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Get Going with Excel 95

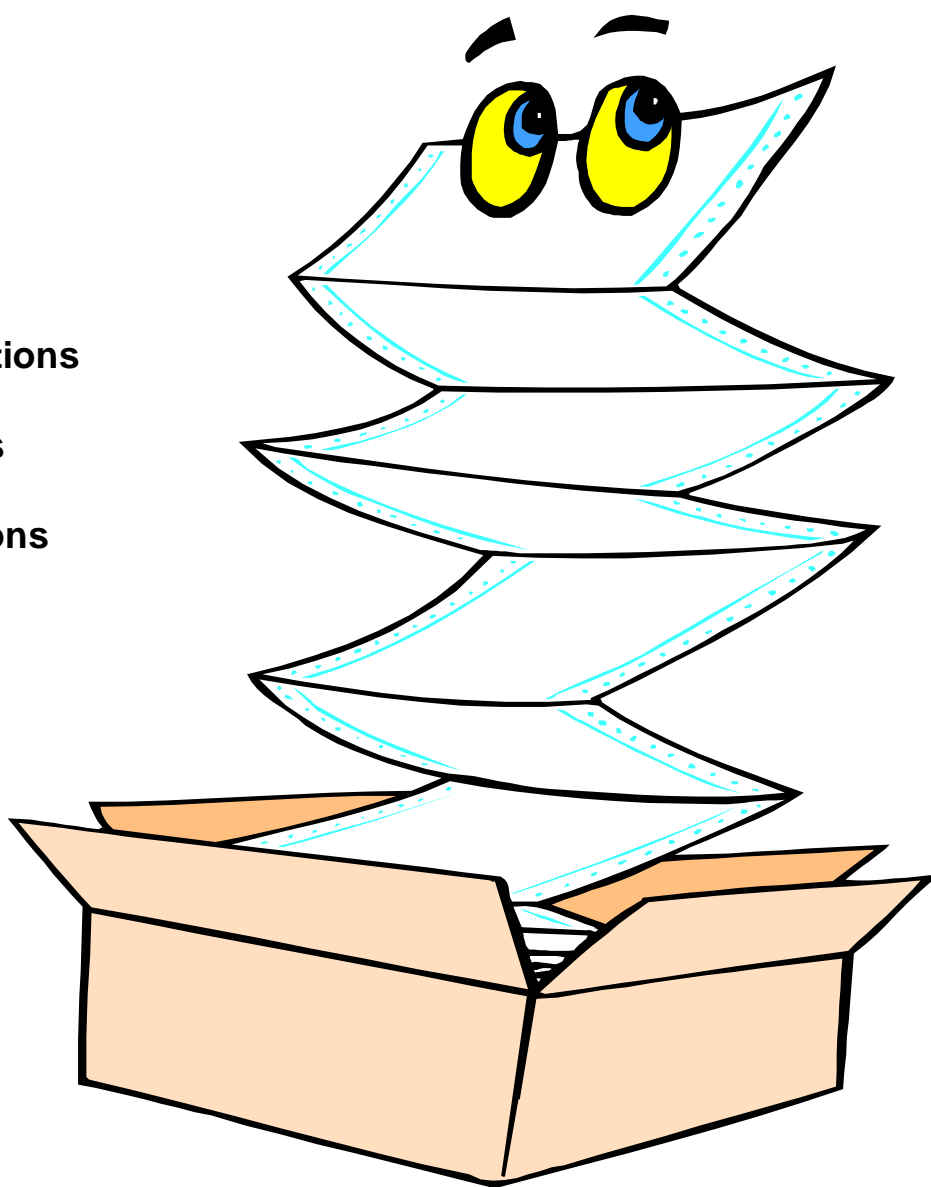
User Friendly

Simple Instructions

Easy Exercises

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Setp-by-Step



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Get going with Excel 95

Palle Gronbek

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Is this booklet for you?

This booklet is for Excel beginners. Basic topics will be thoroughly discussed with a focus on fundamental concepts of spreadsheets in general and of Excel in particular.

If you can relate to one of the following statements, you can benefit from reading this booklet:

- You have no idea what a spreadsheet is, and what it is used for.
- You have heard of spreadsheets, but never had the chance to work with one.
- You have worked with other spreadsheet programs, but need to learn about the differences in Excel.
- Arithmetic and calculation have never been your strong points.
- Maybe you are fascinated by numbers and mathematics.

My goal is that this booklet will quickly help you understand the program in a way that you will continue to learn after you have completed the exercises. At the same time you will have built up a household budget, something that most of us will find useful in our daily life.

No matter what you will use Excel for, you will find that the program is easy to get to grips with, but advanced enough to be able to solve most problems involving numbers.

If you feel that Excel is a little bit too difficult at first, then remember the wise words: *‘Every beginning is fun....’*

Technical language – only for nerds?

The computer branch uses a lot of technical abbreviations and terms, which are difficult for a beginner:

Pentium 150MHz, 32 Mb RAM, 8 x CD-ROM, 2.1 GB hard disk etc. etc.

‘Pentium – is that part of the keyboard? How does the computer RAM something? CD-ROM, has that something to do with music...?’

As a new user it is easy to get confused with all this gobbledegook. To understand the most basic terms, then I suggest you read the KnowWare booklet ‘Make Friends with your PC’, while terms which are Excel specific will be explained the first time they appear in the booklet.

For words which are directly Windows95 relevant, see the booklet **Exercises for Windows95**.

Your background

I do not expect you to have any knowledge of spreadsheets. You should have a basic understanding of Windows95 and have followed **Exercises for Windows95**.

Your opinion

The booklet is written for you, so I would really appreciate hearing your comments, either by letter to the publisher, or directly to me via e-mail.

The structure

This booklet is built up with a series of practical examples. By following it from start to finish you will learn to use the Excel methodology and increase your knowledge in a natural way. The examples use Excel 7, but the differences in Excel 5 and Excel 97 are described.

Throughout the booklet some layout rules have been used. These make it easier to read and allow you to practice the most important points quickly and effectively.

Symbols

In some places we have used the following symbols in the left margin to highlight a particular section:



This symbol indicates an important and useful tip. It will often be especially useful if you follow the exercises a second time.



This symbol denotes topics important for optimised use of the program. Important in the way the program has been built up, and for making the most effective use of it.

Text written in this style describes important differences between version 5, 7 and 97.

Should you need to refer to another subject you will find a list of contents in the back of the booklet, and an index in the last couple of pages. So, enjoy yourself both with the booklet and with Excel itself!

Excel – the first impression

If you have some experience with the program, you can skip this section, or just browse through it to pick up any useful tips you may not already know.

Throughout the booklet I will describe the parts of the screen as we meet them, in an attempt to introduce them in a relevant way. I will use Microsoft names so you can search for more help in the program's Online Help.

General concepts

The first time you run Excel, an introduction program shows the most important functions and principles in the program on your screen. Exit from this window, you can always return to it later.

Before we begin on a household budget we will first try a little sample budget for redecorating my living room. I suggest that you follow it on your own computer.

What is a spreadsheet?

In principle a spreadsheet is nothing more than a large sheet of squared paper. So that an individual 'square' can be used in a calculation together with other 'squares', each has to have a way of differentiating it, a unique address (it is unique because no two are the same).

For the program to be able to manage individual 'squares' in large spreadsheets, it works in three dimensions, with each individual spreadsheet built up as a table in two dimensions, called a spreadsheet. These two dimensions are called respectively rows (horizontal) and columns (vertical). Columns are always given a letter as a name, and rows are always given a number. The third dimension is called a spreadsheet (also referred to as worksheet).

There can be up to 256 spreadsheets in a file, which in Excel is called a workbook.

At the bottom of each workbook you will find a sheet tab for every spreadsheet, or page, in the workbook. Each time you open a new workbook **Sheet1** will be selected.



You can move to another worksheet by clicking on the sheet tab. Try clicking on different tabs, then return to **Sheet1** before continuing.

Cells are the individual 'squares' in a spreadsheet.

A cell is where a column and a row cross. The name of a cell comes from the name of the column (letter) together with the name of a row (number). So, the cell where column C and row 5 cross each other has the address C5.

Inserting text and numbers

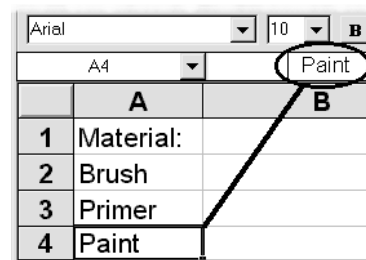
When a new spreadsheet is selected, the cursor will always be in cell **A1** (it is *selected*).

1. Type **Material:** and press **Enter**. Cell **A2** will automatically be selected.
2. Type **Brush** and press **Enter**. Cell **A3** will automatically be selected.
3. Type **Primer** and press **Enter**.
4. In **A4** type **Paint** and press **Enter**.

When you key in data in this way it is obviously useful that the cursor automatically moves down to the next cell (which is not always practical, as you will see later).

If you type a mistake, you can correct it immediately by using the **Backspace** or **Delete** keys. This has to be done before you press **Enter**, and the arrow keys cannot be used. If you notice a mistake after pressing **Enter**, you simply rewrite the correct text over the incorrect text. The contents of the cell are overwritten when you press **Enter**. Editing the contents of a cell will be discussed in more detail throughout the booklet.

Select cell **A4** by pressing the **Up arrow** key.



Notice that the word **Paint** is visible both in the cell and on the *formula bar* (just under the toolbars). This field shows what you typed, and the cell shows the result of your typing.

1. Use the arrow keys, or click with the mouse to select cell **B1**.
2. Type **Net price:** and press **Enter**.
3. In **B2** type **19** and press **Enter**.
4. In **B3** type **98** and press **Enter**.
5. In **B4** type **148** and press **Enter**.

	A	B
1	Material:	Net price:
2	Brush	19
3	Primer	98
4	Paint	148

It is important to understand how different entries are interpreted by Excel.

Data types

Excel differentiates between four data types; text, numbers, dates and formula. When you have typed data in a cell you can immediately see in the cell itself how your data has been classified:

If data is aligned to the left, then it is text (text being written from left to right).

If the cell data is right aligned, then Excel has interpreted your data to be a number or a formula (numbers are usually written right aligned, so that decimal points line up vertically under each other).



If you think you have typed a number, but Excel has displayed it left aligned, then you have probably made a mistake. Maybe you have hit a comma instead of a point when you typed the decimal.

Do not delete the data you have just typed in **Sheet1** – we will come back to it later.

1. Click on **Sheet2** to start with a clean spreadsheet. We can test the principles for inserting data mentioned above.

Creating formulas

Excel always tries to interpret your data as text, numbers, dates or time. If you mix text and numbers, your data will be understood as text. If you type, for example, **125-12**, the '-' will be interpreted as a hyphen, not a minus sign. When you type a

formula you must *always* start with an equal sign: **=125-12**. Try the following example:

1. Type two numbers separated by a minus sign in **Sheet2**, cell **A1**, for example **120856-2895**, and then press **Enter**. Even though it is longer than the cell, it is obvious that the data flows from left to right over the next cell. It has been interpreted as text, which is correct.
2. Now type in the same data in **A2**, but this time with an equal sign in front of it: **=120856-2895** and press **Enter**.



You can also begin a formula with a plus or minus sign ('+', '-'). In every case Excel will add an equal sign in front of the formula. But I would strongly suggest starting formulas with '='. It is a good habit and will help you understand the many built in functions.

Operators

When you type formulas, you can use any of the following operators:

- + add
- subtract
- * multiply
- / divide
- ^ raise in the power of (as in $3^3 = 3*3*3 = 27$).

If you want to type a number as text, you must begin with an apostrophe (for example '125).

Calculation priority

When you type a formula containing several numbers and operators, you should remember that all calculations are carried out in the following order:

- first calculation : () and ^
- second : * and /
- and finally : + and -

Type the following formula in cell **A3**:

= 20 + 20 / 4 and press **Enter**.

The result is 25, as 20 / 4 is calculated first.

Now type the same formula in **A4**, but this time in brackets:

= (20 + 20) / 4 and press **Enter**.

The result is now 10, as the numbers in brackets are calculated first.

Even though brackets are not necessary for calculations using operators on the same level, like add and subtract, they can often make a formula easier to read. I often use brackets for precisely this reason.

Formula bar

On the far left this bar refers to the *active* cell (the selected cell). Next to this is a field for displaying and typing a formula. All entries in cells take place here.

A cell consists of two 'levels'. The background, containing the data entered (shown on the formula bar) and the foreground which contains the result of the entry. It is the foreground which is actually displayed in the cell, and is printed out, while the background creates the result. A cell has to be selected to see the background in the formula line.

Of course, when you type in text or a number, there is no difference between what you type and the result – there is only a difference with data which is calculated (formula).

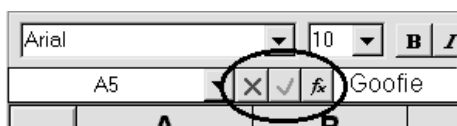
Select **A2** and check the formula on the formula bar. Press the **Down arrow** and check the formula in **A3**.



All changes in the content of a cell happen in the background layer – as shown in the formula line.

	A	B	C
1	120856-2895		
2	117961		
3	25		

You probably noticed that while you were typing data in the cell, three small buttons appeared on the formula line:



Let us look at the buttons a little closer:

1. Try typing your name in cell **A5**.
Now the formula has *apparently* disappeared, but you can still undo your typing.
2. Now try pressing **Esc** and you will see that your name disappears immediately (the same as clicking on the red cross).
3. Type your own name again, and press **Enter** (the same as clicking on the green tick). The formula is replaced by your name.

The third button, **fx**, enables you to insert functions, a process described on page 55.

Version 97: The **fx** button has been replaced with an equals sign on the formula bar.



*The buttons show that you are editing the cell, and that is useful, but I would never click on them, instead I strongly advise that you use the **Esc** and **Enter** keys.*

A word processor inserts text and numbers while you are writing them. In Excel they are not inserted until you actively choose to do so.

Delete the contents of the cells **A1** to **A5** using the **Delete** key and click on **Sheet1**, so we can continue with our sample.

We have been able to buy everything which is necessary from a wholesaler. So there is no sales tax included in the price. We must work out ourselves both this and the total price.

The heading in column **B** must be altered.

1. Select cell **B1**, type in **Net price** and press the **right arrow** key. The text is inserted and the cursor moves in the direction of the arrow to cell **C1**.
2. Type in **Sales tax** and press **Enter**.

We now need to type the formula for calculating the sales tax on brushes assuming that the Sales tax is 25%. We could then choose to type =19*25%, which would calculate the sales tax of the net price. Quite honestly, if we did that we could just as easily forget about the computer and take out our pocket calculator!

It is in exactly this situation that a spreadsheet can show its strength...when you type a new net price, the new sales tax and gross price should be calculated automatically.



It is totally wrong to insert variables in a formula in a spreadsheet. If the value changes at a later time (for example, an exchange rate), you would have to change every cell manually. Instead it is better to point out the cell containing the appropriate value. So all you have to do is edit that cell every time the value changes, and formulas will be updated automatically.

This is how it is done:

1. Select **C2** and type the following formula:
=b2*25%
Press **Enter** and the **Up arrow** to see both the result and the formula. I was quite clear as to what I was doing above when I typed a small 'b' in reference to cell **B2**. I want to start a dialog with Excel. When you pressed **Enter** the 'b' was changed to a large 'B', which is the program's way of saying 'cell address understood'. If I discover later that there is a mistake in the formula, I know for certain that it has nothing to do with the reference to cell address **B2**.
2. After typing a formula it should be tested. Type a new net price in cell **B2** and check that the sales tax in **C2** changes. Now type the original net price again.
3. For the sake of the exercise you should type the formula for the sales tax for two more materials in the same way. Type the formula **=b3*25%** in cell **C3** and **=b4*25%** in **C4**.



As default (standard) only as many decimals as necessary are shown in each cell. So even if you type in 24.00, only 24 is shown. Later we will format numbers to two decimal places.

Now we will calculate the gross price. In other words what we want to calculate is:

$$\text{=Net price} + \text{Sales tax}$$

1. Start by typing the heading **Price:** in **D1**.
2. In **D2** type the formula **= B2 + C2**.
3. Continue yourself with the formula for calculating the price for the next two materials.

Your spreadsheet should now look like this:

	A	B	C	D
1	Material:	Net price:	Sales Tax	Price:
2	Brush	19	4.75	23.75
3	Primer	98	24.5	122.5
4	Paint	148	37	185

It is only for the sake of the exercise that we have typed all the formulas here manually. Normally all you need to do is type it once, check that it works (type a new net price) and then copy it to all the other cells!

When you have checked that the first formula works as it should, why run the risk of typing an error in the following formulas?

Editing

Changing the contents of a cell

You have already tried changing the contents of a cell. However, there are many ways of doing it:

- Type new data over the old and press **Enter**. If you mistakenly start typing data in the wrong cell, you can undo your mistake by pressing **Esc**.
- Press the **F2** key (edit) or click directly on the formula bar.
- Double click on a cell to edit directly in it (a function which I dislike intensely, and which we will switch off a little later).

If a long piece of text or formula needs editing I prefer **F2**. If it is a short piece of text or formula, I prefer overwriting the cell.

Try both methods now:

1. Change cell **B1** to **Net:** by using **F2** and the **Backspace** key.
2. Change the net price for Primer to **105** by overwriting **B3** and press **Enter**.

Deleting the contents of a cell

You have deleted the contents of a cell several times by using **Delete**. This is simple, when you

know about it. I have seen students try to use the **Backspace** key many times, and even seen the Space Bar tried.

Try pressing the **Space Bar** in cell **C2**, followed by **Enter**. The cell is apparently empty, but note the error message in cell **D2**.

	A	B	C	D
1	Material:	Net:	Sales Tax:	Price:
2	Brush	19		#VALUE!
3	Primer	105	26.25	131.25
4	Paint	148	37	185

The formula in **D2** tries to calculate the sum of the net price and a space! There is no way we can expect an answer.



*If a cell should be emptied, use **Delete**!*

Undo

The formula in cell **C2** should be rewritten. If you have just deleted it, then click on the **Undo** button, or choose the menu **Edit|Undo**. You can also use the **Ctrl+Z** keys, which function the same way in most other Windows programs.



I would strongly suggest that you use **Ctrl+Z**.



You can only undo the last operation. If you have deleted the contents of a cell, and then formatted another cell to be in bold type, you can only undo the bold type.

If you have used Word, which can undo the last 100 operations, you will probably think that Excel's one operation limit is a serious weakness. That was my opinion at first, but now I think it is actually a strength. Try following my reasoning here:

1. We want to test a formula for errors, and we will do this by changing the net price for a brush. Select cell **B2**.
2. Type a new price, and keep an eye on the sales tax and the Price (**C2** and **D2**) when you press **Enter**.
3. They changed as they should, and you return to the original cost by pressing **Ctrl+Z**.
4. The formulas were calculated so fast that it can be difficult to check them both simultaneously.

Click **Ctrl+Z** again (you undo your undo, if you understand what I mean). Continue with **Undo** as often as you want until you are certain that all cells with formulas dependent on cell **B2** change correctly.



Undo will switch between the two last actions every time it is used. Pure genius when many formulas need to be checked.

Column width

A single cell can contain up to 255 characters. However the standard column width allows only about 10 characters to be *displayed*. When you type long text strings or numbers, the column width has to be adjusted.

1. Move to **A5**, type **Filler** and press **Right arrow**. In **B5** type **67** and press **Enter**.
2. In **A6** type **Edge filler** and press **Enter**. As long as the next cell across is empty, the text will just flow into it, crossing the cell border.
3. Now type **156.25** in **B6** and press **Enter**. The text in **A6** can no longer be shown in its full length.

Only part of the text can be seen. You can ensure that the entire text remains in the cell by selecting it and reading the actual content on the formula bar. You now need to make the cell wide enough for the entire text to be displayed.

	A7			Glass-fibre
	A	B	C	
1	Material:	Net:	Sales Tax:	Price:
2	Brush	19	4.75	
3	Primer	105	26.25	
4	Paint	148	37	
5	Filler	67		
6	Edge filler	156.25		
7	Glass-fibre	187		

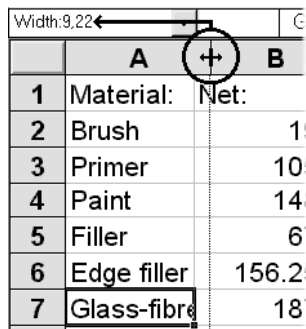
When you change the width, it will apply to the entire column. Can you imagine how confusing it would be to work with a spreadsheet where cell **A5** was double the width of all the other cells? Cell **B5** will be under column **C**, cell **C1** under **D**...chaos!

Excel97 has a function to merge two or more cells (**Format|Format Cells, Alignment**). If for example you combine cell **A7** and **B7**, cell **B7** will no longer exist!

How to change the column width

Place the mouse pointer on the line between column **A** and column **B**. The mouse pointer changes shape to a split arrow and the column divider can now be dragged in the direction you want by holding down the left mouse button.


Notice the field over column **A**. It usually shows which cell has the *focus* (is selected).



	A	B
1	Material:	Net:
2	Brush	19
3	Primer	10
4	Paint	14
5	Filler	6
6	Edge filler	156.25
7	Glass-fibre	18

When adjusting the column width, the field now shows the column width measurement before you release the mouse button. The width is shown as the typical number of characters which will fit in the column, and is *not* an absolute value. The width of a character depends on the font, its size, and which character you type (an 'i' fills much less than an 'm', for instance).

There is an even smarter method of automatically altering the width of a column:

 Double click when the arrow changes to a split arrow, and the width of the column on the left automatically changes (AutoFit).

