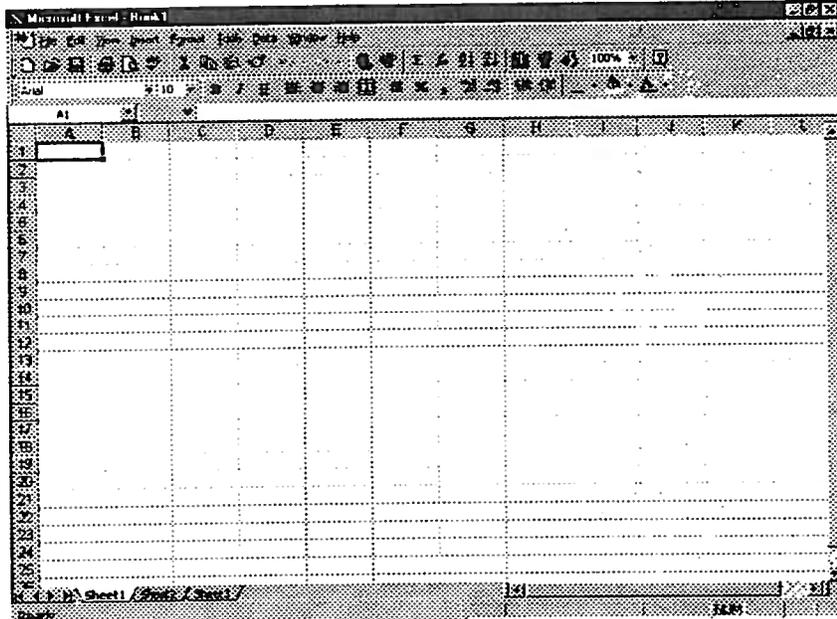


Using Excel

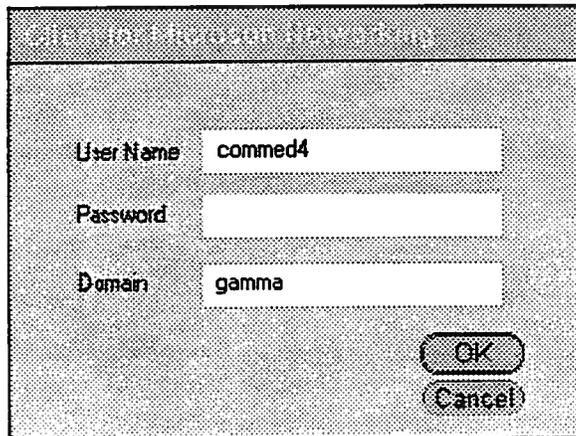


A classroom workbook
By
Algot Runeman

Preliminaries

Logging into the network

At Dover-Sherborn, you do not have Excel on your own computer. It is a shared application on a network server computer. To work with programs during adult education classes, you must begin each session by entering a **user name** and **password**.



Logging into the network

The example screen appears when starting a computer. It will have the name of the last user. You will probably need to change the User Name and then enter the adult ed Password.

Students, who log in by name during the day, get a different, smaller, set of programs and options. Please keep this page from being seen by students of the day school. All evening class adults have the same password, but each User Name must be different.

- Find the User Name taped to the top of the computer monitor where you are and use it.
- Use the mouse to point and click, placing the I-beam cursor into the appropriate blank. You will need to put the cursor into the User Name blank. Delete the name that is there. Type in the User Name found on the top of the computer monitor where you are sitting.
- Do NOT change the word "gamma" in the Domain blank.
- Finish by clicking the OK button.

Starting the Excel program

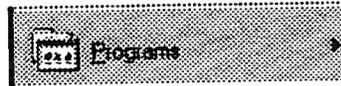
Start Excel from the icon on the Windows desktop screen (if the shortcut is present)...



or by using the Start Menu button...



to access the Programs group...



and finally click on the Microsoft Excel choice from the expanded programs menu list.



If it is installed on your computer (it isn't on mine), you can start Excel from the Microsoft Office Shortcut bar that I cannot illustrate here because, as I mentioned, I don't have it installed.

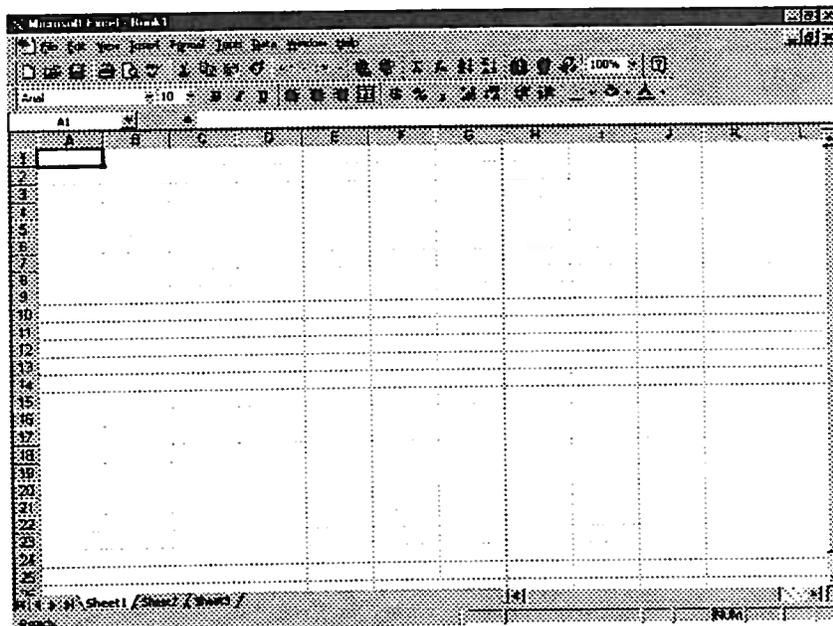
Using Microsoft Excel

Entering Data

Numbers. That's the reason for Microsoft Excel. Calculations, from simple to complex are the center of the story, but Excel is more than a substitute for a hand-held calculator or even an accountant's adding machine with a tape.

Excel is the most popular of several programs collectively called **spreadsheets**. The term originates in accounting where a large sheet of paper divided into rows and columns was a convenient workspace for keeping the financial books of a company.

All computerized spreadsheets use the same screen format of columns and rows.

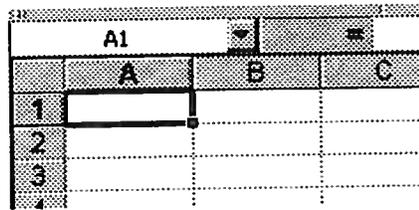


Blank Excel Spreadsheet

The columns are labeled with letters left to right and there are many more columns than show on a computer monitor screen at one time.

The rows are labeled with numbers top to bottom. Again, there are many more rows than will show on a screen.

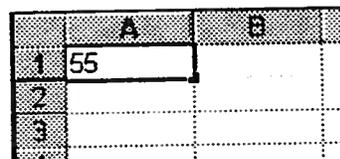
Each little rectangle of the grid, where a column and row intersect, is called a **cell**. The cells are identified using the column and row labels. The top left cell, at the intersection of column A and row 1 is, therefore, cell A1. The cell selection is identified by the highlight around the active cell. The current cell selection is also listed in a space at the left end of the formula bar just above the column headings.



Active cell highlight

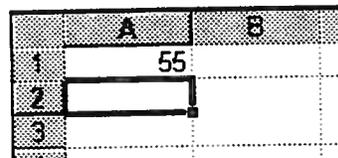
Also notice the bold and embossed headings of the column and row, another subtle clue to the location of the selected cell.

Entering data into a cell is simply a matter of selecting the location where you want the information to go and then typing it. As you type, the vertical flashing cursor will advance in the cell. The data isn't "official" until you enter it, commonly by tapping the **Enter** key on the keyboard.



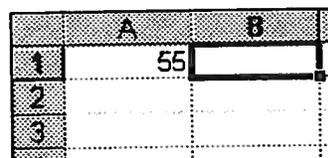
Entering data in a cell

The standard action of tapping the Enter key is to advance the cell selection highlight to the next cell down the current column.



Enter advances the cell selection down

Since you may want to enter your next data in the cell to the right of the first instead, you may opt to "enter" your data by using the **Tab** key on the keyboard.

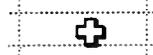


Tab advances the cell selector right

The four arrow keys on the keyboard can also be used to enter data and move to a new cell in the worksheet.

Of course, you may be a mouse-oriented computer user. You can also use the mouse to **point and click** at the next cell where the data will go. Clicking any other cell also "enters" the data.

In Excel, while moving around the grid, the mouse pointer is a large plus symbol...



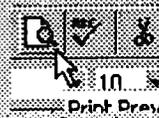
Mouse pointer in spreadsheet grid area

...or it is an I-beam when in a text entry area...



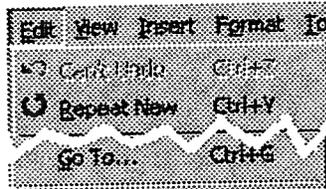
Mouse pointer when in text entry area

...or it is a standard arrow pointer when in a tool or menu selection area.



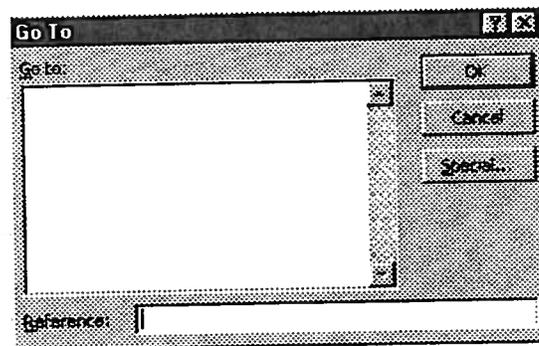
Mouse pointer arrowhead used to select tools

One more way you can move around the grid of cells is to use the **Go To...** option of the Edit menu. (Note that the Go To option in the illustration below is actually much further down a long menu which I've really shortened to save space.)



GoTo... option in Edit menu

Enter the cell reference (like G5) into the **Reference** blank at the bottom of the dialog box which opens as you choose the Go To... option. Then click the OK button and you'll jump to that cell on the grid.



Go To... dialog box

Menu items with three dots after the option like the Go To... option lead you to a dialog box and further options. Expect to have to enter more information or make more choices when you use such a menu option. In this dialog box, the scrollable list space is for named cells (which we'll cover later).

This is as good a place as any to mention the whole concept of menu options and **keyboard shortcuts**. You can pull down a menu with the mouse as most people do, but you can also pull down a menu with a keyboard combination.

For example, to pull down the Edit menu and select the Go To... option, you should tap the Alt key; then tap the letter E; and finally tap the letter G. This is sometimes abbreviated in manuals (like this one) **Alt-E-G**.

You may also notice that some options in a menu have another even easier shortcut which shows at the right in the pulled-down menu. You can, for example, go directly to the Go To... option's dialog box by holding down the Control key while you tap the letter G. This combination of keys is abbreviated in manuals as **Ctrl-G** or **<Ctrl-G>** to show that this combination is done together the way the shift key is used with a letter key to make a capital letter.

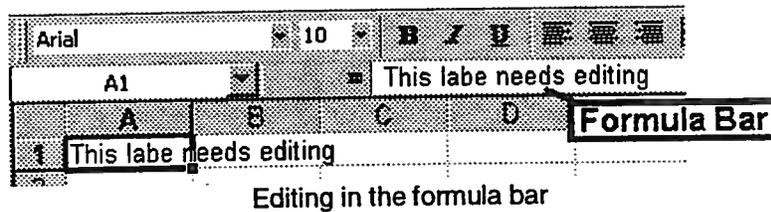
Editing Cell Contents

Data in a cell is intended to be easy to change. One of the main purposes of spreadsheets is to allow for quick updates when a cell value needs to be changed.

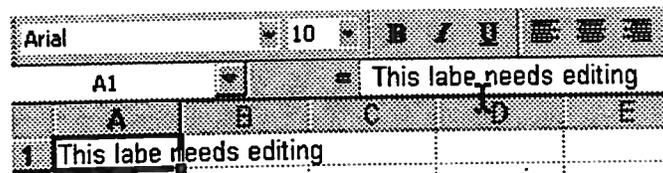
With either the mouse to point and click or the keyboard arrows, move the cell selector back to cell A1 and simply type a new number-followed by the Enter key. Before you tap the enter key, you'll be able to see the vertical **cursor** in the cell. The cursor is always there when you are typing data. It will disappear after you enter the data. A visible cursor indicates that you have not finished entering the data.



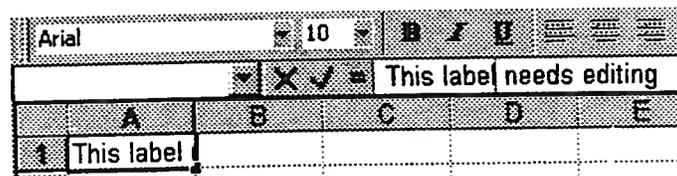
When you edit data directly in a cell, whatever was there is replaced by the new data. You can also edit cell data in the space above the column headings called the **Formula Bar**.



In the case of labels or complex formula constructions, editing in the cell itself is much more work than you want to do because you would need to completely retype the full cell contents. By editing in the formula bar instead, you can position the cursor with the mouse pointer so that it is in a good spot, and just make the necessary change. You can use the keyboard arrow keys to adjust the cursor's position if you don't place it precisely with the mouse point-and-click.



1) Editing in the Formula Bar (positioning cursor with mouse)



2) Editing in the Formula Bar (Enter key not tapped yet)

Data Types

There are four basic data types that can go into each cell of a worksheet.

- Values (numbers)
- Labels (words or special text) (Also sometimes called **Text Values**)
- Formulas (calculations like addition, multiplication, etc. entered by the user)
- Functions (complex calculations at least partially entered by Excel)

Values (first data type) are relatively obvious. A cell can contain a number like 55. It can also contain a number like 3.2 or any other number.

Exercise 1a

Entering number values

- Position the cell selection in cell B1
- Type the number 10
- Move to cell B2
- Type the number 8
- Move to cell B3
- Type the number 5
- Move to cell B4
- Type the number 3
- Move to cell B5
- Type the number 2

	A	B
1		10
2		8
3		5
4		3
5		2
6		
7		

Data shown after exercise 1a

Notice that the numbers automatically move to the right edge of the cell. This is normal for numbers so that the decimal points will line up (even though they are invisible in whole numbers like these).

Column A is intentionally left blank to leave room for labels. See exercise 1b next.

We will come back to examine large numbers and other fancy numeric formats later.

Labels (second data type) are one of the great things that a normal calculator cannot give you. The labels identify the numbers in nearby cells and also provide clarity to a chart of numbers.

Exercise 1b Entering Labels

- Go to cell A1
- Type the word **Oranges**
- Go to cell A2
- Type the word **Grapefruit**
- Go to cell A3
- Type the word **Lemons**
- Go to cell A4
- Type the word **Limes**
- Go to cell A5
- Type the word **Tangerines**
(If you notice the final S is partly hidden, you have good eyesight. You will learn how to adjust the column width later.)
- Go to cell A6
- Type **Total Citrus**

When entering wide labels into a cell, the label will often extend wider than the column's normal space. That's okay.

