UPL UNIVERSITY
OF
SUSTAINABLE TECHNOLOGY

Shroff S. R. Rotary Institute Of Chemical Technology

Basics of Computer System [MH1106]

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Computer Engineering

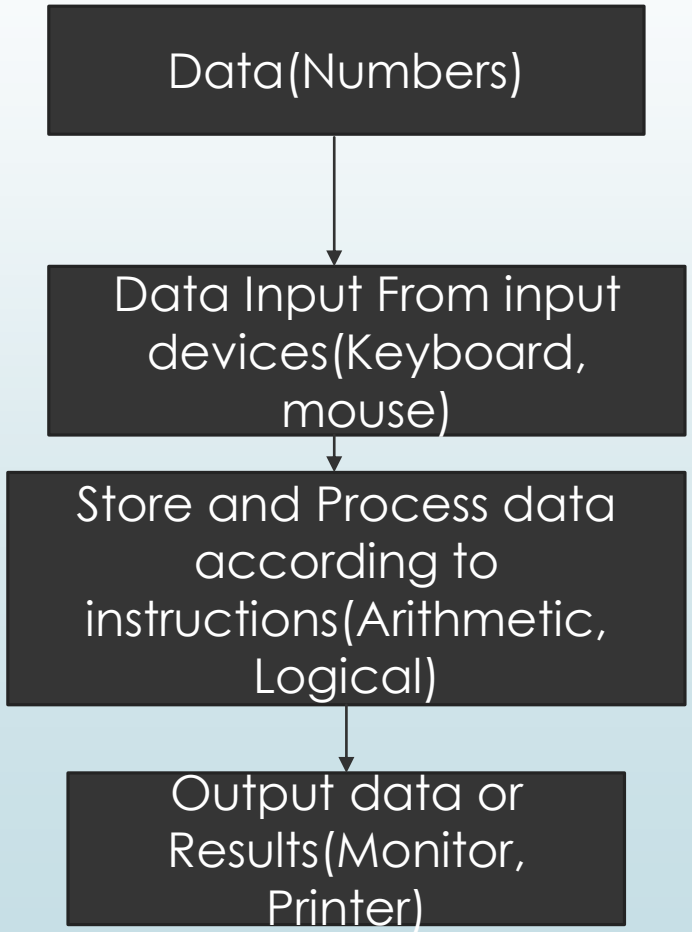
Chapter 1

- Basics Of Computer System

Computer

- Basically computer is an electronic devices.
- Which can process the data and provides useful information.
- It is made of by connecting many electronic devices.
- It can be made to work like a human.
- It can store information and it can also exchange and transmit data and information.
- Computer is an electronic device which takes the data from user and process the data by performing some operations on it, and provides the desired information to the user
- A computer is an electronic data processing device, which
  - accepts and stores data input,
  - processes the data input, and
  - generates the output in a required format.

Data processing:



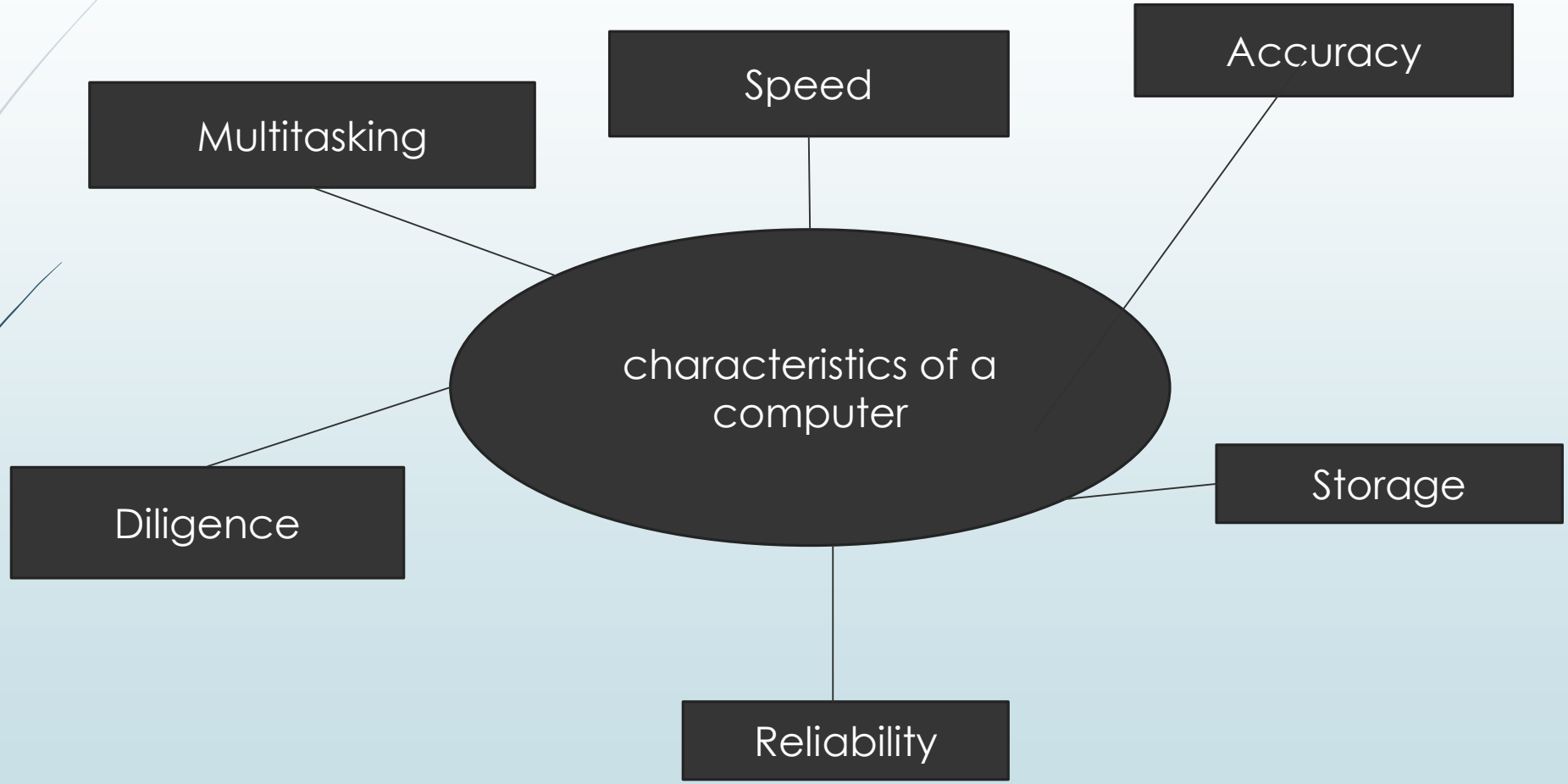
Example:

From the outside, a computer looks like:

- Astudent asks a teacher “what happens when 8 is multiplie d by 5”.
- He receives the answer 40 from teacher.
- In the case of computer, this process can be described as follows:
  - The teacher’s brain receives the question through his e ars (analogous to a computer’s input device),
  - Processes the question with the help of his brain’s infor mation
    processing and analytical ability (analogous to compu ter’s Central Processing Unit) and
  - Give the answer through the mouth (analogous to a c omputer’s output device)
  - The teacher can write down the answer on a sheet of paper or blackboard
  - Computer can also print the answer on a paper throug h a printer attached to it.

Uses of Computer

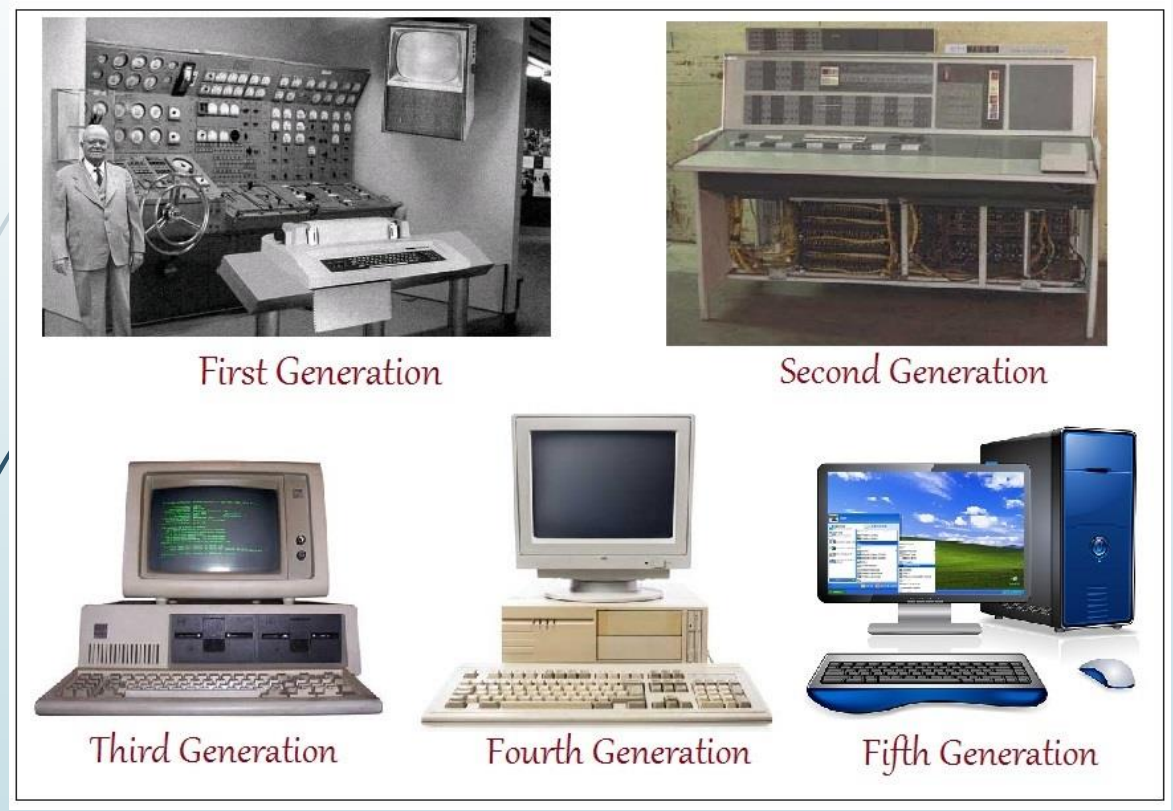
- Nowadays computer become crucial part of our life, They used in commercial application like banking, railways, airways, Super Markets, Offices etc.
- EDUCATION
- BUSINESS AND PERSONAL
- Forecasting weather condition.
- HEALTHCARE
- Searching for the information in the internet.
- Used in scientific research, space technology
- Used for gaming


characteristics of a computer
Speed
Accuracy
Multitasking
Storage
Diligence
Reliability

Computer Classification

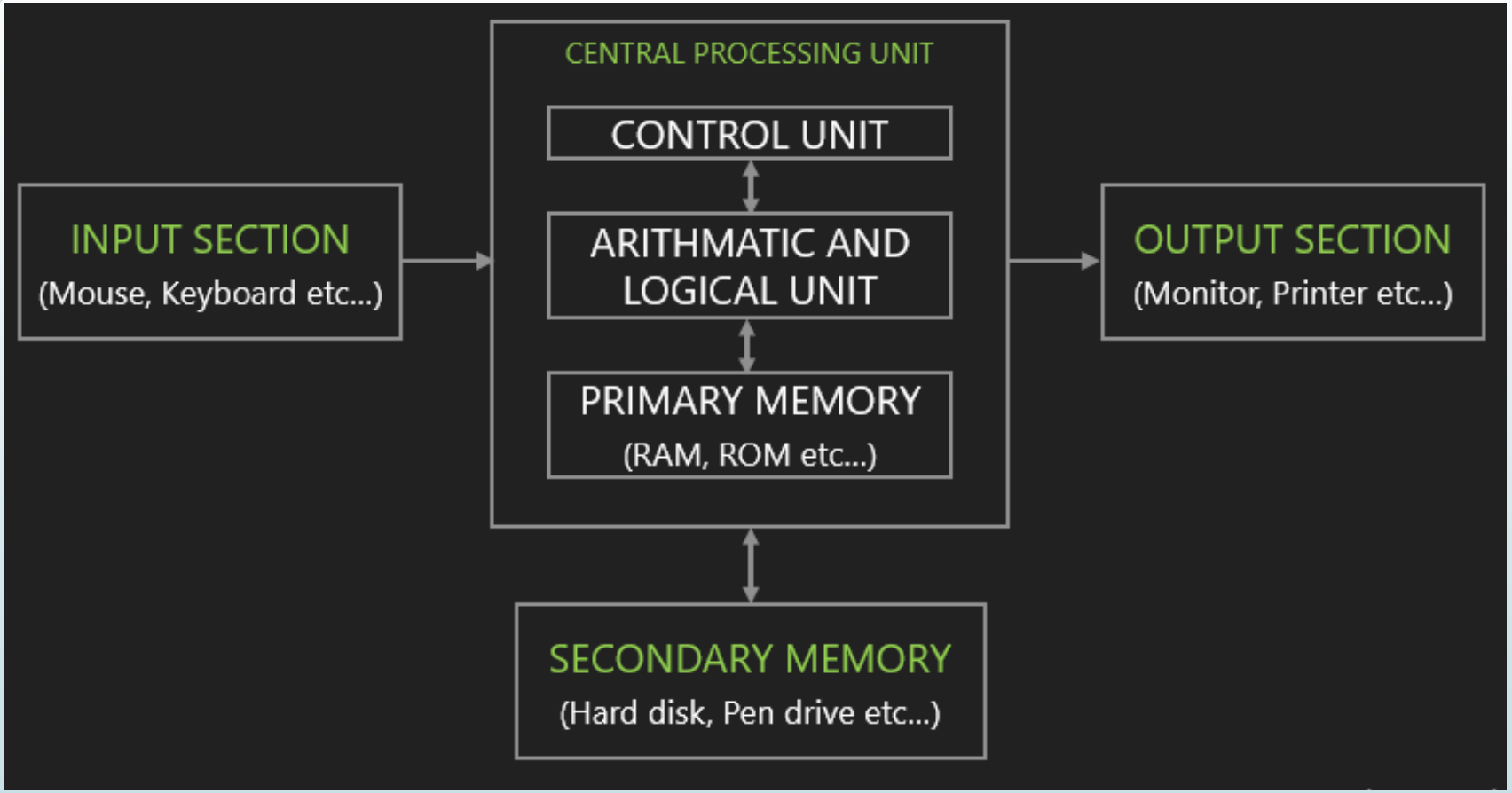
- Computers can be classified many different ways -- by size, by Purpose, or by **Hardware Design** or type.

Computer Generations

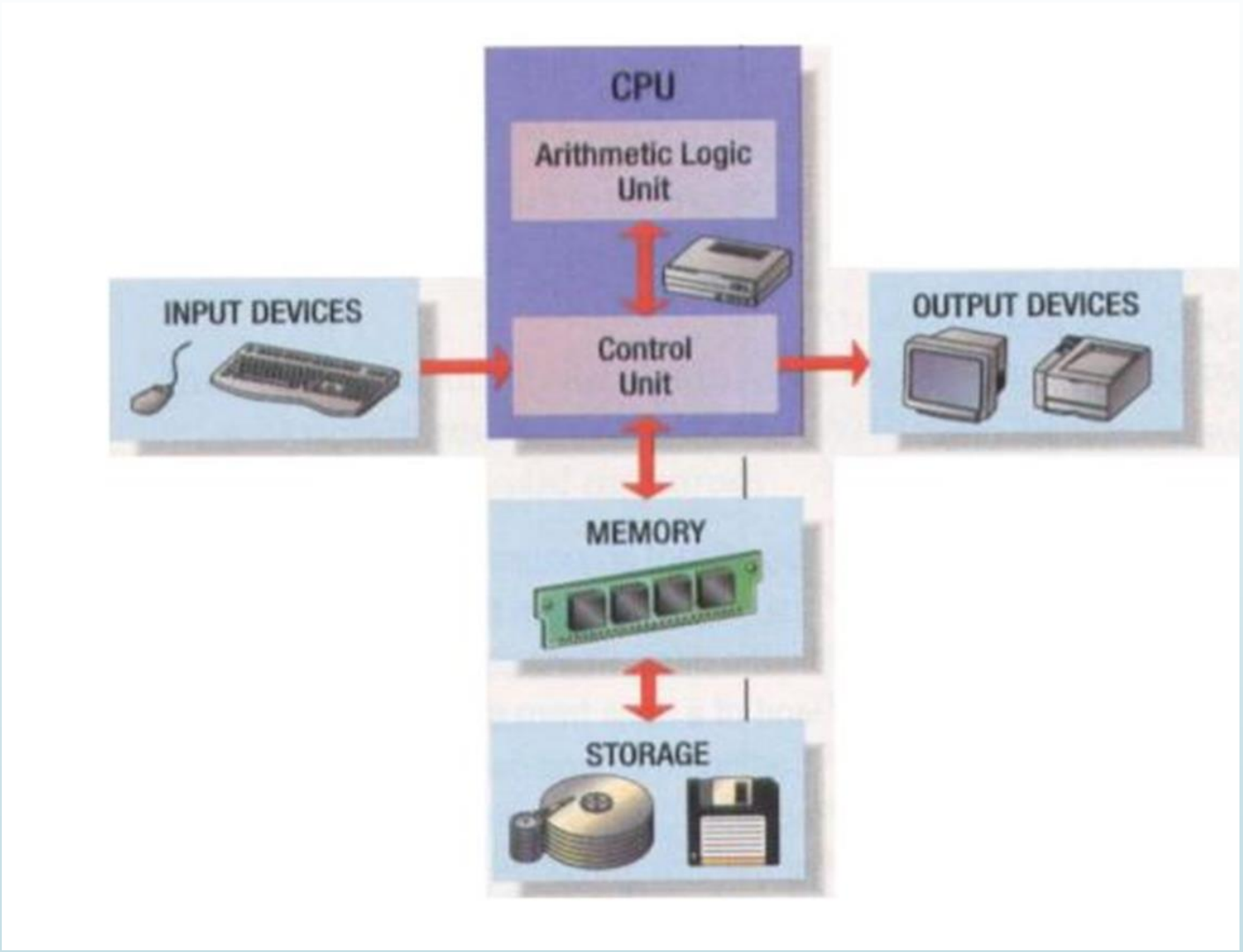


- 1946-1959 Vacuum tube based.
- 1959-1965 Transistor based.
- 1965-1971 Integrated Circuit based.
- 1971-1980 VLSI(**Very large-scale integration**) microprocessor based.
- 1980-onwards ULSI(Ultra large-scale integration) microprocessor based.

Block Diagram Of Computer

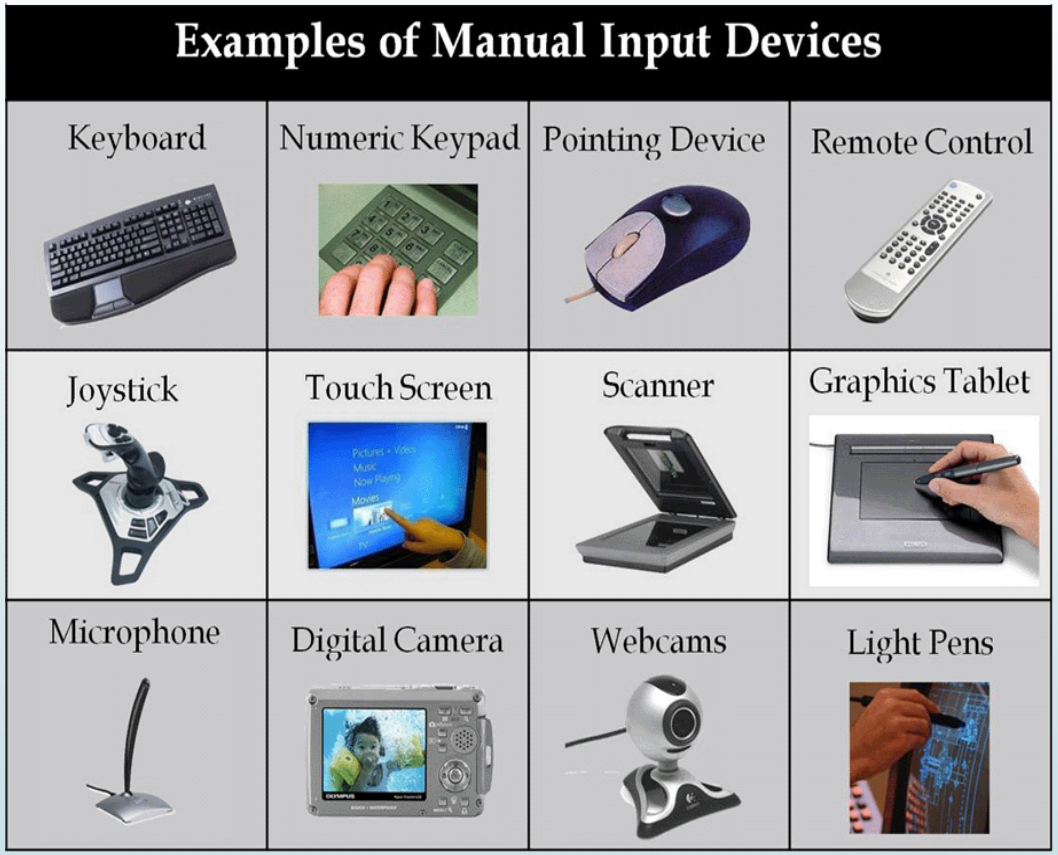


Graphical diagram



Input Unit

- It is a communication media between human and computer.
- It accepts the data and instructions from user.
- An input device converts input data and instruction into suitable binary form which can be accepted by the computer.
- Transfer the converted data to the computer system for further processing.
- Examples:
  - Keyboard
  - Mouse
  - Light Pen
  - Scanners
  - Microphone
  - Optical Character Reader(OCR)
  - Bar Code Readers



Input Unit Conti..

- **Keyboard**
  - The layout of the keyboard is like that of traditional typewriter.
  1. Typing Keys: These keys include the letter keys (A-Z) and digit keys (0-9).
  2. Numeric Keypad: It is used to enter numeric data or cursor movement. Generally, it consists of a set of 17 keys.
  3. Function Keys: The 12 function keys are present on the keyboard which are arranged in a row at the top of the keyboard. Each function key has unique meaning and is used for some specific purpose.
  4. Control keys: It includes four directional arrow keys. Control keys also include Home, End, Insert, Delete, Page Up, Page Down, Control(Ctrl), Alternate(Alt), Escape(Esc).
  5. Special Purpose Keys: Keyboard also contains some special purpose keys such as Enter, Shift, Caps Lock, Numb Lock, Space bar, Tab, and Print Screen
- **Mouse**
  - Generally it has two buttons called left and right button and a scroll is present between the buttons.
  - It can perform functions like selecting menu commands, moving icons, resizing windows, starting programs, and choosing options but it cannot be used to enter text into the computer.
- **Light Pen**
  - Light pen is a pointing device which is similar to a pen. It is used to select a displayed menu item or draw pictures on the monitor screen.
- **Scanner**
  - Scanner is an input device which works more like a photocopy machine.
  - That scans documents such as photographs and pages of text. When a document is scanned, it is converted into a digital format.
  - This creates an electronic version of the document that can be viewed and edited on a computer.
- **Optical Character Reader(OCR)**
  - OCR enables you to convert different types of documents, such as scanned paper documents, PDF files or images captured by a digital camera into editable text.

Central Processing Unit(CPU)

- CPU is considered as the brain of the computer system.
- CPU reads and executes program instructions, performs calculations, and makes decisions.
- All major calculations and comparisons are made inside the CPU.
- The CPU is mainly responsible for storing and retrieving information from all parts of computer system.
- It consists of-
  - Arithmetic and logical unit(ALU)
  - Control Unit(CU)
  - Primary memory
- The control unit and ALU of the computer are together known as the Central Processing Unit (CPU).
- Below you can see meaning of each word of a Control Processing Unit.

  Central => it controls all activities of a system.

  Processing => it does arithmetic and logical operation.

  Unit=> it is a chip, which consists of logical gates, electric circuit

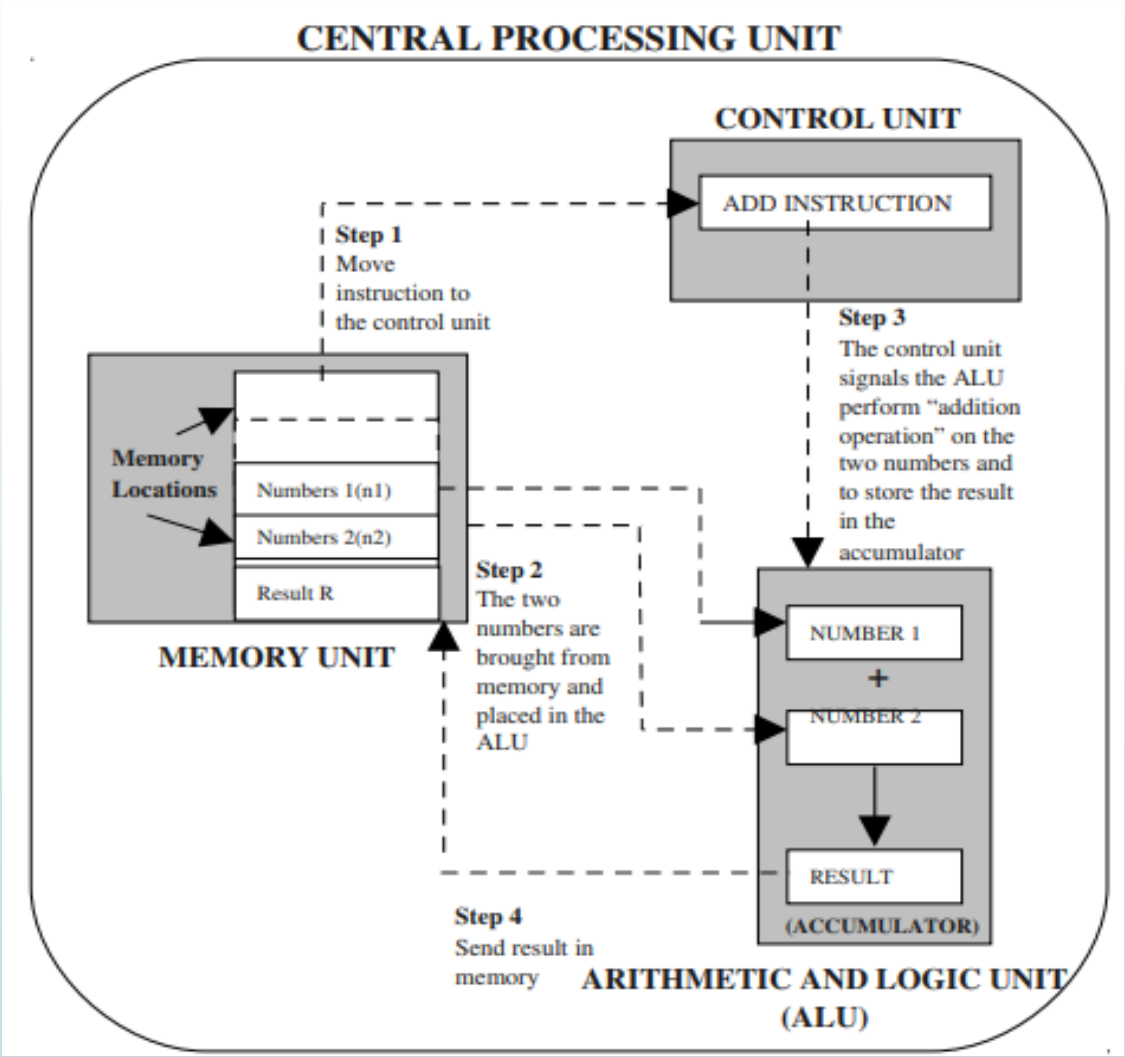
Control Unit

- This unit controls the operations of all parts of computer but does not carry out any actual data processing operations.
- It obtains instruction or data from main memory, interprets instructions and decides to sequencing of instructions.
- Operations which are done by CU:
  - the input device know that it is the time for it to feed data into the storage unit(or memory)
  - the ALU know what should be done with the data once those are received
  - the final results are sent to output device (monitor/screen or printer etc.)
- It communicates with both the arithmetic logic unit and main memory.
  - The CU instructs the arithmetic logic unit which arithmetic operations (such as addition, subtraction etc.) or logical operation (comparison between two number) is to be performed through control logic unit.
- It is also determine requirement of storage.
- The control unit coordinates all peripheral and auxiliary storage devices linked to the computer.
- The **Instruction Register** contains a current instruction once it has been fetched from the primary memory.
- The control unit uses the instruction contained in the instruction Register to decide which circuits need to be activated.
- **Program counter** contains the address of the next instruction to be fetched for execution.

Arithmetic-Logic Unit (ALU)

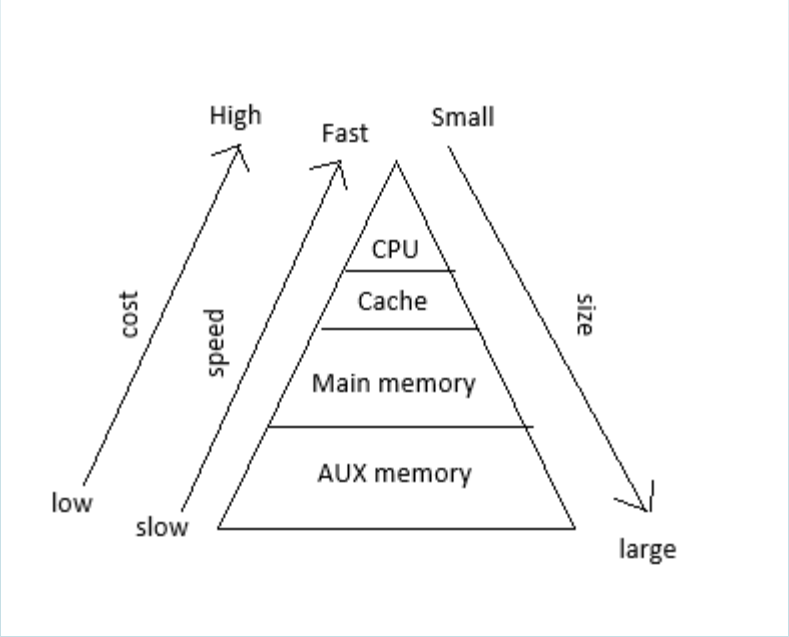
- The major operations performed by the ALU are addition, subtraction, multiplication, division.
- Relational operator (=,<,>), i.e., equal to, less-than and greater-than are used to describe the comparison operations by the ALU.
- ALU performs arithmetic operations on integer(whole number)and real(with decimal) operands. It performs simple logical tests for integers operands only.
- Process:
  - Data send from primary storage to ALU.
  - ALU executes the operations between two data.
  - After that, the final results send to the storage unit.
  - The storage unit are released to an output device (monitor/screen or printer).

CPU Operations



Memory Unit

- The memory unit is the electronic device that holds data and instructions for processing.
- The data and instructions which are entered into the computer system through input devices have to be stored inside the computer before actual processing starts.
- Similarly, after processing, the results produced by the computer must be kept somewhere inside the computer system before being passed onto the output devices.
- Computer memory can be divides on basis of access speed, cost and size.
- Memory is primarily of three types
  1. Cache Memory
  2. Primary Memory/Main Memory
  3. Secondary Memory

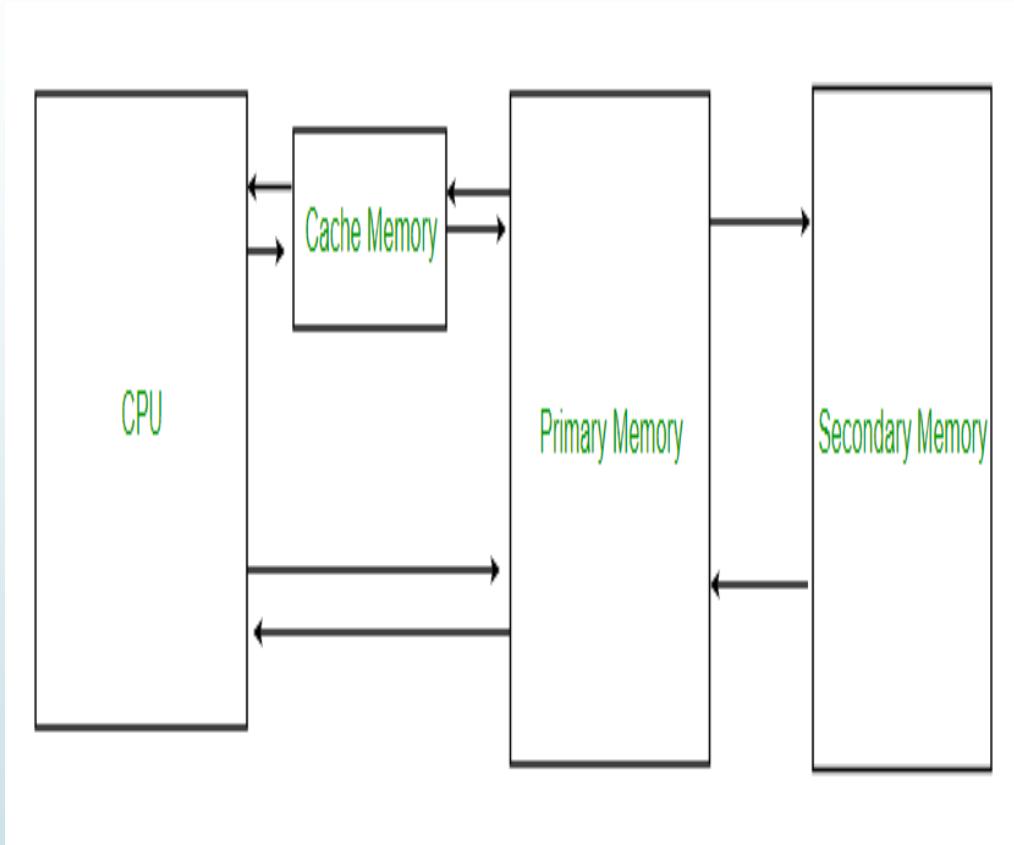


Memory Units

- The computers can understand only electronic signals like ON and OFF.
- The same can be represented mathematically as 1 or 0. So all the data are represented as 0 or 1. Numbers ,alphabets are converted into binary forms.
- Each character or number is represented by an 8 bit code.
- The set of 8 bits code is called a byte.
- A **character** occupies 1 byte space.
- A **number** occupies 2 byte space
- A group of 8 bit is known as byte. (1 byte=1 character)
- 1 byte = 8 bit
- 1024 bytes = 1 kilobyte (1 KB)
- 1024 kilobyte = 1 Megabyte (1 MB)
- 1024 Megabyte = 1 Gigabyte (1 GB)
- 1024 Gigabyte = 1 Terabyte (1 TB)

Cache Memory

- It acts as a buffer between the CPU and main memory.
- It is used to hold those parts of data and program which are most frequently used by CPU.
- Advantages:
  - Cache memory is faster than main memory.
  - It consumes less access time as compared to main memory.
  - It stores the program that can be executed within a short period of time
  - It stores data for temporary use.
- Disadvantages:
  - Cache memory has limited capacity.
  - It is very expensive.

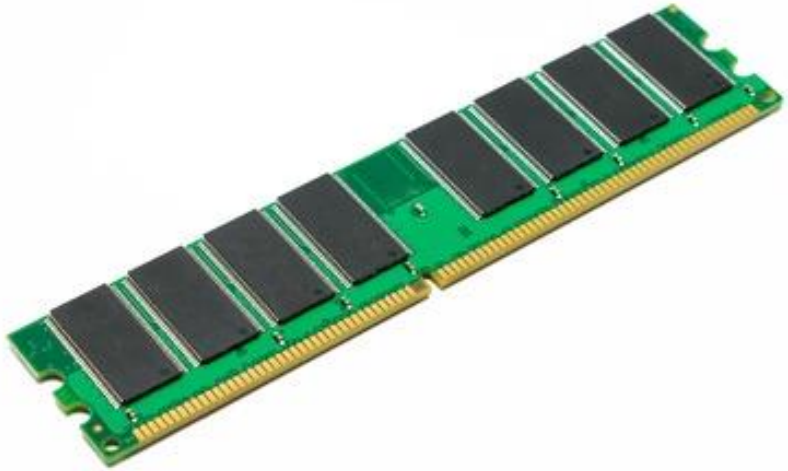


Primary Memory (Main Memory)

- Primary memory can be accessed directly by CPU.
- Primary memory holds only those data and instructions on which computer is currently working.
- when we load software from floppy disk, pen drive, hard disk or CDROM, it is stored in the main memory.
- Characteristics of Main Memory:
  - It has limited capacity.
  - It is working memory of the computer.
  - Faster than secondary memories.
  - A computer cannot run without primary memory
- Classification of Primary Memory
  1. Read-Only Memory (ROM)
  2. Random Access Memory (RAM)

Random Access Memory(RAM)

- It is one of the parts of the Main memory.
- RAM can help in both **read** and **write** which stores data until the machine is working(**temporarily**).
- RAM is a **volatile** memory, which means, If your computer freezes or reboot when working on a program, you loose anything that hasn't been saved.
- The speed of computer depends on RAM, say if the computer has less RAM, it will take more time to load and the computer slows down.
- RAM is of two types
  - Static RAM (SRAM)
  - Dynamic RAM (DRAM)



Read Only Memory(ROM)

- ROM stands for Read Only Memory. The memory from which we can only **read** but cannot write on it.
- The information is **stored permanently.**
- This type of memory is **non-volatile**.
- The memory does not depend on an electric current to save data. Turning off the computer does not have any effect on ROM.
- A ROM, stores such instructions that are required to start a computer*(know as a bootstrap program* that initializes *OS)*.
- ROM chips are not only used in the computer but also in other electronic items like washing machine and microwave oven.

SECONDARY (AUXILIARY) MEMORY

- This type of memory is also known as external memory **or non-volatile**(Data is **permanently** stored even if power is switched off).
- These are used for storing data/Information **permanently**.
- CPU directly does not access these memories instead they are accessed via input-output routines. Contents of secondary memories are first transferred to main memory, and then CPU can access it.
- Auxiliary Storage devices are also useful in transferring data and programs from one computer to another computer.
- For example: Hard Disk, Floppy Disk, CDROMs, DVD, magnetic tapes, magnetic disks etc..
- It is known as backup memory.
- Computer may run without secondary memory.
- Slower and cheaper than primary memories.
- Large capacity(GB) in comparison with primary memory.

