Excel Basics

Introduction

Creating or Opening Workbooks

To create a new Excel workbook or to open an existing workbook, click on "File" in the menu and click the icon for the full list of options. Or, click on the "new" or "open" icons on the standard toolbar. If you select to open an existing workbook, you will get a navigation menu to select the file you want to open. Note under the "File" menu, you can also press the "Control" and "N" keys at the same time to create a New workbook, or "Control" and "O" for the menu to select an existing file to open.

When you open Excel, a new "workbook" is created for you. A workbook is a set of "worksheets." A worksheet is a "page" in your workbook. Excel allows you to quickly switch between different worksheets in a workbook, and between different open workbooks.

Toolbar

There are many tool bars available in Excel which allows you to choose a particular function with a click of the mouse, saving you the time of searching through the menu of all options. When you open Excel, the Standard toolbar and the Format toolbar are available at the top of the screen:

These two toolbars include the most commonly used operations, such as opening, saving, or printing a file, copying and pasting, and formatting text.

In addition to these toolbars, Excel offers the option of displaying several more toolbars, covering such options as creating charts, drawing, and forms. You can display or hide any of the available toolbars as desired.
To display or hide toolbars, select "View" from the menu, then "Toolbars," to see a list of all available toolbars. Click to add a check beside the name of the toolbars you want to display, or remove the check to hide a toolbar.

Name Box / Formula Bar

The name box indicates the currently active cell. The formula bar (the area after the "=") indicates the contents of the cell. In this case, there is nothing in cell A1, so the formula bar is empty.

Worksheet

A new worksheet is a grid of rows and columns. The rows are labeled with numbers, and the columns are labeled with letters. Each intersection of a row and a column is a cell. Each cell has an address, which is the column letter and the row number. The arrow on the worksheet to the right points to cell A1, which is currently highlighted, indicating that it is an active cell. A cell must be active to enter information into it. To highlight (select) a cell, click on it.

To select more than one cell:

- Click on a cell (e.g. A1), then hold the shift key while you click on another (e.g. D4) to select all cells between and including A1 and D4.
- Click on a cell (e.g. A1) and drag the mouse across the desired range, unclicking on another cell (e.g. D4) to select all cells between and including A1 and D4.
- To select several cells which are not adjacent, press "control" and click on the cells you want to select. Click a number or letter labeling a row or column to select that entire row or column.

One worksheet can have up to 256 columns and 65,536 rows, so it'll be a while before you run out of space.

Each cell can contain a label, value, logical value, or formula.

- Labels can contain any combination of letters, numbers, or symbols.
• Values are numbers. Only values (numbers) can be used in calculations. A value can also be a date or a time.
• Logical values are "true" or "false."
• Formulas automatically do calculations on the values in other specified cells and display the result in the cell in which the formula is entered (for example, you can specify that cell D3 is to contain the sum of the numbers in B3 and C3; the number displayed in D3 will then be a function of the numbers entered into B3 and C3).

**Entering Data**

To enter information into a cell, select the cell and begin typing.

Note that as you type information into the cell, the information you enter also displays in the formula bar. You can also enter information into the formula bar, and the information will appear in the selected cell.

When you have finished entering the label or value:

• Press "Enter" to move to the next cell below (in this case, A2)
• Press "Tab" to move to the next cell to the right (in this case, B1)
• Click in any cell to select it

**Entering Labels**

Unless the information you enter is formatted as a value or a formula Excel will interpret it as a label, and defaults to align the text on the left side of the cell. To reformat a label, see the section on Formatting and Editing Data.

If you are creating a long worksheet and you will be repeating the same label information in many different cells, you can use the AutoComplete function. This function will look at other entries in the same column and attempt to match a previous entry with your current entry. For example, if you have already typed "Wesleyan" in another cell and you type "W" in a new cell, Excel will automatically enter "Wesleyan." If you intended to type "Wesleyan" into the cell, your task is done, and you can move on to the next cell. If you intended to type something else, e.g. "Williams," into the cell, just continue typing to enter the term.

To turn on the AutoComplete function, click on "Tools" in the menu bar, then select "Options," then select "Edit," and click to put a check in the box beside "Enable AutoComplete for cell values."
Another way to quickly enter repeated labels is to use the **Pick List** feature. Right click on a cell, then select "Pick From List." This will give you a menu of all other entries in cells in that column. Click on an item in the menu to enter it into the currently selected cell.

**Entering Values**

A value is a number, date, or time, plus a few symbols if necessary to further define the numbers [such as: . , + - ( ) % $ / ].

**Numbers** are assumed to be positive; to enter a negative number, use a minus sign "-" or enclose the number in parentheses "( )".

