Introduction to Spreadsheets

Spreadsheets programs are powerful tools. Spreadsheets act like a calculator by automatically doing calculations. Spreadsheets have many uses. Spreadsheets are great for tracking personal investments, creating budgets, tracking medical expenses and reimbursements. Spreadsheets are also great for small personal databases, like address books, inventorying your music collection, tracking your golf handicap.

There are many programs for creating spreadsheets. We are going to be using OpenOffice Calc but the things we are going to be learning work with many other spreadsheets including Microsoft Excel. OpenOffice can be downloaded from http://www.openoffice.org/ free of charge although donations are always welcome and participating in the feedback program is encouraged..

OpenOffice (OO) is a suite. That means that OO has many different programs bundled together with a common look and feel. There is a direct link to OpenOffice Calc, in the **Start->AllPrograms->OpenOffice** folder.

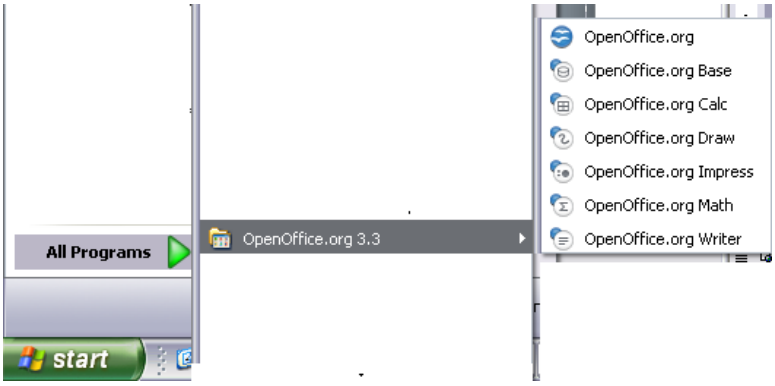


Figure 1 Open Office from the Start Menu

Or we can open the suite menu by choosing OpenOffice.org from the **All Programs** menu and then selecting **Spreadsheet** from the Open Office suite menu**.**

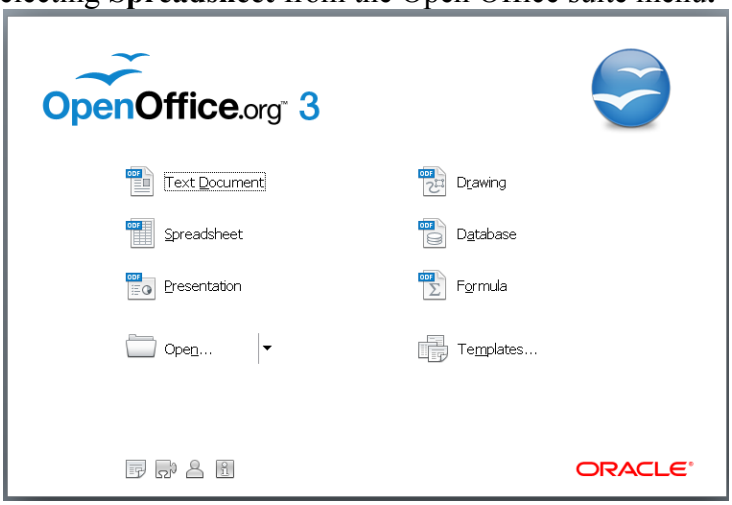


Figure 2. Open Office Suite Menu

When you first open that OpenOffice Calc, it presents you with an untitled document as shown in Figure 3.

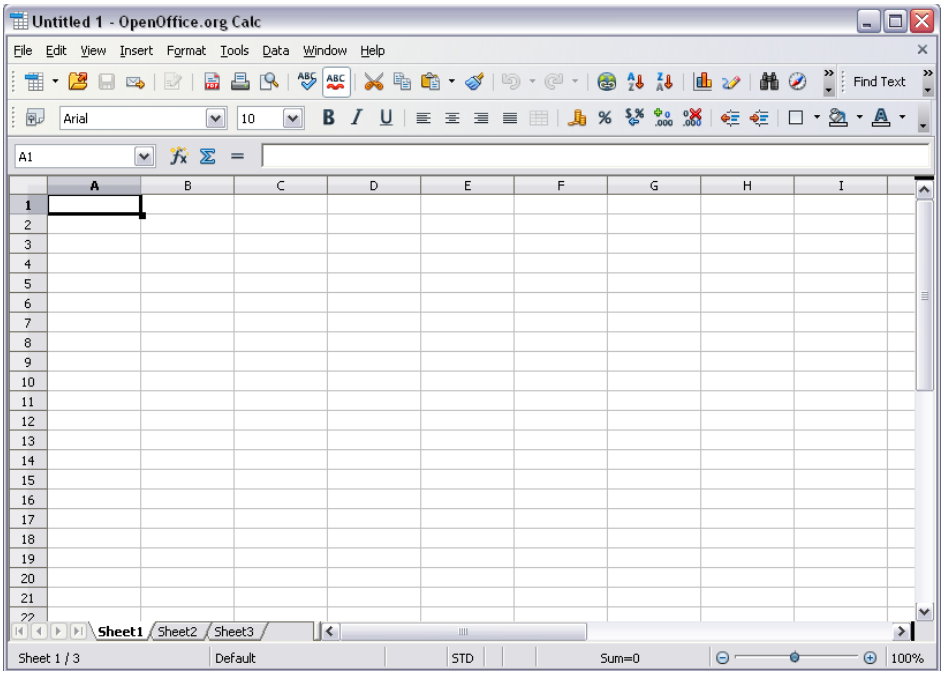


Figure 3 – Blank Spreadsheet

The spreadsheet is divided into rows that have a number at the left of each row and divided into columns with letters at the top of each column.

