PG CA S1-04 (DSE)

TWO YEAR MASTER'S DEGREE COURSE

SEMESTER - I

PC SOFTWARE

MSc IT

Hiranya Chandra Bhuyan School of Science and Technology

KRISHNA KANTA HANDIQUI STATE OPEN UNIVERSITY

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MSc IT

PC SOFTWARE

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COURSE INTRODUCTION

Welcome to the comprehensive course on PC Software, where we will explore a range of essential topics including Operating Systems, Computer Security, Number Systems, and Productivity Tools. This course is designed to provide you with a deep understanding of these key areas, enabling you to effectively navigate and utilize PC software for various purposes.

We will begin by diving into the world of Operating Systems (OS). You will learn about the definition and functions of an OS, as well as the different types such as Single User, Multi-user, Single Tasking, Multitasking, Real-time, Network OS, and Distributed OS. Additionally, we will explore MS DOS, where you will gain insights into bits and bytes, the components of a computer system, primary and secondary memory, and input/output devices.

Another vital area we will cover is Computer Security. We will examine various threats including viruses, worms, spyware, malware, and Trojan horses, and discuss the importance of antivirus software in mitigating these risks. Furthermore, we will delve into cyber threats and the legal framework surrounding them. Topics such as hacking, digital forgery, cyber stalking/harassment, cyber pornography, identity theft and fraud, cyber terrorism, cyber defamation, and offenses under the IT Act of 2000 will be explored in detail.

Throughout the course, we will also delve into Number Systems, Writer (a word processing tool), Calc (a spreadsheet program), Impress (a presentation program), and Base (a database management tool). You will gain practical skills in working with templates, styles, advanced formatting, calculations, data analysis, and multimedia integration. By the end of this course, you will have a strong foundation in PC Software, equipping you with the knowledge and skills to effectively utilize a variety of software applications and enhance your productivity in personal and professional settings.

Each unit includes some along-side boxes to help you know some of the difficult, unseen terms. Some “EXERCISES” have been included to help you apply your own thoughts. You may find some boxes marked with: “LET US KNOW”. These boxes will provide you with some additional interesting and relevant information. Again, you will get “CHECK YOUR PROGRESS” questions. These have been designed for you to self-check your progress of study. It will be helpful for you if you solve the problems put in these boxes immediately after you go through the sections of the units and then match your answers with “ANSWERS TO CHECK YOUR PROGRESS” given at the end of each unit.

UNIT 1 : INTRODUCTION TO OPERATING SYSTEM

UNIT STRUCTURE

1.1 Learning Objectives

1.2 Introduction

1.3 Definition of Operating System

1.4 Functions of Operating System

1.5 Types of Operating System

- 1.5.1 Single User Operating System
- 1.5.2 Multi User Operating System
- 1.5.3 Single Tasking Operating System
- 1.5.4 Multi Tasking Operating System
- 1.5.5 Multiprogramming Operating System
- 1.5.6 Real Time Operating System
- 1.5.7 Network Operating System
- 1.5.8 Distributed Operating System

1.6 Let Us Sum Up

1.7 Further Reading

1.8 Answers to Check Your Progress

1.9 Model Questions

1.1 LEARNING OBJECTIVES

After going through this unit, you will be able to :

- learn about the basic definition of operating systems
- describe the different functions of operating systems
- distinguish between the various types of operating systems
- distinguish between network operating system and distributed operating systems.

1.2 INTRODUCTION

Operating systems have evolved through a number of phases during the last half of a century or earlier. The earliest electronic computer developed

in the mid-1940s had no operating system at all. At that time, the machines were equiped with a console consisting of toggle switches and display lights. There were no programming languages or translators for developing high-level language programs and converting them to machine understandable instruction. The scene was improved from 1960 onwards. A lot of new techniques and technology were developed and finally the concept of operating system came. Operating System is an important component of a computer. The primary objective of an operating system is to make computer system convenient to use and utilise computer hardware and various resources in an efficient manner. An operating system is a large set of software which is also an interface between users and computer systems. It is a system software. Operating system also manages resources of the computer system, such as memory, processor, file system and input/output devices.

The introductory concepts and principles of operating system will be the main issues for our discussion in this unit. Moreover, various types of operating system will also be covered in this unit.

1.3 DEFINITON OF OPERATING SYSTEM

A computer system is made up of hardware, operating system and user interface. Computer software can be divided into *system programs* which manage the operation of the computer itself and the *application programs,* which solve problems for their users. **Operating System i**s the most fundamental of all the system programs (or System Software). The operating system controls the entire computer's resources and provides the base upon which the application programs can be written.

We can define operating system in different ways. Some of the definitions are: An operating system is program that makes the computing power available to users by controlling the hardware. Another definition is that operating system is a program that controls the execution of application programs. It is a set of processes permanently or transitively resident within the computer that makes the resources of the computer system available to the user in a consistent, reliable, friendly way.

Operating system can be divided into two parts: the *Kernel* and the *shell*. The kernel is the essential centre of a computer operating system, the core that provides basic services for all other parts of the operating system. A synonym of kernel is *nucleus*. A kernel can be contrasted with a shell, the outermost part of an operating system that interacts with user commands. *Kernel* and *shell* are terms used more frequently in UNIX. Users interact with operating system through *Command Line Interfaces* (CLIs) or *Graphical User Interfaces* (GUIs). The operating system thus contributes to the simplification of the human interaction with the computer hardware. They are responsible for linking application programs with the hardware, thus achieving an easy user access to the computers.

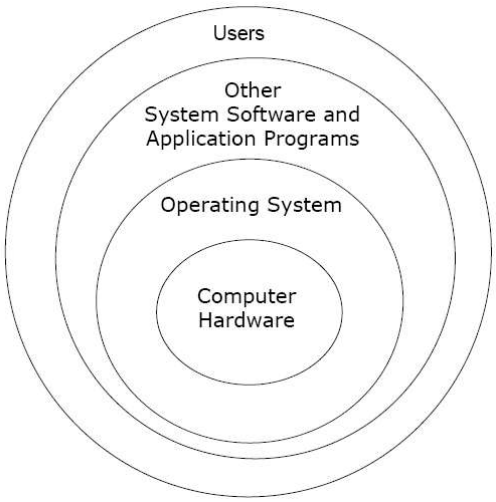


Figure 7.1: Computer System

1.4 FUNCTIONS OF OPERATING SYSTEM

There are various functions performed by an operating system. The basic functions are :

1. Input/Output management
2. Memory management
3. Process management
4. File and directory management
5. Security management
6. Command interpretation

1. Input/Output management : An operating system makes efficient usage of input and output devices and controls them properly. The input/ output management module of the operating system coordinates and assigns different input and output devices, namely terminals, printers, disk drives, tape drives ete. It controls all input and output devices, keeps track of input and output requests, issues commands to these devices and takes measures which would ensure that data is transmitted efficiently and correctly to and from input and output devices.

2. Memory or storage management : Memory is an important resource for a computer system. So memory allocation and deallocation for programs and data is an another function of an operating system. Memory management module of an operating system takes care of allocation and de-allocation of main memory to various procsses. It allocates the main memory and secondary memory to the system programs, user programs and data.

3. Process management : Process can be defined as a program in execution. It is the job which is currently being executed by the processor (CPU). During its execution, a process would require certain system resources, such as processor time, main memory, files, input and output devices etc. UNIX operating system supports multiple processes simultanously. The process management module of UNIX takes care of creation and termination of processes, assigning required resources to different processes currently running, scheduling processor's time to different processes etc.

4. Files and directory management : Files and directories are also properly managed by an operating system. Data is stored in a computer system as files. The file management module of the operating system would manage files as well as directories held on various storage devices as well as transfer of files from one storage device to another device. Thus, file management takes care of organization, storage, retrieval, naming, sharing and protection of different files. It also allows files to be read and modified by using text editors or some other file manipulation software packages.

5. Security management : It is also one of the most important function of an operating system to protect its various resources from the outer world. Security management module of the operating system which are executing concurrently in the memory, in such a way that system can ensure data security and integrity. That is, it protects data and program stored in the computer system from destruction and unauthorised access. It keeps different programs and data in such a way that they donot interfere with each other. Moreover, it protects files from being accessed or modified by unauthorised users.

Role of Operating System :

- Must communicate with the PC's hardware
- Works with the BIOS to provide access to devices such as hard drives
- Communicates with device drivers
- Provides a user interface

Let us explain these in details :

To ***communicate with the PC's hardware***, the operating system starts running immediately after the PC has finished its Power-On Self Test (POST), when it takes control of the PC. The operating system works with the BIOS to provide access to devices such as hard drives, floppy drives, keyboards, mouse, and basic video. If a user wants to access a file on a diskette in a floppy drive, the operating system passes the request to the appropriate set of BIOS instructions that tells the floppy controller to send the requested information to RAM.

If the BIOS is unable to talk with the hardware, the operating system talks to the hardware directly. For this capability, it needs some additional programming. Device drivers provide the code necessary for the operating system to communicate with specific hardware. Device drivers are written specifically for a particular operating system, usually by the hardware manufacturer.

In addition to ***communicating with hardware***, the operating system provides for some type of error handling and error notification. If a piece of hardware is not functioning properly, the operating system tries to fix the

problem or tries to communicate with the device a few more times. If it is still unable to communicate with the device, it provides an error screen notifying the user of the problem.

Providing a user interface is the second function of an operating system. Basically, the operating system organizes applications so that the users can easily access them, use them, and store application data. When an application is opened, the operating system lets the application provide the majority of the user interface. That is, the operating system disappears or moves away from the center of the screen. The operating system still has the responsibility of providing access to the hardware for whatever the application needs. If the program cannot function properly, the operating system again takes control, stops the application, and provides some sort of error message.

1.5 TYPES OF OPERATING SYSTEM

Operating systems are categorised based on the types of computers they control and the sort of applications they support. The types are:

1. Single User Operating System
2. Multi User Operating System
3. Single Tasking Operating System
4. Multi Tasking Operating System
5. Multiprogramming Operating System
6. Real Time Operating System
7. Network Operating System
8. Distributed Operating System

1.5.1 Single User Operating System

A computer system in which only one user can work at a time is called a single user operating system. The familiar Intel processor based Windows OS personal computer is an example of single user system. Such a typical system will have a single keyboard, mouse

and monitor as I/O devices for the user to interact with the system. Users apply command through the keyboard and mouse and the computer displays its responses (output) on the monitor.

1.5.2 Multi User Operating System

This type of operating system which is running on a computer will manage the work of different users, without letting them know that they all are actually working on a single computer. A multi user operating system allows a number to work together on a single computer. Each user will be provided with a terminal and all such terminals will be connected to the single computer. For example, UNIX, Linux, Windows XP etc.

A multi user operating system allows many different users to take advantage of the computer's resources simultaneously. The operating system must make sure that the requirements of the various users are balanced, and that each of the programs they are using has sufficient and separate resources so that a problem with one user does not affect the entire community of users. Unix, mainframe operating systems, such as *MVS*, are examples of multi user operating systems.

1.5.3 Single Tasking Operating System

It is a type of operating system which can execute a single job at a time and is known as Single Tasking operating system. For example, MS-DOS is a single tasking operating system because one can open and run only one application at one time in MS-DOS.

When a single program is allowed to run at a time, the system is grouped under a single-tasking system.

1.5.4 Multi Tasking Operating System

Multitasking is concerned with a single user executing more than one program simultaneously or concurrently. Now a days most of

the operating systems such as UNIX, LINUX, OS/2 etc. are multi tasking operating system.

Multi tasking can be of two types namely, pre-emptive and co-operative. In pre-emptive multitasking, the operating system slices the CPU time and dedicates one slot to each of the programs. Unix like operating systems such as *Solaris* and *Linux* support pre-emptive multi tasking. Cooperative multi tasking is achieved by relying on each process to give time to the other processes in a defined manner. *MS Windows* prior to *Windows 95* used to support cooperative multitasking.

1.5.5 Multiprogramming Operating System

In multiprogramming technique of processing, the CPU runs several programs at the same time. Multiprogramming is implemented in such a way that it appears as if many programs are being executed concurrently. Multiprogramming keeps the CPU busy, switching its attention from one program to another. For example, while one program is waiting for some input or output operation, another program can use the processor because of the high speed of the processor.

Multiprogramming is the rapid switching of the CPU between multiple processes in memory. It is done only when the currently running process requests I/O, or terminates. It was commonly used to keep the CPU busy while one or more processes are doing I/O. It is now mostly superceded by multitasking, in which processes also lose the CPU when their time quantum expires.

Multiprogramming makes efficient use of the CPU by overlapping the demands for the CPU and its I/O devices from various users. It attempts to increase CPU utilization by always having something for the CPU to execute.

The prime reason for multiprogramming is to give the CPU something to do while waiting for I/O to complete. If there is no DMA,

the CPU is fully occupied doing I/O, so there is nothing to be gained (at least in terms of CPU utilization) by multiprogramming. No matter how much I/O a program does, the CPU will be 100% busy. This of course assumes that the major delay is the wait while data is copied. A CPU could do other work if the I/O were slow for other reasons (arriving on a serial line, for instance). I/O operations are exceedingly slow (compared to instruction execution). A program containing even a very small number of I/O operations, will spend most of its time waiting for them. Hence, poor CPU usage when only one program is present in memory.

1.5.6 Real Time Operating System

Real time operating systems work towards providing immediate processing and also responding to user's commands in a very short period of time. This type of operating system is more commonly used in chemical industries for process control and scientific processing like airplane control and space vehicle control operations. The success of a real time operating system does not depend only on the correctness of the result but also on the timeliness of the result. For example: HP-RT and VTWorks etc. It is a multitasking operating system that aims at executing real-time applications. Real-time operating systems often use specialized scheduling algorithms so that they can achieve a deterministic nature of behavior. The main object of real time operating system is their quick and predictable response to events. They either have an event-driven or a time-sharing design.

An event-driven system switches between tasks based on their priorities while time-sharing operating systems switch tasks based on clock interrupts.

1.5.7 Network Operating System

Network Operating System (NOS) is an operating system specifically designed to establish network connections for

workstations, personal computers (PC) accross the world via Local Area Network and internetworking. NOS provides support for multiuser operating system as well as administrative, security and network management functions. Some examples of network operating system are Windows NT, Novell's Netware etc.

A network operating systems has to acknowledge and respond to requests from many workstations, managing network access, resource allocation and sharing, data protection as well as error control.

Features of Network OS :

All network ooperating system provide certain core functions such as connection to other computers on the network. Some of the significant features of NOS are as follows :

- It gives the features of basic (Operating System) such as protocols, processors, hardware detection and multi processing.
- It supports name and directory services.
- It provides file and print services over the network, back up and replication services, web services.
- It facilitates internetworking such as routing, switching, wireless set-up and WAN ports.
- It provides cluster and grid computing capabilities, fault tolerance and high availability systems.
- It provides user management services such as log on, logoff, remote access, auditing tools with Graphical User Interface (GUI) features and administration tools.
- It strictily provides security features such as authentication, authorization, log on restrictions for users and access controls etc.

1.5.8 Distributed Operating System

A distributed system is composed of large a number of computers connected by high-speed networks. The computers in the distributed

system are independent, but they appear to the users as a single system. A distributed operating system hides the existence of multiple computers which are interconnected by a network from the user. That is, the user remains unaware of the fact that many computers are being used to process the data. These computers may be located at many places around the globe.

Distributed Operating System provides single-system image to its users. All these computers work in close coordination with each other. Processes and systems resources are managed globally and controlled from specific locations.

An operating system that manages a group of independent computers and makes them appear to be a single computer is known as a distributed operating system. The development of networked computers that could be linked and communicate with each other, gave rise to distributed computing. Distributed computations are carried out on more than one machine. When computers in a group work in cooperation, they make a distributed system.

Advantages :

i) Data sharing : Allows data sharing access to common databases.
ii) Device sharing : Allows many users to share expensive peripherals like high resolution printers, scanners and digital cameras.
iii) Communication : Makes communication between users easier.
iv) Spreads the availability workload over independent computers of the system in cost-effective way.

Disadvantages :

i) Network communication is delayed due to saturation or other problems.
ii) Security : Needs tools and techniques for providing controlled access to sensitive data.



CHECK YOUR PROGRESS

Q.1. Choose the correct option :

(i) An operating system is a software that

(a) helps the operators who are maintaining a computer system.

(b) helps other programs to run.

(c) helps in resource management.

(d) all of the above.

(ii) UNIX is an example of

(a) batch processing operating system

(b) time sharing operating system.

(c) real time operating system.

(d) none of these.

(iii) The program which takes user input , interprets it and takes necessary actions is

(a) kernel (b) system calls

(c) shell (d) scheduler.

(iv) The main job of one of the following is to allocate CPU to process

(a) kernel (b) shell (c) sceduler (d) login

(v) The objective of a multiprogramming operating system is to

(a) minimize the net execution time.

(b) maximize the processor utilization.

(c) minimize the user response time.

(d) none of above.

(vi) In UNIX, a process is a

(a) program in execution.

(b) sub-program which can be called from other programs.

(c) sequence of commands required to run a program.

(d) none of above.

(vii) MS-DOS operating system is a

(a) time sharing operating system

(b) single user operating system.

(c) distributed operating system

(d) all of the above.

(viii) The example of real time operating system is

(a) UNIX (b) MS-DOS

(c) WINDOWS 2000 (d) HP-RT

(ix) Example of embedded operating system is

(a) FreeBSD (b) Unix

(c) MS-DOS (d) Linux.



1.6 LET US SUM UP

- An operating system is an important component of a computer system. The primary objecives of an operating system is to make computer system convenient to use and utilise computer hardware and various resources in an efficient manner. An operating system is a large set of software which is also an interface between users and computer systems. It is also a system software.
- **Input and Output management :** An operating system makes efficient usage of input and output devices and controls properly.
- **Memory or storage management :** Memory is an important resource for a computer system. So memory allocation and deallocation for programs and data is an another function of an operating system.
- **Process management :** Process can be defined as a program in execution.It is the job which is currently being executed by the processor (CPU).
- **Files and directories management :** Files and directories are also properly managed by an operating system.Data is stored in a computer system as files.

- **Scheduling :** The operating system also establishes and enforces process-priority. That is, it determines and maintains the order in which jobs are to be executed by the computer system.
- **Security management :** It is also one of the most important function of an operating system to protect its various resources from the outer world.
- **Single user Operating System** the simplest operating system which allows only one user to work.
- **Multi user operating system** which is running on a computer will manage the work of all different users.
- **Multitasking operating system** allows the user to perform more than job at the same time on a computer.
- In **multiprogramming technique of processing ,** the CPU runs several programs at the same time.
- **Real time operating system** work towards providing immediate processing and also responding to user's commands in a very short period of time.
- **Network operating System (NOS)** is an operating system specifically designed to support interconnection of several computers.
- **A distributed operating System** hides the existence of multiple computers which are interconnected by a network from the user.



1.7 FURTHER READING

- Tanenbaum, A. S., & Woodhull, A. S. (1987). Operating systems: design and implementation (Vol. 2). Englewood Cliffs, NJ: Prentice-Hall.
- Deitel, H. M., Deitel, P. J., & Choffnes, D. R. (2004). Operating systems. Pearson/Prentice Hall.



1.8 ANSWERS TO CHECK YOUR PROGRESS

Answer to 1 : (i) (d), (ii) (b), (iii) (c), (iv) (c), (v) (b), (vi) (a), (vii) (b), (viii) (d), (ix) (a)



1.9 MODEL QUESTIONS

Q.1: What is an operating system? Why is it necessary to use operating system for a computer ?

Q.2: What is process? What are the main objectives of the process-management module of the operating system?

Q.3: Differentiate between multiprogramming and multi-tasking operating system.

Q.4: Describe the role of operating system in the computer system.

Q.5: What are different functions performed by an operating system?

Q.6: Describe different types of operating systems?

Q.7: What is virtual memory? Why is it so called? How is it used?

Q.8: What is network operating system? How is it different from the distributive operating system?

****

UNIT 2 : MS DOS OPERATING SYSTEM

UNIT STRUCTURE

2.1 Learning Objectives

2.2 Introduction

2.3 DOS Operating System

2.4 System Files of DOS

2.5 Concept of Booting

2.6 Files and Directory Structure

2.7 Concept of Paths

2.8 Internal and External Commands

2.9 Batch File

2.10 Let Us Sum up

2.11 Further Reading

2.12 Answers to Check Your Progress

2.13 Model Questions

2.1 LEARNING OBJECTIVES

After going through this unit, you will be able to :

- describe the DOS operating system
- identify the system files of DOS
- describe files and directory structure
- identify the internal and external commands
- identify the batch files.

2.2 INTRODUCTION

From the previous unit you are aware of the basic definition of an operating system including its functions and various types. In this unit, we will introduce you to the Microsoft Disk Operating System (MS DOS) which is a single user, single tasking operating system. We will also discuss about the system files of DOS, files and directory structure and internal and external commands of DOS.

2.3 DOS OPERATING SYSTEM

Microsoft Disk Operating System (MS-DOS) is the most popular single user operating system in the world. Microsoft Corporation of USA had released it in August 1981. First version of MS-DOS was a refined version of an operating system developed by Tim Peterson of Seattle Computers, which he had named as QDOS (Quick and Dirty Operating System) as he had developed it in record two months and could not introduce some good functions of process management and memory management into it. After the release of the first version of MS-DOS, every time some refinement is made, a new version of it is launched.

2.4 SYSTEM FILES OF DOS

The modern DOS operating system is distributed on 3-5 high density floppy disks. It comes with backup utilities and (depending on how the layers feel) disk compression drivers. However, all the stuff that goes into C:\DOS and its subdirectories are programs and utilities. The core DOS operating system consists of six files:

- The boot sector is a 512 byte record placed at the beginning of the C: drive when DOS was installed, or placed there subsequently using the “sys c:” command.
- Two “hidden” files are stored in the root directory of the C: drive. They do not show up in a DIR listing unless the /A switch is used. On IBM PC DOS systems, they are *IBMBIO.SYS* and *IBMDOS .SYS*. On MS DOS systems, they are called *IO.SYS* and *MSDOS.SYS*. These files form the kernel of the DOS system.
- *COMMAND.COM* is the “shell” or command interpreter. It prints out the “C:\&gt “ prompt and reads user commands. It also supports BAT files.
- The user configuration files are *CONFIG.SYS* and *AUTOEXEC. BAT*. The reader is assumed to be familiar with these files.

COMMAND.COM is initially stored in the C:\ root directory. The problem is that OS/2 and Windows NT have their own versions of COMMAND.COM. To avoid confusion, each COMMAND.COM should be stored in the subdirectory that belongs to its particular operating system. In normal use, this means that the DOS version should be in C:\DOS. To relocate it, two statements must be added to the user configuration files:

"SHELL=C:\DOS\COMMAND.COM" is added to CONFIG.SYS.

"SET COMSPEC=C:\DOS\COMMAND.COM" is added to AUTOEXEC.BAT.

The hidden files IBMBIO, IBMDOS, IO, or MSDOS have names that do not conflict with each other or with any system file belonging to any other operating system. They can stay in the C:\ root directory no matter what gets added to the system. This means that the volatile part of the DOS system consists of the boot record, C:\CONFIG.SYS, and C:\AUTOEXEC. BAT.

2.5 CONCEPT OF BOOTING

The term 'boot' is used to describe the initial loading of an operating system or of some other program into a computer. The word "boot" comes from the term "Bootstrap". The loading of DOS into main memory involves loading of three essential files of DOS i.e. IO.SYS, MSDOS.SYS and COMMAND.COM into the main memory. Loading these files into main memory is called *booting up* of the computer. The booting up process is a step by step process as described below

a) As soon as the machine is switched on, POST (Power On Self Test) is performed which checks for integrity of all the components (CPU,RAM, I/O devices etc.) of a computer system. If any component is found faulty, an error message is displayed.

b) A chip called ROM-BIOS (Read Only Memory-Basin Input-Output Services) is read and executed. Then a check is performed for DOS files presence in the following order:

   i) First in 'A drive'; if found there, DOS is loaded from the drive A.

ii) If not found in drive A, then 'C drive' scanned for the DOS files and if available there from the C drive DOS is loaded.

iii) If DOS file could not be located, an error message is displayed.

c) If DOS files are found in a drive, its very first sector (called *boot sector*) is read which stores a small program called bootstrap loader in which instructions for booting up process are stored. The bootstrap loader is then loaded into the main memory and its instructions are executed and as a result DOS system files IO.STS, MSDOS.SYS and COMMAND.COM will be loaded into the main memory one by one.

Two files IO.SYS and MSDOS.SYS make the kernel of DOS which actually interacts with the hardware and the gets the work done. The user interacts with the shell of DOS which is COMMAND.COM. The shell in turn interprets user request and interacts with the kernel for carrying out the user request. Shell is resposible for user interface.

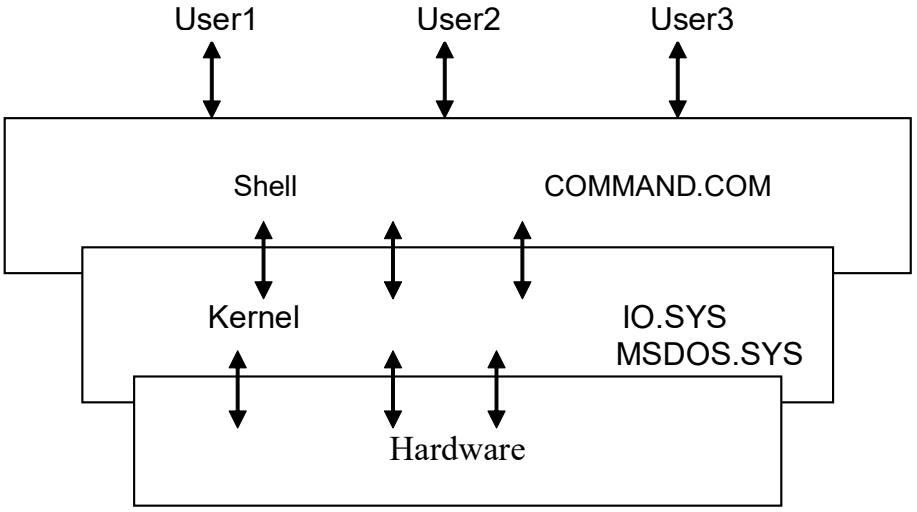


Figure 2.1 : Hierarchy of Interaction with MS-DOS

2.6 FILES AND DIRECTORY STRUCTURE

Files : Any information which is to be stored on the computer's secondary storage, would be stored as a file. A file is a logically related information, such as a file containing all details about mid-term exams, a file containing monthly sales data etc. Each file stored on the system is

given a name. The file name has two parts : *primary file name* and *secondary file name* (also called extension). A primary file name consists of one to eight (1-8) characters in length. File extension consists of a period followed by zero to three (0-3) characters. Extensions are optional, but it is better to us as they are useful for describing the contents of a file. The primary file name and file extensions can have any characters other than following :

[ ] / \ : , ; < > + " = ? |

Extension **.exe** specifies that it is an executable file, **.doc** specifies that it is a document file, **.bas** specifies it is a BASIC program file, .pas specifies that it is a PASCAL file.

Directories : In an office, the file cabinet is divided into shelves, shelves into boxes, boxes into drawers etc. and files are kept in them. Similar types of files are grouped and kept in the same drawer or box or shelf. In the same way files on the disk are stored. The disk (similar to file cabinet) is divided into sub-directories (similar to shelves); each sub-directory can further be divided into sub-directory (similar to box) and so on. DOS files with some similarity (e.g. belonging to the same project) are grouped together and a directory is formed for them under which they are kept.

So, directories let you group your files in convenient categories. These directories, in turn, may contain other directories (referred to as sub-directories). This organised file structure is referred to as multilevel or hierarchical directory system.

The first level in a multilevel directory system is root directory, which is created automatically at the time of the disk formatting. Within the root directory, additional directories and sub-directories can be created. Within each directory or sub-directory, new files or new sub-directories can be created.

Immediately after the booting, root directory is the current directory or working directory i.e. by default all operations will be performed under it unless you specify another directory or files for it. Working directories can be changed using CD or CHDIR command of DOS.

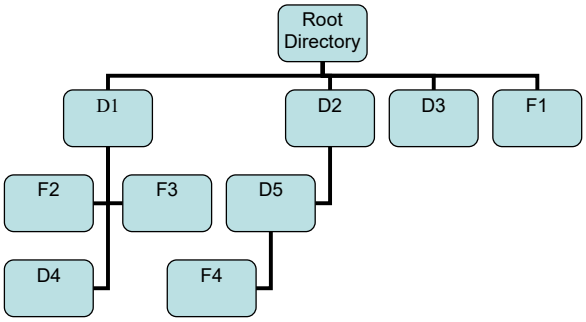


Figure 2.2: Example of Directory Structure

In the figure 8.2, D1, D2, D3 are sub-directories or child directories of root directory and root is the parent directory of D1, D2, D3. D4 is the child directory of D1 and D5 is the child directory of D2; D1 is the parent directory of D4 and D2 is the parent directory of D5. One thing, to be kept in mind is that, a directory can have many sub-directories (child), but a child directory can have only one parent directory, it cannot have more than one parent directory. Directory names follow the file naming rules.

2.7 CONCEPT OF PATHS

Full name of a file or directory consists of path ***primary name. extension***. Path is a sequence of directory names which give you the hierarchy to access a particular directory or file name. Let us consider the following directory structure :

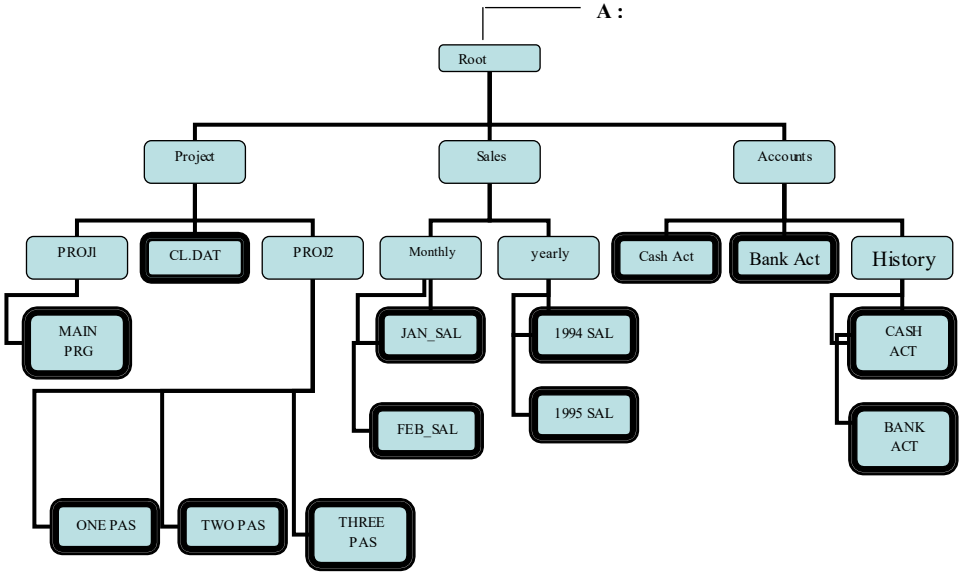


Figure 2.3 : Example of Path

Now, the full name directories PROJECT, SALES and ACCOUNTS will be

A: \PROJECT, A: \SALES and A:| ACCOUNTS respectively.

So format of path can be given as

Drive-letter: \directory[\directory.....]

Where first \ (backslash) refers to root directory and other ('\' s) separate a directory name form the previous directory name. Now the path of directory JAN SAL will be :

A: \SALES\Monthly\JAN SAL

As to reach JAN SAL the sequence one has to follow is under drive A, under root directory (first \), under SALES subdirectory of root, under Monthly subdirectories of SALES, there lies JAN SAL directory.

Similarly the full name of ONE PAS file under PROJ2 subdirectory will be :

A: \PROJECT\PROJ2\ONE PAS

Now, you can see that there are two files with the same name CASH ACT, one under the Accounts directory and the other under HISTORY directory but according to DOS rule no two files can have same names (path names). Both these files have same names but their path names differ, therefore, these can exist on system. So, the paths of the two files will be

A: \Accounts\CASH ACT

and A: \Accounts\HISTORY\CASH ACT

The above mentioned path names are *absolute path names* as they mention the paths from the top most level of the directory structure.

Relative path names mention the paths relative to current working directory. Let us assume that the current working directory now is, say, PROJ2. The symbol **.** and **..** can be used now in relative paths and path names. The symbol **.** can be used in place of current working directory and **..** denotes the parent directory.

So, with PROJ2 as current working directory, path name of TWO PAS will be :

.\TWO PAS (PROJ2 being working directory)

which means under current working directory, there is file TWO PAS. Similarly, path name for file CL DAT will be :

..\CL DAT (PROJ2 being working directory)

which means under parent directory of current directory, there is a file CL DAT. Similarly, path name for MAIN PRG will be :

..\PROJ1\MAIN PRG

that is under parent directory of current directory, there lies a file MAIN PRG.

2.8 INTERNAL AND EXTERNAL COMMANDS

We have seen that, user interface is the shell's responsibility. Therefore, a user passes its request (in the form of DOS command) to the shell i.e. COMMAND.COM. Whenever a request is passed to it, the shell interprets it and then searches for its specification i.e. what is to be done and how it is to be done inside COMMAND.COM. These specification of commands can either be found inside the shell or outside it, thus giving rise to two types of DOS commands:

i) ***Internal Commands :*** DOS commands for which specifications are available within the shell (i.e. COMMAND.COM) are called Internal Commands (as they are internally available in shell).

ii) ***External Commands :*** DOS commands for which specifications are not internally available within the shell (i.e. COMMAND.COM) are called External Commands. The specification for these commands are made available to the shell through external specification files. E.g. FORMAT is an external command and its specifications are available in FORMAT.COM, for DISKCOPY external command, specification file is DISKCOPY.COM and so on. The specification files are executable files i.e. files with extensions *.EXE* or *.COM*.

i) Internal Commands : The Internal commands include some of the following important commands :

File Commands – File commands are those commands which operate on files. Under file commands we will discuss the following commands –

1. ***COPY :*** Allows the user to copy one or more files to an alternate location.

Syntax :

Copies one or more files to another location.

COPY [/A | /B] source [/A | /B] [+ source [/A | /B] [+ ...]] [destination] [/A | /B]] [/V] [/Y | /-Y]

source	Specifies the file or files to be copied.
/A	Indicates an ASCII text file.
/B	Indicates a binary file.
destination	Specifies the directory and/or filename for the new file(s).
/V	Verifies that new files are written correctly.
/Y	Suppresses prompting to confirm you want to overwrite an existing destination file.
/-Y	Causes prompting to confirm you want to overwrite an existing destination file.

The switch /Y may be preset in the COPYCMD environment variable. This may be overridden with /-Y on the command line.

To append files, specify a single file for destination, but multiple files for source (using wildcards or file1+file2+file3 format).

Examples :

copy *.* a:

Copy all files in the current directory to the floppy disk drive.

copy autoexec.bat c:\windows

Copy the autoexec.bat, usually found at root, and copy it into the windows directory; the autoexec.bat can be substituted for any file(s).

copy win.ini c:\windows /y

Copy the win.ini file in the current directory to the windows directory. Because this file already exists in the windows directory it normally would prompt if you wish to overwrite the file. However, with the /y

switch you will not receive any prompt.

copy myfile1.txt+myfile2.txt

Copy the contents in myfile2.txt and combines it with the contents in myfile1.txt.

copy con test.txt

A user can create a file using the copy con command as shown above, which creates the test.txt file. Once the above command has been typed in, a user could type in whatever he or she wishes. When you have completed creating the file, you can save and exit the file by pressing **CTRL+Z**, and then press enter.

2. DEL : Del is a command used to delete files from the computer.

Syntax :

Windows 2000 and Windows XP syntax

Deletes one or more files.

DEL [/P] [/F] [/S] [/Q] [/A[[:]attributes]] names

ERASE [/P] [/F] [/S] [/Q] [/A[[:]attributes]] names

names-	Specifies a list of one or more files or directories. Wildcards may be used to delete multiple files. If a directory is specified, all files within the directory will be deleted.
/P	Prompts for confirmation before deleting each file.
/F	Force deleting of read-only files.
/S	Delete specified files from all subdirectories.
/Q	Quiet mode, do not ask if ok to delete on global wildcard
/A	Selects files to delete based on attributes
attributes	R - Read-only files, S - System files, H - Hidden files, A - Files ready for archiving

Windows 2000 and Windows XP recovery console syntax

Deletes one file.

del [drive:][path]filename

delete [drive:][path]filename

[drive:][path]filenameSpecifies the file to delete.

Delete only operates within the system directories of the current Windows installation, removable media, the root directory of any hard disk partition, or the local installation sources.

Del and delete do not support replaceable parameters (wild cards).

del test.tmp = Deletes the test.tmp in the directory that you currently are in, if the file exists.

del c:\windows\test.tmp = Delete the c:\windows\test.tmp in the windows directory if it exists.

del c:\windows\temp*.* = (* is for wild character(s)) *.* indicates that you would like to delete all files in the c:\windows\ temp directory.

In the previous directory structure, to delete all the files having the .PAS extension under PROJ2, the command will be :

Del A:\PROJECT\PROJ2*.PAS/P

This command will be carried out by displaying all PAS file names for confirmation i.e.

ONE.PAS Delete (Y/N) ? Y

TWO.PAS Delete (Y/N) ? Y

THREE.PAS Delete (Y/N) ? N

3. ***REN (RENAME) :*** Used to rename files and directories from the original name to a new name.

In earlier releases of MS-DOS instead of using ren or rename you need to use the move command to rename your MS-DOS directories or files.

Syntax :

Renames a file/directory or files/directories.

RENAME *[drive:][path][directoryname1 | filename1] [directoryname2 | filename2]*

REN [drive:][path][directoryname1 | filename1] [directoryname2 | filename2]

Note that you cannot specify a new drive or path for your destination.

rename c:\chope hope

Rename the directory chope to hope.

rename *.txt *.bak

Rename all text files to files with .bak extension.

In our example to rename file CL DAT as CLASS DAT under PROJECT, the command will be -

REN A:\PROJECT\CL DAT CLASS DAT

4. TYPE : Allows the user to see the contents of a file.

To edit the files, the user would need to use either edit or copy con.

Syntax :

Displays the contents of text files.

TYPE [drive:][path]filename

Examples :

type c:\autoexec.bat

This would allow us to look at the autoexec. bat file.

In our example, to display the content of the file 1995 sal under yearly subdirectory, the command will be as follows :

TYPE A:\SALARY\YEARLY\1995 SAL

Directory Commands : In this section four internal commands of DOS will be discussed.

5. DIR : The dir command allows you to see the available files in the current and/or parent directories.

Microsoft Windows 2000 and Windows XP syntax

Displays a list of files and subdirectories in a directory.

DIR [drive:][path][filename]	[/A[[:]attributes]] [/B] [/C] [/D] [/L] [/N] [/O[[:]sortorder]] [/P] [/Q] [/S] [/T[[:]timefield]] [/W] [/X] [/4]
[drive:][path][filename] -	Specifies drive, directory, and/or files to list.
/attributes	D Directories R Read-only files H Hidden files A Files ready for archiving S System files - Prefix meaning not

/B	Uses bare format (no heading information or summary).
/C	Display the thousand separator in file sizes. This is the default. Use /-C to disable display of separator.
/D	Same as wide but files are list sorted by column.
/L	Uses lowercase.
/N	New long list format where filenames are on the far right.
/O	List by files in sorted order.
sortorder	N By name (alphabetic) S By size (smallest first) E By extension (alphabetic) D By date/time (oldest first) G Group directories first - Prefix to reverse order
/P	Pauses after each screenful of information.
/Q	Display the owner of the file.
/S	Displays files in specified directory and all subdirectories.
/T	Controls which time field displayed or used for sorting
timefield	C Creation A Last Access W Last Written
/W	Uses wide list format.
/X	This displays the short names generated for non-8dot3 file names. The format is that of /N with the short name inserted before the long name. If no short name is present, blanks are displayed

	in its place.
/4	Displays four-digit years

Examples:

dir

Lists all files and directories in the directory that you are currently in.

dir /ad

List only the directories in the current directory. If you need to move into one of the directories listed use the cd command.

dir /s

Lists the files in the directory that you are in and all sub directories after that directory, if you are at root “C:\>” and type this command this will list to you every file and directory on the C: drive of the computer.

dir /p

If the directory has a lot of files and you cannot read all the files as they scroll by, you can use this command and it will display all files one page at a time.

dir /w

If you don’t need the info on the date / time and other information on the files, you can use this command to list just the files and directories going horizontally, taking as little as space needed.

dir /s /w /p

This would list all the files and directories in the current directory and the sub directories after that, in wide format and one page at a time.

dir /on

List the files in alphabetical order by the names of the files.

dir /o-n

List the files in reverse alphabetical order by the names of the files.

dir \ /s |find “i” |more

A nice command to list all directories on the hard drive, one screen page at a time, and see the number of files in each directory and the amount of space each occupies.

dir > myfile.txt

Takes the output of dir and re-routes it to the file myfile.txt instead of outputting it to the screen.

6. ***CHDIR/CD :*** CD (Change Directory) is a command used to switch directories in MS-DOS. For example, if you needed to run Windows 3.11 from DOS, you would type:

cd windows - Changing the directory to Windows;

win - To run the win.com file within the windows directory.

Syntax :

CHDIR [drive:][path]

CHDIR[..]

CD [drive:][path]

CD[..]

Examples :

cd

Goes to the highest level, the root of the drive.

cd..

Goes back one directory. For example, if you are within the C:\Windows\ COMMAND> directory, this would take you to C:\Windows>

Windows 95, 98, and later versions have a feature in the CD command that allows you to go back more than one directory when using the dots. For example, typing: **cd...** with three dots after the cd would take you back two directories.

cd windows

If present, would take you into the Windows directory. Windows can be substituted with any other name.

cd \windows

If present, would first move back to the root of the drive and then go into the Windows directory.

cd windows\system32

If present, would move into the system32 directory located in the

Windows directory. If at any time you need to see what directories are available in the directory you're currently in use the dir command.

7. ***MKDIR (MD) :*** Allows you to create your own directories in MS-DOS.

Syntax :

Creates a directory.

MKDIR [drive:]path

MD [drive:]path

Examples :

md test

The above example creates the "test" directory in the directory you are currently in.

md c:\test

Create the "test" directory in the c:\ directory.

8. ***RMDIR (RD) :*** Removes empty directories in MS-DOS. To delete directories with files or directories within them the user must use the deltree command, or if you are running Microsoft Windows 2000 or Windows XP use the /S option.

Syntax :

Removes (deletes) a directory.

RMDIR [drive:]path

RD [drive:]path

Windows 2000 and Windows XP Syntax.

RMDIR [/S] [/Q] [drive:]path

RD [/S] [/Q] [drive:]path

S Removes all directories and files in the specified directory in addition to the directory itself. Used to remove a directory tree.

/Q Quiet mode, do not ask if ok to remove a directory tree with /S.

Examples :

rmdir c:\test

Remove the test directory, if empty. If you want to delete directories that are full, use the deltree command or if you're using Windows

2000 or later use the below example.

rmdir c:\test /s

Windows 2000, Windows XP and later versions of Windows can use this option with a prompt to permanently delete the test directory and all subdirectories and files. Adding the /q switch would suppress the prompt.

Miscellaneous Commands :

In this section, we will discuss some miscellaneous commands of MSDOS.

i) ***Break :*** Break can be used to enable or disable the breaking capability of the computer. For example, if a user wanted to cancel a batch file or another MS-DOS processes, that user could simply press CTRL + C (break), which would then prompt the user if they wish to cancel the current process.

Turning break off will cancel CTRL + C; however, the user will still be able to press CTRL + PAUSE/BREAK and have the capability of getting out of a batch file current running process.

Note : Newer versions of Windows (Windows ME, Windows 2000, Windows XP, and higher) only include this command for backwards compatibility and turning the break off has no effect.

Syntax :

Sets or clears extended CTRL+C checking.

BREAK [ON | OFF]

Type BREAK without a parameter to display the current BREAK setting.

Examples :

break on

Turns on the break, which allows the Ctrl + C function.

break off

Turns off the break, not allowing Ctrl + C to cancel a process.

ii) ***CLS :*** Cls is a command that allows a user to clear the complete contents of the screen and leave only a prompt.

Syntax :

CLS

Examples :

cls

Running the cls command at the command prompt would clear your screen of all previous text and only return the prompt.

iii) DATE : Displays or sets the date.

Syntax :

DATE [date]

Type DATE without parameters to display the current date setting and a prompt for a new one. Press ENTER to keep the same date.

Examples :

date

Display the current date and prompt for a new one. If no date is entered, the current date will be kept.

iv) PATH : Path is used to specify the location where MS-DOS looks when using a command. For example, when using the command "format", if the path is not specified to where the command is you will receive bad command or file name.

Syntax :

Displays or sets a search path for executable files.

PATH [[drive:]path[;...]]

Type PATH ; to clear all search-path settings and direct Windows to search only in the current directory.

Type PATH without parameters to display the current path.

Examples :

path=c:\windows\command

This is where a lot of DOS commands are stored in Window 95; if you are not able to do a dos command, type this command in, allowing all commands you type in, such as "deltree", to be loaded from this directory. However, if you have another file in another directory such as C:\DOS it will no longer look there.

v) TIME : Allows the user to view and edit the computer's time.

Syntax :

Displays or sets the system time.

TIME [time]

Type TIME with no parameters to display the current time setting and a prompt for a new one. Press ENTER to keep the same time.

Examples :

time 12:00

Set the time to 12:00

vi) VER : Displays the version of MS-DOS or if running Windows 95 or above the version of Windows. Information about Windows versions can be found on our Windows version page.

Syntax :

Displays the MS-DOS version.

VER

Examples :

ver

Display what version of MS-DOS or Windows command prompt you're using. An example of what this may look like is:

Microsoft Windows XP [Version 5.1.2600]

vii) VOL : Displays the volume information about the designated drive.

Syntax :

Displays the disk volume label and serial number, if they exist.

VOL [drive:]

Examples :

vol c :

Display the volume of drive C: as shown in the below example.

Volume in drive C has no label.

Volume Serial Number is 1C24-AB20

ii) External Commands : It has already been mentioned that external commands are those, for which specifications are not

available within COMMAND.COM. Some important external commands are discussed in this section.

1. ***COMP :*** A simple compare that compares two or more files.

Syntax :

Compares the contents of two files or sets of files.

COMP [data1] [data2] [/D] [/A] [/L] [/N=number] [/C]

data1	Specifies location and name(s) of first file(s) to compare.
data2	Specifies location and name(s) of second files to compare.
/D	Displays differences in decimal format.
/A	Displays differences in ASCII characters.
/L	Displays line numbers for differences.
/N=number	Compares only the first specified number of lines in each file.
/C	Disregards case of ASCII letters when comparing files.

To compare sets of files, use wildcards in data1 and data2 parameters.

Examples :

Note : Unless the /N option is used the comp command will only compare the size of the file.

comp file1.txt file2.txt /N=10 /A

Compares file1.txt with file2.txt. In this example we are using the /A option to display the ASCII characters that the compare has found different. If the /A option is not displayed, the comp command will display the differences in hexadecimal notation.

2. ***FORMAT :*** Format is used to erase all of the information off of a computer diskette or fixed drive.

Syntax :

Microsoft Windows 2000 and Windows XP syntax

Formats a disk for use with Windows 2000.

FORMAT volume [/FS:file-system] [/V:label] [/Q] [/A:size] [/C] [/X]

FORMAT volume [/V:label] [/Q] [/F:size]

FORMAT volume [/V:label] [/Q] [/T:tracks /N:sectors]

FORMAT volume [/V:label] [/Q] [/1] [/4]

FORMAT volume [/Q] [/1] [/4] [/8]

volume	Specifies the drive letter (followed by a colon), mount point, or volume name.
/FS:filesystem	Specifies the type of the file system (FAT, FAT32, or NTFS).
/V:label	Specifies the volume label.
/Q	Performs a quick format.
/C	Files created on the new volume will be compressed by default.
/X	Forces the volume to dismount first if necessary. All opened handles to the volume would no longer be valid.
/A:size	Overrides the default allocation unit size. Default settings are strongly recommended for general use. NTFS supports 512, 1024, 2048, 4096, 8192, 16K, 32K, 64K. FAT supports 512, 1024, 2048, 4096, 8192, 16K, 32K, 64K, (128K, 256K for sector size > 512 bytes). FAT32 supports 512, 1024, 2048, 4096, 8192, 16K, 32K, 64K, (128K, 256K for sector size > 512 bytes). Note that the FAT and FAT32 files systems impose the below restrictions on the number of clusters on a volume: FAT: Number of clusters <= 65526 FAT32: 65526 < Number of clusters < 268435446 Format will immediately stop processing if it decides that the above requirements cannot be met using the specified cluster size. NTFS compression is not supported for allocation unit sizes above 4096.

