

Using Microsoft Excel 1 - Getting Started

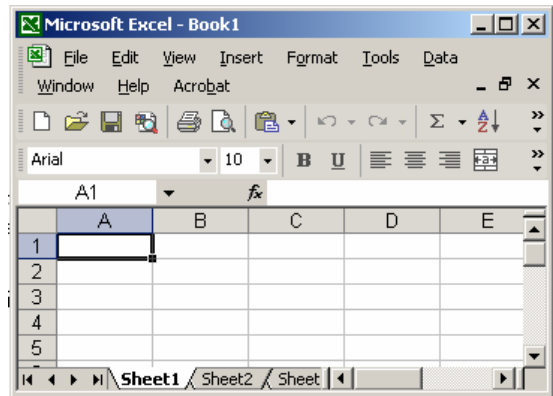
developed by
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Start Excel by clicking **Start** button, usually in the lower left hand corner, then **Programs**, and then find and click on the **Microsoft Excel** item of the Programs menu. Alternatively, there may be an Excel icon, a big green X, on the desktop that starts Excel.



The initial Excel window is illustrated to the right. Some parts of this window that are particular to Excel are

1. The Title bar that states "Book1".
2. "Tabs" at the bottom that are labeled **Sheet1**, **Sheet2** and **Sheet3**.
3. There are four movement buttons to the left of these Sheet tabs for moving from one sheet to the next, or previous, or first, or last.



We will be interested only in using one spreadsheet, **Sheet1**, which is the current sheet, but you should be aware of their existence. The idea behind the multiple spreadsheets in a "workbook" is the series of spreadsheets might represent multiple pages, such as in an account ledger, or in a grade book.

The motivation for spreadsheet programs was essentially to create a computer program that would emulate an accounting worksheet or page of rows and columns of numbers, instead of having to do it by hand. The archetypical accounting problem might be to record the amounts for various accounts over a sequence of time periods, for example, over the months of the year. In the illustration, there are three rows for three accounts, **Rent**, **Car**, and **Food**, and then a row **Total** for the monthly totals of these three accounts. Then there are three columns for the three months, **Jan**, **Feb** and **Mar**, and then a column **Total** for each account's total over the months. The illustration to the right has values entered and the totals calculated. This is what we will learn to do first.

	A	B	C	D	E
1		Jan	Feb	Mar	Total
2	Rent	1000	1000	1000	3000
3	Car	450	450	450	1350
4	Food	625.47	456.78	504.32	1586.57
5	Total	2075.47	1906.78	1954.32	5936.57

Terminology

A spreadsheet is made up of cells, where each cell can hold a value. The two types of values in the illustration are label values and numeric values. Arithmetic operations can be done only on numeric values. A label value is anything other than a numeric value. A numeric value is any valid representation of a number, such as 1000, or 625.47, that is, just digits or digits and a decimal point, and also possibly a minus sign (or plus sign). Usually, you cannot include any other characters in a numeric value. If there are other characters entered, the value becomes a label value and cannot be used in arithmetic operations. However, the Excel program does allow you include a dollar sign in a numeric value, that is, you can type \$1000 and have that value treated as a number.

Cell Addressing

Each cell in the spreadsheet is identified by its row and column position, but in the reverse order, that is, the column identifier is stated first and the row identifier is stated second. The first column is A, the second column is B and so on. The first row is numbered 1, the second row 2 and so on. The column letters are listed along the top of the spreadsheet, and the row

numbers are listed down the left side of the spreadsheet. The first cell in the spreadsheet has address **A1**, for example. In the illustration to the right, the labels **Rent**, **Car**, **Food**, and **Total** are in cells addresses **A2**, **A3**, **A4**, and **A5**, and the month labels **Jan**, **Feb**, **Mar** and **Total** label are in cells **B1**, **C1**, **D1**, and **E1**.

	A	B	C	D	E
1		Jan	Feb	Mar	Total
2	Rent				
3	Car				
4	Food				
5	Total				

The Current Cell and Moving to a Cell

You can use the arrow keys to move from cell to cell, and you can use the mouse cursor to select a cell. There is always one cell that is the current cell, and the arrow keys and the mouse are ways of making another cell the current cell. The address of the current cell is displayed in a small box above the left most top corner of the spreadsheet. In the picture above, **D5** is indicated as the current cell. Also, notice that the current cell is framed with a black border, and that the column letter **D** and the row letter **5** are both highlighted in the column and row borders of the spreadsheet.