A **cell** is the fundamental element of a worksheet. This is where data is entered and where values are displayed. A **cell address** in a spreadsheet identifies the location of the cell in the spreadsheet. A **cell address** is a combination of the column letter and the row number of a cell, such as **A2** or **B16**.etc. When identifying a cell by its address, the column letter is always listed first followed by the row number. The cell address of the example below is **A5**.

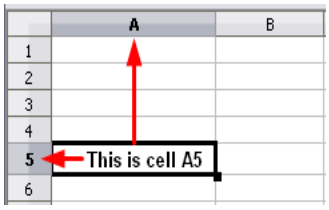


Figure 4. Cell Address

A range is a group of cells. A range is defined by the upper left hand cell followed by a colon, and then the lower right hand cell.

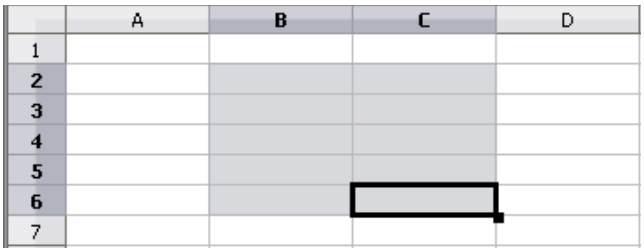


Figure 5 Range B2:C6

Hint: The highlighting colors are determined by your Windows theme. If you can't see the range try changing the themes at the Windows level.

Formula Toolbar

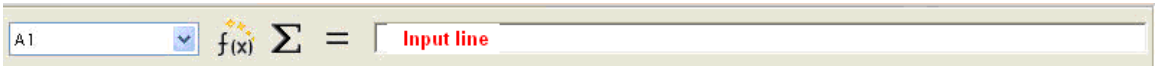


Figure 6. Formula Toolbar

The **Formula Toolbar** contains the **Name Box** drop-down menu and a long white box called the **Input Line**.

The **Name Box** contains the name of the current cell. The **Input Line** contains the contents of the current cell. Data can be entered directly into the spreadsheet cell or into the input line.

Exercise 1

Start OpenOffice Calc

1. Select the start button
2. Select all programs
3. Select OpenOffice.org Calc
4. Click on various cells with the mouse

5. Use the cursor arrow keys to move around the spreadsheet and observe how the name box changes to show the current cell.

Making changes to a cell

Hint: Use the **Ctrl** + **the mouse scroll wheel** to adjust the size of the cell display.

Editing a cell

When you click on a cell and start typing, the original contents are overwritten. If you have a long complicated formula that needs to be corrected, you can type click in the input area on the formula line. Or if you prefer to make the correction in the cell, press **F2** function key to enter edit mode when the cell has the focus..

Deleting cell contents

OpenOffice Calc has a delete method that is unusual. Click on the cell or highlight the **range** of cells you want to delete and then press the **Delete** key. You are presented with an option of what type of information you want to delete.

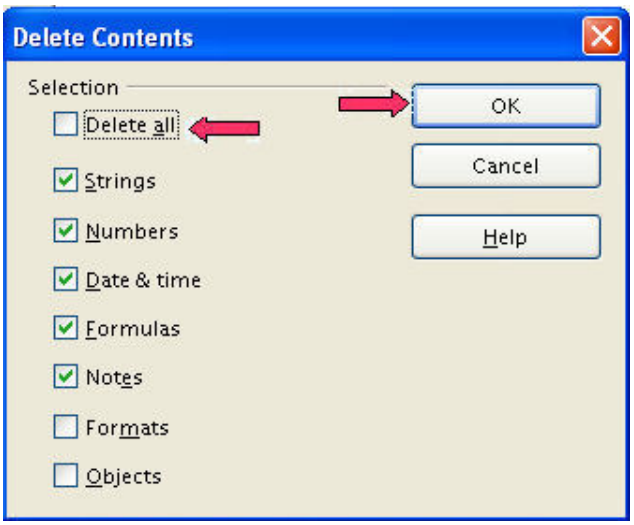


Figure 7. Delete Options

ESCAPE (Esc)

If you are typing in the wrong cell, press the **Esc** key to cancel the entry and restore the cell to the condition before you started typing or click on the **x** on the formula toolbar.

UNDO

If you have already entered the cell data, select **Edit->Undo** from the menu. The keyboard short cut for Undo is **Ctrl** + **Z**. Or you can use the undo icon on the standard toolbar. The undo command can take you back several steps.

Cells can contain Text

A cell can contain up to 255 characters of alphanumeric data. It may not all display. By default the spreadsheet will continue display as much as it can until it encounters a non-emtpy cell to the right of the cell containing the text.

Exercise 2

1) Click on cell **A1**
2) Type **Text can extend beyond the boundaries of a cell** and press **Enter**.
3) Click on cell **B1**
4) Type **25** press **Enter**

Cells can contain numeric data.

Numeric data consists of constants, expressions and dates. Unlike text, the display of numeric data can't spill outside its cell. If the value is too big to be displayed in the cell, ######## is displayed instead.

Entering a number (constant)

When you type in a number into a cell it's called a constant. . Most modern spreadsheet programs allows you to use commas, $ and % signs in numerical data entry, but some programs require those to be left off.