/F:size	Specifies the size of the floppy disk to format (160,180, 320, 360, 640, 720, 1.2, 1.23, 1.44, 2.88, or 20.8).
/T:tracks	Specifies the number of tracks per disk side.
/N:sectors	Specifies the number of sectors per track.
/1	Formats a single side of a floppy disk.
/4	Formats a 5.25-inch 360K floppy disk in a high-density drive.
/8	Formats eight sectors per track.

3. ***LABEL :*** Label is used to view or change the label of the computer disk drives.

Syntax :

Creates, changes, or deletes the volume label of a disk.

LABEL [drive:][label]

Examples :

label a: mydisk

This would label the disk currently in the drive to “mydisk”, but will not label if your disk is write protected.

4. ***MEM :*** Allows you to determine the available, used and free memory.

Syntax :

Displays the amount of used and free memory in your system.

MEM [/CLASSIFY | /DEBUG | /FREE | /MODULE module name] [/PAGE]

/CLASSIFY or /C	Classifies programs by memory usage. Lists the size of programs, provides a summary of memory in use, and lists largest memory block available.
/DEBUG or /D	Displays status of all modules in memory, internal drivers, and other information.
/FREE or /F	Displays information about the amount of free memory left in both conventional and upper memory.

/MODULE or /M	Displays a detailed listing of a module's memory use. This option must be followed by the name of a module, optionally separated from /M by a colon.
/PAGE or /P	Pauses after each screen full of information.

Examples :

mem

This would display information about your memory as seen in the examples below.

Windows 2000 and Windows XP example output:

655360 bytes total conventional memory
655360 bytes available to MS-DOS
633872 largest executable program size
1048576 bytes total contiguous extended memory
0 bytes available contiguous extended memory
941056 bytes available XMS memory
MS-DOS resident in High Memory Area

mem /f

Display the amount of conventional memory free.

5. ***PRINT :*** Print was first introduced in MS-DOS 2.0 as PRINT.COM and later was changed to PRINT.EXE in MS-DOS 5.0 and above. This command allowed users to print a text file to a line printer, in the background.

Syntax :

print	*/d:device /b:size /u:ticks1 /m:ticks2*
	drive:\path\ filename /c /p
/d:device	Name of printer device Printer Ports: LPT1, LPT2 orLPT3 Serial Ports:Com1, Com2, Com3 or Com4
/b:size	Sets size (in bytes) of internal buffer. Default=512 with range of 512 to 16384.

/u:ticks1	Maximum number of clock ticks PRINT is to wait for a printer to become available. Default=1 with a range of 1 to 255.
/m:ticks2	Maximum number of clock ticks PRINT can take to print a character or printer. Default=2 with a range of 1 to 255.
drive:\path\ filename	Location and filename of file to be printed.
/c	Removes files from the print queue.
/p	Adds files to the print queue.

Examples :

print c:\file.txt /c /d:lpt1

Prints the file file.txt to the parallel port lpt1.

6. ***TREE :*** Allows the user to view a listing of files and folders in an easy to read listing.

Syntax :

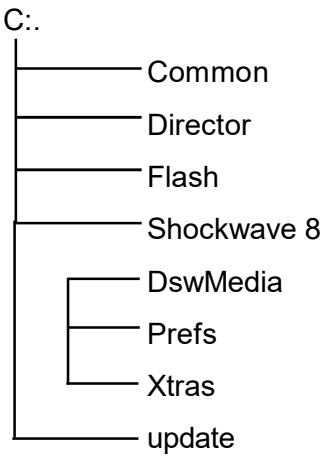
TREE Drive:\ Path /f /a

Drive:\Path	Drive and directory containing disk for display of directory structure.
/f	Displays file names in each directory. /a ext characters used for linking lines, instead of graphic characters.
/a	is used with code pages that do not support graphic characters and to send output to printers that do not properly interpret graphic characters.

Examples :

tree

List a tree listing of the current drive. A basic example of what a directory may look like is given below.



7. ***XCOPY :*** Xcopy is a powerful version of the copy command with additional features; has the capability of moving files, directories, and even whole drives from one location to another.

Syntax :

Windows 2000 and XP xcopy syntax

XCOPY source [destination] [/A | /M] [/D[:date]] [/P] [/S [/E]] [/V] [/W] [/C] [/I] [/Q] [/F] [/L] [/H] [/R] [/T] [/U] [/K] [/N] [/O] [/X] [/Y] [/-Y] [/Z] [/EXCLUDE: file1[+file2][+file3]...]

source Specifies the file(s) to copy.

destination Specifies the location and/or name of new files.

/A Copies only files with the archive attribute set, doesn't change the attribute.

/M Copies only files with the archive attribute set, turns off the archive attribute.

/D:m-d-y Copies files changed on or after the specified date. If no date is given, copies only those files whose source time is newer than the destination time.

/EXCLUDE: file1 [+file2][+file3]... Specifies a list of files containing strings. When any of the strings match any part of the absolute path of the file to be copied, that file will be excluded from being copied. For example, specifying a string like \obj\ or .obj will exclude all files underneath the directory obj or all files with the .obj extension respectively.

/P	Prompts you before creating each destination file.
/S	Copies directories and subdirectories except empty ones.
/E	Copies directories and subdirectories, including empty ones. Same as /S /E. May be used to modify /T. /V Verifies each new file.
/W	Prompts you to press a key before copying.
/C	Continues copying even if errors occur.
/I	If destination does not exist and copying more than one file, assumes that destination must be a directory.
/Q	Does not display file names while copying.
/F	Displays full source and destination file names while copying.
/L	Displays files that would be copied.
/H	Copies hidden and system files also.
/R	Overwrites read-only files.
/T	Creates directory structure, but does not copy files. Does not include empty directories or subdirectories. /T /E includes empty directories and subdirectories.
/U	Copies only files that already exist in destination.
/K	Copies attributes. Normal Xcopy will reset read-only attributes.
/N	Copies using the generated short names.
/O	Copies file ownership and ACL information.
/X	Copies file audit settings (implies /O).
/Y	Suppresses prompting to confirm you want to overwrite an existing destination file.
/-Y	Causes prompting to confirm you want to overwrite an existing destination file.
/Z	Copies networked files in restartable mode.

Examples :

xcopy c:\temp /e

The above example is the basic xcopy command to copy the files,

directories, and subdirectories to the directory you're currently in.

xcopy "c:\documents and settings\hope" /e

In the above example the xcopy command would copy all files and directories in the user "hope" directory to the directory or drive you're currently in.

xcopy h:*.* /a /e /k

The above command would copy everything located on the H drive to the drive you are currently on.

2.9 BATCH FILE

In MS-DOS, OS/2, and Windows, a **batch file** is a text file containing a series of commands intended to be executed by the command interpreter. When a batch file is run, the shell program (usually COMMAND.COM or cmd.exe) reads the file and executes its commands, normally line-by-line. A batch file is analogous to a shell script in Unix-like operating systems.

Batch files are useful for running a sequence of executables automatically. Many system administrators use them to automate tedious processes. Although batch files support elementary program flow commands such as *if* and *goto*, they are not well-suited for general-purpose programming.

DOS batch files have the filename extension .BAT. Batch files for other environments may have different extensions, e.g. .CMD in Windows NT and OS/2, or .BTM in 4DOS and related shells.

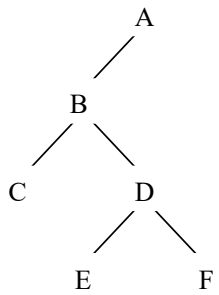
File extension : .bat .cmd .btm

Type of format : Scripting



CHECK YOUR PROGRSS

Q.1. It is required to create six directories viz. A,B,C,D,E,F. These directories should follow the hierarchy shown in the following tree.



The directory A should be created in the root directory of drive C. Give the sequence of MS-DOS commands which would yeild the desired results.

.....

.....

.....

Q.2. How the DOS XCOPY command differ from DOS COPY command.

.....

.....

.....

Q.3. Many times, the computer goes into hang. Which key combination is used to reboot the system?

.....



2.10 LET US SUM UP

- MS-DOS is an acronym for Microsoft Disk Operating System, first released in August 1981.
- Loading of DOS into main memory is known as booting.

- The three system files of MS-DOS are loaded in order of IO.SYS, MSDOS.SYS and COMMAND.COM
- DOS commands are of two types : internal and external.
- Internal commands are those that are directly interpreted by the command processor, COMMAND.COM.
- External commands are those that are interpreted with the help of external files (with extension .COM or .EXE)
- Storage area on a disk are known as directories. A directory may contain files and/or subdirectories inside it.
- Path is a sequence of directory names which give you the hierarchy to access a particular directory or file name.
- The full name of a file or directory (including path) is also called path.
- Some DOS internal commands are COPY, DEL/ERASE, REN, TYPE, DIR, CHDIR/CD, MKDIR/MD, RMDIR/RD, BREAK, CLS, DATE, TIME, PATH, VER etc.
- Some external commands are DISKCOMP, DISKCOPY, FORMAT, LABEL, MEM, PRINT, TREE, XCOPY etc.
- Batches of MS-DOS commands stored under a filename with extension .BAT are known as batch files.
- The batch file with the name AUTOEXEC.BAT is automatically executed by MS-DOS at the time of booting.



2.11 FURTHER READING

- Norton, P. (1989). Peter Norton's DOS guide. Brady.
- Thomas, R. M. (1993). DOS 6.2 Instant Reference. SYBEX Inc.



2.12 ANSWERS TO CHECK YOUR PROGRESS

Answer 1 : C>MD A

C>MD C:\A\B

omitting C: as it is the current i.e. dafault drive

C>MD \A\B\C

C>MD \A\B\D

C>MD \A\B\D\E

C>MD \A\B\D\F

Or alternatively

C>MD A

C>CD A

C>MD B

C>CD B

C>MD C

C>MD D

C>CD D

C>MD E

C>MD F

Answer 2 : COPY can only copy the specified files from one directory only whereas XCOPY /s can copy the files from subdirectories also. COPY can not ask for confirmation before copying files whereas XCOPY /p can ask for confirmation also.

Answer 3 : Ctrl + Alt + Del



2.13 MODEL QUESTIONS

Q.1: Define kernel and shell. What are their roles ?

Q.2: What are internal and external commands? How are they different ?

Q.3: Write the purpose of the following commands? Also state whether they are internal or external commands.

TYPE, PROMPT, DISKCOPY, MEM

Q.4: Write the purpose of the following commands? Also state whether the following are internal or external commands.

RD, VER,MEM, LABEL, FORMAT

Q.5: What functions do the following commands perform:

a) DISKCOPY b) DISKCOMP

Q.6: How is XCOPY a better copy command then COPY?

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UNIT 3: INTRODUCTION TO COMPUTER SECURITY

UNIT STRUCTURE

3.1 Learning Objectives

3.2 Introduction

3.3 Computer Security

3.4 Malware

3.5 Computer Viruses

3.6 Worms

3.7 Other Threats

- 3.7.1 Trojan Horses
- 3.7.2 Spyware
- 3.7.3 Adware
- 3.7.4 Scareware

3.8 Counter Measures

- 3.8.1 Antivirus
- 3.8.2 Deception Techniques
- 3.8.3 Working of Antivirus

3.9 Let Us Sum Up

3.10 Further Reading

3.11 Answers to Check Your Progress

3.12 Model Questions

3.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- learn about computer security and its goals
- describe different threats related to computer security
- describe the classification of the threats
- describe measures of threats

3.2 INTRODUCTION

The advancement of computer networking and information technology has been explosive in recent times. This technology has been propagated around the world rapidly and has affected every aspect of day-to-day life. Most computer facilities continue to protect their physical machine better than their data, but in reality the value of the data is greater than the value of the hardware. Throughout this chapter, the discussion of computer security emphasizes the problem of protecting information from unauthorized disclosure.

3.3 COMPUTER SECURITY

The state of being free from danger or threat is called security. So computer security means protection of the computer systems from theft or damage to its hardware or to its software or to the information it stores, as well as from disruption or misdirection of the services it provides. More precisely we can explain with the CIA triad of information security, which maintains these three security goals:

- **Confidentiality:** It means protecting the information from disclosure to unauthorized parties.
- **Integrity:** It means keeping the data pure and trustworthy by protecting system data from intentional or accidental changes
- **Availability:** It refers to ensuring that authorized parties are able to access the information when needed.

Let us describe a day-to-day example to understand this CIA triad. Suppose I own a bank account and I am not willing to share my ATM card number, PIN and bank statements. So, me and my bank is protecting the information, this is confidentiality. Suppose, one day I make a online transaction to a 3rd party for rupees 1000.00, but in the meantime somehow, someone tampered the information and changed the amount to 10000.00. I don't want to have such tampering with my confidential data. That is integrity. I want my bank account to be accessed and manipulated only by me not by others, my bank should protect my account from unauthorized attempt of access. This is an example of availability.

3.4 MALWARE

If we can ensure these goals for our system then we can say our system is protected and any threat to these goals is a threat to computer security. The threats to computer security can be in the form of unauthorized access or deception or disruption to the services or data. Generally these violations to security are caused by some malicious software. A software is potentially malicious if it can be used to harm either the computer on which it is hosted or another computer. Software may also be considered malicious if it is designed to install itself on a computer without the permission of the owner of that computer, particularly if it does so in a way that may compromise the security of the computer. Malicious may be loosely interpreted. A piece of software may be considered malicious even though it may have been launched with the intention of providing an arguable benefit. These types of software are referred as malware (= malicious + software) in general.

Malware can be classified as

- **Transient -** They need a host to exist (Viruses, Trapdoors)
- **Resident -** They can exist on their own (Worms)

Most malicious software takes advantage of the vulnerability-exploit cycle in software development if it is not managed properly. Vulnerability is a system susceptibility or flaw, and vulnerability-exploit cycle is the continuous process of identifying, classifying, remediating, and mitigating vulnerabilities as they are discovered.

3.5 COMPUTER VIRUSES

A computer virus is an executable program that replicates itself or attached to a file where it infects the computer when the file is executed. Sometimes it may also replace an existing program. There are many techniques used by virus to spread or replicate or attach to a file, but the self replicating nature is the main criterion that distinguish a virus from other software. And not all viruses show harmful activities on system.

But why is such malicious software is termed with the biological term "Virus"? This is so because most computer viruses are parasitic like biological virus i.e.: they work by attaching themselves to a carrier object (e.g.: a file). And when this carrier object is transmitted to other systems the virus is also transmitted and it is activated when the host program is executed. After activation the computer virus like its biological one search for another host and gets attached to it.

Working of a Computer Virus

A virus does not appear as an object in itself. A virus always resides hidden in some useful object and it may perform the main parts of a virus code which are the replication routine and the payload routine. A virus is not a virus without the replication routine, but the pay load routine for a virus is optional.

- **Virus replication:**

  The replication routine contains a code that locates suitable objects to attach the virus to and to copy the virus to these elements. There are different techniques for this purpose.

  Virus code can be executed when the object is executed. Viruses that infect program files may attach the virus code at the start or at the beginning of the program and patch the entry point so that when the program is run the virus code is executed first. The virus usually transfers control to the original program when it has finished its tasks. This ensures that the original program works properly and the virus avoids detection.

- **Payload Execution:**

  Payload routine of a virus is optional, some of the viruses may not have the payload routine which give them the efficiency to replicate more quickly. Payload part of the virus code generally contains the malicious activity such as slowing down the PC, deleting system files, making short cuts of every folder, swiping out the memory etc. The payload routine usually contains some activation criteria that must be met before the payload activates. This gives the virus some time to spread without

detection. The activation criteria may be any data that can be found in computer like a particular date after infection or a lapse of time period or execution of certain application etc.

From the above discussion one thing is clear: a virus always need a host to spread and it cannot spread on its own. It needs some activation criterion to be fulfilled. Then only it can be executed or it can take over the computer resources. But there are some other types of malicious software commonly mistaken as virus but unlike the viruses. They can survive without a host. These malware are called worms.

3.6 WORMS

A worm is more independent than a virus. A pure worm works by itself as an independent object. The main feature that separates worms from viruses is that worms are self replicating. A worm can initiate network communication by itself and send copies to other computers. So there is no need for activation criteria or host process. As worms can spread rapidly across a network infecting every PC so they are the most notorious of malwares. There are some malicious software that resemble both viruses and worms.

One common example of this kind is mass mailing worms. They are attached to documents or other object like a virus, but uses email clients to mass mail themselves in a worm like way. This type of worm needs some kind of activation as for example, in mass mail worms can only activated when a receiver opens an attachment. It makes the worm slow but as it initiate the network by its own they are much faster transmitted than viruses. Worms and viruses are the most common wide-spread malicious software. There are some other programs also which work may not be so vicious like the virus or worm, but still they are malicious.



CHECK YOUR PROGRESS

Q.1. What are the three security goals?

Q.2. What is computer virus?

Q.3. Differentiate between worm and virus.

3.7 OTHER THREATS

In this section we will briefly introduce malicious software other than virus and worm which may not exploit or damage the system like virus or worms do, but may be a potential threat in point of view of security.

3.7.1 Trojan Horses

The term trojan horse comes from the tale of the Trojan horse from the Trojan war described in Greek mythological epic. In the Trojan War, the Greeks were unable to enter the city of Troy despite 10 years long siege and finally they constructed a large wooden horse and hid some soldiers in it. The citizens of Troy thought it was just a mere wooden horse and they let it in their city and in the night the soldiers inside the horse opened the city gates, which eventually became the downfall of their city. The wooden horse is coined as Trojan horse in the epic. The Trojan horses in computer security also serve the same purpose.

Trojan horses are applications which appear to be useful, legitimate applications, but run malicious, hidden code. The application may appear to perform tasks, such as scanning for spyware, but actually steal personal data from your system. Executing Trojans may result in changing desktop wallpaper, creating popups, or even deleting files. One of their most popular uses is creating backdoors to allow malicious users to gain access to files and information. Unlike viruses or worms, Trojans cannot infect other systems.

3.7.2 Spyware

Spyware are the software that collects user sensitive information like browsing and searching habit, password, social interactions without your knowledge and uses such information to gain profit. Information collection by spyware is done using technique like key logging, browser activity monitoring. Spyware is meant to make money by using personal information so it does not exploit the PC like other malware do. In fact, many spyware may be running in our PC without our knowledge.

3.7.3 Adware

Adware are the software that supports advertising. In general it is the entire program that downloads or displays unwanted banner advertisements in the software being used. Adware can be also used to collect user personal data and based on these data the adware shows up with classified advertisement. This type of software doesn't harm the system but collecting information and running advertisement without user knowledge is a threat.

3.7.4 Scareware

Scareware is a new type of attack, where a user is tricked into downloading a software that appears to be a useful one. After installing, it shows that the machine is infected and it can clean all the infection if you purchase the full license version of the software. These scareware applications are malware that hold the PC hostage until people don't pay the ransom. In most of cases, these scareware can't be uninstalled also.

3.8 COUNTER MEASURES

"Prevention is better than cure". To detect and eliminate security threat is always tougher than to prevent it. We can say a standalone system

is more secure than any other. But it is not ideal scenario that a PC will never expose to security threats. A threat to computer security may be in many forms and hence we have to deploy different technique also to encounter them. But in this unit we will mainly focus on counter techniques for malware.

3.8.1 Antivirus

Malware uses different strategies for deception and replication. Hence, for detection and elimination of different malware involved, different techniques and tools are used which is impossible to be done manually. A special kind of software is developed for this purpose commonly known as antivirus. So, antivirus software is a program or set of programs designed for searching, preventing, detecting and eliminating malware. The detection techniques of antiviruses are generally based on malware deception strategies. So let's go through a brief overview of different deceptions strategies used by the malware.

3.8.2 Deception Techniques

Different malicious software uses different strategies to spread or replicate them and exploit the system. Deception helps malware to stay in the system and replicate for a longer time by disguising as a part of the host program. Malware employ different kinds of deception to hide them such as–

- **Overwriting:** In this technique, the virus overwrites files with their own copy. It's a primitive technique but it is simple and easy to implement. This type of viruses can be disinfected from system simply by deleting the infected files.
- **Companion Infection:** In this approach the virus disguises itself as a companion of .exe file by naming it with same base name as the targeted program, but use a .COM extension instead of .EXE, because Windows gives priority to a file with the .COM extension over a file with the .EXE extension.

- **Appending:** In this method, a jump (JMP) or goto instruction is encoded at the start of the of the host program that will point at the end of the original host. And the starting of virus code is laid there.
- **Pre-appending:** In this strategy the virus code has been inserted at the front of host programs. This is a simple efficient method.
- **Cavity filling:** Here the virus tries to install itself in the empty space of the host while not damaging the actual program itself. An advantage of this technique is that the virus does not increase the length of the program but it also minimizes a number of possible hosts. Cavity viruses are rare.
- **Compressing:** Generally after infection, size of the affected files increase, but by using compression techniques in this method size of the affected files has reduced so that change in file become negligible.
- **Encryption:** In this scenario the virus consists of a constant decryptor or set of decryptor, followed by the encrypted virus code, after decryption of the encrypted code with different decryptor yield different virus. This type of malware is called oligomorphic virus.
- **Boot Sector Execution:** Due to the executable nature of master boot record (MBR) and partition boot sector (PBS), if any executable code is present in these sections, it will execute when the machine is booted and hence bypass all the security measures.
- **Macros:** Macros are generally targeted for Microsoft word or similar products and damage only such documents. They are embedded in such application and while activation triggered some other application or insert unreadable character in the documents.
- **Malicious mobile code (MMC):** Mobile codes are lightweight programs that are downloaded from a server and executed with minimal or no user intervention on your local machine. JavaScript scripts, VB Script, and ActiveX controls are some of examples of mobile code that we

encounter while browsing. These code are used to monitor browsing activities, getting unauthorized access to local file system, showing pop ups, adding unwanted browser add-ons etc. Spyware, adware, Trojan are such malware that uses MMC.

3.7.3 Working of Antivirus

Antivirus software scans all the file system and search for virus definition in there and tries to disinfect it by removing the malware code or deleting the infected file. Virus definition of a malware is signature by which the malware can be identified. The signature is determined based on the strategy adopt by the malware to replicate themselves. These definitions are provided by the antivirus company. Antivirus program try to match the files with these definition. The basic searching methods used by the antivirus can be broadly classified into five categories. These are:

1. **Signature based detection:** Once a virus is detected, it is analyzed precisely and a unique sequence of bytes extracted from the virus code. This string is the signature of that virus. The antivirus engine scans the binary code of files to find these strings. If it encounters with a known pattern, it alerts detection of the matching virus. Some of commonly known signature based techniques are:

- **String Scanning method:** Searches for sequence of bytes (strings) that are unique to a specific virus but can't be found in other programs. In this process, a known virus is analyzed precisely and a unique sequence of bytes extracted from the virus code. For example a virus Die.448 has a unique bit string like B440 B9E8 0133 D2CD 2172 1126 8955 15B4 40B9 0500 BA5A 01CD in its code by which we can detect it.
- **Wildcards method:** Including a wild card character like ? or * allows skipping bytes or byte ranges of code in the signature code and try to match next which will enable the antivirus engine to detect slightly modified virus. For example: presence of a wildcard character * in the malware code means that scanner will try to match the next byte in the file.

- **Mismatches method:** This method allows a negligible number of bytes in a signature string to be of random values, regardless of their position. For example, virus X has signature string of 2A 80 4D 01 F6 and following strings contains the same signature values in different places and also mismatched by 2.

  11 2A 32 01 17 80 4D 24

  0A D9 1E 17 80 F6 24 AA

  But using mismatched method we can still say that these two strings contains the virus X.

- **Generic Detection method:** This technique uses one common generic string as a signature string to detect several or all known variants of a family of viruses. When a virus has lots of its variant then the variants are analyzed to extract a common string that can identify the whole genre. This type of technique often uses the wildcard and mismatched technique to determine a common unique string.

- **Bookmarks method:** Bookmark method can ensure more reliable detection of viruses while it is used along with string scanning by negating the false positive. The byte distance between the start of the virus code and start the signature string vary in different viruses. So it can be used to bookmark particular viruses when string based scanning is used.

- **Smart Scanning:** Smart scanning optimizes the signature based detection. Some new variants of viruses try to hide their signature by inserting junk code or instruction in their code which have no effect in execution. Smart scanning skip junk instructions, such as NOPs (No Operation) in the host file to obtain the actual virus body.

- **Skeleton Detection:** The scanner parses the statements of a file line by line and drops all nonessential statements like statements which are not part of the virus or any blank gaps before actual procedure start and try to find essential virus code for execution of the virus which is called

skeleton of the virus. An antivirus named Kaspersky uses this particular method very efficiently to detect macro viruses.

2. **Heuristic Based Detection:** This type of detection helps in detecting new unknown or altered version of malware, but it produces false positive often. So is used with along with signature based scanner. As the name suggest this detection mainly focus on heuristics (experimental trial and error methods) like analysis of file structure and the code organization of the virus or CPU emulation of virus code. Some common heuristic based detection methods are:

- **Heuristics Analysis:** It is an expert based analysis that determines the susceptibility of a malware code by running it on virtual runtime environment and analyzing system towards particular risk using various decision rules or weighing methods. Multi Criteria Analysis (MCA) is one of the means of weighing.

- **Virus specific detection:** There are cases when the standard algorithm of the virus scanner cannot detect a particular malware. In such cases, a new detection code must be introduced to implement a virus specific detection algorithm to detect only specific malware. This method includes-

➢ **Filtering:** A virus only effects a particular type of known objects. So viruses can be classified according to its infection type. For example, executable viruses infect only programs such as .EXE and .COM, macro viruses only attack to files or that can perform macro statements. So whenever a particular set of files are scanned we have to check only the specific virus signature that is relevant to those files. Such filtering minimizes the searching time.

➢ **Static Decryptor Detection:** Some viruses encrypt their body to bypass string matching so they have a decryptor in the virus code. Detection of this decryptor code also result in efferent detection but it also produces false negative and false positive if not used with specific

types of viruses which used that particular decryption. So this method is used after filtering of encrypted virus like oligomorphic virus.

- **XRay scanning:** This method tries to find the weakness in encryption algorithm of viruses. It is also virus specific and can be only used with encrypted viruses and give more suitable result than static decryptor detection as its tries to find the encryption strategy.

3. **Behavioral Based Detection:** When a malware attach to its host or execute its code some particular behavioral pattern or dynamic signature they exhibit is not common to other programs and therefore by observing such signature we may detect them. But as these signatures are dynamic we need a continuous process for monitoring such abnormal behavior. A malware may produce dynamic signature like

- Opening an executable file, with both read and write permission.
- Reading the portion of the file header containing the executable's start address
- Writing the same portion of the file header.
- Seeking to the end of the file.
- Appending to the file.

This detection method monitors a running program's behavior in real time, watching for suspicious activity like the dynamic signature mentioned above. If any such activities are detected, it report to the antivirus engine that as a response prevents such operations from being executed or terminate the program. This detection method can only work when malware perform some malicious activity during runtime.

4. **Sandbox Detection or Emulation Detection:** This type of detection is also based on behavioral traits of the malware. Here the malware code under analysis is executed in an emulated environment or sandbox and the antivirus try to detect it during runtime based on behavioral traits.

But unlike the Behavioral Based detection malware code, it is run in a virtual environment and not in real system and hence, minimizes the risk of being affected.

5. **Data mining techniques:** It is the recent technology used for detecting malware which uses data mining techniques like analyzing very huge sets of infected data and try to find out particular behavioral pattern or try to find out a common signature strings from a large number of different variants of malware and using this signature try to detect a known malware or to classify a code for malware.

After detection, antivirus program try to remove the malware code from host program. If it is not possible to remove the viral code and the host program is not so significant than, the antivirus delete the infected file itself. On the other hand, if the infected file is important from system point of view then it pushes it to quarantine.



CHECK YOUR PROGRESS

4. What are Trojan horses?
5. Differentiate between spyware and adware.
6. Define antivirus.



3.9 LET US SUM UP

- The basic goal of computer security is Confidentiality, Availability and Integrity.
- Violation of these goals leads to a security treats.
- Malware is a term for all malicious programs, such as viruses, worms, Trojan horses, spyware, adware and scareware which are designed to infect and perform malicious activity on computers.

- Antivirus software is designed to protect system against malware. It is available as a standalone product and is also included in most security software packages.
- They use different static and dynamic method to identify malware and neutralize them.



3.10 FURTHER READING

- Stallings, W. (2006). Cryptography and network security: principles and practices. Pearson Education India.
- Canavan, J. E. (2001). Fundamentals of network security. Artech House.



3.11 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q. No 1: The three security goals are

- **Confidentiality:** It means protecting the information from disclosure to unauthorized parties.
- **Integrity:** It means keeping the data pure and trustworthy by protecting system data from intentional or accidental changes
- **Availability:** It refers to ensuring that authorized parties are able to access the information when needed.

Answer to Q. No 2: A computer virus is an executable program that **replicates itself** or attached to a file where it infects the computer when the file is executed.

Answer to Q. No 3: A worm is more independent than a virus. A pure worm works by itself as an independent object. The main feature that separates worms from viruses is that worms are self replicating. A worm can initiate network communication by itself and send copies to other computers. So there is no need for activation criteria or host process. As worms can spread rapidly across a network infecting every PC so they are the most notorious of malwares.

Answer to Q. No 4: Trojan horses are applications which appear to be useful, legitimate applications, but run malicious, hidden code. The application may appear to perform tasks, such as scanning for spyware, but actually steal personal data from your system. Executing Trojans may result in changing desktop wallpaper, creating popups, or even deleting files.

Answer to Q. No 5: Spyware are the software that collects user sensitive information like browsing and searching habit, password, social interactions without your knowledge and uses such information to gain profit. Adware are the software that supports advertising. In general it is the entire program that downloads or displays unwanted banner advertisements in the software being used.

Answer to Q. No 6: Antivirus software is a program or set of programs designed for searching, preventing, detecting and eliminating malware.



3.12 MODEL QUESTIONS

Q.1. Define computer security?

Q.2. What are the goals of computer security?

Q.3. Give an example of computer virus. Explain its working principle.

Q.4. What is the difference between computer virus and worms?

Q.5. Why is scareware considered as malware?

Q.6. Name any antivirus and explain how it works.

Q.7. Briefly describe different detection mechanism used by antivirus software.

Q.8. Why deception is needed for malware? Explain various deception strategy used by malwares.

Q.9. Is deception strategy of malware and detection method of antivirus related to each other? Explain.

Q.10. List out some of the common malware we encounter and list out whether they are viruses, worms, Trojan or any other malicious software.

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UNIT 4: CYBER CRIMES

UNIT STRUCTURE

4.1 Learning Objectives

4.2 Introduction

4.3 Cyber Crime

4.4 Hacking

4.5 Digital Forgery

4.6 Identity Theft

4.7 Cyber Stalking

4.8 Cyber Terrorism

4.9 Cyber Defamation

4.10 Software Piracy

4.11 Information Technology Act, 2000

4.12 Let Us Sum Up

4.13 Further Reading

4.14 Answers to Check Your Progress

4.15 Model Questions

4.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- learn what constitutes cyber crime
- describe hacking, digital forgery, cyber stalking
- define identity theft, cyber terrorism and defamation
- learn about different types of software piracy
- describe different offences under IT Act 2000

4.2 INTRODUCTION

In the previous unit you have been introduced to the concept of computer security. We have learned about different types of computer virus and worms. Different threats like malware, spyware, adware and Trojan

horse were explored. Counter measures to deal with these threats like antivirus software were also explored.

In the present unit you will be introduced to the concepts of cyber crime and how cyber crimes are committed against individuals, institutions and state. Cyber crimes like hacking, digital forgery, cyber stalking, and cyber terrorism are some of the cyber crimes introduced in this unit. The IT Act 2000 which criminalizes cyber crime is also discussed in this unit.

You will be made familiar with the different cyber crimes and laws against cyber crime in this unit, and then in the next unit you will be made familiar with the basics of computer hardware configuration. Different hardware configuration of computers, motherboards and processors will be covered in the next unit.

4.3 CYBER CRIME

Computers have become an essential part of our life. And along with the widespread growth of computers, internet use is also expanding. Although the use of internet and technology has made the life of people easier, it has also given rise to a new type of crime - cyber crime. The term cyberspace is used to represent the electronic medium of computer networks, in which online communication takes place. This term not only represents the internet but also includes computers, computer networks, the internet, data, software etc. Cyber crime can be defined as any crime that is performed using a computer and network either as a tool or as a target. Cyber crimes are often referred to as computer crimes.

According to a definition in the book ‘‘Cyber Crime and the Victimization of women, Laws, Rights and Regulations’’ Cyber crime can also be defined as "Offences that are committed against individuals or groups of individuals with a criminal motive to intentionally harm the reputation of the victim or cause physical or mental harm, or loss, to the victim directly or indirectly, using modern telecommunication networks such as Internet (Chat rooms, emails, notice boards and groups) and mobile phones (SMS/MMS)".

Some of the common cyber crimes are mentioned below :

- computer hacking
- digital forgery
- cyber stalking
- identity theft
- identity fraud
- cyber terrorism
- cyber defamation
- software piracy
- cyber pornography
- cyber bullying
- unwarranted cyber surveillance
- cyber warfare

We will look at some of these cyber crimes in detail in the next few sections.

Cyber crimes are generally divided into two categories depending on the use or activity of the computer. In the first category, the computer is the target of the cyber crime. Some examples of this category of cyber crime include hacking, virus attacks and denial of service attacks. In the second category, the computer is the tool used to perform the cyber crime. Some examples of this category include cyber frauds, cyber stalking and cyber terrorism.

Cyber crimes can also be divided into different categories depending on the target of the crime. The cyber crime performed can be committed against an individual, an institution or against a state. An example of cyber crime committed against an individual can be cyber stalking. Similarly, an example of cyber crime committed against an institution can be hacking their websites. An example of cyber crime committed against a state is cyber terrorism or cyber warfare.

4.4 HACKING

Hacking is one of the most common cyber crimes. It can be defined as an illegal intrusion into a computer system or network. This is a type of

crime where an individual or institution's computer is broken into so that personal or sensitive information can be accessed. The act that is committed towards breaking into a computer system or network is known as hacking.

The person who performs the act of hacking is known as a hacker. The hacker tries to find the vulnerabilities in a person's or in the institutions computer system or passwords to exploit the weakness and gain access into the system. The hackers are usually highly skilled computer professionals. Depending on the intent of the hackers, the hackers are classified into different groups.

The first category of hackers are ethical hackers. Ethical hackers are persons who hack into the computer system with an aim to identify the weaknesses present in the system and not for any personal gain. Because of this they are also called white hat hackers. Mostly, ethical hackers hack into computer systems on a request from the organization itself to test vulnerabilities present in the system.

The second category of hackers are crackers. Crackers are persons who hack into the computer system with an aim to gain unauthorized access to the system or network for personal gain. They aim to steal sensitive and important personal data, or corporate data or bank information. Both types of hackers use a variety of software to enter a person's computer. Most of the victims are sometimes not even aware that they had been hacked.

4.5 DIGITAL FORGERY

Digital forgery is the digitization of the process of forgery. Forgery in traditional systems is the crime of falsely and fraudulently making or altering a document and even possessing such a forged document. Digital forgery is the crime of falsely and fraudulently making or altering a documents and pictures in the digital domain. Examples of digital forgery include counterfeit currency notes, forgery of postage and revenue stamps, forgery of mark

sheets etc. All of these acts of forgery are done by using computers and high quality scanners and printers.

There are different types of digital forgery. The most common types of digital forgery are mentioned below :

- **Document Forgery:** This type of forgery occurs when a legal document is forged or replicated by another person using digital means. This also includes forgery of mark sheets and revenue stamps.
- **Counterfeit Money Forgery:** This type of forgery occurs when the legal currency of a nation is forged or replicated by using digital means.
- **Digital Signature Forgery:** This type of forgery occurs when the signature of an individual is forged or replicated by another person using digital means.
- **Art Forgery:** This type of forgery occurs when a piece of art is replicated and sold as the original art piece. Sometimes the whole painting is forged and sometimes only the signature of a famous painter is forged into the painting with an intention to get more money.

4.6 IDENTITY THEFT

Identity theft is one of the oldest crimes in human history. Identity theft can be defined as stealing personal information of a person and impersonating as that person. The terms identity theft and identity fraud are often used interchangeably. But they refer to different crimes. In identity theft, a criminal impersonates another person who actually exists. In identity fraud, a criminal creates a fictional person and assumes this fictional person's identity. The criminal in identity fraud creates a whole new person, with both personal and financial details.

Identity theft is a much more common crime than identity fraud. Most of the information stolen is in identity theft is financial in nature regarding bank account or credit card details. But according to the victim's need different personal or financial information may be stolen. For example information like name, address, passport number, PAN number, bank account details, bank passwords, and debit or credit card details.

While most of the identity thefts are done for financial gain, there are many identity thefts done with other intentions too. According to a non-profit Identity Theft Resource Center, identity theft can be categorized into five types depending on the intent. These categories are mentioned below:

- **Criminal Identity Theft:** In this type of identity theft, the criminal impersonates as another person as he/she is held accountable for a crime. The criminal identifies himself as another person to the state authority by using simple documents such as fake identity cards. This is usually done to get the police or court authorities off their back. The victim's of this identity theft may never come to know of these crimes done using their false impersonations.

- **Financial Identity Theft:** This is the most common type of identity theft. In this type of identity theft the criminal uses another person's identity to obtain money, loans or any other financial services using the victim's identity. These types of crimes are usually found out only when the debts mount or when it is time to pay off the loan installments.

- **Identity Cloning:** In this type of identity theft, the criminal impersonates another person to conceal their own identity. The criminals are mostly persons hiding from debt collectors or who want to became someone else for personal reasons.

- **Medical Identity Theft:** This is a new type of identity theft where the criminals steal the identity of the victim's for medical benefits. The criminals pose as another person to get medical care like medical insurances and high cost drugs.

- **Child Identity Theft:** This is another type of identity theft where the criminals target minor children for their personal gain. The criminals steal the social security numbers of children and use is information for their own benefit.



CHECK YOUR PROGRESS

Q.1. Define cyber crime?

Q.2. Differentiate between identity fraud and identity theft.

Q.3. Who are the crackers?

4.7 CYBER STALKING

Stalking can be defined as an act of harassment targeting the victim. Stalking includes various acts such as following the victim, making harassing phone calls, vandalizing victim's property, leaving written messages or objects etc. Cyber stalking can be defined as the act of stalking done by using the means of computer systems or internet. The terms cyber stalking and cyber bullying are often used interchangeably. But there is a difference between these two terms, even though in essence both are crimes. The term cyber bullying is generally used when the parties involved are not adults and includes teenagers or children.

In most of the cases of cyber stalking, the victim is harassed by the criminal by sending repeated storm of online messages and emails. The criminals often harass the victims by posting messages on websites or discussion groups. The criminals often try to track every moment of the victim's daily activity using the help of social media. Cyber stalkers use social media sites like Facebook, Twitter, MySpace to keep track of the victim's activities and location. In most of the cyber stalking cases, the stalkers are known to the victims and they use internet to stalk the victims. Also, in many cases, if the criminals find that online stalking does not have their desired effect, they then resort to both online and offline stalking. This crime is punishable by law in India and in the first conviction for cyber stalking the person was sent to jail for three months.

4.8 CYBER TERRORISM

Cyber terrorism can be defined as an act of terrorism that is committed using computer systems and networks. Spreading terrorism through the means of internet has become an attractive option for modern terrorists. This is due to the fact that the terrorists prefer using the internet and other advanced technology in comparison to traditional methods because these machines can be accessed remotely. Another term that frequency comes when we speak of cyber terrorism is cyber warfare. Cyber warfare can be defined as the action by a nation or a state to penetrate another nation's computers or networks for the purpose of causing damage.

In cyber terrorism, the terrorists use the internet to conduct violent acts that may cause loss of life or bodily harm. The terrorists not only target human property and life but also try to cause deliberate failure of functioning of government services by targeting communication networks. Government services like electric and solar power plants, air and rail traffic systems, telecommunication systems, medical services, police and military services are targeted mostly to paralyze the victim country. Large scale disruptions of these services are caused by using tools like computer viruses, worms and other malicious software. Most of the government websites are brought down by performing denial-of-service (DOS) attacks. In 1998, cyber terrorism attack was done by ethnic Tamil guerrillas by disrupting the Sri Lankan embassies using DOS attacks. The Sri Lankan embassies were attacked by sending around 800 e-mails a day for over a two week period.

4.9 CYBER DEFAMATION

Cyber defamation can be defined as defamation done using digital media usually through the internet. When a person publishes defamatory matter about someone on a website or sends e-mails containing defamatory information to all of that person's friends, it is termed as cyber defamation. The defamation can be done using words spoken orally or in written form or by signs or similar visible representations.

In most cases of cyber defamation when it is done with no serious grudge, it can be stopped by a cease and desist letter and by removing the messages from the digital media. But, if it is done with serious intent then the law can be used to punish the criminal. Cyber defamation not only harms the individual victim but also his family, the individual's organization and sometimes even the state or country of the victim. This depends on who the victim is and on what position the individual is currently working on. In such cases, the target for cyber defamation is often chosen not for personal grudge but for damaging the image of the organization or the country of the individual. The harm that is caused in defamation by using digital media is widespread and often irreparable as the information is already out over the whole internet. Some of the digital media that is used to perform cyber defamation are mentioned below :

- world wide web
- social networking sites
- email and messaging
- discussion groups
- bulletin boards

In India, there are two types of liability for defamation. The first category involves cases in which the liability is of the primary publishers of the defamatory content material. This category includes persons who has written the defamatory content material and then published this material in the cyber space. The second category involves cases in which the liability is of the internet service providers or bulletin board operators. This category includes persons who had authorized publication of the defamatory materials.

4.10 SOFTWARE PIRACY

Software piracy can be defined as the unauthorized copying or illegal distribution of copyrighted materials. Software piracy causes loss of

revenue for the makers which in turn lads to the increased prices of software for the licensed consumers. Most of the software has an end user license agreement with the consumers. Violation of this agreement leads to software piracy.

Software piracy has been categorized into six categories. Let us look at each of these six software piracies.

- **Softlifting:** Softlifting or softloading is one of the most common types of software piracy. Softlifting is defined as sharing a program or software with someone who is not authorized to use that software in accordance with the licensing agreement. Most often a single licensed copy of the software is brought and but then it is loaded into multiple computer systems. Softloading is quite common in college campuses and businesses.
- **Internet piracy:** With the increasing number of internet users every year the number of persons committing internet piracy has grown tremendously. Internet piracy occurs when software is downloaded from the internet. There are a lot of websites where software is available for free unlimited download without following any licensing agreements.
- **Software Counterfeiting:** Software counterfeiting is the illegal duplication, distribution and sale of copyrighted software material. In software counterfeiting it is common to make duplicate copies of the programs, the documentation and also the licensed agreements. Microsoft products are one of the most common products to be counterfeited.
- **Hard Disk Loading:** Hark disk loading software piracy occurs when new computers are sold with unauthorized software. This is done by hardware dealers to make their products more attractive to the buyers.
- **Renting:** Renting involves the process of renting software to another person temporarily who does not have the authorized permission or license to use the software.
- **Original Equipment Manufacturer (OEM) Unbundling:** In this type of software piracy, sellers sell standalone software which are originally meant to be included with some other licensed product.

4.11 INFORMATION TECHNOLOGY ACT, 2000

The Information Technology (IT) Act, 2000 is an Act of the Indian Parliament enacted with the prime objective to create an enabling environment for commercial use of information technology. The IT Act specifies the acts which have been made punishable by law regarding cyber crime and electronic commerce in India. The IT Act has amended various sections of the Indian Penal Code (IPC) of 1860, the Indian Evidence Act of 1872, the Bankers Book of Evidence Act of 1891 and the Reverse Bank of India Act of 1934 to include cyber crimes done using new technologies. A major amendment of the IT Act was made in the year 2008 to include penalties for offensive messages, child pornography, cyber terrorism and voyeurism. In 2013, another amendment was made to include the offence of cyber stalking. Let us look at the various offenses that have been made punishable under the IT Act.

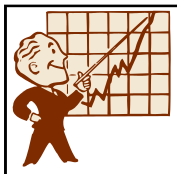
Some of the cyber crimes under the IT Act are mentioned below :

- Tampering with Computer source documents - Sec.65
- Hacking with Computer systems, Data alteration - Sec.66
- Sending any message that is offensive - Sec 66 A
- Publishing obscene information in electronic form - Sec.67
- Un-authorised access to protected system Sec.70
- Breach of Confidentiality and Privacy - Sec.72
- Publishing false digital signature certificates - Sec.73

Some of the cyber crimes under IPC are mentioned below :

- Cyber stalking - Sec 354D IPC
- Web-Hijacking - Sec. 383 IPC
- Bogus websites, cyber frauds - Sec 420 IPC
- Email spoofing - Sec 463 IPC
- Forgery - Sec 463 IPC
- Cyber defamation - Sec 499 IPC
- E-Mail Abuse - Sec.500 IPC

- Sending threatening messages by email - Sec 503 IPC



CHECK YOUR PROGRESS

Q.4. What are the different types of software piracy?

Q.5. Define cyber stalking.

Q.6. What are the different types of medium used for cyber defamation?

Q.7. What is the IT Act, 2000?



4.12 LET US SUM UP

- Cyber crime can be defined as any crime that is performed using a computer and network either as a tool or as a target.
- Hacking can be defined as an illegal intrusion into a computer system or network. This is a type of crime where an individual or institution's computer is broken into so that personal or sensitive information can be accessed. The person who performs the act of hacking is known as a hacker.
- Ethical hackers are persons who hack into the computer system with an aim to identify the weaknesses present in the system and not for any personal gain. Crackers are persons who hack into the computer system with an aim to gain unauthorized access to the system or network for personal gain.
- Digital forgery is the digitization of the process of forgery. Forgery in traditional systems is the crime of falsely and fraudulently making or altering a document and even possessing such a forged document. Digital forgery is the crime of falsely and fraudulently making or altering a documents and pictures in the digital domain.

- Identity theft can be defined as stealing personal information of a person and impersonating as that person. In identity theft, a criminal impersonates another person who actually exists. In identity fraud, a criminal creates a fictional person and assumes this fictional person's identity.
- Cyber stalking can be defined as the act of stalking done by using the means of computer systems or internet. The term cyber bullying is generally used when the parties involved are not adults and includes teenagers or children.
- Cyber terrorism can be defined as an act of terrorism that is committed using computer systems and networks. Cyber warfare can be defined as the action by a nation or a state to penetrate another nation's computers or networks for the purpose of causing damage.
- Cyber defamation can be defined as defamation done using digital media usually through the internet. When a person publishes defamatory matter about someone on a website or sends e-mails containing defamatory information to all of that person's friends, it is termed as cyber defamation.
- Software piracy can be defined as the unauthorized copying or illegal distribution of copyrighted materials.
- The Information Technology (IT) Act, 2000 is an Act of the Indian Parliament enacted with the prime objective to create an enabling environment for commercial use of information technology. The IT Act specifies the acts which have been made punishable by law regarding cyber crime and electronic commerce in India.
- A major amendment of the IT Act was made in the year 2008 to include penalties for offensive messages, child pornography, cyber terrorism and voyeurism.



4.13 FURTHER READING

- Chander, H. (2012). Cyber laws and IT protection. PHI Learning Pvt. Ltd..
- Singh, K. K. (2011). Information security and cyber law. kk singh.
- Godbole, N., & Belapure, S. (2011). Cyber Security: Understanding Cyber Crimes, Computer Forensic and Legal Perspective.