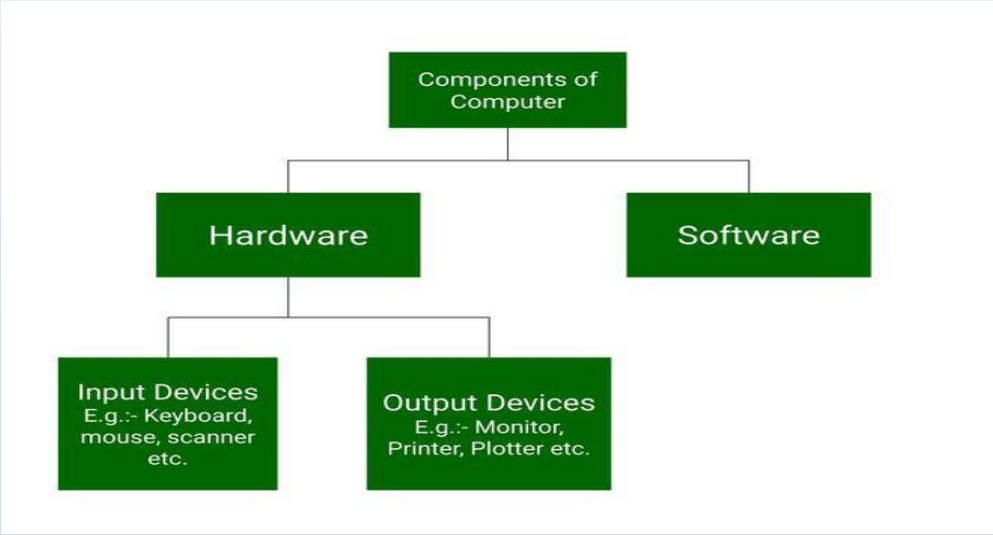
OUTPUT UNIT

- It is a communication media between human and computer.
- After finishing the processing by the CPU, the output unit sends results to the user using output devices.
- Output devices take the machine coded output from the CPU and convert them into a form which human can understand.
- Classified
  - Hard copy devices
    - Printers, plotters
  - Soft copy devices
    - The electric version of output generated using computer.
    - Not Permanent
    - Not touched
- Examples:
  - Monitors
  - Graphic Plotter
  - Printer

Hardware

- A computer system consists of two major components, hardware and software.
- The physical parts that make up a computer which are interconnected electronic devices and which you can see and touch.
- These hardware components are further divided into the following categories, which are:

1. Input Devices
2. Output Devices
3. Storage Devices
   - CD (Compact disc)
   - DVD(Digital Video/Versatile Disc)
   - Hard Disk
4. Internal Components
   - CPU (Central Processing Unit):
   - Motherboard
   - RAM (Random Access Memory)



Software

- In order to perform any task, you have to give a set of instructions in a particular sequence to the computer. These sets of instructions are called **Programs.**
- Software refers to a set of **programs** that makes the hardware perform a particular set of tasks in particular order.
- These instructions come from a **software developer** in the form that will be accepted by the platform(OS+CPU).
- For example, a program that is designed for the windows operating system will only work for that specific operating system.
- Software can be divided into 2 major types:

1. System Software

- System software is designed to run computer's hardware and application programs.
- System software is the interface between the hardware and software.

2. Application Software

Application software is nothing but that can be designed to use by end users.

Two Types of Software

- System Software
- DOS, Windows 95, 98, ME, NT, XP, Vista, Windows 7
- Unix, Linux,
- MAC system OS 6,7,8,9,10
- Android

- Application Software
  - Application Suite
  - Enterprise software
  - Education Software
  - Communication Software
  - Database software

Monitors

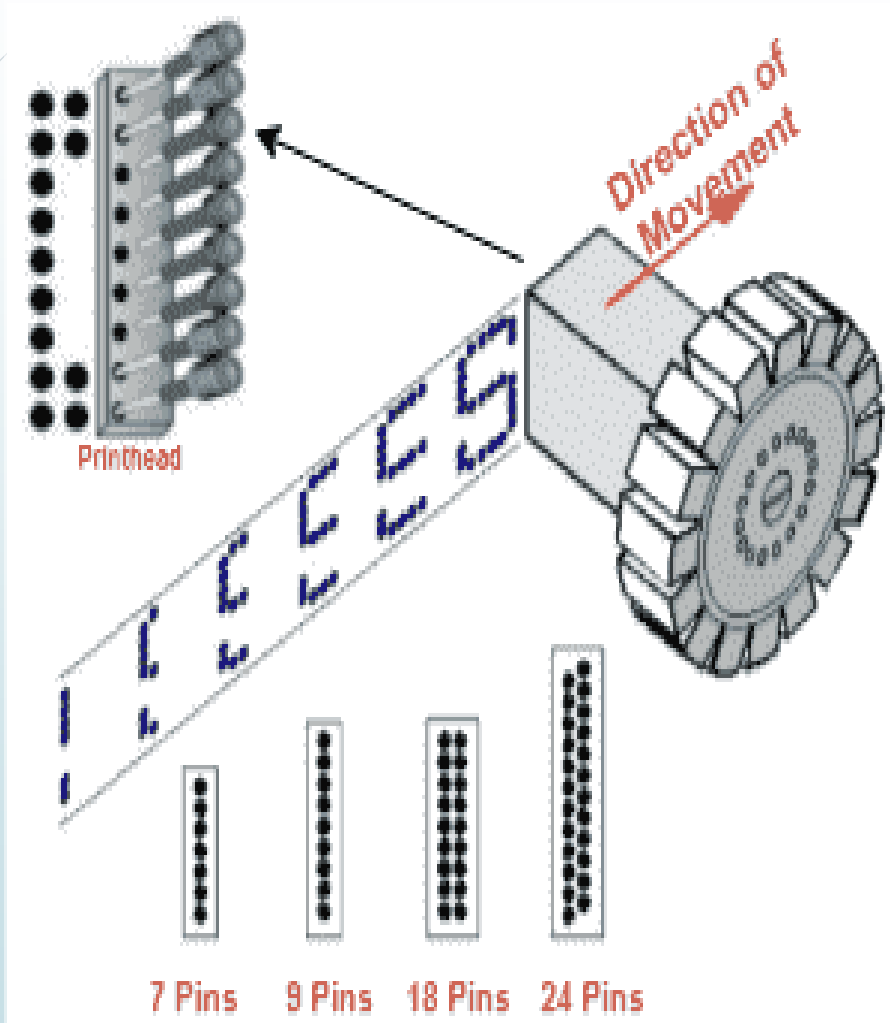
- Monitors is an output device which used to display the information like text, images, videos, audios, etc.
- It is known as a Visual Display Unit (VDU).
- The monitor provides output from a computer on a screen so that users can interact with or view data digitally.
- A monitor typically consists of many parts such as the display device, and power supply, screen adjustment buttons.
- It forms images from tiny dots, called pixels that are arranged in a rectangular form. The sharpness of the image depends upon the number of pixels.
- In the Morden monitors there is display devices which is typically Liquid crystal display(LCD), Cathode-Ray Tube (CRT) used in older monitors.
- By using **Digital Visual Interface(DVI)** monitors are connected to the computers.

Printers

- A printer is an external hardware output device that takes the electronic data stored on a computer or other device and generates a hard copy of it.
- A printer prints characters, images and symbols on paper.
- There are two types of printers:
  - Impact Printers
    - Impact printers make a picture by utilizing some tool to press an inked ribbon on the cover, presenting the ink be kept on the page in the shape accordingly character (letter, digit, dot, line).
    - Impact printers generally utilize hammers, pins, or wheels to hit against an inked ribbon to print on paper.
    - These printers produce so much noise.
    - Dot matrix, daisy-wheel and ball printers are some commonly used types of impact printers.
  - Non-Impact Printers
    - Non-impact printers create figures and pictures without any connection between the printing device and the paper.
    - Non-impact printers use a spray of ink, laser, or heat and pressure to execute their printing operation.
    - Laser printers, Inkjet printers and Thermal printers are some examples of Non-Impact printers.

Dot-Matrix

- Pin printers
- The dot-matrix printer uses print heads containing from 9 to 24 pins.
- These pins produce patterns of dots on paper to form the individual characters.
- The 24 pin dot-matrix printer produces more dots that a 9 pin dot-matrix printer, which results in much better quality and clearer characters.
- The general rule is: the more pins, the clearer the letters on the paper. The pins strike the ribbon individually as the print mechanism moves across the entire print line in both directions, i-e, from left to right, then right to left, and so on.
- The user can produce a color output with a dot-matrix printer (the user will change the black ribbon with a ribbon that has color stripes).
- Dot-matrix printers are inexpensive and typically print at speeds of 100-600 characters per second.
- Advantages
  - Inexpensive
  - Widely Used
  - Other language characters can be printed
- Disadvantages
  - Slow Speed
  - Poor Quality


Direction of Movement
Printhead
7 Pins
9 Pins
18 Pins
24 Pins

Laser

- It is type of non-impact printer.
- The **photoreceptor drum** so the drum gains a positive charge spread uniformly across its surface.
- At the same time, the circuit activates the **laser** to make it draw the image of the page onto the drum.
- The laser beam doesn't actually move: it bounces off a moving mirror that scans it over the drum.
- Where the laser beam hits the drum, it erases the positive charge that was there and creates an area of negative charge instead. Gradually, an image of the entire page builds up on the drum.
- where the page should be white, there are areas with a positive charge; where the page should be black, there are areas of negative charge.
- An **ink roller** touching the photoreceptor drum coats it with tiny particles of powdered ink **(toner**). An inked image of the page builds up on the drum.
- A sheet of **paper** from a hopper on the other side of the printer feeds up toward the drum.
- Laser printers use buffers that store an entire page at a time. When a whole page is loaded, it will be printed.
- The speed of laser printers is high and they print quietly without producing much noise.
- The fastest laser printer can printed up to 200 pages per minute in monochrome (black and white) and up to 100 pages per minute in color.

Conti..

- Advantages
  - Very high speed
  - Very high quality output
  - Support many fonts and different character size
  - Ink is in the form of toner (powder), it does not dries up even if you don't use it for a long time.
- Disadvantages
  - Expensive.
  - Cannot be used to produce multiple copies of a document in a single printing

Inkjet

- It is type of non-impact printer.
- It is cheap in price.
- They have nozzle from which ink is sprayed onto paper and it gets printed.
- An inkjet printer consists of a print head, ink cartridges, paper feed assembly, belt and stabilizer bar.
- Ink in the cartridges is in liquid form, which dries if not used for a long time.
- Inkjet printers are capable of creating high-quality images and high-resolution photos with vivid colors.
- Ink should be refilled in a short span of time, which makes it quite expensive.
- not particularly fast. Typically, an ink-jet printer is more expensive than a dot-matrix printer, but costs only half as much as a laser printer.

Impact vs. Non impact

Parameters	Impact Printer	Non-Impact Printer
Definition	Impact printers create pictures and figures by hitting a device such as a wheel or a print hammer against an inked ribbon.	Non-impact printers create figures and pictures without any connection between the printing device and the paper.
Printing Process or Mechanism	Impact printers generally utilize hammers, pins, or wheels to hit against an inked ribbon to print on paper.	Non-impact printers use a spray of ink, laser, or heat and pressure to execute their printing operation.
Speed Of Printers	Impact printers are low in terms of speed.	Non-impact printers are comparatively fast in speed. They can print several pages in one minute.
Noise Of Printers	They produce high-level noise as they have many moving parts.	They have a low level of noise.
Print Quality	The print quality of impact printers is lower.	The print quality of non-impact printers is higher.

Conti..

Value	They are pretty affordable.	They are quite expensive as compared to impact printers.
Paper Sheet Used	They prefer continuous paper sheets.	They prefer individual paper sheets.
Graphic Images	Except Dot matrix printers, no other impact printers can print graphics images.	Printing graphical illustrations are possible in non-impact printers.
Character Style	Except for the dot matrix, the character or figure style cannot be changed in the other impact printers.	It can print various types of figures from carrying the individual printer.

Plotters

- A plotter is a special kind of output device that, like a printer, produces images on paper.
- Usually a plotter is capable of producing prints on very large size paper sheets but have a speed slower than printers.
- Graph plotters are used for drawing building plans, graphs and three-dimensional drawings. They are often used by architects and engineers designing machines, bridges, etc.
- A plotter can be connected to the port normally used by a printer.
- An array of different colored pens in a clip rack and a robotic arm is part of plotter. The instructions that a plotter receives from a computer consist of a color, and beginning and ending coordinates for a line. With that information, the plotter picks up the appropriate pen through its arm, positions it at the beginning coordinates drops the pen down to the surface of the paper and draws to the ending coordinates. Plotters draw curves by creating a sequence of very short straight lines.
- Plotters usually come in two designs:

  1. Flat Bed: Plotters of small size to be kept on table with restriction of paper size.
  2. Drum: These plotters are of big size using rolls of paper of unlimited length.

Drum Plotters

Flatbed Plotters

Chapter 2

Software

--Rupali Attarde

(M.Tech C.S.E)

Introduction

- Software is a set of programs, which is designed to perform a well-defined function.
- A program is a sequence of instructions written to solve a particular problem.
- There are two types of software –

  System Software

  Application Software


TYPES OF SOFTWARE
Windows
Java
Linux
Mac OS
Gmail
McAfee
SECURE

System Software

- The system software is a collection of programs designed to
  - ➔ operate,
  - ➔ control
  - ➔ extend the processing capabilities of the computer itself.

- System software is generally prepared by the computer manufacturers.
- System software serves as the interface between the hardware and the end users.
- Some examples of system software are Operating System, Compilers, Interpreter, Assemblers, etc.

System Software

4 pic 1 word

Application Software

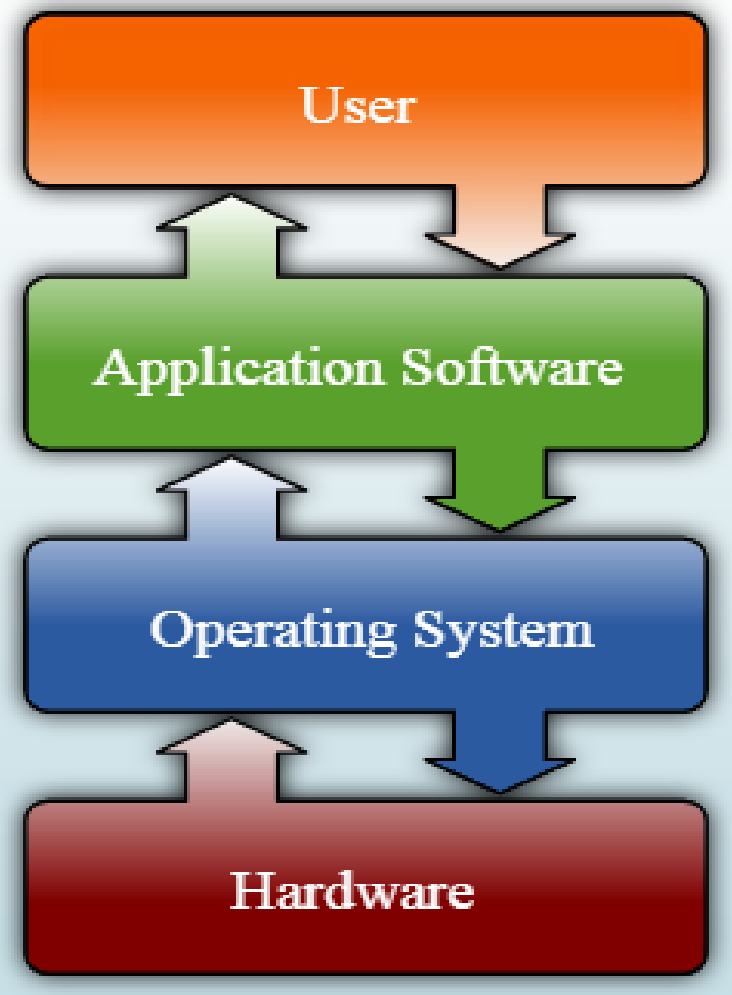
- Application program or application software is a computer program designed to help people perform an activity.
- Application software products are designed to satisfy a particular need of a particular environment.
- You may be familiar with application software through examples like the
  - ➔ Microsoft Office suite,
  - ➔ Internet browsers like Safari or Google Chrome,
  - ➔ mobile software like Spotify, Zoom, and Slack

Application Software

Operating system

- An operating system is a program that acts as an interface between the software and the computer hardware.
- It is an integrated set of specialized programs used to manage overall resources and operations of the computer.
- It is a specialized software that controls and monitors the execution of all other programs that reside in the computer, including application programs and other system software.

Diagram




Monitor
Applications
APP
APP
APP
APP
Printer
Hard Drive
Operating System
Mouse
Keyboard

Operating system

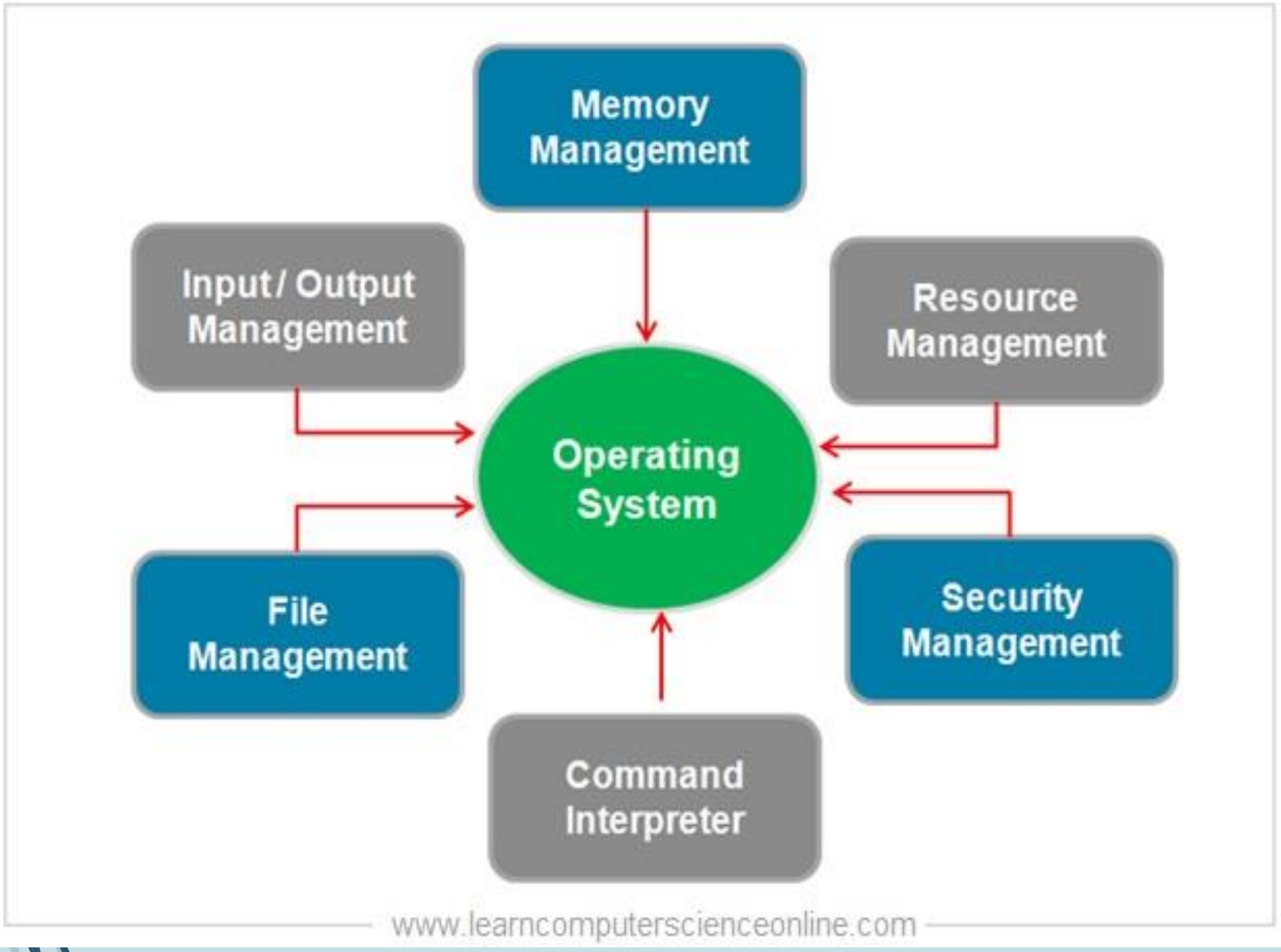
There are primarily three choices: Windows, Linux, Apple OS X.

- Linux is free, however people generally do not use it for home purpose.
- Apple OS X works only on Apple desktops.
- Windows 7 is very popular among desktop users.
- Most of the computers come pre-equipped with Windows 7 Starter edition.
- Windows 8 is recently introduced and is available in the market.
- Windows 7 and Windows 8 come in multiple versions from starter, home basic, home premium, professional, ultimate, and enterprise editions.
- As the edition version increases, their features list and price increases.

The objectives of the operating system

- To hide the details of the hardware resources from the users.
- To provide users a convenient interface to use the computer system.
- To act as an intermediary between the hardware and its users, making it easier for the users to access and use other resources.
- To manage the resources of a computer system.
- To provide efficient and fair sharing of resources among users and programs.

Operating System - Functions



The operating system performs the following functions in a device.

- Instruction
- Input/output Management
- Memory Management
- File Management
- Processor Management
- Job Priority
- Special Control Program
- Scheduling of resources and jobs
- Security
- Monitoring activities
- Job accounting

- Instruction: The operating system establishes a mutual understanding between the various instructions given by the user.
- Input/output Management: What output will come from the input given by the user, the operating system runs this program. This management involves coordinating various input and output devices. It assigns the functions of those devices where one or more applications are executed.
- Memory Management: The operating system handles the responsibility of storing any data, system programs, and user programs in memory. This function of the operating system is called memory management.
- File Management: The operating system is helpful in making changes in the stored files and in replacing them.
- It also plays an important role in transferring various files to a device.

- Job Priority: The work of job priority is creation and promotion. It determines what action should be done first in a computer system.
- Special Control Program: The operating systems make automatic changes to the task through specific control programs. These programs are called Special Control Program.
- Scheduling of resources and jobs: The operating system prepares the list of tasks to be performed for the device of the computer system. The operating system decides which device to use for which task. This action becomes complicated when multiple tasks are to be performed simultaneously in a computer system. The scheduling programs of the operating system determine the order in which tasks are completed. It performs these tasks based on the priority of performing the tasks given by the user. It makes the tasks available based on the priority of the device.
- Security: Computer security is a very important aspect of any operating system. The reliability of an operating system is determined by how much better security it provides us. Modern operating systems use a firewall for security. A firewall is a security system that monitors every activity happening in the computer and blocks that activity in case of any threat.

Monitoring activities: The operating system takes care of the activities of the computer system during various processes. This aborts the program if there are errors. The operating system sends instant messages to the user for any unexpected error in the input/output device. It also provides security to the system when the operating system is used in systems operated by multiple users. So that illegal users cannot get data from the system.

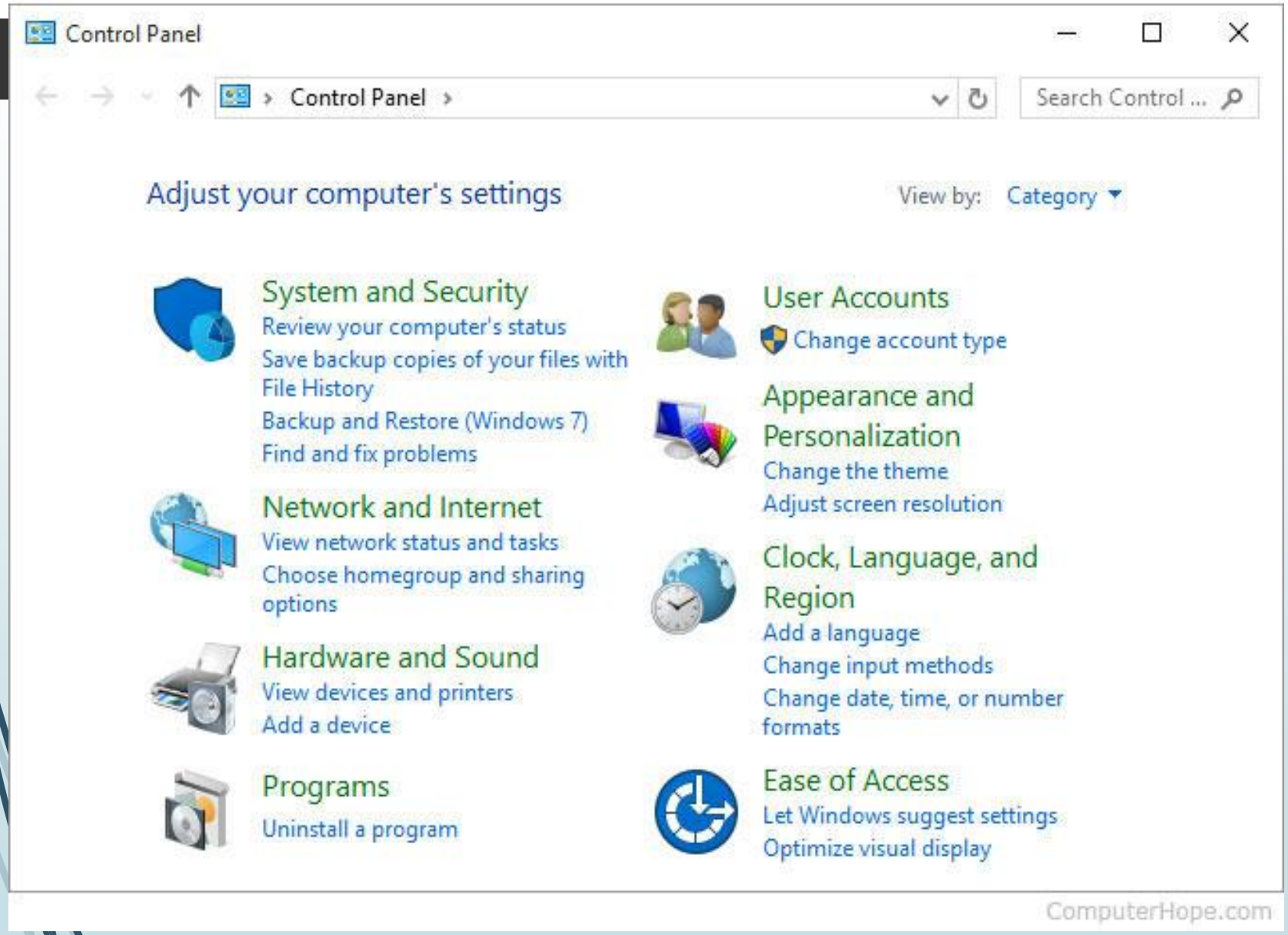
- Job accounting: It keeps track of time & resources used by various jobs and users.

4 pic 1 word

Control Panel

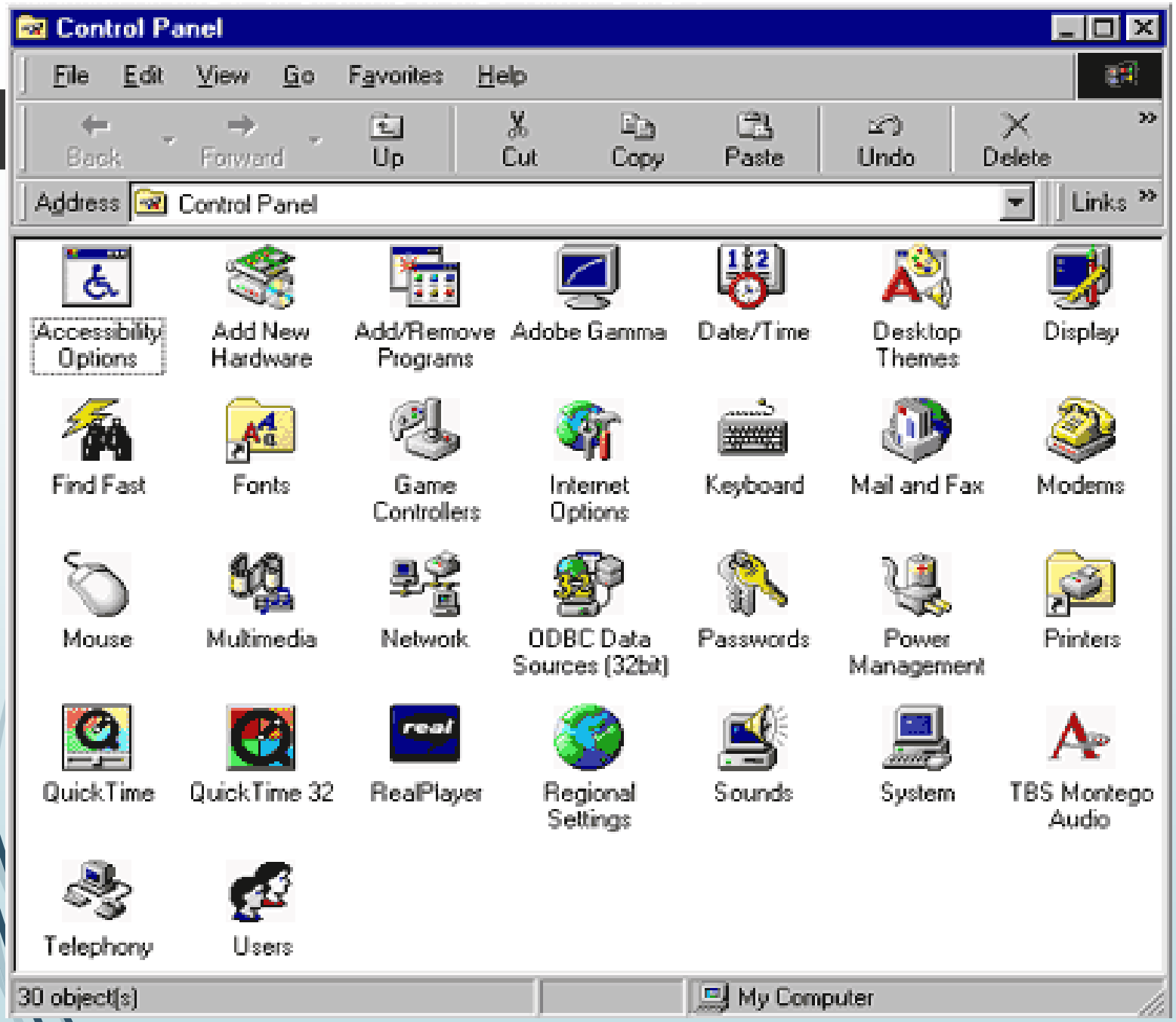
- The Control Panel is a component of Microsoft Windows that provides the ability to view and change system settings.
- It consists of a set of applets that include adding or removing hardware and software, controlling user accounts, changing accessibility options, and accessing networking settings.

Windows 10 Control Panel



The Control Panel in Microsoft Windows enables a user to change various computer hardware and software features.

- Settings for the mouse, display, sound, network, and keyboard represent a few examples of what may be modified in the Control Panel.


Control Panel
File Edit View Go Favorites Help
Back Forward Up Cut Copy Paste Undo Delete
Address Control Panel
Links
Accessibility Options
Add New Hardware
Add/Remove Programs
Adobe Gamma
Date/Time
Desktop Themes
Display
Find Fast
Fonts
Game Controllers
Internet Options
Keyboard
Mail and Fax
Modems
Mouse
Multimedia
Network
ODBC Data Sources (32bit)
Passwords
Power Management
Printers
QuickTime
QuickTime 32
RealPlayer
Regional Settings
Sounds
System
TBS Montego Audio
Telephony
Users
30 object(s)
My Computer

Sections of the Windows Control Panel

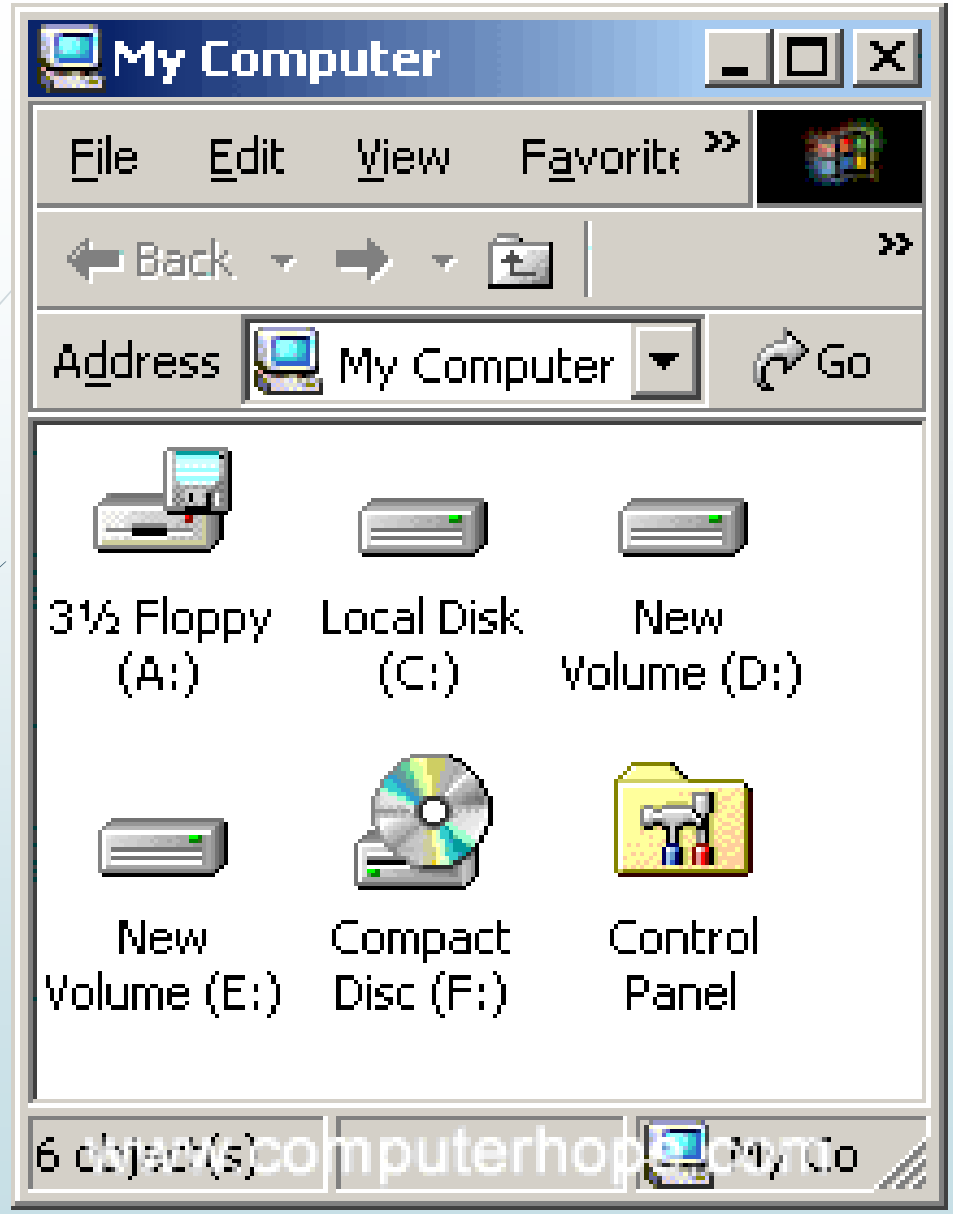
There are eight main areas on the Control Panel, containing different tools

designed to optimize your computer.

- System and Security - A section to check your computer's status, backup and restore, and others.
- Network and Internet - View network status.
- Hardware and Sound - View which devices are on your computer and add devices.
- Programs - Uninstall programs.
- User Accounts - Change user accessibility.
- Appearance and Personalization - Change desktop options, like fonts and screen readers.
- Clock and Region - Change date and time.
- Ease of access - Optimize your display settings.

