Unit 2

Input Device & Output Device

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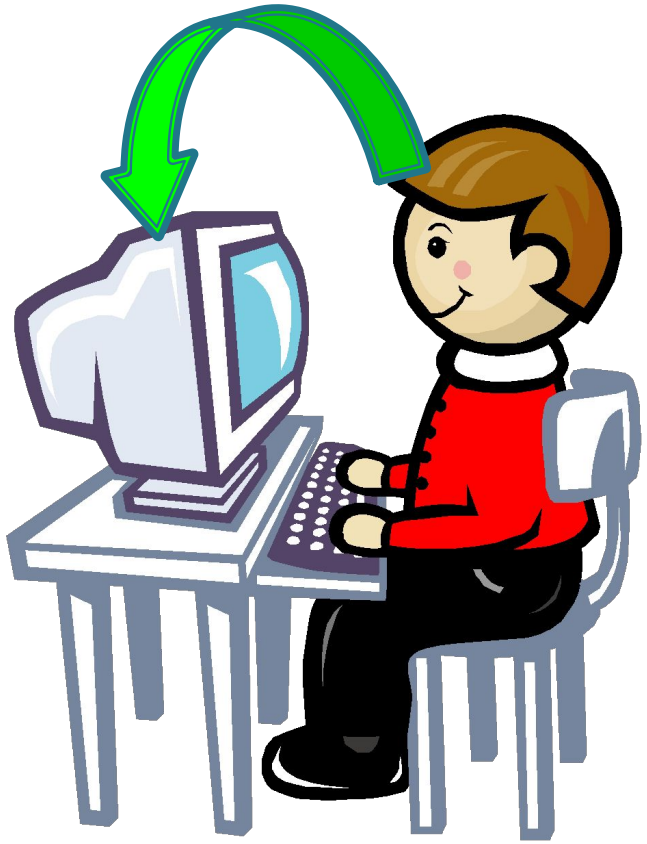
Input Device



An **INPUT DEVICE** lets you **TALK TO** the computer

Parts of a Computer
Input Devices

- Mouse
- Keyboard
- Microphone
- Scanner
- Webcam

Some of the Input Devices

- Following are few of the important input devices which are used in a computer:
  - Keyboard
  - Mouse
  - Joy Stick
  - Light pen
  - Track Ball
  - Scanner
  - Graphic Tablet
  - Microphone
  - Magnetic Ink Card Reader(MICR)
  - Optical Character Reader(OCR)

Input devices mentioned in your syllabus

- Keyboard
- Mouse
- Scanners

- Extra input devices I have mentioned in the slides for your knowledge purpose

Keyboards

- Keyboard is the most common and very popular input device which helps in inputting data to the computer.
- The layout of the keyboard is like that of traditional typewriter, although there are some additional keys provided for performing additional functions.

Keyboards

- Keyboards are of two sizes 84 keys or 101/102 keys, but now keyboards with 104 keys or 108 keys are also available for Windows and Internet.
- The keys on the keyboard are as follows:

Sr.No	Keys	Description
1	Typing Keys	These keys include the letter keys (A-Z) and digit keys (0-9) which generally give same layout as that of typewriters.

Sr.No	Keys	Description
2	Numeric Keypad	It is used to enter numeric data or cursor movement. Generally, it consists of a set of 17 keys that are laid out in the same configuration used by most adding machines and calculators.
3	Function Keys	The twelve 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	These keys provide cursor and screen control. 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, Num Lock, Space bar, Tab, and Print Screen.

Keyboard - Eg

Mouse

- Mouse is most popular pointing device.
- It is a very famous cursor-control device having a small palm size box with a round ball at its base which senses the movement of mouse and sends corresponding signals to CPU when the mouse buttons are pressed.

Mouse

- Generally it has two buttons called left and right button and a wheel is present between the buttons.
- Mouse can be used to control the position of cursor on screen, but it cannot be used to enter text into the computer

Mouse

- Advantages
  - Easy to use
  - Not very expensive
  - Moves the cursor faster than the arrow keys of keyboard.

Actions Performed By Pointer Device

- The action performed using pointer device is Pointing, Clicking, and Double clicking, And Dragging.
- **Pointing:** Moving mouse pointer on desired location or item is known as pointing.
- **Clicking:** The action of pressing any button of the mouse and releasing it is known as Clicking. To select an item we click the left button once, while to display the short cut menus of Windows XP we click the right button once.

Actions Performed By Pointer Device

- **Double clicking:** The action of pressing the left mouse button twice in quick succession known as Double clicking.
- **Dragging:** Moving of mouse while keeping the left button pressed is called Dragging. It is used to move to an item from one position to other on the desktop.

Joystick

- Joystick is also a pointing device which is used to move cursor position on a monitor screen.
- It is a stick having a spherical ball at its both lower and upper ends.
- The lower spherical ball moves in a socket.
- The joystick can be moved in all four directions.

Joystick

- The function of joystick is similar to that of a mouse.
- It is mainly used in Computer Aided Designing(CAD) and playing computer games.

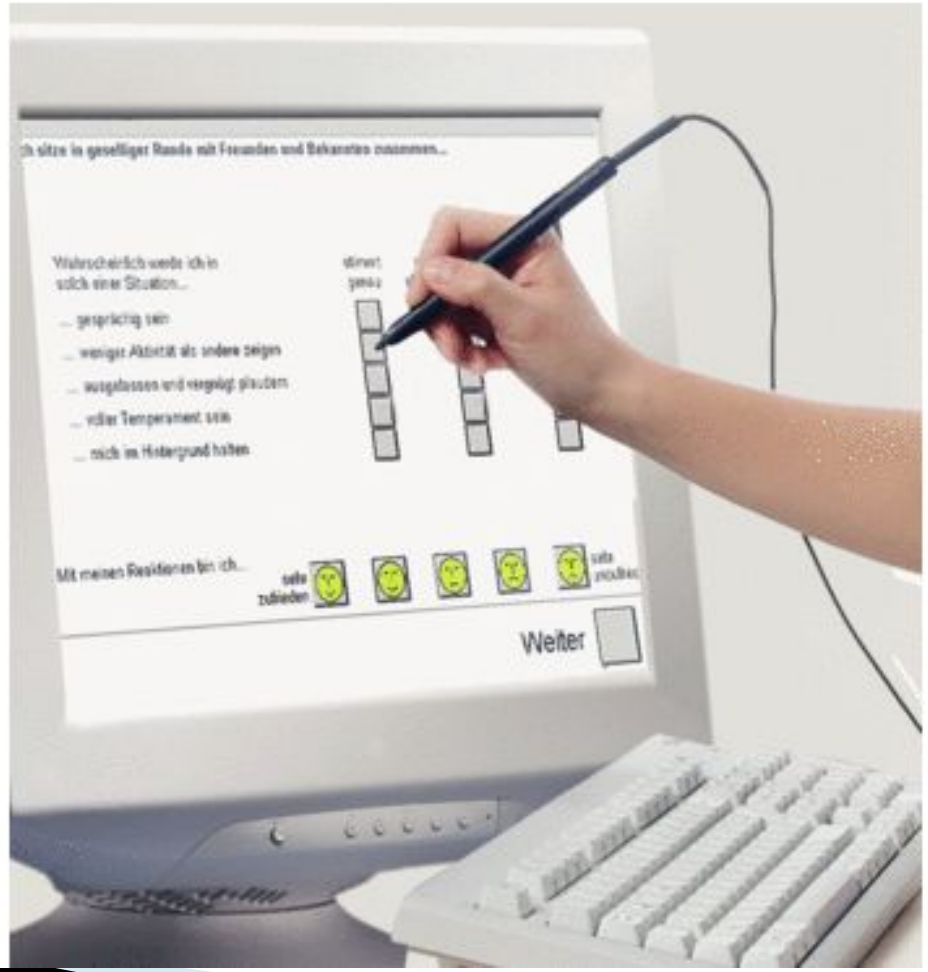
Light Pen

- Light pen is a computer input device that looks like a pen.
- The tip of light pen contains a light sensitive detector that enables the user to point to or select objects on the display screen.
- Its light sensitive tip detects the object location and sends the corresponding signals to the CPU.
- It also helps you draw on the screen if needed.

