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MS Word

Window Control Options (— ⧉ ×)

Customize Quick Access Toolbar (⊞ ⧉ ↶ ↷)

Title Bar (Document 1 - MS Word)

Tabs (Home, File, Draw, Insert, Design)

Ribbons (Clipboard, Font, Paragraph, Styles)

Ruler (Horizontal, Vertical)

Workbook

Status Bar

Scroll Bar

To write a paragraph => =rand()

Shift + _ => Horizontal line

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Mail Merge

1. Start a Word Document.
2. Click on the Mailings Tab.
3. Click on Start Mail Merge.
4. Then click on Letters.
5. Then use current Document.
6. Then Select Recipient.
7. Then Use an existing list
   or
   Type a new list
8. Then click on create.

   Customize Column OR Heading ⇒ Delete Tabs
   Rename
   Add
   ↓
   OK

9. To Add more entries ⇒ New Entry
   ↓
   Ok

   File name → Save File

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10 Write your letter with help of Insert Merge Field option.

11 Preview your letter.

12 Now Complete the Merge.

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Excel Formulas

1. Sum => = Sum (Select range)
2. Give Marks => =randbetween (Bottom, Top)
3. Min => = MIN (Range)
4. Max => = MAX (range)
5. Average => = AVG (range)
6. Rank => =RANK (Total, G3 : G12)
7. Grade => =IF (L7>=95, "A", IF(L7<=95, "B", IF(L7>=85, "C")))

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Computer assembly

Steps for assemble PC

Computer assembly is a Systematic process. First, arrange the computer parts. The Seque for assembly & working of the Computer listed below is as:

1. Open the case.
2. Install the power Supply.
3. Attach the components to the motherboard
4. Install the motherboard.
5. Install internal drives.
6. Connect all internal cables.
7. Install motherboard power connections
8. Connect external cables to the computer
9. Boot the computer for the first time.

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Required Material

* Computer case, with power supply installe
* Motherboard
* CPU
* Heat sink / fan assembly
* Thermal Compound
* RAM module (s)
* Motherboard standoffs and screws
* Anti-static wrist strap and anti-static mat
* Tool kit

Step - 1 Open the Case

Step - 2 Install Power Supply

- Insert the power supply into the case.
- Align the holes in the power supply with the holes in the case.
- Secure the power supply to the case using the proper screws.

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Step-3 Attach the Components to the motherboard

Attach all the components like RAM to the motherboard.

Step-4 Install the motherboard

Then Install the motherboard into the Case.

Step-5 Install Internal Drives

Hard Drive

- Position the HDD so that it aligns with the 3.5-inch drive bay.
- Insert the HDD into the drive bay so that the screw holes in the drive line up with the screw holes in the case.
- Secure the HDD to the case using proper screws.

Optical Drive

- Position the optical drive so that it aligns with the 5.25 inch drive bay.
- Insert the optical drive into the drive bay so that the optical drive screw holes alig

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with the screw holes in the case.

- Secure the optical drive to the case using the proper screws.
- Connect the power cable coming from the SMPS to the power socket of optical drive.
- Connect SATA data cable from optical drive socket to the motherboard socket.

Step-6 Connect all internal cables

Power cables are used to distribute electricity from the power supply to the motherboard and other components. Data cables transmit data between the motherboard and storage devices such as hard drives.

Step-7 Install motherboard power connections

- Align the 20-pin ATX power connector with the socket on the motherboard.
- Gently press down on the connector until the clip clicks into place.
- Align the 4-pin AUX power connector with the socket on the motherboard.

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- Gently press down on the connector until the clip clicks into place.

Step-8 Connect External Cables to Computers

- Connect Monitor

- Connect one end of the cable to the monitor port on the back of the computer case and the other end to the monitor. In case of VGA cable as shown in Fig 12.22 tighten the screws on the monitor cable to secure it.

- Connect keyboard and mouse.

Checklist the following before starting the Computer

- VGA cable of monitor is connected to the cabinet or not.

- Power cable of monitor and cabinet has been plugged into the UPS power output socket. Make sure monitor is connected to the power supply or not.

- keyboard and mouse both are connected to their proper ports.

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Step-9 Starting the Computer

- To Start the computer, it is necessary to follow the correct Sequ to Start up. Now push the power button on the CPU to Start the Computer.

Computer Disassembly

Steps for Disassemble PC

Disassembly is the process of breaking down a device into separate parts.

1. Unplugging
2. Open the case
3. Disconnect all connectors
4. Remove the Fan
5. Remove the Power Supply
6. Remove HDD and Optical Drive
7. Remove RAM
8. Remove Motherboard

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Step-1 Unplugging

- Unplug the power cord from the PC and from the wall socket to prevent any injuries and damage of the PC from electrostatic discharge.

- Unplug all the peripherals attached to the computer, such as the keyboard, mouse, monitor, headphones and any external drives.

- Wear a grounding strap to discharge any static electricity.

Step-2 Open the case

- To open the case, first remove the screws of the left side cover and slide the side cover.

- Pull the latch to release the side panel. Then lift the side cover out from the chassis.

Step-3 Disconnect all connectors

- Disconnect all the connectors connected to the motherboard. These include SATA power cable and data cable of HDD as well as SATA cable of optical drive.

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Step-4 Remove the Fan

- Remove the fan now. Most computers have two fans – the System fan and CPU fan. The System fan is located at the back side of the computer to blow air into the computer. The CPU fan is located on top of the CPU heat sink. The fans and its connectors are labelled with their names.

Step-5 Remove the Power Supply

- Remove the Power Supply. This include power Cables, SATA Cables.

Step-6 Remove RAM

RAM allows for the transfer of information to and from the CPU. Computer runs fast with more RAM. Most computers have four RAM slots, and two RAM chips. To remove the RAM, push down on both tabs holding the RAM in place, which are located at both ends of the RAM. It will cause the module to pop up for easy removal.

Step-7 Remove Expansion Cards

The modern motherboards are integrated

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with the audio, video and network cards. However, if your computer has the expansion card, insert into the expansions slot to increase the functionality. The expansion card is screwed with a single screw on top of expansion card slot.

Step-8 Remove Mother board

- Every part of the computer is attached to the motherboard. The CPU, RAM, and expansion cards are directly attached to the motherboard.

- To remove the motherboard, disconnect all the cables from the motherboard. It has seven screws holding it to the frame. Remove these screws and then lift the motherboard out of the frame.

V Lookup ⇒ Vertical Lookup

= V lookup (Name, Total Table, Col^n no., FALSE)

H Lookup ⇒ Horizontal lookup

= H Lookup (Name (Subject), Total Table, Col^n no., FALSE

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System Software

- System Software is a set of programs that control & manage the operations of computer hardware.
- It also helps application programs to execute correctly.

Example :- Operating System, Programming language, Communication Software etc.

Types of System Software

- Operating System
- Device Driver
- Language processors

Features of System Software

- System Software is closer to the System.
- Generally written in a low-level language.
- The System Software is difficult to design and understand.

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- Fast in Speed
- less interactive
- Smaller in Size
- Hard to manipulate

What is Application Software?

- Application Software is a program that does real work for the user. It is mostly created to perform a specific task for a user.
- Application Software acts as a mediator between the end-user and System Software. It is also known as an application Package.
- This type of Software is written using a high-level language like C, Java, VB, Net, etc.

Example: Word Processing, Spreadsheet, Database etc.

Types of Application Software

- General Purpose Software
  Ex. MS Word, MS Excel, Power Point

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- Customized Software

E.g. railway reservation System, airline reservation System

- Utilities Software

E.g. Antivirus, disk fragmented, memory tester, disk repair

Feature of Application Software

- An important feature of Application Software:

* Perform more specialized tasks like word processing, spreadsheets, email, photoediting etc.

* It needs more storage space as it is bigger in size.

* Easy to design and more interactive for the user.

* Generally written in a high-level Language.

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Difference between System Software & Application Software

System Software	Application Software
1 It is designed to manage the resources of the computer System, like memory and process management, etc.	1 It is designed to full fill the requirements of the user for performing Specific tasks.
2 Written in a low-level language.	2 Written in a high-level language.
3 Less interactive for the users.	3 More interactive for the users.
4 System Software plays vital role for the effective functioning of a System.	4 Application Software is not so important for the functioning of the System as it is task Specific.

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Operating System

- An operating System is a program that controls the execution of application programs and acts as an interface between the user of a computer and the computer hardware.

- A more common definition is that the operating System is the one program running at all times on the computer, with all else being application programs.

Types of Operating System

1. Batch Operating System
2. Time Sharing OS
3. Network OS
4. RTOS

Difference between Linux and Windows OS

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Linux	Windows OS
1 Linux is a open source operating system.	1 While windows is licenced operating system.
2 Linux is free of cost.	2 While windows is paid and costly.
3 Monolithic kernel used.	3 Micro kernel used.
4 Linux is more efficient compared to windows.	4 Less efficient compared to linux.
5 Provide more security than windows.	5 While it provide less security than linux.

Differentiate between 32 bit and 64 bit OS

32 bit OS	64 bit OS
1 32 bit system can access 2^{32} memory address.	1 64 bit system can access 2^{64} memory address.
2 Can Handle upto 4GB RAM data.	2 Can Handle more than 4GB RAM data.

32 bit OS	64 bit OS
3 A 32-bit processor system could properly run a 32-bit OS, but it cannot run the 64-bit OS at its full capability.	3 A 64-bit processor system can run either a 32-bit or 64-bit version of an installed operating system.
4 The 64-bit programs and applications won't work.	4 The 32-bit programs and applications will work with no hassle.
5 Runs on a 32 bit operating system.	5 This one can run both 32-bit and the 64-bit operating system

FDISK, Format, Scandisk commands

Disk part command in windows 10 - fdisk command

- The diskpart command interpreter helps you manage your computer's devices (disks, partitions, volumes, or virtual hard disks).

- Disk Part, replacing its predecessor - fdisk, is a command-line utility that provides the ability to manage disks, partitions or volumes in your computer

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running all versions of the operating System Since Windows 2000, also including the latest Windows 10.

Using Disk management create partition

Disk Management is not as powerful as Mini Tool Partition Wizard Free Edition, but as a Windows built-in partition manager, it can complete most Simple and basic partition managements like create partition, delete partition, format partition, etc.

Scandisk Command

- Scandisk can improve the performance of your hard drive and help maintain the Windows file System.

Command Prompt, follow these steps:

- Boot your computer.
- Go to Start, -> Run, -> cmd in the box:
- You can now type chkdsk to open the utility in a read-only mode. Press Enter.
- To repair errors.

Format Command

The format command is used to erase information from a computer diskette or fixed drive.

Format

C:\WINDOWS\system 32 > format E:

E: is the drive letter

Disk Partition using Disk Management

- Click on Start button.
- Then click on Control Panel.
- Then click on System & Security.
- Then click on Administrative Tools.
- Then Double click on Computer Management.
- When Computer Management opens up then click on Disk Management.
- Then right click on (X) & then click on Extend Volume.

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- After then select the options required and then click on Finish.
- Then close all the windows.

Disk Partition using Command Prompt

- Boot your Computer.
- Go to Start, -> Run, -> cmd in the box :
- Then type diskpart.
- Then type select disk 0.
- Then write list Partition.
- Then Write select partition 2.
- Extend Size = 512.

Now Diskpart Successfully extended the Volume.

- Now Exit

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How to run a Disk Check in Windows 10 using the Command prompt.

* Click on the Task / Search bar.
* Then Search command prompt.
* You will see command prompt, then right click on command prompt and Select Run as Administrator.
* Then the Command prompt will get opened.
* Then write chkdsk C:/f
* Then write Y & press Enter.
* It will restart your computer and your problem will be Solved.

How to format a Drive using Command prompt / Diskpart.

* Click on Start button & Search Command prompt in Search bar.
* Then right click on Command Prompt & Select Run as Administrator.
* Type Diskpart.

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- list disk
- Select disk 3
- list Volume [For those who want to work with specific partetion rather than the whole Disk.]
- Select Volume 3.
- Clean
- Create part pri
- active
- Format fs = ex fat / fat 32 / ntfs Label = 4USB
  fs → File System quick
- assign Letter = Y
- list Volume

What is Directories?

A directory is a location for storing files on your computer. Directories are found in a hierarchical file system such as Linux, DOS, and Unix.

Pictured is an example of output from the Windows /DOS tree command. It shows all the local & Subdirectories

FAT File System

- A disk formatted with FAT is allocated in clusters, whose size are determined by the size of the volume. When a file is created, an entry is created in the directory and the first cluster number containing data is established.

- It is only used with FAT12 and FAT16, it imposes on the root directory a fixed maximum size which is pre-allocated at creation of this volume.

- FAT 32 stores the root directory in the Data Region, along with files and other directories, allowing it to grow without such a constraint.

NTFS

- NT file System (NTFS), which is also sometimes called the New Technology File System, is a process that the Windows NT operating System uses for storing, organizing, and finding files on a hard disk efficiently.

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Functions of key board and Mouse

What is a Computer keyboard?

- A keyboard is a peripheral device that enables a user to input text into a computer or any other electronic machinery
- It is a peripheral device that is the most basic way for the user to communicate with a computer.

Categories of keys on a keyboard

- Typing keys
- Control keys
- Function keys
- Navigation keys
- Numeric keypad
- Other keys (Shift, Caps lock, Tab, Enter, Spacebar, Backspace)

What are the Uses of keyboard in Computer?

- Input Data

- Type Numbers
- Text Chatting
- Type Special Character
- Types computer Shortcut keys

Types of keyboards

- Gaming keyboard
- Mechanical keyboard
- Multimedia keyboard
- Hand keyboard
- Flexible keyboards
- Wireless keyboard
- Laptop keyboard
- Wired keyboard

Five Functions of Keyboard

- Built-in functions
- Boot Sequence functions
- Operating keystrokes
- Shortcut Commands
- Specialty keys

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How does keyboard Works in Computer?

- A keyboard contains many mechanical switches or push - buttons called "keys".
- When one of these are pushed, an electrical circuit is closed, and the keyboard sends a signal to the computer that tells it what letter, number or symbol it would like to be shown on the screen.

Keyboard Advantages and Disadvantages

Advantages	Disadvantages
User Friendly	Cost
Security	Maintenance
Visual Representation	Cleanliness
Water Proof	
Typing Errors	

What is Computer Mouse?

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

- It controls the movement of the cursor on the computer screen & allows users to move & select folders, text, files, and icons on a computer.

What are the uses of a Mouse?

- Move the mouse pointer
- Select
- Open or execute a program
- Drag-and-drop
- Hovering
- Scroll Up & down
- Perform other functions
- Playing Game
- Combination Activities

Computer Mouse Parts with their Function

- Buttons
- Ball / Laser / LED

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- Perform other functions
- Playing Game
- Combination Activities

Computer Mouse Parts with their Function

- Buttons
- Ball / Laser / LED

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- Mouse Wheel
- Printed Circuit Board
- Cable / Wireless Receiver
- Battery
- Microprocessor

Types of Mouse

- Optical Mouse
- Gaming Mouse
- Wireless Mouse
- Laser Mouse
- Trackball Mouse
- Ergonomic Mouse

How does Mouse Works in Computer?

