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Foreword

I was one of those who did not like arithmetic and mathematics in school. It used to bore me to tears. Despite this, today I am an enthusiastic user of Excel and have been for years. Funnily enough part of what fascinates me are the calculation routines it offers.

The difference between Excel and those terrible mathematics classes of my childhood is that Excel makes mathematics a creative process. You can see what you are doing, you can see why you are doing it, and you can set up calculations which are so much more ingenious than anything you would be able to achieve using paper, pen and a pocket calculator.

I use Excel for anything and everything. All the way from small ad hoc tasks, like working out what my holiday will *really* cost me, to budgeting, producing invoices and other financial jobs. I also use Excel for word processing and 'desk top publishing' type production, where what I want is to present something as smartly and professionally as possible.

As well as including every calculation routine under the sun, Excel is also a terrific supplement to word processing. Roughly speaking Excel is more suitable than a word processor for any writing task which is not simply flowing lines of text (like this book), but consists of *columns, forms*, or any sort of vertical format, like formulae. Of course, Word and other word processors have brilliant form functions - but when it really counts there is nothing like a good spreadsheet, and in Excel it is really easy to adjust or alter your design. Excel is perfectly suited to produce anything containing illustrations, drawings or diagrams.

Besides this, Excel is a terrific tool for working with small indexes or collections of data, though funnily enough not many people realise this. The program calls this function a 'database' which is rather an exaggeration. Databases are usually able to link collections of different data, like a customer list and an invoice list. Excel cannot really manage this, but if you need a database containing just one list - like a telephone list

or an invoice list - then Excel is an cheap and easy solution. If you want to get involved with a real database then I would warmly recommend Microsoft Access - but that is another story.

This introduction to Excel is written for you if you are using the program for the first time in your life (and maybe have no experience with other spreadsheet programs), and do not feel you are a world champion mathematician, but have the courage to begin - and also for *you* who have maybe played with the program a little, and who might also have belonged among those with sharpened pencils sitting in the front row who stayed awake during maths class in school. In a nutshell, there should be something here to suit every taste.

The author

I am 36 years old and was originally a high school teacher with french as my main subject. After eight years as training manager in a large company, and with the programming course from one of København's largest business schools under my belt I took the plunge and went self employed, working to spread computer literacy and systems development in several european countries.

How to use this book

If you are totally new to Excel but have it installed on your PC, then you should read this book right from the beginning. If you have not even installed Excel, then you should start with the chapter entitled *Installing Excel* at the end of the book. If you have already worked with Excel a little you might feel that you can safely hop over the first chapters: *Let's get started* and *What is Excel?* If you have some practical experience with the program then choose things from the contents list which might be new for you: This could be things like: *Card indexes, Charts* or *Formulae and functions*.

Notation

- ⇒ Keys to press are shown by the use of italic text: eg. *Delete*.
- ⇒ Some times you will have to hold one key down while you press another. This is shown like this: *Ctrl+Delete*.
- ⇒ When you give a command from a menu, this is shown in a distinctive font: eg. **File, Open**.
- ⇒ The same font is used to refer to names and fields you see on the screen: eg. **File name**.
- ⇒ References to other chapters in this book, along with references to other books are in italic text: eg *My first accounts*.
- ⇒ Finally I must remind you how you use mouse clicks. When you read “click on the menu option **File**”, you should only click once. If it says “double click on the file’s name” then it means two clicks, the second quickly after the first.
- ⇒ Most dialog boxes are shown in 2D because 3D is harder to read. This is specified in EXCEL5.INI by the line
3ddialogs=0

I hope you enjoy working with what is in this book, and beyond. You will undoubtedly discover that using Excel can be a very enjoyable way to while away the hours and fill up otherwise useless time with entertaining and productive play.

Kåre Thomsen

Let's get started

This chapter is for those of you who have not used Excel before, but *already have Windows and Excel installed* on your computer. If you have not yet installed Excel, then go to the chapter *Installing Excel* at the back of the book.

When you are in Windows

When you are in Windows, find the icon for Excel in Program Manager.

Double click on the icon and Excel will start. If you cannot seem to find the symbol then try a double click on the Office or Excel group (if either one exists) to see if the icon is in one of them. If you still cannot find the icon anywhere, then Excel is probably not installed on your system.



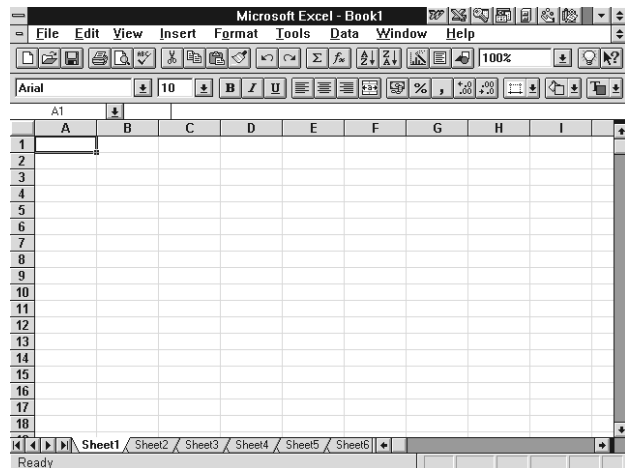
When you are in Excel

As soon as you are in Excel itself you are ready to work with a spreadsheet.

Let us have a more detailed look at what you can see on your screen.

At the top is the menu bar containing command options. **File**, **Edit** and the other menus are used for all kinds of tasks like saving, opening and editing your work. They will be covered as we come to them.

Immediately under the menu bar are two toolbars. These consist of buttons for you to 'press' - which you do by clicking the mouse. They are all activated by a single click, *not* a double click, which is what you used to start the program. Everything you can do by using the toolbar can also be done by using the menus from the menu bar above it. The buttons are there so you can save time by 'clicking' on commands you use the most. For instance, it is quicker to click on the printer symbol than it is to click on **File**, **Print**, **OK**.



Under the toolbar is the *formula bar*. You can always use this to check what a cell actually contains. At the left of the formula line you will see the cursor's position given as cell coordinates. In the illustration this is given as A1, as the marker is in column A, row one. This is also called cell A1.

Under this is your working area. This consists of columns, labelled with letters, and numbered rows. This white area is where you enter your numbers, text and formulae.

Below this is a row of tabs which are there to be clicked on. As you see **sheet1** is highlighted, because **sheet1** is on top. Every time you start a new set of computations - by which I mean open a new file - it is created to a standard pattern consisting of 16 empty, white spreadsheets laid on top of each other in a workbook. This is a new feature of Excel 5, and the idea behind it is that when you are working with budgets, or similar projects, these are often very complex affairs involving several sets of accounts (or parts of accounts) which interact with each other.

But it is up to you if you will use one or more flat spreadsheets at once. It is quite all right to delete the 15 you do not want to use and just retain sheet1. On the other hand, you can also expand your workbook so it consists of even more sheets, and you can rename sheets as you want. More about this in the *Workbook* chapter.

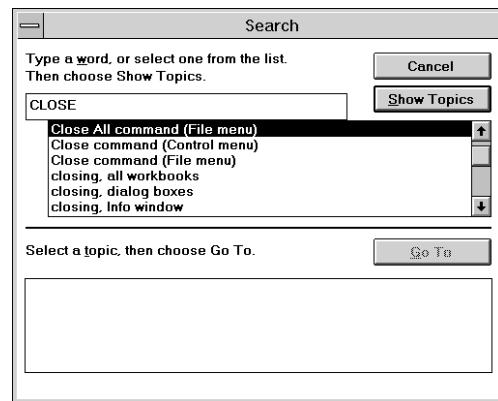
At the bottom of the screen is the status line. You can see here if OVERWRITING is switched on or not. Try pressing the *Insert* key and seeing if anything appears on the right hand side of the status line.

On the right is a scroll bar. It looks like an lift shaft containing a small square lift. You drag this up and down with the mouse to move around in a spreadsheet which is larger than can be shown on screen at one time. You can also click on the arrow at each end of the scrollbar to move a little more slowly. At the bottom is a horizontal elevator - a rolling pavement - which works in the same way.

Help

If you are stuck, press the F1 key. If you are in the middle of something you will be offered help with the task you are trying to accomplish. If you are not trying something specific you will see a dialog box which lets you search for specific help from a sea of possibilities. Let us try to find some help about the command [File, Close](#).

1. Press *F1* and click on the Search button, or use the menu command [Help, Search for help on..](#)
2. Type the word [Close](#) in the dialog box, as shown in the illustration.
3. Click on [Show Topics](#).
4. Click on the appropriate topic in the bottom pane: eg. [Close command, \(File menu\)](#).
5. Click the [Go to](#) button.



Now you can read the help text at your own pace. It is like having the manual always on your screen.

Select a topic, then choose [Go To](#).



[Close and Close All Commands \(File Menu\)](#)

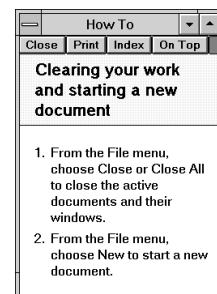
when it moves over them. Clicking once while it is a hand will give you more information about the subject highlighted.

Sometimes the help text is presented in a special 'How To' window. If you press the [On Top](#) button this will remain on screen, even if you exit [Help](#) by double clicking the top left hand button (the control menu box). This 'How To' window will sit over your spreadsheet so you can read it while following its suggestions. It is closed by clicking on the [Close](#) button.



You can also use the help button to get help, for instance for a menu command. Click on the button. The pointer changes to a question mark. Click on the command you want to know about, eg. [File, Close](#).

Notice the words highlighted in green. The mouse pointer changes to a little pointing hand



Your first calculations

How does a spreadsheet work?

Excel is a *spreadsheet*. You use a spreadsheet for calculations. For this reason it looks like squared paper. But to make it easy to comprehend every 'square' in a spreadsheet has a name - eg. A1. This is always composed of a letter and a number, giving the column and row respectively.

In this example text has been written in column A - but it could just as well have been numbers. Column B contains amounts. There is also a marker which can be moved around. Here this is on column B, row 4, also called *cell* B4. The marker is moved around the spreadsheet by using the arrow keys, or you can click on the cell where you want to do something.

	A	B
1	Nails	1200
2	Screws	1580
3		
4	Total	2780
5		

In principle every cell can contain one of three types of information.:

- a number, eg. **1200**
- text, eg. **Total**
- a formula or calculation eg. **=1200+1580** or **=B1+B2** as her in cell B4 (it is the result of your calculation which is displayed in the cell)

The information itself is entered by simply placing the marker where you want to write - and typing what you want.

Your spreadsheet can contain much more than just dry figures, formula and text. For instance you can include diagrams and drawings, and even record sounds if you have a sound card. Imagine that you double click on a cell, and it clearly 'says' to you "This result is corrected to four decimal places". This book cannot teach you to do this, but now you know it is possible.

To return to numbers, formulae and text: These are the linchpin for everything you do. Numbers and words do not need any special explanation, but what makes a spreadsheet such a useful tool is that it lets you use *formulae*. The formula in the example illustrated above (cell B4) looks like this:

=B1+B2

You can read this as "the number in cell B1 added to the number in cell B2". So why is this so clever? Precisely because if you change the number in either B1 or B2 the formula will promptly recalculate the total and you will see the updated result immediately.

You might remember trying to calculate using x, y and z when you were in your mathematics class at school, probably without really seeing any reason for it, other than that you had to. Here, however, you can see a creative example of the use of variables: Instead of using x, y and z you use *cell addresses*, eg. B1.

This facility makes your accounting flexible and suitable to be experimented with or used again. Altering the size of a payment, a percentage rate or a date will immediately show a new result on the bottom line. Everything is automatically updated.

Before we try creating a set of accounts you should learn something about the basic editing functions.

Simple editing

Place the cursor in a random cell and type:

Nails.↵

Now let us assume that you want to alter what you have just written in the cell. If this is the case double click on the cell. An insertion marker will appear. The *backspace* key (the large key on the upper right hand end of the keyboard, usually marked with a left pointing arrow) deletes to the left, while the *delete* key gobbles up anything to the right of the marker.

You can select (or mark) using the mouse by:

- 1) Positioning the mouse's insertion marker at the beginning or end of what you wish to select.
- 2) Holding the mouse button down while you drag the mouse over what you want to select.
- 3) Releasing the mouse button after you have selected what you want.

When (some of) the text in a cell is selected you can delete it by pressing the *delete* key. You can also overwrite it - as soon as you type anything, even a single character, EVERYTHING you have selected will be overwritten. Be careful when something is marked. If you do happen to delete something by mistake, then immediately click on **EDIT** up on the menu bar. A drop down menu will appear and you can click on the **UNDO** option. The text will return to how it was.

If you want to delete the entire contents of a cell, click (once) on the cell, or move the marker to the cell using the arrow keys. Then press the *delete* key.

If you want to delete the contents of several cells, begin by marking the entire area. Drag the cursor over the cells while holding the mouse button down. When all the required cells are selected, press the *delete* key.

Try setting up the calculations shown above on your own screen. In cell B4 write the following formula:

=B1+B2.↵

Now try altering the numbers in cells B1 and B2. The result on the bottom line should reflect the changes you make.

Formulae

=B1+B2 gives us the sum of the contents of the two cells. In theory all your formulae will be built up in the same way. The 5 basic mathematical operations use the following symbols:

+	plus
-	minus
*	multiply
/	divide
^	to the power of (2^3 is 2 cubed, eg. 2 multiplied by itself 3 times.)

Brackets are used around expressions following the usual rules, ie. if adding or subtraction are to be carried out before multiplication or division.

Let us try setting up a calculation:

We want a calculation in cell B9 which gives us the amount of VAT (Value Added Tax) on the total bill. In Denmark our VAT is set at 25%, so the amount is calculated by multiplying by 0.25, but before this can be done the cost of the three items has to be added together and the discount subtracted. The calculation ends up looking like this:

=(B3+B4+B5-B7)*0,25

	A	B	
1	Invoice		
2			
3	PC	1995	
4	Windows	79	
5	Applications	590	
6			
7	Discount	50	
8			
9	VAT		
10	Total		
11			

HINT! When you build up a formula as in the previous example it can be rather difficult to keep an eye on the cell addresses. To make it easier you can also use the mouse to create formulae. Let us try this using the same formula.


Start with an equals sign. Now Excel knows that you are about to write a formula. Then type the brackets. You cannot use the mouse to do this either, but now the cell address B3 has to be entered in them. This is done by either clicking on the cell or moving the marker up to it using the arrow keys. Watch the formula line. The cell address changes every time you click on something new. Only when you click on an operator (in this instance, the plus sign) is the cell address added. Now you can click on another cell, and then on the operator you want. Continue doing this until the entire formula is built up.

Managing your files

I assume that you only need to learn about this if you have never worked with Windows before. The methods here are exactly the same as those you use if you work with WinWord or other Windows programs.

Your calculations are always part of a workbook, which is made up of at least one sheet. In the following section the words file and workbook are used interchangeably. You can read more about workbooks on page 49.

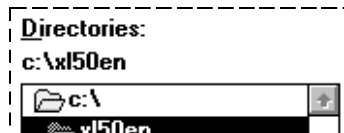
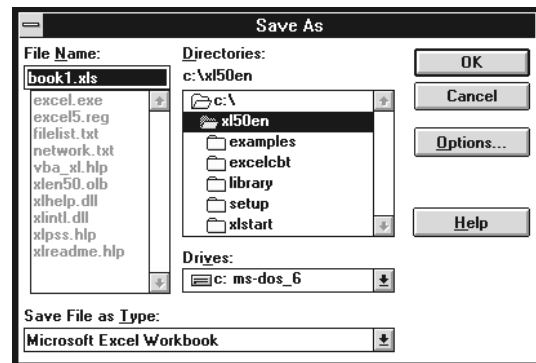
Save file/workbook

When you have created your calculations on screen you should save them. If you do not do this they will be lost as soon as you turn your PC off. Use the menu commands [File, Save](#) or click on the Save tool. 

A dialog box appears where you can give your workbook a name in the [File Name](#) field. You can use up to 8 letters and/or numbers. You may not use commas, full stops, spaces and similar symbols like &%\$ etc.

Finish by clicking [OK](#). Your workbook is now saved.