4.14 ANSWERS TO CHECK YOUR PROGRESS

Answer to 1: Cyber crime can be defined as any crime that is performed using a computer and network either as a tool or as a target.

Answer to 2: In identity theft, a criminal impersonates another person who actually exists. In identity fraud, a criminal creates a fictional person and assumes this fictional person's identity. The criminal in identity fraud creates a whole new person, with both personal and financial details whereas in identity theft, the criminal impersonates an already existing person.

Answer to 3: Crackers are persons who hack into the computer system with an aim to gain unauthorized access to the system or network for personal gain.

Answer to 4: There are six types of software piracy. They are - softloading, internet piracy, renting, software counterfeiting, hard disk loading and OEM unbundling.

Answer to 5: Cyber stalking can be defined as the act of stalking done by using the means of computer systems or internet. In most of the cases of cyber stalking, the victim is harassed by the criminal by sending repeated storm of online messages and emails. The criminals often harass the victims by posting messages on websites or discussion groups.

Answer to 6: The different types of media used for cyber defamation are world wide web, social networking sites, discussion groups, bulletin boards and using emails and messages.

Answer to 7: The Information Technology (IT) Act, 2000 was enacted with the prime objective to create an enabling environment for commercial use of information technology. The IT Act specifies the acts which have been made punishable by law regarding cyber crime in India.



4.15 MODEL QUESTIONS

Q.1: What are the different types of cyber crime?

Q.2: Define digital forgery. What are the different types of digital forgery?

Q.3: Differentiate between cyber trolling and cyber bullying.

Q.4: What is cyber warfare? Give an example.

Q.5: Differentiate between identity fraud and identity theft?

Q.6: Describe the different types of identity theft?

Q.7: Describe the different categories of cyber defamation.

Q.8: Define hacking. How are the ethical hackers different from crackers?

Q.9: Define cyber stalking. How is the crime of cyber stalking performed? Whch section of IT Act deals with cyber stalking?

Q.10: Describe the laws related to cyber crime in India?

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UNIT 5 : INTRODUCTION TO NUMBER SYSTEMS

UNIT STRUCTURE

5.1 Learning Objectives

5.2 Introduction

5.3 Number System

- 5.3.1 Decimal Number System
- 5.3.2 Binary Number System
- 5.3.3 Octal Number System
- 5.3.4 Hexadecimal Number System

5.4 Number System Conversion

- 5.4.1 Binary to Decimal Conversion
- 5.4.2 Decimal to Binary Conversion
- 5.4.3 Octal to Decimal Conversion
- 5.4.4 Decimal to Octal Conversion
- 5.4.5 Hexadecimal to decimal Conversion
- 5.4.6 Decimal to Hexadecimal Conversion

5.5 Let Us Sum Up

5.6 Further Reading

5.7 Answers to Check Your Progress

5.8 Model Questions

5.1 LEARNING OBJECTIVES

After going through this unit, you will be able to :

- define and describe number systems like decimal, binary, octal, and hexadecimal.
- convert from one number system to another number system.

5.2 INTRODUCTION

Computer system uses different number systems to represent data. In this unit, we will be able to understand how numbers are represented in different number systems.

In this unit, we will learn about decimal, binary, octal and hexadecimal number systems. In addition to this, we will also discuss the ways for converting from one number system to one another number system. Once, we have the knowledge of number systems, then in the next units, we will discuss about binary arithmetic and data representation methods.

5.3 NUMBER SYSTEM

Number system is a fundamental concept used in micro computer system. They are of different types and can be represented by digit symbols. The knowledge of binary, octal and hexadecimal number system is essential to understand the operation of a computer. This unit deals with all these number systems. In this unit we will discuss about all the representation of number system and their conversion from one number system to another number system.

We are familier with the decimal number system which is used in our day-to-day work. Ten digits are used in decimal number system. To represent these decimal digits, ten separate symbols 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are used. But a digital computer stores, understands and manipulates information composed of only zeros and ones. So, each decimal digits, letters, symbols etc. written by the programmer (an user) are converted to binary codes in the form of 0's and 1's within the computer. The number system is divided into different categories according to the base (or radix) of the system as binary, octal and hexadecimal. If a number system of base r is a system, then the system have r distinct symbols for r digits. The knowledge of the number system is essential to understand the operation of a computer.

5.3.1 Decimal Number System

Decimal number system have ten digits represented by 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. So, the base or radix of such a system is 10.

In this system, the successive position to the left of the decimal point represent units, tens, hundreds, thousands etc. For example, if we consider a decimal number 1257, then the digit representations are :



Decimal Number System uses 10 digits from 0 to 9.

1	2	5	7
↓	↓	↓	↓
thousands positions	hundreds position	tens position	units position

The weight of each digit of a number depends on its relative position within the number.

Example 5.1 : Find the weight of each digit in 6472.

The weight of each digit of the decimal no. 6472

$6472 = 6000 + 400 + 70 + 2 = 6 \times 10^3 + 4 \times 10^2 + 7 \times 10^1 + 2 \times 10^0$

The weight of digits from right hand side are :

Weight of 1st digit = 2×10^0

Weight of 2nd digit = 7×10^1

Weight of 3rd digit = 4×10^2

Weight of 4th digit = 6×10^3

The above expressions can be written in general forms as the weight of n^{th} digit of the number from the right hand side :

$= n^{th}$ digit $\times 10^{n-1}$

$= n^{th}$ digit $\times$ (base)$^{n-1}$

The number system in which the weight of each digit depends on its relative position within the number is called positional number system. The above form of general expression is true only for positional number system.



A ***Binary Number System*** uses only digit 0 and 1

5.3.2 Binary Number System

Only two digits 0 and 1 are used to represent the binary number system. So the base or radix is two (2). The digits 0 and 1 are called bits (Binary Digits). In this number system the value of the digit will be two times greater than its predecessor. Thus, the value of the places are :

$\leftarrow 32 \leftarrow 16 \leftarrow 8 \leftarrow 4 \leftarrow 2 \leftarrow 1$

The weight of each binary bit depends on its relative position within the number. It is explained by the following example--

Example 1.2 : Find the weight of binary number 10110.

The weight of bits of the binary number 10110 is :

$= 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0$

$= 16 + 0 + 4 + 2 + 0 = 22$ (decimal number)

The weight of each bit of a binary no. depends on its relative pointer within the no. and explained from right hand side as :

Weight of 1st bit = 1st bit X 2^0

Weight of 2nd bit = 2nd bit X 2^1

.....

.....

and so on.

The weight of the n^{th} bit of the number from right hand side

$= n^{th}$ bit $\times 2^{n-1}$

$= n^{th}$ bit $\times$ (Base)$^{n-1}$

It is seen that this rule for a binary number is same as that for a decimal number system. The above rule holds good for any other positioned number system. The weight of a digit in any positioned number system depends on its relative positon within the number and the base of the number system.

Table 5.1 shows the binary equivalent numbers for decimal digits.

Table 5.1 : Binary equivalent of decimal numbers

Decimal Number	Equivalent Binary Number
0	0
1	1
2	10
3	11
4	100
5	101
6	110
7	111
8	1000
9	1001

Binary Fractions : A binary fractions can be represented by a series of 1s and 0s to the right of a binary point. The weight of digit positions to the right of the binary point are given by 2^{-1}, 2^{-2}, 2^{-3} and so on.

Example 5.3 : Show the representation of binary fraction 0.1101.

Solution : The binary representation of 0.1101 is :

$$0.1101 = 1 \times 2^{-1} + 1 \times 2^{-2} + 0 \times 2^{-3} + 1 \times 2^{-4}$$
$$= 1 \times 0.5 + 1 \times 0.25 + 0 \times 0.125 + 1 \times 0.0625$$
$$= 0.8125$$

So, $(0.1101)_2 = (0.8125)_{10}$



Octal Number System uses 8 digits from 0 to 7.

5.3.3 Octal Number System

A commonly used positional number system is the Octal Number System. This system has eight (8) digit representation as 0,1,2,3,4,5,6 and 7. The base or radix of this system is 8. The values increase from left to right as 1,8,64,512, 4096 etc. The decimal value 8 is represented in octal as 10,9 as 11,10 as 12 and so on. As $8=2^3$, an octal number is represented by a group of three binary bits. For example, 3 is represented as 011, 4 as 100 etc.

Table 5.2 The octal number and their binary representations.

Decimal Number	Octal Number	Binary Coded Octal No.
0	0	000
1	1	001
.	.	.
.	.	.
7	7	111
8	10	100 000
15	17	001 111

5.3.4 Hexadecimal Number System

The hexadecimal number system is now extensively used in computer industry. Its base (or radix) is 16, and the digits are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F. The hexadecimal numbers are used to represent binary numbers incase of conversion and compactness.

As $16 = 2^4$, hexadecimal number is represented by a group of four binary bits. For example, 5 is represented by 0101. Table 1.3 shows the binary equivalent of a decimal number and its hexadecimal representation.

Table 5.3 : Hexadecimal number and their Binary representation

Decimal No.	Hexadecimal No.	Binary coded Hex. No
0	0	0000
1	1	0001
2	2	0010
3	3	0011
4	4	0100
5	5	0101
6	6	0110
7	7	0111
8	8	1000
9	9	1001
10	A	1010
11	B	1011
12	C	1100
13	D	1101
14	E	1110
15	F	1111

5.4 NUMBER SYSTEM CONVERSION

As the computer uses different number systems, there is a process of converting generally used decimal number systems to other number systems and vice-versa.

5.4.1 Binary to Decimal Conversion

To convert a binary number to its decimal equivalent we use the following expression.The weight of the n^{th} bit of the number from right hand side can be represented as-

$= n^{th}$ bit $\times 2^{n-1}$

First we mark the bit position and then we give the weight of each bit of the number depending on its position. The sum of the weight of all bits gives us the equivalent number.

Example 5.4 : Convert binary $(100101)_2$ to its decimal equivalent.

Solution : $(100101)_2 = 1 \times 2^5 + 0 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$

$= 32 + 0 + 0 + 4 + 0 + 1$

$= 37$

So, $(100101)_2 = (37)_{10}$

Mixed number contain both integer and fractional parts and can convert to its decimal equivalent is as follows :

Example 5.5 : Convert $(11011.101)_2$ to its equivalent decimal number.

Solutaion :

$(11011.101)_2 = (1 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0) + (1 \times 2^{-1} + 0 \times 2^{-2} + 1 \times 2^{-3})$

$= (16 + 8 + 0 + 1) + (0.5 + 0 + 0.125) = 27.625$

So, $(11011.101)_2 = (27.625)_{10}$

5.4.2 Decimal to Binary Conversion

There are different methods used to convert decimal number to binary numbers. The most common method is to repeatedly divide the decimal number by 2, then the remainder 0's and 1's obtained after division, is read in reverse order to obtain the binary equivalent of the decimal number.

Example 5.6 : Convert $(75)_{10}$ to its binary equivalent.

Solution :

			Remainder	
2 | 75				
2 | 37	LSB		1	
2 | 18			1	↑
2 | 9			0	Read in
2 | 4			1	reverse order
2 | 2			0	
2 | 1	MSB		0	
0			1	

So, $(75)_{10} = (1001011)_2$

Example 5.7 : Convert decimal fraction $(25.625)_{10}$ to its equivalent binary number.

Solution : 2|25 Remainder MSB 0.625

2 |12	1	↑	× 2
2 |6	0		1.250
2 |3	0		× 2
2 |1	1		0.500 ↓
0	1		× 2
			1.000

$(25)_{10} = (11001)_2$

$(0.625)_{10} = (0.101)_2$

So, $(25.625)_{10} = (11001.101)_2$

5.4.3 Octal to Decimal Conversion

The method of converting octal numbers to decimal numbers is simple. The decimal equivalent of an octal number is the sum of the numbers multiplied by their corresponding weights.

Example 1.8 : Find decimal equivalent of octal number $(153)_8$

Solution : $1 \times 8^2 + 5 \times 8^1 + 3 \times 8^0 = 64 + 40 + 3 = 107$

So, $(153)_8 = (107)_{10}$

The fractional part can be converted by multiplying it by the negative powers of 8 as shown in the following example.

Example 1.9 : Find decimal equivalent of octal number $(123.21)_8$

Solution : $(1X8^2 + 2X8^1 + 3X8^0) + (2 \times 8^{-1} + 1 \times 8^{-2})$

$= (64 + 16 + 3) + (0.25 + 0.0156) = 83.2656$

So, $(123.21)_8 = (83.2656)_{10}$

5.4.4 Decimal to Octal Conversion

The procedure for conversion of decimal numbers to octal numbers is exactly similar to the conversion of decimal number to binary numbers except replacing 2 by 8.

Example 1.10 : Find the octal equivalent of decimal $(4121)_{10}$

Solution :

8 |4121		
8 |515	1	read from MSB
8 |64	3	to LSB
8 |8	0	
8 |1	0	
0	1	

So, $(4121)_{10}=(10031)_8$

The fractional part is multiplied by 8 to get a carry and a fraction as shown in the following example.

Example 5.11 : Find the octal equivalent of $(.123)_{10}$

Solution : Octal equivalent of fractional part of the decimal number is :

8 × 0.123 = 0.984	0	
8 × 0.984 = 7.872	7	read from LSB
8 × 0.872 = 6.976	6	to MSB
8 × 0.976 = 7.808	7	

Read the integer to the left of the decimal point.

The calculation can be terminated after a few steps if the fractional part does not become zero.

The octal equivalent of $(0.123)_{10}= (0.0767)_8$

NOTE : The octal to binary and binary to octal conversion is very easy. Since, 8 is the third power of 2, we can convert each octal digit into its three-bit binary form and vice versa.

Example 5.12 : Convert $(567)_8$ to its binary form.

Solution :

5	6	7
↓	↓	↓
101	110	111

So, $(567)_8 = (101\ 110\ 111)_2$

Conversion from binary to octal is just opposite of the above example.

5.4.5 Hexadecimal to Decimal Conversion

The method of converting hexadecimal numbers to decimal numbers

is simple. The decimal equivalent of an hexadecimal number is the sum of the numbers multiplied by their corresponding weights.

Example 5.13 : Find the decimal equivalent of $(4A8C)_{16}$

Solution :

$(4A8C)_{16} = (4 \times 16^3) + (10 \times 16^2) + (8 \times 19^{1)} + (12 \times 16^0)$

$= 16384 + 2560 + 128 + 12$

$=(19084)_{10}$

$(4A83)_{16} = (19084)_{10}$

Example 1.14 : Find the decimal equivalent of $(53A.0B4)_{16}$

Solution :

$(53A.0B4)16 = (5 \times 16^2) + (3 \times 16^1) + (10 \times 16^0) + (0 \times 16^{-1})$

$+ (11 \times 16^{-2}) + (4 \times 16^{-3})$

$= 1280 + 48 + 10 + 0 + 0.04927 + 0.0009765$

$= (1338.0439)_{10}$

$(53A.0B4)_{16} =(1338.0439)_{10}$

5.4.6 Decimal to Hexadecimal Conversion

The procedure for conversion from decimal no. and its fraction part to hexadecimal equivalent is exactly similar to the conversion of decimal to binary number except replacing 2 by 16.

Example 5.15 : Convert decimal $(1234.675)_{10}$ to hexadecimal.

Solution : First, we consider $(1234)_{10}$:

	Remainder Decimal	Hexadecimal
16 |1234	2	2
16 |77	13	D
16 |4	4	4

$(1234)_{10} = (4D2)_{16}$

Then, conversion of $(0.675)_{10}$:

	Decimal	Hexadecimal
$0.675 \times 16 = 10.8$	10	A
$0.800 \times 16 = 12.8$	12	C
$0.800 \times 16 = 12.8$	12	C
$0.800 \times 16 = 12.8$	12	C

$(0.675)_{10}= (0.ACC)_{16}$

Hence $(1234.675)_{10}= (4D2.ACC)_{16}$

If the decimal number is very large, it is tedious to convert the number to binary directly. So it is always advisable to convert the number into hexadecimal first, and then convert the hexadecimal to binary.



CHECK YOUR PROGRESS

Q.1. What is the largest numbar that can be represented using 8 bits?

.....

Q.2. What is the weight of 1 in $(10000)_2$.

.....

Q.3. Convert the following:

a) $(565.25)_{10}$ to its equivalent binary number.

b) $(256.24)_8$ to decimal equivalent.

c) $(A3B.BB)_{16}$ to decimal equivalent.

d) $(10010.110)_2$ to decimal equivalent.

e) $(3964.63)_{10}$ to octal equivalent.



5.5 LET US SUM UP

- We have learnt four different number systems used in digital systems in this unit.
- Conversion of one number system to another number system can be done.
- In our day-to-day life, we use the decimal number system. In this system, base is 10 and we use 10 digits from 0 to 9.
- The binary number system has two digits and so its base is 2.
- The octal number system has 8 digits from 0 to 7 and the base of the system is 8.
- The hexadecinal number system has 16 digits from 0 to 9 and A to F and the base of the system is 16.



5.6 FURTHER READING

- *Ram, B. (2000), Computer Fundamentals Architecture and Organization*, New Age International
- *Mano, M.M. (2017), Digital Logic and Computer Design*, Pearson Education India
- *Sinha, P. K. and Sinha P. (2010), Computer Fundamentals*, BPB Publication.
- *Talukdar, P. (2010), Digital Techniques*, N.L. Publications.



5.7 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1 : $(1111\ 1111)_2$

Ans. to Q. No. 2 : Weight is $2^4 = 16$

Ans. to Q. No. 3 : a) $(1000110101.01)_2$ b) $(174.44)_{10}$ c) $(2620.8)_{10}$
d) $(18.75)_{10}$ e) $(7574.50)_8$



5.8 MODEL QUESTIONS

Q.1: What is binary number system?

Q.2: What is meant by 'base' or 'radix' of a number system?

Q.3: Convert the following to its binary equivalent:

(i) $(67)_8$ (ii) $(A8D)_{16}$ (iii) $(81B6.F)_{16}$
(iv) $(64.3)_{10}$ (v) $(765.45)_8$ (vi) $(1725.23)_8$

Q.4: Convert the following to its decimal equivalent:

(i) $(11011)_2$ (ii) $(1111.11)_2$ (iii) $(45)_8$
(iv) $(671.23)_8$ (v) $(ABCD)_{16}$ (vi) $(12AF.E4)_{16}$

Q.5: Explain the process of converting a decimal number to binary.

Q.6: How can a binary number be converted into octal and hexadecimal numbers?

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UNIT 6 : GETTING STARTED WITH WRITER

UNIT STRUCTURE

6.1 Learning Objectives

6.2 Introduction

6.3 Launch Writer and Create a New Document

6.4 Understand the Writer Interface

6.5 Working with Writer

- 6.5.1 Entering and Formatting Text
- 6.5.2 Applying Font Styles
- 6.5.3 Working with Paragraphs
- 6.5.4 Find and Replace
- 6.5.5 Saving, Closing and Opening Existing Document

6.6 Let Us Sum Up

6.7 Further Reading

6.8 Answer to Check Your Progress

6.9 Model Questions

6.1 LEARNING OBJECTIVES

After going through this unit, you will be able to :

- launch Writer and create a new document.
- describe the Writer interface and its different components.
- enter and format text using Writer's tools and features.
- apply different font styles to their text.
- work with paragraphs, including changing alignment, indentation, and spacing.
- save, close, and open existing Writer documents.

6.2 INTRODUCTION

Writer is a word processing software that is part of the LibreOffice suite of productivity applications. It allows users to create, edit, and format text documents with ease. In this context, we will discuss some of the essential features of Writer that will enable you to work effectively with the

software. We will cover how to launch Writer and create a new document, understand the interface, and work with text and paragraphs. We will also discuss how to apply different font styles, save, close, and open existing documents. By the end of this unit, you will have gained a solid foundation in using Writer.

6.3 LAUNCH WRITER AND CREATE A NEW DOCUMENT

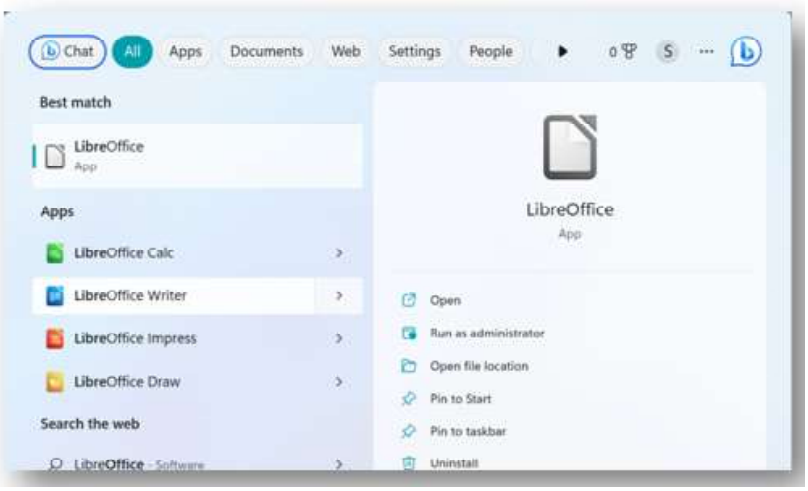
Following are step-by-step procedures to launch LibreOffice Writer and open a new document:

Step 1: Open your computer or laptop and ensure that LibreOffice is installed. If not, you can download it from the official website and install it on your computer.

Step 2: Click on the Start menu button on your desktop screen or press the Windows key on your keyboard to open the Start menu.

Step 3: Search for LibreOffice Writer in the search bar of the Start menu.

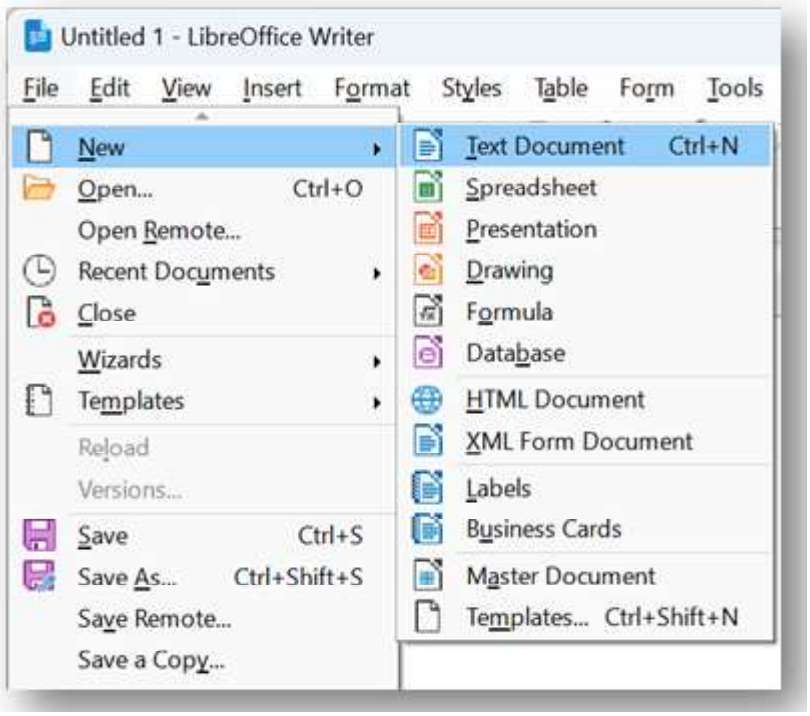
Step 4: Click on the LibreOffice Writer icon to launch the program.



Step 5: Once Writer is launched, click on the File menu in the top left corner of the screen.

Step 6: Click on the New option from the File menu.

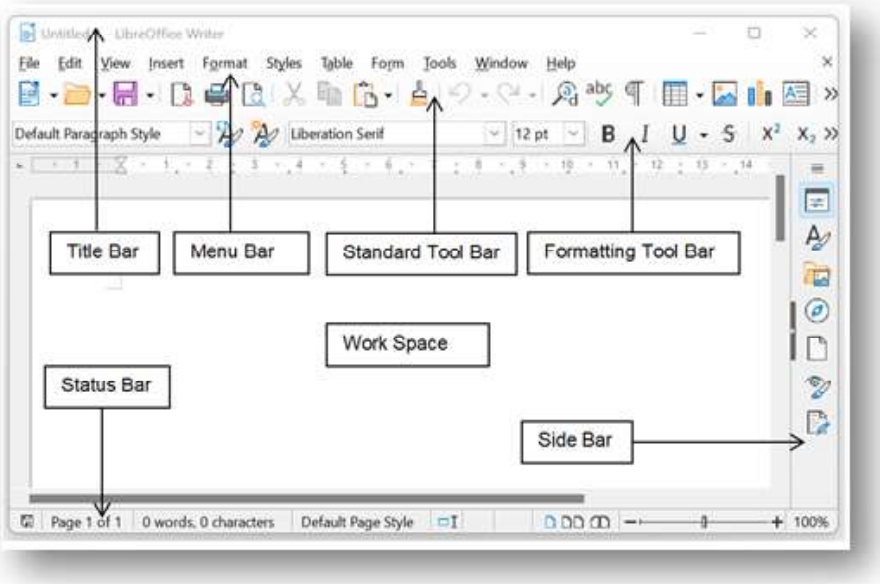
Step 7:A new window will appear with a list of different document types. Choose the type of document you want to create and click on it.



You can now start typing your document and use the various formatting tools and features available in Writer to format your text as needed.

6.4 UNDERSTANDING THE WRITER INTERFACE

Followings are the components of LibreOffice Writer interface:



- **Menu Bar:** The Menu Bar is located at the top of the LibreOffice Writer window and contains various menus such as File, Edit, View, Insert, Format, Table, Tools, Window, and Help.
- **Standard Toolbar:** The Standard Toolbar is located directly below the Menu Bar and contains commonly used tools such as Save, Undo, Redo, Cut, Copy, and Paste.
- **Formatting Toolbar:** The Formatting Toolbar is located below the Standard Toolbar and contains tools for formatting text such as font style, size, color, alignment, and highlighting.
- **Ruler:** The Ruler is located at the top of the document window and provides visual aids for adjusting margins, tabs, and indentation.
- **Status Bar:** The Status Bar is located at the bottom of the LibreOffice Writer window and displays information about the current document such as page number, word count, and zoom level.
- **Scroll Bar:** The Scroll Bar is located on the right-hand side of the document window and allows you to scroll up and down the document.
- **Document Area:** The Document Area is the main area where you can create and edit your document. This is where you will enter and format your text.
- **Sidebar:** The Sidebar is located on the right-hand side of the LibreOffice Writer window and contains various options and features such as styles, formatting, and properties.

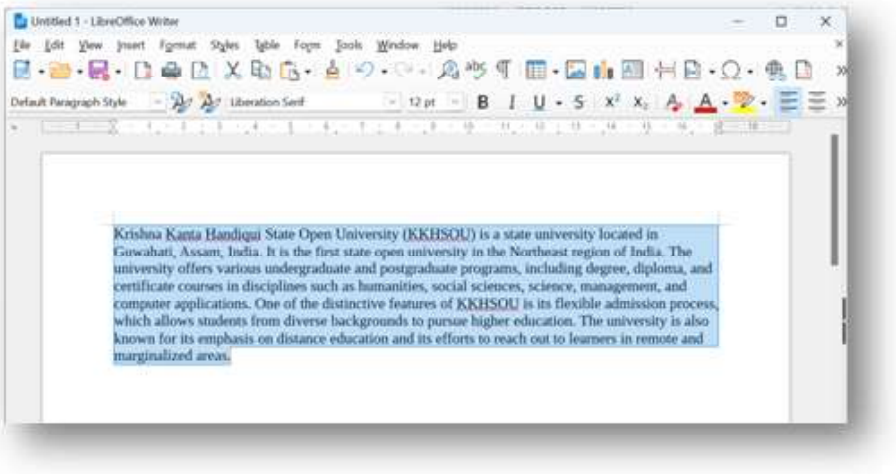
The LibreOffice Writer interface is designed to be user-friendly and intuitive, with various tools and features readily accessible through the Menu Bar and toolbars. The Ruler, Status Bar, and Sidebar provide additional functionality and customization options, making it easy to create professional-looking documents with LibreOffice Writer.

6.5 WORKING WITH WRITER

6.5.1 Entering and Formatting Text

here's a step-by-step procedure to enter and format text in a LibreOffice Writer document:

1. Launch LibreOffice Writer and create a new document by clicking on the File menu and selecting New, or by pressing Ctrl+N on your keyboard.
2. Type in the text that you want to include in your document.
3. To format your text, select the text by clicking and dragging your mouse over the text that you want to format.



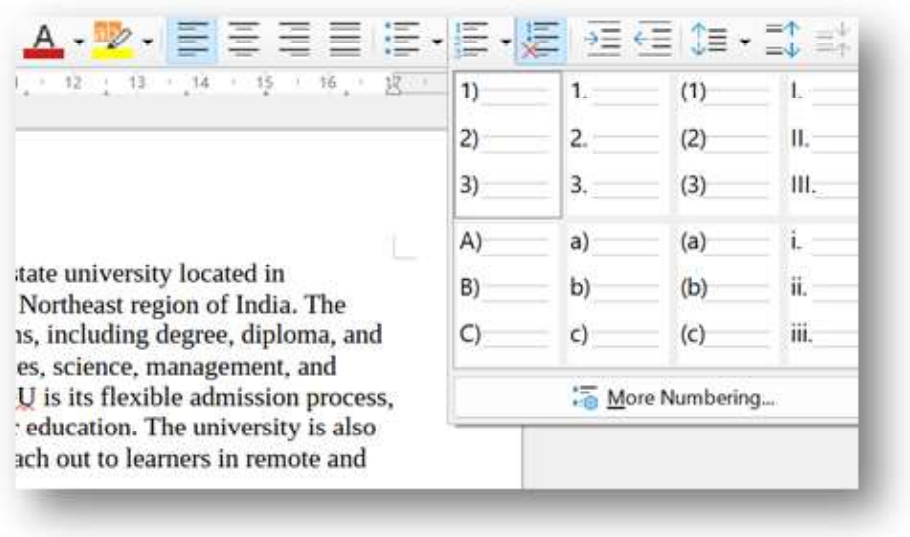
4. Use the formatting tools available in the Formatting Toolbar to apply formatting options such as font style, font size, bold, italic, underline, strikethrough, and color.



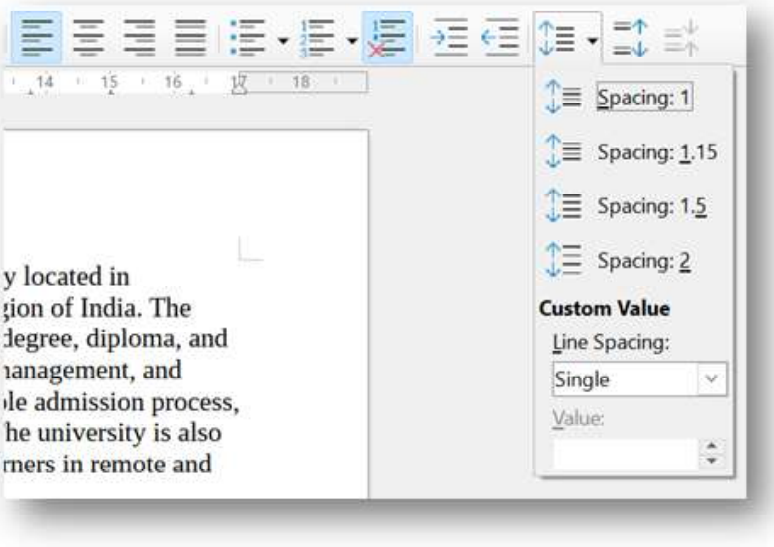
5. To change the alignment of your text, use the Alignment buttons available in the Formatting Toolbar. You can align your text to the left, center, right, or justified.



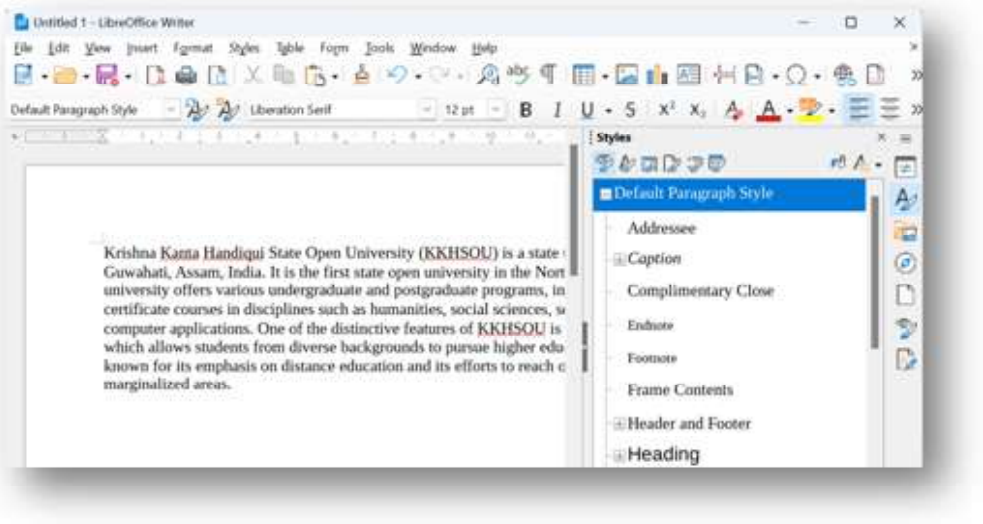
6. To add bulleted or numbered lists, click on the Bullets or Numbering buttons available in the Formatting Toolbar. This will automatically add bullet points or numbers to your text.



7. To adjust the spacing between lines or paragraphs, use the Line Spacing or Paragraph Spacing options available in the Formatting Toolbar.



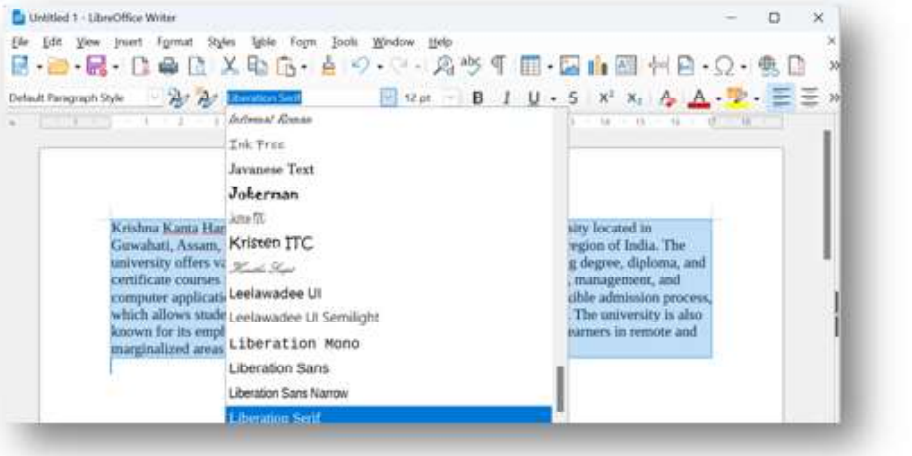
8. To change the indentation of your text, use the Indent buttons available in the Formatting Toolbar. You can indent your text to the left or right.
9. To apply a specific style to your text, use the Styles and Formatting feature available in the Sidebar. Click on the Styles and Formatting button in the Sidebar, select the style that you want to apply, and click on the Apply button.



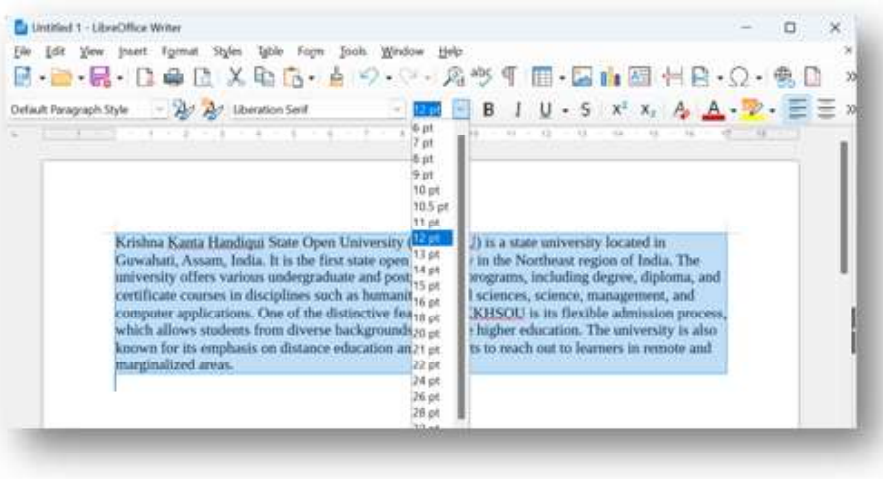
6.5.2 Applying Font Styles

Here's a step-by-step procedure to apply font styles in LibreOffice Writer:

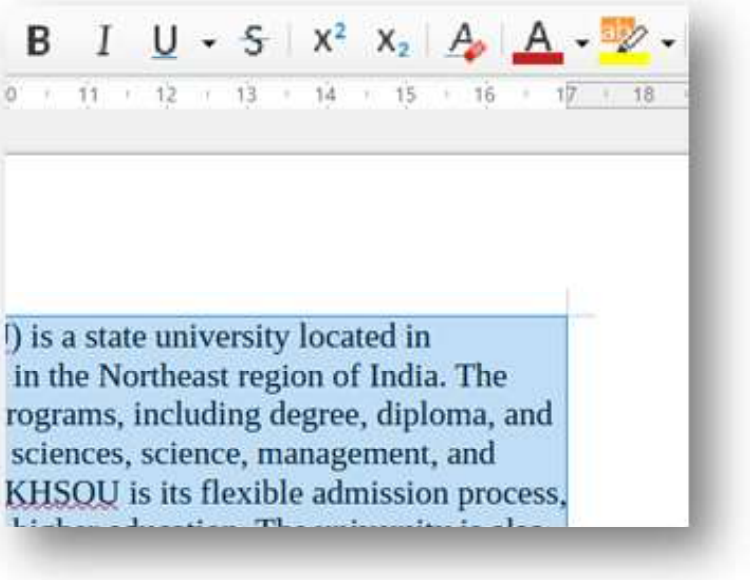
1. Launch LibreOffice Writer and create a new document.
2. Type in the text that you want to format.
3. Select the text that you want to apply the font style to.
4. Go to the Formatting Toolbar located at the top of the LibreOffice Writer window.
5. In the Formatting Toolbar, locate the Font Name dropdown menu. This dropdown menu displays the font styles that are currently available.



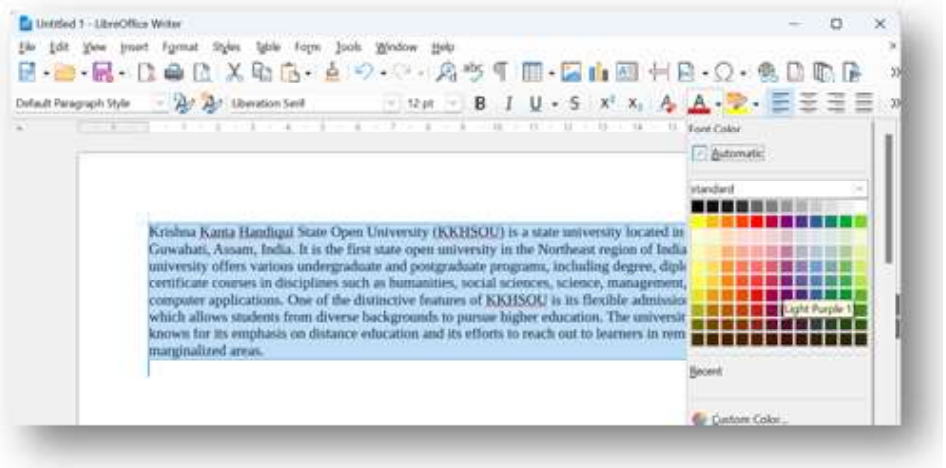
6. Click on the Font Name dropdown menu and select the font style that you want to apply to your text. The font style will be applied to the selected text.
7. You can also change the font size of your text by selecting the text that you want to format and then selecting a font size from the Font Size dropdown menu in the Formatting Toolbar.



8. Additionally, you can make your text bold, italic, or underlined by clicking on the corresponding buttons in the Formatting Toolbar.



9. To change the color of your text, click on the Font Color button in the Formatting Toolbar and select a color from the color palette.

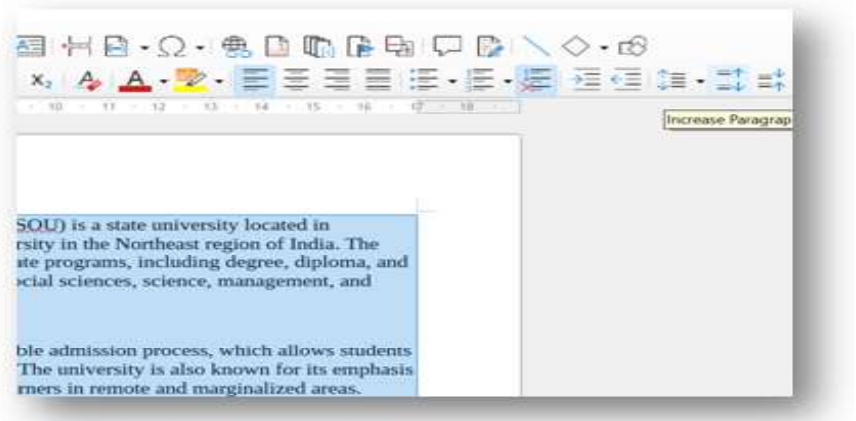


By following the above procedures, you can successfully apply font styles to your text in LibreOffice Writer. You can continue to use these formatting tools to customize the appearance of your document.

6.5.3 Working with Paragraphs

Sure, here's a step-by-step procedure to work with paragraphs in Writer:

1. Launch LibreOffice Writer and create a new document.
2. Type in the text that you want to include in your document.
3. To start a new paragraph, press the Enter key on your keyboard.
4. To add spacing between paragraphs, select the paragraph(s) that you want to add spacing to, and then use the Paragraph Spacing options available in the Formatting Toolbar.



5. To change the alignment of a paragraph, select the paragraph that you want to align, and then use the Alignment buttons available in the Formatting Toolbar. You can align your paragraph to the left, center, right, or justified.
6. To add bullet points or numbers to a paragraph, place your cursor at the beginning of the paragraph and then click on the Bullets or Numbering button available in the Formatting Toolbar.
7. To indent a paragraph, select the paragraph that you want to indent and then use the Indent buttons available in the Formatting Toolbar. You can indent your paragraph to the left or right.
8. To apply a specific paragraph style to your text, use the Styles and Formatting feature available in the Sidebar. Click on the Styles and Formatting button in the Sidebar, select the paragraph style that you want to apply, and click on the Apply button.
9. To create a numbered or bulleted list, type in the list items one after the other, each on a new line, and then click on the Numbering or Bullets button available in the Formatting Toolbar.

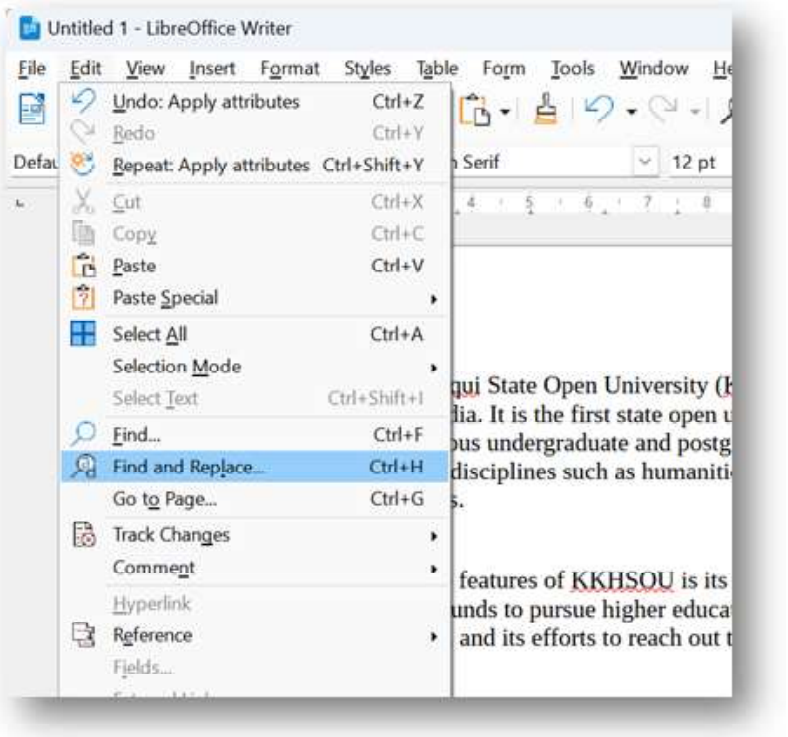
You can continue to use these formatting tools to customize the appearance of your document.

6.5.4 Find and Replace

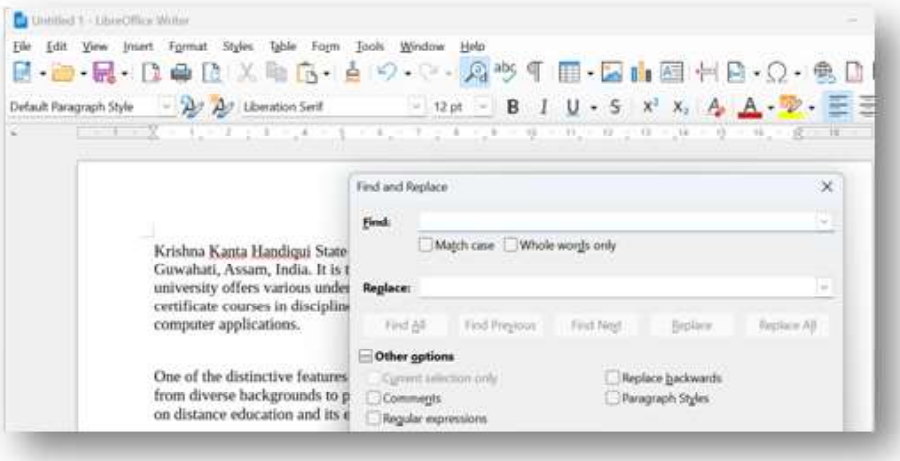
The “Find and Replace” feature in LibreOffice Writer is a powerful tool that allows you to search for a specific word, phrase or character in your document, and replace it with another word, phrase or character.

Following are step-by-step procedures to find and replace text in LibreOffice Writer:

1. Launch LibreOffice Writer and open the document that you want to search and replace text in.
2. Click on the Edit menu in the top-left corner of the window.
3. Click on the Find & Replace option. Alternatively, you can use the keyboard shortcut Ctrl+H.



4. In the Find & Replace dialog box, type in the text that you want to search for in the Search for field.



5. If you want to search for a whole word, check the Whole words only option.
6. If you want to match the case of the text that you're searching for, check the Match case option.

7. Click on the Find button to find the first occurrence of the text that you're searching for.
8. To replace the found text, click on the Replace button.
9. To replace all occurrences of the text, click on the Replace All button.
10. If you want to search for and replace more text, click on the Find Next button to find the next occurrence of the text.
11. Once you're done searching and replacing text, click on the Close button to close the Find & Replace dialog box.

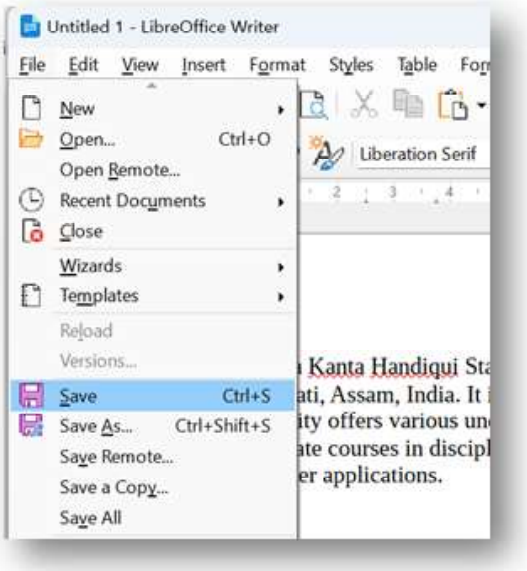
In this way, you can find and replace text in LibreOffice Writer. You can use these steps to quickly search and replace text in your documents.