Light Pen

- When the tip of a light pen is moved over the monitor screen and pen button is pressed, its photocell sensing element detects the screen location and sends the corresponding signal to the CPU.

Light Pen



Track Ball

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

Track Ball

Scanner

- Scanner is an input device which works more like a photocopy machine.
- It is used when some information is available on a paper and it is to be transferred to the hard disc of the computer for further manipulation.

Scanner

- Scanner captures images from the source which are then converted into the digital form that can be stored on the disc.
- These images can be edited before they are printed.

Scanner

Digitizer

- Digitizer is an input device which converts analog information into digital form.
- Digitizer can convert a signal from the television or camera into a series of numbers that could be stored in a computer.
- They can be used by the computer to create a picture of whatever the camera had been pointed at.
-

Digitizer

- Digitizer is also known as Tablet or Graphics Tablet because it converts graphics and pictorial data into binary inputs.
- A graphic tablet as digitizer is used for doing fine works of drawing and image manipulation applications.

Digitizer

Microphone

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

Microphone

Digital Cameras

- A **digital camera** lets you capture pictures and videos in a digital format.
- By connecting the camera to your computer's USB port, you can transfer the images from the camera to the computer.

Web Cameras

- A **web camera**—or **webcam**—is a type of input device that can record **videos** and take **pictures**.
- It can also transmit video over the Internet in **real time**, which allows for **video chat** or **video conferencing** with someone else.
- Many webcams also include a microphone for this reason.

Other Input Devices

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

Optical character recognition

- OCR is an input device used to read a printed text. OCR scans text optically character by character, converts them into a machine readable code and stores the text on the system memory.

Optical Mark Recognition

- OMR is a special type of optical scanner used to recognize the type of mark made by pen or pencil. It is used where one out of a few alternatives is to be selected and marked.
- It is specially used for checking the answer sheets of examinations having multiple choice questions.

Magnetic ink character recognition

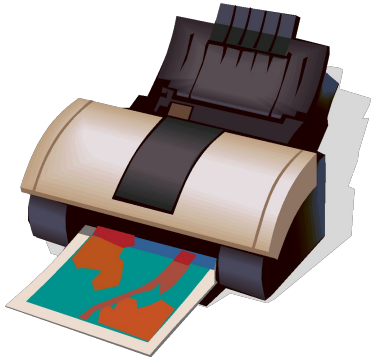
- MICR input device is generally used in banks because of a large number of cheques to be processed every day.
- The bank's code number and cheque number are printed on the cheques with a special type of ink that contains particles of magnetic material that are machine readable.
- This reading process is called Magnetic Ink Character Recognition (MICR). The main advantages of MICR is that it is fast and less error prone.

Bar code reader

- Bar Code Reader is a device used for reading bar coded data (data in form of light and dark lines).
- Bar coded data is generally used in labelling goods, numbering the books etc. It may be a hand held scanner or may be embedded in a stationary scanner.
- Bar Code Reader scans a bar code image, converts it into an alphanumeric value which is then fed to the computer to which bar code reader is connected.

Output Device

An **OUTPUT DEVICE** lets the computer **TALK TO** you



Parts of a Computer
Output Devices

- Monitor

- Printer

- Speaker/Headphone

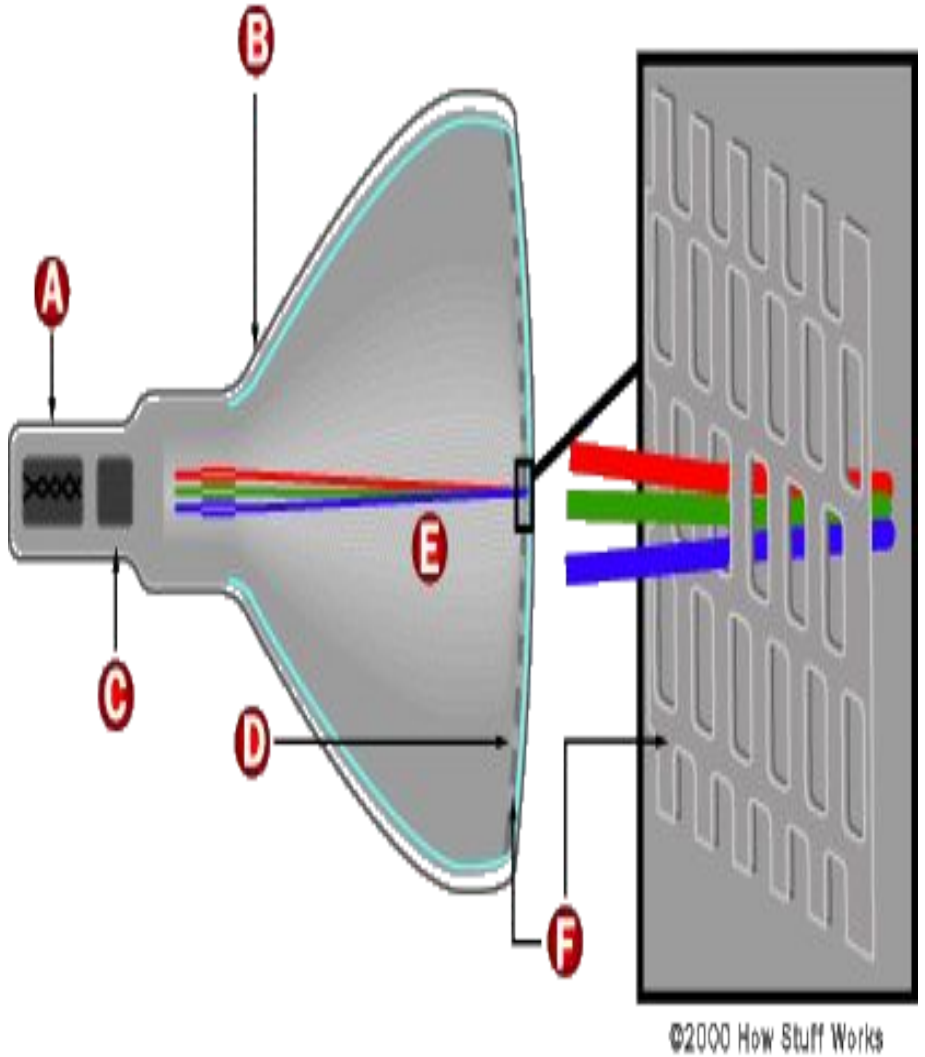
Output Device - Monitors

- The monitor is the most common output device. It displays information in a pictorial form or commonly referred to as pixels.
- More the number of pixels, the better is the picture clarity and sharpness. It includes a screen, circuitry, and the box, in which the circuit is enclosed. The user can view the processed data on the screen.
- It is the main output device that displays the processed data or information as text, images, audio or video.
- There are two kinds of viewing screen used for monitors.
  - Cathode-Ray Tube (CRT)
  - Flat- Panel Display

