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Preparation & Reference Book
Category - Senior

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Unit 1 Computer Fundamentals & Hardware

Aim: You will learn about -

- Hardware & Software of computer.
- Functions of Different parts of computer.
- OS, BIOS, and Booting.

Learning Outcomes:

- Categorize a computer component into Hardware & Software
- Identify various parts inside a computer & state their functions
- Define OS, BIOS, and Application software.

Introducing various parts of computers

Computer Hardware is the physical part of a computer, as distinguished from the computer software that executes or runs on the hardware. The hardware of a computer is infrequently changed, while software and data are modified frequently. The term soft refers to readily created, modified, or erased. These are unlike the physical components within the computer which are hard.



Input Device

An **input device** is any hardware device that sends data to a computer, allowing you to interact with and control the computer. The picture shows a trackball mouse, an example of an input device. The most commonly used or primary input devices on a computer are the keyboard and mouse. However, there are dozens of other devices that can also be used to input data into the computer. Following are few of the important input devices which are used in a computer:



- **Keyboard**

Keyboard is a device used to enter data in computer. For operating a computer, you need to provide Instructions to the computer. You can use keyboard to enter data and instruction for the computer. In other words, a keyboard helps you to communicate with the computer. The keyboard is normally connected to a computer through a cable.

Types of keyboard–

1. 101-Key Enhanced Keyboard
2. 104-key Windows Keyboard
3. Multimedia Keyboard



- 1. 101- Key Enhanced Keyboard** – The 101-keyboard layout is based on the IBM PC/AT 390 Model. This layout was introduced in 1984 and is now standard for full size keyboard. The 101-key keyboard consists of basic keypad, a Cursor keypad and numeric keypad.
- 2. 104- Key Windows Keyboard** – The 104-key windows keyboard Introduced by microsoft. It is Advance version of the 101-key enhanced keyboard. The 104-key windows keyboard offer additional 3 keys that includes two windows key and 1 context menu key. The windows key helps you to resume the windows related function such as opening start menu. The context menu key used for Right Click option.
- 3. Multimedia Keyboard** – Multimedia keyboard is designed in a standard keyboard layout that provides media controls to play CD, DVD, and mp3 media files. Multimedia keyboard have special keys for accessing web-browser, email or a music player at the touch of a button.

- **Mouse**

A mouse is a basic input device of a computer that controls the movement of the cursor or the pointer on the display screen.



Types of Mouse

1. Mechanical Mouse
2. Optical Mouse
3. Wireless Mouse

1. Mechanical Mouse :-

Mechanical Mouse is the oldest form of computer mouse. This type of mouse consist of rubber ball that makes contact with wheels inside the unit when it is rolled on mouse pad Mechanical mouse consist of mechanical sensor that detect the direction and movement of mouse generates electric signal. These signals are sent to the computer and computer converts them into proper action on the screen.

2. Optical mouse: -

An optical mouse is the latest computer pointing device that uses the light emitting diode to detect the movement of the mouse.

3. Wireless mouse: -

The wireless mouse is similar to other conventional mouse accept that if does not make use of a cable to connect to the computer. It usually work on radio frequency commonly known as RF.



- **Joystick**



A joystick is an input device commonly used to control video games. Joysticks consist of a base and a stick that can be moved in any direction. The stick can be moved slowly or quickly and in different amounts. Some joysticks have sticks that can also be rotated to the left or right. Because of the flexible movements a joystick allows, it can provide much greater control than the keys on a keyboard.

Joysticks typically include several buttons as well. Most joysticks have at least one button on the top of the stick and another button in the front of the stick for the trigger. Many joysticks also include other buttons on the base that can be pressed using the hand that is not guiding the stick. Joysticks typically connect to your computer using a basic USB or serial port connection and often come with software that allows you to assign the function of each button.

- **Light pen**





Light pen is a pointing device which is similar to a pen. It is used to select a displayed menu item or draw pictures on the monitor screen. It consists of a photocell and an optical system placed in a small tube. When the tip of a light pen is moved over the monitor screen and pen button is pressed, its photocell sensing element detects the screen location and sends the corresponding signal to the CPU

- **Trackball**



Track ball is an input device that is mostly used in notebook or laptop computer, instead of a mouse. This is a ball which is half inserted and by moving fingers on ball, pointer can be moved. Since the whole device is not moved, a track ball requires less space than a mouse. A track ball comes in various shapes like a ball, a button and a square.

- **Scanner**





Scanner is an input device which works more like a photocopy machine. It is used when some information is available on a paper and it is to be transferred to the hard disc of the computer for further manipulation. Scanner captures images from the source which are then converted into the digital form that can be stored on the disc. These images can be edited before they are printed.

- **Graphic Tablet**



It is an input device which converts analog information into digital form. Digitizer can convert a signal from the television or camera into a series of numbers that could be stored in a computer. They can be used by the computer to create a picture of whatever the camera had been pointed at. Graphics Tablet is also known as digitizer or Tablet because it converts graphics and pictorial data into binary inputs. A graphic tablet as digitizer is used for doing fine works of drawing and image manipulation applications.

- **Microphone**

Microphone is an input device to input sound that is then stored in digital form. The microphone is used for various applications like adding sound to a multimedia presentation or for mixing music.



