Contents

Unit 1

Overview of Computerised Accounting System 05

Unit 2

Spreadsheet 19

Unit 3

Use of Spreadsheet in Business Applications 113

Unit 4

Graphs and Charts for Business Data 143

Unit 5

Accounting Software Package - GNUKhata 161

Unit 6

Database Management System 203

UNIT 1

OVERVIEW OF COMPUTERISED ACCOUNTING SYSTEM

Key Concepts

1.1 Computerised Accounting System (CAS)
1.2 Components of Computerised Accounting System.
1.3 Data and Information
1.4 Accounting cycle
1.5 Grouping of accounts
1.6 Security Features of CAS
1.7 Merits and Demerits of CAS
1.8 Accounting Information System

Introduction

The advancement of Information Technology has brought enormous possibilities in the field of accounting. Usage of computers and accounting software packages help business men to carry out accounting process quickly and accurately. We have already learnt about the Manual Accounting System under which transactions are physically entered in the books of accounts. Computerised Accounting System processes voluminous data and variety of transactions with the help of computers. Both manual and computerised accounting system follow same principles and concepts of accounting.

1.1 Computerised Accounting System (CAS)

The computerised accounting system facilitates timely production of management information reports, which will help management to monitor and control the business effectively. Computerised accounting makes use of computers and accounting software packages to record, store and analyse financial data. The need for this system arises from advantages of speed and accuracy in recording and retrieval of data and lower cost of handling business transactions.

A computerised accounting system is a system used by businesses for recording and manipulating financial data with the help of computers and various accounting software.

Today, accounting software packages are in abundance to help us to process accounting data and come up with reports instantly.

Features of CAS

Computer assisted accounting programmes have been widely used in the field of accounting.

- Can you imagine the purpose of using computer in accounting system?

Let us see this by narrating the features of CAS

1. Simple and Integrated

Computerised accounting system is integrated to provide accurate and up-to-date business information instantly. It is designed to automate and integrate all the business operations such as sales, finance, purchase, inventory and manufactoring.

2. Transparency and Control

Computerised accounting system provides sufficient time to plan, increases data accessibility and provides user satisfaction. It provides greater transparency for day- to-day business operations.

3. Accuracy and Speed

The accuracy of computer is very high. Each and every calculation is performed with same accuracy. Computer can also process data millions of times faster than human beings.

4. Scalability

The requirement of additional manpower is confined only to data entry operators and it costs almost nothing for processing additional transaction. Hence the cost of processing additional transactions is almost negligible.

5. Reliability

Since computer system is well adapted to performing repetitive operations, the generated financial information is more accurate and reliable in comparison with manual accounting systems.

1.2 Components of Computerised Accounting System

Computerised accounting system has five components, namely procedure, data, people, hardware and software. They are regarded as five pillars of computerised accounting system (Figure 1.1).

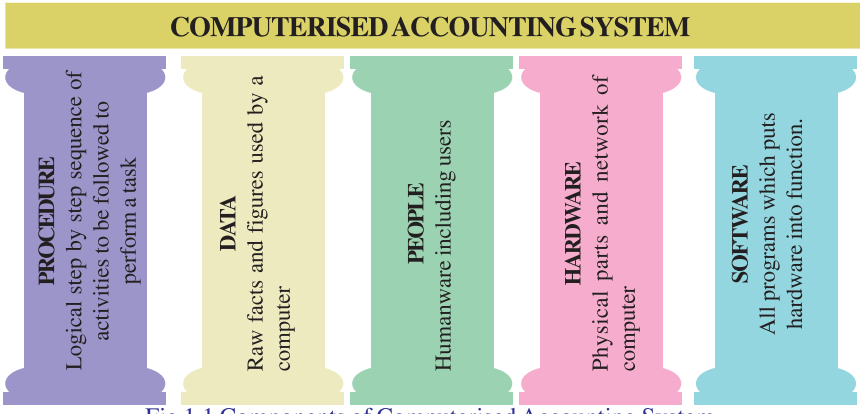


Fig 1.1 Components of Computerised Accounting System

1.3 Data and Information

See figure 1.2 and try to understand how data is transformed into information.

Fig 1.2 Conversion of Data into Information

In accounting, data comprises of one or more elements / items relating to a transaction. A data item or data element means the smallest unit or segment of data. When data is processed, it becomes information. Computerised accounting system is based on the concept of database wherein data is stored and processed with the help of software. The user can take various accounting reports such as Income Statement, Balance Sheet etc. Thus CAS converts the data into information.

Let's make this clear with the help of an example.

Think of a data that is created when the business makes a credit sale. This include

- Name of Account (Debtor)
- Account code (1.3.7)
- Date of transaction (1st June 2017)
- Amount (₹25,000)

This data needs processing at the point of sale inorder to issue a valid receipt (information). The data would be useful to the Sales Manager for preparing reports showing the total sales (information) during a particular period of time.

Let's assess

1. *Describe how computerised accounting helps in keeping of systematic records in a business organisation.*
2. *Which among the following is not a component of CAS?*
   a. data b. Software c. Procedure d. Decisions
3. *Distinguish between Data and Information with an example.*
4. *Describe the features of computerised Accounting System.*

1.4 Accounting Cycle

The term accounting cycle refers to the specific steps that are involved in the completion of accounting process. We have learnt about different stages of accounting process in Plus One classes. The different stages of accounting cycle starts with recording of business transactions and ends with the preparation of financial statements which is given as follows:

1. Recording of transactions in journal
2. Posting of journal entries to ledger accounts
3. Preparation of Trial Balance from balance of accounts
4. Passing adjusting entries
5. Preparation of adjusted Trial Balance
6. Passing closing entries
7. Preparation of Financial Statements

In computerised accounting, the various stages of accounting cycle mentioned above are carried out with the help of computers.

1.5 Grouping of Accounts

In business, large number of transactions with varying nature is to be stored, processed and retrieved. Therefore it becomes necessary to have proper classification of data. Grouping of accounts in computerised accounting is based on accounting equation.We know that accounts are classified into assets, liabilities, income, expense and capital.

You can recollect that the accounting equation can be expressed as;

Assets = Equities (A = E)

Where

Equities = Liabilities + Capital (E = L+ C)

Thus

Assets = Liabilities + Capital (A = L + C)

The amount of capital may be increased by profits or decreased by losses.

Thus the basic accounting equation can be re-written as;

Assets = Liabilities + Capital + (Revenues – Expenses)

Revenue means inflow of resources, which results from the sale of goods or services in the normal course of business and increase in capital. Expenses imply consumption of resources in generating revenues and results in reduction of capital.

We can divide and group each component of the above equation as follows:

1. **Assets**
   - Fixed Assets
     - Land
     - Buildings

- Plant and Machinery
- Furniture and Fixtures

- Current Assets
  - Cash
  - Bank
  - Debtors
  - Inventories

2. **Liabilities**
   - Secured loans
   - Unsecured loans
   - Creditors
   - Provisions
3. **Capital**
   - Share capital
   - Reserve and Surplus
     - Capital reserve
     - General reserve
     - Balance of Profit and Loss account
4. **Revenues**
     - Sales
     - Other Income
5. **Expenses**
     - Material consumed
     - Salary and wages
     - Manufacturing expenses
     - Administrative expenses

1.5.1 Codification of accounts

Systematic grouping is a pre-condition for proper codification, since each ledger under a group will have similar coding pattern.There is a hierarchical relationship between the groups and its components.Codification will help to ensure neatness of classification.