This is a very useful function. Excel adjusts the column width to show all the text, no matter where it is placed in the column.

Automatic adjustment can also be used on rows in the same way. In this picture the height of row **4** will be adjusted when you double click.

You may want to ask, 'couldn't I just insert the text in column **A**, leave column **B** blank and then type the numbers in column **C**'?

You could, but it would be a big mistake! Blank columns or rows divide the data area and makes it difficult to add colours and borders or use the many advanced Excel functions.



It is good practice to enter data in adjoining cells. Avoid using blank columns and rows when data are considered belonging together.

Simple number formatting

I will be using more material for the imminent re-decorating, which will also give you a chance to practice copying the formulas for sales tax and prices.

1. Type the following data in columns **A** and **B**:

	A	B	C	D
1	Material:	Net:	Sales Tax:	Price:
2	Brush	19	4.75	23.75
3	Primer	105	26.25	131.25
4	Paint	148	37	185
5	Filler	67		
6	Edge filler	156.25		
7	Glass-fibre	187		
8	Sandpaper	28.25		
9	Roller	38.95		
10	Filling knife	47.5		
11	Craft knife	27.35		
12	Craft knife blades	19.95		
13	Small stepladder	208		
14	Rubber gloves	19.25		
15	Face mask	19.95		
16	Wood treatment	125.75		

Version 7 and 97: Did you notice what happened as soon as you started typing in **A10**? The moment you started with an 'Fi', the program suggested the same text as that in **A5**. It was only a suggestion (it was marked) and as you continued to type it was replaced with your new text. You can also accept a suggestion by pressing **Enter** or reject it by pressing **Delete**. This principle applies within an adjoining area.

The numbers need to be formatted so they all appear with an equal number of decimal places. In the example this is two decimals.

1. Select cell **B2**, and click twice on the **Increase decimal** button.



Excel starts with the format of the selected number, and shows one more decimal each time you click the button.

2. Select cell **B6** and click once on the **Decrease decimal** button.



Now the number **156.25** is decreased to one decimal place. Of course, this does not mean

that the last decimal has disappeared, which you can check by looking at the formula bar.

3. Click on **Decrease decimal** again. Now the number is shown without any decimals. Click twice on **Increase decimal**, to make it appear with two decimals again.

! You must have noticed that when you point to a button on the toolbar, a description of its function is shown. Notice at the same time that the **status bar** gives an even more detailed description of the function.

! No matter how you decide to format a cell, calculations are performed in the same way. As a standard Excel calculates to 9 decimal places.

All the cells in column **B** should be formatted to show two decimals. Before trying to format all cells, be patient while I just quickly introduce the idea of selecting cells.

Move to **Sheet2**.

Selecting cells

To format a cell it has to be selected or highlighted. By selecting several cells simultaneously you can format them in the same way, so they all have the same appearance. A selected range of cells is indicated by the address of the first and the last cell, separated by a colon. Selecting **B2:D6** will highlight all the cells in a rectangle with **B2** at one corner and **D6** at the opposite corner.

	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					

The mouse pointer should be a large cross when you begin highlighting.

The first highlighted cell will always be white as it has the 'focus'. The black frame surrounding the selection will clearly show that it is a part of the highlighted area.



Try selecting the following area using the mouse.

1. Select **B2:D6** (as shown above) by holding the left mouse button down over cell **B2** and dragging to cell **D6**.
2. Before doing anything else, place the mouse pointer over cell **H10**, hold the left mouse button down (the first selection disappears), drag to cell **C2** and release the mouse. The area **H10:C2** is now selected.

The first cell selected will always be white or have focus, no matter which method you use.

! It is even easier to select cells using the keyboard. Hold **Shift** down while you expand the selected area using the **arrow keys**. Try this on different parts of the spreadsheet.

Remember, selecting is not an action in itself. You typically select cells *before* carrying out an action on them (for example, to display two decimal places, or change text to bold type).

Click on **Sheet1** again. We will now format all numbers in column **B** to display two decimal places.

1. Select cells **B2** to **B16**.
2. The cell with the focus (white), in this case **B2**, will determine how many decimal places appear in each cell.. Click **Increase decimals** and **Decrease decimals** until all cells show two decimals.
3. Repeat the same process with cells **C2:D4**. Click on **Increase decimals** and **Decrease decimals** until all cells display two decimals.

Your model should now look like this:

	A	B	C	D
1	Material:	Net:	Sales Tax:	Price:
2	Brush	19.00	4.75	23.75
3	Primer	105.00	26.25	131.25
4	Paint	148.00	37.00	185.00
5	Filler	67.00		
6	Edge filler	156.25		
7	Glass-fibre	187.00		
8	Sandpaper	28.25		
9	Roller	38.95		
10	Filling knife	47.50		
11	Craft knife	27.35		
12	Craft knife blades	19.95		
13	Small stepladder	208.00		
14	Rubber gloves	19.25		
15	Face mask	19.95		
16	Wood treatment	125.75		

! *Formatting a cell means that all future entries in the cell will be shown with two decimal places, no matter what numbers you enter. The format is only changed by choosing another format for the cell.*

If you are still unsure about how you select cells, format decimals or enter simple formula then you should practice a little more now. Delete any extra data you type after practising before moving to the next section.

Copying cells

When a formula is entered and you have checked that it works, it should then be copied to the other relevant cells.

Relative references

The formula we typed into C2 can be understood as: 'Take the value in the cell to the left and multiply it by 25%'. A cell reference is relative when it refers to a cell which has a distinct position in relation to the first cell, as here.



When you copy data it is the background you copy, not the result. When you copy a formula one cell down, the relative cell references in the formula will also 'follow'.

There are many ways to copy data. Which method is best to use is dependant on where the copy should end. Here I will concentrate on the two methods I find most useful: One using the keyboard and the other using the mouse.

Copy using the keyboard

To the right of the **Copy** and **Paste** commands on the **Edit** menu you can see that the **Ctrl+C** and **Ctrl+V** keys can also be used. I recommend this method when you want to paste the copied data into cells not directly next to the cells you copied from.

The principle is that the selected area is copied to the Windows Clipboard, from where it can be pasted to a new cell or area in the spreadsheet (or in any other Windows program, for that matter).

The function is carried out by:

- selecting the cell with the formula which should be copied.
- choosing **Copy**
- selecting the area which should 'inherit' the formula
- and choosing **Paste**.

Try the following example:

- Use the arrow keys to select C4.
- Press **Ctrl+C** to copy the data. The dotted frame around the selected cell indicates that the copy function has been initiated.

	A	B	C	D
1	Material:	Net:	Sales Tax:	Price:
2	Brush	19.00	4.75	23.75
3	Primer	105.00	26.25	131.25
4	Paint	148.00	37.00	185.00
5	Filler	67.00		
6	Edge filler	156.25		
7	Glass-fibre	187.00		
8	Sandpaper	28.25		
9	Roller	38.95		
10	Filling knife	47.50		
11	Craft knife	27.35		
12	Craft knife blades	19.95		
13	Small stepladder	208.00		
14	Rubber gloves	19.25		
15	Face mask	19.95		
16	Wood treatment	125.75		

Sheet1 / Sheet2 / Sheet3 / Sheet4 /

Select destination and press ENTER or choose Paste

← Note the text

- Select cells C5:C16 using **Shift+Down arrow**, and press **Enter**. Copy is now finished.

! If the formula is to be copied to several areas, then paste it by using **Ctrl+V**, which keeps the copy function active. This means you can continue pasting it by using **Ctrl+V**. The copying is terminated by pressing **Esc**.

Press Down arrow to check the sales tax formulas one by one on the formula bar. I have cheated a little in the next picture and shown all formulas directly in the cells for you to compare with your own formulas:

	A	B	C
1	Material:	Net:	Sales Tax:
2	Brush	19.00	=B2*25%
3	Primer	105.00	=B3*25%
4	Paint	148.00	=B4*25%
5	Filler	67.00	=B5*25%
6	Edge filler	156.25	=B6*25%
7	Glass-fibre	187.00	=B7*25%
8	Sandpaper	28.25	=B8*25%
9	Roller	38.95	=B9*25%
10	Filling knife	47.50	=B10*25%
11	Craft knife	27.35	=B11*25%
12	Craft knife blades	19.95	=B12*25%
13	Small stepladder	208.00	=B13*25%
14	Rubber gloves	19.25	=B14*25%
15	Face mask	19.95	=B15*25%
16	Wood treatment	125.75	=B16*25%

Copy using the mouse

Now you are going to copy the formula for the price by using the mouse. I usually recommend using the keyboard as much as possible, but have to admit that for this operation the mouse is really good – a stroke of genius!

1. Click in cell **D4** – this formula should be copied.
2. Point the mouse to the small black square at the bottom right hand corner of the cell (the pointer changes to a little black cross) and then drag the mouse down to cell **D16** while holding down the left mouse button.
3. The instant you release the mouse button, the copying is carried out automatically! Voila!



Notice the difference between *selecting* and *copying*. When you select, all the cells are black (except the first). When you copy, all the cells are white.

Microsoft calls the little black square an 'Fill handle' because it copies or 'fills the area up' with data depending on the kind of data the cell contains.

I will return to the 'Fill handle' function on page 21.

There are buttons for both **Copy** and **Paste** on the toolbar, but force yourself to use the methods above, it will pay off later.

C	D
Sales Tax:	Price:
4.75	23.75
26.25	131.25
37.00	185.00
16.75	
39.06	
46.75	
7.06	
9.74	
11.88	
6.84	
4.99	
52.00	
4.81	
4.99	
31.44	

Summing data

It is now time to work out what our decorating project will cost in total. We could, of course, add the individual cells together, but there is a faster and more flexible method. Excel has many built in functions, including one for summation of data. All functions are built up in the following way:

=NAME(arguments)

NAME is the function name (what you want Excel to do for you). Arguments can be cells or other calculations. In our example the function is called SUM, and the arguments are the cells which should be added together as follows:

=SUM(B2:B15)

You can type the formula manually, but there is no need. Microsoft has assumed that you will need to sum data in the majority of spreadsheets and has developed the following extremely effective and easy to use function:

1. In **A17** type **Total:** and press **Enter**.
2. Cell **B17** must contain the sum of all the net prices. Click on the **AutoSum** button on the toolbar and wait a second. It is not enough that the formula has been written out for you, Excel has also understood which cells you want to add together (not so bad!).



The dotted frame surrounding your data shows which cells the program suggests – because it is only a suggestion. In the formula the cells are black, meaning that all you need to do is overwrite the references if they are incorrect.

=SUM(B2:B16)

3. Press **Enter** to accept the formula.
4. Copy the sum formula for the sales tax and the price from cell **B17** to cells **C17** and **D17**, with the following results:

D17	=SUM(D2:D16)			
	A	B	C	D
17	Total:	1217.20	304.30	1521.50

! *Instead of clicking on the **AutoSum** button, use the **Alt+=** keys (you are actually pressing **Alt+Shift+=**).*

AutoSum calculates both horizontally and vertically on the same principle. Let us prove this by changing the formula for calculating the total price for each material:

1. Select **D2:D16** and press **Delete**. The cells are empty and the sum formula in **D17** displays '0'.
2. Select cell **D2** and click on **AutoSum**.
3. Press **Enter** and click on **AutoSum** from cell **D3**.
4. Press **Enter** and repeat the click on **AutoSum** in cell **D4**; but be careful, this time the suggestion is incorrect!

B	C	D	
t:	Sales Tax:	Price:	
19.00	4.75	23.75	
105.00	26.25	131.25	
148.00	37.00	=SUM(D2:D3)	

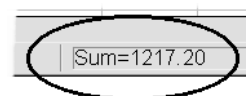
! *If there are numbers in both the cells above and to the left of the selected cell, Excel will suggest summing the numbers above. Vertical summation takes priority over horizontal summation.*

Even though **AutoSum** is smart and easy to use you should still remember the principle of a spreadsheet: When a formula is inserted *once*, it should be copied to the other relevant cells!

Undo the last formula by using **Esc** (**Delete** if you have entered the formula using **Enter**) and instead copy the formula like this:

1. With **D3** selected drag the Fill handle down to **D16**.
If you drag it too far, you can drag the Fill handle back into the selected area. As long as the cells are selected you can expand or reduce the copying.
2. Use an arrow key or click with the mouse in any other cell to cancel the highlight.

Only version 7 and 97: If you need to see the sum of the numbers without having the result displayed in a cell, all you need to is select the cells and read the result on the status line:



! *Click with the right mouse button on the field in the status line and choose, if need be, another calculation of the selected numbers.*

Our model is now ready. Try changing some of the net prices and see how the calculations reflect the changed numbers. You can also smarten the model up a bit by adding a little colour and formatting, but I will tell you how to do this later. Just now it is more important to repeat and emphasize the principles involved in building up a formula. Your spreadsheet should be saved so you do not lose it when you shut down your computer. You must be able to retrieve it again the next time you decorate your house.

Save a file

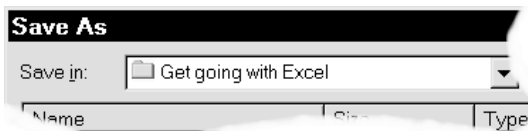
The first time you save a workbook you will be asked to specify a name. Using the **File** menu, choose the **Save** or **Save As** command. You can also just click on the **Save** button on the tool-bar.



In the **Save As** dialog box you can choose an existing folder (directory), or create a new one for the examples in this booklet. I would suggest the latter. If you feel unsure when working with folders and files you can follow the example here:



1. In the **Save in** field, choose **C:** (the computer's hard disk).
2. Click on the **Create New Folder** button and call it **Get going with Excel**. Press **Enter**, which creates the folder and displays it in the large white field.
3. Double click on your newly created folder to open it. The folder name should be in the **Save in** field:



4. Click on the **File name** field, delete the name suggested by Excel and type **DECORATING**. Press **Enter** (or click **OK**). Your spreadsheet is now saved, and the dialog box disappears from the screen.
5. Notice that the file name now appears on the title bar (all Excel spreadsheet files have an **XLS** extension).

For a more detailed explanation of how folders and files are managed, I suggest that you read the 'Windows95 Exercises' booklet from KnowWare, or study Excel's Help program.

Excel's Help lets you search for assistance in more ways than Windows own Help program. I will quickly run through them in the next section.

Help

Without any doubt the programs of the future will contain larger and better Help programs and come with thinner printed manuals.

You have already seen how the Help function can work. The small yellow 'tips' which appear next to the buttons on the toolbar and the longer description on the status line are both part of the complete Help program.

The 'real' Help program is a kind of shortened user manual which can be read on screen while you are working.

If you have a standard installation of the program, the Help program will be available. If it is not, you can run the installation program again and choose to add it. To start the Help program, choose **Help|Microsoft Excel Help** or press **F1**. The **Contents**, **Index** and **Find** tabs work identically to the ordinary Windows95 help.

In version 97 **F1** will start an 'Office Assistant' which will give you a tip and let you search for a subject.

The 'Answer Wizard' tab

The **Answer Wizard** tab lets you type in a question using ordinary language. Try writing in **'How can I create a graph?'**. The answers you get here are not always as intelligent as your questions!

If you double click on the toolbar **Help** button you go directly to the Answer Wizard dialog box.



Shift+F1

It can be annoying trying to search for a function without knowing what it is called. It is possible to search directly from the screen by clicking on the **Help** button on the toolbar. The mouse pointer turns into a small arrow with a question mark (or use **Shift+F1**). Now try clicking on the **Cut** button on the toolbar. A box appears giving you instant help for that function.



When you see the Help for a subject, you will notice that some words in the help text are highlighted (usually in green). This is called hypertext. Click on this text to get even more help.

TipWizard

Finally there is the **TipWizard** tool, which tries to follow your working method. If it thinks that you could have performed a procedure in a better and more effective way, it will suggest it. Well, that is the theory...unfortunately the practice does not always live up to expectations!

The **TipWizard** is represented by a little bulb on the toolbar which turns yellow when it has a suggestion to make. Click on the button to read the Wizard tip.



The **TipWizard** pops up on its own toolbar or in its own window. Close it by clicking again on the **TipWizard** button. This 'switches off the light' in the bulb, and it is ready to 'switch on again' as you carry on working.

Try keeping an eye on the bulb and clicking on it next time it lights up yellow.

If you keep the **TipWizard** open it will continuously display tips as you work.

In version 5 the options for searching for a text string are not as developed as described here.

Help for dialog boxes

If you want help with a field or button in a dialog box, then all you need to do is click it with the right mouse button. You can also click on the small question mark on the dialog box's title bar, then on the subject you want help with.



It seems unnecessary that Microsoft has inserted a button with a question mark, as you can get help from dialog boxes in Windows95 by clicking the right mouse button.

Household budget

When I first installed Excel many years ago I only had a vague idea what I could use it for. I had heard much about the program, and I was curious to try it. Well, I thought, it might also help me find out why my budget never seemed to balance.

It was when I started that I realised that a spreadsheet did not just function like an adding machine. It could also show me the consequences of my insurance rates increasing by 5% while my salary only increased 2% and my eldest son began to go to fencing...all I need do was type in a couple of figures and my increased overdraft was calculated in moment.

At first I found it frustrating that a task could be carried out in so many different ways. Which was the best? Wasn't it enough for example just to be able to copy in *one* way?

Why not limit all these methods to one for the mouse and one for the keyboard?...But on the other hand, who would go into a clothes shop which only stocked black and white sweaters, or a restaurant which only sold meatballs and mushy peas? People are so different that we need choice. So my task here is to guide you so you can choose the method which is best for *you*.

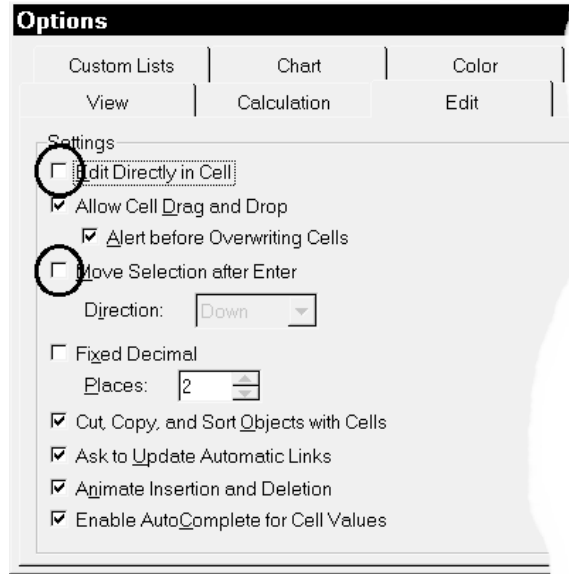
I have decided to describe most of the options available *while* you are working with a weighty task. So you will not find a section which describes copying, for example, alone. Different techniques will be described several times, often in a more and more detailed fashion, but always in situations where they are relevant. This will allow you to revise and go deeper into the most important functions. It might make it more difficult to look up a single function, but if you work through this booklet several times I am sure that you will get the most out of this method. Before starting with our exercise there are a couple of preferences I want to change.

Permanent preferences

Excel comes with a number of default (standard) preferences. The idea is that you can change them as you work to optimise the program to your needs.

Try this on your own machine:

1. Click on the menu [Tools|Options](#).
2. The first tab we want to change the options on, is the **Edit** tab:



I would strongly suggest that the following two fields are deselected:

1. Click on the **Edit directly in cell** and **Move selection after Enter** with the right mouse button, to read what they mean. Remove the small tick in both fields to deselect them (click on them).
2. Press **Enter** or click **OK** to close the dialog box.
3. In the **DECORATING** file, select cell **D17**, and press **Enter** – the cursor remains where it was, which makes it much easier to read and edit formulas when they are entered.
4. Double click on the cell. The cells used in the formula are selected. Smart, especially when you refer to cells which are not immediately visible.

! *I would suggest that you work for a while with both of these options deselected before you decide whether to select them again.*

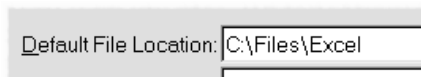
Let us look at some other things you can do in [Tools|Options](#):

On the **View** tab you can change the screen picture. Gridlines are the small lines surrounding every cell in the spreadsheet. If you deselect them they will not be seen on the screen or on a printout.

Later you will see that it is possible to print a document without the gridlines, even though they are shown on the screen.

You should know about two fields on the **General** tab:

1. In the **Sheets in New Workbook** field you specify how many spreadsheets new workbooks contains as default. Set the number of sheets to four. You can always add more later.
2. In the **Default File Location** field you decide where Excel saves and looks for its files. Type in **C:\Get going with Excel**. When you are finished working through the booklet you can change it to another folder.



Incidentally, it is strange that you cannot click your way to the folder. You have to write the exact path to it yourself.

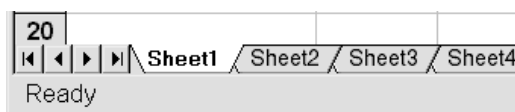
Press **Enter** to accept the changes and close the dialog box. Close the **DECORATING** file. If Excel asks you if you want to save the file, then choose **Yes**. The program will never close without giving you the opportunity to save any changes you may have made.

The budget

We are going to create a household budget for covering income and expenditure. You can choose to enter your own figures immediately, or begin by following this example using my fictional figures for a family living in Denmark with two children, and change them to suit your own situation later.

Start by opening a new workbook (**Ctrl+N** or the **New Workbook** button on the toolbar).

Your new workbook contains four spreadsheets.



In **Sheet1** type the following text in columns **A** and **B** and adjust the width of column **A** until the 'indentation' of the text in column **B** is suitable:

	A	B
1	Income	
2		Salary after tax - husband
3		Salary after tax - wife
4		Total income
5		Expenses

You can use Excel's suggestion that the text in **B3** should be the same as the text in **B2**. Press **Enter** to accept the suggestion and change 'husband' to 'wife'.

