

# Open Calc. The OpenOffice.org spreadsheet application

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## Introduction

OpenOffice.org also has a component for working with spreadsheets called Open Calc. This unit will describe its main features, which include the following:

- **Filters for other spreadsheet formats.** The Microsoft Excel one is particularly good.
- **Support for inserting all types of graphics format.** The standard installation includes the most common ones, but you can also install custom formats.
- **Version control.** You can save different versions of a document and return to previous versions if need be.
- **List sorting.** You can sort cell items by specific criteria.
- **Conditional format.** It is possible to apply formats conditionally to spreadsheet cells.
- **Automatic conversion of databases** to spreadsheets and vice versa.
- **Cell protection.** To avoid accidentally modifying important values or functions.
- **Control of input values.** We can specify, for example, a range of values in a cell.
- **Scenarios.** We can change a given value depending on the selected scenario. For instance, the interest on a mortgage will depend on the bank.
- **Automatic completion** of unknown values based on the values of other cells.

This unit will describe the basic features of the program and its most common options, functions and utilities.

The main aims of this unit are:

- 1) to teach the basics of how to use the OpenOffice.org spreadsheet application,

- 2) to explain to students how to perform basic operations with numbers and how to use functions to enhance their work, and
- 3) to illustrate, step by step, the creation of charts using data from a spreadsheet.

## 1. Basic use of the program

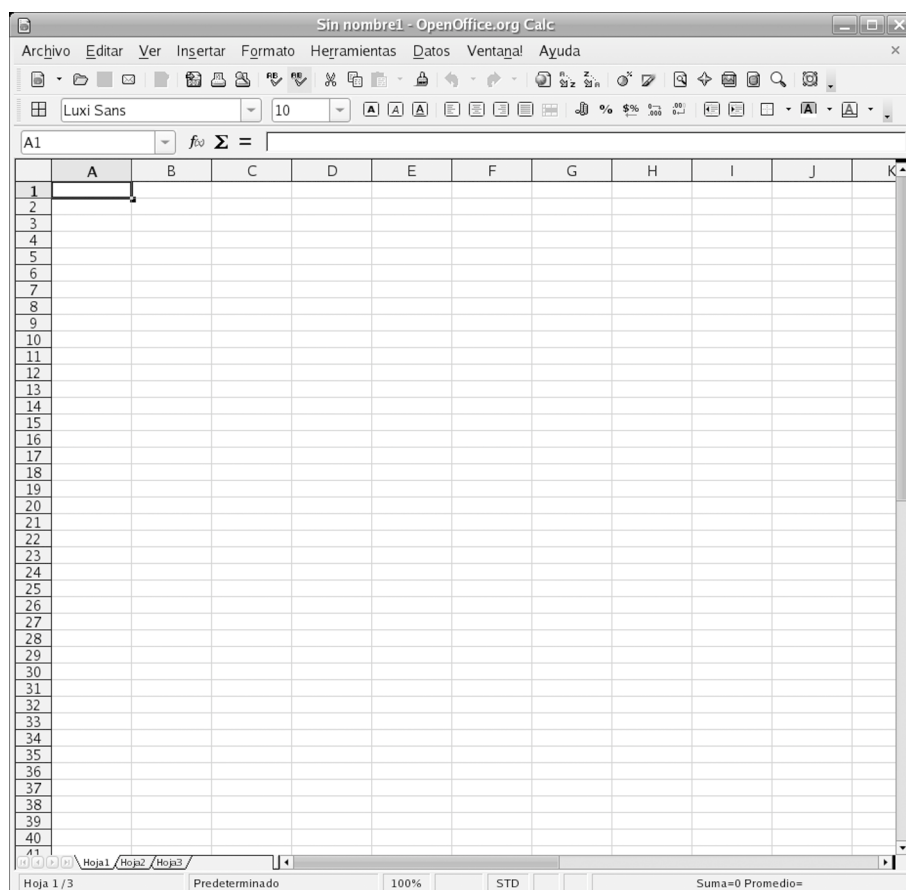
Calc can be launched from any OpenOffice.org application by selecting the File -> New -> Spreadsheet menu option.

Tips can be very useful for learning about the different features of the program. Tips are displayed for each of the labels and buttons on the screen. You can enable or disable this option using the Help -> Tips menu option.

### 1.1. The working environment

As with the other applications, if you need help with a dialog box or window, you can always click on the Help button or press F1.

Figure 1. The Calc working environment



We will now describe the diverse elements in the program's workspace:

- The **Menu bar** contains the various actions that can be carried out globally across the OpenOffice.org program and those that are specific to Calc.

- The **Function bar** indicates the full path of the file being edited and provides a shortcut to the program's global features.
- The **Object bar** is used to apply formatting to the objects you are working on at a given time. The most useful of these will be the text display and cell formatting tools.
- The **Formula bar** allows you to enter formulae, create quick sums, launch the AutoPilot features and browse different areas of a spreadsheet.
- The **Main toolbar**, positioned vertically down the left-hand side of the document, gives quick access to the most common spreadsheet functions.
- The **Status bar** at the bottom of the screen has a number of functions, which include displaying the spreadsheet number and the total number of spreadsheets, applying page styles (by right-clicking on Standard), changing zoom percentage and changing the default type of text selection.
- The **tabs** can be used for easy scrolling through the spreadsheets of a document.
- The **Stylist** is used to automatically apply cell and page styles. To show or hide the Stylist, press F11 or use the Format -> Stylist menu option.