Some more Input devices are as follows:

- Magnetic Ink Card Reader(MICR)
- Optical Character Reader(OCR)
- Bar Code Reader
- Optical Mark Reader(OMR)

output device:

- ❖ An **output device** is any peripheral that receives data from a computer, usually for display, projection, or physical reproduction.
- ❖ For example, the image shows an inkjet printer, an output device that can make a hard copy of any information shown on your monitor.
- ❖ Another example of an output device is a computer monitor, which displays an image that is received from the computer. Monitors and printers are two of the most common output devices used with a computer.

Following are few of the important output devices which are used in a computer.



- **Monitors**
- **Graphic Plotter**
- **Printer**
- **Monitors**

A monitor or a display is an electronic visual display for computers. The monitor comprises the display device, circuitry and an enclosure. The display device in modern monitors is typically a thin film transistor liquid crystal display (TFT-LCD) thin panel, while older monitors use a cathode ray tube (CRT) about as deep as the screen size.

- **CRT Monitor:**

CRT Monitor has a cathode tube in the back. Electricity causes the cathode ray to release electrons which accelerate and heat the screen, as the electrons collide with the screen which is often made from phosphorous. The interaction between the electrons and phosphorous generate 3 colours red, green and blue. CRT monitor use this colour in different combination to form all the other necessary colours. This is why the monitor cable that connects to the computer is sometimes called the RGB cable. The CRT monitor uses information same from the computer to create image one by one essentially refreshing the screen a creation of number of time per second. The higher number of the time the screen is refreshed in a second the smoother the image on the screen will be displayed. A low refresh rate causes the flicker effect commonly seen on older CRT Monitor and T.V

*Size: CRT monitors normally range in screen size from 15 to 21 inches.



*Misconception: CRT are often thought of as the absolute in light off Liquid Crystal Display. CRT often produce a picture that is sharper and clear than newer technology because the CRT is able to achieve a higher resolution. The reason for replacing CRTs with flat panel monitors were that the flat panel monitors save space and energy.

*Consideration: CRT create better contrast and are cheaper than flat panel technology monitors but they are also heavier and bulkier than LCDs. LCD consume about half to two third the energy of CRT monitor.

*Features of CRT: The ultimate goal of monitor technology is the thinnest and at cheap model that still delivers the quality image. However there are still many application for CRT monitors. Games with high motion graphics work better on CRT monitor than LCD because LCD can have motion blur or pixelation problem.

- **LCD Monitor:**

Liquid Crystal Display monitor is one of most widely used flat panel monitor. The LCD is popular as a display device as compared to CRT because of its power conservation thinness and eye resolution its widely use in digital television laptop computer and digital camera LCD monitor take up less disk space and they are lighter compared to CRT Monitor.

***Characteristics of Monitor:**

- 1) Resolution: A computer display such as image is made of pixel. Monitor resolution is Major in pixel for e.g, 640X480 resolution means that the screen is 640 pixel wide by 480 pixel fall. The more the pixel, the higher is resolution and the more sharp and clear is display on the screen.



2) Size: The size of the monitor refer to the length of the monitor in inches. Monitor are available in size ranging from 40 inches to 22 inches. The size of the monitor is major diagonally.

- **LED Monitor**

An LED monitor (short for Light Emitting Diode) or LED display is a flat screen, flat panel computer monitor or television. It has a very short depth and is light in terms of weight. The actual difference between this and a typical LCD monitor is the backlighting. The first LCD monitors used CCFL instead of LEDs to illuminate the screen.



- **Graphic Plotter**



A plotter is a graphics printer that literally uses ink pens to draw the images. The pens move around on the surface of the paper like



something out of The Sorcerer's Apprentice. Plotters can only draw data in vector graphics format, graphics that are made of straight lines (the curved forms are actually drawn with many tiny straight lines). There are flatbed plotters where the pen moves across the page in the x and y axes.

- **Printer**



A printer is a device that accepts text and graphic output from a computer and transfers the information to paper, usually to standard size sheets of paper. Printers vary in size, speed, sophistication, and cost. In general, more expensive printers are used for higher-resolution color printing.

Personal computer printers can be distinguished as impact or nonimpact printers. Early impact printers worked something like an automatic typewriter, with a key striking an inked impression on paper for each printed character. The dot-matrix printer was a popular low-cost personal computer printer. It's an impact printer that strikes the paper a line at a time. The best-known non-impact printers are the inkjet printer, of which several makes of low-cost color printers are an example, and the laser printer. The inkjet sprays ink from an ink cartridge at very close range to the paper as it rolls by. The laser printer uses a laser beam reflected from a



mirror to attract ink (called toner) to selected paper areas as a sheet rolls over a drum.

Computer Port

- A computer port is a connection point or interface between a computer and an external or internal device. Internal ports may connect such devices as hard drives and CD ROM or DVD drives; external ports may connect modems, printers, mice and other devices.
- Mainly computer ports are divided into two heads, serial ports and parallel ports. These two are also famously known as female ports and male ports. There are more serial ports in modern computers than parallel ports.

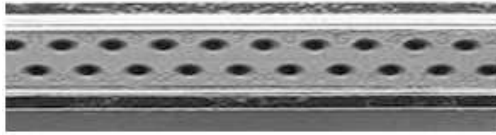
Serial Ports:



- Serial port is used to communicate singles line or for completing the circuit.
- Data is transferred as bits from sender to receiver.
- The serial port takes 8, 16, or 32 parallel bits from the computer bus and converts it as an 8, 16, or 32 bit serial stream.
- Serial communications are further divided into two types, synchronous and asynchronous.