- Able to work on almost any surface, the mouse has a small, red light-emitting diode (LED) that bounces light off that surface onto a (CMOS) sensor.

- The computer moves the cursor on screen based on the coordinates received from the mouse.

Mouse Advantages and Disadvantages

Advantages

- It is easier to use and handle a mouse as compared to the keyboard.
- Mouse requires less space.
- Mouse can be used to draw graphics.
- Mouse is light to carry. Therefore it is portable.
- They can be easily connected to any devices with USB port.

Disadvantages

- The wired mouse is delicate in nature and must be used carefully as it can be damaged easily.
- If the batteries are low they tend to lose their accuracy and speed.
- Wireless mouse can sometimes face

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connectivity issues.

- Mouse cannot enter text data into the computer.

What is MS Paint?

- MS Paint is a simple program that allows users to create basic graphic art on a computer.

- Images created within MS Paint are typically saved as GIF, Windows bitmap, PNG, TIFF or JPEG files.

Tools of MS Paint?

- Free-Form Select and Select Tool
- Eraser / Colour Eraser
- Pick Colour
- Pencil
- Airbrush
- Fill With Colour
- Magnifier
- Brush
- Text
- Curve Tool
- Shapes (Line, Rectangle, Ellipse, Polygon)

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What is Notepad?

- Notepad is a generic text editor included with all versions of Microsoft Windows that allows you to create, open, and read plaintext files.

How to use Notepad?

- Create, open, and save text files with Notepad.
- Simple text edits
- Turn Word Wrap on or off
- Change the font of the text document
- Print text files

What is the text-based formats?

- Text based also refers to documents that contain only text, such as program source code, batch and shell scripts as well as HTML and XML files.
- Text-based documents are readable in any text editor and most wordprocessors.

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File format extensions for text files

- .doc and .docx - Microsoft Word file
- .odt - Open Office writer document file
- .pdf - PDF file
- .rtf - Rich Text Format
- .tex - A La TeX document file
- .txt - Plain text file
- .wpd - WordPerfect document

What is the image-based formats?

- Image Format describes how data related to the image will be stored.
- Data can be stored in compressed, Uncompressed or vector format.

File format extensions for image files

- .ai - Adobe Illustrator file
- .bmp - Bitmap image
- .gif - GIF image

- .ico - Icon file
- .jpeg or .jpg - JPEG image
- .png - PNG image
- .ps - Post Script file
- .psd - PSD image
- .svg - Scalable Vector Graphics file
- .tif or .tiff - TIFF image

What is a Compressed File?

A compressed file is any file containing one or more files or directory that is smaller than their original file size.

How Does Compression Work?

- Data compression is a means of altering or encoding structured data to take up less disk space when stored on a computer-based system.

Types of Compression

- Lossless Compression
- Lossy Compression

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Common Compression and Extraction Methods

- zip
- rar
- gz
- 7z

Advantages & Disadvantages of Using File Compression

Advantages

- Increased computing efficiency
- Quicker transfers
- Improved file integrity
- Email / webpage accessibility

Disadvantages

- Memory Issue
- Speed
- File Size
- Viruses and Malware
- File Transfer

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Difference between the Zip and Rar format

- ZIP and RAR are widely used file formats for data compression and archive.
- ZIP supports lossless data compression. Whereas, RAR supports data compression error recovery and file spanning.

What is Backup?

- Backup is the process of creating a copy of the data on your system that you use for recovery in case your original data is lost or corrupted.
- You can also use backup to recover copies of older files if you have deleted them from your system.

Why Should I back up my data?

- Data loss prevention
- Cyberthreats
- Natural disaster
- Tax reporting & audits
- Hard drive Fails
- Lost devices

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Types of Backups

- Full backup
- Differential backup
- Incremental backup

Advantages and disadvantages of backup

Advantages

- Quick Access to Files
- Protection Against Power Failures
- Added Anti-Virus Protection
- Safeguard Against Failed Hard Drive.
- Recovery if Operating System Fails

Disadvantages

- Hardware failure
- Hidden costs
- Failed recoveries

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What is Cloning?

- Cloning is also used to describe the a of making the exact copy of a directo file or disk inclusive of any subdire -tories or files within the disk or directory.

Simple steps with cloning software

- Install all desired programs and files to a master computer.
- Use software create an image of the master computer's hard disk.
- Clone the image to the other computers.

Advantages & disadvantages of Cloning

Advantages

- A faulty computer can be wiped clean of data and restored from the untouch master image.
- Don't have to waste the installing individual applications to new computers.

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- A comprehensive backup of operating systems and installed softwares.

Disadvantages

- Need to have a high number of the same hardware for the same image.
- Must have dedicated IT staff when dealing with more than just a few computers.

Backup Vs Clone

- A backup disk creates an image file. You can use this to recover data if there's an emergency.
- Cloning copies data from one hard disk to another, if you want to change the drive.

What is an Operating System?

- Operating System is defined as a collection of programs that coordinates the operations of computer hardware and software.
- It acts as a bridge for the interface between man and machine.

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Types of Operating System (OS)

- Batch Operating System
- Multitasking / Time Sharing OS
- Multiprocessing OS
- Real Time OS
- Distributed OS
- Network OS

Functions of Operating System

- Security
- Command interpretation
- Networking
- Job accounting
- Communication management

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Familiarization with Disk management

Introduction

- Disk Management is a Microsoft Windows utility first introduced in Windows XP as a replacement for the fdisk command. It enables users to view & manage the disk drives installed in their computer and the partitions associated with those drives.

How to Open Disk Management

Way 1 : The easiest way to open disk management in Windows 10 is from computer Desktop.

- Right click on Start Menu (or press Windows + X hotkey) and then Select "Disk Management".

Way 2 : Use Windows + R hotkey to open Run window. Then type "Diskmgmt.msc" and click "Ok" or hit "Enter" key.

Way 3 : Directly type "disk management" in the Search box and choose "Create and format hard disk partitions" from the results.

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How to Use Disk Management

Disk Management has two main sections - a top and a bottom.

- The top section contains a list of all the partitions, formatted as Windows recognizes.
- The bottom section contains a graphical representation of the physical drives installed in the computer.

How to Partition a Hard Drive

- Open Disk Management the tool included in all versions of Windows that lets you partition drives, among a number of other things.
- When Disk Management opens, you should see an Initialize Disk window with the message "You must initialize a disk before Logical Disk Manager can access it."
- Choose a partition style for the new hard drive.
- Locate the hard drive where you want to partition.

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- Once you've found the Space tap-and-hold or right-click anywhere on it, and choose New Simple Volume.
- Choose Next > on the New Simple Volume Wizard window.
- Choose Next > on the Specify Volume Size Step to confirm the size of the drive you're creating.
- Select Next > on the Assign Drive Letter or Path Step.
- Verify your choices on the Completing the New Simple Volume Wizard Screen.
- Choose Finish and Windows will partition the drive.
- Next, Windows will try to open the new drive automatically.
- You'll see this message instead : "You need to format the disk in drive F: before you can use it. Do you want to format it?"
- Select Cancel

How to Format A Hard Drive in Windows

- Open Disk Management, the hard drive manager included with all versions of Windows.

- After Disk Management opens, which might take several seconds, look for the drive you want to format from the list at the top. There's a lot of information in Disk Management, so if you can't see everything, maximize the window.

- If you don't see the drive listed on the top or an Initialize Disk window appears, it probably means that the hard drive is new & has not yet been partitioned. Partitioning is something that must be done before a hard drive is formatted.

- The first of several formatting details which we'll cover over the next several steps is the volume label, which is essentially a name given to the hard drive.

- In the Volume label textbox, enter whatever name you'd like to give to the drive.

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- Next up is the file System choice. In the File System textbox, choose NTFS.
- Next Click on "Perform a quick format checkbox".
- The final format option is the Enable file and folder compression setting that is unchecked by default, which we recommend sticking with.
- Windows is usually pretty good about warning you before you might do something damaging, and a hard drive format is no exception.
- The hard drive format has begun! You can check the progress by watching the formatting.
- That's it! Your hard drive has been formatted and it's ready for use in Windows.

Hard Drives

SSD	HDD
Faster	Slower
Shorter lifespan	longer lifespan

more expensive	Cheaper
non-mechanical (flash)	mechanical (moving parts)
Shock-resistant	Fragile
best for storing operating systems, gaming apps, and frequently used files	best for storing extra data, such as movies, photos and documents

Computer

Computer is an electronic device that is designed to automatically accept input data to store & processed and produce output result.

Hardware & Software

OS → Operating System

OS Functions

1. Memory Management

Primary Memory	Secondary Memory
RAM, ROM	HDD, CD, Pen Drive
Volatile Memory	Temporary Memory
Until the power is On	

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2 User Interface → Accessing / Communication
↳ Mediator b/w User & Computer

3 Control of I/O Devices

4 Security System [File Encrypt with Password]

5 Date & Time Management

Without OS we cannot work on the computer.

VM Ware & Ubantu Download and Installation Process

VM Ware Downloading Process

1 Boot the Computer.

2 Open Google Chrome & type VM Ware Download

3 Select the installer from the list according to your host Operating System.

4 Click Download.

5 VM Ware will be downloaded.

VMware Installation Process

1. Log in to the Windows host.
2. Open the folder where the VMware Player installer was downloaded.
3. Right-click the installer and click Run as Administrator.
4. Follow the on-screen instructions to finish the installation.
5. Restart the host machine.

Ubuntu Downloading Process

1. Boot the Computer
2. Open Google Chrome & type Ubuntu Download.
3. Download Ubuntu 22.04 LTS Desktop.
4. Ubuntu will be downloaded in your Computer.

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Task Scheduler

Task Scheduler Library
↓
Basic Task
↓ Next
When do you want the task to Start
↓ Next
Mention date & Time
↓
Start a program
↓
Address [Browse, CD Drive
↓
Program Files
↓
Google
↓
Chrome
↓
Application

Then write \chrome.exe*
↓
Then click on Finish

Alt + Control + Delete → Task Manager

Task Scheduler

How to create an automated task using Task Scheduler on Windows

1. Windows Scheduler helps you automate your work.

- Task Scheduler works by keeping track of the time and events on your computer and executes the task as soon as the condition is met.

2. Select the Task Scheduler app from Start window.

- Right click on Task Scheduler library in the left navigation tree, and select New Folder.

4. Select the new folder you've created. In the Actions navigation bar on the right, select Create Basic Task. This will open the Create Basic Task Wizard. Type a name for the task in the Name field. Select Next to continue.

5. The next step of the wizard is to choose a trigger for your task. You can choose one of the time intervals, or one of the system events. In this example, we'll select Daily. Select Next to continue

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6 The next step is to fine tune the interval trigger. In this case we'll set the trigger to happen at 8AM every day, starting today. Set the recurrence to every 1 day. Select Next to continue.

7 The next step is to setup the Action for the task. In this case, select Start a Program and then select Next.

8 Select the Browse button and browse to Chrome which should be located at "C:\Program Files (x86)\Google\Chrome\Application\". The file name is chrome.exe. Once you browse to the file, select it and select Open. Select Next to continue.

9 On the Finish tab of the Wizard, you'll see the Trigger Status and Action you've created. Select Finish to close the Basic Task Wizard.

10 You'll see your new task in the main pane in the Task Scheduler window. You can right click the task and select Run.

How to create a basic task using Task Scheduler

- Go to Task Scheduler window, select Create Task in the right navigation pane.

- On the General tab, type a name fo your task in the Name field.
- On the Triggers tab, Select New, Sel Monthly, select all months in the Mo dropdown and set the Days dropdo to 30 for the end of the month. Mak Sure Enabled is selected. Select O

How to run, edit, and delete a ta using Task Scheduler.

- Open Start, Search Task Scheduler, click to open the experience.
- Expand the Task Scheduler Library
- Select the folder with your tasks
- To run a task right-click it and select the Run option.
- To edit a task, right-click it and select the Properties options.
- To delete a task, right-click it and select the Delete option.

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Event Viewer

The Windows Event Viewer is an administrative tool found in all versions of Windows. It allows you to view events, errors, and additional important information about what's happening under the hood in your operating System.

Opening the Event Viewer

Open it by Search

- Type event in the Search box on taskbar and choose View event logs in the result.

Turn on Event Viewer via Run

- Press Windows+R to open the Run dialog, ~~event~~ enter eventvwr (or eventvwr.msc) & hit OK.

Open Event Viewer in Control Panel

- Access Control Panel, enter event in the top-right Search box and click View event logs in the result.

Open it in This PC

- Open This PC, type event viewer in the Search box on the top-right corner, and then double-click Event Viewer in the list.

Device Manager

Device manager is used to manage the hardware devices installed on computer like hard disk drives, keyboards, sound cards, USB devices and more.

How to Access Device Manager

- Device Manager can be accessed in several different ways in all versions of Windows, most commonly from the Control Panel, the Command Prompt, Computer Management.

- Device Manager can also be opened through the command-line or Run dialog box with a special command.

How to Use Device Manager

- Device Manager lists devices in separate categories so that it's easier to find what you're looking for. You can expand each section to see which devices are listed inside. Once you find the right hardware device, double-click it to see more information like its current status, driver details, or in some cases its power management options.

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Shared folders

Share files or folders over a network

- Right-click or press a file, Select Give access to > Specific people.

- Select a file, Select the Share tab at the top of File Explorer, then in the Share with section Select Specific people.

Services and applications

Definition of Services

- A Windows Service is an application that usually serves a core operating System function running in the background and has no user interface.

Services and applications

Definition of application

- A program that is written to run under the Microsoft Windows operating System, also called a "Windows app." All 32-bit Window applications run in the 32-bit and 64-bit versions of Windows. All 64-bit applications require 64-bit Windows, which is the standard on new Windows computers & tablets

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Virus and its type and Antivirus

Definition of VIRUS

- A computer virus is a program which can harm our device and files and infect them for no further use. When a virus program is executed, it replicates itself by modifying other computer programs and instead enters its own coding.

Open Office tools for creating documents

What is open office

- OpenOffice is the leading open-Source Office Software Suite for word processing, Spreadsheets, presentations, graphics, databases and more.

- Developed by Sun Microsystems Ltd.

Advantages of Open Office

- No licensing fees
- Cross-platform
- Extensive language Support
- Consistent user interface

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- Integration
- Granularity
- File compatibility

Features

- Styles and formatting
- Interoperability
- Programmability

What are the minimum requirements

- Microsoft Windows 98, ME, 2000, XP or 2003
- GNU/linux Kernel Version 2.2.13 and glibc 2.2.0 or newer
- Mac OS X 10.3.x, Mac OS X 10.4.x, plus X11
- Solaris version 8 or higher

Parts of the main window

- Title Bar
- Tool Bar
- Control Buttons
- Status Bar
- Menu Bar

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Working with documents

- Starting a new document
- Entering the Text
- Saving the Document
- Saving with Password
- Closing a Document
- Closing Unsaved Document
- Opening an existing document
- Editing a document
- Deleting and renaming files
- Deleting a file
- Moving within a document

Starting a new document

You can also start a new document in one of the following ways:

- Use File > New and choose the type of document.