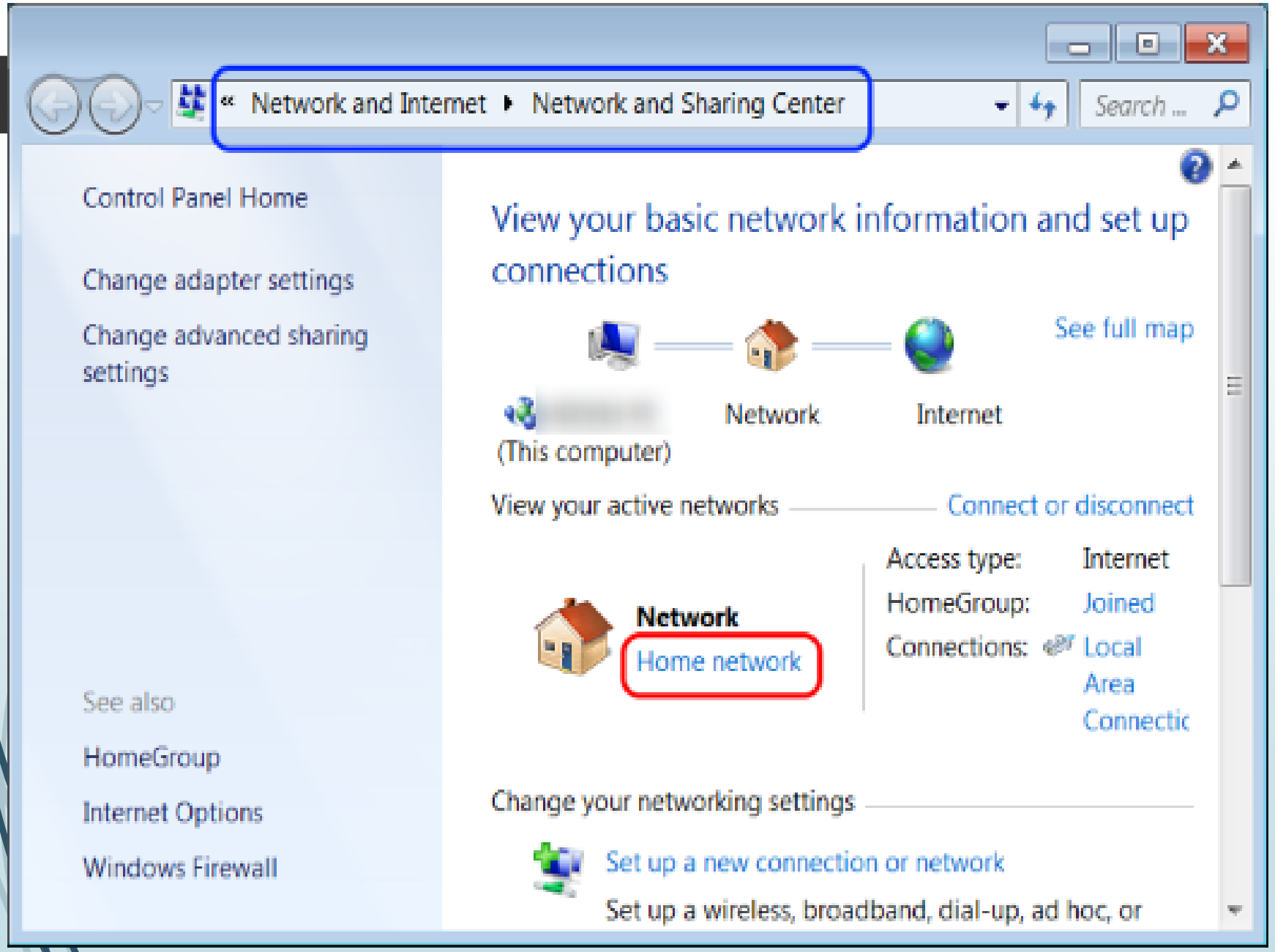
My Computer

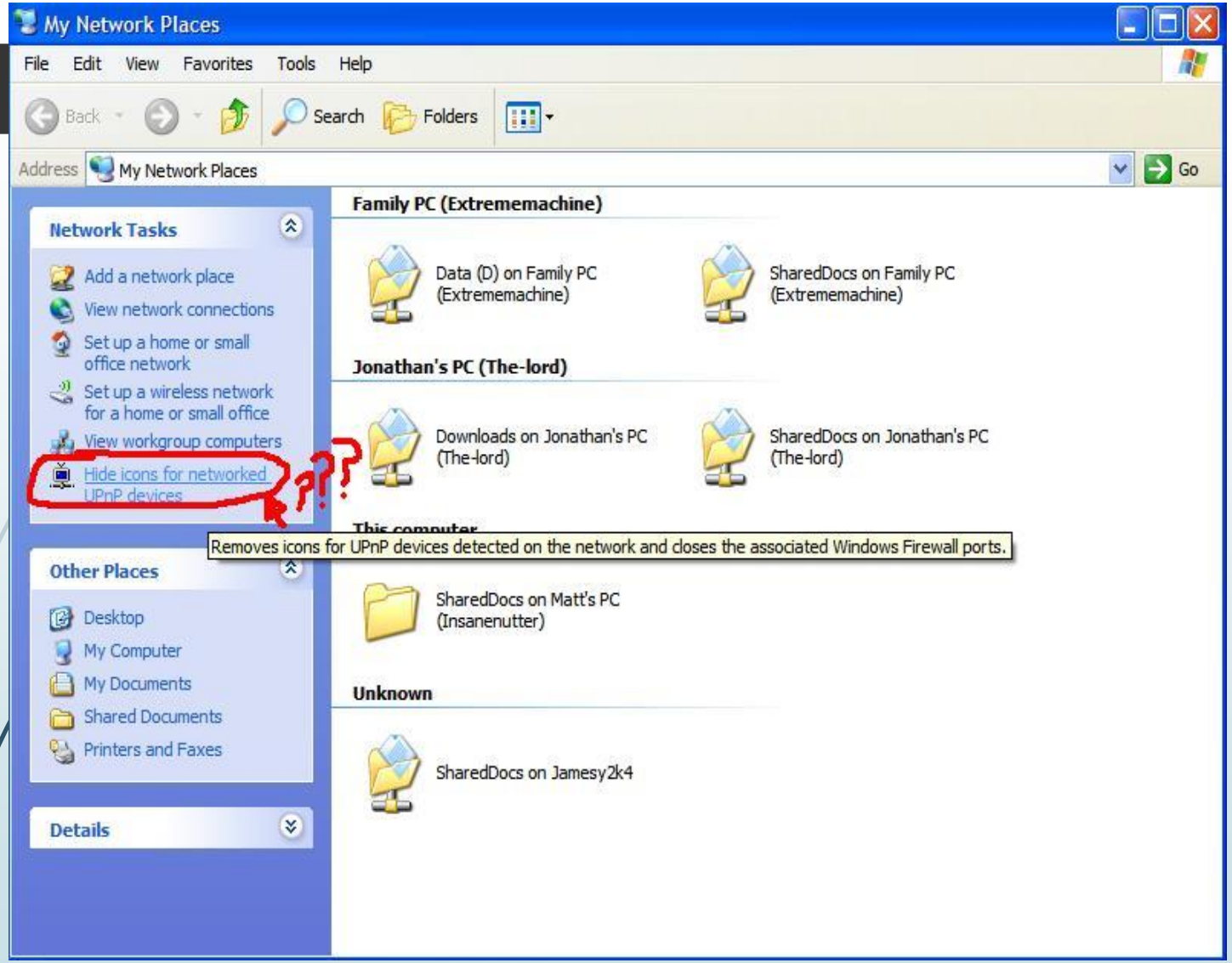
- My Computer is a Microsoft Windows feature first found in Windows 95 and included with all later versions that allows you to explore and manage the contents of your computer drives.
- The image shows examples of the My Computer icon in Microsoft Windows XP, Vista and Windows 7, and the "This PC" icon in Windows 8 and in Windows 10.
- Although the name has changed, "This PC" still has the same functionality as "My Computer."


My Computer
File
Edit
View
Favorite
Back
Address
My Computer
Go
3½ Floppy (A:)
Local Disk (C:)
New Volume (D:)
New Volume (E:)
Compact Disc (F:)
Control Panel
6 object(s)

My network places

- What is My Network Places? My Network Places is a desktop folder in Microsoft Windows Explorer that displays the networking connectivity of your machine.
- You can use My Network Places to connect to shared folders on other computers on the network.
- My Network Places was formerly known as Network Neighbourhood.


« Network and Internet ▸ Network and Sharing Center
Search ...
Control Panel Home
Change adapter settings
Change advanced sharing settings
View your basic network information and set up connections
See full map
Network
Internet
(This computer)
View your active networks
Connect or disconnect
Network
Home network
Access type: Internet
HomeGroup: Joined
Connections: Local Area Connectic
Change your networking settings
Set up a new connection or network
Set up a wireless, broadband, dial-up, ad hoc, or
See also
HomeGroup
Internet Options
Windows Firewall


My Network Places
File Edit View Favorites Tools Help
Back Search Folders
Address My Network Places
Go
Network Tasks
Add a network place
View network connections
Set up a home or small office network
Set up a wireless network for a home or small office
View workgroup computers
Hide icons for networked UPnP devices
Other Places
Desktop
My Computer
My Documents
Shared Documents
Printers and Faxes
Details
Family PC (Extrememachine)
Data (D) on Family PC (Extrememachine)
SharedDocs on Family PC (Extrememachine)
Jonathan's PC (The-lord)
Downloads on Jonathan's PC (The-lord)
SharedDocs on Jonathan's PC (The-lord)
Removes icons for UPnP devices detected on the network and closes the associated Windows Firewall ports.
SharedDocs on Matt's PC (Insanenutter)
Unknown
SharedDocs on Jamesy2k4


Thank
you

Chapter 3

Information Processing Using Open Office

--Rupali Attarde

(M.Tech C.S.E)


OpenOffice.org 3
Text Document
Spreadsheet
Presentation
Open a document...
Drawing
Database
Formula
Templates...
ORACLE

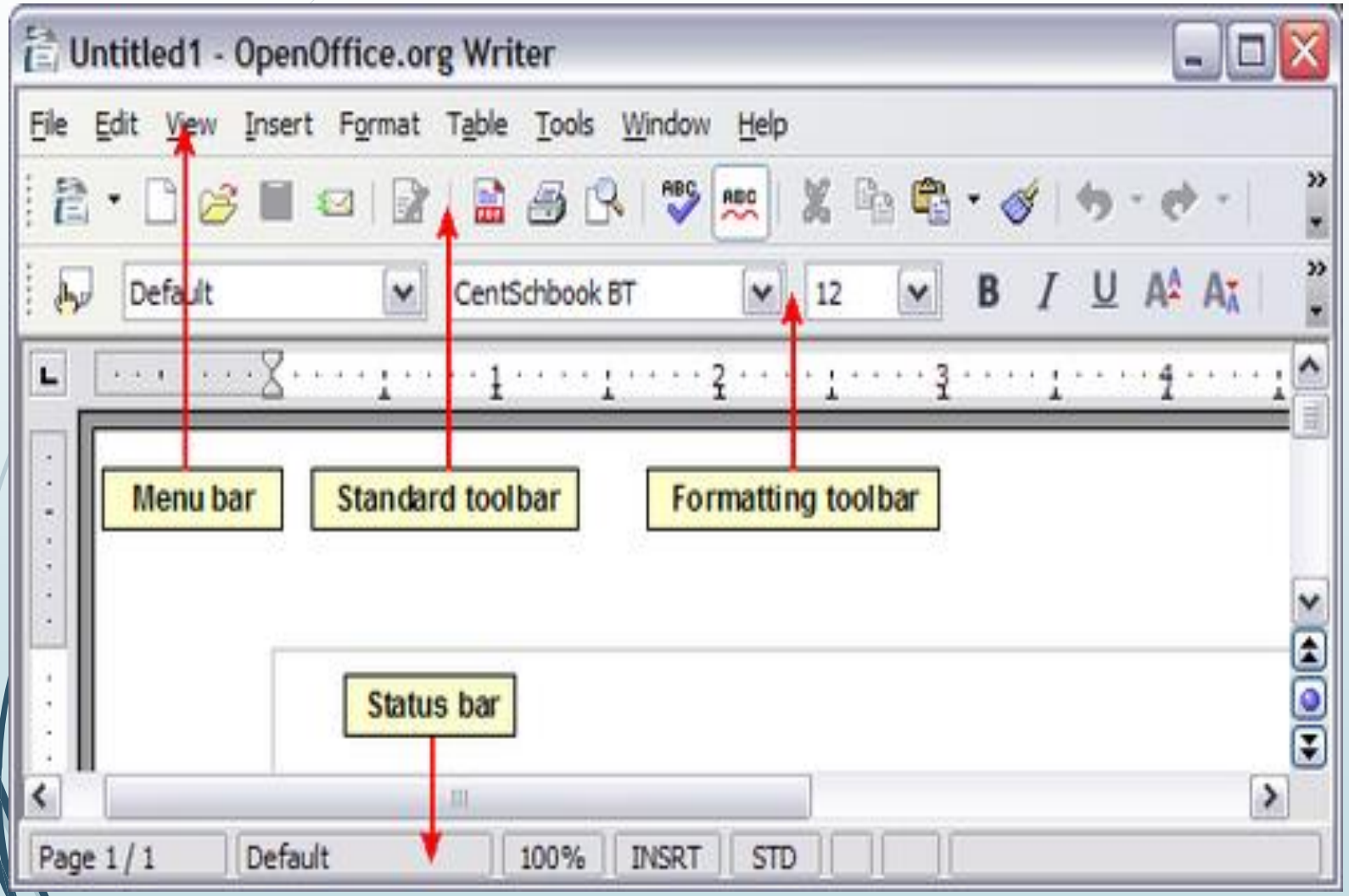
Introduction

- Writer: makes word processing simple
- Impress: produces top-notch slideshow presentations
- Calc: creates spreadsheets and graphs with ease
- Base: makes database management a snap
- Draw: gives you the tools to communicate with graphics and diagrams
- Math: Allows you to easily format complex math equations

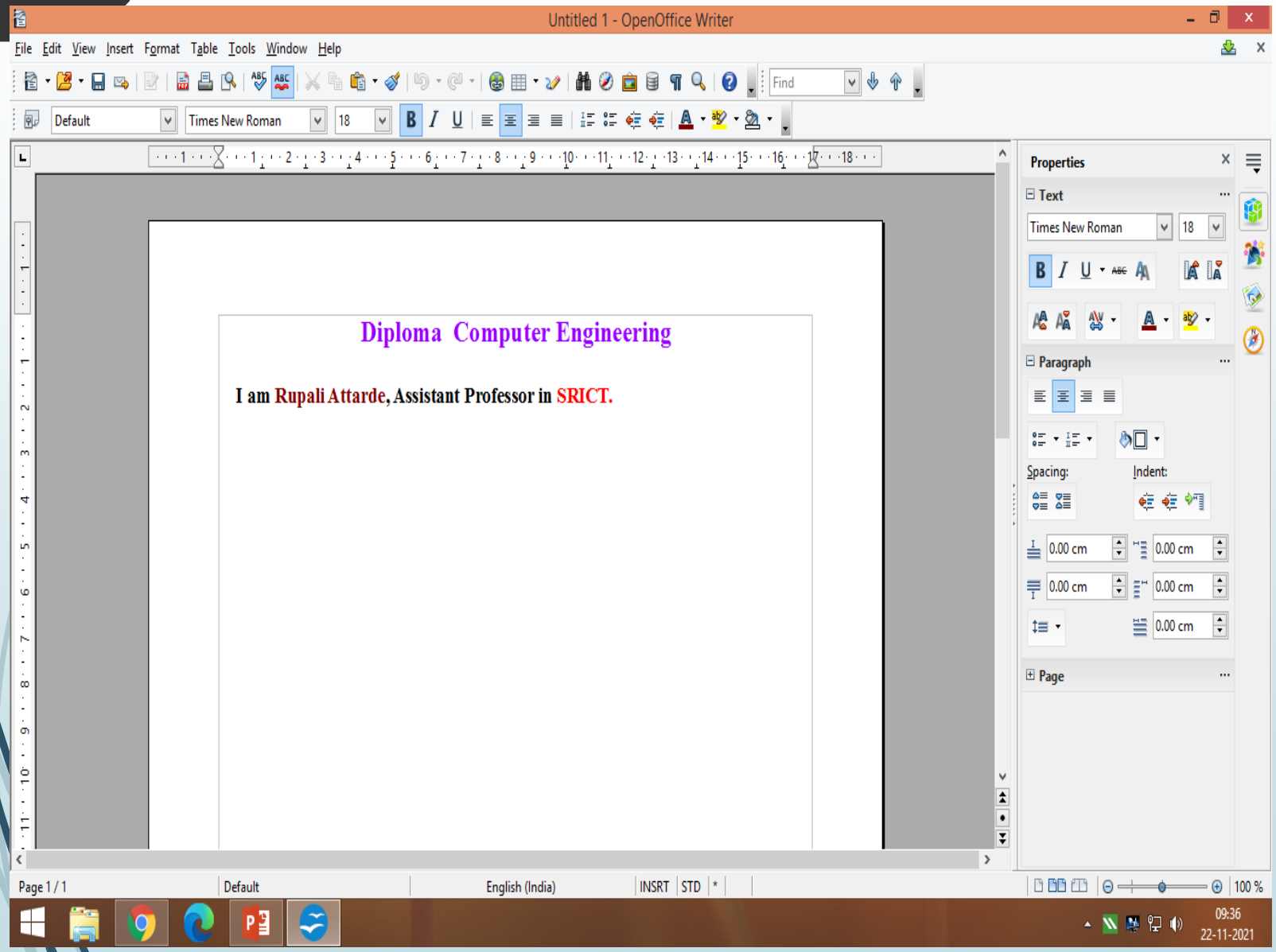
Icon	Title	Description
	**Writer**	A word processor analogous to Microsoft Word or WordPerfect.
	**Calc**	A spreadsheet analogous to Microsoft Excel or Lotus 1-2-3.
	**Impress**	A presentation program analogous to Microsoft PowerPoint or Apple Keynote. Impress could export presentations to Adobe Flash (SWF) files, allowing them to be played on any computer with a Flash player installed. Presentation templates were available on the OpenOffice.org website
	**Draw**	A vector graphics editor comparable in features to the drawing functions in Microsoft Office.
	**Math**	A tool for creating and editing mathematical formulas, analogous to Microsoft Equation Editor. Formulas could be embedded inside other OpenOffice.org documents, such as those created by Writer.
	**Base**	A database management program analogous to Microsoft Access. Base could function as a front-end to a number of different database systems, including Access databases (JET), ODBC data sources, MySQL and PostgreSQL. Base became part of the suite starting with version 2.0. HSQL was the included database engine..

- OpenOffice.org - word processor, spreadsheet application, presentation tool and more
- OpenOffice.org is an open, feature-rich multi-platform office productivity suite. The user interface and the functionality is very similar to other products in the market like Microsoft Office or Lotus SmartSuite, but compared to these commercial products OpenOffice.org is absolutely free.
- OpenOffice.org Writer is a full-featured word processor. The powerful Navigator and Stylist tools make changing the formatting throughout a document a simple task

Word Processor(MS Office)
OpenOffice(Writter)



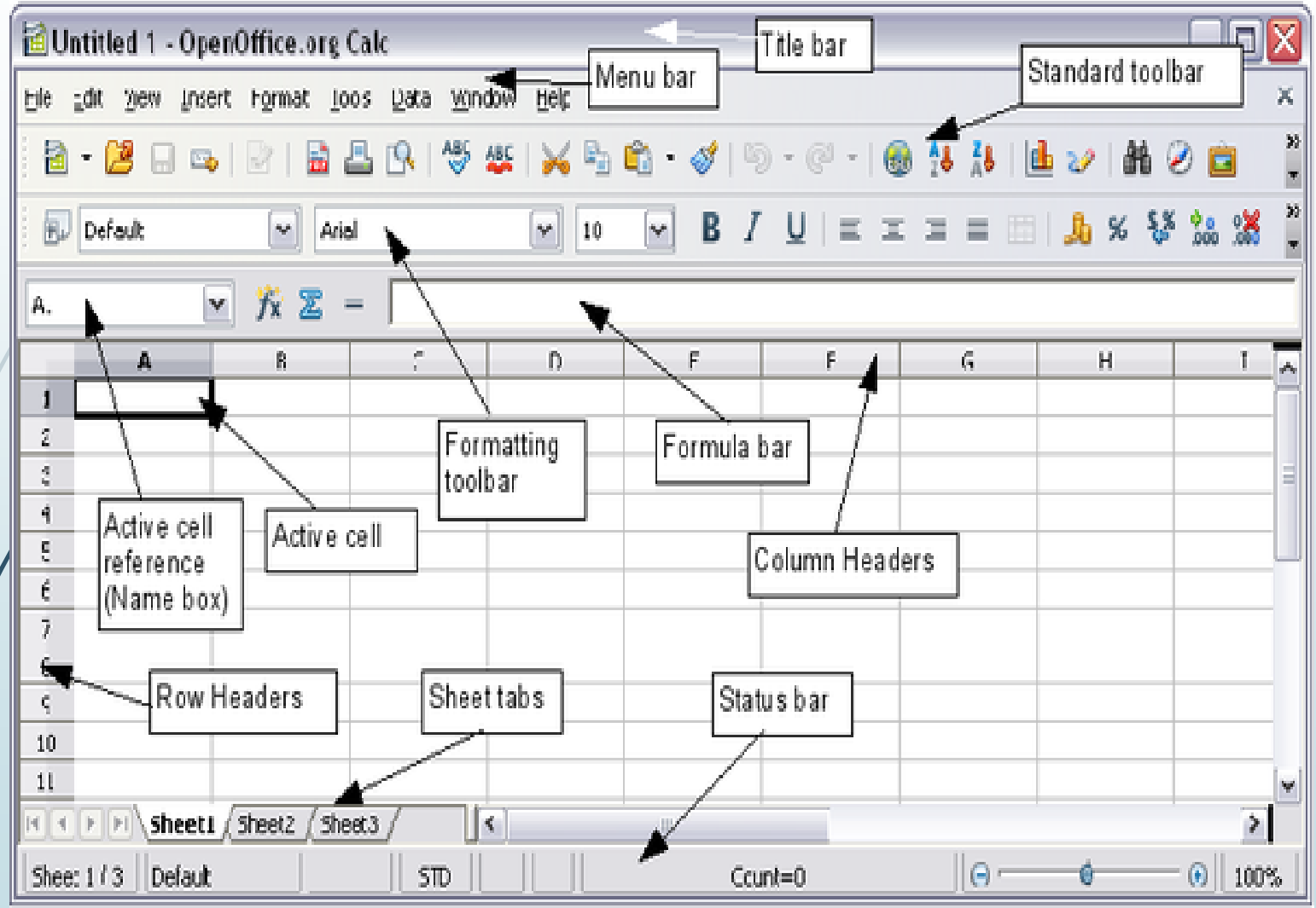
OpenOffice Writer

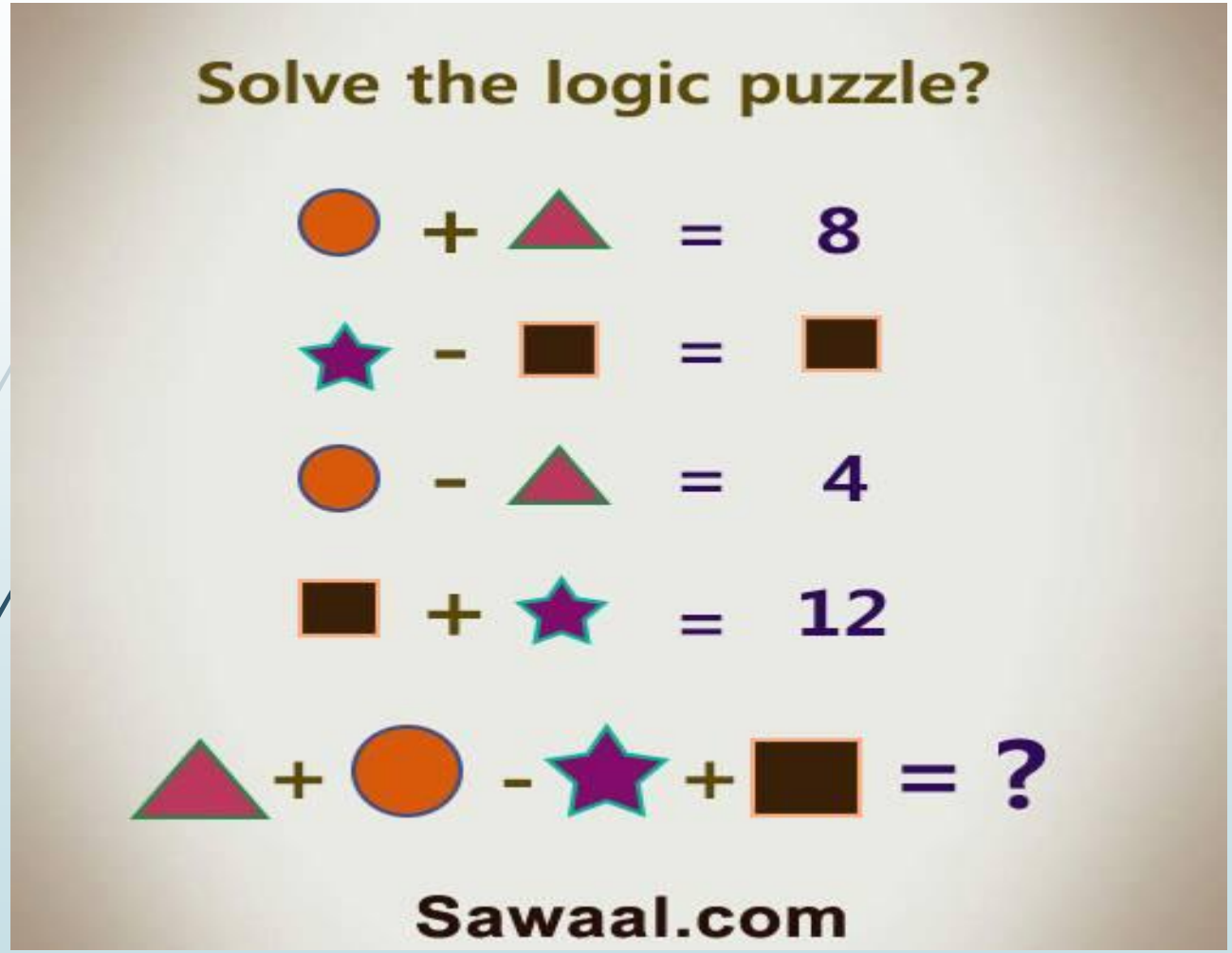


OpenOffice.org Calc

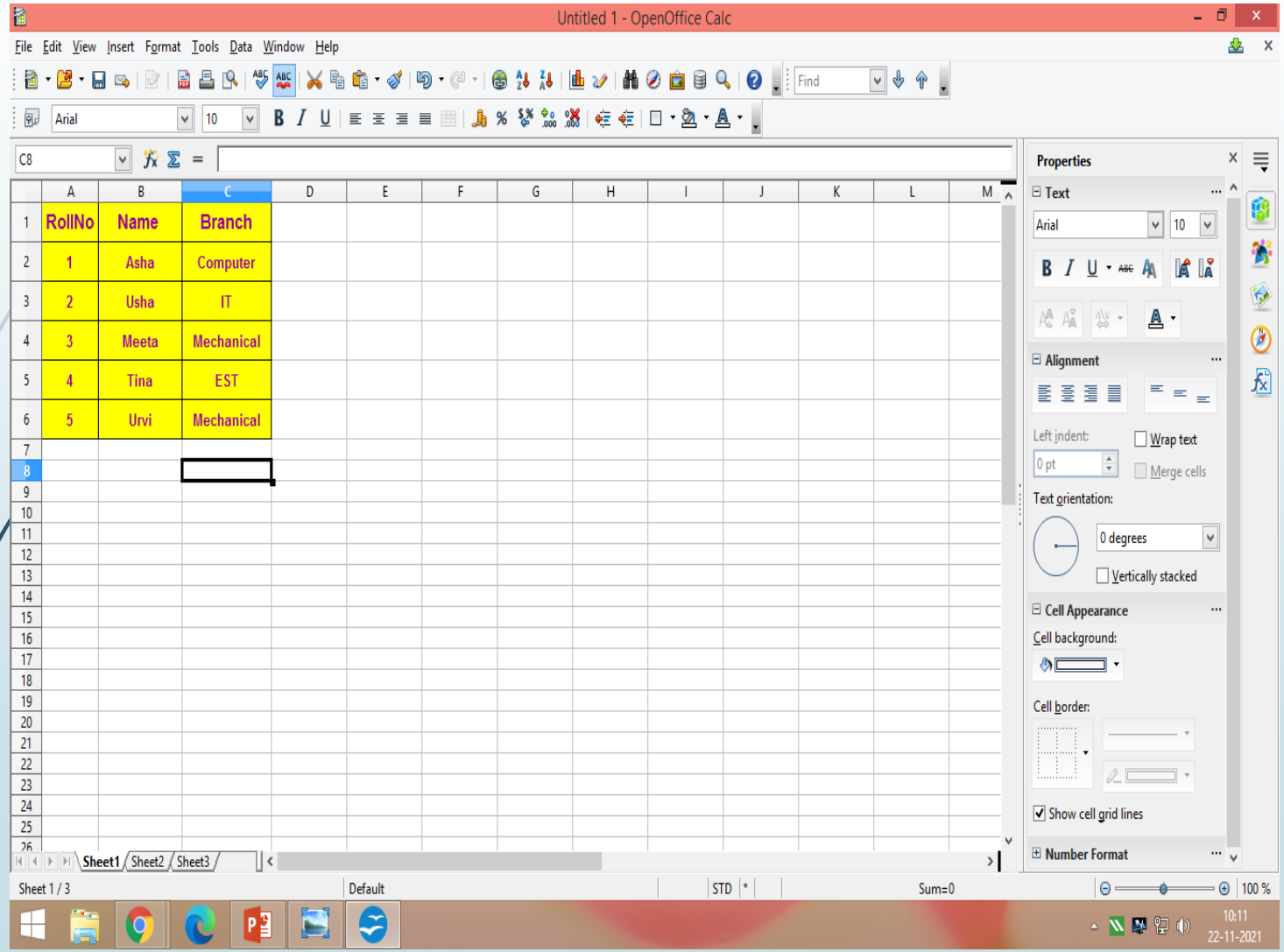
- OpenOffice.org Calc provides full spreadsheet functionality incl. a huge number of statistical and scientific functions, pivot tables and charts.

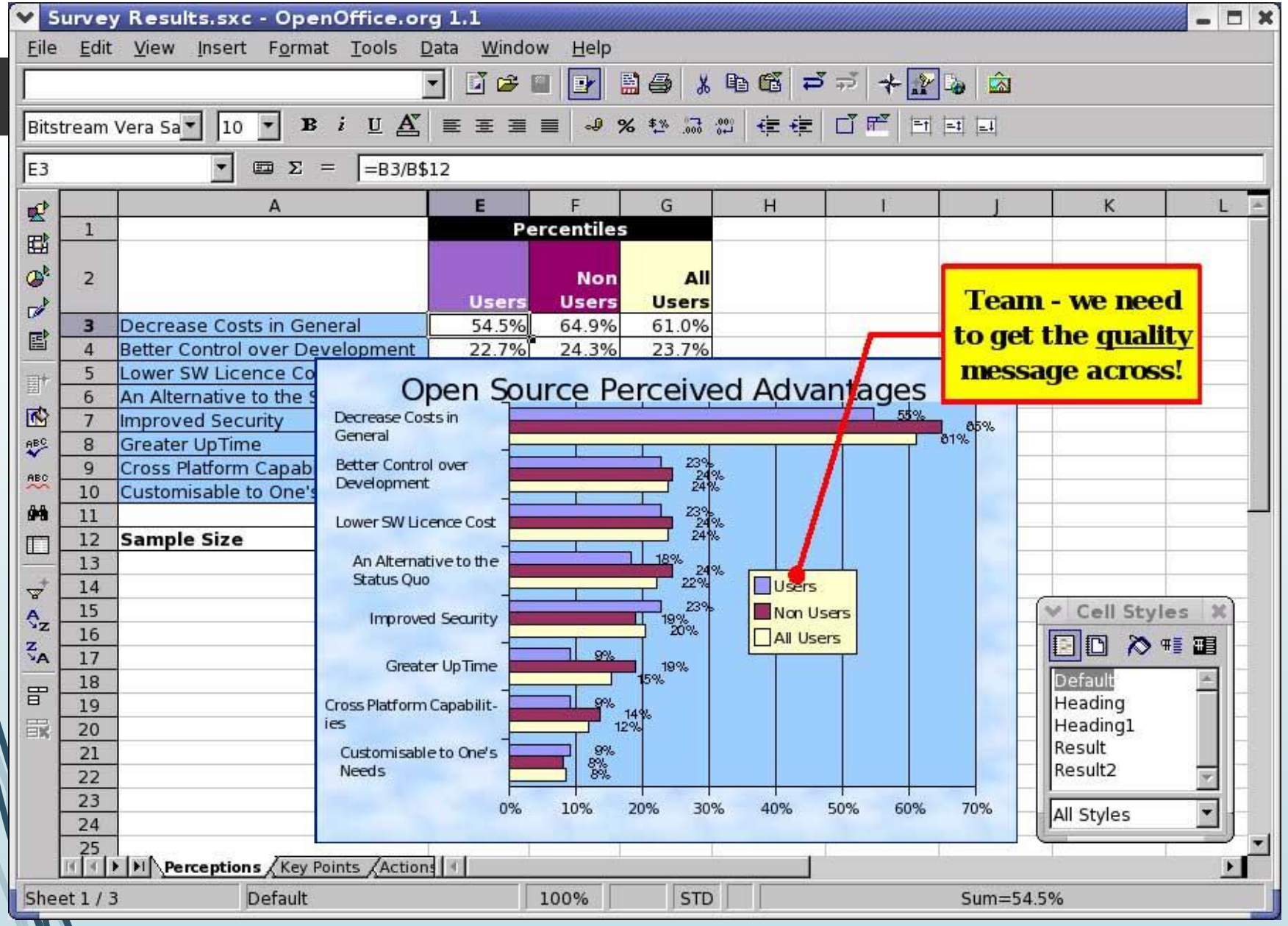
Calc


Untitled 1 - OpenOffice.org Calc
Title bar
Menu bar
Standard toolbar
File Edit View Insert Format Tools Data Window Help
Default
Arial
10
A1
Formatting toolbar
Formula bar
Active cell reference (Name box)
Active cell
Column Headers
Row Headers
Sheet tabs
Status bar
Sheet1
Sheet2
Sheet3
Sheet 1 / 3
Default
STD
Count=0
100%


Solve the logic puzzle?
+ = 8
- =
- = 4
+ = 12
+ - + = ?
Sawaal.com

ScreenShot

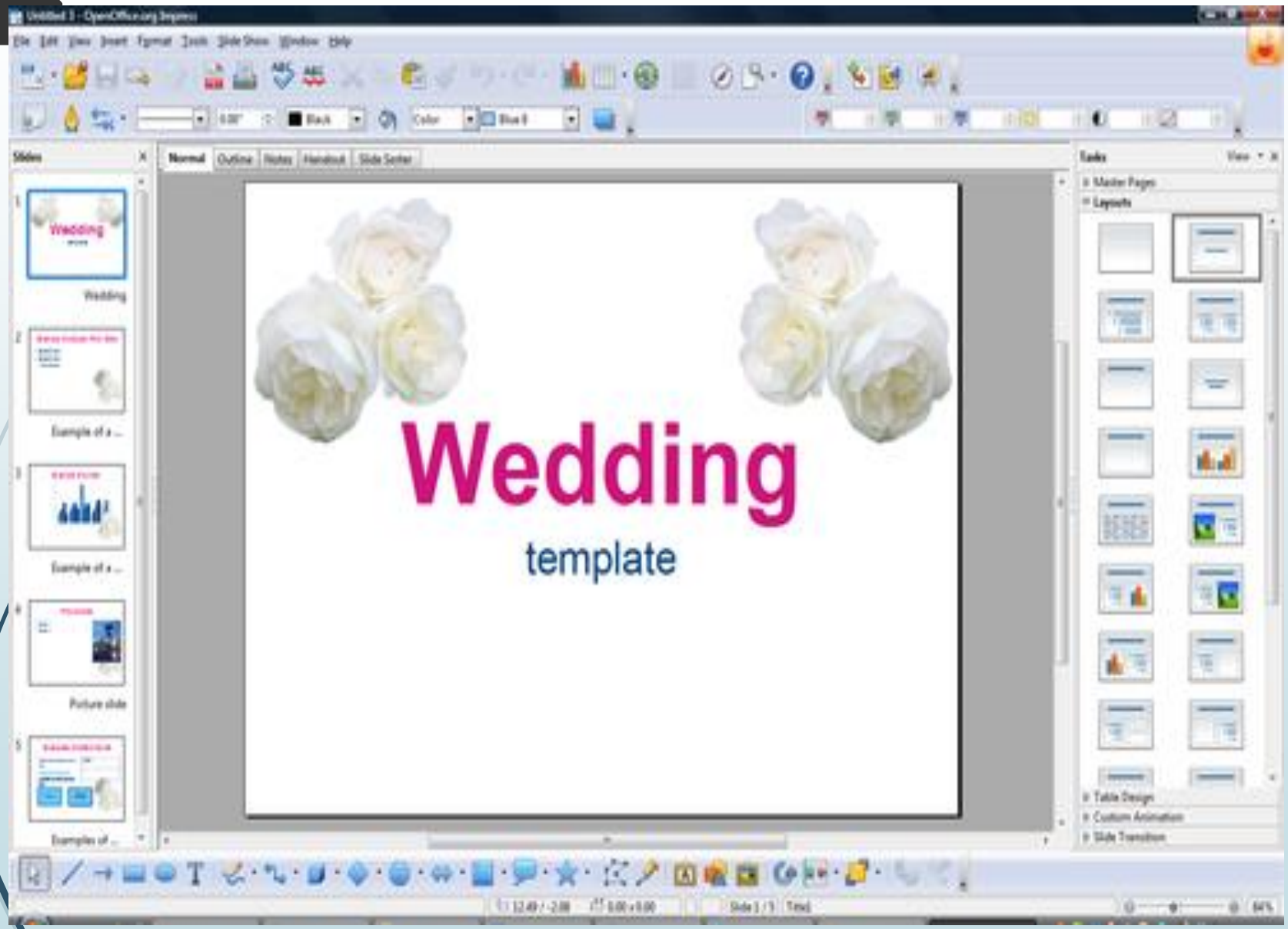

Untitled 1 - OpenOffice Calc
File Edit View Insert Format Tools Data Window Help
Find
Arial
10
C8
RollNo Name Branch
1 Asha Computer
2 Usha IT
3 Meeta Mechanical
4 Tina EST
5 Urvi Mechanical
Sheet1 Sheet2 Sheet3
Properties
Text
Alignment
Left indent:
Wrap text
Merge cells
Text orientation:
0 degrees
Vertically stacked
Cell Appearance
Cell background:
Cell border:
Show cell grid lines
Number Format
Sheet 1 / 3
Default
STD
Sum=0
100 %
10:11
22-11-2021

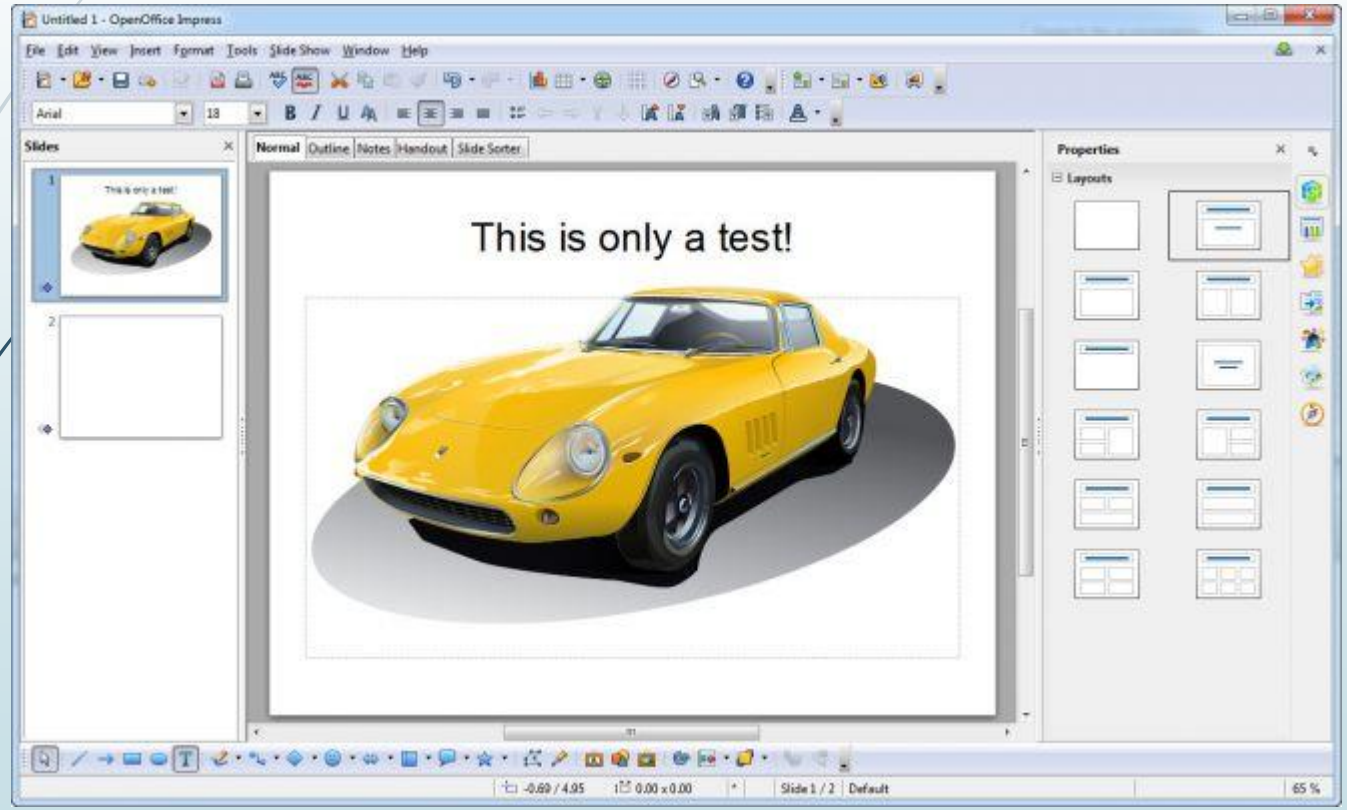

Survey Results.sxc - OpenOffice.org 1.1
File Edit View Insert Format Tools Data Window Help
Bitstream Vera Sa
10
E3
=B3/B$12
Percentiles
Users
Non Users
All Users
Decrease Costs in General 54.5% 64.9% 61.0%
Better Control over Development 22.7% 24.3% 23.7%
Sample Size
Open Source Perceived Advantages
Decrease Costs in General
Better Control over Development
Lower SW Licence Cost
An Alternative to the Status Quo
Improved Security
Greater UpTime
Cross Platform Capabilities
Customisable to One's Needs
Users
Non Users
All Users
0%
10%
20%
30%
40%
50%
60%
70%
Team - we need to get the quality message across!
Cell Styles
Default
Heading
Heading1
Result
Result2
All Styles
Perceptions
Key Points
Actions
Sheet 1 / 3
Default
100%
STD
Sum=54.5%

OpenOffice Impress

- A presentation program analogous to Microsoft PowerPoint or Apple Keynote. Impress could export presentations to Adobe Flash (SWF) files, allowing them to be played on any computer with a Flash player installed. Presentation templates were available on the OpenOffice.org website.