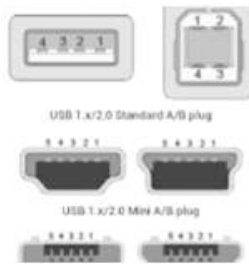


Parallel ports:



- Parallel ports are used to connect printers and other hardware.
- It is 25 pin port also named as IEEE 1284-compliant centronics port.
- Two variants of this port are ECP and EPP ports.
- These are 10 time faster than older port and support computer to handle data in two-ways.

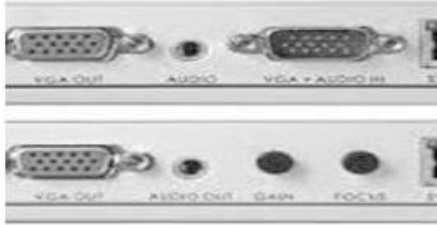
Universal Serial Port (USB):



- Universal serial port which is commonly known as USB, it was first introduced in 1997.
- This port is used to connect external devices (External storage devices and other devices) to your computer.
- This port can be available on either sides of computer back/front sides of computer. With a USB hub you can connect more than 127 devices to a port.
- This port can transfer data at speed of 12 MB per second. This device is further available in different types that includes original USB, basic USB trident, Super Speed USB and USB 3.0. Among all of them USB 3.0 is fastest.



VGA Port:



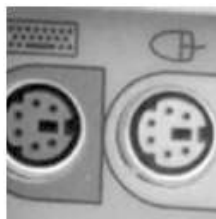
This port is used to connect system's video card with monitor. This connector holds 15 holes and looks more like a serial port connector. But only difference is that there are pins not holes.

Ethernet or Network Port:



- This port enables users to connect to network or Ethernet much faster than other ports. Its jack looks more like telephone jack and help to connect system with internet.
- Cable connected in this port is either lead to network hub,
- DSL modem or cable modem. It share connection in faster way, new systems come with at least three of these ports.

PS/2 port:





Audio jack Socket:



In electronics, a **Phone connector**, also known as **Phone Jack**, **Audio Jack** or **Jack Plug**, is a common family of connector typically used for analog signals, primarily audio. It is cylindrical in shape, typically with two, three, four and, recently, five contacts.

Power Plugs Sockets:



AC power plugs and sockets are devices that allow electrically operated equipment to be connected to the primary alternating current (AC) power supply in a building.

A computer fan:



- Is any fan inside, or attached to, a computer case used for active cooling, and may refer to fans that draw cooler air into the case from the outside,
- Expel warm air from inside, or move air across a heatsink to cool a particular component. Generally these are found in axial and sometimes centrifugal forms



Other components of computer

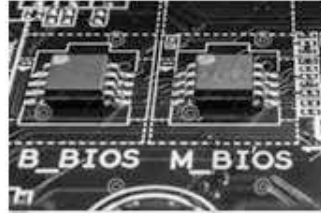
Motherboard



- A motherboard is one of the most essential parts of a computer system.
- It holds together many of the crucial components of a computer, including the central processing unit (CPU), memory and connectors for input and output devices.
- The base of a motherboard consists of a very firm sheet of non-conductive material, typically some sort of rigid plastic. Thin layers of copper or aluminum foil, referred to as traces, are printed onto this sheet.
- These traces are very narrow and form the circuits between the various components. In addition to circuits, a motherboard contains a number of sockets and slots to connect the other components.

BIOS:

- BIOS (pronounced bye-oss) is a ROM chip located on all motherboards that allows you to access and set up your computer system at the most basic level. In the picture is an example of what a BIOS chip may look like on your computer motherboard.
- In this example, this is a picture of an early AMIBIOS, a type of BIOS manufactured by the AMI. Another good example of a BIOS manufacturer is Phoenix.



The BIOS includes instructions on how to load basic computer hardware and includes a test referred to as a POST (Power On Self Test) that helps verify the computer meets requirements to boot up properly. If the computer does not pass the POST, you will receive a combination of beeps indicating what is malfunctioning within the computer.

* * *

Unit 2. Introduction to Advance Operations of Ubuntu

Aim: You will learn about -

- About operating system & its works.
- Introduction to Ubuntu
- Working on basics & Menu Bar of Ubuntu

Learning Outcomes

- Understanding desktop
- Examples & functions of operating system (OS)
- Features of operating system (OS)
- Understand the use of launcher and dash board.

What is OS (Operating System)?

An Operating System (OS) is an interface between a computer user and computer hardware. An operating system is a software which performs all the basic tasks like

- File management
- Memory management
- Process management
- Handling input and output, and
- Controlling peripheral devices such as disk drives and printers.

Introduction to Ubuntu Operating system

Ubuntu is a Linux-based open source operating system. The term



'open source' can be defined as a set of principles and practices that promotes access to the design and production of goods and knowledge. Open source is generally applied to the source code of software and is available to users with relaxed or no intellectual property restrictions. This enables users to distribute, create and modify software content, either individually to meet their specific requirement or collaboratively to improve the software. Both open source and Linux have transitioned through various phases to reach their present form. The idea behind openly distributed source code is to encourage the voluntary, collaborative development of software. Users continuously enhance the software, fix bugs, develop new features and share it with others. As a result of collaborative software development which involves a large number of programmers, users receive software that is often better in quality and performance than proprietary alternatives. Users are encouraged to customise the software to their own personal requirements, which in itself is a huge step away from the 'one size fits all' philosophy. Open source projects call on the talents of many people with skills other than programming. Many projects involve artists, musicians, user-interface designers and documentation authors to create a complete product.