1) Click on cell **A2**
2) Type **2000** press **Enter**
3) Click on cell **B2**
4) Type **2,000** press **Enter**

Depending on what spreadsheet program you are using, the , is either stripped out or the information is aligned to the left indicating it was interpreted as text.
If no special formatting has been applied to cells, numbers are always right justified in a cell. If you are trying to enter a number and it appears left justified, it probably has characters that are not valid for numerical data.

Entering a date
A date is a special kind of number. If you enter a partial date, your spreadsheet will assume it's the current year. Your Spreadsheet can do all sorts of calculations with numbers

1) Click on cell **A3**
2) Type **Dates** press **Enter**
3) Type **5/2** press **Enter**
4) Type **5/2/2010** press **Enter**

Cells can contain Formulas
One of the most valuable features of a spreadsheet is its value to calculate values by using formulas. Formulas can range from the simple, to the extremely complex. You can calculate values based on numbers you type directly into the formula =1+5+2 to add the values 1, 5 and 2. However the power of a spreadsheet formula in the fact that formulas can refer to other cells in the worksheet. The formula = B2+B3+B4 adds the values of the cells B2, B3 and B4. When the values of those cells change, the spreadsheet automatically recalculates the value of B2+B3+B4.

The spreadsheet recognizes a formula if the entry begins with an equal sign (=) or a plus sign(+).

1) Select cell **B2**
2) Type **2** press →
3) Type **4** press →
4) Type **5** press →
5. Type **=B2+C2+D2** press **Enter**

Did you notice that we could use the arrow keys to finish an entry?

Instead of typing in the Cell number you can also point instead of type.

1. Click on cell **E2**
2. Type = press ← ← ← type to select **B2**+ use the cursor keys to highlight **B3**→ type + use the cursor keys to highlight **B4**

press **Enter**

Did you notice that when the spreadsheet is expecting an operand pointing does not exit the cells? If the formula was a complete expression the cursor key exited the cell.

Mathematical Operations

A spreadsheet program can calculate formulas using addition(+) , subtraction(-), multiplication(*), division (/) and exponentiation(^).

Exercise

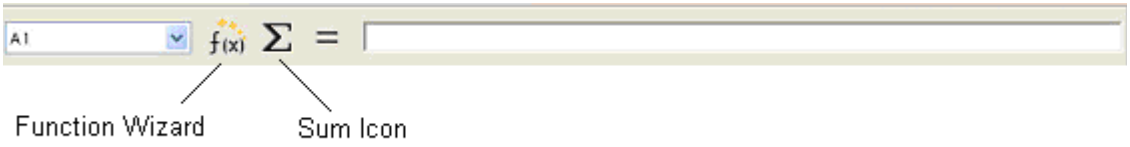
Enter the following text and formulas into the spreadsheet

Addition	=5+2	
Subtraction	= 5-2	
Multiplication	=5*2	
Division	=5/2	
Exponentiation	=5^2	Five squared or 5^2

When you combine these operators in a formula you need to keep in mind that there is a mathematical order of operations. This is something you learned in school, but may not have used since then. A formula is not processed from left to right. Mathematical rules require that items in inner most parenthesis are performed first, exponentiation is done next, multiplication and division is done, and then addition and subtraction. The natural mathematical order is **( ), ^, *, / , +, -,** and spreadsheet programs obey these rules.

=2+3*5 will yield 17
=(2+3)*5 will yield 25

Functions



Your spreadsheet program has many built-in functions. In this class we are only going to use two, the **Sum** function, and the **Round** function**.** You can find out more about the other functions in the spreadsheet's **Help** documentation or by using the function wizard on the formula bar.

The sum is such a popular function that it has its own icon on the formula bar. The sum works on a range. We've done written a few formulas where we add a bunch of cells together using the + operator. The SUM( ) function works on what we call a range. A **range** is a rectangular group of cells that can be acted on in one command.

= A1+A2+A3+A4 =SUM(A1:A4)

When you want to add 100's of cells together the SUM becomes a necessity.

You can type a range **A1:A4** or you can select a range using the mouse or the cursor arrows on the keyboard.

To select a range with a mouse

1. Click one of the corner cells of the range
2. Drag the mouse over the range.
3. When you reach the other corner of the range, release the mouse button.

To select a range with the cursor arrows

1. Move to a cell at a corner of the range.

2. Press and hold down the **Shift** key, and press the arrows until you get to the end of the range.

Practice

1)Create this spreadsheet or open the **Class samples\Budget.xls**

	A	B	C	D	E	F	G
1		January	February	March	April	Total	
2	Rent	700	700	700	700		
3	Electricity	38.59	24.49	50.59	60		
4	Gas	200	230	240	250		
5	Phone	39	39	43	39		
6	Food	225.78	219.75	280.3	223.4		
7	Enterntain	44	63.5	150	22		
8	Miscellane	23	44	88	25		
9	Total						
10							
11							

2) Click on cell **F2**
3) Click on the **Σ** icon on the formula tool bar
4) note the spreadsheet will try to guess what you want to sum up, so **B2:E2** should already be selected. If however these are not the cells selected, press **Delete** and then highlight **B2** and drag the mouse to **E2**
5) Press **Enter**

Extra: Create a sum for the January column.

The Standard Tool bar

Copy and Paste

The copy command works on a cell or a range of cells. The copy command copies a cell to clipboard. The copy command can be found on the Edit menu. **Edit->Copy** or you can click on the Copy Icon from the standard toolbar, or you can use the keyboard shortcut **Ctrl+C** or we can simply right click on the cell and select copy from the options.