If the next cell is empty, the label will simply extend to the right covering the empty cell(s). The label is "in" only the cell where you started typing, but it "runs over" adjacent cells. When you try to edit a long label, you must select the cell where the label began. Although the adjacent cells seem to have part of the label in them, they are really empty.

If the adjacent cell already has data, a new label that is too-wide (like **Tangerines**, in cell A5 here) will be partially hidden by the data in the next column. You'll see how to deal with that later.

If it seems like many things have been put off until "later," it is so that initially I can present a concept in a simple way, without too many options. I hope to show a basic idea about labels, for example, as I just did. Boxed text like this, adds explanations that are a little beyond the basic idea. More complex examples and explanations **should** come later so the initial ideas have time to sink in.

Formulas (third data type) are descriptions of calculations to be done on numbers entered into the spreadsheet cells. Always begin typing a formula with the equal sign (=). Starting a formula with an equal sign is very important. If you forget the equal sign, Excel may interpret your typing as a text label.

Formulas are designed for general-purpose use. While you could create a formula that said, "Add 3 plus 4," spreadsheet formulas attempt to be more general by saying, "Add the contents of cell A1 to the contents of cell B1." That way, you can later enter different numbers into the cells and reuse the same formula to calculate the answer.

Brief Excel math lesson

1. All Excel formulas begin with the equal sign.
2. A formula can be built from fixed values.
=5+4 The answer is 9.
3. A formula can be built from variable values that refer to cells.
=A1+B1 The answer depends on the numbers in cell A1 and B1.
4. Most formulas in Excel will use variable (cell reference) values.
5. The four basic operations use the following operator symbols.

Operation	Symbol	Symbol name	Example
Addition	+	Plus symbol	=5+3
Subtraction	-	Minus (hyphen)	=6-3
Multiplication	*	Asterisk	=5*5
Division	/	Right slash	=12/3

Exercise 1c

Entering a formula

- Go to cell B6
- Type the formula **=B1+B2+B3+B4+B5**
(Be sure to begin the formula with the equal sign (=) and do not put spaces between any parts of the formula and complete the formula by tapping the enter key.)

Exercise 1d

Changing values used by a formula

- Go to cells B1 through B5 and enter different numbers. Each time you do so, notice that as soon as you complete the entry with the Enter key or by using the mouse to select the next cell, the answer expressed in cell B6 changes to show the new total of the column of numbers.

Functions (fourth data type) are intended to help develop complex calculations that could be difficult to do in a manually entered formula.

Exercise 1e

- Go to cell A7 and type **Sum of Citrus**
- Go to cell B7 and carefully type **=SUM(B1:B5)**
(Don't forget to tap the Enter key or select another cell with the mouse, Tab or arrow key.)

That's a colon between B1 and B5. It stands for the word "through". You would read the function as "Calculate the sum of the range of numbers found in cells B1 through B5." A function is excellent for creating the calculation of a long column of numbers that would be a pain in the neck to enter as a formula. Imagine if your column were 50 numbers long instead of only five.

Functions refer to a **range** of numbers. A range can be a group of cells from a column, a row, or a rectangular area of cells, (and actually even more complex cell selections).

Exercise 1f (another function) The Average() function

Go to cell A8
Type the label **Average Citrus**
Go to cell B8
Type the function **=Average(B1:B5)**

Creating a formula to calculate the average could be more complicated than the function. I figured out three different ways to make an equivalent formula instead of the built-in average function. There might be more than these three, of course. Nobody's perfect!

- $=(B1+B2+B3+B4+B5)/5$
- $=(B1+B2+B3+B4+B5)/Count(B1:B5)$
- $=Sum(B1:B5)/Count(B1:B5)$

The first of these formulas is the most manual.
The second combines a formula and a function.
The third combines two functions

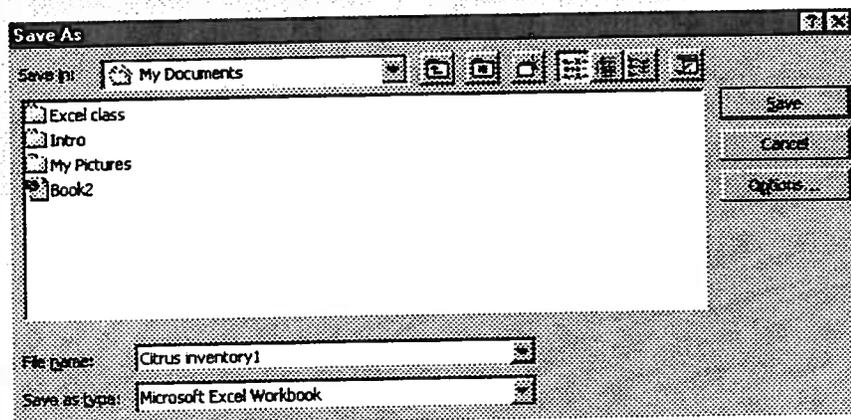
Nonetheless, using the built-in averaging function is the "easiest." method.

Of course you do need to know about the available functions to make use of them. Excel has many different functions. We'll come back to examine functions again later.

If you are practicing at home or in the office, take time now to save this little worksheet.

Pull down the File menu and choose Save. (First Save is always a Save As... for name.) You will be given a dialog box in which you will choose the new name and the location to which you want to save the worksheet.

Typically, save the worksheet in a folder in "My documents."
I put mine in a folder called **Excel class**.



With good eyesight, you can see, I've called the file **Citrus inventory1**.

Formatting

There are many ways to improve the appearance of Excel worksheets. There are many different kinds of formatting available.

Column and Row Formatting

Remember I promised earlier that you would be able to clean up the column widths "later"? This is "later."

Exercise 2a

- Position your mouse pointer in the column headings, the row of letters at the top of the columns. Get it right at the line between column A and column B. The pointer should change to a double-headed arrow.

	A	B
1	Oranges	10
2	Grapefruit	8
3	Lemons	5
4	Limes	2

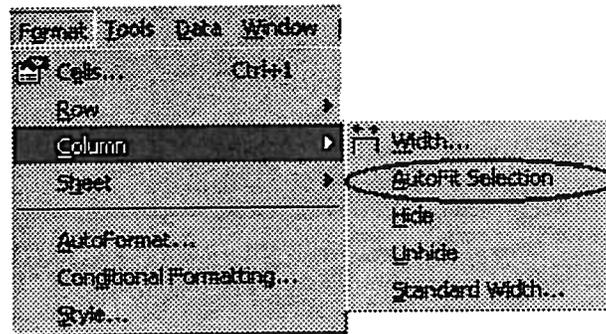
Adjusting column width with two-headed arrow

- Hold down the left mouse button and **drag** (move) the mouse to the right until the words all show.
- Try making column B narrower, too so the numbers just fit.

If you are shaky with your mouse skills, there's almost always the "other" way to do every job in a modern computer program.

Select the entire A column by clicking the column heading on the top of the column where the A is.

Pull down the Format menu, select **Column** and then select **AutoFit Selection**.

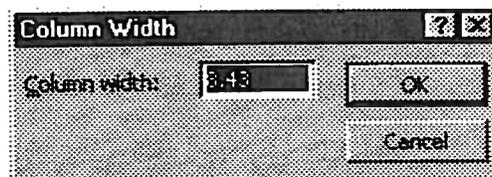


Adjusting columns with AutoFit

You can also make columns a precise size.

Pull down the Format menu, select **Column** and then select **Width...**

The dialog box will show you the normal (default) width of 8.43 (measured in digits that will fit).



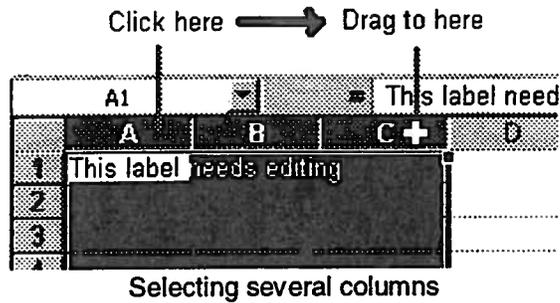
Changing column widths precisely

Simply type a new value into the dialog box and tap the Enter key to make the change. Of course, you have to have some idea of what size you want.

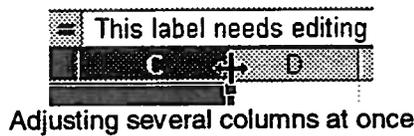
Exercise 2b

Practice changing column widths.

To change more than one column width at once, select more than one. Use the mouse and click on the heading of the first column you want to change and while holding down the left mouse button drag across the screen to highlight several columns.



Now, if you drag the right heading margin of the last column chosen, all chosen columns will adjust to the same new width. Put the mouse pointer at the right edge of column C. When you get there, the pointer should look like a two-headed arrow. Hold down the mouse button when the mouse pointer looks like this to adjust column widths.



Rows work in essentially the same way except that you are changing the thickness or height of the row(s).

Exercise 2c
Experiment with changing row heights.

If you completely slaughter the practice spreadsheet, close it **without saving it** and open the version you saved earlier.

Adding a row

The current Citrus Inventory worksheet should look something like the following illustration now.

	A	B	C
1	Oranges	10	
2	Grapefruit	8	
3	Lemons	5	
4	Limes	3	
5	Tangerines	2	
6	Total Citrus	28	
7	Sum of Citrus	28	
8	Average Citrus	5.6	
9			

Citrus Inventory Worksheet

As part of making this spreadsheet better looking, it should have a title of some kind. Of course, in a perfect world, we would plan ahead and we would have put the title into the

first row before beginning the rest of the data. That’s okay. So the world isn’t perfect. Excel will “forgive” us. We can add the row we need.

Exercise 3a

- Select row number one by using the mouse to click the row heading. The result should look like the following illustration.

	Name Box	B	C
1	Oranges	10	
2	Grapefruit	8	
3	Lemons	5	
4	Limes	3	
5	Tangerines	2	
6	Total Citrus	28	
7	Sum of Citrus	28	
8	Average Citrus	5.6	

Selecting a row

- Pull down the **Insert** menu and choose the Rows option .
- Now select cell A1 and type in the text label “Algot’s Kitchen – Citrus Inventory.”
- Do it again; add another row, but this time select row 2 so the new row goes between “Algot’s Kitchen” and “Oranges.”
- Enter labels for the columns “Fruit”, “Count”, “Cost”, and “Sell Price”

Your work should match the following illustration.

	A	B	C	D
1	Algot's Kitchen - Citrus Inventory			
2	Fruit	number	cost	Sales price
3	Oranges	10		
4	Grapefruit	8		
5	Lemons	5		
6	Limes	3		
7	Tangerines	2		
8	Total Citrus	28		
9	Sum of Citrus	28		
10	Average Citrus	5.6		

Added rows

Challenge exercise 3b: Try to figure out how to add two or more rows at once, not one and then another.

Exercise 3c

- Enter prices for the cost of each kind of fruit in the inventory into column C. For now, enter them just as numbers. Don't enter a dollar sign as you type each number, just appropriate decimal points. (0.5 for oranges is 50 cents and that will be the number entered even if you enter 0.50) Copy the values in the illustration below.

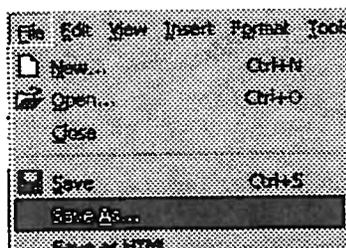
	A	B	C	D
1	Algot's Kitchen - Citrus Inventory			
2	Fruit	number	cost	Sales price
3	Oranges	10	0.5	
4	Grapefruit	8	0.45	
5	Lemons	5	0.3	
6	Limes	3	0.4	
7	Tangerines	2	0.35	
8	Total Citrus	28		
9	Sum of Citrus	28		
10	Average Citrus	5.6		

Prices before formatting

- Leave the Sales price column blank for now, we'll fill it later when you practice a more advanced skill.

Exercise 3d (No the illustrations won't pop out of the screen at you!)

- Save your work again using **Save As...** from the File menu this time so you can change the name to **Citrus inventory2**. If you choose the regular Save option, you will overwrite the earlier version of the worksheet (Citrus inventory1). We need that simpler worksheet for a later exercise.



Use Save As... (for changing a file name)

Formatting data in cells

Manual data formatting

I want you to learn to format worksheets in two different ways, first manually and then automatically. You need both skills.

Exercise 4a

Making text Bold

The title would look much better if it stood out a little from the other words.

- Select cell A1
- Find the large letter B on the Formatting toolbar and click it with the mouse.



Formatting toolbar

The title label should turn **Bold**.

Exercise 4b

Centering text

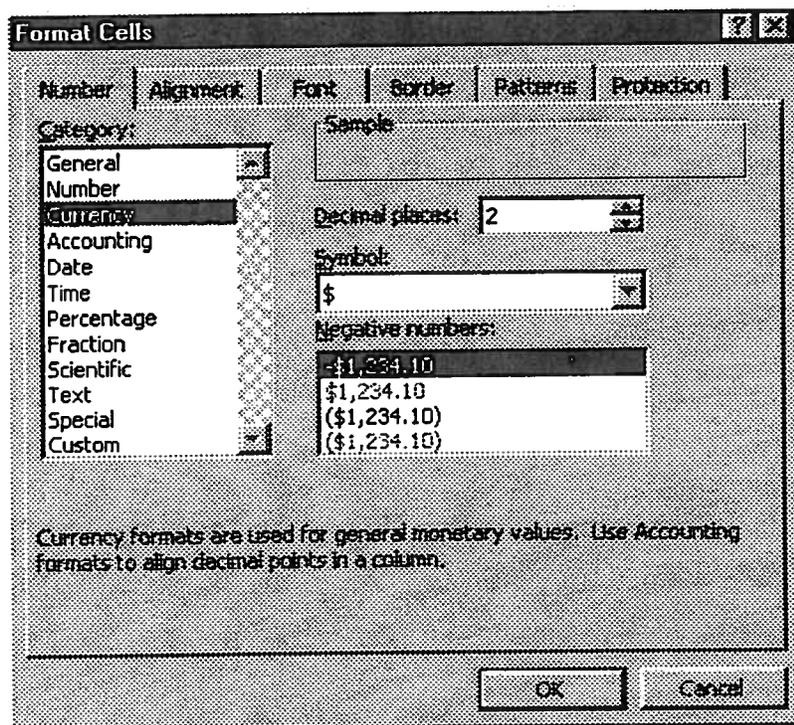
- Start in cell A2 and drag to select A2 through D2.
- Find and click the Centering Icon on the Formatting toolbar (below)



The text labels should be **centered** in each column instead of being **left aligned**. Left aligned is the standard alignment for text in a spreadsheet cell.

Exercise 4c
Number formats

- Select cells C3 through C10 (even though the last three are currently empty.)
- Pull down the Format menu and select the Cells option
- Click on the Numbers “Page Tab.”
- Click on the **Currency** option.



Cell format dialog box from the Format menu

The prices will automatically change to look like the illustration below.

cost
\$0.50
\$0.45
\$0.30
\$0.40
\$0.35

Prices after “Currency” formatting

To be fair, I should admit that the “intelligence” of Excel is good enough to recognize that if I use a dollar sign (\$) when I enter the data, I intend that the cell be formatted as currency. Therefore, if I typed each of the numbers, starting with the dollar sign, like (\$0.5), Excel would automatically enter (\$0.50) in the cell. There always seems to be

more than one way to accomplish the same thing in a Windows-style program. It means that each user can use the procedural style that suits the individual.