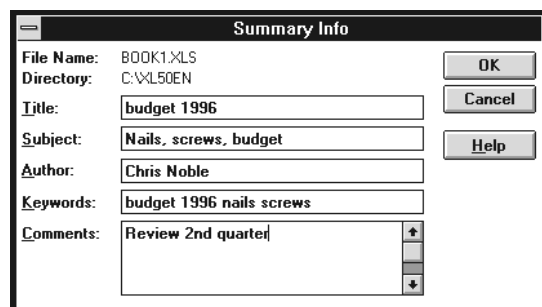
If you want to save your work in a different directory to the one suggested, then double click on the directory name in the [Directories](#) field. The list can be moved up and down by using the 'elevator' buttons at top and bottom.



Files are saved in a tree-like structure of directories. Files can hang like leaves on every 'branch'. You click yourself back to the tree's root by double clicking on C:\ in the Directories field.

After saving you will be presented with a dialog box where you can enter further details about your workbook. The only thing this information will be used for in future is if you are searching for a particular workbook. See page 12. It is good to get into the habit of filling in the [Title](#) field at least, even if you leave the rest blank.

When you click on [OK](#) the workbook is saved. Remember to save the workbook regularly by clicking on the save tool. The process of saving the entire workbook with any alterations and additions you have made is very fast, though you might possibly see an hour glass symbol for a moment.



If you exit Excel, by using the menu commands [File, Exit](#), or you close a workbook by using [File, Close](#) you will be prompted to save your work if there are any unsaved alterations or additions.

HINT! You can choose yourself if the document Info dialog box is shown when saving a workbook. Use the menu **Tools, Options** and then click on the **Standard** tab. Clicking on the **Prompt for Document Info** field will insert or remove a cross, with the result that you will be reminded (or not) to fill out this dialog box when saving a file.

Saving under another name

If you want to save a second edition of your workbook under a new name - so you have two originals, each with its own name - then use the menu item **File, Save as** and specify a new name and/or directory. It is just like saving a file for the first time, except that you give your old workbook a new name.

Opening a workbook



Click on the Open tool, and click yourself through the directory list as described in the previous **Save file/workbook** section. Double click on the name of the file you want, or click once and then on **OK**.

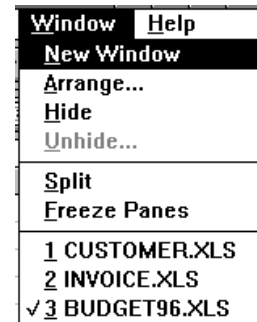
Creating a new workbook

Click on the **New workbook** tool.

More workbooks

It is all right to open a workbook, or create a new one, even though you have one on screen already. The workbooks are simply placed on top of each another. Move from one to the other by using the **Window** menu. Just click on the name of the workbook you want to see. All those which are currently open will be listed at the bottom of the menu.

If you want to see all the open workbooks on screen simultaneously, then click on **Window, Arrange All**.



Closing a workbook

Click on the menu option **File, Close** or double click on the document window control box (on the left of the menu bar, or on the left of the document title bar if the worksheet is not full size). You will be prompted to save the workbook if there have been any changes since the last save.

Closing Excel

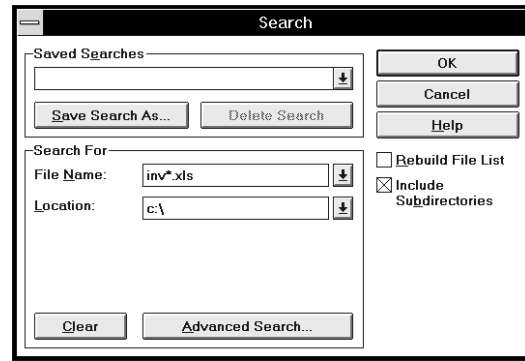
Click on the menu option **File, Exit** or double click on the program control box (extreme top left hand corner), or press **Alt+F4**. You will be prompted to save all the workbooks which have been altered since they were last saved, or which have never been saved.

Finding the right file

Let us assume you have a file (workbook) called **INVOICES.XLS** (or something like that - maybe **INVOIC1.XLS**). You know you have this file, but you cannot find it because you have forgotten which directory you have saved it in. It would be very irritating to have to search through every directory.

This is how you find your file:

1. Click on the menu option **File, Find file**.
2. Click on the **Search** button.
3. Type **INV* .XLS** in the **File Name** field. (* acts as a substitute for anything and everything. With this command you are also looking for **INV.XLS, INVOICE.XLS** and anything else fitting this pattern).
4. In the **Location** field you type the name of the directory you want to look in. To search the entire hard disk type **C:** and make sure the **Include Subdirectories** check box has a cross in it.
5. Click on **OK** - and wait!
6. You will be presented with a list of all the files found which fit your specifications. Click on the name of the file you want, and then on **Open**. The file will now open.



HINT! When you have the search dialog box open you can also click on the **Advanced Search** button, and then on the **Document Info** tab. Doing this allows you to search using the title or a keyword as parameters.

Autosave

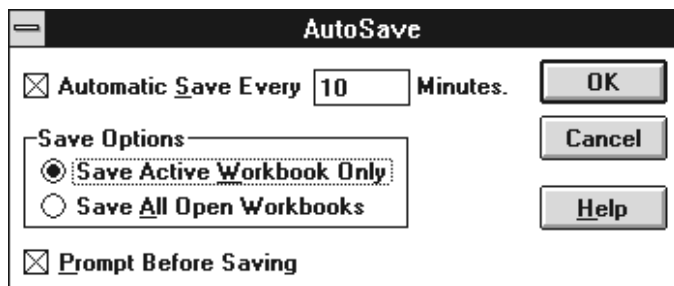
Of course, you will save your workbook regularly. If something untoward happens, like a power cut, or you make a fatal mistake you can always return to your saved version will not end up losing several hours work.

However you can also let Excel save your work automatically at regular intervals. This is done by using the menu option **Tools, Autosave**. As soon as you click on **Tools** you can see if the **Autosave** function is switched on. If it is there will be a tick (✓) in front of it.

If this menu option is not there, then go into **Files, Add** and check **Autosave**. This can be done, if you have installed Excel using the 'standard' option.

When the **Autosave** command is available and you click on it a dialog box will appear where you can choose how often the file should be saved.

You can also specify whether only be the current workbook should be autosaved, or all open workbooks. Finally, you can choose whether Excel should ask you before autosaving, or just do it automatically.



But what if you make a real mess of things, and then Excel comes along and Autosaves your mess? Do not worry. Autosave is not saving in the same way as you do. It saves the file in a hidden location, and deletes this autosave when you leave the program. If something goes wrong, like a program crash or a power cut, this autosaved version will not be deleted and next time you start Excel it will ask you if you want to open any autosaved files it finds.

This means that you cannot let Excel do all the work for you - you must still save your files 'manually', even though Excel is autosaving them automatically.

Moving, deleting and copying

Selecting

Before you move, copy, delete or format (in this context format means to change the appearance of) an area larger than one cell you will need to select the cells. Drag the mouse pointer over the area you want to select with the left mouse button held down. You will see the cells you drag over turn black. When you are satisfied with your selection, release the mouse button.

For instance, if you want to mark the area of the calculations you set up before, place the marker in one corner of the square of cells you want to mark. In this case this is cell A1. Now drag to the right and down with the mouse until the entire area is marked, and release the mouse button. In this case in cell B4. The marked selection now looks like this:

You can also select an area by using the arrow keys. Hold the *Shift* key (used for writing capital letters) down while you press the keys to move the cursor.

You can also mark several different areas at one time. You will need to hold the *Ctrl* key down while you are marking the next area. If you do not hold *Ctrl* down, then your first selection will be de-selected as soon as you begin the next.

A selection is cancelled by clicking on any cell, or by pressing an arrow key.

If you want to enter figures into a block of contiguous cells then mark the area first. Each time you press the *Enter* (\downarrow) key the marker will jump to a new cell in the marked area. This allows you to speedily enter figures into a row or column.

	A	B	C
1	Nails	1200	
2	Screws	1580	
3			
4	Total	2780	

Moving


The traditional method of moving something in a Windows' program is as follows:

- 1) Select the characters to be moved (or place the cursor in the appropriate cell, if just one cell to be moved).
- 2) Give the command **Edit, Cut** (or press *Ctrl+x*).
- 3) Place the cursor where you want to move the characters to.
- 4) Give the command **Edit, Paste** (or press *Ctrl+v*).

You can *always* use this method, and it will always work (except in some older Windows programs which use different key combinations). Excel, however, gives you an alternative and easier method:

- 1) Select the area required.
- 2) Place the cursor at the edge of the selected area. It will turn into a white arrow. Only when you see this arrow is your selection ready to move.
- 3) Hold the mouse button down while you drag the selected area around your screen. The selection will be pasted in in the position you release the mouse button.

As if this was not enough choice, you can also use the toolbar:

Instead of the **Edit, Cut** command, click on 

Instead of the **Edit, Paste** command, click on 

Copying

The traditional method for copying a block of text (or other object) in Windows is:

- 1) Select the characters to be copied (or place the cursor in the appropriate cell, if only one cell is to be copied).
- 2) Give the command **Edit, Copy** (or press *Ctrl+c*). The marked area will now be surrounded by a flowing dotted line.
- 3) Place the cursor where you want the copy of the characters to appear.
- 4) Give the command **Edit, Paste** (or press *Ctrl+v*).

If you want to remove the flowing dotted line and cancel your selection, press the *Esc* key (sometimes marked as *Escape*). As long as the dotted line is there you can copy the area it surrounds by placing the cursor somewhere new and pressing *Ctrl-v*.

You can *always* use this method, it will never be wrong. However, just like moving a selection, Excel gives you an easier method as an alternative:

- 1) Select the area required.
- 2) Place the cursor at the edge of the selected area. It turns into a white arrow. Only when you see this arrow can you copy your selection.
- 3) Hold the *Ctrl* key down while holding down the left mouse button and dragging the selected area around your screen. The selection will be copied to the position shown when you release the mouse button.

As a further alternative, you can use the toolbar to copy:



Instead of the **Edit, Copy** command, click on



Instead of the **Edit, Paste** command, click on

Easy copying

Notice that the spreadsheet cursor has a 'handle' on it.

You can quickly and easily copy the contents of a cell to the right or vertically down by:

- 1) 'Stroking' the handle with the cursor (without pressing the mouse button) - the cursor will change to a cross: +
- 2) Pressing and holding down the left mouse button while dragging either down or to the right.

	A	B	C
1	Nails	1200	
2	Screws	1580	
3			
4	Total		
5			
6			
7			
8			

You will end up with a screen picture looking like this:

Very clever, wouldn't you say! But there is better to come! Let us assume that you want to do your accounts for the first six months of the year. First you move the whole thing down one row (see the section on moving), and delete the superfluous **Total**. Above the figures in column B you now write: **January** (or **Jan**, or **Month 1** or whatever suits you best.)

	A	B
1	Nails	1200
2	Screws	1580
3		
4	Total	
5	Total	
6	Total	
7	Total	
8	Total	
9		

And now it gets entertaining:

Try copying **January** into the five cells on the right by using the handle!

	A	B
1		January
2	Nails	1200
3	Screws	1580
4		
5	Total	2780
6		
7		

→ cells on the right by

This is what happens:

	A	B	C	D	E	F	G
1		January	February	March	April	May	June
2	Nails	1200					
3	Screws	1580					
4							
5	Total	2780					

As soon as Excel can see that there is a pattern it fills out the cells with the appropriate values. It does not matter if the starting point is 1-1-95 or **January** or **1st quarter**. Try using the different options yourself.

If there are two cells looking like this:

Jan	Apr
-----	-----

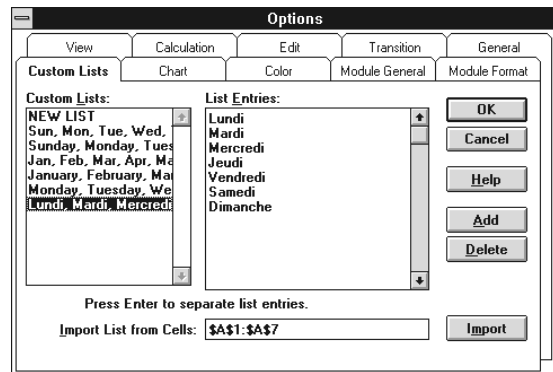
and *both* cells are marked the system knows that there is a three month interval and will repeat this as you move to the right. You will end up with **Jan Apr Jul Oct**.

HINT! You can set up a new series yourself. For instance, if you want the days of the week in a language your program does not give you, then this is how to do it.

- 1) List the days in a row or a column, typing them in the language you require.
- 2) Select the list.
- 3) Click on **Tools, Options**.
- 4) Click on the **Lists** tab.
- 5) Click on the **Import** button.
- 6) Click on **OK**.

	A
1	Lundi
2	Mardi
3	Mercredi
4	Jeudi
5	Vendredi
6	Samedi
7	Dimanche
8	

Your new list is now ready to use. Try writing Monday (or whatever the first day you have typed in) somewhere in the spreadsheet. Place the cursor in a cell and drag down or to the left and see what happens!



Copying formulae

Try placing the marker in cell B4 - where the total for January should be entered. This total should be given as cell addresses, not as figures. Type in the formula: `=B2+B3`

You can see the result of the calculation in the cell, and while your marker is there you can also see the formula on the formula line. (If you double click on the cell containing the calculation's result, the formula will be displayed here so you can alter it if you want.

	B5		=B2+B3		
	A	B	C	D	E
1		January	February	March	April
2	Nails	1200			
3	Screws	1580			
4					
5	Total	2780			
6					

Now we will assume that you have filled in the figures for the next five months as well:

	A	B	C	D	E	F	G
1		January	February	March	April	May	June
2	Nails	1200	1218	1254	1320	1322	1400
3	Screws	1580	1582	1596	1500	1460	1420
4							
5	Total	2780					

The only thing you need to complete your accounts are the totals for each individual month. You can make a lot of work for yourself by typing the formula in every column, or you can be smart and simply copy it. Grab the handle on the marker with the mouse, and copy the formula:

	January	February	March	April	May	June
Nails	1200	1218	1254	1320	1322	1400
Screws	1580	1582	1596	1500	1460	1420
Total	2780	2800	2850	2820	2782	2820

You will see that even though the original formula is being copied, it is not just repeated in every cell. The totals are different! The formula changes its cell references as it is being copied, so that it calculates the totals of the numbers above it.

When the formula `=B2+B3` is copied one cell to the right, the copy becomes: `=C2+C3`. This is called *relative copying*, but there is also another option, called absolute references, which is described in the next section. The standard, or default, is that formulae alter relative to their placing when they are copied. Instead of dragging the handle, you can also:

- Copy using **Edit, Copy** and **Edit, Paste**. When the latter command is given all cells that you want to copy to should be marked.
- Mark the cell containing the formula and all the cells where you want the formula copied to, then use: **Edit, Fill Right** (or **Fill Down**).

Absolute references

We will try another example. You have three different loans with a monthly interest rate of 2%. You want to see the monthly interest payments due on each loan. This is like this:

This formula will give the correct result for the first loan. But what happens if you just copy it? It will get 'out of step' with the cell containing the percentage, which every copy of the formula should read from the same place. Try it yourself!

The solution is called *absolute references* - meaning that the cell references are not altered when the formula is copied.

	A	B	C
1	Interest	2%	
2			
3			
4	Amount	Interest	
5	5000	=A5*B1	
6	6000		
7	7000		

You stop them changing by inserting a \$ (dollar) sign in front of the column and row co-ordinates (if they should both be fixed). In practice all you need to do is place the cursor in front of the cell address to 'lock' and press *F4*. Of course, you can also insert the dollar sign manually. In this example only cell B1 should have an absolute reference as the formula should use the same percentage rate on each loan amount.

The formula is now ready to be copied.

	A	B
1	Interest	2%
2		
3		
4	Amount	Interest
5	5000	=A5*\$B\$1
6	6000	
7	7000	

Undoing

Typing, deleting, moving and copying, along with any other action you carry out, can all be undone if you change your mind or make a mistake, by using the undo function. Click on the **Undo** tool.



And if you change your mind about changing your mind, click on the same tool again and undo your undoing!

Formatting

What can you do?