## 1.2. Creating a sample document

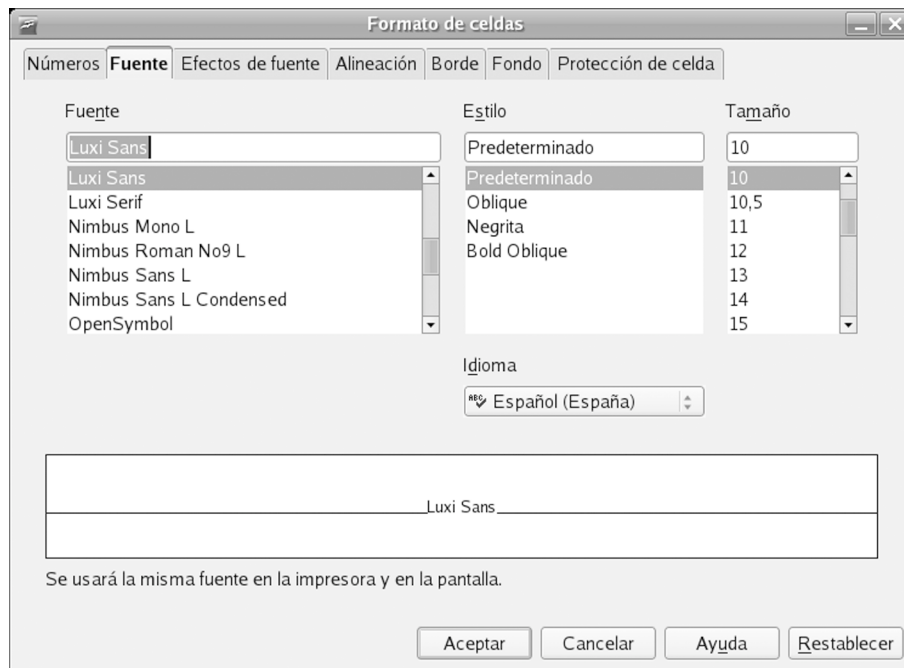
We will now look at the basics of this program by creating a sample spreadsheet. To do so, follow these instructions step by step.

1) Launch OpenOffice.org and create a new spreadsheet document by selecting the File -> New -> Spreadsheet option from the main menu. This will open a new window with a blank spreadsheet.

2) In this blank sheet, go to cell A1 and enter the following text: "Calculation of credit card use" and change the font size to 20. To do this, either go to the program's Object bar or right-click the cell and select Format Cells from the context menu. In the Format Cells dialog box, go to the Font tab.



Figure 2. Format Cells Font tab

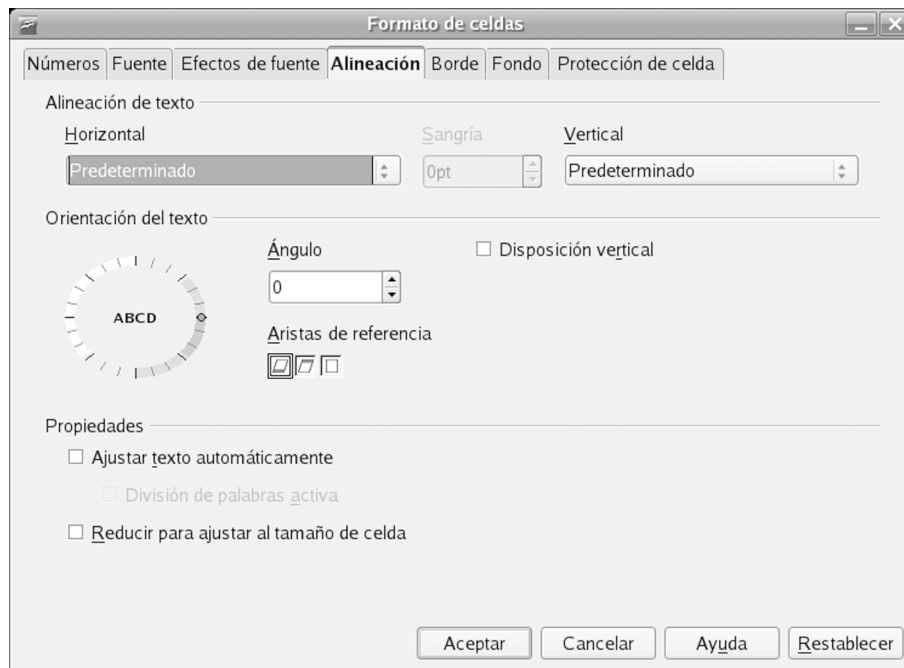


3) Select the entire row by clicking on the grey square with the row 1 label and change the background colour of the title using the Background Color button on the Object bar.

4) In cells **A4**, **B4**, **C4** and **D4** type "Annual percentage rate", "Monthly interest", "Starting balance" and "Monthly payment", respectively. You will see that the text does not fit in the column space. You can change the size of the columns by dragging their borders but you can also fit the text on more than one line. To do this, select these cells by clicking on cell **A4** and without releasing the mouse button, move across to **D4**.

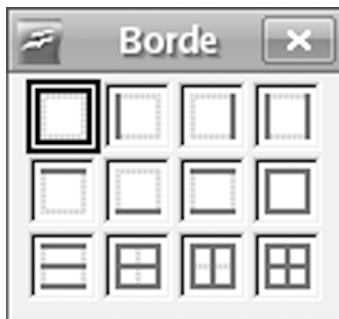
5) Select the Format -> Cells menu option and click on the Alignment tab in the Format Cells dialog box. In this tab, check the Automatic line break option.

Figure 3. Format Cells Alignment tab



6) With the text still selected, format it in italics and centre it using the program's Object bar. We will now create a border for the selected cells. Go to the Object bar and click and hold the left mouse button on the Borders button and select the bottom border.

Figure 4. Borders window



7) Position the cursor on cell A5 and click on the Number Format: Percent button to indicate the cell format and enter ".20", where the full stop is the decimal point. Then press the tab key to move to the next cell.

8) In cell B5, click on the % button in the Object bar and type in the following formula " $=A5/12$ ", which divides by 12 months the annual value recorded in cell A5.

9) In cells C5 and D5, click on the Number Format: Currency button to indicate that you are going to enter a value in € in these cells. Type the values "6000" and "125", respectively, in these cells.

10) In cells **A8** to **D8** enter the following text: "Payment Number", "Interest", "Capital" and "Balance" respectively. Then format the text in the same way as you did with cells **A4** to **D4**.

11) In cell **A9** , type the number "1".

12) Position the cursor on cell **B9** and check the Number Format: Currency option before typing in the following formula `"=$B$5*$C$5"`. This multiplies the contents of cell **B5** (the monthly interest rate) by the contents of cell **C5** (the credit card balance). When we use the \$ signs, we are telling the application that the cell address is an absolute reference. We will explain the meaning of this concept later when we look at cell references.

13) In cells **C9** and **D9**, after clicking on the Number Format: Currency button, type the following formulae: `"=D$5-B9"` and `"=$C$5-C9"`. The first formula subtracts the amount of interest paid this month from the monthly payment, which gives us the amount of capital taken from the total card balance. The second formula subtracts the monthly capital payment from the starting balance of the credit card.

14) We will need to add a new row of data to be able to use the incremental data filling feature. So, in cell **A10** , type in "2" and in the rest of the cells of the row ( **B10** to **D10**), enter the following values: `"=D9*$B$5"`, `"=D$5-B10"` and `"=D9-C10"`.