**Dates** are stored as MM/DD/YYYY, but you do not have to enter it precisely in that format. If you enter "aug 9" or "aug-9", Excel will recognize it at August 9 of the current year, and store it as 8/9/2000. Enter the four-digit year for a year other than the current year (e.g. "aug 9, 1999"). To enter the current day's date, press "control" and ";" at the same time.

**Times** default to a 24 hour clock. Use "a" or "p" to indicate "am" or "pm" if you use a 12 hour clock (e.g. "8:30 p" is interpreted as 8:30 PM). To enter the current time, press "control" and ";" (shift-semicolon) at the same time.

An entry interpreted as a value (number, date, or time) is aligned to the right side of the cell. To reformat a value, see the section on Formatting and Editing Data.

**Formatting**

**Adjusting Column and Row Sizes**

If you have a label that does not fit in the default size of a cell, you can make that column wider by moving the cursor to the border between the column headers, then click and drag the border to a new location to specify how wide you want the column to be:
Note that the other columns do not change size; they just all move to the right.

Double clicking on the border between the column headers will automatically adjust the column width so that it is just wide enough to fit the labels in that column. This is a quick way to resize several columns.

Row heights can be adjusted in the same ways.

To change several columns (or rows) at once, press "control" and click on columns (or rows) to select them. Click on "Format" in the menu, then select "Column," then "Width." The current column width is displayed. Overwrite the width with the desired width, and all selected columns will be resized to the new width.

To change all columns (or rows) on a sheet at the same time, click in the upper left corner of the sheet (the intersection of the column labels and row labels) to select the entire sheet. Click on "Format" in the menu, then select "Column," then "Width." The current column width is displayed. Overwrite the width with the desired width, and all columns in the worksheet will be resized to the new width.

**Adding, Deleting, Copying Columns and Rows**

If you need to add information between existing columns or rows, it is easy to insert a new column or row. Right click on a cell to bring up a menu of options. Select "Insert" from the menu. Your options are:

- Shift cells right - Move the contents of the selected cell and all cells to its right one column to the right, and insert a new cell here.
- Shift cells down - Move the contents of the selected cell and all cells below it down one row, and insert a new cell here.
- Entire row - Move this entire row and all the rows below it down one row, and insert a new row here.
- Entire column - Move this entire column and all the columns to its right one column to the right, and insert a new column here.

If you need to delete a cell, or an entire column or row, right click on a cell to bring up a menu of options. Select "Delete" from the menu. Your options are:

- Shift cells left - Delete the contents of the selected cell, and shift all cells to its right one column to the left.
- Shift cells up - Delete the contents of the selected cell, and shift all cells below it up one row.
- Entire row - Delete this entire row and move all the rows below it down up one row.
- Entire column - Delete this entire column and move all the columns to its right one column to the left.

You can use the "cut," "copy," and "paste" icons in the standard toolbar to move or copy one column or row to another column or row. Select a column or row, click on "cut" in the standard toolbar, then select another column or row and click "paste" to move the column or row. Use "copy" to copy one column or row into another column or row.
**Formatting Labels and Values**

Each cell can be formatted to display text and/or numbers in a specified way. Select a cell or a range of cells for formatting. Then right click on the selected cell or selected range of cells to get a menu of possible operations. Select "Format Cells" from the list for a menu of formatting options. Or, select "Format" from the menu bar, then select "Cells."

You can format cells after entering information, or preformat a cell or a range of cells before entering data.

Click the tabs to specify formats for:

- Numbers (e.g. currency, fractions, dates)
- Alignment (e.g. left, right, center)
- Font (font name, size, etc)
- Border (around the cell or data)
- Patterns (e.g. color, shading)
- Protection (hide or lock information)

Some of the most commonly used text format options are available as icons on the Format toolbar (e.g. font, size, bold, center).

**Copying and Editing Cells**

You can delete (or clear) the contents of a cell while retaining the format, or clear the format while retaining the contents (when you clear the format, the cell's format reverts to "Normal"). Select the cell(s) you want to clear. Then click on "Edit" in the menu bar; select to "Clear"; then select to clear "Format" while retaining content, "Content" while retaining format, or "All" to clear both content and format.

To copy a format from one cell to another, use the "format painter" icon in the standard toolbar. Select a cell, then click the "format painter" icon; click on any other cell to copy the format to that cell. To copy a format to more than one cell, select the original cell, then double click on the "format painter" icon; click on all the cells you want to format (you can also click and drag to format a range of cells); when all the desired cells have been formatted, click on the "format painter" icon to turn the format painter function off.

To copy a format and content from one cell to another, right click on a cell to bring up a menu of options, then click to "copy" the cell. This copies the format and content of the cell. A dotted line will appear around the selected cell. Right click on any other cell, then click to "paste" into that cell. Both the format and the contents of the original cell will be pasted into the new cell. You can continue right clicking on other cells to paste the format and contents into them also. To paste to an entire range of cells, select the range, then right click anywhere within the selected range, and "paste" the format and contents into all cells in the range. When you are finished copying, double click anywhere on the worksheet to turn off the copy/paste function.