Ubuntu is a community developed, Linux-based operating system that is perfect for laptops, desktops and servers. It contains all the applications you need - including a Web browser, presentation, document and spreadsheet software, instant messaging and much more.

Advantages of Ubuntu Operating system

- Ubuntu will always be free of charge, including enterprise releases and security updates.



- Ubuntu comes with full commercial support from Canonical and hundreds of companies around the world.
- Ubuntu includes the best translations and accessibility infrastructure that the free software community has to offer.
- Ubuntu CDs contain only free software applications. Ubuntu encourages you to use free and open source software, improve it and pass it on.

Understanding the Ubuntu desktop

Initially, you may notice many similarities between Ubuntu and other operating systems, such as Microsoft Windows or Apple OS. This is because they are all based on the concept of a graphical user interface (GUI)

Ubuntu Desktop





Windows Desktop



All GUI based operating systems use a desktop environment.
Desktop environments

Contain many features, including (but not limited to):

- The look and feel of the system
- The organization of the desktop
- How the user navigates the desktop

The Menu Bar

The menu bar incorporates common functions used in Ubuntu. The icons on the far-right of the menu bar are located in an area of the menu bar called the indicator area, or notification area.

The most common indicators are:



1. **Text entry settings:** The keyboard indicator menu contains Character Map, Keyboard Layout Chart, and Text Entry Settings.



2. **Messaging indicator:**Join your social applications. You can access instant messenger and email clients.
3. **Battery Indicators:** Is the indicator of battery level (in case of laptop & other battery based devices).
4. **Network indicator:**Manages network connections, allowing you to connect quickly and easily to a wired or wireless network.
5. **Sound indicator:**Provides an easy way to adjust the sound volume as well as access your music player and sound settings.
6. **Clock displays:** Clock display the current time and provides a link to your calendar and time and date settings.
7. **Application Menu**

Every application has a menuing system where different actions can be executed in an application (like File, Edit, View, etc.). The menuing system for an application is appropriately called the Application menu.

Locally integrated menus can be enabled via Session. It is located to the left area of the menu bar.

Indicator System Settings Appearance Behavior
Show the menus for a window in the window's title bar.



► **The Launcher:**

- The vertical bar of icons on the left side of the desktop is called the Launcher.
- The Launcher provides easy access to applications, mounted devices, and the Trash. To change the Launcher icon size, go to Session Indicator System

Settings Appearance, tab Look.



- The first icon at the top of the Launcher is the Dash, a component of Unity.
- Other applications appear in the Launcher, including the Files file manager, LibreOffice, Firefox, any mounted devices, and the Trash, which contains deleted folders and files, at the bottom of the Launcher.

➤ **Adding and removing applications from the Launcher**

There are two ways to add an application to the Launcher:

- Open the Dash, find the application you wish to add to the Launcher, and drag its icon to the Launcher.
- Run the application you want to add to the Launcher, right-click on the application's icon on the Launcher, and select Lock to Launcher.
- To remove an application from the Launcher, right-click on the application's icon, then select Unlock from Launcher.

The Dash:

- The Dash helps you quickly find applications and files on your computer.
- The Dash to be similar to the Windows Start menu or the Start Screen in Windows 8.
- The Dash allows you to search for information, both locally (installed applications, recent files, bookmarks, etc.) as well as remotely (Twitter, Google Docs, etc.).



Ubuntu



Lenses:

Searching is accomplished by utilizing one or more lenses, also known as scopes. Each lens is responsible for providing a category of search results for the Dash.



The seven lenses installed by default at the bottom.

1. Home lens (□),
2. Applications lens (A),
3. Files and Folders lens (□),
4. Music lens (♪),
5. Photo lens (□),
6. Videos lens (□),
7. Social network



messages lens (□).

The Dash is an extremely powerful tool allowing you to search your computer for applications and files.

❖ How to search files and applications with the Dash?

➤ Find files/folders:

The Dash can help you find names of files or folders. Simply type a portion of the file or folder name. As you type, results will appear in the Dash. You can use the filter results button in the top-right corner of the Dash to filter results by attributes such as file or folder modification times, file type (.odt, .pdf, .doc, .txt, etc.), or size.

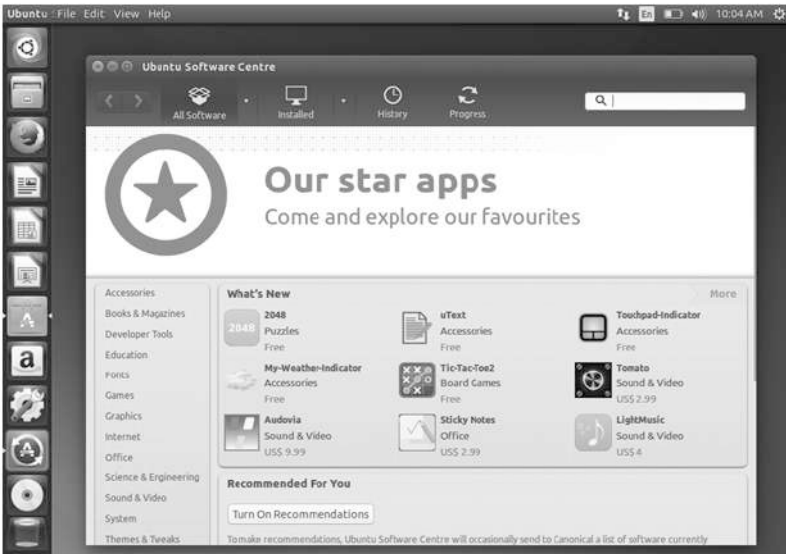


➤ Find applications:

Users can also download thousands more applications from the Ubuntu Software Center. The Applications lens on the Dash can



assist with this search. This lens will automatically categorize installed applications under “Recently Used,” “Installed,” or “More Suggestions.” You can also enter the name of an application (or a part of it) into the search bar in the Dash, and the names of applications matching your search criteria will appear. For example, type music, and the Dash will show you the default music player and any music player you've used.



➤ **Workspace:**

Workspaces are also known as **Virtual Desktops**. These separate views of your desktop allow you to group applications together, and by doing so, help to reduce clutter and improved desktop navigation.

For example, you can open all of your media applications in one workspace, your office suite in another, and your web browser in a



third workspace. Ubuntu has four workspaces by default.

click on Session Indicator > System Settings > Appearances then click on the Behavior tab and click on the Enable workspaces box.

You've activated the workspace switcher as described above, you can switch between workspaces by clicking on the workspace switcher icon located on the Launcher.



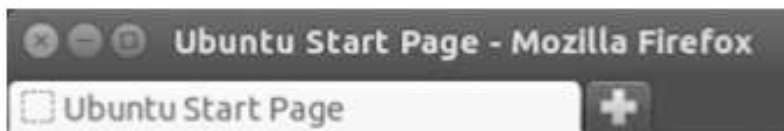
➤ **Managing windows**

In Ubuntu, the top part of a window (the *title bar*) will have the name of the application to the left (most often, the title will be the same as the application's name)

A window will also have three buttons in the top-left corner. From left to right, these buttons represent *close window*, *minimize window*, and *maximize window*. Other window management options are available by right-clicking anywhere on the title bar.



➤ Closing, maximizing, restoring, and minimizing windows



- To close a window, click on the close button () in the upper-left corner of the window—the first button on the left-hand side.
- The button immediately to the right of the close button is the minimize button () which removes the window from the visible screen and places it in the Launcher. Clicking the icon of the minimized application will restore the window to its original position.
- The rightmost button is the maximize button () which causes the application to completely fill the unused displayable space on the desktop. Clicking the maximize button again will return the window to its original size.

➤ The File manager window

When you select the **Files** shortcut in the Launcher, click on a folder in the Dash, or double-click a folder on the desktop, Ubuntu should open the Files through file manager. The default window contains the following features:

- **Menu bar:** The menu bar is located at the top of the screen. The Files menu allows you to modify the layout of the browser open a Help document, open a new window, connect to a server, or quit. Choosing **Enter Location** will open the Locations text field where you can enter any location directly.



- **Title bar:** The title bar shows the name of the currently selected folder. It also contains the **Close**, **Minimize**, and **Maximize** buttons.
- **Toolbar:** On the right side of the toolbar, there are five buttons: 1) Search (represented by a magnifying glass), 2) View items as a grid, 3) View items as a list, 4) View options, and 5) Location options. Clicking on the Search icon opens a field so you can search for a file or folder by name.
- **Left pane:** The left pane of the file browser—Titled Places—has shortcuts to commonly used folders. You can also bookmark a folder through the toolbar by choosing Location option.
- **Right pane:** The largest pane shows the files and folders within the folder you are currently browsing.



To navigate to a folder in Files, double-click on its icon. This may be in the right pane, the left pane, or the toolbar.

➤ **Opening Files:**

A file, in its simplest form, is data. Data can represent a text document, database information, or other media such as music or



videos. To open a file, you can double-click on its icon.

To select an application, right-click the icon and select one of the **Open With** options.

➤ **Creating New Folders:**

To create a new folder from within the file manager, right-click in the blank area of the right pane and select **New Folder** from the popup menu.

You can also create a new folder by pressing Ctrl+Shift+N.

➤ **Hidden Files and Folders:**

If you wish to hide certain folders or files, place a dot (.) in front of the name (*e.g.*, “.Personal Finances”).

You can easily view hidden files by clicking **View options** **Show Hidden Files** or by pressing Ctrl+H.

➤ **Copying and moving files and folders**

• **Copy & Paste files:**

You can cut, copy, and paste files or folders in the file manager by right-clicking on the item and selecting the corresponding button from the popup menu.

You can also use the keyboard shortcuts Ctrl+X, Ctrl+C, and Ctrl+V to cut, copy, and paste files and folders, respectively.

Note: when you “cut” or “copy” a file or folder, nothing will happen until you “paste” it somewhere. Paste will only affect the most recent item(s) cut or copied.



- **Move a file or folder:**

To move a file or folder, select the item to move, then click **Edit** □ **Cut**. Navigate to the desired location, then click **Edit** □ **Paste**.

You click on a file or folder, drag it, then hold down the **Alt** key and drop it to your destination folder, a menu will appear asking whether you want to *copy*, *move*, or *link* the item.

- **Searching for files and folders on your computer**

You can search for files and folders using the Dash or the Files file manager.