OpenOffice Impress

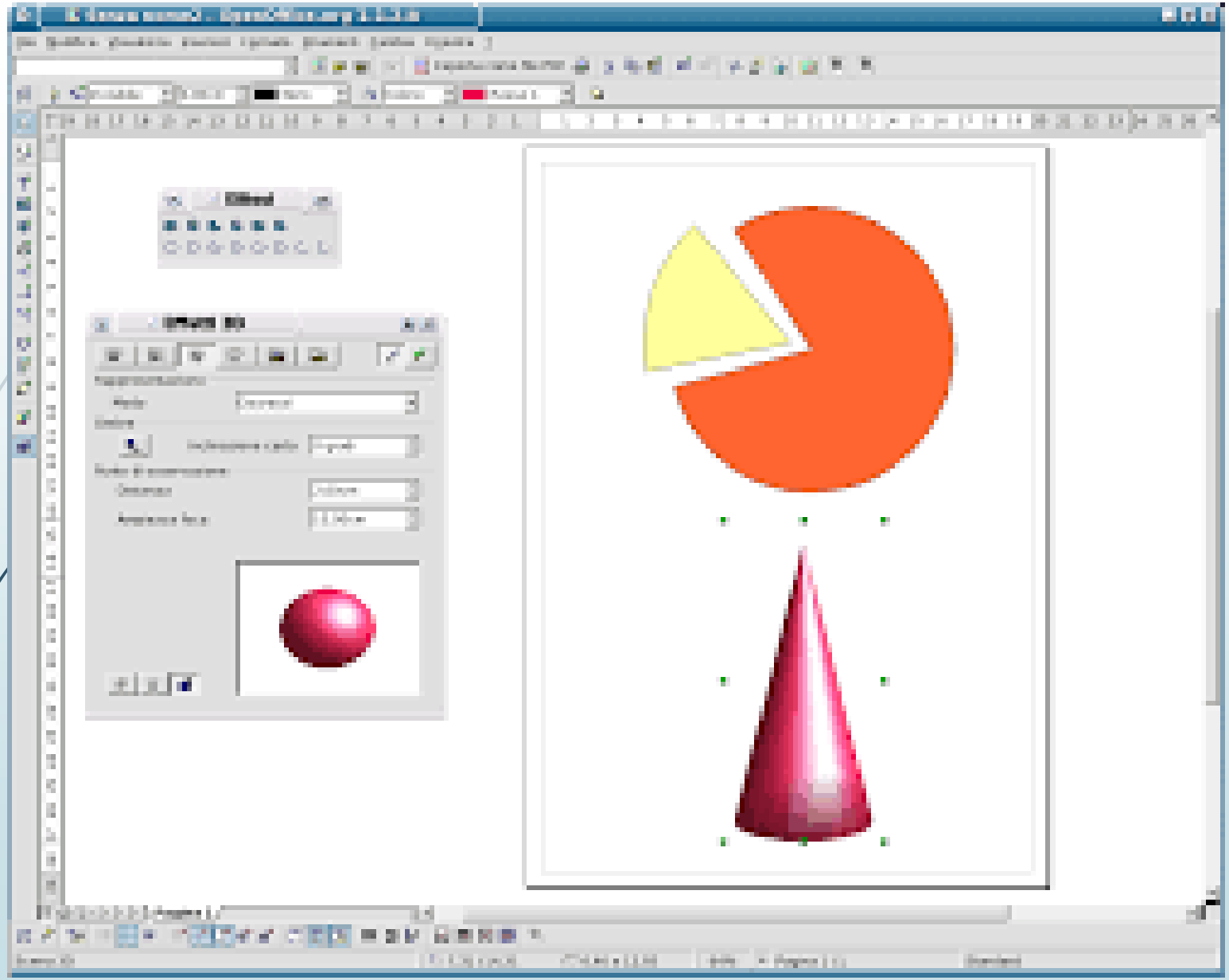



Untitled 1 - OpenOffice Impress
File Edit View Insert Format Tools Slide Show Window Help
Arial
18
Slides
Normal Outline Notes Handout Slide Sorter
This is only a test!
Properties
Layouts
Slide 1 / 2
Default
65 %

OpenOffice Draw

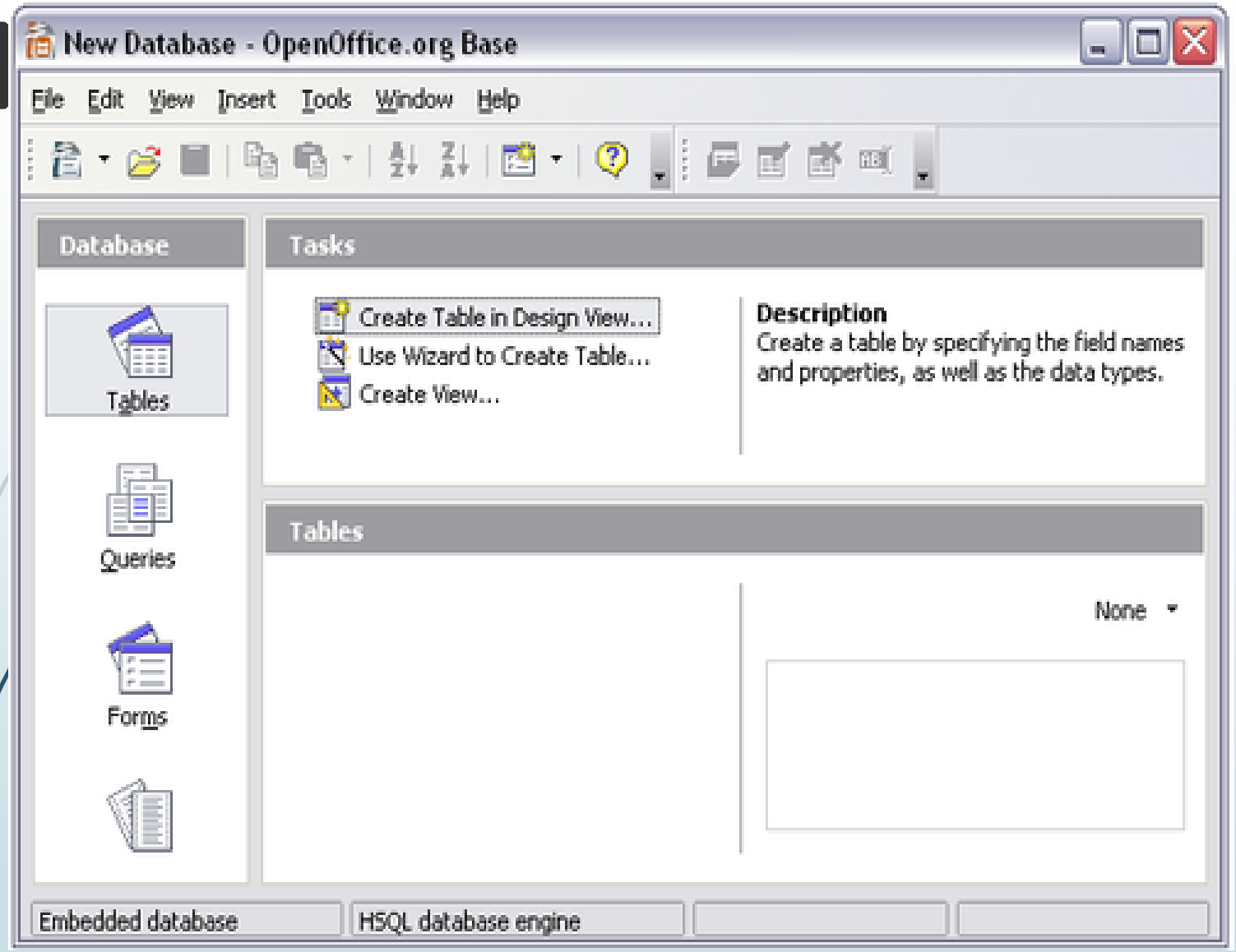
- A vector graphics editor comparable in features to the drawing functions in Microsoft Office.


FruitDepot



OpenOffice Base

- Base is a fully featured desktop database management system, designed to meet the needs of a broad array of users, from tracking a personal CD collections, to producing a corporate monthly departmental sales reports.
- Base offers wizards to help users new to database design (or Base) to create Tables, Queries, Forms and Reports, along with a set of predefined table definitions for tracking Assets, Customers, Sales Orders, Invoices and much more.
- When a personal use database is all you need, Base offers the full HSQL relational database engine, configured for single user, with the data stored right in the Base file, as well as native support for dBase flat files.
- multi-user database engines: MySQL, Adabas D, MS Access and PostgreSQL


New Database - OpenOffice.org Base
File Edit View Insert Tools Window Help
Database
Tables
Queries
Forms
Tasks
Create Table in Design View...
Use Wizard to Create Table...
Create View...
Description
Create a table by specifying the field names and properties, as well as the data types.
Tables
None
Embedded database
HSQL database engine

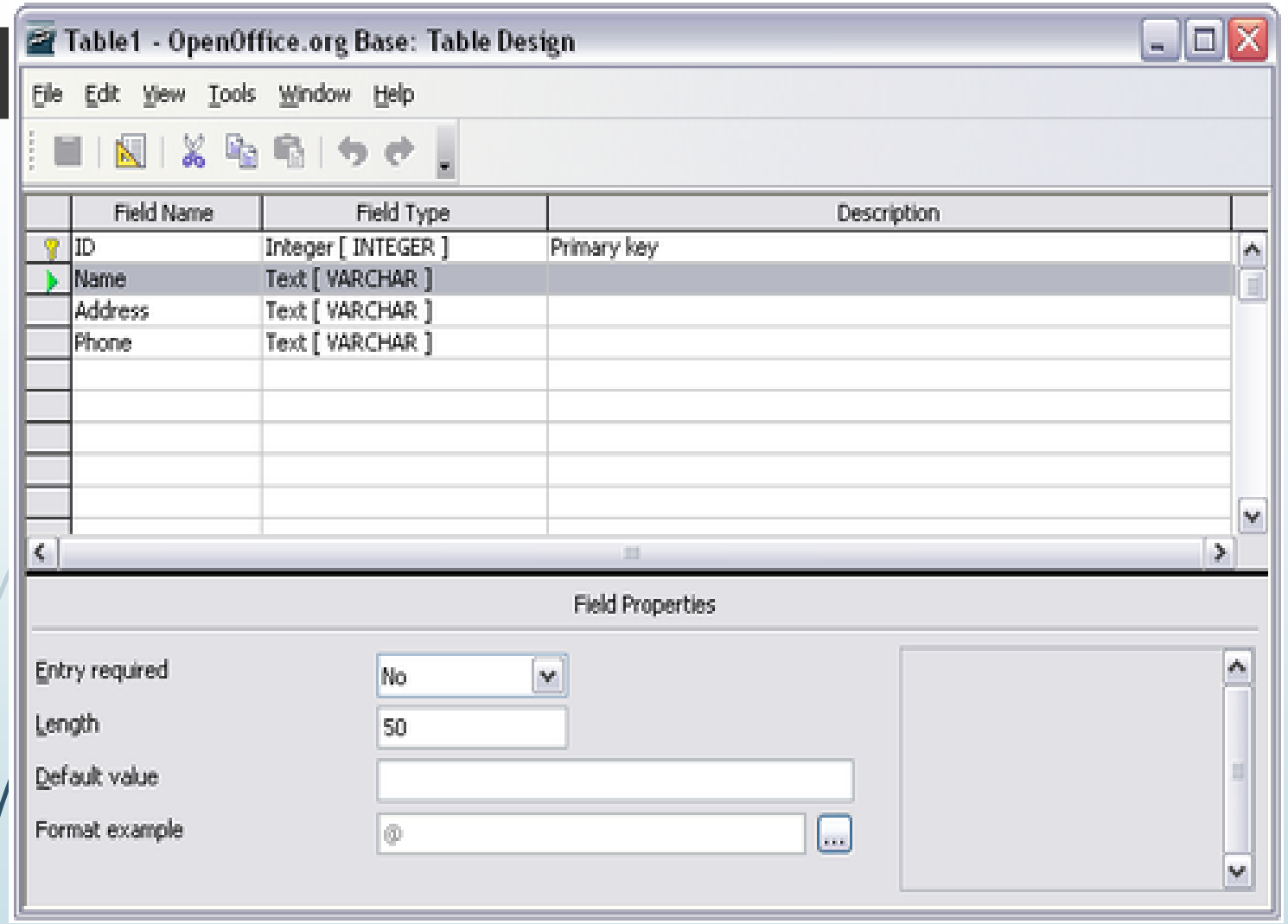
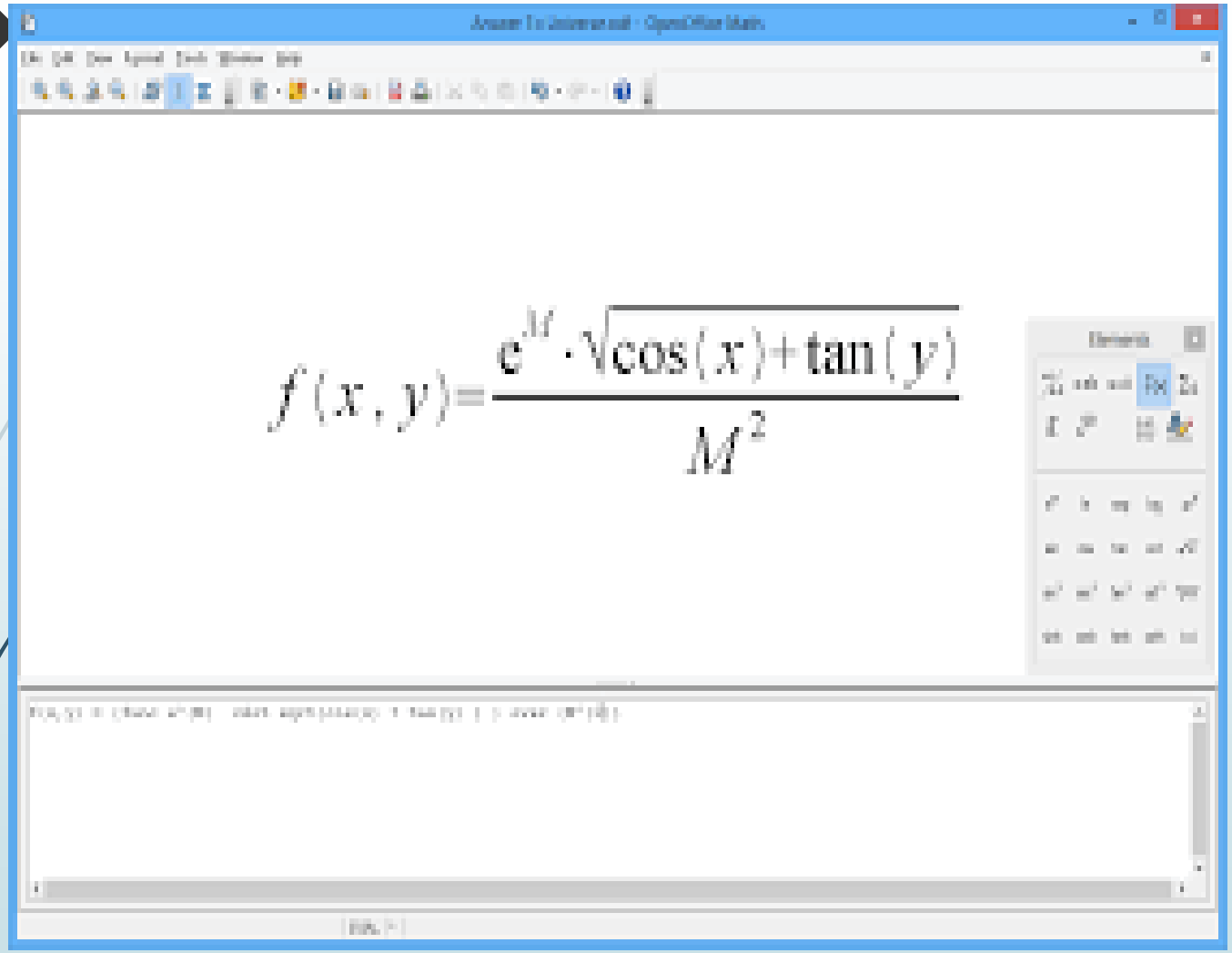
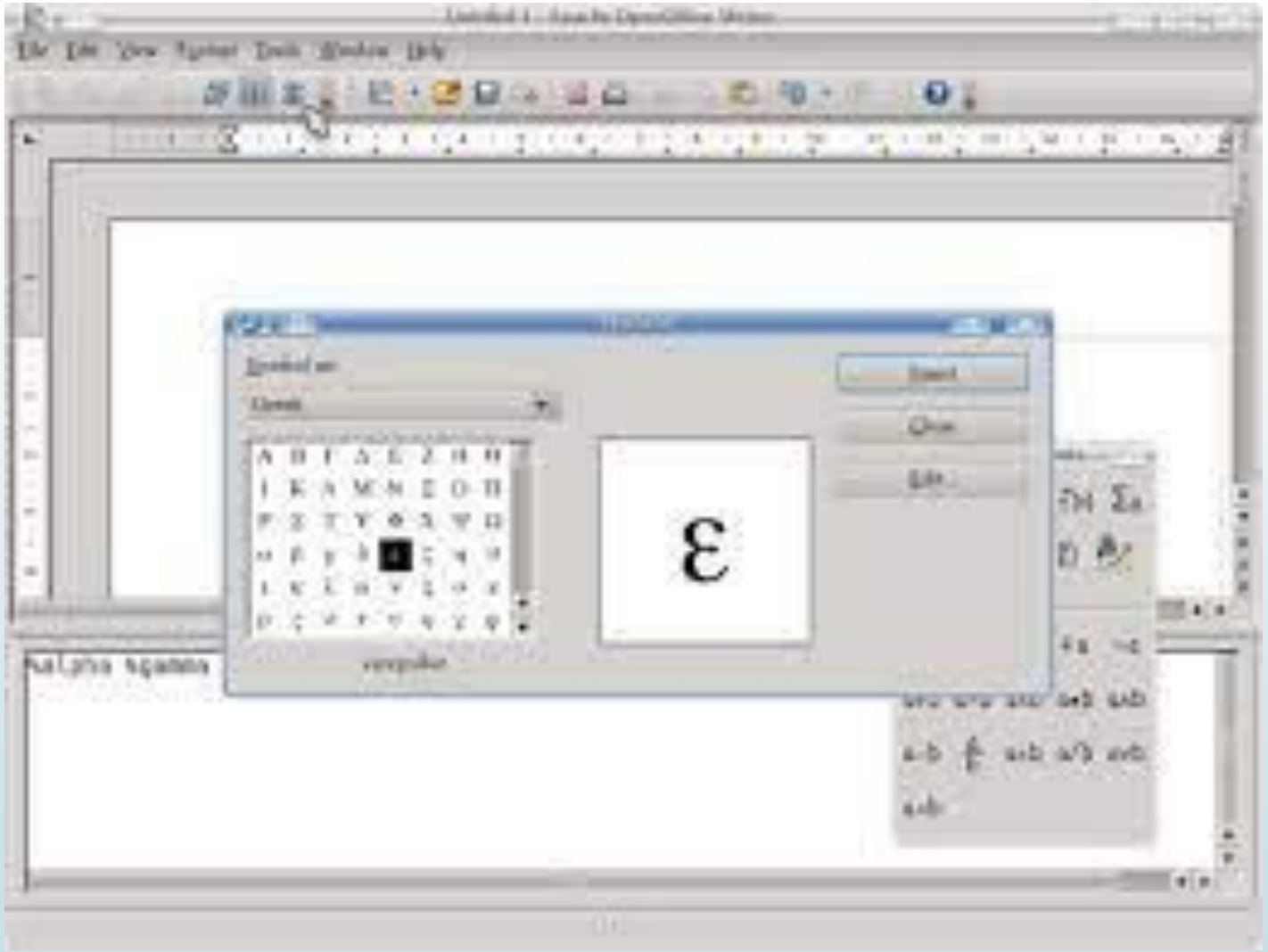


Table1 - OpenOffice.org Base: Table Design
File Edit View Tools Window Help
Field Name
Field Type
Description
ID
Integer [INTEGER]
Primary key
Name
Text [VARCHAR]
Address
Text [VARCHAR]
Phone
Text [VARCHAR]
Field Properties
Entry required
No
Length
50
Default value
Format example
@

OpenOffice Math

- Math is Apache OpenOffice's component for mathematical equations.
- It is most commonly used as an equation editor for text documents, but it can also be used with other types of documents or stand-alone.
- When used inside Writer, the equation is treated as an object inside the text document.
- Similarly, one can also insert these into other Apache OpenOffice programs like Calc and Impress.


$$f(x,y)=\frac{e^{M}\cdot\sqrt{\cos(x)+\tan(y)}}{M^{2}}$$



Thank You

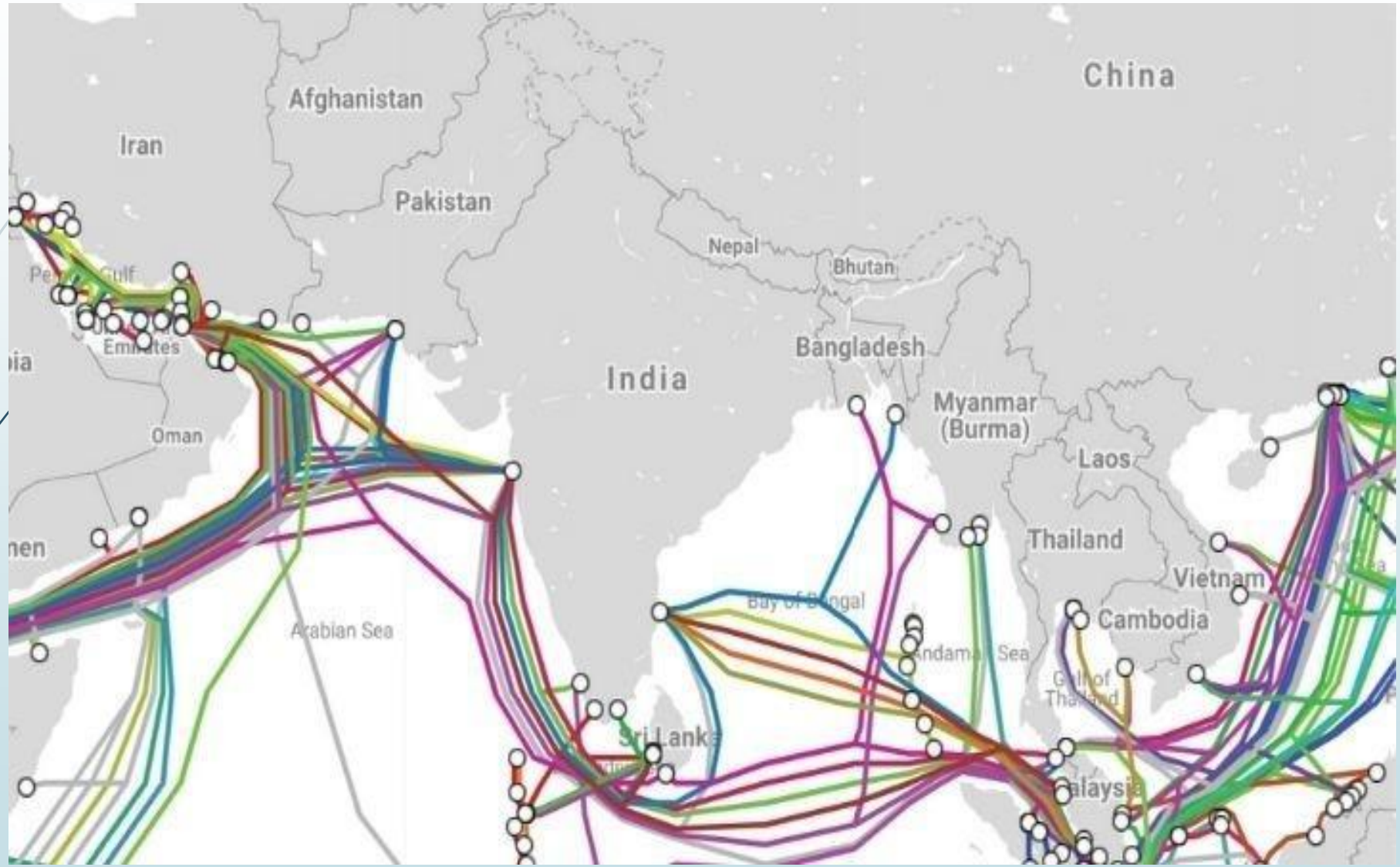
Chapter 4

Computer and Communication

--Rupali Attarde

(M.Tech C.S.E)

Cable Network



Reliance Jio Announces 100Gbps Connection

NEW

Jio

Jio

Data transmission

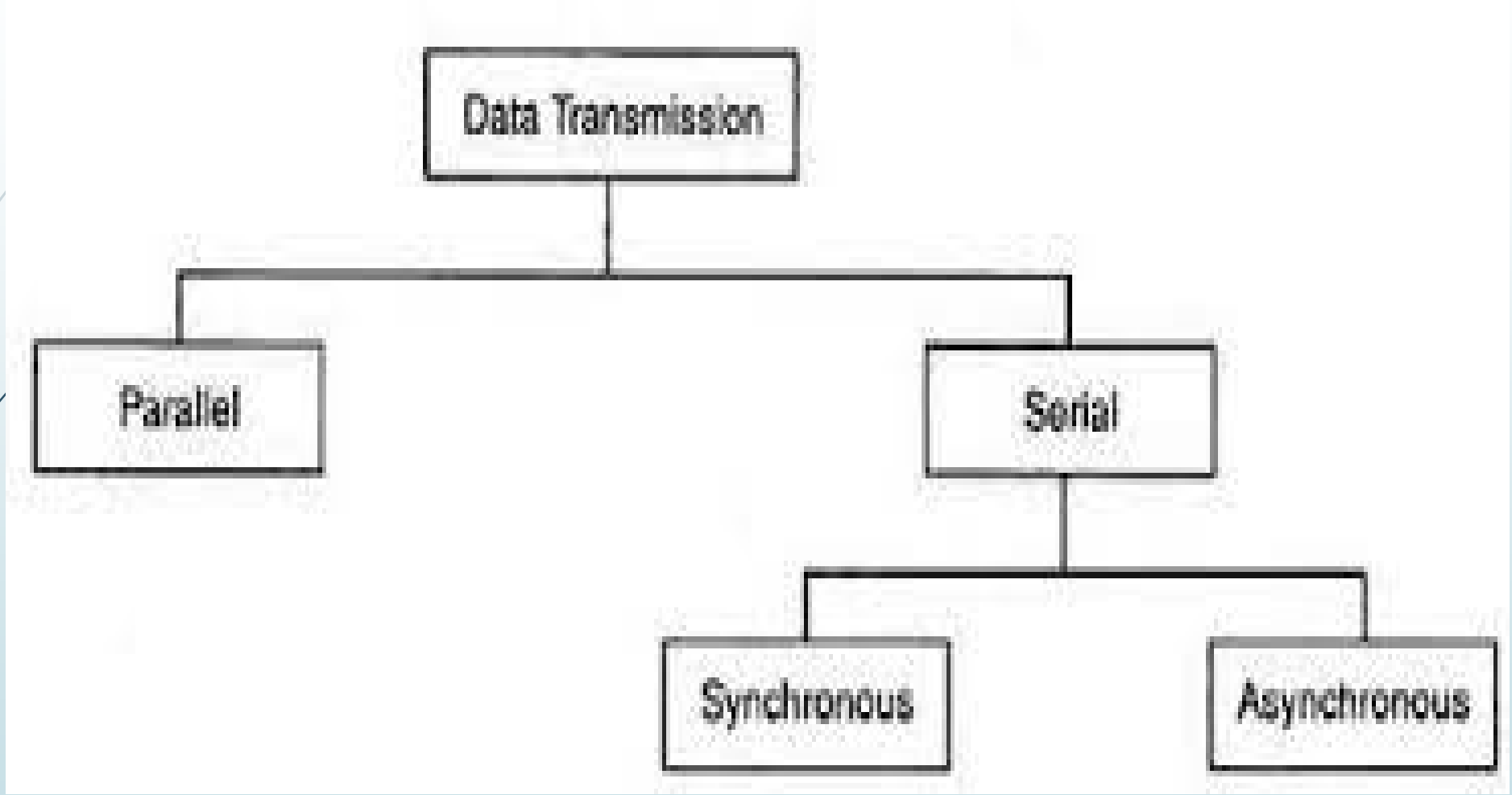
- Data needs to be transmitted between devices in a computer system.
- Data is transmitted in the form of bits.
- So an 8 bit byte, which stands for a single character, will be transmitted in 8 parts, one signal for each bit.

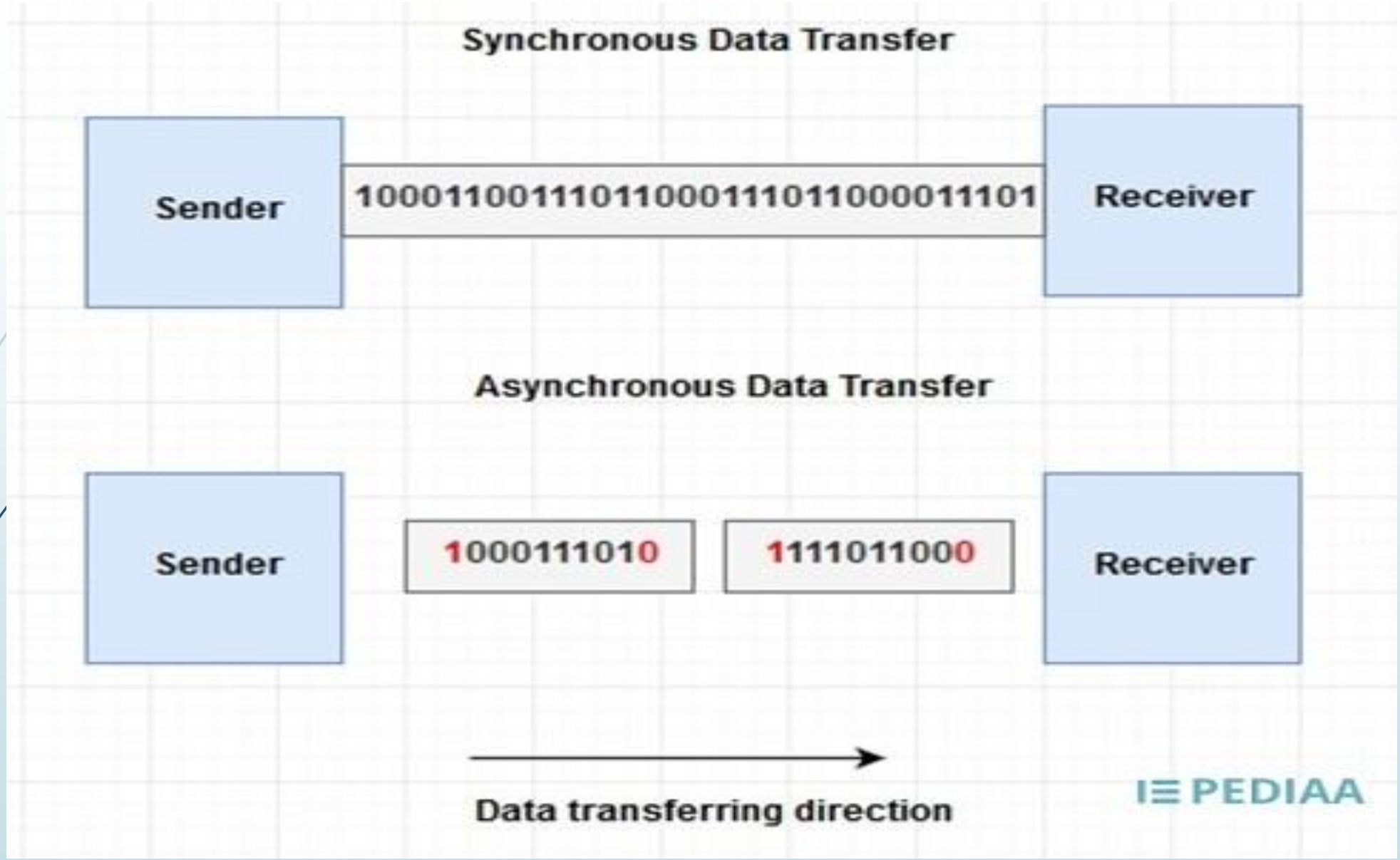
Need for Data Transmission

Data communication or transmission is basically needed for the following reasons:

1. The data consisting of text, graphics, sound, motion pictures etc. can be communicated at extremely fast rate through networks.
2. The data becomes available online. For instance, a user can browse through uuniversity results or railway reservations through the Internet.
3. The productivity and effectiveness of the people and organizations are increased because of increased transfer rate of data transmission.
4. The user gets better services such as email, e-commerce, Internet shopping, cloud services etc.