CRT Monitor

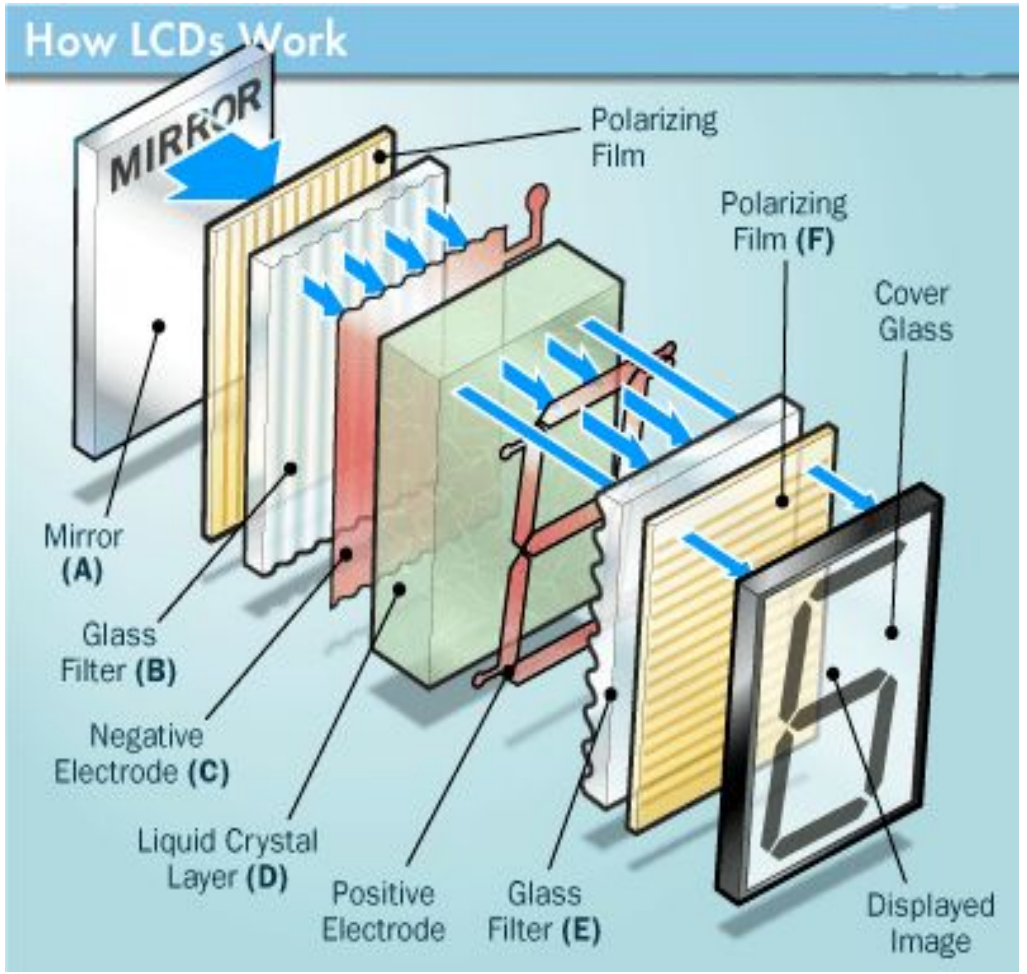
- CRT monitors are based on the cathode ray tubes. They are like vacuum tubes which produce images in the form of video signals.
- Cathode rays tube produces a beam of electrons through electron guns that strike on the inner phosphorescent surface of the screen to produce images on the screen.
- The monitor contains millions of phosphorus dots of red, green and blue color.

- The main components of a CRT monitor include the electron gun assembly, deflection plate assembly, fluorescent screen, glass envelope, and base.
- The front (outer surface) of the screen onto which images are produced is called the face plate. It is made up of fiber optics.
- There are three electron beams that strike the screen: red, green, and blue. So, the colors which you see on the screen are the blends of red, blue and green lights.
- The magnetic field guides the beams of electrons. Although LCDs have replaced the CRT monitors, the CRT monitors are still used by graphics professionals because of their color quality.



LCD Monitor

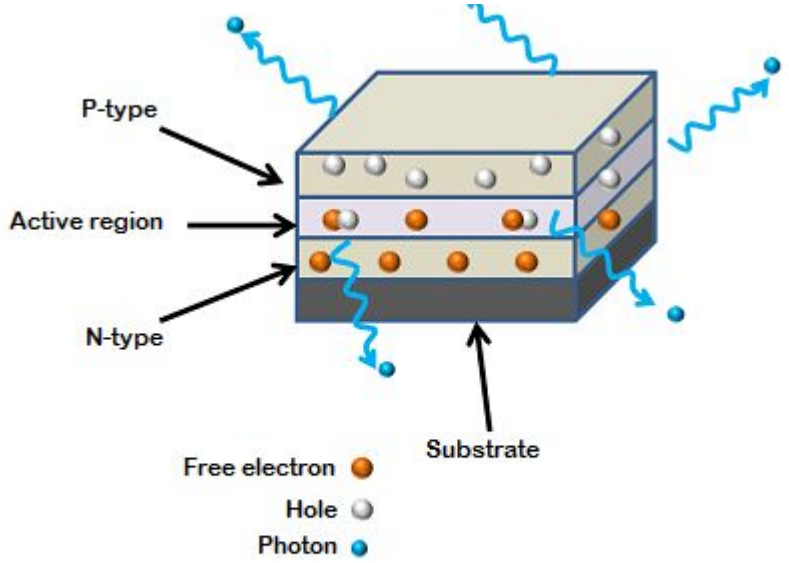
- The LCD monitor is a flat panel screen that is compact and light-weight as compared to CRT monitors.
- It is based on **liquid crystal display** technology which is used in the screens of laptops, tablets, smart phones, etc.
- An LCD screen comprises two layers of polarized glass with a liquid crystal solution between them.
- When the light passes through the first layer, an electric current aligns the liquids crystals. The aligned liquid crystals allow a varying level of light to pass through the second layer to create images on the screen.



- The LCD screen has a matrix of pixels that display the image on the screen.
- Old LCDs had passive-matrix screens in which individual pixels are controlled by sending a charge. A few electrical charges could be sent each second that made screens appear blurry when the images moved quickly on the screen.
- Modern LCDs use active-matrix technology and contain thin film transistors (TFTs) with capacitors.
- This technology allows pixels to retain their charge. So, they don’t make screen blurry when images move fast on the screen as well as are more efficient than passive-matrix displays.

LED monitor

- The LED monitor is an improved version of an LCD monitor.
- It also has a flat panel display and uses liquid crystal display technology like the LCD monitors.
- The difference between them lies in the source of light to backlight the display.
- The LED monitor has many LED panels, and each panel has several LEDsto backlight the display, whereas the LCD monitors use cold cathode fluorescent light to backlight the display.
- Modern electronic devices such as mobile phones, LED TVs, laptop and computer screens, etc., use a LED display as it not only produces more brilliance and greater light intensity but also consumes less power.

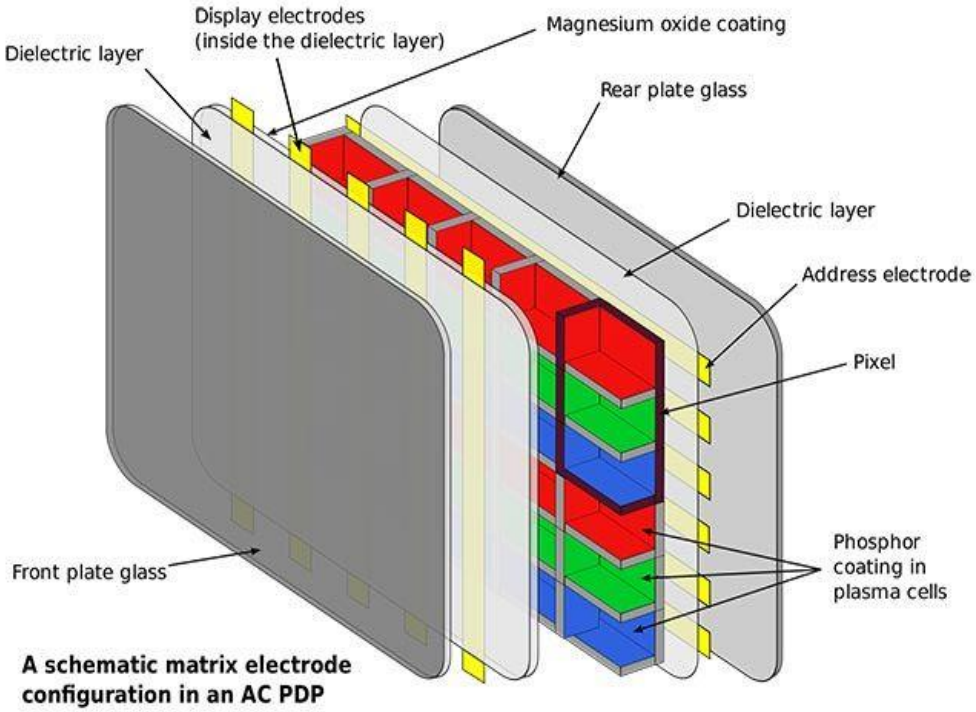


Construction of LED

Physics and Radio-Electronics

Plasma Monitor

- The plasma monitor is also a flat panel display that is based on plasma display technology.
- It has small tiny cells between two glass panels. These cells contain mixtures of noble gases and a small amount of mercury.
- When voltage is applied, the gas in the cells turns into a plasma and emits ultraviolet light that creates images on the screen, i.e., the screen is illuminated by a tiny bit of plasma, a charged gas.
- Plasma displays are brighter than liquid crystal displays (LCD) and also offer a wide viewing angle than an LCD.
- Plasma monitors provide high resolutions of up to 1920 X 1080, excellent contrast ratios, wide viewing angle, a high refresh rate and more. Thus, they offer a unique viewing experience while watching action movies, sports games, and more.