A1 and **A5** should be highlighted using **bold** type, which we will do simultaneously for both cells:

1. Select **A1**
2. Hold **Ctrl** down while you click on **A5**.
3. Press **Ctrl+B** (or click on the **Bold** button).
4. Cell **B4** should be *italic*. Press **Ctrl+I** (or click on the **Italic** button).

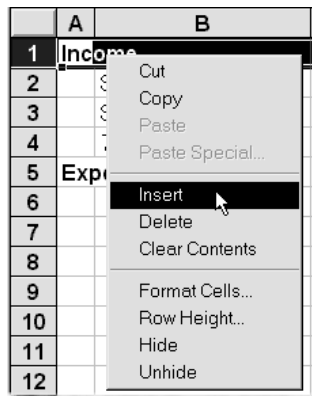
! Several unconnected cells are selected by holding the **Ctrl** key down while you are selecting the individual cells. When selecting adjoining cells, hold down the **Shift** key while pressing the arrow keys (you can also click on the first cell and then hold **Shift** down while you click on the last cell). Practice these important keys before you continue.

Insert rows

Whoops, I forgot to leave room for a heading at the top of the spreadsheet. The budget should contain the income and expenditure for every month of the year. This is easily corrected by inserting a row where row 1 is at present. We will try it first using the mouse:

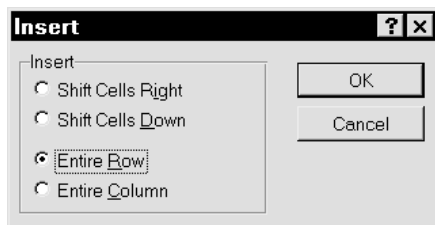
1. Click on the grey row number **1** on the left side, to select the entire row.
2. While pointing at the selected row, click the right hand mouse button. Choose **Insert** on the object menu.

! A click on the right mouse button will open the object menu for the object the mouse is **pointing at**! You should point at one of the selected cells before opening the object menu. Try pointing at a cell at random and clicking the right mouse button. Close the object menu using **Esc**. Repeat the exercise a couple of times so you are sure you have understood how it works.



We need to insert one more row. This time using the keyboard:

1. Select a cell in **Row 1**.
2. Press **Ctrl+Plus** using the plus sign on the numerical keyboard. If you have a laptop PC, without a numerical keyboard, you might need to press **Ctrl+Shift+Plus**. (Note that this option also works with *some* ordinary PC keyboards, and that the Windows **Regional settings** have an influence on how your keyboard functions. Try yours to see if it works).
The following dialog box is displayed, allowing you to choose what you want to insert:
3. **Down arrow** to **Entire row** and press **Enter**.



There you are! Any problems about positioning the mouse exactly are eliminated.

Deleting rows

You can delete rows in the same way by using either the mouse (choose **Delete** on the object menu) or the keyboard by pressing **Ctrl+Minus** and **Down arrow** to **Entire row**.

Insert/delete several rows

Drag the mouse over the rows you want to select, or use the keys like this:

1. First select a cell in every row by holding down **Shift** while pressing the **Down arrow**.
2. Press **Ctrl+Plus** or **CTRL+Minus** and **Down arrow** to **Entire row** and press **Enter**.
Excel inserts or deletes just as many rows as there were selected cells.
3. Delete or insert cells so your spreadsheet has *two blank rows at the top* (**Income** should be in cell **A3**).

Inserting and deleting columns

Let us look at editing columns:

If you are using the mouse, all you need to do is click on the column heading to select it. Other than that, everything is the same as when inserting/deleting rows.

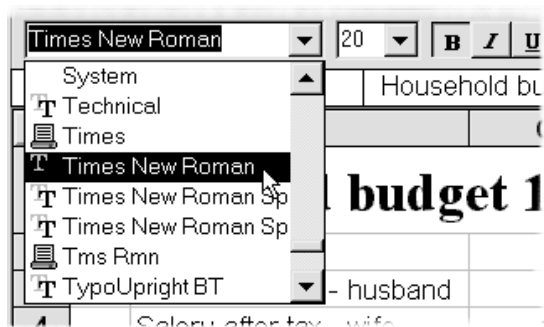
On the keyboard do the following:

1. Select any cell, for example one in column **B**.
 2. Press **Ctrl+Plus** and **Down arrow** to **Entire Column**.
 3. Press **Enter** to close the dialog box and insert a column. The existing columns move to the right.
- Repeat the exercise with more columns using the same method (select several cells using **Shift+Right arrow**), and then delete them again. Keep trying until it becomes second nature.

Font and font size

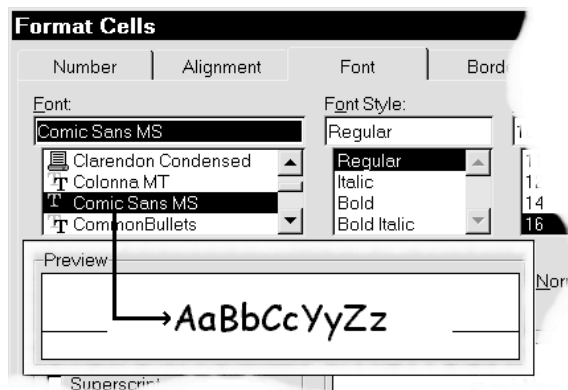
A1 is to contain the heading for the entire spreadsheet. Type **Household Budget 1997** here, and press **Enter**. The text should be larger and in a different font to the rest of the spreadsheet:

1. Click on the **Font** field on the toolbar.
2. Move down and choose the **Times New Roman** font.
3. Choose **20** in the **Font size** field. The size is given in points, a point being approximately 0.35 millimetres. (You could try typing in a formula which calculates the size of letters in mm).



If you are looking for a specific appearance for your heading and do not know what the font is called, it is better to use the **Font** dialog box:

1. With the cursor still in cell **A1**, open the object menu using the right mouse button and choose **Format Cells...**
2. Choose the **Font** tab and click on a name in the **Font** field. An example showing what the font looks like is displayed at the bottom right of the dialog box.
3. Use the arrow keys to move around in the installed fonts. When you find the one you want, choose its size, style and any other effects and press **Enter** to confirm your choice (remember that **Esc** will let you cancel it). Choose a font and size you like for your heading. The next picture shows the **Preview** and **Font** fields:



A field needs to be selected before you can use the arrow keys to move around in it. Therefore you need to click on the **Font** field before using the arrow keys to select a font. You can also press the **Tabulator** key until the field has focus.

Choose a size of 12 points for the words **Income** and **Expenses** in cells **A3** and **A7**.

Continue typing under **Expenses** inserting the following text:

	A	B
8	House	
9		Mortgage
10		Electricity
11		<i>Total house expenses</i>
12	Insurance	
13		House
14		Accident
15		<i>Total insurance:</i>
16	Transport	
17		Car loan
18		Tax
19		Insurance
20		Repairs and maintenance
21		<i>Total transport</i>

The text in **A8**, **A12** and **A16** is formatted to be **bold**, while the text in **B11**, **B15** and **B21** is *italic*.

Depending on the size of your screen you might not be able to see the top rows. Use the scroll bar on the far right, or the **Ctrl+Home** keys. The latter is recommended as it selects cell **A1** immediately.

Whoops, I forgot a couple of categories, so you will need to insert a couple of rows:

1. Insert a blank row between *Mortgage* (**B9**) and *Electricity* (**B10**) and type in **Heating** (row 10).
2. Between *Insurance* (**B19**) and *Repairs and Maintenance* (**B20**) there should be a row with the text **Petrol & oil** (row 20).

The months should be typed in the empty second row:

1. Type **January** in **C2** and press **Right arrow**.
2. In **D2** type **Febr...hang on a moment!** Press **Esc** to cancel your typing and read this:

If Excel really is smart, the programmers at Microsoft must have come up with a smart function here. Think how often you have to type every month of the year in a new spreadsheet?

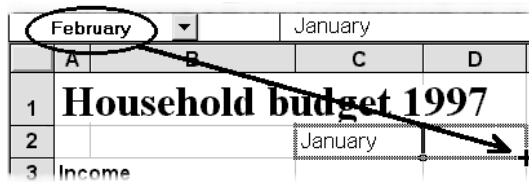
Let us look a bit closer at the Fill handle:

Fill (series)

You have already tried copying a few times using the Fill handle at the bottom right of a cell. While you were dragging the handle, the status line cryptically informed you: 'Drag outside selection to extend series or fill, drag inside to clear'. Honestly, who has understood that ...!

Once again Microsoft has introduced another nerd term to the computer branch: 'Fill'. Even though the text may appear confusing it is actually telling you about a simply amazing function.. Try this example:

1. Select cell **C2** (type **January** and press **Enter** if not already done).
2. Use the mouse to grab onto the Fill handle and drag it to the right. When you get about half way through cell **D2**, a dotted frame appears. Still keeping the left mouse button down keep an eye on the field above column **A**. It usually shows which cell is selected, but now it shows the word **February**.



1. Still with the mouse button down keep dragging to the right until you reach **December** (cell **N2**).
2. If you drag too far (when you hit the edge of the window the screen picture can roll very fast), then just drag back to **N2**.



If you dragged too far and accidentally released the mouse button, just grab hold on the Fill handle again and drag into the selected area to delete the extra text (this is what the words '...drag inside to clear' means).

One of the basic principles of Excel is that all trivial and repetitious insertions should be performed by the program.

And before you come to the conclusion that this is all the function can do, follow this example:

1. Click on the sheet tab for **Sheet3**. We can use this to play with.

2. Type **Monday** in any cell, press **Enter** and drag downwards with the Fill handle...
3. In another cell, type **JAN**, press **Enter** and drag the Fill handle horizontally or vertically (but *not* diagonally). Notice that the program continues to use capital letters.
4. Try typing a list with **June** and then drag the Fill handle. Excel does not mind which month you start with.
5. Type **1st quarter** in yet another cell and repeat the procedure. Try dragging further than **4th quarter** (if you use the English version of Excel, it starts again at 1st quarter. If you use it in another language, type it as you usually do, for example '1. quarter').

So how does a function find out when it should copy and when it should make a series like the ones we have just seen?

Let us try some numbers. Type 1997 in a cell and drag. What do you end up with?

Now type **Year 1997** in another cell and drag.

The function differentiates between numbers and text. When you mix text and numbers in a cell the whole entry is taken to be text and the function allows the number part to grow.

On the other hand, a 'pure' number is simply copied, which is wise...in a moment we will type the mortgage payments into the budget. The number is the same every month, so in this case you need to copy. It would be a little embarrassing if the function made your mortgage increase by a pound every month.

Let us imagine that you want to type a series of numbers starting with 12 and growing by 6 every time (cell). It is done like this:

1. Type **12** in one cell and **18** in the cell under it.
2. Select both cells. Now the program knows that it should start the number series with 12 and increase it in steps of 6.
3. Drag the Fill handle as far as you want.

Now try with other number series, like percentages and dates (dates should be typed using hyphens or slashes, for example 10/08/97).

! It will pay you to try the following if you often need to insert dates. Type a date in a cell, and drag using the Fill handle and the **right** mouse button. When you release the mouse button you can use the object menu to choose how the series should be carried on. If you choose **Fill Weekdays** Excel leaves out the weekends (and it also recognises leap years...and has no problem with the year 2000. Someone has obviously used their grey matter at Microsoft).

Creating your own lists

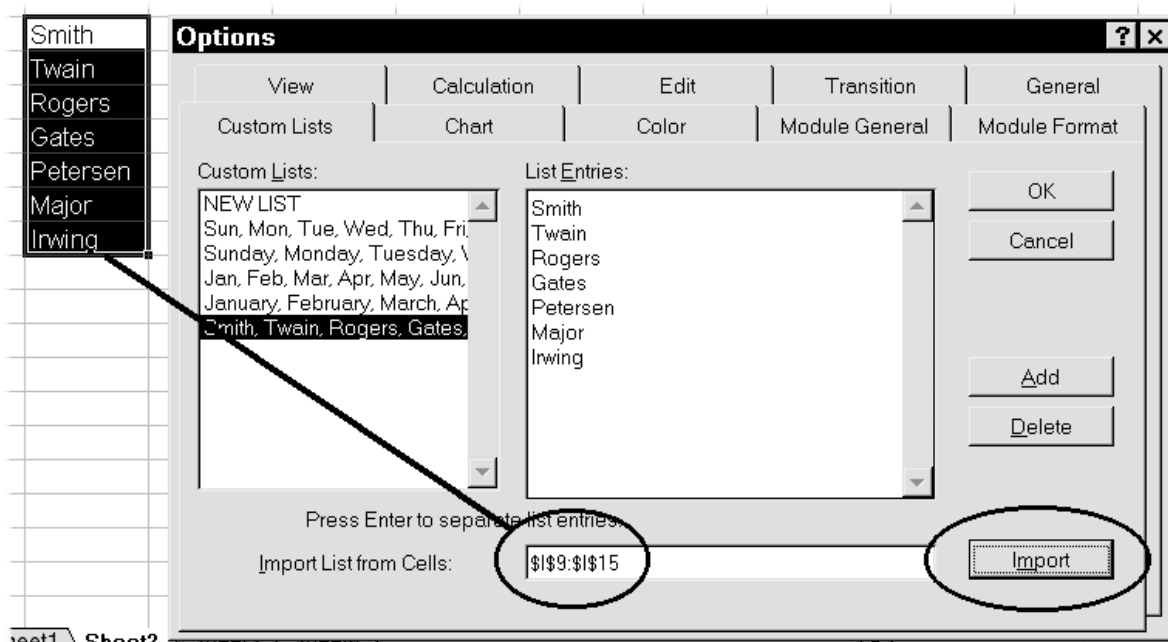
Do you often need to type the same data, like names, stock numbers. etc?

Then you can create your own lists, which function in exactly the same way as Excel's own built in lists.

1. Type a number of names, or other relevant text.
2. Select all the names or text and choose **Tools, Options** and the **Custom Lists** tab.
3. Click on the **Import** button:
You can correct your own lists in the **List entries** field.

When you want to use your list, just type one of the names in a cell and drag using the Fill handle. The list starts with the name you wrote and continues in the correct order.

The lists you create are available in all future workbooks.



Numbers and formulas in our budget

Click back to **Sheet1** where we will now type numbers and formulas. Type the numbers without thinking about formatting at the moment.

We will start with income:

1. The husband has a monthly net income of **9585 kr.** Type this amount in cell **C4**.
2. His wife earns net **10250 kr.** Type this amount into **C5**.
3. Copy both incomes to the other months using **Ctrl+C** and **Enter**.

The formula for **Total income** should be typed into **C6** and copied. The formula could be given as **=C4+C5**, but this would not be particularly flexible. If you add further rows with other incomes at a later time, these will not appear in the summation. Instead we use the function **=SUM(C4:C5)**, which allow us to insert rows between rows four and five, and include them in the formulas. We will demonstrate that later.

You can use the **Autosum** button, but try using the following keys instead:

1. Select **C6**.
2. Press **Alt+=** and the formula is ready:

		C4		X	✓	fx	=SUM(C4:C5)
	A		B				C
1							
2							
3							
4							
5							
6							

3. Press **Enter** and copy the formula to the other months.

The mortgage for our fictional family's apartment is constant, but the heating and electricity is based on a shared basis. (This is a Scandinavian system, where the total is taken for the entire building, and shared out among the tenants in direct proportion to the floor area of their apartments). The mortgage is **3875 kr.** per month, which you type in **January** and copy.

The heating bill for the entire building last year was **10875 kr.** per month, and the family's apartment has a floor area corresponding to **0.12** of the total. So the formula for calculating the total is **=10875*0.12**.

The final monthly payment for heating is actually not finalised yet, and our family would like to be able to see the effect of any changes. And the way it is divided could also be changed. If we choose to type 10875 and 0.12 in every formula we would have to change every single one if either of the figures changes. At the risk of repetition I will just repeat a point from earlier in the booklet:



It is totally wrong to insert variables in a formula. They should be put in separate cells. All formulas which use this variable will get the value for this cell. If a variable is changed, just correct this one cell and the entire spreadsheet will be updated!

With this in mind we will create an area to use for variables:

1. Insert **five rows** above the spreadsheet so that we can easily see the variables while we work with the formulas.
2. Type **Total apartment block:** in **A1**.
3. Continue typing as follows:

	A	B	C
1			
2			
3			
4			
5			
6			

The formula for calculating the amount of heating used should appear as in the next illustration, but wait just a moment before typing it.


First I want to show you two easier methods for entering formulas. One method using the mouse and one using the keyboard.


Selecting formulas

The more complex formulas become, and the more of them you enter, the greater the chance becomes of making mistakes when you type them yourself. Use this method instead:

1. With **C15** selected type = to anchor the cursor to the cell.
2. Click on **C3**. A dotted frame surrounds the cell. Notice the text 'Point' on the left on the status line. If you click in the wrong cell just carry on clicking until you hit the correct one.
3. Press *, and then you are ready to click on the next cell.
4. Click on **C2** and press **Enter**.

C2 X ✓ ✖ =C3*C2				
	A	B	C	D
1	Total apartment block:			
2		Apartment share:	0.12	
3		Heating:	11250	
4		Electricity consumption:	3325	
5				
6	Household Budget 1997			
7			January	February
8	Income			
9		Salary after tax - husband	9585	9585
10		Salary after tax - wife	10250	10250
11		Total income	19835	19835
12	Expenses			
13	House			
14		Mortgage	3875	3875
15		Heating	=C3*C2	

 You can also select the cells using the arrow keys, a method which is preferable when they are close together.

 When you have begun to type a formula, the arrow keys can only be used for pointing out cells. This is the reason that entering a formula must always be finished by pressing **Enter**!

Save the budget

Before continuing you should save your budget. In contrast to many other programs Excel does not automatically save its spreadsheets at fixed intervals. (In fact this can be set, but to do it is so troublesome that it appears the program designers have never intended this function to be used).

Click on the **Save** button, or use the **Ctrl+S** keys. Type **Household budget** and press **Enter** (the file will be saved in our standard folder). I would suggest that you press **Ctrl+S** regularly to save the data you enter. (In the branch it used to be said that: 'Real men never backup their data' – later it was said that 'Real men cry often'...I know what they mean!).

Absolute cell references

The formula for calculating the monthly cost of heating is ready for copying...or is it?

Try and copy the formula from **C15** one cell to the right. There is something wrong here, the result in **D15** is zero! Select **D15** and see if you can work out yourself what is wrong with the formula before you go on.

	A	B	C	D
1	Total apartment block:			
2		Apartment share:	0.12	
3		Heating:	11250	
4		Electricity consumption:	3325	
5				
6	Household Budget 1997			
7			January	February
8	Income			
9		Salary after tax - husband	9585	9585
10		Salary after tax - wife	10250	10250
11		Total income	19835	19835
12	Expenses			
13	House			
14		Mortgage	3875	3875
15		Heating	=C3*C2	=D3*D2

The formula you have copied was told to use the content of the cell positioned 12 rows above it in the same column, and multiply it with the cell 13 rows above it. When you copied the formula to column **D** Excel remembered these relative references and moved them to column **D**. The program did not make a mistake, it did exactly what it was asked to. Experience has taught me that:

'the greatest cause of errors is sitting 40cm in front of the screen ...'

So we have to find a way to explain to the program that the references should be fixed, no matter where we copy the formula to.

This fixing of a reference to a cell is called *an absolute reference*, and is defined using a \$ (dollar) character in front of both the column and row reference, like this:

=C\$3*C\$2

Why a \$ character?

Well, I cannot really give you a good reason, but would guess that it is because it was the Americans who invented the spreadsheet. No matter, it is standard in all spreadsheet programs.

But this does not mean that you should type a \$ character in yourself. Use the **F4** key instead:

1. Select **C15**.
2. Press **F2** to edit the cell, and use the **Left arrow** until the cursor is placed by the reference to **C3** (it does not matter if the cursor is in front, in the middle or at the end of the reference).
3. Press **F4**. The reference is now locked to cell **C3**. Try pressing **F4** again. Now only the row is locked, and pressing **F4** yet again will lock the column only:

=C\$3*C2

Only the reference to column C is absolute here

4. A last press will remove the lock from everything. Finally press **F4** to lock the column and row references.
5. Use the **Right arrow** to move the cursor to the other side of the multiplication sign. Press **F4** again. Now **C2** is locked. Now press **Enter** (the result should be 1350).
6. You can now copy the formula to the heating for all the other months (D15:N15).



*When you edit a formula using **F2**, the arrow keys can be used for moving backwards and forwards on the formula line.*

Now try changing the result of the monthly heating bill by typing the overall use of the building in cell **C3** to **16000**. The moment you press **Enter**, you have the new figures for each month. Go back to the original figure by pressing undo (**Ctrl+Z**). Try using other figures for the apartment's share to see what happens to the total.

The formula for **Electricity** should be typed in and made absolute. This time we will do it all in one process:

1. Select **C16**, type = and click on **C4**.
2. Press **F4** and type *.
3. Click on **C2** and press **F4**.
4. Press **Enter** (result 399).

=C\$4*C\$2

We will now copy the formula using the keyboard:

1. Select **C16** and press **Ctrl+C**. Notice the text in the status line.
2. Use **Shift+Right arrow** to select the cells **D16:N16** and press **Enter**.

Calculate the **Total house expenses** in **C17** by using the sum formula. Remember the **Alt+=** keys.

For **January** the formula looks like:

=SUM(C14:C16)

and the result should be: 5624 kr.

Copy the formula to the other months using the keyboard.