Diagram

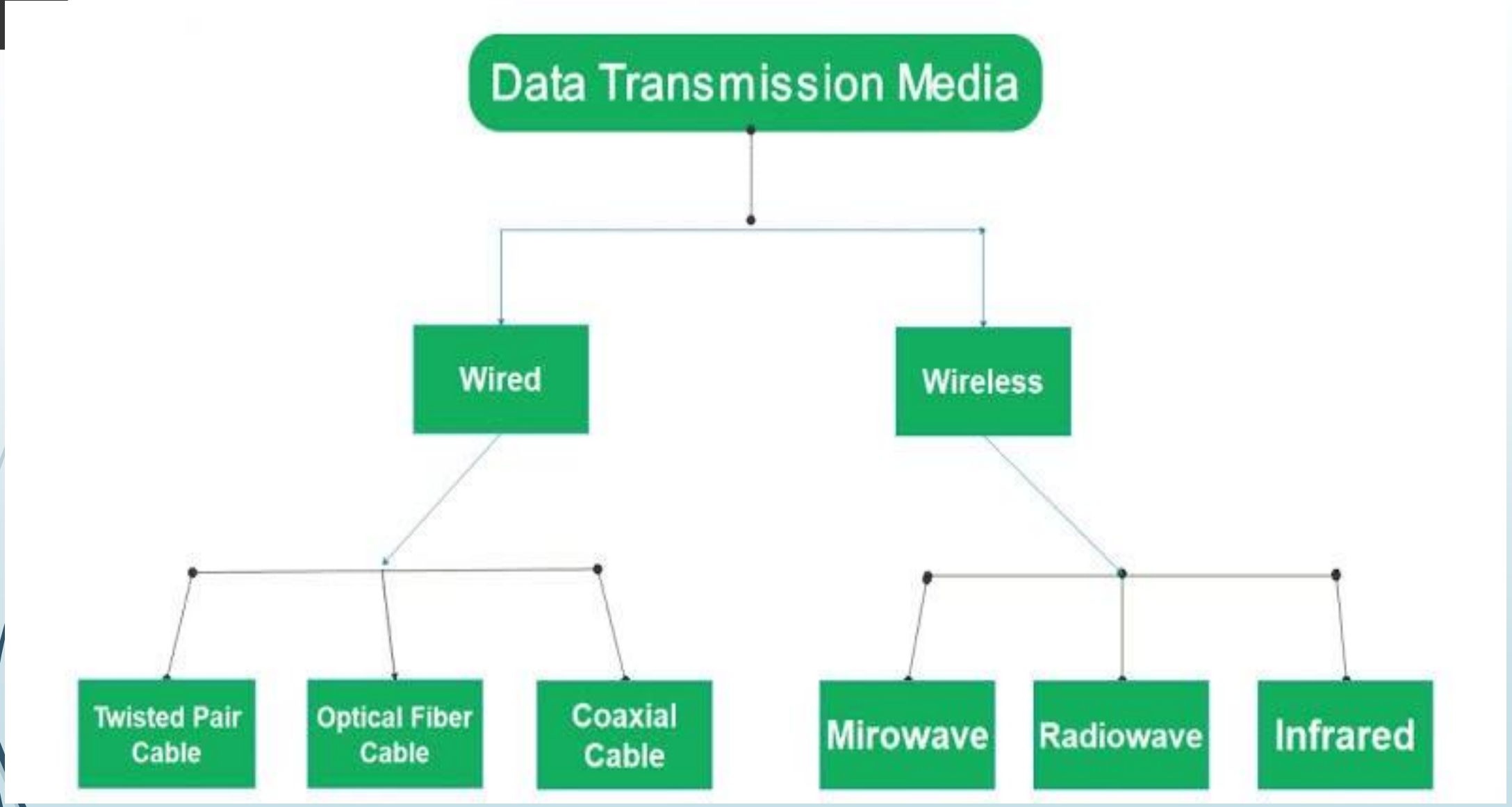

Data Transmission
Parallel
Serial
Synchronous
Asynchronous

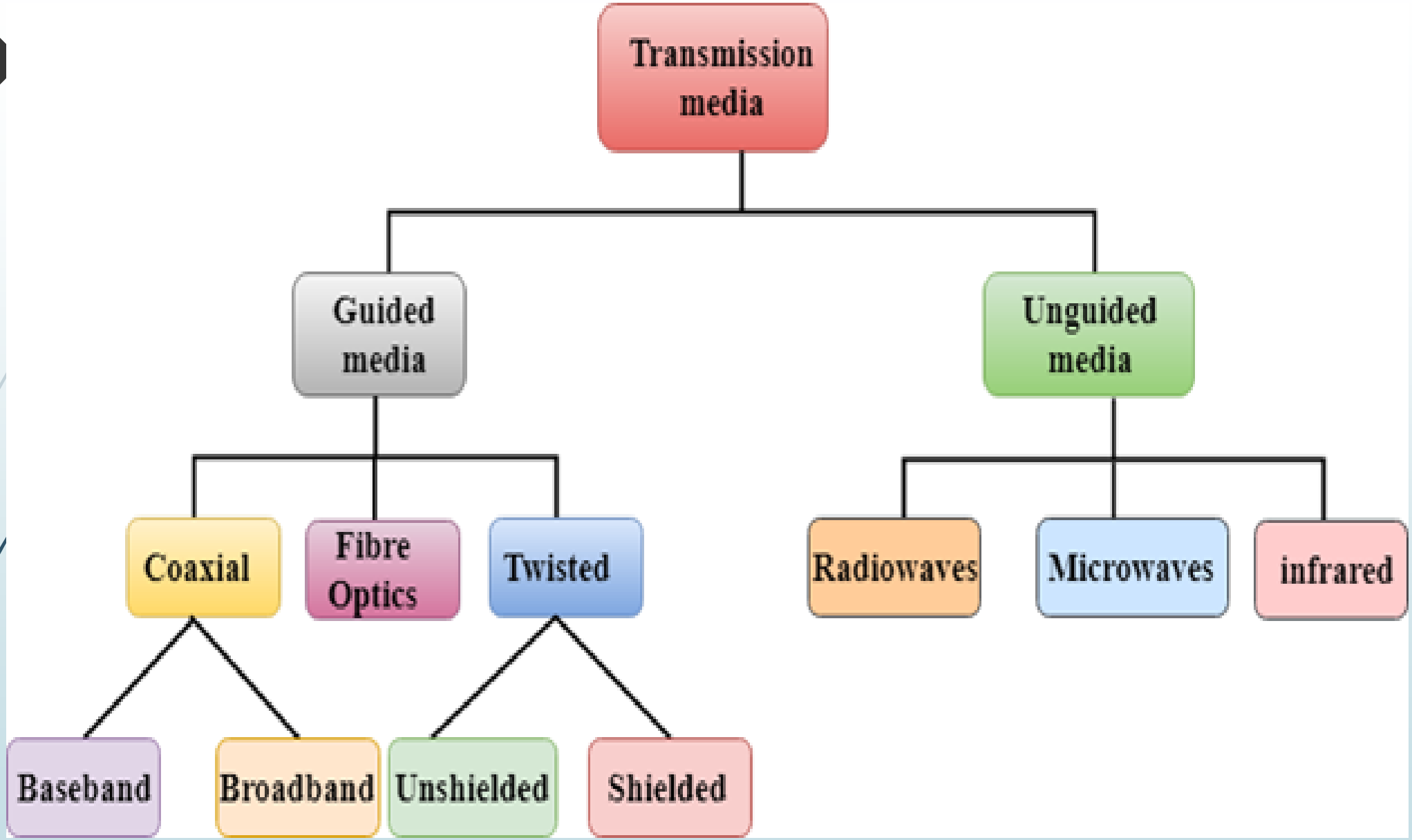

Synchronous Data Transfer
Sender
10001100111011000111011000011101
Receiver
Asynchronous Data Transfer
Sender
1000111010
1111011000
Receiver
Data transferring direction
IEPEDIAA

Transmission Media

- Physical path between transmitter and receiver
- Wired and Wireless
- Communication is in the form of electromagnetic waves
- Characteristics and quality of data transmission are determined by characteristics of medium and signal
- In wired media, medium characteristics is more important, whereas in wireless media, signal characteristics is more important

Diagram


Data Transmission Media
Wired
Wireless
Twisted Pair Cable
Optical Fiber Cable
Coaxial Cable
Mirowave
Radiowave
Infrared


Transmission media
Guided media
Unguided media
Coaxial
Fibre Optics
Twisted
Radiowaves
Microwaves
infrared
Baseband
Broadband
Unshielded
Shielded

Activity/Category	Wireless Network	Wired Network
Freedom of movement for users	Users can access network from anywhere within range.	Users location limited by need to use cable and/or connect to a port.
Sharing Files	Easier with wireless network as you do not need to be cabled to network, though transfer speeds may be slower.	Generally less convenient as you have to be cabled in, but transfer speeds often faster.
Cables	Far less complicated, disruptive, and untidy cabling needed.	Lots of cables and ports needed which can be a headache.
Business	For businesses dealing with public, customers like and often expect wireless, so wireless can increase income.	Wired networks are not convenient for public use, but sometimes acceptable for a traditional office.
Connection speeds	Usually slower than wired.	Usually faster than wireless.
Security	Less secure than wired. Both bandwidth and information can sometimes be accessed.	More secure than wireless.
Set up	Upgrading to a wireless network can be difficult and expensive.	Can also be difficult and expensive to set up.

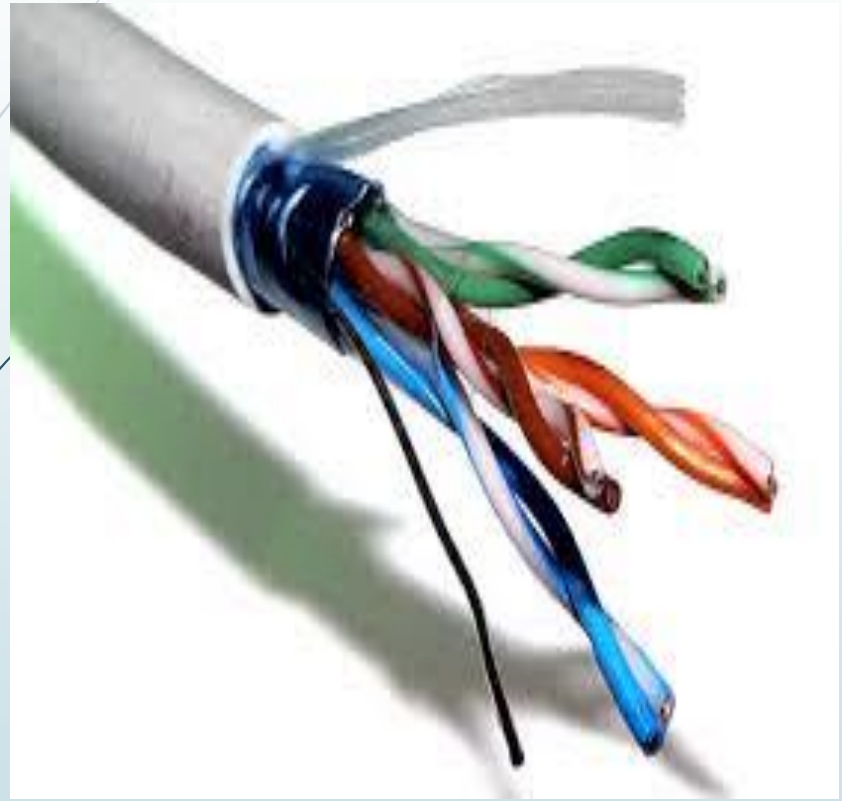
1. Twisted Pair Cable

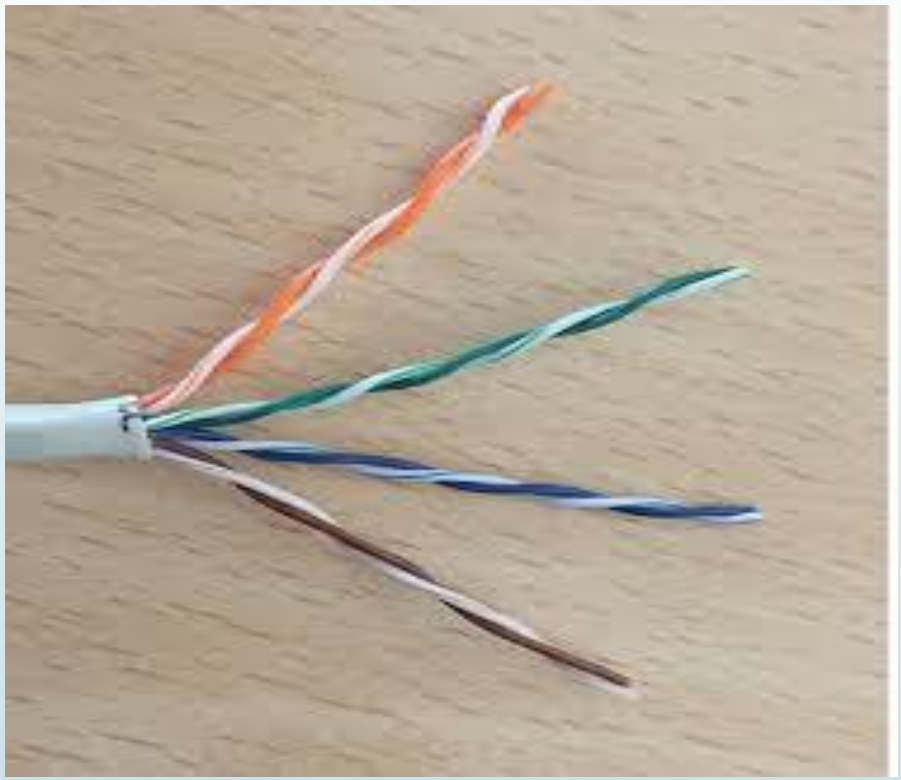
- Twisted pair cables have been around for a long time.
- They were mainly invented for voice transmissions.
- Twisted pair is a widely used medium in networking because it's lighter, cheaper, more flexible, easy to install, and provides greater speeds than coaxial cables.
- There are two types of twisted pair cables:

  unshielded twisted pair (UTP) and

  shielded twisted pair (STP).

Dia. of Twisted pair cable

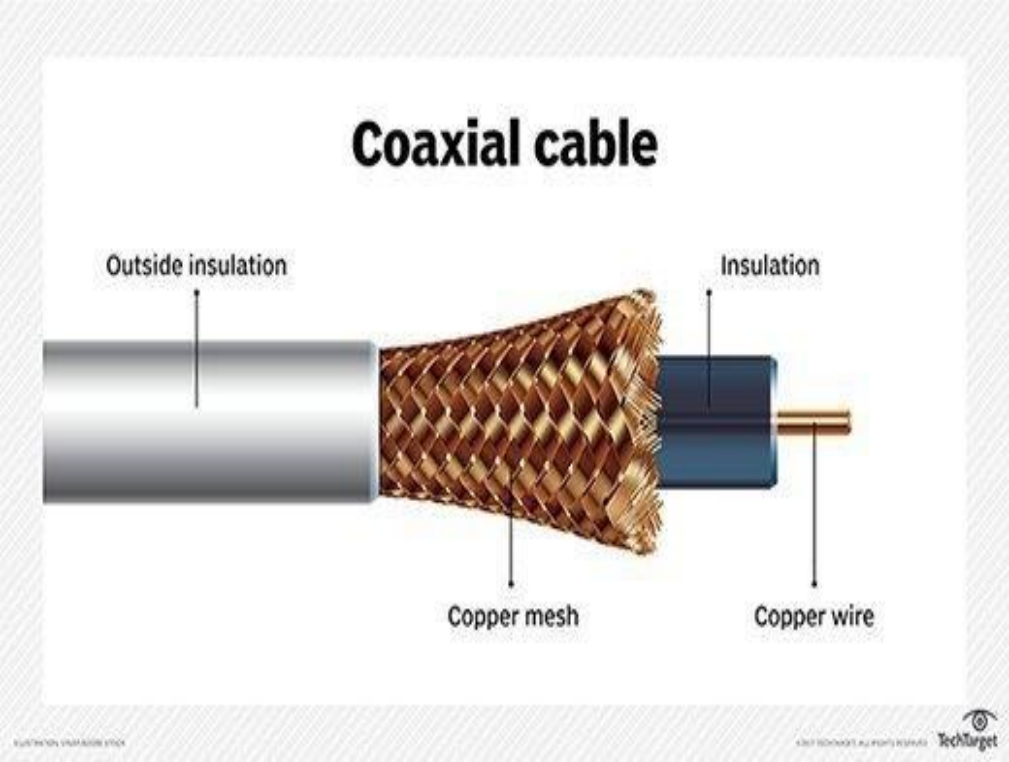


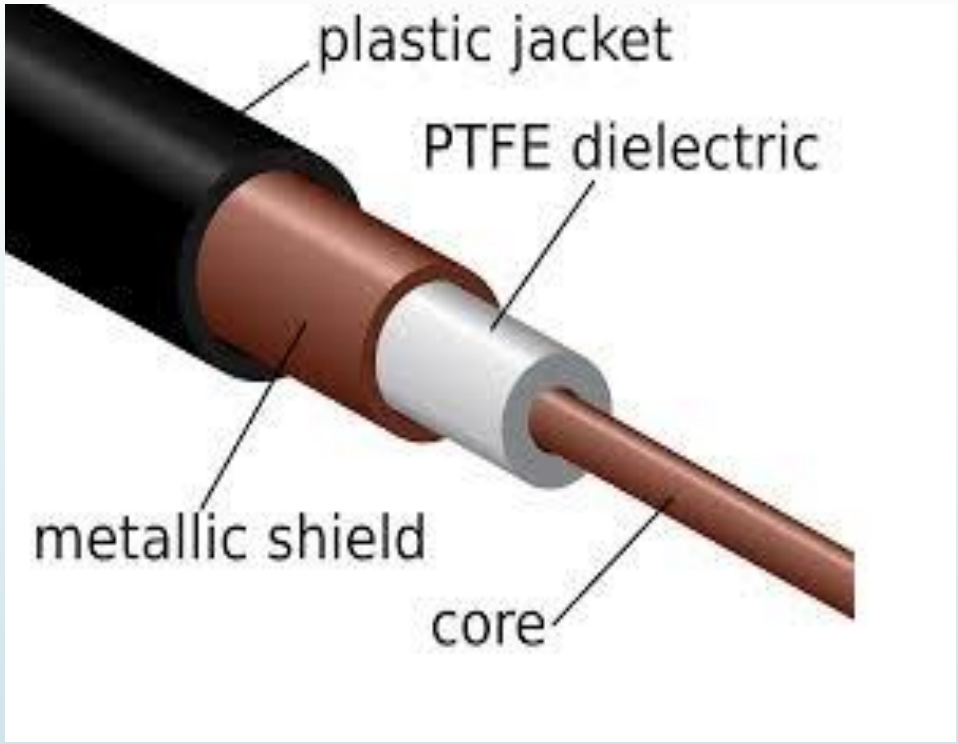


2. Coaxial Cables

- The coaxial cables have a central copper conductor, surrounded by an insulating layer, a conducting shield, and the outermost plastic sheath.
- Thus, there are three insulation layers for the inner copper cable.
- There are two basic modes of data transmission in coaxial cables: baseband mode that has dedicated bandwidth, and broadband mode that has distributed cable bandwidth.
- Cable TV and analog televisions mainly use coaxial cables.
- Coaxial cables have better resistance to cross talk than twisted pair cables. The coaxial cables are used for long distance communication.
- The most widely used types of coaxial cables are RG-59 and RG-6 (RG stands for 'radio guide'). RG-59 has lesser shielding and is suitable for short cable lengths and cable TV connections.

Dia. Of Coaxial cable

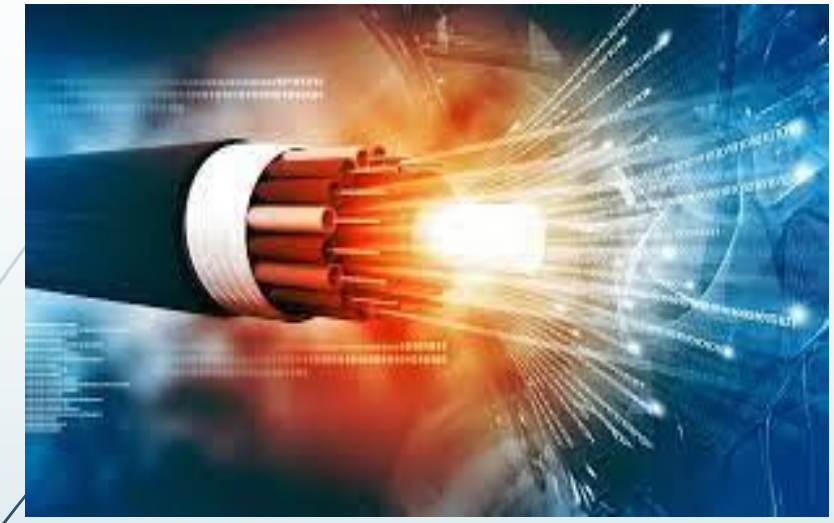


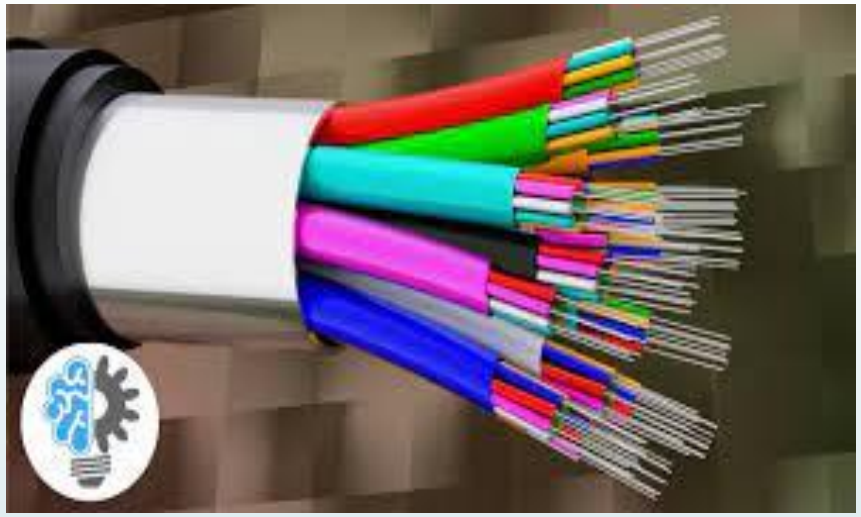


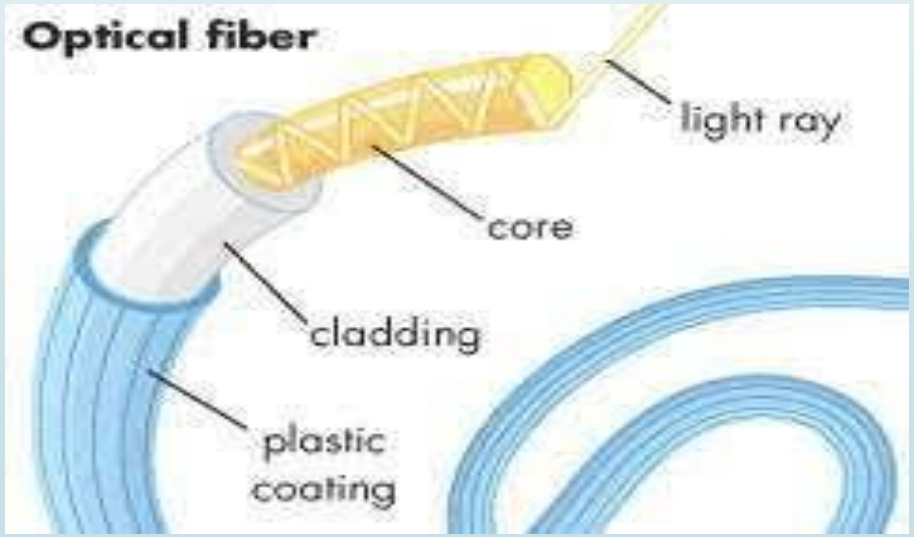
3. Optical Fibers

- Optical fibers use light waves for transmission. Crosstalk, EMI, and attenuation aren't issues with optical fibers.
- These cables are well-suited for voice, data, and video transmissions.
- Optical fibers are the most secure of all the cable media.
- Installation and maintenance are difficult and costly.
- Fiber optic cables have greater transmission speed, high bandwidth, and the signal can travel longer distances when compared to coaxial and twisted pair cables.
- Though the cost of optical fiber cable is less compared to co-axial and twisted pair cables, the additional optical components needed for installation make fiber optic the costliest of all the cables.

Dia. Of Optical Fiber







Wireless transmission media

- Wireless transmission is a form of unguided media.
- Wireless communication involves no physical link established between two or more devices, communicating wirelessly.
- Wireless signals are spread over in the air and are received and interpreted by appropriate antennas.

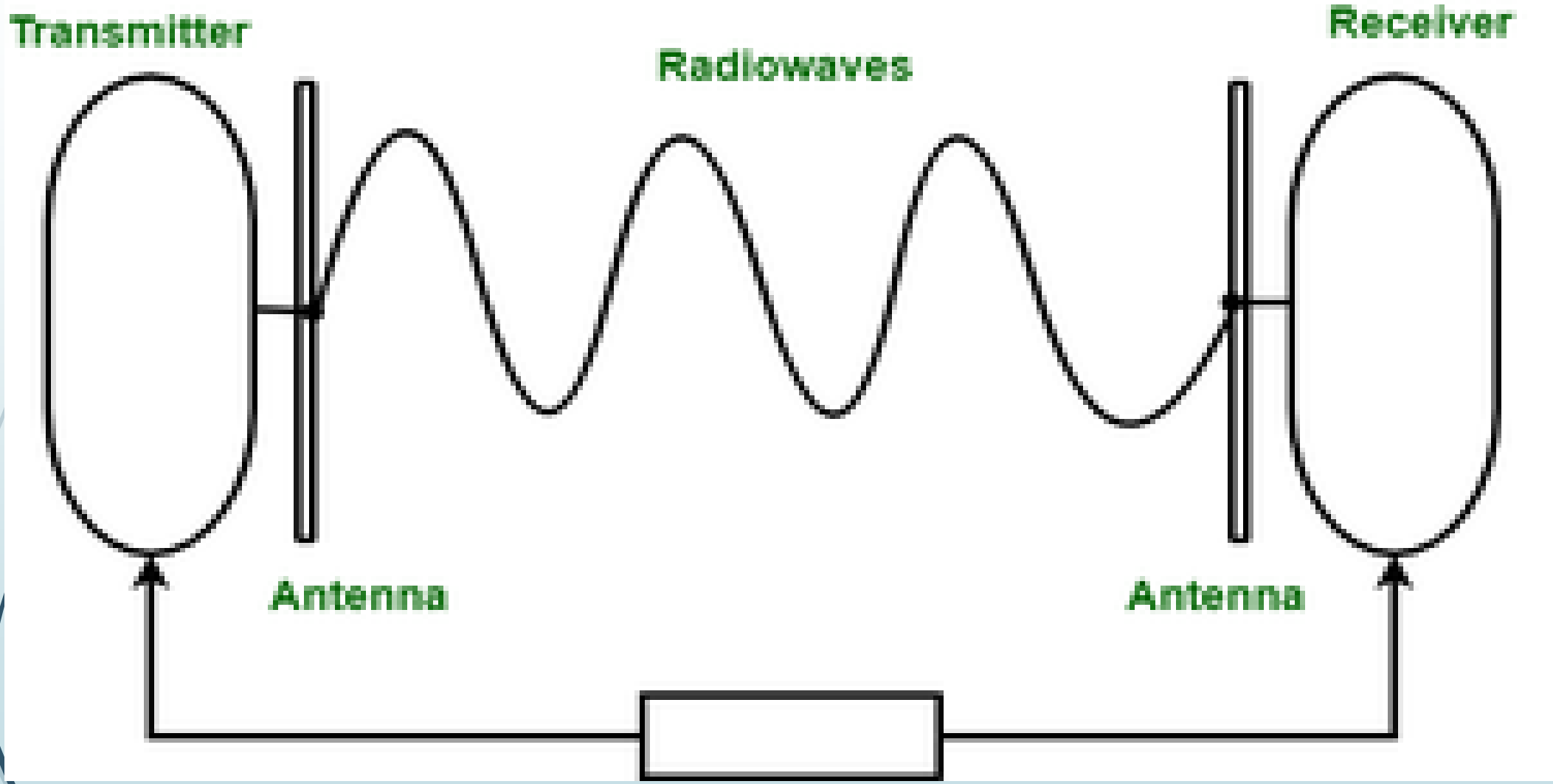
unacademy

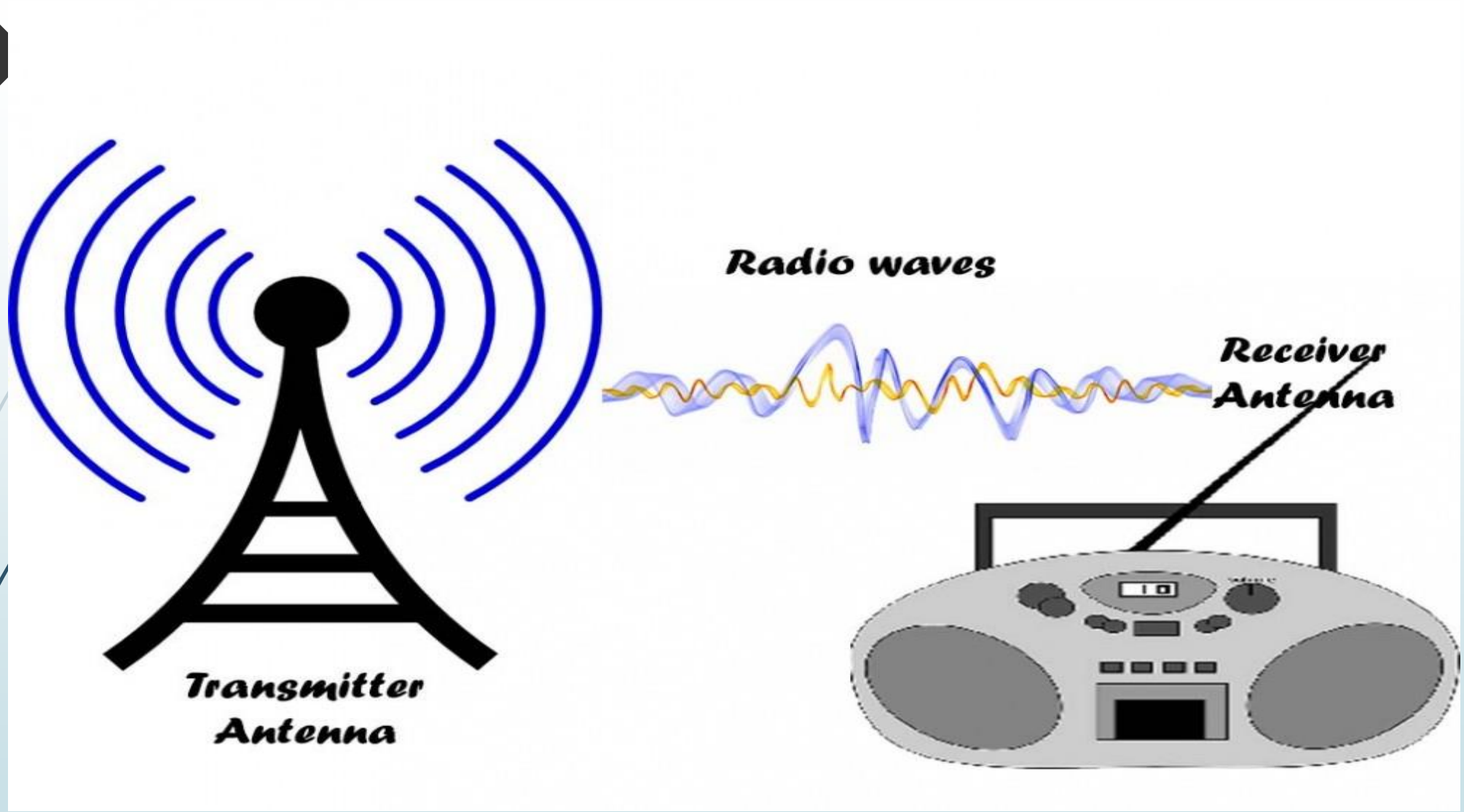
Wireless Media

- Electromagnetic waves are used for wireless communication over computer networks.
- Frequencies of waves are measured in Hertz (Hz). As the frequencies of electromagnetic waves change, their properties also change.

Radio Transmission

- In communication link, the TRANSMITTER is connected through a cable to one ANTENNA.
- ANTENNA is a device which provides means for radiating or receiving radio waves.
- The signal is radiated to ANOTHER ANTENNA, and then passes through another cable to the RECEIVER.
- Broadcast systems such as TV or radio can used one transmitter to serve many receivers via a free space link.


Transmitter
Radiowaves
Receiver
Antenna
Antenna


Radio waves
Receiver Antenna
Transmitter Antenna

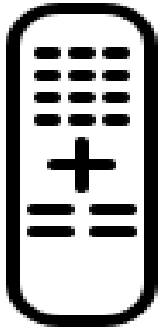
- Infrared Transmission
- Infrared wave lies in between visible light spectrum and microwaves. It has wavelength of 700-nm to 1-mm and frequency ranges from 300-GHz to 430-THz.
- Infrared wave is used for very short range communication purposes such as television and it’s remote. Infrared travels in a straight line hence it is directional by nature. Because of high frequency range, Infrared cannot cross wall-like obstacles.

Infrared Technology

- Infrared technology allows computing devices to communicate via short-range wireless signals.
- With infrared, computers can transfer files and other digital data bidirectionally.

Television

Infrared Radiations



Remote

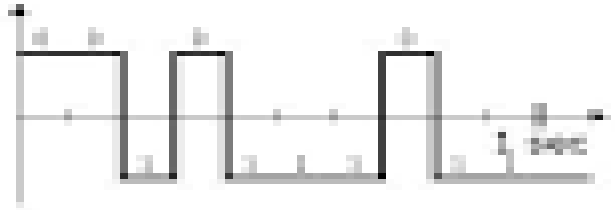
Sr. No.	Key	Bit Rate	Baud Rate
1	Definition	Bit rate is transmission of number of bits per second.	Baud rate is number of signal units per second.
2	Definition	It can be defined as per second travel number of bits.	It can be defined as per second number of changes.
3	Focus	Bit rate focusses on computer efficiency.	Baud rate focusses on data transmission.
4	Formula	Bit Rate = Baud rate x the number of bit per baud	Baud Rate = Bit rate / the number of bit per baud

Baud Rate

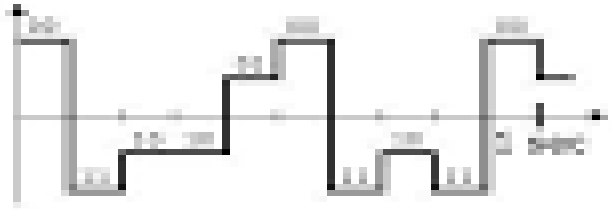
- Baud rate, then, is the measure of the number of changes to the signal (per second) that propagate through a transmission medium. The baud rate may be higher or lower than the bit rate, which is the number of bits per second that the user can push through the transmission system.
- Bit rate – the number of binary ‘bits’, 1s or 0s to be transmitted per second
- Baud rate – the number of line ‘symbols’ transmitted per second
- Channels – the number of transmission channels

Baud and Bit Rate

- **Baud** → How many times a signal changes per second
- **Bit rate** → How many bits can be sent per time unit (usually per second)
- Bit rate is controlled by baud and number of signal levels



Baud = 10
Bit rate = 10 bps



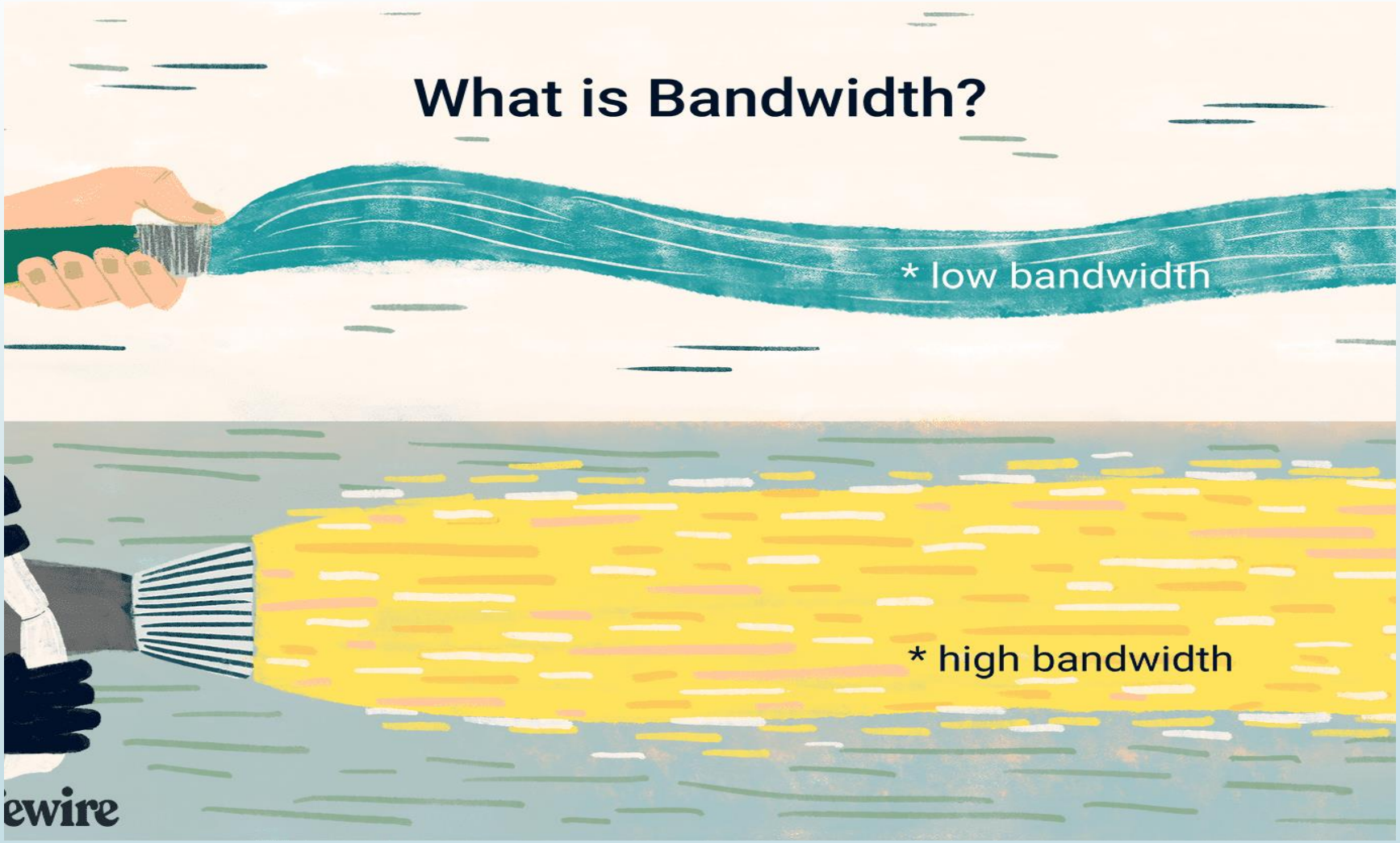
Baud = 10
Bit rate = 20 bps

Bandwidth

- The maximum amount of data transmitted over an internet connection in a given amount of time.

- Bandwidth is often mistaken for internet speed when it's actually the volume of information that can be sent over a connection in a measured amount of time – calculated in megabits per second (Mbps).

