UNIT-2: ELECTRONIC SPREADSHEET (ADVANCED)

SESSION 1: ANALYSE DATA USING SCENARIOS AND GOAL SEEK

SESSION 2: LINK DATA AND SPREADSHEETS

SESSION 3: SHARE AND REVIEW A SPREADSHEET

SESSION 4: CREATE AND USE MACROS IN SPREADSHEET

SESSION 1: ANALYZE DATA USING SCENARIOS AND GOAL SEEK

Consolidating data

Data Consolidation allows you to gather together your data from separate worksheets into a master worksheet. In other words, the Data Consolidation function takes data from a series of worksheets or workbooks and summaries it into a single worksheet that you can update easily.

1) Open the worksheet that contains the cell ranges to be consolidated.
2) Choose the Consolidate option under the Data menu as shown in Figure2.1. The Consolidate dialog box is shown in Figure 2.2.

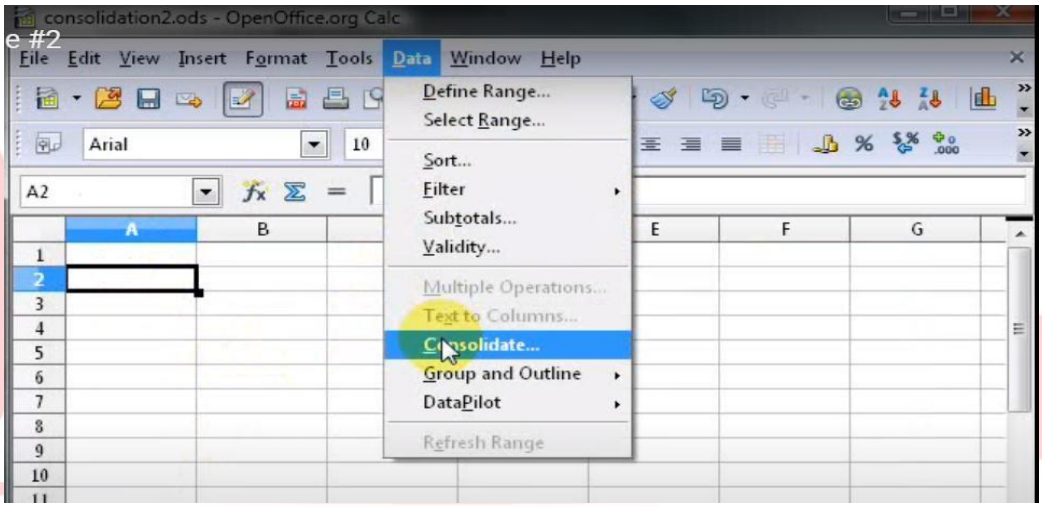


Figure 2.1: Consolidate option under Data Menu

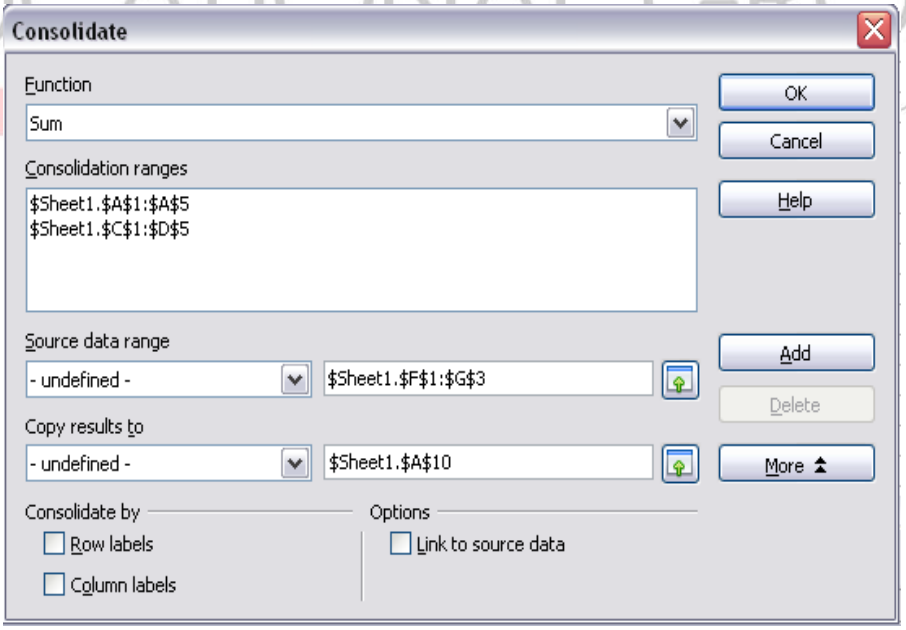


Figure 2.2: Consolidate Dialog box defining the data to be consolidated

3) If the **Source data range** list contains named ranges, you can select a source cell range to consolidate with other areas.
   If the source range is not named, click in the field to the right and either type a reference for the first source data range or use the mouse to select the range on the sheet. (You may need to move the Consolidate dialog to reach the required cells.)
4) Click **Add**. The selected range now appears on the Consolidation ranges list.
5) Select additional ranges and click **Add** after each selection.
6) Specify where you want to display the result by selecting a target range from the Copy results to box.
   If the target range is not named, click in the field next to **Copy results to** and enter the reference of the target range or select the range using the mouse or position the cursor in the top left cell of the target range.
7) Select a function from the Function list. The function specifies how the values of the consolidation ranges are linked. The Sum function is the default setting.
   Most of the available functions are statistical (such as AVERAGE, MIN, MAX, STDEV), and the tool is most useful when you are working with the same data over and over.
8) Optionally click **More** in the Consolidate dialog to display additional settings.

- Select **Link to source data** to insert the formulas. This generates the results in the target range instead of the actual results. If you link the data, any values modified in the source range are automatically updated in the target range. The corresponding cell references in the target range are inserted in consecutive rows, which are automatically ordered and then hidden from view. Only the final result, based on the selected function, is displayed.
- Under **Consolidate by** setting, select either *Row labels or Column labels*, if the cells of the source data range are not to be consolidated corresponding to the identical position of the cell in the range, but instead according to a matching row label or column label. To consolidate by row labels or column labels, the label must be contained in the selected source ranges. The text in the labels must be identical, so that rows or columns can be accurately matched. If the row or column label does not match any that exist in the target range, it will be appended as a new row or column.

9) Click **OK** to consolidate the ranges.
10) If you are continually working with the same range, then you probably want to use **Data > Define Range** to give it a name. Define Range option is available under the Data Menu.

The data from the consolidation ranges and target range are saved when you save the worksheet. If you later open a worksheet in which consolidation has been defined, this data will again be available.

Creating Subtotals

SUBTOTAL is a function listed under the Mathematical category when you use the Function Wizard (**Insert > Function**). Because of its usefulness, the function has a graphical interface. It is accessible from Data menu as shown in Figure2.3.

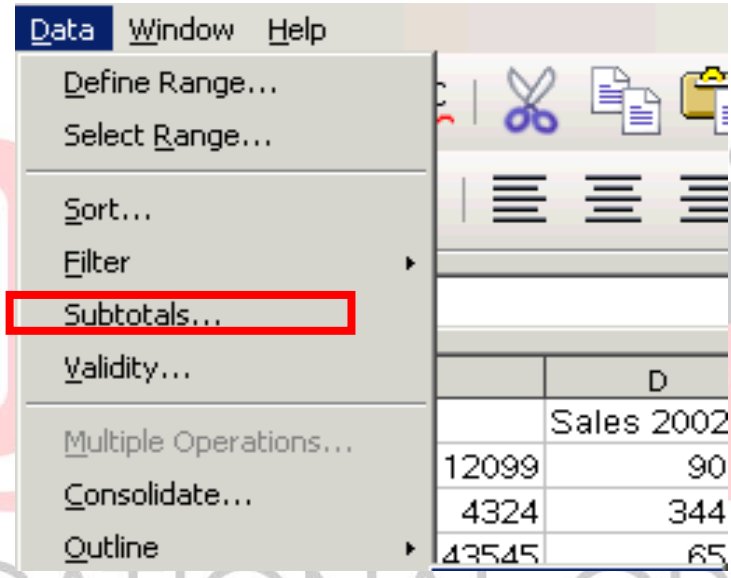


Figure 2.3: Subtotal option under Data Menu

SUBTOTAL, totals/adds data arranged in an array—that is, a group of cells with labels for columns and/or rows. Using the Subtotals dialog, you can select arrays, and then choose a statistical function to apply to them. For efficiency, you can choose up to three groups of arrays to which to apply a function. When you click **OK**, Calc adds subtotals and grand totals to the selected arrays, using the Result and Result2 cell styles for them. Steps to insert subtotal values into a sheet:

1) Ensure that the columns have labels.
2) Select the range of cells that you want to calculate subtotals for, and then choose **Data -> Subtotals**.
3) In the Subtotals dialog (Figure 2.4), in the **Group by** box, select the column that you want to add the subtotals to. If the contents of the selected column change, the subtotals are automatically recalculated.
4) In the **Calculate subtotals** for box, select the columns containing the values that you

want to subtotal.

5) In the **Use function** box, select the function that you want to use to calculate the subtotals.
6) Click **OK**.

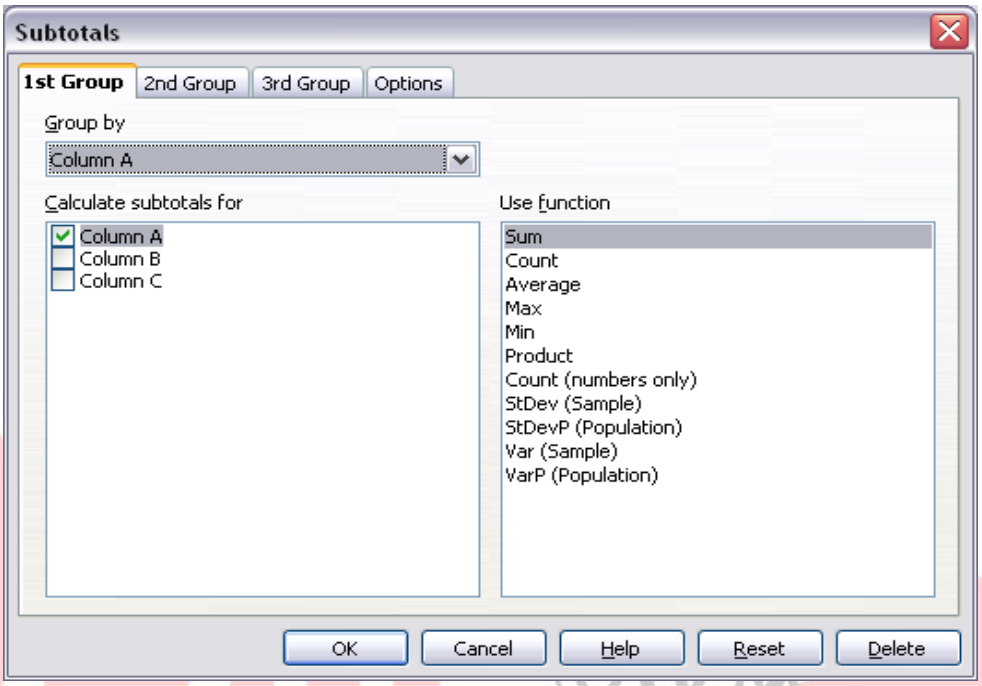


Figure 2.4: Setting up subtotals

If you use more than one group, then you can also arrange the subtotals according to choices made on the dialog's Options page (Figure 2.5), including ascending and descending order or using one of the predefined custom sorts defined under Tools menu as **Tools-> Options-> OpenOffice.org Calc-> Sort Lists**.

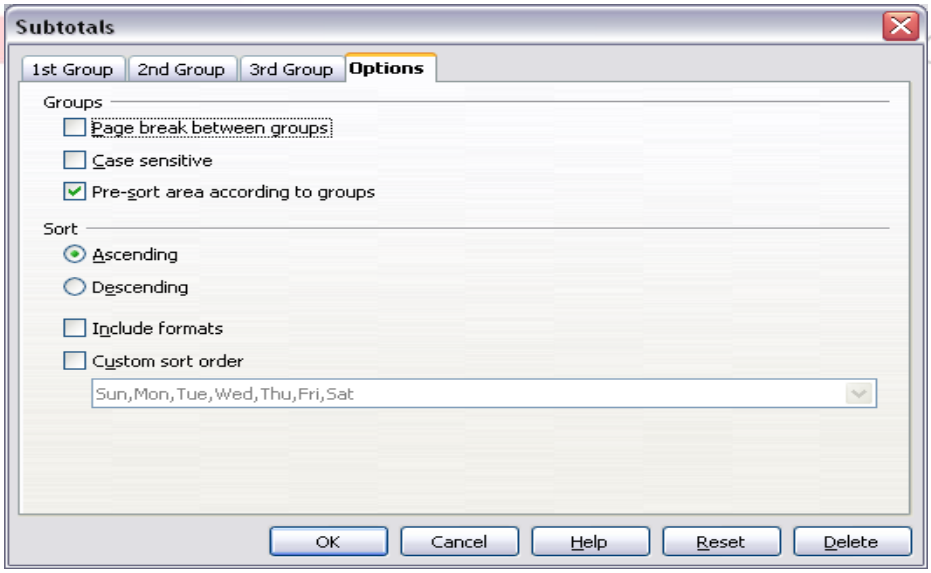


Figure 2.5: Choosing options for subtotals

Using "What If" Scenarios

Scenarios are a tool to test "what-if" questions. Each scenario is named, and can be edited and formatted separately. When you print the spreadsheet, only the content of the currently active scenario is printed.

A scenario is essentially a saved set of cell values for your calculations. You can easily switch between these sets using the Navigator or a drop-down list which can be shown beside the changing cells. For example, if you wanted to calculate the effect of different interest rates on an investment, you could add a scenario for each interest rate, and quickly view the results. Formulas that rely on the values changed by your scenario are updated when the scenario is opened. If all your sources of income used scenarios, you could efficiently build a complex model of your possible income.

Creating Scenarios

Use Scenarios option under Tools menu to enter variable contents—scenarios—in the same cell. To create a scenario:

1) Select the cells that contain the values that will change between scenarios. To select multiple cells, hold down the Ctrl key as you click each cell.
2) Choose **Tools > Scenarios**.
3) On the Create Scenario dialog (Figure 2.6), enter a name for the new scenario. It's best to use a name that clearly identifies the scenario, not the default name as shown in the illustration. This name is displayed in the Navigator and on the title bar of the scenario on the sheet itself.