Year total

We still have to add the monthly figures to get a total for the year. In **O7** type the text **Total:**, and in **O9** use the **Alt+=** keys to sum the formula. The result should be 115020 kr.

All the rows *containing data* should be summed. Of course you could just copy the sum formula all the way from **O9** to **O17**, but that will also insert the formula in cells **O12** and **O13**. Instead use the keys for copying:

1. Select **O9** and press **Ctrl+C**.
2. Select the area **O10:O11** and press **Ctrl+V**. You should not press **Enter**, as that would finish the copying. When using **Ctrl+V** to paste, the copy function is still active. In this way you can insert the formula everywhere you want it.
3. Move the cursor to **O14** and select the area **O14:O17** by using **Shift+Down arrow**. Since we are not going to continue copying after this range, you can press **Enter**. (If you want to stop copying without inserting data, press **Esc**).

Check your formulas

Type another apartment share in **C2**. Now all the formulas react to the changed number.

Use undo (**Ctrl+Z**) to swap between the two last entries while you check that all the formulas for **heating, electricity** and **Total house expenses** change.

Continue typing the following data. When you copy the data, try using the keyboard, it will pay off in the long run.

Insurance:

Home:

January 1950
July 1950

Accident:

December 975

Transport:

Car loan:

Each month 1950

Car tax:

March 995

Insurance (car):

January 1215
April 1215
July 1215
October 1215

Petrol and oil:

Every month 500

Repairs & maintenance:

January 800
July 800

Now you have a number of cells with data, and some without. There is no problem with that, but the empty cells make it difficult for Excel to work out which cells should be summed when you enter formula for **Total insurance, Total transport** and a year total.

Select **C28, Total transport** and press **Alt+=** or click on the **AutoSum** icon. Now the cells **C25:C27** are selected – the empty cell **C24** stopped the selection, so that **Car loan** and **Car tax** were not included.

C25						=SUM(C25:C27)
	A	B				C
22	Transport					
23		Car loan				1950
24		Tax				
25		Insurance				1215
26		Petrol and Oil				500
27		Repairs and maintenance				800
28		Total transport				=SUM(C25:C27)

Change the formula using this method:

1. You have to select the correct cells yourself. Select cells **C23:C27** instead and press **Enter** (Remember that the **Autosum** only *suggests* cells. As long as they are highlighted in black you can change the selection. Now you can copy the formula to the remaining months (to **N28**).
2. Type the formula for **Total insurance (C21)** and copy it to the remaining months.

The formula for the calculation of the year's total in column **O** has the same problem – there are a number of empty cells each month. It seems that Microsoft want blank cells to *surround* an area.

Therefore cells which are part of an area should not be empty. Instead they should contain a value of '0' (zero), as an accountant would expect.

1. Insert a '0' (zero) in every empty cell in the area **C19:N20**.
2. Insert a '0' (zero) in every empty cell in the area **C24:N27**.
3. Type a sum formula in **O19** and copy it to **O20:O21** and **O23:O28**. Remember to copy using **Ctrl+C** and **Ctrl+V**.

Your spreadsheet should now look like this:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Total apartment block:														
2		Apartment share:	0.12												
3		Heating:	11250												
4		Electricity consumption:	3325												
5															
6	Household Budget 1997														
7			January	February	March	April	May	June	July	August	September	October	November	December	Total:
8	Income														
9		Salary after tax - husband	9585	9585	9585	9585	9585	9585	9585	9585	9585	9585	9585	9585	115020
10		Salary after tax - wife	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	10250	123000
11		Total income	19835	19835	19835	19835	19835	19835	19835	19835	19835	19835	19835	19835	238020
12	Expenses														
13	House														
14		Mortgage	3875	3875	3875	3875	3875	3875	3875	3875	3875	3875	3875	3875	46500
15		Heating	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	16200
16		Electricity	399	399	399	399	399	399	399	399	399	399	399	399	4788
17		Total house expenses	5624	5624	5624	5624	5624	5624	5624	5624	5624	5624	5624	5624	67488
18	Insurance														
19		House	1950	0	0	0	0	0	1950	0	0	0	0	0	3900
20		Accident	0	0	0	0	0	0	0	0	0	0	0	975	975
21		Total insurance	1950	0	0	0	0	0	1950	0	0	0	0	975	4875
22	Transport														
23		Car loan	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	23400
24		Car tax	0	0	995	0	0	0	0	0	0	0	0	0	995
25		Insurance	1215	0	0	1215	0	0	1215	0	0	1215	0	0	4860
26		Petrol and Oil	500	500	500	500	500	500	500	500	500	500	500	500	6000
27		Repairs and maintenance	800	0	0	0	0	0	800	0	0	0	0	0	1600
28		Total transport	4465	2450	3445	3665	2450	2450	4465	2450	2450	3665	2450	2450	36855

Navigation

When you want to move around in a large spreadsheet (Microsoft calls it navigating) it is not so easy to use the mouse and the scroll bars. Think about it. You type data using the keyboard and have to break off, move your hand to the mouse, move the mouse pointer, click and then go back to the keyboard. It is much easier to keep your hands on the keyboard for the entire operation.

If you use the mouse constantly, sooner or later it will result in problems with your wrist and shoulder, so stick with the keyboard.

Try the following keys until you feel relaxed using them. Write them out on a piece of paper and put it next to your keyboard in the beginning.

Home

Selects the first cell in the row.

Ctrl+Home

Selects cell A1.

Ctrl+Arrow

Selects the last cell containing data in the direction of the arrow. When the cells are empty the cursor

will move to the last row or column in the direction of the arrow.

Try pressing **Ctrl+Right arrow** – cursor is now in column **IV**. Press **Ctrl+Down arrow** – the cursor is now in the last cell in the spreadsheet (**IV16384** = 4.194.304 cells !!!).

In version97 there are 65536 rows. There is no chance of running out of space.

F5

Opens a 'Go to' dialog box. Type the address of the cell you want to move to in the **Reference** field (for example **CD1250**) and press **Enter**. Press **F5** again, type **D48** and press **Enter**. Press **F5** again. All the cells you have jumped to are displayed in the **Go to** area. Try to double click on one of them. These references disappear when you exit the workbook.

When you keep pressing the **F5** key, the program will keep suggesting that you jump back to where you have just jumped from.

Smart detail!

Formatting

Now it is time to smarten up the appearance of our spreadsheet.

The heading in **row 7** should be centered and formatted in bold:

1. Click on the row number to select the entire row and choose bold by using **Ctrl+B** (if you run Excel in an other language, the letter used with **Ctrl** might be different. Use the letter shown on the button).
2. With the row still selected centre all text by using the **Centre** button (there is no key for centering data!).



All numbers should be displayed with two decimal places. You can choose between several methods when you have to select a lot

of data, as here. You can select entire rows, or entire columns, or even the entire spreadsheet (click on the small grey field at the intersection of the row numbers and column letters). There is just one problem with formatting the entire sheet.

It *can* lead to printing problems, and will most definitely slow down the machine...just think how many cells have to be worked through for no reason. So we will format only the cells containing data using the following method:

1. Select the area **C9:O28** (**Shift+Arrow keys**).
2. Click on the **Increase decimal** keys until all numbers display two decimals.
This will help a little, but it would be even easier if the thousands were also selected by commas: 1,000.00 (Note: Many countries use a point for thousands, and a comma for decimals. The way your spreadsheet displays will depend on the **Regional settings** in Windows control panel).
3. Now click on the **Comma style** (you really need to have tried this button to understand what it does.).



In version 5 this button is called 'Decimal separator' (I don't think that name is any better).

Now all numbers have thousand separators and are displayed to two decimal places. But that is easy

enough for me to say, for you can probably see nothing more than some mystic 'noughts and crosses' (hatches) in your fields: #####.

These characters (called hatches, and meaning 'number'), tell you that the columns are not wide enough to display the numbers.

We have seen earlier that if there is not enough space in a cell to display all the text, it is simply cut short. Luckily Microsoft has chosen a different procedure with numbers...if not, can you imagine the chaos: You type 17,000,000 – but there is not enough space in the cell, so Excel just removes the last three zeros!

Version 97: When you type or format numbers, the program automatically adjusts the width of the column. This only works with cells containing data other than text (numbers, dates or time).

We need to adjust the column's width, which we do in a single process, like this:

1. Select the relevant columns. If you still have cells **C9:O28** selected this is very easy: press **Ctrl+Space**. Otherwise you will have to drag the mouse over all the column headings (from **C** to **O**).
2. Now double click between two of the selected columns. It does not matter which columns you choose. All columns width will be individually adjusted.

Let the columns remain selected while you try the following:

! A double click adjusts every selected column to their individually required width. If you want all columns to have the **same** width, then drag the right border of one of the selected columns. When you release the mouse, all the other columns in the selection will be given the same width as the column you adjusted.

Now you can see all the numbers. Note that there is a little extra space on the right hand side of the cells. This is a rather special format Microsoft has defined. The appearance of the numbers is dependent on your Windows set-up. Let us just test that:

1. Select the cells **C9:O28**.
2. Click on the **Currency style** button.



Adjust your column width again if necessary. Now all your numbers will display the currency unit defined in [Control Panel, Regional settings](#).

£	958.00
£	1,025.00
£	1,983.00

Remember that a cell has two layers. We have just formatted the foreground layer, while the background layer, the formula, remain unaffected. You can check this by changing a number in one of the formatted cells. Try typing **12000** in cell **C9**. As soon as you press **Enter** the number will be displayed in the format you have chosen for the cell. Return to the original number by using **Ctrl+Z**.

Notice that the zeroes in the 'empty' cells are shown as dashes. (This is applied by both currency style and comma style).

Excel and Windows

This booklet is not about Windows...but all programs using Windows are dependant on its configuration, as discussed above when formatting cells using the currency style.

Without closing or minimising Excel click on the **Start** button and choose **Settings, Control panel**. Activate the **Regional Settings** program.



Regional settings

Version 5 uses Windows 3.1, where Control Panel is found in the System group.

I assume that the value in the **Regional Settings** tab is English (Australian), but it could be any one of a number of languages. This sets a standard for numbers, currency symbol, time and date. The **Number** tab shows the decimal and thousands separator (English speaking countries standard: 1,250.00). If you work on a machine which shows the decimal as a comma, then it is probably set up to continental European standard (French, German, Danish, etc. etc.).

The **Currency** tab shows the currency symbol used by Excel (and other programs). If you are on the default English (Australian) setting, then the £ sign will be there. Maybe you are sitting in a Australian company in Japan, working with Japanese accounts, and have defined ¥ as your currency symbol.

You can set all the individual values in **Regional settings** to your own needs. Check that the currency is what it should be, and at the same time specify that it should be placed in front of both negative and positive amounts:

* = Universal currency symbol

Currency symbol:	£
Position of currency symbol:	*1.1
Negative number format:	*-1.1

Click on **Apply** and **OK** to close the **Regional settings** program and the **Control panel** window. Return to the household budget. All the cells formatted with currency style has been adjusted to your new settings.

Toggling formats

Select the area **C9:O28** like this:

1. Select cell **C9**.
2. Hold **Shift** down while you press **Ctrl+Down arrow**. Excel selects to the next blank cell. Keep holding down **Shift** and continue to press the **Down arrow** until the selection has reached the last row of data..
3. Continue holding **Shift** down and press **Ctrl+Right arrow**.

Even though selecting using the keyboard demands quite a few strokes, it is by far the most precise method.

Shift between the **Comma format** and **Currency format**. Notice that the numbers do not actually change place. The only difference is the display of your currency unit.



You remove a format by choosing another.

! You can choose to delete only some of a cell's many properties. Choose **Clear** on the **Edit** menu. If you choose to clear only the **Formats**, the data in the cell remains untouched.

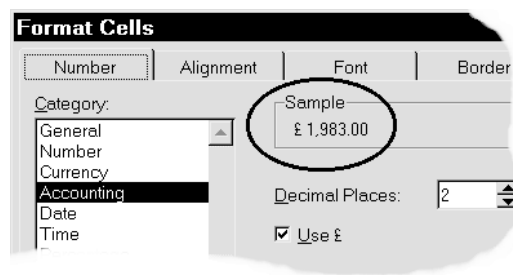
There are a multitude of formats to choose between. With the cells **C9:O28** still selected, press **Ctrl+1** or open the object menu (right mouse button) and choose **Format Cells**. Click on the **Number** tab. (**Ctrl+E** is used in some language versions of the program).

Version 97: The **Ctrl+1** keys open the **Format Cells** dialog box, which is slightly changed in appearance. It allows you, among other things, to rotate the contents of a cell in 1 degree increments.

Click on the different options in the **Category** field and keep watching the **Sample** field.

Later on you will define your own formats.

Version 5 only displays formats as codes (the same as the formats in the **Custom** in version 7 and **User defined** in version 97). Code formats are described on page 40.



More data

We still have to type the household expenses.

Type the following data under the existing:

	A	B
29		Household etc.
30		Telephone
31		TV licence
32		Food and household
33		Bank loan
34		Total household etc
35		Total expenses
36		Income - expenses

This is the time to look at the options for viewing all your data on screen, before typing the numbers and formula for the new items.

Viewing the spreadsheet

Our model has now become so large that it is difficult to keep track on the individual data. Using the arrow keys, move to **O28 – Total transport** (press **F5**, type **O28** and press **Enter**). Depending on the size of your screen and its resolution, you probably cannot see any of the headings. It would be an advantage to keep the text in columns **A** and **B** and also the months in row **7** fixed on the screen as you scroll through the data. There are several different ways to do precisely that:

Zoom

We will start by testing the entire budget on your screen.

1. Press **Ctrl+Home** to select **A1**.
2. Click on the **Zoom** button on the toolbar. Try choosing **50%**. Now you can probably see the

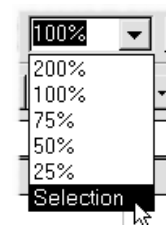
entire spreadsheet, but can you read it? Now try **75%**, I'm sure that is better.

3. Notice that you can click on the **Zoom** field, type a number (you do not need to type %) and press **Enter**. Try with different values until all the data is visible on screen. Can you read it?



Let us just try a smart detail:

Select some cells, try with **A6:E18**. Now choose **Selection** on the **Zoom** drop down box. This lets you quickly zoom in and out on different areas of the spreadsheet. This does not, of course, ensure that some areas are always visible, which is the function we need to look at now.



Return to 100% zoom before continuing.

Freeze panes

Freeze panes gives the option of certain columns and rows always appearing on the screen. Select the first 'free' cell. When you choose to **Freeze panes** all the columns to the left and rows above will be 'frozen'. We want to freeze row 7 and columns A and B. With this in mind, select C8 and choose **Window|Freeze panes**. A vertical and horizontal line show where the freezing has taken effect. Try using the arrow keys to move around in the spreadsheet. **Ctrl+Home** usually selects A1, but now the cursor stops at the first 'free' cell. You can still move into the locked area using either the arrow keys or the mouse.

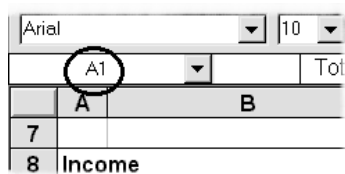
Switch the function off again using **Window|Unfreeze panes**.

We do not need to see the total house charges while we work with the budget, but we do want as much space as possible for displaying data. Follow the example here:

1. Without freezing the panes, scroll down the spreadsheet until row 7 is the first visible row.
2. Select C8 freeze the panes. Now only row 7 is visibly locked:

	A	B	C
7			January
8	Income		
9		Salary after tax - husband	9585

In the **Name box** just above column A you can see that the cursor can move up into the top rows using the **Up arrow**, even though they are not visible:



The following data should now be entered, while the panes are frozen.

More data

Type the following data. Remember to type a zero in the months not named:

Cell:	Text/month:	Data:
A29:	Household etc.	
B30:	Telephone:	
	January	825
	April	745
	July	715
	October	830
B31:	TV-license:	
	January and July	859

If you want yet another shortcut for copying the data below, just type the following numbers and wait copying until you have read next section.

Cell:	Text/month:	Data:
B32:	Food & household:	
	Every month.....	7200
B33:	Bank loan:	
	Every month.....	2250
B34:	Total Household etc.	

Quick copy using the keys

You already know the principles of copying. The **Ctrl+C** and **Ctrl+V** keys are effective, and the Fill handle is smart, but you have to use the mouse. Instead, try this to see how creative the folks at Microsoft have been:

1. Using **Alt+=** and **Enter** insert the formula for **Total Household etc.** in cell C34 (result: 11.134 kr.).
2. Select from C34 to N34 (December) using **Shift+Right arrow**.
3. Press **Ctrl+R**. That is it ('R' for 'Right').

Version 5: Use **Ctrl+J** instead (**Ctrl+R** is used to hide the selected rows).

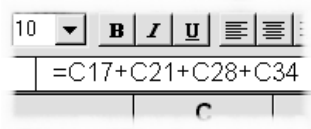
In the same way you can copy vertically using **Ctrl+D** ('D' for 'Down') after selecting. Try it using the year totals:

1. In O30, **Total telephone** type a sum formula using **Alt+=** and **Enter**.
2. With the cursor in O30 use **Shift+Down arrow** to select the area O30:O34.

3. Press **Ctrl+D**.

Lets continue with the last formula:

1. In row 35, **Total expenses**, all expenses should be added together. The formula for January in **C35** looks like this:



Build the formula by pressing = and go to **C17** using the arrow keys. Type + and select the next cell etc. Press **Enter** when the formula is ready. Now try double-clicking on the cell. Are the correct cells selected? (result: 23,173 kr.)

- Copy the cell to the other months and press **Home** and **Down arrow** (selects **C36**).
- Type the formula for **income – expenses** in **C36** (**=C11-C35**) and copy it to the other months. The result in **C36** should be -3.338 kr.
- Create a sum formula in cells **O34:O36**. The total result for the year in **O36** should be: 10,569.00 kr.

That is a comfortable surplus, even though January and July are in the red.

All the rows containing totals should have the same appearance as the text in columns **A** and **B**.

! You can select several unconnected cells or areas by holding down **Ctrl** while you are selecting.

Follow these instructions exactly as written:

- Select row **11**, hold **Ctrl** down and select the other rows (**17**, **21**, **28** and **34**).
- Press **Ctrl+I** or click on the **Italic** button.
- Adjust the column width as necessary (remember that you can adjust all columns simultaneously).
- Rows **35** and **36** should be in bold. Select them and press **Ctrl+B** or click on the **Bold** button. As **A35** is already bold, the first thing happening is that the bold format is removed from all selected cells. Press **Ctrl+B** or click the **Bold** button again.

All the new data should be formatted using the **Currency format** button, to give the same appearance. Do that now.

Save

If you have not already done so, save all the changes you have made to our budget by clicking the **Save** button or pressing **Ctrl+S**.

Summary

You have now tried just about all the functions necessary for building up a large spreadsheet.

Maybe it is a good idea to stop a moment and revise some of the most important functions.

I want to focus on the principles of absolute references.

Leave the household budget on the screen, and open the **DECORATING.XLS** using the **Ctrl+O** keys or the **Open** button.

At the bottom of the **Window** menu you can now see that both files are open. Click on the file you want to work with, or use **Ctrl+Tab**, to avoid using the menu and mouse.

The supplier we are buying from is a mail order company. Apparently they want to deliver the goods directly from their warehouse in Sweden.

What we thought was Danish kroner, turns out to be Swedish kroner, which is cheaper as the Swedish kroner is worth less than the Danish (at this time). First, calculate the net price of the ordered goods in Danish kroner, then the sales tax and finally calculate the gross price. We will be paying Danish sales tax, but it would be interesting to see what the result would be with another sales.

The exchange rate for the Swedish kroner and Danish sales tax should be placed in its own cell, so it can be changed quickly if necessary. Try it now:

- Insert a new row **2** (**Ctrl+Plus** and **Down arrow** to **Entire Row**).
- Insert a new column **C** (**Ctrl+Plus** and **Down arrow** to **Entire Column**).
- Change the text in **B1** to **Net price SEK:** and in **C1** to **Net price DKK:**

4. Adjust the column width.
5. Insert the exchange rate **0.88** in **C2** and the sales tax rate to **25%** in **D2**.
6. Format rows **1** and **2** with **bold**, and center **C2** and **D2**.

The two top rows should now look like this:

B	C	D	E
Net price SEK.:	Net price DKK.:	VAT:	Price:
	0.88	25%	

You are now ready to build a formula which will calculate the net price in Danish kroner:

The formula in **C3** should multiply the Swedish net price in **B3** with the exchange rate in **C2**. In **C4** the net price in **B4** should be multiplied by the exchange rate in **C2** etc. The reference to **C2** is used in all column C formulas and should therefore be absolute.



When the same cell is to be used in several formulas, the reference to it should be absolute.

Have a go at inserting and copying the formula yourself first. Use the arrow keys to select the different cells and for copying.

How did it go?

This is how I would have done it:

1. Select **C3** and type =.
2. Press **Left arrow** to select **B3**.
3. Type '*' and press **Up arrow** to select **C2**.
4. Press **F4** to lock the reference (make it absolute). The formula should now read **=B3*\$C\$2**.
5. Press **Enter** and select down to **C17** using **Shift+Down arrow**.
6. Press **Ctrl+D** to copy the formula.
7. Type a new exchange rate in **C2** and check using **Ctrl+Z**, that all the net prices change.

It is important to understand why we used a combination of relative and an absolute reference here!

The formula for calculating the sales tax should not contain a value of 25%, but should get a value from cell **D2**.