The term 'code' literally means a system of letter of figure with arbitrary meaning for brevity and for machine processing of information. It is an identification mark. Codification refers to allotting code numbers to accounts in a hierarchical structure. The codes are classified into each section and grouping of accounts can be done effectively. The grouping and codification depend upon the type of organisation and the extent of subdivision required for reporting on the basis of profit centres or product lines.

Codification is the essence of computerised accounting system. Here codes are necessary because the computer cannot understand that whether the item is an expense,

income, asset or liability. When it is coded, computer can easily identify them.

Methods of codification

The coding scheme of account-heads should be such that it leads to grouping of accounts at various levels so as to generate Balance Sheet and Profit and Loss Account. The codes so used shall be simple, understandable, concise and expandable. For example, we may allot numeric codes for the major account groups, their sub groups, next level sub groups and so on.

1 Assets

1.1 Fixed Assets
- 1.1.1 Land
- 1.1.3 Building
- 1.1.5 Plant and Machinery
- 1.1.7 Equipments
- 1.1.9 Furniture and fittings

1.3 Current Assets
- 1.3.1 Cash
- 1.3.3 Bank
- 1.3.5 Bills Receivable
- 1.3.7 Debtors
- 1.3.9 Stock in hand

2 Liabilities

2.1 Long term liabilities
2.3 Current Liabilities

3. Capital

3.1 Share capital
3.3 Reserve and Surplus
- 3.3.1 Capital reserve
- 3.3.3 General reserve

4. Revenues

4.1 Direct Income
- 4.1.1 Sales

4.3 Indirect income
- 4.3.1 Rent received
- 4.3.3 Commission received

5 Expenses

5.1 Capital expenditure
5.3 Revenue expenditure
- 5.3.1 Direct expenses
  - 5.3.1.1 Wages
  - 5.3.1.2 Carriage inwards
- 5.3.3 Indirect expenses
  - 5.3.3.1 Salary
  - 5.3.3.2 Rent

- The codification given above is not rigid. The code numbers of sub groups are not given consecutively (See the above example) so as to provide flexibility. ie.,we can add new sub groups in future, if necessaary.

Types of codes

Codes can be classified in the following manner.

1. Sequential codes
2. Block codes
3. Mnemonic codes

1. Sequential codes

In sequential code, numbers and/or letters are assigned in consecutive order. They are applied primarily to source documents such as cheques, invoices etc.

For example:

CM001 – Excel Company Limited
CM002 – Premium Company Limited
CM003 – Modern Company Limited

This method of codification is simple, easy and concise. Here it is easy to identify the missing codes if any.

2. Block codes

In block code, a range of numbers is partitioned into a desired number of sub ranges and each sub range is allotted to a specific group.

For example

1001 – 1999 Televisions
2001 – 2999 Mobile phones
3001 – 3999 Refrigerators

Sub blocks can also be allotted inside a range of number. For example,
in case of 1001 – 1999 Televisions, mentioned above the codes can be alloted in the following manner.

1001 – 1099 LED Televisions
1100 – 1199 LCD Televisions
1200 – 1299 Plasma Televisions

3. Mnemonic codes

It consists of alphabets or abbreviations as symbols to codify a piece of information. For example,Railway station codes – PGT for Palakkad, TVC for Trivandrum, TCR for Thrissur, etc.

Similarly, in accounting Codes may be assigned for day books as;

SJ	Sales Journal
PJ	Purchase Journal
CB	Cash book
JP	Journal Proper
SRJ	Sales Return Journal
PRJ	Purchase Return Journal

We can conclude here that it is convenient to code account heads, departments, places or locations. It is simple, meaningful and easy to remember but when size is increasing, grouping will become difficult.

1.5.2 Methodology to develop coding structure and coding

The coding system should be pre-planned by considering the scope and features of the piece of information. The codes should be designed to accommodate future additions. The hierarchy of data names should be strictly observed while developing codes.

The methodology can be explained with an example of assigning register number to a student. Register numbers are the individual codes allotted to students. Here the hierarchy of the schooling system should be identified first. The other relevant facts associated with the identification of a student are also taken.

The hierarchy may be decided as follows.

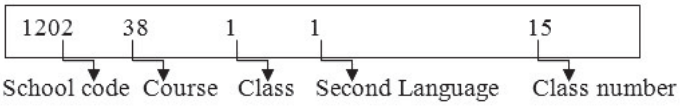
School → Course → Class → Second Language → Class number of Student.

Coding structure will be as follows.

- School – 4 digits
- Course – 2 digits
- Class – 1 digits
- Second Language – 1 digit
- Class number of student – 2 digit

Thus, every student will get a 10 digit code which helps to get the following details of a student from the code itself (eg. the school in which he/she is studying, the course for which he/she is studying, the second language of the student, the class number of the student etc).

Once the coding structure is decided, allotment of codes becomes easy. For example, the code number of a student with class number '15', with second language 'Malayalam' in class 'XI' 'Commerce' stream of School Code '1202' will be '1202381115'. Its coding is shown as follows;



Let's assess

1. *Range of numbers are used for codification in .....*
   (Block codes, Mnemonic codes, Sequential codes, All of these)
2. *Grouping of accounts should be done basically by considering .....*
   (The rules of debit and credit, Accounting equation, Capital investment, Method of codification)
3. *Codification of accounts is required for the purpose of .....*
   (a) Hierarchical relationship between groups and components.
   (b) Faster data processing .
   (c) Keeping data secured.
   (d) Easy preparation of final accounts.
4. *Explain various types of codes with suitable examples.*

1.6 Security features of CAS

Imagine the security features you have installed or made use of in your mobile phone;

- Pattern locking
- Biometric finger print scanning
- PIN

Why do you use such security features in your phone?

Ensuring data security, preventing unauthorised access etc. will be your answer. Think in terms of the level of security features an organisation must use to safeguard its accounting data when compared to a mobile phone.

It is necessary that all accounting information must be kept safe and secure for all the time. Any unauthorised access to this information may have adverse effects. Possibility of theft, deletion, and alteration in accounting data will affect its reliability and accuracy.

All accounting software must ensure data security, safety and confidentiality. Therefore, the software usually provides the following.

(a) Password security
(b) Data audit
(c) Data vault

Password security

Password is a mechanism which restricts the access to the computer system and data to the user only. The system facilitates defining the user rights according to organisation policy. By setting passwords, a person in an organisation may be given access to a particular set of data, while he may be denied access to another set of data.Password is the key or code to allow the access to the system.

Data Audit

This feature enables us to know as to who and what changes have been made in the original data. This facility helps to fix responsibility to the person who has manipulated the data and thereby answers data integrity. In most software this is a separate menu available to the administrator to track unauthorised changes that have taken place in the data following his previous review.

Data vault

Accounting software provides additional security through data vault. Vaulting will save data in encrypted form to ensure its security. Encryption essentially scrambles the information so as to make its interpretation extremely difficult or impossible.

Encryption ensures security of data even if it lands in wrong hands, because the receiver of data will not be able to decode and interpret it.

1.7 Merits and Demerits of CAS

The merits of CAS include ;

1. Timely generation of desired reports.
2. Efficiency in record keeping
3. Saves time and money
4. Confidentiality of data is maintained
5. Automated document preparation
6. Transparency and reliability
7. Accurate and updated information

The demerits of CAS include ;

1. Danger of hawkers and stealing of data
2. Problems with technology
3. Non-availability of skilled personnel
4. Chances of data loss due to various reasons
5. Faster obsolescence of technology which leads to scrapping of heavy investment
6. Huge training cost of employees
7. Unprogrammed and unspecified reports that cannot be generated from the system.