15) We can now use the automatic incremental data fill process. To begin, select the row of cells from **A10** to **D10**. You will now see a small black square in the bottom right-hand corner of the selection. Position the cursor on it and the square will become a cross. Now, right-click the mouse and drag this cross to row 20. Release the button when you reach this row.

16) You will see that the cells have been filled automatically. If the cell values are the same, press **F9** to force OpenOffice.org to recalculate the spreadsheet.

17) We will now calculate the total interest payable based on the number of payments we have made. Go to cell **E9** and click on the Number Format: Currency button. Enter this text `"=SUM("` and then use the mouse to select all of the values in column B, starting at **B9**. Once you have selected these, close the formula with a bracket. The result should look like this: `"=SUM(B9:B20)"`.

The best thing about spreadsheets is that when we change a value, the other values in the spreadsheet are automatically updated. To see this, change the original values of row 5. Be very careful about changing cells that contain formulas rather than values, because the results are never what we were hoping for when we change them.

### 1.3. Cell references

Cell references are cell addresses that have been inserted into a formula. These references make spreadsheets very flexible because the reference remains the same even if its contents change. We do not need to manually enter cell references in a formula because the program does this automatically if we click on the cell we want to use as a value while we are creating the formula. We can also select a set of formulae and use them as an argument in formulae that allow this.

OpenOffice.org has two types of cell references:

- **Relative references:** when we select and cut or copy a group of cells with a calculated value to a new location, OpenOffice.org will change the references used in the formula so that the calculated values remain as they were. This is possible because the formula references were relative to the rest of the cells. It does not matter if we move them because their relationship to the rest does not change. By default, all references are relative.
- **Absolute references:** there may be times when relative references do not fully meet our needs, such as when we reference cells whose location is never going to change. We say that these cells have an absolute position. In spreadsheets, we mainly use absolute references when we use incremental data filling tools which, as their name suggests, increase cell values and references. However, we do not always want these references to increase. To indicate that a reference is absolute, we need to add a dollar symbol, \$, in front of the name of each coordinate. For example: "\$A\$3".

For absolute references, there is no need to enter the dollar sign before the row and column name every time. We can use different combinations of relative and absolute references, depending on the incremental filling operation we wish to use.

- To use incremental filling across columns (left and right), simply put the dollar sign before the column letters. For example: "\$A1".
- To use incremental filling up and down columns, simply insert the dollar sign before the column number. For example: "A\$1".
- To reference cells that are never going to change location, put the dollar sign before the column letter and row number. For example: "A\$1".

To change these settings quickly in a formula, simply select the elements to be changed (or the whole formula) and use the key combination **Shift+F4**.

## 2. Calculations and functions

In this section, we will look at the process for making calculations and creating formulae to use in our spreadsheet documents.

### 2.1. Basic operators

Operators are the symbols used to tell the program to perform different calculations. The most important of these is the = symbol, which means that what follows is a formula rather than a text. We will now look at the list of operators that we can use in our formulae:

Operator	Description	Example of use
=	Equals sign. All formulae begin with this	=1+3
^	Exponent. Increases the number on the left by the power of the number on the right	=2^8
*	Multiplication	=2*5
/	Division	=21/7
+	Addition	=A1+25
-	Subtraction	=B3-A1
<	Less than	=if(A1<3; "Good";"Bad")
>	Greater than	=if(A2>10; "Good";"Bad")
<=	Less than or equal to	=if(B3<2; "Good";"Bad")
>=	Greater than or equal to	=if(C1>4; "Good";"Bad")
<>	Different	=if(A1<>B1; "Good";"Bad")
:	Range of cells. Includes all cells from the value to the left of the symbol to the value on the right.	=sum(a1:a10)
;	Separates non-consecutive cells and different parts of a formula.	=sum(a1;a3;a5)
!	Intersection	=sum(a1:b3!b2:c7)

## 2.2. Order of evaluation of expressions

We need to take into account the order of evaluation of expressions when we make a calculation. OpenOffice.org evaluates expressions from left to right using the rules of algebraic order. It multiplies, then divides, then adds and finally subtracts. However, if we use exponents, these are calculated before multiplication and division.

So, for the following sum: `"=1+10*2-20/2+4"`, the result is 15, because the multiplications and divisions are made first, giving us `=1+20-10+4`.

However, as in algebra, it is possible to alter these rules using brackets. In this case, OpenOffice.org solves the operations inside the brackets first and then works out the rest of the formula following algebraic rules.

When we use brackets in our formulae, the use of other brackets to control evaluation of the expression is inevitable. In these cases, OpenOffice.org works out the brackets from innermost to outermost. For example: `=(8*(12-2)/((7*2)-(2*2))+12)` equals 20.

## 2.3. Entering formulae

Thus far we have seen the basic operations available in OpenOffice.org for working with values, but the program's most interesting feature is the use of formulae. The sum formula, for example, allows us to select a range of cell references. Without this, we would have to enter the name of each cell one by one.

As formulae are an essential part of spreadsheet work, OpenOffice.org has a variety of built-in functions. These allow the user to calculate anything from a sum or square root to conditions that make a cell display a certain text if an expression is true or false (the 'IF' function). In this section, we will look at some of the program's more useful features.

### 2.3.1. Quick sum

OpenOffice.org allows columns or rows to be added very quickly with a single mouse click. Simply click on the cell where you want the sum to be inserted and then click on the Sum button in the Formula bar.

OpenOffice.org will automatically select a range of cells for the sum function. You can use the suggested default range or you can change it if it is incorrect. Simply drag the selection across the spreadsheet cells and change their size by clicking and dragging the black square in the bottom right-hand corner of the selection border. To mark cells in spaces that are not adjacent, press **Ctrl** as you click on them.

After ensuring that the selection is correct, press **Enter** to calculate the formula.