You can also use the "cut," "copy," and "paste" icons in the standard toolbar to move or copy the format and contents of one cell to another cell. Select a cell, click on "cut" in the standard toolbar, then select another cell...
and click "paste" to move the format and contents of the first cell to the second cell. Use "copy" to copy the format and contents of the first cell to the second cell.

**Formatting Tables**

To make it easy to make your data look good, Excel allows you to select from a list of preformatted tables for your data. Once you have entered your data, click anywhere in your table, then select "Format" from the menu bar, and select the "Autoformat" option. This will bring up a menu of preformatted tables. Scroll through the list to find one you like, click to select it, then click "OK" to create a table for your data.

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**Formulas**

Formulas are what do the work in a spreadsheet program. Without formulas, an electronic spreadsheet wouldn't have much of an advantage over a paper version. But with formulas, you can have the spreadsheet program do all the calculating of your data for you.

Formulas take the values of a specified range of cells and perform mathematical operations on them. A formula can add, subtract, divide, multiply, compute averages or interest rates, and perform many other functions.

**Creating a Formula**

Suppose you have a list of various item, and you want to calculate the total number of items. Here, in column A, we have names of various items, and the number of each type of item is listed in column B. We want to find the total of all the items combined, and put that total in cell B6. Further, we want to be able to change the numbers for each individual item when those numbers change, and we want the spreadsheet to automatically update the total.
To do this, you enter a formula into cell B6. All formulas begin with an equals sign, so type an "=" and then enter the formula. In this case, we want to add the contents in cells B2, B3, B4, and B5, so you type "=B2+B3+B4+B5" into cell B6. You can enter the formula directly into the cell, or type it into the formula bar. You do not need to use capital letters; Excel will convert them to capitals if you don't use them.

When you press "enter" or click another cell to go on to another task, the sum of the values in cells B2 through B5 will appear in B6. If you change one or more of the values in cells B2 through B5, the total in B6 will be instantly recalculated.

If you want "total" just to be the sum of the values in cells B2 and B4, your formula would be ",=B2+B4,"

You can calculate the values from any selection of cells; they do not have to be contiguous. Thus, ",=B2+B4+C7+F19,\text{" adds the values from all four cells and places the total in whatever cell you have entered the formula.

To calculate the average of the values in cells B2 through B5, you would add to get the total, then divide the total by the number of values added together: ",=(B2+B3+B4+B5)/4,\text{" adds the values in the four cells, then divides the total by 4 to calculate the average number of items in each category.

You can get really fancy with formulas: ",=(F2+F22)/((E2+E5)-(F2*F3)),\text{" uses addition (+), subtraction (-), multiplication (*), and division (/). The parentheses indicate the order in which the operations are to be performed: the calculations start from the innermost parentheses and work their way out.

**Using Functions to Create Formulas**

Rather than typing out the whole formula, there are shortcuts to creating commonly used formulas. The formula ",=B2+B3+B4+B5,\text{" can be represented as a function: ",=SUM(B2:B5),\text{" This function says that the cell is to contain the sum of the values in the cells from B2 through B5. Or, suppose you just want the sum of what is in cells B2 and B4; to add non-consecutive cells, use commas rather than a colon: ",=SUM(B2,B4,C7:C12),\text{" adds the values in cell B2, cell B4, and cells C7 through C12.
For common functions such as SUM, there are even shorter short cuts. Click in cell B6 to select it, then click on the AutoSum icon in the standard toolbar. Excel will assume that you wish to calculate the total of cells B2 through B5. Press enter to accept Excel's assumption, and the total appears in cell B6.

The AutoSum feature also works if you want to calculate the total of cells in a row. For example, to calculate the total of the values in cells B2, C2, D2, and E2 and put the total in cell F2, click in cell F2 and then click the AutoSum icon. Excel will assume that you wish to calculate the total of cells B2 through E2.

Another way to create this function is to click on cell B2 and drag to cell B5 to select the column of numbers, and then click on the AutoSum icon. The formula will be automatically entered, and the total will appear, in cell B6.

To enter individual or non-consecutive cells into the function, hold the control key and click on the cell(s) you want to include in your total. So, if you select cells B3, B5, F4, and G5, your function would look like "=SUM(B3,B5,F4,G5)."

Other Functions Besides "SUM"

As soon as you type "=" into the function bar, Excel assumes you are doing a SUM (or, that you are repeating the last type of function used), and SUM (or the last function you used if other than SUM) is displayed in the Name Box to indicate that. But if you click on the down arrow to the right of the Name Box, you get a list of other functions you can use, including an option to see "More Functions," which offers functions.

