



Microsoft Excel 5.0 Session 2

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Introduction

Excel Session 2 is a course created for CAL PACT participants to learn more about the features of Excel. The course covers simple introductory material and applies to both the Windows and Macintosh computer platforms. This document serves as a supplement and future reference to the class.

Skills needed to take this class

- how to use the mouse
- how to use the Macintosh or Windows computing environment
- the material covered within the CAL PACT Excel 5.0 Session 1 class.
Specifically: using menus and toolbars within Excel
data entry and manipulation
basic formatting

Skills and concepts learned in this class

- creating series
- creating formulas
- absolute vs. relative referencing
- creating split screens
- creating freeze panes
- hiding rows and columns
- outlining and presenting data

Conventions used in this document

Menus and menu commands are separated by a vertical bar (|). In the document they will appear as **Menu | Command**. An example of this is "Select **File | New...**"

Filling

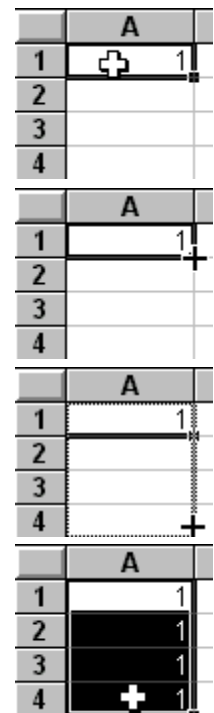
Worksheets often contains cells with similar contents. To avoid repetitive data entry, cells can be quickly duplicated. One way to do this is to select the desired cell, copy the cell, and then paste the cell over and over again.

A quicker method of copying exists when the cell being copying from is adjacent to the location where the cell will be copied to. This process is called filling.

To fill a series of cells:

1. Select that cell(s) that contain the data to be copied.
2. Move the mouse towards the lower right corner of the selection until the mouse pointer turns into a thin black cross. This is the fill handle. Remember the location of the fill handle and the appearance of the mouse pointer because the fill handle is used greatly in Excel to perform a variety of functions.
3. Click on the fill handle and hold down the mouse button. Drag the mouse downwards or to the right to fill the data.
4. Release the mouse button when the region to fill is selected. An exact copy of the original cell will appear in cells of the fill region.

The fill feature not only works with data, but with formatting and formulas (which will be described more in depth later).



Series

A series is a set of data that has a logical pattern. For example, a group of numbers (such as {1,2,3,...} or {2,4,6,...}), days of the weeks, and months of a year can be a series.

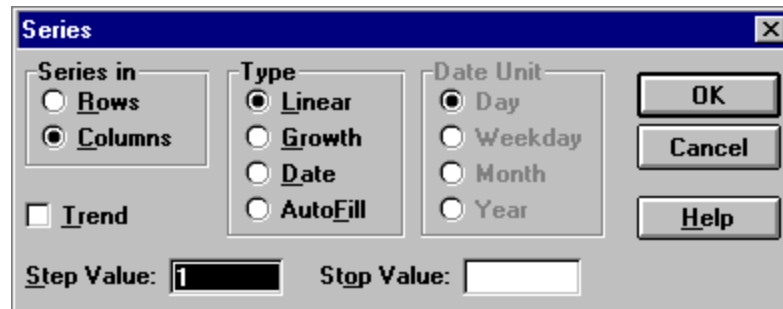
Creating Series

Excel provides a systematic way to automatically create a simple series on a worksheet. There are two ways to do this:

1. Use the series function available by choosing **Edit | Fill | Series**. Using this method is longer but it provides more options and better control over the series being created.
2. Dragging the fill handle on the lower right hand corner of a selection. Using this method is simple but provides less control.

Using the Series Function

1. Select the cell where the series will begin. Enter the value for the first item of the series (a number, date, etc.) and select this cell as the active cell.
2. Choose **Edit | Fill | Series...**, the following window will appear:



3. Select the desired direction in the Series in options. A series will be created extending downward in the column or to the right of the row.
4. Specify the Type of series that will be created. If the series will add a constant value to the previous value (e.g. a 1, 2, 3, ... series), select *Linear*. If the series will multiply a constant value by the previous value (e.g. 1, 2, 4, 8,...), pick *Growth*. If the series is a date, select *Date*. To have Excel automatically fill the series, select *AutoFill*.