A schematic matrix electrode configuration in an AC PDP

Output Device - Printers

- A printer produces hard copies of the processed data. It enables the user, to print images, text or any other information onto the paper.
- Based on the printing mechanism, the printers are of two types: Impact Printers and Non-impact Printers.
- **Impact Printers: They are of two types:**
  - Character Printers
    - Dot Matrix printers
    - Daisy Wheel printers
  - Line printers
    - Drum printers
    - Chain printers
- **Non-impact printers: They are of two types:**
  - Laser printers
  - Inkjet printers

Classification/types of Printers

- Printers
  - Impact Printers
    - Characters Printer
      - Dot Matrix Printer
      - Daisy Printer
    - Line Printer
      - Drum Printer
      - Chain Printer
  - Non-Impact Printers
    - Laser Printer
    - Inkjet Printers

Impact Printer

- The impact printer uses a hammer or print head to print the character or images onto the paper. The hammer or print head strikes or presses an ink ribbon against the paper to print characters and images.

Impact printers are further divided into two types.

- Character Printers
- Line printers

A) Character Printers

- Character printer prints a single character at a time or with a single stroke of the print head or hammer.
- It does not print one line at a time.
- Today, these printers are not in much use due to their low speed and because only the text can be printed.

The character printers are of two types,

Dot Matrix printer and

Daisy Wheel printer

DOT MATRIX PRINTER

- Dot Matrix Printer is an impact printer. The characters and images printed by it are the patterns of dots.
- These patterns are produced by striking the ink soaked ribbon against the paper with a print head.
- The print head contains pins that produce a pattern of dots on the paper to form the individual characters.
- The print head of a 24 pin dot matrix contains more pins than a 9 pin dot matrix printer, so it produces more dots which results in better printing of characters.
- To produce color output, the black ribbon can be changed with color stripes. The speed of Dot Matrix printers is around 200-500 characters per second.

Daisy Wheel Printer

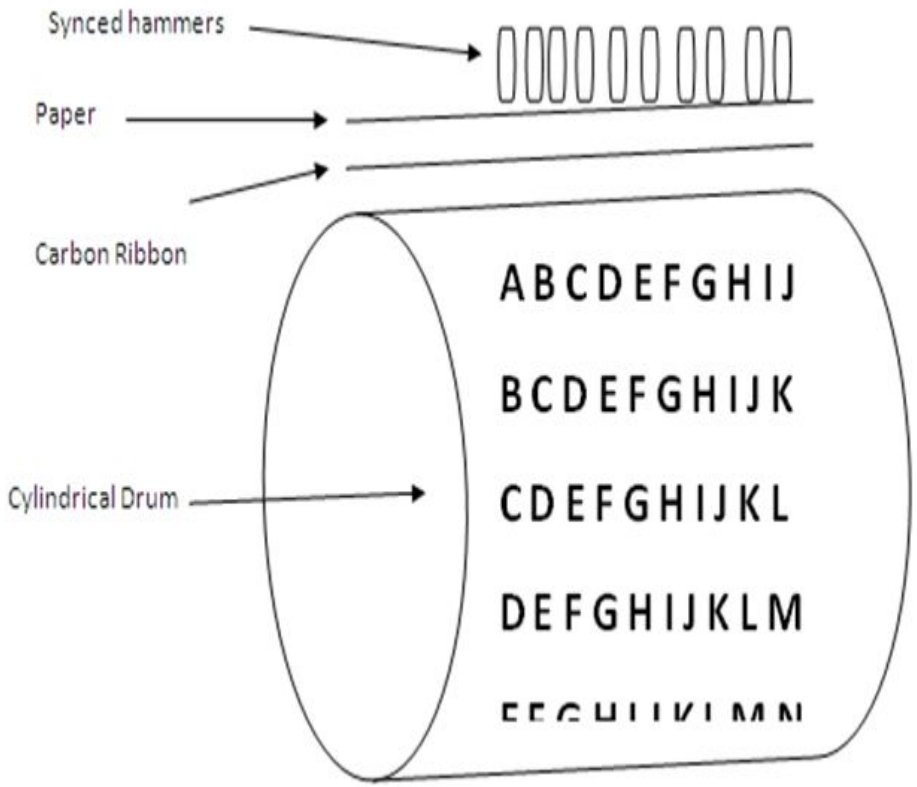
- Daisy Wheel Printer was invented by David S. Lee at Diablo Data Systems.
- It consists of a wheel or disk that has spokes or extensions and looks like a daisy, so it is named Daisy Wheel printer.
- At the end of extensions, molded metal characters are mounted.
- To print a character the printer rotates the wheel, and when the desired character is on the print location the hammer hits disk and the extension hits the ink ribbon against the paper to create the impression.
- It cannot be used to print graphics and is often noisy and slow, i.e., the speed is very low around 25-50 characters per second. Due to these drawbacks these printers have become obsolete.

B) Line Printers

- Line printer, which is also as a bar printer, prints one line at a time.
- It is a high-speed impact printer as it can print 500 to 3000 lines per minute.
- Drum printer and chain printer are examples of line printers.

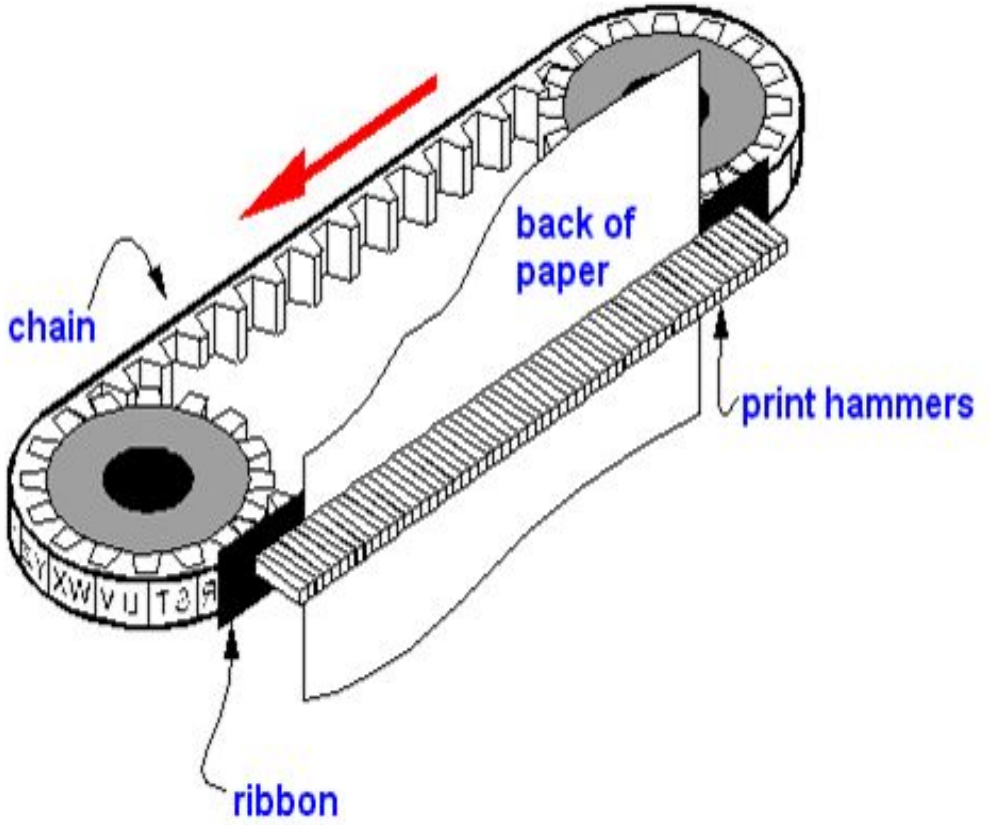
Drum Printer

- Drum printer is a line printer that is made of a rotating drum to print characters.
- The drum has circular bands of characters on its surface.
- It has a separate hammer for each band of characters.
- When you print, the drum rotates, and when the desired character comes under the hammer, the hammer strikes the ink ribbon against the paper to print characters.
- The drum rotates at a very high speed and characters are printed by activating the appropriate hammers. Although all the characters are not printed at a time, they are printed at a very high speed.
- Furthermore, it can print only a predefined style as it has a specific set of characters. These printers are known to be very noisy due to the use of hammering techniques.