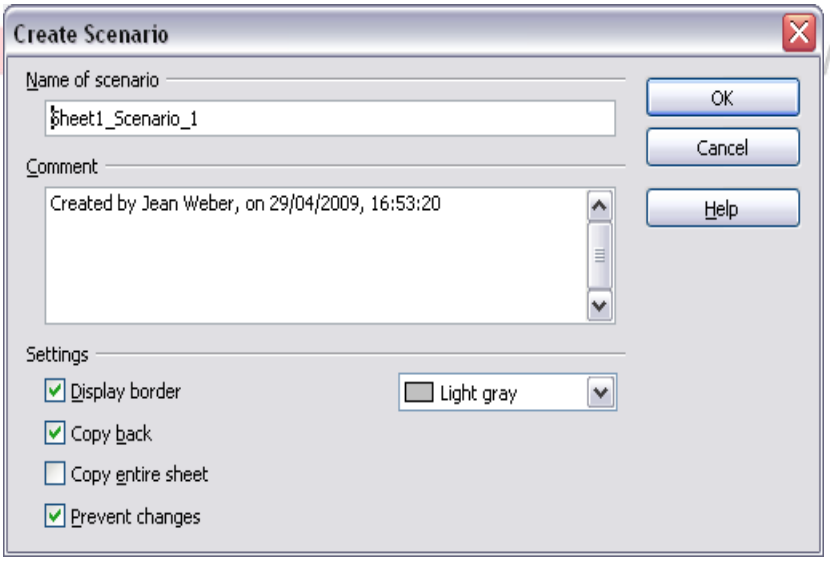


Figure 2.6: Creating a scenario

4) Optionally add some information to the Comment box. The example shows the default comment. This information is displayed in the Navigator when you click the Scenarios icon and select the desired scenario.
5) Optionally select or deselect the options in the Settings section. See below for more information about these options.
6) Click **OK** to close the dialog. The new scenario is automatically activated.
You can create several scenarios for any given range of cells.

Using Goal Seek

Usually, you run a formula to calculate a result based upon existing values. By contrast, using Goal Seek option under Tools menu, you can discover what values will produce the result that you want.

To take a simple example, imagine that the Chief Financial Officer of a company is developing sales projections for each quarter of the forthcoming year. She knows what the company's total income must be for the year to satisfy stockholders. She also has a good idea of the company's income in the first three quarters, because of the contracts that are already signed. For the fourth quarter, however, no definite income is available. So how much must the company earn in Q4 to reach its goal? The CFO can enter the projected earnings for each of the other three quarters along with a formula that totals all four quarters. Then she runs a goal seek on the empty cell for Q4 sales, and receives her answer.

Other uses of goal seek may be more complicated, but the method remains the same. Only one argument can be altered in a single goal seek.

Goal Seek example

To calculate annual interest (I), create a table with the values for the capital (C), number of years (n), and interest rate (r). The formula is I = C*n*r.
Let us assume that the interest rate r of 7.5% and the number of years n (1) will remain constant. However, you want to know how much the investment capital C would have to be modified in order to attain a particular return I. For this example, calculate how much capital C would be required if you want an annual return of $15,000.
Enter each of the values mentioned above into adjacent cells (for Capital C, an arbitrary value like $100,000 or it can be left blank; for number of years n, 1; for interest rate r, 7.5%). Enter the formula to calculate the interest I in another cell. Instead of C, n, and r

use the reference to the cell with the corresponding value. In our example, this would be =B1*B2*B3.

1. Place the cursor in the formula cell (B4), and choose Tools > Goal Seek.
2. On the Goal Seek dialog, the correct cell is already entered in the Formula cell field.
3. Place the cursor in the Variable cell field. In the sheet, click in the cell that contains the value to be changed, in this example it is B1.
4. Enter the desired result of the formula in the Target value field. In this example, the value is 15000. The figure below shows the cells and fields.

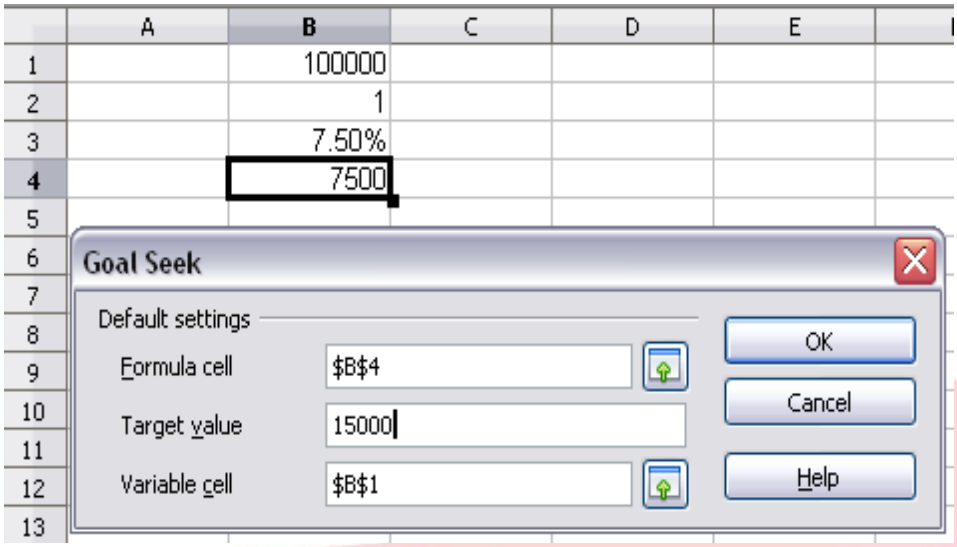


Figure 2.7: Example setup for goal seek

5. Click OK. A dialog appears informing you that the Goal Seek was successful. Click Yes to enter the result in the cell with the variable value. The result is shown below.

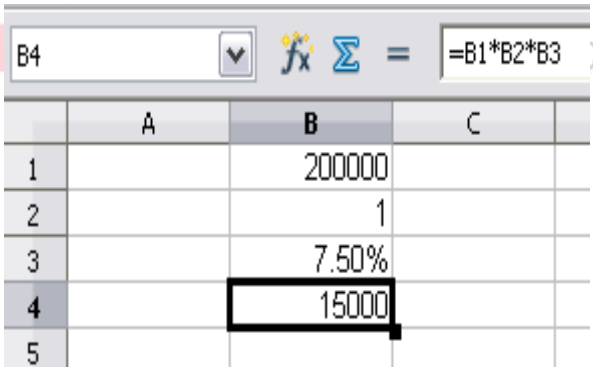


Figure2.8: Result of goal seek operation

Using the Solver

Solver option under Tools menu amounts to a more elaborate form of Goal Seek. The difference is that the Solver deals with equations with multiple unknown variables. It is

specifically designed to minimize or maximize the result according to a set of rules that you define.

Each of these rules sets up whether an argument in the formula should be greater than, lesser than, or equal to the value you enter. If you want the argument to remain unchanged, you enter a rule that the cell that contains it should be equal to its current entry. For arguments that you would like to change, you need to add two rules to define a range of possible values: the limiting conditions. For example, you can set the constraint that one of the variables or cells must not be bigger than another variable, or not bigger than a given value. You can also define the constraint that one or more variables must be integers (values without decimals), or binary values (where only 0 and 1 are allowed).

Once you have finished setting up the rules, you can adjust the argument and the results by clicking the **Solve** button.

Solver example

Let's say you have $10,000 that you want to invest in two mutual funds for one year. Fund X is a low risk fund with 8% interest rate and Fund Y is a higher risk fund with 12% interest rate. How much money should be invested in each fund to earn a total interest of $1000?

To find the answer using Solver:

1. Enter labels and data:
   - Row labels: Fund X, Fund Y, and total, in cells A2 thru A4.
   - Column labels: interest earned, amount invested, interest rate, and time period, in cells B1 thru E1.
   - Interest rates: 8 and 12, in cells D2 and D3.
   - Time period: 1, in cells E2 and E3.
   - Total amount invested: 10000, in cell C4.
2. Enter an arbitrary value (0 or leave blank) in cell C2 as amount invested in Fund X.
3. Enter the formulae given below:
   - In cell C3, enter the formula C4-C2 (total amount - amount invested in Fund X) as the amount invested in Fund Y.
   - In cells B2 and B3, enter the formula for calculating the interest earned (see below).
   - In cell B4, enter the formula B2+B3 as the total interest earned.

B3 f(x) Σ = =C3*D3/100*E3

	A	B	C	D	E	F
1		interest earned	amount invested	interest rate	time period	
2	Fund X	0	0	8	1	
3	Fund Y	1200	10000	12	1	
4	total	1200	10000			
5						
6						

Figure2.9: Example setup for solver

4. Choose Tools -> Solver. The solver dialog opens as shown in Figure 2.10.

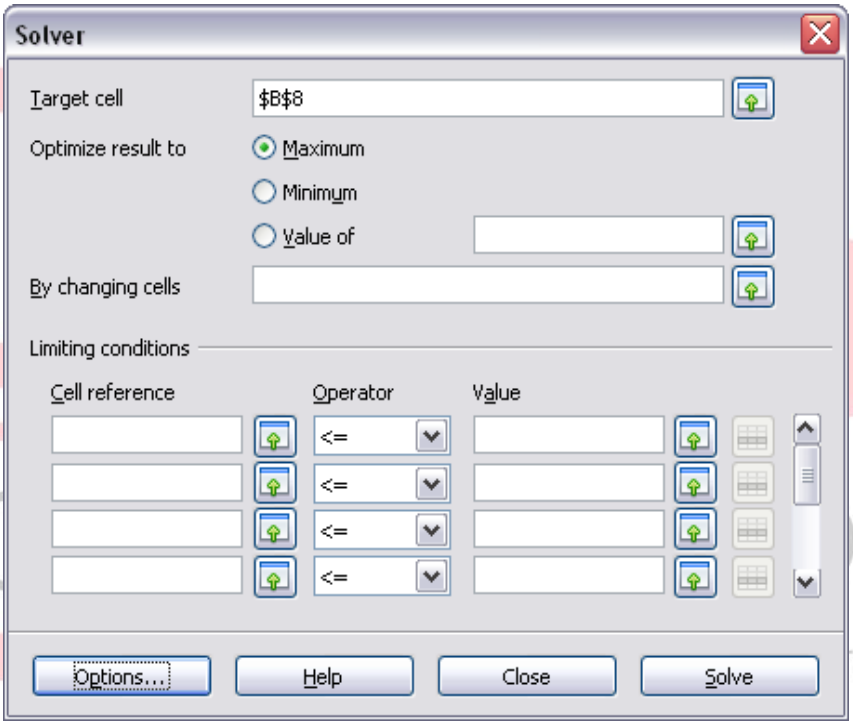
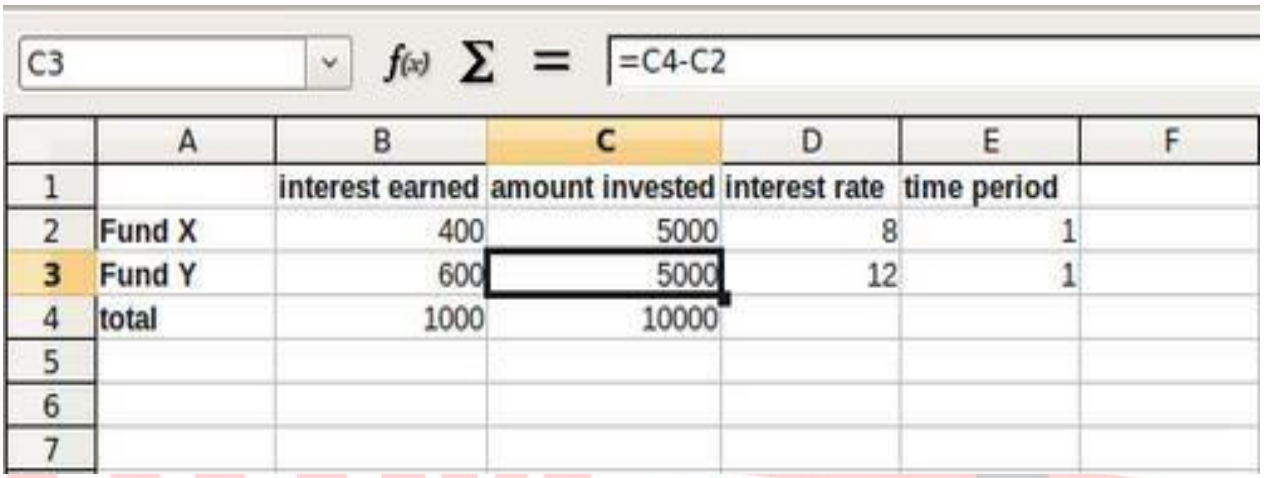


Figure2.10: The Solver dialog

5. Click in the Target cell field. In the sheet, click in the cell that contains the target value. In this example it is cell B4 containing total interest value.
6. Select Value of and enter 1000 in the field next to it. In this example, the target cell value is 1000 because your target is a total interest earned of $1000. Select Maximum or Minimum if the target cell value needs to be one of those extremes.
7. Click in the By changing cells field and click on cell C2 in the sheet. In this example, you need to find the amount invested in Fund X (cell C2).
8. Enter limiting conditions for the variables by selecting the Cell reference, Operator

and Value fields. In this example, the amount invested in Fund X (cell C2) should not be greater than the total amount available (cell C4) and should not be less than 0.

9. Click OK. A dialog appears informing you that the Solving successfully finished. Click Keep Result to enter the result in the cell with the variable value. The result is shown below.



	A	B	C	D	E	F
1		interest earned	amount invested	interest rate	time period	
2	Fund X	400	5000	8	1	
3	Fund Y	600	5000	12	1	
4	total	1000	10000			
5						
6						
7						

Figure2.11: Result of Solver operation

ACTIVITY/ QUESTIONS:

1. A student is planning her goals about the marks she should attain in the forthcoming Semester 4 examinations in order to achieve a distinction (75%). Assuming that examination of each subject is for 100 marks, her marks of the previous semesters are given as under.

	Subject 1	Subject 2	Subjec3	Subject 4
Semester 1	82	67	53	87
Semester 2	88	78	76	69
Semester 3	89	85	91	67

Find out how many marks should she obtain in 4th semester to secure distinction.

2. A business owner wants to decide if he should try to increase the sales a product or price of an existing product in order to increase the profit by 10%.

Current Sales	82
Cost per Unit	75
Profit per unit	12

The owner believes that he can either increase sales by 5 units without incurring additional costs while the price can be increased by Rs 8 without affecting the sales.

3. The current profit situation of a business owner is as follows.

Current Sales	82
Cost per Unit	75
Profit per unit	12

Using the scenario manager, find the effect of in the new profit in case of the following situations.

a. Sales = 70 and cost = 80
b. Sales = 90 and cost = 72
c. Sales = 85 and cost = 80
d. Sales = 65 and cost = 80

SESSION 2: LINK DATA AND SPREADSHEETS

USING MULTIPLE WORKBOOKS AND LINKING CELLS

Relevant Knowledge

Spreadsheet also allows you to link the cells from various worksheets and from various other spreadsheets to summarize data from several sources. In this manner, you can create formulas that span different sources and make calculations using a combination of local and linked information. Multiple sheets help keep information organized

SETTING UP MULTIPLE SHEETS

Identifying sheets

When you open a new spreadsheet, by default, it has a sheet named Sheet1 which is managed using tabs at the bottom of the spreadsheet, as shown below.

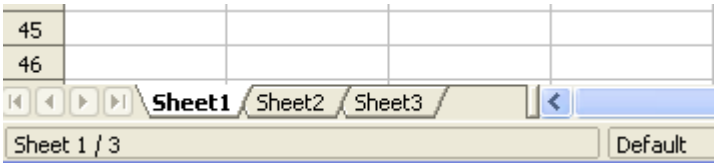


Figure 2.12 Identifying Sheets

Inserting new sheets

There are several ways to insert a new sheet. The first step, in all cases, is to select the sheet that will be next to the new sheet. Then do any of the following:

- Select **Insert > Sheet** from the menu bar, or
- Right-click on the tab and select I**nsert Sheet**, or
- Click in an empty space at the end of the line of sheet tabs.