Let's assess

1. *Develop a coding structure suitable to assets with its different sub groups.*
2. *Explain the methodology to develop coding.*
3. *Mention the internal controlling methods in CAS.*

1.8 Accounting information system (AIS)

Accounting Information System (AIS) and its various sub-systems may be implemented through computerised accounting system. Accounting is a huge information system for any organisation. CAS integrates the entire sub systems of the organisation and provides a sound accounting information system. The major sub-systems are depicted in figure 1.4.

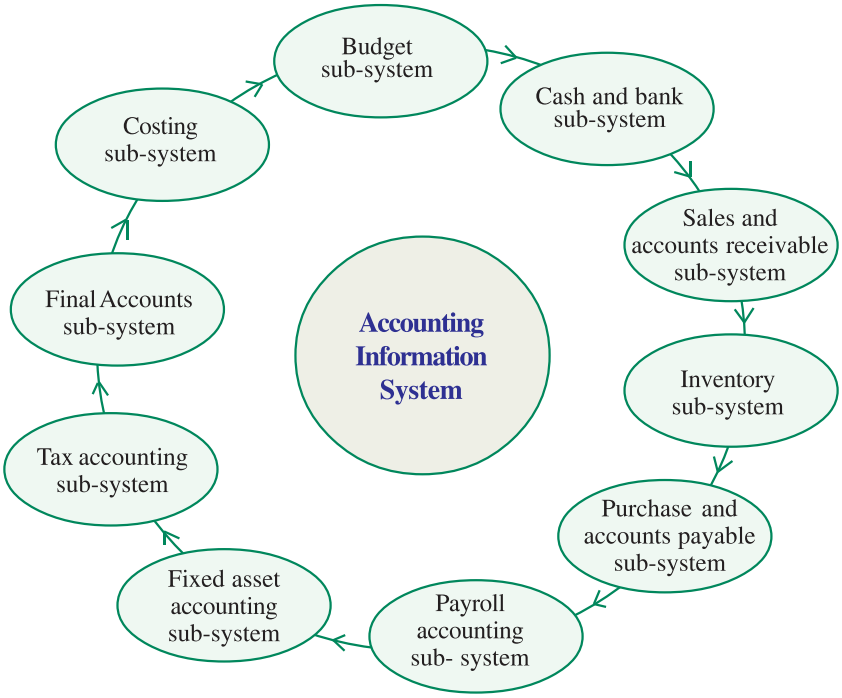


Fig 1.4 sub-systems of AIS

The sub systems of AIS are briefly explained below.

Cash and Bank Sub-system

It deals with the receipts and payments of cash (both physical and electronic). It includes electronic fund transfer, digital cash dealing etc.

Sales and Accounts Receivable Sub-system

It deals with recording of sales, maintaining of sales ledger and managing receivables. It generates periodic reports about sales, collections made, overdue accounts and receivables position.

Inventory Sub-system

It deals with the recording of purchases and issues of sale of products specifying the price, quantity and date. It generates the inventory position and valuation report.

Purchase and Accounts Payable Sub-system

It deals with recording of purhcases and managing payables. It also generates periodic reports about the performance of suppliers, payment schedule and position of the creditors.

Payroll Accounting Sub-system

It deals with payment of wages and salary to employees. It gives information about basic pay, dearness allowance, and other allowances and deductions from salary and wages on account of provident fund, taxes, loans, advances and other charges. The system generates reports showing total pay of the employees .

Fixed Assets Accounting Sub-system

It deals with the recording of purchases, additions, deletions, usage of fixed assets such as land and buildings, machinery and equipments, etc. it also generates reports about the cost, depreciation, and book value of different assets.

Tax Accounting Sub-system

This sub-system deals with compliance requirement of various taxes. This sub-system used in large size organisation.

Final Accounts Sub-system

This subsystem deals with the preparation of Profit and Loss account / Balance Sheet and other statements for reporting purposes.

Costing Sub-system

It deals with recording of cost of materials, labour and other expenses with a view to ascertain cost of goods produced.

Budget Sub-system

It deals with the preparation of budget for the coming financial year as well as comparison of actual performances with the current budget.

Summary

- CAS is a system used by businesses for recording the financial information using computers and various accounting software.
- The features of CAS include;
  Simple and integrated, transparency and control, accuracy and speed, scalability and reliability
- CAS has five components namely procedure, data, people, hardware and software.
- Data element is the smallest unit of data. Data when processed become information.
- The term accounting cycle refers to the specific steps that are involved in the completion of accounting process.
- There is a hierarchical relationship between the groups and its components.
- Codification of accounts refers to allotting code numbers to accounts in a hierarchical structure. The grouping and codification depend upon the type of organisation and the extent of sub-divisions required.
- Codes can be of sequential codes, block codes and mnemonic codes.
- Every accounting software ensures data security, safety and confidentiality.
- The merits of CAS include;
  Timely generation of reports, efficient record keeping, less time and cost, confidentiality of data, transparency,reliability, and updated information
- The demerits of CAS include;
  Danger of Hawkers, technological problems, skilled employees are required, chance of data loss, huge training costs of employees and obsolescence of technology.
- CAS integrates the entire sub systems of the organisation and provides a sound accounting information system.

I can

- describe the need of computerized accounting
- identify the various components of Computerised Accounting System (CAS)
- explain the need, importance and methodology of grouping and codification of accounts
- describe the uses of a software for CAS
- list out the merits and demerits of CAS
- list out the various sub systems of accounting information system and their functions

TE QUESTIONS

1. The code 301-399 for cosmetics is an example of ..... code.
   a. Sequential b. Block c. Mnemonic d. Numeric
2. Find the odd one out.
   a. Data b. People c. Hardware d. Virus
3. Mention the name of any two coding methods with examples.
4. Classify the following into mnemonic codes, sequential codes and block codes.
   a. CA, CL – for current assets and current liabilities.
   b. 001, 002 for customer A and B.
   c. 001 to 099 – soaps, 100 to 199 - face powder.
5. Computerised accounting has several merits over manual accounting. Describe any four.
6. Write a coding structure for a higher secondary school having Science, Commerce and Humanities batches of 1 each. Duration of course is 2 years maximum students in the class is 50. Second language available there are Hindi, Malayalam and Sanskrit.
7. Describe the accounting information system and its sub systems.

UNIT 2

SPREADSHEET

Key Concepts

2.1 Electronic Spread Sheets
2.2 Components of the Spreadsheet
2.3 Spreadsheet Operations
2.4 Types of Worksheet Data
2.5 Components of a Formula
2.6 Classification of Functions
2.7 Data Entry, Text Management And Cell Formatting
2.8 Output Reports
2.9 Common Error Codes(Messages) in LibreOffice Calc

Introduction

One of your friends - Lakshmi approaches you and asks your help with a project she is working on. Lakshmi wants to prepare a list of scores obtained by the students of a higher secondary school in Palakkad town. There are 60 students each in three streams namely Commerce, Science and Humanities. The list must include the name of student, batch, sex, and scores obtained by them in the final examination. She also needs to identify the top scorer and percentage for each batch. Lakshmi knows that it is difficult to do this work with pen and paper.

- She seeks your help. Suggest the best software for doing this task.
- What are the calculations we can do with this software?

From your earlier experiences, you know that spreadsheet is particularly a handsome choice of application software when a task involves working with numerical data. Anyone can use a spreadsheet for their work in office, school, personal projects or other purposes. This is regarded as one of the most commonly used analysis and reporting tools. People are using spreadsheet at home for keeping track of their finances, calculation of income tax and even for recording important events chronologically. Its in-built formulae and functions hold the key to analyse data - that is digging out nuggets of important information on various aspects. All these have made spreadsheet an essential tool for

many business professionals in the fields of presentation, illustration, budgeting, and payroll preparations. From the above discussion, can you list down some uses of spreadsheet in accounting other than the above?