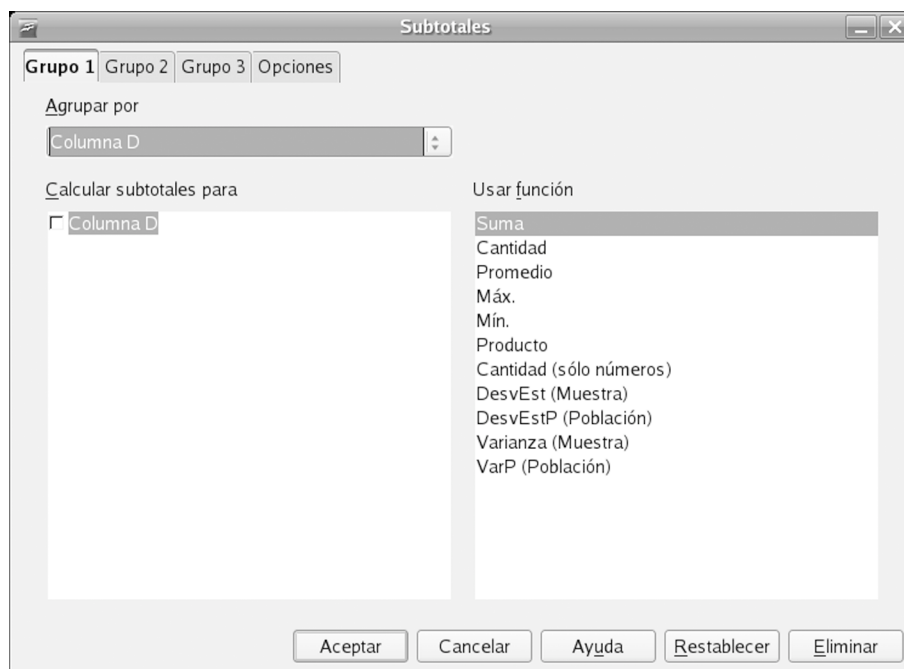
### 2.3.2. Subtotals

If you have a column of numbers that you wish to add up, you can use OpenOffice.org's Subtotal function to generate automatic balances. This feature inserts a new row for the subtotals it generates so that references to other cells, where used, can be modified. As a result, you will need to use absolute references in your formulae here.

The steps to the process are as follows:

- 1) Select the area in which to generate the subtotals.
- 2) Go to the Data -> Subtotals option in the main menu, which will bring up the Subtotals dialog box.

Figure 5. 1st Group tab of the Subtotals dialog box

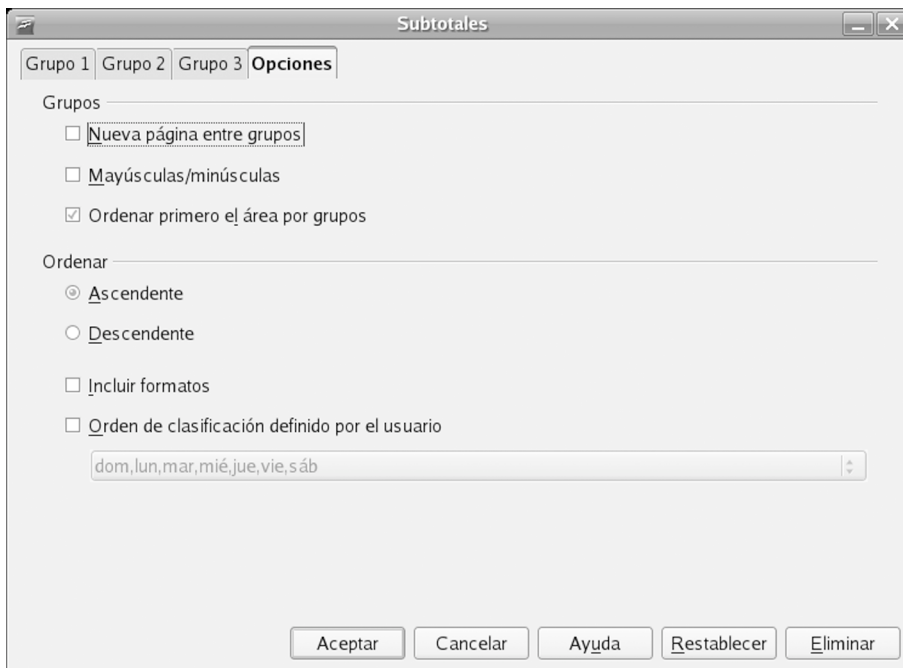


In the Group by field, select the column in which to group the data. You can use the other tabs of the Subtotals dialog box to create new groups, if need be.

In the Calculate subtotals for list, mark the columns for which you want to generate subtotals and select the type of operation to use in Use Function.

- 3) To modify any of the Subtotals options, go to the Options tab.

Figure 6. Subtotals dialog box Options tab



In the Groups section, you can specify whether to insert a page break between different groups, whether to respect word case when generating subtotals and whether to pre-sort the area according to groups.

In the Sort section, you can enter any further group sorting options.

4) After defining the settings, click on OK to close the dialog box.

You will see that when OpenOffice.org creates the subtotals, it allows us to expand and reduce the groups created using a new toolbar.

## 2.4. Use of the AutoPilot: Functions

OpenOffice.org has a tool called AutoPilot: Functions that can be used to insert formulae very easily. The steps for launching the tool are as follows:

- 1) Position the cursor in the cell where you want to place the function.
- 2) Click on the AutoPilot: Functions button in the Function bar.
- 3) In the first AutoPilot: Functions dialog box, select the function you wish to use and click on Next.



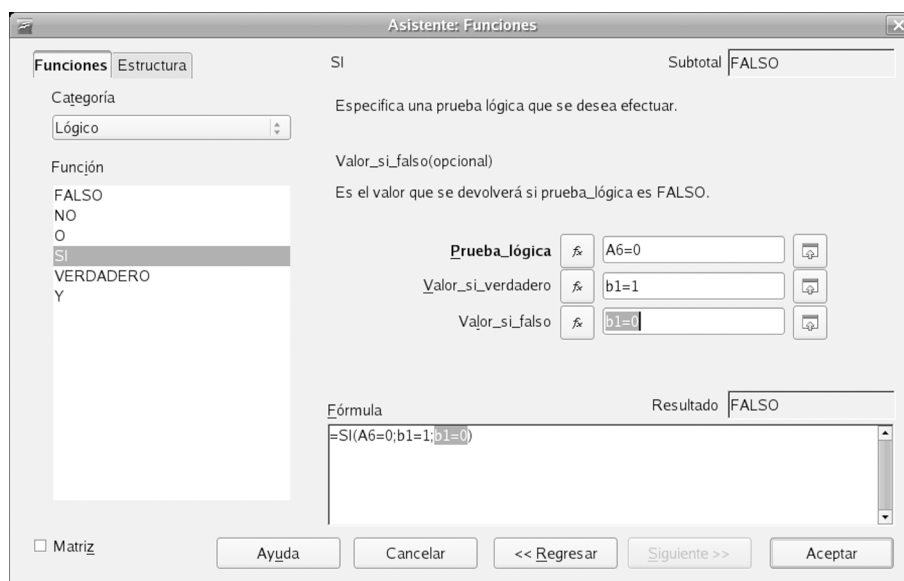
Figure 7. First AutoPilot: Functions dialog box



In the Category field, you can specify all of the available functions or just those from a certain category. In Function, select the function to use. A description will appear on the right.