A better question is: is there anything you cannot do? You can use any installed font, in regular, bold, underlined, italic and in any size. You can specify how many figures your numbers should be corrected to, you can include a currency symbol or abbreviation (£, \$, Dkr, etc), you can automatically express numbers as percentages...

The general rule with formatting is: select the area you wish to improve the appearance of, and then make the alterations. You can either mark the cells you want as you would normally, or you can mark the whole row (or several) by clicking on its row number (appearing on the left hand side):

	A	B	C	D	E	F	G
1		January	February	March	April	May	June
2	Nails	1200	1218	1254	1320	1322	1400
3	Screws	1580	1582	1596	1500	1460	1420
4							
5	Total	2780	2800	2850	2820	2782	2820
6							

In this example you have clicked on the number 5 on the left. You can mark one or more columns in the same way.

HINT! You can select the *entire sheet* by clicking on the little square in the corner between A and 1.

As soon as you have made your selection, you can begin altering it. Generally the options given on the toolbar will be enough for your purposes.

Formatting toolbar

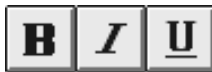
Letters

The formatting toolbar contains these buttons:



The first is what is called a combo box, and is activated by clicking on ↓. Using this enables you to choose which font you want to use. Which, and how many, depends on what is installed on your system. The next combo box lets you choose the size of your text (point size).

The next buttons are:



These make your selection **bold**, *italic* and underlined respectively.



These three buttons are used for the layout of both text and numerical values. Choose between left justified, centred or right justified.

The last button is used for centring in the marked field. Titles and headings look especially professional in this position. Let us try it out with the heading of this invoice. Begin by selecting the area where the text should be centred.

	A	B	C	D	E
1	Invoice				
2					
3	PC	9995			
4	DOS	995			
5	Windows	495			
6					
7	VAT	2871,25			
8	Total	14356,25			
9					



Click on The heading centres itself.

The next buttons are used for formatting numbers.



formats a number into a currency. Place the marker on the cell which is to be formatted (or mark an area of several cells), and click on the button. 200 becomes £200.00.



is used to show numbers as a percentage. The number 1 will be shown as 100%, 0.2 shown as 20%, and so on.



shows decimals. 200 will be formatted as 200.00 and so on.

Try selecting all the cells in our invoice that contain numbers, and then clicking on the decimal point button. Now our invoice looks much smarter:

Whoops! What has happened now? The number in cell B8 has changed into a row of hatch signs! This is because there is no longer room to display the entire number in the cell. Excel displays these symbols instead of showing an incorrect or misleading number when some figures have had to be left out because of lack of space.

	A	B
1	Invoice	
2		
3	PC	9.995,00
4	DOS	995,00
5	Windows	495,00
6		
7	VAT	2.871,25
8	Total	
9		

Before going any further with these buttons we will have to make column B a little wider.

- 1) Place the cursor on the vertical line between columns B and C. The cursor changes into two arrows with a vertical line between them. ← | →
- 2) Press and hold down the left mouse button.
- 3) Drag to the right.
- 4) Release the mouse button when the column is of the required width.

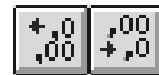
	A	B	C	D
1	Invoice			
2				
3	PC	9.995,00		
4	DOS	995,00		
5	Windows	495,00		
6				
7	VAT	2.871,25		
8	Total	14.356,25		
9				

HINT! Instead of dragging you only need to double click on the vertical line between B and C. The column will now expand to a width large enough to accommodate the widest entry in column B.

HINT! The height of the rows can be altered in the same way: by dragging with the mouse on the line between two rows (eg. Between rows 2 and 3).

And so to continue with the buttons:

Used to display a decimal place more or less, respectively. Every click increases/decreases the number of decimal places displayed.



is your frame and line tool. Let us look at the ironmonger's inventory again. This would look smarter with a line over the totals, and double underlining beneath them. First mark the totals:



Now click on the arrow by the frame combination button, and choose the symbol for a line above and double lines under.

	A	B	C	D	E	F	G
1		January	February	March	April	May	June
2	Nails	1200	1218	1254	1320	1322	1400
3	Screws	1580	1582	1596	1500	1460	1420
4							
5	Total						
6							

You can choose what you want from the options given here. Play around and experiment to find a style you like.

	January	February	March	April	May	June
Nails	1200	1218	1254	1320	1322	1400
Screws	1580	1582	1596	1500	1460	1420
Total						

these are your colour buttons. Make your colour screen - and the output from your colour printer if you have one - a little easier to understand, and maybe a little more attractive. The first button is used to choose a background colour, the second is for choosing the colour of your text.



Let us try improving the presentation of our trial invoice. First the word *invoice*. This should be in the *Times New Roman* font, and in 15 point.

- 1) Place the cursor in cell A1. (Even though this heading has been centred it still 'belongs' in cell A1, where it was written).
- 2) Click on by the font combo box on the formatting bar.
- 3) Use the scroll bars until you find *Times New Roman*, and then click on it.
- 4) Choose 15 points in the size combo box in the same way.

HINT! It is very entertaining - and quite wonderful - to sit and play with all the formatting options. But sometimes you are in too much of a hurry to do it, even though you want a layout which is a little more interesting than the default type-face in black and white. In these situations you can use the **Autoformat** command.

- 1) Select the area you wish to be automatically formatted.
- 2) Use the menu commands **Format, AutoFormat**.
- 3) Click on the different options. The box on the right will show you how each one will appear. Choose, for instance, **Classic 2**.

Your invoice now looks like this (and there are other many possible appearances):

	A	B	C	D
1		Invoice		
2				
3	PC	9.995,00		
4	DOS	995,00		
5	Windows	495,00		
6				
7	VAT	2.871,25		
8	Total	14.356,25		
9				

Invoice	
PC	9.995,00
DOS	995,00
Windows	495,00
VAT	2.871,25
Total	14.356,25

HINT! The toolbars can be switched on and off by using the [View, Toolbars...](#) menu. In the dialog box you can also switch [ToolTips](#) on and off by clicking the check box. ToolTips are the small explanatory boxes which appear automatically when you let the cursor stop over a tool button without actually clicking on it.

Copying a format

Let us imagine that your invoice is now formatted with yet another, new, appearance which you have spent hours of hard work creating.

The heading **Invoice** is shown in Times New Roman in bold and at a large point size. Above this is another heading: The PC shop. This should be in exactly the same format as **Invoice**. So all you need to do is copy the formatting.

- 1) Placing the cursor in the cell whose formatting you wish to copy.



- 2) Clicking on the [Format Painter tool](#).
- 3) Clicking on the cell the format should be copied to (or drag the cursor over all the cells, if there are more than one).

	A	B
1	The PC Shop	
2		
3	Invoice	
4		
5	PC	9.995,00
6	DOS	995,00
7	Windows	495,00
8		
9	VAT	2.871,25
10	Total	14.356,25
11		

Removing formatting

You can go back to a 'neutral' (default) format in a cell by:

- 1) Place the cursor in the cell (or select the cells if there are several).
- 2) Choose the menu commands [Edit, Clear, Format](#).



HINT! If you have altered the formatting in a cell or an area, you can undo your actions by clicking on the undo tool.

Your own number formats

Most users will be able to format numbers to give them the appearance they want by using the buttons on the toolbar, but there will be some situations where you want to define the number format yourself.

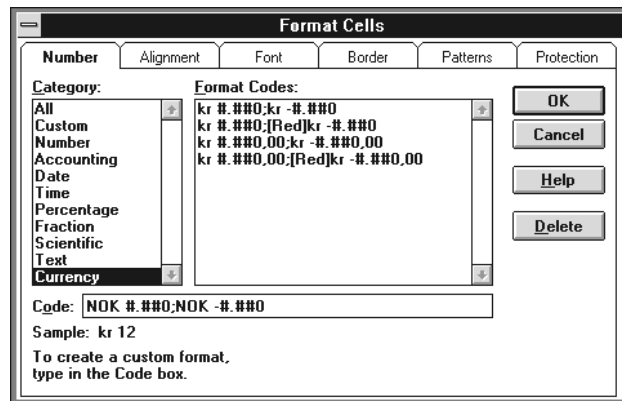
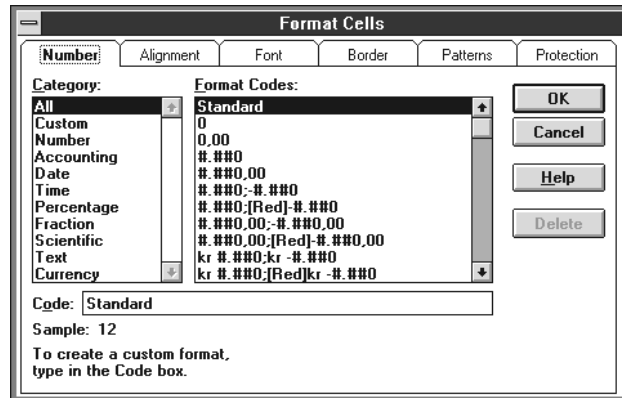
Let us say that you want to calculate with norwegian crowns, which should appear as Nkr and to two decimal places. You type the number 5 in a cell, and then want to format it as Nkr 5.00.

Give the menu command **Format, Cell**. Look at the dialog box. You are open at the **number** tab, but you can also see the tabs for formatting alignment, borders, fonts, patterns and protection.

In other words, you can use this menu option in a situations where you want a special format for cells, and what is available on the toolbar is not enough. Here we want to format a number, so the number tab option is the right one to use. On the left of the dialog box is the **Category** list box.

This is used to filter the choices shown in the **Format Codes** list box on the right.

When, as here, the category **All** is selected you can view every available formatting code. If you click on a specific category on the left, the right hand list box will only shows the codes available for that category. Try clicking on **Currency**, as what we want to insert is a format suitable for norwegian crowns.



The formats are built up around a semicolon. The format for a positive number is shown before the semicolon, following it is the format for a negative number.

The hatch (or number) symbol (#) indicates that a cipher will be shown only if it contains a value. 0 indicates that a cipher will always be shown. The comma shows thousands and the point is the decimal sign, unless you are working with a continental keyboard layout, when this is reversed. The colour is given in square brackets, eg [Red] for negative numbers. If there is a text prefix, eg £ or \$, then this is simply written where you want it to appear.

At the bottom of the dialog box is the **Code** field where you can enter your own format. First click on the format in the **Format Code** text box which most resembles what you want to use, eg £ #,###0.00; £ -#,###0.00. Now click in the **Code** field where the format is shown. Here you can alter £ to Nkr - (the formatting code you have chosen is not deleted, as you build on it, a new one is simply added).

Now you have finished defining your new code, click on **OK**

How to use your new number format

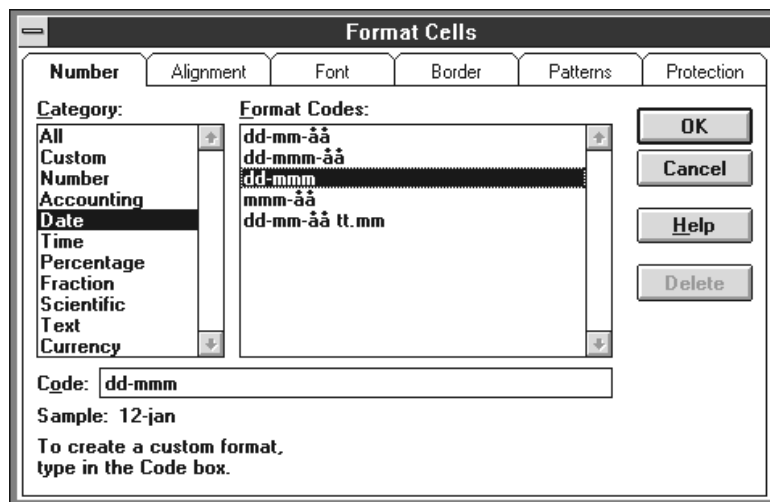
The format you have just created can be used everywhere in the workbook.

- 1) Place the cursor on the number which should be formatted as Canadian dollars.
- 2) Use the menu **Format, Cell**. You will be open at the **Number** tab.
- 3) Click on the category containing the format you want - this makes it easier to find your own formatted code. In the case of Canadian dollars you would click on the **Currency** category.
- 4) Click on the format code desired on the right hand side, and then on **OK**.

Remember that you can also use the Format Painter to repeat a format (see page 22).

Date formats

Formatting dates is a subject in itself. If you write 1-1 in any cell at random you will see that it is automatically formatted as a date: 1-Jan (this year). Now return to the same cell and type in the number 850. As soon as you press Enter (↵) the date 29-Apr appears. What is this all about? Try placing the cursor in the cell again, and use the menu commands **Format, Cell**. This will show you



that a date format has been chosen. You can always choose another one if you want, maybe one which includes the year if this is not already shown. If you do this you will find that the date shown is the 29th of April, 1902. A greeting from the past!

If you go in and choose one of the 'normal' number formats, then the number 850 will be shown again. In some way the number 850 is connected with the date 29th April 1902. Why should this be? The explanation is that Excel defines dates from a series of numbers which specify that the first of January 1900 is day 'number one'. The days are counted from this starting point. I am writing this on the 21st November 1994, which is the 34659th day of this century, so Excel defines it as day number 34659. When you want to use a date, write it in with a hyphen as shown, and then format it as you want.

Remember that you can set up your own calendar by copying using the marker handle, as shown in *Easy copying* (page 15)

More on formatting

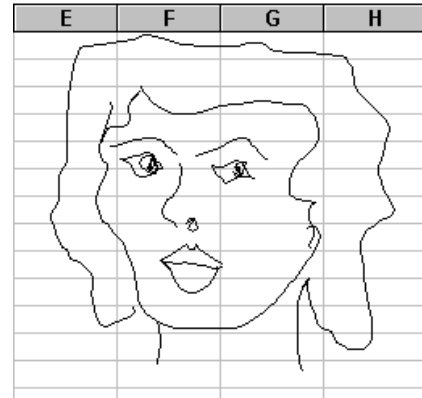
The section on *Styles* on page 53 shows you how you can save your formats as Styles. By doing this you have the option, among other things, of altering formats which have already been defined.

Drawings and decoration

The last time Matisse came to visit he sketched a little using Excel, just to show that it could be done. This is the result.

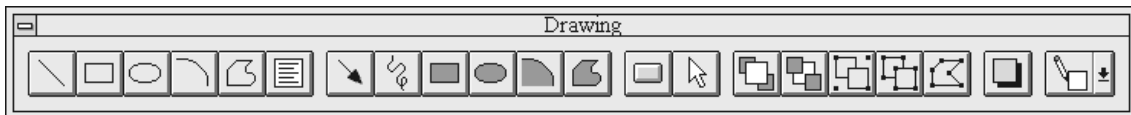


The only nearly original Matisse drawing produced in Excel! Before he began he displayed the toolbar containing drawing tools. He did this by clicking on the drawing tool. (Alternatively he could have used the menu: [View, Toolbars...](#), click the [Drawing](#) checkbox, then click on [OK](#)).



HINT! In general you can decide yourself if you want toolbars to be hanging around as independent windows in the working area, or if they should all be smartly and neatly together up at the top. If you want to separate a toolbar and turn it into an independent window then: place the cursor over the toolbar. Make sure that you are not touching any of the tool buttons but are over a free area.

Press the left mouse button down, and hold it down while you drag the toolbar down and over the working area. You will be able to see the outline of the toolbar on the screen very clearly. When you release the mouse button somewhere in the working area, the toolbar will be displayed where the outline was shown.



When you do not want to see the toolbar any more, then either double click in the control box - the small grey square to the left of the title bar containing the word [Drawing](#), or use the menu commands: [View, Toolbars...](#), and remove the cross from the [Drawing](#) checkbox and click on [OK](#).

You can also drag a toolbar which is sitting down in the working area up the top of the screen in exactly the same way. Place the cursor over the toolbar and press and hold down the left mouse button while you drag the toolbar up. Let go of the mouse button when the cursor is roughly where the toolbar should be. You decide whether it should be above or below any other toolbars. It is just a question of where you release the mouse button. Alternately you can just double click over an empty space on the toolbar and it will jump back into position. Just make sure that you are not touching any buttons when you do this.

This is how you draw



The first five tools from the left are used for: straight lines, rectangles, ellipses, curves and freeform shapes. Excel will remind you what each tool does if you position the cursor over a tool *without clicking* on it. After a second or two a ToolTip will be displayed as a caption containing the tool's name.