1. Select **D3** and press **F2** to edit the formula.
2. Delete **25%**. Try pressing **Up arrow** – nothing happens, because you are in the process of editing. Press **F2** again.
3. Now you can press **Up arrow** to select **D2**. Press **F4** to lock (make absolute) the reference (the formula should read **=C3*\$D\$2**)
4. Press **Enter** and select the area **D3:D17**.
5. Press **Ctrl+D** to copy the formula.
6. Type a new sales tax and check that the dependant cells adjust correctly.
7. Copy the sum formula in **B18** to **C18**.

Check the sum formula in **E3**. It is incorrect at the moment, as it adds together all three cells to the left of it.

Change the formula so that it only adds **C3** and **D3** together, and then copy it.

With an exchange rate of 0.88 and sales tax at 25%, the total price (in cell **E18**) should be 2,592.64 kr.



***F2** switches editing on and off: Press **F2** once to edit the contents of a cell, and **F2** again when you want to point to a cell reference. Press **Enter** when you are finished.*

Version 97: When editing a formula using **F2** the involved cells will be shown in a different colour.

Save As

Our new model should be saved, but we want to keep the original **DECORATING** as well. Using **F12** or **File|Save As** change the name to **DECORATING – SWEDISH** and close the workbook.

Formatting the household budget

Our household budget should be made more attractive and easier to read.

The gridlines on the screen seldom look good on a printout. The effect is much stronger if you just have lines where *you* want them to be, to highlight or separate your data.

Rather than defining all frames and colours manually, the program can do it all for you with a built in automatic function:

AutoFormat

One of the smartest things with Excel is that you do not have to select a consecutive area first. All you have to do is select just one of the cells in the area. Try it on your own computer:

1. On the **Household budget** sheet, start by choosing the **Window** menu and the **Unfreeze panes** command. Press **Ctrl+Home** to see the entire spreadsheet.
2. Save the changes in the file (**Ctrl+S** or the **Save** button). You can always return to the original appearance.
3. Select any cell in the household budget, **C10** will do fine.
4. Choose the **Format** menu and the **AutoFormat** command. Notice how all connected cells in the entire budget are automatically selected. If you had left an empty row or column somewhere then Excel would have stopped selecting there.
5. The **Down arrow** lets you move among the different options in the **Table format** field, and also displays an example of each of them in the centre of the dialog box.
6. Choose a format and press **Enter**.

7. Look at the different areas of the spreadsheet and see how they are formatted.
8. Choose the **Format** menu and the **AutoFormat** command again, and choose another format for your spreadsheet.
9. Repeat point 8 above as often as you want.

AutoFormat is a quick method to format your spreadsheet, even though you have only a limited influence over what the program actually does. I mainly use the function when I am busy and have to prepare some data for printing in a hurry.

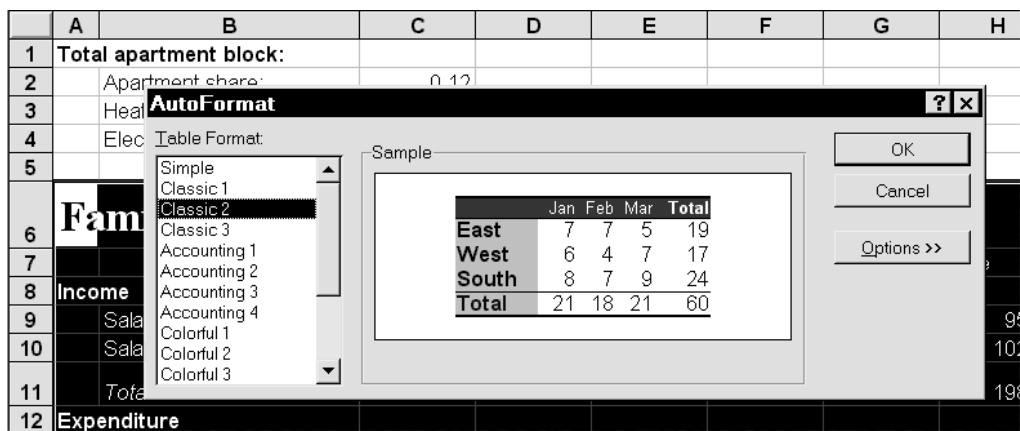
If you want to make your spreadsheet more personal, using the **AutoFormat** function is not such a good idea.

! You can decide just how much the function will change the appearance of your data. Click on the **Options** button in the **AutoFormat** dialog box and remove the check marks in the fields you do not want changed by the function.

Removing an AutoFormat

An applied **AutoFormat** can be removed the following way:

1. Choose **Format|AutoFormat** and **None** in the **Table format** list (at the bottom). As you can see, all formatting except the number formats is removed.
2. Luckily we were sensible enough to save our spreadsheet before we played with the **AutoFormat** function. Close the file and click **No** when you are asked if you want to save changes, then open it again.



Remember that you can always find the last four opened files at the bottom of the **File** menu. It is easy to open a file using the keyboard:

1. Press **Alt+F** (the **Alt** key activates the menu line, while **F** is the underlined letter in the menu name).
2. Press the number corresponding to the file you want to open (**1** will always be the last saved file).

! Use **AutoFormat** to quickly format a spreadsheet, which you can 'personalise' afterwards by using manual formatting.

Manual formatting

I do not think that our budget looks particularly good – the figures are fine, it is just its appearance I am unhappy with. I must admit that I was not very consistent in my formatting. I will do something about this now, using the data to help me find a suitable format for each part of the spreadsheet.

The **Total income** heading in **B11** should actually have been entered **A11**, and have been in **Bold** instead of in *italic*:

You have probably already guessed that data can be moved in many different ways.

I will demonstrate the two most used methods.

Moving data using the mouse

If you work with the computer in the same way as me, you will already have discovered that the mouse is not the easiest tool to control. It is very sensitive and needs a good deal of precision to be used efficiently.

It is very important to keep an eye on the mouse pointer's appearance as you move the mouse. The mouse pointer can have three basic different appearances. You have seen two of them earlier in the booklet:

Select:

The mouse pointer is a large white cross.



Fill & copy:

Demands precision mouse work.



Move:

Point at the frame of the selected cell or area, and the mouse pointer changes appearance to an arrow.



1. In the **Household budget**, select **A13** and move it to **B13** by dragging, using the mouse when the mouse pointer is an arrow.
2. Move cell **A18** to **B18**.
3. Move cell **A22** to **B22**.
4. Move cell **A29** to **B29**.
5. Format row **11** to be **Bold** and not *Italic* using **Ctrl+I** and **Ctrl+B**.

Moving data using the keyboard

It is not practical to have the Total apartment block expenses at the top of the spreadsheet. They should not appear in a place where they tend to dominate the entire budget. When data is to be moved outside the viewing area, the keyboard is better than the mouse.

1. Select cells **A1:C4**.
2. Cut the selection using **Ctrl+X**. Notice the text on the status line.
3. Use the **Down arrow** to select cell **A40** and press **Enter**.
4. Press **Ctrl+Home** to select cell **A1**.
5. Select rows **1:5**, (which are now empty), and remove them using **Ctrl+Minus**.

Now the heading 'Household Budget 1997' should now be in **A1**, and the 'Total apartment block' costs are in the area **A35:C38**.

What has happened to our formulas for calculating heating and electricity? They originally took their information from cells **C2**, **C3** and **C4**.

Select **C10**, heating for January:

=C\$37*\$C\$36



Formulas remember which cells they refer to, and use them no matter where you move them, whether the references were absolute or relative:

The formatting of our spreadsheet should conform with its contents:

1. Select rows **12, 16, 23** and **29** (select the first row and hold **Ctrl** down as you click on the rest).
2. All cells in this row should be in *italic* (**Ctrl+I**).

Borders

You can divide your spreadsheet into appropriate areas by using borders (lines). Borders should only be used for cells containing data, not for whole rows or columns. Even though it is easier to select an entire row or column, it *may* cause problems when you print.

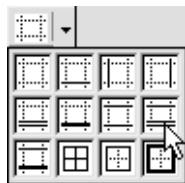
The principle is as follows:

First select the area you want a border around, then use the **Borders** button on the toolbar. If you just click on the button, the border style shown will be used. If this is not what you want, then you should click on the small arrow on the right part of the button.



The following choices are then given:

Click on the border type you want to use. The first choice removes all borders in the selected area, while the last three put a border around the entire selected area.



1. Select cells **A6:O6**
2. Choose the pattern which puts a single line at the top and a double line at the bottom of the selected area (as in the example above).
3. To make further formatting with the same type of border easier, the button remembers the last border type you used. Select **A30:O30** and click on the **Borders** button.
4. Select **B12:O12** and choose the pattern with a thin line above and below (second from right in the center row).
5. Continue adding borders to highlight the part of the spreadsheet you want.



That looks better; although the border options were a little limited. You cannot choose a colour for the lines, and there are no thin dotted lines, nor extra thick lines ...

Use the toolbar as a shortcut to more subtle options. You have seen earlier how everything to do with formatting cells is contained in the **Format Cells** dialog box:

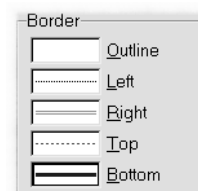
1. Select **A2:O2**. You will add a coloured line under these cells.
2. Open the object menu using the right mouse button and choose **Format Cells** or press **Ctrl+1**.
3. Choose the **Border** tab.

Your choice has to be made in two steps. First you choose the appearance of the line (**Style**), then which part of the cell should have a line around it like this:

1. Select the third line in the left hand column of the **Style** field.
2. Choose a suitable colour for the line. Note that all the lines in the **Style** field now have the chosen colour.
3. You now need to decide where the selected line style should be inserted. Click on **Bottom** in the **Border** field.
4. Press **Enter** and press an arrow key to cancel the selection (format options are difficult to see when the cells are selected).

Do you think this way of doing things is strange? I did at first, but now I have to admit that I do not think there is a better way of doing it.

While the dialog box is open you can give lines an individual format. The example in the picture is an attempt to demonstrate what is possible (though you cannot see the colours, which is maybe a good thing!).



*The **Outline** field places a border all the way around the selected area.*

Remove gridlines

Our household budget has a lot of borders in it, but as long as the gridlines are visible it is hard to see if they are going to help produce a clear and understandable printout.

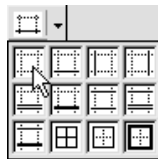
We will remove the gridlines from the screen:

1. Choose **Tools|Options** and remove the tick in the **Gridlines** checkbox on the **View** tab.
2. Choose **OK** or press **Enter** to close the dialog box.

Changing and removing a border

If you want to change a border, all you need to do is put the new style 'over' the old.

If you want to remove a border in a selected area completely, the easiest thing to do is click on the **Border** button on the toolbar and choose the first field.



Shading and colour

You can colour and shade cells. Just as with borders, you can click on the **Color** button to use the colour it displays or click on the arrow on the button to choose another colour.



We want to give some areas in our budget another colour.

1. Select the area **A2:O2**.
2. Click on the **Color** button (the standard colour is grey).
3. Press an arrow key to cancel the selection.

Let us try another colour. Try using **Undo** to select the cell again (it actually removes the colour formatting, but as the area was selected before we applied the colour, it selects the area for us again). As you are going to choose another colour it is not important that **Undo** removes the grey background.

1. Press **Ctrl+Z**.
2. Click on the little arrow on the **Color** button. Choose a colour.
3. Press an arrow key to cancel the selection.

Continue doing this to test different colours. If you want to remove the colour completely at some stage, then just choose the large field **None**.

If you prefer a dark basic colour, then it is sensible to choose white text:



1. With the area still selected press the **Font Color** button.
2. Use the same method you used for the background colour to change the font colour.

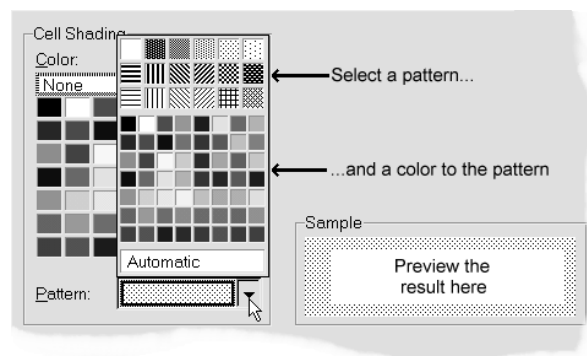
! Every time you make a change you want to keep, press **Ctrl+S** to save the file.



You can combine a background colour with a pattern to give exactly the effect you want.

I will just introduce you to the principle, so you can play around with it as much as you want in your own time:

1. Select an area, choose **Format Cells** and the **Pattern** tab.
2. Press the **Pattern** button. Another colour palette appears. This is starting to get confusing. The new colour palette only applies to the pattern you can add over the background colour (the cell colour can have two 'layers'):




That is to say, you can look *through* the coloured pattern and *see* the background colour.

After you have experimented with this function a little, choose a light background colour with a pattern of white dots over it for your cells.

! When a printout of a spreadsheet is to be copied, it is best to choose a dotted pattern as a background colour. Copy machines do not copy solid colours well.

Copy formats

The format of cells **B12:O12** should be copied to **Total insurance**, **Total transport** and **Total household etc.** This is done as follows:


1. Select the format for copying, **B12:O12**.
2. Choose **Format Painter** button. The mouse pointer turns into a little brush. 
3. Click on **B16**. Cells **B16:O16** 'inherit' the formatting (number format, lines and colours). There is no need to select all the cells.


The copying stops automatically. When you want to copy to several areas, as in this example, then do the following:

1. Hold the area **B16:O16** selected and *double* click on the **Format Painter**.
2. Click in **B23**. The function remains active.
3. Click in **B29**. End the copying process by pressing **Esc** (or click again on the **Format Painter** button).

Save the workbook (**Ctrl+S**) and continue to format the budget as you wish. You may want to change the text colours for income and expenses...it is up to you.

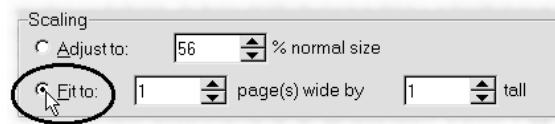
Printing the budget

The easiest way to print the budget is to press the **Print** button. However the standard printout layout is not especially suited to our spreadsheet. I will now briefly show you how to adjust a printout. You will find a more detailed description of printing on page 43. 

I recommend that you use the **Print Preview** button as this function will show you exactly how *your* printer prints. 

You can see how many pages will be printed at the bottom of the screen. It would be best to print the budget in landscape format (horizontal layout).

1. From the **Print Preview** screen, click on the **Setup...** button and choose **Landscape** on the **Page** tab.
2. You can use the **Scaling** area to fit your printout on a single page. This is an efficient function as the printout will be compressed to fit on one page, even if it otherwise would take many pages! Select **Fit to 1 page wide by 1 page tall**.



Click **OK** (**Enter**) and check, at the bottom of the page, that the printout now fits on one page.

Click on the **Setup...** button again and the **Adjust to** field will show you how much the spreadsheet has been compressed (between 10 and 400 percent).


Press **Esc** to close the **Setup...** dialog box and click on **Close** to return to the working area.

All you need to do now is press the **Print** button to see the budget as 'hardcopy'.


Data layout

Centering headings

The heading 'Household Budget 1997' can be centered across the entire spreadsheet in the following way:

1. Select the heading and the cells it should be centered across (**A1:O1**).
2. Click on the **Center Across Columns** button 

In version 97 the button is called **Merge and Center**.

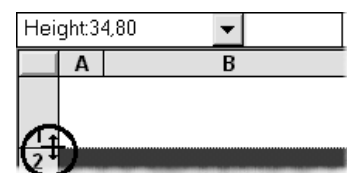
 *The heading actually stays in cell A1, but is centered over all the columns. Select cell A1 to edit the heading.*

Vertical layout

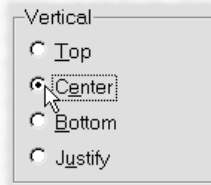
You can create more space in the spreadsheet by increasing the height of rows.

This is done by dragging the bottom line of the row number:

Drag down to increase the height. Note that the name field over column A shows the height of the row. In fact the only thing you can use this number for is to compare the height of other rows.



1. Drag the height of **row 1** to be approximately 30.
2. Select the row and choose **Format Cells** (**Ctrl+1**).
3. On the **Alignment** tab, choose **Center** in the **Vertical** field.



Entire rows or columns can be selected when you want to format the text to bold, or center it. When you want to add a border to cells in a spreadsheet, you should only select cells containing data as previously described. Continue as follows:

1. Change the height of row **6** and row **30** to be approximately 20. The height of row **31** should be about 25.
2. Select rows **6, 30** and **31** and choose **Vertical Centering**.

! You can select several independent areas by holding **Ctrl** while clicking on other rows or columns.

It is difficult to really assess the layout properly before looking at a hard copy of the spreadsheet. I suggest that you print one page before deciding whether you are satisfied with the layout or not.

This is what my 'Household budget' looks like now (need a magnifying glass?):

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
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31															

Create your own number formats

It can be necessary to create your own number formats. Excel understands some currency symbols when you type numbers. It will recognise the currency symbol for the language (country) you have set regional settings to ('kr.' for Denmark, 'DM' for Germany, etc.), plus '\$' and '£'. If your regional settings language is either English (British) or English (Australia) you will only have the '\$' or '£'. All other symbols or characters need to be created as user defined formats before being accepted together with numbers.

Version97: You can type one currency symbol directly in the **Number** tab (**Currency** category) regardless of the Regional settings.

1. Close the **Household budget**, deciding whether you will save your latest changes.
2. Open the **DECORATING – SWEDISH** file.

We are going to create a format looking like this:

19.00 SEK
105.00 SEK
148.00 SEK

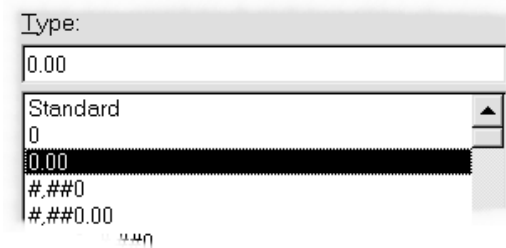
Follow this process:

1. Select **B3:B18** (select **B3**, hold down **Shift** while pressing **Ctrl+Down arrow**).
2. Choose **Format Cells** (**Ctrl+1**) and the **Number** tab.

The number formats are divided into categories. Every category allows you to choose how positive and negative numbers should appear in the selected cells, whether or not you want thousand separators, or how many decimal places should be displayed etc. Check the options in the **Number**, **Currency** and **Accounting** categories.

You will have to create the format shown above:

1. Click on **Custom** in the **Category** field on the left.
2. The format of the cell is now shown as code in the center of the dialog box:



These codes need a little explanation.

Version 97: The category is now called **User defined** instead of **Custom**.

You can change the format code in the **Type** field (strange name – in version 5 the field is called **Format codes**, a more logical name).

All text which may be shown together with numbers should be set in quotation marks ("SEK" for example). You can type exactly the text you want, for example "miles/gallon", "bananas" or "Transfer balance to account no.".

The easiest thing to do is select the number format closest to what you want, then adjust the code to the exact format you want. This new format will be positioned at the bottom of the list of formats and can be used in all the sheets of the current workbook. Your own formats will appear in the **Custom** category.

We want our numbers to be displayed with thousand separators and two decimal places.

Click on the code **#,##0.00** which will be displayed in the **Type** field.

The code should be understood as follows:

- The hatch character (#) specifies that a number will only be displayed in the cell if there is a digit in this position.
- A zero specifies that a zero will be shown if you do not add a digit yourself.

With the format code **#,##0.00** your data will look like this:

If you type:	it is shown as:
1250	1,250.00
.5	0.50
0	0.00

1. Click in the **Type** field, insert a space after the code and type **"SEK"**. The first quotation mark tells the program that the code is stopped and that text starts. The next quotation mark stops the text – Excel can continue to read the code. The code should now look like this:
#,##0.00 "SEK"
2. Press **Enter** to accept the format and close the dialog box.
3. Type a new number in **B3** and press **Enter**. The number will be shown in the format we just defined (a rather expensive brush!).
4. Undo the new number using **Ctrl+Z**.

! *A cell holds its format even though you may delete or overwrite its contents. If you want to delete only the format, choose **Edit|Clear|Formats**.*

For information:

Codes are defined in sections separated by a semicolon:

First section Positive numbers
 Second section Negative numbers
 Third section Zero values
 Forth and last section Text display

When data is entered, the program searches for a format in the codes. When you type a positive value the first section of code is used. If the result of a formula is zero, the third section is used and so on.

If a colour was specified in the **Type** field code, pressing the **Font Color** button on the toolbar has

no effect. Negative numbers will always be shown in red when the following code is chosen:

Type:
 #,##0.00:[Red]-#,##0.00

1. Select **C3:C18** and press **Ctrl+1**.
2. Select the format shown on the previous picture, and press **Enter**.
3. Choose another colour than red by using the **Font Color** button.
4. Just for the test, select **B3**, type a negative number and press **Enter**.
5. The price in **C3** is shown in red. Colours specified in the code has a higher priority.
6. Undo the entry in **B3** (**Ctrl+Z**).

You can, if you want to, try to interpret the currency format used in our household budget (it is not easy). The little 'underscore' (_) which appears in so many places means that the display of the next sign is hidden. In other words, there is space for it, but it is not actually shown.

It may seem a little strange that Microsoft has chosen so advanced a format for a standard button on the toolbar. The same applies to the **Comma Style** button.

Try changing the way the zero amounts are displayed in our household budget to 0.00 (remember that zero values are defined in the third section - you can always search for help for: **Creating user defined formats**).

Return to **Sheet1** in the **DECORATING – SWEDISH** file.

Naming cells

The model on **Sheet1** in the **DECORATING – SWEDISH** file is very small and easy to maintain.