4) In the second AutoPilot: Functions dialog box, enter the formula.

Figure 8. Second AutoPilot: Functions dialog box



The second AutoPilot: Functions dialog box displays each element required for the function. Click on a function field to view a description of the element.

You can type values directly in the function fields or click on the minimize button to the right of each field. When you click on this button, you can select the cells from your spreadsheet. The selected cells will be automatically

inserted in the formula when the window is restored. You can also insert a formula inside an element of another formula. To do this, click on the fx button to the left of each field.

The Formula field displays the formula as you create it. You can also edit it in this field.

The Function result field indicates whether the values you have entered are valid.

5) Once you have completed the formula, click on the OK button.

AutoPilot: Functions is a very useful tool that can help us to learn how to use the program's functions in a straightforward way.

### 3. Creating graphs from data

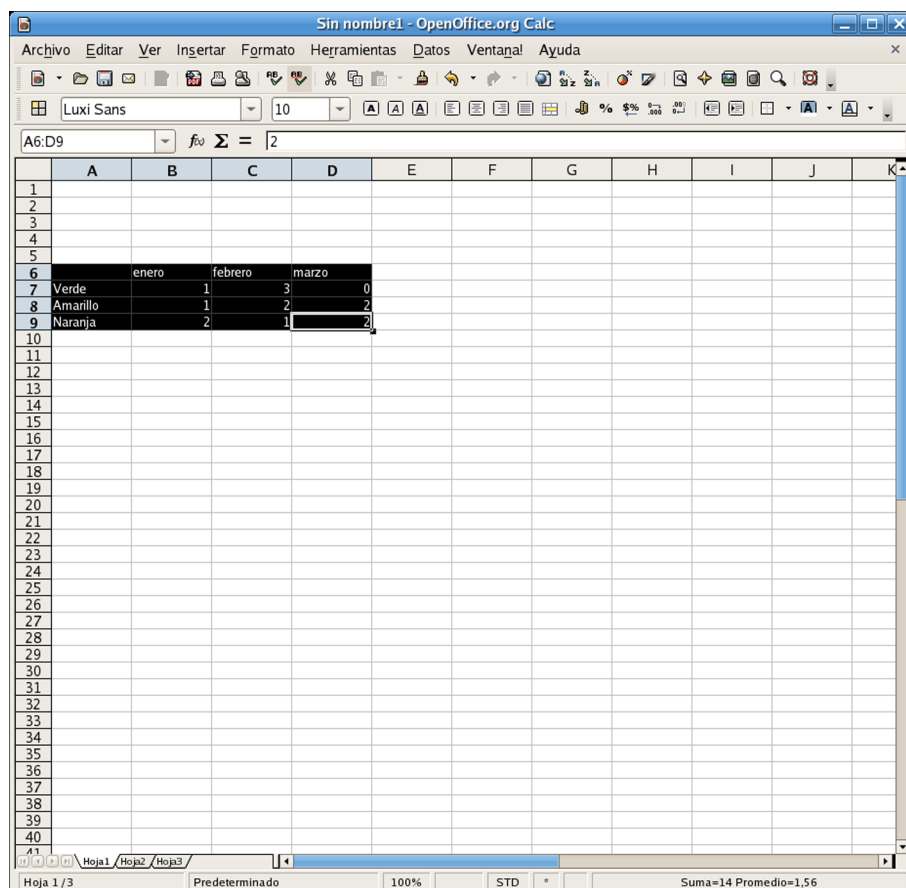
One of the most eye-catching elements of spreadsheets are graphs used to display results. OpenOffice.org offers many types of predefined charts that can be used to create graphs in just a few clicks.

#### 3.1. Creating a graph

This section will look at the steps required to create a graph with the AutoFormat Chart tool.

1) Select the data to use for your spreadsheet graph. You can select numerical data only but it is also possible to mark text, which OpenOffice.org will use for the legend and even the title.

Figure 9. Data selected in a spreadsheet

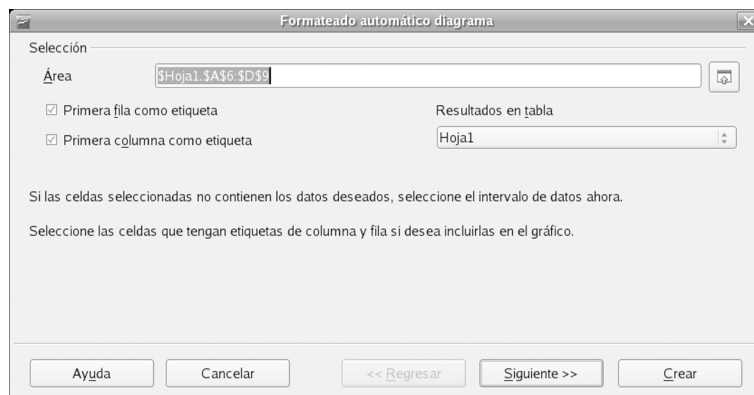


	A	B	C	D	E	F	G	H	I	J	K
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2											
3											
4											
5											
6		enero	febrero	marzo							
7	Verde	1	3	0							
8	Amarillo	1	2	2							
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2) In the Main toolbar, click and hold the mouse on the Insert Object button until the Insert Object toolbar appears. Then click on Insert Chart.

3) The mouse pointer will change into a cross with a bar chart in the bottom right-hand corner. Click on the cells you selected previously to bring up the AutoFormat Chart tool.

Figure 10. Selection of source data



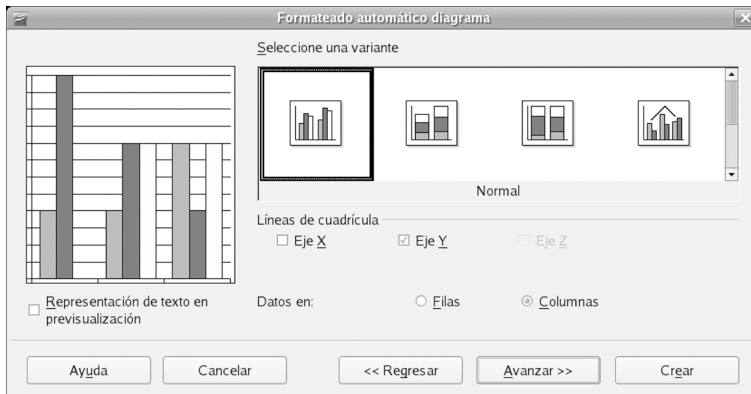
4) In the Range field, enter the location of the data you are going to use to draw the chart. If your selection was incorrect, click on the button at the end of the text field to select the data again. You can also create titles for the graph by marking the First row as label option, which turns the first row of selected cells into the label content, or check First column as label to use these data for the chart legend. Click on Next to continue.