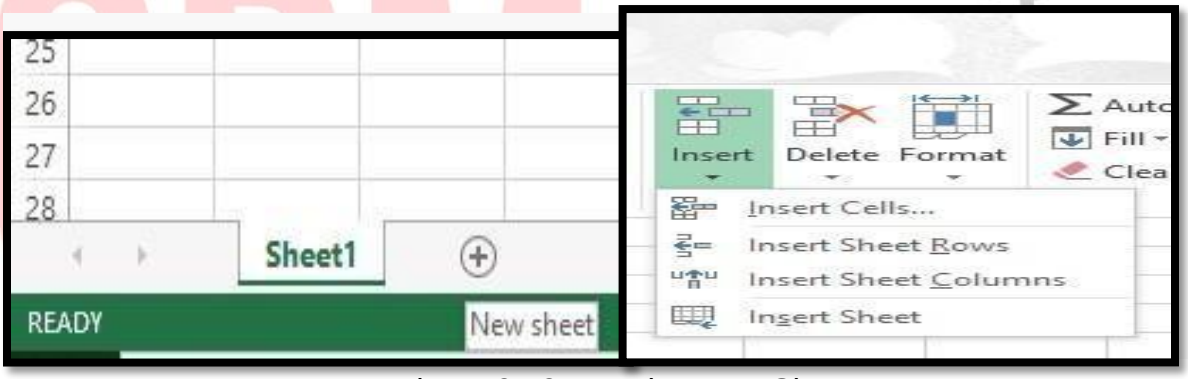


Figure 2.13 Inserting New Sheets

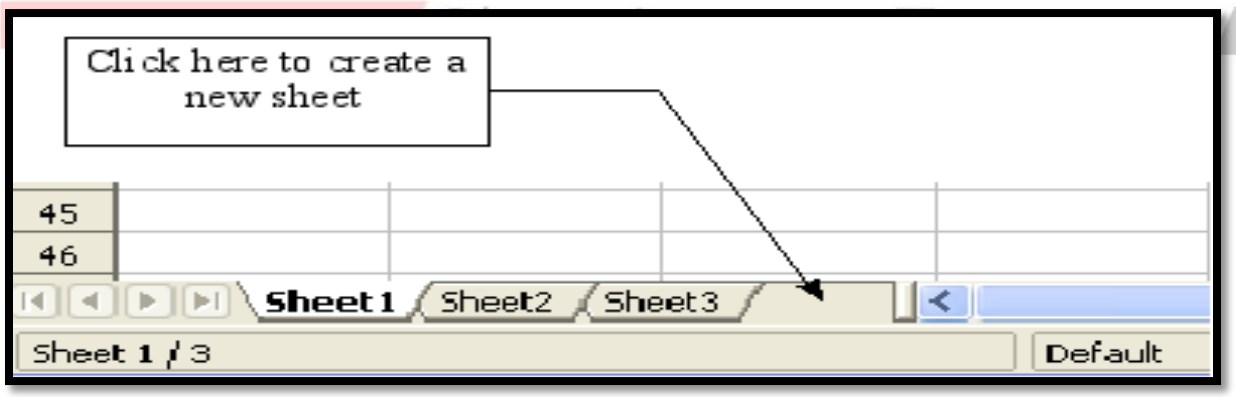


Figure2.13 Creating a new sheet

Each method opens the Insert Sheet dialog. Here you can choose to put the new sheet before or after the selected sheet and how many sheets to insert.

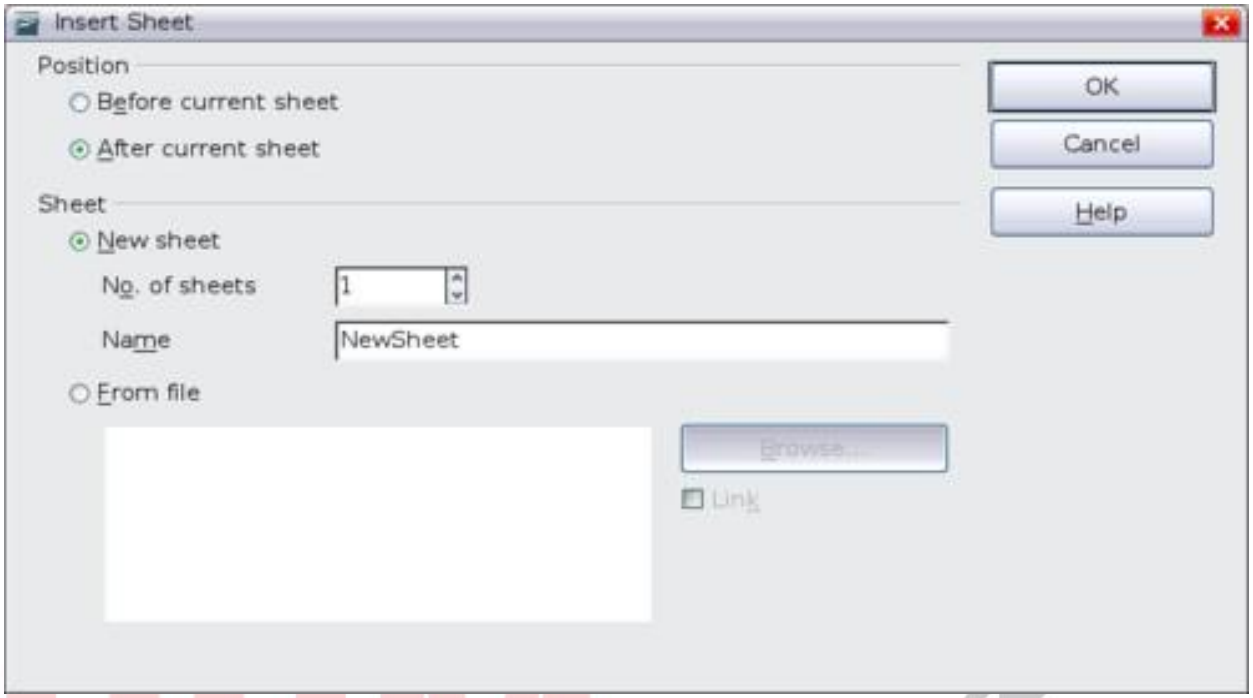


Figure2.14 Insert Sheet dialog

We need 6 sheets, one for each of the 5 accounts and one as a summary sheet so we will add 3 more. We also want to name each of these sheets for the account they represent: Summary, Checking Account, Savings Account, Credit Card 1, Credit Card 2, and Car Loan.

We have two choices: insert 3 new sheets and rename all 6 sheets afterwards; or rename the existing sheets, then insert the three new sheets 1 at a time, renaming each new sheet during the insert step.

To insert sheets and rename afterwards:

1. In the Insert Sheet dialog, choose the position for the new sheets (in this example, we use **After current sheet**).
2. Choose **New sheet** and **3** as the *No. of sheets*. (Three sheets are already provided by default.) Because you are inserting more than one sheet, the *Name* box is not available.
3. Click **OK** to insert the sheets.
4. For the next steps, go to "Renaming sheets" below.

To insert sheets and name them at the same time:

1. Rename the existing sheets Summary, Checking Account, and Savings Account, as described in "Renaming sheets" below.
2. In the Insert Sheet dialog, choose the position for the first new sheet.
3. Choose **New sheet** and 1 as the *No. of sheets*. The *Name* box is now available.
4. In the **Name** box, type a name for this new sheet, for example Credit Card 1.
5. Click **OK** to insert the sheet.
6. Repeat steps 1–4 for each new sheet, giving them the names Credit Card 2 and Car Loan.

On the Insert Sheet dialog, you can also add a sheet from a different spreadsheet file (for example, another Calc or Excel spreadsheet), by choosing the **From file** option. Click **Browse** and select the file; a list of the available sheets appears in the box. Select the sheet to import. If, after you select the file, no sheets appear you probably selected an invalid file type (not a spreadsheet, for example).

Note: For a shortcut to inserting a sheet from another file, choose **Insert > Sheet from file** from the menu bar. The Insert Sheet dialog opens with the **From file** option preselected, and then the Insert dialog opens on top of it.

Inserting sheets from a different spreadsheet

If you prefer, select the Link option to insert the external sheet as a link instead as a copy. This is one of several ways to include "live" data from another spreadsheet. The links can be updated manually to show the current contents of the external file; or, depending on the options you have selected in **Tools > Options > OpenOffice.org Calc > General > Updating, whenever the file is opened.**

Renaming Worksheets

At the bottom of each worksheet window is a small tab that indicates the name of the worksheets in the workbook. These names (Sheet1, Sheet2, Sheet3, and so on) are not very descriptive; you might want to rename your worksheets to reflect what they contain. For instance, if your workbook contains Students Marks in individual Subject then you may want to rename the worksheets as Subject names such as English, Mathematics and Social Science etc.

There are three ways you can rename a worksheet, and the only difference between them is the way in which you start the renaming process. You can do any of the following:

- Double-click on one of the existing worksheet names.
- Right-click on an existing worksheet name, then choose Rename from the resulting Context menu.
- Select the worksheet you want to rename (click on the worksheet tab) and then select the Sheet option from the Format menu. This displays a submenu from which you should select the Rename option.

Create Or Change A Cell Reference

A cell reference refers to a cell or a range of cells on a worksheet and can be used to find the values or data that you want formula to calculate.

In one or several formulas, you can use a cell reference to refer to:

- Data from one or more contiguous cells on the worksheet.
- Data contained in different areas of a worksheet.
- Data on other worksheets in the same workbook.

Referencing Other Sheets

There are two ways to reference cells in other sheets: by entering the formula directly using the keyboard or by using the mouse. We will look at the mouse method first.

Creating The Reference With The Mouse

Look at the example below in Figure 2.14 which shows an account summary sheet with a blank Balance column. On the Summary sheet, set up a place for all five account balances, so we know where to put the cell reference. We want to place the reference for the checking account balance in cell B3.

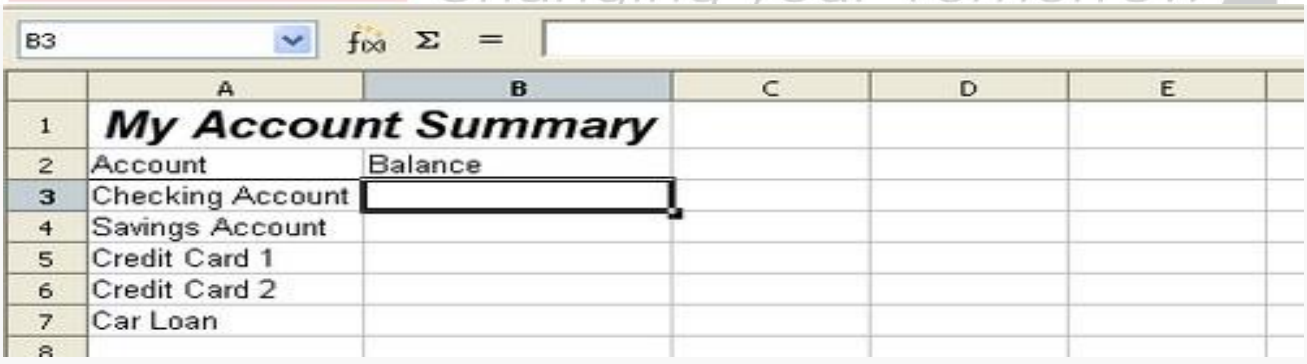


Figure 2.14 Blank summa

To make the cell reference in cell B3, select the cell and follow these steps.

1. Click on the = icon next to the formula bar. The icons change and an equals sign appears in the formula bars shown below.

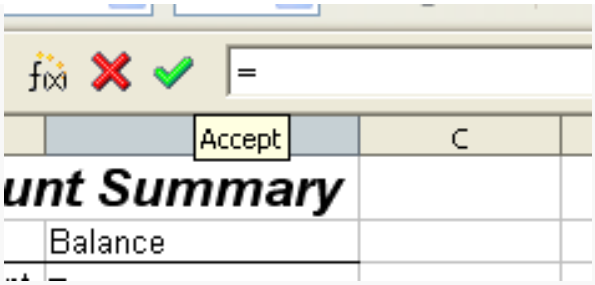


Figure 2.15 Equal sign in formula bar

2. Now, click on the sheet tab for the sheet containing the cell to be referenced. In this case, that is the *Checking Account* sheet as shown below.

Figure 2.16 the checking account tab

3. Click on cell F3 (where the balance is) in the *Checking Account* sheet. The phrase 'Checking Account'.F3 should appear in the formula bar as shown below.

	A	B	C	D	E	F
1	**Checking Account**					
2	Description	Amount	Balance			
3	Opening Balance	$75.00	$75.00		Total Balance	$380.05
4	Pay	$425.00	$500.00			
5	Groceries	-$75.00	$425.00			
6	Cable Bill	-$44.95	$380.05			
7						
8						

Figure 2.17 Cell reference selected

4. Click the green checkmark in the formula bar to finish.
5. The *Summary* sheet should now look like the figure below.

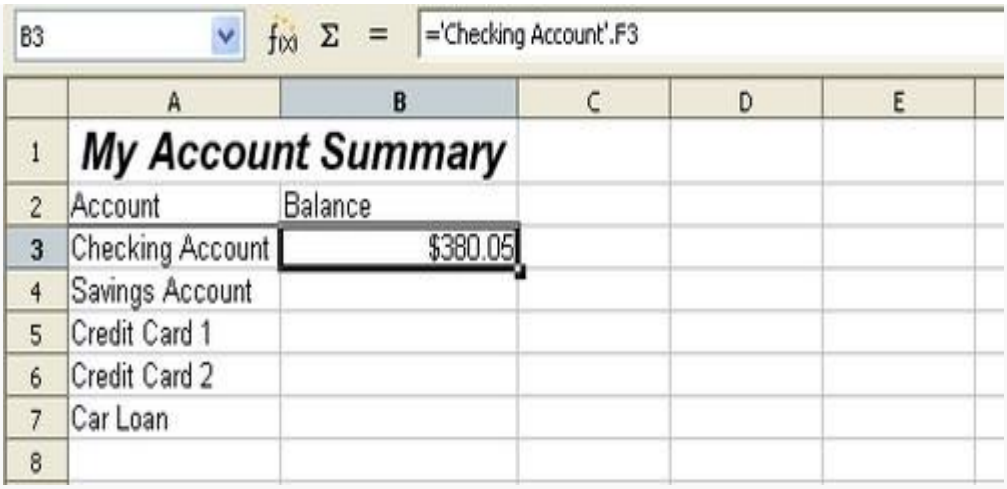


Figure 2.18. Finished checking account reference

Creating The Reference With The Keyboard

From the figure above, you can deduce how the cell reference is constructed. The reference has two parts: the sheet name (*'Checking Account'*) and the cell reference (*F3*). Notice that they are separated by a period.

Note: The sheet will be in single quotes because it contains a space, and the mandatory period (.) always falls outside any quotes.