Exercise:

1) Select cell **F2**
2) Click on the Copy Icon
3) Click on cell **F3** and drag the mouse down to **F9**
4) Right click and then click on the Paste Icon

Now inspect the contents of cells **F2:F9**. Do you see how the formulas changed relative to the cell you copied from?

Extra: Copy the January Total formula, to February and March.

Relative verses Absolute Addressing

The reason all those formulas changed was because they use relative addressing. What would we do if we didn't want all or some of those cell references to change?. Then we

would use an absolute address in a formula. Absolute addressing can cause the column, row, or both the column and row to remain the same.

Address	
A1	This is a relative address, when the formula is copied all the addresses will be relative to the new location.
A1	This is an absolute address, when the formula is copied all the formula will still reference A1
$A1	This is an absolute address. When the formula is copied the formula will still reference column A, only the row will change to be relative to the new location.
A$1	This is an absolute address. When the formula is copied, the cell will still refrence row 1, only the column will be relative to the new location.

A1 is a relative address. A1 is an absolute address. When it is copied, the address is always the same. $A1 says the column must stay the same but the row can change. A$1 says the column can change, but the row must stay the same.

Example
Lets make a running total for our budget.

1. In cell **A11** type **Running Total**
2. In cell **B11** type **=SUM(B2:B8)** and press Enter
3. Right click on cell **B11** and select copy from your list of options
4. Highlight the range **C11:E11**-and right click the mouse in the range and select paste from the options menu.

Cut and Paste

The Cut and Paste commands moves a cell. Formulas that reference the cell directly will be changed to reflect the new location. Functions that use a range usually are not effected by a cut and paste unless the cell was the corner cell of a range.

Example

1. Create a spreadsheet that looks like this

	A	B
1		
2	10	
3	20	
4	30	
5	=A2+A3+A4	
6		

3. Highlight cell **A3** and then click on the in the toolbar.

4. Right click on cell **B3** and then click on the paste icon,

5. Now click on cell **A5** and check out the formula

Note: The keyboard shortcut for cut is **Ctrl** + **X,** the shortcut for paste is **Ctrl** + **V**

Note: Inserting and deleting rows and columns can also change formulas.

Making it Pretty - Formatting Cells

One of the really nice things about spreadsheet programs is the ability to make your numbers look nice. We are going to be using the formatting toolbar, but a more complete list of formatting options is available if you pick the **Format-> Cells** from the menu.

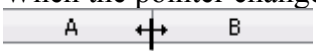
Formatting Toolbar

	A	B	C	D	E	F	G
1		January	February	March	April	Total	
2	Rent	700	700	700	700		
3	Electricity	38.59	24.49	50.59	60		
4	Gas	200	230	240	250		
5	Phone	39	39	43	39		
6	Food	225.78	219.75	280.3	223.4		
7	Enterntain	44	63.5	150	22		
8	Miscellane	23	44	88	25		
9	Total						
10							
11							

Practice

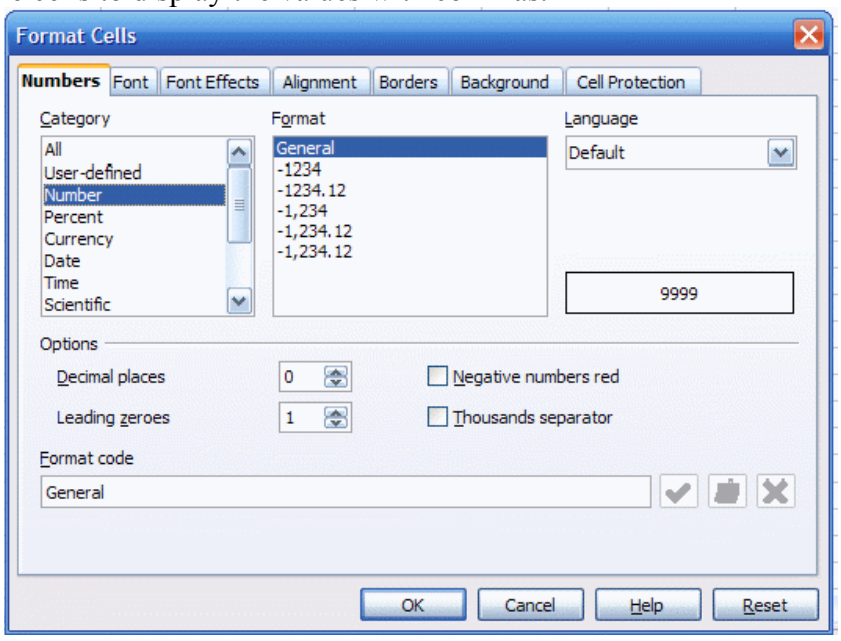
1. Select cells **B1:F1**
2. Click on the to bold the selection
3. Click on the Right justify Icon, , to align the column headings
4. Select cells **B2:F2**
5. Click on the add decimal places icon , , 2 times

Let's widen column A too

1. Move the mouse over the line between A and B.
2. When the pointer changes to show the resizing pointer 

press and hold the left mouse button
3. Drag the column to the right until the column is wide enough to fit the words.

More advanced formatting options can be found if you select **Format->Cells** from the menu. Remember when I said we couldn't enter commas in our numbers? Well we can still format the cells to display the values with commas.