Bandwidth



Protocols

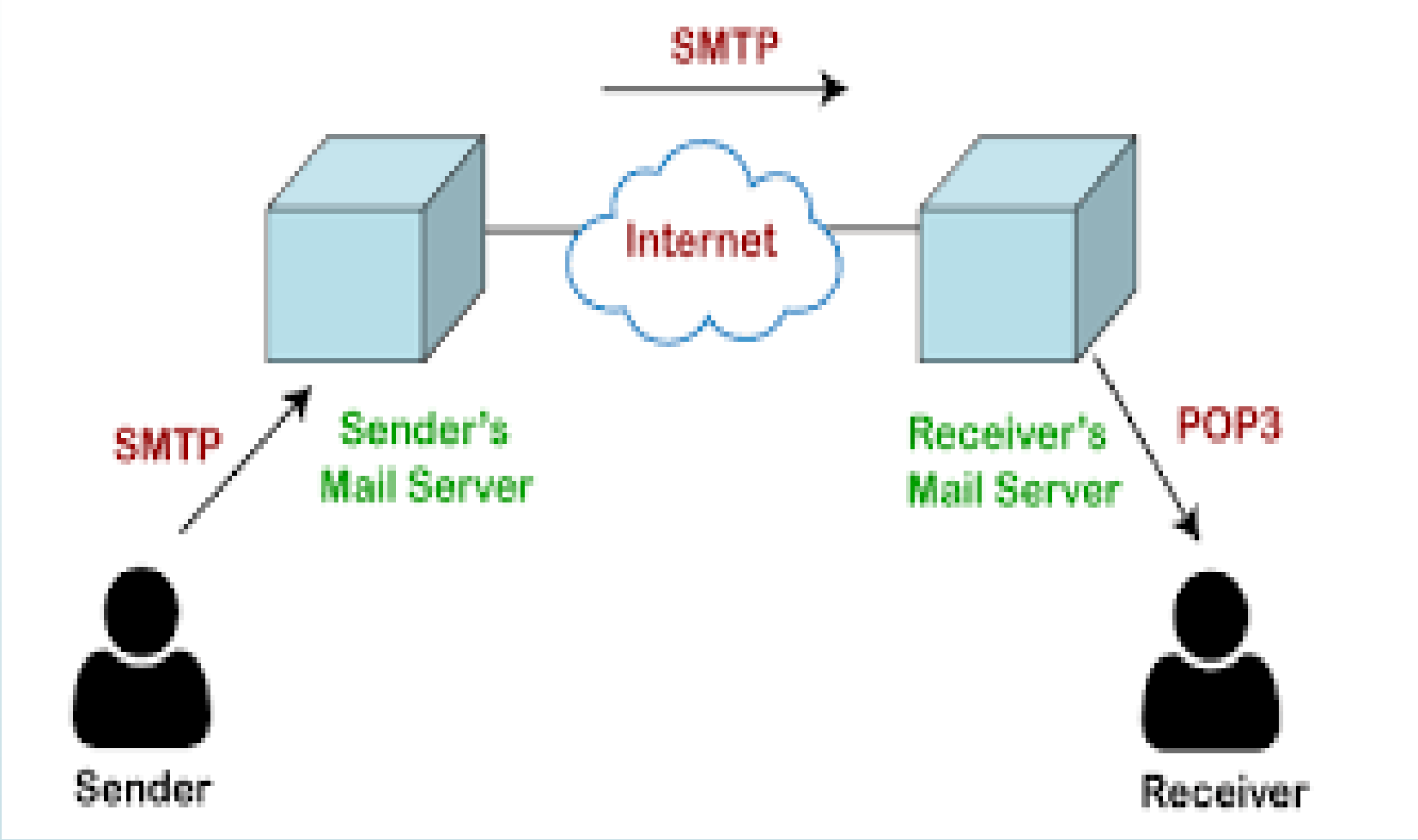
- In networking, a protocol is a set of rules for formatting and processing data.
- Network protocols are like a common language for computers. The computers within a network may use vastly different software and hardware; however, the use of protocols enables them to communicate with each other regardless.

Types Of Protocols

- Transmission Control Protocol (TCP)
- Internet Protocol (IP)
- User Datagram Protocol (UDP)
- Post office Protocol (POP)
- Simple mail transport Protocol (SMTP)
- File Transfer Protocol (FTP)
- Hyper Text Transfer Protocol (HTTP)
- Hyper Text Transfer Protocol Secure (HTTPS)

- **Transmission Control Protocol (TCP): TCP is a popular communication protocol which is used for communicating over a network. It divides any message into series of packets that are sent from source to destination and there it gets reassembled at the destination.**
- **Internet Protocol (IP): IP is designed explicitly as addressing protocol. It is mostly used with TCP. The IP addresses in packets help in routing them through different nodes in a network until it reaches the destination system. TCP/IP is the most popular protocol connecting the networks.**
- **User Datagram Protocol (UDP): UDP is a substitute communication protocol to Transmission Control Protocol implemented primarily for creating loss-tolerating and low-latency linking between different applications.**
- **Post office Protocol (POP): POP3 is designed for receiving incoming E-mails.**
- **Simple mail transport Protocol (SMTP): SMTP is designed to send and distribute outgoing E-Mail.**
- **File Transfer Protocol (FTP): FTP allows users to transfer files from one machine to another. Types of files may include program files, multimedia files, text files, and documents, etc.**
- **Hyper Text Transfer Protocol (HTTP): HTTP is designed for transferring a hypertext among two or more systems. HTML tags are used for creating links. These links may be in any form like text or images. HTTP is designed on Client-server principles which allow a client system for establishing a connection with the server machine for making a request. The server acknowledges the request initiated by the client and responds accordingly.**
- **Hyper Text Transfer Protocol Secure (HTTPS): HTTPS is abbreviated as Hyper Text Transfer Protocol Secure is a standard protocol to secure the communication among two computers one using the browser and other fetching data from web server. HTTP is used for transferring data between the client browser (request) and the web server (response) in the hypertext format, same in case of HTTPS except that the transferring of data is done in an encrypted format. So it can be said that https thwart hackers from interpretation or modification of data throughout the transfer of packets.**

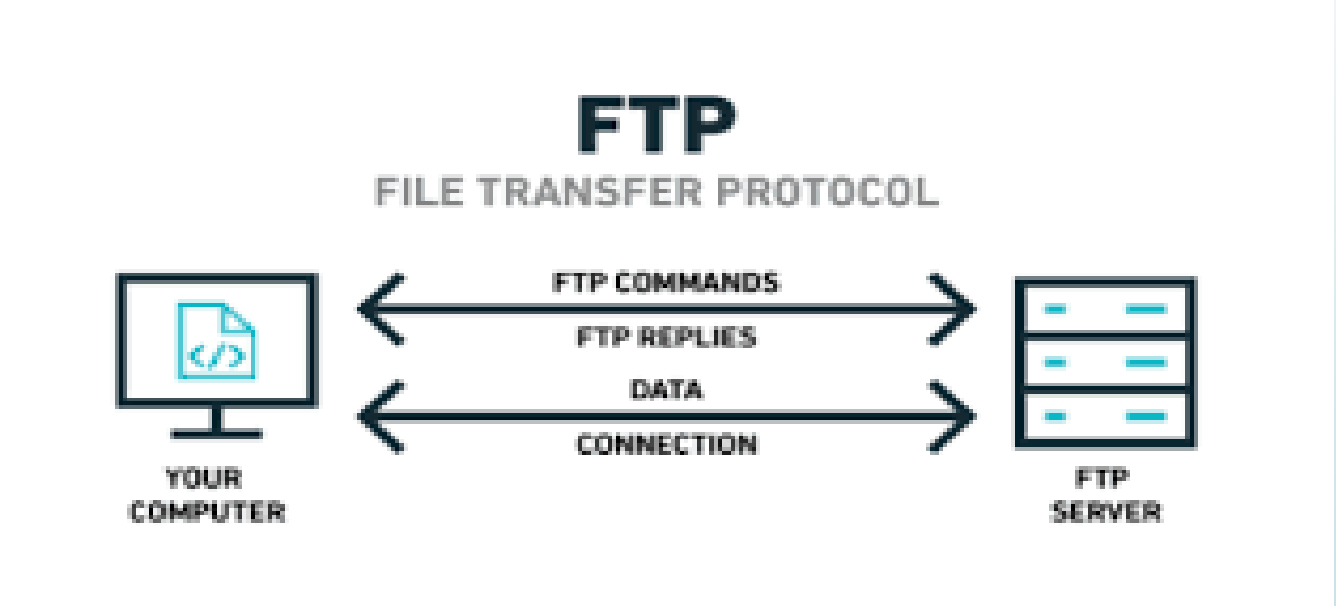
SMTP and POP3

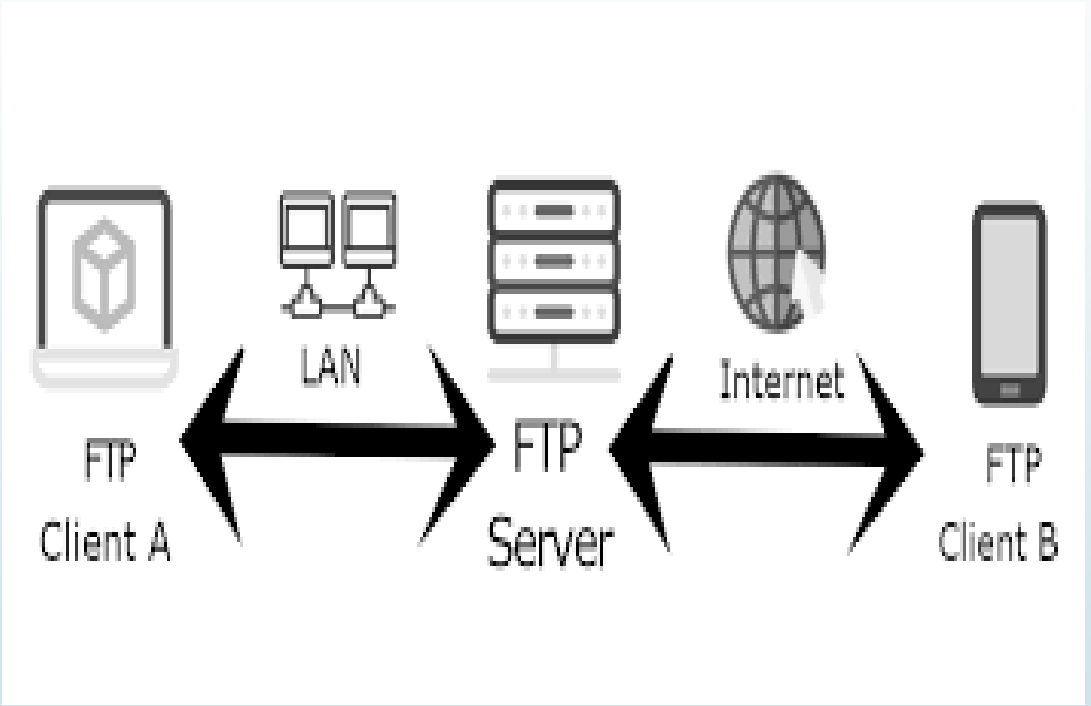


SMTP and POP3

- SMTP is referred to as PUSH protocol, and POP3 is called a POP protocol. SMTP sends the email from the device of the sender to the mailbox from the mail server of the receiver. POP3 lets you retrieve and organize emails from the mailbox on the mail server of the receiver to the computer of the receiver.

BASIS FOR COMPARISON	SMTP	POP3
Basic	It is message transfer agent.	It is message access agent.
Full form	Simple Mail Transfer Protocol.	Post Office Protocol version 3.
Implied	Between sender and sender mail server and between sender mail server and receiver mail server.	Between receiver and receiver mail server.
work	It transfers the mail from senders computer to the mail box present on receiver's mail server.	It allows to retrieve and organize mails from mailbox on receiver mail server to receiver's computer.


FTP
FILE TRANSFER PROTOCOL
FTP COMMANDS
FTP REPLIES
DATA
CONNECTION
YOUR COMPUTER
FTP SERVER


LAN
Internet
FTP
Client A
FTP
Server
FTP
Client B

What is IP……?

- IP stands for Internet Protocol
- IP specifies the format of packets, also called datagrams, and the addressing scheme. Most networks combine IP with a higher-level protocol called Transmission Control Protocol (TCP), which establishes a virtual connection between a destination and a source.

IP

- The Internet Protocol (IP) is a protocol, or set of rules, for routing and addressing packets of data so that they can travel across networks and arrive at the correct destination. Data traversing the Internet is divided into smaller pieces, called packets. IP information is attached to each packet, and this information helps routers to send packets to the right place. Every device or domain that connects to the Internet is assigned an IP address, and as packets are directed to the IP address attached to them, data arrives where it is needed.
- Once the packets arrive at their destination, they are handled differently depending on which transport protocol is used in combination with IP. The most common transport protocols are TCP and UDP.


Sender of packet
Recipient of packet
192.16.00.12
To: 192.00.00.75
192.16.00.12
The Internet
192.00.00.75

Internet Protocol (IP)

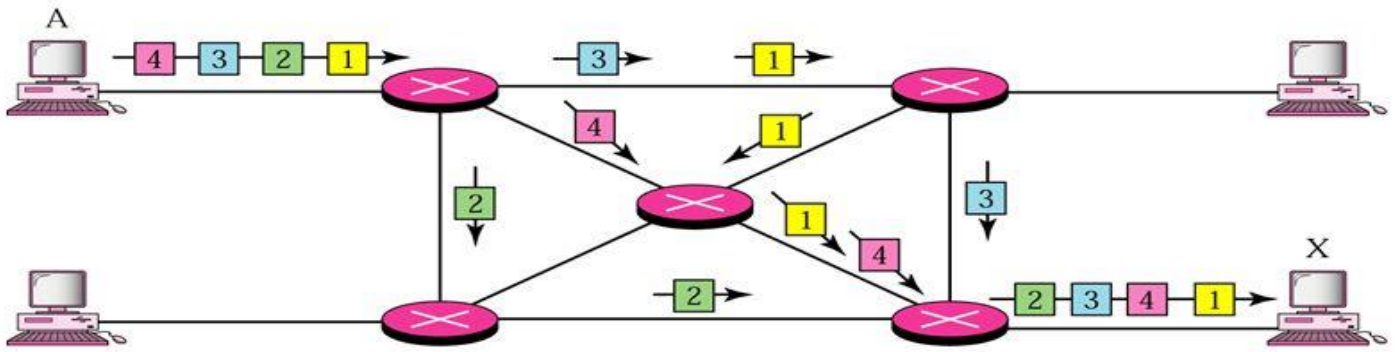
a) The IP is the host-to-host network layer delivery protocol for Internet.

b) IP is a connectionless datagram protocol for packet switching network.

c) Best effort delivery service: meaning that IP provides no error control or flow control.

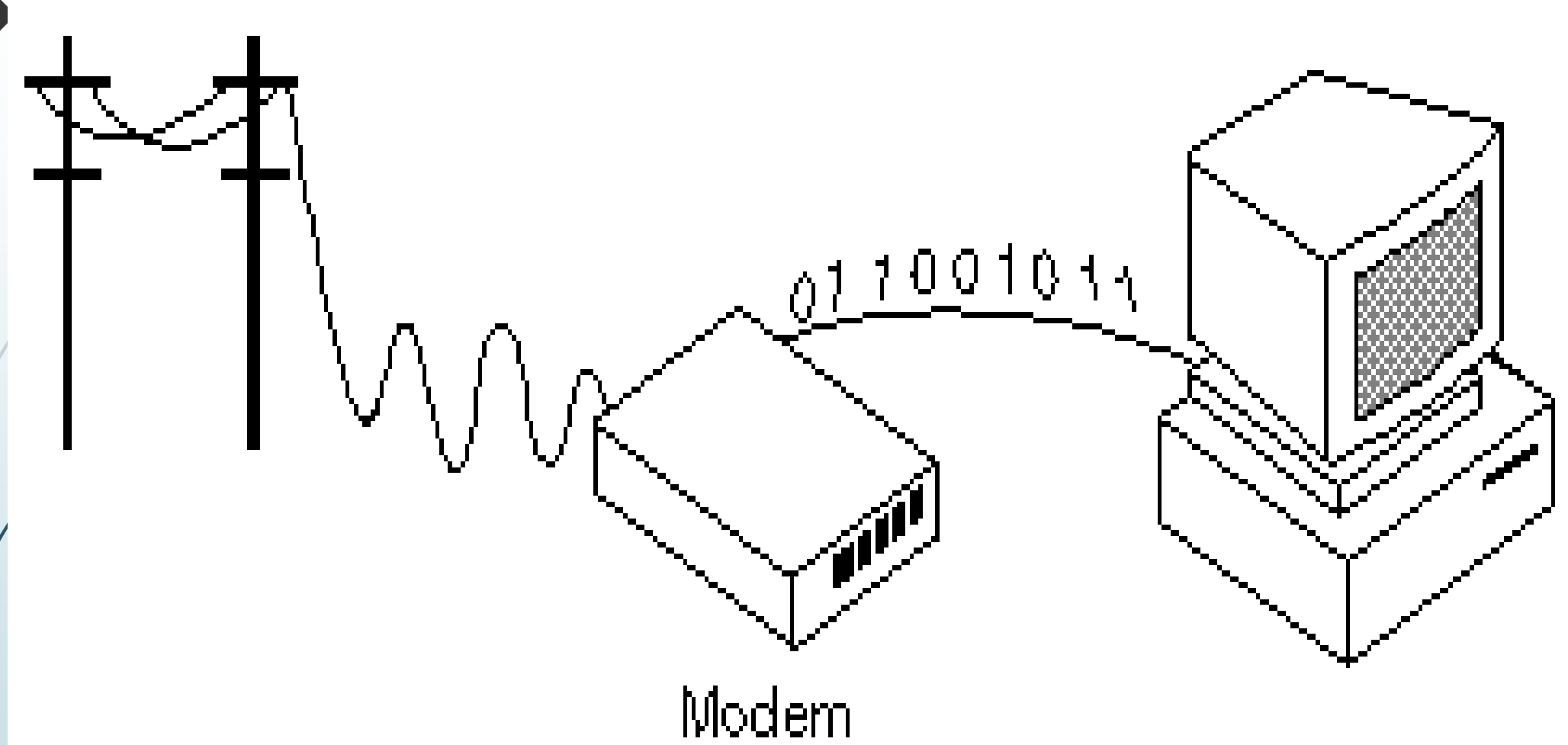
d) IP uses only an error detection mechanism (Chechsum) and discards the packet if it is corrupted.

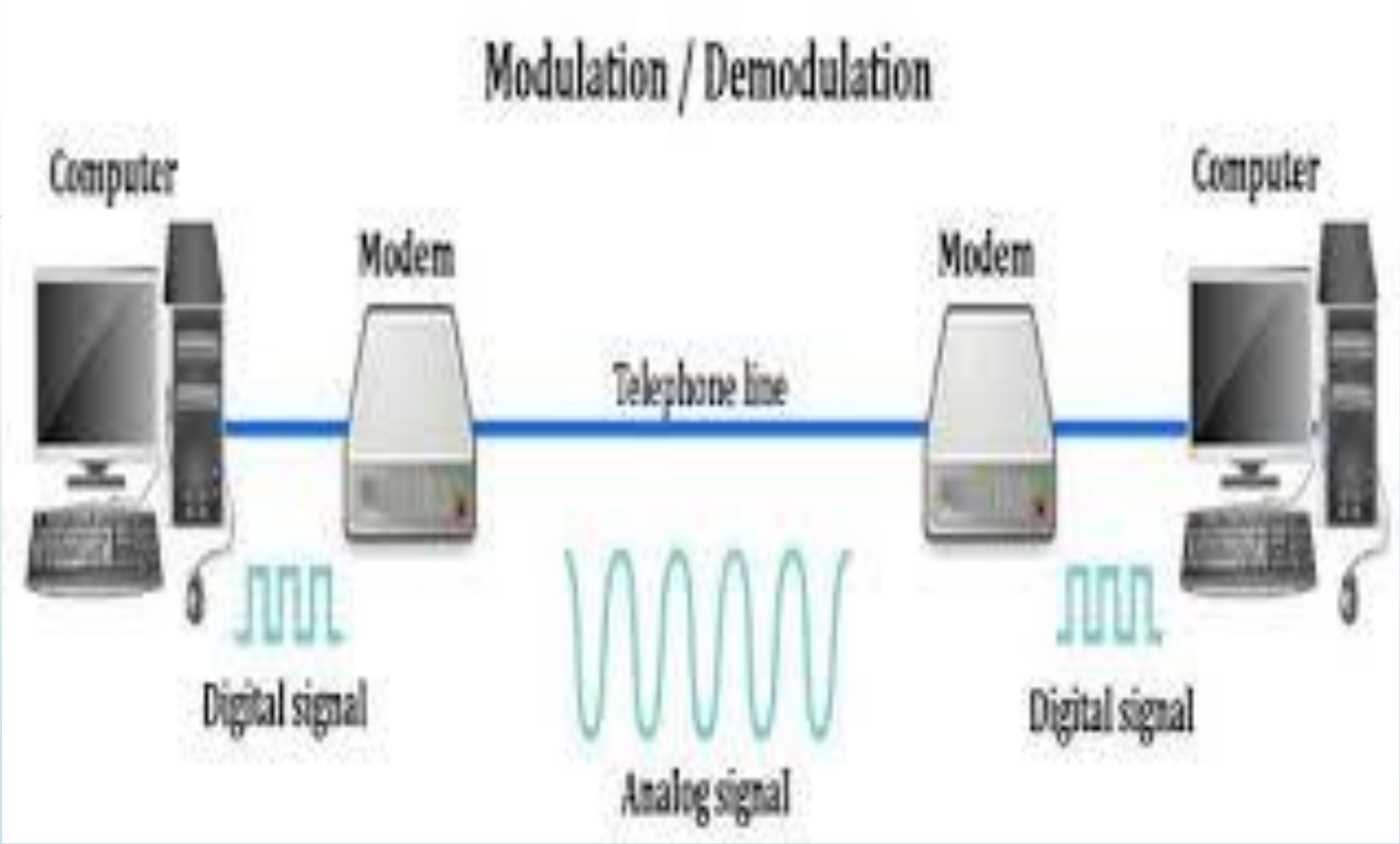
e) IP does its best to deliver a packet to its destination, but with no guarantees. Needs to rely on TCP layer for reliable delivery.



Modem

- A modulator-demodulator, or simply modem, is a [computer hardware] device that converts data from a digital format into a format suitable for an analog such as telephone or radio.
- A modem transmits data by [Modulation modulation methods or modulating methods] one or more [carrier wave] signals to encode [digital information],while the receiver demodulates the signal to recreate the original digital information.
- The goal is to produce a electrical signal that can be transmitted easily and decoded reliably.
- Modems can be used with almost any means of transmitting analog signals, from light-emitting diodes to radio.


01100101
Modem


Modulation / Demodulation
Computer
Modem
Telephone line
Modem
Computer
Digital signal
Analog signal
Digital signal

Networking of Computers

- A computer networking is a process of connecting two more than two computers with the purpose to share data, provide technical support, and to communicate (especially for the business purpose.
- Internet is the technology that is used to connect different computer systems (located in different geographic location).

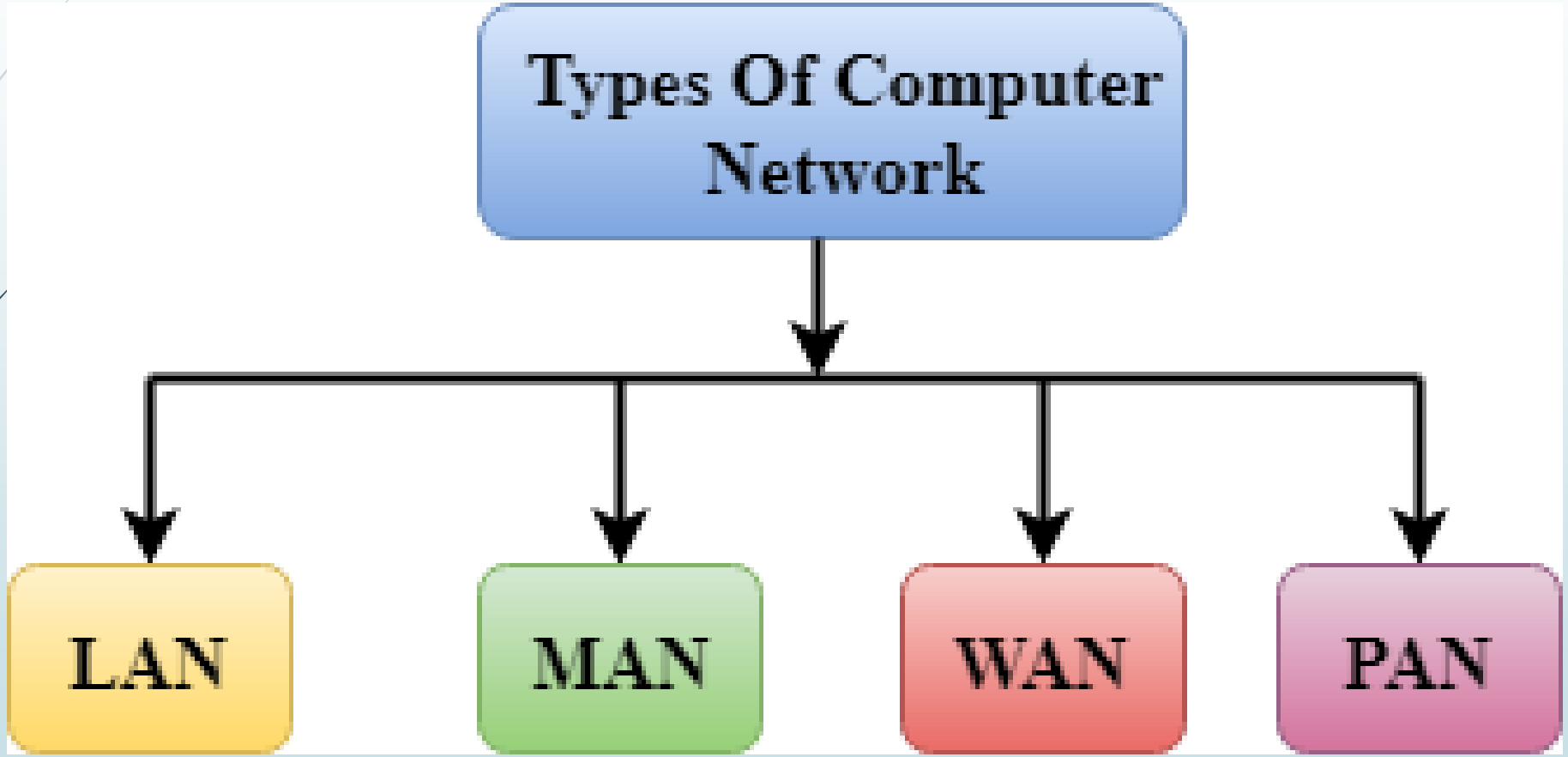
Computer Network Types

- 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.

- A computer network can be categorized by their size. A computer network is mainly of four types:

- Computer Network Types
- LAN(Local Area Network)
- PAN(Personal Area Network)
- MAN(Metropolitan Area Network)
- WAN(Wide Area Network)

Diagram



Sitesbay

Difference Between LAN, MAN and WAN

LAN	MAN	WAN
LAN stands for Local Area Network.	MAN stands for Metropolitan Area Network.	WAN stands for Wide area network.
LAN's ownership is private.	MAN's ownership can be private or public.	While WAN also might not be owned by one organization.
The transmission speed of LAN is high.	While the transmission speed of MAN is average.	Whereas the transmission speed of WAN is low.
The propagation delay is short in LAN.	There is moderate propagation delay in MAN.	Whereas there is long propagation delay.
There is less congestion in LAN.	While there is more congestion in MAN.	Whereas there is more congestion than MAN in WAN.
LAN's design and maintenance is easy.	While MAN's design and maintenance is difficult than LAN.	WAN's design and maintenance is also difficult than LAN as well MAN.
There is more fault tolerance in LAN.	While there is less fault tolerance.	In WAN, there is also less fault tolerance.
Used in College, School, Hospital.	Used in Small towns, City.	Used in Country/Continent.
Allows Single pair of devices to communicate.	Allows Multiple computers can simultaneously interact.	Allows A huge group of computers communicate at the same time.

Hub

Gateway

Router

Repeater

Bridge

Switch

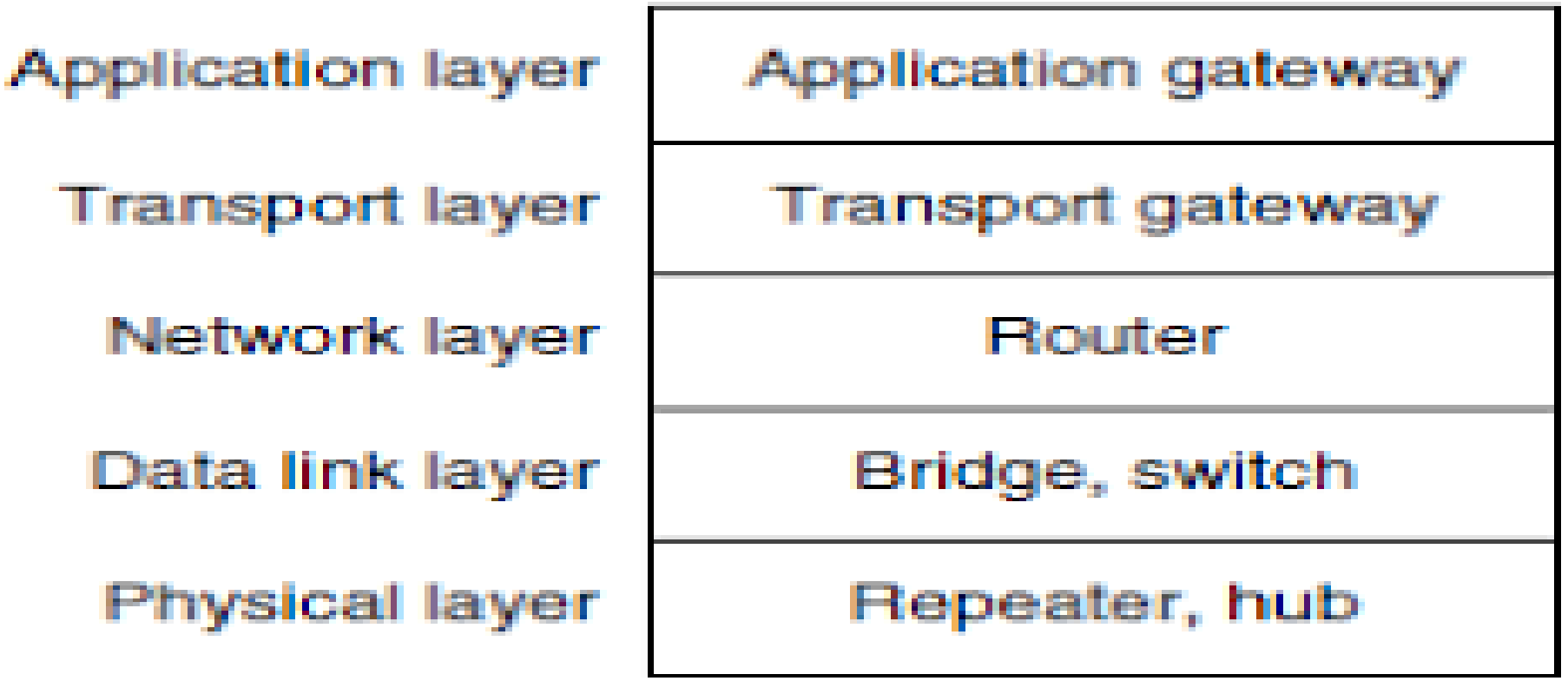
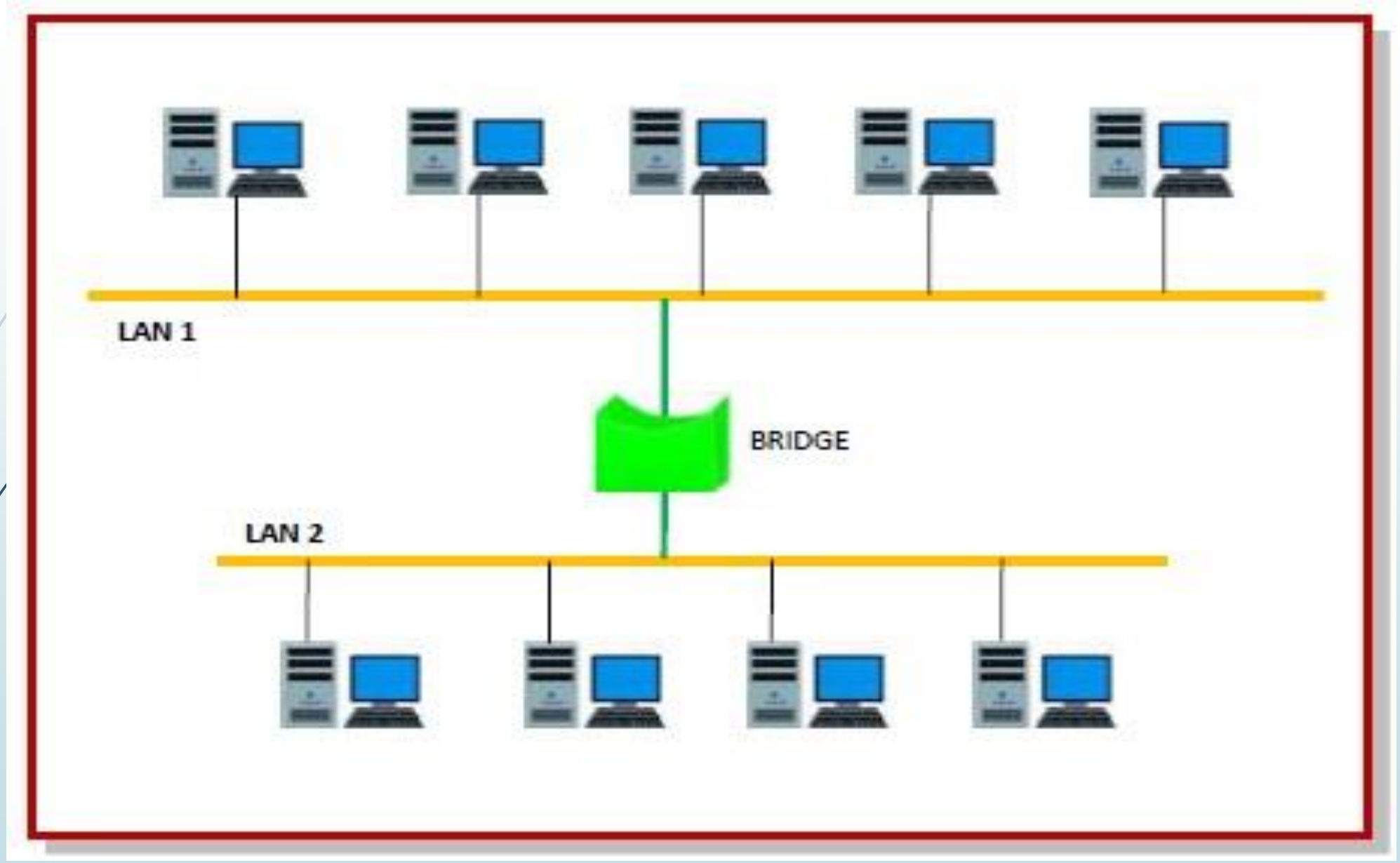


Fig: Devices in different layers

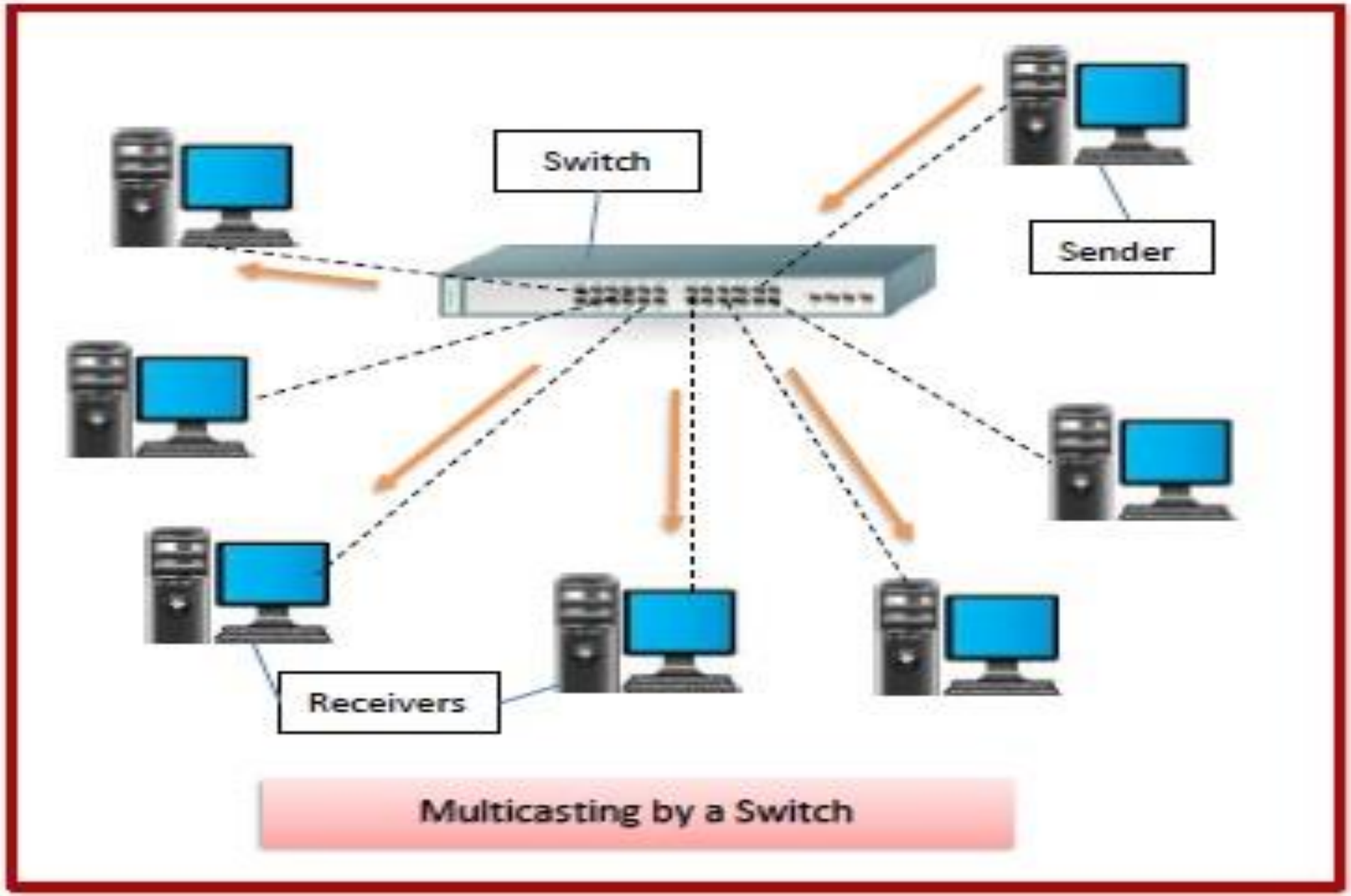
Bridge

- bridge is a network device that connects multiple LANs (local area networks) together to form a larger LAN. The process of aggregating networks is called network bridging. A bridge connects the different components so that they appear as parts of a single network. Bridges operate at the data link layer of the OSI model and hence also referred as Layer 2 switches.