- Sales report preparation
- Inventory analysis
-

Several spreadsheet softwares like Gnumeric, Calligra Sheets, Lotus-123, Microsoft Excel, OpenOffice Calc, LibreOffice Calc etc. are available to perform the above functions. In this unit we shall discuss about the various aspects of LibreOffice Calc which is included in LibreOffice package.

Let's know more ...

History of Spreadsheets

The word 'spreadsheet' came from 'spread', to refer to a newspaper or magazine item that covers two facing pages. Daniel Bricklin is regarded as the 'Father of electronic spreadsheet'. In 1978, Harvard Business School student, Daniel Bricklin came up with the idea for an interactive visible calculator. Bricklin and Bob Frankston then co-invented or co-created the software program VisiCalc. The name 'VisiCalc' is a compressed form of the phrase 'visible calculator'. VisiCalc is considered as the first spreadsheet program that combined all essential features of a modern spreadsheet. Later, Mitch Kapor developed Lotus and his spreadsheet program quickly became the new industry spreadsheet standard. Lotus 1-2-3 is the first spreadsheet software established as a major data presentation.

2.1 Electronic Spreadsheets

Electronic spreadsheet is a computer application software that provides interactive pages similar to a calculator, which allows the user to arrange and organise huge volume of data in a tabular form. Spreadsheets facilitate arithmetic calculations, arrange and analyse data and provide easy correction of errors.

A file in spreadsheet is known as a 'Workbook'. A workbook is a collection of a number of 'Worksheets'. At a time, only one worksheet can be made as active worksheet and that worksheet is available to a user for carrying out operations. Worksheet names will be shown in the 'Sheet Tab' at the bottom left of the window. Additional sheets can be added and its name can be changed, if required.

Let's know more ...

Free and Open-Source Software (FOSS)

Free and open-source software (FOSS) is the computer software that can be classified as both free software and open-source software. That is, anyone is freely licensed to use, copy, study, and change the software. The source code is openly shared so that people are encouraged to voluntarily improve the design of the software. This is in contrast to proprietary software,(like Windows) where the software is under restrictive copyright and the source code is usually hidden from the users. The benefits of using FOSS include lower software costs, enhanced security and stability (especially with regard to Malware), protecting privacy and giving users more control over their own hardware. Free, open-source operating systems such as Linux are widely utilized today, powering millions of servers, desktops, smartphones (eg. Android) and other devices.

2.1.1 LibreOffice Calc

LibreOffice Calc is a spreadsheet application that we can use to calculate, analyse, and manage data. It is included in LibreOffice Package, which is Free and Open Source software under the General Public Licence (GPL). LibreOffice Calc is available for a variety of platforms, including Linux, OS X, Microsoft Windows, and FreeBSD.

2.1.2 Features of LibreOffice Calc

As a spreadsheet, LibreOffice Calc has the following features:-

1. Easy Calculations

The software provides a lot of tools with which one can perform even complex calculations on different data spread across sheets with ease.

2. What-If Calculations

This lets users to predict what will happen if certain condition changes. For instance, you can see how change in interest rate affects the installment of a loan.

3. Serves as a database

A spreadsheet also performs the functions of a database. Even huge volume of data can be organised, stored and filtered without much efforts. This programme allows storing any number of data in different sheets.

4. Arranging Data

The data stored in a spreadsheet can be organised or reorganised according to the needs of the users. We can also apply formatting, sorting and filtering functions to customise as per the requirements.

5. Dynamic Charts

The inbuilt charts and graphs provide versatility in presenting the data in an appealing manner. Different types of charts are available in the application which cater to the various needs of the users.

2.2 Components of LibreOffice Calc

When LibreOffice Calc opens, the programme window displays a blank worksheet as shown in figure 2.1.

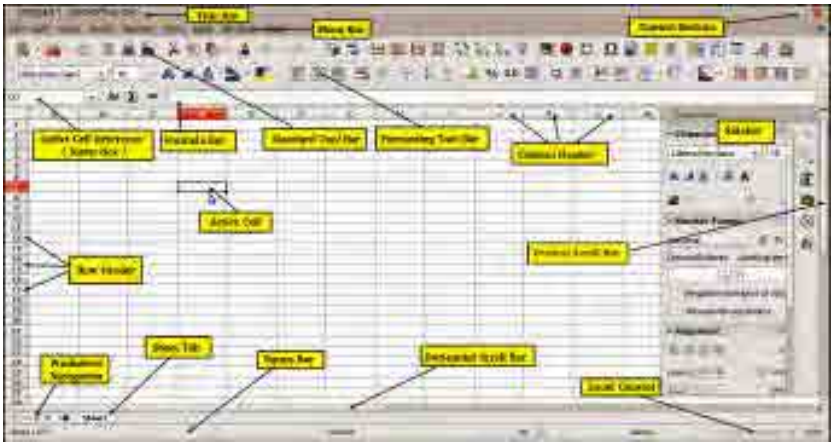


Fig. 2.1 Blank Worksheet

Navigating through the figure 2.1 will give a clear picture of the various components of a spreadsheet. Let us discuss some of the major components.

1. Rows and Columns

The Worksheet in LibreOffice Calc contains Rows and Columns in Table format. Rows are named numerically (1,2,.....) from top to bottom while Columns are referred by alpha characters (A,B,C,D,....) from left to right.

Let's know more ...

Inserting new Rows or Columns

We can add or delete Rows and columns in a Spreadsheet. To add column, click at the column header (right click on the mouse), there we get an option to add columns. In similar manner, we can add rows also by clicking on the row header. Delete option is also available in the pop up menu by right clicking on column or row header.

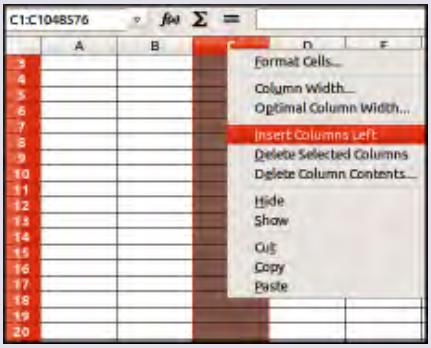


Fig. 2.2 Add new columns

Fig. 2.3 Add new rows

2. Cell

In a spreadsheet, data are recorded in cells. The intersection of a Row and a Column is called a cell. A cell is identified by a combination of a letter (column header) and a number (row header).For example, the first cell of a worksheet is identified as A1. From the figure 2.4 can you name the cell? The cell name is 'C4'. Each cell thus has a unique identification known as 'Cell Address'.

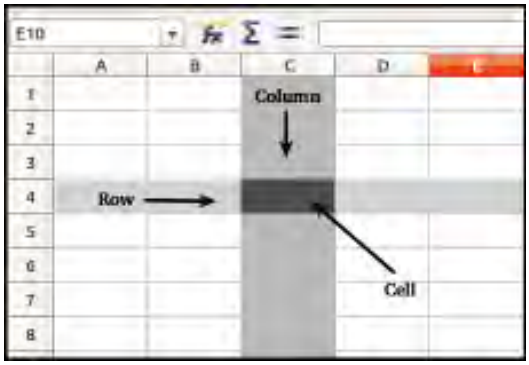


Fig. 2.4 Cell of a Worksheet

3. Range

Range is a group or block of cells that are highlighted in a worksheet. A range may contain just a single cell or many cells.