Entering Values into Cells

Since entering a value in a cell is so fundamental to a spreadsheet, it's easy to do. Just select the cell you want by using the arrow keys or the mouse, and then type the value for that cell, then press the Enter key, or press any arrow key, or click on another cell. Any of these actions will cause the value to be stored in that cell. Try it by creating the values in this illustration.

- Enter the account labels **Rent**, **Car**, **Food**, and **Total** in cells A2 through A5.
- Enter the month values in row 1 columns B, C and D, and then
- Enter the **Total** label in cells A5 and E1.

	A	B	C	D	E
1		Jan	Feb	Mar	Total
2	Rent				
3	Car				
4	Food				
5	Total				

Now enter the numeric values:

- Enter 1000, 450, and 625.47 in cells B2, B3, and B4.
- Enter the remaining values in this illustration.

	A	B	C	D	E
1		Jan	Feb	Mar	Total
2	Rent	1000	1000	1000	
3	Car	450	450	450	
4	Food	625.47	456.78	504.32	
5	Total				

Formulas

Finally, we want to calculate the totals for each column and each row. Being able to have the spreadsheet program calculate a value based on the values in other cells and store the resulting value in some cell is the primary motivation of spreadsheet programs. It automates the hard work of doing repetitive and tedious calculations.

To calculate a value and store it in a cell, we have the third thing that can be entered in a cell - a formula. A formula in Excel starts with an equals-sign. This is the way that Excel distinguishes a formula from a label or number. After the equals-sign, the formula consists of an algebraically correct sequence of numbers, cell addresses, arithmetic operations, paired parentheses, and other things that we'll cover in a bit. As an example, in the illustration below, the sum or total of the values in cells B2, B3, and B4 (in the January column) is computed by the formula $=B2+B3+B4$. Also, it can be typed in lower case character as $=b2+b3+b4$. Enter this formula in cell **B5**, as illustrated here:

	A	B	C	D	E
1		Jan	Feb	Mar	Total
2	Rent	1000	1000	1000	
3	Car	450	450	450	
4	Food	625.47	456.78	504.32	
5	Total	$=B2+B3+B4$			

Notice that several things have happened as you enter this formula:

- The formula is displayed over the cell B5.
- The cell numbers in this display of the formula are each colored differently so that you can see if there is an error in your typing of the formula.
- The formula is displayed in the f_x box above the spreadsheet column letters, C, D, ...
- The three cells, B2, B3 and B4 are highlighted, each by the same color as the cell addresses of the formula that you typed, again to help you identify if you have typed the formula correctly.

	A	B	C	D
1		Jan	Feb	Mar
2	Rent	1000	1000	1000
3	Car	450	450	450
4	Food	625.47	456.78	504.32
5	Total	=B2+B3+B4		

For example, if you had typed $=B2+B3+C4$ by accident, then the visual display shows this and you would see the error, as illustrated here with cell C4 being highlighted.

	A	B	C
1		Jan	Feb
2	Rent	1000	1000
3	Car	450	450
4	Food	625.47	456.78
5	Total	=B2+B3+C4	

After you have entered the formula correctly, press the Enter key, or move to another cell. Then the formula is stored in cell B5. Notice that now the actual calculated value is displayed in cell B5, not the formula, which is of course the purpose of having the formula - to calculate and display the sum. Click or move back to cell B5, and notice the f_x box above the spreadsheet that displays the formula.

	A	B	C	D	E
1		Jan	Feb	Mar	Total
2	Rent	1000	1000	1000	
3	Car	450	450	450	
4	Food	625.47	456.78	504.32	
5	Total	2075			

Now type in appropriate formulas in the other cells for the totals of the columns and the rows. Your spreadsheet should now look like this with the formula in cell E4 for the total of the Food account being $=B4+C4+D4$.