LAN 1
BRIDGE
LAN 2

Switch

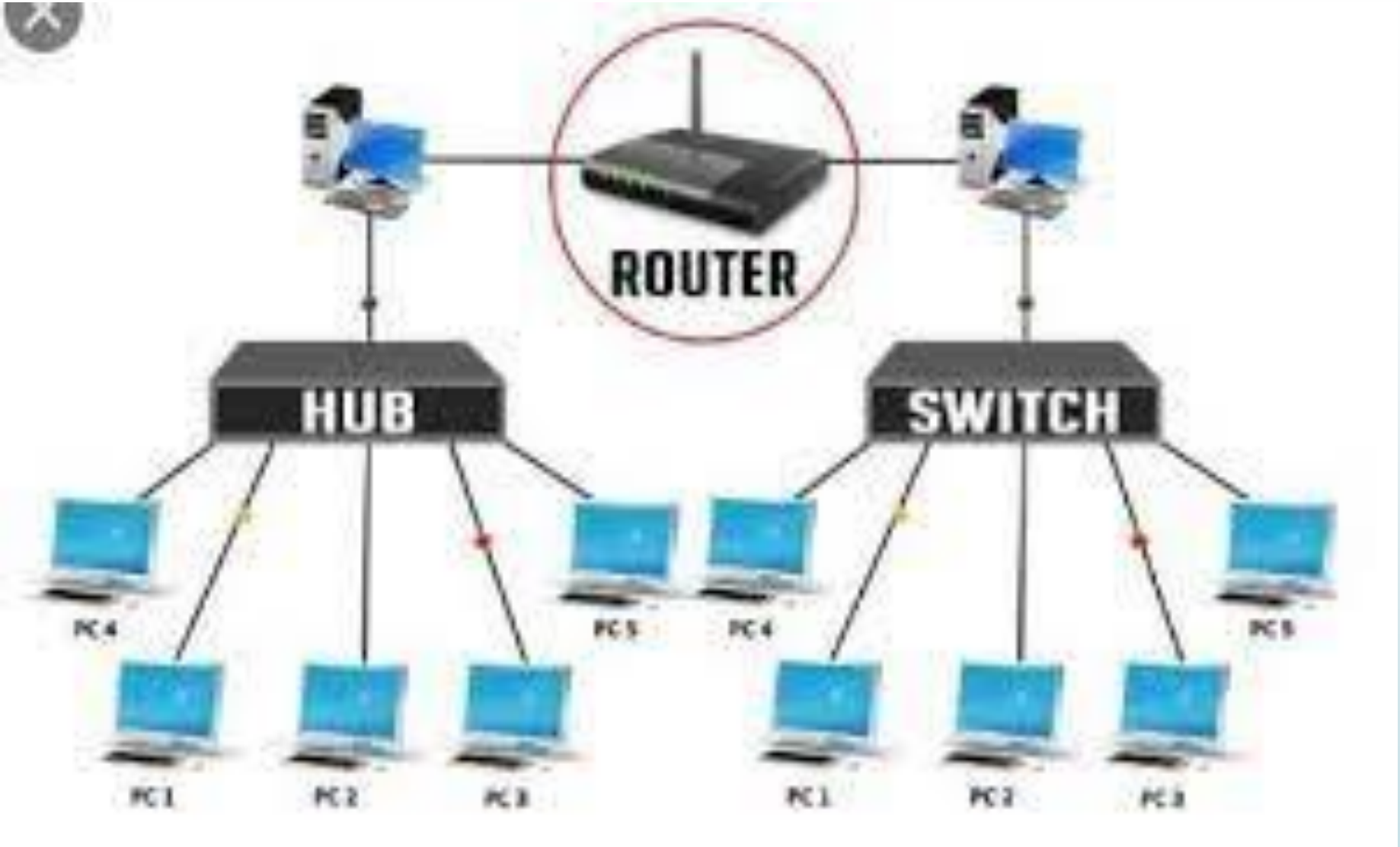
- A switch has many ports, to which computers are plugged in.
- When a data frame arrives at any port of a network switch, it examines the destination address, performs necessary checks and sends the frame to the corresponding device(s).
- It supports unicast, multicast as well as broadcast communications.

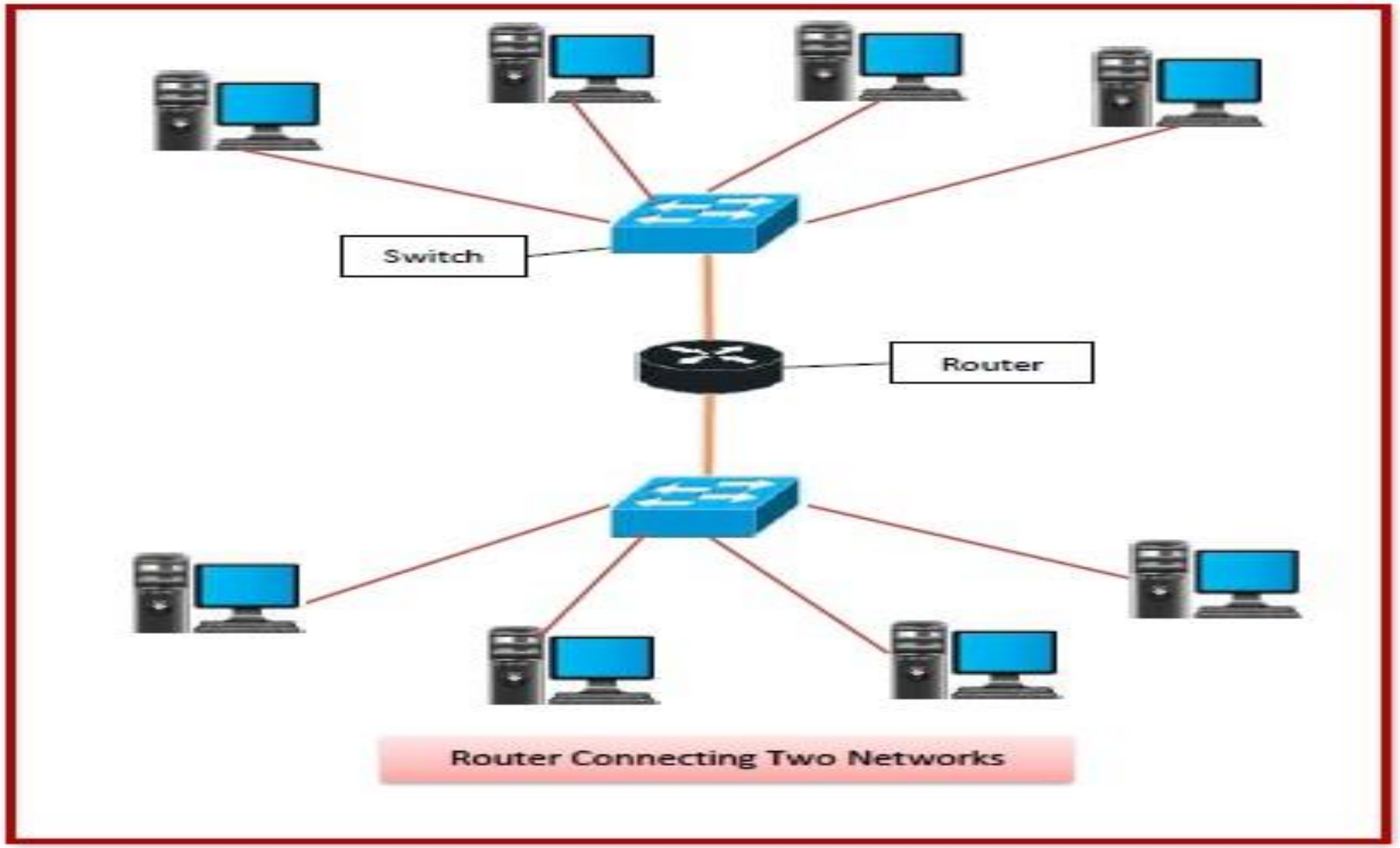


Multicasting by a Switch

Router

- Routers are networking devices operating at layer 3 or a network layer of the OSI model.
- They are responsible for receiving, analysing, and forwarding data packets among the connected computer networks.
- When a data packet arrives, the router inspects the destination address, consults its routing tables to decide the optimal route and then transfers the packet along this route.


ROUTER
HUB
SWITCH
PC4
PC5
PC4
PC5
PC1
PC2
PC3
PC1
PC2
PC3


Switch
Router
Router Connecting Two Networks

Bridge Vs Switch

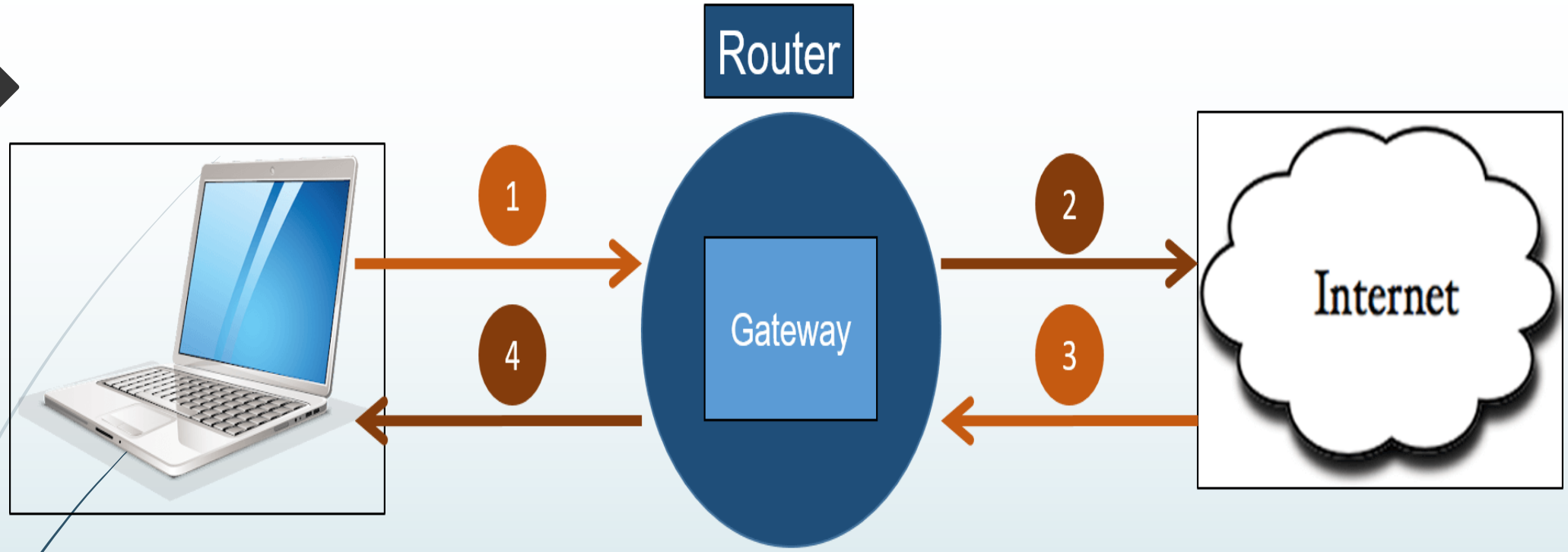
ZOOM TECHNOLOGIES

Bridge	Switch
• Bridges are software based • Bridges have lesser no. of ports • Generally used for connecting two different topology (Segment)	• Switches are hardware based • Switches have higher no. of ports • Generally used for connecting single topology (Segment)

Routers	Bridges
Routers operates in netwok layer of OSI Model.	Bridge operates in data link layer of OSI Model.
Router is use to connect the LAN and WAN.	Bridge is use to connect two different LAN segments.
Router transmits data in the form of packets.	Bridge transmit data in the form frames.
Router reads the IP Address of a device.	Bridge reads the MAC Address of a device.
Router has more ports compare to bridge.	Bridge has only two ports.
Router uses routing table for sending data.	Bridge does not use any routing table for sending data.

Gateway

- A gateway is a hardware device that acts as a "gate" between two networks. It may be a router, firewall, server, or another device that enables traffic to flow in and out of the network.
- For example, a proxy server may only allow local computers to access a list of authorized websites .
- A gateway is a network node used in telecommunications that connects two networks with different transmission protocols together.
- Gateways serve as an entry and exit point for a network as all data must pass through or communicate with the gateway prior to being routed.

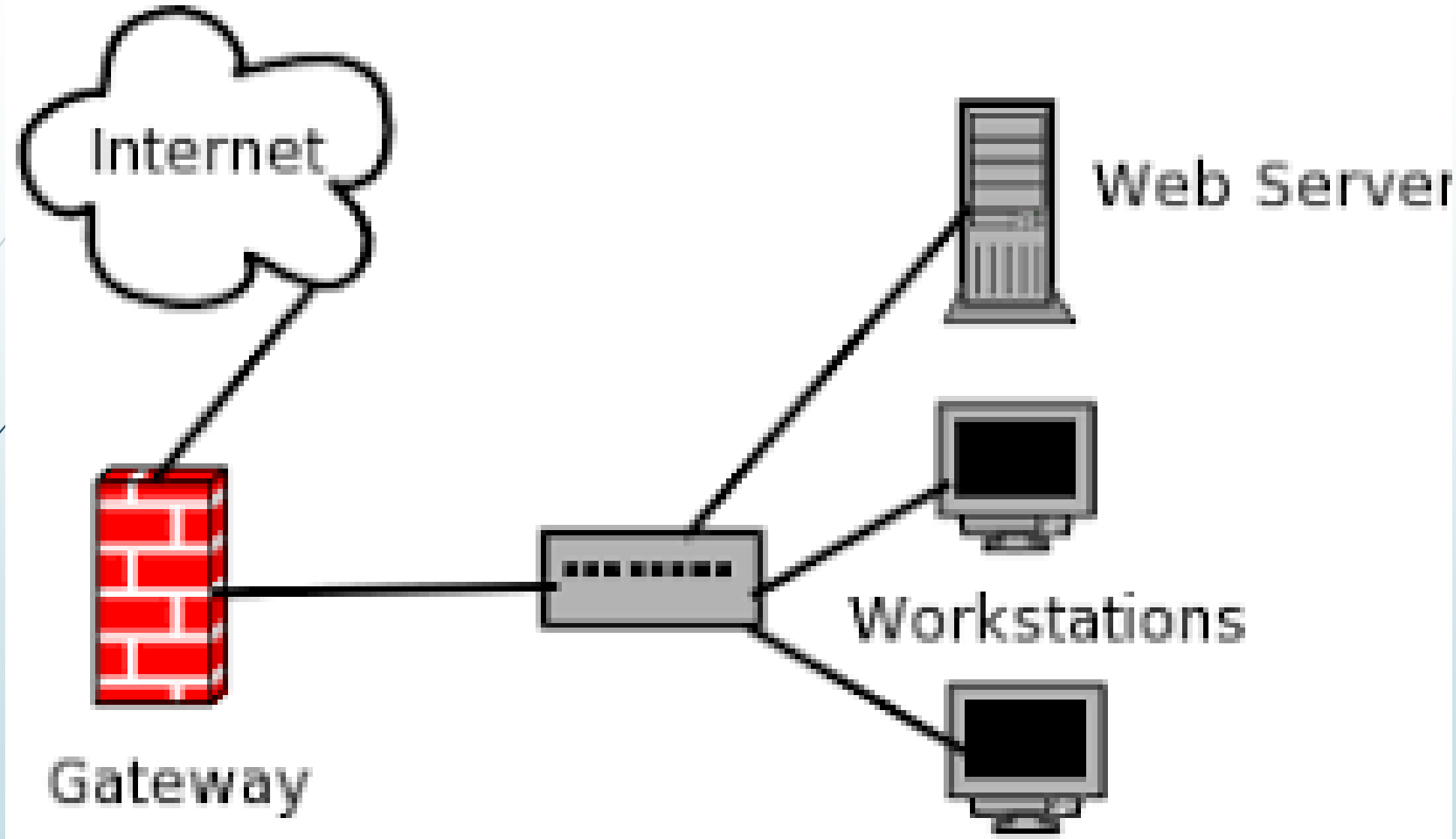


1 Request goes from computer to Gateway

2 From Gateway to respective server or website

4 From your Gateway to your computer

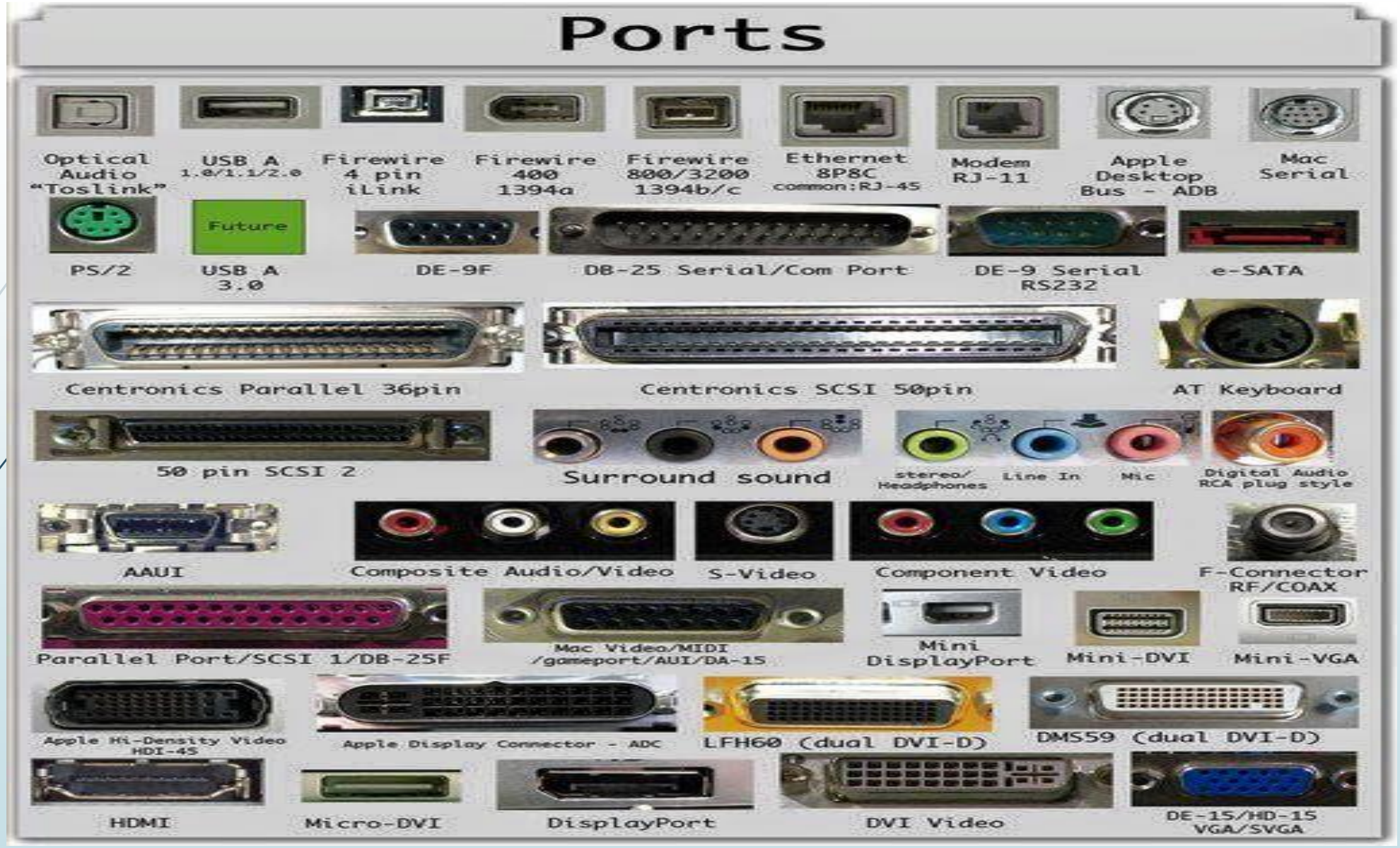
3 And Your receive response from respective server or website to your Gateway


Internet
Web Server
Workstations
Gateway

Computer Ports

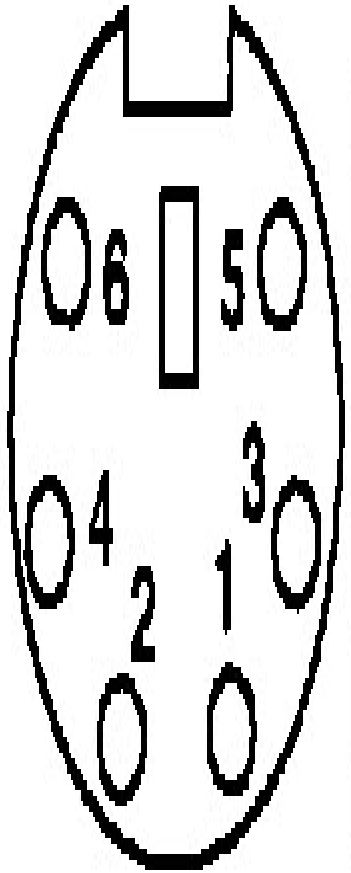
- A Computer Port is an interface or a point of connection between the computer and its peripheral devices. Some of the common peripherals are mouse, keyboard, monitor or display unit, printer, speaker, flash drive etc.

- The main function of a computer port is to act as a point of attachment, where the cable from the peripheral can be plugged in and allows data to flow from and to the device.


Ports
Optical Audio "Toslink"
USB A 1.0/1.1/2.0
Firewire 4 pin iLink
Firewire 400 1394a
Firewire 800/3200 1394b/c
Ethernet 8P8C common:RJ-45
Modem RJ-11
Apple Desktop Bus - ADB
Mac Serial
PS/2
Future
USB A 3.0
DE-9F
DB-25 Serial/Com Port
DE-9 Serial RS232
e-SATA
Centronics Parallel 36pin
Centronics SCSI 50pin
AT Keyboard
50 pin SCSI 2
Surround sound
stereo/ Headphones
Line In
Mic
Digital Audio RCA plug style
AAUI
Composite Audio/Video
S-Video
Component Video
F-Connector RF/COAX
Parallel Port/SCSI 1/DB-25F
Mac Video/MIDI /gameport/AUI/DA-15
Mini DisplayPort
Mini-DVI
Mini-VGA
Apple Hi-Density Video HDI-45
Apple Display Connector - ADC
LFH60 (dual DVI-D)
DMS59 (dual DVI-D)
HDMI
Micro-DVI
DisplayPort
DVI Video
DE-15/HD-15 VGA/SVGA

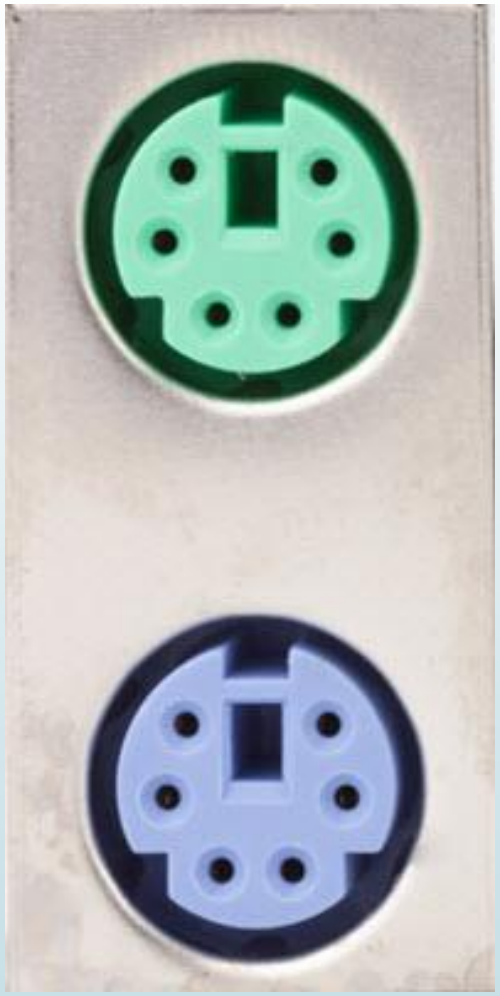
PS/2 Connector

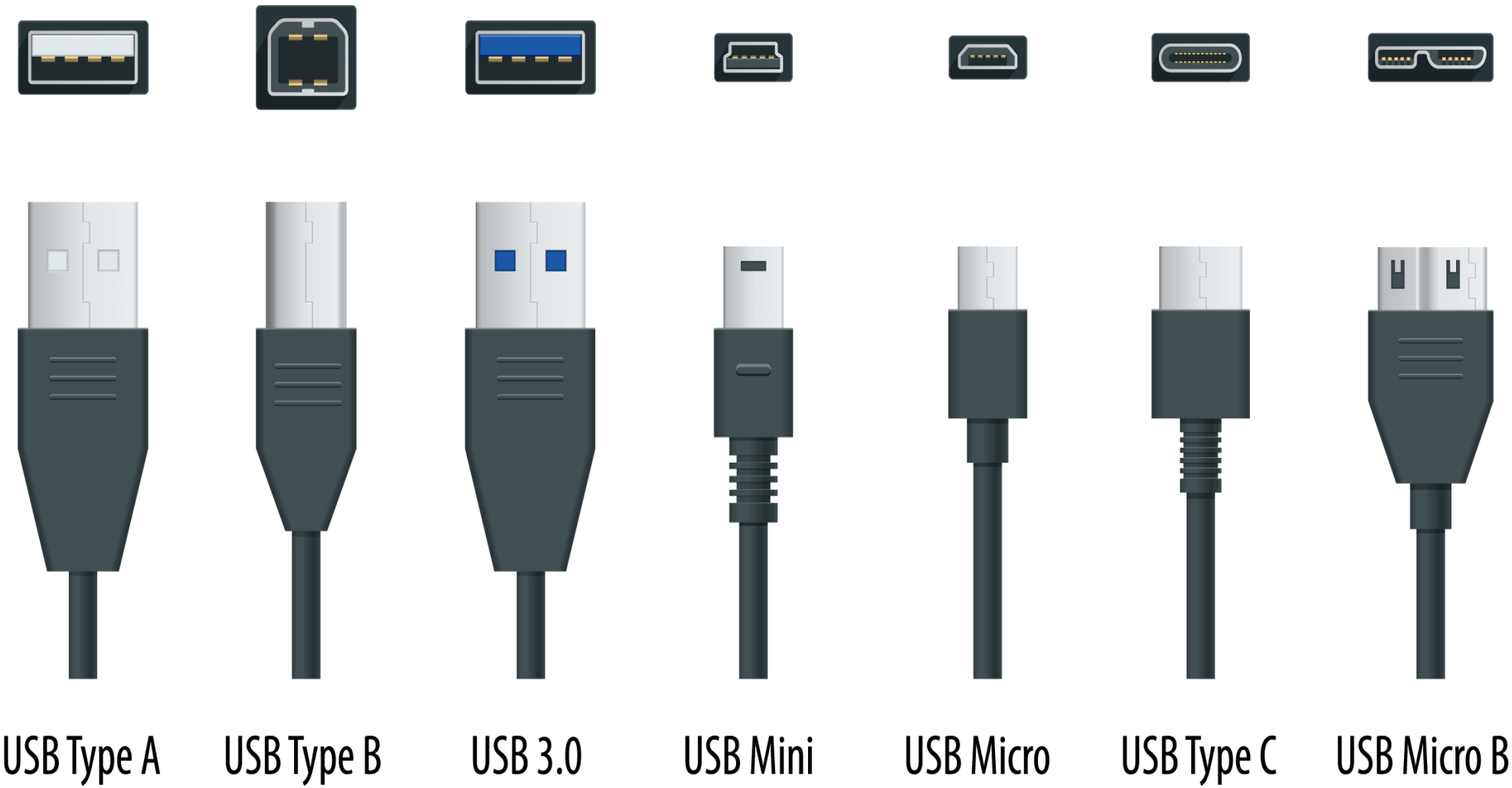
- PS/2 connector is developed by IBM for connecting mouse and keyboard.
- It was introduced with IBM's Personal Systems/2 series of computers and hence the name PS/2 connector.
- PS/2 connectors are colour coded as purple for keyboard and green for mouse.



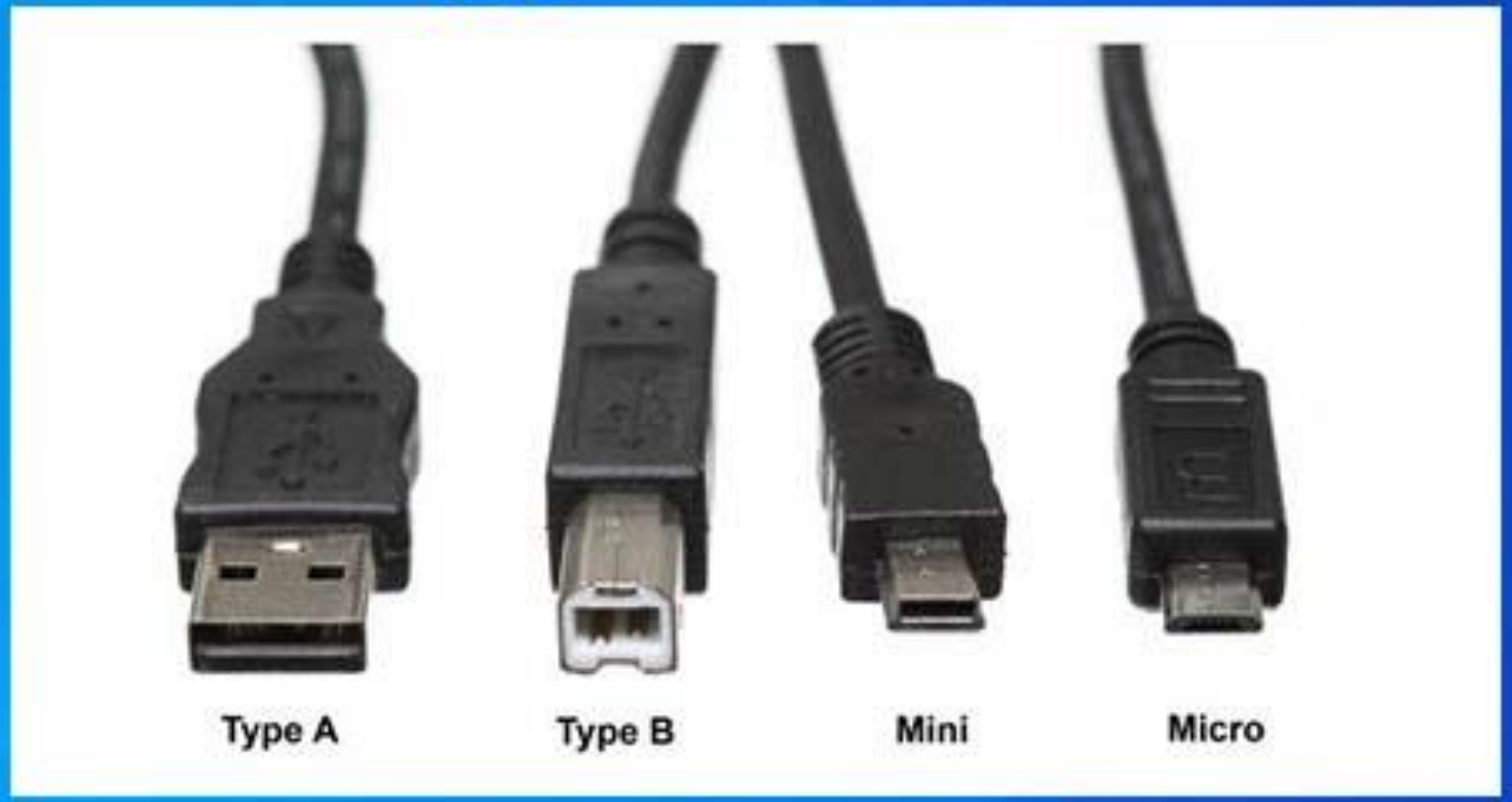
Pinout on Female Port

Pin Number	*Description*
1	Data
2	No Connection
3	Ground
4	+5V
5	Clock
6	No Connection

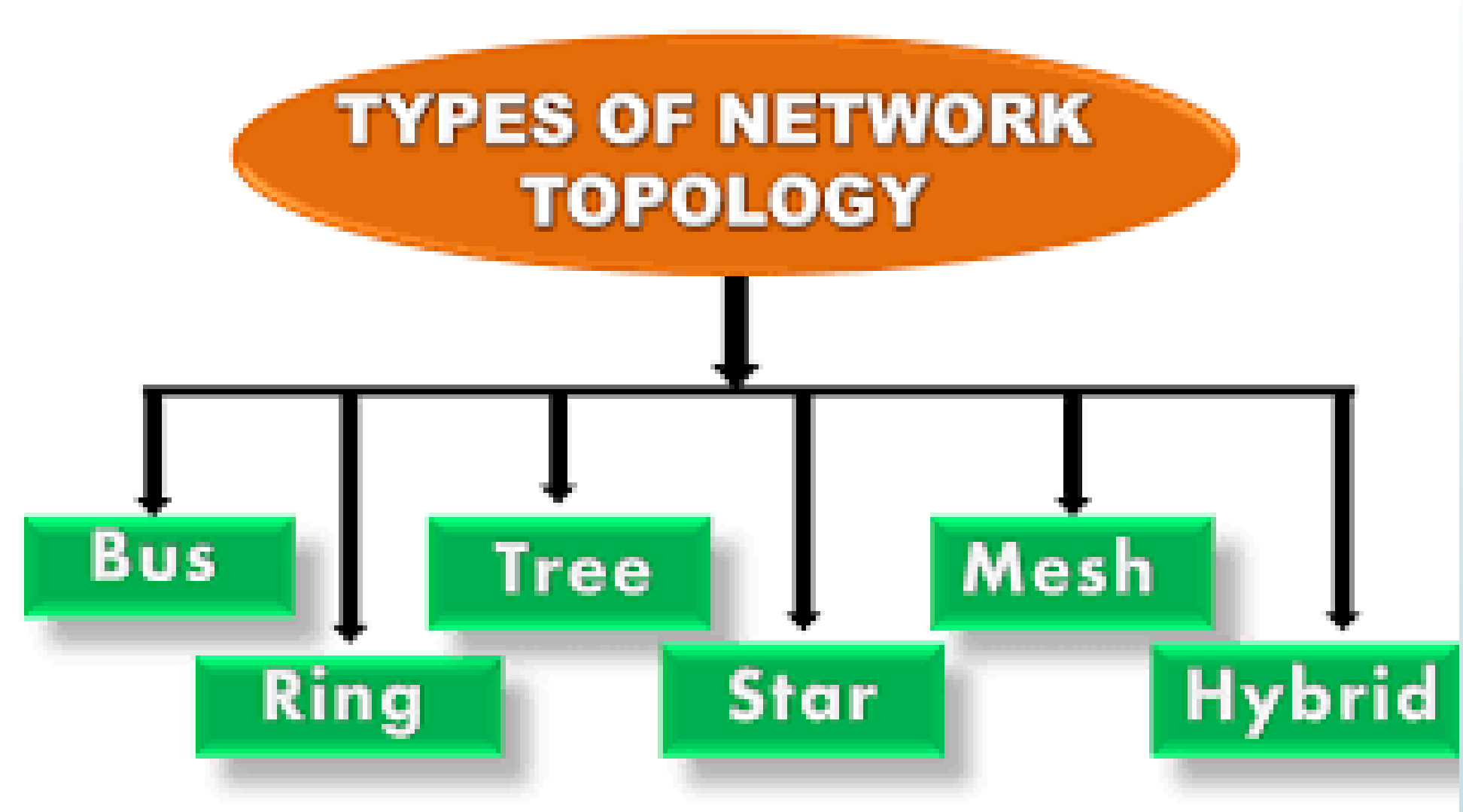



USB Type A
USB Type B
USB 3.0
USB Mini
USB Micro
USB Type C
USB Micro B
TechTerms.com

Types of USB



Topologies



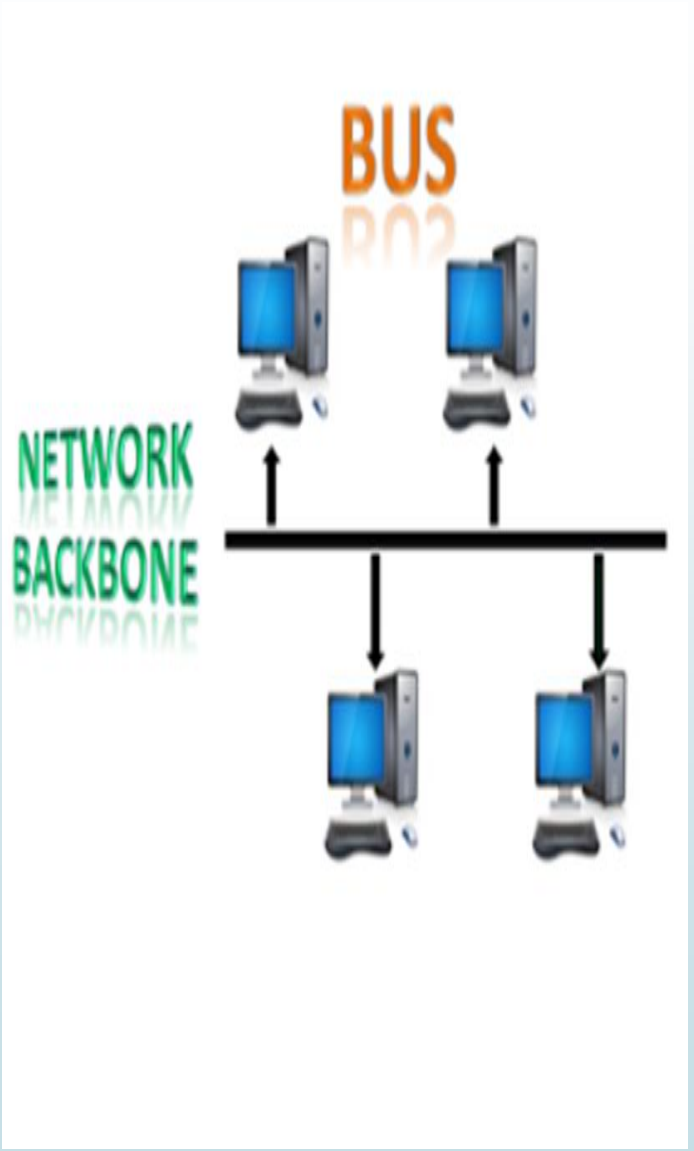
Bus Topology

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.