So, you can fill in the Savings Account cell reference by just typing it in. Assuming that the balance is in the same cell in the *Savings Account* sheet, F3, the cell reference should be *='Savings Account'.F3*.

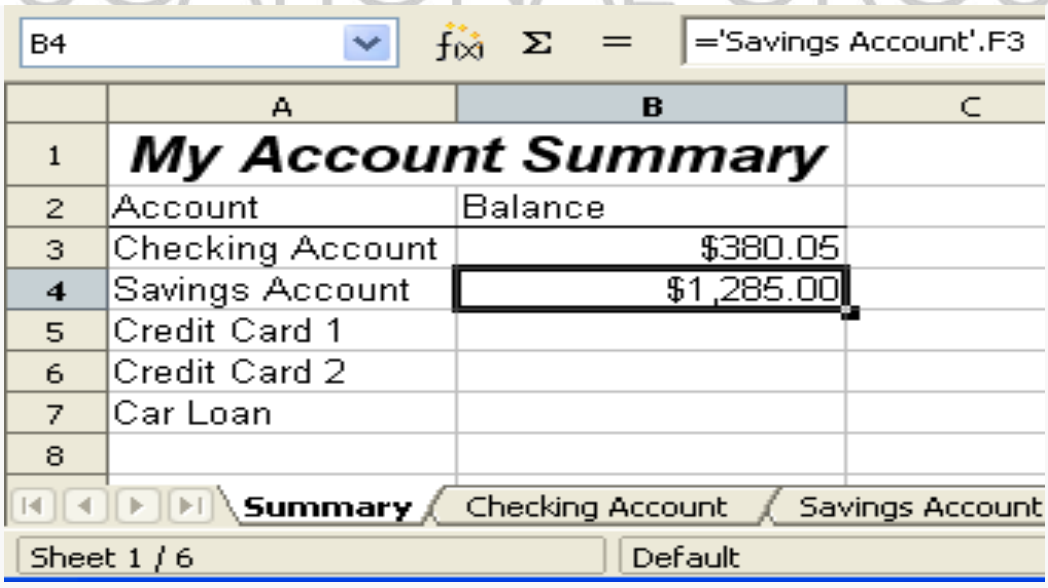


Figure2.19 Savings account reference

Referencing Other Worksheets

Calc can link different files together. The process is the same as described for different sheets in a single spreadsheet, but we add one more parameter to indicate which file the sheet is in.

Creating The Reference With The Mouse

To create the reference with the mouse, both spreadsheets need to be open. Select the cell in which the formula is going to be entered.

1. Click the = icon next to the formula bar.
2. Switch to the other spreadsheet (the process to do this will vary depending on which operating system you are using).
3. Select the sheet (Savings account) and then the reference cell (F3).

Figure 2.20 Selecting the savings account reference cell

4. Switch back to the original spreadsheet.
5. Click on the green check mark on the formula bar.

Your spreadsheet should now resemble the figure below.

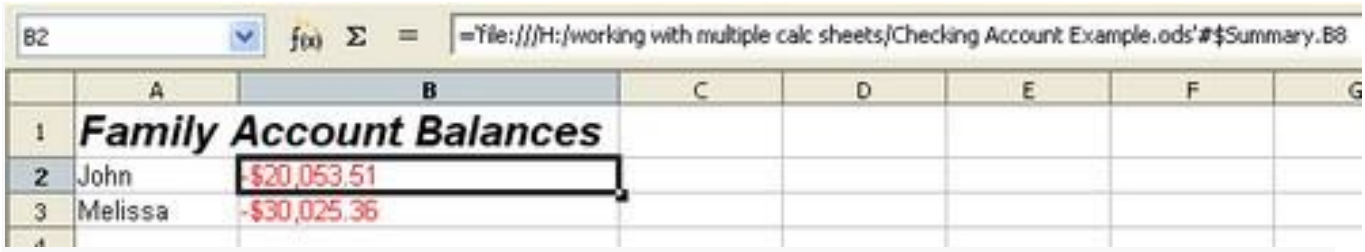


Figure 2.21 Linked files

You will get a good feel for the format of the reference if you look closely at the formula bar. Based on this line you can create the reference using the keyboard.

Creating The Reference With The Keyboard

Typing the reference is simple once you know the format the reference takes. The reference has three parts to it:

- Path and file name
- Sheet name
- Cell

Looking at the figure above, you can see the general format for the reference is

='file:///Path &File Name'#$SheetName.CellName.

Working with Hyperlinks

Hyperlinks can be used in Calc to jump to a different location from within a spreadsheet and can lead to other parts of the current file, to different files or even to web sites.

Relative And Absolute Hyperlinks

Hyperlinks can be stored within your file as either relative or absolute.

An absolute link will stop working only if the target is moved. A relative link will stop working only if the start and target locations change relative to each other. For instance, if you have two spreadsheets in the same folder linked to each other and you move the entire folder to a new location, a relative hyperlink will not break.

To change the way that OOo saves the hyperlinks in your file, select **Tools > Options > Load/Save > General** and choose if you want URLs saved relatively when referencing the *File System*, or the *Internet*, or both.

You can insert and modify links using the Hyperlink dialog. To display the dialog, click the **Hyperlink** icon  on the Standard toolbar or choose **Insert > Hyperlink** from the menu bar. To turn existing text into a link, highlight it before opening the Hyperlink dialog.

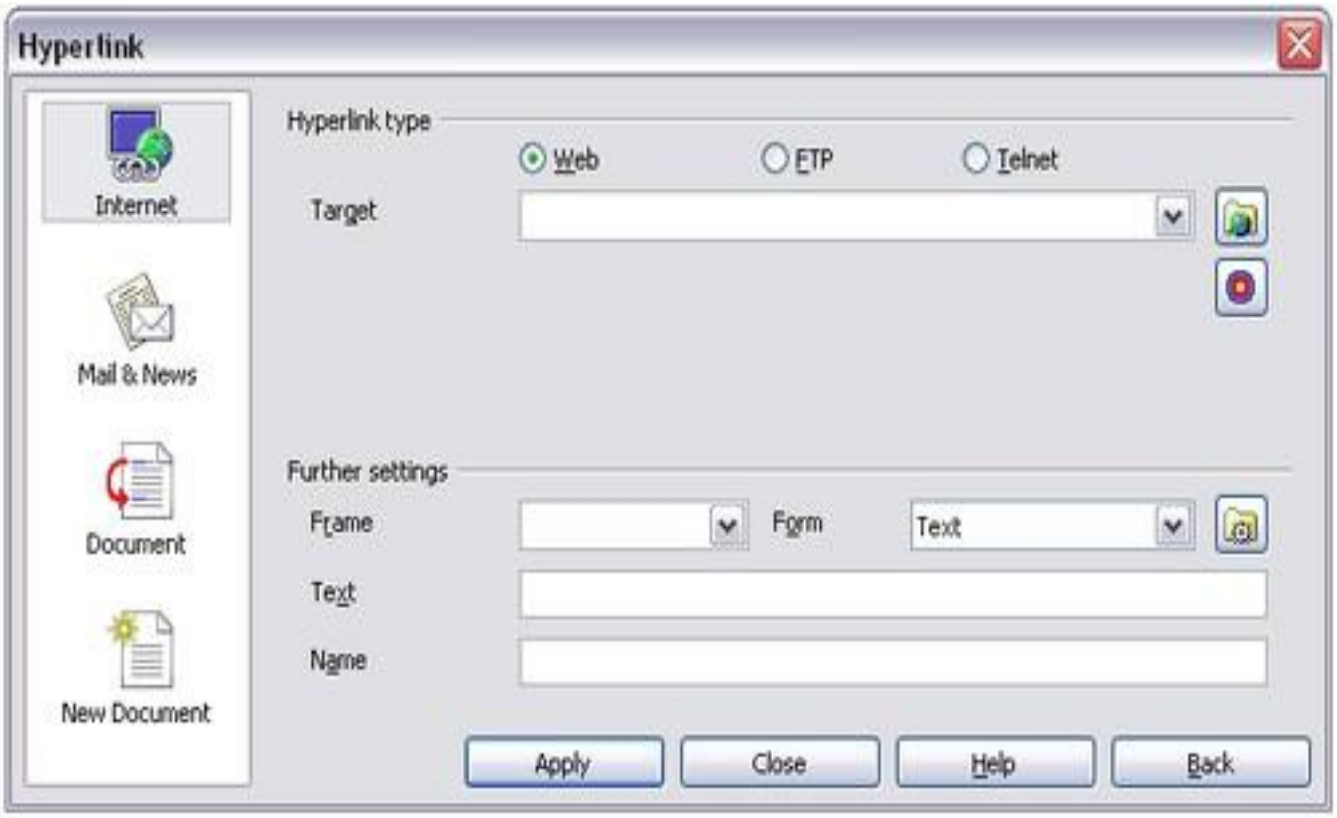


Figure 2.22 Hyperlink dialog showing details for Internet links

On the left hand side, select one of the four types of hyperlinks:

- **Internet**: the hyperlink points to a web address, normally starting with http://
- **Mail & News**: the hyperlink opens an email message that is pre-addressed to a particular recipient.
- **Document**: the hyperlink points to a place in either the current worksheet or another existing worksheet.
- **New document**: the hyperlink creates a new worksheet.

The top right part of the dialog changes according to the choice made for the hyperlink category from the left panel. A full description of all the choices, and their interactions, is beyond the scope of this chapter. Here is a summary of the most common choices used in presentations.

For an *Internet* hyperlink, choose the type of hyperlink (choose between Web, FTP or Telnet), and enter the required web address (URL).

For a *Mail and News* hyperlink, specify whether it is a mail or news link, the receiver address and for email, also the subject.

For a *Document* hyperlink, specify the worksheet path (the **Open File** button opens a file browser); leave this blank if you want to link to a target in the same spreadsheet. Optionally specify the target in the worksheet (for example a specific sheet). Click on the **Target** icon to open the Navigator where you can select the target, or if you know the name of the target, you can type it into the box.

For a *New Document* type hyperlink, specify whether to edit the newly created worksheet immediately (**Edit now**) or just create it (**Edit later**) and enter the file name and the type of worksheet to create (text, spreadsheet, etc.). The **Select path** button opens a directory picker dialog.

The *Further settings* section in the bottom right part of the dialog is common to all the hyperlink types, although some choices are more relevant to some types of links.

- Set the value of **Frame** to determine how the hyperlink will open. This applies to worksheets that open in a Web browser.
- **Form** specifies if the link is to be presented as text or as a button. The figure below shows a link formatted as a button.

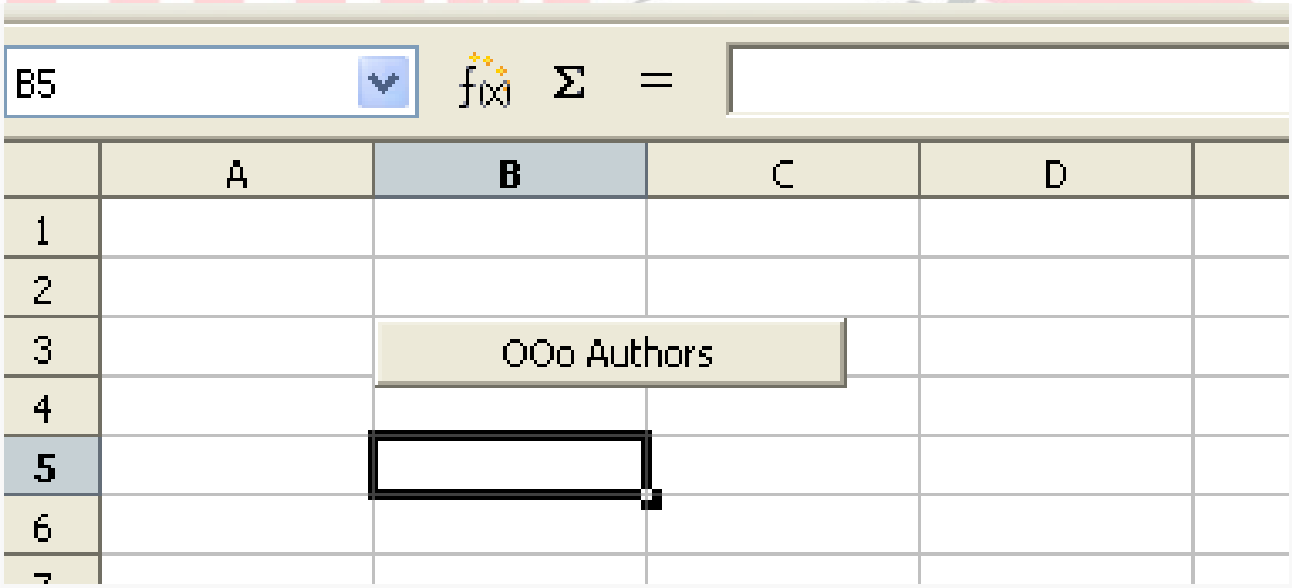


Figure 2.23 Authors hyperlink as button

- **Text** specifies the text that will be visible to the user. If you do not enter anything here, Calc will use the full URL or path as the link text. Note that if the link is relative and you move the file, this text will not change, though the target will.
- **Name** is applicable to HTML documents. It specifies text that will be added as a NAME attribute in the HTML code behind the hyperlink.

Linking To External Data

You can insert tables from HTML documents, and data located within named ranges from an OpenOffice.org Calc or Microsoft Excel spreadsheet, into a Calc spreadsheet

You can do this in two ways: using the External Data dialog or using the Navigator.

Using the External Data dialog

1. Open the Calc worksheet where the external data is to be inserted. This is the target worksheet.
2. Select the cell where the upper left-hand cell of the external data is to be inserted.
3. Choose **Insert -> Link to External Data**.
4. On the External Data dialog, type the URL of the source worksheet or click the [...] button to open a file selection dialog. Press *Enter* to get Calc to load the list of available tables.
5. In the *Available tables/range* list, select the named ranges or tables you want to insert. You can also specify that the ranges or tables are updated every (number of) seconds.
6. Click **OK** to close this dialog and insert the linked data.

Figure 2.24 Selecting a table or range in a source document from the Web

Linking To Registered Data Sources

You can access a variety of databases and other data sources and link them into Calc worksheets. First you need to register the data source with OpenOffice.org. (To register means to tell OOo what type of data source it is and where the file is located.) The way to do this depends on whether or not the data source is a database in *.odb format.

To register a data source that is in *.odb format:

1. Choose Tools -> Options -> OpenOffice.org Base -> Databases.
2. Click the New button (below the list of registered databases) to open the Create Database Link dialog.