	B	C	D	E
1	Jan	Feb	Mar	Total
2	Rent	1000	1000	3000
3	Car	450	450	1350
4	Food	625.47	456.78	1586.57
5	Total	2075.47	1906.78	1954.32
6				

You were instructed to type each formula into each cell of a column total or row total. The point of this was to have you see how tedious it is to type formulas many times and how error prone it might be since formulas are so exacting. There's a better way.

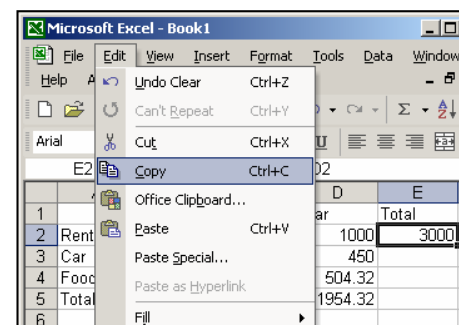
Copying Cells

A powerful feature of the spreadsheet program is the ability to copy the contents of one cell into other cells. This is especially useful for copying formulas since (i) formulas are difficult to type correctly if the formula is more than a simple sum, and (ii) the copy operation will automatically change the cell addresses to the new row and or column that the cells are being copied to.

As an example exercise, click on the total cells in cells E3 and then E4 and press the **Delete** key in each cell to erase the formulas. Your spreadsheet should look like this:

	A	B	C	D	E
1		Jan	Feb	Mar	Total
2	Rent	1000	1000	1000	3000
3	Car	450	450	450	450
4	Food	625.47	456.78	504.32	504.32
5	Total	2075.47	1906.78	1954.32	

Now click on cell E2, and then click on the Edit menu item on the menu bar and click on the Copy option. Alternatively, you could have pressed Ctrl-C. After you have clicked on the Copy option or pressed Ctrl-C, cell E2 will have a twinkling border indicating that you are copying that cell.



Now move the mouse cursor to cell **E3** and then **drag** it into cell **E4**. Cell E2 will still have its twinkling border as you highlight cells E3 and E4.

Then click on Edit | Paste on the main menu bar, and the formula in cell E2 will get copied into cells E3 and E4. In the illustration to the right, note the formula in cell E3 is adjusted to sum the values in its row 3. Similarly, if you move to cell E4, you will see that the formula in cell E4 is the sum of the cells on row 4, that is, the formula is =B4+C4+D4.

	A	B	C	D	E
1		Jan	Feb	Mar	Total
2	Rent	1000	1000	1000	3000
3	Car	450	450	450	1350
4	Food	625.47	456.78	504.32	1586.57
5	Total	2075.47	1906.78	1954.32	

Inserting Rows and Columns

Excel allows you to insert new rows or columns between existing rows and columns. In the example spreadsheet, let's insert two blank rows above the first row. We'll use the two new rows for a title and a date.

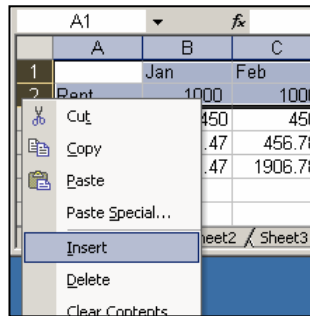
First, click on the row number **1** of row 1, and drag the mouse down to row **2**. These two rows will be highlighted when you do this.

	A	B	C	D	E
1		Jan	Feb	Mar	Total
2	Rent	1000	1000	1000	3000
3	Car	450	450	450	1350
4	Food	625.47	456.78	504.32	1586.57
5	Total	2075.47	1906.78	1954.32	

Now **right** click on the highlighted row numbers to get the drop down menu of edit options.



Click on the insert option, and two new rows are inserted.



	A	B	C	D	E
1					
2					
3		Jan	Feb	Mar	Total
4	Rent	1000	1000	1000	3000
5	Car	450	450	450	1350
6	Food	625.47	456.78	504.32	1586.57
7	Total	2075.47	1906.78	1954.32	

Now enter the title "Year-to-date Personal Accounts" on row 1 starting in cell A1.

Then enter the date in cell A2. But don't just type today's date. Instead, type =today() which will result in the current date being displayed in that cell.