5. If the series is a date series, a Date Unit must be specified.

Important Note: while it is possible to create a date using this method, it is usually much better to use the dragging technique (explained in the next section) for a series of days, months, etc.

6. Enter the step value for the series. The step value is the increment value for the series. In a linear series, the step value is added to the previous value. In a growth series, the step value is multiplied by the previous value.

7. Select a stop value for the series. Once Excel reaches this number, the series will end.

Dragging to create a Series

1. Once again, select the cell(s) where the series will begin. Enter the value for the first item of the series. For number series, the first two initial values must be entered. When applied to numbers, only linear series are created. Excel calculates the difference between the first two values and uses it as the step value for the series.

	A
1	1
2	2
3	
4	

	A
1	January
2	
3	
4	

2. Move the mouse towards the fill handle. The fill handle is located at the lower right corner of the highlighted area. The mouse pointer will change into a black cross.

	A
1	1
2	2
3	
4	

	A
1	January
2	
3	
4	

3. Click and drag the handle downwards or to the right until the desired selection is highlighted. Release the mouse button and Excel will create the series in the highlighted region.

	A
1	1
2	2
3	3
4	4

	A
1	January
2	February
3	March
4	April

Formulas

Formulas in Excel are very similar to formulas used in algebra. Formulas are equations which calculate particular values. For example, the formula to find the average of four numbers adds the numbers together and then divides the sum by four to generate one value. These formulas along with charting are Excel's most useful and powerful tools.

Creating Formulas

To create a formula, it is a good idea to first see an example.

$$= (B2 + B3)*A1$$

This formula adds the numbers in cell B2 and cell B3 and then multiplies the result by the number in A1. The result is shown in the cell that contains the formula.

To enter a formula, type the formula in the cell where the results will appear. When a formula is entered in a cell, the worksheet will only display the result. The formula is stored in the worksheet, but it is only displayed in the formula entry bar. This concept is shown in the following screen shot.

	C1		
			= (B1+B2)*B3
	A	B	C
1		1	9
2		2	
3		3	
4			

This is a portion of an Excel screen. Notice that cell C1 is selected. On the worksheet the cell displays the number "9". However, to see what formula is in the cell, look in the formula entry bar above the worksheet. In this case, the formula is " = (B1+B2)*B3 ".

Basic Rules for Formulas

Here are some rules for writing a formula:

- Start with an equal sign. This tells Excel a formula is being created.
- Know what variables are going to be used. Usually they will consist of other cells such as B2, F6, C52, etc. However, you can have constants (such as 3.14) in your formulas as well.

- All groupings are done within parentheses.
- Remember this list of the common mathematical operators:

Operation	Symbol
Addition	+
Subtraction	-
Multiplication	*
Division	/
Powers	^

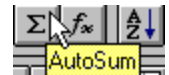
Functions and Ranges



In addition to common mathematical operations (+, -, /, *, ^), Excel has many other functions. These advanced functions include (but are not limited to) such things as average, round, minimum, sine, cosine, etc. Since there are so many different functions, Excel provides a tool to quickly find and use these functions. This tool is called the Function Wizard. Start the Function Wizard by first selecting the cell which will display the result and then click on the Function Wizard button in the toolbar.

An example of a commonly used advanced function is the

AutoSum function. This function takes a selection of cells and adds them together. While this may sound very similar to addition, it is different because it can add a **range** of cells rather than a list of individual cells. A range is merely a group of cells defined by a starting cell and an ending cell.



An example of the AutoSum function:

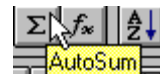
1. Type a few numbers down a column or across a row.

	A	B
1	1	
2	5	
3	6	
4	9	
5		

2. Select the cell where the sum will be displayed.

	A	B
1	1	
2	5	
3	6	
4	9	
5		

3. Click the AutoSum button in the toolbar.



4. Highlight the cells that will be added together. At this point, look in the formula entry bar and notice that it shows something similar to: =SUM(A1:A4) This formula will add the numbers in column A between rows 1 through 4.