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- Press Control + N on the keyboard.
- Use File > Wizards for some types of documents.

Entering the Text

- Once a new document is open, the text can be typed in blank area of the screen.
- As the text is typed they appear on the screen and the flashing vertical bar.

Saving the Document

- Click File -> Save, (or) File -> Save As (or) Ctrl+S
- Select location to store your document
- Type your document name in the File Name box.
- Click "Save" button

Saving with password

- click on "Save with password" check box and then click "Save" button.
- Enter a password and retype the same password.

- Click "Confirm Password"
- Click "Ok" button.

Closing a Document

- After your document is saved.
- File -> Close Command (or) Press Ctrl

Closing Unsaved Document

- When you close an unsaved file with the close control button, Writer shows a warning message.

Opening an existing document

- To open an existing document, Click the File -> Open or Ctrl + O, the Open dialog box appears, enter the name of the file in the File Name text box and click on OPEN button.

Deleting and renaming & moving files

- You can rename or delete files within the Open Office.org dialogs. It is not possible to copy and paste files within the dialogs.

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Preview the document to be printed

- Click File -> Page Preview
- To close the preview click the Close Preview button.

Setting the Printer and Printing

- Click File -> Print or Ctrl+P
- Click General Tab
- Select the required printer
- Specify Number of Copies using Spin arrows.
- Click Print button.

Open Office tools for creating Spreadsheet

Introduction to Spreadsheet

- Spreadsheet is used for calculate, graph, and analyze the information.

Features of Open Office Calc

- Connecting with Excel
- Auto Sum

- List Auto Fill
- Auto Fill
- Charts
- Databases
- Functions

Structure of a Spreadsheet

Creating a new worksheet

- Start -> All Programs -> Open Office -> Open Office Calc (or)
- Double - click on "Open Office" icon desktop.
- File -> New -> Spreadsheet

Parts of the Open Office Calc Window

- Title Bar
- Control Buttons
- Menu Bar
- Tools Bar
- Scroll Bar
- Status Bar

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Title Bar

- The title bar is displayed at the top most part of the window, which displays the name of the document and the name of the application.

Control Buttons

- In the right corner of title bar : minimize, maximize / restore and (3) close control buttons are available.

Menu Bar

- The menu bar is just below the title bar which comprises of various menus consisting of various options.

Tool Bar

Under the menu bar, there are two toolbars available by default. They are:

- Standard Toolbar
- Formatting Toolbar

Status Bar

- The status bar is at the bottom of the window which shows the current status of the

document such as number of page, current page number, default lang etc.

Row, Column, Cell and Cell Poente

- The worksheet has number of rows & columns.
- each column is labelled as A, B, C, D and rows are numbered from 1, 2, 3
- Open Office Calc Version 4.1.5 contai 1024 columns and 10,48,576 rows.
- Intersection of each row and column makes a box which is called as "Cell

Worksheet tabs

- At the bottom of the grid of cells a the sheet tabs.
- When you open a new worksheet, Sheet1 is the default active shee
- If you click on another sheet, it become active and its colour wi turn white.
- To select multiple sheet select sheet

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press Ctrl + Click.

Worksheet tabs

On the left of the Sheet tab, four navi-gation buttons are used to move between worksheets.

- Move to the First Sheet.
- Move to the previous Sheet.
- Move to Next Sheet.
- Move to the Last Sheet.

Working with Data

- "Tab key" is used to move the cell pointer towards the right side.
- "Shift + Tab" is used to move backward.
- "Enter" key is also used to move the cell pointer.
- Four "direction keys" are used to move the cell pointer anywhere in the worksheet.

Entering Data

1 Entering number 2 Entering text 3 Entering Date &

Copy, Cut & Paste - Spreadsheet

Copy and paste Data

- Select the cell or cells you want to copy.
- Select Edit -> Copy or Click "Copy" in from the Standard toolbar or Press C
- Move the cell pointer to the cell in which you want to paste.
- Select Edit -> Paste or Click "Paste" in or Press Ctrl+V.

Cut and Paste Data

- Select the cell or cells you want to c
- Select Edit -> Cut or Click "Cut" in from the Standard toolbar or Press Ctrl+X.
- Move the cell pointer to the cell which you want to paste.
- Select Edit -> Paste or Click "Paste" icon or Press Ctrl+V.

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Copy a formula from one cell and paste it in multiple cells.

- Copy the formula from H2 using Ctrl+C
- Select all cells in which you want to paste this addition formula.
- Paste the copied formula using Ctrl+V or Edit -> Paste (or) Click "Paste" icon.

Inserting Columns, Rows and Cells - Spreadsheet

Inserting Columns

- Select the column where a new column should be inserted.
- Right-click on the selected column name that you selected. A pop-up menu appears.
- Click the "Insert Columns" option from the menu.

Inserting multiple columns or rows

Multiple columns or rows can be inserted at once rather than inserting one at a time.

- Select multiple rows or columns for insertion.

Inserting Columns, Rows & Cells using "Insert Cells" Toolbar

- Click View -> Toolbars -> Insert Cells

Deleting columns and rows - Spreadsheet

- Delete single column or row.
- Delete multiple columns or rows.

Save, Close and Open the Worksheet

Saving Worksheet

- File -> Save (or) Ctrl + S (or) Click "Save"
- If the file has not been saved previously the Save As dialog box will appear.
- Give "File Name".
- Click "Save" button.

Closing a Worksheet

- File -> Close command (or) Press Ctrl+W

Opening an existing worksheet

- File -> Open Command (or) "Open" icon (or) Ctrl+O

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Creating Formulae

- Operators
- Construction of formula

Operators

(i) Arithmetic Operators

(ii) Relational Operators

(iii) Reference Operators

(iv) Text Operator

Open Office Installation & Download

1. Open Google
2. Write Open Office download
3. Then Click on the provided second link.
4. Then a new window Download Apache Open Office will be displayed.
5. Click on Windows 32-bit (x86) (EXE)
6. Then click on exe file & click on next.

7 Then Destination folder will appear browse the location.

8 Then Unpack it.

9 Then click on next & put username.

10 Then click on next.

11 Then click on Install.

12 Open Office will be installed.

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Creating Formulae

Construction of formula

- Formula should begin with an = sign.
- = cell reference 1 <operator> cell reference 2 <operator>.....

Inserting Functions into Worksheet

Direct Insert method

- SUM (range 1 ; range 2 ; range 3 ..... range n)

Using Function Wizard method

- Insert -> Function (or) Ctrl + F2

Formatting Worksheet - Spreadsheet

Text Formatting

Making the cell contents as bold, italics, underlined, changing font style, size, colour etc.

Number formatting options are used to visually change the format of a numeric content.

Working with Chart - Spreadsheet

Chart Wizard

Steps

- Chart type
- Data Range
- Data Series
- Chart Elements

Chart Type

This step use to select Chart type in the "Choose a chart type" list box

- Select Chart type.
- Select Chart Style.
- Click, "Next" button.

Data Range

This step Specify the range of data for which the chart should be created

- Click "Select data range".

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- There are two checkboxes used to set the first row or first column or both, as X & Y axis labels to the chart.

- Click "Next" button to move to the third step.

Data Series

In this step, the user can fine tune the data to be included in the chart.

- To add some more columns click "Add" button.

- To remove columns click "Remove" button.

- Click "Next" button to move the last step.

Chart Element

This step is used to insert or change titles and legend.

- In "Title" box, type the title for the chart.

- To add a subtitle type it in the "Subtitle" box.

- User can add or modify the labels of X & Y axis.

- To create a chart, click "Finish" button.

Editing Chart elements

After inserting a chart any elem the chart can be modified. To m the element

(a) Double click on the element.

(b) Right click on the selected element.

(c) Select Format from the popup menu.

Structure of Presentation

Opening a new presentation

- To open impress click Start butto Select All programs -> Open Office -> Open Office Impress

Creating a new presentation

You can create a presentation by any of the following methods.

(i) By selecting an Empty presentation.

(ii) By selecting from template.

(iii) By selecting from Open existing presentati

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Using Empty presentation

- Select Empty presentation under Type.
- Click Next, Choose a design under select a slide design.
- Click Next, click an item to see a preview of the transition.
- Select how the presentation will be Speed drop-down menu.
- Click Create, A new presentation is created.

Using Template

If you choose the option from template, it uses a template design already created as the basis for a new presentation. The wizard changes to show a list of available templates. Choose the template that you want.

Using Open existing presentation

- If you choose the option Open existing presentation, it helps in continuing the work on a previously created presentation.
- You have to open a presentation already

prepared by clicking Open button. The wizard changes to show a list of existing presentations, from which you can choose the one that you want.

Parts of the main Impress window

The main Impress window has three fo

(i) Slides pane

(ii) Workspace

(iii) Task pane

Additionally, several toolbars can displayed or hidden during the creation of a presentation.

Slides pane

- The Slides pane contains thumbna pictures of the slides in your present in the order of our insertion of slides

Tasks pane

- The Tasks pane has five sections :

(i) Master Pages

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(ii) Layout

(iii) Table Design

(iv) Custom Animation

(v) Slide Transition

Window elements of Impress

The window elements of Impress includes :

Title Bar, Menu Bar, Tool Bar, Ruler Bar which are Similar to the elements in Open Office writer.

- View Buttons
- Status Bar
- Navigator

Working with Presentation

Workspace

The Workspace has five tabs :

(i) Normal
(ii) Outline
(iii) Notes
(iv) Handout
(v) Slide Sorter

These five tabs are called View Buttons. The

actual Workspace section is below View Buttons.

Formatting a presentation

(i) Creating the first slide

(ii) Inserting additional slides

(iii) Deleting a Slide

(iv) Rearranging slides

Creating the first slide

- The first slide is normally a title slide. Decide the layout as per its purp of presentation.

- You can select a layout in the lay section of the Tasks pane by clicking

Inserting additional slides

- Insert a new slide. This can be de a variety of ways.

(i) Insert -> Slide.

(ii) Right-click on the present slide, & select Slide -> New Slide

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iii) Click the Slide icon in the Presentation toolbar

- Select the layout slide that best fits your needs.
- Modify the elements of the slide.

Deleting a Slide

You can delete a slide at any time using the following procedure.

- Select the slide you want to delete.
- Click Edit
- Delete Slide
- Or else, right click the slide and choose Delete slide.

Rearranging Slides

- Select the slide that you want to rearrange.
- Drag that slide to the desired position by holding the mouse using left click.
- Release the mouse once you drag the slide to the desired place.

Running the Slide Show

To run the slide show, do one of following:

- Click Slide Show -> Slide Show main menu bar.
- Click the Slide Show button.
- Press F5 or F9
- To exit the slide show, press the Esc

Saveing a Presentation

To save the presentation, do one of following:

- Click File -> Save
- Give file name
- Click Save

Creating Graphic Objects - Presentati

Inserting images - presentation

- To insert Image place the cursor the place where you want the image

Running the Slide Show

To run the slide show, do one of the following:

- Click Slide Show -> Slide Show on main menu bar.
- Click the Slide Show button.
- Press F5 or F9
- To exit the slide show, press the Esc k

Saving a Presentation

To save the presentation, do one of the following:

- Click File -> Save
- Give file name
- Click Save

Creating Graphic Objects - Presentati

Inserting images - presentation

- To insert Image place the cursor i the place where you want the image

be inserted. Then, click Insert -> Select Picture From file.

Inserting audio and video

- The audio and movie files can be inserted by clicking Insert Movie and Sounds Option from the Insert menu.
- Select the audio or movie file from the Specified location & open.

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Virus and its type and Antivirus

Definition of VIRUS

A computer virus is a program which can harm our device and files and infect them for no further use. When a virus program is executed, it replicates itself by modifying other computer programs and instead enters its own coding.

Types of Computer Virus

- Boot Sector Virus
- Direct Action Virus
- Resident Virus
- Multipartite Virus
- Overwrite Virus
- Polymorphic Virus
- File Infector Virus
- Space filler Virus
- Macro Virus

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What Causes Computer Viruses

The delivery of a computer virus can happen in several ways.

- One common method is via a phising email.
- Another technique is hosting malware on a server that promises to provide a legitimate program.
- It can be delivered using macros or by injecting malicious code into legitimate software files.

What Is a Computer Worm

- A computer worm is malware, just like a virus, but a worm takes a copy of itself and propagates it to other users. Worms can also deliver a payload and exhaust resources.

What does a Computer Virus Do

- The way a computer virus acts depends on how it's coded. It could be something as simple as a prank that doesn't cause any damage, or it could be sophisticated, leading to criminal activity and fraud.
- Many viruses only affect a local device,

but others spread across a network environment to find other vulnerable hosts.

Symptoms of Computer Virus

Malware authors write code that is undetectable until the payload is delivered. However, like any software program, bugs could present issues while the virus runs.

Examples of Computer Virus

- The web contains millions of computer viruses, but only a few have garned popularity and infect record number machines. Some examples of widespread computer viruses include:

- Morris Worm
- Conficker
- Nimda
- Tinba
- ILOVEYOU
- Welchia
- SQL Slammer
- Shlayer
- Stuxnet
- Cryptolocker

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How to Prevent Computer Viruses

- Install antivirus Software
- Don't open executable email attachments.
- Keep your operating System updated
- Avoid questionable websites
- Don't use pirated Software

What is an Anti-Virus

- Antivirus is a program that helps to secure various Systems by Scanning, detecting & removing viruses, malware, computer worms, and So on.

Different types of Software

- Cloud-Based Software
- Standalone Software
- Security Software Suites

What Does Anti Virus Software Do

- Scan specific files or directories for any malware or known malicious patterns.

- Allow you to Schedule Scans to a
-matically run for you.

- Allow you to initiate a scan of a fo
-lar file or your entire computer, a
of a CD or flash drive at any tim

- Remove any malicious code detected
Sometimes you will be notified of a
infection and asked if you want to
the file, other programs will automatic
do this behind the Scenes.

- Show you the 'health' of your computer

What are the Benefits of Antivirus Sof

- Antivirus Solutions protect more th
just laptops, office computers, Smartph
and tablets.

- They protect precious memories, musi
photo libraries, and important docum
from destruction by malware.

How Does Antivirus Software Work

- Many antivirus Software program
Still download malware definition
Straight to your device & Scan your
files in Search of matches.

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- But since, as we mentioned, most malware regularly morphs in appearance to avoid detection, Webroot works differently.

Using different types of firewalls

Types of Firewalls

- Packet-Filtering Firewalls
- Circuit-Level Gateways
- Application-level Gateways (Proxy Firewalls)
- Stateful Multi-layer Inspection Firewalls
- Next-generation Firewalls (NGFW)
- Threat-focused NGFW

How Does a Firewall Work

- There are multiple types of firewalls based on their traffic filtering methods, structure, and functionality.