There are many different data formats, of course. I casually had you skip over the General and Number formats for Exercise 4c. Some of you noticed my carefree attitude, didn't you?

The General format is the standard for data entry. With the General format, Excel will use "intelligence" to recognize the kind of data that you are entering. If you begin typing with a letter, Excel will automatically assign Text formatting to the cell. If you type in only digits, Excel will use Number formatting. If you start with the dollar sign, Excel picks Currency.

Now, let's look at the special case of zip codes. A basic zip code is composed of only five digits, so Excel will interpret it as needing the number format. That's okay as long as you don't live in New England.

Exercise 4x

- Enter Natick's zip code 01760 into a cell.

The automatic use of Number formatting by Excel causes the first digit, a zero, to disappear. For a number format, that is the right thing to do. Leading zeros are not appropriate in number formatting except when the zero comes immediately before a decimal point. Entering 0.5 would, therefore, keep the leading zero.

The zip code **needs** the leading zero. The way to keep it is to force Excel to see the five digits of Natick's zip code all as "text."

Exercise 4xx

- Type the zip code again, but this time, start with the quote key (single quote/apostrophe).
- Type: '01760

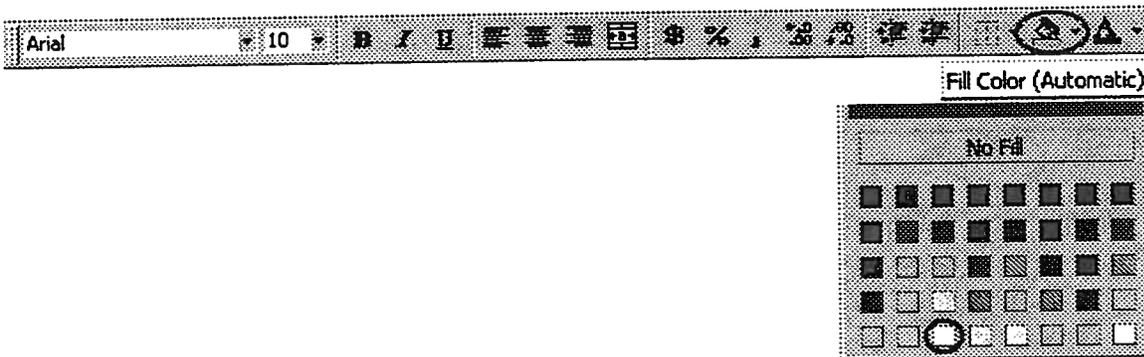
When you tap the Enter key, the quotation mark will NOT show in the cell (although if you examine the formula bar editing space, you will see the quotation mark there). Starting the zip code with a quotation mark informs Excel that the rest of what you type into this cell should be considered text no matter what keys get tapped. Notice, too, that the zip code is aligned to the left edge of the cell when it is forced as text. Like any normal text of words, the zip code digits are aligned left in their cells.

If you know ahead of time that a column of cells will be zip codes, you can apply text formatting to a group of cells and then just type the zip codes without needing the quotation mark.

Actually, this new version of Excel has a few Special cell formats. You can preset a group of cells to be zip, zip+4, phone number and social security number. When you use the phone number format, for example, you don't need to type the punctuation. Excel will keep track of where the parentheses and dash go. (Experiment—go ahead; try it.)

Exercise 4d
Highlighting Cells for emphasis

- Select cells A1 through D2
(Start at cell A1 and click/hold the left mouse button. Drag the mouse to cell D2 and release).
- Select the cell filler button on the formatting toolbar.
(It's supposed to look like a paint bucket pouring out color.)
- Be careful to click on the little triangle arrow tip to the right of the bucket the first time.



As a standard, the cell fill color is listed as (Automatic) which means "No Fill" as shown in the color chart that opens when you click the little triangle point. Clicking on the bucket when "No Fill" is the color option will give you a clear cell, just what you started with. Phooey! That's no fun.

You must select a color to fill the selected cells. I chose light yellow, the third from the left in the bottom row of color patches. Fortunately for the colorblind like me, each color is given a label if you hover the mouse pointer on the color patch.

If you really want to experiment with different color effects, Excel lets you pull the color chart out to "float" over the spreadsheet. To pull the chart away, click and drag on the narrow stripe at the very top of the color fill chart.

Select cells A3 through A10 and apply Turquoise color to them.
The result might look something like the next illustration which is going to show both colors as shades of gray on the printed copy.

What?

Do you think that I could afford a fancy color laser printer?

	A	B	C	D
1	Algot's Kitchen - Citrus Inventory			
2	Fruit	number	cost	Sales price
3	Oranges	10	\$0.50	
4	Grapefruit	8	\$0.45	
5	Lemons	5	\$0.30	
6	Limes	3	\$0.40	
7	Tangerines	2	\$0.35	
8	Total Citrus	28		
9	Sum of Citrus	28		
10	Average Citrus	5.6		
11				

Highlighted labels enhance appearance

If you are printing your worksheets with a monochrome ink jet or laser printer, as I am, be sure to test colors for their impact on the printout. Very dark colors may not give enough contrast for the black text. (Even if you have a nice color ink jet printer, copies will probably be done on a Xerox machine – unless you have another brand of copier.)

For high contrast, you can use a black fill and then change the text color to white. The text color tool is just to the right of the background fill bucket. While in the middle of these two steps, of course, you will not be able to see the black text against the black cell background.



Text color tool

	A	B	C	D	E
1	Algot's Kitchen - Citrus Inventory				
2	Fruit	number	cost	Sales price	
3	Oranges	10	\$0.50		
4	Grapefruit	8	\$0.45		
5	Lemons	5	\$0.30		
6	Limes	3	\$0.40		
7	Tangerines	2	\$0.35		
8	Total Citrus	28			
9	Sum of Citrus	28			
10	Average Citru	5.6			

High contrast white text color with black cell fill

Please experiment with different color combinations to see what combinations you like. Whenever you can, repeat an exercise with different options. The more you repeat the pattern of steps for an exercise, the more comfortable you will feel with the steps and the whole concept of the exercise. You will come to realize that you cannot break the computer by trying simple steps. The repetitive exploration is important, especially if you can do it under low pressure, non-threatening conditions.

Exercise 5a Adding cell borders

- Select Cells A2 through D2
- Select the Border control tool from the Format Bar.
- Remember to use the triangle arrow point to get the border options.
- Use the second one in on the second row to get a nice thick border below the labels.



Border control tool (not the one near El Paso, TX)

	A	B	C	D	E
1	Algot's Kitchen - Citrus Inventory				
2	Fruit	number	cost	Sales price	
3	Oranges	10	\$0.50		
4	Grapefruit	8	\$0.45		
5	Lemons	5	\$0.30		
6	Limes	3	\$0.40		
7	Tangerines	2	\$0.35		
8	Total Citrus	28			
9	Sum of Citrus	28			
10	Average Citru	5.6			
11					
12					

Manually edited worksheet

- Save your work again using **Save As...** from the File menu so you can change the name to **Citrus inventory3**. Remember, if you choose the regular Save option, you will overwrite the earlier version, and we need that for the next exercise.

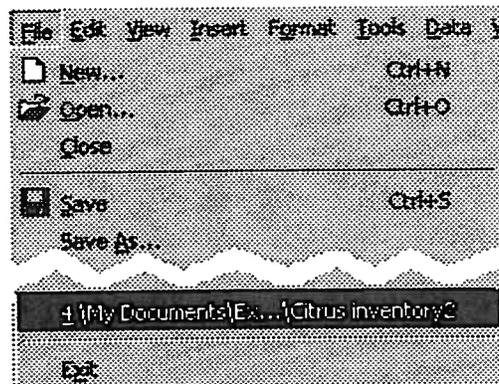
Exercise 5b

Automatic formats

- Pull down the File menu and choose the **Open** option. You will get the standard **Open file** dialog box. Explore to locate the “Citrus inventory2” file. If you are continuing a work session, the file will be one of the ones listed in the current **Look in** location.

If you are coming back to this work after many days or after just starting Excel, you may need to navigate to the proper folder. This booklet doesn't intend to cover much in the way of basic Windows navigation skills. An Excel class probably should not be your first exposure to using a Windows-based computer (Windows 95/98)

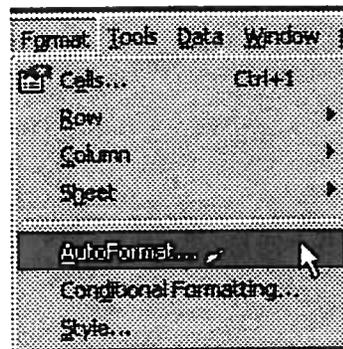
You may be able to save a step here if you are continuing with exercise 5a soon after finishing the earlier exercises. Excel maintains a list of recent documents at the bottom of the File menu. Look to see if “Citrus inventory2” is there. If it is, you can just click on the name there at the bottom of the File menu.



File menu showing recent file (Shortened)

Excel 97 has a group of standard formats to provide the kinds of beautification we have been trying (desperately?) to accomplish by hand. Sometimes manual methods will turn out better, but for simple data layouts, you probably will like the **AutoFormat** options.

- Select the range of cells from A1 through D10.
- Pull down the Format menu and choose the **AutoFormat** option.



AutoFormat option

- From the list of preset choices in the dialog box, try at least a few. For this context, I like the **Classic 3** choice.
- Don't just try the Classic 3, though. Try several. Learn by experimentation. It's very helpful even though it takes time.

Applying AutoFormat with an Alternative technique:

Some people describe Excel 97 as "intelligent." Find out what that means.

- With the mouse, click any cell in the rectangle of data in the Citrus Inventory worksheet.

Excel's AutoFormat wizard determines the limit of data by checking for a row or column of empty cells. If you try to begin at an empty cell, Excel can't work outwards to reach any "edge" of data. Excel isn't really intelligent. It has a limited set of rules to follow. Excel cannot look to the left and up on the worksheet to see that we've chosen a cell just outside the data range. Nonetheless, being able to let Excel find the margins of a data block is pretty impressive.

- Try starting AutoFormat with cell F11 selected.

I know that I just told you it wouldn't work. So what. Find out what happens when you do the wrong thing. See if the result of your action tells you something useful.

- Save this formatted version as Citrus inventory4 if you wish, just to see what you did.

Actually, it is more important to just be sure you don't save the formatted version back in place of the unformatted version called Citrus inventory2. You should keep practice files in their original format so you can go back to repeat the exercises that depend on them.

If you decide not to save the AutoFormatted version, just close it without saving.

Playful Exploration

Making a “mistake” is sometimes a very important learning experience. To be truly literate with computers, you must develop a sense of childlike **playful exploration**. Children, especially young ones, do not expect to immediately understand their surroundings. They explore without much self-judgement. Any result is instructive, even a result which does not apparently lead in the “right” direction. Young children are natural learners. Everything is a puzzle to be solved, even tasks adults totally take for granted. That’s the problem with adult education. Adults may be uncomfortable making mistakes. There is a feeling that “I should be able to do this. I am an adult.” The sad corollary is the adult’s conclusion that “I must be really dumb because I don’t get this.” Adults see the mistake and condemn themselves. Children see the mistake as a natural step in the learning process. It is only the worst parts of the institutionalized education process which rob us of accepting the natural mistakes that happen while we are learning. It is the sad nature of adulthood that we are always in a hurry to be **productive**. Learning (during the process anyway) is counter-productive. “I don’t have time for this!” That’s a common, frustrated reaction to a job full of change and challenge. Learning Excel or any other computer skill is certainly a challenge. Children expect the challenge. Adults rebel against it.

Become childlike when you sit down to learn something new. Shed your adult “habits” and see the exercise before you as a child does. Look at each option again and again with small variations, not too many at once. Too many changes all at once will get you frustrated because you don’t absorb the impact of each variation. Return to an exercise more than once. Don’t assume that your adult brain is good enough to “get it” the first time you try something. Each time you repeat an exercise, the result becomes more consistent with other things you already know. Try a new variation. Let the new variation connect with the knowledge and skills you have absorbed earlier through repetition.

I often tell people that I do not feel like a computer expert. The amount of information to know about computers is too much for me to memorize. So I don’t memorize. Instead, I repeat a procedure until it makes sense to me, varying options until I feel comfortable that I understand what I’ve done. Then I put the skill aside, so to speak. I store it as a piece of connected knowledge, not as an isolated fact that I have memorized. I don’t think my learning style is unique. It is the context-based style that children use. If something isn’t part of their daily routine, it isn’t a habit. If they do repeat something often enough, it becomes a habit. (We hope most habits are good for us, unlike the smoking habit which we are counseled to avoid.)

I try to put a new skill in context with the older ones that I’ve internalized by repeated use. Then when I need the new skill again, maybe I remember I’ve done it before and I think about what steps probably will get the job done. If I am wrong, I try a variation of the steps until I find the solution.

Good knowledge is, mostly, **knowing how to find an answer**, not just memorizing the answer itself.

Copying, Pasting and Filling

Exercise 6a

Copying formulas and formats is a time saver

- If necessary, open the unformatted practice file called Citrus inventory2.
- Select cell D3 and type the formula =C3*0.5+C3
- **Remember to enter the value. (To keep the cell selection from moving, hold down the control key while you tap the enter key <Ctrl-Enter>). If you just tap the Enter key the cell selector will jump down to cell D4.**

“Wait a minute, you didn’t tell us about this way to enter data before,” says the tall guy at the back. True, but remember, I did tell you there is usually more than one way to do things. This seemed like a good time to introduce you to entering data and keeping the selector in the same cell since you are going to want to copy the cell formula in a minute.

- Read that as: “Multiply the cost times 50% and then add that to the cost.”
- Or read it as “Mark up the cost by 50% to get the sales price.”

This is your reference formula. You are about to copy it to the rest of the cells in column D where it is appropriate. There are two ways to do it (Copy/Paste) and (Fill).

Method 1a

Copy and Paste (with Menu)

- Select cell D3 again if your selector has moved.
- Pull down the Edit menu and choose the **Copy** option.

The cell highlight will become a moving **marquee**-style box.

Inventory	
cost	Sales price
\$0.50	\$0.75
\$0.45	
\$0.30	
\$0.40	

Marquee style selector (why isn't this paper copy moving?)

(This exercise continues on the next page.)

- Select cell D4.
- Pull down the Edit menu again and choose the **Paste** option.

	A	B	C	D
1	Algot's Kitchen - Citrus Inventory			
2	Fruit	number	cost	Sales price
3	Oranges	10	\$0.50	\$0.75
4	Grapefruit	8	\$0.45	\$0.68
5	Lemons	5	\$0.30	
6	Limes	2	\$0.20	

Updated formula pasted in cell D4

- Notice that the formula that was pasted into cell D4 isn't exactly the same as the one in cell D3. It is **almost the same**, but it has been updated relative to its current position.

The formula in cell D3 was $=C3*0.5+C3$ (referring to number and cost of oranges).
 The formula in cell D4 is $=C4*0.5+C4$ (referring to number and cost of grapefruit).

The reason for the reference change is important. The cell references in Excel are considered to be **relative** not **absolute** references during copy and paste operations.