Figure 11. Type of diagram selection



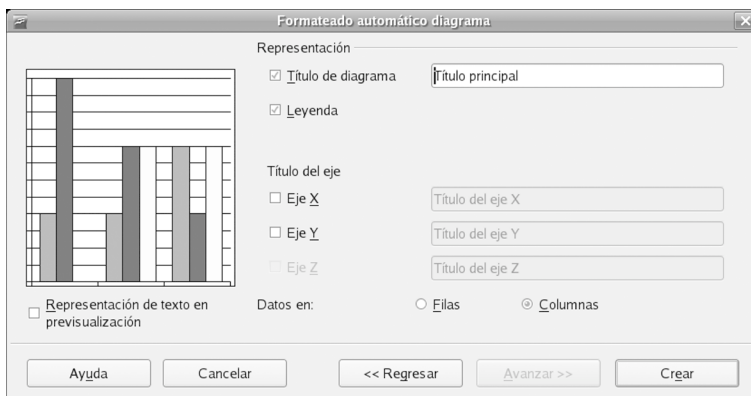
5) In the Chart Type selection dialog box, select the type of chart you wish to use to represent the information. Note that not all charts can be used to represent all types of tables of information. The Data series in option can be used to specify the type of information displayed on the axes and the type shown in the legend. To preview the result, you can mark Show text items in preview. Click on Next to continue.

Figure 12. Chart variant selection



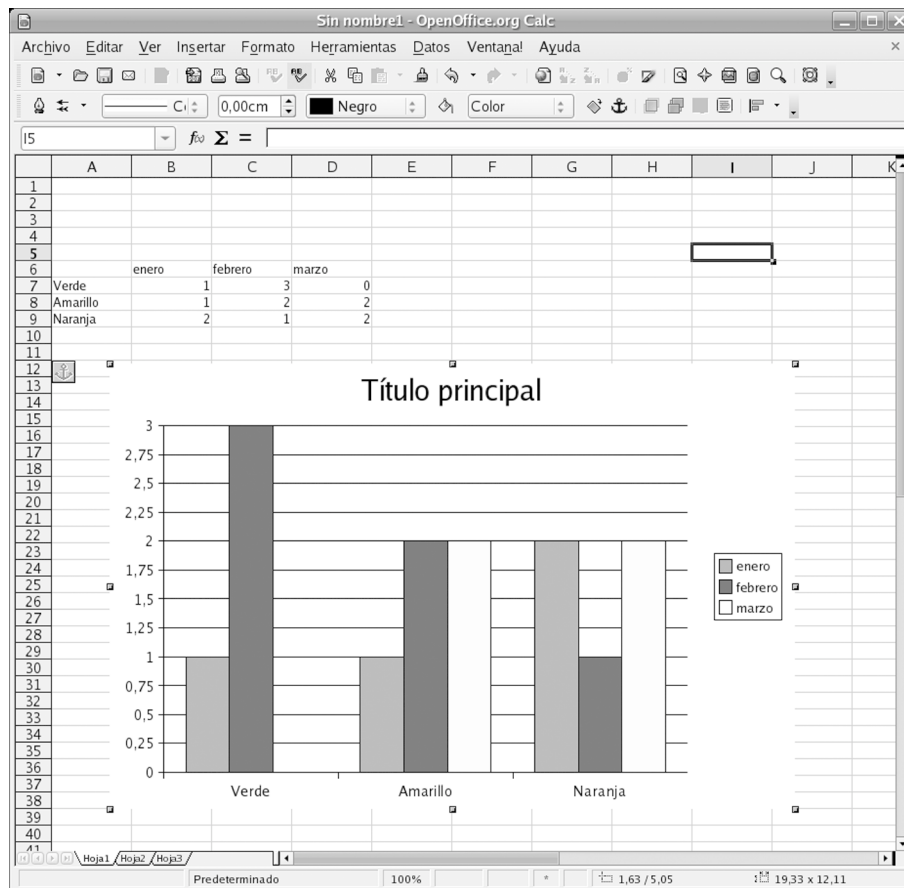
6) The next window is used to select a variant of the type of chart selected. You can also decide whether it should display different gridlines for each data axis. Click on Next to continue.

Figure 13. Data representation



7) Finally, you can enter the title of the chart and any of its axes in the last dialog box. To display or hide a title, check or uncheck it according to your preferences. Click on the Create button to insert the chart in the current spreadsheet.

Figure 14. Chart inserted in a spreadsheet



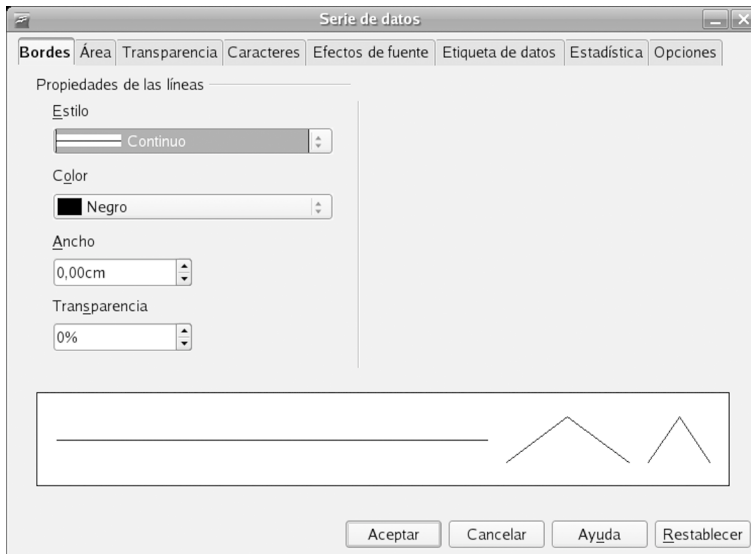
### 3.2. Modifying a chart

Although your first attempt may produce a perfect chart, more often than not you will want to modify its appearance to adapt it to your expectations after creating it. To modify a chart, simply double-click on it to display a new toolbar that will replace the program's Main toolbar.