	A	B
1	1	
2	5	
3	6	
4	9	
5	=SUM(A1:A4)	

5. Hit enter to insert the AutoSum into the cell.

	A	B
1	1	
2	5	
3	6	
4	9	
5	21	

The colon (:) is the symbol which defines a range of cells. A range of cells is defined with a starting cell (which is entered before the colon) and the ending cell (which is entered after the colon). A range of cells cannot be used with the standard math operations. The formula = B1:B6 is incorrect and meaningless. Many functions use the range symbol.

Important note: Using a range like B2:C3 is perfectly valid. Ranges can span rows and columns at the same time.

Moving Formulas and (Absolute vs. Relative) Referencing

One special feature of Excel allows formulas to be moved and copied. This is accomplished by using the cut, copy, and paste commands, or by using the fill handle. When a formula is moved or copied, it is not an exact copy of the original formula.

Look at the example to the right. Cell A3 contains the formula “=A1+A2” which is the sum of the two cells above. To set B3 equal to the sum of B1 and B2, copy the formula from A3 to B3. After the formula has been copied, Excel will automatically change the formula from “=A1+A2” to “=B1+B2”.

	A3		
	A	B	C
1	400	500	
2	200	800	
3	600		

Excel automatically translates the formula so that one formula can be used in different parts of a worksheet. While this does not provide much timesaving in the example above, it will when the formula is longer or more complicated.

The way Excel alters a formula is determined by the distance the formula has shifted. Look back to the previous example. Since the formula moved one cell to the right, Excel changed the formula by shifting every cell reference **inside** the formula one cell to the right. This change applies to every cell reference within the formula by the exact distance that the formula was shifted. If the formula shifted one cell up and two cells to the left, all of the cell references within the formula would change one cell up and two cells to the left.

The system of changing the cell references is called **relative referencing**. In this case, Excel makes the assumption that the formulas are general formulas that can apply to any situation. When moving formulas, Excel assumes the cell references being calculated from are moving as well.

While this feature is very helpful, there are times when relative referencing is not desired. When this is the case, cell references in a formula can be changed to **absolute referencing**. In this case, moving the formula will not change the absolute cell references.

Going back to the previous example once more, the formula =A1+A2 can be

rewritten with absolute referencing. The formula will be set to always add cell A1 and A2 no matter where the formula is copied or moved.

The symbol for absolute referencing is the dollar sign (\$). Place the \$ before each cell reference. The old formula:

$$= A1+A2$$

becomes:

$$= \$A\$1+ \$A\$2$$

The first reaction here may be to think there are too many dollar signs, however this is not the case. Remember that a cell can move in two directions: by its row (vertically) or by its column (horizontally). To make sure a cell reference does not change, place a dollar sign before its column component (the A) **and** the row component (the 1). Inside a formula, cell references do not have to conform to one referencing standard. The formula could have been written as =A1+\$A\$2 where only the cell reference to A2 is absolute.

Conversely, placing a dollar sign in front of the column and row is not always necessary; a cell reference can have an absolute reference in one direction only (either horizontally or vertically).

Split Screens

Split screens is one of many tools in Excel that help organize the view of the spreadsheet. How the spreadsheet is viewed can be important either for presentations or to help visualize the data in a more effective manner.

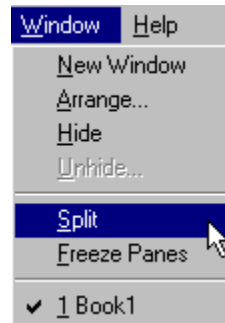
Split screen allows the current sheet to be divided into halves (with one split) or fourths (with a horizontal and vertical split). Data from multiple parts of the worksheet can be viewed at the same time.

To create a split screen:

1. Highlight the area where the screen will be split. To split the screen vertically, select the column just to the right of where the split should appear. To split the sheet horizontally, select the row just below where the split should appear.