Format Cells Dialog Box

Formatting doesn't effect the value

See for yourself

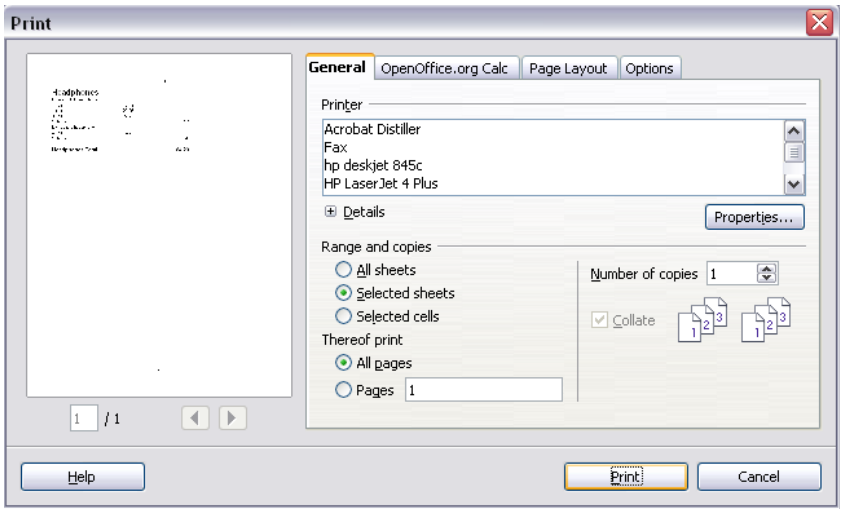
1 Click on cell **A10.**
2. Type =**1/3** press **Enter.**
3. Select cell **A10**
4. Select **Format Cells** from the menu.
5 On the Numbers tab change Decimal Places to 2
6. Click on cell **B10.**
7. Type **=A10*100000** press **Enter.**

In cases where you are doing calculations that can result in decimal places you would need to Round the result instead of formatting the result. In Open Office the round function has two arguments, the value and the number of decimals.**=Round(*value; # of decimals*).** Most other spreadsheets use a comma instead of a semicolon to separate the arguments.

1. Click on cell **A11.**
2. Type **=Round(A10;2)** press **Enter**.
3. Click on cell **B11.**
4. Type **=A11*100000** press **Enter.**

Printing

Open Office 3 doesn't use the standard Microsoft printer dialogs, so it's a bit different to do your printing. Avoid the Printer Icon on the toolbar, it prints directly to your default printer without presenting any printer dialog screen, and prints the entire spreadsheet .. The **File->Print** option from the dropdown menu, gives you a better print control.



Printer Dialog box from the menu item File->Print

Print range

There are some special considerations when printing a spreadsheet. . If no print area was defined, it will print the entire spreadsheet. If you don't want to print everything, you need to set a print range or print selected cells. The print range is stored with the document, and will remain until the print range is cleared.

To set a print range,

1. Select the cells you want to print
2. Choose **Format->Print Ranges->Define** from the menu.

To clear a print range

2. Choose **Format->Print Ranges->Remove** from the menu.

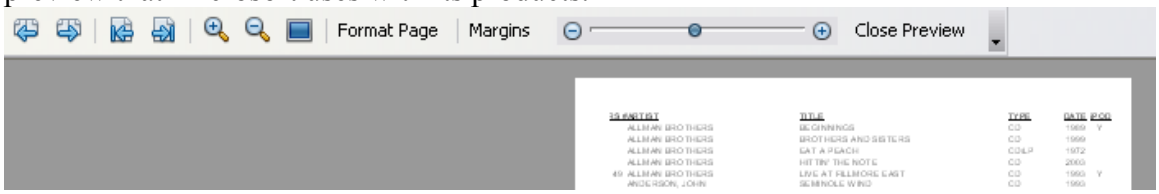
Page Breaks

Manual Breaks are available for both columns and rows. A row page break is inserted just above the active cell. A column page break is inserted just to the left of the active cell.

To insert a row break. Click on a cell below the last row to be included on the page and then select **Insert->Manual Break->Row**

Page Preview

It is always a good idea to preview before you print a spreadsheet. Using the scaling tool you can shrink or grow the size of the print, but this is not nearly as intuitive as the print preview that Microsoft uses with its products.