How can we express a range of cells?

This is specified by giving the address for first cell in the range and the last cell in the range. For example, B2:D8 represents the range starting from B2 to D8. We use colon (:) as the range operator. Refer the figure 2.5.

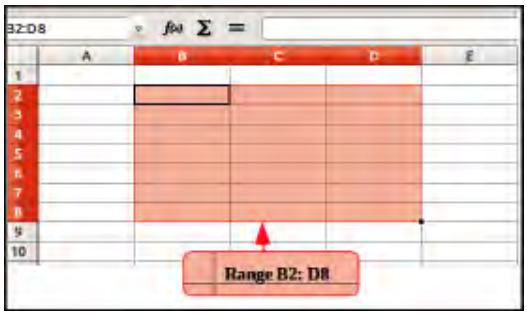


Fig. 2.5 Range in a Worksheet

Naming Ranges

This means giving a name to a specific range. For example, scores obtained by the students of your class in Accounting is given in the range C2:C15. You can name this range as "Score". Now this range name can be used in various formulae or functions instead of quoting cell range. This enables us to save time and avoid complexity while framing formulae. For example, to calculate the 'Average Score', use the formula as =AVERAGE(Score), instead of =AVERAGE(C2:C15).

The procedure for 'Naming ranges' and its use in formula is illustrated below:

- Enter the scores of each student in a worksheet as shown in figure 2.6.

	A	B	C
1	Class No.	Name	Acc
2	1	Arunkumar K. P.	62
3	2	Balachandran M. A	43
4	3	Chadrababu N.	42
5	4	Devasia P. V.	56
6	5	Emily Sebastian	71
7	6	Filsy Mathew	34
8	7	George P. V	25
9	8	Haridas P.	28
10	9	Ismayil P. P.	39
11	10	Joseph P. V.	56
12	11	Kurian Chariyan	65
13	12	Lasiyamol Joseph	23
14	13	Manoj K. K	36
15	14	Narayanan P. P.	45

Fig. 2.6 Score sheet

Select the cells which are to be named. Here, select C2:C15 and got to

Insert → Names → Define...

Then, the window 'Define Name' appears in the screen as shown in figure 2.7.

Fig. 2.7 Define Name Window

- Enter the name of range (Score) in the window appeared and click 'Add'.
- Now this range name - 'Score' can be used in various formulae or functions.
- Use the name of the range in each formula by inserting it from the 'Names' option available in 'Insert' menu.

Insert → Names → Insert....

Then, the window 'Paste Names' appears as shown in figure.2.8.

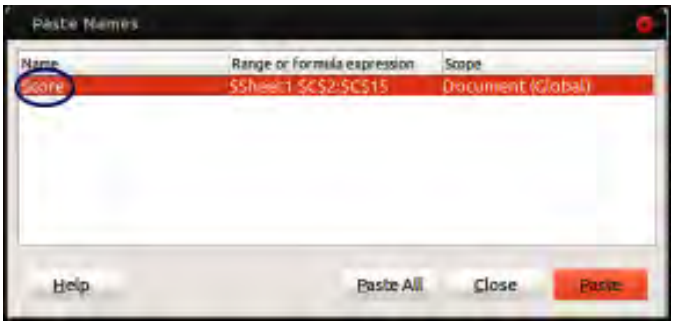


Fig. 2.8 Paste Names Window

- Select the name 'Score' and click on 'Paste' button.
- Then, the name 'Score' will appear in the formula. Pressing 'Enter' key will return the result. See the figure 2.9.

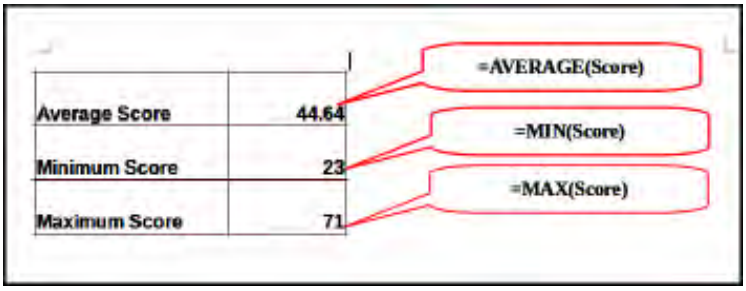


Fig. 2.9 Using named ranges in Formulae

Let's assess

1. *LibreOffice Calc is a ..... software.*

   (a) Presentation *(b) Data base*

   (c)Text document *(d) Spreadsheet*

2. *The intersection of rows and columns in a worksheet is called .....*

3. *A spreadsheet file is called .....*

   (a) Worksheet *(b) Workbook*

   (c) Range *(d) Pop-up menu*

4. *A group of adjacent cells that forms a rectangular area is called .....*

2.3 Spreadsheet Operations

Some useful spreadsheet operations are discussed below:

1. Open Work sheet

While being on the Calc, you can open a new workbook by choosing 'New' option or by clicking the respective icon from the 'File' menu.

An existing workbook can be opened by choosing 'Open' option in the File menu or by clicking the 'icon' on the standard tool bar.

2. Save a Worksheet

You know that all the files need to be saved in the computer once your work is completed, if you want them to be used in future. 'Save' option in the File menu enables you to save a workbook to the computer. 'Save' icon on the standard tool bar can also be used to save a file. The 'Save As' option is used to save the same file in a different name, location or format.

3. Close work sheet

After you finish working in a workbook, you can close the workbook with 'Close' option from the 'File' menu. Then another workbook can be opened without closing the Calc.

4. Quit LibreOffice Calc

Quitting the Calc is different from closing a workbook. On closing the workbook, that particular file will be closed, but Calc application will be still working. On quitting, the entire application will be unloaded from the active memory of the computer. For this, use 'Exit LibreOffice' option from the file menu. To protect our files, always quit Calc before turning off the computer.

Fig. 2.10 Basic Spreadsheet Operations

5. Add worksheet

By default only one worksheet is available. What needs to be done if you want additional worksheets? You can follow any of these steps.

(a) Right click the mouse at sheet tab area and select 'insert Sheet' from the popup menu.

(b) Alternatively, by clicking on the 'Plus mark' near the sheet tab you can insert as many sheets as you need.

6. Delete worksheet

To delete an unwanted worksheet, right click the mouse on the sheet tab to be deleted and select the 'Delete Sheet' option from the popup menu.

7. Rename worksheet

By default, worksheets are named as Sheet 1, Sheet 2, and Sheet 3 etc. A worksheet can be renamed by selecting the option 'Rename Sheet' from the popup menu on a right click of sheet tab. Give the name desired and click OK. New name will appear on the sheet tab.

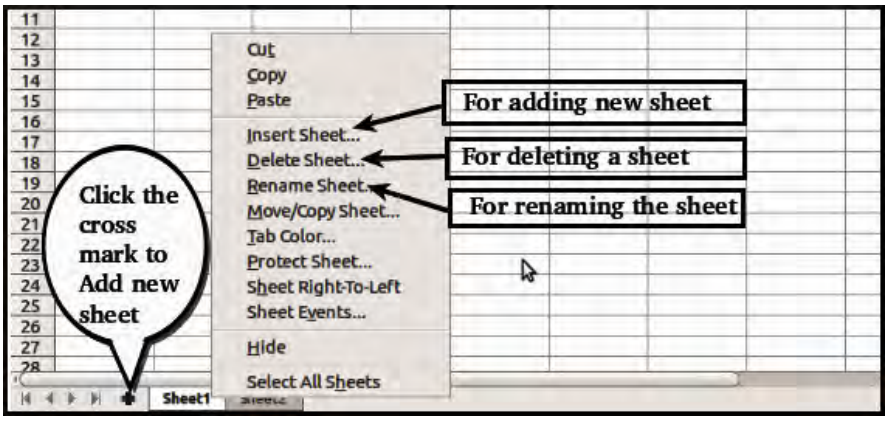


Fig. 2.11 Insert, Delete and Rename sheet

2.3.1 Spreadsheet Navigation

How can you move rapidly with in a worksheet?