- Paste again into cell D5 and see the new version of the formula in the Formula Bar.
 $=C5*.05+C3$ (referring to the number and cost of lemons).
- Paste again into cell D6 and check the updated formula.
- Paste again into cell D7 and check the updated formula.
- Close the file without saving the changes. (Pull down the File menu and choose the Close option.)
- Repeat exercise 5a exactly as before then go on to Method 1b.

Method 1b

Copy and Paste (Using Keyboard shortcuts)

- Start with a fresh copy of the Citrus inventory2 file.
- Select cell D3 and enter the formula $=C3*0.5+C3$.
 That much is the same.
- Hold down the Control key and tap the letter C <Ctrl-C> (meaning copy).
- Tap the down pointing arrow key to move the selection.
- Hold down the Control key and tap the letter V <Ctrl-V> (meaning paste).
- Continue pasting in cells D6 and D7.
 So Copy/Paste is faster, if you can remember the shortcut keys.

Method 1c

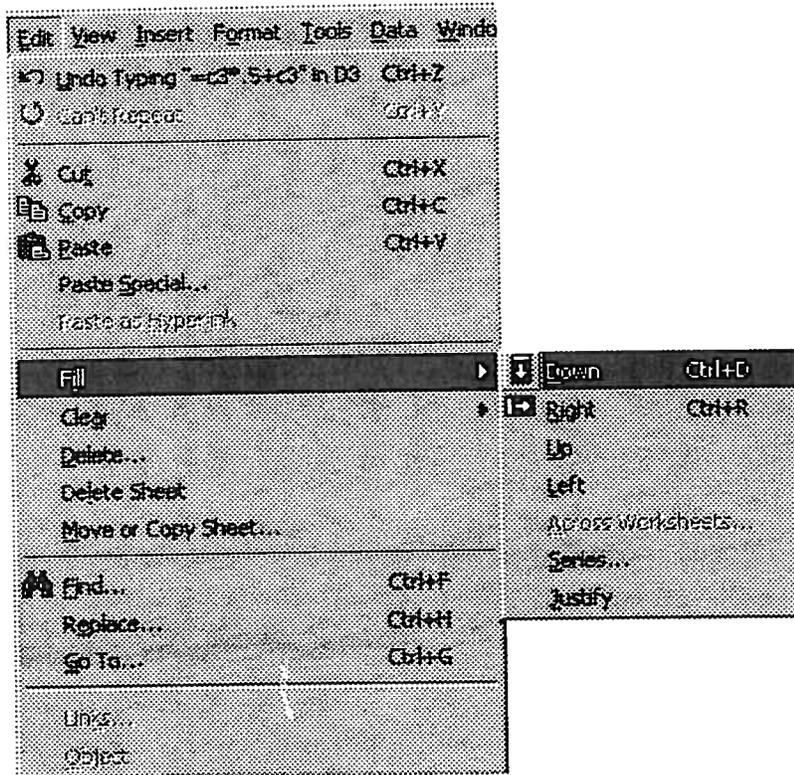
Fill Down

- Start with a fresh copy of the Citrus inventory2 file.
- Select cell D3 and enter the formula =C3*0.5+C3.
That much is the same again.
- Be sure Cell D3 is highlighted.
- Click and drag to select cells D3 through D7

	A	B	C	D	E
1	Algot's Kitchen - Citrus Inventory				
2	Fruit	number	cost	Sales price	
3	Oranges	10	\$0.50	\$0.75	
4	Grapefruit	8	\$0.45		
5	Lemons	5	\$0.30		
6	Limes	3	\$0.40		
7	Tangerines	2	\$0.35		
8	Total Citrus	28			
9	Sum of Citrus	28			
10	Average Citrus	5.6			
11					

Selecting the cells to fill in one step

- Pull down the Edit menu and choose the Fill option.
- Choose the Fill Down option on the extended options.



- While you are looking at the open menu and its many options, look at the shortcut keys mentioned for **Fill down**.
- Select cells D4 through D7 and tap the delete key on the keyboard. (Hey, that's a new trick isn't it.)
- Select cells D3 through D7 and use the shortcut keys <Ctrl-D> to fill the adjusted formulas down the column.
These techniques are getting very quick, aren't they?

Exercise 6b

New Formula to duplicate.

- Put the following formula into cell E3. **=C3*B3**
- Read that as "Multiply the cost of a fruit times the number of that kind of fruit."
- Add the label **Replacement Cost** in cell E2.
- Put the formula into cells E4 through E7 in each of the methods described in exercise 6a.

This is an important part of repetitive and playful exploration.

Exercise 6c

Another Formula to duplicate.

- Put the formula **=(C3*.5+C3)*B3** into cell F3.
- Read that as "Mark up the cost of a fruit by 50 percent and then multiply that by the number of that fruit."
- Add the label **Potential gross sales** in cell F2
- Duplicate the formula into cells F4 through F7 by whatever method you like best.

Exercise 6c

The last of these formulas to duplicate for now

- Put the formula **=F3-E3** into cell G3.
- Read that as "Subtract the cost of a fruit from the sales price to find the net profit if all the fruit sell."
- Add the label **Potential profit** in cell F2
- Duplicate the formula into cells F4 through F7 by whatever method you like best.
- Backtrack enough pages to help you remember how to format the new number data as currency.

If everything goes well in these exercises, the final spreadsheet should look like the illustration at the top of the next page. Check the calculations and see if they match.

	A	B	C	D	E	F	G
1	Algot's Kitchen - Citrus Inventory						
2	<i>Fruit</i>	<i>number</i>	<i>cost</i>	<i>Sales price</i>	<i>Cost of inventory</i>	<i>Potential Gross Sales</i>	<i>Potential profit</i>
3	Oranges	10	\$0.50	\$0.75	\$5.00	\$7.50	\$2.50
4	Grapefruit	8	\$0.45	\$0.68	\$3.60	\$5.40	\$1.80
5	Lemons	5	\$0.30	\$0.45	\$1.50	\$2.25	\$0.75
6	Limes	3	\$0.40	\$0.60	\$1.20	\$1.80	\$0.60
7	Tangerines	2	\$0.35	\$0.53	\$0.70	\$1.05	\$0.35
8	Total Citrus	28					
9	Sum of Citrus	28					
10	Average Citrus	5.6					
11							
12							

Exercise 6d

- Make the whole Worksheet beautiful with highlight formatting.
- When I chose to AutoFormat using Classic 3, I needed to make some columns less wide so I could be happy with the result shown below.

	A	B	C	D	E	F	G
1	Algot's Kitchen - Citrus Inventory						
2	<i>Fruit</i>	<i>number</i>	<i>cost</i>	<i>Sales price</i>	<i>Cost of inventory</i>	<i>Potential Gross Sales</i>	<i>Potential profit</i>
3	Oranges	10	\$0.50	\$0.75	\$5.00	\$7.50	\$2.50
4	Grapefruit	8	\$0.45	\$0.68	\$3.60	\$5.40	\$1.80
5	Lemons	5	\$0.30	\$0.45	\$1.50	\$2.25	\$0.75
6	Limes	3	\$0.40	\$0.60	\$1.20	\$1.80	\$0.60
7	Tangerines	2	\$0.35	\$0.53	\$0.70	\$1.05	\$0.35
8	Total Citrus	28					
9	Sum of Citrus	28					
10	Average Citrus	5.6					
11							

I then saved my completed worksheet as **Citrus inventory5**.

Math as applied in Excel worksheets

All through these recent exercises, some underlying discomfort may have been developing in some of you. MATH was involved, and, while you believed I might know what I was doing, you still would like to be sure that you could do the proper formulas yourself.

Let's review the basics.

The four basic math operations, as done in Excel, are:

Operation	Formula	Result
Addition	=10+5	15
Subtraction	=10-5	5
Multiplication	=10*5	50
Division	=10/5	2

I'm sure you recognized the plus and minus symbols.

Where did the asterisk (*) come from? Sorry, the letter X cannot be used for multiplication. Consider multiplying 4 times 2. That would look like =4X2 if X were used instead of the asterisk (*). Since X2 is a valid cell reference just like A2 or B2, Excel would be confused. We humans are able to handle ambiguity, but computer programs are not. To avoid trying to make the letter X have more than one use, computer programmers long ago decided to substitute the asterisk as the symbol to stand for multiplication.

"Division has a unique symbol," argues our tall student from the back row. True, the accepted symbol is a horizontal line with dots above and below (+) for division, but that symbol isn't on any key of a standard keyboard. And besides, algebra students have routinely accepted that a fraction is another way to show division. The decision stands. 10/5 means "10 divided by 5."

The next, and more troubling, issue is precedence. Precedence is the order in which operations should be done. When doing math with more than one operation, order is very important. If you do the wrong order, the answer you get will not be correct.

Don't ask me, I don't know who decided what order was correct. Since the correct order has already been decided, though, the rest of us must use the same rules.

Humans frequently think through the rules this way.

1. Generally the calculations go from left to right.
2. Multiplication and division get done first, then addition and subtraction.
Some of us learned rule 2 with the help of the Mnemonic "My Dear Aunt Sally."
My (multiply), Dear (division), Aunt (addition), Sally (subtraction)
3. Use parentheses to group calculations when it is necessary.

To successfully do math in Excel (and elsewhere, too), humans need to apply the rules, but in the correct order.

1. Use parentheses to group calculations when it is necessary for clarity.
2. Multiplication and division get done first, then addition and subtraction.
3. After considering precedence, calculations go from left to right.

What does all that mean?" asks the tall man in the corner. "Please explain with some examples." (He must be the designated interrogator in the class.)

Exercise 7a

Learning math rules for Excel

- Pull down the File menu and start a new worksheet.
 - In cell A1 enter the number 10.
 - In cell B1 enter the number 6.
 - In cell C1 enter the formula **=A1+B1**. (adding 6 and 10)
 - In cell D1 enter the formula **=A1*B1** (multiplying 6 and 10)
- These are your reference values. Having them on screen may help with the rest of these examples.

Now for how the rules apply: Left to right with multiplication first.

- In cell D2, enter the formula **=10*6+10**.
- Read that as "Add the product of 10 times 6 to the number 10."
Multiplication happens first, then addition. Humans and computers agree.
The answer should be 70.
- In cell D3 do the formula **=B1*A1+B1**.
That's the same as the fixed number calculation just above, but using the cell references we set up before, to prove that the fixed values (numbers) and the referenced values (cell references) work the same way.
The formula should still be read the same, and the answer should still be 70.

Now let's see how human misapplication of math rules can be a problem. Even when they are wrong, many humans try to apply left to right thinking first, forgetting that math operation precedence must be considered first.

- In Cell D4 enter the formula **=B1+A1*B1**
(This is the same calculation as before, just in reverse order)
Careless left to right calculation in a person's mind would translate to improperly read this formula as "Add 10+6 and then multiply by 10."
The expected answer of that careless reading would be 160.
As you can see, looking at the results in cell D4, it says 70. Left to right thinking does not apply first. Multiplication must happen first, before the addition. Precedence!

The actual order of operations must have the multiplication done first even though it is not the “first” in a left-to-right reading. We still have to read the formula as “Multiply 6 times 10 and then add 10.” The answer is still 70.

Now see how using parentheses can tell the computer to understand “human logic” and work left to right without confusion. Maybe we really do want to add before multiplying.

- In cell D5 enter the formula **=(B1+A1)*B1**.

In this case, by using parentheses we group the calculations and override the raw math (and computer) logic.

This time, because the parentheses regroup the calculations, you should read the formula as “Add 10 plus 6 and then multiply by 10.”

The answer is 160.

	A	B	C	D
1	6	10	16	60
2		Formulas	=10*6+10	70
3			=B1*A1+B1	70
4			=B1+A1*B1	70
5			=(B1+A1)*B1	160

Math examples (Formulas added for improved clarity)

Therefore, if you are in any doubt about precedence, use parentheses to force the calculation to be what you expect. It would be just fine to do parentheses for the following example that technically doesn't need them.

=B1*A1+A1
 =(B1*A1)+A1

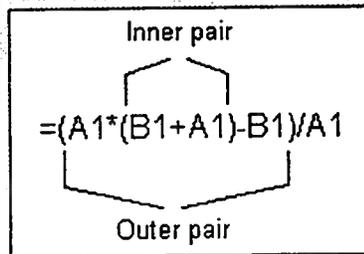
The parentheses do not need to be there. Multiplication would be done before addition anyway.

They do not get in the way, though. Go ahead and use them. Whenever you have any doubt about precedence, use parentheses.

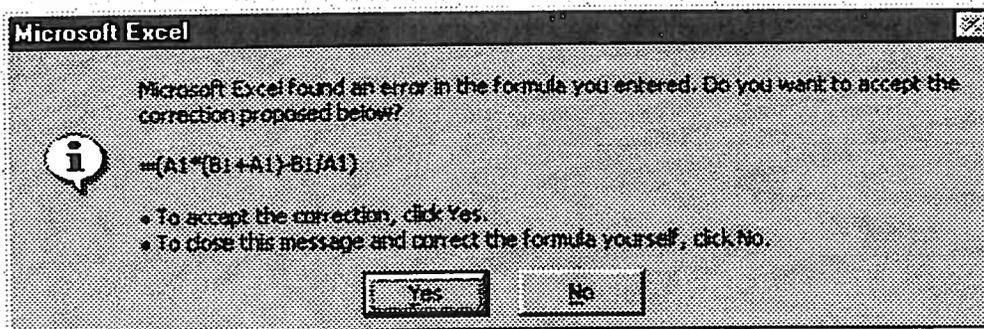
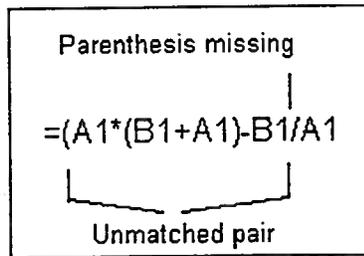
In more complex situations, you may find that you need many sets of parentheses. They always work in pairs. Generally move from inside out. Watch the bold parts of the following calculation as we apply the rules.

=(A1*(B1+A1)-B1)/A1	First add the inside parentheses
=(A1*(B1+A1)-B1)/A1	Next multiply by A1
=(A1*(B1+A1)-B1)/A1	Next subtract B1
=(A1*(B1+A1)-B1)/A1	Finally divide by A1

To emphasize the pairs of parentheses, visualize the following illustration.



If you forgot to put in one of the parentheses, Excel would automatically warn you that it was missing.



Unfortunately, Excel's advice isn't always correct. Notice that the final closing parenthesis in the dialog box is misplaced compared to my example. You would answer No in this situation and correct the mistake yourself.

There is actually another level of precedence that comes before multiplication/division. In cell D6, enter the formula =A1^B1 which we read as "Six to the 10th power." That's the same as saying, "Multiply 6 times 6."

The expressed number is 60466176.

On paper the formula is sometimes written 6^{10} and most of us cringe at the thought of doing the multiplication. Scientists encounter this kind of number all the time when they are counting galaxies, bacteria and grains of sand.

In the situations where you need to do a fractional power, remember to enclose the power exponent in parentheses.

$$6^{(5/4)}$$

If you forget to use the parentheses, the formula will raise 6 to the 5th power before dividing by 4.