CHAIN PRINTER

- Chain printer is a line printer that uses a rotating chain to print characters.
- The characters are embossed on the surface of the chain.
- The chain rotates horizontally around a set of hammers, for each print location one hammer is provided, i.e., the total number of hammers is equal to the total number of print positions.
- The chain rotates at a very high speed and when the desired character comes at the print location, the corresponding hammer strikes the page against the ribbon and character on the chain.
- They can type 500 to 3000 lines per minute. They are also noisy due to the hammering action.



Non-impact Printers

- Non-impact printers don't print characters or images by striking a print head or hammer on the ink ribbon placed against the paper.
- They print characters and images without direct physical contact between the paper and the printing machinery.
- These printers can print a complete page at a time, so they are also known as page printers.
- The common types of non-impact printers are **Laser printer** and **Inkjet printer.**

Laser Printers

- A laser printer is a non-impact printer that uses a laser beam to print the characters.
- The laser beam hits the drum, which is a photoreceptor and draws the image on the drum by altering electrical charges on the drum.
- The drum then rolls in toner, and the charged image on the drum picks the toner.
- The toner is then printed on the paper using heat and pressure. Once the document is printed, the drum loses the electric charge and the remaining toner is collected.
- The laser printers use powdered toner for printing instead of liquid ink and produce quality print objects with a resolution of 600 dots per inch (dpi) or more.

Inkjet Printers

- The inkjet printer is a non-impact printer that prints images and characters by spraying fine,ionized drops of ink.
- The print head has tiny nozzles to spray the ink. The printer head moves back and forth and sprays ionized drops of ink on the paper, which is fed through the printer.
- These drops pass through an electric field that guides the ink onto the paper to print correct images and characters.
- An inkjet printer has cartridges that contain ink.
- Modern inkjet printers are color printers that have four cartridges containing different colors: Cyan, Magenta, Yellow, and Black.
- It is capable of printing high-quality images with different colors. It can produce print objects with a resolution of at least 300 dots per inch (dpi).

Inkjet Printers

- **ADVANTAGES**
  - High quality printing
  - More reliable
- **DISADVANTAGES**
  - Expensive as cost per page is high
  - Slow as compared to laser printer

Inkjet Printers

Modems

- The **modem** is an **input** and an **output** device.
- It is used for sending and receiving information and data over telephone lines.
- There are at least two ways that can be used to represent data and information electronically.
- One way is digital and another way is analogue.
- Computer information is stored digitally, whereas information transmitted over telephone lines is transmitted in the form of analog waves.

Modem

- Modulator – Demodulator
- A network hardware device that modulates one or more carrier wave signals to encode digital information for transmission and demodulates signal to decode the transmitted information
- Modem enables a computer to transfer data over the telephone cable lines

Modem

- Modulate – process of converting binary information into analog signals
- Demodulate – process of converting analog signals back to binary information

Basic Types of Modem

- Onboard – Built on computer motherboard. Cannot be removed but can be disabled

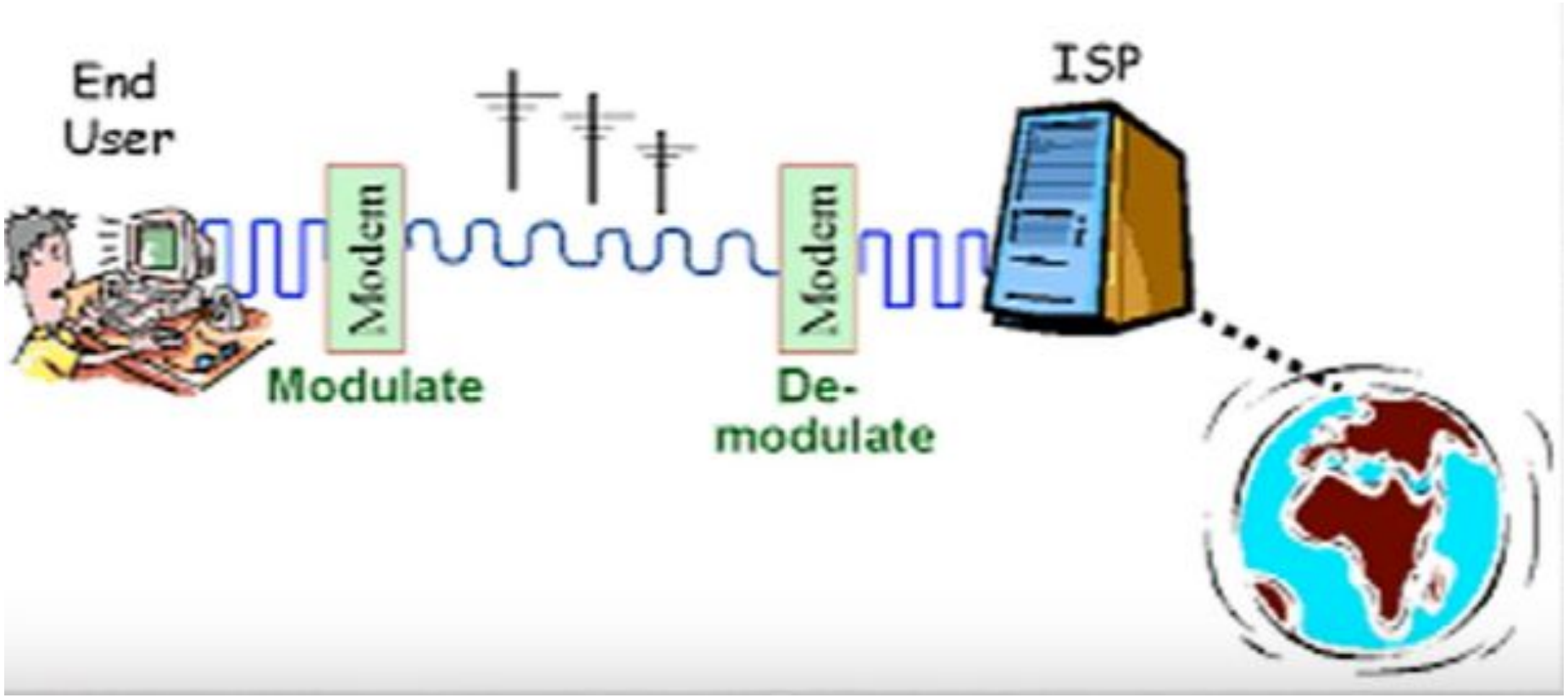
- **Internal** - A modem card that you can plug into an expansion slot on the motherboard. It is advisable to remove the telephone line when not used

Internal Modem

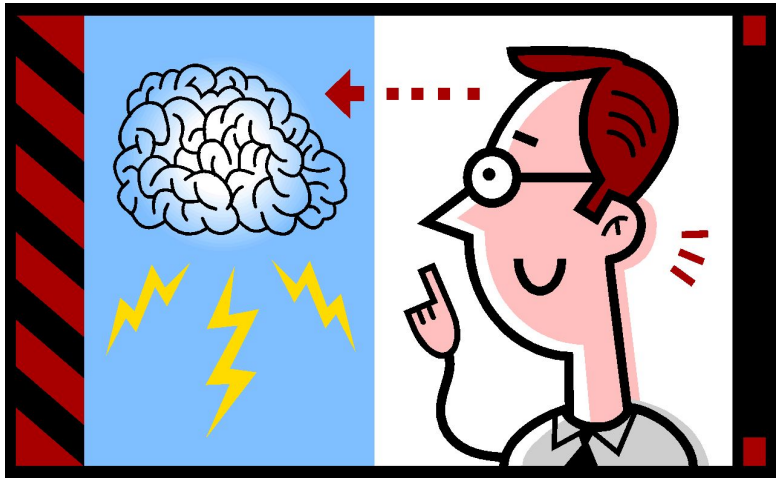
- **External** - Connected to the PC through a cable, which is plugged into serial port on the back of the system unit.