6.5.5 Saving, Closing and Opening Existing Document

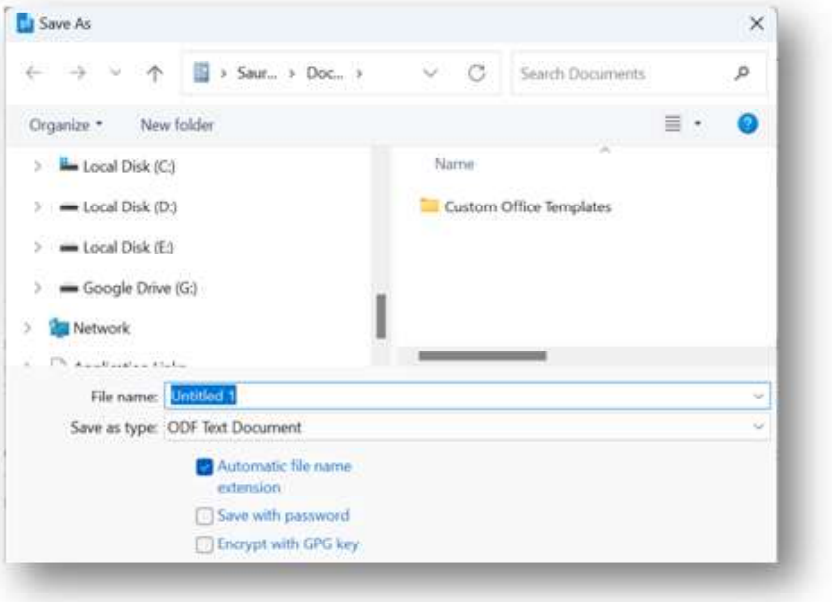
Following are step-by-step procedures to save, close, and open an existing document in LibreOffice Writer:

To save a document:

1. Click on the File menu in the top-left corner of the LibreOffice Writer window.
2. Click on the Save option. Alternatively, you can press the Ctrl+S keys on your keyboard.



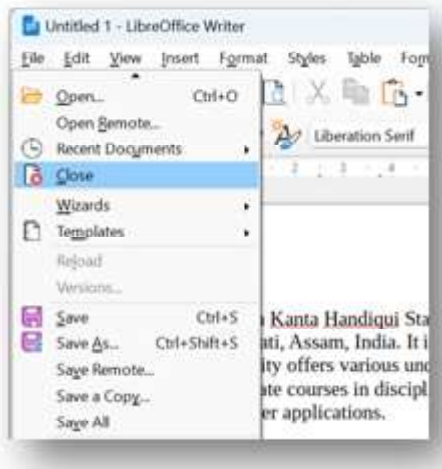
3. Choose a location where you want to save the document.



4. In the Save As dialog box, give your document a name and select the file type you want to save it in.
5. Click on the Save button.

To close a document:

1. Click on the File menu in the top-left corner of the LibreOffice Writer window.
2. Click on the Close option. Alternatively, you can press the Ctrl+W keys on your keyboard.



3. If there are any unsaved changes to your document, LibreOffice Writer will prompt you to save your changes before closing the document.

To open an existing document:

1. Click on the File menu in the top-left corner of the LibreOffice Writer window.
2. Click on the Open option. Alternatively, you can press the Ctrl+O keys on your keyboard.
3. Choose the location where the document is saved.
4. Select the document that you want to open.
5. Click on the Open button.

By following these steps, you can successfully save, close, and open an existing document in LibreOffice Writer.



CHECK YOUR PROGRESS

Q.1: Answer the following questions:

(a) What is LibreOffice Writer?

(b) What are the components of the LibreOffice Writer interface?

(c) How can you launch LibreOffice Writer?

(d) How can you open a new document in LibreOffice Writer?

(e) What is the purpose of the Ruler in LibreOffice Writer?

(f) Where is the Sidebar located in LibreOffice Writer?

(g) What options are available in the Formatting Toolbar in LibreOffice Writer?

(h) How can you apply font styles in LibreOffice Writer?

(i) How can you add bulleted or numbered lists in LibreOffice Writer?

(j) What is the purpose of the Styles and Formatting feature in LibreOffice Writer?



6.6 LET US SUM UP

- The Writer interface consists of a Menu Bar, Standard Toolbar, Formatting Toolbar, Ruler, Status Bar, Scroll Bar, Document Area, and Sidebar.
- The Ruler, Status Bar, and Sidebar provide additional functionality and customization options.
- To enter and format text in a LibreOffice Writer document, create a new document, type in the text, select the text, and use the formatting tools available in the Formatting Toolbar.
- The Formatting Toolbar includes options for font style, font size, alignment, bullet points, numbering, line spacing, paragraph spacing, and indentation.
- The Styles and Formatting feature available in the Sidebar can be used to apply a specific style to your text.
- Font styles can be applied by selecting the text, choosing a font style from the Font Name dropdown menu, changing the font size, making the text bold, italic or underlined, and changing the text color.
- LibreOffice Writer is user-friendly and intuitive with various tools and features readily accessible through the Menu Bar and toolbars.
- LibreOffice Writer is a good alternative to Microsoft Word for creating professional-looking documents.



6.7 FURTHER READING

1. “Getting Started with LibreOffice Writer,” The Document Foundation, accessed March 11, 2023, https://documentation.libreoffice.org/en/english-documentation/getting-started-writer/.
2. “LibreOffice Writer Guide,” The Document Foundation, accessed March 11, 2023, https://documentation.libreoffice.org/en/english-documentation/writer-guide/.

3. "LibreOffice Writer Tutorial," Tutorials Point, accessed March 11, 2023, https://www.tutorialspoint.com/libreoffice/libreoffice_writer_tutorial.htm.



6.8 ANSWERS TO CHECK YOUR PROGRESS

Ans.to.Q.No.1:

(a) LibreOffice Writer is a free and open-source word processor software.

(b) The components of the LibreOffice Writer interface are Menu Bar, Standard Toolbar, Formatting Toolbar, Ruler, Status Bar, Scroll Bar, Document Area, and Sidebar.

(c) You can launch LibreOffice Writer by searching for it in the Start menu or by clicking on the LibreOffice Writer icon on your desktop.

(d) You can open a new document in LibreOffice Writer by clicking on the File menu and selecting New, or by pressing Ctrl+N on your keyboard.

(e) The Ruler in LibreOffice Writer provides visual aids for adjusting margins, tabs, and indentation.

(f) The Sidebar is located on the right-hand side of the LibreOffice Writer window.

(g) The Formatting Toolbar in LibreOffice Writer contains options for formatting text such as font style, font size, alignment, and highlighting.

(h) You can apply font styles in LibreOffice Writer by selecting the text you want to format and using the Font Name dropdown menu and other formatting tools in the Formatting Toolbar.

(i) You can add bulleted or numbered lists in LibreOffice Writer by clicking on the Bullets or Numbering buttons in the Formatting Toolbar.

(j) The Styles and Formatting feature in LibreOffice Writer allows you to apply a specific style to your text.



6.9 MODEL QUESTIONS

Q.1: What are the components of the LibreOffice Writer interface?

Q.2: How do you enter and format text in a LibreOffice Writer document?

Q.3: What is the purpose of the Ruler in LibreOffice Writer?

Q.4: How can you add bulleted or numbered lists in a Writer document?

Q.5: How do you apply specific styles to text in Writer using the Styles and Formatting feature?

Q.6: What is the purpose of the Sidebar in LibreOffice Writer?

Q.7: How do you change the alignment of text in a Writer document?

Q.8: How can you adjust the spacing between lines or paragraphs in a Writer document?

Q.9: How can you indent text to the left or right in a Writer document?

Q.10: What are some of the font styles that can be applied to text in LibreOffice Writer?

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UNIT 7 : WORKING WITH TEMPLATES AND STYLES IN WRITER

UNIT STRUCTURE

7.1 Learning Objectives

7.2 Introduction

7.3 Creating Document Templates

- 7.3.1 Understanding Document Templates
- 7.3.2 Creating a New Template
- 7.3.3 Modifying an Existing Template

7.4 Using Document Templates

- 7.4.1 Applying a Template to A New Document
- 7.4.2 Changing the Template for an Existing Document

7.5 Paragraph Styles

- 7.5.1 Understanding Paragraph Styles
- 7.5.2 Creating a New Paragraph Style
- 7.5.3 Modifying a Paragraph Style
- 7.5.4 Applying Paragraph Styles to Text

7.6 Managing Styles in the Styles and Formatting Dialog Box

- 7.6.1 Opening the Styles and Formatting Dialog Box
- 7.6.2 Navigating the Dialog Box
- 7.6.3 Managing Styles in The Dialog Box

7.7 Let Us Sum Up

7.8 Further Reading

7.9 Answers to Check Your Progress

7.10 Model Questions

7.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- learn the concept of document templates and their importance in creating new documents.
- create a new document template in LibreOffice Writer.

- modify an existing document template to meet specific needs.
- save and use document templates efficiently in LibreOffice Writer.
- apply a document template to a new document and change it for an existing document.
- update a document template to reflect any changes made in the document.
- learn the concept of paragraph styles and their role in creating consistent formatting throughout a document.
- create new paragraph styles in LibreOffice Writer.
- modify existing paragraph styles to meet specific formatting needs.
- apply paragraph styles to text efficiently in LibreOffice Writer.
- navigate and manage styles effectively in the Styles and Formatting dialog box of LibreOffice Writer.

7.2 INTRODUCTION

LibreOffice Writer is a powerful word processing software that allows users to create professional-looking documents with ease. One of the most useful features of Writer is its ability to create and use document templates, which are pre-designed formats that can be used as a starting point for new documents. In this section, we will explore how to create, modify, and save document templates, as well as how to apply them to new and existing documents. Additionally, we will discuss the use of paragraph and character styles to further enhance the appearance of your documents. Finally, we will take a closer look at managing styles in the Styles and Formatting dialog box, which is a useful tool for organizing and manipulating styles. With these skills, you can create consistent, professional-looking documents quickly and easily in LibreOffice Writer.

7.3 CREATING DOCUMENT TEMPLATES

7.3.1 Understanding Document Templates

In LibreOffice Writer, document templates are pre-designed formats that can be used to create new documents. These templates include

various elements such as page layout, font styles, header and footer, and other design elements that make the document look professional and consistent.

Document templates can save time and effort by providing a starting point for creating a new document. Instead of starting from scratch, you can select a template that best suits your needs, and then modify it to create your own document.

LibreOffice Writer comes with a range of built-in templates, and you can also create your own custom templates. To create a new template, you can start with a blank document or an existing document and customize it to suit your needs. Once you have created a template, you can save it and use it to create new documents in the future.

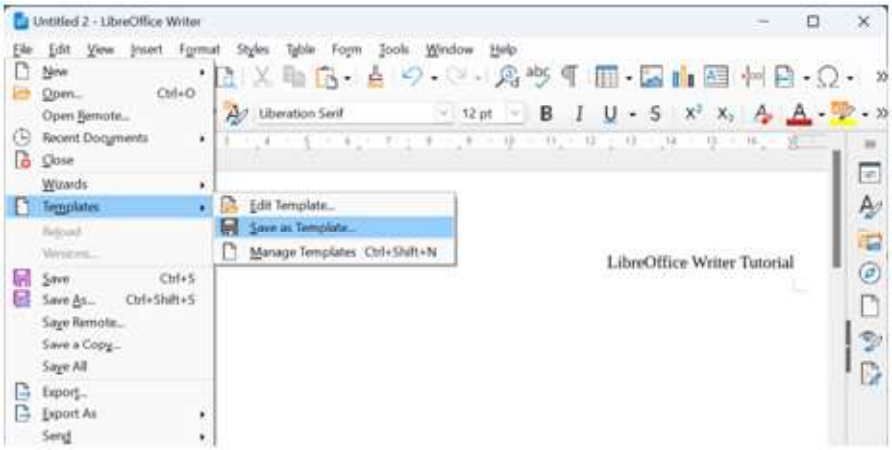
7.3.2 Creating a New Template

Here is the step-by-step procedure to create a new template in LibreOffice Writer:

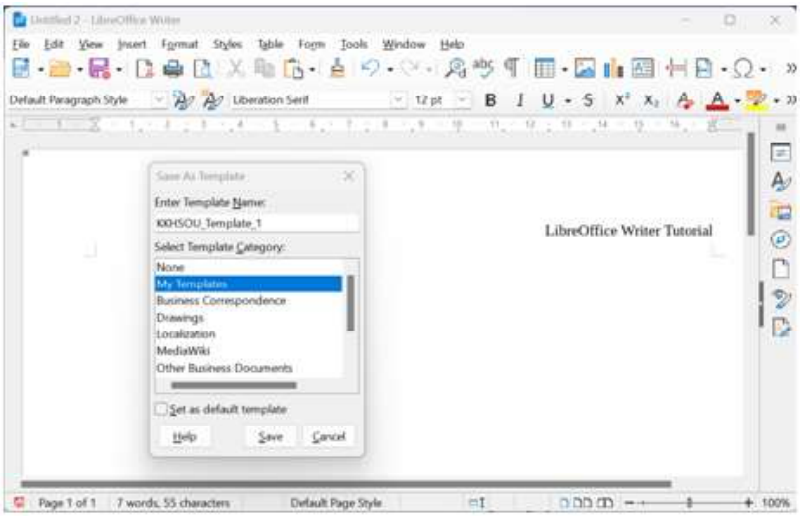
1. Open LibreOffice Writer and click on the “File” menu in the top-left corner.
2. From the drop-down menu, click on “New” and select “Text Document” from the options.



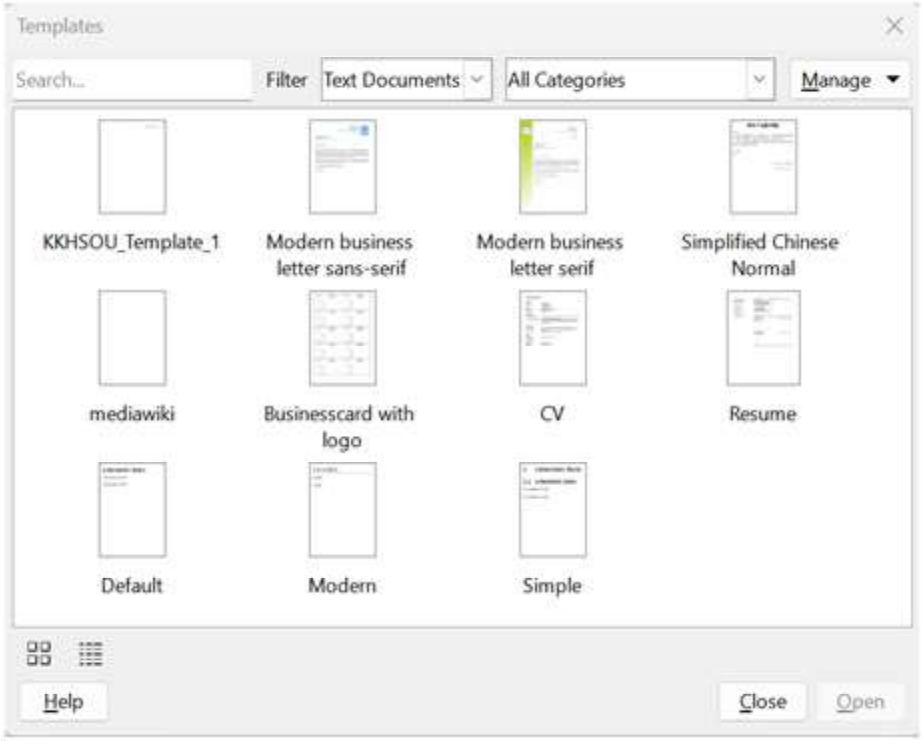
3. Customize the new document as per your requirements. This can include formatting the text, changing the page layout, adding headers and footers, and inserting any required design elements.
4. Once you have customized the document, click on the “File” menu again and select “Templates” > “Save as Template.”



5. In the “Save As Template” dialog box, enter a name for the template in the “Name” field.
6. Select the category where you want to save the template. Click on the “Save” button to save the template.



7. Your new template is now saved and can be accessed from the “File” menu > “New” > “Templates” > “KKHSOU_ Template_1” in the future.



8. To use the template, simply open a new document from the "File" menu > "New" > "Templates" and select the template you want to use.

By following these steps, you can create a new template in LibreOffice Writer and save it for future use.

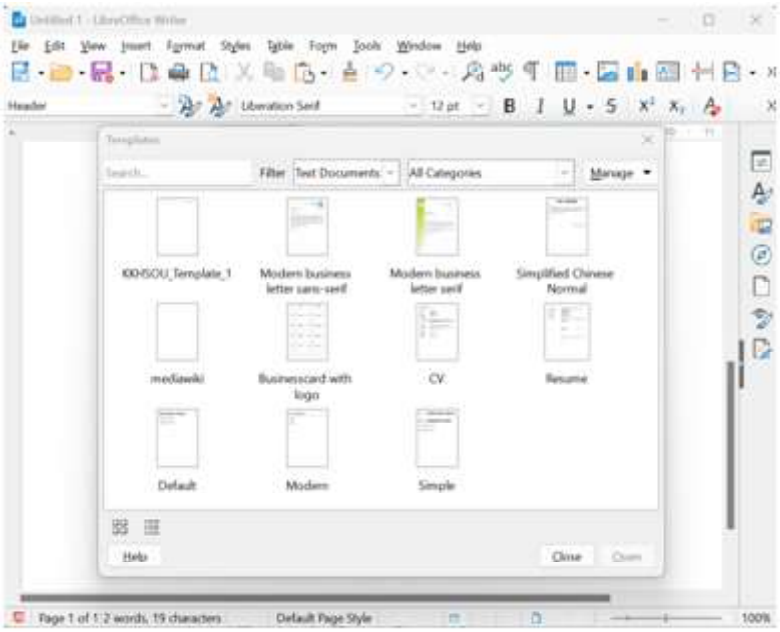
7.3.3 Modifying an Existing Template

You can modify an existing template by following the steps mentioned below:

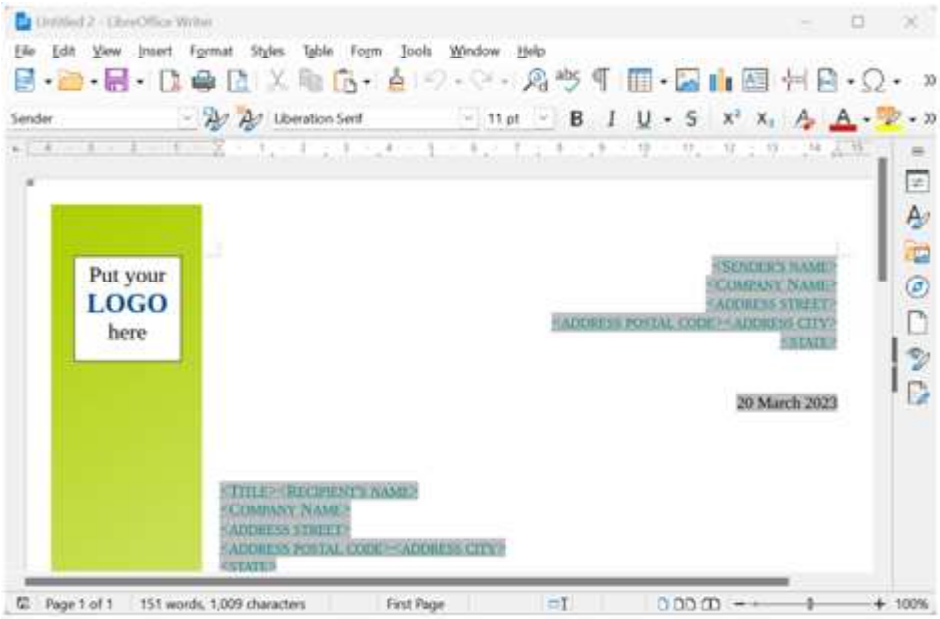
1. Open LibreOffice Writer and click on the "File" menu in the top-left corner.
2. From the drop-down menu, click on "Templates" > "Manage Templates" to open the "Template Manager" dialog box.



3. In the “Template Manager” dialog box, select the category where your existing template is saved. You can use the search bar to find the template quickly.



4. Once you have found the template, click on it to select it and then click on the “Edit” button. For example, we will edit the template named “Modern business letter serif”.



5. This will open the template in a new Writer document. You can now modify the template as per your requirements. You can add or delete text, change formatting, and modify design elements.
6. Once you have made the necessary changes, click on the “File” menu and select “Templates” > “Save as Template.”
7. In the “Save As Template” dialog box, ensure that the same template name and category are selected as the existing template.
8. Click on the “OK” button to save the modified template.

Your modified template is now saved and can be accessed from the “File” menu > “New” > “Templates” in the future.

7.4 USING DOCUMENT TEMPLATES

7.4.1 Applying a Template to a New Document

You canapply a templateto a new document in by following the steps mentioned below:

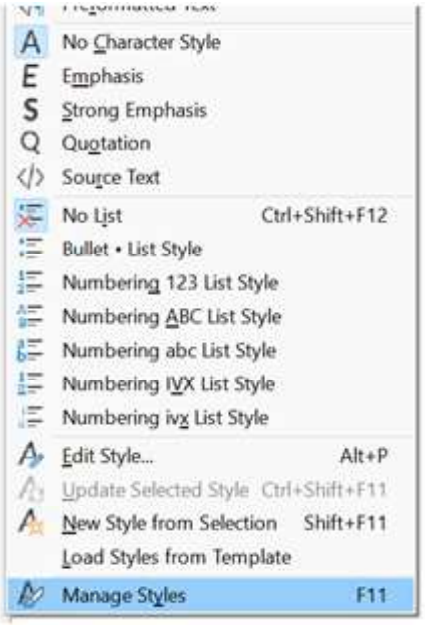
1. Open LibreOffice Writer.
2. Click on “File” in the menu bar and select “New” to create a new document.

3. In the “New Document” dialog box, select “Templates” on the left-hand side.
4. Click on the template category you want to use. For example, if you want to create a business letter, select “Business Correspondence” and then select the “Business Letter” template.
5. Once you have selected the template, click on “Create” at the bottom of the dialog box.
6. A new document will be created based on the selected template. You can now edit the document as needed.
7. If you want to save the document using a different name or location, click on “File” in the menu bar and select “Save As”. Enter the desired file name and location and click “Save”.

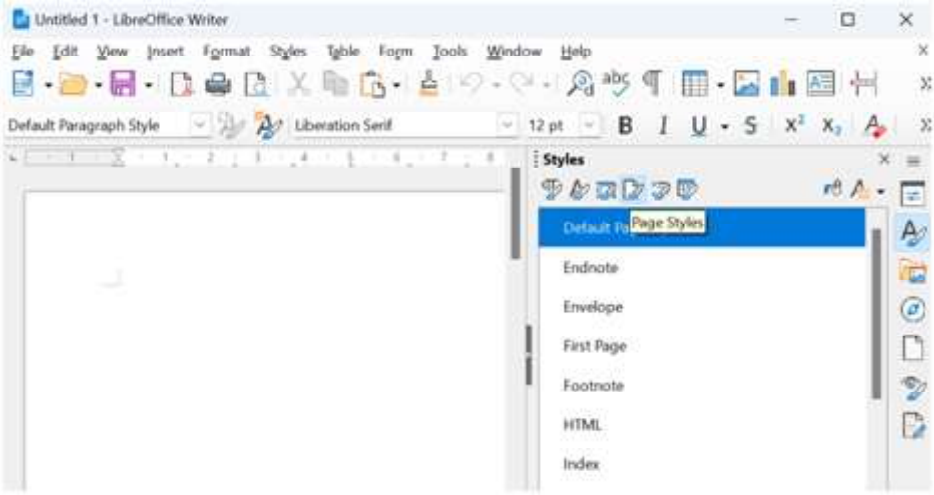
7.4.2 Changing the Template for an Existing Document

You can change the template for an existing document in LibreOffice Writer by following the steps mentioned below:

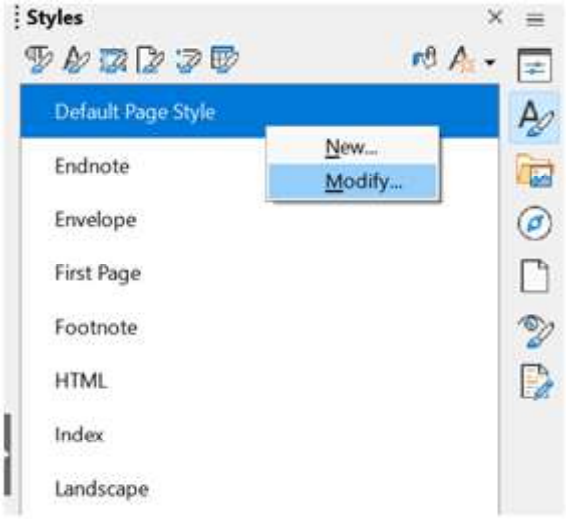
1. Open the document you want to change the template for in LibreOffice Writer.
2. Click on “Styles” in the menu bar and select “Manage Styles” from the drop-down menu.



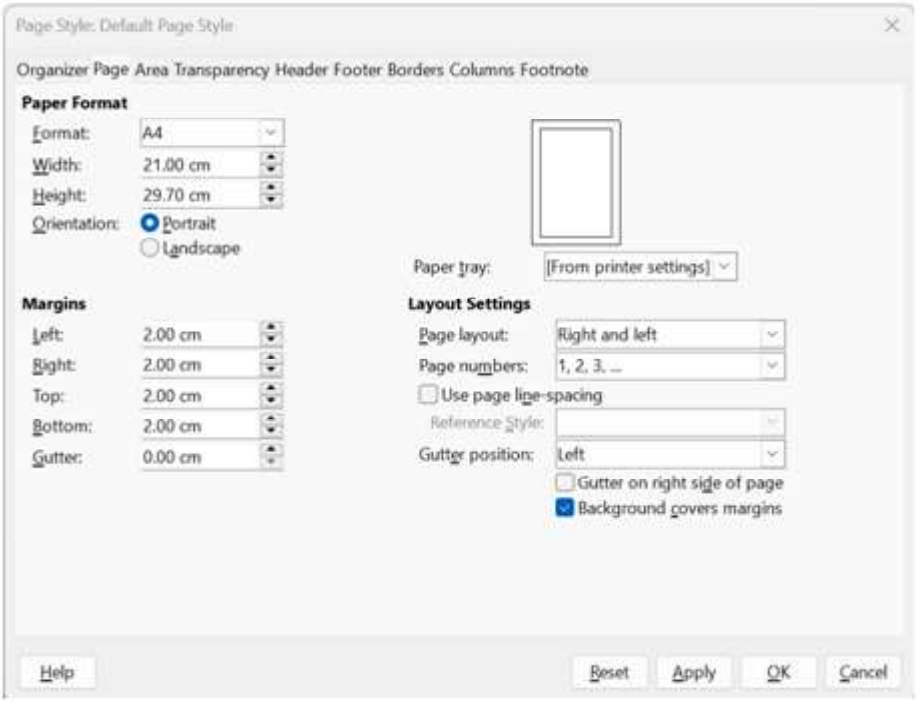
3. In the “Styles and Formatting” dialog box, click on the “Page Styles” icon.



4. Right-click on the current page style applied to the document and select “Modify” from the pop-up menu.



5. In the following window, you can change the page styles by clicking the tabs.



6. Save the changes to the document by clicking on the “Apply” and then the “OK” button.

7.5 PARAGRAPH STYLES

7.5.1 Understanding Paragraph Styles

In Libre Office Writer, paragraph styles are a way to apply consistent formatting to a group of paragraphs. They allow you to define attributes such as font, font size, line spacing, indentation, and alignment. By applying paragraph styles, you can quickly and easily format your document, while ensuring consistency and making it easier to modify the formatting later on.

To apply a paragraph style, you can either use the Styles and Formatting dialog or the sidebar. In the Styles and Formatting dialog, select the text you want to format and then double-click the appropriate paragraph style in the list. In the sidebar, select the text you want to format, expand the Styles section, and then click the appropriate paragraph style.

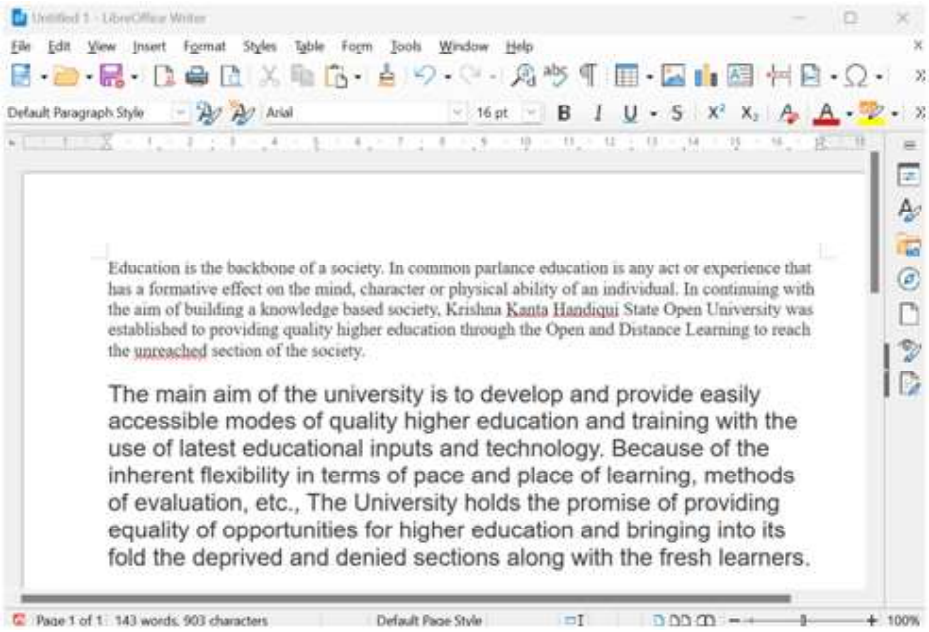
You can also modify existing paragraph styles or create new ones. To modify an existing style, right-click the style in the Styles and Formatting dialog and select Modify. You can then make changes to the attributes and save the modified style. To create a new style, click the New Style button in the Styles and Formatting dialog or in the sidebar, and then define the attributes for the new style.

Using paragraph styles in LibreOffice Writer can save you time and effort in formatting your document, while also ensuring consistency and making it easier to make changes later on.

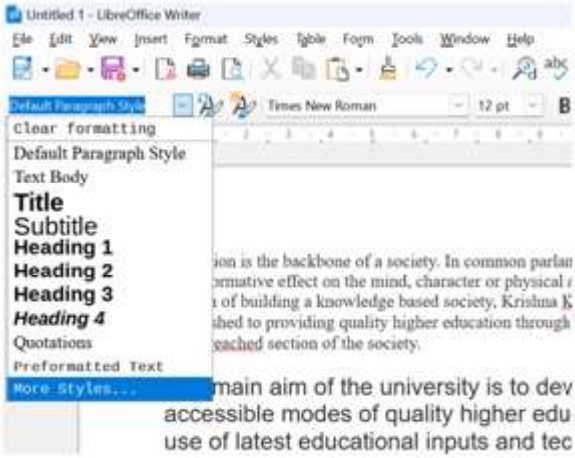
7.5.2 Creating a New Paragraph style

To create a new paragraph style in LibreOffice Writer, follow these steps:

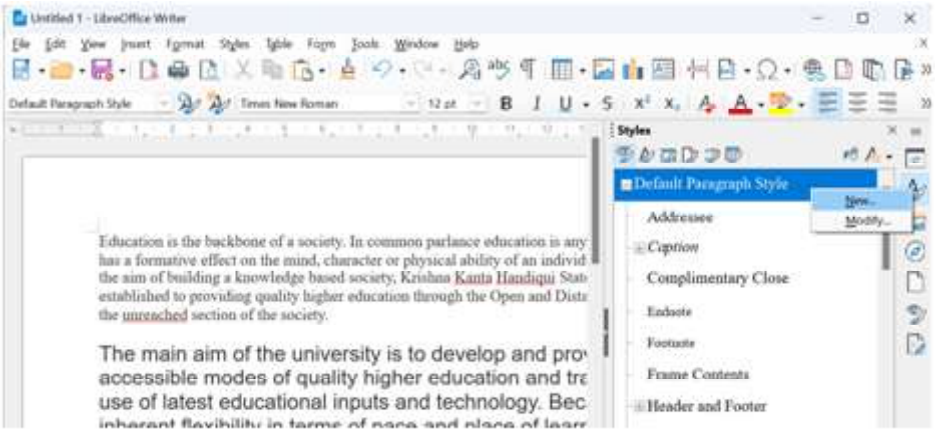
1. Open a new or existing document in Writer.For example, let us open an existing document which contains two paragraphs of different styles as shown below:



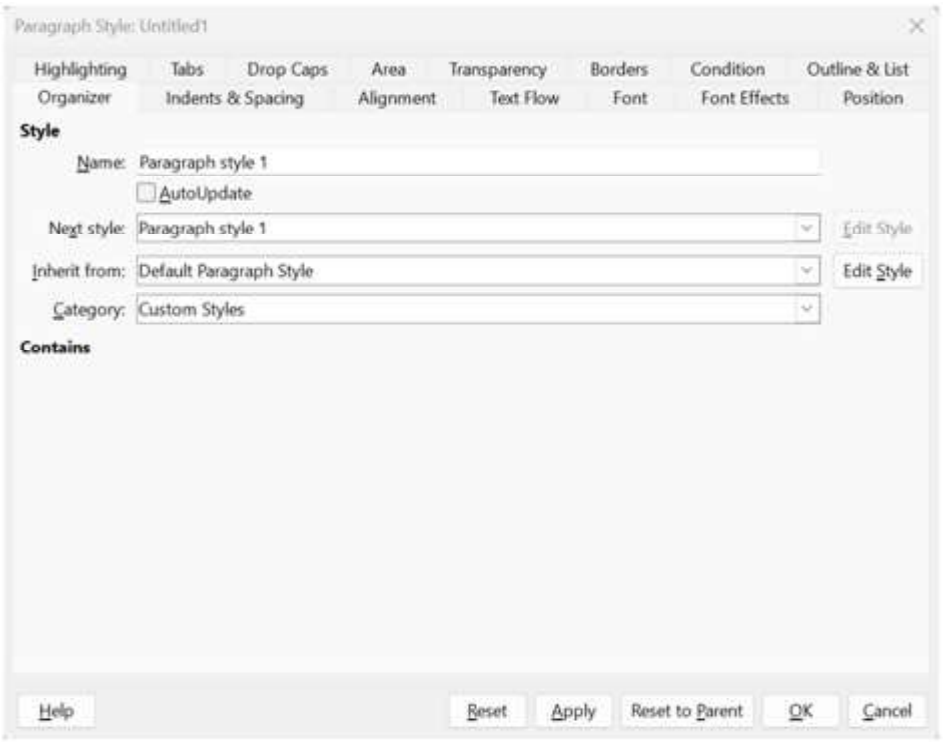
2. Go to “Default Paragraph Styles” > “More Styles” option (as shown below).

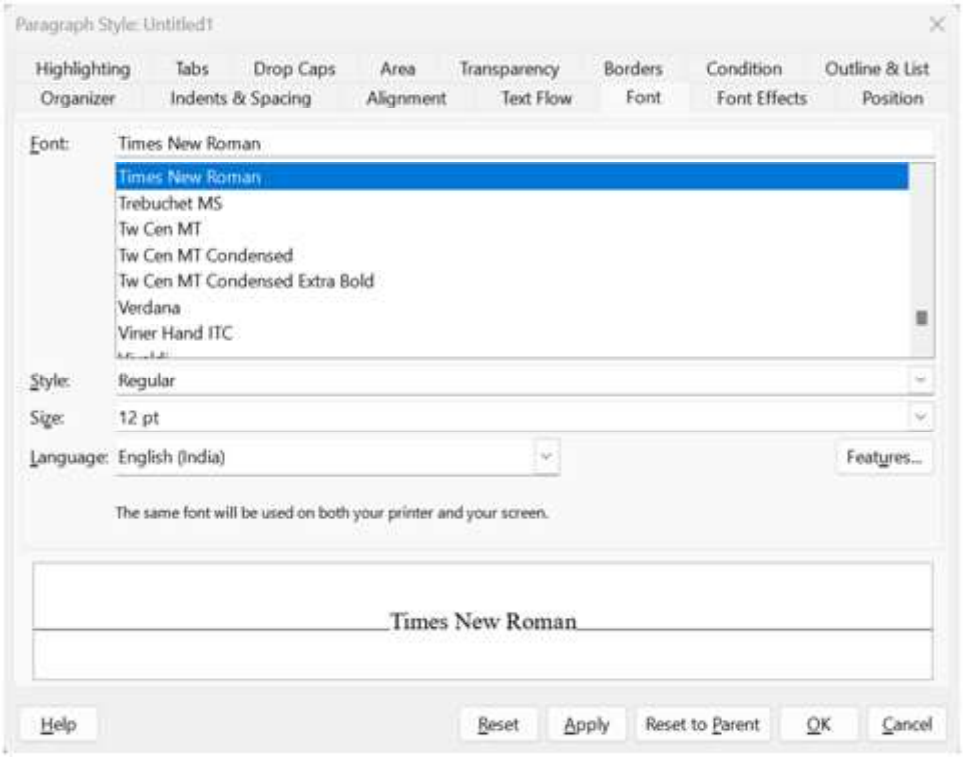


A Styles sidebar will appear in the right side of the document (as shown below).



3. Right-click over the “Default Paragraph Styles” and select “New”.
4. In the Paragraph Style dialog box, give your new style a name, and then make any changes to the settings that you want to apply to the style, such as font, alignment, line spacing, or indentation. You can also choose to base your new style on an existing style by selecting it from the list of styles. (as shown below)

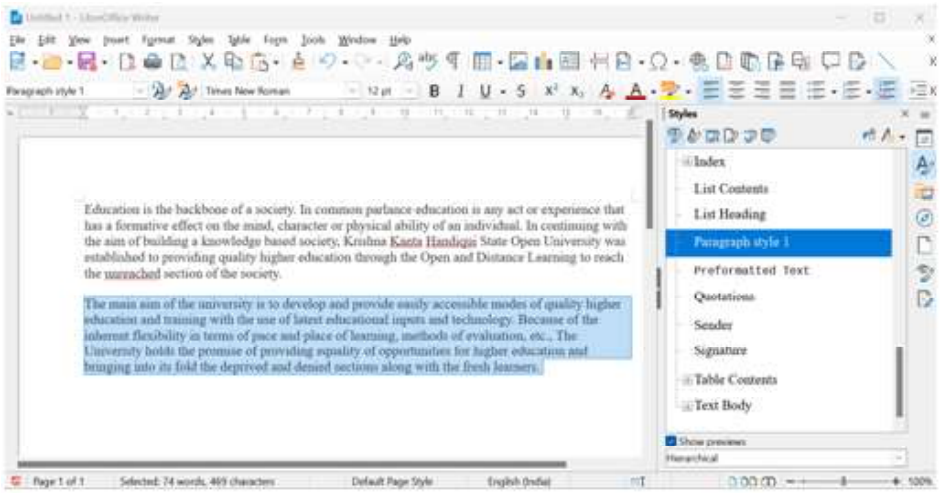




5. Click “Apply” and then “OK” to save your new paragraph style.

   Your new style will now appear in the list of paragraph styles in the Styles and Formatting window. You can apply the style to any

paragraph in your document by selecting the paragraph and then clicking on the style in the list. Let us change the second paragraph to this new style. For this, select the second paragraph in the document, then double click over the new paragraph style just created. The two paragraph styles will now be same.



You can also modify or delete the style by right-clicking on it and selecting Modify or Delete.

7.5.3 Modifying a Paragraph Style

To modify a paragraph style in LibreOffice Writer, follow these steps:

1. Open the document in which you want to modify the paragraph style.
2. Select the text whose paragraph style you want to modify.
3. Right-click on the selected text and choose “Paragraph” from the context menu.
4. In the Paragraph dialog box, you can modify various parameters such as alignment, line spacing, indentation, and borders.
5. Once you have made the necessary changes, click on the “OK” button to apply the changes to the selected text.
6. To apply the modified paragraph style to other text in the document, select the text and right-click on it. Choose “Styles” from the context menu and then select the modified paragraph style from the list of styles.

7. If you want to save the modified paragraph style as a new style, click on the “New Style” button in the Paragraph dialog box. Give a name to the new style and click on the “OK” button to save it.

By following these steps, you can easily modify a paragraph style in LibreOffice Writer.

7.5.4 Applying Paragraph Styles to Text

To apply paragraph styles to text in LibreOffice Writer, follow these steps:

1. First, select the text that you want to apply a style to.
2. Next, click the “Styles” menu.
3. You will see a list of available paragraph styles. Click on the style that you want to apply to the selected text.
4. If the style you want to apply is not listed, you can create a new style by right-clicking on an existing style and selecting “New”. You can then modify the new style to fit your needs.
5. Once you have selected the style you want to apply, the text will be automatically formatted according to the style’s settings.
6. If you want to modify the formatting of a style, you can go to the “Style” menu options again and select “Edit Style” options. This will allow you to change the font, size, color, and other formatting options for the style.



CHECK YOUR PROGRESS

Q.1: Answer the following questions:

(a) What are document templates in Libre Office Writer?

(b) How can you create a new template in Libre Office Writer?

(c) How can you modify an existing template in Libre Office Writer?

(d) How can you apply a template to a new document in Libre Office Writer?

(e) What are paragraph styles in Libre Office Writer?

By using paragraph styles in LibreOffice Writer, you can quickly and easily format your text according to a consistent set of rules, which can save you time and effort when working on larger documents.

7.6 MANAGING STYLES IN THE STYLES AND FORMATTING DIALOG BOX

7.6.1 Opening the Styles and Formatting Dialog Box

To open the Styles and Formatting dialog box in LibreOffice Writer, there are a few different ways:

1. Method 1: Use the F11 key
   Press the F11 key on your keyboard. This will open the Styles and Formatting dialog box.
2. Method 2: Use the Format menu
   Click on the “Format” menu in the menu bar at the top of the Writer window. From the drop-down menu, select “Styles and Formatting”. This will open the Styles and Formatting dialog box.
3. Method 3: Use the sidebar
   If the sidebar is visible in your Writer window, click on the “Styles and Formatting” icon in the sidebar. This will open the Styles and Formatting dialog box.

Once you have opened the Styles and Formatting dialog box, you can use it to manage styles for your document. You can apply styles to text, modify existing styles, or create new styles.

7.6.2 Navigating the Dialog Box

When working with dialog boxes in LibreOffice Writer, you can navigate through the various options and settings using several methods. Here are some common ways to navigate dialog boxes in Writer:

1. Use the Tab key: In most dialog boxes, you can use the Tab key to move between fields and options. Pressing Tab will move the cursor to the next field, and Shift+Tab will move the cursor to the previous field.

2. Use the arrow keys: You can also use the arrow keys to move between fields and options. The up and down arrow keys will move the cursor between options, while the left and right arrow keys will move the cursor within a field.
3. Use the mouse: You can also use the mouse to select options and fields in the dialog box. Clicking on an option or field will select it, and you can then enter text or use the drop-down menus to select options.
4. Use keyboard shortcuts: Many dialog boxes have keyboard shortcuts that can be used to quickly navigate between options and fields. These shortcuts can be found in the menu bar or by hovering over the buttons in the dialog box.
5. Use the Enter key: In some dialog boxes, pressing the Enter key will select the current option and close the dialog box. This can be useful for quickly making changes without having to navigate through all the options.

By using these methods to navigate through dialog boxes in LibreOffice Writer, you can quickly and easily make changes to your documents and settings.

7.6.3 Managing Styles in the Dialog Box

To manage styles in the dialog box in LibreOffice Writer, follow these steps:

1. Open the Styles and Formatting window by pressing the F11 key or selecting “Styles” from the “Format” menu.
2. In the Styles and Formatting window, click on the “Manage Styles” button at the bottom of the window. This will open the “Organizer” dialog box.
3. In the Organizer dialog box, you can manage the styles in several ways:
4. To create a new style, click on the “New” button at the bottom of the window. This will open the “New Style” dialog box, where you can specify the properties of the new style.

5. To modify an existing style, select the style in the list on the left-hand side of the window and click on the “Modify” button. This will open the “Modify Style” dialog box, where you can change the properties of the style.
6. To delete a style, select the style in the list and click on the “Delete” button. Note that you cannot delete built-in styles.
7. To rename a style, select the style in the list and click on the “Rename” button. Enter the new name for the style in the dialog box that appears.
8. To import styles from another document or template, click on the “Import” button and select the document or template that contains the styles you want to import.
9. To export styles to another document or template, select the styles you want to export and click on the “Export” button. Save the styles as a separate document or template.

Once you have made any necessary changes to the styles, click on the “OK” button to close the Organizer dialog box and return to the Styles and Formatting window.

By managing styles in the dialog box, you can more easily create and modify styles in LibreOffice Writer. This can help you to create documents with a consistent and professional appearance.



7.7 LET US SUM UP

- Document templates in Libre Office Writer are pre-designed formats that include page layout, font styles, header and footer, and other design elements to create a professional-looking document.
- These templates can save time and effort by providing a starting point for creating a new document.
- Libre Office Writer comes with built-in templates, and you can also create your own custom templates.

- To create a new template, you can start with a blank document or an existing document and customize it to suit your needs.
- You can modify an existing template by opening it in LibreOffice Writer, making the necessary changes, and saving it as a new template.
- To use a template, you can select it from the “Templates” option under the “New” menu or from the “Template Manager” dialog box.
- LibreOffice Writer uses paragraph styles to apply consistent formatting to a group of paragraphs, including font, font size, line spacing, indentation, and alignment.
- Paragraph styles can be applied using the Styles and Formatting dialog or the sidebar, and existing styles can be modified or new ones created.
- Modifying a paragraph style can be done through the Paragraph dialog box, and the modified style can be saved as a new style.
- Applying paragraph styles to text is a simple process of selecting the text and choosing the appropriate style from the Styles and Formatting window.



7.8 FURTHER READING

1. “Getting Started with LibreOffice Writer,” The Document Foundation, accessed March 11, 2023, https://documentation.libreoffice.org/en/english-documentation/getting-started-writer/.
2. “LibreOffice Writer Guide,” The Document Foundation, accessed March 11, 2023, https://documentation.libreoffice.org/en/english-documentation/writer-guide/.
3. “LibreOffice Writer Tutorial,” Tutorials Point, accessed March 11, 2023, https://www.tutorialspoint.com/libreoffice/libreoffice_ writer_ tutorial.htm.



7.9 ANSWERS TO CHECK YOUR PROGRESS

Ans.to.Q.No.1:

(a) Document templates are pre-designed formats that can be used to create new documents in LibreOffice Writer.

(b) To create a new template in LibreOffice Writer, you can customize a new or existing document and then click on “File” > “Templates” > “Save as Template.”

(c) To modify an existing template in LibreOffice Writer, you can select the template from the “Template Manager” dialog box, click on “Edit,” make the necessary changes, and then save the modified template.

(d) To apply a template to a new document in LibreOffice Writer, you can click on “File” > “New” > “Templates,” select the template category, choose the desired template, and then click on “Create.”

(e) Paragraph styles are a way to apply consistent formatting to multiple paragraphs in LibreOffice Writer.



7.10 MODEL QUESTIONS

Q.1: What are document templates, and how can they be useful in LibreOffice Writer?

Q.2: How can you create a new template in LibreOffice Writer, and what steps are involved in the process?

Q.3: Can you modify an existing template in LibreOffice Writer? If so, how can you do it?

Q.4: What is the procedure for saving and using templates in LibreOffice Writer?

Q.5: How can you apply a template to a new document in LibreOffice Writer, and what are the steps involved in the process?

Q.6: Can you customize a document template in LibreOffice Writer, and if yes, what kind of modifications can you make?

Q.7: What are paragraph styles in LibreOffice Writer and how can they be useful in formatting a document?

Q.8: Can you explain the process of creating a new paragraph style in LibreOffice Writer?

Q.9: How can you modify an existing paragraph style in LibreOffice Writer?

Q.10: What are character styles in LibreOffice Writer and how do they differ from paragraph styles?