Following navigation methods are available here:

a. **Using Mouse:** You can place the mouse pointer over the cell and click on it.

b. **Using a cell reference :** Click on the little inverted black triangle just to the right of the Name Box on the formula bar .Type the cell reference of the cell you want to go to and press Enter. You may also just click into the Name Box, backspace over the existing cell reference, and type in the cell reference you want.

c. **Using the Navigator :** Click on the Navigator button in the Vertical scrollbar (or press F5) to display the Navigator. Type the cell reference in the Column and Row fields, and press Enter. The navigation window appears as in figure 2.12.

Fig. 2.12 Navigation window

Keyboard short-cuts for navigating around Spreadsheet	
Movement	**Key Stroke**
One cell down	Down arrow key or Enter key
One cell up	Up arrow key or Shift + Enter key
One cell right	Right arrow key or Tab key
One cell left	Left arrow key or Shift + Tab key
Top of Sheet (cell A1)	***CTRL + HOME***
The cell at the intersection of the last row and last column containing data	***CTRL + END* keys**
Moves the cursor to the right most cell with data in the current row. If there is no data in the current row, the cursor moves to the last cell in that row.	**CTRL + Right arrow key**
Moves the cursor to the bottom cell with data in the current column. If there is no data, the cursor moves to the last cell in the current column.	**CTRL + Down arrow key**
Beginning of the Row	**HOME key**
Moves the cursor to the extreme left cell with data in the current row. If the current row is empty, the cursor moves to the first cell in that row.	**CTRL + Left arrow key**
Moves the cursor to the top most cell with data in the current column. If the current column is empty, the cursor moves to the first cell in that column.	**CTRL + Up arrow key**
Moves cursor to the last cell in the column with data in the current row.	**END key**

2.4 Types of Worksheet Data

In the cell of a worksheet usually three types of data are entered:

(a) Value

(b) Label

(c) Formula

(a) **Value:-** Value is a number that you enter in a cell. Thus, numerical data is called a value. It also includes currency symbol, minus sign (-), plus sign (+),

decimal point (.) and comma (,). The worksheet accepts positive values and negative values. By default values are right-aligned. Calculations can be done using the values only. For example: Age of employee, Salary of employee etc.

(b) **Label:**- The text data is called label. It includes alphabets and symbols. They are non-numeric data but may include digits also. By default, labels are left-aligned. For example: Name of Employee, Sex, Designation etc.

(c) **Formula:**- The worksheet cells also contains formula to perform calculations. When a formula is entered in a cell the result of the formula will be displayed on pressing the 'Enter' key. The actual formula is displayed on the 'input line' of the spreadsheet. Formula should always begin with an equal sign (=). Even if a formula begins with mathematical symbols + (plus) or - (minus), the software will prefix = (equal to) sign in the formula.

2.5 Components of a Formula

Formulae are Calc's most powerful aid for getting your work done. Formulae usually speed up the creation of your worksheet. You don't need to worry about whether the calculation is correct because Calc doesn't make mistakes. Best of all, if you change any value in a formula, Calc automatically update the results.

Now it's time to think in terms of what constitutes a formula?

A standard formula may have three components:

(a) Cell References

(b) Mathematical operators

(c) Functions

2.5.1 Cell References

The cell co-ordinates in a formula are called cell reference. A cell reference identifies the location of a cell or group of cells in the spreadsheet. In other words, the cell address used in a formula is called cell reference. A cell reference may be relative, absolute and mixed.

(i) Relative Cell Reference

Let us see how relative reference works.....

Suppose in E5 you enter a formula =C5+D5 and press enter key the result will be displayed in cell E5. If you copy the above formula to cell E6 the new formula will read as = C6+D6. With relative referencing you can create a formula in one column and then just copy this formula to other columns.

By default cell reference is relative. Here when a formula is copied to a new location in a worksheet, cell references in the formula change in relation to the new location of the formula.

(ii) Absolute cell reference

When you copy a formula or function, absolute reference is used to keep a cell reference constant. The cell references in a formula remain the same even when the formula is copied to a new location. For absolute cell referencing, you need to use the $ (dollar) symbol as prefix before the column and row names in a formula. A5 is example an for absolute reference.

(iii) Mixed cell reference

You know that a cell address has two parts- first part denotes column letter and second row number.

If any one part is prefixed with a dollar ($) sign leaving the other part plain then it is termed as mixed reference. For example, $B4 or B$4 is mixed reference. This is a combination of relative and absolute cell references.

2.5.2 Mathematical operators

If you need to create a formula, you must include a mathematical operator. The following table tells you about various types of operators -

a. Arithmetic
b. Comparison
c. Reference

Operation performed	Operator symbol
Arithmetic Operators	
Addition	+
Subtraction	-
Multiplication	*
Division	/
Percent	%
Exponential	^
Comparison Operators	
Equal to	=
Greater than	>
Less than	<
Greater than or Equal to	>=
Less than or Equal to	<=
Not equal to	<>
Reference Operators	
Range operator	:
Union operator	,

2.5.3 Functions

We have already discussed about formula. How is it different from a function? The following discussion will make it clear.

Functions are the pre-defined formulae in spreadsheet that return a specific result. It is a built in set of formulae which starts with an 'equal to sign' (=). It is a special key word which can be entered into a cell in order to perform and process the data which is appended within brackets. A function differs from a formula in the sense that the former is designed by the software, but the latter is user designed. In a function we should give only the cell references, but not the arithmetic operators. Functions perform calculations by using specific values called 'arguments', in a particular order called 'syntax'.

You should remember the following while using a function:

- *Use an equal sign (=) to begin the function.*
- *Specify the function name. (Example : SUM)*
- *Enclose all the arguments within brackets.*
- *Use comma to separate the individual arguments in a function.*
- *Strictly follow the syntax of the function.*

You might have noticed this button '***f(x)***' (called as function wizard) on the formula bar. (see fig 2.14). When we click it, function offers assistance and prompts into a spreadsheet cell. Alternatively, we can enter the function directly into the formula bar. We can also select any function by clicking 'function' at the Insert tab or by pressing Ctrl+F2.

AVERAGE, COUNT, MIN, MAX, SUM etc. are some of the commonly used functions which are relatively easy to understand. These functions with its results are shown in figure 2.13.

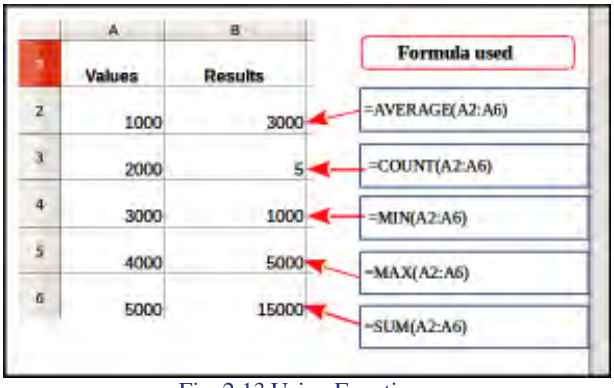


Fig. 2.13 Using Functions

Autosum (Σ)

The AUTOSUM (Σ) function is the most basic and one of the commonly used functions. It is used to get the total (sum) of various numbers. For example if you need to get the sum of cells A2:C2 in Cells D2, select the cell D2 and click on sum button in the formula bar and then press enter key. To get the result in any other cell in the worksheet, select the required cell, click on SUM button and highlight the range A2:C2 and then press Enter key. (See Fig 2.14).