You use the tools by clicking on the appropriate symbol, and then drawing your shape in the working area by pressing and holding the left mouse button down where the line or shape should begin, dragging the cursor to where the line or shape should end, and then releasing the mouse button. When the drawing is selected, meaning that you can see handles around it, you can drag these handles to alter its size. If you hold the *Shift* key down while dragging the handles, the line will not move, simply change size. Similarly, pressing *Shift* will cause a circle or box to retain its proportions if you drag on a corner handle to change its size.

You select a drawing by clicking on it while the mouse cursor is in the shape of a white arrow.

The Freeform tool works by letting you draw a straight line, then change direction by clicking once, and then continuing with another straight line. Once you get used to it you can draw quite freely and creatively by using this technique. When you double click, the shape finishes.



The text tool is used to add a frame containing text to a spreadsheet. You can format the text as you want, and move or alter the frame by clicking on it with the cursor (when it appears as a white arrow) and then dragging the handles. The shadow effect shown in the illustrated text box is made by using the shadow tool on the far right of the toolbar.



The Matisse forgery shown at the start of this section was drawn using the freehand drawing tool.



Well, that is enough to get you started! See what happens when you press the other buttons. The options available can be used for many things, including designing questionnaires and forms which look more attractive than a visa application form for a south american dictatorship. The *Printing* section on page 45 should inspire you even more.

Formulae and functions

References

Cell references can be relative or absolute. Absolute references are specified by using a dollar (\$) sign. See the end of the *Moving, deleting and copying* section.

Naming cells

Putting formulae together can be a confusing affair in a large spreadsheet. You will often have to sit, find and then click on one complicated cell address after another. It is easy to end up with a formula containing a mistake.

Take the following calculations:

And this is just a simple layout, The formula is OK, but it would be much easier to understand if what was actually written in the last cell was:

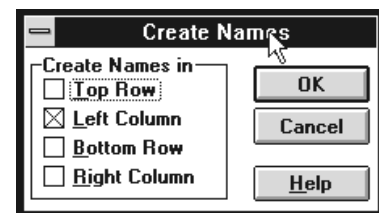
=Loan_amount*Interest_rate/Yearly_payments

	A	B
1	Amount	7.000,00
2	Interest rate	14,5%
3	Number of years	4
4	Periods per year	2
5		
6	Interest/period 1	=B1*B2/B4
7		

A *name* is created in this way:

- 1) Mark the cells to be named, in this case A1:B4. If there are names you can use shown on the left or above the cells, then include these in the selection.
- 2) Give the menu commands **Insert, Names, Create**.

As you have already selected the caption cells Excel 'knows' that the cells containing numbers (on the right of the selection) should be named after the cells containing text (on the left of the selection). Because of this there is already a cross in the **Left Column** check box. Accept this by clicking on **OK**.



Now click on cell B1. Up on the left of the formula line, where the cell co-ordinates are usually displayed, you will now see the cell's name: '**Loan_Amount**'

Try clicking on each cell, one by one. They have all been named after the caption cells on their left, even the result cell!

	Amount	7000
	A	B
1	Amount	7.000,00
2	Interest rate	14,5%

Now delete the formula in cell B6. We will try entering it again:

=Loan_amount*Interest_rate/Yearly_payments

This formula is *much* easier to understand, especially if you return to a spreadsheet you have not looked at for months.

Functions

As well as being able to build up formulae using the mathematical functions you know, you can also use functions which are already programmed into the spreadsheet. These functions allow you to carry out calculations which would either take a very long time to construct yourself, or which would normally be *impossible* for you to build up manually. For instance, the cost of an annuity loan, where from the details of the size of the loan, the length of the loan period, the number of monthly payments and the interest rate the payment you must make each year can be worked out.

There are a large number of inbuilt functions, divided up into mathematical, statistical, financial and so on. They are all built up after a similar pattern, and a practical little context sensitive button will help you find the right one.

The simplest function is the sum function, so we will start with that.



- 1) Enter some numbers in a column.
- 2) Click on the cell under your little column of numbers.
- 3) Click on the sum tool, and immediately the sum appears under the numbers. However, the formula is not =B1+B2+B3. It looks completely different: =SUM(B1:B3)

HINT! When you click on the Sum tool, the cells Excel thinks you want to summate are enclosed by a moving dotted line. If you do not agree with Excel, then mark the cells you want to sum with the mouse.

Common to the syntax of all functions is:

- They start with an equals sign.
- This is followed by the function's name (eg. SUM)
- The function's variables and parameters are enclosed by brackets and are separated by either commas (which mean 'and' or separate variables) or colons (which mean 'from-to').



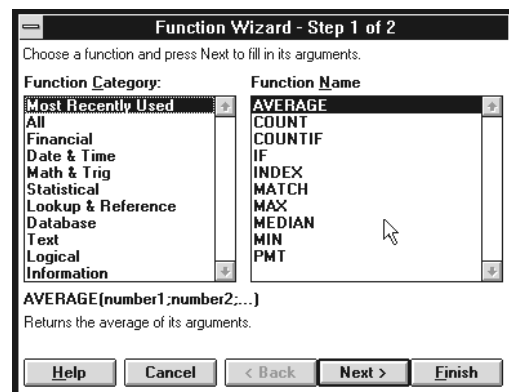
Function guide

When you want to enter a formula, the simplest way to do it is to use the function guide. Click on the button.

You will now be guided through a series of choices where all you need to do is answer the questions the program asks you. Any time you are not sure, then you can obtain further information by pressing the *FI* key for [Help](#).

Notice that on the left hand side you can select which functions should be available on the right hand side. At the top you can click on [Last used](#) which will let you see the function you used last. You can also click on [All](#), but that will make the right hand list *very* long. Usually you will only see a selection based on the category you have chosen on the left.

What clever things can you use these functions for? The following will illustrate some examples.



Financial functions

Here is an example which you can use for calculating a fixed rate loan - something which non accountants usually find very difficult. It can be very practical to work out exactly how much you will end up paying if you buy a new car or something similar where you have been offered a fixed rate of interest over a fixed term.

This is based on normal banking practice in Denmark where most loans are given on fixed interest rates, and payments are made only twice or four times a year. You may well have alter the figures given here to reflect what happens in your country, but the principle stays the same. If you make monthly payments, set the period figure to 12, and if the interest rate is variable, entering its current rate will show you the size of the payments until it alters again.

The formula looks like this:

=PAYMENTS(Interest_rate;Total_number_of_periods;Loan_amount)

A period is the amount of time between two payments, so the number of periods is the same as the total number of payments. There are a further two parameters, which are **fv** (future value of an investment) and **type**. These are used if you do not intend the pay the loan off completely, and to indicate when during each period a payment is made respectively. 0 (zero) indicates that payments are made at the end of each period, 1 (one) that they are made at the beginning.

Let us use the loan shown before:

This time we have typed in **Payments** at the bottom. What we want is a function which will calculate the payments due on the loan.

	A	B
1	Amount	7.000,00
2	Interest rate	14,5%
3	Number of years	4
4	Periods per year	2
5		
6	Payment	
7		

1) Place the cursor in the cell where you want the result

2) Click on the Function guide



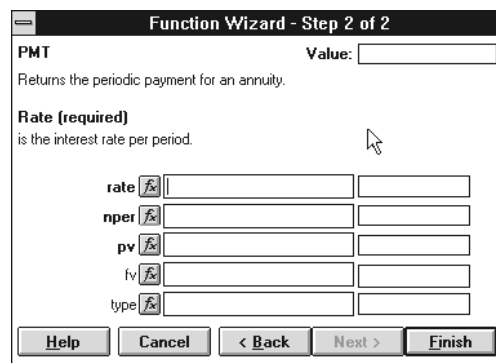
3) Choose **Financial** in the left hand box, and use the scroll bar to find the function called **Payments** in the right hand box.

4) Click on **Next**.

This dialog box will appear:

Remember: Do not enter *numbers* - use cell addresses! You can move the window around if it hides the cells you want to keep an eye on. Drag on the dark coloured (title) bar with the mouse.

The first variable is the **interest rate**. Click in the field named **interest** in the dialog box, and then click in the cell on the spread sheet containing the interest rate. In the example shown this is cell B2. BUT: You are actually asked for the interest payable per period, but the cell contains the interest rate per year. Payments for this particular loan are biannually. The yearly interest rate must therefore be divided by the number of periods (or payments) per year to give what is asked for here: the interest rate per payment period. So the first field,



where you have clicked in B2, should also contain a division sign, followed by the cell address containing the number of payments (B4):

Maybe using all these cell addresses sound a bit complicated, but what if the conditions of the loan change? All you have to do is fill in the new numbers and the formula will calculate your new payments - immediately!

But, to continue: Click in the **nper** field (number of periods - payments). For this little imaginary loan there are only two payments due per year. This means that the number of years should be multiplied by the number of payments per year:

Function Wizard - Step 2 of 2

PMT Value:

Returns the periodic payment for an annuity.

Rate (required) is the interest rate per period.

rate

nper

pv

fv

type

nper

Finally you should click in the **pv** field (now value) which is the actual amount of the loan. This is in cell B1.

You are now ready to insert the function. Click on **Finish**.

rate	<input type="text" value="B2/B4"/>	<input type="text" value="0.0725"/>
nper	<input type="text" value="B3*B4"/>	<input type="text" value="8"/>
pv	<input type="text" value="B1"/>	<input type="text" value="7000"/>

So if you borrow £7,000 over four years at 14.5% interest, making two payments a year, each half yearly payment will be £1,183.66. This payment is given as a negative amount, but the operator can be altered to a plus. You will see how to do this a little later in the book.

This is actually a useful little model, which can be used for any fixed interest loan. Save it as a kind of template and use it any time it is relevant. You can always change the amount of the loan, the interest rate, the period the loan is over and the number of payments. The correct payment amount will be automatically calculated by the function.

Mathematical functions

When you want to add a mathematical function, use the Guide tool.

Click on the left of the dialog box, on **Mat** and **trig**. You will be presented with a list composed only of mathematical and trigonometric functions. Most of them are not really useful for accounting and budget purposes, but they can be of great help if you work with mathematics. If this is the case I would recommend that you read the program's excellent help function.



For most of us the following is enough:

ABS	Gives the absolute value of a number. The absolute value of 2 is 2. The absolute value of -2 is also 2.
TRUNC	The integer part of a number. ie the decimal part of the number is chopped off. When you calculate with this number, <u>the decimal part of the number is no longer included!</u>
ROUND	Rounds a number off to a specified number of digits. Unlike TRUNC this can happen up or down. <u>The rounded off value is used in any further calculation!</u>
POWER	Shows the result of a number being raised to the specified power.
PRODUCT	Multiplies the arguments (the numbers or symbols you specify).
MOD	Returns the remainder from a division calculation.
SUM	Totals the arguments. This is what is used when you use the SUM tool.



The following gives some examples of how these mathematical functions are used.

Absolute values

The formula =ABS(number) should be mentioned here, because it can be used in connection with the payment result you calculated in the forgoing example. The payment appears in your spreadsheet as a minus sign number. Maybe you want it without a negative in front.

- 1) Double click on the cell showing the payment amount.
- 2) Edit the formula so that it looks like this:

=ABS(PAYMENT(B2/B4;B3*B4;B1))

- 1) The result shown in the cell will now be positive. Notice that the brackets used for the ABS function contain entire formula.

The result is that you will now see the payment amounts as a positive number.

Statistical functions

Once again you will find masses of functions which very few non specialists will ever use. The most ordinary are:

MAX	Returns the largest number from a list of arguments (values).
MEDIAN	Returns the middle value from a list of arguments (values).
MIN	Returns the smallest number from a list of arguments (values).
COUNT	Shows how many numbers are in a list of arguments.
COUNT.IF	Shows how many numbers fulfil certain criteria in a list of arguments.

MAX, MIN and MEDIAN

This table shows the number of goals scored by various football clubs over a certain period.

	A	B	C	D	E
1	Club	Points		Statistics	
2	Brøndby	19		Highest number of points:	
3	Frederikshavn	21		Lowest number of points:	
4	Hvidovre	8		Avg. number of points:	
5	Rungsted	31			
6	Rødovre	32			
7					

We now want to introduce some statistics on the right hand side. Use can use the MAX, MIN and MEDIAN functions for this. You can use the function's brackets to specify which area the function should calculate for, but this will happen automatically when you use the Guide function.

We will begin by finding the highest number of goals which have been scored during the season. The value will be shown in cell E2.

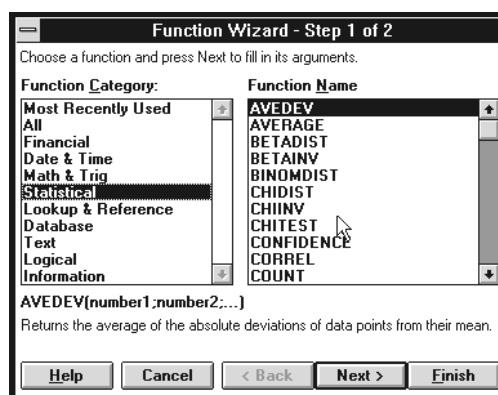


Place the cursor in cell E2 and click on the Guide tool.

Scroll down using the scroll bar until you come to the MAX function.

HINT! You can go directly to the functions beginning with M if you press the M key. Then click on MAX. Finally click on **Next**.

Notice that there are two fields which can accept values in the dialog box: **number1** and **number2**. **number1** is highlighted because it must be filled out - **number2** is optional.



Fill out the **number1** field by clicking in it. Select the area with the mouse. (Or you can write in the cell addresses if you feel like doing some typing).

Now click on **Insert** - and the formula will be placed in the cell.

	A	B	C	D	E
E2					=MAX(B2:B6)
1	Club	Points		Statistics	
2	Brøndby	19		Highest number of points:	32
3	Frederikshavn	21		Lowest number of points:	
4	Hvidovre	8		Avg. number of points:	
5	Rungsted	31			
6	Rødovre	32			
7					

Try inserting formula for MIN and MEDIAN in the same way.

	A	B	C	D	E
E4					=AVERAGE(B2:B6)
1	Club	Points		Statistics	
2	Brøndby	19		Highest number of points:	32
3	Frederikshavn	21		Lowest number of points:	8
4	Hvidovre	8		Avg. number of points:	22,2
5	Rungsted	31			
6	Rødovre	32			
7					

COUNT and COUNT.IF

COUNT and COUNT.IF are really useful. COUNT is used to count the number of cells containing values in an area:

E6		=COUNT(B2:B6)			
	A	B	C	D	E
1	Club	Points		Statistics	
2	Brøndby	19		Highest number of points:	32
3	Frederikshavn	21		Lowest number of points:	8
4	Hvidovre	8		Avg. number of points:	22,2
5	Rungsted	31			
6	Rødovre	32		Items counted	5
7					

COUNT.IF is used to count the number of cells containing a certain value in an area. Let us say that we want to find out how many clubs scored over 20 goals this season.

You may have noticed that this function cannot be chosen from the Guide tool - perhaps because it is so new it got forgotten when the finished product was being polished up. The easiest way to insert it is to type it directly into the cell. Remember the equals sign!

The COUNT.IF formula is used like this:

=COUNT.IF(area;"criteria")

Remember: a full stop between COUNT and IF - not a space, and also: the criteria must be contained within quotation marks.

So, how many clubs have scored more than 20 goals?

The formula appears on the formula line. Simple but effective!

E7		=COUNTIF(B2:B6;">20")			
	A	B	C	D	E
1	Club	Points		Statistics	
2	Brøndby	19		Highest number of points:	32
3	Frederikshavn	21		Lowest number of points:	8
4	Hvidovre	8		Avg. number of points:	22,2
5	Rungsted	31			
6	Rødovre	32		Items counted	5
7				Clubs with more than 20	3
8					

Logical (Boolean) operators

Any assertion has what could be called a truth value - *either* it is true, *or* it is not true. Mathematical assertions are built up using operators, some of which are these:

=	equal to
>	larger than
<	smaller than
>=	larger than or equal to
<=	smaller than or equal to
<>	different from

Logical functions start by making an assertion which can either be true or false. The following section will show you how to benefit from the most useful logical function of them all: the IF function. This is used to divide a formula so that one of two possible courses is taken, depending on the truth or otherwise of a defined assertion. What can this be used for? Well, for example:

- Specify that a note should be shown if a certain number is under a specified value eg. "ATTENTION; LOSS!"
- Make a function carry out one of two (or more) different calculations. eg. If a tax calculation is dependant on the amount of income, the formula can test the total first, and then 'say': Okay, the amount earned was under £16,700, so I will use calculation 1, otherwise I would have used calculation 2!. The same formula can be copied and used elsewhere, and will always use one or other of the calculations, depending how much income was earned.