Advantages of Using Firewalls

- Firewalls play an important role in the companies for security management.

- It provides enhanced security & privacy from vulnerable services.
- It prevents unauthorized users from accessing a private network that is connected to the internet.
- Firewalls provide faster response time and can handle more traffic loads.
- A firewall allows you to easily handle update the security protocols from a single authorized device.
- It safeguards your network from phishing attacks.

How to Use Firewall Protection

Here are some tips to help you improve your firewall security:

(a) Constantly update your firewalls as soon as possible.

(b) Use antivirus protection

(c) Limit accessible ports & host

(d) Have active network

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Introduction to Linux Operating System

History of linux

In 1991, the linux history started with the starting of a particular project by the Finland student linus Torvalds for creating a new free OS kernel.

What is an Operating System?

- Operating System is defined as a collection of programs that coordinates the operations of computer hardware & software.
- It acts as a bridge for the interface between man and machine.

Types of Operating System (OS)

- Batch Operating System
- Multitasking / Time Sharing OS
- Multiprocessing OS
- Real Time OS
- Distributed OS
- Network OS

Functions of Operating System

- Process management
- Memory management
- File management
- Device management
- I/O System management
- Secondary-Storage Management
- Security
- Command interpretation
- Networking
- Job accounting
- Communication management

Advantages of Operating System

- User Friendly.
- Security
- Sharing Resources

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- Hardware Accessibility
- Multitasking

Disadvantages of Operating System

- Cost
- Reliability
- Complexity
- Fragmentation
- Virus Attacks

Who created Linux?

- Linux, computer operating system created in the early 1990s by Finnish software engineer Linus Torvalds and the Free Software Foundation.

Basic features of Linux

- Portable
- Open Source
- Multi-user
- Multiprogramming
- Hierarchical File System
- Shell
- Security

History of linux

In 1991, the linux history starts with the starting of a particul project by the Finland student Li Torvalds for creating a new free kernel.

Components of linux System

- Kernel
- System library
- System Utility

The linux kernel

- linux kernel is a free, open-sourc monolithic, modular, Unix-like op System kernel.
- It is the main component of the li Operating System and is the core interface between the computer's hardware & its processes.

User-interface of linux

- A user interface (UI) refers to t part of an operating System, progra

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or device that allows a user to enter and receive information.

Distribution of linux

- Ubuntu
- linux Mint
- Debian
- Red Hat
- Fedora

Best Command-line Editors in Linux

- Vim
- Emacs
- Nano
- Micro

Types of Users in Linux

- Root user
- Service Account
- Regular User

Comparison of linux with another Operating System

- Linux is Open Source and is free to
Windows is not open Source & is no
free to use.

- Linux file System is case Sensitive
Windows file System is case insensitive

Linux	Ubuntu
• A family of free & open Source Software operating System built around the linux kernel.	• A free & open Source operating System & linux distribution based on Debian.
• Core Operating System	• An operating System, which is a distribution of linux
• Linus Torvalds was the initial developer; linux community can support the development of the OS.	• Developed by Canonical Ltd. & the Ubuntu community can support its development
• Initially released in 1991.	• Initially released in 2004.
• Used for personal	• Used for personal

computers, game consoles, embedded systems, desktop & servers.	computers, servers, cloud computing & IoT.

Advantages and disadvantages of Linux Operating System

Advantages

- Open Source
- No anti-virus software needed
- Text editors
- Powerful command prompt
- No reboot needed
- Low system specifications
- Good at multitasking
- Less disk space needed
- File formats

Disadvantages

- Hardware drivers
- Learning curve

- Software alternative
- No Games

What is Graphical User Interface?

A graphical user interface is an interface through which a user interacts with electronic devices such as computers and smartphones through the use of icons, menus & other visual indicators or representations.

Top 10 linux Desktop Environments

- GNOME
- KDE Plasma
- Unity
- MATE
- Cinnamon
- Budgie
- LXQT
- XFCE
- Deepin
- LXDE

CLI vs GUI

- CLI, or Command line Interface, is text-based interface used to interact software & operating system by typing commands into the interface & receive a

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response in the same way.

- GUI, or Graphical User Interface, is a visual-based interface which features the use of graphic images, including windows, icons, and menus.

GUI	CLI
• A type of user interface that allows users to interact with electronic devices through graphical icons and visual indicators.	• An interface for the user to issue commands in the form of successive lines of text or command lines to perform the tasks.
• Graphical User Interface	• Command Line Interface
• Even a beginner can easily handle.	• User should have good knowledge of commands.
• Requires more memory as it contains a lot of graphical components.	• Does not require more memory.
• Slower	• Fast
• There are customizable options to change the appearance.	• It is not possible to change the appearance.
• More flexible	• Not much flexible

Syntax of Shell commands

Linux directory Structure

- / - Root
- /bin - Binaries and other executable prog
- /etc - System configuration files
- /home - Home directories
- /opt - Optional or third party Softw
- /tmp - Temporary space, typically clea on reboot.
- /usr - User related programs.
- /var - Variable data, most notably l files.

Types of Files in Linux

- Regular Files (-)
- Directory Files (d)
- Special files

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What are Shell Commands?

- In linux, commands are ways or instructions through which you can instruct your system to do some action.
- Commands are executed in the command line.

Ubuntu Coding

Alt + Ctrl + T => Terminal

ls → List
↓
cd Documents
↓
ls
↓
mkdir dir1 → Directory name
To make directory
↓
ls
↓
cd /dir1
↓ → To come out of the directory / folder
ls
↓
cd \
↓
ls

cd Downloads

↓

ls

↓

cd\

↓

mkdir new_directory

↓

ls

↓

cd new_directory

↓

cd\

↓

cd Documents

↓

ls

↓

rmdir dir1

↓ → To remove directory

ls

↓

rmdir dir1 dir2

clear → To clear the content

history → To see history

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Pwd → present work Directory

↓

ls

↓

cd Downloads

↓

ls

↓

cd \

↓

cd Documents

↓

mkdir Drishti

↓

ls

↓

cd Drishti

↓

clear

↓

Cat > Hello.txt

To create a file ← [Enter the content]

↓

To save file [Control+D]

↓

Cat Hello.txt

To view the file ← ↓

Touch apple.txt Mango.txt

Used to create empty files ← ↓

rm apple.txt

To remove files ← ↓

Cat > Sample.odt → Libre Office extension

red colour
↓
Executable Files

Blue colour
↓
Directory Folder

White Colour
↓
Files

cp command
↓
Copy the file content to another
cp file name (To) file name (Through)

eog command
↓
To view the jpeg file
eog File name

sudo apt-get update → To update whole machine

sudo apt update → To update applications

sudo apt-get install vlc → To install vlc

vlc video.mp4 → To run video
↓ File name

ls
↓
echo (To Display the content)
↓
echo $HOME
↓
echo $PWD
↓
echo $BASH
↓
echo $BASH_VERSION
↓
echo $LOGNAME
↓
echo $OSTYPE
↓
echo $SHELL
↓
echo "Hello World"

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Google Installation in Ubuntu

1. Go to firefox & Download Google Chrome.

2. You will get a file in Downloads folder.

3. Now press Alt + Ctrl + T

Then type:-

cd Downloads
↓
ls
↓
sudo apt install ./ File Path .deb

If we want to delete filled Directory

rm -r folder name
↳ Directory / Folder to be removed

VAANI

What is Command Line Interface (CLI)

- The Command line Interface (CLI), is non-graphical, text-based interface the computer system, where the user types in a command and the computer then successfully executes it.

- The Terminal is the platform or the that provides the Command line interface environment to the user.

Basic Shell Commands in Linux

- It is a command language interpreter that executes commands read from input devices such as keyboards or from files

- The shell gets started when the user logs in or starts the terminal.

File and Directory Manipulation Commands

- mkdir
- cp
- mv
- rm
- touch

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What is the use of Shell command?

- It is a command language interpreter that executes commands read from input devices such as keyboards or from files.

- The Shell gets started when the user logs in or starts the terminal.

Shell Scripting

- Shell Scripting is an open-source computer program designed to be run by the Unix / Linux Shell.

- Shell Scripting is a Program to write a series of commands for the Shell to execute.

Editors

- VI Editor

- Nano Editor

VI Editor

- It is the default text editor that comes with most linux systems.

- It is a Terminal-based text editor that users need to learn, essentially when more user-friendly text editors are not available on the System.

sudo apt install vim

Nano Editor

- GNU nano is a simple terminal-based text editor.

- Nano can be used in a terminal window or at the system console..

sudo apt install nano

Why do we need Shell Scripts?

- Using a shell script is most useful for repetitive tasks that may be time consuming to execute by typing one line at a time.

What is Bash?

- BASH is an acronym for Bourne Again Shell

- Bash or Shell is a command line tool

that is used in open Science to efficiently manipulate files and directories.

Features of Bash

- Shell commands
- I/O Redirection
- Interactive
- Manuals/help
- Scripting
- Functions
- Extras

Bash Scripting

- A Bash Shell Script is a plain text file containing a set of various commands that we usually type in the command line.
- It is used to automate repetitive tasks on linux fileSystem.

Shell Variables

- A variable is a temporary storage area in memory that is either set by the user, Shell System, or any program that loads another program.

There are two categories of variables:

- environment variables
- Shell variables

Bash Operators

- Integer Comparisons
- String Comparisons
- Logical Operators
- File Test Operators

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- pwd command - pwd command is used to display the location of the current working directory.

  Syntax - pwd

- mkdir command - The mkdir command is used to create a new directory under any directory.

  Syntax - mkdir

- rmdir command - The rmdir command is used to remove directory.

  Syntax - rmdir

- ls command - The ls command is used to display list of a directory.

  Syntax - ls

- cd command - The cd command is used to change the current directory

  Syntax - cd directoryname

- Touch Command - Touch command is used to create empty files. We can create multiple empty files by executing touch command at once.

  Syntax - Touch FN
  Syntax - Touch FN1, FN2, FN3

Cat Command - The cat command is a -purpose command in the linux ~~command~~ system. It is used to create a file and display the content of a file.

Cat > FN
Enter the file content
To save the file (Press Ctrl D)

To display the File content Type

Syntax : Cat FN

Rm command - Rm command is used to rem a file.

Syntax : rm filename

Cp Command - It is used to copy a file.

```
cp FN
$ cd desktop
$ ls
$ cp sample.txt adit.txt
$ ls
$ cat sample.txt
$ cat adit.txt
```

Syntax :- cp Existing File New File

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Head Command - The Head command is used to display the content of a file but it displays the first 10 lines of a file.

Syntax :- Head FN

Tail Command - Tail command is similar to Head command but tail command display the last 10 lines of the file content.

Syntax :- Tail FN

Tac Command - Reverse of Cat Command. It displays the file content in reverse order.

Syntax :- Tac FN

Grep Command :- The grep command is used to filter. The grep stands for Global regular Expression print. It is used for searching the Content from a file it is used with the pipe sign

Cat FN pipesign Grip searchword

Date Command :- To show date
$ date

Cal command :- To show month
sudo apt install ncal => For installing Calendar
$cal

gedit

```
$ cd Document
$ mkdir Shell Scripting
$ ls
$ cd Shell-Scripting
$ gedit FN (input.sh)
```

SHELL

BASH OPERATORS

gedit = Scripting file in gedit

```
$ gedit input.sh
$ chmod +x input.sh
echo "welcome to ADIT"
~~$ x. input~~
$ ./ input.sh
$ gedit demo.sh
$ chmod +x demo.sh
$ ./demo.sh
```

```
1) #!/bin/bash (File # on the top)
2) # User define variable
3) Name = "Pratibha"
4) Age = "20"
5) echo "Hello my name is "${name}"
6 echo "And my age is ${age}"
```

```
$ chmod +x user.sh
$ ./user.sh
```

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Echo " Hello my name is ${name}, and my age is ${age}

Read user Input =>

$gedit readvariable.sh

```
1 #!/bin/bash
2 read p "Enter your name"
3 read p "Enter your age"
4 Echo "Hello this is ${name}, and my age is ${age}
```

$chmod +x readvariable.sh
$./read variable.sh

Nano Editor

Open in Nano Terminal
$ nano readvariable.sh

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Shell Scripting

Types of Shell

- The Bourne Shell
- The C Shell

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Bash Operators

- Integer Comparisons
- String Comparisons
- Logical Operators
- File Test Operators

Read User Input

- 'read' command is used to take input from user in bash.
- It takes input from the user & assigns to the variable

```
read <variable_name>
```

Bash Conditional Statements

- if Statement
- if - else Statement
- Else if ladder
- Nested if
- Switch Statement

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Nano Editor

cd Desktop
↓
mkdir a
↓
cd a
↓
nano b.sh
↓
[Gnu nano 6.2] b.sh
↓
echo $HOME
echo "Drishti" ← Esc
[ctrl+X] :wq
↓
bash b.sh

VI Editor

vi sample.sh
↓
Enter to the editor -> You compress i (insert) -> Type the code -> Esc button hit
↓
:wq
↓
Save & Exit
↓
bash sample.sh

Addition ['+' operator]

Method 1

```
#!/bin/bash
Sum = $((10+3))

echo "Sum of 10+3 = $Sum"

chmod +x Sum.sh
./Sum.sh
```

Method 2

```
#!/bin/bash

((Sum = 12+5))

echo "Sum of two number is = $Sum"
```

Method 3

```
num1 = 20
num2 = 40

((Sum = num1+num2))
echo "$Sum"
```

Method 4

```
num1 = 15
num2 = 5

Sum = $((num1+num2))
echo "The Sum of two number is $Sum"
```

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Comments

Alt + Ctrl + T → Terminal

```
# b/bin/bash
echo " We are using Single line & multi line
        Comment"
  # This is a single line comment
```

1
```
<< long Comment
 This is
 a multi
  line
  Comment
 long Comment
 echo "Hello World"
```

2
```
<< Multiline-Comment
 This
  is
 a multi
  line
 comment
 Multiline-comment
```

3
```
: '
This is a comment in line 1
This is a comment in line 2
This is a comment in line 3
'
```

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Syntax

1. echo "Increment x by 10 then x = "
   ((x+=10))
   echo $x

2. echo "Decrement x by 4 then x = "
   ((x-=4))
   echo $x

3. echo "Multiplication of x & y"
   ((y*=10))
   echo $y

4. echo "Dividing x by 2, x = "
   ((x/=2))
   echo $x

5. echo "Remainder of dividing x by 2, x
   ((x%=2))
   echo $x

For loop

for varname in [list] → List of values (Variables)

keywords → do

Command 1
Command 2
...
done

Method 1

```
echo "Program to print 1 to 5 numbers"

for i in 1 2 3 4 5
do
echo $i
done
```

Method 2

```
echo "Program to print 1 to 10 numbers"

for i in {1..10}
do
echo $i
done
```

Method 3

```
echo "Program to print 1 to 10 numbers"

for i in {0..10..2} # Start end increment
do
echo "Welcome $i times"
done
```