- **Search using the Dash:**

In the Dash, simply type your search terms in the search bar at the top of the Dash. It is sufficient to type the first few letters of the file or folder for which you are searching.

- **Search using file manager**

In Files file manager, click on the magnifying glass button or press **Ctrl+F**. This opens the search field where you can type the name of the file or folder you want to find.

- **Customizing your desktop**

Most customizations can be reached via the Session Indicator and then selecting **System Settings** to open the System Settings application window.

The Dash, desktop appearance, themes, wallpapers, accessibility, and other configuration settings are available here.

You can change most of your system's settings here.



Appearance

The Appearance tool is available by default and allows users to change the look and behavior of their Unity desktop. It opens to the Look tab and allows you to change the background, theme, and Launcher icon size



The Look tab

- ❖ Through the **Look** tab you can change the background, fonts, and window theme to further modify the look and feel of your desktop.



- ❖ The “**Appearance**” window will display the current selected background wallpaper and theme.
- ❖ To select **Change Desktop Background** or selecting **Session Indicator** □ **System Settings** □ **Appearance**. Select the **Look** tab.

➤ **Theme**

- ❖ Themes control the appearance of your windows, buttons, scrollbars, panels, icons, and other parts of the desktop.
- ❖ Just click once on any of the listed themes to give a new theme a try. The theme will change your desktop appearance immediately.

➤ **Desktop Background**

- ❖ To change the **Background**, either select **Wallpapers > Pictures > Folder**, or **Colors and Gradients** from the drop-down list.
- ❖ To change the background, simply click the picture you would like to use.
- ❖ To use one of your own pictures, click the + button and navigate to the image you would like to use. Then double-click the image, and the change will take effect immediately.

➤ **Launcher icon size**

At the bottom of the **Look** tab you find a slider to change the size of icons on the Launcher. You may choose from a range between 32 and 64 pixels.

* * *

Unit 3. Introduction of Libre Office Calc- The spreadsheet program

Aim: You will learn about -

- What is LibreOffice Calc
- Major feature differences between MS excel & calc

Learning Outcomes:

- To understand basic functioning of LibreOffice Calc
- Understand functions & tools in LibreOffice Calc

What is LibreOffice Calc?

LibreOffice Calc is the spreadsheet component of the LibreOffice software package. Calc is also capable of saving spreadsheets as PDF files. As with the entire LibreOffice suite, Calc is available for a variety of platforms, including Linux, OS X, Microsoft Windows, and FreeBSD.

LibreOffice Calc provides you with functions, including statistical and banking functions, that you can use to create formulas to perform complex calculations on your data.



LibreOffice VS MS Office

For understanding the strength & weaknesses of spreadsheet program lets compares the features of LibreOffice and Microsoft Office. It separates major and minor feature differences and also includes notes on LibreOffice extensions. The comparison highlights differences and therefore does not display any features which are present in both office suites.

MS Office	LibreOffice	Cross-platform availability
Windows and macOS versions are based on different code bases resulting in some format compatibility problems, somewhat different feature sets and differences in the user interface. macOS version does not include the database application MS Access and also lacks a number of other features (see below). Feature inconsistencies/differences in Windows versions "MS Office 2016" sales version and the "Office 2016 for Office 365" rental version: some features are being subsequently included only in the rental version (newly added features also differ between macOS and MS Windows) leading to inconsistencies in the feature set (see below).	<u>Windows, macOS, Linux, FreeBSD, NetBSD and OpenBSD.</u> (based on the same code base).	
No	Yes	Open Source
Windows 7, 8, 8.1, 10, Server 2008 R2, Server 2012, Server 2012 R2 ([2]). Support for Windows RT was dropped after MS Office 2013 (in that version few features missing, no MS Access and not Metro-compliant)	Windows XP SP3, Vista, 7, 8, 8.1, 10, Server 2008, Server 2012. ([1]). 64-Bit versions for all Windows > XP.	Supported versions of MS Windows
No (old and discontinued MS Office Starter 2010 edition runs on USB flash disks)	yes	Portable version that runs on USB flash disks (without installation)



96 Languages	111 Languages	Localization
Limited support in MS Windows version, and online version, ODF v. 1.2. Support of ODF in macOS version and mobile versions (Android, iOS, Windows 10 Mobile) limited and require the use of an online file format conversion service.	Advanced support, ODF v. 1.2 extended	Support of ISO standardized <u>OpenDocument (ODF)</u> format
No	Yes	Document converter wizard
Supported, <u>Tell Me</u> search bar.	Not supported. Only via help system. On Ubuntu Unity support for Head-Up-Display (HUD) system. (tdf#91874)	Keyboard driven menu system (search function to better find features in office suite)
Yes	No	Inserting audio / video from online sources
Slightly adjusted user interface for touchscreen devices, but no redesign	No	User interface improved to enable use on touchscreen devices on desktop operating systems
Yes	Partial	Digital signatures
Yes	No	Live preview while formatting
Office web apps, with reduced functionality.	Libreoffice/Collabora Online: version 2.0 released with full document support and rendering fidelity, reduced editing functionality, basic collaborative editing.	Online/cloud version of office suite
No	Draw	Drawing program
Yes	No	Export to XPS format



Calculations

LibreOffice Calc provides you with functions, including statistical and banking functions, that you can use to create formulas to perform complex calculations of your data.

You can also use the Function Wizard to help you create your formulas.