	A	B	
1			
2			
3			
4			

2. Choose **Window | Split** and a gray bar will appear at the row or column specified.



	A	B	
1			
2			
3			
4			

3. Scrolling around the window will only the currently active section of the screen to move. The portion of the sheet that is on the other side of the split will not move.

	A	B	
1			
2			
10			

Important Note: A split screen does not create a copy of the sheet; **it only allows a different view of the same sheet.** Any changes made apply to the whole sheet; not just the cell within the current split view.

To adjust a split location, move the mouse over the gray split bar. The mouse pointer will change to a two headed arrow. Click and drag to move the split to a new location.

	A	B	
1			
2			
3			

Freeze Panes

Once a split screen has been created, the split location can be “locked-in” by using the freeze pane command. Freezing the panes prevents a change in the split until the panes have been unfrozen.

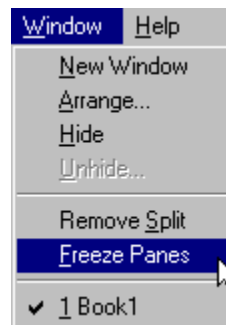
In addition to locking in a split, a freeze pane will also limit how much of the worksheet will scroll in the window. Multiple views created by the split are condensed into one concise view of the bottom left pane. Thus it is important to carefully freeze the correct panes.

To create freeze panes:

1. First create a split screen (see the procedure in the previous section).

	A	B	
1			
2			
3			
4			

2. Select **Window | Freeze Panes**.



3. Now the split screen is locked.

	A	B	
1			
2			
3			

To unfreeze panes, select **Window | Unfreeze Panes**.

Hiding Rows and Columns

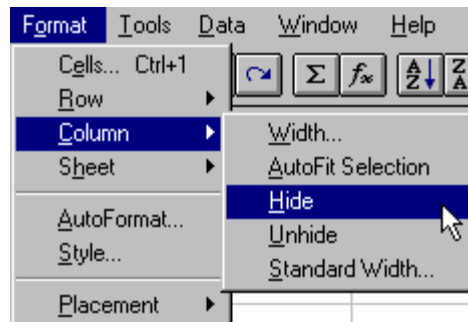
Another feature Excel offers is row and column hiding. A hidden row or column does not appear on the worksheet, but for all other purposes (such as formulas, format changes, etc.) still exists.

To hide a row or column:

1. Select the row or column to hide. More than one row or column can be selected at a time.

	A	B	C
1	1	the line	A
2	2	the triangle	B
3	3	the square	C
4	4	the pentagon	D

2. Select the **Format | Row | Hide** or **Format | Column | Hide** (depending on the selection).



3. Now the row or column is hidden.

	A	C
1	1	A
2	2	B
3	3	C
4	4	D

The row or column will not longer appear on the screen, however, hidden rows or columns can be identified by a labeling skip (such as columns labeled A, B, D, etc. or rows labeled 1, 3, 4, etc.) in the row or column headers. The entire row or column must be hidden; individual cells or grouping of cells cannot be hidden on the worksheet.

To unhide a row or column:

1. Select the two rows or columns adjacent to the hidden row or column.

	A	C +
1	1 A	
2	2 B	
3	3 C	
4	4 D	

2. Select the **Format | Row | Unhide** or **Format | Column | Unhide** depending on the selection).



3. Now the row or column is restored.

	A	B	C
1	1 the line	A	
2	2 the triangle	B	
3	3 the square	C	
4	4 the pentagon	D	

Outlining

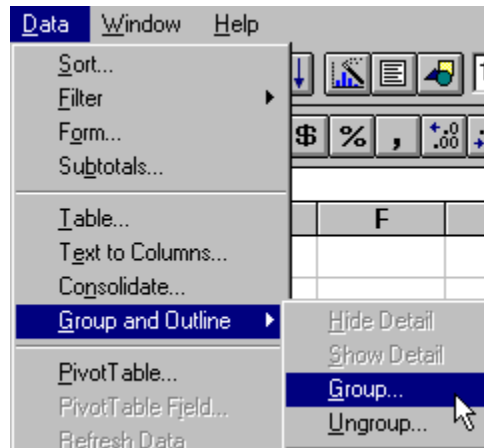
Outlines are a more powerful form of hiding row and columns. Instead of just selecting which rows and columns to hide, cells are grouped together to be hidden or unhidden with a click of the mouse button. Similar to real outlines, a group of cells can be placed within a larger group of cells. As with hiding, both rows and columns must be outlined separately.