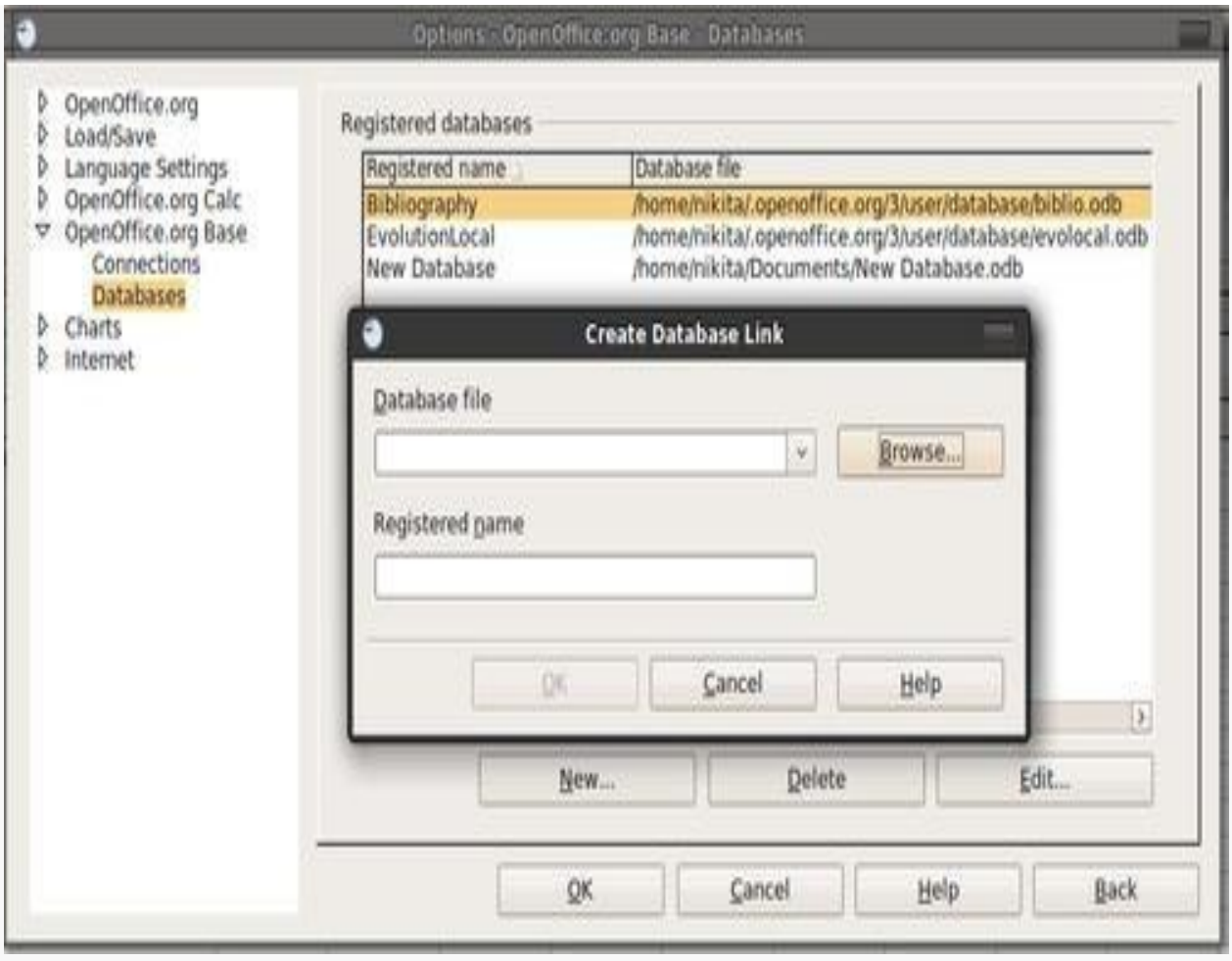


Figure 2.25 Registering databases

3. Enter the location of the database file, or click **Browse** to open a file browser and select the database file.

4. Type a name to use as the registered name for the database and click **OK**. The database is added to the list of registered databases. The **OK** button is enabled only when both fields are filled in.

ACTIVITY

Create a set of worksheets for storing records of marks of differnet classes and compare all these on a separate worksheet

QUESTIONS:

1. How can we rename a worksheet?
2. What are the two ways of referencing cells in other worksheets?
3. Differentiate between relative and absolute hyperlinks.
4. List the procedure involved in Linking HTML Tables to Calc Worksheet
5. Fill up the blanks

a. At the bottom of each worksheet window is a small tab that indicates the _____ of the worksheets in the workbook.

b. A_____refers to a cell or a range of cells on a worksheet and can be used to find the values or data that you want formula to calculate.

SESSION 3: SHARING WORKSHEET DATA

Relevant Knowledge

In most office settings, there is a shared drive where teams can store common files for everyone to use. This usually leads to sighting of the message: “The document [file name] is locked for editing by another user. To open a read-only copy of this document, click“!! This message appears because someone else already has the file open.

Sometimes however, it is necessary to have multiple people working on a file at the same time. This can be to either speed up data entry or simply make things easier for collaboration purposes.

Spreadsheet software allows the user to share the workbook and place it in the network location where several users can access it simultaneously.
In this exercise, you will learn how to share a worksheet in OpenOffice Calc.

Setting Up A Spreadsheet For Sharing

At any time, you can set up a spreadsheet for sharing with others. With the spreadsheet document open, choose Tools > Share Document to activate the collaboration features for this worksheet. A dialog opens where you can choose to enable or disable sharing.

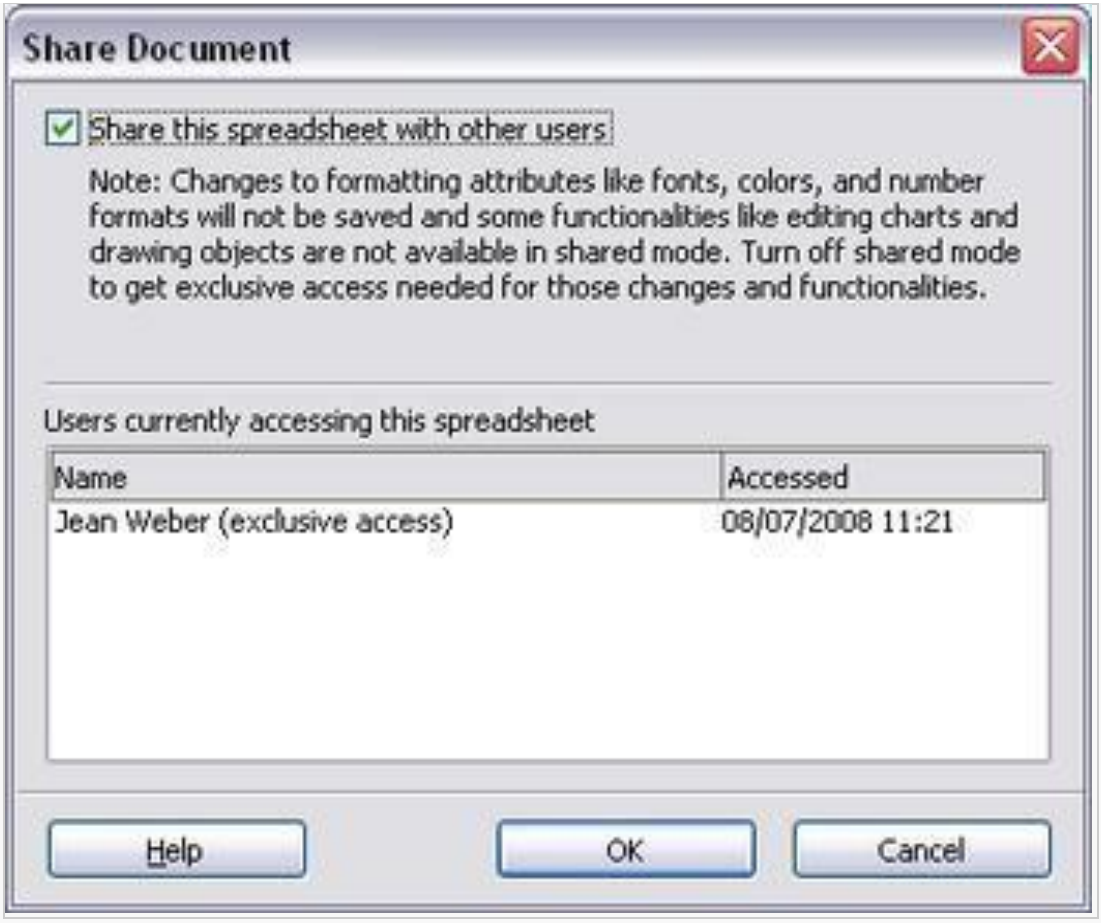


Figure 2.26 Choosing to share a spreadsheet

To enable sharing, select the box at the top of the dialog, and then click OK. A message appears stating that you must save the worksheet to activate shared mode. Click Yes to continue. The word (shared) is then shown on the title bar after the worksheet's title.

The Tools > Share Document command can be used to switch the mode for a worksheet from unshared to shared. However, if you want to use a shared worksheet in unshared

mode, you need to save the shared worksheet using another name or path. This creates a copy of the spreadsheet that is not shared.

Opening A Shared Spreadsheet

When you open a spreadsheet that is in shared mode, you see a message that the worksheet is in shared mode and that some features are not available in this mode. You can choose to disable this message for the future. After clicking OK, the worksheet is opened in shared mode.

The following features are known to be disabled in a shared spreadsheet:

- Edit > Changes, except for Merge Document
- Edit > Compare Document
- Edit > Sheet > Move/Copy & Delete
- Insert > Cells Shift Cells Down & Shift Cells Right
- Insert > Sheet from file
- Insert > Names
- Insert > Comment
- Insert > Picture > From File
- Insert > Movie and Sound
- Insert > Object
- Insert > Chart
- Insert > Floating Frame
- Format > Sheet > Rename, Tab Color
- Format > Merge Cells > Merge and Center, Merge Cells, Split Cells
- Format > Print Ranges
- Tools > Protect Document
- Data > Define Range
- Data > Sort
- Data > Subtotals
- Data > Validity
- Data > Multiple Operations
- Data > Consolidate
- Data > Group and Outline (all)
- Data >DataPilot

Saving A Shared Spreadsheet

When you save a shared spreadsheet, one of several situations may occur:

- If the worksheet was not modified and saved by another user since you opened it, the worksheet is saved.
- If the worksheet was modified and saved by another user since you opened it, one of the following events will occur:
- If the changes do not conflict, the worksheet is saved, the dialog below appears, and any cells modified by the other user are shown with a red border.

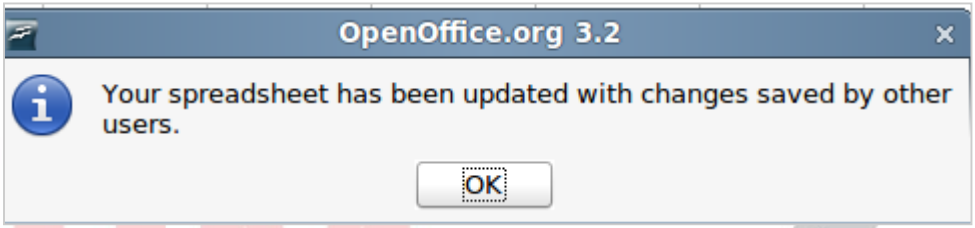


Figure 2.27 Update message after saving

- If the changes conflict, the Resolve Conflicts dialog is shown. You must decide for each conflict which version to keep, yours or the other person's. When all conflicts are resolved, the worksheet is saved. While you are resolving the conflicts, no other user can save the shared worksheet.

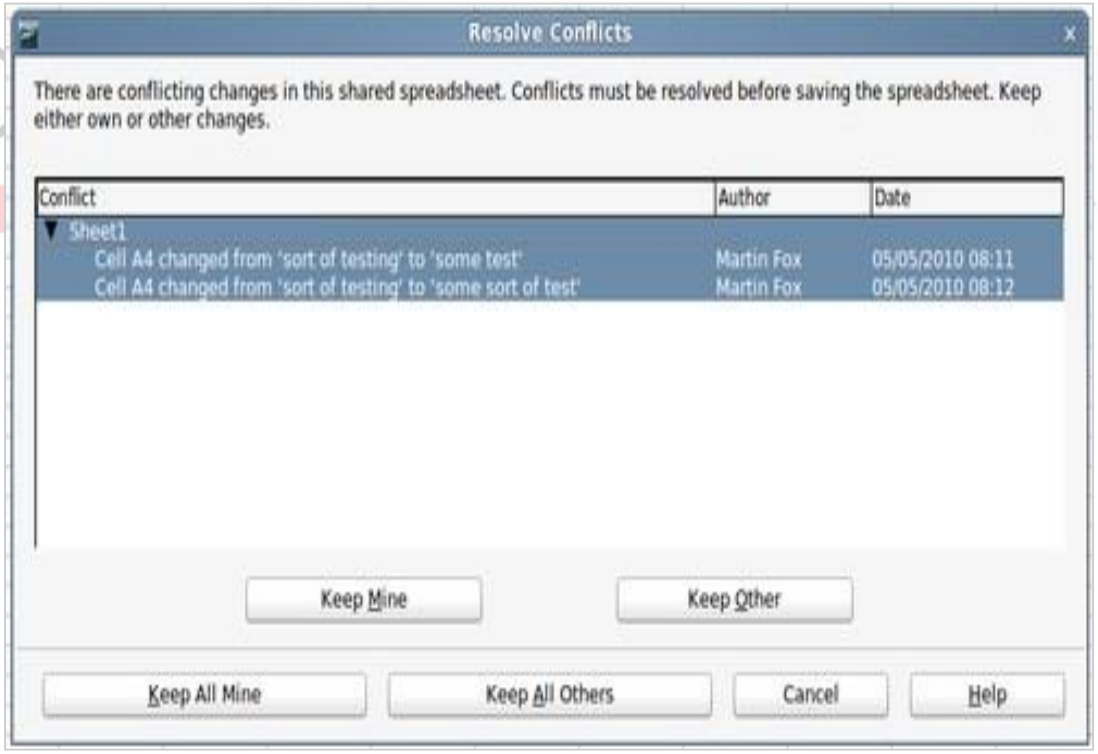


Figure 2.28 Resolve Conflicts dialog

- If another user is trying to save the shared worksheet and resolve conflicts, you see a message that the shared spreadsheet file is locked due to a merge-in in progress. You can choose to cancel the Save command for now, or retry saving later.

  When you successfully save a shared spreadsheet, the worksheet shows the latest version of all changes that got saved by all users.

  Note: Most spreadsheets software automatically turns off some features in shared workbooks. This is to simplify the workbook since multiple people can be working on the file at the same time. For example, shared workbooks don‘t allow merging cells, conditional formatting, or inserting pictures/graphs/etc.

