

CLASS 10 – INFORMATION TECHNOLOGY (402)

1. Unit Overview

Learning Outcomes

- Analyse data using scenarios and goal-seeking techniques.
- Use data consolidation and subtotals to summarize information.
- Create and use what-if scenarios and other what-if tools.
- Use Goal Seek and Solver to solve target-based and constraint-based problems.
- Automate repetitive spreadsheet work using macros.
- Link information across sheets, documents, external data, and registered data sources.
- Share, review, compare, merge, and manage changes in spreadsheets.

Important LibreOffice Calc Terms

Term	Meaning
Spreadsheet	A document containing data arranged in rows and columns.
Workbook / Spreadsheet file	The complete Calc file containing one or more sheets.
Sheet	A single worksheet inside a spreadsheet document.
Cell	Intersection of a row and a column, such as B5.
Range	A group of cells, such as A1:D10.
Formula	An expression used to calculate a result, normally beginning with =.
Function	A predefined formula such as SUM(), AVERAGE(), or COUNT().
Reference	The address of a cell or range used by a formula.
Macro	A recorded or written sequence of instructions used to automate tasks.
Scenario	A named set of input values used to compare possible outcomes.

2. Analysing Data in a Spreadsheet

2.1 Data Consolidation

Data consolidation combines values from different ranges or sheets into one summary. It is useful when the same type of information is maintained separately—for example, monthly sales on different sheets or branch-wise sales in different ranges.

Why Consolidate Data?

- To combine similar information from multiple sources.
- To prepare a single summary for management or decision-making.
- To calculate totals, averages, counts, minimums, maximums, etc.
- To reduce manual copying and repeated calculations.

Common Consolidation Functions

Function	Purpose	Example
SUM	Adds values	Total sales
AVERAGE	Finds arithmetic mean	Average marks
COUNT	Counts numeric cells	Number of entries
MAX	Finds largest value	Highest sales
MIN	Finds smallest value	Lowest sales

Practical Steps – Consolidate Data

1. Open LibreOffice Calc and prepare the source ranges/sheets.
2. Select the destination area where the summary will be placed.
3. Choose Data → Consolidate.
4. Select the required function, such as Sum or Average.
5. Add the source ranges one by one.
6. If headings are present, choose the appropriate options for row/column labels.
7. Choose whether the result should be linked to the source data when required.
8. Click OK and verify the summary.

Exam Tip Consolidation is about combining information from multiple ranges/sheets into a summary; it is not the same as simply adding two cells with a formula.

2.2 Creating Subtotals

A subtotal is a partial total calculated for each group of related records. For example, a sales list can be grouped by product or salesperson and a subtotal can be shown for every group.

Conditions Before Applying Subtotals

- The data should have clear column headings.
- The records should be sorted/grouped by the field on which the subtotal is required.
- The data should have consistent entries in the grouping column.

Practical Steps – Subtotals

9. Select the complete data range including headings.
10. Sort the data by the field that will define the groups.
11. Choose Data → Subtotals.
12. Select the grouping column under 'Group by'.
13. Choose the function, such as Sum, Average, Count, Max or Min.
14. Select the numeric column(s) on which the calculation will be performed.

15. Click OK.
16. Use the outline/grouping controls to expand or collapse details.

Example

If a table contains Salesperson, Product and Amount, sorting by Salesperson and applying Sum on Amount can produce a subtotal for each salesperson and a grand total for the complete list.

2.3 What-If Analysis

What-if analysis asks: 'What will happen to the result if one or more input values change?' It helps students and managers compare possible situations without rebuilding the spreadsheet.

Examples

- What will be the profit if the selling price increases?
- What marks are needed to reach a target percentage?
- How will EMI or total cost change if the interest rate changes?
- How will sales change under optimistic, normal, and pessimistic assumptions?

2.4 Scenarios

A scenario is a named collection of input values that can be applied to the same spreadsheet model. For example, a business can create 'Best Case', 'Normal Case', and 'Worst Case' scenarios.

Steps to Create a Scenario

17. Enter the model and identify the cells whose values may change.
18. Select the changing cells.
19. Choose Tools → Scenarios.
20. Give the scenario a meaningful name, such as Best Case.
21. Set the scenario values and confirm.
22. Create additional scenarios using the same model.
23. Switch between scenarios to compare results.

Scenario	Sales	Expenses	Expected Result
Best Case	High	Low	Higher profit
Normal Case	Medium	Medium	Expected profit
Worst Case	Low	High	Lower profit

2.5 Goal Seek

Goal Seek works backward. Instead of asking for the result of a given input, you specify the desired result and ask Calc to find the input value required to achieve it.

Key Parts of Goal Seek

Part	Meaning
Formula cell	The cell containing the formula whose result must reach a target.
Target value	The desired result.
Variable cell	The input cell Calc is allowed to change.