Table of 5

```
echo "Table of 5"

for i in {0..50..5}
do
echo $i
done
```

Method 4

```
echo "Method 4 : program to Print Weekday"
for day in Mon Tue Wed Thu Fri
do
echo $day
done
```

Method 5

```
echo "Method 5: Program to print Weekday"
i=1
for day in Mon, Tue, Wed, Thu, Fri
do
echo "Weekday $((i++)) : $day"
done
```

Method 6

```
echo "Method 6 : Program to print Number"

for i in "zero" "one" "two" "three" "four
do
echo "Value $i"
done
```

Program to print letter range

```
for i in (a..z)
do
echo "Letter : $i"
done
```

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```
echo "program to print letter range"
for i in (10..0)
do
echo "Number : $i"
done

echo "program to print letter range"
for i in (50..01..2)
do
echo "Number : $i"
done

echo " C Style for loop"
echo "Print number 0 to 5"

for ((i=0; i<=5 ; i++)) # 1. initialization
                          2. condition
                          3. Increment/
                             Decrement
do
echo "$i"
done

for i in {1..50..2}
do
echo $i
done

echo "Print ls, pwd, date"
for i in ls pwd date
do
$i
echo → done
```

```
echo "Print infinite loop"
for ((; ;))
do
echo
```

While loop

Syntax

```
While [condition - Should evaluate to
                   true or false]
do
        Statement 1
        Statement 2
done
```

- -ne = Not equal to
- -eq = Equal to
- -lt = Less than
- -le = Less than = to
- -gt = greater than
- -ge = greater than = to

```
echo "Print Numbers"

i=0
while [ $i -le 10 ]
do
echo $i
(( i++ ))
done
echo False
```

```
echo "Print Number"

n=10
while [ $n -le 20]
do
echo $n
n=$((n+1))
done
```

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Until Loop

```
#!/bin/bash

until [Condition]
do
[Commands]
done

Counter=0
until [ $counter -gt 5]
do
echo "Counter: $counter"
(( counter++))
done
```

Swapping of Two numbers

```
a=20
b=10

echo "Before Swapping"
echo "a = $a"
echo "b = $b"

c=$a                    # c=20
a=$b                    # a=10
c=$c                    # b=20
echo "After Swapping"
echo "a : $a"
echo "b : $b"
```

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Write a program to read two integer numbers and print the Subtraction of both variable.

```
echo "Enter num1"
read num1

echo "Enter num2"
read num2

echo "Subtraction is : $(num1-num2)"
```

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If-else Statement

#!/bin/bash

Syntax

```
if [condition]
 then
     Statement
 else
     Statement
fi
```

```
echo " Using if-else to check whether
     two numbers are equal"

a = 10
b = 5

if [ $a -eq $b ]
then
    echo "Both variables are equal"
else
    echo "Both variables are differe
fi

echo "Using if-else to compare two v

a = 20
b = 15
```

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```
echo "a = 20"
echo "b = 15"
if [ $a -gt $b ]
then
    echo "a is greater than b"
else
    echo "b is greater than a"
fi
```

echo "Using if-else to check whether a number is even or odd"

```
a = 20
echo "a = 20"
if [ $ (( a % 2 )) = 0 ]
then
    echo "a is even"
else
    echo "a is odd"
fi
```

Whether a number is less than 100 or not

```
echo "Enter Integer"
read "a"

if [ $a -lt 100 ]
then
echo "$a is less than 100"
else
echo "$a is greater than 100"
fi
```

```
echo "Enter a number"
read n
if [ $n -lt 100 ]; then
printf "$n is less than 100 \n"
else
printf "$n is greater than 100 \n"
fi
```

If-elif-else Statement

```
a=10
b=20
if [ $a == $b ]
then
echo "a is equal to b"
elif [ $a -gt $b ]
then
echo " a is greater than b"
elif [ $a -lt $b ]
then
echo " a is less than b"
else
echo "None of the condition true"
fi
```

Enter the marks

```
echo "Enter the marks"
read m
if (( $m >= 90)) ; then
echo " you Scored A+"
```

```
elif (( $m < 90 && $m >= 80)) ; then
echo " You Scored A"

elif (( $m < 80 && $m >= 70)) ; then
echo " You Scored B+"

elif (( $m < 70 && $m >= 60)) ; then
echo " You Scored C"

else
echo " You are Fail"
fi
```

Nested If

Syntax

```
echo " User will enter three numbers and
       print the largest among the three nos."

echo -n "Enter the first number"
read var1

echo -n "Enter the second number"
read var2

echo -n "Enter the third number"
read var3

if [[ $var1 -ge $var2 ]]
```

```
then
if [[ $var1 -ge $var3 ]]
then
echo " $var1 is the largest number."
else
echo " $var3 is the largest number."
fi
else
if [[ $var2 -ge $var3 ]]
then
echo "$var2 is the largest number"
else
echo " $var3 is the largest number"
fi
fi
```

Use of && Operator

```
echo -n "Enter the 1st number"
read var1

echo -n "Enter the 2nd number"
read var2

echo -n "Enter the 3rd number"
read var3

if [[ $var1 -ge $var2 ]] && [[ $var1 -
then

echo "$var1 is the largest number"
```

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```
elif [[ $var2 -ge $var1 ]] && [[ $var2 -ge
                                $ var3 ]]
then
echo "$var2 is the largest number"
else
echo "$var3 is the largest number"
fi
```

Switch Case

Syntax

```
case (word) in
 <first pattern>
 <Statements>
   ;;
 <Second pattern>
 <Statements>
   ;;
 *)
 <default Statement>
   ;;
 esac
```

Ex

```
Vegetable = "Cabbage"
case $vegetable in
 potato)
echo "Your potato will cost Rs 70"
   ;;
 Tomato)
echo "Your Tomato will cost Rs 20"
```

```
;;
lady_Finger)
echo "Your lady Finger will cost Rs 35"
;;
*)
echo "Unknown Vegetable"
;;
esac
```

Entry of One, Two & Three Digits

```
echo "Enter a number"
read n

case $n in
[0-9])
echo "You have entered a single digit
      number"
;;

[1-9] [1-9])
echo "You have entered a two digit
      number"
;;

[1-9] [1-9] [1-9])
echo "You have entered a three digit
      number"
;;
*)
echo "Entry doesn't match"
;;
esac
```

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Functions

Syntax

Bash Function Syntax

Method-1

```
function_name () {
        <command>
}
```

Alternate: the Same function can be i
one line

```
function_name() { <command> ; }
```

Method-2

```
function <function_name> {
        <command>
}
```

Alternate: the Same function can be in
one line

```
function <function_name> { <command> ;
```

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Example

```
Hi() {                    # Calling f^n
  echo "Hii"
  echo "My Name is Drishti"
  }
  Hi                      # Called f^n


Hi() {
  echo "Hii"
    }
Hello() {
  echo "My name is Drishti"
    }
Hello
 Hi


Hi() {
   echo "Hii"
    }
Hello() {
  echo "Hello"
 Hi
 }
 Hello

Hi() {                    Hello
  echo "Hii"              Hello
  }                       Hello
Hello() {
   echo "Hello"
 Hi }
```

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With Function Keyword.

```
function a {
    echo "My name is Drishti"
    echo "Have a good day"
    }

function b {echo "Nice to meet you" ; echo
                "Bye!" ; }

a
b
```

Without Function Keyword

```
c () {
echo "Hello I am function 3"
echo "Bye!"
    }

d() { echo "Hello I am function 4" ;
        echo "Bye" ; }

c
d
```

Passing a String argument to a function

```
Hello () {
    echo "My name is $1"
    echo " I am $2 years old"
    }
```

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```
Hi () {
    echo " I live in $1"
    }

Hello "Drishti Chakraverty" "22"
Hi " Delhi"
```

#

```
Hello () {
    echo $1
    echo $2
    echo $3
    echo $4
    echo $5
    echo $6
    echo $7
    echo $8
    echo $9

Hi () {
    echo $1
    }

Hello "Passing" "more" "than" "one" "string"
    "argument" "to" "a" "function"

Hi " Passing more than one string
    argument to a function
```

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11) Passing the integer argument to a function for addition

```
Sum () {
    add = $ (( $1 + $2))
    echo " The Sum of $1 & $2 is $add"
    }

mul () {
    a = $ (( $1 * $2))
    echo " The multiplication of $1 & $2 is $a"
    }

div () {
    b = $ (( $1 / $2))
    echo " The Division of $1 & $2 is $b "
    }

Sub () {
    c = $ (( $1 - $2))
    echo " The Subtraction of $1 & $2 is $c"
    }
```

Sum	20	30
mul	5	10
div	20	5
Sub	10	5

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Explain and apply common prevention methods

Monitors

- Keep it clean - use periodic cleaning, dusting.
- Use simple cleaning solutions, not aerosol sprays, solvents, or commercial cleansers. DON'T use windows sprays on a monitor screen.
- Do not leave monitors on unattended for extended periods of time.
- Don't attempt to work inside the cabinet unless you are properly trained to do so.
- Don't tamper with the monitor.
- DON'T use windows sprays on a monitor screen.

Hard Disk Drives

- Avoid rough handling.
- Never move a hard disk when it is still spinning.

- Never expose the internal housing to open air.
- Perform regular data backups.

Keyboards and Pointing Devices

- Use a hand-held vacuum cleaner to remove dust from the small crevasses.
- Never use spray cleaners.
- Clean a mouse or trackball by removing the ball and cleaning the x & y rollers.
- When using a light pen, never touch the end with your fingers.

Printers

- Printers are more mechanical than other peripherals and therefore require more attention.
- Because they use paper, ink, or carbon, printers generate pollutants that can build up and cause problems.
- Here are a few steps for cleaning the most popular types of printers

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Printers Laser Printers

- Vacuum to remove dust buildup and excess toner from the interior. Remove the toner cartridge before vacuuming.
- Clean the laser printer's rollers using a damp cloth or denatured alcohol.
- Clean the gear train of the paper-handling motor using a foam swab.
- Apply light oil to the gears using a foam swab.

Ink - Jet Printers

- Adjust the print - head spacing.
- Check the tension on the print - head - positioning belt.
- Clean the printer and its mechanism.
- Clean the printer's roller surfaces.
- Clean the gear train of the paper - handling motor.
- Move the carriage assembly to distribute the oil.

To take the input from the user as to check whether a number is greater than 50 or not.

```
a() {

read -p "Enter a number" b
  if [ $b -ge 50 ]
then
 echo "$b is greater than 50"
else
echo "$b is smaller than 50"
fi
  }

a
```

To print Numbers

```
f2 () {
for i in 1 2 3 4 5
do
echo "$i"
done
 }
a
```

Table of 5

```
a() {
for b in {5..50..5}
do
echo "$b"
done  }
```

Weekdays

```
echo "Weekdays"
 c() {
for f in Mon Tue Wed Thur Fri
do
echo " Weekday $f"
done
 }
 c
```

Print reverse Counting

```
echo "Program to print reverse counting"
 d() {
for e in {50..1..2}
do
echo "Number $e"
done
 }
d
```

VAANI

Safety precautions in handling PC

Finding a Place to Work

- The first thing you need to think about when planning ~~your~~ your new homebuilt computer has nothing to do with parts, performance, or configuration.
- You need to find a place to work.

Staking Out your Work Area

- Professionals and die-hard home computer builders usually have work benches that are dedicated to nothing but computer work.
- You need a study table or workbench.
- The table should be clean and non-metallic.
- Avoid places that are damp, subject to temperature extremes, dirty, or dusty

Computer Safety Tips

Backups

- The most important precaution against any risk of data loss is a full, up-to-date backup.

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- Tape backup drives are the wisest form of insurance for your computer.
- Good tape drives are very inexpensive.
- Full backups weekly and partial backup: daily is best.

Telephone line danger

- One potential threat to your computer which most often goes unnoticed is your modem connection.
- Surges and power fluctations can hit your System through your phone line and cause serious damage.
- Make sure your power Strip or battery backup has telephone line Protection.

Battery backups

- A Single power outage is not as damaging to your computer as the extreme Surges & drops in power that occur during a blackout, brownout, or just your ordinary lightning Storm.
- Your computer is very sensitive to power fluctuations - Protect yourself

against this.

- Uninterrupted Power Supplies (UPS) are available at most any computer store or Office Supply Store.

Turn Off your Computer

- Monsoon Season is the exception to the rule.

- Whenever a storm is expected, your safest strategy is to turn off computers and monitors.

- These precautions can save you a great deal of frustration and loss.

Sub assemblies and Components

- Subassemblies are electronic parts of the computer that are a portion or part of a functional area.

- A Subassembly can contain just electronic parts.

- Two or more components combined into a unit will form a Subassembly.

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Basic PC Components

- Motherboard
- Processor
- Memory (RAM)
- Case / Chassis
- Power Supply
- Hard drive

The main Components of a Computer :-

1. Input Unit
2. Storage Unit
3. Processing Unit
4. Output Unit
5. Controlling Unit

1. Input Device

In computer input unit is defined as an input device, a piece of computer hardware apparatus used to supply a data processing system including a computer or information device with control and data signals.

Example :- Mouse, Keyboards, Scanners, joysticks, and digital cameras.

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Basic PC Components

- Motherboard
- Processor
- Memory (RAM)
- Case / Chassis
- Power Supply
- Hard device

The main Components of a Computer :-

1. Input Unit
2. Storage Unit
3. Processing Unit
4. Output Unit
5. Controlling Unit

1. Input Device

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2 Storage Unit

When a user enters data using input devices, the computer system stores this data in memory unit i.e. storage unit. The storage unit uses a set of pre-programmed instructions to further transmit this data to other parts of CPU. There are two types of memory

- Primary memory
- Secondary memory

3 Processing Unit

A piece of hardware that handles all the instructions of a computer program is the CPU (Central Processing Unit) of a computer. It performs a computer system's basic logical, arithmetical and input/output functions.

4 Output Unit

In computer Output Unit is defined as Output device, any device that is used to transmit a computer's data between devices or client. The bulk of computer output data designed for people is in audio or video format.

Example: Projectors, monitors, printers, headphones

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5 Controlling Unit

Control Unit is the part of the computer central processing unit (CPU), which directs the operation of the processor. It interprets instructions.

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Important points to be considered while purchasing and replacing components

The three most important factors to consider when purchasing computer hardware and software are:

- Quality
- Price
- Service after the Sale

Quality

You can determine quality by asking yourself the following questions:

- How well does this product meet my specific needs?
- Does it have the features & functions I require?
- How well is it made?
- How long will it last?

Price

- Everyone has a budget, but that doesn't mean buying cheap is necessarily the way to go.

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- If you purchase a product that breaks easily or doesn't fully meet your needs.
- You'll end up needing to replace it, thereby busting your budget.