External Modem

Modem



The CPU



The **CPU**
(**C**entral **P**rocessing **U**nit) is the **brain** of a computer – it tells the other parts what to do

CPU (Central Processing Unit)

- CPU consists of the following features:
  - CPU is considered as the brain of the computer.
  - CPU performs all types of data processing operations.
  - It stores data, intermediate results and instructions(program).
  - It controls the operation of all parts of computer.

Computer - CPU(Central Processing Unit)

- CPU itself has following three components.
  - Memory or Storage Unit
  - Control Unit
  - ALU(Arithmetic Logic Unit)

Memory Unit or Storage Unit

- This unit can store instructions, data and intermediate results.
- This unit supplies information to the other units of the computer when needed.
- It is also known as internal storage unit or main memory or primary storage or Random access memory(RAM).
- Its size affects speed, power and capability.
- Primary memory and secondary memory are two types of memories in the computer.

Memory Unit or Storage Unit

- Functions of memory unit are:
  - It stores all the data and the instructions required for processing.
  - It stores intermediate results of processing.
  - It stores final results of processing before these results are released to an output device.
  - All inputs and outputs are transmitted through main memory.

MEMORY

- Memory is the essential part of the computer.
- It is used to store data and instructions, which are required by the CPU for processing
- Computer memory can be classified into different types
  - Primary Memory
    - RAM
    - ROM
  - Registers
  - Cache Memory
  - Secondary Memory
    - Floppy Disk
    - Hard Disk
    - Compact Disc (CD)
    - Digital Versatile Disc (DVD)
    - Flash Drive – means pen drive or USB Drive
    - Zip Drive – similar to portable disks
    - Blu-Ray Disc – similar to CD and DVD but can store upto 25GB of data

Control Unit

- This unit controls the operations of all parts of computer but does not carry out any actual data processing operations.
- Functions of this unit are:
  - It is responsible for controlling the transfer of data and instructions among other units of a computer.
  - It manages and coordinates all the units of the computer.

Control Unit

- It obtains the instructions from the memory, interprets them, and directs the operation of the computer.
- It communicates with Input/Output devices for transfer of data or results from storage.
- It does not process or store data.

ALU(Arithmetic Logic Unit)

- This unit consists of two subsections namely
- Arithmetic section
  - Function of arithmetic section is to perform arithmetic operations like addition, subtraction, multiplication and division. All complex operations are done by making repetitive use of above operations.
- Logic Section
  - Function of logic section is to perform logic operations such as comparing, selecting, matching and merging of data.

Introduction of Hardware and Software

Hardware:

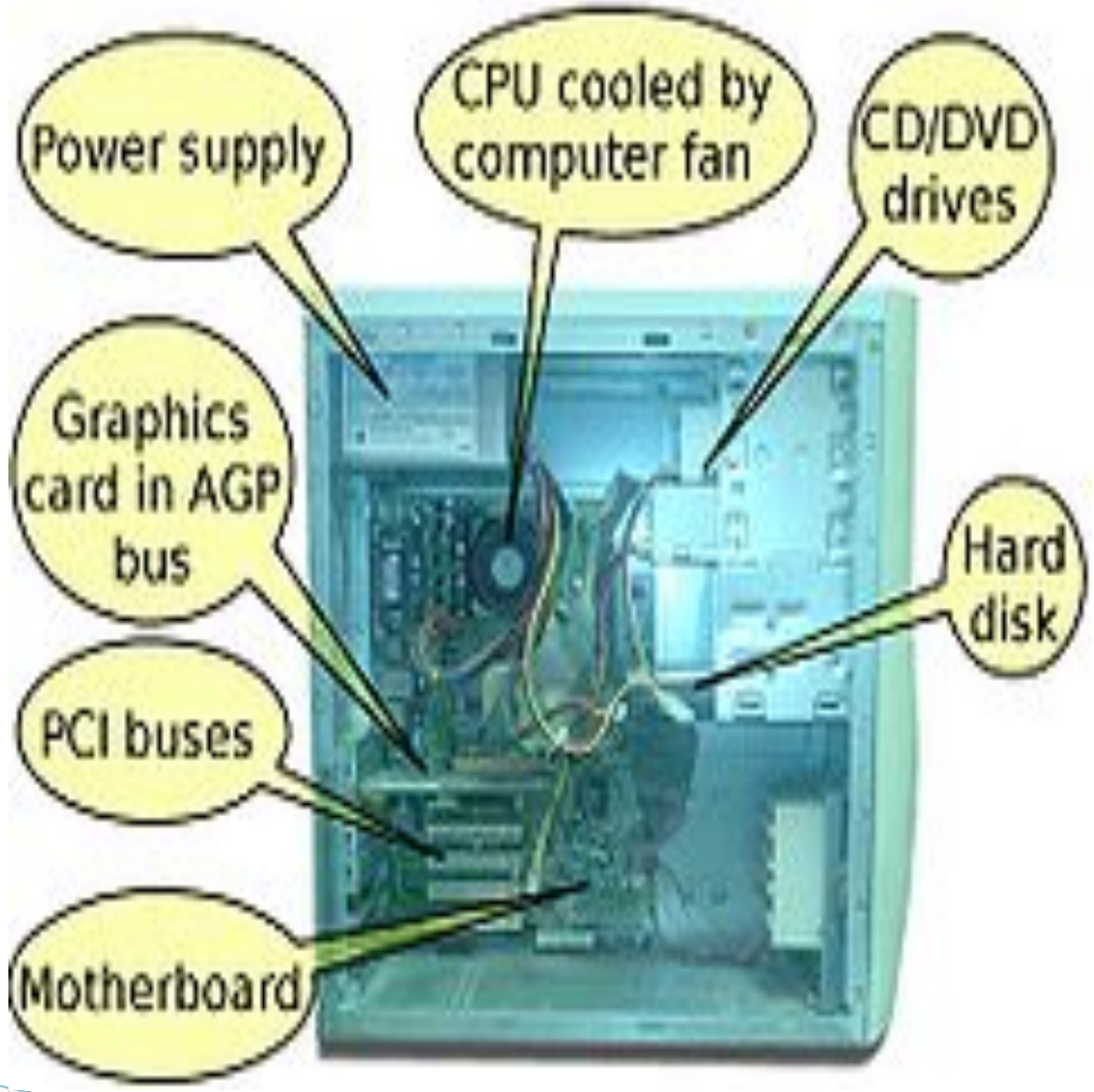
A computer system consists of hardware, the electronic devices that are capable of computing and manipulating information.

This is also sometime called the machinery or the equipment of the computer.

Examples of hardware in a computer are the keyboard, the monitor, the mouse and the **central processing unit**.

However, most of a computer's hardware cannot be seen; in other words, it is not an external element of the computer, but rather an internal one, surrounded by the computer's casing (tower).

A computer's hardware is comprised of many different parts, but perhaps the most important of these is the **motherboard**. The motherboard is made up of even more parts that power and control the computer.


Power supply
CPU cooled by computer fan
CD/DVD drives
Graphics card in AGP bus
Hard disk
PCI buses
Motherboard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Software:

Software is a set of instructions that carries out predefined tasks to complete a given job.

As we know, a computer cannot think or perform on its own. It performs operations like addition, subtraction, multiplication, and division only when the user instructs it to do so.

The user issues instructions and the CPU acts in accordance with the instructions. The sets of instructions, which control the sequence of operations, are known as programs, and collectively programs are called software. software systems into two major classes:

- **System software:** Helps run the computer hardware and computer system itself. System software includes operating systems, device drivers, and more. System software is almost always pre-installed on your computer.

- **Application software:** Allows users to accomplish one or more tasks. It includes word processing, web browsing and almost any other task for which you might install software. (Some application software is pre-installed on most computer systems.)

System Software

- The system software is collection of programs designed to operate, control and extend the processing capabilities of the computer itself. System software is generally prepared by computer manufactures.
- These software comprise of programs written in low level languages which interact with the hardware at a very basic level. System software serves as the interface between hardware and the end users.
- Some examples of system software are Operating System, Compilers, Interpreter, and Assemblers etc.

Features of System Software are following

- Close to system.
- Fast in speed.
- Difficult to design.
- Difficult to understand.
- Less interactive.
- Smaller in size.
- Difficult to manipulate.
- Generally written in low level language.