IF

The function looks like this:

=IF(assertion;true;false)

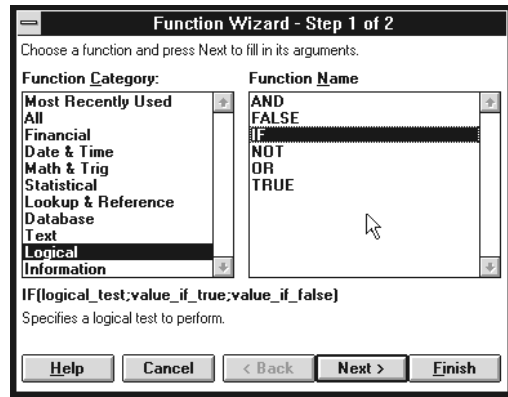
and it can be understood as follows:

assertion	carry out a test, eg. Is A5 < 2 ? (is the value in A5 less than two?)
true	Should be carried out/shown if the assertion is true.
false	Should be carried out/shown if the assertion is false.

For instance, if we create a set of accounts for the income and expenditure over the year's first six months. With an uneven income and expenses there may well be a loss in some of the months. We would like these to be marked with the word *LOSS*.

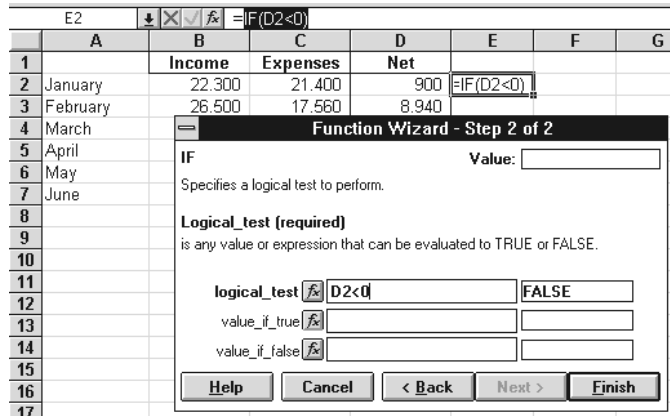
	A	B	C	D
1		Income	Expenses	Net
2	January	22.300	21.400	
3	February	26.500	17.560	
4	March	9.000	12.540	
5	April	28.000	28.000	
6	May	19.200	45.000	
7	June	11.000	5.000	
8				

Place the cursor in cell E2 and click on the Guide tool.
 Choose **Logical** functions and **IF**.
 Click on **Next**.

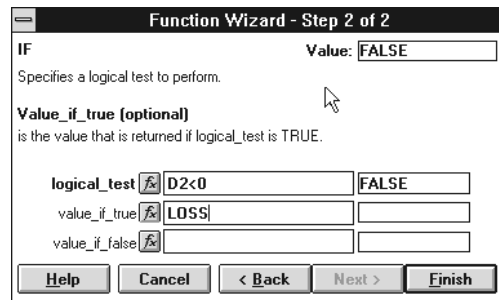


Fill out the **logical_test** field
 For this exercise we want to test if the number remaining in the **Remainder** column is negative.

This is done by using the expression **D2<0** (Remember: This is a zero, not the letter 'O'). This statement can either be true or false. At the moment it is false, as the dialog box clearly reminds you. But only after you have copied the formula in can it be used, and so meet conditions where it is true.



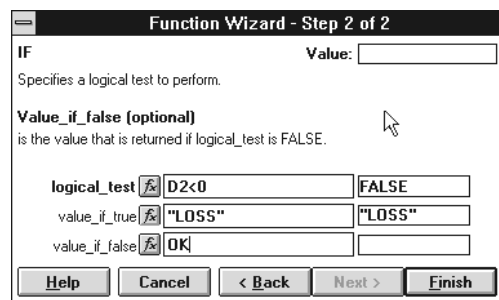
If it is true that the value in cell D2 is negative, then we want the function to write the word **LOSS**. Write **LOSS** in the **Value_if_true** field.



...and if it is false that the value in cell D2 is less than zero, then the function should give the message **OK**.

So that is what you write in the **Value_if_false** field.

Now you are ready to click on the **Insert** button.



The result is that the function writes OK, which is what it should as the number in D2 is not less than zero.

E2		=IF(D2<0;"LOSS";"OK")			
	A	B	C	D	E
1		Income	Expenses	Net	
2	January	22.300	21.400	900	OK
3	February	26.500	17.560	8.940	
4	March	9.000	12.540	-3.540	
5	April	28.000	28.000	0	
6	May	19.200	45.000	-25.800	
7	June	11.000	5.000	6.000	

Now copy the function to the remaining cells in column E (by dragging the handle on the cell marker as described on page 15).

The function writes a different message in cell E4, because the number in D4 is less than zero.

E7		=IF(D7<0;"LOSS";"OK")			
	A	B	C	D	E
1		Income	Expenses	Net	
2	January	22.300	21.400	900	OK
3	February	26.500	17.560	8.940	OK
4	March	9.000	12.540	-3.540	LOSS
5	April	28.000	28.000	0	OK
6	May	19.200	45.000	-25.800	LOSS
7	June	11.000	5.000	6.000	OK

This is a very basic example, but imagine if, instead of just instructing the function to write a message, you also asked it to carry out a calculation! Do this and things begin to look very impressive.

Imagine that you could take time off in lieu of any overtime you work. Your employer will give you 1½ hours off for every hour of overtime you work. BUT, if you have more than three hours overtime in a day, you may take two hours free for every hour over the first three hours overtime. In other words, your time off is computed by 1½ times the first three hours, then 2 times any further hours.

Start with the following set-up:

HINT! The dates are inserted as follows: Type 1-1 in cell A2 (note: the number 1, not the letter l). This will be automatically formatted as a date. If you are not satisfied with the format which appears, choose another you prefer from the selection made available by using the menu commands **Format, Cell**. (See also page 24).

	A	B	C
1	Date	Overtime	Calculated
2	01-01-95	1,0	
3	02-01-95	4,0	
4	03-01-95	3,0	
5	04-01-95	0,0	
6	05-01-95	2,5	
7	06-01-95	2,0	
8	07-01-95	5,0	

The formula to be used for calculating how much time off in lieu you will receive must first test how much overtime you have worked: Is it more than three? Some times it will be, other times it will not be, and so there are two different calculations which need to be done.

If there are less than or exactly three hours overtime, then the number of hours needs to be multiplied by 1½. If there are more than three hours, then 4½ hours should be given for the first three hours, and the remainder should be multiplied by two.

The formula looks like this:

=IF(B2<=3;B2*1.5;4.5+(B2-3)*2)

Let this stand for a minute. Read it slowly and carefully from left to right. "If the number in B2 is less than or equal to 3, then it should be multiplied by 1.5 - or 4.5 hours in lieu should be given for the first 3 hours overtime, and every hour over 3 should be multiplied by 2 and added to this."

Yes, you may need to digested this a couple of times before it makes sense. Try typing in the function, and then copy it to all the cells in the column.

	A	B	C	D	E
			=IF(B2<=3;B2*1,5;4,5+(B2-3)*2)		
1	Date	Overtime	Calculated		
2	01-01-95	1,0	1,5		
3	02-01-95	4,0	6,5		
4	03-01-95	3,0	4,5		
5	04-01-95	0,0	0,0		
6	05-01-95	2,5	3,8		
7	06-01-95	2,0	3,0		
8	07-01-95	5,0	8,5		
9	08-01-95	0,0	0,0		
10	09-01-95	0,0	0,0		
11	10-01-95	1,0	1,5		

More about functions

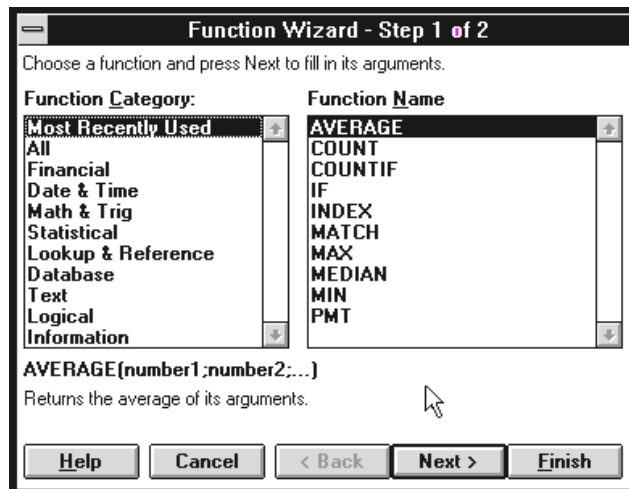
This is far from the whole story concerning built in functions in Excel - but these examples are certainly enough to get started, and encourage you to investigate what is possible. If you want to get even further into this subject, then there are more advanced examples in the book *Excel for experienced users* (planned for publication in the spring of 1995).

Editing functions

You can use the Function guide to edit a function which is already in place. Position the cursor in the cell containing the function, and click on the function guide. Now you can edit the function in the dialog box.

Last used

In the Functions dialog box you can choose the **Last used** category. This lets you choose from the functions you use most often.



Card indexes and lists

Excel has a number of functions which let you use your spreadsheet as a little database. These can be used for a simple card index, an invoice system, or a catalogue for your CD collection or whatever it is you fill your shelves with.

Such an application is traditionally called a 'database', but it is obvious that these functions do not have very much in common with an advanced professional database program. The first difference is immediately obvious. Excel is not able to get several tables to work together (so that, for instance, a customer reference number can be used to find the customer's name and address).

This example is a membership list for a little nature conservancy association in the danish towns of Gåserød and Sandholt. It is designed to keep track of member's names, addresses, telephone numbers, as well as if the member takes an active part in activities, or is just a passive supporter.

The card index can also be used for mail merges in WinWord (or other word processors). If you do this you can even carry out your selecting and filtering directly in WinWord.

Of course, you can also filter the list in Excel. For example, you could choose just to display list of passive supporters on screen.

The list function also includes easy sorting and a user friendly screen form which can show you one member at a time, together with their details. This is where you can search for a certain member, and add, edit or delete members. All in all a number of clever functions which can be developed into a very useful little system if you understand how to exploit them.

Basic rules

My suggestions are:

- Create a workbook which only contains your card index (read about workbooks on page 45).
- Start the card index in cell A1.
- Avoid empty column and rows.
- Insert the column headings in bold text, and everything else in regular text.

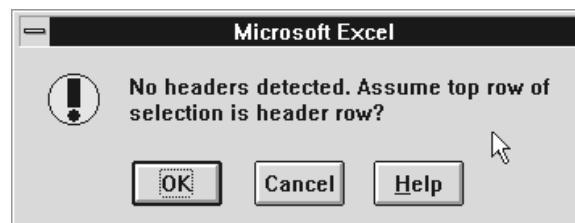
Creating your card index

First write out the lists headings over the columns on sheet 1 of a new workbook.

	A	B	C	D	E	F
1	FirstName	Surname	Address	PostalCode	Phone	Type
2						
3						

Your list is now set up and ready to receive members! Their details can either be typed directly into the columns, or you can use the screen form. As this is something new and exciting we will use this opportunity to try it out!

Place the cursor in cell A2 as is shown in the illustration (or anywhere in the area A1:F2). Click on the **Data** menu and choose **Form**. Excel asks:



Excel wants to know if the headings in row one should be taken to be field names. This is exactly what we want, so answer **OK**.

HINT! If you have already typed in even one member's details AND there is at least one column where the data type is 'not text' and contains a number (ie it is not blank), then you will not see this question. In the case Excel is able to recognise that the text at the top must be the field names. For instance, there could be an 'Age' column. In that case the word Age will be at the top, and all the cells underneath will contain numbers. Excel makes it very difficult to do anything wrong.

Now you are ready to enter details for the first member. The cursor is sitting and blinking in the first field: **First name**. Type in a christian name, and then move to the next field by using the *Tab* key, not the *Enter* key.

To go backwards (ie to the previous field) use the combination *Shift+Tab*.

When you are finished with this member, click on **New** and you are ready for the next one.

When you are tired of typing, click on **Close**.

Now we will assume you have been really conscientious and have entered the details of the entire membership of the Gåserød and Sandholt Nature Preservation Society.

	A	B	C	D	E	F
1	FirstName	Surname	Address	PostalCode	Phone	Type
2	Anni	Thorsen	Læstedet 67	9000 Gåserød		A
3	Jette	Sanders	Hovedgaden 12	9200 Sandholt		P
4	Karl	Gottleben	Bøgestien 46	9000 Gåserød		A
5	Minna	Ribelli	Svinget 7	9200 Sandholt		A
6	Anton	Bøgh	Svinget 9	9200 Sandholt		A
7	Jeff	Hansen	Holger Danskes vej 60	9000 Gåserød		A
8	Erik	Andersen	Kanonvej 6	9000 Gåserød		P
9	Mie	Luhlenssen	Lærkevej 46	9000 Gåserød		A

At the moment they are not in any sort of order, but you can filter and sort them to your heart's content.

Sorting

You have two tools for sorting:



for ascending order (the arrow should have pointed the other way, with the letters the other way around!)



for descending order.

Position the cursor in the column you want to the list to be sorted around, and click on the type of sort you want.

Try placing the cursor in different columns and sorting in both ascending and descending order. When the whole filing system is as you want it, then remember to save it using **File, Save**.

	A	B	C	D	E	F
1	FirstName	Surname	Address	PostalCode	Phone	Type
2	Erik	Andersen	Kanonvej 6	9000 Gåserød		P
3	Viggo	Brummer	Molbækvej 5	9000 Gåserød	9175 4287	A
4	Anton	Bøgh	Svinget 9	9200 Sandholt	8458 9820	A
5	Karl	Gottleben	Bøgestien 46	9000 Gåserød		A
6	Jeff	Hansen	Holger Danskes vej 60	9000 Gåserød	9154 7811	A
7	Anni	Hansen	Skovej 8	9000 Gåserød	9175 1860	A
8	Mette	Jensen	Skovstien 17	9000 Gåserød	9175 8744	A
9	Mie	Juhl-Jensen	Lærkevej 46	9000 Gåserød	9076 6488	A
10	Jens	Lerdam	Mirabellevej 18	9000 Gåserød	9176 5473	P
11	Minna	Ribelli	Svinget 7	9200 Sandholt	8457 2100	A
12	Jette	Sanders	Hovedgaden 12	9200 Sandholt	8457 3655	P
13	Anni	Thorsen	Læstedet 67	9000 Gåserød	9076 4511	A

Searching

You can also use the form to search for a particular member. Using the menus choose **Data, Form**. In the form, click on the **Criteria** button.

Let us try looking for a member who has the name Thorsen as a surname. Write the name in the **Surname** field. Click on **Find previous** and **Find next** until you have the member on the screen.

HINT! You can also use mathematical operators like < and > when searching.

Click on **Form** to return to the normal display. If you want to find a member whose name begins with 'Th' then just give this as the search criteria.

You can also search for all the members whose names end with the letters 'son'.

For this you use an asterisk - you write the criteria *son.

←
Members

FirstName:

Surname:

Address:

PostalCode:

Phone:

Type:

↑

↓

Criteria


Autofilter

Return to the list, without the form showing. Now you have the opportunity to use different filters, so that you just see a selection of the members sorted according to different criteria.

Use the menu commands **Data, Filter, Autofilter** (remember that the cursor must be in the list).

Combo box arrows will immediately appear next to your column titles.

	A	B	C	D	E	F
1	Fornavn	Efternavn	Adresse	Post	Telefon	Ty
2	Erik	Andersen	Kanonvej 6	9000 Gåserød		P

Now we want to see all the members from Sandholt! Click on the  next to the Town heading.