Service after the Sale

Here are a few aspects you'd be wise to look into before purchasing:

- Return policy
- Warranty
- Service agreement

Concept of Preventive and Corrective maintenance

Preventive Maintenance

- Preventive maintenance can be defined as an equipment maintenance strategy based on replacing, or restoring, an asset at a fixed interval regardless of its condition.
- Scheduled restoration tasks & replacement tasks are examples of preventive maintenance tasks.

Time Based Maintenance (TBM)

- Time-Based Maintenance refers to replacing or renewing an item to restore its reliability at a fixed time, interval or usage regardless of its condition.

Failure Finding Maintenance (FFM)

- Failure Finding Maintenance tasks are aimed at detecting hidden failures typically associated with protective functions.

Risk Based Maintenance (RBM)

- Risk Based Maintenance is when you use a risk assessment methodology to assign your scarce maintenance resources to those assets that carry the most risk in case of a failure.

Condition Based Maintenance (CBM)

- It may be possible to take action to prevent it from failing completely and/or to avoid the consequences of failure. Condition Based Maintenance as a strategy therefore looks for physical evidence that a failure is occurring or is about to occur.

7 Must-Have Hand Tools

- Flat-Tip Screwdrivers
- Philips-Head Screwdrivers
- Torx Screwdrivers & Nut Drivers
- Wire Cutters
- Needle-Nose Pliers
- Wire Strippers
- Crimpers

Active & Passive Maintenance

Active Maintenance

The following is a sample weekly disk maintenance checklist:

- Backup any data or important files.
- Delete all temporary files.
- Empty the Recycle Bin.
- Check for and install antivirus software updates.
- Finally, run a disk-defragmenting program

The following are some monthly maintenance procedures you should perform:

- Create an operating system startup disk.
- Check for and installing any BIOS updates.
- Check for and install any updated drivers for the video, sound, modem, and other devices.
- Check for & installing any operating system updates.
- Clean the System.
- Check that the cooling fans are operating or not.

Passive Maintenance

- Passive preventive maintenance involves taking care of the System by providing the best possible environment - both physical & electrical - for the System.
- General System Care & Handling
- The Operating Environment
- Temperature, Humidity, and Altitude

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Maintenance Scheduling

There are no universal maintenance schedules that work on every computer. Each schedule must be individualized to meet the needs of the work environment.

Do This Daily

- Back up data.
- Check computer ventilation to ensure that its clear.
- Remove any paper, books, or boxes that might impede the flow of air into or out of the computer.

Do This Weekly

- Clean the outside of the case.
- Clean the screen.
- Run CHKDSK or Scan Disk on all hard disk drives.
- Run a current antivirus program & check all drives.
- Inspect all peripheral devices.

Do This Monthly

- Clean the inside of the system.
- Clean the inside of any printers.
- Vacuum the keyboard.
- Clean the mouse ball and x & y wheels.
- Defragment all hard disk drives.
- Delete any unnecessary temporary files.

Do This Every Six Months

- Perform an extensive preventive maintenance check
- Apply any antistatic solution to the entire computer.
- Check & reseat all cables.
- Run the printer's self-test programs.

Do This Annually

- Reformat the hard disk drive and reinstall all software. Don't forget to back up data first.

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- Check all floppy disk drives.
- Consider an upgrade to your computer. Check to see that your components can handle your workload.

Summary

- The best maintenance practice is to keep a computer clean.
- Never use solvent - based cleaners on a computer.
- Never use liquids on the electrical components inside a computer.
- Create and implement a regular maintenance program for each computer under your care.

Need of diagnostics program

- Computer diagnostics tools are pieces of software that give you the knowledge you need to be able to potentially repair your own computer.
- Some of these tools come built in to your operating system while others come from 3rd party software developers.

- Wifi Analyzer
- Performance Monitor
- Reliability Monitor
- ESET ~~SysInsf~~ SysInspector
- System Explorer
- CPU-Z

What is a Monitor?

A monitor is an electronic output device that is also known as a video display terminal (VDT) or a video display unit (VDU).

Types of Monitor

- Cathode Ray Tube (CRT) Monitors
- Flat Panel Monitors
- Liquid Crystal Display : LCD
- Gas Plasma Display
- Touch Screen Monitors
- LED Monitors

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- OLED Monitors
- Flat Panel Monitors
- DLP Monitors
- TFT Monitor
- Plasma Screen Monitor

CRT vs LCD display Systems

Basis For Comparison	CRT	LCD
Stands For	Cathode Ray Tube	Liquid Crystal Display
Major Components	Vacuum glass tube, phosphor screen, electron gun, deflection plates.	Glass plates, nematic liquid crystal, internal light Source.
Size	CRT is weighted, bulky, & large in size.	LCD is light, compact, and thin in Size.
Weight	Heavier	Lighter
Power consumption	It consumes High power.	It consumes Low power.

Image Flickering	Image Flickering is there in CRT.	No image Flickering is there on LCD.
Color	CRT is like Black	LCD is like White
Image Retention	Image Retention is not there in CRT.	Image Retention is there on LCD.
Cost	It is less expensive.	It is more expensive.
Image Formation	Electron Gun is used to form images.	Liquid crystals are used to form images.

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age mation	Electron Gun is used to form images.	Liquid crystals are used to form images.

VRAM

- VRAM (video RAM) is a reference to any type of random access memory (RAM) used to store image data for a computer display.
- All types of VRAM are special arrangements of dynamic RAM (DRAM)

How to Diagnose Motherboard or Processor Problems?

- The motherboard and processor are two of the most important hardware components inside the computer.
- The various pieces of hardware inside the PC communicate with one another through the

circuits on the motherboard, while the CPU stores and executes programming instructions.

- The motherboard and CPU can both be ex-pensive to replace, however, but diagnosing hardware failure on your own can reduce the potential repair costs for your business.
- Turn Off the Computer
- Touch a Bare Metal Surface
- Turn on the Computer
- Navigate to Motherboard Manufacturer's Website
- Uninstall Hardware
- Loosen the Heat Sink and Processor Fan
- Touch the Processor
- Lift Out the C.PU
- Lock the CPU in Place
- Reconnect the Power
- Check for Damage on Motherboard

- Remove the CLRTC Jumper
- Reconnect the keyboard
- Load Fail-Safe Defaults
- Restart the Computer

Motherboard Troubleshooting

- Check the power supply to see if the fan is turning. If the CPU or motherboard has a fan, see if it is turning. Check voltages going from the power supply to the motherboard.

- Check the BIOS/UEFI settings for accuracy.

- Check for overheating. Power down the computer and allow the computer to cool. Power on the computer with the cover off.

- Check the motherboard for distended capacitors. These are small components that might appear to be bulging. If sighted, replace the motherboard as soon as possible.

- Reseat the CPU, adapters, and memory chips.

- Remove unnecessary adapters and devices & boot the computer.

- Plug the computer into a different power outlet and circuit, if possible.
- Check to determine whether the mother-board is shorting out on the frame.
- Check the CMOS battery.
- With a motherboard that has diagnostic LEDs, check the output for any error code.

Troubleshooting I/O Devices

- Solution 1: Make certain that all cables are connected correctly.
- Solution 2: Start the computer in a clean boot state.
- Solution 3: Change the transfer mode for the drive in IDE Channel Properties.
- Solution 4: Check the status of the device in Device Manager.
- Solution 5: Contact the hardware manufacturer

Introduction to Networks

What is a Computer Network?

- A computer network is a set of computers connected together for the purpose of sharing resources.

- The term network originated during the mid of the 1960s in the Department of Defense in the United States.

- A network is a collection of computers, servers, mainframes, network devices, peripherals, or other devices connected to one another to allow the sharing of data.

Characteristics of a Computer Network

- Share resources from one computer to another.

- Create files and store them in one computer, access those files from the other computers connected over the network.

- Connect a printer, scanner, or a fax machine to one computer within the network and let other computers of the network use the machines available over the network.

Following is the list of hardware's required to set up a computer network.

- Network Cables
- Distributors
- Routers
- Internal Network Cards
- External Network Cards

Network Cables

Network cables are used to connect computers. The most commonly used cable is Category 5 cable RJ-45

Distributors

A computer can be connected to another one via a serial port but if we need to connect many computers to produce a network, this serial connection will not work.

The solution is to use a central body to which other computers, printers, scanners etc. can be connected & then this body will manage or distribute network traffic.

Router

A router is a type of device which acts as the central point among computers and other devices that are a part of the network. It is equipped with holes called ports. Computers and other devices are connected to a router using network cables. Now-a-days routers come in wireless modes using which computers can be connected without any physical cable.

Network Card

Network card is a necessary component of a computer without which a computer cannot be connected over a network. It is also known as the network adapter or Network Interface Card (NIC).

Network cards are of two types:

- Internal Network Cards
- External Network Cards

Internal Network Cards

Motherboard has a slot for an internal network card where it is to be inserted.

Internal network cards are of two types in which the first type uses Peripheral Component Interconnect (PCI) connection, while the second type uses Industry Standard Architecture (ISA), Network cables are required to provide network access.

External Network Cards

External network cards are of two types: Wireless and USB based. Wireless network cards need to be inserted into the motherboard, however no network cable is required to connect to the network.

Basics Components of Computer Network

A computer network is built up from several components. These components together make it possible to transfer data from one device to another and makes smooth communication between two different devices. In this guide, we will discuss the main components of a computer network.

- Servers
- Clients
- Transmission Media
- Network Interface Card
- Modem
- Hub
- Switch
- Cables & connectors
- Router
- LAN Cable

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Server

Servers are computers that run operating systems and hold data that can be shared over a computer network.

Client

A client is a computer that is connected to other computers in the network and can receive data sent by other computers

Transmission Media

All computers in a computer network are connected with each other through a transmission media such as wires, optical fibre cables, coaxial cables etc.

Network Interface card

Each system or computer in a computer network must have a card called network interface card (NIC). The main purpose of NIC is to format the data, send the data & receive the data at the receiving node.

Modem

Modem Short for modulator - demodulator
In a communication modem converts the

digital data into analog so that it transmits over the phone line because the phone line transmits analog data. In the same way on the other hand when data is received modem again converts this analog data into a digital signal so that computer stores and processes the information.

Modulator means that it converts digital signals into analog signals and sends it over telephone lines. This process is known as modulation.

Demodulator means that receiving modem converts analog signals into digital signals and this process is known as demodulation.

It helps us to transmit data from one computer to another computer using standard telephone lines.

Cables and Connectors

Networking cables are networking hardware used to connect one network device to other network devices or to connect two or more computers to share printers, scanners etc.

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Hub

Hub acts as a device that connects all the computers in a network to each other. Any request that comes from a client computer first received by Hub & then hub transmits this request over a network so that the correct server receives and responds to it.

Switch

Switch is similar to hub however instead of broadcasting a incoming data request it uses the physical device address in the incoming request to transfer the request to the correct server computer.

Router

Router joins multiple computer networks to each other. For example let's say a company runs 100 computers over a local area network (LAN) and another company runs another LAN of 150 computers. These both LANs can be connected with each other through an internet connection which is provided by the router.

LAN Cable

A wire that is used to connect more than

one computers or other devices such as printers and scanners to each other.

Features of a Computer Network

- Performance
- Data Sharing
- Backup
- Reliability
- Security
- Scalability
- Software & Hardware Compatibility

A computer network has following features:

Performance

Performance of a computer network is measured in terms of response time. The response time of sending and receiving data from one node to another should be minimal.

Data Sharing

One of the reasons why we use a computer network is to share the data between different systems connected with each other through a transmission media.

Backup

A computer network must have a central server that keeps the backup of all the data that is to be shared over a network so that in case of a failure it should be able to recover the data faster.

Software & Hardware Compatibility

A computer network must not limit all the computers in a computer network to use same software & hardware, instead it should allow the better compatibility between the different software & hardware configuration

Reliability

There should not be any failure in the network or if it occurs the recovery from a failure should be fast.

Security

A computer network should be secure so that

the data transmitting over a network should be safe from unauthorised access. Also, the sent data should be received as it is at the receiving node, which means there should not be any loss of data during transmission.

Scalability

A computer network should be scalable which means it should always allow to add new computers to the already existing computer network.

Advantages of Computer Networks

- Workgroups - a group of users can work together on a single project.
- Shared-databases - many users can access the data, such as bank accounts
- Distributed Systems - a problem can be divided into parts and each part worked on independently
- Communications - Data can be shared, such as emails, video conferencing, VoIP
- Device Sharing - Many users share one pointer

- Software Sharing - Software is installed on a server and can be updated centrally.
- Security - All work is under a central and breaches can be tracked.

Disadvantages of Computer Networks

- Buying the computer cable and servers can be very expensive.
- Viruses can spread to other computers throughout a computer network.
- People can hack your computer.
- It encourages people to become dependent on computers.
- It comes with the risk of security issues.

Type of Networks

A computer network is a group of computers linked to each other that enables the computer to communicate with another computer and share their resources, data, and applications.

- LAN
- MAN
- WAN
- VLAN
- WLAN
- VPN
- CAN
- SAN
- SHAN
- PAN

LAN (Local Area Network)

- Group of interconnected computers within a small area. (room, building, campus)
- Two or more PC's can from a LAN to share files, folders, printers, applications and other devices.
- Coaxial or CAT5 cables are normally used for connections.
- Due to short distances, errors and noise are minimal.
- Local Area Network provides higher security.
- Data transfer rate is 10 to 100 mbps.

Example: A computer lab in a school

Advantages of LAN

Resource Sharing

LAN provides resource sharing such as computer resources like printers, scanners, modems, DVD-ROM drives, and hard disks can be shared within the connected devices. This reduces cost and hardware purchases.

Software Applications Sharing

In a local Area Network, it is easy to use the same software in a number of computers connected to a network instead of purchasing the separately licensed software for each client a network.

Easy and Cheap Communication

Data and messages can easily be shared with the other computer connected to the network.

Centralized Data

The data of all network users can be stored on a hard disk of the central / server computer. This helps users to use any computer in a network to access the required data.

Data Security

Since data is stored on the server computer it will be easy to manage data at only one place and the data will be more secure too.

Internet Sharing

Local Area Network provides the facility to share a single internet connection among all the LAN users. In school labs and internet Cafes, single internet connection is used to provide internet to all connected computers.

Disadvantages of LAN

High Setup Cost

The initial setup costs of installing Local Area Networks is high because there is special software required to make a server. Also, communication devices like an ethernet cable, switches, hubs, routers, cables are costly.

Privacy Violations

The LAN administrator can see & check personal data files of each & every LAN user.

Moreover, he can view the computer and internet history of the LAN user.

Data Security Threat

Unauthorized users can access important data of an office or campus if a server hard disk is not properly secured by the LAN administrator.

LAN Maintenance Job

Local Area Network requires a LAN Administrator because there are problem such as software installations, program faults or hardware failures or cable disturbances in Local Area Network. A LAN Administrator is required to maintain these issues.

Covers Limited Area

LANs are restricted in size; they cover a small area like a single offic single building or a group of nearby buildings.

MAN (Metropolitan Area Network)

- Design to extend over a large area.

Moreover, he can view the computer and internet history of the LAN user.