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UNIT 8 : FORMATTING DOCUMENTS IN WRITER

UNIT STRUCTURE

8.1 Learning Objectives

8.2 Introduction

8.3 Inserting and Formatting Images

- 8.3.1 Adding images
- 8.3.2 Resizing images
- 8.3.3 Wrapping text around images
- 8.3.4 Applying image effects

8.4 Adding and Formatting Tables

- 8.4.1 Creating tables
- 8.4.4 Merging and splitting cells

8.5 Applying Advanced Formatting Options

- 8.5.1 Adding page borders
- 8.5.2 Applying page backgrounds

8.6 Using Writer's Built-in Tools for Checking and Translation

- 8.6.1 Spell-checking and autocorrect
- 8.6.2 Thesaurus and word completion

8.7 Let Us Sum Up

8.8 Further Reading

8.9 Answers to Check Your Progress

8.10 Model Questions

8.1 LEARNING OBJECTIVES

After going through this unit, you will be able to

- add images to a Writer document
- resize images to fit your document's layout
- wrap text around images to create an aesthetically pleasing design
- apply image effects such as brightness, contrast, and transparency
- create tables and add rows and columns to organize your content
- format table cells to adjust their appearance and alignment

- merge and split table cells as necessary
- apply table styles to improve the overall look of your tables
- add page borders, columns, and backgrounds to your document for advanced formatting options
- work with templates to save time and streamline your document creation process
- utilize Writer's built-in tools such as spell-checking, grammar-checking, thesaurus and word completion, and language translation to improve the quality of your writing.

8.2 INTRODUCTION

In Writer, LibreOffice's word processing software, you can enhance your documents by adding images and tables, as well as applying advanced formatting options. In this section, we will explore how to insert and format images, including resizing, wrapping text around images, and applying image effects. Additionally, we will learn how to create and format tables, including adding rows and columns, merging and splitting cells, and applying table styles. Finally, we will delve into advanced formatting options such as adding page borders, using columns, applying page backgrounds, and working with templates. To further improve your document's quality, Writer also provides built-in tools for checking spelling, grammar, thesaurus and word completion, and even language translation.

8.3 INSERTING AND FORMATTING IMAGES

8.3.1 Adding images

Here is a step-by-step procedure to add images to your LibreOffice Writer document:

1. Open the LibreOffice Writer document in which you want to add an image.
2. Click on the location in the document where you want to insert the image.
3. Click on the "Insert" tab in the menu bar at the top of the screen.

4. Click on the “Image” option from the drop-down menu.
5. In the “Insert Image” dialog box that appears, navigate to the folder where the image you want to insert is located.
6. Click on the image file to select it and then click on the “Open” button.
7. The “Insert Image” dialog box will reappear, showing a preview of the image you have selected. You can adjust the settings for the image, such as size and position, using the options available.
8. Once you have made the desired adjustments, click on the “Insert” button to insert the image into your document.
9. You can then move and resize the image as necessary by clicking and dragging it to the desired location and dragging its edges to adjust its size.
10. To apply image effects, such as brightness, contrast, and transparency, select the image and click on the “Image” tab in the sidebar that appears. Here, you will find options to adjust the image’s color, position, size, and more.

When you are finished working with the image, save your document by clicking on “File” in the menu bar and selecting “Save” or “Save As.”

8.3.2 Resizing images

Here is the step-by-step procedure to resize images in LibreOffice Writer:

1. Open the LibreOffice Writer document that contains the image you want to resize.
2. Click on the image to select it. You should see small boxes or handles around the image, indicating that it is selected.
3. To resize the image, hover your mouse over one of the handles until it changes to a double-headed arrow. Click and hold the mouse button, then drag the handle to adjust the size of the image.

4. As you resize the image, you may notice that its aspect ratio changes. To maintain the original aspect ratio, hold down the Shift key while dragging the handle.
5. You can also adjust the size of the image by right-clicking on it and selecting “Picture” from the context menu. In the Picture dialog box, go to the “Type” tab and adjust the values in the “Size” section.
6. To further customize the image size, you can use the “Crop” and “Position” tabs in the Picture dialog box. The “Crop” tab allows you to trim the edges of the image, while the “Position” tab lets you adjust the image’s position within the frame.
7. Once you are satisfied with the image size and positioning, click “OK” to apply the changes.
8. Save your document to ensure that the resized image is saved with the document.

8.3.3 Wrapping text around images

Here are the steps to wrap text around images in LibreOffice Writer:

1. Insert the image into your document by clicking on “Insert” in the menu bar and then selecting “Image.”
2. Select the image by clicking on it.
3. Click on the “Wrap” tab in the “Image” dialog box that appears.
4. Choose one of the text wrapping options: “Right,” “Left,” or “Through.” These options allow you to position the image to the left or right of your text or to have the text flow around the image.
5. Adjust the distance between the text and the image by setting the “Spacing” option. You can specify the distance in inches or centimeters.
6. Set the “Anchor” option to determine how the image will be positioned on the page. You can anchor the image to the paragraph, the page, or to a character.
7. Click “OK” to apply the changes.

You can further adjust the image and text wrapping settings by selecting the image and going back to the “Wrap” tab in the “Image” dialog box. Experiment with different options to achieve the desired layout for your document.

8.3.4 Applying image effects

1. Open the document in which you want to apply image effects.
2. Insert an image in the document by going to Insert > Image.
3. Once the image is inserted, click on the image to select it.
4. Go to the Format menu and select Image.
5. In the Image dialog box, you will see various tabs such as Type, Crop, Borders, and Effects. Click on the Effects tab.
6. Under the Effects tab, you will see several options for adjusting the image’s brightness, contrast, and transparency.
7. To adjust the brightness, move the slider to the left to decrease the brightness or to the right to increase the brightness.
8. To adjust the contrast, move the slider to the left to decrease the contrast or to the right to increase the contrast.
9. To adjust the transparency, move the slider to the left to decrease the opacity or to the right to increase the opacity.
10. You can also choose to apply a color filter to the image. To do so, select the desired color from the drop-down menu under the Color Filter section.
11. Once you have adjusted the image effects to your liking, click OK to apply the changes.
12. Save the document to ensure that the image effects are retained.

By following these steps, you can easily apply image effects to your images in LibreOffice Writer.

8.4 ADDING AND FORMATTING TABLES

8.4.1 Creating tables

Here's a step-by-step procedure to create a table in LibreOffice Writer:

1. Open a new or existing document in LibreOffice Writer.
2. Place the cursor where you want to insert the table.
3. Click on the "Table" menu in the top menu bar.
4. Select "Insert Table" from the drop-down menu and click on it.
5. In the "Insert Table" dialog box, specify the number of rows and columns you want in the table.
6. Select a style for the table.
7. Click "Insert" to insert the table into your document.
8. Your cursor will now be in the top-left cell of the table, allowing you to begin entering data.
9. To add rows or columns to the table, right-click anywhere within the table and select "Insert" from the context menu. From there, you can choose to insert a row above or below the current row, or a column to the left or right of the current column.
10. To format the table, you can change the font, text alignment, cell borders, and more using the formatting options in the top menu bar or by right-clicking within the table and selecting "Table Properties" from the context menu.

8.4.2 Merging and splitting cells

Merging Cells:

1. Open your Writer document and locate the table that you want to edit.
2. Select the cells that you want to merge by clicking and dragging the mouse over them.
3. Right-click on the selected cells and click "Merge Cells" from the dropdown menu.
4. The selected cells will now be merged into one cell.

Splitting Cells:

1. Open your Writer document and locate the table that you want to edit.
2. Place the cursor inside the cell that you want to split.
3. Right-click on the cell and click “Split Cells” from the dropdown menu.
4. In the “Split Cells” dialog box, specify the number of rows and columns you want to split the cell into.
5. Click “OK” to split the cell into the specified number of rows and columns.



CHECK YOUR PROGRESS

Q.1: Write short answers of the followings:

(a) How do you add an image to a LibreOffice Writer document?

(b) How do you resize an image in LibreOffice Writer?

(c) How do you wrap text around an image in LibreOffice Writer?

(d) Can you adjust the size and position of an image in LibreOffice Writer?

(e) What is the purpose of the “Wrap” tab in the “Image” dialog box?

(f) What is the “Effects” tab in the “Image” dialog box used for?

8.5 APPLYING ADVANCED FORMATTING OPTIONS

8.5.1 Adding page borders

1. Open your document in LibreOffice Writer.
2. Click on the “Format” menu in the top menu bar.
3. Select “Page Styles” from the dropdown menu.
4. In the Page Style dialog box, click on the Borders tab.
5. Choose the type of border you want from the dropdown list of border styles.

6. Choose the line style, color, and width of the border by clicking on the corresponding buttons.
7. Select the desired border spacing from the dropdown list.
8. Once you are satisfied with your border settings, click on the OK and then Apply button to apply the border to your document.

8.5.2 Applying page backgrounds

To apply page backgrounds in LibreOffice Writer, follow these steps:

1. Open your Writer document and go to the page where you want to add a background.
2. Click on the “Format” menu in the menu bar and select “Page Style”.
3. In the “Page Style” dialog box that appears, click on the “Area” tab.
4. Choose your option
5. Once you have selected your background type and made any necessary adjustments, click “OK” to apply the background to your page.

Your page background should now be visible in your document. You can repeat these steps to add a background to any other pages in your document as needed.

8.6 USING WRITER’S BUILT-IN TOOLS FOR CHECKING AND TRANSLATION

8.6.1 Spell-checking and autocorrect

Here is a step-by-step procedure to use spell-checking and autocorrect in LibreOffice Writer:

1. Open the document you want to spell-check in LibreOffice Writer.
2. Click on the ‘Tools’ menu in the top menu bar.
3. Select ‘Spelling’ from the drop-down menu.

4. The spell-checker will start scanning your document from the beginning, highlighting any misspelled words or grammar errors as it goes. Suggestions for corrections will appear in a pop-up window.
5. To correct an error, select the suggested word from the pop-up window and click 'Correct'. Alternatively, you can choose to ignore the error by clicking 'Ignore Once' or 'Ignore All'.
6. If a suggested correction is not suitable, you can edit the word directly in the document or add it to the dictionary by clicking 'Add to Dictionary'.
7. If you want LibreOffice Writer to automatically correct certain errors for you, click on the 'Tools' menu again and select 'Automatic Spell Checking" Option.
8. Click 'OK' to save your changes and close the AutoCorrect dialog box.
9. When you're finished spell-checking your document, click 'Close' in the 'Spelling' dialog box to close it.

By following these steps, you can quickly and easily check your document for spelling and grammar errors and set up autocorrect options to save time and improve the quality of your writing.

8.6.2 Thesaurus and word completion

Here is the step-by-step procedure to use the Thesaurus and word completion features in LibreOffice Writer:

Thesaurus:

1. Open the LibreOffice Writer document.
2. Select the word that you want to look up synonyms for.
3. Click on the "Tools" menu from the top menu bar and select "Thesaurus".
4. A new dialog box will appear that will display a list of synonyms for the selected word. You can choose any word from the list and click "Replace" to replace the original word with the new one.

Word Completion:

1. Open the LibreOffice Writer document.
2. Start typing a word that you want to complete.
3. Click on the “Tools” menu from the top menu bar and select “AutoCorrect Options.”
4. In the “AutOnce word completion is enabled, you can start using it by typing a word. As you type, LibreOffice Writer will suggest words that match what you have typed so far. You can press Tab to accept the suggestion, or keep typing to see other suggestions.
5. You can also use the arrow keys to move through the list of suggestions. To insert a suggested word without accepting it, press the Spacebar.

Once word completion is enabled, you can start using it by typing a word. As you type, LibreOffice Writer will suggest words that match what you have typed so far. You can press Tab to accept the suggestion, or keep typing to see other suggestions.You can also use the arrow keys to move through the list of suggestions. To insert a suggested word without accepting it, press the Spacebar.To disable word completion, follow the same steps as above, but uncheck the Enable Word Completion checkbox.

These features can help you to save time and improve the quality of your writing by providing you with synonyms and completing words for you as you type.



CHECK YOUR PROGRESS

Q.2: Fill in the blanks:

(a) To apply page backgrounds in LibreOffice Writer, go to the _____ where you want to add a background.

(b) The spell-checker in LibreOffice Writer will highlight any misspelled words or grammar errors and suggest corrections in a _____ window.

(c) To use the Thesaurus feature in LibreOffice Writer, select the word you want to look up _____ for.

(d) To enable word completion in LibreOffice Writer, go to the "AutoCorrect" tab in the "AutoCorrect Options" dialog box and make sure that the "Enable word completion" option is _____.



8.7 LET US SUM UP

- LibreOffice Writer is a popular word processing software that allows users to add and format images in their documents.
- Users can insert images in a Writer document by clicking on the "Insert" tab and selecting "Image" from the drop-down menu.
- The image can be resized by dragging the handles or by adjusting the values in the "Size" section of the Picture dialog box.
- Users can wrap text around images by selecting the image and going to the "Wrap" tab in the "Image" dialog box.
- The "Effects" tab in the "Image" dialog box allows users to adjust the brightness, contrast, transparency, and color filter of an image.
- Images can be anchored to a paragraph, page, or character by adjusting the "Anchor" option in the "Wrap" tab.
- The "Crop" tab in the "Picture" dialog box allows users to trim the edges of the image.
- The "Position" tab in the "Picture" dialog box allows users to adjust the image's position within the frame.
- Users can adjust the spacing between the text and image by setting the "Spacing" option in the "Wrap" tab.
- Once the desired adjustments have been made to the image, users can save their document to ensure that the changes are retained.



8.8 FURTHER READING

1. "Getting Started with LibreOffice Writer," The Document Foundation, accessed March 11, 2023, https://documentation.libreoffice.org/en/english-documentation/getting-started-writer/.
2. "LibreOffice Writer Guide," The Document Foundation, accessed March 11, 2023, https://documentation.libreoffice.org/en/english-documentation/writer-guide/.
3. "LibreOffice Writer Tutorial," Tutorials Point, accessed March 11, 2023, https://www.tutorialspoint.com/libreoffice/libreoffice_writer_tutorial.htm.



8.9 ANSWERS TO CHECK YOUR PROGRESS

Ans.to.Q.No.1:

(a) Click on the "Insert" tab in the menu bar, select "Image," navigate to the folder where the image is located, select the image file, and click "Open."

(b) Click on the image to select it and drag the handles to adjust its size. Hold down the Shift key to maintain the original aspect ratio.

(c) Insert the image, select it, click on the "Wrap" tab in the "Image" dialog box, choose a wrapping option, adjust the spacing, and set the anchor.

(d) Yes, by dragging the image and adjusting its settings in the "Image" dialog box.

(e) It allows you to adjust how text flows around the inserted image.

(f) It is used to adjust the brightness, contrast, transparency, and color filter of an image.

Ans.to.Q.No.2.

(a) page (b) pop-up (c) synonyms (d) selected



8.10 MODEL QUESTIONS

Q.1: How do you add an image to a LibreOffice Writer document?

Q.2: What is the purpose of the “Wrap” tab in the “Image” dialog box in LibreOffice Writer?

Q.3: How do you resize an image in LibreOffice Writer?

Q.4: What options are available for text wrapping around an image in LibreOffice Writer?

Q.5: Can you adjust the brightness and contrast of an image in LibreOffice Writer? If so, how?

Q.6: How do you adjust the transparency of an image in LibreOffice Writer?

Q.7: What is the purpose of the “Crop” and “Position” tabs in the Picture dialog box in LibreOffice Writer?

Q.8: How can you apply a color filter to an image in LibreOffice Writer?

Q.9: Can you apply image effects to multiple images at once in LibreOffice Writer?

Q.10: How do you save a document to ensure that the resized image and image effects are retained in LibreOffice Writer?

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UNIT 9 : INTRODUCTION TO CALC

UNIT STRUCTURE

9.1 Learning Objective

9.2 Introduction

9.3 Overview of Calc and its features as a spreadsheet program

9.4 Launching Calc and creating a new spreadsheet

9.5 Navigating the Calc interface and understanding the different components of the worksheet window

9.6 Entering and formatting data

9.7 Applying cell formatting

9.8 Let us Sum Up

9.9 Further Reading

9.10 Answers to Check Your Progress

9.11 Model Questions

9.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- explore the LibreOffice calc
- create a spreadsheet using calc
- explore the ways to enter and format data in calc
- practice formatting of data and cells in calc

9.2 INTRODUCTION

LibreOffice Calc is a robust spreadsheet programme that is available for free and may be used for a variety of data processing activities. Calc is a fantastic alternative to proprietary spreadsheet software because to its simple user interface and wealth of functionality. In this post, we'll examine some of LibreOffice Calc's most useful capabilities and how they may be applied to efficient data management and analysis.

9.3 OVERVIEW OF CALC AND ITS FEATURES AS A SPREADSHEET PROGRAM

One of the most widely used spreadsheet programmes accessible today is Calc, an open-source spreadsheet programme created by the Apache OpenOffice project. It offers users a robust range of functions for managing and analysing data, making it an indispensable tool for organisations, people, and students.

Calc allows users to create and edit spreadsheets, perform calculations, and analyse data in various formats. Here are some of its key features:

- **Spreadsheet Creation and Editing:**Spreadsheets can be readily created, edited, and formatted with Calc. Cells, rows, and columns may be added, removed, or moved by users. Calc also offers a number of templates for typical spreadsheets including budget sheets, calendars, and invoicing.
- **Calculation and Formulas:** Calc provides a wide range of mathematical and financial functions that enable users to perform complex calculations on their data. It supports a range of operators, including arithmetic, comparison, and logical operators. Users can create complex formulas using functions and operators to perform calculations on their data.
- **Data Analysis:**A variety of tools are available in Calc to assist users in data analysis. Data can be sorted and filtered by users, pivot tables can be made, and the DataPilot function can be used to build sophisticated data analysis models. Moreover, Calc supports a number of chart types, enabling users to rapidly and simply visualise their data.
- **Compatibility:** Calc is compatible with Microsoft Excel, which means users can open, edit, and save Excel files using Calc. This makes it easy to share files with others who use Excel.
- **Collaboration:** Calc supports collaboration features that enable users to work together on a spreadsheet. Users can share their spreadsheets with others and track changes made by different users. Additionally, Calc supports a range of file formats, making it easy to exchange files with other spreadsheet programs.

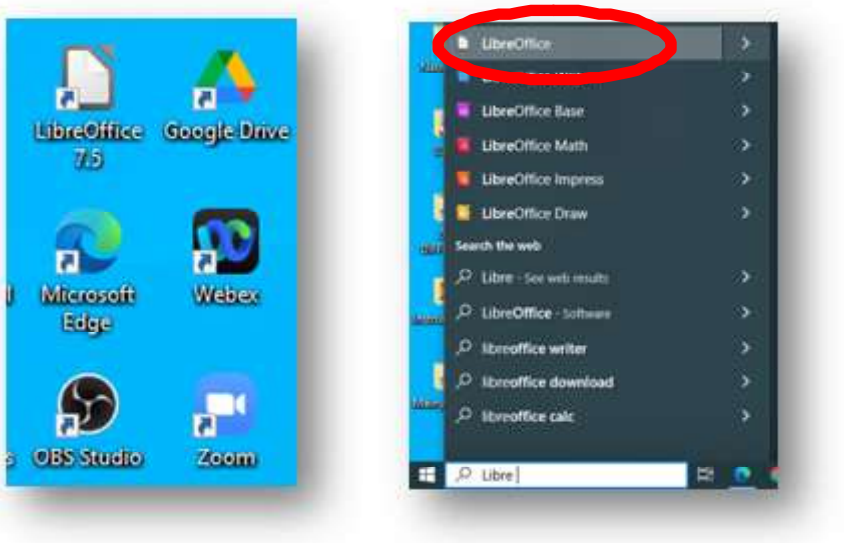
- **Macros:** Calc allows users to create macros, which are sets of instructions that automate repetitive tasks. Users can create macros using Calc's built-in macro recorder or write macros using a programming language called OpenOffice Basic.

Calc is a robust and adaptable spreadsheet tool that offers a number of functions for data management and analysis. It is the perfect solution for businesses and individuals who need to use spreadsheets because of its interoperability with Microsoft Excel and collaborative features. Calc offers the tools you need to complete the task, whether you're making a budget, evaluating data, or working with colleagues.

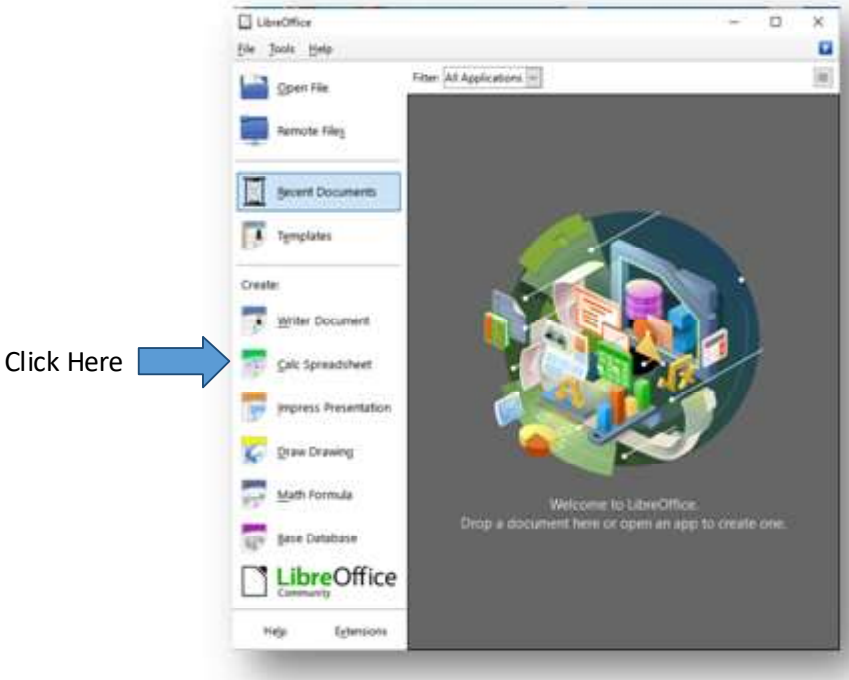
9.4 LAUNCHING CALC AND CREATING A NEW SPREADSHEET

LibreOffice Calc is a free and open-source spreadsheet program that allows users to create and edit spreadsheets. It is part of the LibreOffice suite, which is available for Windows, macOS, and Linux. Here are the steps to launch LibreOffice Calc and create a new spreadsheet:

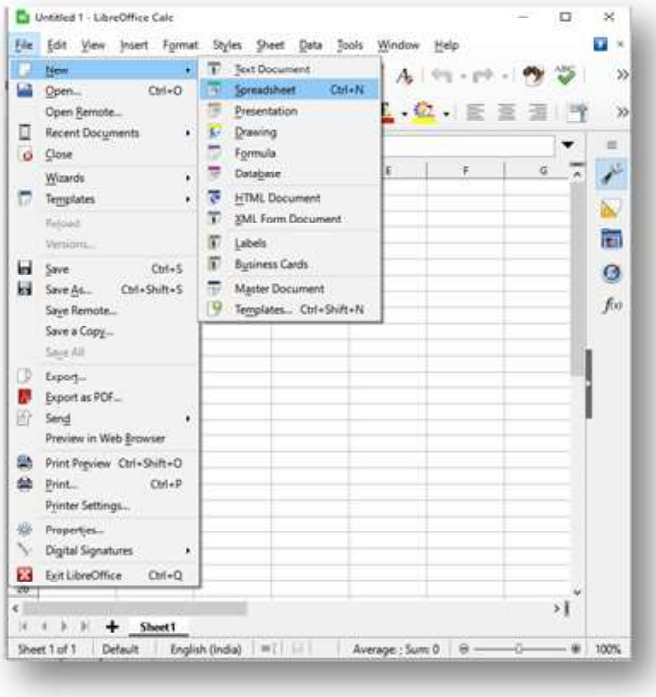
1. **Launch LibreOffice:** To launch LibreOffice, you can either click on the LibreOffice shortcut on your desktop or open the Start menu and search for LibreOffice. Click on the LibreOffice icon to launch the program.



2. **Open Calc:** Once LibreOffice is open, click on the Calc Spreadsheet



3. **Create a new spreadsheet:** To create a new spreadsheet, click on the File menu and select New > Spreadsheet. Alternatively, you can press the shortcut key Ctrl+N to create a new spreadsheet.

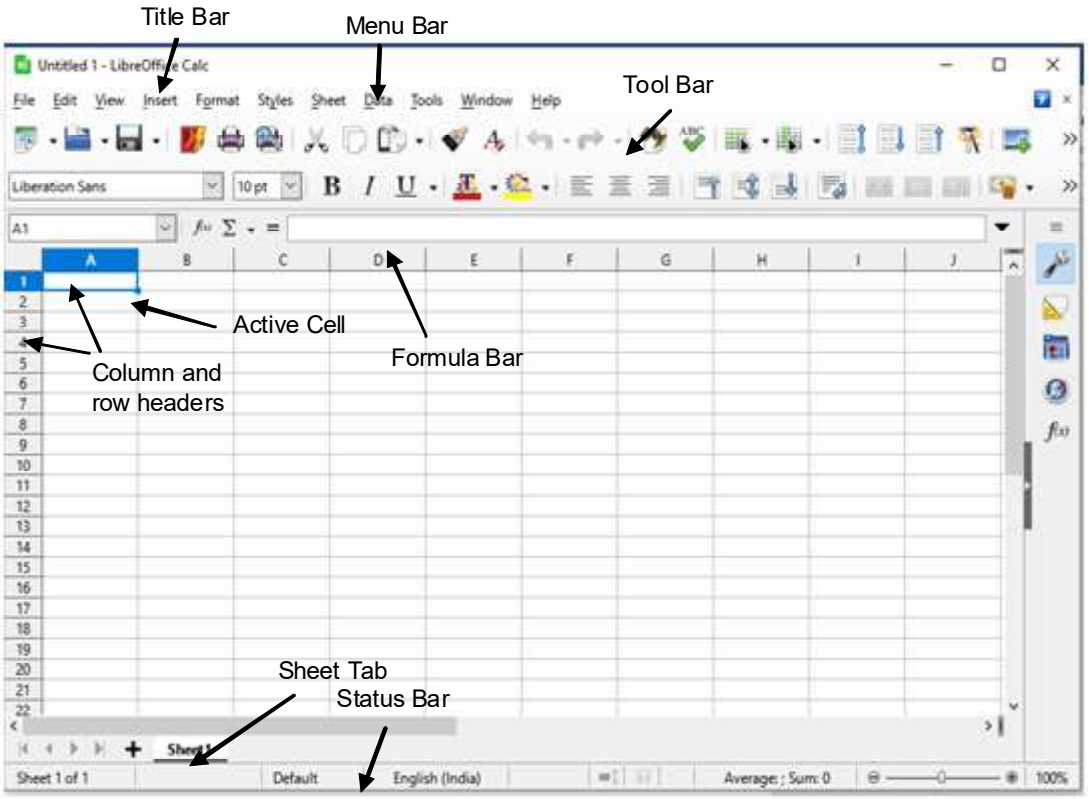


4. **Customize the spreadsheet:** Once you've created a new spreadsheet, you can customize it by adding or removing rows and columns, changing the font size and style, and changing the background color. You can also add borders and shading to cells, merge cells, and add conditional formatting.
5. **Add data:** To add data to your spreadsheet, simply click on a cell and start typing. You can also copy and paste data from other sources, such as a website or another spreadsheet program. Once you've added your data, you can use Calc's calculation and formula functions to perform calculations and analyse your data.
6. **Save the spreadsheet:** To save your spreadsheet, click on the File menu and select Save. You can also use the shortcut key Ctrl+S. Choose a location on your computer to save the spreadsheet, give it a name, and select a file format. Calc supports a range of file formats, including ODS, XLS, and CSV.

9.5 NAVIGATING THE CALC INTERFACE AND UNDERSTANDING THE DIFFERENT COMPONENTS OF THE WORKSHEET WINDOW

LibreOffice Calc is a spreadsheet application that allows users to create, edit, and manipulate data in a table format. Navigating the interface of LibreOffice Calc is essential to efficiently work with data in the worksheet window. The following steps will help you navigate the LibreOffice Calc interface and understand its different components.

Let us again open Calc as described above and open a new spreadsheet. Now the spreadsheet window is the primary working area of LibreOffice Calc, where you enter and manipulate data. The worksheet window is divided into several components, which include:



Title bar: The Title Bar is located at the very top of the window. On the Title Bar, Calc displays the name of the spreadsheet you are currently using with the application name. At the top of your window, you could see "Untitled 1 -LibreOffice Calc'' or a similar name.

Menu bar: The menu bar is located at the top of the LibreOffice Calc window and contains a list of commands that you can use to manipulate data in your worksheet.

Toolbars: Toolbars are located below the menu bar and contain a set of tools that you can use to perform various tasks.

Formula bar: The formula bar is located below the toolbars and displays the contents of the currently selected cell or range of cells.

Column and row headers: Columns are labeled with letters from A to Z, and then AA to AZ, BA to BZ, and so on. Rows are labeled with numbers from 1 to 1048576.

Sheet tabs: Sheet tabs are located at the bottom of the worksheet window and allow you to switch between different sheets in your workbook.

Status bar: The status bar is located at the bottom of the LibreOffice Calc window and displays information about the current status of your worksheet.

1. Navigating the worksheet window: To navigate the worksheet window, you can use the arrow keys on your keyboard or use the scroll bars on the right and bottom of the window to move up, down, left, or right.
2. Selecting cells and ranges: To select a single cell, click on it. To select a range of cells, click and drag the cursor over the cells you want to select, or hold down the Shift key while using the arrow keys to move to the range you want to select.
3. Entering data: To enter data in a cell, click on the cell, and start typing. You can also use the formula bar to enter data by typing it directly into the formula bar.
4. Saving your work: To save your work, click on the File menu and select Save or use the shortcut key Ctrl+S. You can also use the Save As option to save your workbook with a different name or in a different location.



CHECK YOUR PROGRESS

Choose the correct option

Q.1: What is Calc?

A) A word processing program B) A presentation program

C) A spreadsheet program D) A database program

Q.2: What is the purpose of macros in Calc?

A) To create data charts

B) To automate repetitive tasks

C) To import data from other sources

D) To filter and sort data

Q.3: What is the shortcut key to create a new spreadsheet in LibreOffice Calc?

A) Ctrl+S B) Ctrl+N

C) Ctrl+O D) Ctrl+P

4. What is the purpose of the Formula bar in LibreOffice Calc?

   A) To display the contents of the currently selected cell or range of cells

   B) To customize the appearance of cells

   C) To add or remove rows and columns

   D) To save a spreadsheet

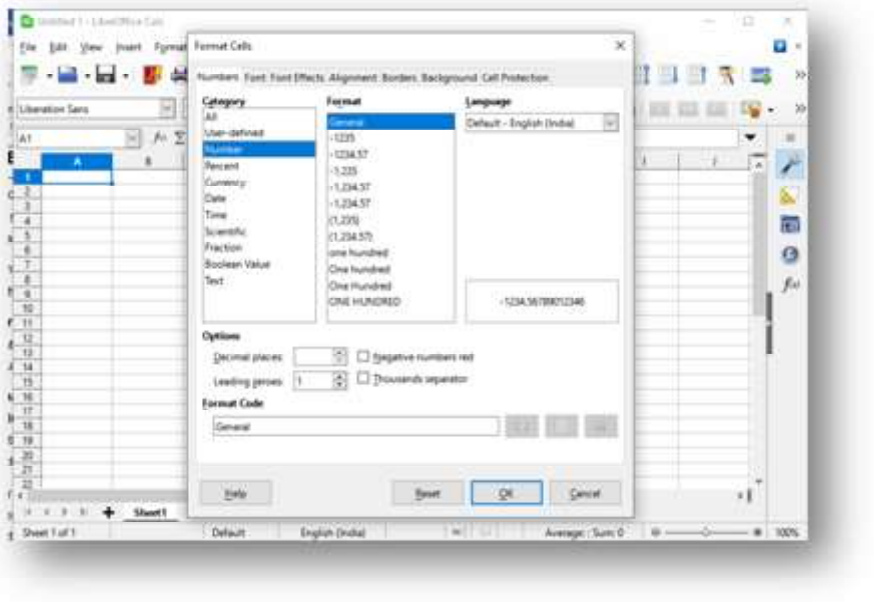
9.6 ENTERING AND FORMATTING DATA

Till now we have discussed about how to start LibreOffice Calc and create a new spreadsheet. Now let us discuss the steps involved in Entering and formatting data in LibreOffice Calc.

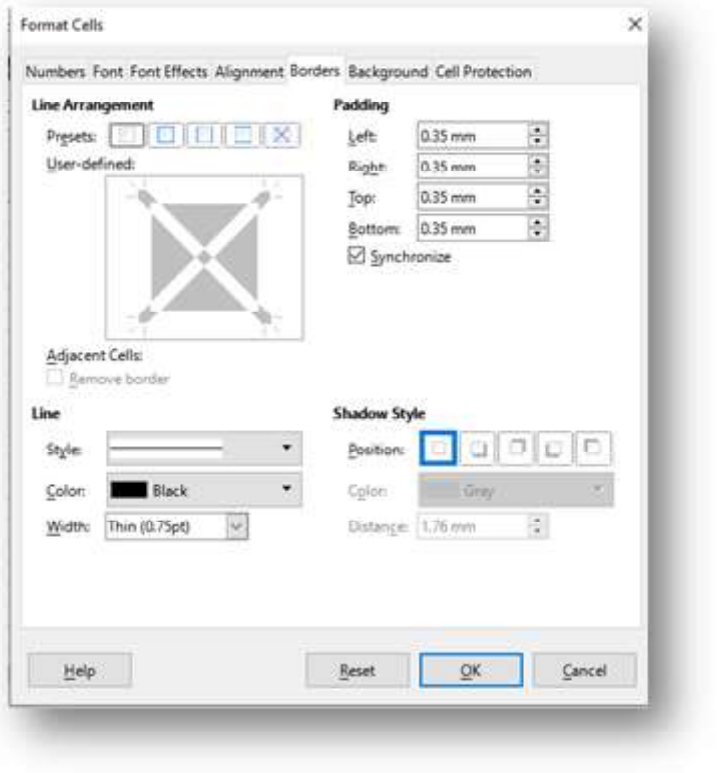
To enter data into a cell, simply click on the cell you want to enter data into and start typing. You can enter text, numbers, dates, and formulas.

Enter data into cells: To enter data into a cell, simply click on the cell you want to enter data into and start typing. You can enter text, numbers, dates, and formulas.

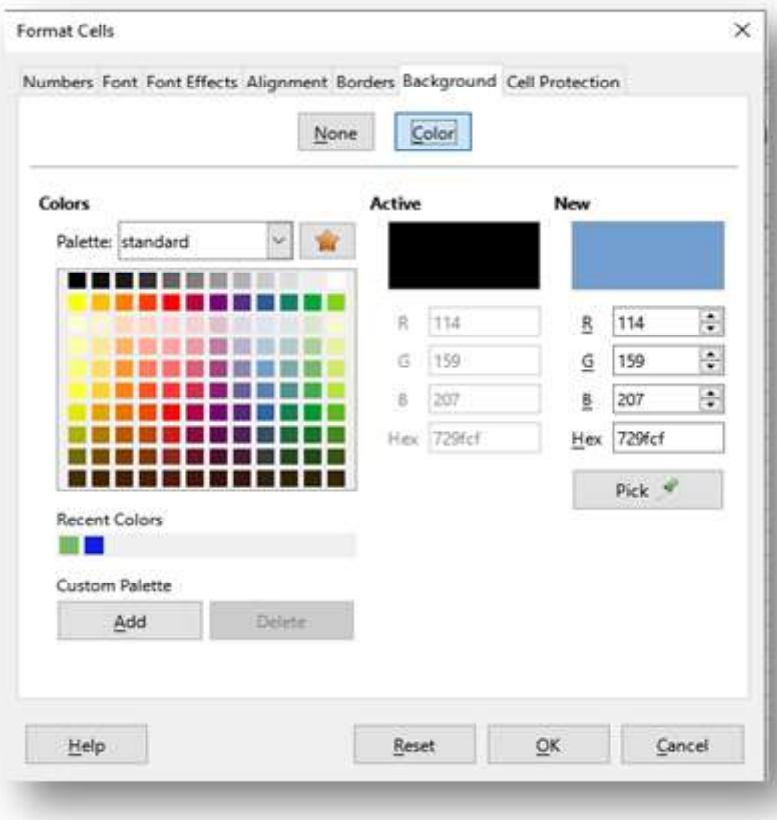
Format cells: To format cells, select the cells you want to format by clicking and dragging your mouse over them. Then, right-click and select “Format Cells” from the context menu. This will open the “Format Cells” dialog box, where you can choose the formatting options you want to apply.



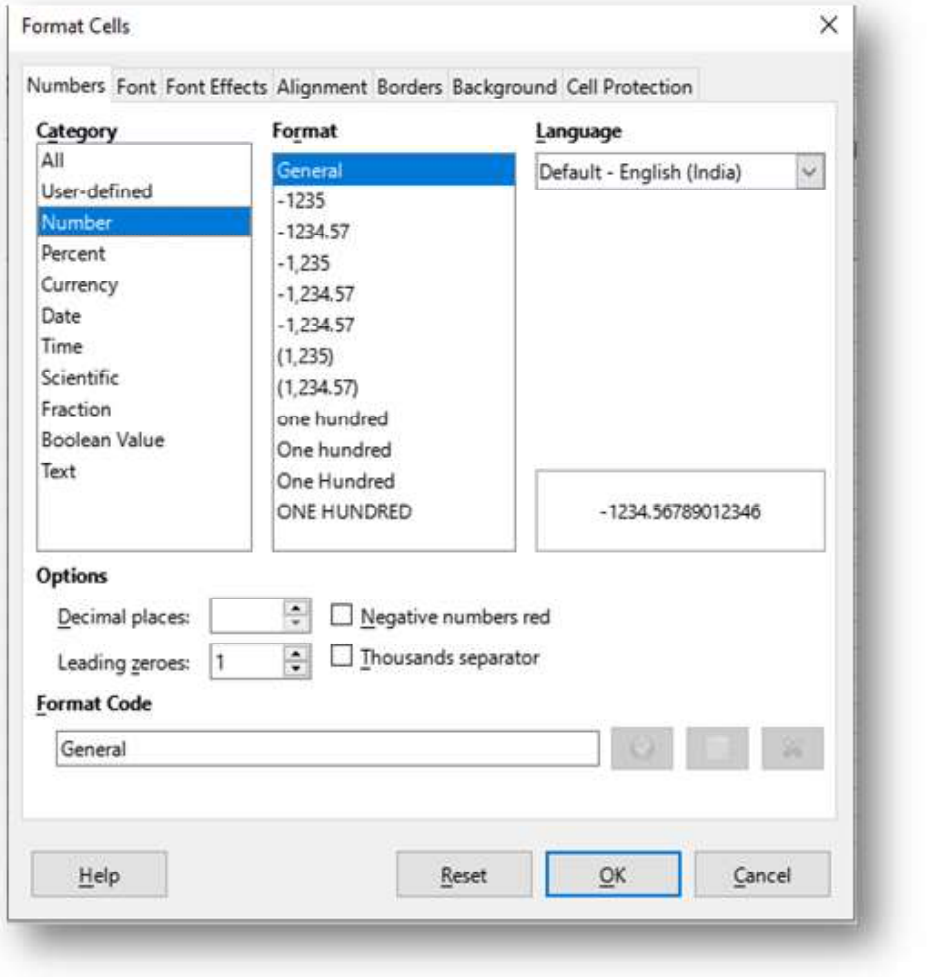
Apply cell borders: To apply cell borders, select the cells you want to apply borders to by clicking and dragging your mouse over them. Then, right-click and select “Format Cells” from the context menu. In the “Format Cells” dialog box, select the “Borders” tab and choose the border style you want to apply.



Apply cell background colour: To apply a background colour to cells, select the cells you want to apply the background colour to by clicking and dragging your mouse over them. Then, right-click and select “Format Cells” from the context menu. In the “Format Cells” dialog box, select the “Background” tab and choose the background color you want to apply.



Apply number formatting: To apply number formatting to cells, select the cells you want to apply number formatting to by clicking and dragging your mouse over them. Then, right-click and select “Format Cells” from the context menu. In the “Format Cells” dialog box, select the “Numbers” tab and choose the number formatting you want to apply.



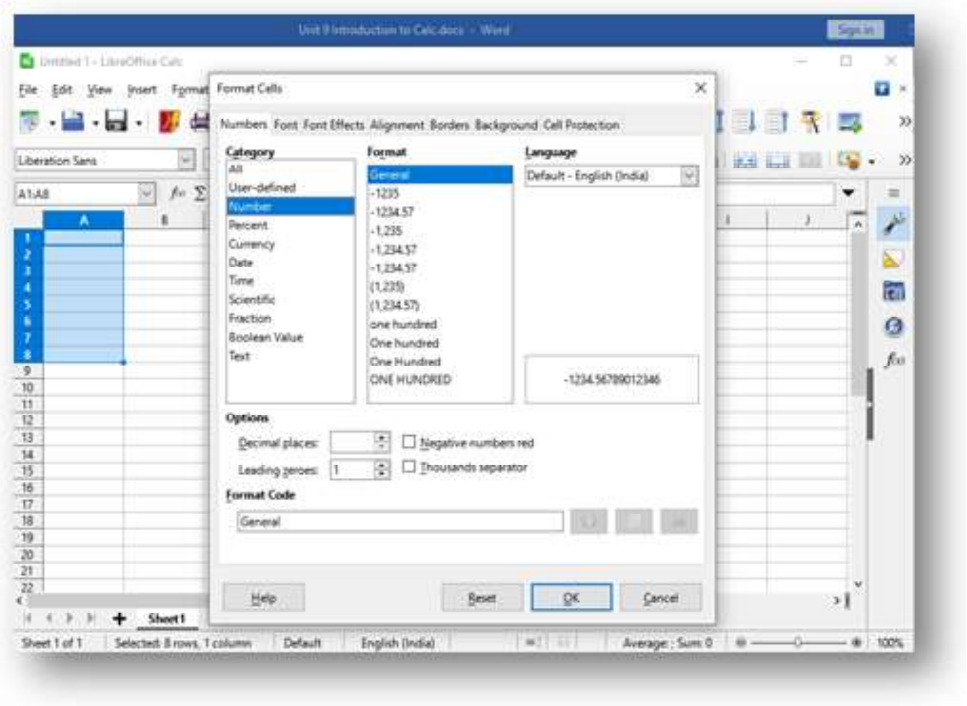
Save your work: Once you have entered and formatted your data, it is important to save your work. To do this, select “File” > “Save” from the menu and choose a location on your computer to save the spreadsheet

9.7 APPLYING CELL FORMATTING

LibreOffice Calc is a powerful spreadsheet program that allows you to apply a variety of cell formatting options to your data. Here are the steps involved in applying cell formatting in LibreOffice Calc:

1. Select the cell(s) you want to format: To apply formatting to a cell, first, you need to select the cell or range of cells you want to format. You can do this by clicking and dragging your mouse over the cells or by clicking on the first cell and then holding down the Shift key while clicking on the last cell in the range.

2. Open the “Format Cells” dialog box: Once you have selected the cell(s) you want to format, right-click on the selected cell(s) and select “Format Cells” from the context menu. Alternatively, you can go to the “Format” menu and select “Cells.”



3. Choose the type of formatting you want to apply: In the “Format Cells” dialog box, you will see several tabs that allow you to choose the type of formatting you want to apply. For example, you can choose to format the cells as numbers, currency, percentages, dates, times, or text. You can also apply different types of alignment, borders, and background colors.
4. Customize the formatting options: Once you have selected the type of formatting you want to apply, you can customize the formatting options to meet your specific needs. For example, you can choose the number of decimal places to display, the currency symbol to use, or the date format o apply.
5. Preview your formatting: As you make changes to your formatting options, you can preview the changes in the “Preview” section of

the “Format Cells” dialog box. This allows you to see how your data will look before you apply the formatting.

6. Apply your formatting: Once you are satisfied with the formatting options, click the “OK” button to apply the formatting to your selected cells.

By following these simple steps, you can apply a wide range of formatting options to your data in LibreOffice Calc, making it easy to present your data in a clear and professional manner.



CHECK YOUR PROGRESS

Fill-up the gaps for the following:

Q.5: To enter data into a cell in LibreOffice Calc, simply click on the cell you want to enter data into and start _____.

Q.6: To format cells in LibreOffice Calc, select the cells you want to format by clicking and dragging your mouse over them. Then, right-click and select “Format Cells” from the _____ menu.

Q.7: To apply cell borders in LibreOffice Calc, select the cells you want to apply borders to by clicking and dragging your mouse over them. Then, right-click and select “Format Cells” from the context menu. In the “Format Cells” dialog box, select the “Borders” tab and choose the border style you want to _____.

Q.8: To apply number formatting to cells in LibreOffice Calc, select the cells you want to apply number formatting to by clicking and dragging your mouse over them. Then, right-click and select “Format Cells” from the context menu. In the “Format Cells” dialog box, select the “Numbers” tab and choose the number formatting you want to _____.



9.8 LET US SUM UP

- Calc is a versatile and powerful open-source spreadsheet program that provides users with a range of functions for managing and

analyzing data, including spreadsheet creation and editing, calculation and formulas, data analysis, compatibility with Microsoft Excel, collaboration features, and macros.

- With its ease of use, robust features, and compatibility with Microsoft Excel, Calc is an essential tool for businesses, individuals, and students who need to create and manage spreadsheets, perform complex calculations, analyze data, and collaborate with others.
- LibreOffice Calc is a free and open-source spreadsheet program that is available for Windows, macOS, and Linux and allows users to create and edit spreadsheets.
- To launch LibreOffice Calc and create a new spreadsheet, users need to open the LibreOffice program, select Calc Spreadsheet, create a new spreadsheet, customize it, add data, and save the file in a chosen file format.
- The LibreOffice Calc interface consists of several components, including the title bar, menu bar, toolbars, formula bar, column and row headers, sheet tabs, and status bar. Navigating and working with data in Calc requires an understanding of these different components.
- To enter and format data in Calc, you can click on a cell to enter data, select cells to apply formatting, and use various formatting options, such as cell borders, background colors, and number formatting. It is important to save your work regularly to avoid losing any changes.
- The steps involved in applying cell formatting in LibreOffice Calc include selecting the cell(s), opening the “Format Cells” dialog box, choosing the type of formatting, customizing the formatting options, previewing the formatting changes, and applying the formatting to the selected cells. By following these steps, users can apply various formatting options to their data in LibreOffice Calc to present it in a clear and professional manner.



9.9 FURTHER READING

1. Lowenthal, M. (2015). Calc for dummies. John Wiley & Sons.
2. Starks, C. (2013). LibreOffice Calc Guide. The Document Foundation.



9.10 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q No 1: C) A spreadsheet program

Answer to Q No 2: B) To automate repetitive tasks

Answer to Q No 3: B) Ctrl+N

Answer to Q No 4: A) To display the contents of the currently selected cell or range of cells

Answer to Q No 5: typing

Answer to Q No 6: context

Answer to Q No 7: apply

Answer to Q No 8: apply



9.11 MODEL QUESTIONS

Q.1: What are some of the key features of LibreOffice Calc as a spreadsheet program, and how can they be used for data management and analysis?

Q.2: How can users launch LibreOffice Calc and create a new spreadsheet, and what customization options are available to them?

Q.3: What are the different components of the worksheet window in LibreOffice Calc, and how can users navigate the interface?

Q.4: How does LibreOffice Calc support collaboration among users, and what tools are available for sharing and tracking changes to spreadsheets?

Q.5: How can users automate repetitive tasks in LibreOffice Calc using macros, and what programming language is used to write macros?