	A	B	C	D	E
1	Year-to-date Personal Accounts				
2	10/15/2004				
3		Jan	Feb	Mar	Total
4	Rent	1000	1000	1000	3000
5	Car	450	450	450	1350
6	Food	625.47	456.78	504.32	1586.57
7	Total	2075.47	1906.78	1954.32	

Functions

The **today()** is a function that you entered in the A2 cell. Excel has many functions available for a variety of different purposes - mathematical, financial, statistical, logical, text manipulation (such as the today() function), and so on.

Statistical functions include functions to compute the SUM, AVERAGE, MAXimum, MINimum, COUNT, and others. Let's go back to our example spreadsheet and use the SUM function to compute the totals in the spreadsheet.

Highlight the total cells B7, C7 and D7 by clicking in cell C7 and dragging the mouse across the other two cells. Then press the **Delete** key on the cursor keypad (do not press the

	A	B	C	D	E
1	Year-to-date Personal Accounts				
2	10/19/2004				
3		Jan	Feb	Mar	Total
4	Rent	1000	1000	1000	3000
5	Car	450	450	450	1350
6	Food	625.47	456.78	504.32	1586.57
7	Total				

Backspace key) to delete the formulas in these cells. Do the same for the totals in cells E4, E5, and E6.

Now in cell B7, type the formula **=SUM(B4:B6)** and as you do so look at the things that are happening in the spreadsheet:

- The formula is displayed in cell B7
- The cells B4 through B6 are framed with a color that is used to highlight the cell numbers in the formula in cell B7 (blue in my spreadsheet)
- The formula appears in the box just above the spreadsheet columns and after the f_x symbol.

	A	B	C	D	E
2	10/19/2004				
3		Jan	Feb	Mar	Total
4	Rent	1000	1000	1000	
5	Car	450	450	450	
6	Food	625.47	456.78	504.32	
7	Total	=SUM(B4:B6)			

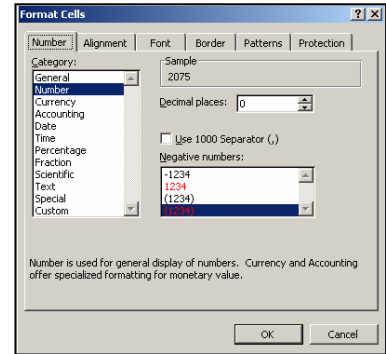
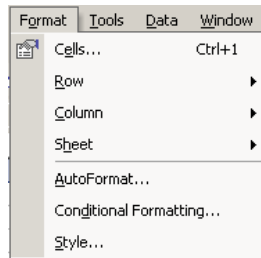
Press Enter or move to another cell to store the SUM function in cell B7.

Click in cell B7 and then click Edit | Copy (or press Ctrl-C) to copy this formula, then select cells C7 and D7, and finally, paste the formula into these two cells (use Edit | Paste or press Ctrl-V). The cell address box indicates that cell C7 is the current cell, and the value/formula box lists the formula **=SUM(C4:C6)** which is the SUM formula that you typed into cell B7 except that the cell addresses have been changed to column C instead of column B.

	A	B	C	D	E
2	10/19/2004				
3		Jan	Feb	Mar	Total
4	Rent	1000	1000	1000	
5	Car	450	450	450	
6	Food	625.47	456.78	504.32	
7	Total	2075	1907	1954	

Now enter the Sum formula in cell E4 for the sum of cell B4, C4, and D4. Remember that you type the cell range by stating the first cell address, B4 in this case, then a colon, and then the last cell address. That is, you type B4:D4 as the argument for the SUM function. Finally, when you have written the SUM formula in cell E4 correctly, then copy that formula to cells E5 and E6. Your totals should be the same as they were when you typed in the formulas explicitly.

Notice that in the picture above, the totals do not have a cents value. That's due to the cells being formatted in the wrong format. Select the cells B7 through D7 (by clicking in B7 and dragging to D7). To see the current format and to change to a new format, you can click Format | Cells, and then you get the



Format Cells window. This window indicates that the cells have a "Number" format, but that the number of decimal places is set at 0. For our purposes of having the cents value displayed, change the 0 to 2, and click the OK button. Now the cells B7 through D7 display the cents value of the totals. Also, change the cell format of E4 through E6 to have two decimal places.