Example

Suppose B2 contains selling price, B3 contains quantity, and B4 contains $=B2*B3$. If you want B4 to become ₹50,000 by changing only B2, Goal Seek can find the required selling price.

Steps – Goal Seek

24. Prepare the spreadsheet model with a formula cell.
25. Choose Tools → Goal Seek.
26. Select the formula cell.
27. Enter the target value.
28. Select the variable/input cell.
29. Run Goal Seek and review the proposed value.
30. Accept the result if it satisfies the problem.

Remember Goal Seek changes one variable cell to reach one target value. It is different from Solver, which can handle more complex conditions and constraints.

2.6 Solver

Solver is a more advanced optimization tool. It can find the best value for one or more variables while satisfying constraints. Depending on the problem, the objective may be to maximize, minimize, or reach a specific value.

Typical Solver Components

- Target/Object cell – the formula whose value is optimized.
- Optimization direction – maximum, minimum, or a specified target.
- Variable cells – cells Solver can change.
- Constraints – rules that the solution must satisfy, such as quantity ≥ 0 or budget $\leq 50,000$.

Goal Seek vs Solver

Feature	Goal Seek	Solver
Main purpose	Reach a target result	Optimize a result under conditions
Variables	Normally one variable cell	Can work with multiple variable cells
Constraints	Limited/simple	Supports explicit constraints
Typical use	Find required input for a target	Find best allocation/combination

Practical Solver Example

A shop wants to decide how many units of two products to make to maximize profit while staying within a limited budget. Profit is the objective, production quantities are variables, and budget/capacity limits are constraints. Solver can search for the best feasible combination.

3. Using Macros in Spreadsheet

A macro is a sequence of commands or actions that can be executed automatically. Macros are useful for repetitive tasks such as formatting a report, sorting data, applying standard calculations, or preparing a recurring summary.

3.1 Advantages of Macros

- Save time on repetitive work.
- Reduce repeated manual steps.
- Improve consistency in routine operations.
- Automate formatting and calculations.
- Can be reused whenever the same task is required.

3.2 Macro Recorder

The Macro Recorder captures actions performed by the user and stores them as a macro. The recorded macro can later be run to repeat the same sequence.

Typical Workflow

31. Start recording the macro.
32. Perform the required actions carefully.
33. Stop recording.
34. Give the macro a meaningful name and save it in the appropriate library/document.
35. Run the macro to test it.
36. Edit the macro when necessary.

Best Practice Before recording, plan the exact sequence of actions. Avoid unnecessary clicks and keep the macro focused on one task.

3.3 Running a Macro

37. Open the document containing the macro.
38. Use Tools → Macros → Organize Macros → Basic.
39. Select the required macro and choose Run.
40. Check the output and correct the macro if necessary.

3.4 Macros as Functions

A macro can be written so that it behaves like a user-defined function. It can accept arguments, perform calculations, and return a value. This is useful when the same custom calculation is needed repeatedly.

Passing Arguments

An argument is a value or reference supplied to a macro/function. Arguments allow the same macro to work with different inputs instead of being fixed to one cell or one value.

Concept	Example Idea
No argument	Macro always works on the same fixed range.
With argument	Macro receives a number, cell value, or range and processes it.
Pass by value	The macro receives the value itself.
Cell/range reference	The macro can work directly with spreadsheet cells or ranges.

3.5 Accessing Cells Directly

Macros can access cells through the LibreOffice Basic object model. A cell can be referenced by sheet and position, and its value or formula can be read or changed.

Conceptual example: a macro can read a cell containing a quantity, multiply it by a rate, and place the result in another cell. Students should focus on the idea of cell references, values, and automation for theory questions.

3.6 Macros for Sorting

A macro can automate sorting when a report must be sorted in the same way repeatedly. The macro can select the relevant range, apply the desired sort order, and repeat the process whenever needed.

Macro Safety

- Only enable/run macros from trusted sources.
- Do not execute unknown macros from untrusted files.
- Save important work before testing a macro.
- Use meaningful names and document what the macro does.

4. Linking Data and Spreadsheets

Linking allows a spreadsheet to use information stored in another sheet, spreadsheet document, or external data source. It reduces duplication and helps keep related information connected.

4.1 Multiple Sheets

A Calc spreadsheet can contain multiple sheets. Separate sheets are useful for different months, departments, classes, or categories while a summary sheet can collect the final results.

Common Sheet Operations

- Insert a new sheet.
- Rename a sheet with a meaningful name.
- Move or copy a sheet.
- Delete an unwanted sheet.
- Arrange sheets in a logical order.

4.2 References to Another Sheet

A formula can refer to a cell or range on another sheet. This is useful when a summary sheet needs values from detailed sheets.

General idea: =Sheet2.A1 (the exact syntax can vary with sheet names and quoting). If a sheet name contains spaces, Calc uses an appropriate quoted sheet reference.