****

UNIT 10 : WORKING WITH FUNCTIONS AND FORMULAS IN CALC

UNIT STRUCTURE

10.1 Learning Objectives

10.2 Introduction

10.3 Using built-in functions and formulas for common calculations in Calc

10.4 Creating custom functions and formulas for complex calculations

10.5 Using conditional formatting to highlight data based on certain criteria

10.6 Let us sum up

10.7 Further Reading

10.8 Answers to Check Your Progress

10.9 Model Questions

10.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- apply the built in function in LibreOffice Calc.
- create custom functions and formulas in LibreOfficeCalc
- utilize the conditional formatting facility in Calc

10.2 INTRODUCTION

In this unit, we will explore working with functions and formulas in LibreOffice Calc. Calc comes with a variety of built-in functions that allow you to perform common calculations on your data, such as summing a range of cells, finding the average of a range of cells, counting the number of cells with a certain value, and more. In addition to these built-in functions, you can also create custom functions and formulas using the Basic programming language to perform complex calculations. We will also look at how to use conditional formatting to highlight data based on certain criteria. By the end of this unit, you will have a solid understanding of how to work

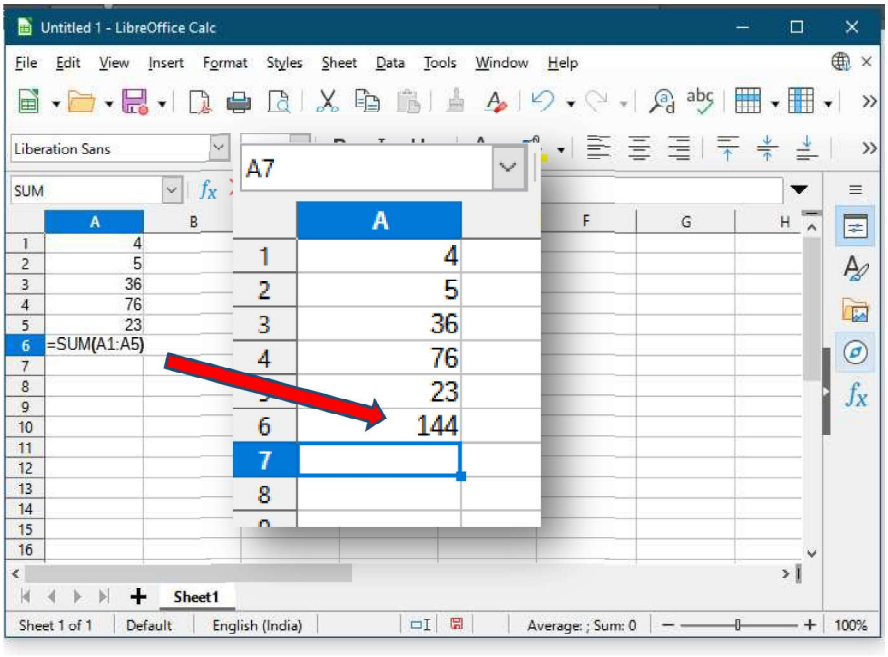
with functions and formulas in Calc to efficiently analyse and manipulate your data.

10.3 USING BUILT-IN FUNCTIONS AND FORMULAS FOR COMMON CALCULATIONS IN CALC

LibreOfficeCalc comes with a variety of built-in functions that you can use to perform common calculations on your data. Here is a detailed guide on using built-in functions and formulas for common calculations in LibreOfficeCalc, along with examples:

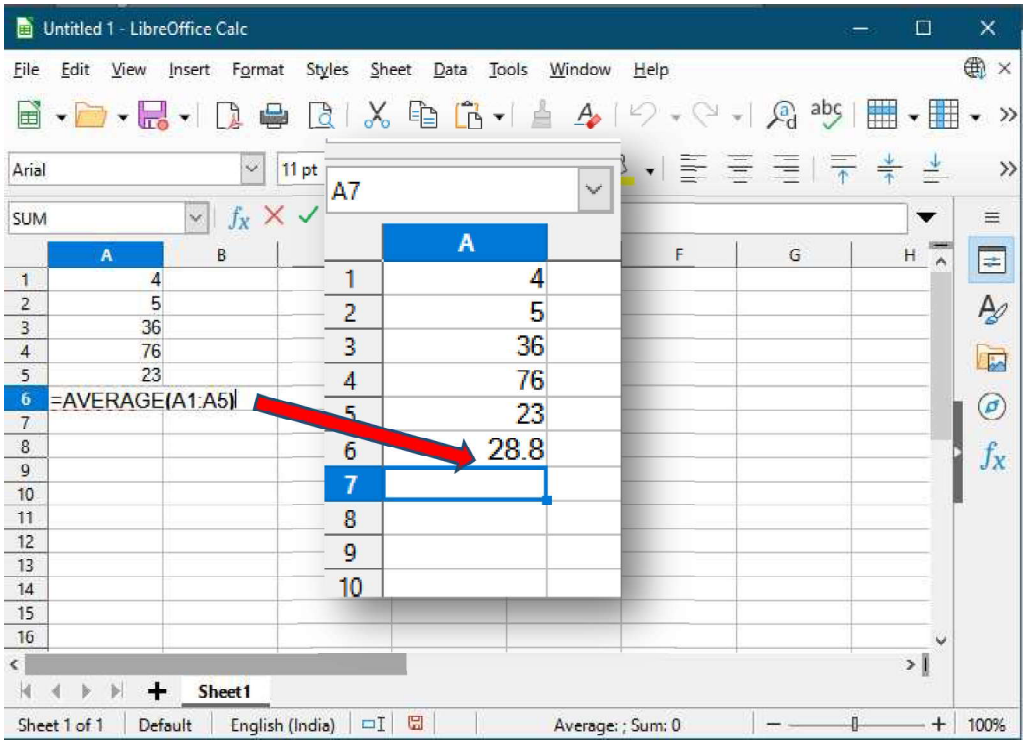
1. Summing a range of cells: One of the most common calculations you may need to perform is adding up a range of cells. You can use the SUM function to do this.

   For example, if you have a list of numbers in cells A1 to A5 and want to calculate their sum, you can use the formula "=SUM(A1:A5)" in another cell. This will add up the values in cells A1 to A5 and display the result in the cell with the formula.



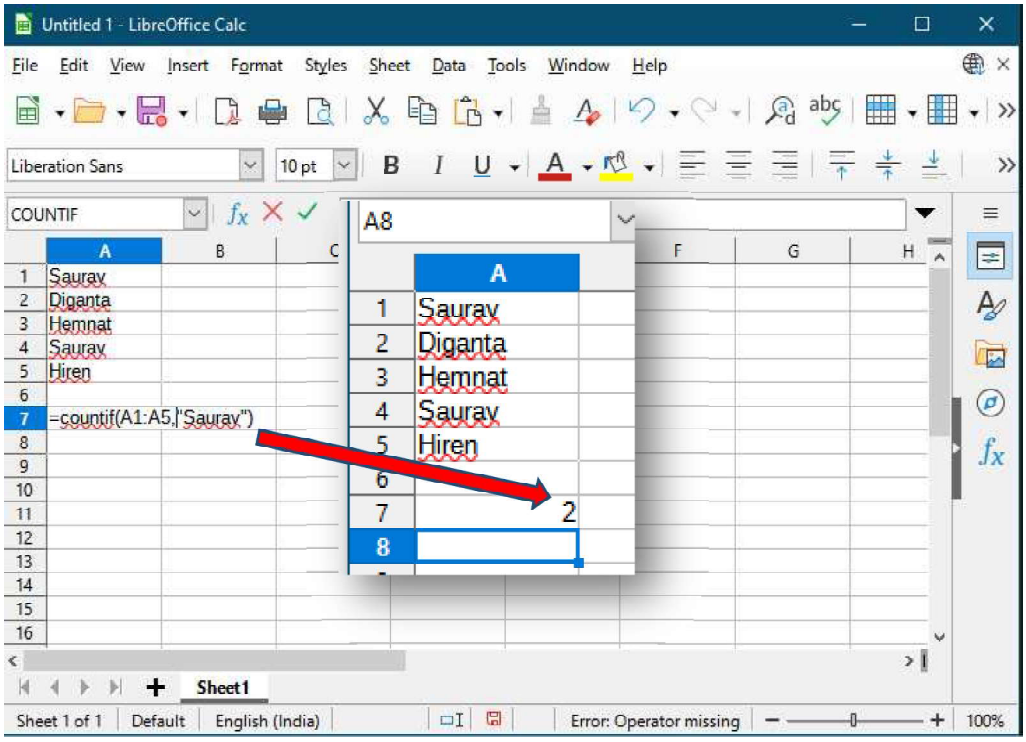
2. Finding the average of a range of cells: If you have a list of numbers and want to find their average, you can use the AVERAGE function.

For example, if you have a list of test scores in cells A1 to A5 and want to find their average, you can use the formula "=AVERAGE(A1:A5)" in another cell. This will calculate the average of the values in cells A1 to A5 and display the result in the cell with the formula.



3. Counting the number of cells with a certain value: If you want to count the number of cells in a range that contain a certain value, you can use the COUNTIF function.

   For example, if you have a list of names in cells A1 to A5 and want to count the number of cells that contain the name "Saurav," you can use the formula "=COUNTIF(A1:A5,"Saurav")" in another cell. This will count the number of cells in cells A1 to A5 that contain the name "Saurav" and display the result in the cell with the formula.

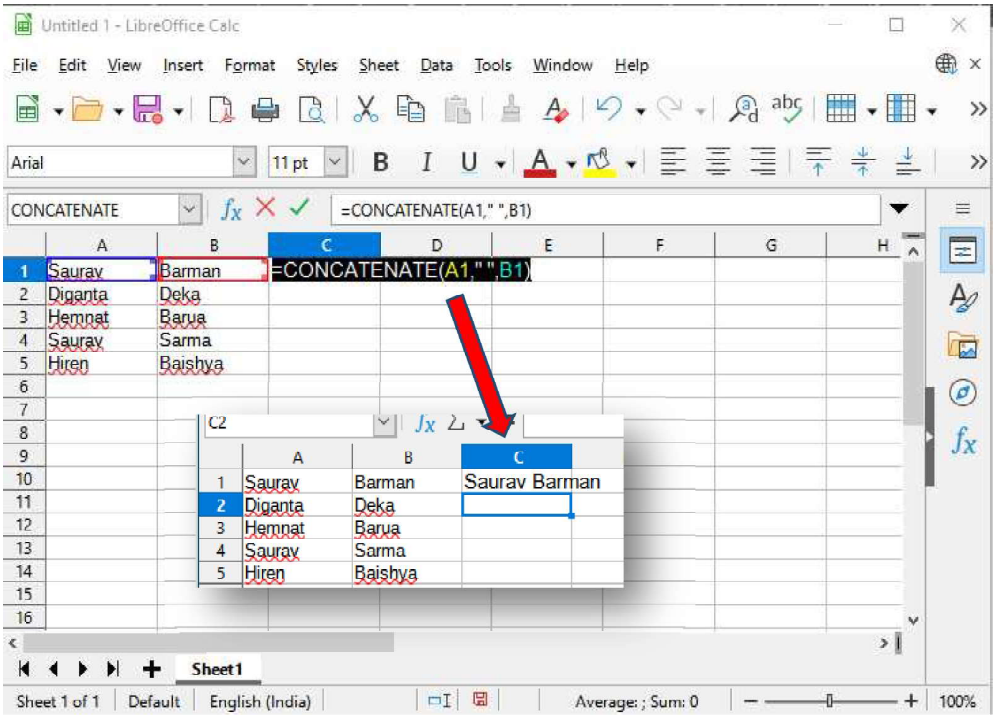


4. Finding the maximum or minimum value in a range of cells: If you want to find the maximum or minimum value in a range of cells, you can use the MAX or MIN function.

   For example, if you have a list of prices in cells A1 to A5 and want to find the highest price, you can use the formula "=MAX(A1:A5)" in another cell. This will find the maximum value in cells A1 to A5 and display the result in the cell with the formula.

5. Concatenating text strings: If you want to combine two or more text strings into one cell, you can use the CONCATENATE function.

   For example, if you have a first name in cell A1 and a last name in cell B1 and want to combine them into one cell, you can use the formula "=CONCATENATE(A1," ",B1)" in another cell. This will combine the values in cells A1 and B1 with a space in between and display the result in the cell with the formula.



6. Converting between units: If you want to convert a value from one unit to another, you can use the CONVERT function.

For example, if you have a length in inches in cell A1 and want to convert it to centimeters, you can use the formula "=CONVERT(A1,"in","cm")" in another cell. This will convert the value in inches to centimeters and display the result in the cell with the formula.

In conclusion, LibreOfficeCalc comes with a wide range of built-in functions and formulas that you can use to perform common calculations on your data. By using these functions and formulas, you can save time and ensure accuracy in your calculations.



CHECK YOUR PROGRESS

Q.1. What function can you use to find the sum of a range of cells in LibreOfficeCalc?

.....

Q.2. How do you calculate the average of a range of cells in LibreOfficeCalc?

.....

Q.3. What function can you use to find the maximum or minimum value in a range of cells in LibreOfficeCalc?

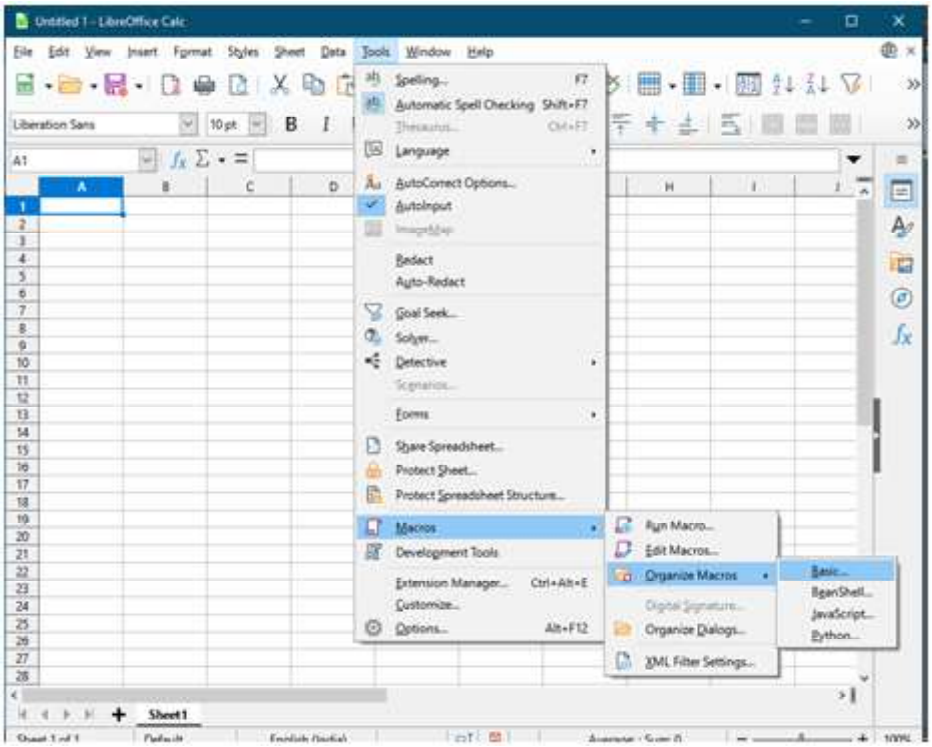
10.4 CREATING CUSTOM FUNCTIONS AND FORMULAS FOR COMPLEX CALCULATIONS

LibreOfficeCalc is a spreadsheet program that allows users to create complex calculations and formulas using built-in functions and also create custom functions to meet specific requirements. In this note, we will discuss how to create custom functions and formulas in LibreOfficeCalc with basic examples.

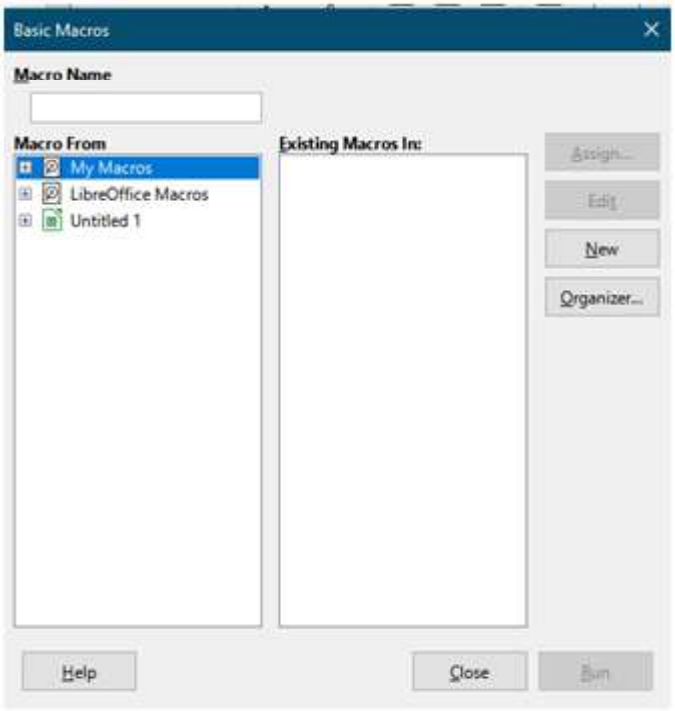
Creating Custom Functions:

Custom functions are user-defined functions that can be created to perform specific calculations. LibreOfficeCalc supports the creation of custom functions using the Basic programming language. Here are the steps to create a custom function:

- Open a new or existing spreadsheet in LibreOffice Calc.
- Go to “Tools” on the menu bar and select “Macros” -> “Organize Macros” -> “ Basic...”.



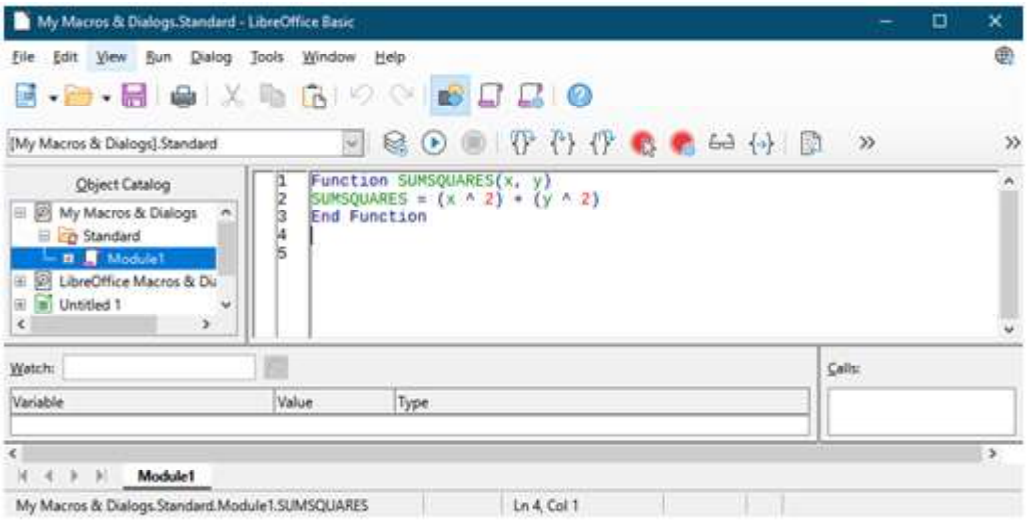
- In the " Basic Macros" dialog box, select "My Macros" and click "New".
- In the "New Module" dialog box, give a name to the module and click "OK".



- In the Basic editor window, write the code for the custom function. For example, the following code creates a custom function called "SUMSQUARES" that calculates the sum of squares of two numbers:

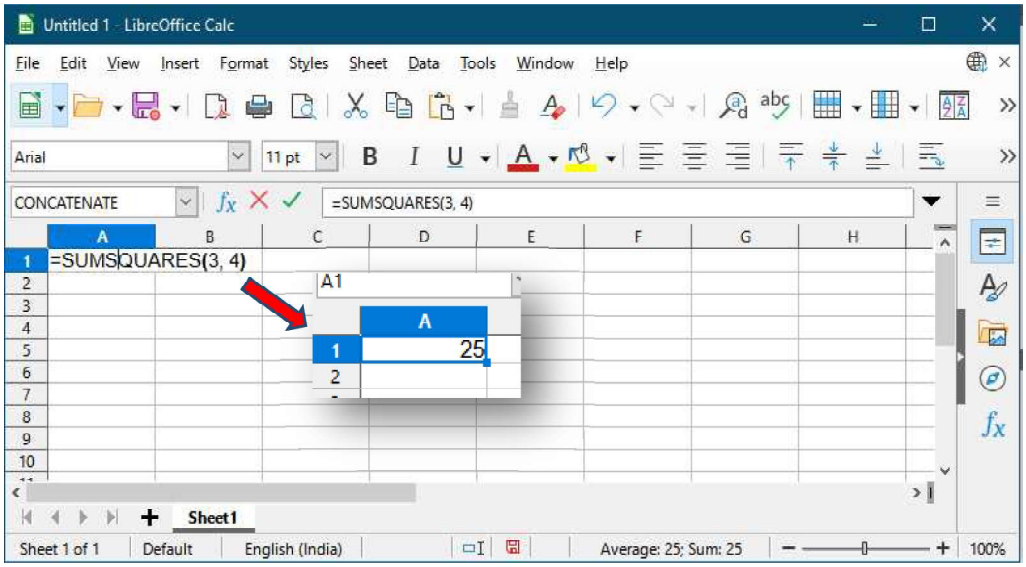
```
Function SUMSQUARES(x, y)
SUMSQUARES = (x ^ 2) + (y ^ 2)
End Function
```

- Save the module by selecting "File" -> "Save" on the menu bar.



- Close the Basic editor window.

Now that we have created the custom function, we can use it in our spreadsheet just like any other built-in function. For example, to use the SUMSQUARES function, we can type “=SUMSQUARES(3, 4)” in a cell, which would return the value 25.

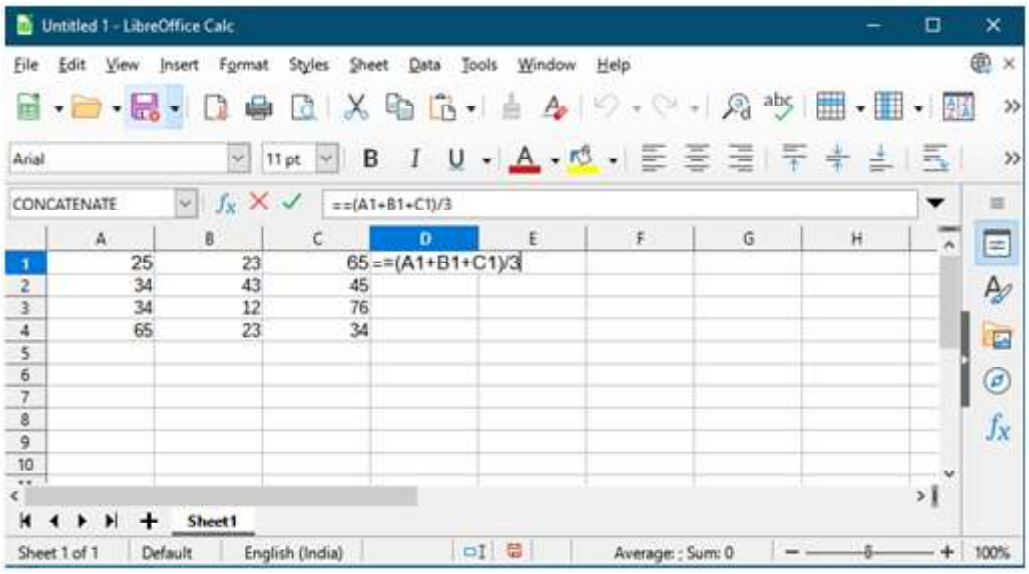


Creating Custom Formulas:

Custom formulas are user-defined formulas that can be created to perform specific calculations. LibreOfficeCalc supports the creation of custom formulas using built-in functions and operators. Here are the steps to create a custom formula:

- Open a new or existing spreadsheet in LibreOffice Calc.
- Select a cell where you want to create the custom formula.
- In the formula bar, type the formula using built-in functions and operators. For example, the following formula calculates the average of three numbers:

  =(A1+B1+C1)/3



- Once you have typed the formula, press “Enter” to calculate the result.
- To save the custom formula, select the cell with the formula and drag the fill handle (a small square at the bottom right corner of the cell) to other cells where you want to use the formula.
- Now that we have created the custom formula, we can use it in other cells just like any other built-in formula. For example, if we want to calculate the average of four numbers, we can simply change the formula to include the fourth number, like this:

  =(A1+B1+C1+D1)/4

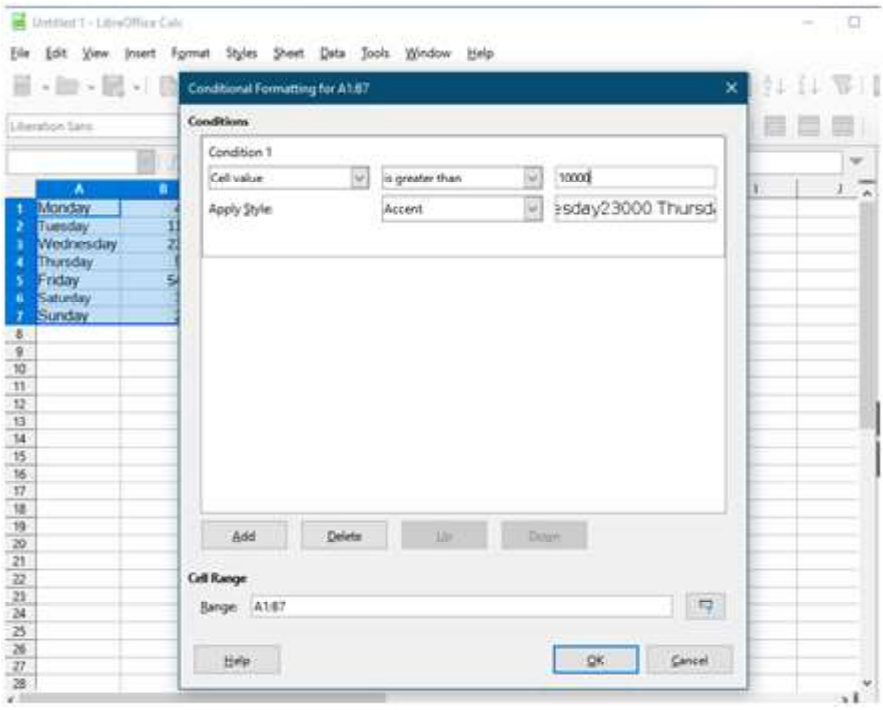
Thus we can see that LibreOfficeCalc provides powerful tools for creating custom functions and formulas to perform complex calculations. By using these tools, users can meet specific requirements and achieve greater efficiency in their spreadsheet work.

10.5 USING CONDITIONAL FORMATTING TO HIGHLIGHT DATA BASED ON CERTAIN CRITERIA

Conditional formatting in LibreOfficeCalc is a useful feature that allows you to automatically format cells based on specific criteria. This can help you to quickly identify important data in your spreadsheets.

Here are some examples of how you can use conditional formatting to highlight data based on certain criteria in LibreOfficeCalc:

1. **Highlight cells that contain a certain value**: Let's say you have a spreadsheet of sales data, and you want to highlight all the cells that contain sales over Rs10,000. To do this, select the cells you want to format, and then click on Format > Conditional Formatting > Condition. In the Condition dialog box, select "Cell value is" from the first drop-down menu, and then select "greater than" from the second drop-down menu. In the third field, enter the value "10000". Then, choose the formatting you want to apply to the cells, such as a different background colour or font colour



2. **Highlight cells that are within a certain range:** Let's say you have a spreadsheet of student grades, and you want to highlight all the cells that are between 70 and 90. To do this, select the cells you want to format, and then click on Format > Conditional Formatting > Condition. In the Condition dialog box, select "Cell value is" from the first drop-down menu, and then select "between" from the second drop-down menu. In the third field, enter the values "70" and "90". Then, choose the formatting you want to apply to the cells.
3. **Highlight cells that contain a certain text string:** Let's say you have a spreadsheet of customer data, and you want to highlight all the cells that contain the text "VIP". To do this, select the cells you want to format, and then click on Format > Conditional Formatting > Condition. In the Condition dialog box, select "Cell contains" from the first drop-down menu, and then enter the text "VIP" in the second field. Then, choose the formatting you want to apply to the cells.

These are just a few examples of how you can use conditional formatting to highlight data based on certain criteria in LibreOffice Calc. There are many more possibilities, and you can experiment with different options to find the ones that work best for your needs.



CHECK YOUR PROGRESS

Q4. What is conditional formatting in LibreOffice Calc?

……

……

Q.5. How can you highlight cells that contain a certain value using conditional formatting in LibreOfficeCalc?

……

……

Q.6. How can you create custom functions in LibreOfficeCalc using Basic programming language?

……

……



10.6 LET US SUM UP

- LibreOfficeCalc has built-in functions for common calculations, such as SUM, AVERAGE, COUNTIF, MAX, MIN, CONCATENATE, and CONVERT.
- You can use the SUM function to add up a range of cells, AVERAGE to find the average of a range of cells, COUNTIF to count the number of cells with a certain value, MAX or MIN to find the highest or lowest value in a range of cells, CONCATENATE to combine two or more text strings, and CONVERT to convert between units.
- Using built-in functions and formulas can save time and ensure accuracy in calculations.
- Custom functions and formulas can be created in LibreOfficeCalc to perform specific calculations.
- Custom functions can be created using the Basic programming language by going to “Tools” -> “Macros” -> “Organize Macros” -> “Basic...” and writing the code in the Basic editor window.
- Custom formulas can be created using built-in functions and operators by typing the formula in a cell and pressing enter.
- Using custom functions and formulas can help meet specific requirements for complex calculations.



10.7 FURTHER READING

1. Lowenthal, M. (2015). Calc for dummies. John Wiley & Sons.
2. Starks, C. (2013). LibreOfficeCalc Guide. The Document Foundation.



10.8 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q No 1: The SUM function.

Answer to Q No 2: By using the AVERAGE function.

Answer to Q No 3: The MAX or MIN function.

Answer to Q No 4: Conditional formatting is a feature in LibreOfficeCalc that allows users to automatically format cells based on specific criteria.

Answer to Q No 5: To highlight cells that contain a certain value, select the cells to format, go to Format > Conditional Formatting > Condition, select “Cell value is” from the first drop-down menu, select “greater than” or “less than” from the second drop-down menu, and enter the desired value in the third field.

Answer to Q No 6: To create custom functions in LibreOfficeCalc, go to “Tools” on the menu bar and select “Macros” -> “Organize Macros” -> “Basic...”. In the “Basic Macros” dialog box, select “My Macros” and click “New”. In the “New Module” dialog box, give a name to the module and click “OK”. In the Basic editor window, write the code for the custom function and save the module by selecting “File” -> “Save” on the menu bar.



10.9 MODEL QUESTIONS

Q.1: What are some of the most common built-in functions in LibreOfficeCalc and how can they be used to perform common calculations on data? Provide examples of how to use these functions to perform tasks such as summing a range of cells, finding the average of a range of cells, counting the number of cells with a certain value, finding the maximum or minimum value in a range of cells, and concatenating text strings.

Q.2: How can you create custom functions in LibreOfficeCalc to perform specific calculations? What programming language does

LibreOfficeCalc support for creating custom functions? Provide a step-by-step guide on how to create a custom function in LibreOfficeCalc, using an example of a custom function that calculates the sum of squares of two numbers.

Q.3: How can you create custom formulas in LibreOfficeCalc to perform specific calculations using built-in functions and operators? Provide a step-by-step guide on how to create a custom formula in LibreOfficeCalc, using an example of a custom formula that calculates the area of a circle based on its radius.

Q.4: What are some of the benefits of using built-in functions and formulas in LibreOfficeCalc for common calculations, as opposed to manual calculations? How can these functions and formulas save time and ensure accuracy in your calculations? Provide examples to illustrate your answer.

Q.5: What are some of the limitations of using built-in functions and formulas in LibreOfficeCalc for complex calculations? When might it be necessary to create custom functions or formulas to perform more complex calculations? Provide examples to illustrate your answer.

****

UNIT 11 : ADVANCED FORMATTING AND CHARTING IN CALC

UNIT STRUCTURE

11.1 Learning Objectives

11.2 Introduction

11.3 Applying Advanced Formatting Options

11.4 Creating and modifying charts

11.5 Using Calc's built-in tools

11.6 Let Us Sum Up

11.7 Further Reading

11.8 Answers to Check Your Progress

11.9 Model Questions

11.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- apply conditional formatting to highlight specific data.
- validate data inputs to ensure they meet predefined criteria.
- customize number formats
- create and modify charts
- use Calc's built-in filtering and sorting tools
- analyse and extract specific information from a dataset.

11.2 INTRODUCTION

The spreadsheet programme Calc, which is part of the LibreOffice package, is an effective tool for compiling and analysing data. Calc provides a variety of sophisticated formatting options and data analysis capabilities that let users to make sense of complicated datasets, in addition to fundamental spreadsheet features like entering and manipulating numerical data. A few of these features, including as conditional formatting, data validation, custom number formats, the construction and editing of charts, and built-in tools for data filtering, sorting, and analysis, will be covered in

this unit. You will have a good understanding of how to use these features by the conclusion of this unit to improve the look and ease of analysis of your data.

11.3 APPLYING ADVANCED FORMATTING OPTIONS

LibreOfficeCalc offers a wide range of advanced formatting options that allow users to customize and present their data in a visually appealing and informative way. These options include conditional formatting, data validation, cell styles, custom number formats, and more. With conditional formatting, users can highlight specific cells or ranges of cells based on certain criteria, such as cell values or text. Data validation enables users to set rules for data entry, ensuring that only valid and accurate data is entered. Cell styles allow users to apply a consistent look and feel to their worksheets, while custom number formats enable users to format numbers in a way that makes them more easily understandable. Overall, the advanced formatting options in LibreOffice Calc provide users with powerful tools to create professional-looking spreadsheets and effectively communicate their data.

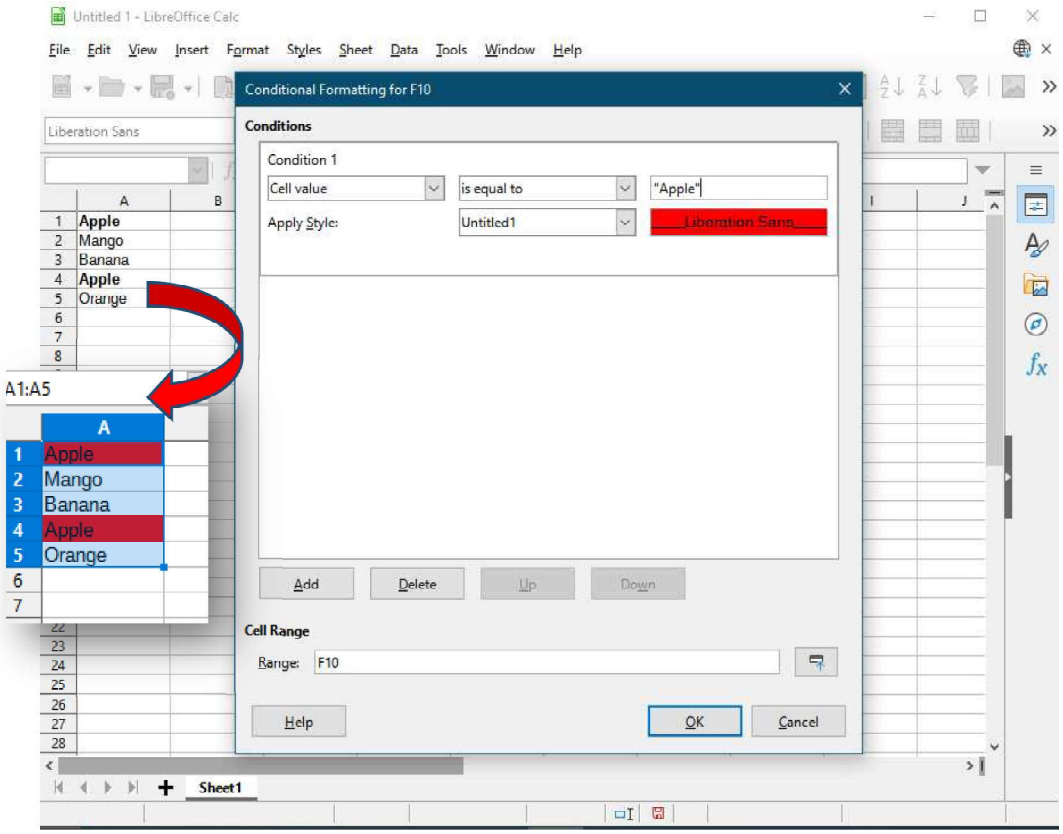
Conditional Formatting

Conditional formatting in LibreOffice Calc is a powerful feature that allows users to apply formatting to cells based on certain conditions. By using conditional formatting, users can easily highlight cells that meet specific criteria, making it easier to identify trends and patterns in their data.

Here are some examples of how to use conditional formatting in LibreOffice Calc:

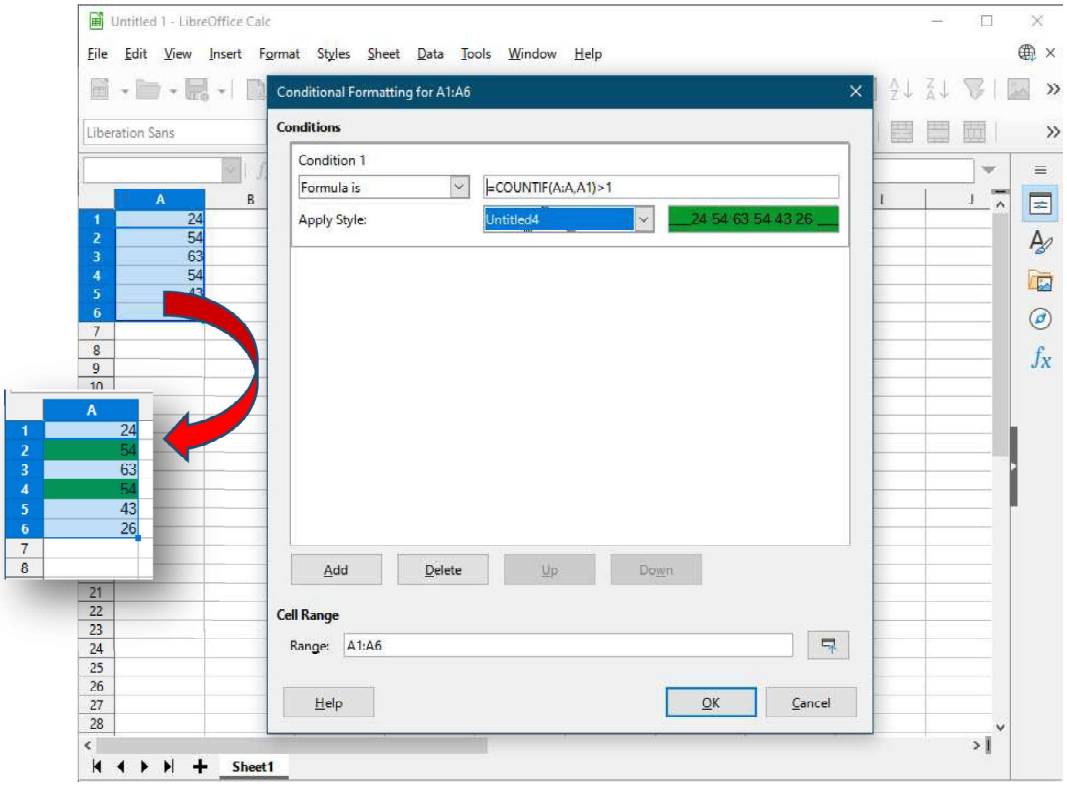
1. Highlight cells with specific text: Assume you have a column of data with different types of fruits in it. Cells that contain a particular fruit can be highlighted using conditional formatting. To do this, choose the range of cells you wish to format, then select “Conditional Formatting” from the menu bar’s “Format” drop-down menu. Select “Equal to” from the second drop-down list after selecting “Cell Value is” from the first drop-down list in the “Conditional Formatting” dialogue box. Type the name of the fruit you want to highlight, such as “Apples,”

in the following box. Select the formatting options you want to use, such as a background colour or font style, in the final step.



2. Highlight cells based on numerical values: Suppose you have a list of test scores and you want to highlight all scores above a certain threshold. To do this, select the range of cells you want to format, click on “Format” from the menu bar, and select “Conditional Formatting”. In the “Conditional Formatting” dialog box, choose “Cell Value is” from the drop-down list, and then select “Greater than” from the second drop-down list. In the next box, enter the threshold score, such as “80”. Finally, choose the formatting options you want to apply, such as a background colour or font style.
3. Highlight cells based on numerical values: Assume you have a list of test results and want to emphasise any scores that are higher than a particular cutoff. To do this, choose the range of cells you wish to format, then select “Conditional Formatting” from the menu bar’s “Format” drop-down menu. Choose “Cell Value is” from the

drop-down list in the “Conditional Formatting” dialogue box, and then pick “Greater than” from the subsequent drop-down list. Put the required score—for example, “80”—in the following box. Select the formatting options you want to use, such as a background colour or font style, in the final step.



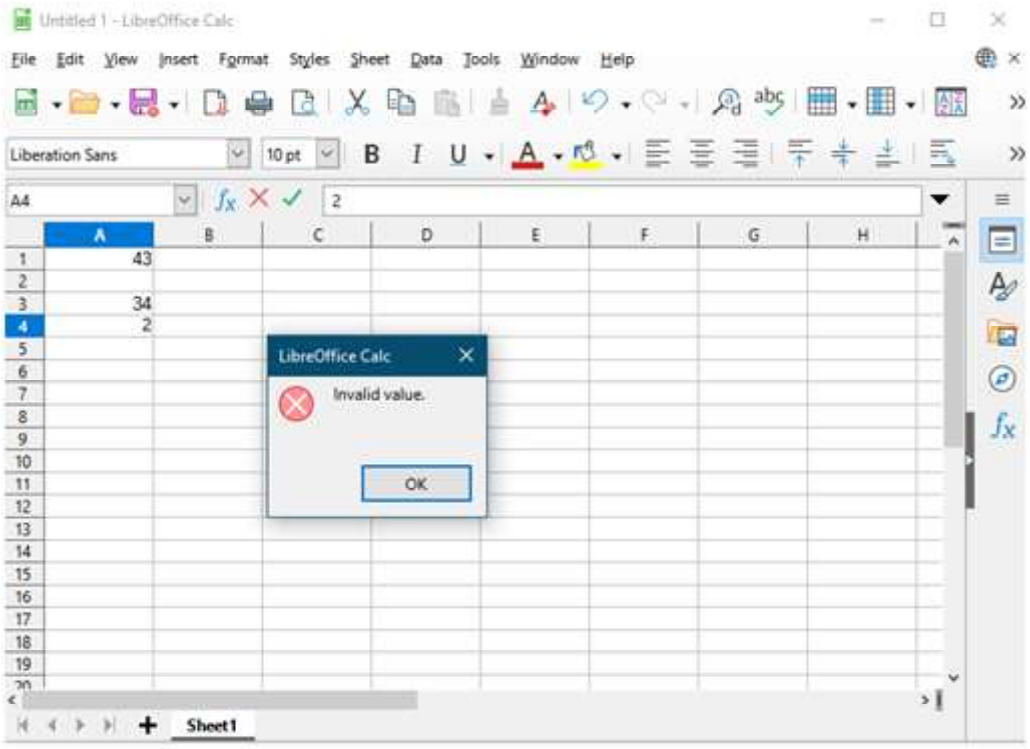
Data Validation

Users of LibreOfficeCalc can regulate the kind and scope of data that can be entered into cells using the data validation feature. This makes it easier to make sure that the information entered is correct and complies with a particular set of rules or guidelines. In LibreOfficeCalc, you can choose from a variety of data validation options, including those for text, numbers, dates, and more.

1. The steps below explain how to apply data validation to a cell or range of cells in LibreOffice Calc.
2. Choose the cell or range of cells to which data validation should be applied.
3. Select “Validity” from the “Data” menu by clicking on it.

4. From the “Allow” dropdown menu in the “Validity” dialogue box, choose the category of data you want to validate. There are many options available, including “Whole number,” “Decimal,” “Date,” “Time,” “Text length,” and more.
5. Set the parameters for the chosen data type. You can specify a minimum and maximum value for the number, for instance, if you chose “Whole number”.
6. You have the option to specify an error message that will be displayed if the user enters incorrect information.
7. To apply the data validation to the chosen cells, click “OK”.

For example, suppose you have a spreadsheet with a column for product prices, and you want to ensure that the prices entered are between Rs 10/- and Rs 100/-. To do this, select the column of prices, go to “Data” > “Validity”, select “Whole number” from the “Allow” dropdown menu, and enter 10 and 100 as the minimum and maximum values. Now, any time someone enters a price that falls outside of this range, an error message will appear.

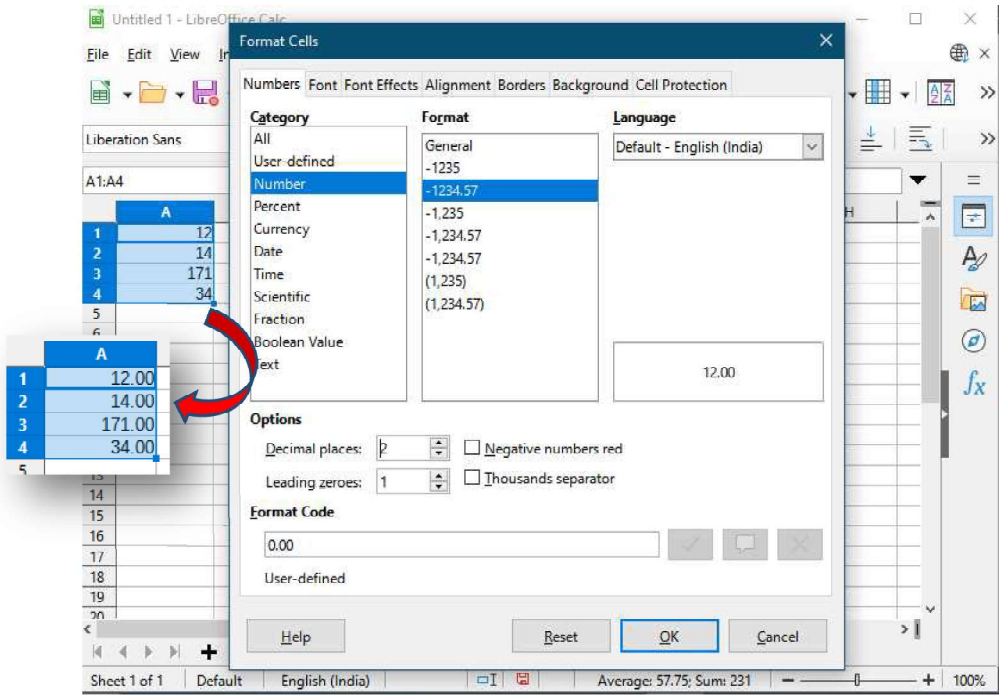


Setting up a dropdown list for a cell is another illustration of data validation. When you want to restrict the options available for a specific cell, this can be helpful. To accomplish this, first choose the cell that needs validation, then navigate to “Data” > “Validity,” choose “List” from the “Allow” dropdown menu, and then enter the options you want to show up in the dropdown list. Now, only the options you listed will be available to anyone who selects that cell.