One final thing to do in this accounting spreadsheet example is to compute the total of the totals and have it displayed in cell E7. You can do it by totaling the cells B7:D7 or the cells E4:E6. Either one should give you the same total. Here's another way to have the sum of a sequence of cells calculated.

First, move to the E7 cell. Then click on the capital-Sigma symbol on the standard toolbar, and the formula **=SUM(...)** is filled in for you with a range of cells that Excel is guessing at. In the picture to the right, the range E4:E6 is filled into the SUM function. If this is the correct range, just press Enter to store the formula. If its incorrect, then press either Backspace or Delete, and the formula changes to have no list, =SUM(). Now you can type the



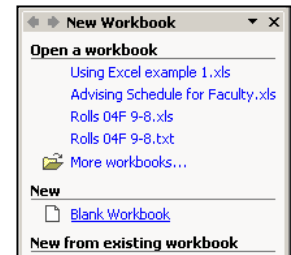
	A	B	C	D	E
2	10/19/2004				
3		Jan	Feb	Mar	Total
4	Rent	1000	1000	1000	3000.00
5	Car	450	450	450	1350.00
6	Food	625.47	456.78	504.32	1586.57
7	Total	2075.47	1906.78	1954.32	=SUM(E4:E6)
8					SUM(number1, ...)

range, or alternatively, you can use the mouse to select the range. Change the range to B7:D7 by using the mouse and finish by pressing Enter.

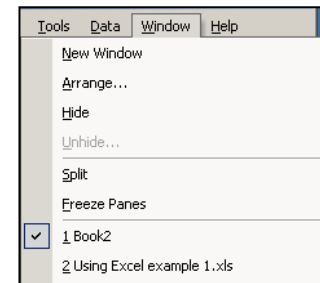
A Second Example

Let's start a grade book example, which will provide some other features of the spreadsheet program.

Start with a blank spreadsheet. You can do this by exiting and restarting Excel, or by saving and closing the current spreadsheet, or by clicking on File | New. You may get a window that has a list of possibilities as illustrated to the right. Click on the Blank Workbook item and you will get a blank spreadsheet.



You have not necessarily lost the other spreadsheet, its just not being displayed at the moment. To see all of the workbooks that are currently open in Excel, click on the Window option of the menu bar, and the workbooks are listed at the bottom of the drop down menu.



My grade spreadsheets look something like the example to the right.

	A	B	C	D	E
1	CSCI 101	Fall 2004			
2	10/19/2004		----- Tests -----		
3	Name	Average	1	2	Final
4	Adams, Sue	76.5	88	77	71
5	Baker, John	81.4	91	75	82
6	Casel, Jane	79.8	66	77	88
7	Edwards, John	88.0	88	88	88
8			66.8	63.8	82

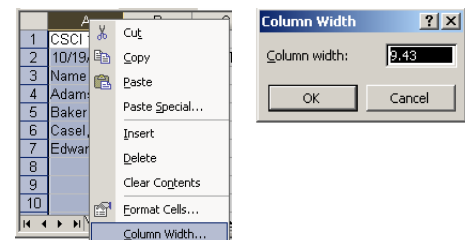
A few features are used here that were not used above.

Begin by entering the labels in cells A1, B1, the date function in A2, the labels in cells A3 through E3, the student's names in column A, and the long label "|----- Tests -----|" in cell C2.

Your spreadsheet looks something like this:

Notice some of the differences between this picture and the one above. First, the names in column A slop over into column B. You can change this by changing the width of column A. As with most things in the Microsoft software, there are several ways to do this. One way is to **right** click on the top of column A to get the drop down menu and then click on the Column Width item. You can now type in a value for the column width. However, this is not intuitive since the number does not mean much to us - what are its units? inches? pixels?