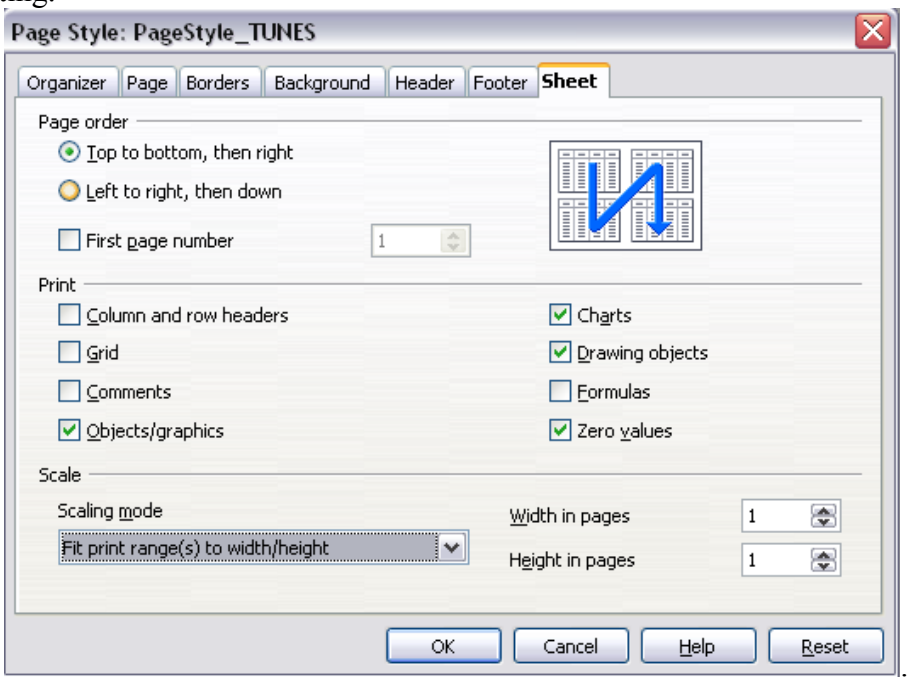


Page Preview Controls

The page preview controls allow you to inspect all the pages, zoom in, zoom out, fill the full page with the preview, but the two most important controls on this page are the **Format Page** and the **Close Preview.**

Close Preview returns you to your spreadsheet view so don't try to 'x' it out..

Format Page
The **Sheet tab** from the **Format Page** option, allows you to select scaling options for your printing.



Saving

When you save a spreadsheet, Open Office defaults to an ODS file type. Keep in mind that we are living in a Microsoft world. Older Microsoft products don't open ODS files. If you are sharing files with other people, you should consider using the Microsoft Excel 97/2000/XP(.xls) format. Most spreadsheet programs will open this format. If you change the Windows default file association for XLS to Open Office Calc, you can use the double click open method.

Hint: You can set the save options to default to Microsoft Excel 97/2000/XP (.xls).

Database

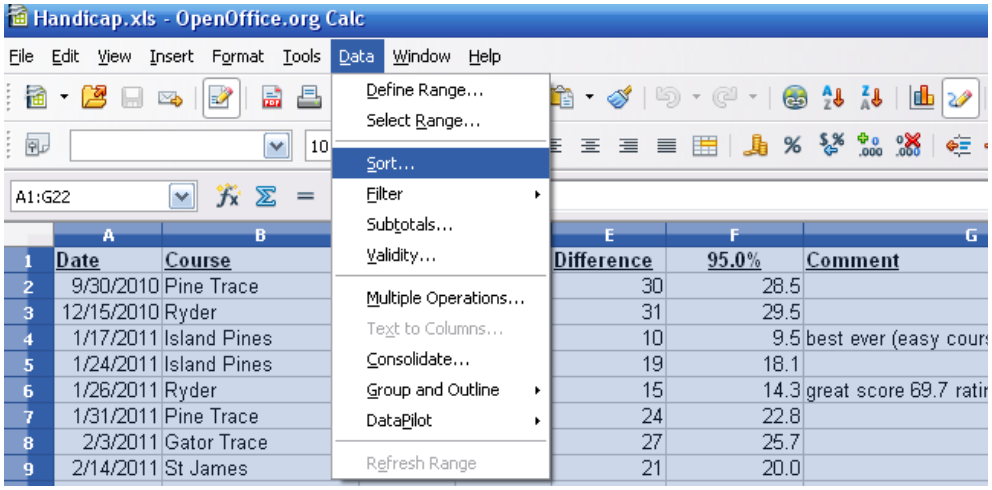
Many people use a spreadsheet for a personal database. The ability to sort items and set filters makes this ideal for keeping lists.

Sorting

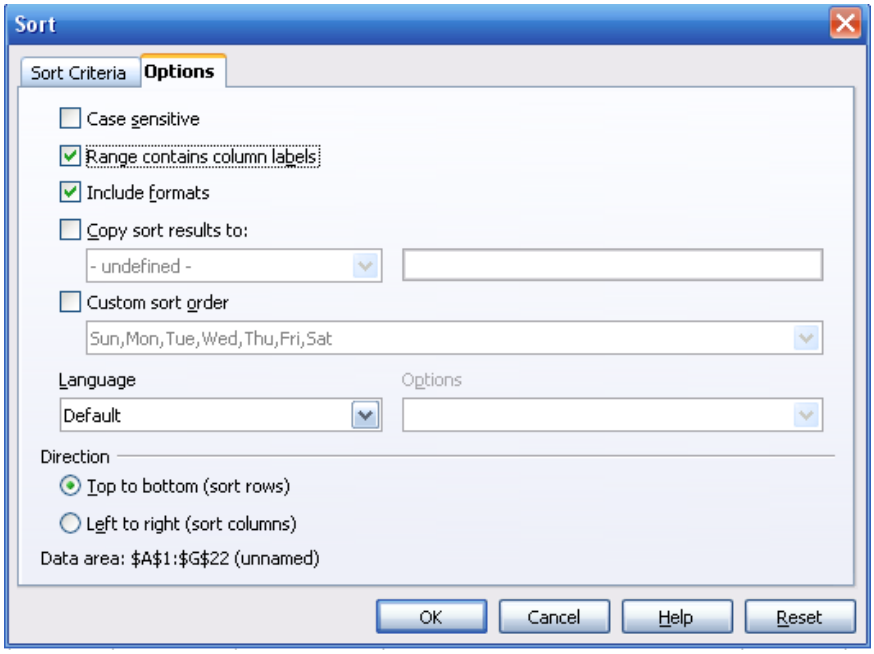
When sorting it is important to get a range that includes all the data for a each line in the database.