This toolbar is fairly straightforward to use. Simply hover the mouse over a button to find out what it does.

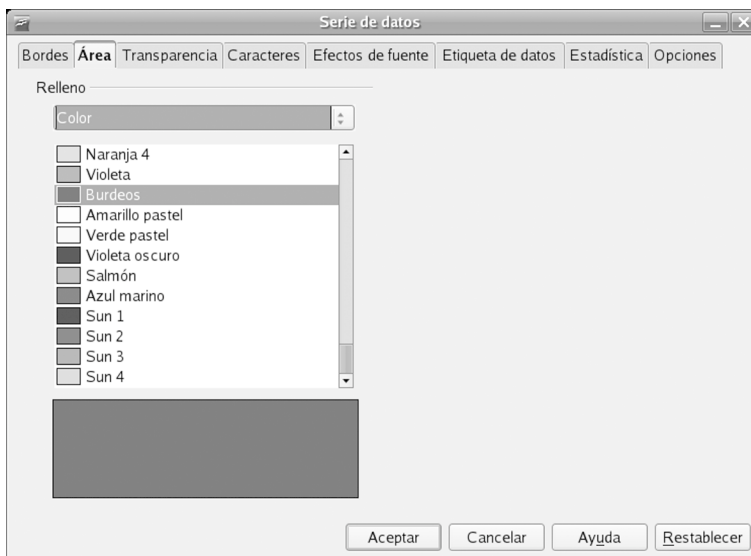
Besides the features of this toolbar, we can also modify the format of the individual elements in the chart. To do this, simply double-click on the element you wish to modify. This will bring up a dialog box with different tabs containing the available customising options for the selected element. Not all elements have the same customisation options. The possible tabs are now described briefly.

Figure 15. Data Series dialog box Lines tab



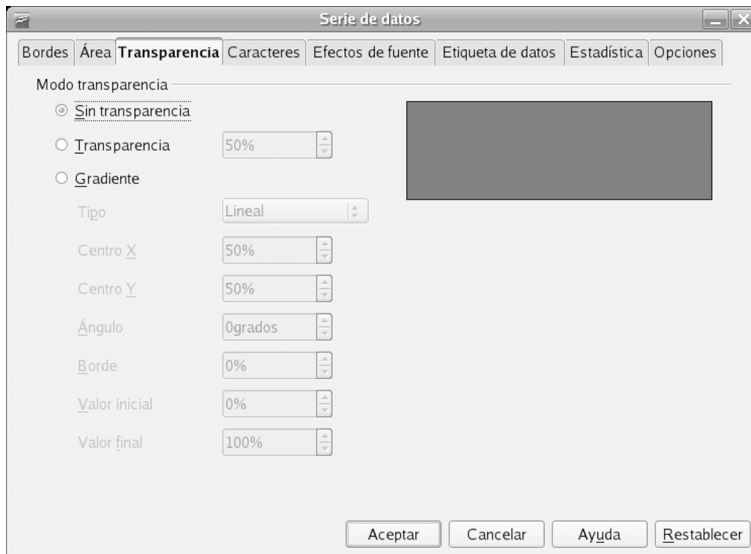
- The **Lines tab** is used to select the line or border style, colour, width and transparency of the selected object.

Figure 16. Data Series dialog box Range tab



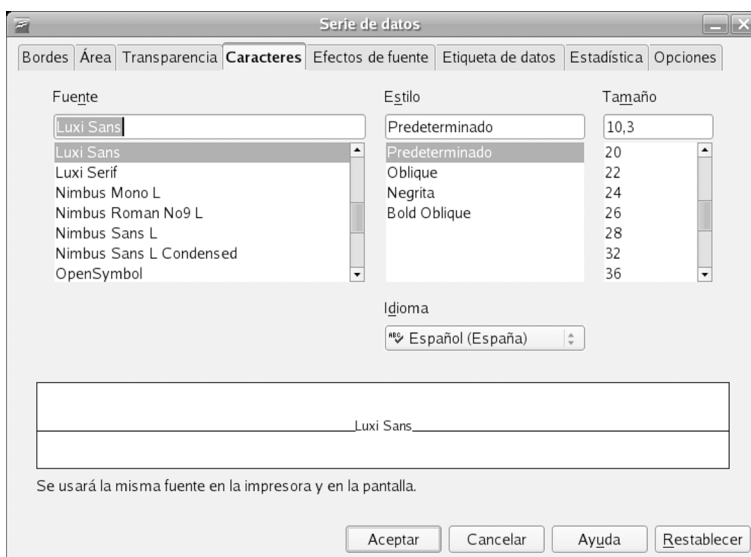
- The **Area tab** is used to select a colour, gradient, pattern or bitmap for the area of the selected object. It is also possible to enter more options, depending on the object.

Figure 17. Data Series dialog box Transparency tab



- The **Transparency tab** is used to define the transparency settings for the options specified in the Area tab. The greater the transparency, the less intense the colour, gradient, pattern or bitmap. It is also possible to specify gradient options to modify the colour intensity gradually.

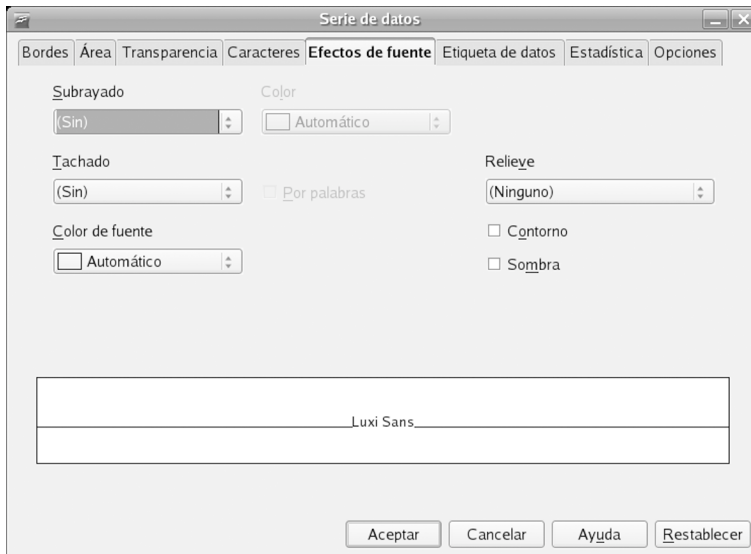
Figure 18. Data Series dialog box Characters tab



- The **Characters tab** is used to customise the features of the source of the selected element.