=B7*\$C\$2

This formula, taken from **C7**, is not particularly difficult to understand. When you can see both cells on the screen simultaneously, it is easy to check that the formula refers to the correct cells. In large spreadsheet models it is much more difficult.

You should get into the habit of building up spreadsheets so that the formulas are easy to understand. Remember it might be several months before you work with it again and by that time you may have forgotten what they refer to.

For this purpose the ability to name cells is an indispensable utility. Quite simply it allows you to give cells a more meaningful name than the ordinary cell references.

In principle all cells in a spreadsheet can be called something other than their cell references. The cell containing the exchange rate, **C2**, would be easier to refer to if it was named **Currency** like this:

=B7*Currency

Two cells cannot have the same name, and names cannot contain spaces. If you want to name a cell for example 'Danish VAT', it could be done without the space (DanishVAT) or with an underscore in stead of the space (Danish_VAT).

1. Select **C2**, and click on the cell reference in the name box over column **A**. The reference will automatically be selected. This means that you can overwrite the original reference with a new name.



2. Type **Currency**, followed by **Enter**. You can now refer to the cell simply by writing = **Currency**.

You can of course continue to write **C2** if you want. You can see this by selecting a cell containing a formula for calculating the net price in Danish kroner, like **C3**. The formula is unchanged.

Change all formulas in the model so that they refer to the cell name **Currency** instead of the original cell reference, as here:

1. Select **C3** and press **F2** to edit the content of the cell.
2. Delete the reference **\$C\$2** and instead type **currency** and press **Enter**. Excel will show that the reference is valid by showing 'currency' with a capital 'C'.
3. Copy the formula down to cells **C4:C17**.
4. Select some cells in the area **C4:C17** to see that the reference is correct.



Important: References to cells with names are automatically absolute. In other words, you do not have to press **F4** when you use names.

Other advantages using names

As well as making formulas easier to read, there are other clear advantages in naming cells.

Entering formula

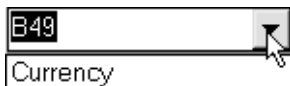
Move down the spreadsheet by pressing **Page-Down (PgDn)** a couple of times. The cell containing the exchange rate is no longer visible.

1. In a cell selected at random, type =**Currency** and press **Enter**. Excel shows the value of **C2** – you did not need to remember which cell contained the Exchange rate!
2. Press the **Down arrow** and type =**250*Currency**. Press **Enter**. Easy and efficient.

Jumping to named cells

The exchange rate for SEK has changed to 0.92:

1. Click the small arrow in the right side of the name box:



2. All the names in this workbook are listed here. In this case it is only **Currency**. Click on the name and the cell is selected. A fast and flexible 'go to' function.
3. Type the new rate in: **0.92** and press **Enter**. The entire spreadsheet is updated.

It is not a good idea to give all cells in a spreadsheet names; but as you can see, all key cells should be named.

The cell containing the sales tax rate should also be named.

1. Select **D2** and click the name box.
2. Type **SalesTax** and press **Enter**.
3. Change the formula in **D3** to **=B3*SalesTax** and press **Enter**.
4. Copy the formula to cells **D4:D17**.

Version97: Column and row headings you want to use throughout the spreadsheet can be defined as Labels. Once defined they will automatically be applied as you type formula referring to these cells. Label areas are defined in the **Insert|Name|Labels** command. Search for help on 'Labels and names in formulas' for more information.

Names in the 'Household budget'

In the household budget there are three cells which should be named. Open or move to the budget and select **C36**, Apartment share.

1. Type **Share** in the name box and press **Enter**.
2. Select **C37**, type **Heating** in the name box and press **Enter**.
3. Select **C38**, type **Electricity** in the name box and press **Enter**.

All cells referring to these three key figures should be changed so that they refer to names. Instead of changing each formula and then copying them, we will get the program to do the hard work for us:

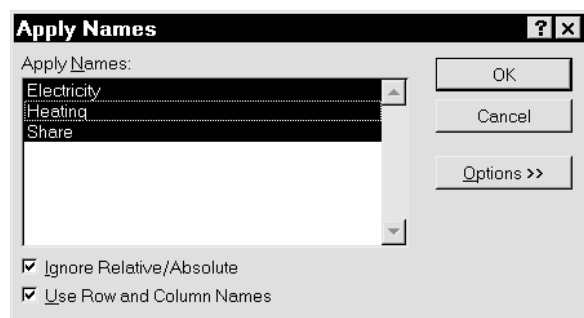
You should select one cell, it does not matter which one.

1. We will now apply the names we have created. Choose **Insert|Name|Apply**.

All the names in the workbook will be shown here. Make sure all three names are selected (click on them).



*If you have selected more than one cell when you choose **Insert|Name|Apply** the cell references will only be changed in the selected cells. But if you have only selected one cell, Excel will change the formulas in every cell in the spreadsheet.*



1. Right click the two check boxes, **Ignore Relative/Absolute** and **Use Row and Column Names** to read what they mean.
2. Click on **OK** or press **Enter** to accept the settings.
3. Select different cells in rows 10 and 11 to check the formulas. **C10**, for example:

=Heating*Apartment_share

4. We have now heard that the actual heating consumption will be higher than expected. By using the name box, jump up to the **heating** cell and change the number to **11250**.
5. Check that the formulas for calculating the monthly heating bill in row 10 changes to 1,350.00 kr. Use **Ctrl+Z** to check the changes.
6. Save the folder using the same name (**Ctrl+S**).

Printing

Maybe you have already printed the Household budget a couple of times. There are however, many ways to customise a printout when large models should be printed out over several pages.

Margins

1. With any cell in our household budget selected, click on the **Print Preview** button.
2. When the changes were made in print setup last time (page 38), the spreadsheet was printed on one page in landscape format.
3. Click on the **Margins** button. All margins can be changed by dragging them.



	January
Income	
Salary after tax - husband	9,585.00 kr
Salary after tax - wife	10,250.00 kr
Total income	19,835.00 kr

4. Drag the left margin as far to the left as possible. The mouse pointer will stop automatically at the point where text falls out of the print area defined by your specific printer.
5. Drag the right margin as far to the right as possible.
6. Pull the spreadsheet's top margin a little closer to the header margin.
7. Try dragging some of the column borders (you cannot adjust the column widths automatically on the **Print Preview** screen).

As we specified that the spreadsheet must be printed out on one page, its size will be adjusted each time you drag a margin.

Headers and footers

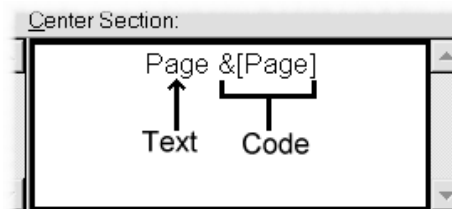
We will adjust the text shown at the top and bottom, the header and footer:

1. Click the **Setup...** button, then the **Header/Footer** tab.
2. Click the little arrow to the right of the **Footer:** field.

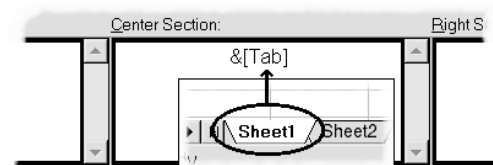
Excel is incredibly user friendly almost always – but not here. The options shown on this roll down list are often totally useless!

Create your own footer instead:

1. Click the arrow again to close the roll down list, and click on the **Custom Footer...** button instead.
2. The **Footer** dialog box is divided into three sections. You can insert text on either the left, middle or right third of the footer area. In the middle is a code which inserts the text 'Page' followed by the page number.



There are other codes available, for example the standard header code that inserts the name of the spreadsheet:

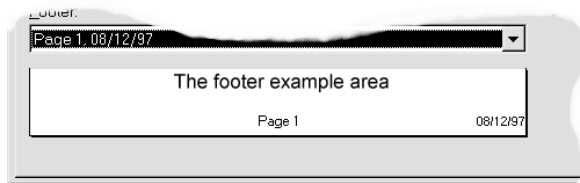


The codes are commands to the printer. All printer codes begin with '&' while the actual command is within square brackets.

3. Click the **Right Section** field and click the **Date** button. This code inserts the current date every time you print the spreadsheet.
4. Drag the mouse over the code **&[Date]** to select it and click on the **Font** button.
5. Choose a font size of 8 points and click **OK** or press **Enter** to close the **Font** dialog box.




- Click **OK** or press **Enter** to accept the footer and return to the **Page Setup** dialog box. The date and page number is shown in the lower part of the dialog box:





The little yellow help labels do not appear when you point to the buttons in the **Page Setup** dialog box. Instead you can get help by clicking them with the right mouse button.

The footer still needs some changes:

- Click on the **Custom Footer...** button.
- In the middle section you can see how text and codes can be combined without putting the text in quotes.
- Click after the code **&[Page]** and type a space
- Type **of**, type another space and click the **Total Pages** button. 

Page **&[Page]** of **&[Pages]**

- Click the **Left Section** field and type your initials, followed by a space.
- Click the **Time** button. 
- Select the text and the code, and click on the **Font** button. This code ensures that we can always read which is the most recent printout. The font size should be 6 points. You cannot choose a size of less than 8 points, but click in the **Size** field, delete the 8 and type **6** instead. Press **Enter** to confirm your choices and close the dialog box.

- In the **Right section** field we want the name of the file in stead of the date. Select the date code and delete it.
- Press the **File name** button. This code ensures that we can always see the name of the file. 
- The file name should be printed in a very small point size. Use the same method as 7 above. Look at the picture on the bottom of the page.
- Click **OK** to close the **Footer** dialog box and **OK** again to close the **Page Setup** dialog box. You should now review the page layout on the **Print Preview** screen.

You can insert other codes, for example the date, in the **Custom Header...** dialog box if you want.

Scaling the printout

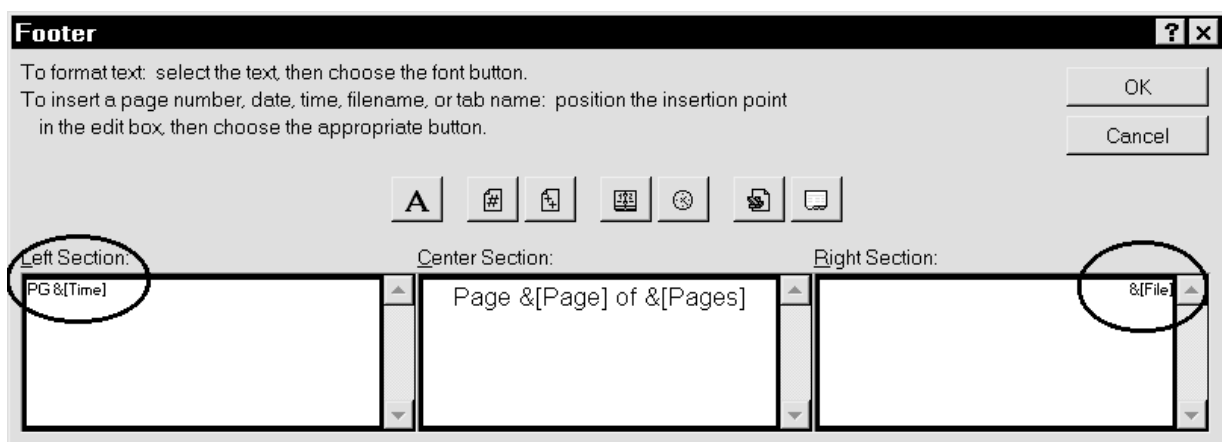
It is not always possible to read the printout of a large spreadsheet when it has been compressed to just one page. Let us return to normal size:

- Remaining in **Print Preview** click the **Setup...** button and the **Page** tab.
- Specify that the printout should be adjusted to 100% in the **Adjust to** field (click on the **Adjust to:** field and type 100 and press **Enter** or use the small arrows).
- Press **Enter** and look at the bottom of the screen to see how many pages the printout will be.

Manual page breaks

When a spreadsheet takes up more than one page it is often necessary to decide where the pages should begin and end:

- While you are in the **Print Preview** screen, press **PageDown (PgDn)** and **PageUp (PgUp)** to leaf among the different pages.



You will see that the Total apartment block figures are printed out on their own, while the spreadsheet is divided at September. Exactly where, depends on your particular computer/printer combination.

2. We want to start a new page after the first half year. Press **Esc**, or click the **Close** button to return to the working screen. Notice that this now contains both a vertical and horizontal dotted line. This shows you where the new pages begin.
3. Click in the cell to the right of and below the position of the new page break (hmm...difficult to explain – but easier to see on screen). We want the new page to begin between June and July. Select **I33** and choose **Insert|Page break**.

Vertical and horizontal dotted lines indicate page breaks. The spreadsheet is now divided into four pages. Check that the page breaks work properly:

1. Choose **Print preview** and check the pages one by one, using **PageDown** and **PageUp**. Are the page breaks where they should be?
2. Click the **Setup...** button and the **Sheet** tab. In the **Page order** field at the bottom you can choose which order the pages should be printed.
3. Press **Esc** twice to return to the working screen.

You can insert as many page breaks as you want, all you need do to insert either a horizontal or a vertical page break is select a column or row and then choose **Insert|Page break**.

Removing page breaks

Manual page breaks can be removed by placing the cursor on the right or under the page break which is to be removed.

1. Try removing one of the page breaks. Select any cell in column **I**, for example **I35** (but not **I33**). The mouse pointer is now touching the vertical page break.
2. Choose the **Insert** menu. The command is now called **Remove page break**. Choose it.
3. The horizontal page break over row **33** is still there. Now select any cell in row **33** and choose **Insert|Remove page break**.

If you want to remove both page breaks at once, select the cell at the intersection of the horizontal and vertical page breaks (**I33**).

There are still a couple of things to change before the printout is totally satisfactory.

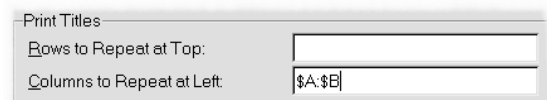
Repeating headings

Earlier you tried to freeze panes so you could always see the text in the first column and row while you moved through the spreadsheet. Be aware that the Freeze Pane function only works on the screen and not on printouts.

The first two columns and two rows should be repeated on every page of the printout.

This is how you do it:


1. Choose **File|Page Setup** and the **Sheet** tab. The dialog box is the same as that you saw in **Print Preview, Setup...** but now you should choose the fields in the **Print titles** area (these fields cannot be chosen from **Print Preview**).
2. The **Rows to Repeat at Top** field is not relevant here as the printout is wide and not high. Click in the **Columns to Repeat at Left** field – move the dialog box if necessary so you can see columns **A** and **B** on the working screen. Remember that you move the dialog box by dragging it by the title bar.
3. Drag the mouse over columns **A** and **B**, so both columns are selected. It should look like this:



4. Click the **Print Preview** button on the right side of the dialog box and look at the pages. The text next to every category will be included on pages one and three of the four pages printout.

Version 97: A small button at the right side of the Print area field and titles gives you more room to select areas on the spreadsheet (the size of the dialog box has been reduced). When you have chosen an area, click again on the little symbol on the reduced dialog box.



 The heading **Household Budget 1997** has been cut right in the middle of the sentence. It is often best to left justify headings when the printout runs over several pages. See page three of the printout:

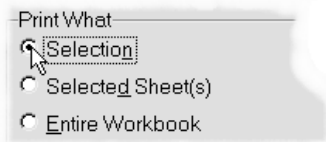
Household Budget 19	
	September
Income	
Salary after tax - husband	9,585.00 kr
Salary after tax - wife	10,250.00 kr
Total income	19,835.00 kr

Excel has done precisely what you asked it to do! You asked for columns A and B to be repeated on all pages of the printout, and as the heading is longer than the two columns, the text has been cut.

Unfortunately the total apartment block charges have also been printed on page two, and the text on page four. This should be corrected.

Print area

You can limit the area to be printed. The idea with 'key' cells, like our total apartment block charges, is that it should be easy to change the spreadsheet by changing figures in a single cell, making it quick and easy to do a 'what if' analyses. They do not necessarily have to be printed together with the spreadsheet.

1. Select the area **A1:O31**.
2. Press **Ctrl+P** or choose **File|Print**. The Print dialog box is displayed.
3. Choose **Selection** from the **Print what** area:
 
4. Click the **Print Preview** button at the bottom of the dialog box – the printout is now only two pages.

The choice is only valid as long as the area is selected. Next time you print a spreadsheet without selecting anything, the entire sheet will be shown as the print area.

Fixed print area

Version 5: The following does not apply to version 5. See instead what is written in the **Customise toolbar** section on page 48

If you want to specify an area as a fixed print area, you do not have to select it and choose **Selection** every time. It can be done as follows:

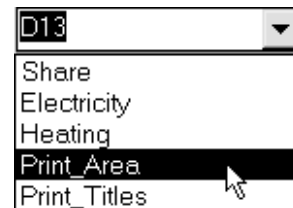
1. Select the area **A1:O31** and choose **File|Print area|Set print area**. Press an arrow key to cancel the selection and click on **Print Preview**.
2. No matter what you select in the future, this area will always be printed when you click the **Print** button.
3. Press **Esc** to close **Print Preview**.

When another area of the spreadsheet is to be printed, it is done quite simply, as follows:

1. Select a smaller area, like **A2:E6**, press **Ctrl+P** and choose **Selection**. Press the **Print Preview** button. The print area previously specified is now ignored.
2. Press **Esc** to close **Print Preview** and press any arrow key to cancel the selection.
3. Without selecting anything else, press the **Print Preview** button. The previously defined print area will now be active again.
4. Press **Esc** to close **Print preview**.

Printing areas (name)

When you define print titles and print areas, they are automatically named.



Named areas are used by Excel as a major part of the management of more advanced functions.

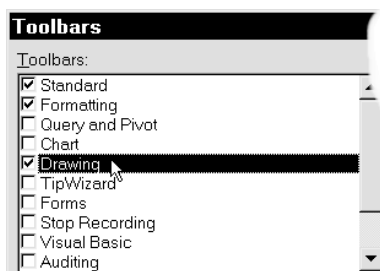
If you learn to use names from the very start, many routines will be much easier to manage in the future. When you need to print different areas it is obviously best to name each area.

Select areas you often print, click in the name box and type a suitable name (for example, area **A1:E31** could be named **First_Quarter** – note the underscore as you cannot have spaces in a name). When you want to print this area, choosing its name in the name box will select it. Then press **Ctrl+P** and choose **Selection**.

Or even better, you can add a button to the toolbar to define a print area as we will try next.

Toolbars

Nearly all commands can be placed on a toolbar as a button. There are a number of predefined toolbars available.



1. Choose **View|Toolbars**. You can see in the dialog box that there are two toolbars visible, **Standard** and **Formatting**.
2. Choose the **Drawing** toolbar and click **OK**, to return to the working screen.
3. The **Drawing** toolbar appears as a floating toolbar and can be dragged to wherever you want (just drag the title bar). You can also place it at the bottom of the screen or together with the other toolbars. In these positions their title bars are hidden. To drag them somewhere else on the screen, take hold of the toolbar in an area between two buttons and drag:



4. A toolbar is closed by clicking on the little cross on its title bar. Close the **Drawing** toolbar now.

Another, and faster, way to open a toolbar is to *right click* any toolbar button on the screen. You can then select the toolbar you want on the object menu.

The object menu also gives you the option of customising the toolbars.

Customising toolbars

To be really effective the buttons on each toolbar should reflect your method of working.

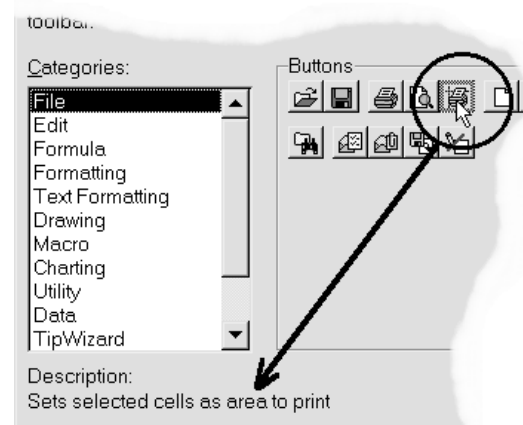
When you have worked a while with the program, you will notice that you have not used some of the buttons on the toolbars. When this is the case, replace them with more relevant buttons. Right now

we need a button to help us define printout areas. This is how to do it:

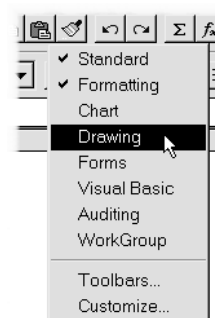
1. Right click anywhere on the toolbar and choose **Customise** on the object menu.

Version 97: The **Toolbars** and **Customise** options are merged and contain a dialog box with three tabs. Choose the **Commands** tab, then follow the instructions below.

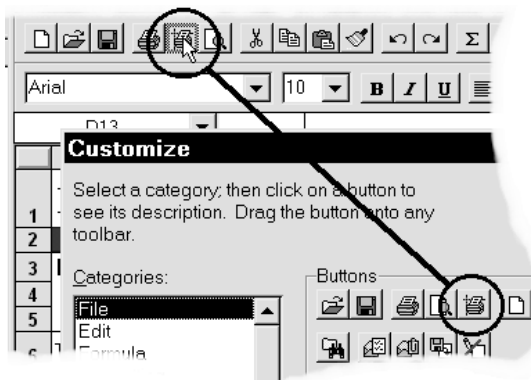
2. The buttons in the **Customise** dialog box are divided into categories. These correspond to Excel's menus. Click the different categories and buttons to read their description at the bottom of the dialog box:



3. Go back to the **File** category and find the button described as: 'Sets selected cells as area to print'.
4. We want to make space for this button on the **Standard** toolbar. This is done by dragging one or more unneeded buttons from it. You can always find a button again under the category it belongs to in the **Customise** dialog box. I suggest that you remove the **Spelling** button. Drag it anywhere off the toolbar and release the mouse. (Note that this can *only* be done with the **Custom** dialog box open!).
5. Grab the new button using the mouse and drag it to the position you want it on the toolbar. This



button will be used when printing, so why not position it between **Print** and **Print Preview**:



The other buttons on the toolbar move and the program makes space for the new button when

you release the mouse button. Change the individual position of the buttons by dragging them around.