Sorting Exercise

1. Open the file called Handicap.xls
2. Select the range A1:G22
3. Select Data Sort from the menu

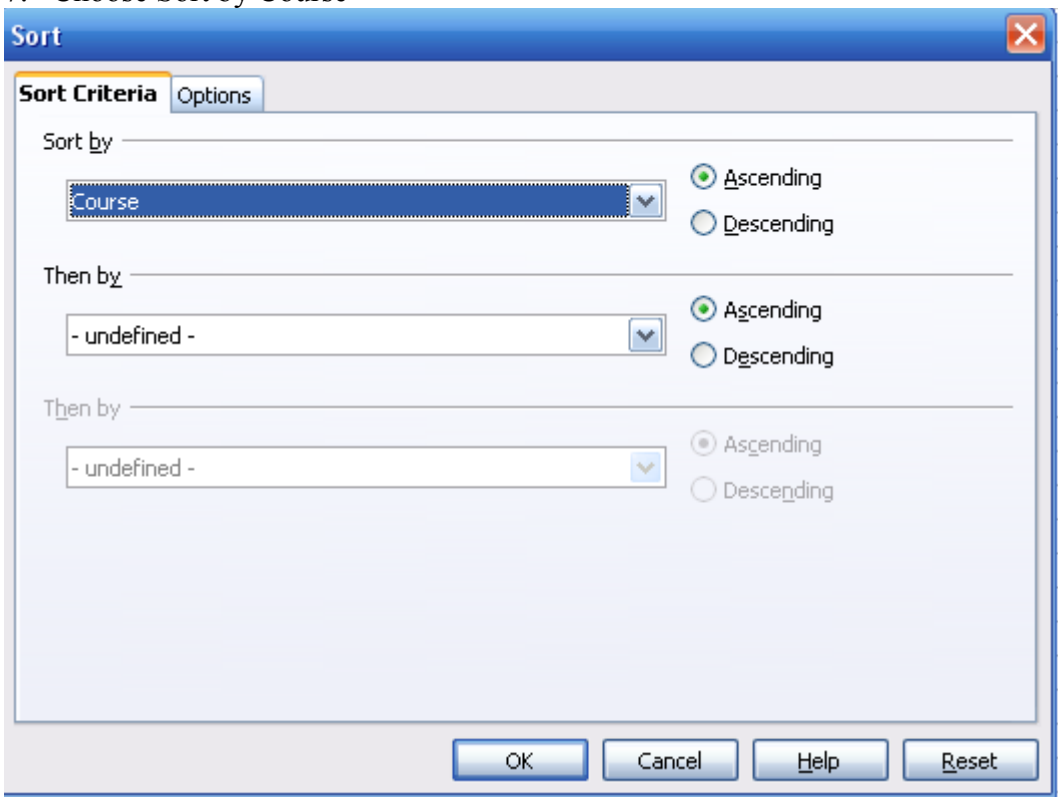


4. From the Sort Dialog window select the Options tab
5. Check Range contains column labels



6. Click on the Sort Criteria Tab

7. Choose Sort by Course



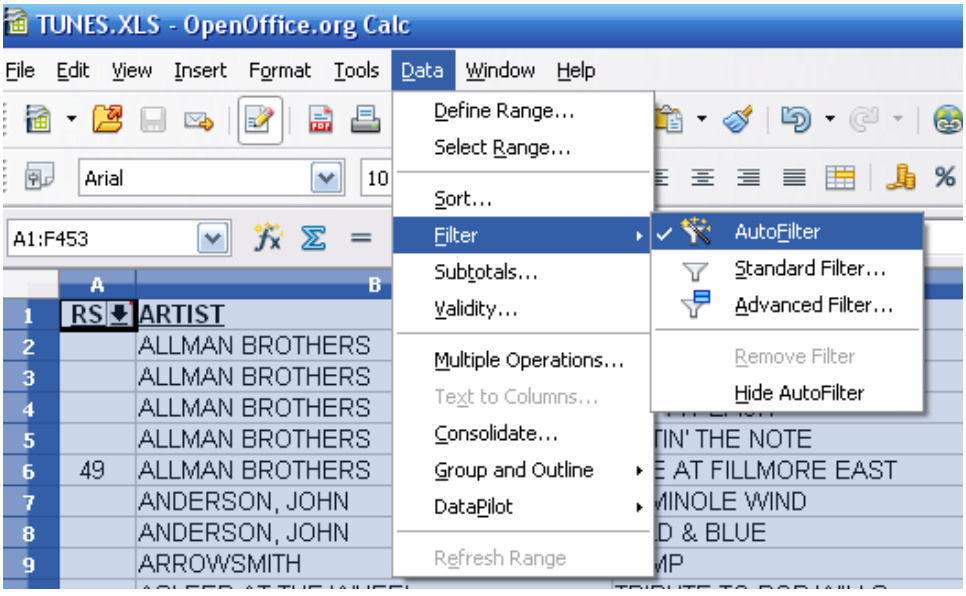
8. Click on **OK**

AutoFilters

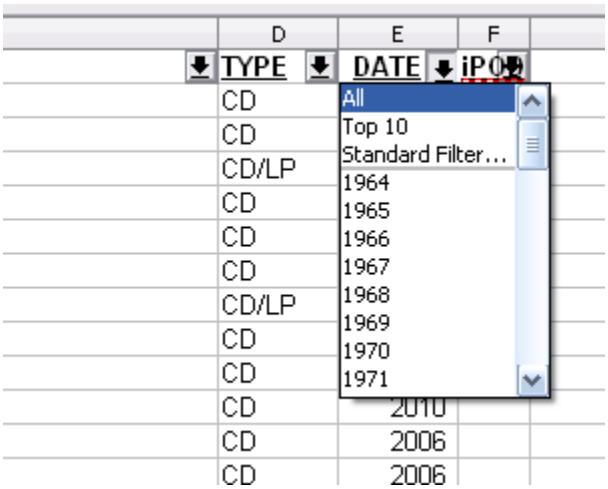
While sorts can be handy, the setting filters is preferable if the data is already in the most logical order.