Steps

41. Open the summary sheet and select the destination cell.
42. Type = to start a formula.
43. Click the source sheet tab.
44. Click the required source cell.
45. Press Enter.
46. Calc creates the reference automatically.

4.3 Relative and Absolute References

Reference	Example	Behaviour when copied
Relative	A1	Row/column can change according to the new position.
Absolute	\$A\$1	Row and column stay fixed.
Mixed	\$A1	Column fixed, row changes.
Mixed	A\$1	Row fixed, column changes.

Absolute references are especially useful when a fixed tax rate, discount rate, conversion factor, or constant must be used in many formulas.

4.4 Hyperlinks

A hyperlink is a clickable connection to another location. In Calc, a hyperlink can point to a web page, an email address, another document, or a location within the spreadsheet.

Types of Hyperlinks

- Web/Internet hyperlink.
- Email hyperlink.
- Link to another document.
- Link to a specific sheet or location within a spreadsheet.

Creating a Hyperlink

47. Select the cell/text that should become clickable.
48. Choose Insert → Hyperlink (or use the appropriate toolbar command).
49. Select the destination type.
50. Enter/select the target.
51. Apply the hyperlink and test it.

4.5 Linking to External Data

External data means information stored outside the current spreadsheet, such as another spreadsheet or supported data source. Linking can reduce repeated data entry and help maintain a connected workflow.

4.6 Registered Data Sources

LibreOffice can work with registered data sources. A registered data source is a data source known to LibreOffice so that it can be accessed through supported database/data connection features.

Exam Tip A reference connects data for calculation; a hyperlink provides clickable navigation. Do not confuse the two.

5. Sharing and Reviewing a Spreadsheet

Collaborative spreadsheet work may require several people to edit, comment on, or review the same document. LibreOffice provides features for sharing, tracking changes, comments, comparison, and merging.

5.1 Sharing a Spreadsheet

A shared spreadsheet is prepared so that multiple users can work with the same document in a collaborative workflow. The exact availability of sharing features can depend on the LibreOffice version and document format.

General Workflow

52. Save the spreadsheet in a suitable shared location.
53. Enable the spreadsheet sharing feature when required.
54. Open/save the document using the shared workflow.
55. Record changes when review is required.
56. Review and resolve changes before finalizing the document.

5.2 Recording Changes

Recording changes keeps a history of edits so that a reviewer can identify what was changed. This is useful when a document passes between students, teachers, or team members.

5.3 Comments

Comments are notes attached to cells. They can be used to explain a value, ask a question, give feedback, or remind another user about an issue.

Comment Operations

- Insert/add a comment.
- Edit the comment.
- Format the comment when needed.
- Delete/remove the comment after the issue is resolved.

5.4 Accepting or Rejecting Changes

During review, each recorded change can be examined. The reviewer can accept a correct change or reject an unwanted change.

Typical Review Process

57. Open the spreadsheet with recorded changes.
58. Review changes one by one.
59. Accept changes that should remain.
60. Reject changes that should not remain.
61. Save the final reviewed version.

5.5 Comparing Spreadsheets

Comparing two versions helps identify differences between them. This is useful when two people have worked on separate copies of a file.

5.6 Merging Spreadsheets

Merging combines compatible changes or content from different spreadsheet versions into one document, subject to the conditions supported by LibreOffice.

Review Tip Compare first when you need to identify differences; merge when you need to bring compatible

changes together.

6. Quick Revision Sheet

Topic	One-Line Revision
Consolidation	Combines data from multiple ranges/sources into a summary.
Subtotal	Calculates a summary value for each group of records.
What-if Analysis	Studies how changing inputs affects results.
Scenario	Stores a named set of changing input values.
Goal Seek	Finds the input required to achieve a target result.
Solver	Finds an optimal solution subject to constraints.
Macro	Automates a sequence of spreadsheet actions.
Macro Recorder	Records user actions to create a macro.
Relative Reference	Changes when copied to another position.
Absolute Reference	Remains fixed using \$ signs.
Hyperlink	Provides clickable navigation to a target location.
Comment	Adds a review/note attached to a cell.
Track/Record Changes	Keeps information about edits for review.
Compare	Identifies differences between spreadsheet versions.
Merge	Combines compatible changes from versions.

Important Differences

Pair	Difference
Consolidation vs Subtotal	Consolidation combines separate source ranges; subtotal summarizes groups within a dataset.
Scenario vs Goal Seek	Scenario compares predefined input sets; Goal Seek calculates an input needed for a target.
Goal Seek vs Solver	Goal Seek generally solves a one-variable target problem; Solver handles optimization with variables and constraints.
Reference vs Hyperlink	A reference is used by formulas; a hyperlink is used for navigation.
Macro vs Formula	A formula calculates a result; a macro automates a sequence of actions and can also perform custom logic.
Comment vs Change Tracking	A comment is a note; change tracking records edits made to the document.