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MAN (Metropolitan Area Network)

- Design to extend over a large area.

- Connecting number of LAN's to form larger network, so that resources can be shared.
- Government agencies use MAN to connect to the citizens and private industries
- In MAN, various LANs are connected to each other through a telephone exchange line.
- Networks can be up to 5 to 50 km
- Data transfer rate is low compared to LAN.

Example: Organization with different branches located in the city.

Advantages of a MAN Network

There are many advantages of the MAN network, some of them given below.

Less Expensive

It is less expensive to attach MAN with WAN Network. MAN gives you good efficiency of data. All data on MAN is easily manageable in a centralized way

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Sending local Emails

You can send local emails fast and free on MAN.

High Speed than WAN

The speed of data can easily reach 1000 Mbps, as MAN uses fiber optics. Files and database transfer rates are fast.

Sharing of the Internet

With the installation of MANs, users can share their internet connection. In this way, multiple users can get the same high-speed internet.

Conversion of LAN to MAN is Easy

MAN is a combination of two or more LAN networks. So it is a faster way to connect two LAN networks together. It is possible by the fast configuration of links.

High Security

MAN's has a higher - security level than WAN.

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Disadvantages of MAN Network

Difficult to Manage

It is very difficult to manage if the size and number of LANs network increase. This is due to security & extra configuration problems.

Internet Speed Difference

As it cannot work on phone copper wires. Copper wires affect the speed of MAN. So high cost is needed for fiber optics.

Hackers Attack

In this network, there is a high risk of attacking hackers as compared to LAN. So data may be a leak. Highly security staff is the need in MAN.

Technical Staff requires to Setup:

Highly technical people are required to set up MAN. The technical people are network administrators & troubleshooters.

Need More wires

In MAN more than LAN networks, cables require.

As you know, it is a combination of two LANs.

WAN (Wide Area Network)

- A Wide Area Network is a network that extends over a large geographical area such as States or countries.
- Contains multiple LAN's and MAN's.
- A Wide Area Network is quite a bigger network than the LAN.
- Distinguished in terms of geographical range.
- Data transfer rate depends upon the ISP provider and varies over the location.

Example : Internet

Advantages of WAN

WAN covers a larger geographical area. Hence business offices situated at longer distances can easily communicate.

Like LAN, it allows sharing of resources & application softwares among distributed workstations or users.

The software files are shared among all the users. Hence all will have access to the latest files. This avoids use of previous versions by them.

Organizations can form their global integrated network through WAN. Moreover it supports global markets & global businesses.

The emergence of IoT (Internet of Things) and advanced wireless technologies such as LAN or LAN-Advanced have made it easy for the growth of WAN based devices. Messages can be sent very quickly across the globe with the help of applications such as WhatsApp, facebook messenger etc.

Disadvantage of WAN

- Initial investment costs are higher.

- It is difficult to maintain the network. It requires skilled technicians and network administrators.

- There are more errors & issues due to wide coverage & use of different technologies. Often it requires more time to resolve issues due to involvement of multiple

wired and wireless technologies.

- It has lower security compared to LAN and MAN due to wider coverage and use of more technologies.

- Security is a big concern and requires use of firewall and security softwares / protocols at multiple points across the entire system. This will avoid chances of hacking by intruders.

WLAN (Wireless Local Area Network)

- A WLAN makes use of a Wireless Access Point (WAP) device, which serves as the point of connectivity for wireless clients on the network.

- A LAN that uses high frequency radio waves for communication.

- Provides short range connectivity with high speed data transmission

Advantages of WLAN

- It is a reliable type of communication.

- As WLAN reduces physical wires so it is a flexible way of communication.

- WLAN also reduces the cost of ownership.
- It is easier to add or remove workstation.
- It provides high data rate due to small area coverage.
- You can also move workstation while maintaining the connectivity
- For propagation, the light of sight is not required.
- The direction of connectivity can be anywhere i.e. you can connect devices in any direction unless it is in the range of access point.
- Easy installation & you don't need extra cables for installation.
- WLAN can be useful in disaster situations e.g. earthquake & fire. People can still communicate through the wireless network during a disaster.
- It is economical because of the small area access.
- If there are any building or trees then still wireless connection works.

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Disadvantages of WLAN

- WLAN requires license.
- It has a limited area to cover.
- Government agencies can limit the signals of WLAN if required. This can affect data transfer from connected devices to the internet.
- If the number of connected devices increases then data transfer rate decreases.
- WLAN uses radio frequency which can interfere with other devices which use radio frequency.
- If there is rain or thunder then communication may interfere.
- Attackers can get access to the transmitted data because wireless LAN has low data security.
- Signals may be affected by the environment as compared to using fiber optics.
- The radiation of WLAN can be harmful to the environment.
- As WLAN uses access points and access points are expensive than wires and hubs.

- Access points can get signals of nearest access points.
- It is required to change the network card and access point when standard changes.
- LAN cable is still required which acts as the backbone of the WLAN.
- Low data transfer rate than wired connection because WLAN uses radio frequency.
- Chances of errors are high.
- Communication is not secure and can be accessed by unauthorized users.

VLAN (Virtual Local Area Network)

- Virtual Local Area Networks (VLANs) divide a single existing physical network into multiple logical networks.
- Thereby, each VLAN forms its own broadcast domain.
- Communication between two different VLAN is only possible through a router that has been connected to both VLANs.

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- VLANs behave as if they had been constructed using switches that are independent of each other.

Advantages of VLANs

- VLANs provide enhanced network security. In a VLAN network environment, with multiple broadcast domains, network administrators have control over each port and user.

- Allowing network administrators to apply additional security to network communication.

- Making expansion & relocation of a network or a network device easier.

- It allows higher performance and reduced latency.

- VLAN Removes the physical boundary.

Disadvantages of VLANs

- High risk of virus issues because one infected system may spread a virus through the whole logical network.

- More effective at controlling latency than a WAN, but less efficient than a LAN.

- For Inter-VLAN communication we need a router.
- Management is complex.
- Possible problems in interoperability.

VPN (Virtual Private Network)

- A Virtual Private Network is a type of network that makes use of existing private or public network infrastructure to provide a secure network connection.
- This is often achieved by creating an encrypted tunnel for secured end-to-end connectivity.
- A Virtual ~~Power~~ Private Network uses data encryption techniques to provide security for files that are sent or received over the network.
- This is often used by organizations that have highly sensitive data to transfer.

VPN Advantages

- A VPN service hides your real IP address, effectively masking your online identity & allowing you to bypass geo-blocks.

- Since a VPN masks your IP address, it also helps you bypass firewalls.

- By encrypting your online traffic, a VPN ensures your ISP can't throttle your bandwidth.

VPN Disadvantages

- VPN services will usually cost money, as free VPNs aren't an option since they don't work right & endanger your data.

- Using a VPN will usually lower your online speeds to a certain extent because of various factors.

- Some VPN providers log user data, which ca put your privacy in danger.

CAN (Campus Area Network)

- A Campus area network is a network of multiple interconnected local area networks in a limited geographical area.

- CAN is smaller than WAN

- CAN is also known as a Controller area network.

Example: Network in university

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Advantages of CAN

Economical

CAN is economical in the sense that it uses fewer cables, switches, hubs and routers.
Sharing of data is easy:

In CAN, the message is sent one time and is transferred to all the linked departments easily.

Use a wireless connection

CAN use a wireless connection for connecting different departments and buildings across one organization.

Transferring files is fast

In CAN, files are transferred with high speed over the network.

One ISP across all departments

In CAN, the internet is used from the same ISP.

Disadvantages of CAN

limitation for connecting nodes.

- Troubleshooting and maintenance of CAN are expensive as compared to other networks.

SAN (Storage Area Network)

- A Storage Area Network (SAN) is a specialized, high-speed network that provides block-level network access to storage.

- Connects servers to data storage devices via fiber-optic cables.

- SANs are typically composed of hosts, switches, storage elements, and storage devices that are interconnected using a variety of technologies, topologies, and protocols.

Example: Used for daily backup of organization or a mirror copy.

Advantages of Storage Area Networks

- The storage devices are independent of the system and their data is accessed using the storage area network. So the storage devices can be increased & decreased as required.

- The storage data is very secure on the storage area network and cannot be copied or stolen by anyone else.

- There can be a remote copy of the storage data kept separately using the storage area network. This can be useful if there is a primary data failure or natural disaster.

Disadvantages of Storage Area Networks

- If there is a lot of traffic in the storage area network, then operations will be extremely slow. So it is better not to use storage area networks for data extensive applications.

- The storage area network operates in a shared environment. So there is a chance that data may be leaked for sensitive operations.

SHAN (Smart Home Area Network)

A home area network (HAN) is a network contained within a user's home that connects a person's digital devices, from multiple computers and their peripheral devices to telephones, VCRs, televisions, video games, home security, systems, smart appliances, fax machines and other digital devices that are wired into the network.

The SHAN network is generally used in homes and office space.

Advantages of SHAN

Accessibility

This is a better way which gives the better accessibility for all the devices in the network for accessing Internet connection.

Management

The resources on this network can be managed and controlled by this easy manner and data usage also can be managed.

Security

It enhances the home network security & reliability. Internet network also password protected. It can support MAC address filtering. So Internet can be accessed by authorised peoples only.

Resources Sharing

Resources on the network can be shared over the network. Such as files, folders, printers, faxes etc.

Multi User

Multiple users can access the network resources

Such as the Internet, Shared devices, files etc Simultaneously.

Life Style

It makes the quality of life and home work digital communication by its Style.

Disadvantages of SHAN

Lack of Wifi Password

If the wifi password is easily guessed by others then anybody within the range can steal Internet access and resources on the network.

Wifi - Microwaves

Wireless devices use the microwave as a medium for communication. This microwave signals will specially affect brains. It is not good for health.

Expensive

The devices which are used for communication should be capable of accessing the Internet which is expensive etc... Smart TV, laptops, Smart phones...

Internet Slow

When multiple people access the Internet with the same share point then Internet speed will be shared to all users with equivalent speed. If one person is downloading a large file from the Internet then it will slow down the speed for all other users.

PAN (Personal Area Network)

- Personal Area Network is a network arranged within an individual person, typically within a range of 10 meters.
- Personal Area Network is used for connecting the computer devices of personal use is known as Personal Area Network.
- Personal computer devices that are used to develop the personal area network are the laptop, mobile phones, media player and play stations.
- Personal Area Network covers an area of 30 feet.

There are two types of Personal Area Network:

Computer Network Types

- Wired Personal Area Network
- Wireless Personal Area Network

Wireless Personal Area Network

Wireless Personal Area Network is developed by simply using wireless technologies such as WiFi, Bluetooth. It is a low range network.

Wired Personal Area Network

Wired Personal Area Network is created by using the USB.

Advantages of personal area network

- As PANs are for personal use, so benefits are more easily understandable than LAN, WAN, MAN.
- In PAN no extra space is required.
- No need for extra cable and wire.
- Easy to connect to many devices at a time.
- Affordable Cost.
- PAN is easy to use.

- It is very reliable.
- This Network is fully Secure.
- We can use it in office meetings.
- It is used in TV remotes, AC remotes etc.
- Data can Syncheronize between different devices.
- Portable

Disadvantages of personal area network

- Its range is less.
- Its interference is with radio signals.
- Transfer of data is Slow.
- It creates Health problems.
- Cost is high in terms of communication devices.
- Infrared Signals travel only in a Straight line.

Internet and Intranet

Internet

The Internet is a global network of millions of private, public, academic, business, & government networks worldwide connected with each other over the network to share massive amounts of information, resources and services.

- It is a public network therefore anyone can access the internet.
- The Internet consists of a network of computers that anyone can access.
- Many intranets together make up the internet.
- There is no limit to the number of users who can use the internet at any given time.
- The information available on the internet is gathered from different sources. Anyone can easily access any data on the internet.

Advantages

- Huge amounts of information can be accessed almost anywhere.

- Can help with disabilities to be more independent.
- improved communication

Disadvantages

- Increased problems due to hacking and viruses.
- Pedophiles look at the children on the internet.
- Addiction to gambling

Intranet

The term "Intranet" basically stands for the network of a specific organization or the private network of an organization. It may be used for organizations or networks that do not want their information to be able to be accessed by outside sources. It has a firewall surrounding the system to avoid the unauthorized user from accessing the network. Only authorized users have permission to access the network.

- It is a private network therefore anyone can't access intranet.
- Only a specific few users can access the intranet.

- There are limitations on the volume of traffic at any given time.
- Intranet contains a specific kind of information only.

Advantages

- Ideal for school because they can be used to prevent students from accessing unsafe websites the email system is more secure.
- Only information relevant to the organisation can be accessed - saves time.

Disadvantages

- Less information
- Can't go on websites needed

Extranet

An extranet is a private network that only authorized users can access. These authorized users may include business partners, suppliers, and even some customers. An extranet is like a secure file room located somewhere off the company premises. Only those issued a key can enter and browse through the filing cabinets.

- It is used for information sharing.
- The access to the extranet is restricted to only those users who have login credentials.

Advantages

- Integrate supply chains like consolidated processes.
- Improve their business relationships through the collaboration within the extranet.
- Simplify their internal processes by using a single interface.
- Secure company communication in a controlled environment.

Disadvantages

- If hosted internally instead of via an active server page, the implementation of an extranet within an organization tends to be quite expensive.
- The security of extranets can be a big concern because it deals with valuable information, systems, therefore, need to be carefully controlled in order to avoid hacks or misuse of data.

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Uses and benefits of Network

Networking benefits

The benefits of networking on computers and other devices include low costs and higher productivity.

Fewer peripherals are needed

Every computer on the network does not need its printer, scanner, or backup device. It is possible to configure several printers in a central location and share them among network users.

Greater communication capabilities

Networks offer various collaboration tools that can be used to establish communication between network users.

Duplication and file corruption are avoided

A server manages network resources. The servers store the data and share it with the users of a network.

Lower cost in license acquisition

Acquiring application licenses can be expensive for

individual computers. The site license allows a group of people or an entire organization to use the application for a single fee.

Centralized administration

Centralized administration reduces the number of people needed to manage devices and data on the network, allowing the company to save time and money.

Resources are conserved

It is possible to distribute data processing among many computers to prevent a computer from being overloaded with processing tasks.

Uses of Networking

Information and Resource Sharing

Programs and software in any computer can be accessed by other computers linked to the network. It also allows sharing of hardware equipment, like printers and scanners among varied users.

Retrieving Remote Information

Through computer networks, users can retrieve

remote information on a variety of topics

Speedy Interpersonal Communication

Computer networks have increased the speed and volume of communication like never before. Online communications have increased by manifold times through social networking services.

e Commerce

Computer networks have paved the way for a variety of business and commercial transactions online, popularly called e-commerce.

Highly Reliable Systems

Computer networks allow systems to be distributed in nature, by the virtue of which data is stored in multiple sources. This makes the system highly reliable.

Cost - Effective Systems

Computer networks have reduced the cost of establishment of computer systems in organizations.