Exercise:

1. Open the file ClassExamples\Tunes.xls
2. Turn on the Filters



3. Set the filter to Year = 1977



Splitting Windows

With a big spreadsheet like Tunes, its easy to lose track of what column is what column. Make sure that Auto Filter is off.before you try splitting the window.

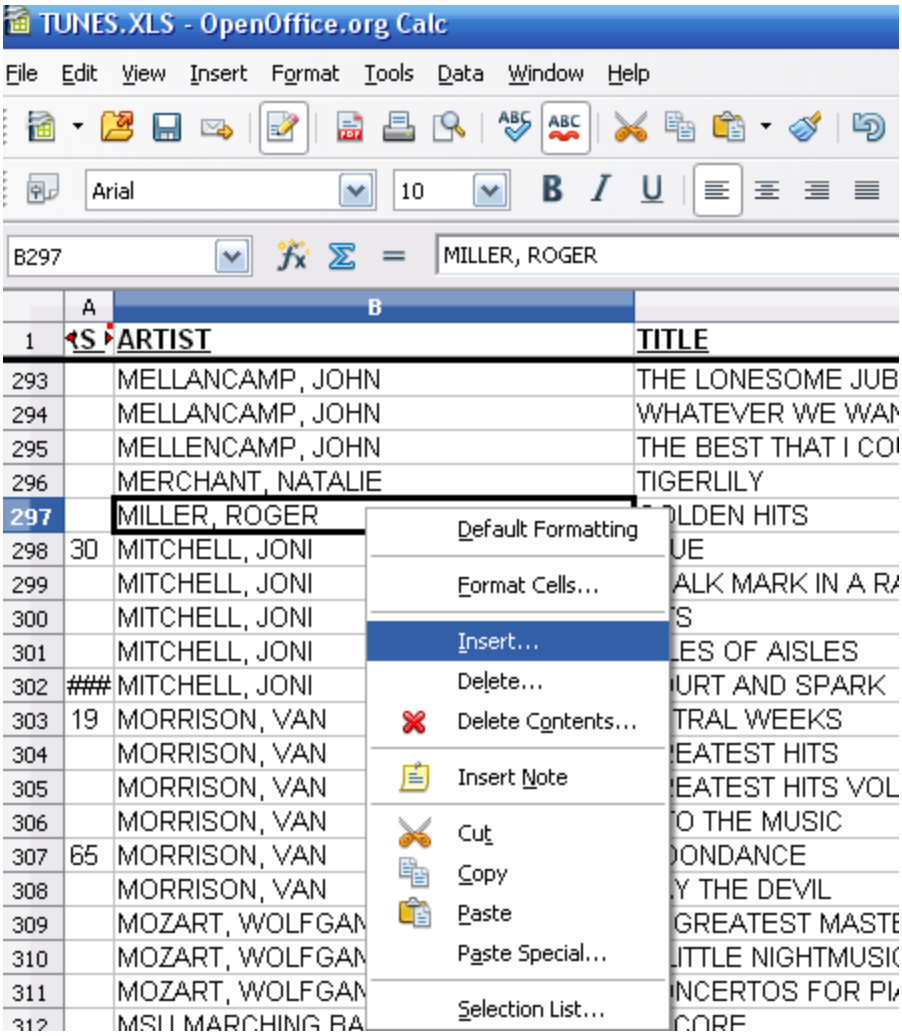
Exercise
1.) Move to cell A2
2.)Select Windows Split from the menu

Note If you had split the window at B2 you would have frozen the row labels too.

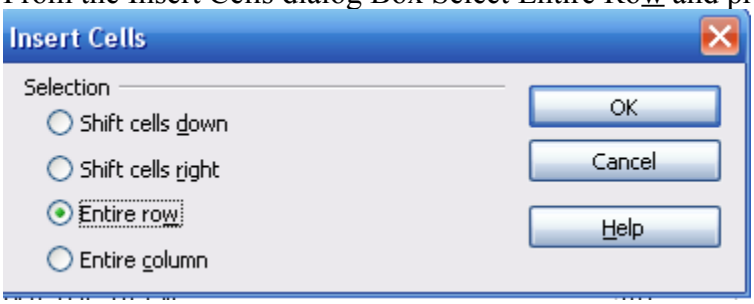
Inserting Rows and Columns

Its easy to insert missing rows or columns. There is an **Insert->Rows** and **Insert ->Column** on the menu. This is also a place where you can use a right click.

Exercise
1) Scroll down to the Artist =Miller, Roger
2) Right click and select Insert from the list of options



3) From the Insert Cells dialog Box Select Entire Row and press OK



4) Create an Entry for “Miller, Glen “, “Greatest Hits”, CD, 1996

Conclusion

You now have some basic spreadsheet skills. You can find more Open Office Tutorials at http://www.tutorialsforopenoffice.org/category_index/Index.html