Application Software

- Application software is the software that is designed to satisfy a particular need of a particular environment. All software prepared by us in the computer lab can come under the category of Application software.
- Application software may consist of a single program, such as a Microsoft's notepad for writing and editing simple text. It may also consists of a collection of programs, often called a software package, which work together to accomplish a task, such as a spreadsheet package.
- **Examples of Application software are following**
- Payroll Software
- Inventory Management Software
- Railways Reservation Software
- Microsoft Office Suite Software
- Microsoft Word
- Microsoft Excel
- Microsoft Powerpoint

Features of Application Software are following

- It is close to user.
- It is easy to design.
- More interactive.
- Slow in speed.
- Generally written in high level language.
- Easy to understand.
- Easy to manipulate and use.
- Bigger in size and requires large storage space.

Relationship between Hardware and Software

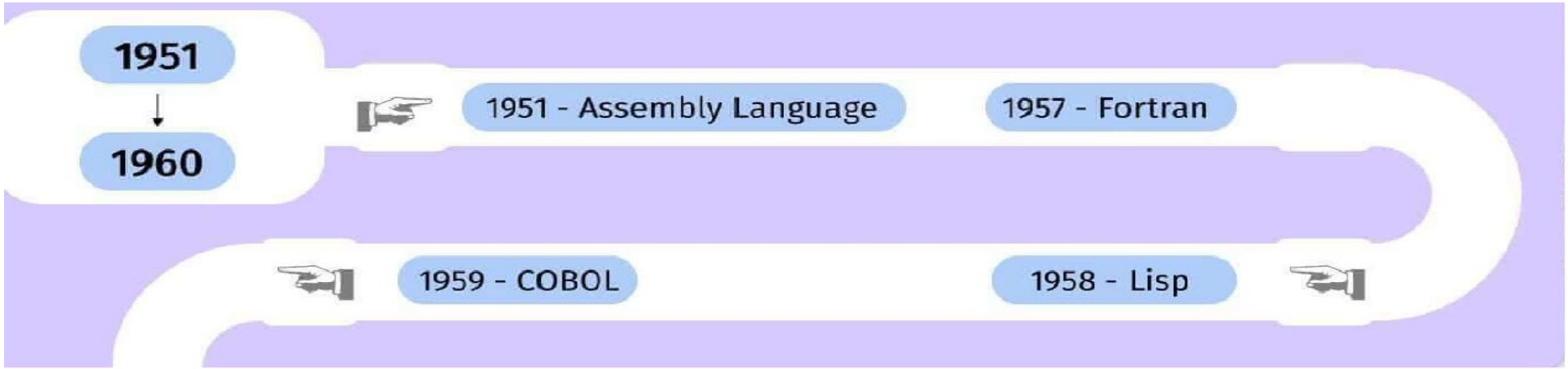
- Mutually dependent. Both of them must work together to make computer produce a useful output.
- Software cannot be utilized without supporting hardware.
- Hardware without set of programs to operate upon cannot be utilized and is useless.
- To get a particular job done on the computer, relevant software should be loaded into the hardware
- Hardware is a onetime expense.
- Software development is very expensive and is a continuing expense.
- Different software can be loaded on hardware to run different jobs.
- Software acts as an interface between the user and the hardware.
- If hardware is the 'heart' of a computer system, then software is its 'soul'. Both are complimentary to each other.

Computer languages

- Programming is an interesting activity which gives instant results in most of the cases based on the programs written by us.
- It's always fun to write programs. The programming languages are evolved to great extent over past few decades from Assembly Language to Kotlin and Swift.

Evolution of programming languages

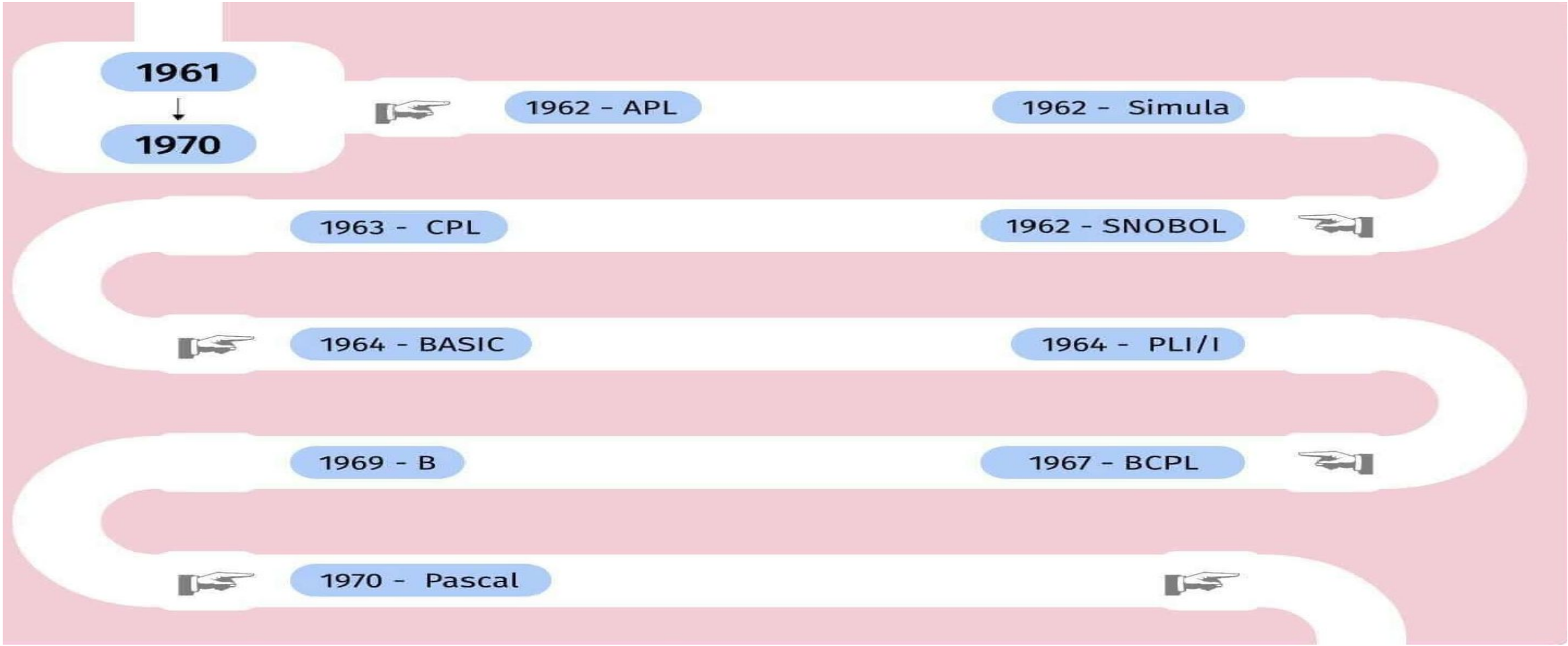
1951 - 1960 - The long-lasting languages evolved over this decade are **Fortran** and **COBOL** and laid down the foundation for further evolution. Assembly Language - the first in this list is a low-level programming language and works closure to hardware and specific to computer architecture.