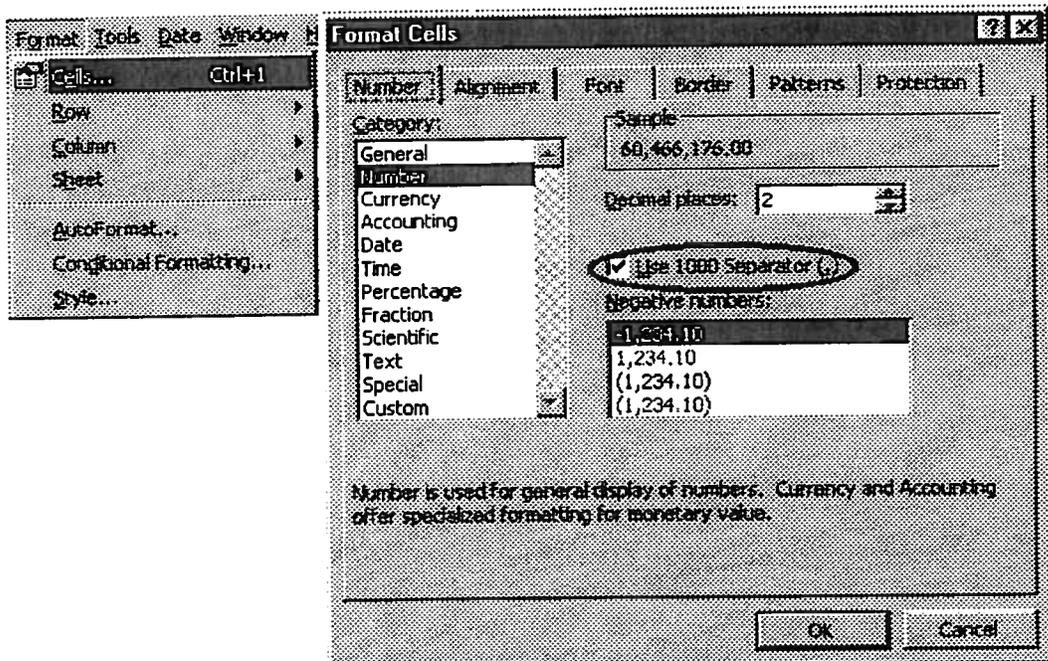
Exercise 7b
Another Formatting issue
A “bigger” problem

The number 60466176 in cell D6 from the last exercise is a little difficult to read. American number conventions split long numbers into groups of three digits starting from the right (at the decimal point) and working left.

60,466,176

“Sixty million, Four hundred sixty-six thousand, one hundred seventy-six”

- Select cell D6.
- Pull down the Format menu and select the Cell option and then select the Number tab and the Number Category.
- Click your mouse pointer in the box where it says “Use 1000 Separator (.).” It is circled in the illustration below.



Making long numbers easier to read

The result will theoretically be easier to read, but we have another immediate concern. Long numbers don't always fit into a cell. When that happens, Excel tells us the number is too large by showing the number as many number symbols (#####).

To see a long number like this one, widen the column by dragging the right margin of the column header.



Long numbers don't always fit

Exercise 7c Really Big Numbers

No, you know I don't mean numbers like **6**.



There are numbers that are huge (and we dream of equally huge salaries).

- In cell D7, type the number 1000000 (one million) (six zeros)
(Practice getting the commas as in the last exercise if you want.)
(Change the format to "Currency" if you want to think of a nice "seven figure salary.")
- In cell D8, type the formula `=10^20` (ten to the 20th power)
- The result is expressed as **scientific notation**.
- **1E+20** means "One times ten to the 20th power." (E means exponent – power of 10)
We could dream (even Bill Gates could dream) of this twenty-one figure salary!
- See if Excel will show cell D8, 10 to the 20th power as currency. (Playful exploration, indeed!)
- Save this worksheet as **Math Rules** if you want.
Though it might be more valuable to repeat some or all of exercises 6a through 6c from scratch with your own variations as part of the playful exploration process.

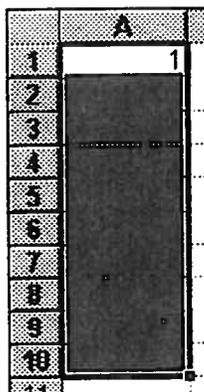
Now that we've all had a good laugh at our own expense... (salary/income – expense, get it? Sorry! I'll try to avoid such word play in the future.)

Let's go back to the subject of Copying and Filling, the concept that we were examining before the extended examination of math rules.

Take a deep breath, shake the tension out of your shoulders and turn to the next exercise.

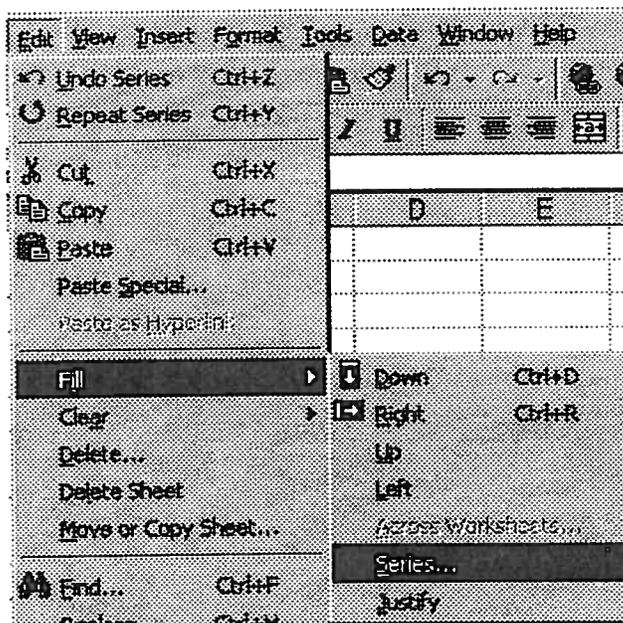
Exercise 8a
Filling to create a series

- Start a new Excel worksheet file.
- Type the number 1 into cell A1 (remember to enter the data).
- Click on cell A1 and hold down the mouse button to highlight (select) cells A1 through A10.



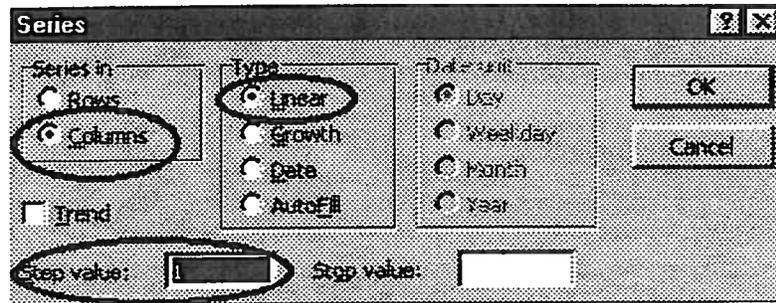
Preparing for a Fill Down

- Pull open the Edit menu and select the **Fill** option.
- Select the **Series** option.



Selecting a Series Fill

You will get a new dialog box of options. We'll look at some of them, but remember that you may want to return later to be childlike, unproductive and an eager learner, as you explore other options of this dialog box.



Series Fill options

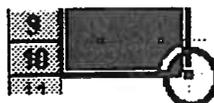
- Notice, when you look at the Series fill options dialog box, that because we have selected cells A1 through A10, Excel has matched our selection of a **Series in Columns**.
- Notice, too, that the standard **Type** of series fill is Linear. (Linear means “single stepped” in this case)
- Notice, finally, that the standard **Step value** is 1. When you click the OK button, the selected cells will fill with numbers, counting from 1 to 10, which is a linear series with a step value of 1.

	A
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10

A Column Linear Series Fill

Exercise 8b
Extending a fill.

- Click on the selection handle (sometimes called the fill handle)...



Selection handle

- And drag the handle down to include cell A20. The series will be extended, continuing to count from 11 to 20.

Variations on a Series Fill**Exercise 8c****Stepping by 10**

- Enter 10 in Cell B1.
- Select cells B1 through B10.
- Select the Fill/Series from the Edit menu again, but this time change the step value to 10.
- Click the OK button and look at the results, a linear series with a step value of 10.
- Try some number series variations on your own.

Note that you can do these series in Rows as well as columns. Playfully explore.

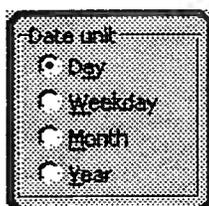
Exercise 8d**Alternate method to fill****Drag to fill**

- Put a starting value in a cell.
- Put the next value in an adjacent cell.
- Select the two cells (release mouse button after selecting) and then click again to drag the selection handle to the point where the series should end.

- Try putting 5 and 10 in the first two cells of column C.
- After selecting the two cells, drag the selection handle down. You should get a series like 5,10, 15, 20, 25, etc.

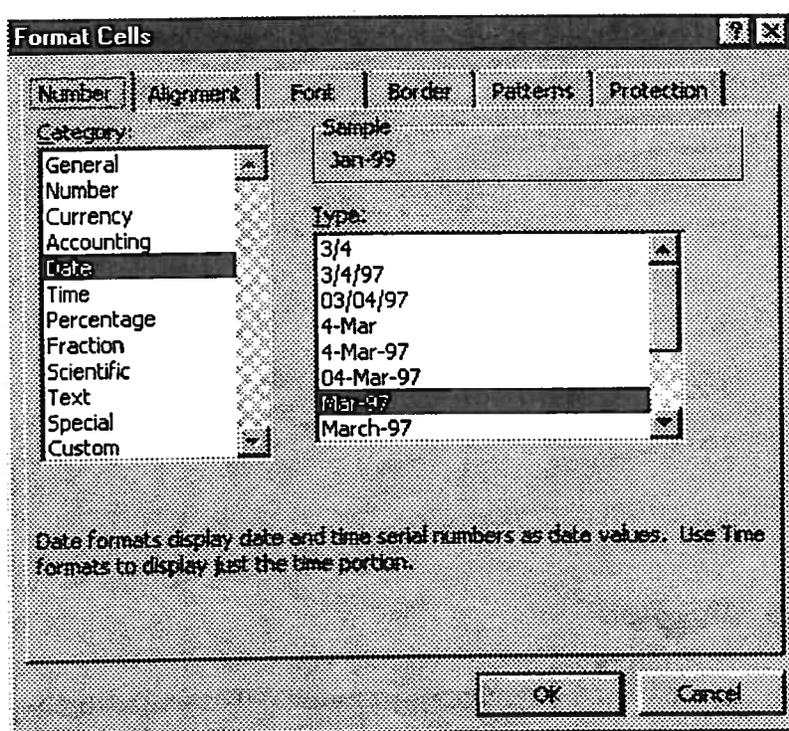
Exercise 8e
Date Series

- Enter the date 1/10/99 in cell C1.
- Select cells C1 through C10.
- Select the Fill/Series from the Edit menu again, but this time note that the **Date unit** options are active. They were inactive before.



Series fill - date unit options

- Enter the date 1/99 (representing month and year only) in cell D1.
- Select Cells C1 through C12 (room for a year of dates counted by month).
- Fill the dates by **Month** (another date unit in the dialog box).
- Notice that the date may be expressed as Jan-99 through Dec-99.
- Pull open the Format menu (Cells/Number tab) and see that you can also choose other date formats.



Standard Month-Year format

A lot of information overlaps, doesn't it? (childlike fascination)

Exercise 8f
Time series

- Enter 9:00 AM in cell E1.
- Select Cells E1 through E9
- Pull down the Edit menu to select Fill/Series.
- Enter 1:00 in the Step value blank of the dialog box.

A time series was something I had done using other spreadsheets, but had not actually tried in Excel before preparing these class materials. (Remember that nobody knows everything.) My first playful exploration method was to use a step of 1. It didn't work. 9:00 copied down into all the selected cells. I next tried a Type of "growth," but that didn't work either. I probably should have looked this up in Excel's help menu, but I'm stubborn. I was sure it was possible to create an hour-by-hour series and I intended to find it by the playful exploration method I've recommended so highly. After a few more failures (harsh word, but not negative when in play mode), I finally tried telling the step value to be 1:00 (one hour) and had success. I initially thought that Excel's "intelligence" would understand that a step of 1 was one hour. It turned out that Excel's was not really intelligent, and that I had to be more specific in my description of what I meant by "one."

It was even further into my exploration that I found the help menu was not easy to follow on this one. I got caught in an examination of Date(), Time() and Hour() functions before I went back to the Excel screen and noticed that filling down with an increment step of 1 actually didn't produce just 8:00 all the way down. The hour 8:00 did repeat all the way down, but the date it represented increased by one day. This was one time that playful exploration got me mired in a swamp of information that a novice Excel user would have found daunting at best. Remember, I've been playing with spreadsheet programs since the Apple II+ and the original spreadsheet program called Visicalc. I'm not a novice. There are plenty of things I do not know about spreadsheets because I just don't use all the available features.

When playful exploration isn't enough, and the help menu isn't a good guide, find a well written book and check the index there or call a more advanced computer user who can give you the benefit of experience.

A second look at Excel's built-in Functions

Functions are intended to be replacements for complex formulas you might want to create manually.

The most commonly used function is the SUM() function. For that reason, the toolbar has a special wizard for helping you build the correct addition.

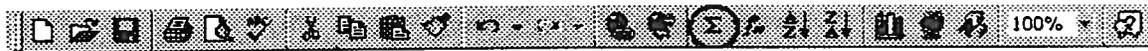
Exercise 9a Automatic sums

- Enter the numbers 10, 20, 30, 40, 50 and 60 into column A as shown by the following illustration.
- Select cell A7 as shown, too.

	A
1	10
2	20
3	30
4	40
5	50
6	60
7	

Prepare for AutoSum

- Find the AutoSum function button on the toolbar (circled in the following illustration).



AutoSum button on the toolbar

Excel's "intelligence" will figure out that you probably want to create a sum from the set of cells above. In this case, that Excel decision is good.

- Enter a row of numbers instead of a column, and try the AutoSum button with the highlight at the end of the row of numbers.

Playful exploration "demands" that you try invoking the AutoSum function wizard with some other cells selected, not the obvious one at the end of a row or column. Try to figure out what you get.

- Enter a new practice column of numbers and then highlight the cells you just entered.
- Click the AutoSum button and see how Excel adds a new cell at the bottom of your cells and puts the sum formula there.

Exercise 9b
Function Wizard (Average)

The less common functions are designed for complex jobs. The function wizard will also help with these jobs.

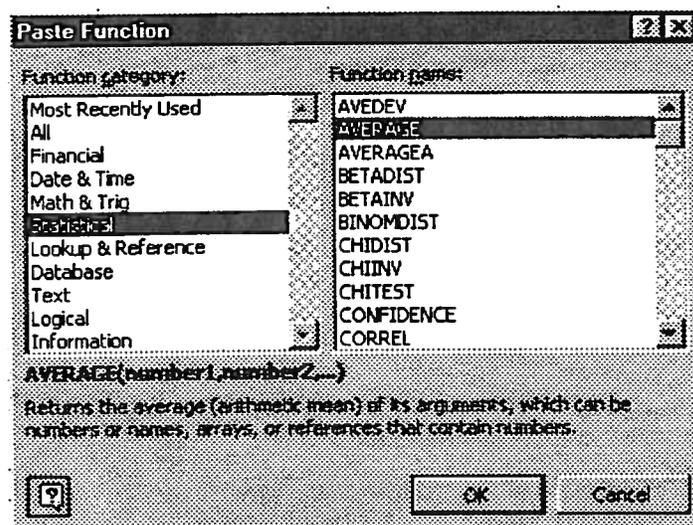


The function wizard button leads you to a dialog box with many different built-in functions. We did the Average function manually before. This time, let's see how to get the Average by using the function wizard.