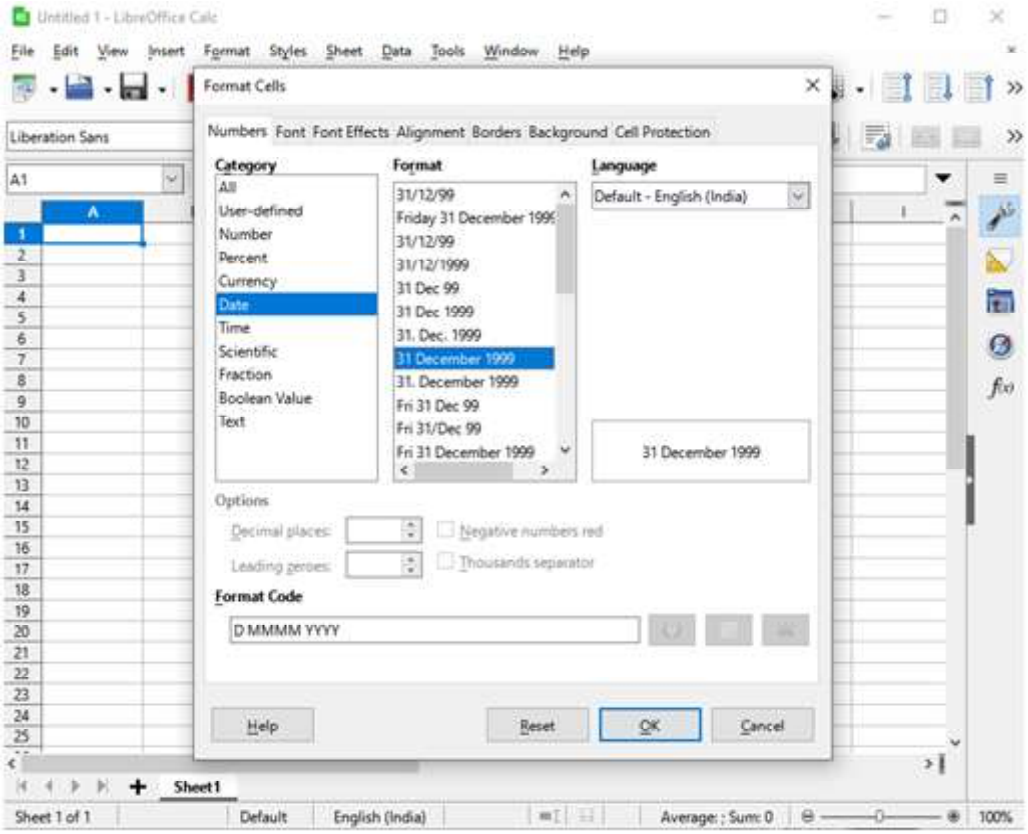
Custom Number Formats

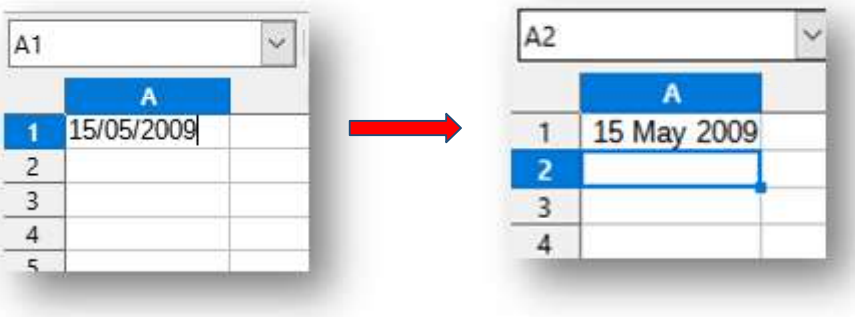
Users of LibreOfficeCalc can format numbers in a way that best suits their needs by using custom number formats. The appearance of numbers, including the number of decimal places, the use of currency symbols, and the display of negative numbers, can be customised by users. Dates, times, and other types of data can be displayed using custom number formats in a way that is simple to understand and read.Here are some examples of custom number formats in LibreOffice Calc:

1. **Number format with decimal places:**Select the cells you want to format, then select “Format” > “Cells” to format numbers with two decimal places. Select “Numbers” from the “Format Cells” dialogue box, and then type “0.00” in the “Format Code” field.



2. Currency format: Select the cells you want to format and choose “Format” > “Cells” to format numbers as currencies. Choose “Numbers” from the “Format Cells” dialogue box, then choose the desired currency symbol from the drop-down list.
3. Formatting dates: Choose the desired cells and choose “Format” > “Cells” to format dates. Select “Date” in the “Format Cells” dialogue box, then select the desired format from the drop-down list.





5. Scientific notation format: Select the cells you want to format and choose “Format” > “Cells” to format numbers in scientific notation. Select “Numbers” in the “Format Cells” dialogue box, and then type “#.###E+00” in the “Format Code” field.
6. Custom format for negative numbers: Negative numbers can be formatted in a specific way by choosing the desired cells and choosing “Format” > “Cells.” 6. Custom format for negative numbers. To display negative numbers in parentheses and with a currency symbol, choose “Numbers” from the “Format Cells” dialogue box, and then type a custom format code, such as “($#,##0.00);($#,##0.00)”.



CHECK YOUR PROGRESS

Fill in the blanks

Q.1: LibreOfficeCalc offers a wide range of _____ options to customize and present data.

Q.2: Conditional formatting allows users to easily highlight cells that meet specific _____.

Q.3: Data validation is a feature in LibreOfficeCalc that allows users to control the type and range of data that can be entered into _____.

Q.4: Custom number formats in LibreOfficeCalc allow users to format numbers in a way that meets their specific _____.

Q.5: A dropdown list can be set up for a cell using the _____ feature in LibreOffice Calc.

11.4 CREATING AND MODIFYING CHARTS

With the help of the robust spreadsheet programme LibreOfficeCalc, users can design and edit charts that present data in an easier-to-understand manner. Chart creation and modification in Calc is a fairly simple process that can be finished in a few easy steps.

Here are the steps to create and modify charts in LibreOffice Calc:

1. Preparing the Data:

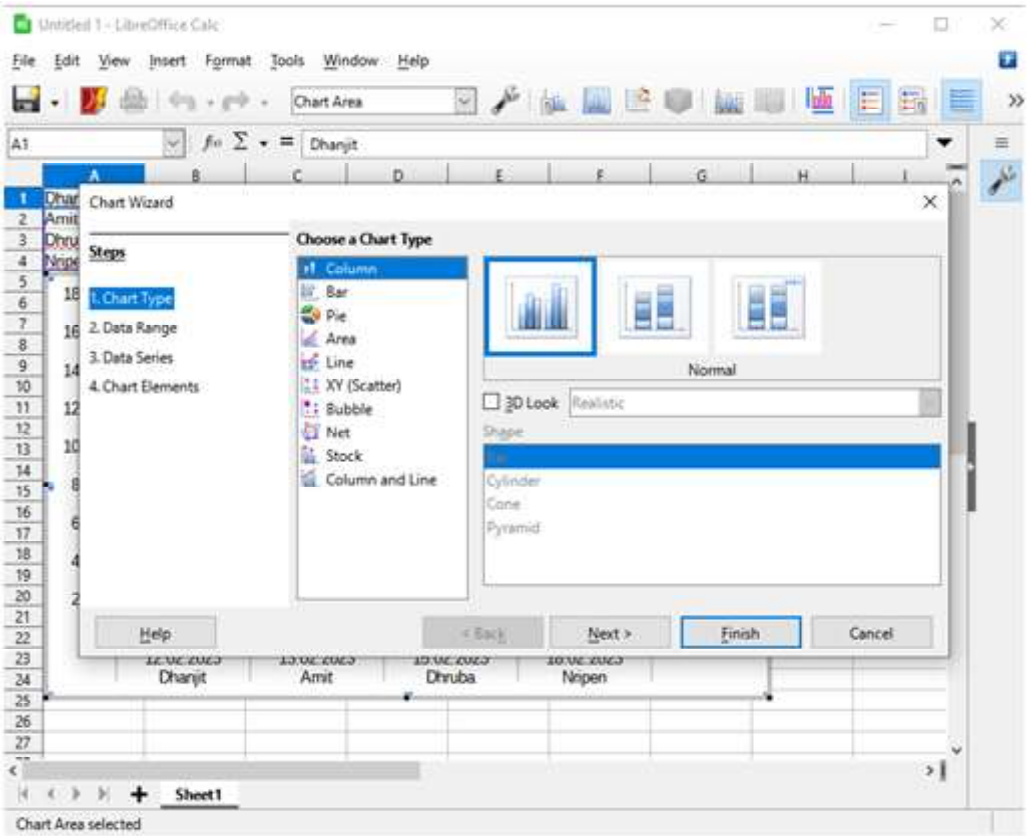
It is essential to prepare the data that will be represented in the chart before beginning to create one. Each set of data should have its own row and column headings in a table with the data. Columns for salesperson names, sale dates, and sale amounts, for instance, might be included in a chart that displays sales data for a business.

2. Selecting the Data:

Choose the cells you want to include in the chart after you have prepared the data. To select multiple cells at once, hold down the Shift key while clicking and dragging the mouse over the desired cells.

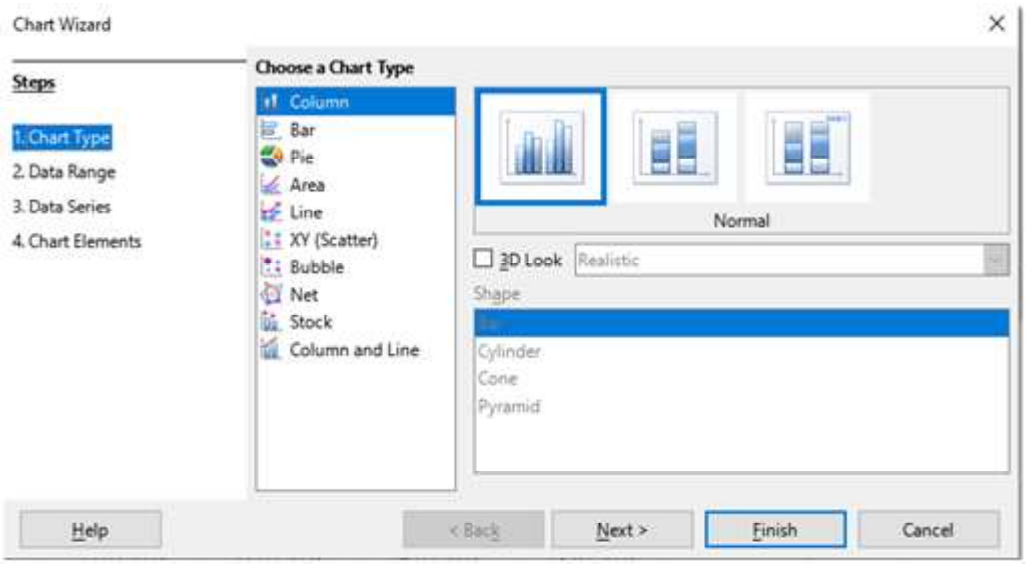
3. Inserting the Chart:

After choosing your data, choose “Chart” from the “Insert” menu in the menu bar. You can then follow the instructions in the “Chart Wizard” dialogue box to create the chart. In addition, you can utilise the “Chart” icon located in the toolbar.



4. Choosing the Chart Type:

You must choose the type of chart you want to make in the Chart Wizard dialogue box. Calc supports the following chart types: Column, Line, Pie, Bar, Area, XY (Scatter), Net, and Stock. Pick the option that most closely fits your needs.



5. Defining the Chart Data Range:

The next step is to specify the data range for your chart. The categories and data series must be specified in this. A data series is a collection of associated data points, and each data series has a category label. The values of each data point are shown next to the data point in the chart as data labels, which are an additional option.

6. Customizing the Chart:

You can alter the chart's appearance, layout, and formatting after specifying the data range. The chart's title, legend, axis labels, and axis scales can all be changed. Additionally, you can alter the chart's colours, fonts, and other visual components.

7. Saving and Exporting the Chart:

Once the chart has been designed and customised, you can export it to a file format like PNG, JPG, or PDF or save it to your spreadsheet.



ACTIVITY

Suppose you have a table with sales data for the past six months. To create a column chart for this data, follow these steps:

1. Select the cells that contain the sales data.
2. Click on the “Insert” menu in the menu bar and select “Chart.”
3. In the Chart Wizard dialog box, select “Column” as the chart type.
4. Define the data range by selecting the cells containing the data series and categories.
5. Customize the chart by changing the title, axis labels, and colours.
6. Save the chart to your spreadsheet or export it to a file format.

11.5 USING CALC’S BUILT-IN TOOLS

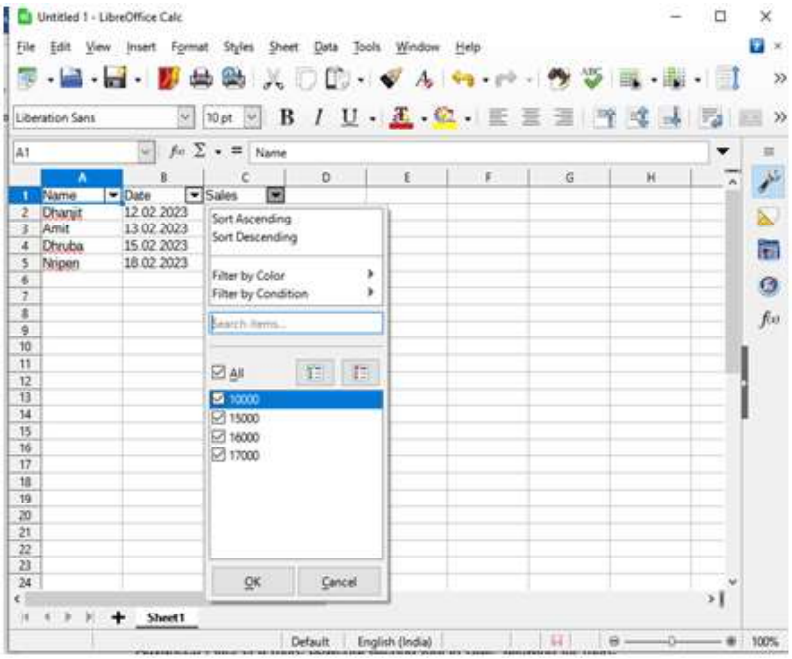
Dealing with large datasets is made simpler by a variety of built-in tools for filtering, sorting, and analysis provided by LibreOffice Calc. Users of the filtering tool can limit the display of data to only that which satisfies their criteria, enabling more focused analysis. Sorting enables users to group data according to different criteria, such as numerical value or alphabetical order, making it simpler to spot patterns and trends in the data. Additionally, Calc offers a variety of tools for data analysis, including pivot tables, which enable users to meaningfully summarise and visualise data. Overall, Calc’s built-in tools make it simpler for users to work with data and extract insights from sizable datasets without the use of additional programmes or tools.

1. FILTERING DATA

- There is a robust set of built-in data filtering tools available in LibreOffice Calc. With the help of these tools, users can choose to display only the data that satisfies specific criteria, which can aid in performing focused analysis and comprehending particular subsets of data. Here are some examples and instructions for using these tools to filter data in Calc:

Auto Filter:

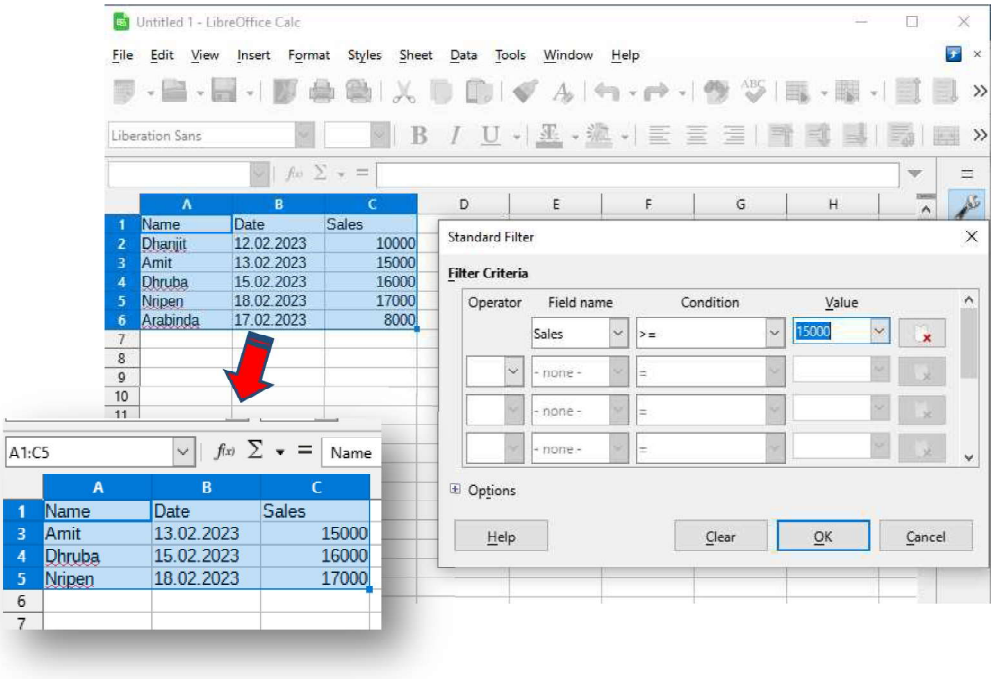
Data filtering in Calc is quick and simple thanks to AutoFilter. Selecting the cells containing the data you wish to filter before selecting the “Data” menu from the menu bar will activate AutoFilter. Choose “Filter” and then “AutoFilter” from there. Each column’s header will have a tiny arrow that you can use to select or deselect particular values to filter the data.



- **Advanced Filter:**

Calc’s Advanced Filter is a more powerful filtering tool that supports more complicated filtering criteria. Select the cells containing the data you wish to filter, and then click the “Data” menu link in the menu bar to access Advanced Filter. Choose “Filter” and then “Advanced Filter” from there. You can specify the filtering criteria based on various conditions in the ensuing dialogue box, such as values in other cells, regular expressions, and more.

For example, suppose you have a table containing the sales data for different salespersons, and you want to see only the sales figures for the salespersons who sold more than Rs 15,000 worth of products. Using Advanced Filter, you can specify the filtering criteria to show only the salespersons whose sales figures meet this condition.



- **Form Filter:**

  Another filtering tool in Calc that lets users filter data based on form entries is called Form Filter. To use Form Filter, click the “Data” menu in the menu bar, choose “Form,” and then fill out the form that appears with the filtering requirements.

  Consider the scenario where you have a table with the sales information for various salespeople and you want to view only the sales data for a particular salesperson. The salesperson’s name can be entered into the form using Form Filter, and then the filter can be applied to only show the data that matches the entered criteria.

2. SORTING OF DATA

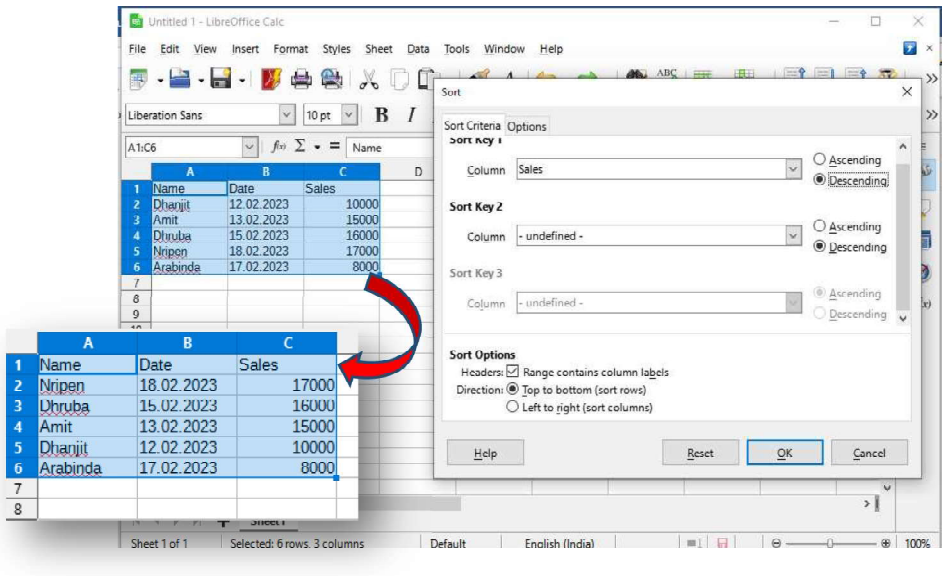
Many built-in data sorting tools in LibreOfficeCalc can aid in more effective data organisation and analysis for huge datasets. Basic sorting, multi-level sorting, and custom sorting are some of these tools.

Basic Sorting:

Users of Calc’s basic sorting tool can arrange data according to a single column or row. To use this tool, choose the desired data, then click the “Data” menu and choose “Sort.” By doing so, the “Sort” dialogue box will

open, allowing you to choose the column or row and the sort order (ascending or descending).

For instance, if you have a table of sales data with columns for salesperson names and sales amounts, you can use the basic sorting tool to determine which salesperson has sold the most by sorting the data based on the sales amounts in descending order.



- **Multi-Level Sorting:**

  Users of Calc can sort data based on multiple columns or rows using the multi-level sorting tool. To use this tool, choose the desired data, then click the “Data” menu and choose “Sort.” You can add more sorting levels in the “Sort” dialogue box by selecting the “Add Level” button. This will enable you to group the data according to a variety of criteria, such as sales volume followed by salesperson name.

  For example, if you have a table of sales data that includes columns for salesperson names, sales dates, and sales amounts, you can use the multi-level sorting tool to sort the data first by salesperson name and then by sales amount in descending order to see the total sales amount for each salesperson.

- **Custom Sorting:**

  Users can sort data in Calc using custom criteria by using the tool for custom sorting. To use this tool, choose the desired data, then click the “Data” menu and choose “Sort.” Choose “Custom sort order” from the “Sort by” drop-down menu in the “Sort” dialogue box. By adding new criteria, you can customise the sort order by opening the “Custom Sort” dialogue box.

  For example, if you have a table of inventory data that includes columns for item names and stock levels, you can use the custom sorting tool to sort the data based on the item names, but with a custom sort order that places certain items at the top of the list, regardless of their alphabetical order.

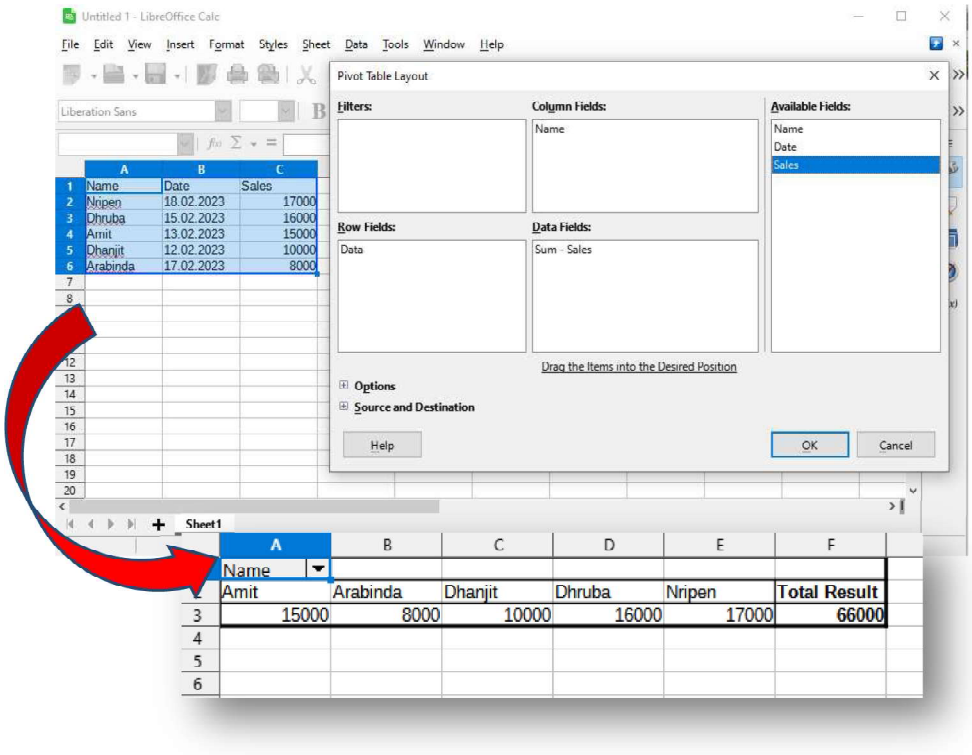
3. ANALYSING DATA

Several built-in data analysis tools in LibreOfficeCalc are helpful for gaining insights into sizable datasets. Here are a few instances of how to analyse data using Calc’s built-in tools:

- **Pivot Tables:**

  Powerful tools for data analysis and summarization include pivot tables. They enable you to easily summarise sizable datasets and present them in a more readable manner. Select the data you want to analyse before you can create a pivot table in Calc. Then click the “Data” menu, choose “Pivot Table,” and adhere to the wizard’s directions. A pivot table can be made more unique by dragging and dropping fields to alter the layout and produce different summaries after it has been created.

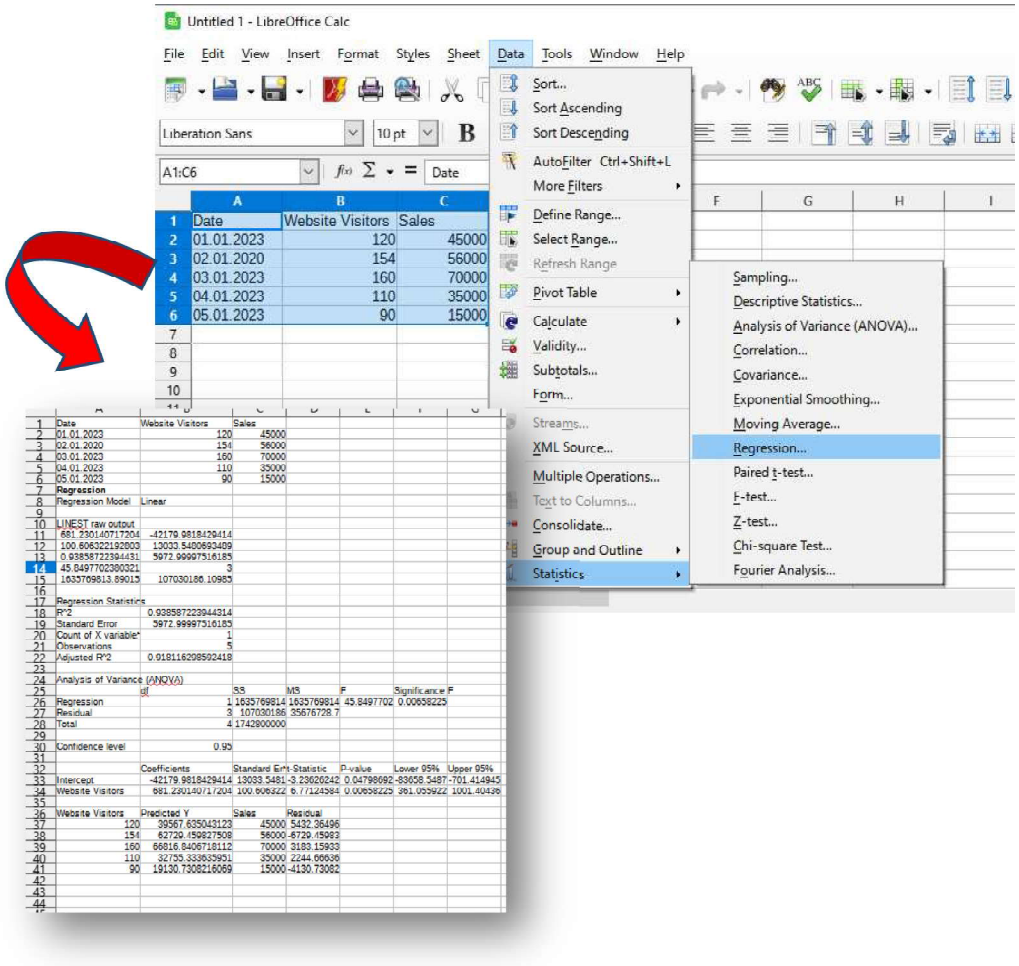
  Example: Suppose you have a dataset that includes sales data for a company. You could use a pivot table to summarize the data by salesperson, month, or product category, and analyse which salesperson or product category is performing the best.



- **Data Analysis Tools:**

  Regression analysis, Fourier analysis, and moving average are just a few of the data analysis tools available in Calc. These tools can help you predict the future based on historical data and understand the relationship between various variables. Click on the “Data” menu, choose “Statistics,” and then select the tool you want to use to access the data analysis tools.

  Example: Suppose you have a dataset that includes information on the number of visitors to a website and the corresponding sales data. You could use regression analysis to understand the relationship between the number of visitors and sales, and predict future sales based on the number of visitors.



Similarly, other analysis like sampling, co-relation, chi-square etc can be done using Calc and all these above potential makes Libre office a great open source software for data analysis.



CHECK YOUR PROGRESS

Choose the correct option:

Q.6: What is the first step to create and modify charts in LibreOffice Calc?

a) Insert the chart

b) Define the chart data range

c) Select the data

d) Customize the chart

Q.7: Which of the following is a built-in tool in LibreOfficeCalc for analyzing data?

a) Pivot tables

b) Photoshop

c) AutoCAD

d) InDesign

Q.8: How can users use AutoFilter to filter data in Calc?

a) Click on the “Insert” menu and select “AutoFilter”

b) Click on the “Data” menu and select “Filter” and then “AutoFilter”

c) Click on the “Chart” menu and select “AutoFilter”

d) Click on the “Format” menu and select “AutoFilter”

Q.9: Which of the following is a more powerful filtering tool in Calc?

a) AutoFilter

b) Basic Filter

c) Advanced Filter

d) Form Filter

Q.10: What is the purpose of sorting data in LibreOfficeCalc?

a) To create charts

b) To customize the chart

c) To organize and analyse large datasets

(d) None of these



11.6 LET US SUM UP

- LibreOfficeCalc offers a variety of advanced formatting options that allow users to customize and present their data in a visually appealing and informative way.
- Conditional formatting is a powerful feature in LibreOfficeCalc that allows users to highlight cells based on specific conditions, making it easier to identify trends and patterns in their data.

- Data validation is another feature in LibreOfficeCalc that enables users to control the type and range of data that can be entered into cells, ensuring that only valid and accurate data is entered.
- Cell styles and custom number formats can be used to apply a consistent look and feel to worksheets and format numbers in a way that makes them more easily understandable.
- Examples of how to use conditional formatting in LibreOfficeCalc include highlighting cells based on specific text, numerical values, and duplicate values.
- Data validation can be applied to cells to ensure that the data entered conforms to specific rules or guidelines, such as limiting the options available for a particular cell or setting minimum and maximum values for numerical data.
- LibreOfficeCalc is a powerful spreadsheet application that allows users to create and modify charts to visualize data in a more accessible and understandable format.
- To create and modify charts in Calc, the data needs to be prepared in a table with headings for each column and rows for each set of data.
- Calc provides a variety of built-in tools for filtering, sorting, and analyzing data, making it easier to work with large datasets.
- Filtering tools in Calc allow users to selectively display only the data that meets certain criteria, which can help in performing targeted analysis and understanding specific subsets of data.
- Sorting tools in Calc allow users to organize data based on various criteria, such as alphabetically or by numerical value, making it easier to see patterns and trends in the data.
- Calc also provides a range of tools for analyzing data, such as pivot tables, which can help users summarize and visualize data in a meaningful way.
- Overall, these built-in tools make it easier for users to work with data in Calc and gain insights from large datasets without the need for external software or tools.



11.7 FURTHER READING

1. Lowenthal, M. (2015). Calc for dummies. John Wiley & Sons.
2. Starks, C. (2013). LibreOfficeCalc Guide. The Document Foundation.



11.8 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q No 1: formatting

Answer to Q No 2: criteria

Answer to Q No 3: cells

Answer to Q No 4: needs

Answer to Q No 5: data validation

Answer to Q No 6: c) Select the data

Answer to Q No 7: a) Pivot tables

Answer to Q No 8: b) Click on the “Data” menu and select “Filter” and then “AutoFilter”

Answer to Q No 9: c) Advanced Filter

Answer to Q No 10: c) To organize and analyse large datasets



11.9 MODEL QUESTIONS

Q.1: How can conditional formatting be used to highlight specific cells or ranges of cells based on certain criteria in LibreOfficeCalc? Provide at least three examples of how conditional formatting can be used effectively to analyse data and improve its presentation.

Q.2: Data validation is an important feature in LibreOfficeCalc that allows users to control the type and range of data that can be entered into cells. Explain how to apply data validation to a cell or range of cells in LibreOfficeCalc, and provide an example of how data validation can be used to ensure accurate data entry. In addition, discuss at least

two other types of data validation options available in LibreOfficeCalc and how they can be useful in data analysis.

Q.3: How can LibreOfficeCalc's built-in tools for filtering, sorting, and analyzing data be used to gain insights from large datasets? Provide examples of how each tool can be used to manipulate data and extract specific information from a dataset.

Q.4: Describe the steps involved in creating and modifying charts in LibreOffice Calc. What are some of the customization options available to users when creating a chart, and how can these options be used to create a visually appealing and informative chart?

Q.5: How can LibreOfficeCalc be used to perform statistical analysis on a dataset? What are some of the statistical functions and tools available in Calc, and how can they be used to extract meaningful insights from a dataset? Provide examples of how statistical analysis can be used to identify trends and patterns in data.

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UNIT 12: INTRODUCTION TO IMPRESS

UNIT STRUCTURE

12.1 Learning Objectives

12.2 Introduction

12.3 Overview of Impress

12.4 Features as a Presentation Program

12.5 Launching Impress

12.6 Creating a New Presentation

12.7 Navigating the Impress Interface

12.8 Understanding the Different Components of the Slide Window

12.9 Adding and Formatting Slides

12.10 Applying Transitions

12.11 Customizing Presentations Settings

12.12 Let Us Sum Up

12.13 Further Reading

12.14 Answers to Check Your Progress

12.15 Model Questions

12.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- start with Impress
- learn the different parts of the Impress such as the Title bar, Menu bar, Status bar, Horizontal and Vertical Scroll bar
- learn different component of Impress
- create a new presentation

12.2 INTRODUCTION

LibreOffice Impress is a powerful and free presentation software that is part of the LibreOffice suite. It allows you to create stunning presentations with a wide range of features and tools.In the same way as Microsoft PowerPoint, it helps users create professional-looking

presentations.You can easily create professional-looking slide presentations using Impress. The program features a number of tools and features to make your presentations more effective.The aim of this unit is to guide you through the Impress environment when designing your presentations.

12.3 OVERVIEW OF IMPRESS

Impress is a powerful presentation software developed as part of the LibreOffice suite. It is a free and open-source alternative to commercial software like Microsoft PowerPoint and it is available for Windows, macOS, and Linux operating systems.LibreOffice Impress allows users to create, edit, and deliver professional-looking slideshows and presentations.It offers a variety of templates and themes to choose from, or users can create their own custom designs. The software also supports a wide range of file formats, including Microsoft PowerPoint files, making it easy to import and export presentations to and from other software.Users can add and edit slides, create and format text, insert and manipulate images and other multimedia, and create animations and transitions between slides. Impress also includes drawing tools, charts, and diagrams, which can be used to create custom graphics within the presentation.

LibreOffice Impress offers a robust set of features and is suitable for personal, academic, and professional use. You can create slides that contain many different features, including text, bulleted and numbered lists, tables, charts, and a wide range of graphic objects such as clip-art, drawings and photographs. Impress also includes a spelling checker, a thesaurus, text styles, and background styles.

12.4 FEATURES AS A PRESENTATION PROGRAM

LibreOffice Impress, as a presentation program, offers a wide range of features to help you create and deliver impactful presentations.LibreOffice Impress provides a comprehensive set of features for creating, designing, and delivering professional presentations. Its open-source nature and compatibility with different file formats make it a versatile and accessible option for users seeking a free and powerful presentation program.

Here are some of the important features of LibreOffice Impress:

- Slide Creation and Editing: Impress provides an easy-to-use interface for creating and editing slides. It offers a range of formatting options for text, images, charts, tables, and other graphical elements, allowing users to customize their presentations to their needs.
- Slide Transitions and Animations: Impress offers a range of transition effects to smoothly transition between slides, and animation options to bring content to life during the presentation.
- Templates and Styles: Impress includes a collection of built-in templates and styles to give your presentations a professional look. You can choose from various themes and layouts or create your own custom templates to maintain consistency throughout your presentation.
- Multimedia Support: Impress supports adding multimedia content such as images, audio files, and videos directly into slides, enhancing the overall presentation experience.
- Presenter View: Impress provides a Presenter View option that displays additional information to the presenter while showing the slides to the audience. You can see your speaker notes, next slides, and slide timings, helping you deliver your presentation more effectively
- Customization Options: Impress allows users to customize the appearance and layout of their presentations, with a range of templates and themes available.
- Slide Show Settings: Impress offers customizable slide show settings. You can define the order in which your slides appear, set slide timings, and control slide transitions. The software also provides options for looping slide shows, enabling automatic advancements, and rehearsing timings.
- Collaboration and Compatibility: LibreOffice Impress supports a wide range of file formats, including the Microsoft PowerPoint formats (PPT, PPTX), making it easy to collaborate with users of other

presentation software. You can import and export files in different formats, ensuring compatibility with different platforms.

- Master Slides and Templates: Impress supports master slides, which act as templates for your presentation. Master slides allow you to define the overall layout, background, fonts, and placeholders that are used consistently across multiple slides. This feature helps maintain a consistent design throughout your presentation and saves time when creating or modifying slides.
- Speaker Notes and Presenter View: Impress enables you to add speaker notes to your slides, which can be displayed separately to assist you during the presentation. The Presenter View provides a dual-screen setup where you can view your current slide, upcoming slides, speaker notes, and a timer, while your audience sees only the slides.

12.5 LAUNCHING IMPRESS

To launch LibreOffice Impress, you can follow these steps:

1. Ensure that you have LibreOffice installed on your computer. If you don't have it installed, you can download it for free from the official LibreOffice website (https://www.libreoffice.org).
2. Once LibreOffice is installed, open the application launcher or the Start menu on your computer.
3. Open your computer's start menu or launcher
4. Type "LibreOffice" in the search bar to find the LibreOffice program.
5. Click on the "LibreOffice Impress" icon to launch the program.
6. Once LibreOffice is open, click on the "Impress" icon, which should be located in the bottom row of icons. Alternatively, you can select "Impress" from the list of LibreOffice applications that appears when you click on the "Applications" menu at the top of the screen.
7. If you want to create a new presentation, select a blank slide or choose a template from the available options. Alternatively, you can open an existing presentation by selecting "Open" from the File menu.

8. Begin working on your presentation by adding slides, content, and formatting elements using the various tools and options available in the user interface.

Once you have launched LibreOffice Impress, you can start creating or editing your presentation. The software offers a range of tools and features to help you customize your slides, add multimedia content, apply animations and transitions, and many more.

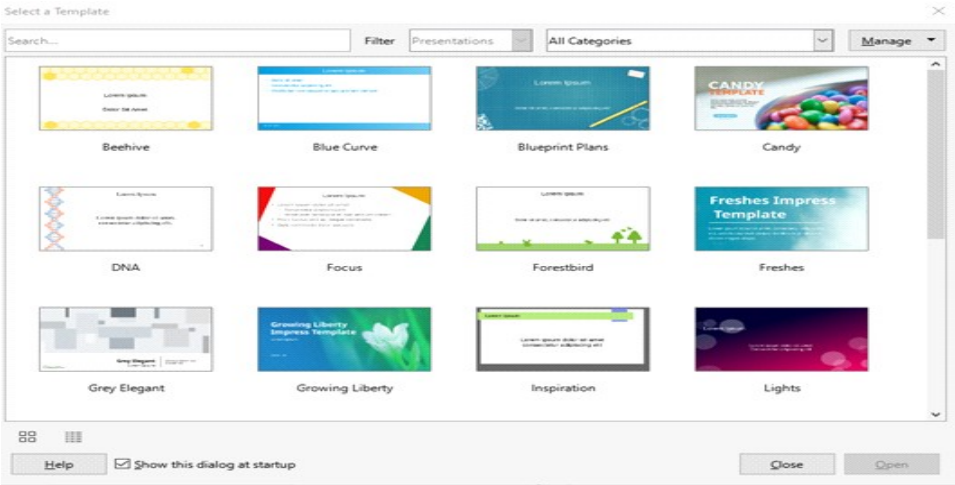


Figure 12.1:Template dialog

12.6 CREATING A NEW PRESENTATION

To create a new presentation in LibreOffice Impress, you can follow these steps:

- Launch LibreOffice Impress by following the instructions provided in the previous section.
- Once Impress is open, you will see a start screen with various options. To create a new presentation, click on the “Empty Presentation” option. This will open a new blank presentation for you to work on.
- Alternatively, you can also click on “Open File” if you want to start with an existing presentation template or a previously saved presentation.

- The main Impress interface will now be displayed, with a blank slide ready for editing. The slide pane on the right-hand side will show the thumbnail of the current slide.
- You can start building your presentation by adding slides. To add a new slide, you have a few options:
    - Click on the “New Slide” button on the toolbar. It typically looks like a plus symbol or a blank slide icon.
    - Go to the “Insert” menu and select “Slide” or “New Slide.”
    - Use the keyboard shortcut “Ctrl+M” (Windows/Linux) or “Cmd+M” (Mac) to insert a new slide.
- Impress offers various slide layouts to choose from. You can select a layout that suits your content by clicking on the desired layout in the “Layouts” panel. The layout options are typically displayed on the right side of the interface.
- Now you can start adding content to your slides. Click on the text boxes provided on the slide and begin typing to enter your text. You can format the text by selecting it and using the formatting options available in the toolbar.
- To add images, charts, tables, or other graphical elements, go to the “Insert” menu and choose the desired option. You can also use the icons in the toolbar to insert these elements directly.
- Customize the appearance of your slides by applying different fonts, colors, backgrounds, and other formatting options available in the toolbar. You can also modify the slide master to ensure consistent formatting across all slides.
- To save your presentation, go to the “File” menu and choose “Save” or “Save As.” Give your presentation a name and select the desired file location on your computer.
- As you work on your presentation, remember to save your progress regularly to avoid losing any changes.

By following these steps, you can create a new presentation in LibreOffice Impress and begin designing your slides with various content elements and customization options.

12.7 NAVIGATING THE IMPRESS INTERFACE

When you first open LibreOffice Impress, you will see a user-friendly interface that consists of several elements. Here's an overview of the main parts of the Impress interface and how to navigate them:

- Title Bar: The title bar at the top of the window displays the name of the program and the name of the current presentation.
- Menu Bar: The menu bar contains all the menus available in Impress, such as File, Edit, View, Insert, Format, Slide, etc. You can access various options and settings from the menus.
- Toolbars: Impress has several toolbars, such as the Standard toolbar, the Formatting toolbar, and the Drawing toolbar. These toolbars contain various buttons and tools to help you create and edit your presentation.
- Slides Pane: The Slides pane is located on the left side of the window and displays a list of all the slides in your presentation. You can use it to navigate to a specific slide, add new slides, or delete existing slides.
- Workspace: The workspace is the main area where you create and edit your slides. It occupies the majority of the Impress window.
- Status Bar: The status bar is located at the bottom of the window and displays information about the current slide, such as the slide number, the slide layout, and the zoom level. You can also use it to switch between the normal and slide master views.

12.8 UNDERSTANDING THE DIFFERENT COMPONENTS OF THE SLIDE WINDOW

When working with slides in LibreOffice Impress, the Slide Window is the main area where you create and edit individual slides. Here are the different components of the Slide Window in LibreOffice Impress:

1. **Slide Area:** The largest section of the Slide Window is the Slide Area. It displays the content of the currently selected slide. You can

add and format text, images, shapes, charts, and other elements within this area. It serves as a canvas for designing your slide layout.

2. **Slide Thumbnails:** On the left side of the Slide Window, you will find a vertical pane called the Slide Thumbnails pane. It provides a visual overview of all the slides in your presentation. You can click on a thumbnail to select and edit a specific slide. The selected slide's thumbnail is usually highlighted or visually differentiated from the rest.
3. **Slide Layout Pane:** Towards the right side of the Slide Window, you may find the Slide Layout pane. It displays different slide layout options available for the selected slide. Each layout represents a predefined arrangement of placeholders for text, images, titles, and other content. You can select a layout that best suits your needs or modify it to fit your content.
4. **Properties Pane:** The Properties pane is located on the right side of the Slide Window, adjacent to the Slide Layout pane. It provides options to customize the properties and attributes of the selected slide or its elements. You can adjust settings related to slide transitions, animations, background color or image, and more. The options available in the Properties pane may vary depending on the selected slide element or the view mode.
5. **Ruler and Guides:** The Slide Window may have horizontal and vertical rulers at the top and left edges, respectively. The rulers help you align and position objects precisely on the slide. You can drag guides from the rulers onto the slide to create alignment guides, which assist in maintaining consistent spacing and alignment between slide elements.
6. **Task Panes:** Task Panes are additional panels that can be accessed through the View menu or specific toolbar buttons. These panes provide extended functionality for tasks such as formatting, applying transitions and animations, managing master slides, working with styles, and more. Task Panes can be docked to the Slide Window or placed as floating windows based on your preference.

Understanding these components of the Slide Window in LibreOffice Impress will allow you to efficiently create and design your slides, customize their layout and properties, and navigate through your presentation with ease.

These components of the Slide Window in LibreOffice Impress provide different ways to view, edit, and manage your slides. You can switch between these views and utilize their respective functionalities based on your specific needs during the creation and editing process of your presentation.

12.9 ADDING AND FORMATTING SLIDES

To add and format slides in LibreOffice Impress, follow these steps:

1. Open LibreOffice Impress and click on the “New Presentation” option.
2. Choose a template or create a new blank presentation.
3. To add a new slide, click on the “New Slide” button located in the toolbar or go to the “Insert” menu and select “Slide”.
4. Choose the type of slide layout you want to use. You can select from a variety of pre-designed layouts or create your own.
5. To add content to your slide, click on the text boxes and insert your text. You can also insert images, shapes, charts, and other objects by going to the “Insert” menu.
6. To format your slide, go to the “Format” menu and choose the formatting options you want to apply. You can change the font, color, background, and other aspects of your slide.
7. To rearrange your slides, click and drag them to the desired position in the slide sorter view.
8. To apply transitions and animations to your slides, go to the “Slide Transition” and “Custom Animation” options located in the sidebar.
9. Save your presentation by going to the “File” menu and selecting “Save” or “Save As”.

By following these steps, you can create and format slides in LibreOffice Impress to create an engaging and visually appealing presentation.

12.10 APPLYING TRANSITIONS

LibreOffice Impress is a presentation software that allows users to create and edit slideshows with various effects, including transitions. Here are the steps to apply transitions to slides in LibreOffice Impress:

1. Open your presentation in LibreOffice Impress.
2. Select the slide to which you want to apply a transition.
3. Click on the “Slide Transition” icon located in the sidebar or go to the “Slide” menu and select “Slide Transition.”
4. In the “Slide Transition” panel, select the transition effect you want to apply to the slide. You can choose from various options, such as fade, dissolve, push, wipe, and more.
5. Set the transition options, such as direction, speed, sound, and duration, by using the corresponding controls in the “Slide Transition” panel.
6. Preview the transition by clicking on the “Preview” button located at the bottom of the panel.
7. Apply the transition by clicking on the “Apply” button.
8. Repeat the process for other slides if you want to apply transitions to them as well.
9. Save your presentation by going to the “File” menu and selecting “Save” or “Save As.”

By following these steps, you can apply transitions to slides in LibreOffice Impress to create a dynamic and engaging slideshow.

12.11 CUSTOMIZING PRESENTATIONS SETTINGS

By following these steps, you can customize presentation settings in LibreOffice Impress to tailor your slideshow according to your preferences and requirements.

LibreOffice Impress is a presentation software that allows users to customize various settings to create and edit presentations. Here are the steps to customize presentation settings in LibreOffice Impress:

1. Open your presentation in LibreOffice Impress.

2. Click on the “Tools” menu and select “Options.”
3. In the “Options” dialog box, select “LibreOffice Impress” from the left-hand menu.
4. Customize the settings in the “General” tab, such as the default presentation format, the number of undo steps, and the default language.
5. Customize the settings in the “Print” tab, such as the printer settings, the number of copies, and the page layout.
6. Customize the settings in the “View” tab, such as the display options, the grid settings, and the zoom level.
7. Customize the settings in the “Slide Show” tab, such as the timing, the slide transition speed, and the sound.
8. Customize the settings in the “Compatibility” tab, such as the file format options and the font embedding.
9. Click on the “OK” button to apply the changes.

The Slides Pane

The Slides pane contains thumbnail pictures of the slides in your presentation; in the order the slides will be shown. Clicking a slide in this pane selects it and places it in the Workspace. When a slide is in the Workspace, you can make any changes you like. You can also use it to do the following:

- Add new slides to the presentation.
- Mark a slide as hidden so that it will not be shown as part of the presentation.
- Delete a slide from the presentation if it is no longer needed.
- Rename a slide.
- Duplicate a slide (copy and paste) or move it to a different position in the presentation (cut and paste).
- Change the slide transition following the selected slide or after each slide in a group of slides.
- Change the sequence of slides in the presentation.
- Change the slide design.
- Change slide layout for a group of slides simultaneously.