Perform the following activity till you are confident:

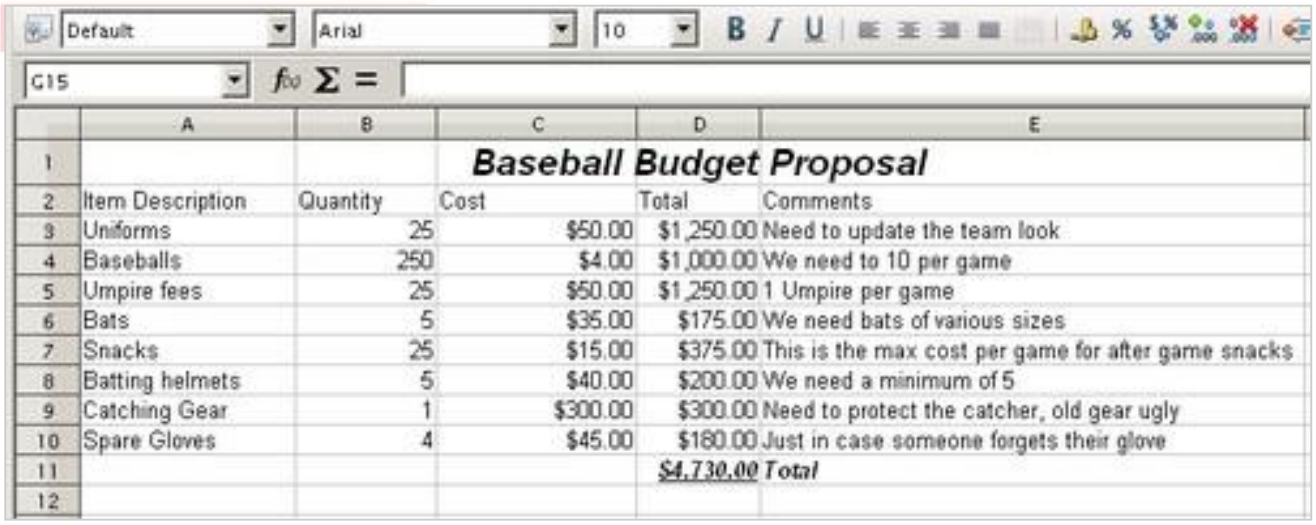
S.No.	Activity
1.	Share worksheet data with other users.

Record Changes

Calc has the feature to track what data was changed, when the change was made, who made the change and in which cell the change has occurred.

If you are the sponsor of a youth baseball team. The coach has submitted a budget to you for the season and you need to edit the costs and return it to her. You are concerned that if you just make the changes, then the coach won't see the changes you made. You decide to use Calc with the record changes feature turned on, so that the coach can easily see the changes you have made.

The figure below shows the budget spreadsheet your coach submitted.



	A	B	C	D	E
1			Baseball Budget Proposal		
2	Item Description	Quantity	Cost	Total	Comments
3	Uniforms	25	$50.00	$1,250.00	Need to update the team look
4	Baseballs	250	$4.00	$1,000.00	We need to 10 per game
5	Umpire fees	25	$50.00	$1,250.00	1 Umpire per game
6	Bats	5	$35.00	$175.00	We need bats of various sizes
7	Snacks	25	$15.00	$375.00	This is the max cost per game for after game snacks
8	Batting helmets	5	$40.00	$200.00	We need a minimum of 5
9	Catching Gear	1	$300.00	$300.00	Need to protect the catcher, old gear ugly
10	Spare Gloves	4	$45.00	$180.00	Just in case someone forgets their glove
11				$4,730.00	Total
12					

Figure 2.29 Baseball budget spreadsheet

Looking Over The Values,

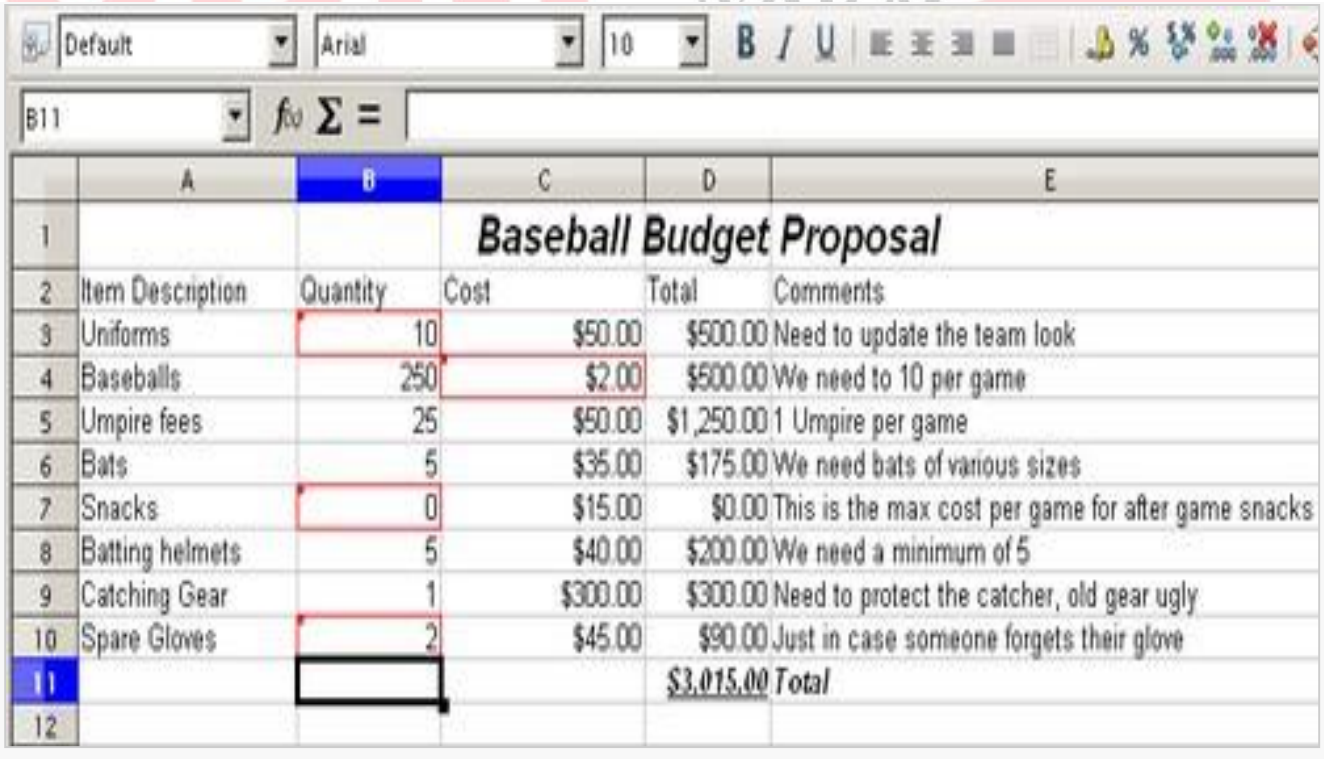
You see a few places where money could be saved:

- Post-game snacks can be bought by parents.
- New uniforms can wait; only buy 10 to replace damaged ones.
- Buy cheaper baseballs.
- Only buy 2 spare gloves.

To make these changes, use the record changes feature in Calc. To start recording changes:

1. Open the Budget Spreadsheet.
2. Select Edit > Changes > Record from the menu bar.
3. Begin editing the worksheet.

A colored border, with a dot in the upper left-hand corner, appears around a cell where changes were made. Other reviewers then quickly know which cells were edited. A deleted column or row is marked by a heavy colored bar.



Default | Arial | 10 | B I U

B11 | fx Σ =

	A	B	C	D	E
1			Baseball Budget Proposal		
2	Item Description	Quantity	Cost	Total	Comments
3	Uniforms	10	$50.00	$500.00	Need to update the team look
4	Baseballs	250	$2.00	$500.00	We need to 10 per game
5	Umpire fees	25	$50.00	$1,250.00	1 Umpire per game
6	Bats	5	$35.00	$175.00	We need bats of various sizes
7	Snacks	0	$15.00	$0.00	This is the max cost per game for after game snacks
8	Batting helmets	5	$40.00	$200.00	We need a minimum of 5
9	Catching Gear	1	$300.00	$300.00	Need to protect the catcher, old gear ugly
10	Spare Gloves	2	$45.00	$90.00	Just in case someone forgets their glove
11				$3,015.00	Total
12					

Figure 2.30 Edited worksheet with red border on changed cells

Some changes, for example cell formatting, are not recorded and marked.

To change the color that indicates changes, select Tools > Options > OpenOffice.org Calc > Changes.

Viewing Changes

Calc gives you tremendous control over what changes you see when reviewing a worksheet. To change the available filters, select **Edit > Changes > Show**. The following dialog opens.

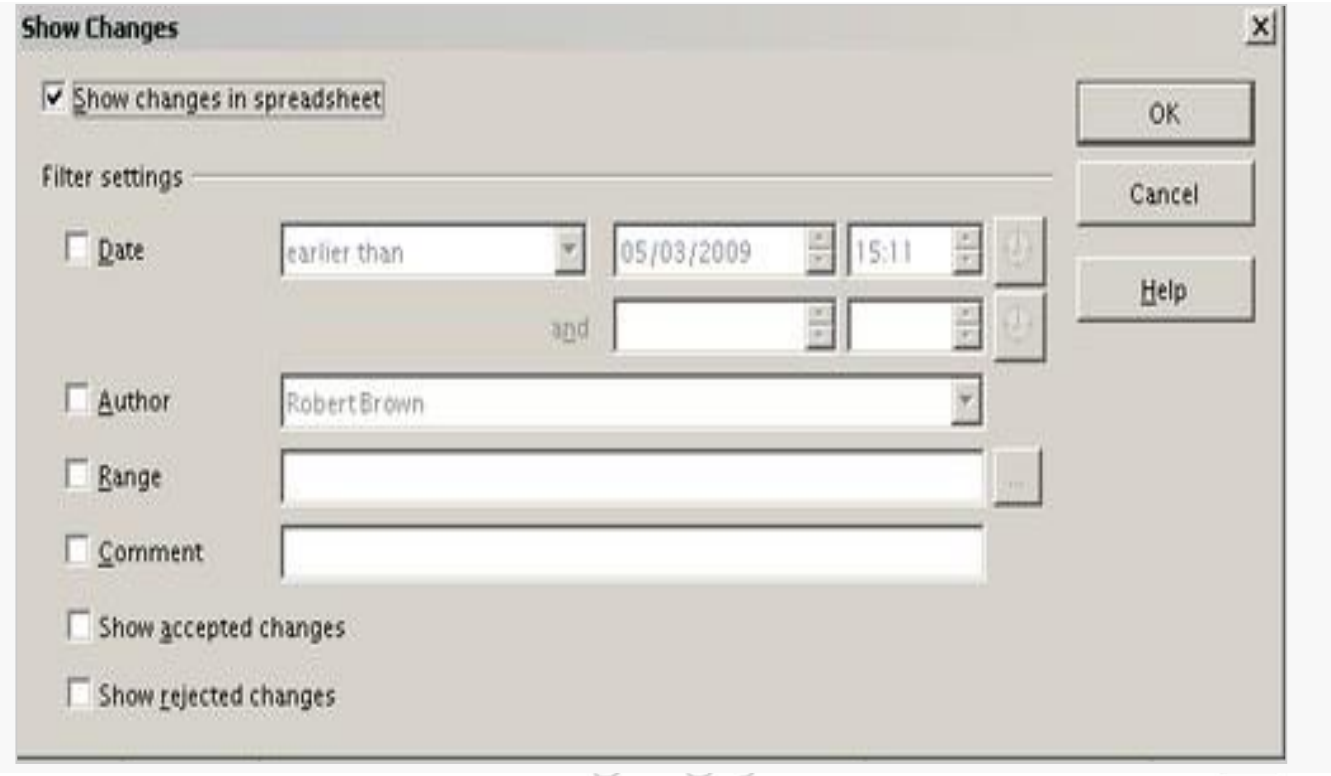


Figure 2.31 Show changes dialog

Using the different settings, you can control which changes appear on screen. You can filter based on:

- Date – Only changes made in a certain time range are displayed.
- Author – Only changes made by a specific author are displayed. This is especially useful if you have multiple reviewers on the worksheet.
- Range – Only changes made in a specific range of cells are displayed. This is especially useful if you have a large spreadsheet and only want to review a part of it.
- Comment – Searches the content of the comments and only displays changes which have comments that match the search criteria.

- Show accepted changes – Only changes you accepted are displayed.
- Show rejected changes – Only changes you rejected are displayed.

You can also access the filter control in the Accept or Reject Changes dialog shown below. Click the *Filter* tab to get a set of options similar to those shown in the figure above.

Adding Comments to Changes

Calc automatically adds to any recorded change a comment describing what was changed (for example, *Cell B4 changed from '9' to '4'*). Reviewers and authors can add their comments to explain their changes.

To add a comment to a change:

1. Make the change to the spreadsheet.
2. Select the cell with the change.
3. Choose Edit > Changes > Comments. The dialog shown below appears. The automatically-added comment provided by Calc appears in the title bar of this dialog and cannot be edited.
4. Type your own comment and click OK.

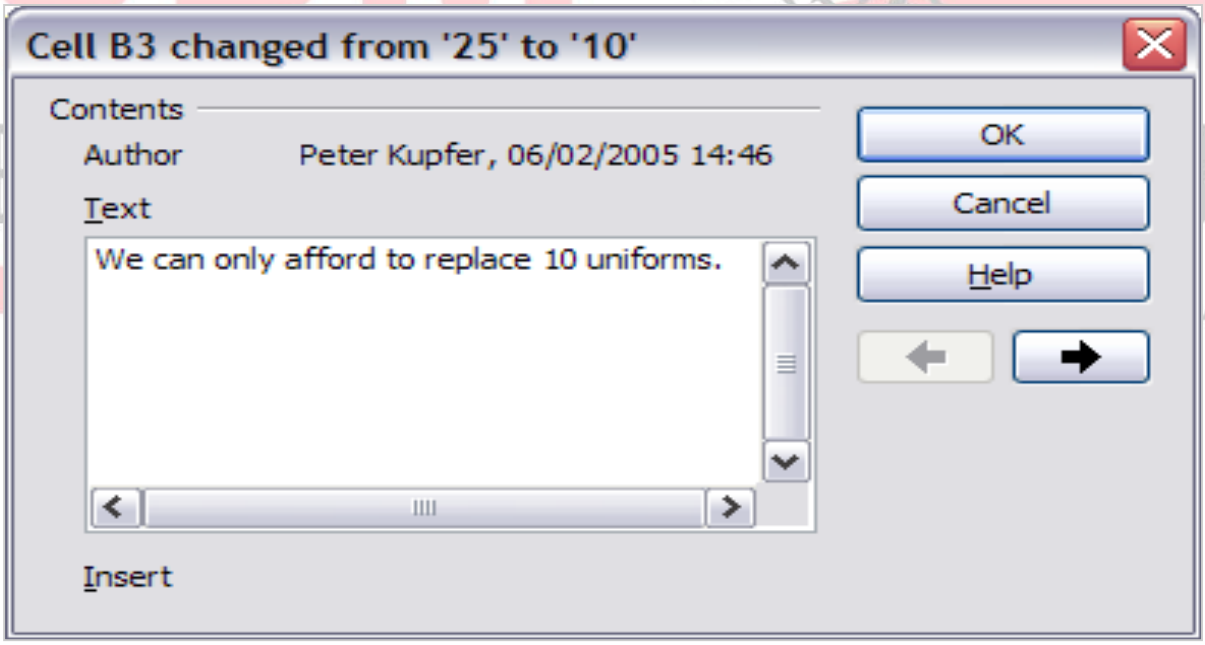


Figure 2.32 Comment dialog

After you have added a comment to a changed cell, you can see it by hovering the mouse pointer over the cell.

