clients or jobs, there is another solution to this: check through the templates offered in your version of Excel. Excel 7 includes a Time Card template consisting of three worksheets.

The first sheet is a typical, fully-formatted, personal weekly time sheet. You just enter the account code and then, in the column for the appropriate day, the number of hours spent on the task (or working for a client).

The second sheet shows a pie chart for this employee with the account codes and total percentage of time spent during the week; on the task or against the client.

The third sheet is a "Customise your Time Card" option macro, where you can insert things like a company logo, and fixed details for the employee. The Time Card and part of the productivity graph page are shown in Fig. 2.

Array, awry

Roy Small emails: "I have a sheet created in Excel 5 in which I chose the wrong axis for accumulating my data — it grew across the sheet instead of down. I am now using the Office 95 version and can find no way to transpose the columns to rows. The Excel function TRANSPOSE seems to have nothing to do with my requirement. Am I onto a loser or is there a way?"

The TRANSPOSE function can be used on a worksheet or in a macro and it works with arrays. What it does is return the first row of the array as the first column of the new array; the second row of the array as the second column of the new array; and so on.

It has its uses, but a better method is to mark your whole block, including all headings in the columns and rows. Right click your mouse and choose Copy. Go to a blank cell, or a new sheet in your workbook, where you would like to lay the range down again.

Right click on this cell which will become the top left cell of the new block. Choose Paste Special. Check the Transpose box. Click OK. Then your old rows will appear as columns and your old



Infuriating hang-ups

Sometimes, a spreadsheet can be as stubborn as a mule. Here are some common hang-ups and the solutions in Excel 7.

- If you open a worksheet and the Status Bar reads "Filter Mode" and you want to get out of that, choose Data, Filter and check Show All.
- If some of your columns are missing and you can't get to them with the Scroll Bar, click to the left of a visible column heading and then right-click Unhide. If you can't move fast enough around a large worksheet, hold Shift while you slide either Scroll Bar with the mouse.
- If, for some inexplicable reason, your worksheet tabs aren't visible choose Data, Options, View and check Sheet Tabs. If you enter, say, 101 and the cell insists on displaying only 1 then you probably have two different settings fighting each other. Under Tools, Options, Edit, the Fixed Decimal setting may be checked and 2 decimal places chosen. Under Format, Cells, the Number Category and zero decimal places may be selected.
- If all your worksheet is visible but the vertical Scroll Bar won't go above say, row 4 and the horizontal Scroll Bar won't go left of say column D, it means you've set the Freeze Panes control in cell D4. Just choose Window, Unfreeze Panes.

columns will become rows — Paul Daniels couldn't do it better.

How does it RATE?

If there's one thing that drives people bonkers, it's finding that a function name has different meanings in different spreadsheets.

Take the RATE function, for instance. In Lotus 1-2-3 it has the following syntax: @RATE(FV,PV,Nper). In Excel it is RATE(nper,pmt,pv,fv,type,guess). Naturally, the formulas provide different answers.

The @RATE function in 1-2-3 calculates the compound growth rate for an initial investment that grows to a specific future value over a specified number of periods. The RATE function in Excel returns the interest rate for a period for an annuity based on equal periodic payments.

For non-financial types, let me define these terms. An "annuity" is any series of equal payments made at regular intervals of time. The time intervals are called "payment periods". Interest is compounded.

It always helps to use an example, so see Fig 3. Let's say that you invest £2,000. You are promised £8,000 back after 20

Payment	No. of periods	Present value	Future value	Growth rate
£100.00	20	£2,000.00	£8,000.00	7%

Fig 3 Using the @RATE function in Lotus 1-2-3 and the equivalent formula in Excel

years. Assuming that the interest rate is fixed in this instance and that the interest is compounded annually (rather than monthly or quarterly) what interest rate are you being paid?

The 1-2-3 @RATE function uses the future value (FV), or £8,000; the present value (PV), or £2,000; and the total number of periods in the annuity (Nper), or 20. Its @RATE function calculates that you would be earning seven percent (plus a few minor decimal points).

In both spreadsheets, I put the number of periods in column C, the present value in D, the future value in E and the answer in F. With an entry made on row 4, to arrive at the same answer in Excel when provided with the same bits of information, you would use the following formula:

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= (E4/D4)^(1/C4) - 1
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So what does Excel tell you with its RATE function? It works just like the IRATE function in 1-2-3. You might start with nothing and then save £100 a year for 20 years. The difference between the £2,000 you eventually put in and the £8,000 you might take out is the interest you've earned and left to compound.

Confusingly, your payment is entered as a negative if it's a savings account and positively if it's a loan payment. (Down at the bank they do it in reverse: loan payments are entered negatively and savings positively. It depends on who's paying out and who's receiving.)

The other elements in the Excel RATE function are "type" and "guess". Type is either 0 or 1 and the default is 0. What is considered here is whether the payment is at the end of the period (0), or at the beginning (1).

An ordinary annuity, sometimes called "payments in arrears", involves payments made at the end of each payment period. Most loans fall into this category. You take out a loan and receive the money now but

don't start paying on it until the end of the first period; typically, a month.

An example of deposits made at the beginning of a period are life assurance premiums, which are called "annuity-due situations". Here, you're making payments in anticipation of services to be received during the coming period.

Excel starts the "guess" at ten percent. You can change that, but ten percent is the default. Then Excel starts an iteration cycle until the actual interest rate is discovered.

Where it sometimes falls down is that if it can't arrive at an answer that works out within 0.0000001 after 20 tries at it (iterations), it unhelpfully throws up a #NUM! error value.

Not a lottery

I've received my first lottery solution Excel template on disk from Belgium. Not that I could run it, because when I tried to open it, all I got was an error message that said: "VBA Dutch object library not found." Grateful as I am to any reader who takes the trouble to send me examples of their work, I want to nip further contributions of this application in the bud.

The lottery result is produced at random. No spreadsheet program is going to come up with the answer nor "better your chances" as they always put it — obviously if anyone ever cracked a solution, they'd keep it to themselves.

As to the lottery itself; let's hear no more in this column about this new tax on the poor.

PCW Contacts

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