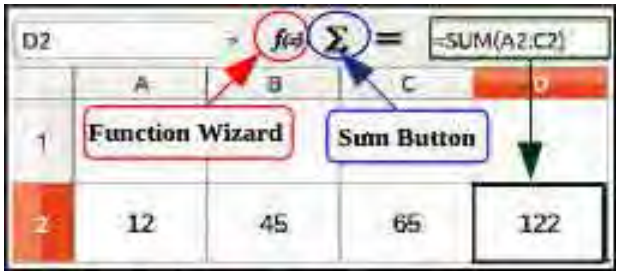


Fig. 2.14 Function Wizard & SUM Button

Let's assess

1. *In spreadsheets, 'Save' option is available in .....menu.*
2. *The numerical data entered in a spreadsheet cell is called a .....*
3. *By default, Labels entered in a spreadsheet have ..... alignment.*
4. *In a spreadsheet, formula should always begin with .....*
   (a) Equal sign *(b) Plus sign*
   (c) Minus sign *(d) Any of these*
5. *Dollar symbol is prefixed on the column and row names in a formula is:*
   (a) Absolute cell reference *(b) Relative cell reference*
   (c) Mixed cell reference *(d) All of these*
6. *Pre-defined formulae in spreadsheets are called .....*

2.6 Classification of Functions

Numerous inbuilt functions are available in LibreOffice Calc, but for the time being our study is limited to the following.

1. Date & Time Functions
2. Statistical Functions
3. Logical Functions
4. Mathematical Functions
5. Text Functions
6. Spreadsheet Functions
7. Financial Functions

2.6.1 Date & Time Functions

This function is used to perform operations on date and time values. This includes fetching today's date, current time, calculating number of days between two given dates etc.

In effect Date and Time functions are used for inserting, editing and manipulating date and time. LibreOffice calc internally handles a date/time as a numerical value. If you assign the format "Number" to a date or time, it is converted to a number. For example, the date 01/01/2017 is converted to 42736. This number can be converted in to date format by changing the format as date or time.

You may change the default date format from the tools option (see figure 2.15).
The path is:

Tools → Options → LibreOffice Calc → Calculate

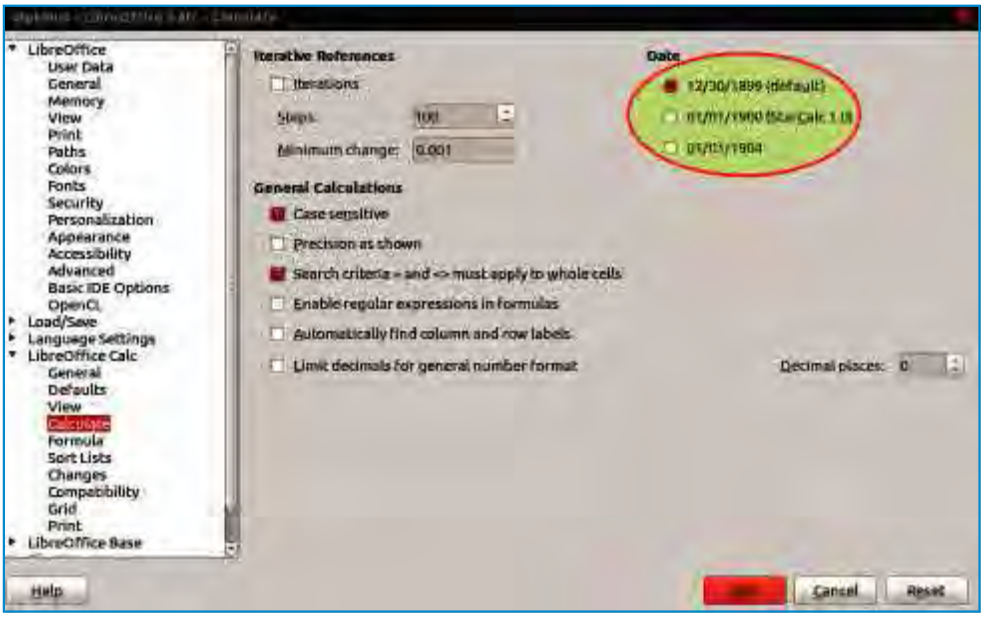


Fig. 2.15 Setting Default date format

The use of " / " or " - " in date may be interpreted as arithmetic operators . So date values used in Calc's function must be entered in double quotes.

For Example "01/01/2017".

The most commonly used Date & Time functions are :

- **TODAY**

This function returns the current computer system date in the cell. The current date is automatically returned when we open the document on a future date. TODAY is a function without arguments.

Syntax : =TODAY( )

Example :

Suppose today is 16th December 2017 and if we enter TODAY( ) function in a cell =TODAY( ), it will return 16/12/2017 as current date.

- **NOW**

NOW function displays the current system date and time. It differs from the TODAY function in the sense that it returns current time along with current date. It is also a function without arguments.

Syntax : =NOW( )

Example : If you enter NOW( ) function in cell B1 on 20th July 2017 at 04.39 PM, it will return 20/07/17 16:39 in B1.

- **YEAR**

YEAR function returns the 'year' from the date or date value given in the brackets.

Syntax:- =YEAR("Date")

Example : =YEAR("01/05/2016") returns 2016 as shown in figure 2.16

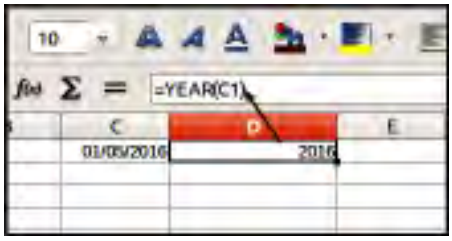


Fig. 2.16 Example of YEAR function

- **MONTH**

MONTH function returns the month of a given date as an integer between 1 and 12.

Syntax: =MONTH("date")

Examples: =MONTH("05/08/2016") returns the result- 8 as shown in figure 2.17

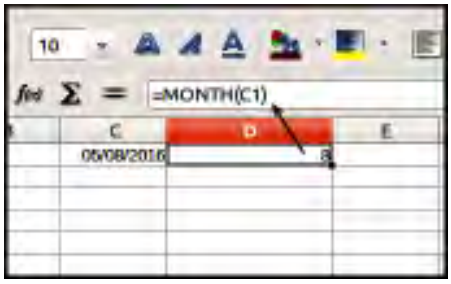


Fig. 2.17 Example of MONTH function

- **DAY**

DAY function returns integer value of a given date(between 1 and 31).

Syntax:- =DAY("date")

Examples :- =DAY("25/05/2016") return 25

- **DATE VALUE**

LibreOffice Calc considers 30/12/1899 as the base date with date value zero(0). Based upon this, DATEVALUE function converts the given date and return its corresponding date value number.