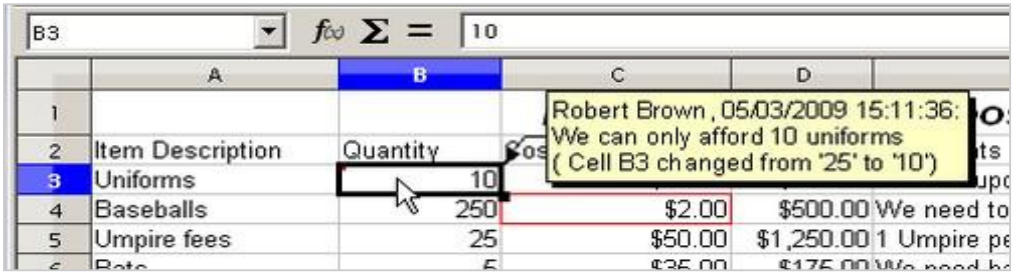


Figure 2.33 Comment added to cell B3

The comment also appears in the dialog when you are accepting and rejecting changes.

Editing change comments

1. Select the cell with the comment that you want to edit.
2. Select Edit > Changes > Comments.
3. Edit the comment and click OK.

Accepting or Rejecting Changes

When you receive a worksheet back with changes, the beauty of the recording changes system becomes evident. Now, as the original author, you can step through each change and decide how to proceed. To begin this process:

1. Open the edited worksheet.
2. Select **Edit > Changes > Accept or Reject**. The dialog shown below opens.
3. Calc steps through the changes one at a time. You can choose to accept or reject each change as you go through.

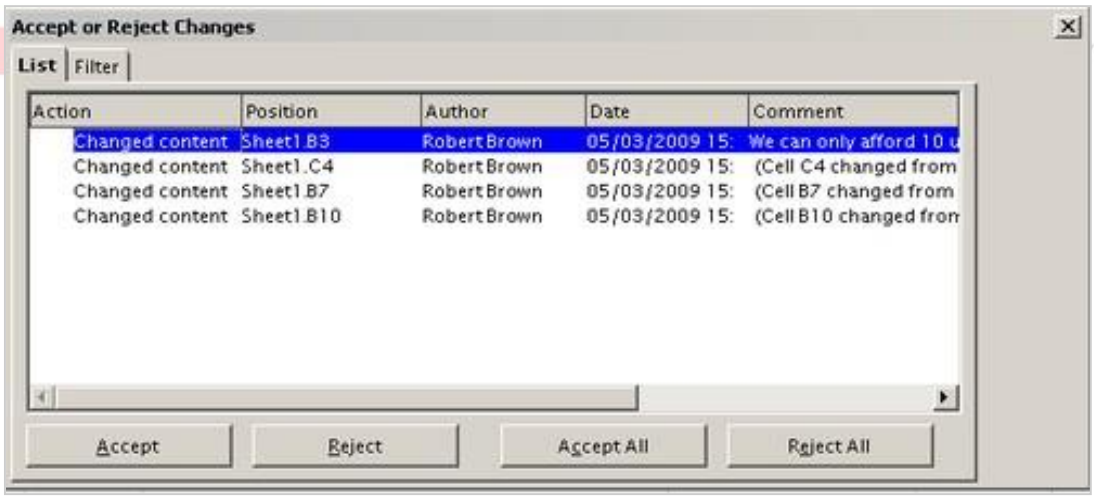


Figure 2.34 Accept or Reject Changes dialog

The *Comment* column by default contains an explanation of the change that was made. If the reviewer added a comment to the change, it is displayed, followed by the description of the change.

If more than one person has reviewed the worksheet, one reviewer may have modified another reviewer's change. If so, the changes are hierarchically arranged with a plus sign for opening up the hierarchy.

On the Filter tab of this dialog (not shown here), you can choose how to filter the list of changes: by date, author, cell range, or comments containing specific terms. After selecting the filter criteria, switch back to the List tab to see the results.

Merging Worksheets

Sometimes, multiple reviewers return edited versions of a worksheet at the same time. In this case, it may be quicker to review all of these changes at once, rather than one review at a time. For this purpose, Calc provides the feature of merging worksheets.

To merge worksheets, all of the edited worksheets need to have recorded changes in them.

1. Open the original worksheet.
2. Select **Edit > Changes > Merge Document**.
3. A file selection dialog opens. Select a file you want to merge and click **OK**.
4. After the worksheets merge, the Accept or Reject Changes dialog opens as shown below, showing changes by more than one reviewer. If you want to merge more worksheets, close the dialog and then repeat steps 2 and 3.

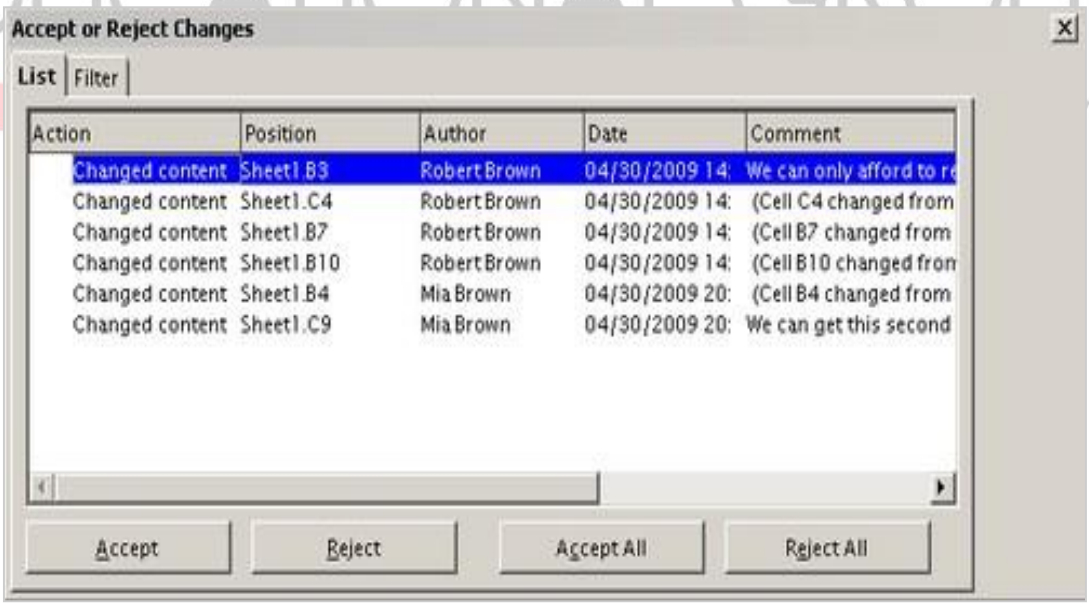


Figure 2.35 Accept or reject for merged worksheets

Now all of the changes are combined into one worksheet and you can accept or reject the changes. Changes from different authors appear in different colors in the worksheet. In this example, all of the changes from Robert are blue and the changes from Mia are red.

Baseball Budget Proposal

Item Description	Quantity	Cost	Total	Comments
Uniforms	10	$50.00	$500.00	Need to update the team look
Baseballs	275	$2.00	$550.00	We need to 10 per game
Umpire Fees	25	$50.00	$1,250.00	1 Umpire per games
Bats	5	$35.00	$175.00	We need bats of various size
Snacks	0	$15.00	$0.00	This is the max cost per game for after game snacks
Batting Helmets	5	$40.00	$200.00	We need a minimum of 5
Catching Gear	1	$175.00	$175.00	Need to protect the catcher, old gear is ugly
Spare gloves	2	$45.00	$90.00	Just in case someone forgets their glove
			$2,940.00	**Total**

Figure 2.36 Merged worksheets with different author colors

Comparing Documents

When sharing worksheets reviewers may forget to record the changes they make. This is not a problem with Calc because Calc can find the changes by comparing worksheets.

In order to compare worksheets you need to have the original worksheet and the one that is edited. To compare them:

1. Open the edited worksheet that you want to compare with the original worksheet.
2. Select Edit > Compare Document.
3. An open worksheet dialog appears. Select the original worksheet and click **Insert**.

Calc finds and marks the changes as follows:

- All data that occurs in the edited worksheet but not in the original is identified as inserted.
- All data that is in your original worksheet but is not in the edited worksheet is identified as deleted.
- All data that is changed, is marked as changed.

QUESTIONS:

1. What is the purpose of adding comments?
2. How can we add comments to the changes made?
3. State True/ False

a. Original author of the Worksheet can accept or reject changes made by other users.

4. Fill up the blanks

a. Spreadsheet software allows the user to share the workbook and place it in the _____location where several users can access.

c. Spreadsheet software can find the changes by_____Sheets.

SESSION 4: CREATE AND USE MACROS IN SPREADSHEET

Relevant IKnowledge

A macro is a saved sequence of commands or keystrokes that are stored for later use. An example of a simple macro is one that "types" your address. The OpenOffice.org (OOo) macro language is very flexible, allowing automation of both simple and complex tasks. Macros are especially useful to repeat a task the same way over and over again.

Using the macro recorder

This session provides a basis for understanding the general macro capabilities in OpenOffice.org using the macro recorder. The following steps create a macro that performs paste special with multiply.

1. Open a new spreadsheet.
2. Enter numbers into a sheet.

	A	B	C	D
1	1	8	9	
2	2	7	10	
3	3	6	11	

Figure 2.37 Enter numbers.

3. Select cell A3, which contains the number 3, and copy the value to the clipboard.
4. Select the range A1:C3.
5. Use **Tools > Macros > Record Macro** to start the macro recorder. The Record Macro dialog is displayed with a stop recording button.

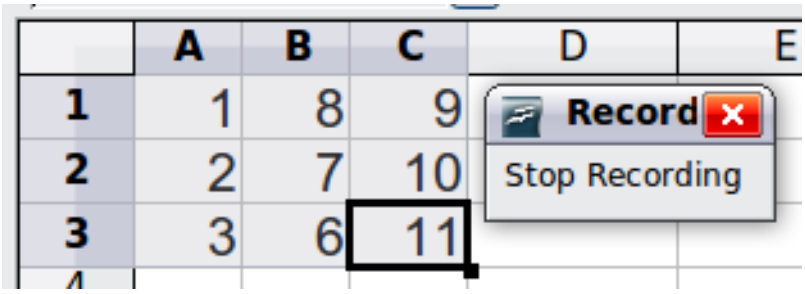


Figure 2.38 Stop recording button.

6. Use **Edit > Paste Special** to open the Paste Special dialog.

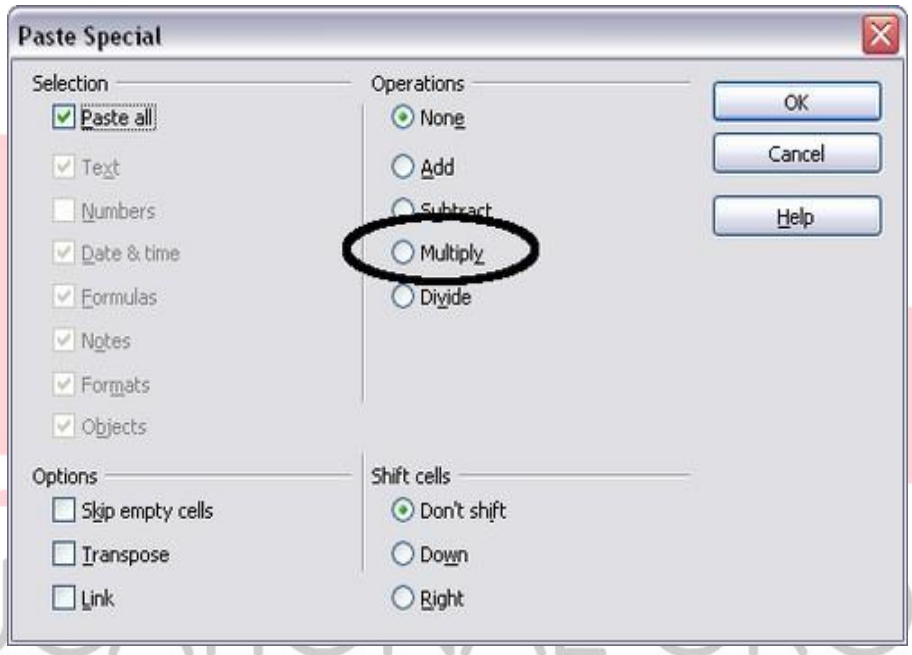


Figure 2.39 Paste Special dialog.

7. Set the operation to **Multiply** and click **OK**. The cells are now multiplied by 3.

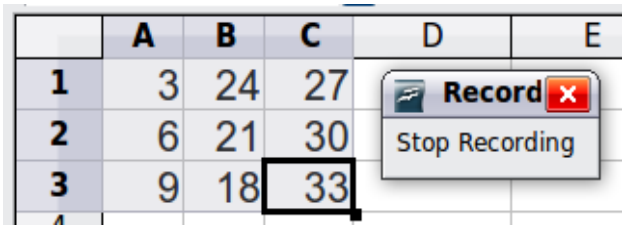


Figure2.40 Cells multiplied by 3.

8. Click **Stop Recording** to stop the macro recorder. The OpenOffice.org Basic Macros dialog opens.

9. Select the current worksheet. For this example, the current Calc worksheet is *Untitled 1*. Existing worksheets show a library named Standard. This library is not created until the worksheet is saved, or the library is needed, so at this point your new worksheet does not contain a library. You can create a new library to contain the macro, but this is not necessary.

Figure 2.41 Select the Standard library if it exists.

10. Click **New Module**. If no libraries exist, then the Standard library is automatically created and used. In the New Module dialog, type a name for the new module or leave the name as Module1.

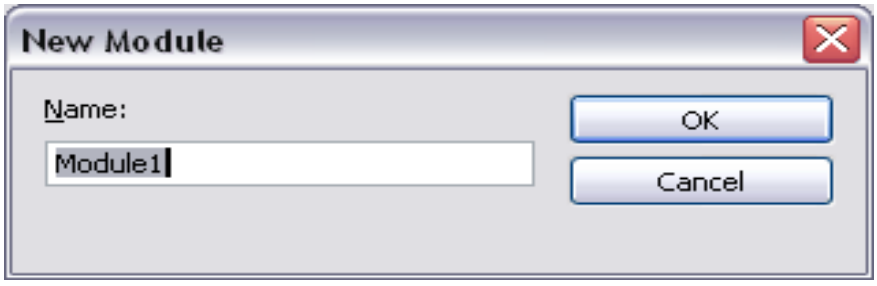


Figure 2.42 New Module Dialog Box

11. Click **OK** to create a module named Module1. Select the newly created Module1, enter the macro name *PasteMultiply* and click **Save**.