C	D	E	F
ss	PostalCode	Phone	Ty
vej 6	(All)		P
ekvej 5	(Custom...)	9175 4287	A
et 9	9000 Gåserød	8458 9820	A
stien 46	9200 Sandholt		A
r Danskes vej 60	(Blanks)		A
ej 8	(NonBlanks)	9154 7811	A
en 17	9000 Gåserød	9175 1860	A
vej 16	9000 Gåserød	9175 8744	A

You can choose between:

(All)All members.

(User...).....A selection further defined by you.

9000 Gåserød.....All members living in 9000 Gåserød.

9200 Sandholt.....All members living in 9200 Sandholt.

(Empty)All members where there is *no* entry under 'Town'.


(Not empty)All members where there *is* an entry under 'Town'

First try clicking on 9200 Sandholt. All the members who live elsewhere disappear from the list.

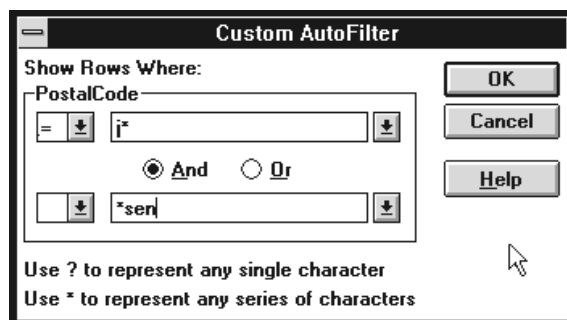
When you want to see all the members again, click on  and then on (All).


User-defined Autofilter

Now we want to see all the members with a surname beginning with J and ending with -sen.

Click on the  by **Surname**. Then click on (User). A dialog box will appear where you can choose between an equals or an unequal sign on the left, and specify on the right what the surname should be equal or unequal with. The dialog box also shows you what the asterisk (*) and question mark (?) are used for.

“All surnames beginning with J and ending with -sen” is specified as shown in this illustration:



Click on **OK** and your list will be filtered so that it only shows the members specified. When you want to see all of them again, click on  and then on (All).

Mail merge

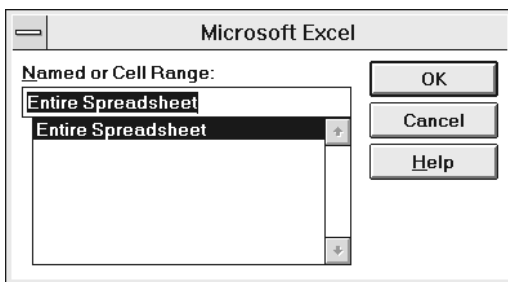
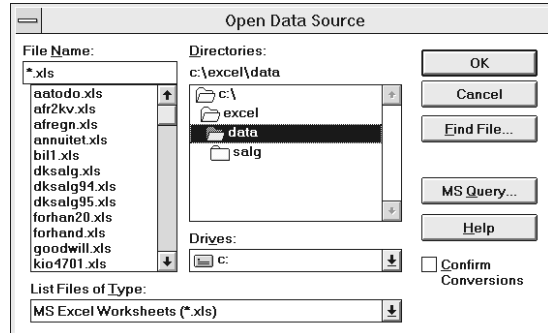
Your Excel 'database' can also be used to set up a mail merge in Word. A mail merge is when you send a 'personal' letter to lots of different people, where each individual's name and address is included in the letter.

In Word you create a standard letter using the command **Tools, Mail Merge....** First set up your main document. When you want to specify the name list then click on the **Get data** button, followed by the **Open data source** button.

At the bottom of the dialog box you should specify that you want to open an MS Excel spreadsheet (*.xls).

Click on **↓** and choose from the list.

Then navigate yourself to the spreadsheet file you want to use, and click on **OK**.



If you followed the advice I gave you on page 38, then you can choose **Entire spreadsheet**.

You can now insert merge fields in your main document.

A more detailed description of Mail merge will be included in the next edition of the *Word 6* book.

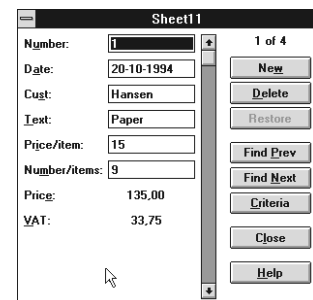
Lists containing calculations

Naturally your database can also contain fields which carry out calculations. If you set up a list which handles invoices, you can use such fields to calculate sales tax (VAT) etc.

	A	B	C	D	E	F	G	H
1	Number	Date	Cust	Text	Price/item	Number/items	Price	VAT
2	0001	20-10-94	Hansen	Paper	15,00	9	135,00	33,75
3	0002	20-10-94	Andersen	Pencils	18,00	8	144,00	36,00
4	0003	25-03-95	Jensen	Lamps	59,00	12	708,00	177,00

This spreadsheet includes formulae in columns G and H. The formulae are then copied as many times as you need - several hundred times if you want, and you do not have to stop there, they can always be copied further. These fields are not accessible for editing when viewing the Form.

When you type in a new entry the result of the calculation is not immediately shown in the appropriate field. Only after the *Enter* key is pressed, or when you move away from the entry and then return to it, will the result appear.



Printing

It is easy enough to print. All you need do is click on the Print tool, and the active sheet in your workbook will be produced by your printer (almost) immediately. By using the menu **File, Print...** you can also specify if you want to print more sheets from your workbook at the same time.



You can also choose to preview your printout on screen. Click on the Print Preview tool. You can zoom in and out by clicking.



Your printout will appear more or less like this. The entire table will be placed roughly at the top left hand corner of the of paper. Column and row dividers will be shown. This illustration does not show that a header and footer showing the file name and side number respectively are also included.

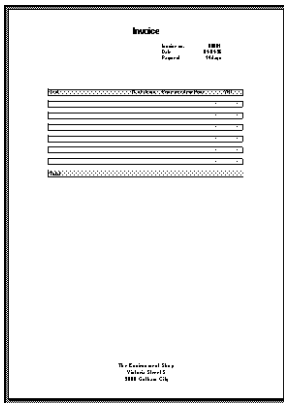
Nails	8
Screws	4
Bolts	6
Total	18

Let us see how we can improve on what is printed out.

In the following section I use an invoice as an example. If you combine this example with a database (page 38), a template (page 47) and a couple of macros you can build yourself an automatic system for managing your invoicing. But be careful, do not fine tune it too much! If you want a really precise system you would be better off using the Access database program.

Everything which needs to appear on the Invoice should be set up. Make use of formulas, frames, shadows and anything else you feel is necessary or attractive. For hints, see the section covering *Formatting*, page 19.

D11	=B11*C11				
	A	B	C	D	E
1			Invoice no.	00001	
2			Date	01-01-96	
3			Payment	14 days	
4					
5					
6					
7					
8					
9	Text	N. of items	Price per item	Price	VAT
10					
11					
12					



Our example above will end up being printed out as shown on the left. But for now we will alter a one thing at a time so we can end up with a presentable invoice. We want a header saying 'Invoice', and a footer containing the name and address of your firm.

The gridlines should not be printed, and the text of the invoice is nicely centred on the paper.

You will often be tempted to use a word processor for a job like this, but actually Excel is more suitable for documents which need 'vertical formatting' - like forms, printed columns and so on, and, of course, documents containing a lot of figures.

Print Options

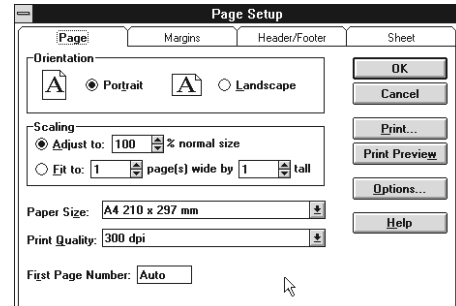


When you choose [Print Preview](#) (see the start of this chapter) you can go into [Options](#). Click on the tabs to alter various properties.

Page

This is primarily for choosing your paper orientation - whether you want portrait or landscape. Notice the [Options](#) button in this dialog box.

Changing these properties affects your printer set-up throughout Windows.



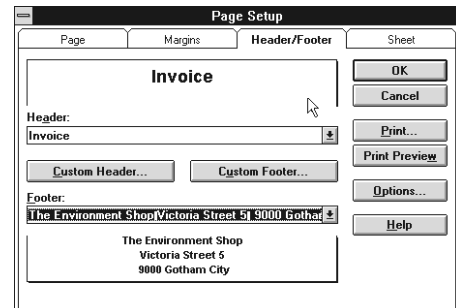
Margins

is obvious. Just experiment yourself.

Headers and footers

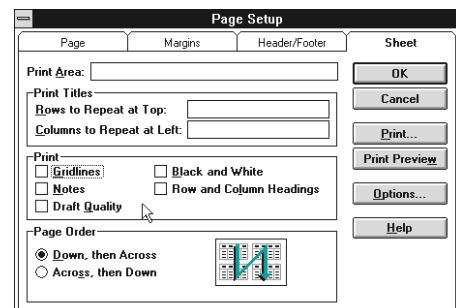
Clicking on the next to Header will show you a number of 'off the peg' suggestions. If these do not suit you, go into [Custom header...](#) and alter the text, font, point size and so on. Again, play around with this function yourself. One thing is certain, your header can be designed to look exactly as you want it to.

For an invoice you should have the **Invoice** heading with bold text, and the name and address of your firm as a footer.



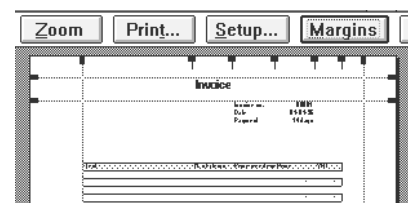
Sheet

What I want to especially point out here is the [Gridlines](#) option - which you use to choose whether or not to print the column and row lines. To present your invoice without these lines remove the cross from the checkbox by clicking on it. Notice also the option at the bottom of the dialog box: [Side order](#). By clicking on one of the radio buttons here you can choose which order the sides are printed out in when you are dealing with a really large spreadsheet. This is irrelevant for our little invoice.



Margins

In [Print preview](#) there is also a [Margins](#) button at the top which you can click on. This displays the margins as dotted lines which you can move by dragging with the mouse.



Workbooks

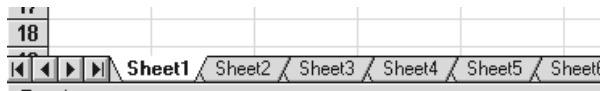
Up to and including Excel v.4 a spreadsheet was just a spreadsheet. Excel v.4 allowed the user to set up what was called a *Workbook*, which was used to manage several sides connected to each other, almost like keeping a number of sheets together in a ring binder.

Not surprisingly this concept was a huge success, so much so that spreadsheets in Excel v.5 are created as a whole workbook with a standard 16 pages. You may alter the contents of every workbook so that they include exactly the number of pages you require (minimum one, maximum 255). You can name the sides yourself, but they are created descriptively named [Sheet1](#), [Sheet2](#) etc.

HINT! You decide yourself how many empty sheets a workbook should open with as standard. Make the choice in [Tools](#), [Options](#), [General](#).

Sheets in New Workbook:

The idea is that each workbook represents a 'file', containing, for example, a database, a budget, a set of accounts, a set of charts etc.



At the bottom of the screen are the tabs in your 'ring folder'. All you need to do is simply click on the sheet you want to see. Click on the arrows on the left hand side to move to the first or last sheet, or backwards and forwards through the sheets.

You can change the order of the sheets by clicking on the sheet you want, then holding down the mouse button while you drag it to the required position. A little black arrow will clearly mark where the sheet will be inserted.

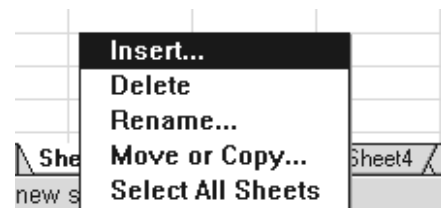
You can select several sheets at once by clicking on them while holding the *Ctrl* key down. This allows you to move several sheets at once.

HINT! You can jump from one sheet to the next by using the *Ctrl+Page Up* or *Ctrl+Page Down* key combinations.

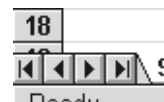
Right mouse button

The easiest way to make changes to the layout of your sheets is to use the right hand mouse button. Click the tab on the sheet you want to change, and then click with the right mouse button.

You can now insert a new empty sheet, delete the marked sheet or sheets, or rename the marked sheet.



Clicking with the right mouse button when the cursor is over the arrows on the left side of the screen will give you a list of all the sheets contained in this workbook. Click on the sheet you want to be displayed.



When your calculations grow

Maybe you already have spreadsheets where the amount of data has now grown so large that you cannot really take it all in at once, which makes working with it difficult. It can be a good idea to either A) divide your work between several sheets, *or* B) see different areas of the same sheet in different windows - at the same time.

Links

The figures can either be spread over several sheets in the same workbook, or be divided among different workbooks. The most practical thing to do is usually to keep related sheets together in one workbook.

To connect data together you create *links*: numbers which are copied from one sheet to another, but which are still connected. This means that if you alter a number in the sheet you copied from, it will automatically be altered in the sheet you copied it to.

Copying to make a link is done like this:

- Mark the cell or cells which are to be copied.
- Click on the copy tool or press *Ctrl-C*.
- Go to the sheet you want to copy to.
- Use the menu command **Edit, Paste Special, Paste Link**.

The copy will now be connected to the original number.

HINT! You can use the same method to create links between data in different programs, for example between a Word document and a spreadsheet (both ways).

The same sheet seen in different windows

BUDG94.XLS:4					BUDG94.XLS:2				
	A	B	C	D		A	B	C	D
1	January				73	February			
2					74				
3	Nails	8,00			75	Nails	12,00		
4	Screws	9,00			76	Screws	3,00		
5	Bolts	6,00			77	Bolts	7,00		
6	Total	23,00			78	Total	22,00		
7					79				

BUDG94.XLS:3					BUDG94.XLS:1				
	A	B	C	D		A	B	C	D
127	March				145	1. Quarter			
128					146				
129	Nails	8,00			147	Nails	28,00		
130	Screws	4,00			148	Screws	16,00		
131	Bolts	1,00			149	Bolts	14,00		
132	Total	13,00			150	Total	58,00		
133					151				

If it is absolutely necessary that your really wide and long spreadsheet must be on one sheet, you can always see the really important bits simultaneously, no matter how far away from each other they might be spread (over the nearly four million cells available in every sheet).

For every new window you want to open, you must use the menu commands **Window, New Window**. Nothing will appear to have happened, but now try giving the menu commands **Window, Arrange, Side by side**. Now you have the same sheet in as many windows as you have opened, and can scroll it to precisely the area you want to view.

Templates and styles

Templates

If you find yourself creating a spreadsheet with the same appearance and/or approximately the same contents again and again, using a template can save you time and effort. This could be a workbook which already includes certain formulae, with some formatting already in place on some of the sheets.

Creating a template

1. Open a new workbook
2. Edit it so it looks exactly as you want it to be.
3. Give the menu commands [File](#), [Save as](#).
4. Specify the file type to be [Template](#)
5. Give the file a name and save it in the required directory.

Save File as Type:

Template

Creating a new workbook using your template

If you have a template all you need do is :

1. Click on the [Open](#) tool. The [File type](#) field will now show [Microsoft Excel files \(.xl*\)](#).
2. Double click on the template's name. This will have an .XLT extension. A new, untitled, workbook will now be created which will be a copy of the template.

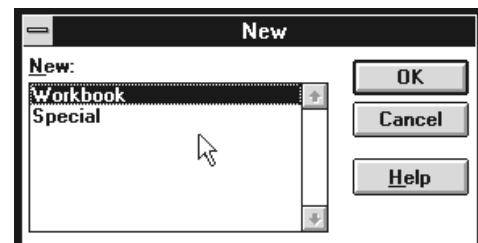


Start directory

What Excel calls your start directory is named XLSTART and is usually a sub-directory of the XL directory. This is where you place workbooks which you want to open automatically when Excel starts. If you save your template in this directory you will be able to choose it when you create a new project map.

For example; you have saved a template called: C:\EXCEL\XLSTART\SPECIAL.XLT

When you use the menu commands [File](#), [New](#) a dialog box will appear where you can choose between the standard template [Workbook](#) and the template you created yourself - which in this case is called [Special](#).