Calc is the spreadsheet program you've always needed. Newcomers find it intuitive and easy to learn, while professional data miners and number crunchers appreciate the comprehensive range of advanced functions. Built-in wizards guide you through choosing and using a comprehensive range of advanced features. or You can download templates from the LibreOffice template repository, for ready-made spreadsheet solutions.

An interesting feature is to be able to immediately view the results of changes made to one factor of calculations that are composed of several factors. For instance, you can see how changing the time period in a loan calculation affects the interest rates or repayment amounts. Furthermore, you can manage larger tables by using different predefined scenarios.

Database Functions

Use spreadsheets to arrange, store, and filter your data.

LibreOffice Calc lets you drag-and-drop tables from databases, or lets you use a spreadsheet as a data source for creating form letters in LibreOffice Writer.

You can perform collaborative work on spreadsheets, thanks to Calc's multiple-user support. Just share a spreadsheet so that other users can easily add their data to it. The spreadsheet owner can then easily integrate the new data in just a few clicks. This collaboration feature helps to avoid editing conflicts.



Opening and Saving in Microsoft file format

Use the LibreOffice filters to convert Excel files, or to open and save in a variety of other formats.

Functions by Category

Financial

This category contains the mathematical finance functions of LibreOffice Calc.

Date & Time

These spreadsheet functions are used for inserting and editing dates and times.

Logical

This category contains the **Logical** functions.

Mathematical

This category contains the **Mathematical** functions for Calc.

Spreadsheet

This section contains descriptions of the **Spreadsheet** functions together with an example.

Text

This section contains descriptions of the **Text** functions.

Data Series

Number and date series

It is very easy to enter a series of date, numbers or text. You can enter the above type of series in two ways.



- Using the mouse to drag the fill handle
- Using a command

Shortcut menu

Description	Fill series
Fills the selection with values that increase by one	Fill series
Fills the selection with days that increase by one	Fill days
Fill the selection with weekdays that increase by one	Fill weekdays
Fill the selection with months increasing by one	Fill month
Fill the blank cells in the selection with linear values	Linear Trend
Display the series dialog box	Series

Series types

Description	Type
Adds the steps value to the preceding number in the series i.e. 1,2,3,4,5.....	Linear
Multiplies the step value by the preceding number in the series i.e. 1,2,4,8,16	Growth
Enables the date unit group so that the increment applies to Day, weekday, month or year	Date
Create automate series that may include text, dates and labels.	Auto fill

Creating series of text

- Enter 1 in A1 & 3 in A2 cell
- Select the two cells A1 and A2 cell
- Fill the handle down side
- Release the mouse

The area enclosed with grey border fills with a series of numbers.

Linear series means next numbers calculated by addition.



Using Paste Special

- It is very useful to copy and paste part of cells attributes.
- You can reorient database layout into worksheet layout.
- Enables to combine the attributes of cells by pressing them together.
- Places the contents of the clipboard where the cursor is.
- The drop down arrow of the paste button called Paste preview.
Home → Copy → Clipboard or Ctrl+C.

Paste Special options

Function	Options
All the original contents and characteristics	All
Formula	Formulas
Values	Values
Cell formats	Formats
Note contents	Comments
Validation rules	Validation

Sorting:

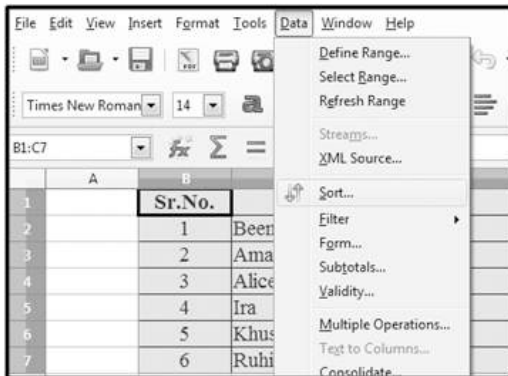
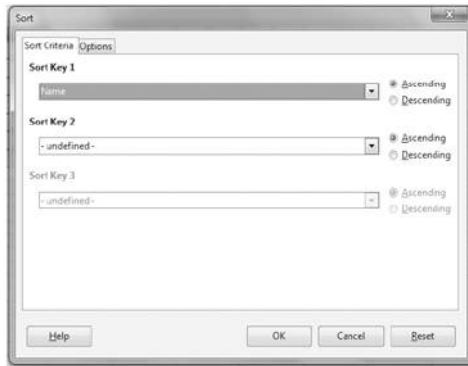
Sort is a term used to describe the process of organizing data in a particular order allowing for information to be found easier.

1. Select the table content along with column headings.



	A	B	C
1		Sr.No.	Name
2		1	Beena
3		2	Aman
4		3	Alice
5		4	Ira
6		5	Khushbu
7		6	Ruhi

2. Now click on 'Data' from the menu bar and then select the 'Sort' option.
3. Select the sort key (Column heading which needs to be sorted) and the sort order (ascending or descending).





4. Click on 'Ok' button to sort the data.

How to calculate the Sum?

Using function:

Steps:

1. Select the cells whose sum needs to be calculated (B4 to B9) in this example.

	A	B
1	Sameer – Terminal Exam Marks	
2		
3	Subject	Marks
4	English	56
5	Maths	76
6	Hindi	47
7	Science	87
8	Social studies	65
9	Marathi	58
10	Total	
11	Percentage	

2. Click on the ' Σ ' Sum sign from the toolbar.
3. Press the Enter key.
4. The total of marks will be calculated and it will be displayed in cell 'B9'.