Since this is an introductory tutorial, we won't go over the other functions here. Explore them at your leisure and try some of them out. Do some experimenting to see how they work.

Copying Formulas

Suppose you include the number of items in each of your categories from various times past. You have put forth a lot of effort to create a formula to calculate the total of the items you have now. Do you have to go to all that effort to create formulas to calculate how many total items you had at various times past?

No, there is an easy way to create these new formulas: copy the one already made and apply it to the new "total" cells:
To do this, just click on the cell with the function you want to copy (in this case, B6). Then click on the bottom right corner of the cell border, and drag it across the next two cells to copy the formula into them. Excel automatically copies the formula to the other cells, and edits the formulas so that they calculate the totals of the cells above them in that column.

Another way to copy a formula is to use the **copy a format and content** function. Right click on a cell to bring up a menu of options, and then click to "copy" the cell. This copies the format and content of the cell. When the cell contains a function, it copies the function. A dotted line will appear around the selected cell. Right click on any other cell, and then click to "paste" into that cell. You can continue right clicking on other cells to paste the formula into other cells. When you are finished copying, double click anywhere on the worksheet to turn off the copy/paste function.

This will copy the function to the new cell(s). The function will also automatically be edited so that it takes the values from the appropriate cells. For example, if you copy the function from cell B6 in the example above and paste it into D6, the function will automatically change from ";=\text{SUM}(B2:B5)\" to ";=\text{SUM}(D2:D5)\".

**Charts**

So, now you have a worksheet, with labels and values and formulas all in a table format. That's enough to have all the information you need to record, track, and analyze data. But there is more you can do to illustrate it, and to make the analysis easier. Using charts, you can create a variety graphical displays of your data. Depending on what you want to illustrate or emphasize, Excel offers many different chart options, such as pie charts, columns, bars, lines, or areas.

You can put a chart on a worksheet with the data it is charting, in which case it is called an embedded chart. Or you can put your chart on a separate chart sheet.
Let's say you have created a worksheet to keep track of your budget. You have all the information you need to see and compare how much you are spending on various items each semester. But it's just a long list of numbers that you have to make an effort to think about to get various comparisons. With a chart, you can quickly create graphics which can show you what you want to know in easy to grasp visual representations.

For example, suppose you want to compare the amount of your budget that you spent on various items during the Fall '98 semester. A pie chart would be just the thing. To create a pie chart, first you must select what information on your worksheet you want to be charted. You want the numbers in the Fall '98 column, and you want the labels so you know what the numbers mean. So, select all the relevant cells: click on cell A2 and drag to cell B6 (or, hold down the "Control" key and click on individual cells to select, or use any of the other methods of selecting a range of cells).

Now, click on the Chart Wizard icon in the Standard toolbar to activate the Chart Wizard, which will take you through the steps of creating a chart. Note: if the Chart Wizard icon is not on the Standard toolbar, then click the down arrow at the far right end of the toolbar to find the Chart Wizard icon. From here, you can also add or remove buttons from the Standard toolbar.
The Chart Wizard takes you through four steps:

- Select a chart type. You want a pie chart, so click on "Pie" to get a choice of pie charts. Note that you can click "Press and hold to view sample" to preview what your chart will look like. When you find a type of chart you like, click "Next" to get.
- Some "Data Range" options, such as selecting whether to reverse the default axes. The default axis is irrelevant in a pie chart, but in many others (such as a bar chart), it can make a big difference in how something is displayed, and thus in how it is interpreted when viewed. Then.
- You can insert a title for your chart, and select from such options as whether and how to label the elements of the chart. The last step is to.
- Select whether you want your chart to be embedded in the current worksheet or placed on a separate chart sheet.

When you have finished making your specifications for your chart, click "Finish" to have it appear on your worksheet (or chart sheet).

**Expenses - Fall '05**

Your chart will look something like this. At least, it will if you selected a flat pie chart, inserted "Expenses - Fall '05" as a title, and selected to "Show percent" in the Data Labels option.

You can change the size, colors, locations, and fonts of various elements in the chart once you have completed it. Just click on any element to select it, then drag it elsewhere in the chart to move it, or drag an edge to resize it. If you double click on an element in the chart, you will bring up a Format menu to change the color, font, size, etc of the selected element. Or, right click on the chart to bring up a menu of general chart options.
Let's look at one more example of a chart derived from the worksheet above, to get an idea of the versatility and usefulness of the Chart Wizard options for helping you interpret the data in your worksheet.

This chart was created by selecting the range of cells between A1 and D6 in the worksheet above (i.e. everything but the "totals" row and column). When these data are put in a bar graph, you can easily compare the amount spent on any of your categories in different semesters.

Do some experimenting with various types of charts to see the many ways you can render a worksheet of data, or any subset of the data, into easily interpreted visual representations.