Syntax : =DATEVALUE("Text")

In LibreOffice Calc 30/12/1899 has been set as the default date with date value zero(0).The number is determined by date settings in the ***Tools*** *menu. We can change the default date to* ***01/01/1900 or 01/01/1904*** *as shown in figure 2.15.*

The 'Text' parameter implies that date must be given as text. Giving date in double quotes will consider the date as text. Date without quotes will return an error message(Err502)

Example:- =DATEVALUE("31/01/2017") - Display 42766 as shown in figure 2.18

Formula Used	Result
=DATEVALUE("30/12/1899")	0
=DATEVALUE("31/12/1899")	1
=DATEVALUE("01/01/1900")	2
=DATEVALUE("01/01/2000")	36526
=DATEVALUE("01/12/2015")	42339
=DATEVALUE("01/01/2018")	43101

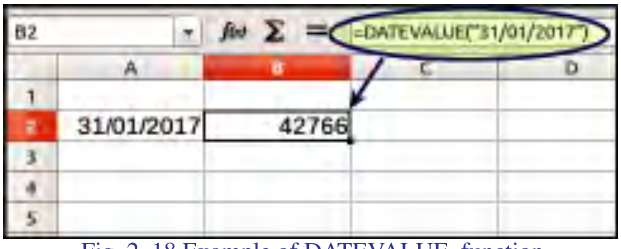


Fig. 2. 18 Example of DATEVALUE function

For ascertaining year, month and day, we may use datevalue instead of date while using YEAR, MONTH and DAY functions. Their syntax are:

=YEAR (datevalue)
=MONTH(datevalue)
=DAY(datevalue)

Let us calculate the year and month of datevalue 42766 (Date "31/01/2017") by using YEAR and MONTH functions :

=YEAR (42766) returns 2017 as shown in Fig 2.19

=MONTH(42766) returns 1 as shown in Fig 2.20.

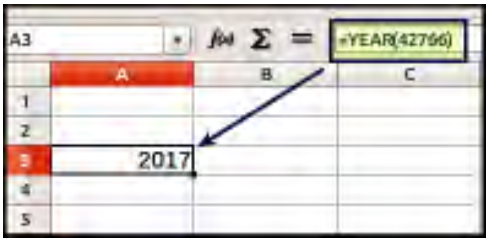


Fig. 2.19 Example of YEAR function

Fig. 2.20 Example of MONTH function

- **DATE**

This function returns a date, when the year, month and day parameters are given as integer separated by commas.

Syntax : =DATE(Year, Month, Day)

Example: =DATE(2017,12,08), it is displayed as - 08/12/17 as shown in Figure 2.21

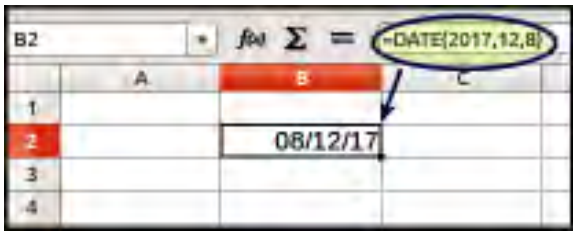


Fig. 2. 21 Example of DATE function

Various date formats available in Calc

DATE Function	Cell Format	Result
=DATE(2017,12,23)	DD/MM/YYYY	23-12-2017
=DATE(2017,12,23)	Number – General	43092
=DATE(2017,12,23)	DD/MM/YY	23-12-17
=DATE(2017,12,23)	D MMMM YYYY	23 December 2017
=DATE(2017,12,23)	NNNND MMMM YYYY	Saturday, 23 December 2017

Try Yourself

Show the following :

(a) Display Current system date in Cell B2

(b) Display Current system date and time in Cell B3

(c) Display Year from the given date 31/12/2017 in Cell B4

(d) Display Month from the given date 31/12/2017 in Cell B5

(e) Display Date from the given date 31/12/2017 in Cell B6

(f) Display Numerical value corresponding to the date 31/12/2017 in cell B7

(g) Calculate your age by using DATEVALUE() function.

Let's assess

1. *Identify the function which converts date into the corresponding internal date number.*
   (a) TODAY (b) DATEVALUE (c) NOW (d) DATE
2. *Identify the function which displays the current system date.*
   (a) TODAY (b) DATEVALUE (c) NOW (d) DATE
3. *Which function returns the system date and time?*

2.6.2 Statistical Functions

Statistical function operates on a set of data and gives summarised results. LibreOffice Calc provides a number of statistical functions, such as AVERAGE, MIN, MAX, COUNT etc. A few of them are discussed in this section.

- **COUNT**

This function returns the count of numeric value used in a given range of cells. Only numbers, dates and time are counted here. Empty cells, logical values, text and error codes are not considered.

For example, the Fig 2.22 contains some values from cells A1 to D3. If you apply the formula =COUNT(A:D3) in cell E3, Calc returns the value as 5. Here you can see that blank columns, text values etc. are not considered.

Syntax : =COUNT(Value1,Value2.....)

=COUNT (Range)

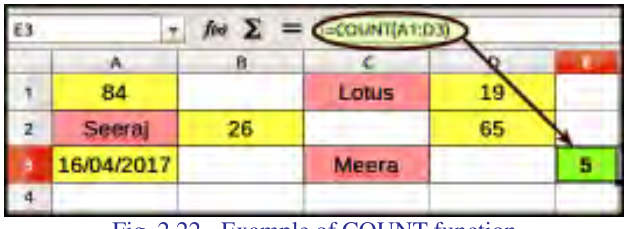


Fig. 2.22 - Example of COUNT function

- **COUNTA**

The COUNTA function counts the total number of cells which contain any value. It will count numbers, text, date, time, logical values, and error codes in the specified range or list of arguments. But empty cells are not counted here.

If you apply the formula =COUNTA(A1:D3) in the example shown in figure 2.22, it returns the result as '8' in cell E3 by avoiding the blank cells in that range specified.

Syntax : =COUNTA(Value1,Value2.....)

=COUNTA(Range)

- **COUNTBLANK**

COUNTBLANK function counts the number of empty cell in the given range. It is the opposite function of COUNTA.

Syntax : = COUNTBLANK(Range)

Example : = COUNTBLANK(A1:E1) gives the result as shown in figure 2.23 as there is only one blank cell.

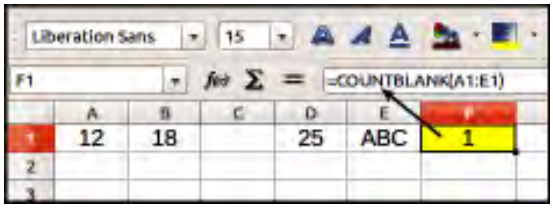


Fig. 2.23: Example of COUNTBLANK function

- **COUNTIF**

This function counts the number of cells within a given range that meets the user defined criteria or condition.

Syntax : =COUNTIF(Range,Criteria)

Where,

Range - It is the set of cells to which the criteria are to be applied.

Criteria - it can be a number, an expression, cell reference or a character string. For example, criteria can be expressed as 5000, ">32", "Commerce", or C4. If you search for literal text enclose the text in double quotes.

For example, see the given Fig. 2.24 in which A2:A11 contains numbers from 2000 to 2009 and in cell B2 the number 2006 is also included. The table shows clearly how COUNTIF function can be used with different criteria in column 'C' and its output is shown in the next column.

	A	B	C	
1			Formula	Result
2	2000	2006	=COUNTIF(A2:A11,2006)	1
3	2001		=COUNTIF(A2:A11,B2)	1
4	2002		=COUNTIF(A2:A11">=2006")	4
5	2003		=COUNTIF(A2:A11,"<"&B2)	6
6	2004		=COUNTIF(A1:A10,"<0")	0
7	2005			
8	2006			
9	2007			
10	2008			
11	2009			

Fig. 2.24 Example of COUNTIF function