The Tasks Pane: The Tasks pane has five sections and they are:

1. Master Pages

Here you define the page (slide) style for your presentation. Impress includes several designs of Master Pages (slide masters). One of them—Default—is blank and the rest have background and styled text.

2. Layouts

The layouts included in Impress are shown here.

3. Custom Animation

A variety of animations can be used to emphasise or enhance different elements of each slide. The Custom Animation section provides an easy way to add, change, or remove animations.

4. Slide Transition

The Slide Transition section provides access to a number of slide transition options.

5. The Workspace

The Workspace (normally in the center) has five tabs: *Normal, Outline*, *Notes*, *Handout* and *Slide Sorter*. These five tabs are called View buttons. The Workspace below the View buttons changes depending on the chosen view.

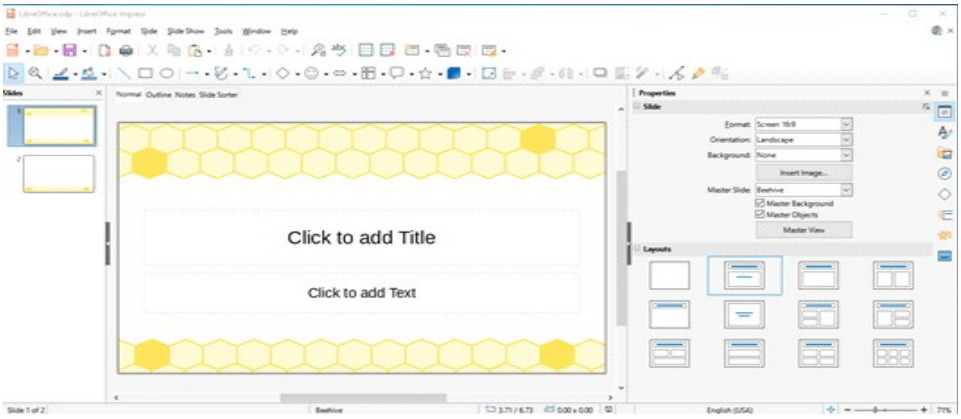


Figure:12.2

Outline view

Outline view in the Workspace contains all of the slides of the presentation in their numbered sequence. It shows topic titles, bulleted lists, and numbered lists for each slide in outline format.

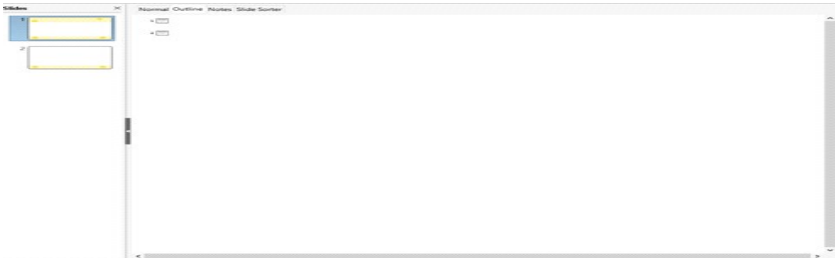


Figure 12.3: Outline view in the workspace

Notes view

Use Notes view in the Workspace to add notes to a slide.

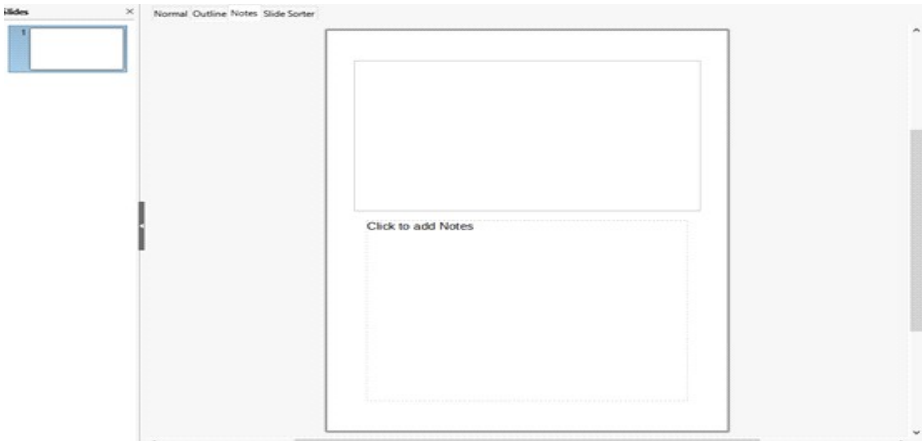


Figure 12.4: Notes view in the Workspace

Slide Sorter view

The Slide Sorter view in the Workspace contains all the thumbnails of slides used in your presentation.

Status bar

The Status bar is located at the bottom of the Impress window.

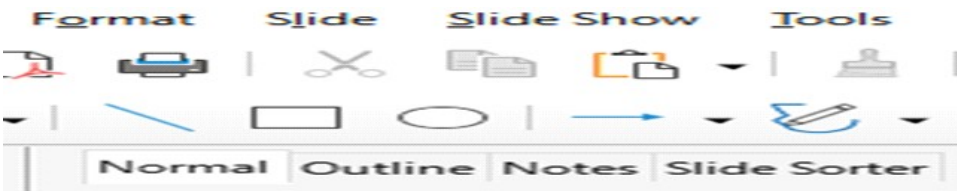


Figure 12.5



CHECK YOUR PROGRSS

Q.1: What do you understand by a presentation?

Q.2: Define a template in Impress.

Q.3: What is a Normal view? Explain.

Q.4: How many types of views are provided by Impress to its users?

Q.5: Define the Slide Sorter view and its significance.



12.12 LET US SUM UP

- To create a new presentation, click File > New... and then click "Blank Presentation'' in "New Presentation'' task pane.
- There are three types of views of a presentation – Normal View, Slide Sorter View and Reading View.
- To create/insert a new slide in to your presentation, click on the slide after which you want to insert the new slide then click Home –> New Slide.
- You can change your font and font-styles of your text with the help of either Home menu or by short-cut buttons/keys.
- To delete an existing slide, right-click on the slide and then click "Delete Slide'' option.
- You can also apply designs to your slides by using the design templates provided in Impress. To apply design template, select the "Design'' menu and then select a design template.



12.13 FURTHER READING

1) Gupta, Vikas. Comdex Linux and Open Office Course Kit (with CD Rom). New Delhi: Dreamtech Press, 2010. Print.

2) Wikipedia, the Free Encyclopedia (2012). OpenOffice.org. Web. 15 April 2013. <http://en.wikipedia.org/wiki/OpenOffice.org \>.

3) The Document Foundation. LibreOffice 4.0 Getting Started Guide. 2013. Web.20 April 2013.<http://www.libreoffice.org/get-help/documentation>.



12.14 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q No1: An Impress presentation refers to a type of presentation created using LibreOffice Impress, which is a free and open-source presentation software. Impress is part of the LibreOffice suite, which provides a range of office productivity tools similar to Microsoft Office.Impress is designed to help users create professional-looking slideshows and presentations. It offers a variety of features and tools for creating, editing, and delivering presentations.

Answer to Q No 2: In Impress, a template refers to a pre-designed layout or format that serves as a starting point for creating presentations. It is a predefined structure that includes placeholders for text, images, charts, and other visual elements. Templates in Impress provide users with a consistent and professional-looking design, helping them save time and effort in creating visually appealing presentations.

Answer to Q No 3: In the context of presentation software such as Impress or PowerPoint, the "Normal view" is a working mode that provides users with a comprehensive and versatile interface for creating and editing slides. It is also commonly referred to as the "Normal editing view" or "Slide editing view."The Normal view is specifically designed to provide a comprehensive workspace for efficiently creating and editing presentation slides.

Answer to Q No 4: Impress provides several different views to its users, each serving a specific purpose and offering a unique perspective on the presentation. The various views available in Impress include:(a) Normal View,(b)Slide Sorter View (c) Notes View(d) Handout View (e) Outline View (f) Slide Show View.

Answer to Q No 5: The Slide Sorter view in Impress is a viewing mode that displays a grid of thumbnail representations of all the slides in a presentation. It provides an overview of the entire presentation and allows users to easily manage and manipulate the sequence and arrangement of slides.



12.15 MODEL QUESTIONS

Q.1: What are the purposes for which LibreOffice Impress can be used?

Q.2: What are the different types of views of Impress presentation?

Q.3: What view is useful to see possibly all the slides in a single window?

Q.4: What options are available for applying slide transitions in Impress?

Q.5: What options are available for applying slide transitions in Impress?

Q.6: What are master slides in LibreOffice Impress, and how can you use them?

Q.7: How do you create a new slide in LibreOffice Impress?

Q.8: What are the different slide layouts available in Impress?

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UNIT 13 : WORKING WITH MULTIMEDIA AND ANIMATIONS IN IMPRESS

UNIT STRUCTURE

13.1 Learning Objectives

13.2 Introduction

13.3 Adding Images, Audio and Video to a Presentation

13.4 Creating and Modifying Animations to Enhance Visual Effects

13.5 Using Impress's Builting Tools for Recording and Rehearsing Presentations

13.6 Let Us Sum Up

13.7 Further Reading

13.8 Answers to Check Your Progress

13.9 Model Questions

13.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- add images, audio and video to a presentation
- create and modify animations to enhance visual effects
- use Impress's building tools for recording and rehearing presentations.

13.2 INTRODUCTION

In the previous unit we have learnt about the basic concept of Libreoffice Impress. This unit will help you to create and modify your presentation, i.e. inserting and deleting slides, applying existing design templates to the slides, adding animations to the contents of the slides and also adding slide transition effects to the slides.

13.3 ADDING IMAGES, AUDIO AND VIDEO TO A PRESENTATION

To add images, audio, and video to a presentation in LibreOffice Impress, follow these steps:

Adding Images:

1. Open your presentation in LibreOffice Impress.
2. Select the slide where you want to add the image.
3. Go to the “Insert” menu and choose “Image” or click on the “Insert Image” icon in the toolbar.
4. Locate and select the image file you want to insert, then click “Open.”
5. Resize and position the image on the slide as desired by clicking and dragging its corners or edges.

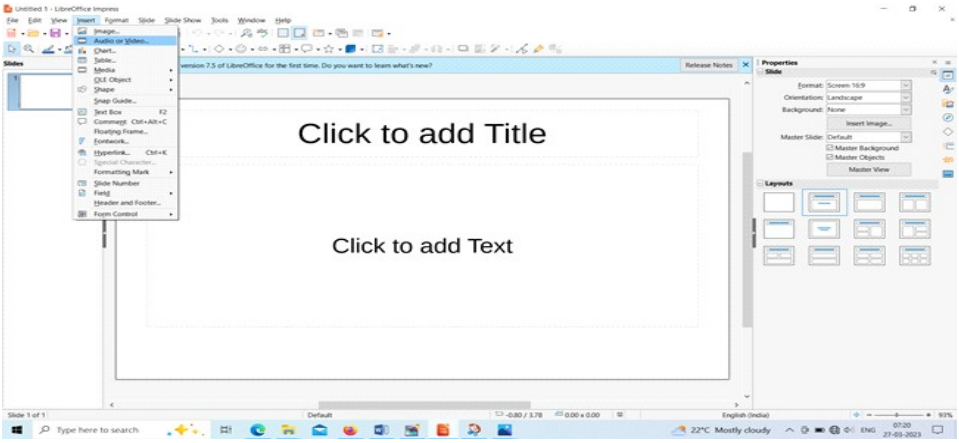


Figure 13.1: Inserting an image using Insert menu

In order to insert an image in OpenOffice Impress, place the cursor in the place where you want the image to be inserted (Figure 13.1).Then, Click Insert ’! select Picture ’! From File option from the Insert menu. OpenOffice Impress will display the dialog box, where you can select the image from the specific location and select open. The image will be inserted in the specified location. Figure 13.2

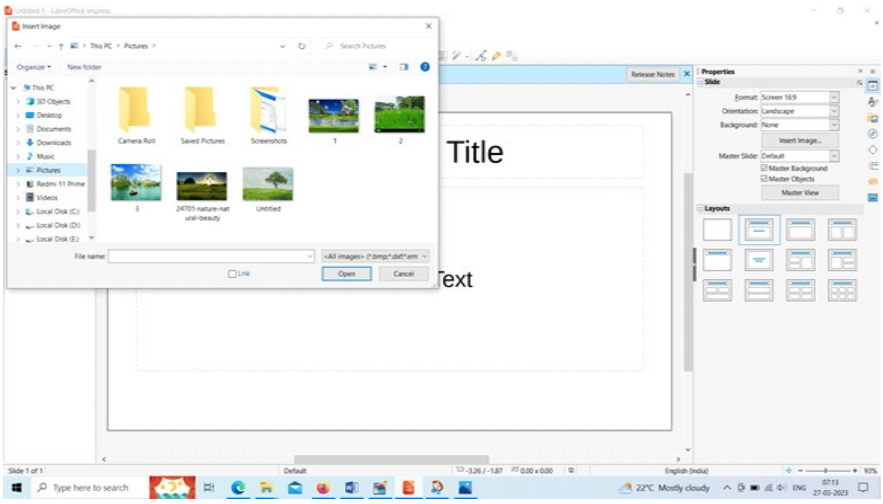


Figure 13.2 Selecting the image from a location

Adding Audio:

1. Open your presentation in LibreOffice Impress.
2. Select the slide where you want to add the audio.
3. Go to the “Insert” menu and choose “Audio or Video” or click on the “Insert Audio or Video” icon in the toolbar.
4. Locate and select the audio file you want to insert, then click “Open.”
5. A dialog box will appear with options to either play the audio automatically or when clicked. Choose the desired option and click “OK.”

Adding Video:

1. Open your presentation in LibreOffice Impress.
2. Select the slide where you want to add the video.
3. Go to the “Insert” menu and choose “Audio or Video” or click on the “Insert Audio or Video” icon in the toolbar.
4. Locate and select the video file you want to insert, then click “Open.”
5. A dialog box will appear with options to either play the video automatically or when clicked. Choose the desired option and click “OK.”

After adding images, audio, or video to your presentation, you can further customize their appearance and settings by selecting the inserted object and using the various formatting options available in LibreOffice Impress.

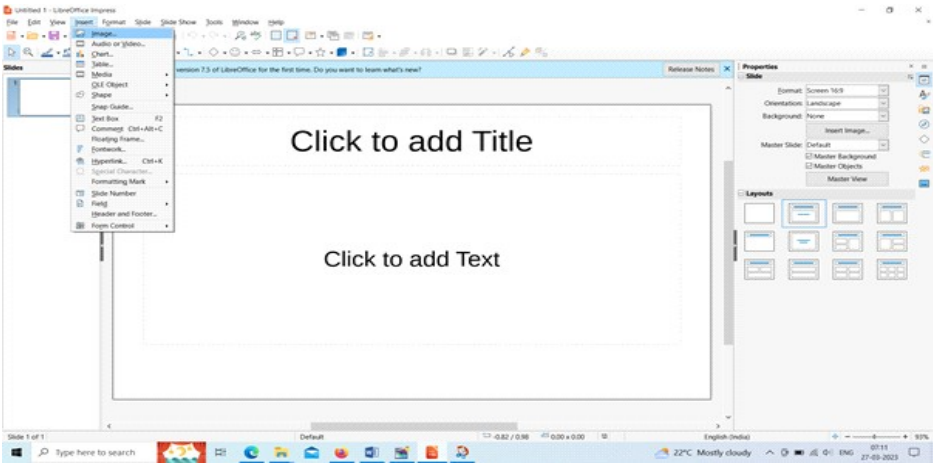


Figure 13.3: Inserting Movie and Sound

By following these steps, you can add images, audio, and video to a presentation in LibreOffice Impress to create a dynamic and engaging slideshow.

Libre Office Impres will let you insert audio files or movie files. The audio and movie files can be inserted by clicking Insert Movie and Sounds option from the Insert menu. Figure 13.3

Same as inserting images here also, a dialog box will be opened. Select the audio or movie file form the specified location and open. It will be opened in the slide. Figure 13.4. The movie or audio file inserted will be played during the slide show by clicking the mouse over it.

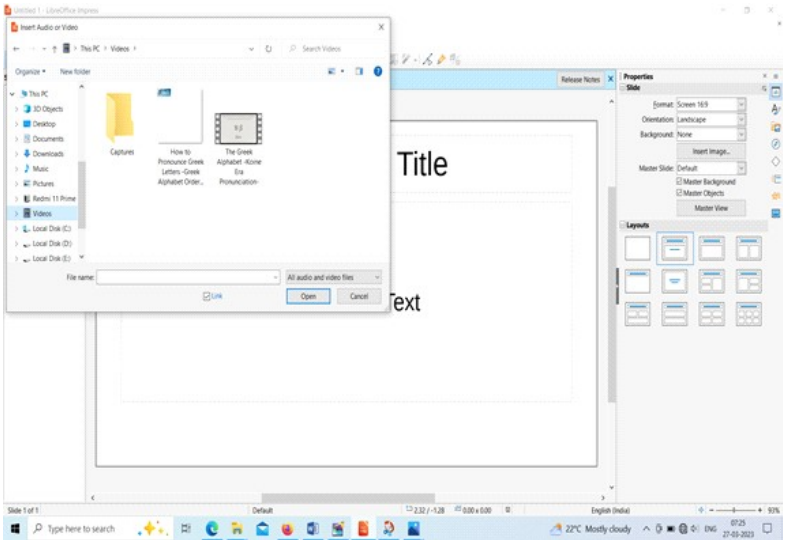


Figure 13.4 :Selecting the Movie / Sound file styles

13.4 CREATING AND MODIFYING ANIMATIONS TO ENHANCE VISUAL EFFECTS

Libre Office Impress allows users to create and modify animations to enhance visual effects and make presentations more dynamic. Here are the steps to create and modify animations in LibreOffice Impress:

Creating Animations:

1. Open your presentation in LibreOffice Impress.
2. Select the slide object (text box, image, shape, etc.) to which you want to apply an animation.
3. Go to the “Slide” menu and select “Custom Animation” or click on the “Custom Animation” icon in the sidebar.
4. In the “Custom Animation” pane, click on the “Add” button to add a new animation to the selected object.
5. Choose the animation effect you want to apply from the list. You can select from options such as entrance, emphasis, exit, or motion paths.
6. Set the animation options, such as duration, delay, and direction, by using the controls in the “Custom Animation” pane.
7. Click on the “Play” button to preview the animation.
8. To add more animations to the same object, repeat steps 4-7.
   To apply animations to other objects on the slide, select the object and repeat steps 4-8.

Modifying Animations:

1. Select the slide object with the animation you want to modify.
2. Go to the “Slide” menu and select “Custom Animation” or click on the “Custom Animation” icon in the sidebar.
3. In the “Custom Animation” pane, select the animation you want to modify.
4. Adjust the animation options, such as duration, delay, or timing, by using the controls in the “Custom Animation” pane.
5. To change the order of animations, use the up and down arrows in the “Custom Animation” pane to rearrange them.

6. To remove an animation, select it in the “Custom Animation” pane and click on the “Remove” button.
7. Click on the “Play” button to preview the modified animation.
8. To modify animations on other objects, select the object and repeat steps 3-7.

Click on the “Close” button to exit the “Custom Animation” pane.

By following these steps, you can create and modify animations in LibreOffice Impress to enhance the visual effects and make your presentations more engaging.

13.5 USING IMPRESS’S BUILTING TOOLS FOR RECORDING AND REHEARSING PRESENTATION

Libre Office Impress does not have built-in tools specifically for recording and rehearsing presentations. However, you can still achieve similar functionality using external screen recording and rehearsal tools. Here is a general approach you can follow:

Recording Presentations:

1. Set up a screen recording tool on your computer. There are several third-party screen recording software available, such as OBS Studio, Camtasia, or QuickTime Player (for Mac users).
2. Open your presentation in LibreOffice Impress and start the screen recording tool.
3. Begin presenting your slides in LibreOffice Impress while the screen recording tool captures your screen and audio.
4. Go through your entire presentation, and the screen recording tool will record your presentation as a video file.

Rehearsing Presentations:

1. Set up a rehearsal environment where you can practice your presentation comfortably.
2. Open your presentation in LibreOffice Impress.
3. Start a timer or use a stopwatch to time your presentation.
4. Practice presenting your slides, paying attention to your timing, delivery, and overall performance.

5. Make note of any areas where you stumble or need improvement, and consider making revisions to your presentation accordingly.
6. Repeat the rehearsal process until you feel confident with your presentation.

While LibreOffice Impress does not have built-in features for recording and rehearsing, you can utilize external tools for these purposes.



CHECK YOUR PROGRESS

Q.1: How can you add image or picture in your presentation in Impress?

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Q.2: Is any built-in tools for recording and rehearsing presentations?

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13.6 LET US SUM UP

- Libre Office Impress allows users to add images, audio, and video to make presentations more lively.
- Libre Office Impress allows users to create and modify animations to enhance visual effects and make presentations more dynamic.



13.7 FURTHER READING

1. Gupta, Vikas. Comdex Linux and Open Office Course Kit, New Delhi: Dreamtech Press, 2010. Print.
2. Wikipedia, the Free Encyclopedia (2012). OpenOffice.org. Web. 15 April 2013. <http://en.wikipedia.org/wiki/OpenOffice.org \>.

3. The Document Foundation. LibreOffice 4.0 Getting Started Guide. 2013. Web. 20 April 2013. <http://www.libreoffice.org/get-help/documentation>.



13.8 ANSWERS TO CHECK YOUR PROGRESS

Answer to Q No 1 :

Following are the steps for adding images:

i) Open your presentation in LibreOffice Impress.

ii) Select the slide where you want to add the image.

iii) Go to 'Insert' Menu and choose 'Image'.

iv) Locate and select the image file you want to insert, then click 'Open'.

v) Resize and position the image on the side as describe by clicking or draging its corners or edges.

Answer to Q No 2 : LibreOffice Impress does not have built-in tools specifically for recording and rehearsing presentations.



13.9 MODEL QUESTIONS

Q.1: What do you mean by custom animation? Write down the steps for applying an animation effect.

Q.2: What are the different kinds of animation effects?

Q.3: Are the slide transition effect and custom animation effect means the same? Explain your answer.

Q.4: Create a Impress about your institute and animation effects and transitions effects to the contents of the slides and the slides respectively. Make at least 5 slides for the presentation.

Q.5: How do you add animations to objects in my presentation?

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UNIT 14 : INTRODUCTION TO BASE

UNIT STRUCTURE

14.1 Learning Objectives

14.2 Introduction

14.3 Overview of Base

- 14.3.1 What is Base?
- 14.3.2 Features of Base

14.4 Launching Base and creating a new database

- 14.4.1 Opening Base
- 14.4.2 Creating a new database

14.5 Creating tables

- 14.5.1 What are tables?
- 14.5.2 Creating a table using the Table Design View
- 14.5.3 Entering data into a table

14.6 Creating forms

- 14.6.1 What are forms?
- 14.6.2 Creating a form using the Form Design View
- 14.6.3 Adding fields to a form

14.7 Creating queries

- 14.7.1 What are queries?
- 14.7.2 Creating a query using the Query Design View
- 14.7.3 Adding criteria to a query

14.8 Creating reports

- 14.8.1 What are reports?
- 14.8.2 Creating a report using the Report Design View
- 14.8.3 Adding fields to a report

14.9 Let Us Sum Up

14.10 Further Reading

14.11 Answers to Check Your Progress

14.12 Model Questions

14.1 LEARNING OBJECTIVES

After going through this unit, you will be able to

- understand the purpose and features of Base as a database management system.
- learn how to launch Base and create a new database.
- understand the concept of tables and learn how to create tables using the Table Design View.
- learn how to enter data into a table and manipulate table data.
- understand the concept of forms and learn how to create forms using the Form Design View.
- learn how to add fields to a form and manipulate form data.
- understand the concept of queries and learn how to create queries using the Query Design View.
- learn how to add criteria to a query and retrieve specific data from tables.
- understand the concept of reports and learn how to create reports using the Report Design View.
- learn how to add fields to a report and manipulate report data.

14.2 INTRODUCTION

Base is a powerful database management system (DBMS) that is included in the LibreOffice suite of productivity software. With Base, users can create, edit, and manage databases that can store a wide range of information, from simple lists to complex relational data. It offers features such as creating tables, forms, queries, and reports, and it can connect to various database engines. In this article, we will explore the basic features and functionality of Base, including how to create a new database, design tables, create forms, queries, and reports. By the end of this article, you will have a basic understanding of Base and be able to start creating your own databases.

14.3 OVERVIEW OF BASE

14.3.1 What is Base?

LibreOffice Base is a database management system (DBMS) that is included in the LibreOffice suite of productivity software. It provides a user-friendly interface for creating and managing databases, allowing users to store, organize, and retrieve various types of data. Base allows users to create tables, forms, queries, and reports, and it can connect to various database engines such as MySQL, PostgreSQL, and Microsoft Access. Base is open-source software, which means that it is free to download, use, and distribute. It is available for Windows, macOS, and Linux operating systems, making it a versatile and accessible tool for managing databases across different platforms.

14.3.2 Features of Base

The features of LibreOffice Base, a database management system, are:

(a) Creating and managing databases: Users can create and manage multiple databases within Base. They can connect to various database engines such as MySQL, PostgreSQL, and Microsoft Access.

(b) Designing Tables: Users can design tables with multiple fields and data types, set primary keys, and set relationships between tables.

(c) Creating Forms: Base allows users to create forms to enter, edit, and view data in tables. Users can customize the form layouts, create sub-forms, and add controls such as buttons and drop-down lists.

(d) Creating Queries: Base allows users to create queries to retrieve specific data from one or multiple tables. Users can filter, sort, and calculate data using queries.

(e) Creating Reports: Users can create reports to present data in a visually appealing format. Users can customize the report layout, add charts, graphs, and other design elements.

(f) Importing and Exporting Data: Base allows users to import and export data from various formats, such as CSV, Excel, and Access.

Overall, LibreOffice Base provides a powerful and flexible platform for creating, managing, and analyzing data in a variety of contexts, from personal data tracking to complex business operations.

14.4 LAUNCHING BASE AND CREATING A NEW DATABASE

14.4.1 Opening Base

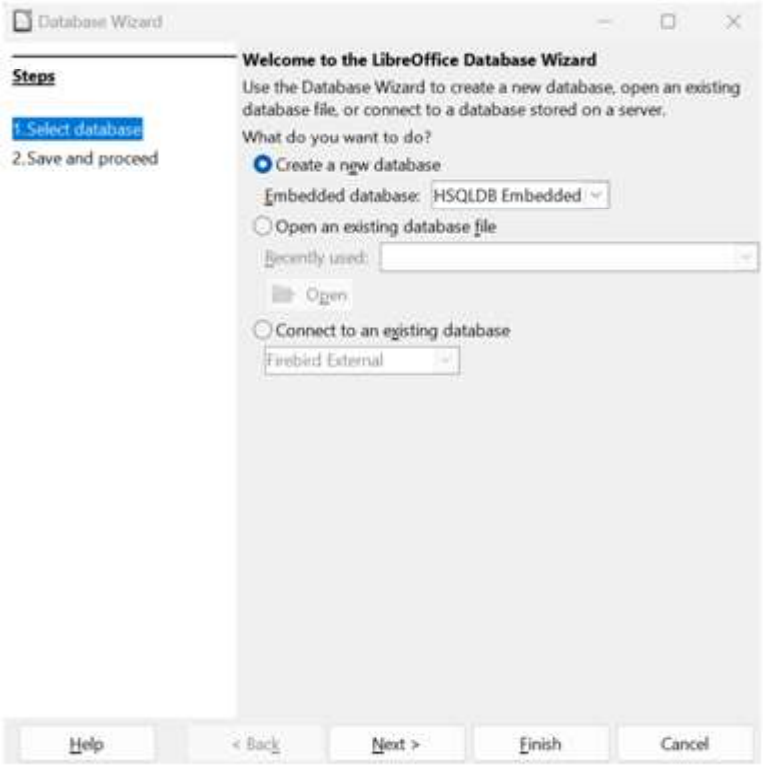
To open LibreOffice Base, you can follow these steps:

1. Click on the “Start” menu button on your computer’s desktop.
2. Type “LibreOffice” in the search bar to locate the application.
3. Click on the “LibreOffice” icon to launch the LibreOffice suite.
4. From the LibreOffice Welcome screen, click on the “Base” icon to launch LibreOffice Base.

14.4.2 Creating a new database

Here is the step-by-step procedure to create a new database in LibreOffice Base:

1. Create a new database: In the LibreOffice Base window, click on the “Create a new database” option.

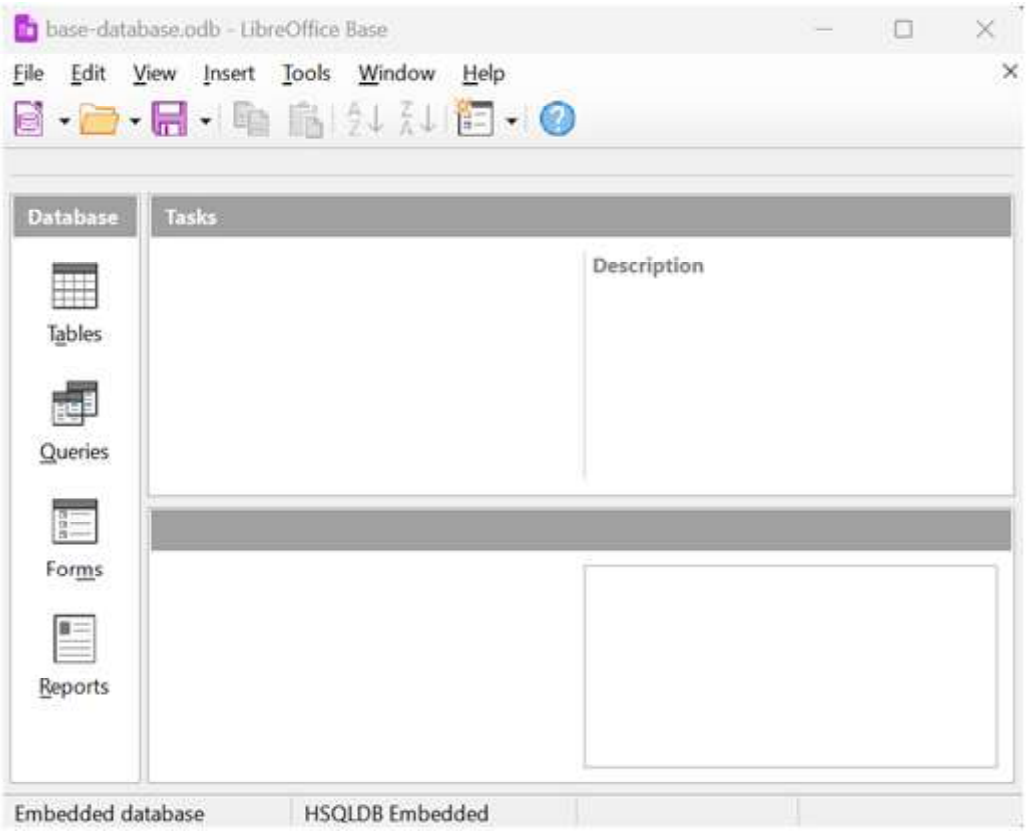


2. Select the database type: Choose the type of database you want to create. You can select from the following options:
    - “Connect to an existing database”: Connect to an existing database file.
    - “Create a new database”: Create a new database file.
    - “Open anexisting database file”: Open an existing database file.
3. Choose the location and name of the database: In the “Save As” dialog box, select the location where you want to save the database file, give it a name, and click “Save.”
4. Select the database engine: Choose the database engine you want to use. The default is “HSQLDB Embedded,” which is suitable for small to medium-sized databases. For larger databases, you may want to consider using a different database engine such as MySQL or PostgreSQL.
5. Set up the database: In the “Set up the database” dialog box, choose the options you want for your database, such as the

default table type, default character set, and default collation. Click “Next” when you’re done.

6. Choose the user authentication method: Choose the user authentication method you want to use. The default is “User-defined,” which means you can create your own usernames and passwords. You can also choose “System” to use the system login information or “No authentication” to have no authentication at all.
7. Create the database: Review your database settings and click “Create” to create the new database. Once the database is created, you can start designing tables, forms, queries, and reports.

Following is the screenshot of “creating a new database” which is saved with database name “base-database”



14.5 CREATING TABLES

14.5.1 What are tables?

In LibreOffice Base, a table is a collection of related data organized into rows and columns. It is similar to a table in a spreadsheet program like LibreOffice Calc or Microsoft Excel, but in Base, tables are used to store data in a database.

Tables in Base have the following properties:

Columns: Each table has a set of columns that define the type of data that can be stored in each field. For example, a column might be defined as text, date, or number.

Rows: The data stored in a table is organized into rows, with each row representing a separate record. Each row contains data that corresponds to the columns in the table.

Keys: A table can have one or more columns designated as keys, which are used to uniquely identify each record in the table.

Relationships: Tables can be related to one another through common columns, allowing data to be shared between them.

Tables are the foundation of any database in LibreOffice Base, and they are used to store and organize all of the data in the database. Other database objects, such as forms and queries, are built on top of tables, making them an essential component of any database application.Top of Form

14.5.2 Creating a table using the Table Design View

The step-by-step procedure to create a table using the Table Design View:

1. Open LibreOffice Base and create a new database or open an existing one.
2. In the main window of LibreOffice Base, click on the “Tables” icon in the left-hand panel.
3. Click the “Create Table in Design View” button at the bottom of the window.

4. In the “Table Design” dialog box, enter a name for your table in the “Table Name” field.
5. In the “Field Name” column, enter a name for the first field in your table.
6. In the “Type” column, select the data type for the first field. You can choose from options such as “Text”, “Number”, “Date”, etc.
7. If you want to specify any additional options for the field, such as a default value or maximum length, you can do so in the “Properties” column.
8. Repeat steps 5-7 for each additional field you want to add to your table.
9. If you want to set a primary key for your table, select the field or fields that will be part of the key and click the “Primary Key” button at the top of the window.
10. Click the “Save” button to save your new table.
11. In the “Save As” dialog box, choose a location to save the table and enter a name for the table.
12. Click “OK” to save the table and close the “Table Design” dialog box.

Your new table will now be listed in the “Tables” section of the LibreOffice Base window. You can open the table to view and edit the data stored in it, or use it as the basis for creating forms, queries, and reports in LibreOffice Base.

14.5.3 Entering data into a table

Here’s a step-by-step procedure to enter data into a table:

1. Open LibreOffice Base and create a new database file or open an existing one.
2. In the main menu, click on “Tables” and select the table you want to add data to.
3. Click on the “Edit” button to open the table in edit mode.
4. You should see an empty grid with the column names of your table. Start by typing the data for the first row in the appropriate cells.

5. You can use the Tab key to move to the next cell or the Enter key to move to the next row.
6. Keep entering data until you have filled in all the necessary rows and columns.
7. Once you are done, click on the “Save” button to save your changes to the table.
8. Close the table edit mode by clicking on the “Close” button.
9. You can now view the data you entered by going to the “Forms” or “Queries” section, selecting the appropriate form or query, and opening it.

14.6 CREATING FORMS

14.6.1 What are forms?

Forms in LibreOffice Base are graphical user interfaces that allow you to view, input, modify, and delete data in a database. Forms are a fundamental feature of any database application, as they allow users to interact with the database in a more user-friendly way than working directly with the raw data in tables.

Forms in LibreOffice Base can be created using a wizard or by designing them manually using the Form Design view. Once created, forms can be customized to suit your needs by adding controls such as text boxes, drop-down lists, and buttons, as well as applying formatting and validation rules to ensure data is entered correctly.

14.6.2 Creating a form using the Form Design View

Here are the step-by-step procedure for creating a form using the Form Design View in LibreOffice Base:

1. Open LibreOffice Base and select the database you want to create a form for.
2. Click on the “Forms” tab in the main window to display the available forms.

3. Click on the “Use Wizard to Create Form” button to launch the form creation wizard, or select “Create Form in Design View” from the “Forms” drop-down menu to create a form manually.
4. In the Form Design View, click on the “Design Mode On/Off” button in the toolbar to turn on design mode if it is not already on.
5. Use the “Controls” toolbar to add controls such as text boxes, labels, and buttons to the form. You can click and drag the controls to move them around the form, and resize them by clicking and dragging the handles on the edges.
6. Use the “Properties” panel to customize the properties of each control. For example, you can set the name, data type, and validation rules for a text box.
7. Use the “Form Navigator” panel to add, remove, or rearrange fields on the form. You can also use this panel to create sub-forms or set up master-detail relationships between tables.
8. Use the “Form Design Toolbar” to customize the appearance of the form. You can change the font, color, and style of the form elements, as well as set up conditional formatting to highlight certain data.
9. When you are satisfied with the form design, click on the “Save” button in the toolbar to save the form. You can give the form a name and choose where to save it in the database.
10. To test the form, switch to “Form Design Off” mode by clicking on the “Design Mode On/Off” button in the toolbar. You can then use the form to view, input, modify, or delete data in the database.

With these steps, you should be able to create a form using the Form Design View in LibreOffice Base.

14.6.3 Adding fields to a form

Here are the step-by-step procedures to add fields to a form in LibreOffice Base:

1. Open LibreOffice Base and open the database containing the table to which you want to add fields to the form.
2. Click on the Forms tab at the bottom of the LibreOffice Base window to open the Forms section.
3. Click on the Create Form in Design View option to create a new form in the design view.
4. In the Form Design view, select the Controls icon in the left-hand sidebar, then select the type of control you want to add to the form from the list. For example, select Text Box for a field that will accept text input.
5. Click and drag the control onto the form where you want to place it.
6. Right-click on the new control and select Control Properties from the context menu.
7. In the Control Properties dialog box, select the Data tab.
8. In the Data tab, select the table to which you want to bind the control from the Table drop-down menu.
9. Select the field from the table that you want to associate with the control from the Field drop-down menu.
10. Adjust any other settings or properties for the control as desired, such as default values or validation rules.
11. Repeat the above steps to add additional fields to the form as needed.
12. Save the form when finished by selecting File > Save from the menu bar or by using the keyboard shortcut Ctrl + S.

Your form should now be updated with the new fields, and you can use it to input, view, or modify data in your database.

14.7 CREATING QUERIES

14.7.1 What are queries?

Queries in LibreOffice Base are a powerful tool for retrieving specific data from a database. A query is essentially a search that you perform

on the data in your database to extract only the information that meets specific criteria.

Queries can be saved and reused, which makes them a useful tool for generating reports or answering recurring questions. By creating a query once, you can extract the information you need quickly and easily each time you need it, without having to manually search through the entire database.

14.7.2 Creating a query using the Query Design View

Here's a step-by-step procedure to create a query using the Query Design View in LibreOffice Base:

1. Open LibreOffice Base and open the database you want to work with.
2. Click on the "Queries" icon in the left-hand pane of the main window.
3. Click on the "Create Query in Design View" button in the toolbar.
4. In the "Tables" pane, select the tables or queries you want to include in the query by double-clicking on them or dragging them to the main pane.
5. Drag the fields you want to include in the query from the "Tables" pane to the main pane. You can also use the "Add Field" button in the toolbar.
6. If you want to include criteria for the query, use the "Criteria" row in the main pane. For example, if you only want to include records where the value in a certain field is greater than a specific number, you would enter "> [number]" in the Criteria row for that field.
7. If you want to sort the results of the query, use the "Sort" row in the main pane. You can specify ascending or descending order for each field.
8. Click the "Run Query" button in the toolbar to preview the results of the query. You can also use the "Run" menu and select "Run Query".

9. If the query is returning the results you want, save it by clicking the “Save” button in the toolbar or using the “File” menu.
10. Give the query a name and click “OK”. The query will be saved and can be run or edited in the future.

14.7.3 Adding criteria to a query

Here are the step-by-step procedures to add criteria to a query in LibreOffice Base:

1. Open LibreOffice Base and select the database that contains the table you want to query.
2. Click on the “Queries” icon in the left sidebar to open the Queries section.
3. Click on the “Create Query in SQL View” button to create a new query.
4. In the Query Design View, click on the “Criteria” row in the grid that corresponds to the field you want to filter.
5. Type the criteria you want to use to filter the field. For example, if you want to find all records where the “Age” field is greater than 25, you would enter “>25” in the Criteria cell.
6. Repeat steps 4-5 for each field you want to filter.
7. Click on the “Run Query” button to view the results of your query.
8. If necessary, refine your criteria until you get the desired results. You can do this by changing the values in the Criteria cells or by adding additional criteria.
9. When you’re satisfied with your query, save it by clicking on the “Save” button in the toolbar.
10. You can now reuse your query whenever you need to retrieve data that meets your criteria by opening it from the Queries section in the left sidebar.

Overall, adding criteria to a query in LibreOffice Base is a simple process that allows you to extract specific data from your database quickly and efficiently. By refining your criteria, you can further narrow down your search and get the information you need with ease.

14.8 CREATING REPORTS

14.8.1 What are reports?

In LibreOffice Base, a report is a document that presents data from a database in a structured and formatted manner. Reports can be used to create professional-looking documents such as invoices, letters, or other business documents. Reports can be based on queries or tables, and can include data from multiple tables or queries.

14.8.2 Creating a report using the Report Design View

Followings are step-by-step procedure to create a report using the Report Design View in LibreOffice Base:

1. Open LibreOffice Base and select the database that contains the table or query you want to base your report on.
2. Click on the “Reports” icon in the left-hand panel to open the reports section.
3. Right-click on an empty space in the reports section and select “Create Report in Design View” from the context menu.
4. In the “Select Database Tables” dialog box, select the table or query you want to base your report on and click “Add”.
5. In the “Report Design” view, you will see the “Report Navigator” pane on the left, and the “Design” pane on the right. The “Design” pane is where you will create your report layout.
6. Drag and drop the fields from the “Table Field List” pane onto the “Design” pane to add them to your report. You can also use the “Report Wizard” to guide you through this process.
7. To format your report, select the field or section you want to format, and use the formatting options in the “Properties” pane on the right.
8. To add headers, footers, or page numbers to your report, right-click on the corresponding section in the “Report Navigator” pane, and select “Edit”.

9. Preview your report by clicking the “Preview” button in the toolbar. You can also print your report or export it to a different format.
10. Save your report by clicking on “File” and selecting “Save” or “Save As”.

14.8.3 Adding fields to a report

Followings are step-by-step procedure to add fields to a report in LibreOffice Base:

1. Open your database in LibreOffice Base and click on the “Reports” icon in the main window.
2. Select the report you want to modify from the list of available reports and click “Edit.”
3. In the report editor, click on the “Design View” button to switch to design mode.
4. To add a new field to the report, click on the “Insert Field” button in the toolbar. This will open the “Insert Field” dialog box.
5. In the “Insert Field” dialog box, select the table or query that contains the field you want to add to the report.
6. Choose the field you want to add from the list of available fields, and click “OK.”
7. The new field will now be added to the report, and you can position it by dragging it to the desired location on the report.
8. To modify the formatting of the field, right-click on the field and select “Properties.” This will open the “Properties” dialog box, where you can change the font, color, alignment, and other formatting options for the field.
9. Repeat steps 4-8 to add any additional fields you want to include in the report.
10. Once you have added all the desired fields and modified their formatting, save the report by clicking on the “Save” button in the toolbar.

11. To view the report with the new fields, click on the “Preview” button in the toolbar. This will generate a preview of the report that you can view and print.



CHECK YOUR PROGRESS

Choose the correct option:

Q.1. What is LibreOffice Base?

A. A spreadsheet program
B. A database management system
C. A word processing program
D. An email client

Q.2. What types of data can be stored in a table in Base?

A. Text, images, and videos
B. Numbers, dates, and times
C. Music, movies, and podcasts
D. All of the above

Q.3. Which of the following is NOT a feature of Base?

A. Creating and managing databases
B. Designing tables
C. Creating animations
D. Importing and exporting data

Q.4. Which operating systems is Base available on?

A. Windows and Linux
B. macOS and Windows
C. macOS and Linux
D. iOS and Android

Q.5. What is a key in a table?

A. A tool used to open the table
B. A column used to uniquely identify each record in the table
C. A type of data that can be stored in the table
D. A relationship between tables

Q.6. What is the purpose of a query in Base?

A. To create charts and graphs

B. To filter and sort data from one or multiple tables

C. To create sub-forms

D. To create reports

Q.7. What is a query in LibreOffice Base?

A. A tool for retrieving specific data from a database

B. A tool for creating professional-looking documents

C. A tool for formatting data in a structured manner

D. A tool for creating tables and fields in a database

Q.8. What is the purpose of creating a query in LibreOffice Base?

A. To create reports

B. To create tables

C. To extract specific data from a database

D. To format data in a structured manner

Q.9. Which view is used to create a query in LibreOffice Base?

A. Report Design View

B. Table Design View

C. Form Design View

D. Query Design View

Q.10. How can you add criteria to a query in LibreOffice Base?

A. By using the Report Design View

B. By using the Table Design View

C. By using the Form Design View

D. By using the Query Design View

Q.11. What is a report in LibreOffice Base?

A. A tool for retrieving specific data from a database

B. A tool for creating professional-looking documents

C. A tool for formatting data in a structured manner

D. A tool for creating tables and fields in a database

Q.12. Which view is used to create a report in LibreOffice Base?

A. Report Design View

B. Table Design View

C. Form Design View

D. Query Design View



14.9 LET US SUM UP

- Base provides various features such as creating and managing databases, designing tables, creating forms, queries, and reports, importing and exporting data, etc.
- To create a new database in LibreOffice Base, users can follow a simple step-by-step process that involves selecting the database type, location, name, database engine, and user authentication method.
- Tables are a fundamental component of a database in Base and consist of columns, rows, keys, and relationships that help store and organize data.
- Queries are a powerful tool in LibreOffice Base used for retrieving specific data from a database by searching and extracting information that meets specific criteria.
- Queries can be saved and reused, which makes them useful for generating reports or answering recurring questions.
- Criteria can be added to a query to further narrow down the search for specific data, and the query can be refined until the desired results are obtained.
- Reports in LibreOffice Base are structured and formatted documents that present data from a database and can be based on queries or tables.
- Reports can be created using the Report Design View, which provides tools for adding fields, formatting options, and sections such as headers, footers, and page numbers.

- Reports can be previewed and saved, and can be used to create professional-looking documents such as invoices, letters, or other business documents.



14.10 FURTHER READING

1. "Getting Started with LibreOffice Writer," The Document Foundation, accessed March 11, 2023, https://documentation.libreoffice.org/en/english-documentation/getting-started-writer/.
2. "LibreOffice Writer Guide," The Document Foundation, accessed March 11, 2023, https://documentation.libreoffice.org/en/english-documentation/writer-guide/.
3. "LibreOffice Writer Tutorial," Tutorials Point, accessed March 11, 2023, https://www.tutorialspoint.com/libreoffice/libreoffice_writer_tutorial.htm.



14.11 ANSWERS TO CHECK YOUR PROGRESS

1.B 2.B 3.C 4.B 5.B 6.B 7.A 8.C 9.D 10.D
11.B 12.A



14.12 MODEL QUESTIONS

Q.1: What is LibreOffice Base, and what are its main features?

Q.2: How do you launch LibreOffice Base, and what are the steps involved in creating a new database?

Q.3: What are tables in LibreOffice Base, and what properties do they have?

Q.4: How do you design tables in LibreOffice Base, and what are some of the options available for customizing their structure and properties?

Q.5: What are forms in LibreOffice Base and how do they enhance user interaction with the database?

Q.6: What are the two ways to create a form in LibreOffice Base, and what are the advantages of each approach?

Q.7: What are the basic steps involved in creating a form using the Form Design View in LibreOffice Base, and what are some of the key features and tools available in this view?

Q.8: How do you add fields to a form in LibreOffice Base, and what are some of the options and settings you can configure for these fields?

Q.9: What are queries in LibreOffice Base, and how do they help you extract specific information from a database? What are the basic steps involved in creating a query using the Query Design View, and what are some of the tools and options available in this view?

Q.10: What is a report in LibreOffice Base?

Q.11: What are the steps to create a report using the Report Design View in LibreOffice Base?

Q.12: How do you add fields to a report in LibreOffice Base?

Q.13: Can reports be based on multiple tables or queries in LibreOffice Base?

Q.14: How do you modify the formatting of a field in a report in LibreOffice Base?

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