Using formula:

Steps:

1. Select the cell where you want to display the total.(B10 in this example)



2. Type the formula =sum(B4:B9) or type =sum()and select the cells whose sum needs to be calculated .
3. Press Enter key
4. The total will be displayed in cell B10

How to calculate the percentage?

Steps:

1. Select the cell where you want to display the percentage and type the formula.

$$\text{Percentage} = \text{marks received} / \text{grand total} * 100$$

2. In this example it will be

$$=(B10/600)*100$$

3. Press Enter key
4. The calculated percentage will be displayed in B11.

How to calculate the average?

Using Formula:

1. Select the cell where you want to display the average. The formula to calculate average is

$$\text{Average} = \text{sum of all numbers} / \text{count of the numbers}$$

2. In this example to calculate the average of marks received in English is the sum of Terminal exam + Final Exam /2 i.e.
=B2+C2/2

	A	B	C	D
1	Subject	Terminal exam	Final exam	Average
2	English	56	66	=(B2+C2)/2
3	Maths	76	75	
4	Hindi	47	46	
5	Science	87	78	
6	Social studies	65	88	
7	Marathi	58	78	
8	Total	389	431	
9	Percentage	64.83	71.83	



3. Press the Enter key.

Using Function:

1. Select the cell where you want to display the average.
2. Select the numbers whose average is to be calculated.
3. Click on functions and select the average option.

Chart

A **chart**, also called a graph, is a graphical representation of data, in which "the data is represented by symbols, such as bars in a bar **chart**, lines in a line **chart**, or slices in a pie **chart**".

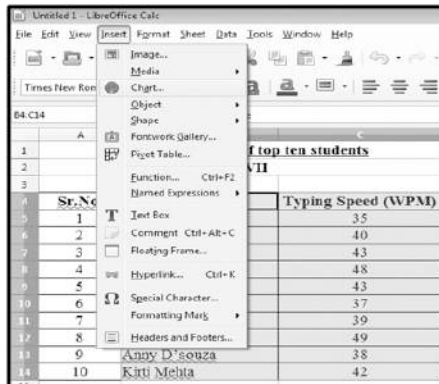
How to create a chart?

Steps: 1. select the columns whose data you want to show in the chart.

Typing test result of top ten students		
Std: VII		
Sr.No.	Name	Typing Speed (WPM)
1	Aman Khan	35
2	Rubi Shaikh	40
3	Sameer Shinde	43
4	Jyoti Khade	48
5	Poojam Gaikwad	43
6	Sara Shaikh	37
7	Dhru Kamble	39
8	Suhana Sayyed	49
9	Amey D'souza	38
10	Kirti Mehta	42

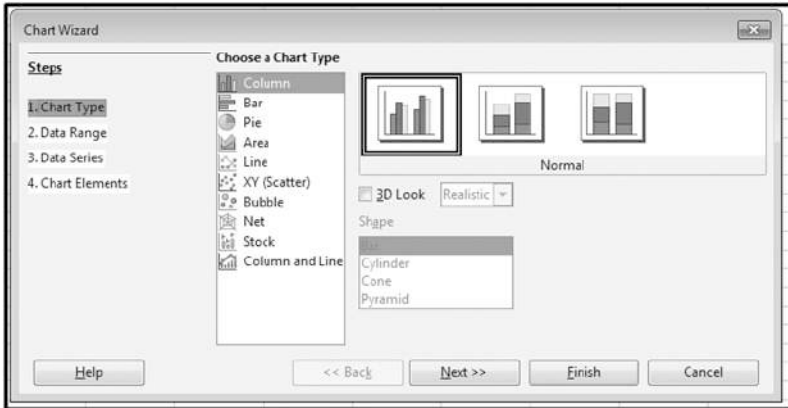
In this example select the columns of name and typing speed.

2. Click on Insert tab and the Chart option.

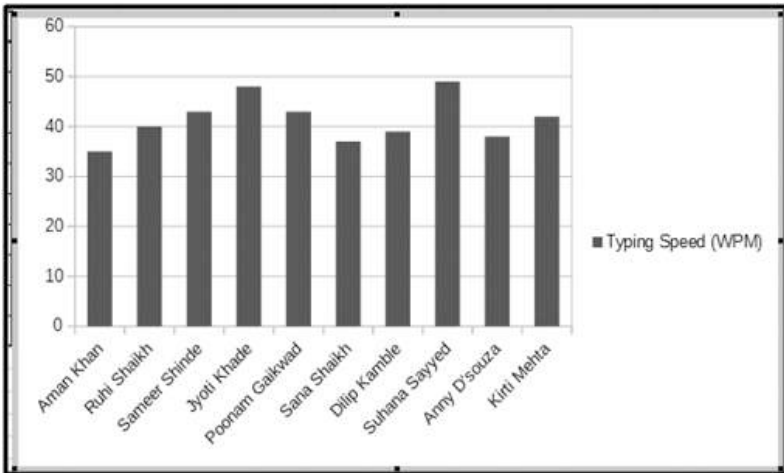




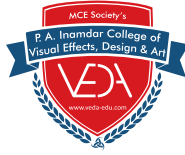
3. Select the type of chart you want to draw from the chart wizard.



4. Place the created graph to the position where you want it to be seen.




* * *



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