	A	B	C	D	Formula Bar
1	CSCI 101	Fall 2004			
2	10/19/2004		----- Tests -----		
3	Name	Average	1	2	Final
4	Adams, Sue				
5	Baker, John				
6	Casel, Jane				
7	Edwards, John				



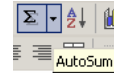
An easy and intuitive method is move the mouse cursor to the small vertical line between the column numbers A and B. The cursor will change to a small vertical bar with two arrows pointing out of each side one to the left and one to the right. Press and hold down the left mouse button and drag the A | B boundary line to make column A whatever width you want - at least enough so that the labels in column A do not slop over into column B. Note that the width measure is being displayed next to the cell address box. In this illustration, it's currently at Width 14.29 (105 pixels).

	A1	B	C	D
1	CSCI 101	Fall 2004		
2	10/19/2004		----- Tests -----	
3	Name	Average	1	
4	Adams, Sue			
5	Baker, John			
6	Casel, Jane			
7	Edwards, John			

Next, enter the grades into the block of cells from B4 to D7 (denoted B4:D7). Then adjust the column widths for columns B, C, D and E so that the values are displayed but the columns are not much wider than they have to be. You can do each column individually. However, if you want to make the columns of grades C, D and E all of the same width, highlight the three column letters and then adjust the right column boundary of column E and the widths of all three columns will be adjusted together.

C	D	E	F	G
1	2	Final		
88	77	71		
91	75	82		
66	77	88		
88	88	88		

Now let's compute the column average for each test. You can simply type the AVERAGE function. For example, in column C to the test 1 grades, in cell C8, type the formula **=AVERAGE(C4:C7)**. Alternatively, click on cell C8 and then click the little down arrow next to the Sigma symbol, and select the Average item from the drop down list. The average formula will be displayed in cell C8, and Excel guesses at the range to be averaged. Note in the picture above, Excel has guessed at the address range C3:C7. Correct this range, and press Enter to store the formula in cell C8. Copy this formula into cells D8 and E8.



	A	B	C	D	E	F	G
1	CSCI 101	Fall 2004					
2	10/19/2004		Tests				
3	Name	Average	1	2	Final		
4	Adams, Sue		88	77	71		
5	Baker, John		91	75	82		
6	Casel, Jane		66	77	88		
7	Edwards, John		88	88	88		
8			=AVERAGE(C3:C7)				
9			AVERAGE(number1, [number2], ...)				

The next step is to calculate the course average for each student. Assuming that the test grades are weighted differently, this is not a simple average as used for the test averages in cells C7, D7 and E7. Let's suppose that the test weights are 25% for test 1, 35% for test 2, and 40% for the final. Then the formula for the student's course average is

$$\text{Course Average} = (25\% \text{ of Test 1}) + (35\% \text{ of Test 2}) + (40\% \text{ of the Final})$$

You translate this into the Excel formula by representing the percentages as decimals, 0.25, 0.35 and 0.40, and the multiplication by an asterisk, "*". So, in cell B4, you want to compute 0.25 times the test 1 grade in cell C4, plus 0.35 times the test 2 grade in cell D4, plus 0.40 times the Final grade in cell E4. In Excel, this formula is written as

$$=(0.25 * C4) + (0.35 * D4) + (0.4 * E4)$$

Enter this formula into cell B4.

Then copy this formula into cells B5:B7 for the averages for the each of the other students.

	A	B	C	D	E	F
1	CSCI 101	Fall 2004				
2	10/19/2004		Tests			
3	Name	Average	1	2	Final	
4	Adams, Sue	77.35	88	77	71	
5	Baker, John		91	75	82	
6	Casel, Jane		66	77	88	
7	Edwards, John		88	88	88	

One last small formatting issue is the positioning of the values within each cell. You can have the value positioned to the left, to the right or in the center of the cell. This is especially useful for readability. In picture to the right, the grades and test column headers have been centered. Also, the date has been left justified. You can position cell contents by clicking on a cell, or range of cells, and then clicking on



one of the position options on the formatting bar.

	A	B	C	D	E
1	CSCI 101	Fall 2004			
2	10/19/2004		Tests		
3	Name	Average	1	2	Final
4	Adams, Sue	77.35	88	77	71
5	Baker, John	81.8	91	75	82
6	Casel, Jane	78.65	66	77	88
7	Edwards, John	88	88	88	88
8			83.3	79.3	82.3