Styles

If you often use the same format, for example bold type on a yellow background and CN\$ (Canadian dollars) to two decimal places, then you can create a style which will automatically alter marked cells to this format. The big advantage is that you can add this formatting to existing data in a single operation. If you alter the style all the cells using it are altered similarly. If you are a Word user you will have met something similar there.

Excel comes with a number of built in styles. The number 58761.585 looks like this using the different formats:

58,761.59	1000 sep
58,762	1000 sep+.00
£ 58,762	Rounded currency
58761.585	Normal
5876159%	Percent
£ 58,761.59	Currency

The default style for all cells is the Normal style. You can redefine every style, whether it is built in or you have created it yourself.

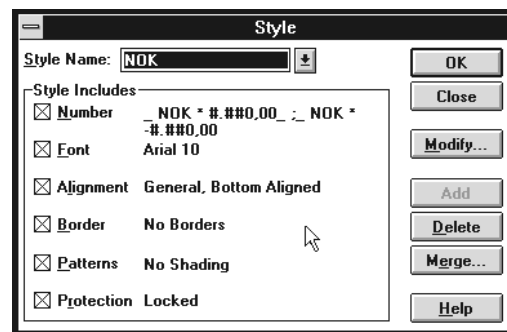
The styles you have created can be used in every sheet in a workbook. They can also be copied from one workbook to another.

Working with styles

The easiest way to create a style is:

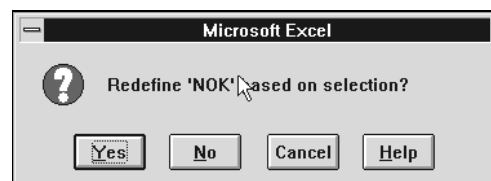
1. Format a cell so that it is in exactly the style you want.
2. Give the menu commands **Format, Style**
3. Type in a name for your style. The dialog box will show you what it looks like.
4. Click on **Add** and **OK**.

You can use the style in future by marking the cells to be formatted, clicking on **Format, Style**, choosing the style you want in the combo box - and then clicking on **OK**.



If you want to alter the existing style by using cells which already have an appearance you want to copy, then do the following:

1. Select the cell(s) which have the desired appearance.
2. Give the menu commands **Format, Style**
3. Type in the name of the style you wish to alter to the appearance of the selected cells.
4. Click on **Apply**.
5. Excel asks you if you want to redefine the named style to have the same appearance as the selected style. Answer **Yes** to this.

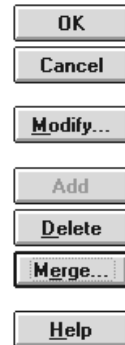


But be careful, there is a rather inconvenient bug here in Excel. Even if you answer **No**, the style is changed anyway. If you want to abandon our changes you must click on **Cancel**.

It is rather irritating that there are differences between the way styles are used in Excel and in WinWord. It would have been much better if both programs had used exactly the same methods. In Word you can mark some text, and then click on the style name in the style box on the toolbar. In all circumstances you are asked if you want to A) alter the marked text to the new style, or B) alter the style so it looks like the marked text. In Excel you have to overwrite the style name, as described above, to get this option.

You styles are available on every sheet in the current workbook. You can also copy them to other workbooks. To do this both workbooks must be open.

1. Go to the workbook you want to copy the style to
2. Use the menu commands **Format, Style**.
3. Click on the **Merge** button.
4. Click on the name of the project map containing the styles you want to copy.



If both workbooks contain styles which have the same name, but are actually different, you will be asked:

If you answer **Yes** the style in the receiving document will be changed to the style from the source document. If you answer **No**, no alterations will take place.



To end this chapter I would suggest you to read the chapter on formatting which starts on page 19. This should contain everything that you need to know to create formats which can then used to set up styles and save you time.

Charts

The pupils on my Excel courses always cheer up when we come to charts. I think there are two reasons for this. On the one hand they know that the hard mathematical gymnastics are over, and on the other hand they expect that working with graphics in Excel will be fun. They are right, charts are fun in Excel!!

At computer exhibitions and in shop windows, computer screens display an avalanche of pictures, charts and diagrams, probably because graphics are more attractive than screens filled with dry letters and numbers. But in the real world there are far more screens filled with numbers than with pictures, in spite of what the industry would have us believe.

Charts and graphs can be a really impressive method to communicate - if they are used correctly. In my opinion their use is only really justified in situations where they show something distinct, something surprising. It creates quite an impression if the most important data leaps out of the page at the reader. The message is received intuitively at a deeper, and perhaps more emotional, level than bare figures would have been.

I must add that figures *can* be made to appear much more impressive by using charts, if you want to attempt a deception (*not* something I would ever try myself, or expect you to try, but it *can* be done). An ordinary bar chart can make a 5% increase in income look as though you have suddenly become a millionaire.

Pie charts are very good if you want to illustrate the relationship between different numbers in one set of data, for instance, the percentage of export trade to several different countries.

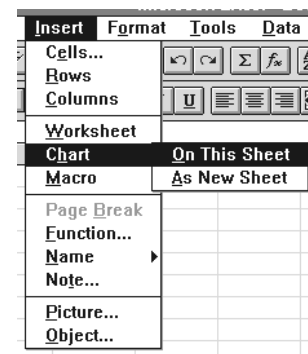
When you create a chart you can choose between two different options: A chart which is totally independent and fills an entire sheet itself (which is called a chart sheet), or one which is attached to a spreadsheet sheet and appears next to the figures it illustrates. This latter type sits in its own square frame which can be moved around and resized as you want.

Both types of chart are *dynamically* linked to the data they represent. This means that if you alter the figures, the chart automatically changes to reflect these alterations.

Create a chart

A chart is a pictorial representation of numerical data. So the first thing to do is to enter the data you wish your chart to show. Let us say that you wish to show the sales of nails, screws and bolts in the months of January, February and March. The numerical data and headings are selected as shown in the illustration.

Use the menu command **Insert, Chart**. You will be given the option of creating a new sheet in the workbook or adding the chart to the existing sheet. If you want a chart added to the existing sheet, ie *not* on its own sheet, then the easiest thing to do is use the Chart guide button. Clicking on this is the same as using the menu command **Insert, Chart** on the current sheet.



	January	February	March
Nails	5	8	9
Screws	12	14	19
Bolts	15	19	22



The cursor now changes shape to a + and the mouse can be used to define the frame to contain your chart. This is done by placing the cursor where you want one corner of your chart to sit, then pressing and holding the left hand mouse button down while you drag the cursor to where you want the opposite diagonal corner to be. Then release the mouse button.

What you do next is the same no matter what sort of chart you want. A dialog box appears where you can design the chart. First you must confirm that the selected area contains the numbers you wish to be illustrated. If the numbers are already selected as shown above, then just press the **Next** button. If not, then first you will have to select the cells you wish to show.

In the next dialog box you must choose what sort of chart you want: **pie**, **horizontal bar**, **bar** etc. Notice that some charts are in three dimensions, which can often be impressive. Try clicking on **3D bar** followed by the **Next** button. The next dialog box asks you to specify a format. Try format no. four, and click on **Next**. You will see a dialog box which allows you to choose what each bar should represent, in this case months or products. Accept Excel's suggestion by clicking on **Next**. In this final dialog box you can name your chart by typing in name in the **chart title** field. You can also give names to each axis. At the top of the dialog box you can specify whether or not a legend should be shown to the right of your chart. When you are satisfied with your choices, click on **Finish**. The chart is drawn.

Two ways to select an embedded chart

An embedded chart, eg. one which has been drawn on the spreadsheet itself, perhaps by using the chart tool, can be activated by clicking on it. Handles which can be used to alter its size appear on the chart's frame. Place the cursor next to one of the handles, press and hold the left mouse button down and drag until the frame has the dimensions you want. This can be done both in the corners and at the sides.

When the chart is selected it can also be deleted, moved and copied. See the section about this type of editing on page 14.

HINT! You can copy your chart into a Word document:

Select the chart by clicking on it once.

Use the command **Copy**.

Switch to your Word document.

Use the command **Paste**.

You can also select a chart by **double clicking** on it. The marking looks a little different this time.

This form of selection is the one to use when you want to alter the title, for instance, or make other alterations within the chart. Notice that your menus change when a chart is selected in this way. Clicking once outside the chart changes the selection back to an ordinary object selection as described above.

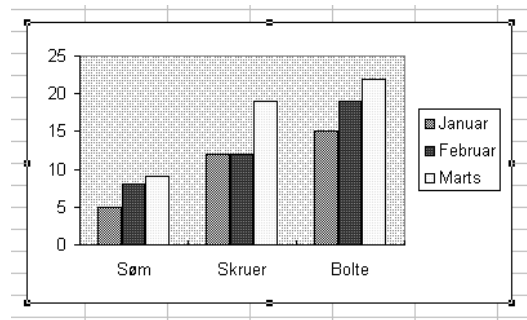


Chart toolbar

When your chart object is selected (after you have clicked on it), and there are handles around it, a **Chart** toolbar should be displayed and be available for use. If it does not appear, then use the menu **View, Toolbars**. Check the **Chart** checkbox by clicking on it, and then click on **OK**.



This button is used to alter the chart type. Click on **↓** and choose the chart type you want.



This is a 'return to default' button. No matter how you have set up your chart this returns it to the default pattern, a two dimensional bar chart with grid lines and a legend on the right hand side.

HINT! The default standard is built into Excel. You can, however, create your own default.

1. Create a chart object which is designed to look like the default you require.
2. Double click on the chart object to select it.
3. Give the menu command **Tools, Options**.
4. Click on the **Charts** tab.
5. Click on **Use the current chart**.
6. Give your standard a name in the dialog box which now appears.
7. Click on **OK**.
8. Click again on the **OK** button in the **Options** dialog box.



HINT! You can always return to the original standard.

1. Give the menu command **Tools, Options**.
2. Click on the **Charts** tab.
3. Click on **↓**.
4. Click on **(Built in) XX**.



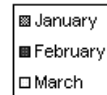
This is the chart guide - identical to the one on the toolbar at the top of the screen.



is used to insert/delete guide lines in a selected chart.

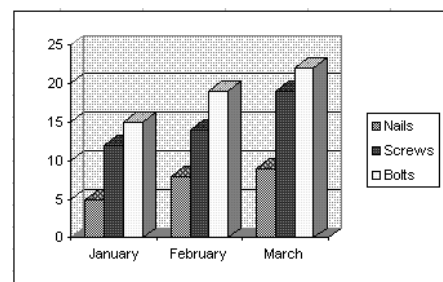
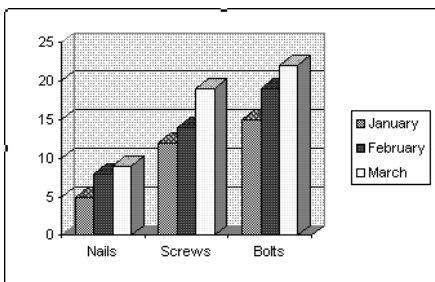
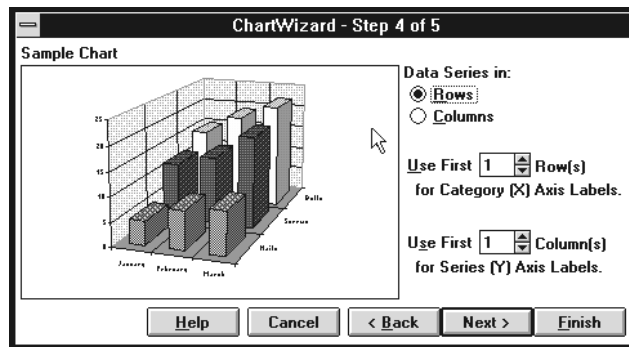


is used to insert/delete a legend for your chart.



Which perspective should I use?

Let us say that you are busy creating a chart to illustrate the data shown above. You want to set up a 3-D bar chart. At some stage during the process you will come to a dialog box which asks you to decide in which angle or direction the chart should be shown. Try creating a chart with the same data series presented in either rows or columns, and the difference will be obvious.

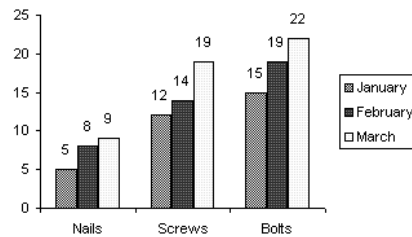


This is an example of the same data presented first as rows or and then as columns, ie. The one shows sales collated by goods type, the other by months.

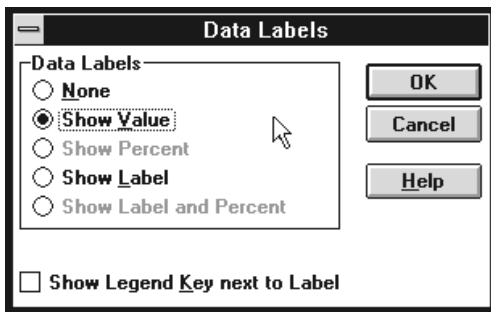
HINT! Even when the chart *has* been drawn, you can still alter the perspective as shown above. Click on the diagram so it is selected (or switch to the diagram if you have created it on a separate sheet), and then click on the Chart tool. A click on **Next** will bring you to the dialog box where you specify how the data should be presented.

Chart labels

What if you want every column in the chart to be labelled with its value?

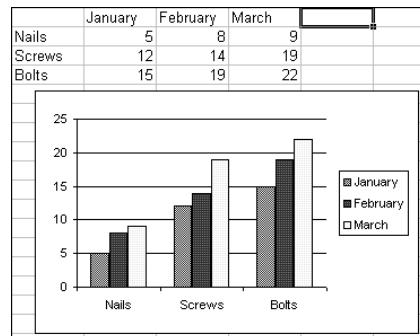


1. Double click on the chart object (or move to the chart if it is on its own sheet).
2. Choose **Insert, Chart labels**.
3. Choose what you want the labels to show in the dialog box which appears.
4. Click on **OK**.



Adding data

You can still add data even though your chart has already been drawn. If we use our chart as an example, at the moment it shows sales for January, February and March.



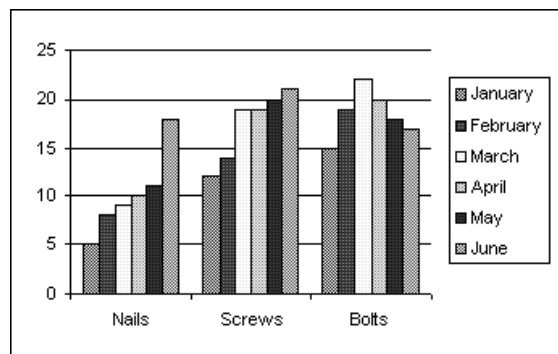
	January	February	March	April	May	June
Nails	5	8	9	10	11	18
Screws	12	14	19	19	20	21
Bolts	15	19	22	20	18	17

Now we expand the spreadsheet itself to include the sales for April, May and June.

The new data is added to our chart like this:

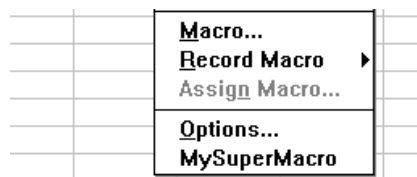
1. Select the new data as shown above.
2. Place the cursor at the edge of the selected area so it turns into a white arrow.
3. Press and hold the left mouse button down.
4. Drag down over the chart - and release the mouse button when the cursor is in the middle of the chart.

Abacadabra - now the chart shows all six months sales figures!



Macros

If you work a lot with Excel you will soon realise that you repeat some actions again and again - in exactly the same way. This can be something as simple as opening the same workbook day after day. If you record what you do in a *macro* it can be played back by pressing one key combination, or clicking on a menu option which you can create and name yourself and then add to the bottom of the **Tools** menu.



You can insert your own menu options for running macros at the bottom of the Tools menu.

You will usually create a macro by switching on a 'recorder', and then carrying out the actions you want the macro to repeat. This is the easiest way of doing things, so this is I will describe here.

There is a more difficult method of creating a macro - by programming it in Visual Basic, the common macro language for all the programs in Microsoft's 'Office' pack (WinWord, Excel, Access). This method is especially good for editing macros which have already been recorded. It is rather too technical for this booklet, however, so you will have to read about how to use it elsewhere.