- Enter a set of numbers into column C. You may copy the numbers in the following illustration.

	A
1	5
2	6
3	4
4	7
5	9
6	2
7	4
8	6
9	9
10	
11	

- Select **Statistical** from the **Function category** because an average is a statistical function.
- Select **AVERAGE** from the list of statistical **Function Names**.
 (Be careful not to choose **AVERAGEA**. That function is not the same.)

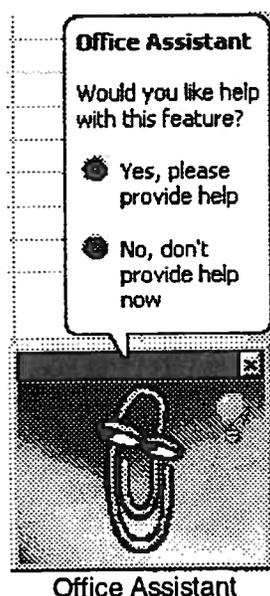


Notice that a description of the function is given near the bottom of the dialog box.

AVERAGE(number1,number2,...)
Returns the average (arithmetic mean) of its arguments, which can be numbers or names, arrays, or references that contain numbers.

That description may make sense to you. If you are not sure, the **Office Assistant** can link you directly to the part of the help file that applies to the Average function if you click the circle where it says "Yes, please provide me with help."

The Office Assistant usually takes the form of a paperclip with eyes.



Office Assistant

If the Office Assistant doesn't appear on its own, click the question mark button in the lower left corner of the function wizard dialog box.



Calling for the Office Assistant

There is no practical way to select appropriate functions to discuss for this class from the giant list available in Excel. There are functions for math, finance, logic, text and more. Ask about specific functions that you want to understand. I'll help you if I can.

Making Charts

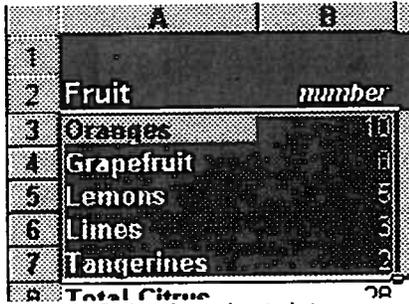
Exercise 9a

Using the Chart Wizard to make a chart

Excel can convert the numbers from a worksheet into a chart or graph that may help you to visualize the content.

Looking back at the fruit data from an earlier exercise...

- Point to cell A3, click and drag to select cells A3 through B7 that includes the label and the number of each fruit.



	A	B
1		
2	Fruit	number
3	Oranges	
4	Grapefruit	
5	Lemons	
6	Limes	
7	Tangerines	
8	Total Citrus	

Selecting chart data

- Select the **Chart Wizard** button from the toolbar.



Chart Wizard Button

When the wizard dialog box opens, you will see a potentially mind-numbing set of options (and this is just the first of four steps in the wizard process).

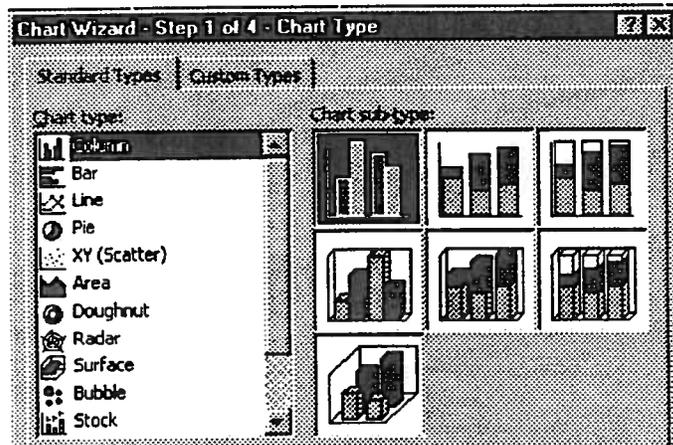


Chart Wizard (1) – Selecting the chart type

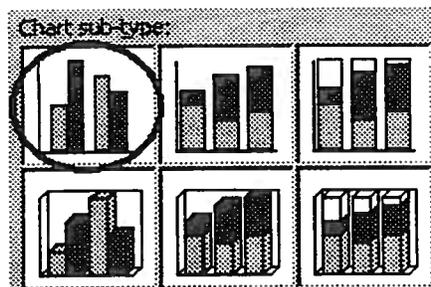
- Select the type of chart you want to use.
 In this case, the purpose of the chart determines the basic type of chart. We want to compare the numbers of each fruit in the inventory and that is best accomplished with a **column** (or bar) chart. If we were illustrating the percentage of the total inventory, we would want to use a **pie** chart. If we were showing the change or trend of a single measurement over time, we would use a **line** chart.

All the chart versions shown in the Excel Chart Wizard are really just fancy variations on these three.

Though Excel and other data tools give you the chance to make many different kinds of chart (graph), fundamentally there are three basic types of graphs:

Type	Purpose
Bar	Compare related items to each other
Circle	Show the part each item plays in relation to the whole group
Line	Display the changing pattern of data over time

- Select the sub-type of chart that you want.
 Again, recognize the many variations on that basic type.



Simple Column chart

- Click the **Next** button at the bottom of the dialog box so you can go to the second step.

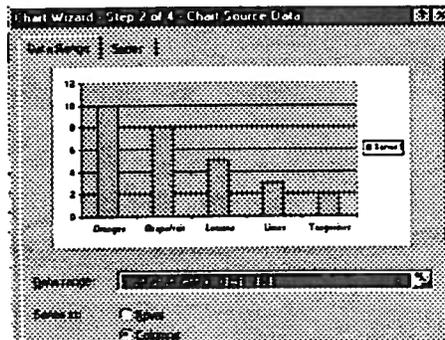


Chart Wizard (2) - Confirming the Data range

- Confirm the source of the data by clicking the **Next** button again.
(If you have carefully selected the data in the first stage of this process, the confirmation can be automatic. Excel “intelligence” determines for you that the data to be charted is in a column because you have selected a column of numbers and a column of labels.)
You also see a preview of the chart as it will appear.
- Enter a title in the **Chart Options** step of using the wizard and click the Next button.

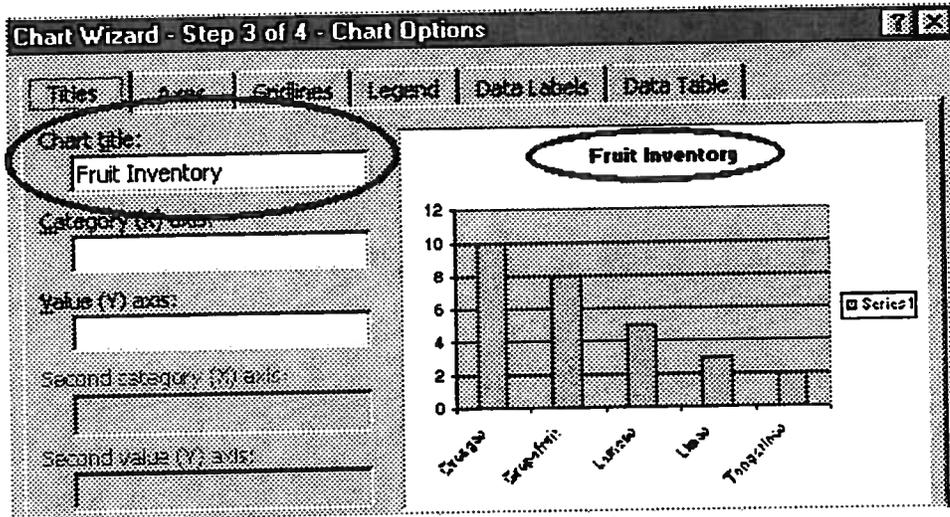


Chart Wizard (3) – Options

In this case, the **Category (X) Axis** (bottom horizontal edge) of the chart is clearly labeled by the labels we selected from the worksheet. If it were not clear enough (as it is here), you could create a single axis label to explain the labeling and the data in the columns. The **Value (Y) axis** (left vertical edge) is similarly obvious, but if you want, enter the word “Count” into the Y-Axis blank.

- Select the location to put the chart and click the **Finish** button.
Usually (the default) location is **As object in:** the current worksheet. I have chosen instead, to put the chart into its own worksheet of the Excel workbook.

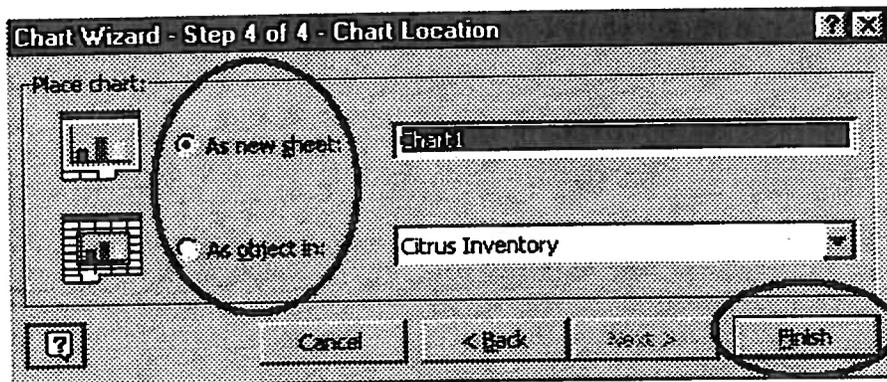


Chart Wizard (4) - Location

Exercise 9b

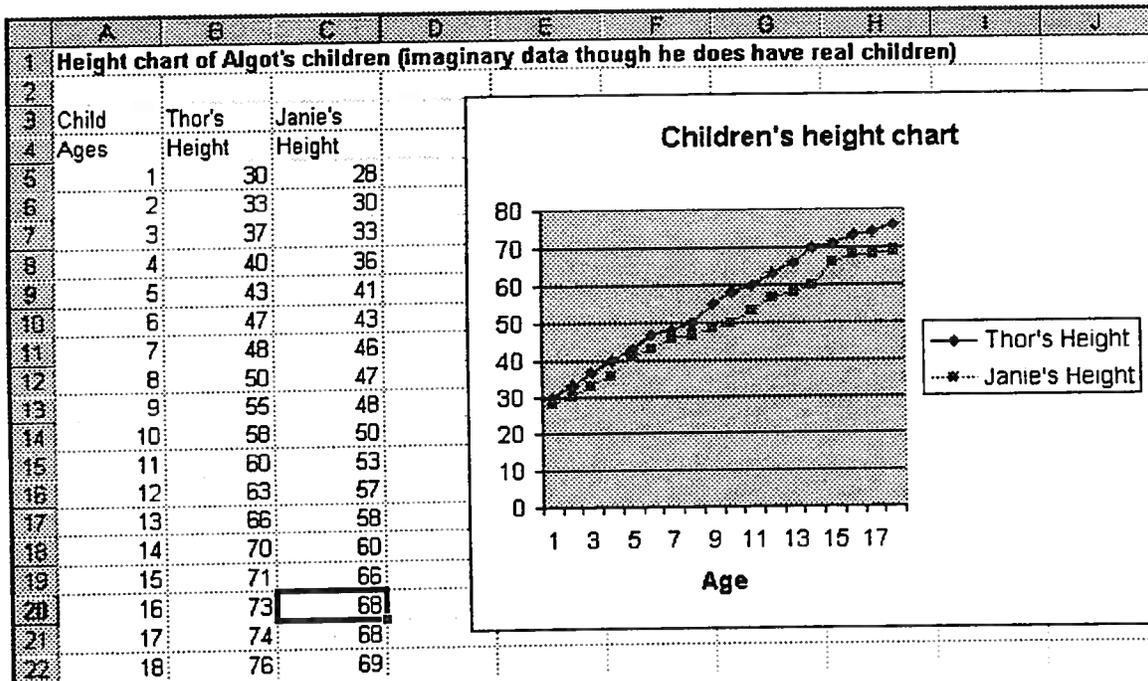
Pie Chart

- Go back through the wizard, but choose to make a simple pie chart of the same data.

Exercise 9c

Line chart

- On your own, create a new Excel worksheet with data about the heights of your children from ages 1 to 18. Make up the data if you want. (Make up children, too, if you want.)



If your data worksheet looks like mine, select only B3 through C22 when selecting data for the chart. (In this example, I made the location of the chart as an object on the current worksheet.

Lists and Sorting

Although there are many good data management programs, including Microsoft Access, the data management program included in the professional version of Microsoft Office, many people do data manipulation with Excel. Excel lacks many important capabilities, but it can easily be used to good work with lists.

Exercise 10a

Using Excel to sort lists

The data in an Excel worksheet has an initial order or arrangement based on the way it was typed into the cells of the spreadsheet. The initial arrangement of the data is not the only order it can have. The data can be reorganized to have the rows of data treated as if they were **records** of a **database**.

- Open **State Population Stats** worksheet file (in Dover-Sherborn’s adult class it will be from the Commedx\Runeman\Excel folder)

1	GEOABBR	GEONAME	TOTPOPHIS	TOTPOPCUR	TOTPOPPROJ
2	AL	Alabama	4040587	4221932	4455517
3	AK	Alaska	550043	610350	679683
4	AZ	Arizona	3665228	4000398	4452859
5	AR	Arkansas	2350725	2441646	2566937
6	CA	California	29760022	31546602	33575312
7	CO	Colorado	3294394	3630585	4079905
8	CT	Connecticut	3287116	3275195	3261723
9	DE	Delaware	666168	707864	757702
10	DC	District Of Columbia	606900	571592	530751
11	FL	Florida	12937976	13819711	14933526

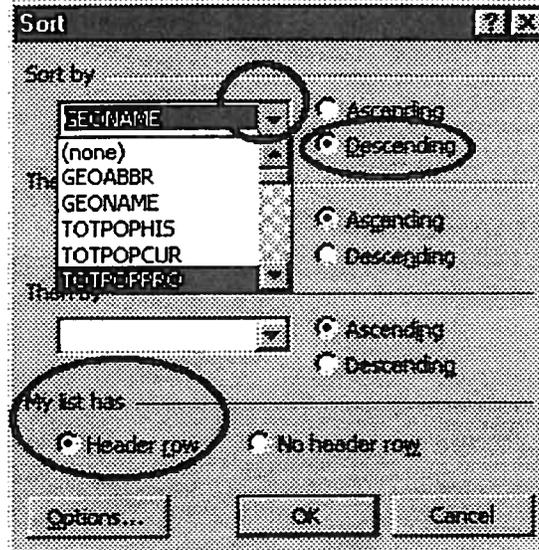
Population Stats (top left corner of large worksheet)

The data in this worksheet is taken from a larger workbook called Mapstats, which is automatically installed when you install Excel using the default settings. It is intended for use with the advanced Excel map annotation features, which we will not cover in this workbook.