6. Click on **Close**, or press **Enter** to close the **Custom** dialog box.

The new button should be tested:

1. Select an area, **A1:E6**, for instance, and click the new button, **Set Print Area**. Click on **Print Preview** – Viola...the area is ready for printing!
2. Repeat with other areas and printout the different areas. Easy and elegant.

Charts

‘A picture says more than a thousand words.’ A wise and well known phrase, highly relevant when numbers are to be displayed and analysed.

It is very difficult to understand things clearly from the spreadsheet data alone, especially in large models.

The amount of data in our household budget is comparatively large, so before we use it, it would be a good idea to ‘play’ a little with charts for a smaller model.

1. Close Household Budget and choose **Yes** when asked if you want to save changes.
2. Type the following small model in a new, blank workbook. It shows a family’s pension plan:

	A	B	C
1		Budgeted	Actual
2	Capital pension	275,000 kr	295,000 kr
3	State pension	156,000 kr	168,500 kr
4	Company pension	185,000 kr	186,250 kr
5			
6	Total	616,000 kr	649,750 kr

It is important to decide what the chart should show before it is created. It is possible to distort reality when numbers are presented graphically.

The family wants to see the relationship between the budgeted and actual amounts. The chart should be created to show for example the capital pension

in two columns, side by side, making them easy to compare.

At the same time, I will create the chart as a separate spreadsheet within the workbook.

In version 97 there is only one route you can follow – the **ChartWizard**. You can still read through the section below and follow on your own screen. The screen shots are not identical, but the Wizard is very easy to understand.

A chart on a new page

First, the data to be displayed should be selected. Do not include the **Total (B6 and C6)** cells, as these columns would be enormous.

We want to see the *details* in the spreadsheet.

1. Select a cell at random within the area **A1:C4** and press **Ctrl+***. The text is also to be included in the chart, and should therefore be included in the selection.

! Quick selection of consecutive cells is best achieved by using **Ctrl+***. Use the asterisk on the numeric keyboard for selecting cells (to use the asterisk beside the Enter key, the Shift key must be depressed as well).

The chart is built up as follows:

1. Choose **Insert|Chart|As New Sheet**.

Version 97: The fourth step of the wizard lets you choose whether to insert the chart as a new sheet or on the existing sheet.

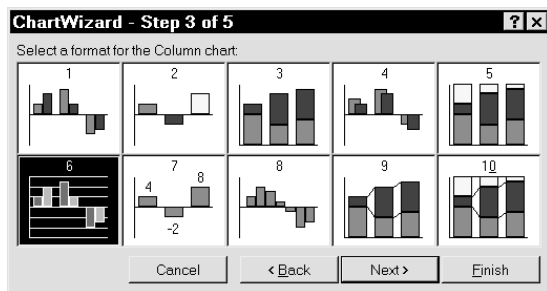
2. The **ChartWizard** will now try and help you to make the right choices. Note that a new tab has already appeared, called **Chart1**.



3. The Wizard's first step asks you to confirm the area you have selected. You can select a new area while the dialog box is open. Move the wizard if it gets in the way of your selection.

Version 97: The first step lets you choose chart type. You choose the data area in Step 2.

4. Click the **Next** button to go to step 2 of the Wizard. To undo a choice, drop back a step by choosing **Back**. If you happen to press **Enter** instead of the **Next** button, the chart will be created (**Enter** selects the **Finish** button). If this should happen, then just start again from **Sheet1** and create a new chart.
5. The Wizard suggests a column chart as this is the most frequently used chart.
6. Click the **Next** button to go to step three of the Wizard:

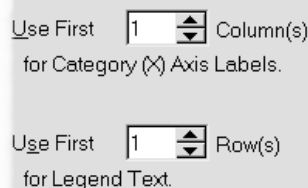


The Wizard suggests format number six with gridlines to help read the size of the columns. Format number three shows the three pensions with the budgeted and actual amounts on top of

each other (you can see the total pension and also see how large a share of the total, each pension type is). Format number five shows the same, but as a percentage. We accept format number six.

Version 97: The Wizard offers you more choices than those named above. Try clicking on each of the tabs in step three. Your choice is shown instantly in a small chart example on the right side of the Wizard. I can recommend that you look at the **Data table** tab and the **Show data table** field.

7. Click the **Next** button to go to step four of the Wizard.
8. In step four you will be presented with a small model of the finished chart. This is set up to show you the finished result. At the same time you can change several options.
The data is arranged in columns. Choose **Rows** instead, and note how the data changes place so the budget amounts are now arranged in one series, and the actual amounts in another. That is not what we want, so click again on **columns**.
9. Take note of the fields:



They show that the first row and first column should be taken as text, which is correct.

10. Click the **Next** button to go to the last step of the Wizard. It is necessary to have a legend to be able to understand what the chart shows. Type **1996** in the **Chart title** field and wait a few seconds. The screen blinks and shows where the title will be inserted on the chart. You do not need to type anything in the **Axis titles** fields, but you can try if you want.
11. The chart is now finished, so choose **Finish** or press **Enter**.

Excel displays the chart in its standard format. We will change the colours in a moment, but let us first see if there is a relationship between the data on **Sheet1** and the columns on **Chart1**.

Updating a chart

The smallest column is **Budgeted** for the **State pension** where the scale on the Y-axis stops at 300,000 kr. Let us change this number to see if the chart is automatically updated.

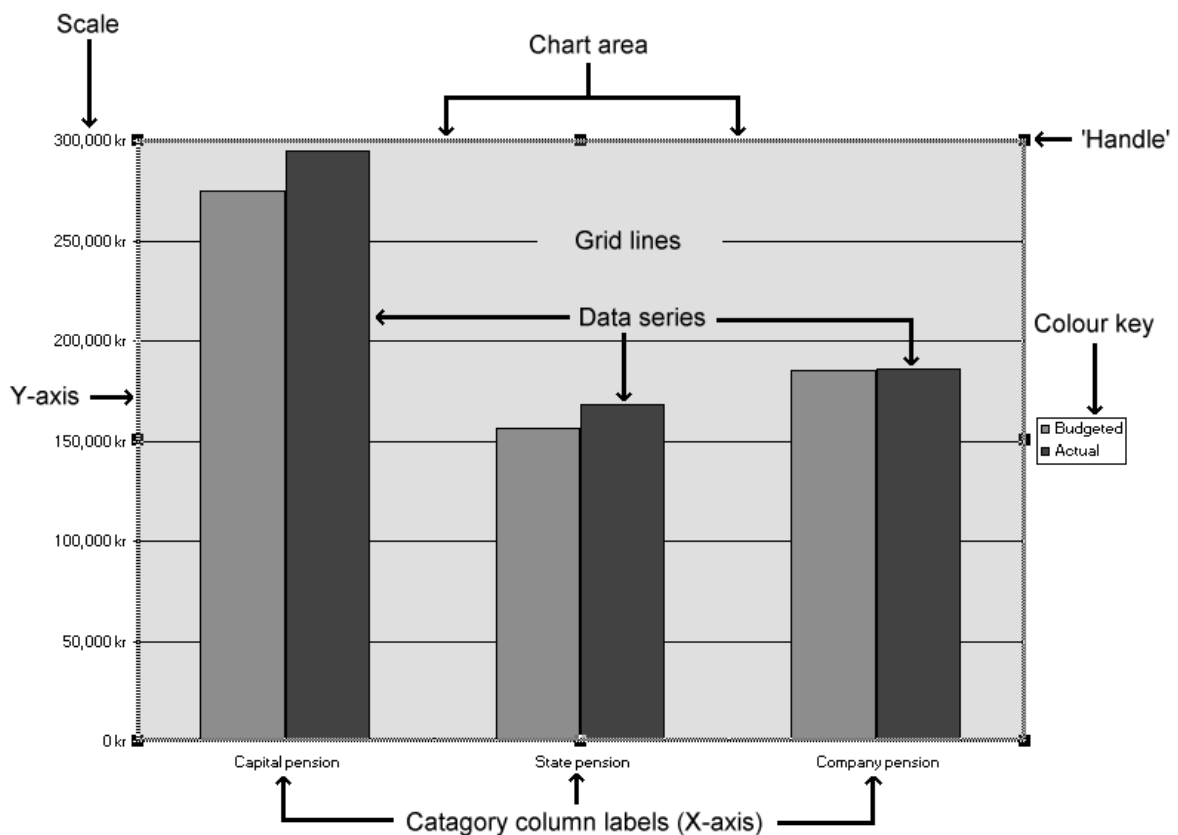
1. Click the **Sheet1** tab. Change the value in **B3** to **365,000 kr**.
2. Click again on **Chart1** and see what has happened to the height of the column. Also notice that the scale on the Y-axis now goes up to 400,000 kr.
3. Return to **Sheet1** and change the payment in **B3** back to 156,000 kr. and then click on **Chart1**.

Adjusting the format in a chart

Every part of a chart can be changed. No matter where you click in the chart area, an element will be selected. Small black 'handles' show the selected area. When you position the mouse pointer on one of these it changes to a double arrow which allow you to change the size of the object.

To change a format, double click the object you want to change.

1. Double click on one of the blue columns (budgeted).
2. The **Format data series** dialog box opens. Choose another colour in the **Area** field. You can also add a pattern to the column.
3. Choose **OK (Enter)** and format the other columns to suit yourself.





Warning: If you double click too slowly on a column, the program thinks that you only want to select the one column. When you then choose a different colour, only this column will change colour – very confusing (undo it immediately).



The appearance of every element in the chart can be changed by a double click, or be moved by dragging using the mouse. Grab hold of one of the black 'handles' (rectangles) to change the size of an object

Chart types

Have you noticed the **Chart** toolbar? It appears automatically when you select a chart.



1. Click the **Chart type** button and choose the three dimensional column chart. All your formatting will be saved.
2. Try moving between the different options. Our model is best suited to column, line and area charts.
3. When you finish experimenting, return to the three dimensional column chart.

3-D perspective

The columns look like skyscrapers seen from a helicopter. Maybe we want to fly around the skyscrapers and see them from another angle:

1. Click on one of the vertical axis. There should be a small black square at the top and bottom of the axis.
2. Click on one of the black squares. Now there should be black squares at the top and bottom of every axis.
3. When the mouse is over any of the black squares it will turn into a small, thin cross. Drag the cross.

Unfortunately I have experienced several times that all my attempts at formatting have ended in an unreadable mess. Luckily the **Chart** toolbar contains a button called **Default chart** which will reset all formatting. One click on this will remove *all* your direct formatting.



We have now gone through the majority – and the most important – principles in formatting charts. In the following section you will create a couple of other charts without me detailing each steps.

Save chart

The chart is part of the workbook, and will be saved together with it.

1. Press **Ctrl+S** and save the workbook using the name **PENSIONS.XLS**. Let the file remain on screen.

A chart on this sheet

A chart can be placed directly on the spreadsheet, which is very sensible when the spreadsheet fills as little as our pension model.

1. With the cursor in any cell in the area **A1:C4**, select all the cells using **Ctrl+***.
2. Click the **ChartWizard** button. The mouse pointer changes appearance.
3. Notice the text in the status line. Click or drag a frame under the area you have used for data, the chart will be created within this frame. You can always move and resize it later.
4. When the mouse is released the guide starts. Follow it step by step to create a column chart.
5. The chart appears in a frame. Drag one of the black handles to change its size, or in the middle of the chart to move it around the spreadsheet.
6. When the chart is selected, the text on the status line says, you should double click the chart to change colours etc. Try it now. A hatched frame shows that you can now edit the chart.
7. When you have made the changes you want, click on any cell in the spreadsheet to stop editing. The chart is still selected, so click again on any cell, and you are back in the spreadsheet. Notice that the **Chart** toolbar disappeared. When the chart is selected, the toolbar reappears.

Version 97: A single click on the chart allows you to edit its elements.

In actual fact the chart is in a frame, on top of the spreadsheet, and is taken to be an object - a picture. The arrow keys let you move the cursor under the

chart's frame. This also means that you can place the chart over some of the spreadsheet's data.

Version 97: Notice the guide lets you choose which sheet in the workbook should contain the chart.

Selecting data

You will now create a pie chart of the data in column C, but want to use the text from column A.

1. Select cells **A1:A4**. You would usually lose this selection as soon as you click in another cell. To avoid this, proceed as follows:
2. Hold the **Ctrl** key down while using the mouse to select cells **C1:C4**.

	A	B	C
1		Budgeted	Actual
2	Capital pension	275,000 kr	295,000 kr
3	State pension	156,000 kr	168,500 kr
4	Company pension	185,000 kr	186,250 kr
5			
6	Total	616,000 kr	649,750 kr



It is very important that the area selected in column A is the same size as that selected in column C. In principle you will not be using A1 for anything in the chart, but if you do not select this cell, the program will not understand how text and data belong together.

Now we are ready to create the chart:

1. Click the **ChartWizard** and create a frame for the chart under the column chart.
2. In step two of the Wizard, choose a **3D-pie** chart and click on **Next**.
3. Accept chart number seven on step three and click on **Next**.
4. The example shown in step four confirms that all cells have been correctly understood. **C1** has become the chart's heading. We do not need any further headings, so you can just click on **Finish**.
5. Adjust the size of the chart's frame so it matches the size of the column chart.



Try double clicking on the pie chart to edit it. Click once on it - now all three layers are selected. Click again, try the smallest bit, and now only it is selected. Drag the piece away from the center of the circle (it is called 'exploding' the chart).

Printing charts

You cannot be sure that the two charts can be printed on the same page before Excel has created the printout:

1. Click the **Print Preview** button. Check the number of pages at the bottom of the screen. If the printout takes up more than one page you will need to go back to the working screen and make the chart frames smaller or move it.
2. The gridlines are useful on the working screen, but are distracting (to say the least) on a printout. Click the **Setup...** button and the **Sheet** tab and deselect printing gridlines.

You can print a chart separately. In this example we will use the pie chart:

1. Double click the chart in the working screen.
2. Choose **Print Preview**. Excel has even decided that a landscape format suits the chart best. Flexible and smart!
3. Click on the **Close** button to return to the spreadsheet.
4. Close the **PENSIONS.XLS** workbook and choose **Yes** when prompted to save changes.

Household Budget

I would very much like to see both the husband's and wife's income shown graphically. The only problem I can see is that **Row 3** should not be a part of the chart. We could select the data areas individually (holding down **Ctrl** as we select), but let us try to treat it as one area and see how the Wizard treat the data:

1. Select the area **A2:N5** and choose **Insert|Chart|As New Sheet**.
2. Follow the Wizard to step four, then stop there for a moment.

	A	B	C	D
1	Household Budget 1997			
2		January	February	March
3	Income			
4	Salary after tax - husband	0.595.00 kr.	0.595.00 kr.	0.595.00 kr.
5	Salary after tax - wife	0.595.00 kr.	0.595.00 kr.	0.595.00 kr.
6	Total income			
7	Expenditure			
8	House			
9	Mortgage			
10	Heating			
11	Electricity			

The program has, cleverly, realised that the first two rows and the first two columns are text!

Finish the Wizard and notice that the Y-axis starts at 9,200 kr.

Now create a chart which compares **Total income** and **Total expenditure** like this

1. Select **A2:N2**, hold **Ctrl** now and continue selecting **A6:N6** and **A30:N30**.
2. Create a column chart on a new sheet and notice that this time one row and two columns are correctly understood to be text.



Remember that each selection must have the same size...!

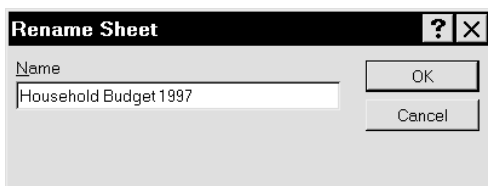
Delete a chart on a spreadsheet by selecting it and pressing **Delete**.

Working with worksheet tabs

Naming tabs

We now have three sheets with different data. They should have more meaningful names:

1. Double click the tab called **Sheet1**.



2. The text: **Sheet1** is automatically selected. Press **F1** (Help) to read which characters you can use. Press **Esc**, type **Household Budget 1997** and press **Enter**.
3. Double click on **Chart1** and type: **Salary-column**. Press **Enter**.
4. Double click on **Chart2** and type: **Results-column**. Press **Enter**.

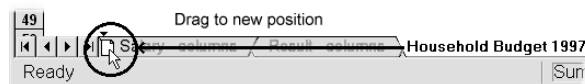
Version 97: When you double click on a sheet tab you can write the name directly on the tab.

The order of the sheets should be changed. You will want to work with the budget often, so that should be placed first.

1. Grab hold of the **Household Budget 1997** tab and drag it to the left. A small picture of a page by the cursor shows you that you hold a spreadsheet. A small triangle indicates where

the sheet will be placed when you release the mouse.

2. Drag the sheet all the way to the left and release it.



Deleting a sheet

We have several unnecessary sheets in the workbook.

1. Select the unused sheets as follows: Click on **Sheet2** and hold **Ctrl** down while you continue clicking on **Sheet3** and **Sheet4** (if you have more empty sheets, select these in the same way).
2. Right click on one of the selected tabs to open the object menu. Choose **Delete**.
3. A dialog box warns you that the deletion will be permanent. Click on **OK** (**Enter**) to accept.

Chart sheets are deleted in the same way

Inserting a sheet

As noted earlier, a workbook can contain up to 255 spreadsheets.

1. Right click on a tab and choose **Insert** on the object menu. The **General** tab in the **Insert** dialog box lets you choose between inserting a spreadsheet, a chart and other more advanced objects. The **Spreadsheet solutions** tab lets you

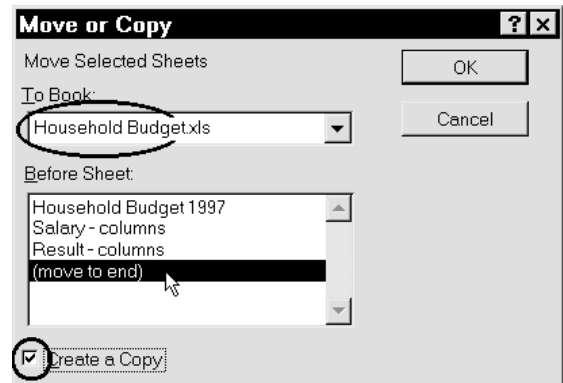
create models based on built in templates. You can experiment with these later if you want to – personally I am not especially enthusiastic about them (I am a bit of an old fashioned type; I know how things I have created myself work, or, to put it another way; if mistakes are going to be made, I am quite capable of making them myself...).

2. Choose **Spreadsheet** on the **General** tab and press **Enter**. The spreadsheet will be inserted to the left of the sheet you right clicked.
3. Drag the new sheet to the right until it is the last in the workbook.

Copying sheets

If a sheet should be used in another workbook, or if you need to create a nearly identical sheet in the same workbook, you can copy it to a new position.

1. Open the **DECORATING - SWEDISH.XLS** file. The spreadsheet is to be copied to **HOUSEHOLD BUDGET**.
2. Right click the spreadsheet tab and choose **Move or Copy...** on the object menu.



3. Specify that the sheet should be copied to **HOUSEHOLD BUDGET.XLS** in the dialog box.
4. Check the **Create a copy** field (by clicking on it).
5. Choose **(move to end)** in the **Before sheet** field.
6. Click **OK**, and the screen will shift to **Household Budget**.
7. The sheet will be called **Sheet2(2)** because there already is a **Sheet2** in the workbook. Double click the tab and change the name to **Decorating**.
8. Go back to the **DECORATING – SWEDISH.XLS** by clicking on the **Window** menu, followed the file's name.
9. Close **DECORATING – SWEDISH.XLS**.

Functions

When Microsoft originally developed Excel, it is unlikely that anyone expected that spreadsheets would be used for as many tasks as they are today. That Microsoft wants the program to be used in as many ways as possible is evident from the many functions it contains.

A function is a built in formula, built up in a very specific way:

=Function name(arguments)

You have seen examples of a function, namely the function for adding cells together: =SUM(cells). All functions begin by giving the operation the program should carry out, while the cells which should be operated on are given in brackets (the arguments).

These arguments can be an area, single cells or even another function.

For example, the function =SUM(C3;D5;C8) add the three given cells. A semicolon separates the arguments and is called a 'List separator' (this is defined in Windows Control Panel/Regional settings).

Average

For example the function:

=AVERAGE(B3;C48;SUM(F4:G12))

calculates the average of the numbers in **B3**, **C48** and the sum of the area **F4:G12**. Pay special attention to how the included function SUM is 'complete' – it has its own arguments within brackets.

A little exercise:

Type a formula to calculate the average income and expenditure in our Household Budget. In **P2** type the heading **Average**, and the formula in **P4** (type it directly in the formula line):

=AVERAGE(C4:N4)

Copy the formula so that every item in the budget has an average calculated for it. Notice that the function is identical, except for its name, with the

SUM formula in column **O**. Format the column as column **O** (best done by selecting **O2:O31**, clicking on the **Format painter** and dragging over cells **P2:P31**). You may want to create a printer area covering just these cells (see page 47).

Other functions

As there is a big difference between what arguments different functions need, Microsoft has chosen to build in a guide to help you create functions, called the **FunctionWizard**.