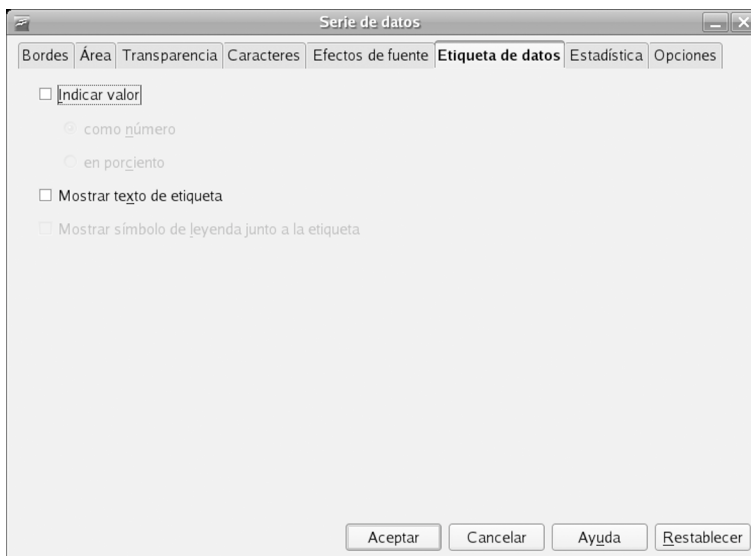


Figure 19. Data Series dialog box Font Effects tab



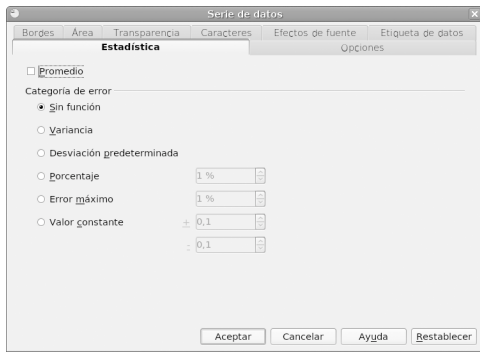
- The **Font Effects tab** is used to apply extra effects to the source of the selected object.

Figure 20. Data Series dialog box Data Label tab



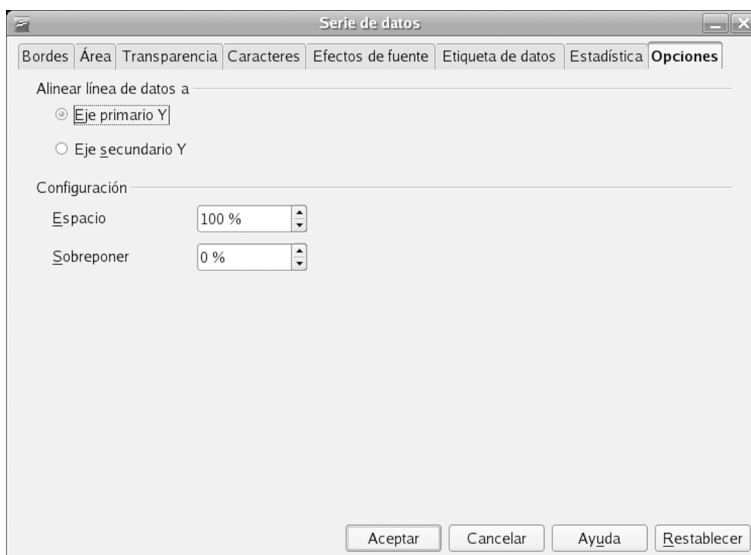
- The **Data Label tab** is used to add a value (such as a number or percentage) and a label to the selected element.

Figure 21. Data Series dialog box Statistics tab



- The **Statistics tab** is only available for 2D charts and is used to display statistical information on chart data such as variance, default deviation, percentage deviation, maximal error and constant value.

Figure 22. Data Series dialog box Options tab



- The **Options tab** is used to display a secondary Y axis and to enter the distance between the data and the chart.

After creating your chart, you can modify the data you entered using the wizard you created it with. To do so, right-click the chart and select the AutoFormat option from the context menu. To finish modifying, click on the Create button.

You can also automatically change the type of chart you chose without going through the wizard again by right-clicking the chart and selecting the Chart Type option from the context menu.

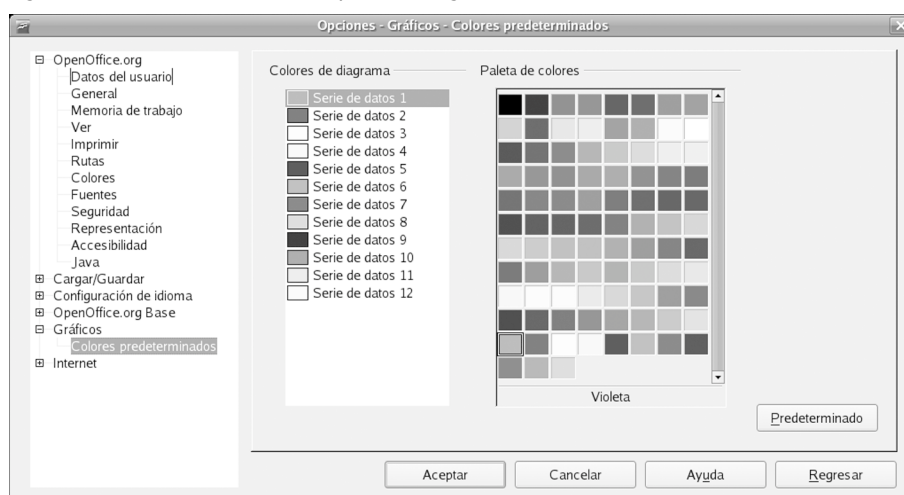
Figure 23. Changing Chart Type dialog box



In the Chart Type dialog box, you can quickly change the type of graph you would like to use to represent the selected data.

To change the default graph colours, go to the Tools -> Options -> Chart -> Default Colors menu option, select each colour you wish to change and specify a new one from the system colour palette.

Figure 24. Chart – Default Colors options dialog box.



## Summary

In this brief unit, we looked at the basics of how to use Open Calc by creating a sample spreadsheet. This exercise allowed students to familiarise themselves with the OpenOffice.org working environment for spreadsheets.

We also looked at the system used by the program to perform basic arithmetical operations and the possibilities of Open Calc's default formulae.

Lastly, we saw how to create charts using one of the program's many wizards.