- Click to select any single cell of the worksheet. Sorting works with Excel “intelligence” and if you have selected a small group of cells, the sort will apply only to that small group of cells and can disrupt your data!
- Pull down the **Tools** menu and select the **Sort** option.
- Click the triangle to expand the choices in the Column selector. In this case you do not want the default **GEONAME** column which represents the state name.



Opening a selector list



Sort dialog box

- Select TOTPOPPRO, a column heading which stands for total population projected for 1999.
- Select Descending order so that the list will arrange from most to least population.
- Accept Excel's default choice of having a header row. This is very important because if you don't mention it, that row will be moved into a new position in the list. You should want the header row to remain right where it is.
- At this point, leave the other blanks empty.

The list will rearrange itself almost instantly to have the states in order from California to Wyoming (highest projected 1999 population to lowest).

Exercise 10b
Quicksort with toolbar buttons

Excel also has a toolbar button that lets you sort data. (It's quicker but has fewer options.)

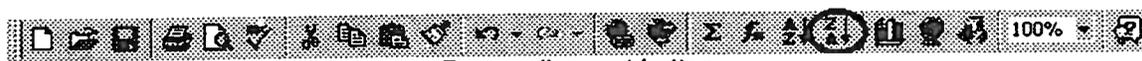
- Select any cell in the column of state names. It does not need to be the header label, but that will work just fine.
- Click the A-Z sort button on the Excel toolbar.



Ascending sort button

The data should be arranged by state name again.

- Sort in descending order by clicking the Z-A button.



Descending sort button

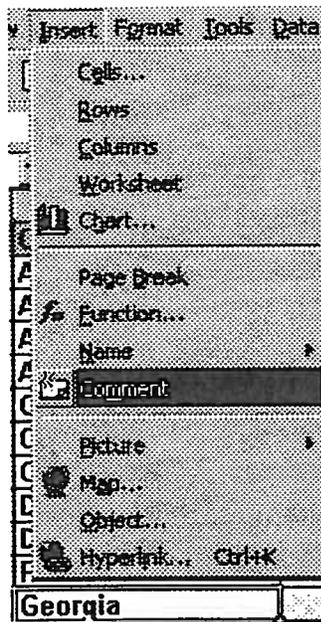
Exercise 10c
Playful Exploration
And comments

Sort the data by several different columns. You can find out what a column heading means by “hovering” your mouse pointer on the header label of each column. Someone attached a comment to each heading label cell. A comment can explain anything you want and has no impact on the contents of the cell during calculations. Comments are effectively an extra layer of data for each cell.

E	F
TOTPOP	Total Population
4455517	Projected:
679683	1999
4452859	

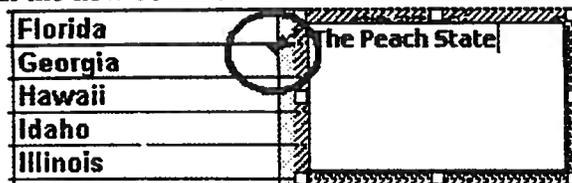
Comment (hover with mouse)

- Select the state name Georgia (in cell B12 when the states are sorted by name).
- Pull down the Insert menu and select the Comment option.



Inserting a comment for (the cell containing the name of) Georgia

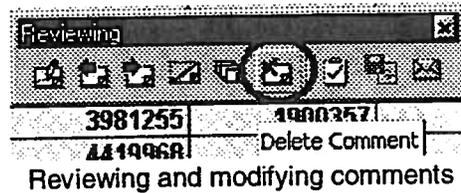
- Delete whatever is currently in the comment editing box (current “Author,” a name usually) and type in the new comment “The Peach State”.



Editing the cell comment for Georgia

- Click on any other worksheet cell to finish editing the comment.
- Hover the mouse pointer over the cell again, and the comment will show. You can also see that a cell has a comment because it has a small red triangle in the top-right corner (see the preceding illustration).
- Show all comments at once by pulling down the view menu and selecting the comments option (Repeat this step to hide the comments. This option is a **toggle** on then off option.)

When you show the comments a small dialog box/toolbar opens to allow you to review and modify the comments.



- Delete the comment for Georgia by clicking the Delete Comment button on the floating Reviewing dialog box.
- Remove the Reviewing dialog box from the screen by clicking the X in the corner.
- Continue your playful exploration.

Combining Multiple Worksheets

Exercise 11a 3-D worksheets Sheet Labels

During these exercises, you have certainly noticed that starting a new Excel workbook usually produces a set of three worksheets (the default number). You can create formulas and functions in cells of one sheet that refer to cells in another sheet, even refer to several cells from different sheets in the same formula. Let's look at a multi-sheet workbook using a file of textbook purchase budget items for a mythical high school. The Insert menu lets you add more sheets as needed.

- Open the **Budget** file (found in the Runeman folder in Commedx at Dover-Sherborn)
- Change the label of "Sheet 5" to "World Languages" by double clicking the tab of the sheet near the bottom of the screen. The text will highlight. Just type the new sheet name to replace what is highlighted.

Exercise 11b Linking to data in another sheet

- Select cell B11 in the Textbook Summary sheet.
- Type equal sign using the key near the right end of the top row of keys on the keyboard.
- Click the sheet tab for the World Languages sheet.
- Click the total of the textbook cost for that sheet (cell F20)
- Tap the Enter key.

The Textbook Summary worksheet again becomes visible and the updated worksheet should include the total for World Languages textbooks in the summative total.

If you look in the Formula Bar while cell B11 of the summary sheet is selected, you will see the required Excel formula syntax for building your own links between sheets. It probably isn't worth the effort to do it yourself, but you should know it is possible.

```
= 'World Languages' !F20
```

The equal sign should be familiar.

The name of the referenced sheet is in single quotes.

An exclamation point precedes the cell reference to indicate it is on the other sheet not the current summary sheet.

The cell reference is a relative reference and if cell F20 were moved on the World Languages sheet during subsequent editing of the data, the summary sheet would properly link to the correct cell.

Exercise 11c
Practice

- In column C of the Textbook Summary sheet, essentially repeat exercise 11b, but set up the links for all the textbook budget totals from all the departmental sheets.
- By whatever method (Copy/Paste or Fill Right or do-it-yourself) create a total for the items in column C.

Exercise 11d

Challenge: Create your own multi-sheet workbook with a summary sheet.

Exercise 11e**Move the Sheets around**

- Notice that the order of the data in the summary sheet is...
English
Math
Science
History/Social Studies
World Languages

But the sheets are currently in a different order.

- While pointing to the tab of the English worksheet, click and hold the left mouse button.



Selecting sheet to drag it to a new order

- Drag the mouse to the left and when the small triangle points to the spot between the Math sheet and the Summary sheet, release the mouse button to drop the English sheet in its new place.
The links do not change in the summary formulas. Each summary formula refers to the sheet by name.



Marking the drop point

If we can get to these topics, I'll produce pages to replace this one which will cover the following topics. It may well be that the content to this point has been too ambitious for a three week class.

Protecting Data

- Locking sheets and cells
- Hiding sheets, columns, rows
- Unhiding
- Passwords

Publishing

- Copying data to Word
- Copying Charts to Word
- Active data linked to reports - OLE

Closing Remarks

As stated more than once, I do not know everything there is to know about Excel or any other computer program past or present. The more I use a program, the better I know it and when I use a program routinely, I develop some skills I can use without needing to think about the steps involved. There are other tasks and skills I do infrequently and those I have to review before doing the job. This need for review has a negative impact on my productivity.

Practice the skills that you expect to need with data you can throw away if it doesn't work, and then become proficient through routine use with live data in your job.

Save a backup copy of any file you will change significantly so you can go back to it if you really mangle the data while adding to it.

Expect to build in a certain amount of on-the-job training for any new task you assign to an assistant, as you should expect to need similar time for new tasks you set for yourself.

Buy a good manual (or many of them) to use as a reference as you expand your skills. While it is not the only good one, I recommend *Running Microsoft Excel 97* by Mark Dodge, Chris Kinata and Craig Stinson, published by Microsoft Press. My 1997 edition has made using Excel less difficult and has helped me immensely during the preparation of this classroom workbook.

I would also like to thank my daughter, Janie Runeman for being my editor for this project. She is a graduate of The Gibbs School where she learned her Excel skills.

Protecting spreadsheet data

There are going to be times that you will want to give a working spreadsheet to another person who may not be as careful as you “always” are. You may want that person to enter changes of data into the carefully designed sheet you’ve made, but you don’t want them to change your carefully developed formulas or formatting.

Locking data

Lock it all

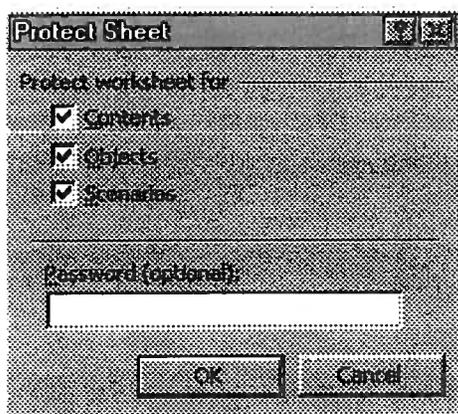
Pull down the Tools menu and select Protection.

Select **Protect Sheet** from the three options. The other two protect more. The workbook option protects all the individual sheets at once. The share... option allows you to enforce that a link back to your data cannot be broken in the spreadsheet where the link is made.

Tool Menu



Enter a password if you want, but you’ll need to remember it or the spreadsheet will be locked for you, too. Without the password, the whole spreadsheet is fixed, allowing no changes at all.



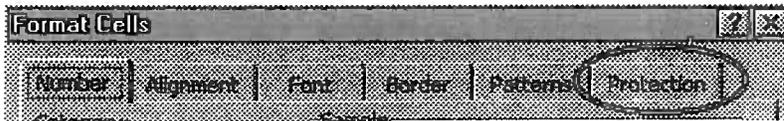
That’s it. The whole worksheet is locked.

Now you can let somebody else see it. They can’t DO anything with it. Maybe this isn’t the best way to lock things up.

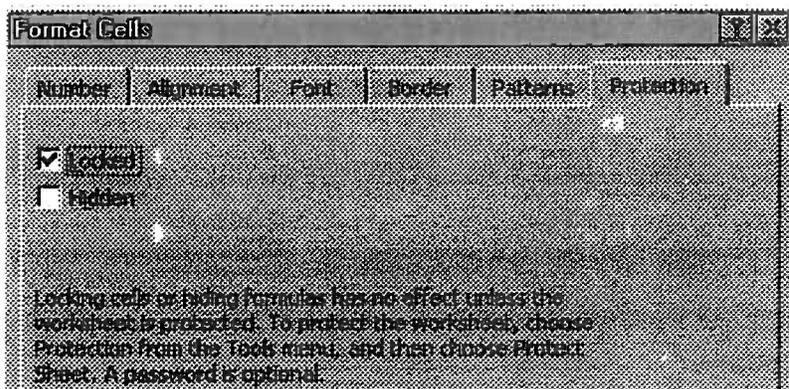
Locking everything but the data entry cells

Select a cell or cells.

Pull down the Format menu; select the Cell option; and select the Protection tab.

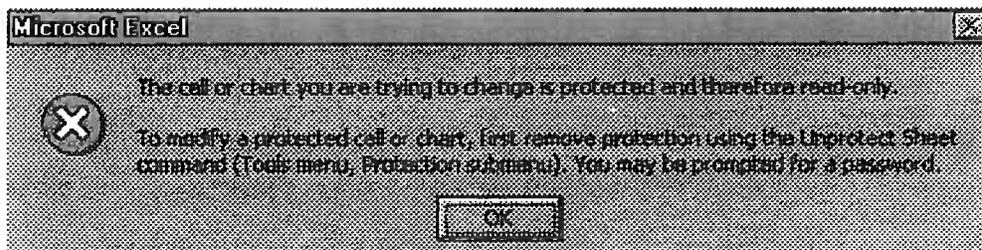


Excel assumes that you will want to lock all the cells of a spreadsheet. It is easier to select cells to unlock than to select cells for locking.



Therefore, when you want to let people change the contents of cells where there is only simple value to update, select those cells and click the "Locked" option box to remove the checkmark. Those unlocked cells can be updated. The rest of the spreadsheet cells will be locked when protection is turned on. If you use a password, only you can make changes to the locked formats and formulas in the locked cells of the spreadsheet.

When anyone (even you) tries to enter data into a cell that was locked when protection was turned on, the following dialog box will appear.



"Read-only" status describes that the cell can be copied and pasted elsewhere, but not changed on the current spreadsheet.

Hiding data

Sometimes you don't even want to call attention to the cell contents. For that you need to hide the data.

Open the file called Protection.xls for the following exercises.

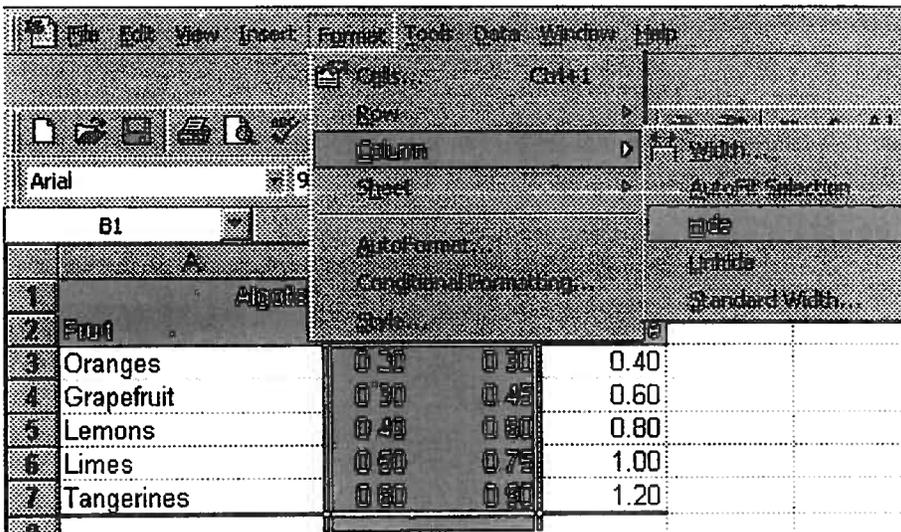
Whole columns and/or rows can be hidden.

Select column B and C by clicking in the label margin at the top of the columns. The whole column will highlight.

In this illustration, click and drag where the Plus pointer shows. Drag across to the right to select both Columns B and C.

	A	B	C	D
1	Algate Kitchen Produce			
2	Fruit	cost	wholesale	retail price
3	Oranges	0.20	0.30	0.40

Then select the Column option of the Format Menu and click on Hide.



In the practice file, the two columns B and C disappear. (see illustration on the next page)

	A	D
1	Alger's Kitchen Project	
2	Fruit	retail price
3	Oranges	0.40
4	Grapefruit	0.60
5	Lemons	0.80
6	Limes	1.00
7	Tangerines	1.20
8		

Notice that the column labels are not visible in the preceding illustration. The data is still there, but the columns are invisible.

Unhide

To make the columns visible again, select the two columns that are on either side of the invisible, hidden columns. Then go back to the Format menu, Column option and choose Unhide. If there are other hidden columns, they will remain hidden.