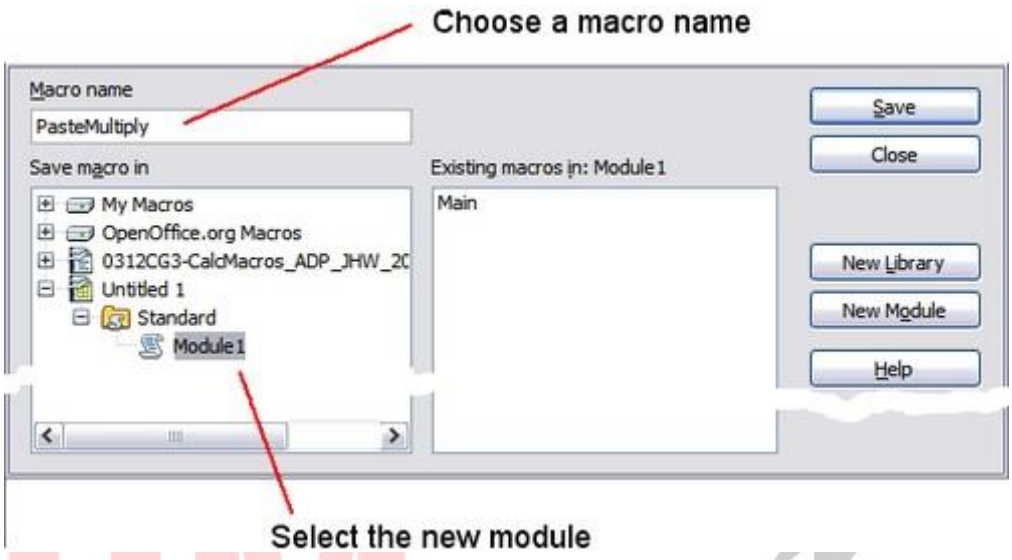


Figure 2.43 Select the module and name the macro.

12. The created macro is saved in Module1 of the Standard library in the Untitled 1 worksheet

Using A Macro As A Function

Using the newly created Calc worksheet CalcTestMacros.ods, enter the formula =NumberFive() (see Figure 2.44). Calc finds the macro and calls it.

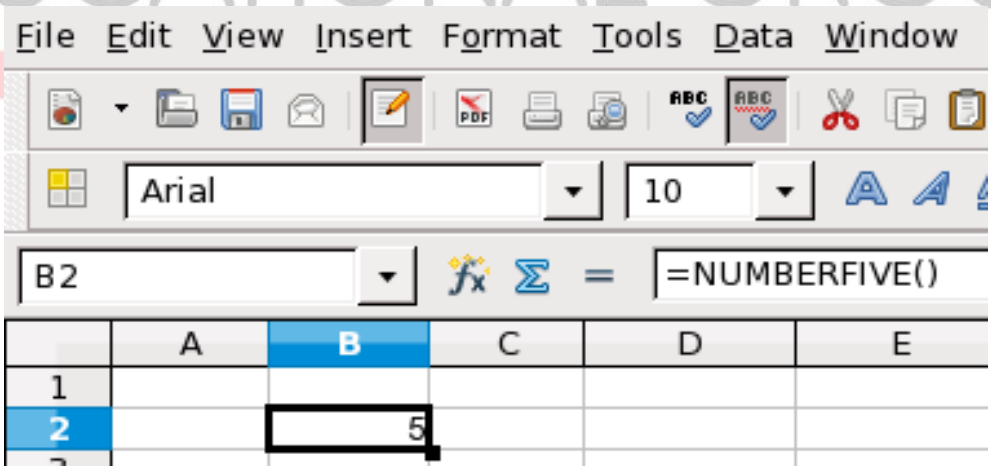
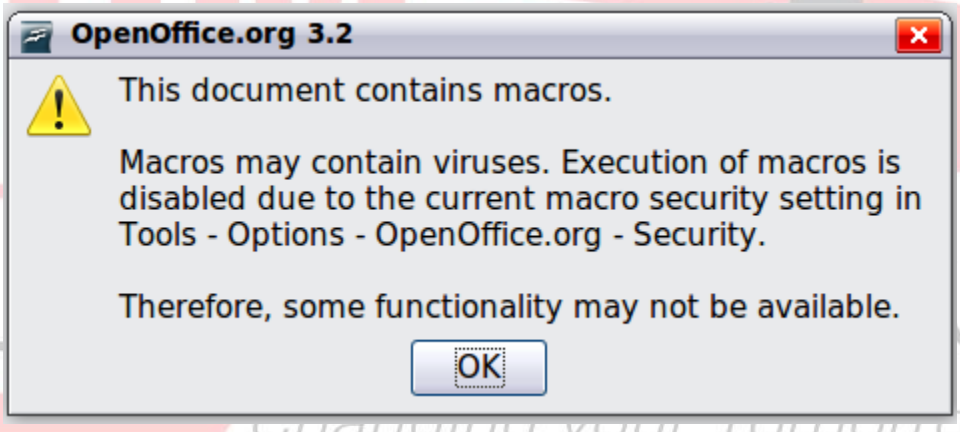


Figure 2.44 Use the NumberFive() Macro as a Calc function

Note: Function names are not case sensitive. You can enter =NumberFive() and Calc clearly shows =NUMBERFIVE().

Save the Calc document, close it, and open it again. Depending on your settings in Tools > Options > OpenOffice.org > Security > Macro Security, Calc will display one of the warnings shown below. You will need to click Enable Macros, or Calc will not allow any macros to be run inside the document.

OOo warns you that a document contains macros.



Warning if macros are disabled

If you choose to disable macros, then when the document loads, Calc can no longer find the function.

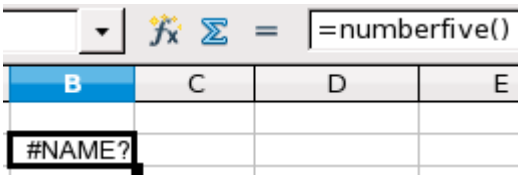


Figure 2.45 The function is gone.

When a document is created and saved, it automatically contains a library named Standard. The Standard library is automatically loaded when the document is opened. No other library is automatically loaded.

Calc does not contain a function named NumberFive(), so it checks all opened and visible macro libraries for the function. Libraries in *OpenOffice.org Macros*, *My Macros*, and the Calc document are checked for an appropriately named function. The NumberFive() function is stored in the AuthorsCalcMacros library, which is not automatically loaded when the document is opened.

Use **Tools > Macros > Organize Macros > OpenOffice.org Basic** to open the OpenOffice.org Basic Macros dialog shown further down the page. Expand CalcTestMacros and find AuthorsCalcMacros. The icon for a loaded library is a different color from the icon for a library that is not loaded.

Click the expansion symbol (usually a plus or a triangle) next to AuthorsCalcMacros to load the library. The icon changes color to indicate that the library is now loaded. Click **Close** to close the dialog.

Unfortunately, the cells containing =NumberFive() are in error. Calc does not recalculate cells in error unless you edit them or somehow change them. The usual solution is to store macros used as functions in the Standard library. If the macro is large or if there are many macros, a stub with the desired name is stored in the Standard library. The stub macro loads the library containing the implementation and then calls the implementation.

1. Use **Tools > Macros > Organize Macros > OpenOffice.org Basic** to open the OpenOffice.org Basic Macros dialog. Select the NumberFive macro and click **Edit** to open the macro for editing.

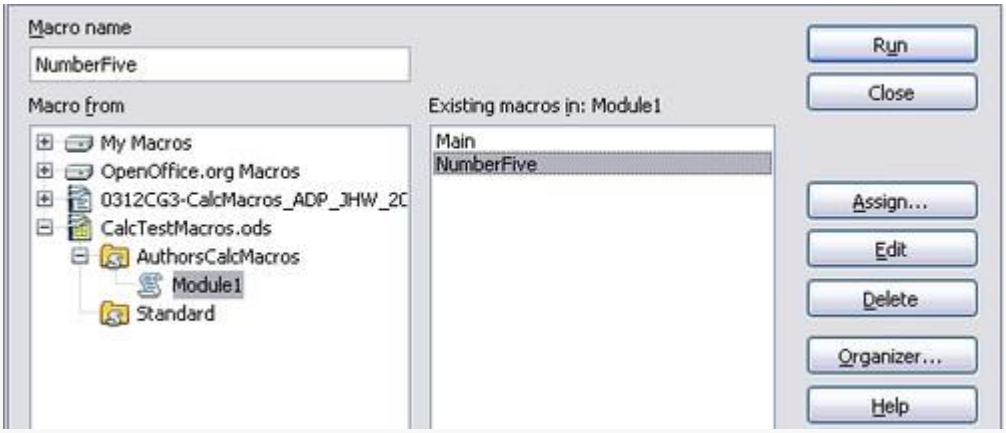


Figure 2.46 Select a macro and click Edit.

2. Change the name of NumberFive to NumberFive_Implementation (see Listing 3).

   Listing 3. Change the name of NumberFive to NumberFive_Implementation

```
Function NumberFive_Implementation()
  NumberFive_Implementation() = 5
End Function
```

3. In the Basic IDE, hover the mouse cursor over the toolbar buttons to display the tool tips. Click the **Select Macro** button to open the OpenOffice.org Basic Macros dialog.
4. Select the Standard library in the CalcTestMacros document and click **New** to create a new module. Enter a meaningful name such as CalcFunctions and click **OK**. OOo automatically creates a macro named Main and opens the module for editing.
5. Create a macro in the Standard library that calls the implementation function (see Listing 4). The new macro loads the AuthorsCalcMacros library if it is not already loaded, and then calls the implementation function.

   Listing 4. Change the name of NumberFive to NumberFive_Implementation.

```
Function NumberFive()
  If NOT BasicLibraries.isLibraryLoaded("AuthorsCalcMacros") Then
    BasicLibraries.LoadLibrary("AuthorsCalcMacros")
  End If
  NumberFive = NumberFive_Implementation()
End Function
```

Save, close, and reopen the Calc document. This time, the NumberFive() function works.

Passing Arguments to Macros

To illustrate a function that accepts arguments, we will write a macro that calculates the sum of its arguments that are positive—it will ignore arguments that are less than zero (see Listing 5).

Listing 5. PositiveSum calculates the sum of the positive arguments.

```
Function PositiveSum(Optional x)
  Dim TheSum As Double
  Dim iRow As Integer
  Dim iCol As Integer

  TheSum = 0.0
  If NOT IsMissing(x) Then
    If NOT IsArray(x) Then
      If x > 0 Then TheSum = x
    Else
      For iRow = LBound(x, 1) To UBound(x, 1)
        For iCol = LBound(x, 2) To UBound(x, 2)
          If x(iRow, iCol) > 0 Then TheSum = TheSum + x(iRow, iCol)
        Next
      Next
    End If
  End If
  PositiveSum = TheSum
End Function
```

The macro in Listing 5 demonstrates a couple of important techniques.

1. The argument x is optional. If the argument is not optional and it is called without an argument, OOo prints a warning message every time the macro is called. If Calc calls the function many times, then the error is displayed many times.
2. IsMissing checks that an argument was passed before the argument is used.
3. IsArray checks to see if the argument is a single value, or an array. For example, =PositiveSum(7) or =PositiveSum(A4). In the first case, the number 7 is passed as an argument, and in the second case, the value of cell A4 is passed to the function.
4. If a range is passed to the function, it is passed as a two-dimensional array of values; for example, =PositiveSum(A2:B5). LBound and UBound are used to determine the array bounds that are used. Although the lower bound is one, it is considered safer to use LBound in case it changes in the future.

Note: The macro in Listing 5 is careful and checks to see if the argument is an array or a single argument. The macro does not verify that each value is numeric. You may be as careful as you desire. The more things you check, the more robust the macro is, and the slower it runs.

Passing one argument is as easy as passing two: add another argument to the function definition (see Listing 6). When calling a function with two arguments, separate the arguments with a semicolon; for example, =TestMax(3; -4).

Listing 6. TestMax accepts two arguments and returns the larger of the two.

```
Function TestMax(x, y)
  If x >= y Then
    TestMax = x
  Else
    TestMax = y
  End If
End Function
```

Passing Arguments as Values

Arguments passed to a macro from Calc are always values. It is not possible to know what cells, if any, are used. For example, =PositiveSum(A3) passes the value of cell A3, and PositiveSum has no way of knowing that cell A3 was used. If you must know which cells are referenced rather than the values in the cells, pass the range as a string, parse the string, and obtain the values in the referenced cells.

Writing Macros that act like built-in Functions

Although Calc finds and calls macros as normal functions, they do not really behave as built-in functions. For example, macros do not appear in the function lists. It is possible to write functions that behave as regular functions by writing an Add-In.

Accessing Cells Directly

You can access the OOo internal objects directly to manipulate a Calc document. For example, the macro in Listing 7 adds the values in cell A2 from every sheet in the current document. ThisComponent is set by StarBasic when the macro starts to reference the current document. A Calc document contains sheets: ThisComponent.getSheets(). Use getCellByPosition(col, row) to return a cell at a specific row and column.

Listing 7. Add cell A2 in every sheet.

```
Function SumCellsAllSheets()
  Dim TheSum As Double
  Dim i As integer
  Dim oSheets
  Dim oSheet
  Dim oCell

  oSheets = ThisComponent.getSheets()
  For i = 0 To oSheets.getCount() - 1
    oSheet = oSheets.getByIndex(i)
    oCell = oSheet.getCellByPosition(0, 1) ' GetCell A2
    TheSum = TheSum + oCell.getValue()
  Next
  SumCellsAllSheets = TheSum
End Function
```

Sorting

Sorting data can be automated in Open Office by creating a Macro in Calc. Data can be sorted on a single column or more than one column. Each time the Macro runs the data gets sorted. Such macros can be written using code in Open Office.

Consider sorting the data in the figure below. First, sort on column B descending and then column A ascending.

	A	B	C
1	1	5	One
2	4	1	Two
3	3	1	Three
4	7	8	Four
5	4	2	Five

Becomes

	A	B	C
1	7	8	Four
2	1	5	One
3	4	2	Five
4	3	1	Three
5	4	1	Two

Figure 2.47 Sort column B descending and column A ascending.

The example in Listing 9, however, demonstrates how to sort on two columns.

Listing 9. Sort cells A1:C5 on Sheet 1.

```
Sub SortRange
  Dim oSheet        ' Calc sheet containing data to sort.
  Dim oCellRange' Data range to sort.

  REM An array of sort fields determines the columns that are
  REM sorted. This is an array with two elements, 0 and 1.
  REM To sort on only one column, use:
  REM Dim oSortFields(0) As New com.sun.star.util.SortField
  Dim oSortFields(1) As New com.sun.star.util.SortField

  REM The sort descriptor is an array of properties.
  REM The primary property contains the sort fields.
  Dim oSortDesc(0) As New com.sun.star.beans.PropertyValue

  REM Get the sheet named "Sheet1"
  oSheet = ThisComponent.Sheets.getByName("Sheet1")

  REM Get the cell range to sort
  oCellRange = oSheet.getCellRangeByName("A1:C5")

  REM Select the range to sort.
  REM The only purpose would be to emphasize the sorted data.
  'ThisComponent.getCurrentController.select(oCellRange)

  REM The columns are numbered starting with 0, so
  REM column A is 0, column B is 1, etc.
  REM Sort column B (column 1) descending.
  oSortFields(0).Field = 1
  oSortFields(0).SortAscending = FALSE

  REM If column B has two cells with the same value,
  REM then use column A ascending to decide the order.
  oSortFields(1).Field = 0
  oSortFields(1).SortAscending = True
```

```
  REM Setup the sort descriptor.
  oSortDesc(0).Name = "SortFields"
  oSortDesc(0).Value = oSortFields()

  REM Sort the range.
oCellRange.Sort(oSortDesc())
End Sub
```

.

Questions:

1. What are Macros?
2. How can we record a Macro?
3. Fill up the blank

a. Macros are useful to_____a task the same way over and over again.