To group a selection of cells for outlining:

1. Highlight the rows or columns to group together.

	A	B	C
1	Monthly Budget		
2			
3	Income		
4	Work Salary	\$ 2,600.00	
5	Work Bonus	\$ -	
6	Miscellaneous	\$ 200.00	
7	Total Income	\$ 2,800.00	

2. Choose **Data | Group and Outline | Group**.



3. To indicate that these cells will be grouped together an outline bar will appear. An outline bar appears to the left for grouped rows and to the top for grouped columns.

1 2	A	B	C
1	Monthly Budget		
2			
3	Income		
4	Work Salary	\$ 2,600.00	
5	Work Bonus	\$ -	
6	Miscellaneous	\$ 200.00	
7	Total Income	\$ 2,800.00	

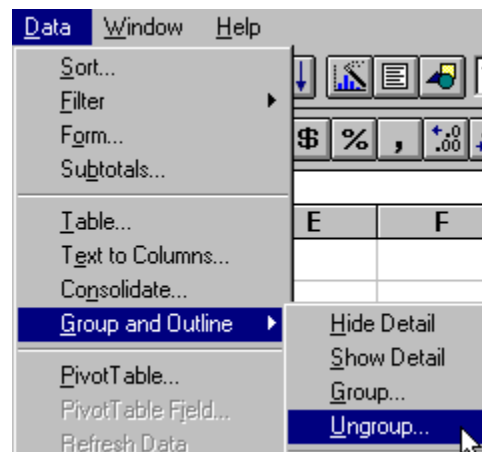
Repeat this process as many times as needed to properly outline the worksheet. This method can be very useful for temporarily hiding large amounts of data to make the worksheet easier to read.

To remove a group of cells from the outline:

1. Highlight the group of cells to ungroup.

	A	B	C
1	Monthly Budget		
2			
3	Income		
4	Work Salary	\$ 2,600.00	
5	Work Bonus	\$ -	
6	Miscellaneous	\$ 200.00	
7	Total Income	\$ 2,800.00	

2. Choose **Data | Group and Outline | Ungroup**.



3. The corresponding outline bar for that section will disappear.

	A	B	C
1	Monthly Budget		
2			
3	Income		
4	Work Salary	\$ 2,600.00	
5	Work Bonus	\$ -	
6	Miscellaneous	\$ 200.00	
7	Total Income	\$ 2,800.00	

Hiding and Unhiding Cells with Outline

To hide outlined cells, find the outline bar that marks the section to hide. There will be a button with a minus sign at the end of each group. Click on the button and the cells will be hidden. When the cells are hidden, the

minus sign in the button changes to a plus sign. Press this button to unhide these cells.

To hide an outline, click on the minus button:

1	2	A	B
	1	Monthly Budget	
	2		
	3	Income	
	4	Work Salary	\$ 2,600.00
	5	Work Bonus	\$ -
	6	Miscellaneous	\$ 200.00
	7	Total Income	\$ 2,800.00
	8		

becomes

1	2	A	B
	1	Monthly Budget	
	2		
	7	Total Income	\$ 2,800.00

To restore cells, click on the plus button:

1	2	A	B
	1	Monthly Budget	
	2		
	7	Total Income	\$ 2,800.00

becomes

1	2	A	B
	1	Monthly Budget	
	2		
	3	Income	
	4	Work Salary	\$ 2,600.00
	5	Work Bonus	\$ -
	6	Miscellaneous	\$ 200.00
	7	Total Income	\$ 2,800.00
	8		

An alternate way to use outlines is to click on the button with the level number. The button identifies each level and clicking on the button displays only the groupings up to that level. Many groups can be quickly hidden and unhidden this way.