Server - Client based network

- A Computer networking model where one or more powerful computers (servers) provide the different computer network services and all other users of the computer network (clients) access those services to perform the users tasks is known as client / server computer networking model.

- In such networks, there exists a central controller called server. A server is a specialized computer that controls the network resources and provides services to other computers in the network.

- A client computer receives the requested services from a server.

- A server performs all the major operations like security and network management.

- All the clients communicate with each other via centralized server.

- Most Local Area Networks are based on client server relationships.

Advantages of Client - Server Architecture

Improved Data Sharing

Data is retained by usual business processes and manipulated on a server is available for designated users (clients) over an authorized access.

Integration of Services

Every client is given the opportunity to access corporate information via desktop interface eliminating the necessity to log into a terminal mode or processor.

Shared Resources Amongst Different Platforms

Application used for client - server model is built regardless of the hardware platform or technical background of the entitled software providing an open computing environment, enforcing users to obtain the services of clients and servers.

Data Processing Capability Despite the Location

Client - server users can directly log into a system despite the location or technology of the processors.

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Easy Maintenance

Client-Server architecture is a distributed model representing dispersed responsibilities among independent computers integrated across a network.

Security

Servers have better control access and resources to ensure that only authorized clients can access or manipulate data & server updates are administered effectively.

Disadvantages

Overloaded Servers

When there are frequent simultaneous client requests, servers severely get overloaded, forming traffic congestion.

Impact of Centralized Architecture

Since it is centralized, if a critical server fails, client requests are not accomplished. Therefore, client-servers lacks the robustness of a good network.

Peer to peer networks

- There is no master or controller or central server in this computer n/w and computers join hands to share files, printers and Internet access.

- Software for peer-to-peer network is included with most modern desktop operating systems such as Windows and Mac OS.

- Peer to peer relationship is suitable for small networks having less than 10 computers on a single LAN.

- In a peer to peer network each computer can not act as both a server and a client.

Advantages

1. Such networks are easy to setup and maintain as each computer manages itself.

2. It eliminates extra cost required in setting up the server.

3. Since each device is master of its own, they are not dependent on other computers for their operations

Disadvantages

Security is weak as each System manages itself only.

There is no central point of data Storage for file archiving.

Network Interface Card

Network Interface Card is a hardware device that is installed on the computer so that it can be connected to the internet. It is also called Ethernet Card or Network Adapter.

Purpose

- NIC allows both wired and wireless communications
- NIC is both a physical layer and a data link layer device.

Components of NIC

- An external Memory is used to store the data temporarily and uses the stored data whenever required while processing the communication.
- A Processor converts the data message into a signal format for communication to take place easily.

- A router is an NIC device that is used to connect wirelessly to the internet.

Types of NIC Cards

- Wired
- Wireless
- USB

Wired

These NIC have input jacks made of cables. The motherboard has a slot for the network cards where they are inserted.

Example : TP-LINK TG-3468 Gigabit PCI Express Network Adapter

Wireless

Wireless network cards are inserted into the motherboard but no network cables are required to connect the computer to the internet. These NICs are designed for Wi-Fi Connections.

Example : Intel 3160 Dual-Band Wireless Adapter

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USB

These are NICs that provide network connection over the device plugged in the USB port.

Example: TP-link TL-UE300 USB 3.0 to RJ45 Gigabit Ethernet Network Adapter

Advantages of NIC

- Highly reliable connection.
- The communication speed using the Internet is high usually in Gigabytes.
- Bulk data can be shared among many users.

Disadvantages of NIC

- Inconvenient in case of wired cable NIC, as it is not portable like a wireless router
- The configuration should be proper for better communication.
- Data is unsecured.

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Transmission Media and Topologies Media Type

What is Transmission Media?

A Communication channel that is used to carry the data from the transmitter to the receiver through the electromagnetic Signals.

Types of transmission media

1. Physical transmission media / Guided media / Wired
   - Twisted-Pair Cable, Coaxial Cable, Fiber-Optic Cable
2. Wireless transmission media / Unguided media / Wireless
   - Infrared, Broadcast Radio, Cellular Radio, Microwave, communications Satellite.

Bounded or Guided Media

Coaxial Cables

- These are made up of Copper. A Plastic layer provides insulation between the copper wire and metal shield.

Transmission rate is 10 Mbps.

It is less expensive than Fiber Optic.

Mostly used for long distance transmission.

UTP (Unshielded Twisted Pair Cable)

It has a maximum range of 100 meters.

It consists of 2 or 4 twisted wire pairs.

Widely used in LANs.

STP (Shielded Twisted Pair Cable)

It is more reliable and faster than UTP.

It covers a long distance.

Normally used as a backbone cable.

Unbounded or Unguided Media

Infrared

Infrared signals can be used for short range communication in a closed area.

Using line-of-sight propagation.

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Microwaves

- Higher frequency ranges cannot penetrate walls.
- Use directional antennas - point to point line of sight communications.

Radio Waves

- They can penetrate through walls.
- Highly regulated. Use omni directional antennas.

Crimping tools and Color Standards for Straight crimping and Cross crimping.

Crimping Tools

A crimping tool is a device used to conjoin two pieces of metal by deforming one or both of them in a way that causes them to hold each other. The result of the tool work is called a crimp.

RJ-45 crossover cable Color

Orange White

Orange

Green White

Blue

Blue White

Green

Brown White

Brown

1 Get your RJ45 plug, Cable Cap, ethernet cable ready.

2 Insert Cable Cap.

3 Put the ethernet cable into stripper tool.

4 Arrange the wires.

5 Cut the wires in oblique angle

6 Put the wires into the load bar in turn.

7 Cut the wires horizontally, Length measure.

8 Assemble plug.

9 Ensure that the wires are pushed to the end of the plug's holes.

Step-10 Put the plug into the crimping tool. Crimp plug.

Step-11 Make the clip and braiding shield, drain wire fully contacted.

Step-12 Crimp plug

Step-13 Insert the Cable Cap into the RJ45 plug.

Step-14 Complete

Network Topology

Bus topology connects individual nodes directly to a main cable.

Ring topology has nodes connected in a loop or ring; each node has a neighbor on each side.

Star topology connects all nodes to a central hub.

Mesh topology has every node connected every other node.

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Segment

A network segment is a portion of a computer network.

Backbone

Backbone is most important part of a system which provides the central support to the rest system, for example backbone of a human body that balance and hold all the body parts.

What is web hosting?

Web hosting is an online service that allows you to publish your website files onto the internet.

How does web hosting work?

When you use web hosting services, your web host is responsible for making sure your server is up and running.

What types of web hosting are there?

Shared Hosting

Shared hosting is when a web hosting provider hosts a number of different websites on the

same server. It is the most affordable form of hosting because you share the same server, so you split costs.

Word Press Hosting

Word Press Hosting simply means hosting that has been optimised for Word Press on a server level to ensure smooth sailing.

VPS Hosting

VPS stands for Virtual Private Server. There's often more memory, storage and processing power available - with a price tag to match.

Dedicated Hosting

Dedicated hosting means you have the entire server to yourself. It gives you access like a VPS, but you don't have to share the server with other sites or apps.

Cloud Hosting

Cloud hosting has become a bit of a nebulous term. So, we would strongly recommend looking closely at what you are getting and if you are signing up for "Cloud Hosting".

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How much does website hosting cost?

Your website hosting cost will vary by provider. Technically you can use a free web hosting service.

Free vs Paid Web hosting

By opting for free hosting, you may encounter problems such as unwanted advertising on your page and their domain name in your URL.

Where do domains come into the picture with website hosting?

The web hosting is the land the house (website is on, and the domain is its address. When someone types in the domain name into their web browser or click a web link, the domain is the means through which the browser locates the right server and downloads the website files.

Analog Transmission

An analog wave form (or signal) is characterized by being continuously variable along amplitude and frequency. Those fluctuations in current are an analog of the actual voice pattern - hence the use of the term analog to describe these signals.

Digital Transmission

Digital transmission is quite different from analog transmission. For one thing, the signal is much simpler.

Advantages of Analog Signals

- Easier in processing.
- Best suited for audio and video transmission.
- It has a low cost and is portable.
- Not necessary to buy a new graphics board.
- It is the natural form of a sound.

Disadvantages of Analog Signals

- Analog tends to have a lower quality signal than digital.
- It offers limitations in editing.

Tape is becoming hard to find.

Quality is easily lost.

Data can become corrupted.

Offers poor multi-user interfaces.

Advantages of Digital Signals

Digital data can be easily compressed.

Any information in the digital form can be encrypted.

A lot of editing tools are available.

Easy to transmit the data over networks.

Disadvantages of Digital Signals

Sampling may cause loss of information.

Processor speed is limited.

It requires greater bandwidth.

Systems and processing is more complex.

Analog and Digital Signals: Systems & Applications

Traditional audio and communication systems used

analog signals. Most systems that interface to real-world signals (such as sound, light, temperature, and pressure) use an analog interface to capture or transmit the information. A few analog signal applications are listed below:

- Audio recording and reproduction
- Temperature sensors
- Image Sensors
- Radio Signals
- Telephones
- Control Systems

A few digital signal applications are listed below:

- Communication Systems
- Networking & data communications
- Digital interfaces for programmability

Base band and Broadband transmission

Broadband System use modulation techniques to reduce the effect of noise in the environment.

Baseband is a digital signal is transmitted on the medium using one of the signal codes like NRZ, RZ Manchester biphase-M code etc. is called baseband transmission.

These are following differences between Broadband and Baseband transmission.

Baseband transmission

- Digital Signalling
- Short distance signal travelling
- Frequency division multiplexing is not possible.
- Baseband is bi-directional transmission.

Example: Ethernet is using Basebands for LAN.

Broadband transmission

- Analog Signalling
- Transmission of data is unidirectional

- Signal travelling distance is long.
- Frequency division multiplexing possible.

Example: Used to transmit cable TV to premises

STP cable, UTP cable, Coaxial Cable, Fiber cable and Connectors

Cables are commonly used to carry communication signals within local Area Networks (LAN). There are three common types of cable media that can be used to connect devices to a network and they are coaxial cable, twisted-pair cable, and fiber-optic cable.

Coaxial Cables

Coaxial cable looks similar to the cable used to carry TV signal. A solid-core copper wire conductor runs down the middle of the cable. A final layer of plastic insulation jacket covers the braided wire.

There are two types of coaxial cabling: Thin Net and Thick Net. Thin Net is a flexible coaxial cable about 1/4 inch thick. Thin Net is used for short-distance. The max. length of

thinnet is 185 to 200 meters.
ThickNet Coaxial cable is thicker cable than ThinNet. ThickNet cable is about 1/2 inch thick and can support data transfer over longer distances than ThinNet. Thicknet has a maximum supported cable length of 500 meters.

Twisted Pair Cables

Twisted-pair cable is the most common type of cabling you can see in today's Local Area Networks. 4 pair of wires forms a circuit that can transmit data. The pairs are twisted to provide protection against crosstalk.

Color codes used for Twisted Pair wire's plastic insulation are Orange, Orange-White Blue, Blue-White, Green, GreenWhite, Brown and Brown-White.

Two types of twisted pair cables are Unshielded Twisted Pair and Shielded Twisted Pair.

Unshielded Twisted Pair Cables (UTP)

Unshielded Twisted Pair Cable is the most common networking media. UTP consists of four pairs of thin, copper wires covered in color-coded plastic insulation that are twisted together. The wire pairs are then covered with

a plastic outer jacket.

Shielded Twisted Pair Cables (STP)

STP cables additionally have an overall conducting metallic shields covering four twisted pair wires. There may be another conducting metallic shields covering individual twisted pairs also.

Types of Connectors

Ethernet Cable Connectors

RJ45 connectors are used for CAT6 cables and CAT5e cables. They are wider, however, because they have eight conductors compared to only four conductors on a telephone jack.

Coaxial Cable Connectors

BNC connectors are a type of F-Series connectors commonly found in households. They are easy to connect and disconnect from equipment and provide inexpensive, stable connections to these communications devices and other cables.

USB Connectors

USB connectors are perhaps most familiar to the majority of people. USB connectors typically join external devices to a personal computer or are used for mobile phone charging.

Fiber Optic Cable Connectors

Fiber Optic connectors require different types of connectors from those used with coax or twisted-pair cables, such as CAT5. These types of connectors in networking must align glass fibers with precision to allow for communication.

Physical and Logical topologies

Physical Topology

Physical topology indicates arrangement of different elements of a network. It reflects physical layout of devices and cables to a form a connected network. It is concerned with essentials of network ignoring minute details like transfer of data and device type. Devices can be arranged to form a ring or linearly connected in a line called Bus Topology.

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Logical Topology

Logical Topology reflects arrangement of devices and their communication. It is the transmission of data over physical topology. It is independent of physical topology irrespective of arrangements of nodes. The logical topology ensures optimal flow control that can be regulated within network.

Types of Network Topology

- Bus
- Ring
- Tree
- Star
- Mesh
- Hybrid

Topology defines the structure of the n/w of how all the components are interconnected to each other.

Bus Topology

- The bus topology is designed in such a way that all the stations are connected through a single cable known as a backbone cable.

- Each node is either connected to the backbone

cable by drop cable or directly connected to the backbone cable.

- The bus topology is mainly used in 802.3 (ethernet) and 802.4 standard networks.

- The configuration of a bus topology is quite simpler as compared to other topologies.

- The most common access method of the bus topologies is CSMA (Carrier Sense Multiple Access).

Ring Topology

- Ring topology is like a bus topology, but with connected ends.

- The node that receives the message from the previous computer will retransmit to the next node.

- The data flows in one direction, i.e., it is unidirectional.

- The data flows in a single loop continuously known as an endless loop.

- The data in a ring topology flow in a clockwise direction.

- The most common access method of the ring topology is token passing.
- Token: It is a frame that circulates around the network.
- Token passing: It is a network access method in which token is passed from one node to another node.

Star Topology

- Star topology is an arrangement of the n/w in which every node is connected to the central hub, switch or a central computer.
- The central computer is known as a server, and the peripheral devices attached to the server are known as clients.
- Coaxial cable or RJ-45 cables are used to connect the computers.
- Hubs or Switches are mainly used as connection devices in a physical star topology.
- Star topology is the most popular topology in network implementation.

Tree Topology

- Tree topology combines the characteristics of bus topology and star topology.
- The top-most node in tree topology is known as a root node, and all other nodes are the descendants of the root node.
- There is only one path exists between two nodes for the data transmission. Thus, it forms a parent - child hierarchy.

Mesh Topology

- Mesh topology is an arrangement of the network in which computers are interconnected with each other through various redundant connections.
- There are multiple paths from one computer to another computer.
- The Internet is an example of the mesh topology.
- Mesh topology is mainly used for wireless networks.
- Mesh topology canbe formed by using the formula:

Number of Cables = $(n * (n-1))/2$;

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Hybrid Topology

- The combination of various different topologies is known as Hybrid topology.
- A Hybrid topology is a connection between different links and nodes to transfer the data.