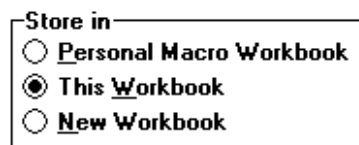
If you have never worked with macros before I would suggest that first you go through the *Example macros* section at the end of this chapter, and then read through the whole chapter again.

Where are macros saved?

Macros are stored as program code in a special module sheet. This sheet is stored in one of the following places.

- *Either* in what is called your personal workbook - which opens automatically when Excel starts. This means that the macro can be used anywhere, no matter what workbook you are using. Normally this workbook is open, but hidden. You can see it by using the **Window, View** menu command. It is hidden again by using **Window, Hide**. Your personal workbook is called PERSON.XLS and is placed in your start directory, which you can read more about on page 47.
- *Or* in a 'normal' workbook. The macro can then only be run when the workbook is open. This workbook can either be the one which was open when you recorded your macro, or you can choose to create a new workbook while creating your macro.

You decide in which workbook the macro should be saved in the **Options** window which you will see after you have used the **Tools, Record, Record new macro** menu command (if you begin recording a macro without having a workbook open, the menu to use is **File, Record new macro**).

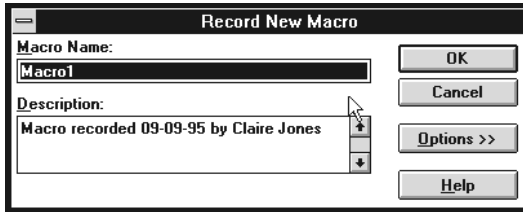


While you are recording a macro, an invisible programming magician writes programming code for you. Excel v.4 used a different macro language. Excel v.5 can use these macros, and you can also write version 4 macros in Excel 5, though some users have reported difficulty with both these functions.

Recording a macro

In theory all you need to do is follow these few 'simple' instructions:

1. Use the menu commands [Tools, Record, Record new macro](#).



2. Give your new macro a name in the dialog box - and give a short description of what it does if you want to.
3. Click [OK](#).
4. Do the things you want your macro to do. It will remember every single mouse click and key press *precisely*.
5. Click the stop button.

Absolute or relative references?

When you use the menu points [Tools, Record](#) you are given the chance to choose whether your macro should use absolute or relative references. The difference can be illustrated in the following example: While recording you move the cursor from cell A3 to A4. This can be understood in either of two ways:

Absolute reference:..... Move the cursor from cell A3 to cell A4.
 Relative reference:..... Move the cursor one cell down.

The relative reference will always move the cursor one cell down, the absolute will move it to cell A4. Unfortunately Excel has been set up so that if you just start recording a macro then the [Use relative references](#) command is not available (it is 'greyed out'). You can get around this by:

1. Create an empty macro (the name is of no importance) by using the menu commands [Tools, Record, Record new macro](#).
2. Notice which name is assigned to your macro, eg. [Macro1](#).
3. Click on [OK](#).
4. Click on the [Stop](#) tool.

Your macro does not actually do anything - it is just a dummy. Now you have to delete it by using the menu commands [Tools, Macro](#). Click on the macro's name (eg. [Macro1](#)), and then the [Delete](#) button.

The result is that you can now use the menu command [Tools, Record, Use relative references](#). When a tick ✓ appears next to this menu point it means that relative references will be used in the macro you are about to record. No tick means that absolute references will be used.



Playing back (using) a macro

Here is the principle method

1. Give the menu commands **Tools, Macro**.
2. Click on the macro's name, and then on **Run**.

Alternatively: Use the key combination you have assigned to be the *Shortcut key*. See the example in the following section.

Further alternative: If you have created a menu command in the **Tools** menu, you can click on it just like any other command. An example of this also appears in the next section.

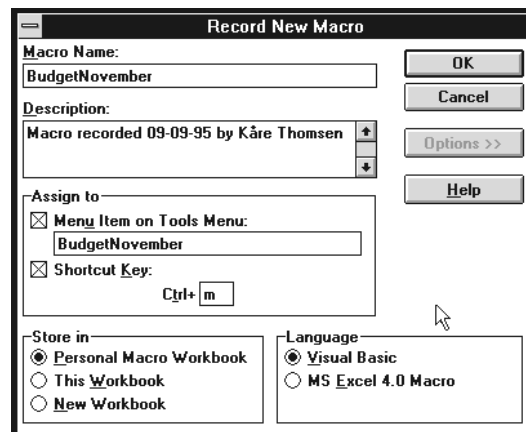
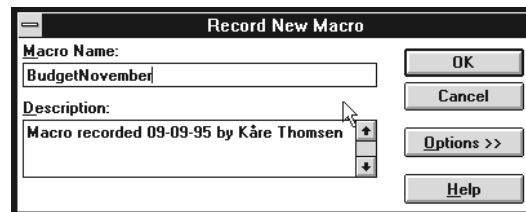
Macro Samples

A macro to open a specific workbook

Let us try recording a macro which will automatically open the workbook C:\BUDGET\NOV.XLS. Of course, this is an example using one of my workbooks, but you can adapt it for one of your own. The aim of this macro is that you only need press the *Ctrl+m* keys (or whichever combination you specify) to open a workbook you use often. We will also add a command, called **BudgetNovember**, to the **Tools** menu, and this can also be used to run our macro.

We will assume that you have a workbook which has the name shown above. If not, then just substitute your own file name for that shown here.

1. Give the menu commands **File, Record, Record new macro** (or **File, Record new macro** if no workbook is open).
2. Give your macro a name, eg. **BudgetNovember**.
3. Click on **Options** to see if there is anything you want to change.
4. And there is: Click on the check box titled **Add to tools menu**. Then write the text you want to appear on the **Tools** menu in the text field. Clicking on this command on the menu will run the macro.
5. Click on the **Shortcut key** checkbox and type in the letter **m** (or accept Excel's suggestion). This will allow you to run your macro by typing *Ctrl+m*.
6. Click on the radio button entitled **Personal Workbook**. When a macro is saved here it can be used anywhere in Excel. If you select **Current workbook** then it can only be used in the current workbook (eg the workbook you are in while recording the macro). You can also select **New workbook**. Funnily enough, if you do this, then the macro will be saved in a new workbook which you will have to open before you can use it.
7. Now we are ready to roll, so click on **OK**.



8. We now record the macro itself. Carry out all the actions you want the macro to execute, which in this example are the following:
 - **File, Open.**
 - Click on the file called **NOV.XLS** (you might have to navigate through to the **C:\BUDGET** directory).
 - Click **OK.**
9. That was all that this macro needed to contain, so end the recording by clicking on the **Stop** tool. Your macro is now finished and ready for use.



Close the **NOV.XLS** file. Now try opening it by using your macro. You can do this by using one of three different methods:

- Either by using the *Ctrl+m* keys.
- Or by using the menu points **Tools, BudgetNovember.**
- or by using the menu point **Tools, Macro**, then clicking on the macro's name, **BudgetNovember**, and then on **Run.**

When you later exit the program Excel will ask you if you want to save your personal workbook where the macro has been stored (so that it is available everywhere within Excel). Answer **Yes** if you want to save your macro.

A macro using relative references

This example is just as simple as the previous one. This makes it too simple for use, but it will do as an example. Try it, it will inspire you to think of more complicated and interesting macros.

The entire macro will be used to subtract one number from another. After you have positioned the cursor under two numbers and activated the macro a formula will be inserted into the cell which will subtract the lower number from the upper one.

12584
7585

This macro will use relative references so it will always work for the two cells above the cursor position, and not just for the same two cells every time. So, use the menu commands **Tools, Record** and check to see if there is a ✓ next to **Use relative references**. If no tick is there, then click on the command.

Macro...	
Record Macro	Record New Macro...
A ssign M acro...	<input checked="" type="checkbox"/> U se R elative R eferences
O ptions...	M ark P osition for R ecording
M ysuper M acro	R ecord at M ark

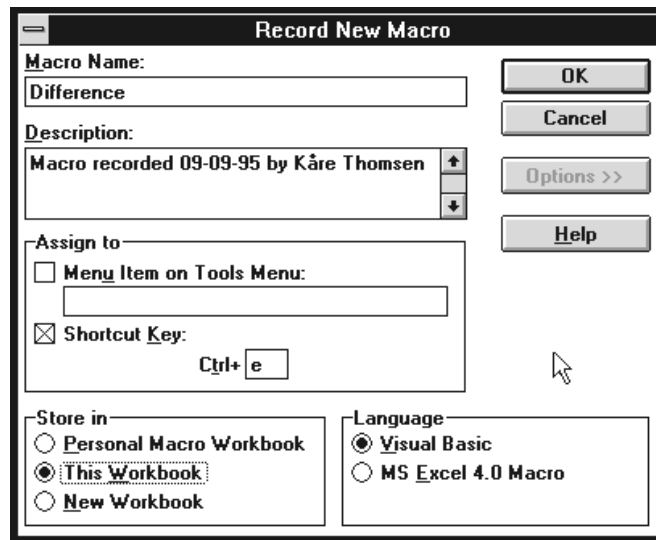
Before we record the macro, let us create some numbers to use it on. Place the cursor as shown in the illustration.

	A	B	C	D	E	F	G
1		January	February	March	April	May	June
2	Income	12584	13540	13850	12800	14587	16230
3	Expenses	7585	6250	4751	6528	9874	6874
4	Rest						
5							

Now we are ready to record.

Give the menu commands **Tools, Record, Record new macro**.

Call the macro **Difference**, and click on **Options**. Fill out the dialog box as shown in the illustration. I suggest that you use **Ctrl+L** as a shortcut key. Notice that this time we are storing it in the **Current workbook**, but you can decide for yourself where you want it. If you are not sure then reread page 54. Click on **OK**.



Now you are back in your spreadsheet and should carry out the actions you want your macro to 'remember'.

- Type in an equals sign.
- Click on the upper figure.
- Type in a minus sign.
- Click on the lower figure.
- Press the *Enter* key. You have now entered a formula which subtracts the lower number from the upper one.
- End the recording by pressing the **Stop** tool, or by using the menu commands **Tools, Record, Stop recording**.

12584
7585
=B2-B3

While your workbook is still open, try positioning the cursor under any two numbers and running your macro. This will insert a formula which subtracts the lower number from the upper into the active cell. The quickest way to run your macro is to use your shortcut key, which in this case is **Ctrl+L**.

When you save your workbook, your macro will automatically be saved with it. It now sits in a special sheet which is at the end of the workbook, and is called **Modul1**. You can jump to this tab by clicking on the arrow symbol at the left on the bottom of the screen.



Now click on the **Modul1** tab so that you can view the sheet and see what your macro looks like in program code. Just to satisfy your curiosity. Read more about sheets and workbooks on page 45.

A button for your macro

If a macro is to be used in a certain workbook or template it might be an idea to draw a button which you can click on to run it.

For example you could have a button which saves your file (maybe with several different names) and exits the spreadsheet. Use your imagination to find something you will find useful.

	January	17
	February	45
	March	32
	April	4
	May	21
	June	3
	July	5
	August	9
	September	18
	October	29
	November	40
	December	46

First you need the drawing toolbar on view. Click on the Drawing tool or on [View, Toolbars...](#) Cross the [Drawing](#) checkbox (by clicking on it) and then click on [OK](#). There is a button tool on the toolbar which will now be displayed at the top of your screen. Click on this tool once. The cursor turns into a cross. Position this cross where you want the upper left hand corner of your button to be. Press and hold the left mouse button down while you drag over to where you want the bottom right hand corner to be.

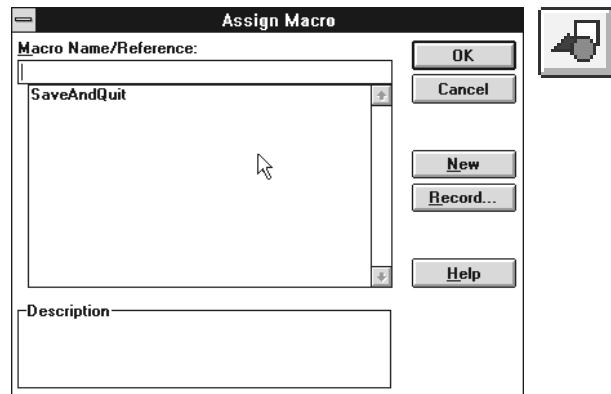
Release the mouse button. Now choose a macro from the macro dialog box and click on [OK](#), or click on the [Record](#) button and record a new macro.

When you have chosen a macro *or* recorded a new one return to the button you have placed in your spreadsheet. Click in it to delete the name and write in a new one. [Macro1](#) or [Macro2](#) are not really very descriptive! If you want to alter the button's size, or its caption, then click on it with the right mouse button.

You will see that the edge of the button alters form, and you can drag on one of the handles to make it larger or smaller. The button is moved by placing the cursor on the edge of the button, but not on a handle. The cursor should be a white arrow. Press and hold the left mouse button down while you drag the button to the desired position. Click anywhere on the spreadsheet away from the button and it will return to its usual appearance.

Notice that after the button has been assigned to a macro the cursor will change into a little pointing hand when you approach it. The finger 'presses the button' when you click with the mouse.

HINT! If you have a button which is unassigned, or which you want to assign to a different a macro, select it by clicking with the *right* mouse button. Use the menu commands [Tools, Assign Macro...](#) and choose a macro name. Click on [OK](#).



Installation

We will end this guide with some tips about Excel's installation. This is *not* an exhaustive description, but it will be enough if your PC is **OK**, you have enough space on your hard disk, and so on. If this is not the case you must go elsewhere for guidance.

If you have just started using a computer then I would suggest that installing a program is not the easiest place to begin your computing career. On the other hand, installing a program rarely gives problems these days. I would suggest that you read the KnowWare book *Get the most out of your PC* to learn about your AUTOEXEC.BAT file. Usually this will be altered automatically during installation, but I cannot promise that you will not have to go in and make some adjustments manually.

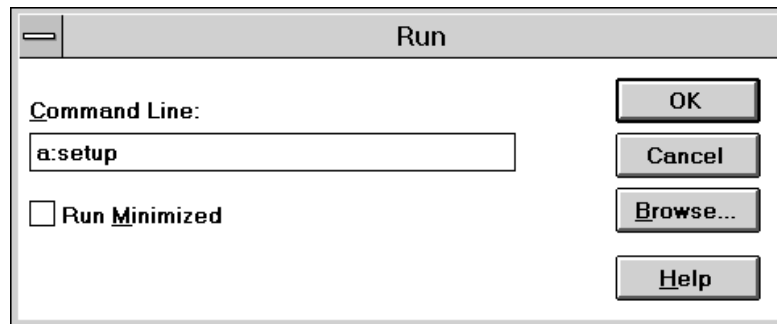
The installation can only proceed if you already have Windows 3.1 or 3.11 installed. If this is not the case you must get this sorted out first. Windows needs DOS to be installed first, but I am not going into any further details about operating systems. If you are in doubt see the KnowWare book *Start with Windows*.

When you buy the program the box will contain a mass of documentation, and an assortment of disks numbered from 1 and up.

Turn on your PC. If Windows is installed it will probably start. If it does not and you just see a black screen with something like `C : >_` on it, then try typing: `win`.

If this still does not start Windows, then it probably is not installed on your machine. Now you are in Windows, insert Excel disk number 1 in the disk drive.

From Program Manager give the menu commands **File, Run**. Type `a:setup` in the Command line field. Click on the **OK** button.



Now you will be guided through the installation procedure. Once in a while you will be prompted to put another disk in the disk drive. At some stage you will be asked to type your name in. This will be written onto the diskette and will be used in any further installations. Normally a program may only be installed on one PC at a time, and under all circumstances may only be used by one person at a time (it may be on several machines, but a user may only use one at a time). If you do not want your name written to one of the installation diskettes, then install from a copy of the diskettes. These copies can be made by using the menu commands **Disk, Copy disk...** in the Windows **File Manager** program,

Anyway, it is a good idea to make a backup copy of all your installation disks and always install from these. This protects your original disks if a mishap should occur during installation.

Accept the installation programs suggestion for a directory. Choose Standard installation.

When the installation procedure is completely finished a message box will appear telling you that Windows will be restarted. Click on the **Continue** button, Windows restarts - and Excel is ready for use!

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