Calculating loans

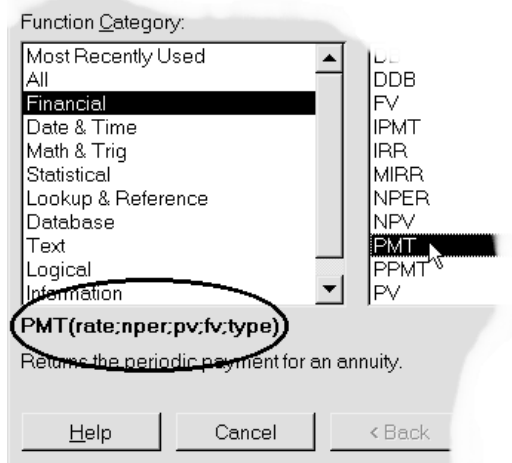
We are going to create a model to calculate the exact repayment on the bank loan in the Household Budget:

1. Double click the **Sheet1** tab, type **Bank loan** and press **Enter**.
2. Type the following model in the spreadsheet:

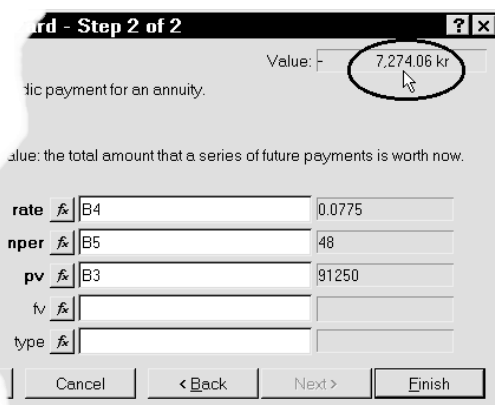
	A	B
1	Bank loan	
2		
3	Total loan	91,250.00 kr
4	Interest	7.75%
5	Payments	48
6		
7	Repayment amount	

In **B4**, two decimals are chosen using the **Increase decimal** button.

3. In **B7**, the formula for calculating the monthly repayments should be typed in. We do not know exactly which arguments the formula uses, so click the **Function guide** button  (Shift+F3).
4. All functions are listed by category. The most used functions are in the **Most recently used** category. But let us see how many functions are actually available in total. Click the **All** category and scroll through the list in the **Function names** list. They are listed alphabetically.
5. Now click the **Financial** category and scroll down the list in the **Function names** field until you find the function **PMT**. Click on it:



6. The text in the grey area is supposed to be a help! Maybe bankers could understand it, but it was nonsense to me at the beginning! It was only when I realised that a loan paid back with equal periodic payments is called an annuity that I knew this was the correct function. The first payment is nearly all interest, and very little instalment, and the last payment is nearly all instalment and very little interest – but the total monthly payment is the same.
7. Click the **Next** button. Now we are ready to type the necessary data. Only the fields with bold type text need to be filled in. The **Rate** is the interest rate on the loan. **nper** is the total number of payments to make, while **pv** is the amount in total you have borrowed:



As shown in the picture above, you should point to the cells containing the relevant information, and not write the values in the fields. But there is something wrong here! The **Value** field in the top right corner shows the result of the calculation, but the figure is far too high.

The interest rate is *annual*. The number of payments is given *monthly*. As it stands we have told the program that we will pay 8.5% interest *every month* for 48 months – this is a very expensive loan!

8. Change the **Rate** field to a monthly interest rate: **B4/12** (click in the field after **B4** and type **/12**).
9. The result in the **Value** field should now be minus 2,216.99. Press **Finish** (**Enter**).

Version 97: The **FunctionWizard** looks a little different, but works in the same way. You can choose a different function on the left side of the formula line, and minimise the dialog box when cells are to be selected.

B7		=PMT(B4/12;B5;B3)
	A	B
1	Bank loan	
2		
3	Total loan	91,250.00 kr
4	Interest	7.75%
5	Payments	48
6		
7	Repayment amount	- 2,216.99 kr

Note that the cells are formatted with the currency format automatically (it is a financial function we have used). In the picture above I have formatted **B3** with a currency format myself.

! If you use a function regularly you will remember what arguments it uses. When this is the case you can just write the formula directly in the formula line – the Wizard is only for use when you need instruction building the function.

Why are the payments negative?

Some people will say that it is always negative when you owe money; but that is not the reason. The function tells you that money is 'flowing away' from you – when the loan is positive, the payments will always be negative.

But payments should be shown as positive numbers – we know that we have to pay. With **B7** selected, click again on the **FunctionWizard** (**Shift+F3**).

rate	$\frac{B4}{12}$
nper	B5
pv	-B3
fv	
type	

1. Type a minus in front of the cell reference in **pv**, and check that the result in the **Value** cell is now positive.
2. Press **Enter**.
3. Type **9** as the interest rate in **B4** (when the cell is formatted to a percentage it is enough just to type a number – the cell already includes the % sign).

Version5: You have to type the % sign or type 0.09 yourself. When a cell is formatted to percentage, it automatically multiplies the type number with 100 (for example type in 0.15 for 15%).

Continue testing the formula:

1. Type a new loan amount and number of payments and check that the payment amount changes in every case.
2. Go back to the original amount again before proceeding.

The other two fields in the Wizard, **fv** and **type**, are optional, so we can leave them blank.

The option **fv** means ‘future value’. When we leave this blank it means that the loan is to be paid back in full in the number of payments we have specified. If you still owe 10,000 kr after you have made these payments, then enter 10000 in the **fv** field.

The option **type** decides when in the period the payment is due, and can contain either **0** or **1**. When we leave it blank (**0**) it means that the payments are due at the end of the month (normal banking practice). If you insert a **1** they are due on the first of the month.

Press the **Help** button in the **FunctionWizard** dialog box for further explanations.

Naming cells in functions.

The formula is not very easy to read. It would be easier if the cells we used had more descriptive names. The text in column **A** is good. We can try and use it to name the cells **B3:B5**:

1. Select both the text and the cells which should be named, **A3:B5**.
2. Choose the **Insert|Name|Create** command. Notice that Excel has understood that the left column contains names and that these should be used in the right column. However, the developers who wrote the captions in the **Create name** dialog box were not as smart. It reads **Create names in left column** but that is incorrect, we will *use* the names in the left column. But the function works correctly, so press **Enter**.
3. Select **B3** and look at the name box. The cell is now called **Total_loan**. Check the names in **B4** and **B5** as well.

	A	B
1	Bank loan	
2		
3	Total loan	91,250.00 kr
4	Interest	7.75%
5	Payments	48
6		
7	<div> <div> <div>Create Names in</div> <div> <input type="checkbox"/> Top Row <input checked="" type="checkbox"/> Left Column <input type="checkbox"/> Bottom Row <input type="checkbox"/> Right Column </div> </div> <div> <div>OK</div> <div>Cancel</div> </div> </div>	
8		
9		
10		
11		
12		
13		

4. We will now use the names in the formula. Choose **Insert|Name|Apply**. The three relevant names are already selected, so just press **OK** (**Enter**) and check the formula in **B7**:


=PMT(Interest/12;Payments;-Total_loan)

This makes the formula much easier to understand. Save the workbook(**Ctrl+S**).

Links

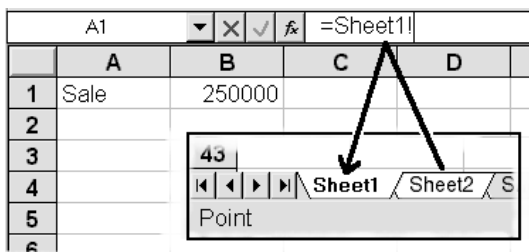
One of the clever things with a spreadsheet is that you only need to store important numbers or formulas in one place. Other spreadsheets which need a number or formula can get it from there. If the **Total apartment costs** in **Household Budget** had been in another spreadsheet, we would have said that we had created a link to the cells.

The principle is very simple. I suggest that we start by practising in a new workbook.

1. Open a new blank workbook by clicking  on the **New workbook** button.
2. In **A1** type **Sale** and in **B1** **25000**.
3. Click on **Sheet2**. You can also press **Ctrl+PageDown** to move to the next sheet (**Ctrl+PageUp** moves to the previous sheet). In cell **A1** type **Sale from Sheet1:** and adjust the width of column **A**.

You are now ready to get the number from **Sheet1**.

1. The link is to be created in **B1** on **Sheet2**. Start with the usual equals sign. The cursor is now anchored to the cell.
2. Click the **Sheet1** tab. The tabs and formula line show you what is happening:



Both tabs are white, and the formula is referring to **Sheet1**. At the same time the status line shows that the program is pointing.

3. Click on **B1** and press **Enter**. Excel jumps back to **Sheet2** and the formula is finished. Let us check the link:
4. Go to **Sheet1** (**Ctrl+PageUp**), and change the number in **B1** to **30000**.
5. Back to **Sheet2** (**Ctrl+PageDown**) – the number in **B1** is updated. The link works.
6. Double click the tab for **Sheet1**.
7. Rename the sheet to **Sales** and press **Enter**.

8. Return to **Sheet2** (**Ctrl+PageDown**), and look at the formula in **B1**:

=Sale 1997!B1

That is the principle of a link. You can also create links between separate workbooks, but that needs more practice (and a great deal of discipline!).

Close the workbook without saving it.

Household Budget

On the **Household Budget 1997** sheet, row 28, the family has budgeted that the bank loan costs them 2,250 kr. per month. However the **Bank loan** spreadsheet we have worked on, shows that the monthly payment is 2,249.16 kr. It is also quite usual for interest rates to change several times a year, and the family wants row 28 to show the correct monthly payment every time. We will create a link:

1. In **Household Budget 1997** select cell **C28** and type =.
2. Click the **Bank loan** spreadsheet. Both tabs are selected.
3. Click on **B7**, the monthly payment.
4. In a moment the formula is to be copied to all the other months. All should refer to **B7**. Press **F4** to make the reference absolute and **Enter**. The formula now looks like this:

=Bank loan!\$B\$7

5. Copy the formula to cells **D28:N28**.
6. Click the **Bank loan** spreadsheet and change the interest rate to 7,75% and press **Enter**. The new monthly payments should be 2,216.99 kr.
7. Click again on **Household Budget 1997** and check that row 28 has changed.

! On page17 we corrected Excel's permanent preferences so that a double click on a cell containing a formula selects the cells that are used in the formula. Try it here in our household budget: Double click on cell **C28** (return to the previous selected cell by pressing **F5** and **Enter**).

Sorting & filtering data

I have chosen sorting and filtering to be the last two subjects dealt with in this booklet. This is just a short introduction to both subjects. Filtering can be used for relatively advanced procedures, which is not illustrated here.

Sorting

Close Household Budget and open the file **DECORATING – SWEDISH.XLS**. You are going to sort the list to be in alphabetical order, but the way the spreadsheet is laid out at present is not suitable.

The function expects there to be only one row of headings.

First you will have to move the **Exchange** rate and **Sales tax** cells further down in the spreadsheet:

1. Type **Exchange rate:** in **A21** and **Sales tax:** in **A22**.
2. Move the **C2** to **B21** and **D2** to **B22**.
3. Delete **row 2** (which is now empty).
4. **Row 17** is not to be sorted, so that should be on its own. Insert a new **Row 17**. The **Total** formulas should now be in **Row 18**.

	A	B	C
1	Material:	Net price SEK.:	Net price DKK.:
2	Brush	19.00	16.7
3	Primer	105.00	92.4
4	Paint	148.00	130.2
5	Filler	67.00	58.9
6	Edge filler	156.25	137.5
7	Glass-fibre	187.00	164.5
8	Sandpaper	28.25	24.8
9	Roller	38.95	34.2
10	Filling knife	47.50	41.8
11	Craft knife	27.35	24.0
12	Craft knife blades	19.95	17.5
13	Small stepladder	208.00	183.0
14	Rubber gloves	19.25	16.9
15	Face mask	19.95	17.5
16	Wood treatment	125.75	110.6
17			
18	<i>Total:</i>	<i>1217.20</i>	<i>1071.14</i>
19			
20			
21	Exchange rate:	0.88	
22	Sales tax	25%	
23			

The spreadsheet is now ready for sorting. All data to be sorted is placed together without blank rows and columns. First, we will sort the materials alphabetically by name:

1. Select any material name in **column A**.
2. Click the **Sort ascending** button. The function leaves the first row alone – smart!
3. Now sort the materials in descending alphabetical order.
4. Select any price in **column E** and sort the data so that the most expensive things are at the top and the cheapest are at the bottom.



All spreadsheets can be sorted in this way, no matter what data they contain. All you have to do is check that the cells are adjoining (next to each other).

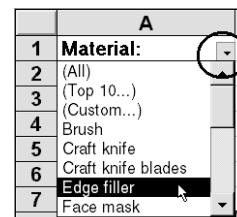
If you want to sort using several conditions, then use the **Data|Sort** function.

Filtering

To search for a particular entry a 'filter' is used. As in sorting, to use this function, the areas must be adjoining.

Let us try using **DECORATING – SWEDISH.XLS**:

1. Select any cell in the area **A1:E16**.
2. Choose **Data|Filter, AutoFilter**. The cells in the first row are now given a drop down list, from where you can choose the value you want.
3. Click the drop down list attached to cell **A1** and choose **Filling knife**.



All the other rows are now hidden and only the row which fulfills your criteria is shown. Note that the row numbers are shown in blue, and the little arrow on the roll down list in **A1** is also blue. This shows that the list has been filtered, and in which column the criteria for the filtering has been defined.

The next exercise is not relevant for version 5.

You are to find the three most expensive materials:

1. First, remove the filtering by choosing the roll down list in row **A1** followed by **(All)**.
2. Click the roll down list in **B1** and choose **(Top 10...)**. This lets you build your own 'top ten' list.
3. In the dialog box, display the **Top 3 items** and press **Enter**:

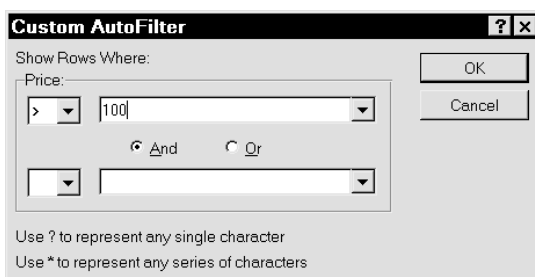


4. Choose **(All)** on the roll down list to make all entries visible.

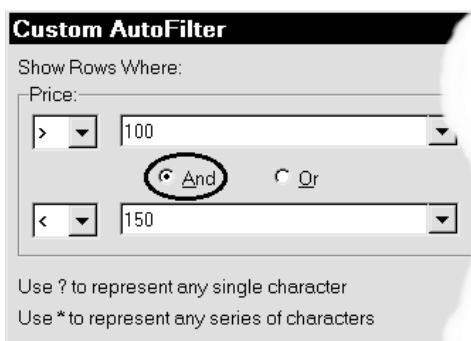
User defined filters

You want to find all materials costing more than 100 kroner. The problem is solved by creating a user defined filter:

1. Click the roll down list in **E1** and choose **(Custom...)**.



2. Specify the filter criteria to be **larger than (>)** **100** and press **Enter**. Eight entries match the criteria.
3. Change the criteria to be **less than 100**. Nine entries match the criteria.
4. Create the criteria to display only entries with a sales price of **between 100 and 150 kroner**:

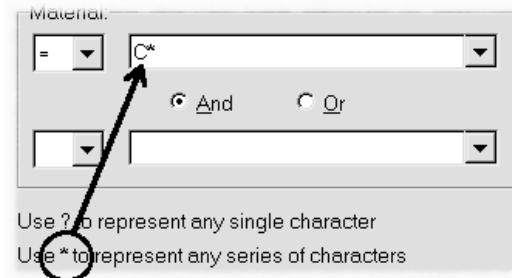


Two entries fulfill the criteria.

5. Remove the AutoFilter by selecting **Data|Filter, AutoFilter**. All entries are displayed again.

You can set criteria which filters entries after their names, or other text. For example, you can find all materials starting with 'P'.

1. Choose **Data|Filter, AutoFilter**.
2. Click the roll down list in **A1** and select **(Custom...)**. Specify that the criteria should be **= P*** where the asterisk specifies that any and all characters are allowed after the P:



Two entries fulfill the criteria.

3. Remove these criteria again by choosing **(All)**. Up to now you have only filtered, using a single field (column). If you want to find the materials beginning with any letter after **K** in the alphabet, and *also* cost **more than 100 kr.** This is done by filtering in both cell **A1** and **E1** as here:

1. Click the roll down list in **A1** and choose **(Custom...)**.
2. Type the criteria **>K*** (larger than K) and press **Enter**.
3. Click the roll down list in **E1** and choose **(Custom...)**.
4. Type the criteria **>100** (larger than 100) and press **Enter**.

Primer, Paint, Small stepladder and Wood treatment are the entries which fulfill the criteria.

If the you want to find entries which *either* begin with a capital letter after K in the alphabet *or* cost more than 100 kr., you cannot use **AutoFilter**. In this case you will have to use the **Advanced filter**. However this function is not particularly user friendly. It is obvious that Microsoft thinks that advanced database tasks should be carried out in a database program like Access. Nevertheless you can go a long way with AutoFilter providing you are careful how you arrange your data.

If you feel you have the courage to explore Excel's database facilities, then search for **Advanced Filter** in the help program.

‘Where do you want to go tomorrow?’

So now we have reached the end of the book...or have we!!!

I hope you do not think so. If you are now inspired to investigate Excel further, to play with the program and let your imagination create new and exciting spreadsheet models, then I have achieved what I set out to do with this booklet.

It must have been obvious from my comments throughout the booklet that I am fascinated by Excel. But you have probably found out yourself that it could still be improved in many areas. And that is what computers are all about...!

Programs can still only carry out the tasks they have been programmed to do. We people make demands on the way a program works – and people make mistakes, which are then reflected in the program. The biggest danger with the fantastic development which is taking place in the computer industry is that we users are becoming so fascinated with the technical side that we completely forget what we really need, we become ‘hi-tech-freaks’.

It is you, dear reader, who should decide what your programs should be used for and which way they should be developed.

Originally computers were difficult to master. Ordinary users had to learn a mass of codes and were forced to think like computers...(!)

Then came the graphical interface and the mouse. In one stroke, the computer was easier to use. The mouse was the new wonder tool, and we could all click and click without thinking about codes.

But it was not long before the worm in the apple (pun intended) became visible, or rather, felt! The mouse showed that it could easily give arm problems, in both the wrist and shoulder.

So where are we now, and how does Excel fit in to these developments?

I am happy to say that Excel has for the most part been designed with the user in mind. Windows95, Word and Excel are excellent examples of how the user has been able to influence program development. If you think I have focused (too) much on how the keyboard can be used – well, you are right. Over the last few years I have learnt how to work fast and effectively without a mouse at the end of my arm. Once you have digested this booklet, and maybe worked through it a couple of times I am sure you will see what I mean.

On the next pages you will find a glossary of the most used keyboard shortcuts. I suggest that you have the booklet open at these pages while you work further with this wonderful program.

Have fun ...and remember what a wise man once said:

‘Whether you think you can, or whether you think you can’t, you’re probably right!!’

Read this while the cat plays with the mouse

F1	Help	CTRL+PGUP	Move to the previous sheet in a workbook
SHIFT+F1	Click the subject you want help with	CTRL+DEL	Delete the text to the end of the line
F2	Activate the formula line	ENTER	End an entry
F3	Displays the Paste Name dialog box, if names are defined in the workbook	ALT+ENTER	Insert a line shift in a cell
SHIFT+F3	Displays the Function Wizard	HOME	Move to the first column in a row
CTRL+F3	Define Name command	CTRL+SHIFT+\$	Format in currency format with two decimals displayed
CTRL+SHIFT+F3	Create Name command	CTRL+SHIFT+%	Format percentage format with no decimals displayed
F4 (on formula line)	Absolute reference (\$).	CTRL+SHIFT+!	Format with two decimals and thousand separators
F4	Repeat last action (Ctrl+Y may also be used)	CTRL+S	Save command
CTRL+F4	Close window	CTRL+1	Open the Format Cells dialog box
ALT+F4	Exit Microsoft Excel	CTRL+B	Bold text on and off
F5	Go to command (the Edit menu)	CTRL+I	<i>Italic</i> text on and off
CTRL+F5	Restore window size	CTRL+U	<u>Underlined</u> text on and off
CTRL+F6	Next window	CTRL+X	Cuts the selected area
CTRL+SHIFT+F6	Previous window	CTRL+C	Copies the selected area
F7	Spell check	CTRL+V	Inserts the contents of the clipboard
F8	Extend a selection (EXT displayed on status line).	CTRL+Z	Undo the last action
F9	Calculates all sheets in all open workbooks	CTRL+D	Fill downwards
F10	Activates the menu line	CTRL+R	Fill to the right
SHIFT+F10	Activates the object menu	CTRL+Home	Move to cell A1
CTRL+F10	Maximise the window	CTRL+Arrow key	Move to the last cell containing data in the direction of the arrow
F11	Creates a standard chart on a new sheet, based on the selected data	CTRL+PLUS	Open the Insert dialog box
F12	The Save as command	CTRL+Space	Select the column
TAB	Move to the next field in a dialog box	SHIFT+ Space	Select the row
SHIFT+TAB	Move to the previous field in a dialog box		
ALT+↓	Opens a roll down list		
ESC	Cancel a command and close the dialog box		
CTRL+PGDN	Move to the next sheet in a workbook		

The shortcuts might be a bit different on your machine depending on your keyboard and regional settings.

There are far more shortcut keys than those I have listed here. You can find them by searching for **shortcut keys** in Excel's help program.