What if you hide column A? You can't actually choose columns on both sides of it, but if you start your pointer in column B and then drag left, a "virtual" column only a couple of dots wide will select visibly left of the B column. Then you can unhide and column A will reappear. You could also select all of the spreadsheet (Control-A) and you could then unhide the first column—or row.

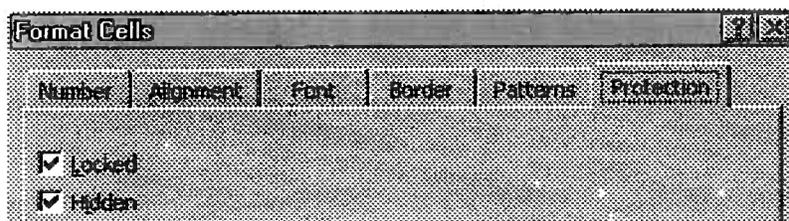
Another kind of hiding is to hide the formulas that underlie the visible, calculated value in a cell.

Select cells B2 through C7 (They will of course need to be visible to do it) and pull down the Format menu.

Choose the Cells option and select Protection.



Put check marks in both Locked and Hidden attribute check boxes.



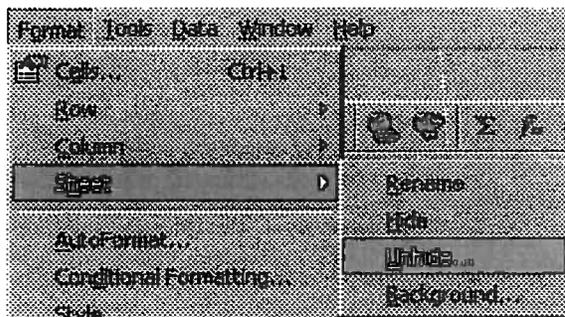
Then pull down the Tool menu and select Protection...Protect Sheet.

The calculations will still show as results, but you won't see the formulas in the edit bar when you select the cells. You can still enter new data in the cells of the unlocked cost column, and the price for wholesale and retail will recalculate. You just won't be able to see how the value was calculated. (In our case, it might be trivial to figure out by just a little algebra, but in some fancy spreadsheets, the complex formula might be valuable as some kind of secret you wouldn't want a clerk or end user to see.

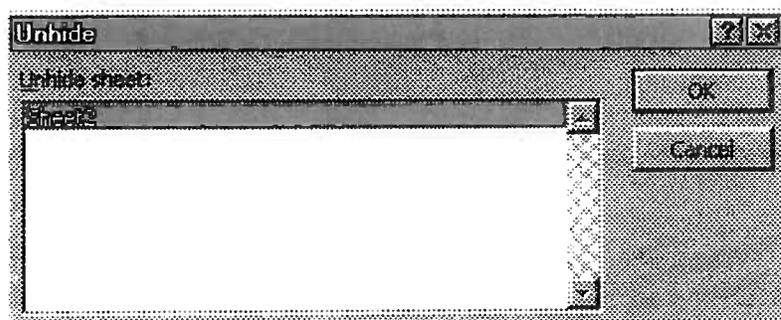
You can hide a sheet of a multiple sheet workbook.

Look at the sheet tabs at the bottom of the screen in the Protection.xls file. There are normally three sheets in a new Excel workbook. In this case sheet 2 is "missing" That could be caused by deleting the sheet, but in this case it is just hidden.

To reveal the sheet, pull down the Format menu and select Sheet and Unhide... from the submenu.



The dialog box below will open and you will have a selection of hidden sheets to unhide. In this example, there is just one, but there might be several in a more complicated workbook.



Publishing Excel Data

Getting data from Excel into another document is done in two different ways
Copy and Paste is the basic technique.

Select the block of Excel spreadsheet cells that you want to put into a Word document

Pull down the Edit menu and select the Copy option.

Start Microsoft Word, or click the Word button on the taskbar if you are already working with a Word document. (Remember that starting Word if you have already started Word actually starts a second version of Word.)

Place the cursor in the location where you want to put the selected cells

Pull down the Edit menu and select the Paste option

Algot's Kitchen - Citrus Inventory						
Fruit	number	cost	Sales price	Cost of inventory	Potential Gross Sales	Potential profit
Oranges	10	\$0.50	\$0.75	\$5.00	\$7.50	\$2.50
Grapefruit	8	\$0.45	\$0.68	\$3.60	\$5.40	\$1.80
Lemons	5	\$0.30	\$0.45	\$1.50	\$2.25	\$0.75
Limes	3	\$0.40	\$0.60	\$1.20	\$1.80	\$0.60
Tangerines	2	\$0.35	\$0.53	\$0.70	\$1.05	\$0.35
Total Citrus	28	\$2.00	\$3.00	\$12.00	\$18.00	\$6.00
Sum of Citrus	28	\$2.00	\$3.00	\$12.00	\$18.00	\$6.00
Average Citrus	5.6	\$0.40	\$0.60	\$2.40	\$3.60	\$1.20

The selection of cells becomes a formatted table in the Word document.

It is editable. You can change the formatting. You can even change the data.

Actually, as originally pasted, the table didn't fit. I needed to change the width of the columns in Word so that the Potential Profit column didn't run off the right margin and get cut off (see next page numbered the same as this one),

Microsoft formally calls the technique **embedding** the data, part of the OLE (object linking and Embedding) technology. As far as embedding is concerned, it is apparently just a fancy way of saying Copy and Paste.

The data copy in Word is a copy, but is independent of its origin in Excel. It is not a "little spreadsheet" in the Word document. You can change the number of oranges to 15, but the Total Citrus will not go up to 33 unless you type the change.

The data originated in a live spreadsheet, but once it is in Word, the pasted copy is totally independent of the source spreadsheet. The data may look the same, but it is isolated, on its own.

Linking is the other technique in OLE.

With linking, the copy of the data you publish is “live” in relationship to the Excel spreadsheet. Changes that are made in the cells of the Excel worksheet will change in the Word document when you update the link.

The obvious benefit of this method is that the Word document is accurate and up to date without needing to copy and paste and fiddle with the format.

The drawback is that the source Excel worksheet must be accessible from the computer where the Word document exists. If the link between the two documents is “broken” then the update cannot occur.

Total Citrus	28
---------------------	-----------

To place this small two-cell link in the Word document, have both the Word and Excel documents open.

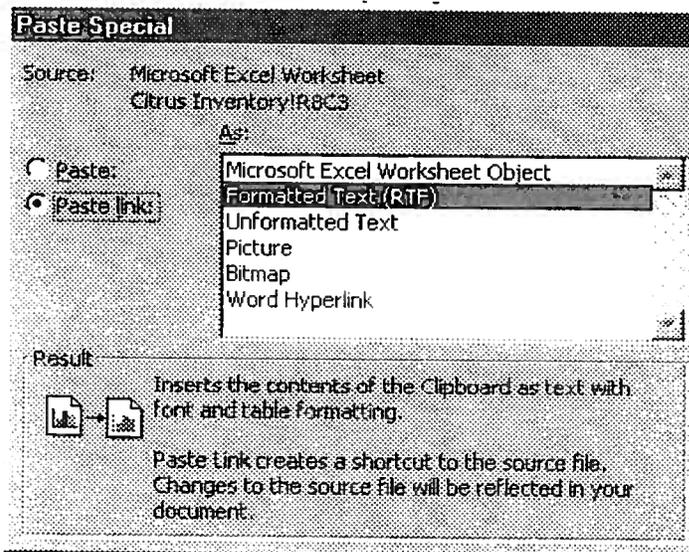
Switch to the Excel worksheet and select the cells you want.

Pull down the Edit menu and choose the Copy option.

On the taskbar, switch to the open Word document.

Pull down the Edit menu and select the Paste Special option.

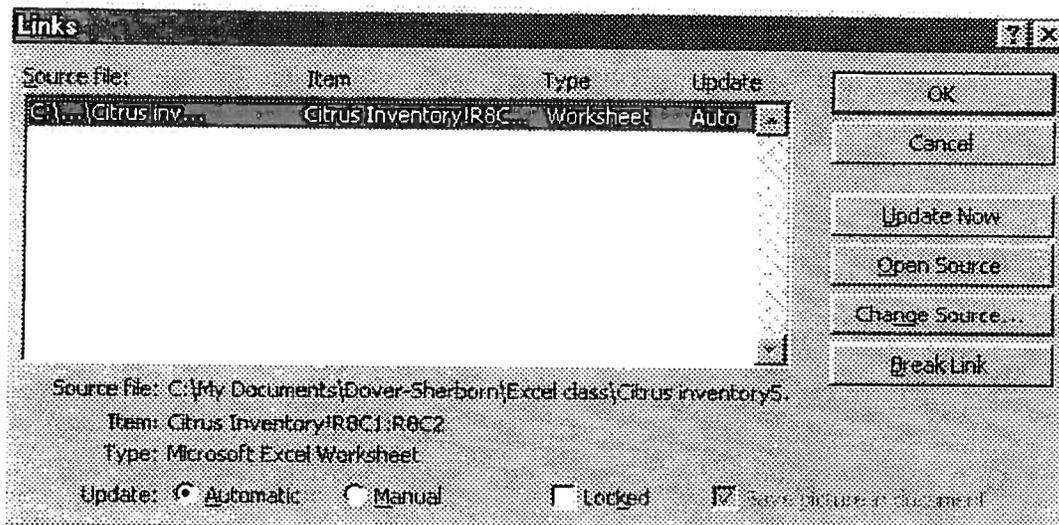
At the left-center of the dialog box, click the circle (called a radio button) that says **Paste link**. (Note the explanation in the Result frame of the box when you click the button.)



The pasted data in the Word document is linked back to the Excel document. When you change the data in Excel and it changes the linked cell(s), then the data in Word will also change as long as both the source worksheet and the linked Word document are open.

There are two ways to keep the document current. You can use the default **Automatic** update. Automatic update changes the linked data in the open Word document moments after you change it in Excel.

If you don't have the Word document open when you make the changes in Excel, the Word will update when you open it.

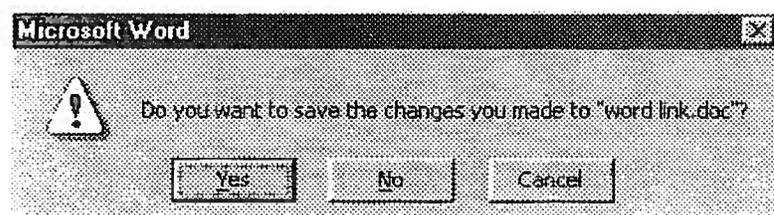


Alternatively, you can select **Manual** updating. That leaves your Word document stable until you decide to update it. If your Word document were linked to an Excel file that somebody else was responsible for updating and stored on a shared network drive, then your Word document would be constantly changing before your eyes while the data was being manipulated. If you were preparing to print an interim report just when the data was changed in the source file, the planned comments about the linked numbers would be made potentially invalid by the changed linked value.

Automatic updating makes sure that you always have up-to-date information in your Word document. You cannot forget to update.

Even if you change the Excel file when the Word document isn't open and then close the Excel worksheet, the next time you open the Word document, if you have updating set to automatic, the change will occur in the Word document.

Therefore, if you try to close the Word document, you will be asked what to do about the changes "you" have made.



Keeping Financial Records in Excel

There are programs like Quicken and Microsoft Money that are designed to keep financial records for business and personal use.

However, Excel can be used effectively for the same purpose.

Create a new Excel Workbook.
Set up a line or two describing the Account.

Setup the columns appropriate to tracking the basic income and expense information.

3	Date	Check No.	Payee	Paid	Deposited	Curr. Bal.	Inc/Exp.	Category
---	------	-----------	-------	------	-----------	------------	----------	----------

I actually added the formatting later.

The Check No. column will include Deposits labeled - DEP
For maintaining good records, I added a column called Category that will allow some fancy additions, keeping track of the total for each category.

Enter some sample data.

4	Date	Check No.	Payee	Paid	Deposited
5	10/1/1999		Account Initialized		
6	10/1/1999		Opening Deposit		\$1,278.00
7	10/1/1999	567	Shell Oil Co.	\$15.97	
8	10/2/1999	568	Star Market	\$178.34	
9	10/2/1999	458	Applebees	\$76.37	
10	10/3/1999	459	Charles Furniture	\$200.00	
11	10/5/1999	DEP	Mason Electric		\$790.22
12	10/11/1999	569	Boston Edison	\$78.19	
13	10/11/1999	570	Bell Atlantic	\$37.60	
14	10/11/1999	580	Town of Natick W/S	\$119.13	

The first row of data needs to be a line something like row five. We need to start the account with a pre-deposit balance of zero. Then we can properly set up the calculations of a running balance.

In cell F5, enter the zero.

In cell F6, enter the calculation that will figure out the running balance.

=F5+E6-D6

This formula adds the balance from the preceding "transaction" to the current deposit (if any) and subtracts the current payment (if any).

Copy the formula down to the cell of the last transaction. The running balance should fill the cells of column F.

Enter the label "**Insert new Row(s) Here**" below the last sample transaction.

In the next row (in the example, row 16), create the formulas to show the current total for Payments, deposits and current balance. (The current balance formula is a little redundant, but will help in a minute.)

15	Select this Row and Insert New Row Here			
16	Current Totals	\$705.60	\$2,068.22	\$1,362.62

Payment Formula =SUM(D5:D15)

Notice that the last cell in the range includes cell D15 from the row below the last transaction. That will allow the formula to properly expand the range automatically as the rows are added for new transactions.

Deposit Formula =SUM(E5:E15)

Balance Formula =SUM(F5:F15)

Unfortunately, as you add a row, the running balance formula does not automatically jump into the new cell in column F. Each time you add a row, you will need to copy the formula in column F into the new cells. The fastest way to do that is to select the cell of the formula above the new rows and drag the corner block down to fill the new cells. Until you enter new transactions, the running total will just be a duplicate of the cell you copied. As soon as you enter the new transaction payment or deposit, the total will update to include the value entered.

\$1,362.62	E
\$1,362.62	
\$1,362.62	
\$1,362.62	

When you reconcile your account at the end of the month, you can also add extra rows for ATM and other electronic transactions that you didn't enter the as they happened the way you did checks and deposits. Just remember to copy formulas into the added cells where necessary.

That's all you need for a basic finance tracking spreadsheet, but you can add some extras.

In this packet, I'll describe just one.

Tracking category totals

There are some fancy **conditional** formulas that you can use to track the totals for each category. For each category you want to track, create a new column. In the row of the first transaction enter a formula like this (using utilities as the category example)
`=IF(H7="Utilities",D7,"")`

This formula says " If the value in cell H7 is the word Utilities, then copy the value from the payment cell of this row, otherwise just leave the cell blank"

Copying that formula into each cell of the transaction rows, you can then create a formula that takes the sum of the column.

In my example worksheet, I've put the sum at the top above the column label.

	\$234.92	\$790.22
Category	Utilities Expenses	Income Summary
Auto		
Groceries		
Misc.		
Household		
Salary		\$790.22
Utilities	\$78.19	
Utilities	\$37.60	
Utilities	\$119.13	

See if you can also set up the column and formula for the Income Summary on your own. The formula will be a conditional formula.