When a node wants to send a message over the network, it puts a message over the network. All the stations available in the network will receive the message whether it has been addressed or not.

The backbone cable is considered as a "single lane" through which the message is broadcast to all the stations.



Star Topology

Star topology is an arrangement of the network 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.

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.

It has no terminated ends, i.e., each node is connected to other node and having no termination point.

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

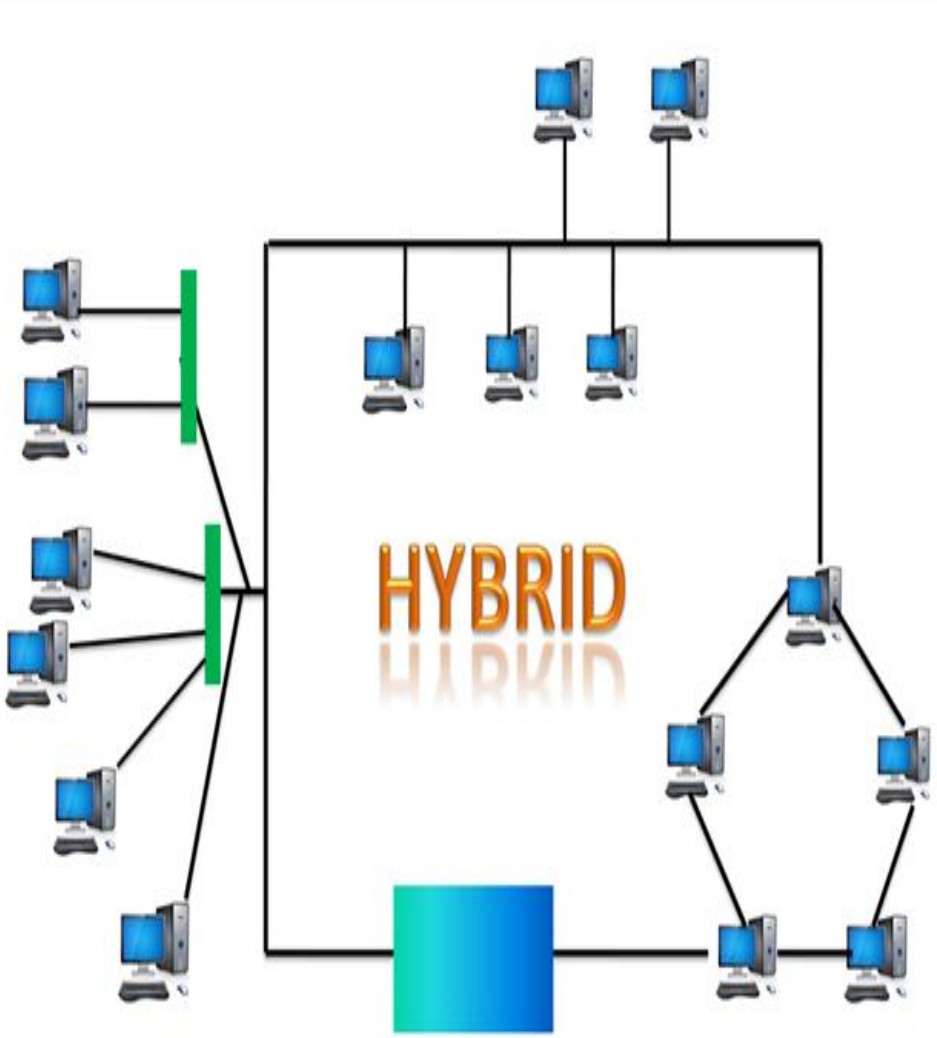
Hybrid Topology

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.

When two or more different topologies are combined together is termed as Hybrid topology and if similar topologies are connected with each other will not result in Hybrid topology.

For example, if there exist a ring topology in one branch of ICICI bank and bus topology in another branch of ICICI bank, connecting these two topologies will result in Hybrid topology.




Thank
You

Chapter 5

Introduction to Internet

WWW

The World Wide Web (WWW), commonly known as the Web, is an information system where documents and other web resources are identified by Uniform Resource Locators (URLs, such as https://example.com/), which may be interlinked by hyperlinks, and are accessible over the Internet.

- The resources of the Web are transferred via the Hypertext Transfer Protocol (HTTP), may be accessed by users by a software application called a web browser, and are published by a software application called a web server.
- Web resources may be any type of downloaded media, but web pages are hypertext documents formatted in Hypertext Mark-up Language (HTML).
- Special HTML syntax displays embedded hyperlinks with URLs, which permits users to navigate to other web resources. In addition to text, web pages may contain references to images, video, audio, and software components, which are either displayed or internally executed in the user's web browser to render pages or streams of multimedia content.

WWW


Online Advertising
SEO
Blogs
WWW
Social Networks
Forums
Email marketing

E commerce

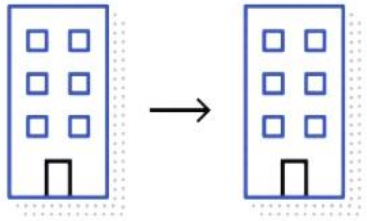
- E-commerce (electronic commerce) is the activity of electronically buying or selling of products on online services or over the Internet.
- E-commerce draws on technologies such as mobile commerce, electronic funds transfer, supply chain management, Internet marketing, online transaction processing, electronic data interchange (EDI), inventory management systems, and automated data collection systems.
- Typical e-commerce transactions include the purchase of products
- E-commerce businesses may also employ some or all of the following:
- Providing or participating in online marketplaces, which process third-party business-to-consumer (B2C) or consumer-to-consumer (C2C) sales;
- Business-to-business (B2B) buying and selling;[4]
- Gathering and using demographic data through web contacts and

Types of Ecommerce

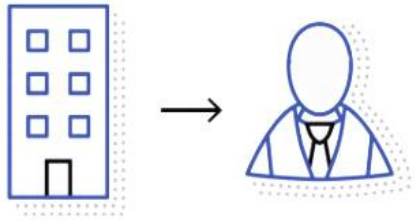
There are four traditional types of ecommerce, including

- **B2C (Business-to-Consumer),**
- **B2B (Business-to-Business),**
- **C2B (Consumer-to-Business) and**
- **C2C (Consumer-to-Consumer).**

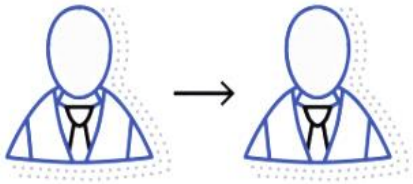
Types of E-Commerce



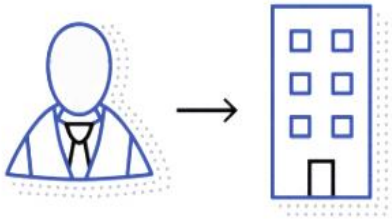
Business to business



Business to consumer



Consumer to consumer



Consumer to business

1. Business-to-Business (B2B)

- Business-to-Business (B2B) e-commerce encompasses all electronic transactions of goods or services conducted between companies.

- Producers and traditional commerce wholesalers typically operate with this type of electronic commerce.

2. Business-to-Consumer (B2C)

- The Business-to-Consumer type of e-commerce is distinguished by the establishment of electronic business relationships between businesses and final consumers.
- It corresponds to the retail section of e-commerce, where traditional retail trade normally operates.

3. Consumer-to-Consumer (C2C)

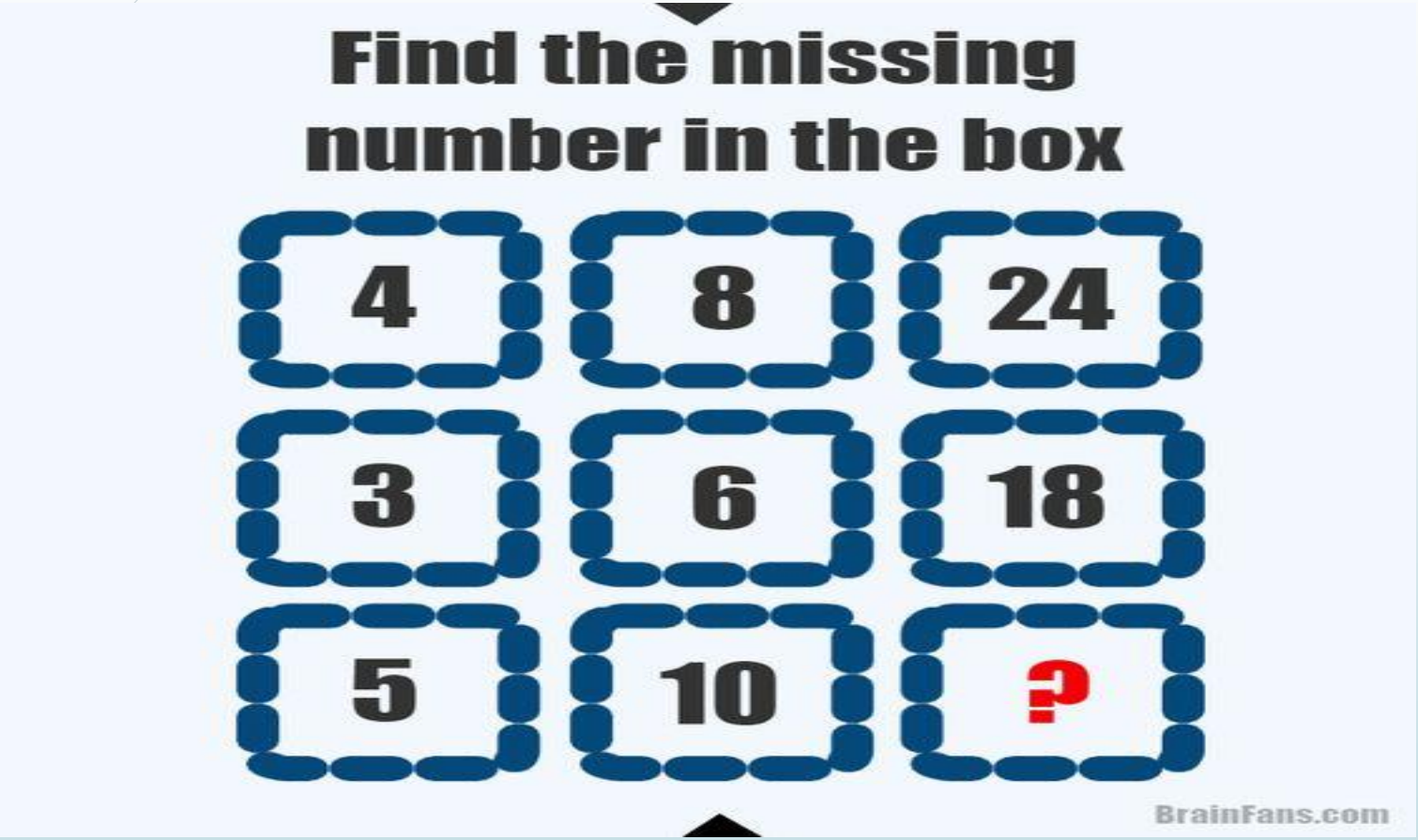
- Consumer-to-Consumer (C2C) type e-commerce encompasses all electronic transactions of goods or services conducted between consumers.

- Generally, these transactions are conducted through a third party, which provides the online platform where the transactions are actually carried out.

4. Consumer-to-Business (C2B)

- In C2B there is a complete reversal of the traditional sense of exchanging goods.
- A large number of individuals make their services or products available for purchase for companies seeking precisely these types of services or products.

Break Time


Find the missing number in the box
4
8
24
3
6
18
5
10
?
BrainFans.com

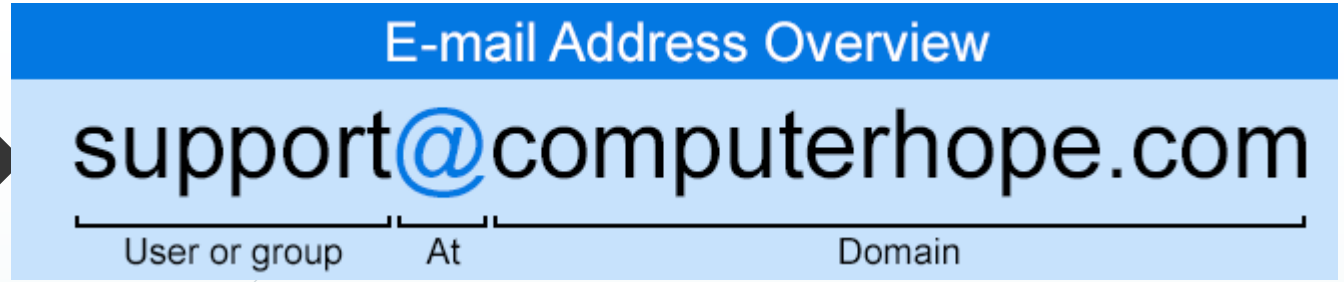
Ans

- 4+8=12x2=24; 3+6=9x2=18; 5+10=15x2=30. Therefore the answer is 30

Email

- Short for **electronic mail**, **e-mail** or **email** is information stored on a computer that is exchanged between two users over telecommunications.

- E-mail is a message that may contain text, files, images, or other attachments sent through a network to a specified individual or group of individuals.



- The first portion of all e-mail addresses, the part before the @ symbol, contains the alias, user, group, or department of a company. In our above example, "support" is the Technical Support department at Computer Hope.
- Next, the "@" (at sign) is a divider in the e-mail address; it's required for all SMTP e-mail addresses since Ray Tomlinson sent the first message.
- Finally, "computerhope.com" is the domain name of where the user belongs. The ".com" is the TLD (top-level domain) for our domain.

Advantages of e-mail

Free delivery - Sending an e-mail is virtually free, outside the cost of Internet service. There is no need to buy a postage stamp to send a letter.

- **Global delivery** - E-mail can be sent to nearly anywhere around the world, to any country.
- **Instant delivery** - An e-mail can be instantly sent and received by the recipient over the Internet.
- **File attachment** - An e-mail can include one or more file attachments, allowing a person to send documents, pictures, or other files with an e-mail.
- **Long-term storage** - E-mails are stored electronically, which allows for storage and archival over long periods of time.
- **Environmentally friendly** - Sending an e-mail does not require paper (paperless), cardboard, or packing tape, conserving paper resources.

Create Digital Signature

- Open Gmail.
- In the top right, click Settings. See all settings.
- In the "Signature" section, add your signature text in the box. If you want, you can format your message by adding an image or changing the text style.
- At the bottom of the page, click Save Changes.

URL

URL stands for Uniform Resource Locator.

- A URL is nothing more than the address of a given unique resource on the Web.
- In theory, each valid URL points to a unique resource.
- Such resources can be an HTML page, a CSS document, an image, etc. In practice, there are some exceptions, the most common being a URL pointing to a resource that no longer exists or that has moved.
- As the resource represented by the URL and the URL itself are handled by the Web server, it is up to the owner of the web server to carefully manage that resource and its associated URL.
- E.g. http://www.google.com

Web Browser

The web browser is an application software to explore www (World Wide Web).

- It provides an interface between the server and the client and requests to the server for web documents and services.
- It works as a compiler to render HTML which is used to design a webpage. Whenever we search anything on the internet, the browser loads a web page written in HTML, including text, links, images, and other items such as style sheets and JavaScript functions.
- Google Chrome, Microsoft Edge, Mozilla Firefox, Safari are examples of web browsers.


Internet Explorer
TheWorld
Opera
Safari
Mozilla Firefox
Netscape
Tencent Traveler
Maxthon
Chrome

Break Time

HTML

HTML stands for HyperText Markup Language.

- It is used to design web pages using a markup language.
- Hypertext defines the link between the web pages.
- A markup language is used to define the text document within tag which defines the structure of web pages.
- This language is used to annotate (make notes for the computer) text so that a machine can understand it and manipulate text accordingly.
- Most markup languages (e.g. HTML) are human-readable.
- The language uses tags to define what manipulation has to be done on the text.

Features of HTML:

- It is easy to learn and easy to use.
- It is platform-independent.
- Images, videos, and audio can be added to a web page.
- Hypertext can be added to the text.
- It is a markup language.

Advantages:

HTML is used to build websites.

- It is supported by all browsers.
- It can be integrated with other languages like CSS, JavaScript, etc.

Disadvantages:

- HTML can only create static web pages. For dynamic web pages, other languages have to be used.
- A large amount of code has to be written to create a simple web page.
- The security feature is not good.


Tag Element
 GeeksforGeeks
Opening Tag
ClosingTag

```
<!DOCTYPE html>
<html>

<head>
  <title>Page Title</title>
</head>

<body>
  <h2>Heading Content</h2>
  <p>Paragraph Content</p>
</body>

</html>
```

Tells version of HTML

HTML Root Element

Used to contain page HTML metadata

Title of HTML page

Hold content of HTML

HTML headling tag

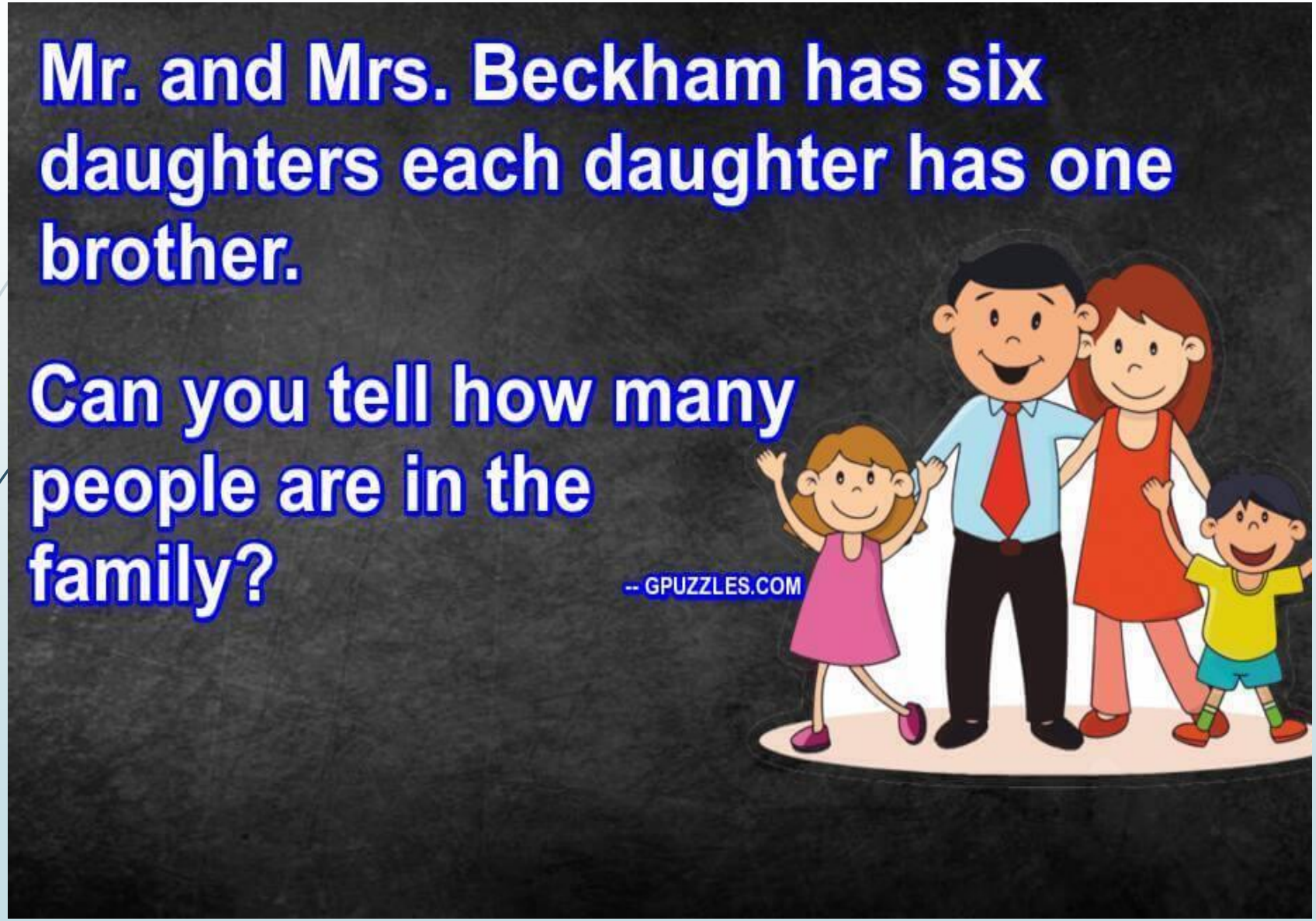
HTML paragraph tag

HTML Page Structure

```
<html>
<head>
    <title>Demo Web Page</title>
</head>


<body>
    <h1>Hello Diplo Guys</h1>
    <p>A computer science portal for geeks</p>
</body>
</html>
```

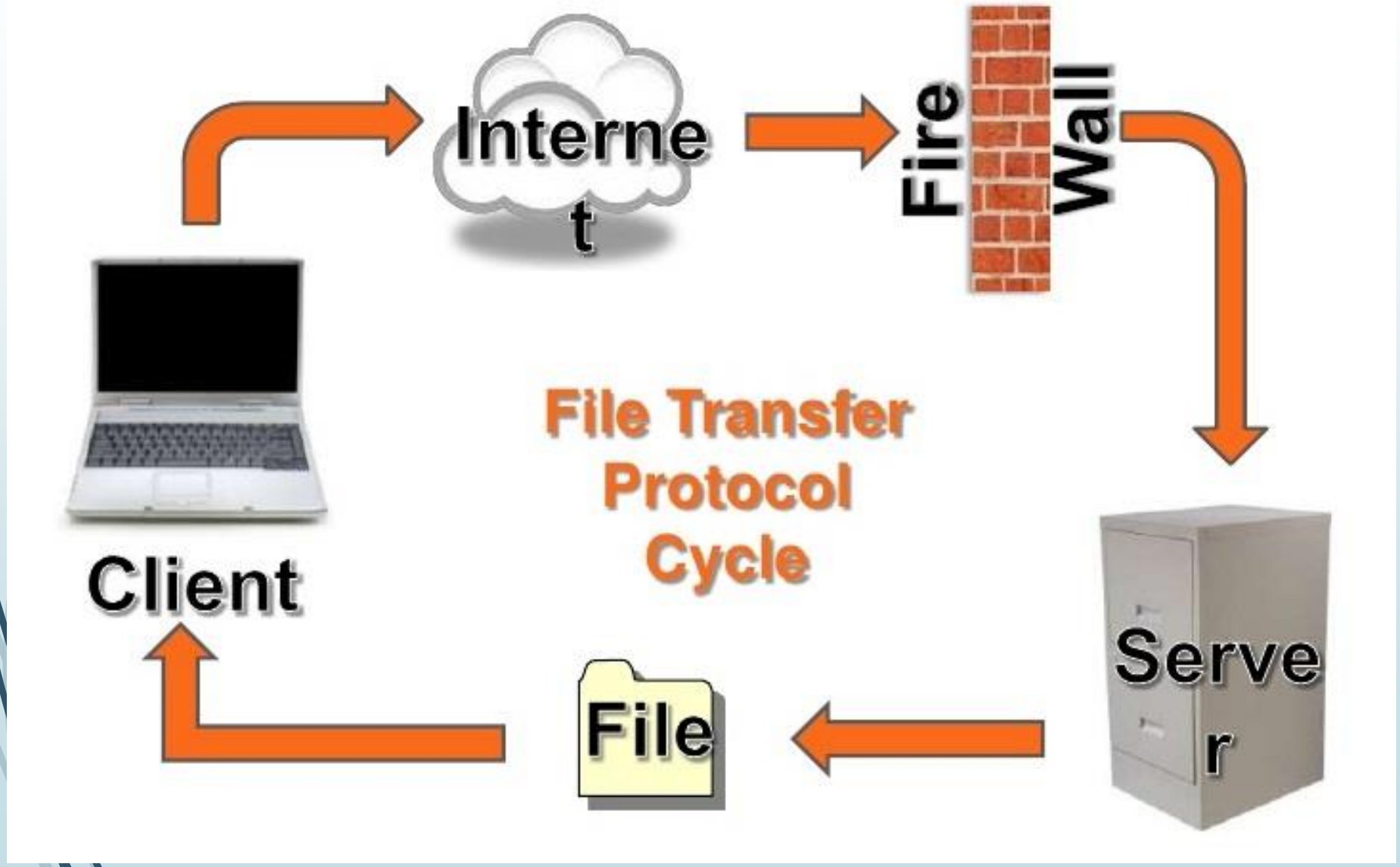
Break Time


Mr. and Mrs. Beckham has six daughters each daughter has one brother.
Can you tell how many people are in the family?
-- GPUZZLES.COM

9

1(Mr. Beckham) + 1(Mrs. Beckham) + 6 (daughters) + 1 (brother).

FTP(File Transfer Protocol)



FTP stands for File transfer protocol.

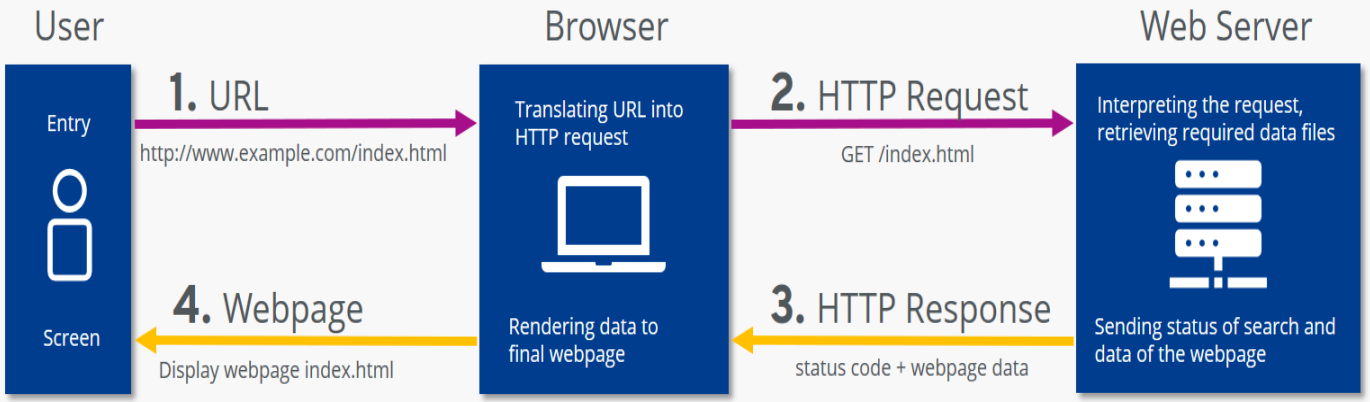
- FTP is a standard internet protocol provided by TCP/IP used for transmitting the files from one host to another.
- It is mainly used for transferring the web page files from their creator to the computer that acts as a server for other computers on the internet.
- It is also used for downloading the files to computer from other servers.

Objectives of FTP

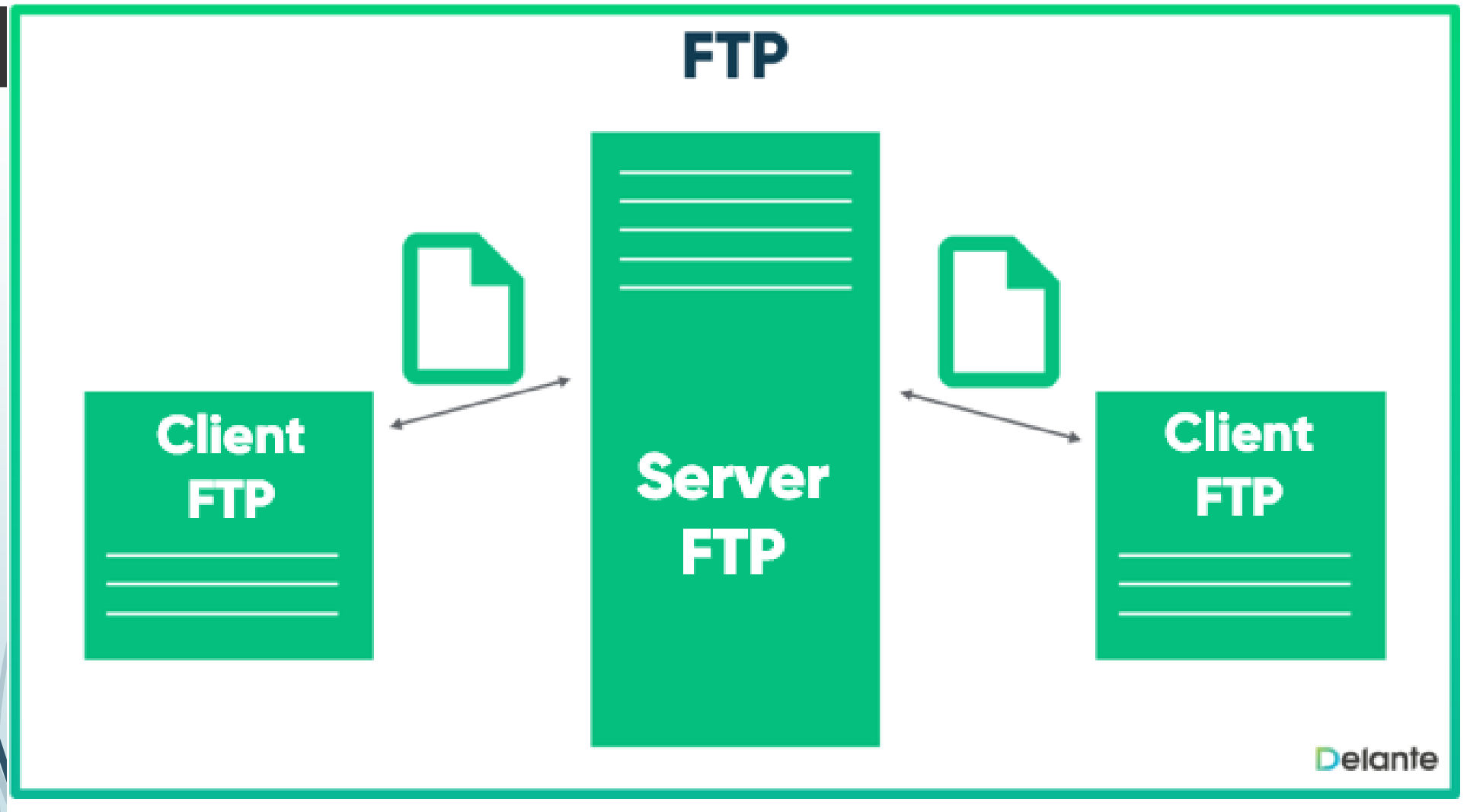
- It provides the sharing of files.
- It is used to encourage the use of remote computers.
- It transfers the data more reliably and efficiently.

HTTP

Communication process according to HTTP



IONOS


FTP
Client
FTP
Server
FTP
Client
FTP
Delante

HTTP Vs FTP

Parameter	FTP	HTTP
Full Form	File Transfer Protocol	Hyper Text Transfer Protocol
Port Number	TCP port no 20 and 21	TCP port no 80 and 8080
RFC	RFC959, RFC765, RFC1738	RFC2616, RFC7230 and RFC7231
Philosophy	Used to transfer files from remote computer after connection is established	Used to transfer web pages from remote server after internet connection is established.
Communication	2-way communication system where upload and download of files from client to server can occur.	1-way communication system where content including pictures and texts can be transferred from server to client.
Speed of download	FTP is slower than HTTP	HTTP is faster than FTP when downloading one big file. HTTP can use parallel chunk download which makes it 6x times faster than FTP
Applicability	Used to access and transfer files.	HTTP is used to view websites.
Client	FTP can be accessed via the command line or a GUI	The common HTTP client is the browser
Usage	Used by fewer people	Most widely used
Authentication	Requires username and password for authentication	Does not requires username and password for authentication


Thank You!

Chapter 6

Information Concept and Security

Definition of Data

- Data can be defined as a representation of facts, concepts, or instructions in a formalized manner, which should be suitable for communication, interpretation, or processing by human or electronic machine.

- Data is represented with the help of characters such as alphabets (A-Z, a-z), digits (0-9) or special characters (+,-,/,*,<,>,= etc.)

Information

- Information is organized or classified data, which has some meaningful values for the receiver. Information is the processed data on which decisions and actions are based.
- For the decision to be meaningful, the processed data must qualify for the following characteristics −
- Timely − Information should be available when required.
- Accuracy − Information should be accurate.
- Completeness − Information should be complete.

Need of information

- We need information technology in today's world to establish faster communication, maintain electronic storage and provide protection to records.
- In a simple way, IT makes a system of electronic storage to provide protection to company's records.
- Customer demands for secured maintenance files and all is made possible by IT.

Data	Information
Data refers to raw facts that have no specific meaning.	Information refers to processed data that has a purpose and meaning.
The word 'data' is derived from the Latin word 'datum', which means 'something that is given'.	The word "information" is derived from the Latin word "informatiō", which means "formation or conception".
The data is independent of the information.	Information is dependent on data.
Data or raw data is not enough to make a decision.	The information is sufficient to help make a decision in the respective context.

SECURITY VERSUS PRIVACY

SECURITY	PRIVACY
Security refers to protection against unauthorized access.	Privacy defines the ability to protect personally identifiable information.
Security provides protection for all types of data and information including the ones that are stored electronically.	Privacy means protecting sensitive information related to individuals and organizations.
Security can be achieved without privacy.	Privacy cannot be achieved without security.
Security program focuses on all sorts of information assets that an organization collects.	Privacy program focuses on personal information such as names, addresses, social security numbers, log in credentials, financial accounts information, etc.
It implements security protocols to provide confidentiality, integrity and availability of information assets.	It refers to protection of privacy rights with respect to processing of personal data.

Data security

- Data security is the process of protecting corporate data and preventing data loss through unauthorized access.
- This includes protecting your data from attacks that can encrypt or destroy data as well as attacks that can modify or corrupt your data.
- Data security also ensures data is available to anyone in the organization who has access to it.

Types of Data Security

Access Controls

- This type of data security measures includes limiting both physical and digital access to critical systems and data.
- This includes making sure all computers and devices are protected with mandatory login entry, and that physical spaces can only be entered by authorized personnel.

Authentication

- Similar to access controls, authentication refers specifically to accurately identifying users before they have access to data. This usually includes things like passwords, PIN numbers, security tokens, swipe cards, or biometrics.

Backups & Recovery

- Good data security means you have a plan to securely access data in the event of system failure, disaster, data corruption, or breach. You'll need a backup data copy, stored on a separate format such as a physical disk, local network, or cloud to recover if needed.

Data Masking

- By using data masking software, information is hidden by obscuring letters and numbers with proxy characters. This effectively masks key information even if an unauthorized party gains access to it. The data changes back to its original form only when an authorized user receives it.

Encryption

- A computer algorithm transforms text characters into an unreadable format via encryption keys. Only authorized users with the proper corresponding keys can unlock and access the information. Everything from files and a database to email communications can — and should — be encrypted to some extent.

Computer Virus

- A computer virus[1] is a type of computer program that, when executed, replicates itself by modifying other computer programs and inserting its own code. If this replication succeeds, the affected areas are then said to be "infected" with a computer virus, a metaphor derived from biological viruses.

- Computer viruses generally require a host program. The virus writes its own code into the host program. When the program runs, the written virus program is executed first, causing infection and damage. A computer worm does not need a host program, as it is an independent program or code chunk. Therefore, it is not restricted by the host program, but can run independently and actively carry out attacks.

- Virus writers use social engineering deceptions and exploit detailed knowledge of security vulnerabilities to initially infect systems and to spread the virus. Viruses use complex anti-detection/stealth strategies to evade antivirus software. Motives for creating viruses can include seeking profit (e.g., with ransomware), desire to send a political message, personal amusement, to demonstrate that a vulnerability exists in software, for sabotage and denial of service, or simply because they wish to explore cybersecurity issues, artificial life and evolutionary algorithms.

Computer virus symptoms

A virus can cause many problems to a computer. Some of these are:

- It can reformat the hard disk.
- It can show abnormal write protected errors.
- It can delete or damage the files.
- It can reduce the speed of the computer system by decreasing the computer memory.
- It can cause the system to hang frequently.
- It can cause weird movements or patterns on the screen.

Types of Computer Viruses

- Worm
  - a virus that replicates itself over and over in the computer's memory until the computer can barely function causing your computer to work more slowly.
  - Works slowly through files
- Time bomb
  - Virus that does not cause its damage until a certain date or until the system has been booted a certain number of times.
- Logic bomb
  - A virus that becomes active when a particular activity happens.
  - Ex. appearance or disappearance of specified data.
- Trojan horse
  - A virus that hides itself inside another legitimate program causing it to do something different than what it is expected to do.
    http://www.commoncraft.com/video/computer-viruses-and-threats

Anti-virus

- Antivirus software (abbreviated to AV software), also known as anti-malware, is a computer program used to prevent, detect, and remove malware.

- Antivirus software was originally developed to detect and remove computer viruses, hence the name. However, with the proliferation of other malware, antivirus software started to protect from other computer threats. In particular, modern antivirus software can protect users from malicious browser helper objects (BHOs), browser hijackers, ransomware, keyloggers, backdoors, rootkits, trojan horses, worms, malicious LSPs, diallers, fraud tools, adware, and spyware.[1] Some products also include protection from other computer threats, such as infected and malicious URLs, spam, scam and phishing attacks, online identity (privacy), online banking attacks, social engineering techniques, advanced persistent threat (APT), and botnet DDoS attacks.

List of Anti viruses


Thank
You