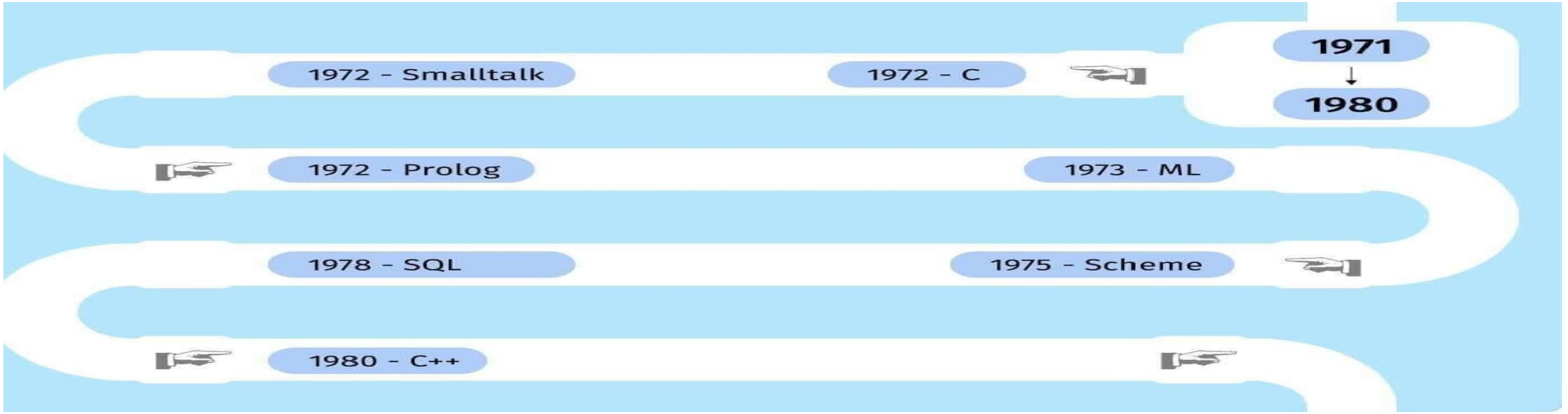
Assembly language– Assembly language is a low-level programming language for a computer or other programmable device specific to a particular computer architecture in contrast to most high-level programming languages, which are generally portable across multiple systems.

Fortran language- Fortran was originally developed by a team at IBM in 1957 for scientific calculations. Later developments made it into a high level programming language.

COBOL language- COBOL stands for Common Business Oriented Language.The US Department of Defense, in a conference, formed CODASYL (Conference on Data Systems Language) to develop a language for business data processing needs which is now known as COBOL.
COBOL is used for writing application programs and we cannot use it to write system software. The applications like those in defense domain, insurance domain, etc. which require huge data processing make extensive use of COBOL.



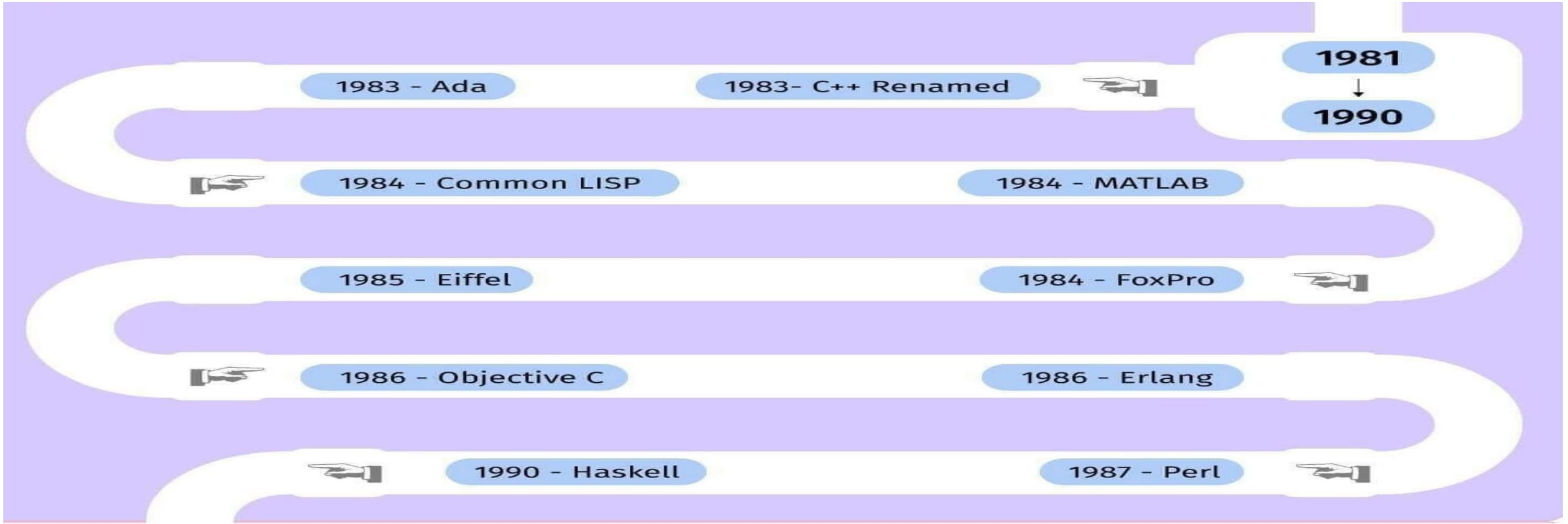
BASIC (**Beginners' All-purpose Symbolic Instruction Code**) is a family of general-purpose, high-level programming languages whose design philosophy emphasizes ease of use. The original version was designed by John G. Kemeny and Thomas E. Kurtz and released at Dartmouth College in 1964. They wanted to enable students in fields other than science and mathematics to use computers.



C language- is a powerful general-purpose programming language. It can be used to develop software like operating systems, databases, compilers, and so on. C programming is an excellent language to learn to program for beginners.

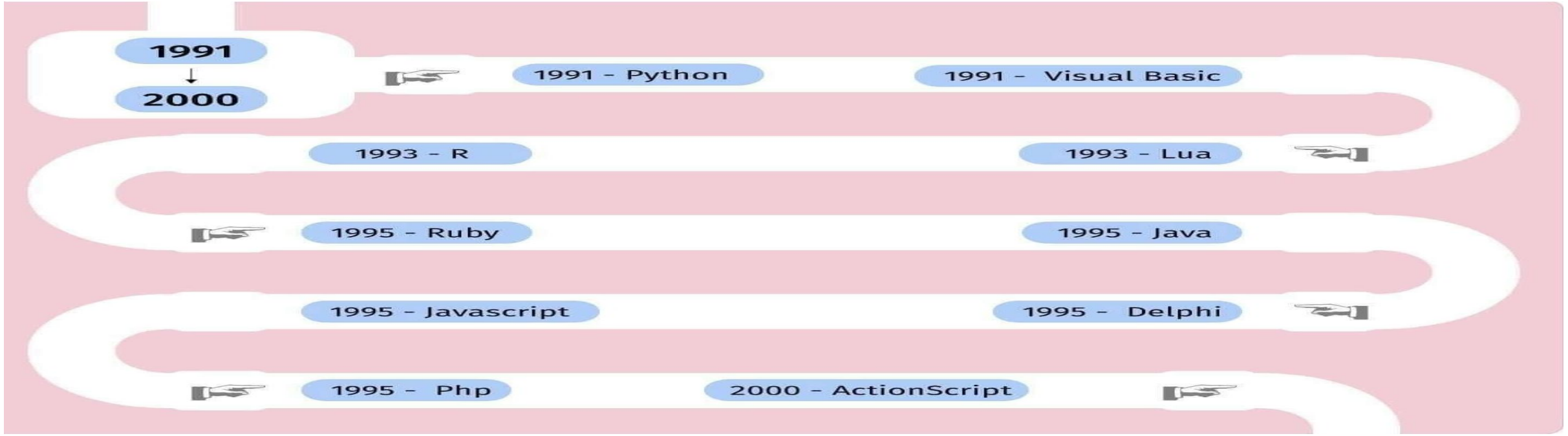
SQL language- is a programming language that enables programmers to work with that data. SQL stands for **Structured Query Language**. Essentially, it's a language that allows communication with databases in order to manage all the data they contain.

C++ language- is a powerful general-purpose programming language. It can be used to develop operating systems, browsers, games, and so on. C++ supports different ways of programming like procedural, object-oriented, functional, and so on. This makes C++ powerful as well as flexible.



MATLAB, FoxPro and **Objective C** evolved as major languages during this decade where **MATLAB** was widely used for algorithms and visualizations. **FoxPro** is a mix of programs having DBMS concepts and it's also Object Oriented Programming Language. **Object C** is an object-oriented programming language and majorly used by Apple for OS X and iOS development.

Perl Language- Perl is a general-purpose programming language originally developed for text manipulation and now used for a wide range of tasks including system administration, web development, network programming, GUI development, and more.



Python is a powerful general-purpose programming language. It is used in web development, data science, creating software prototypes, and so on. Fortunately for beginners, Python has simple easy-to-use syntax.

Visual Basic (or VB) is a programming language developed by Microsoft that runs on the .Net Framework. With Visual Basic you can build Windows applications, web applications and Windows phone applications. Programs developed in Visual Basic will only run on a Windows Operating System.

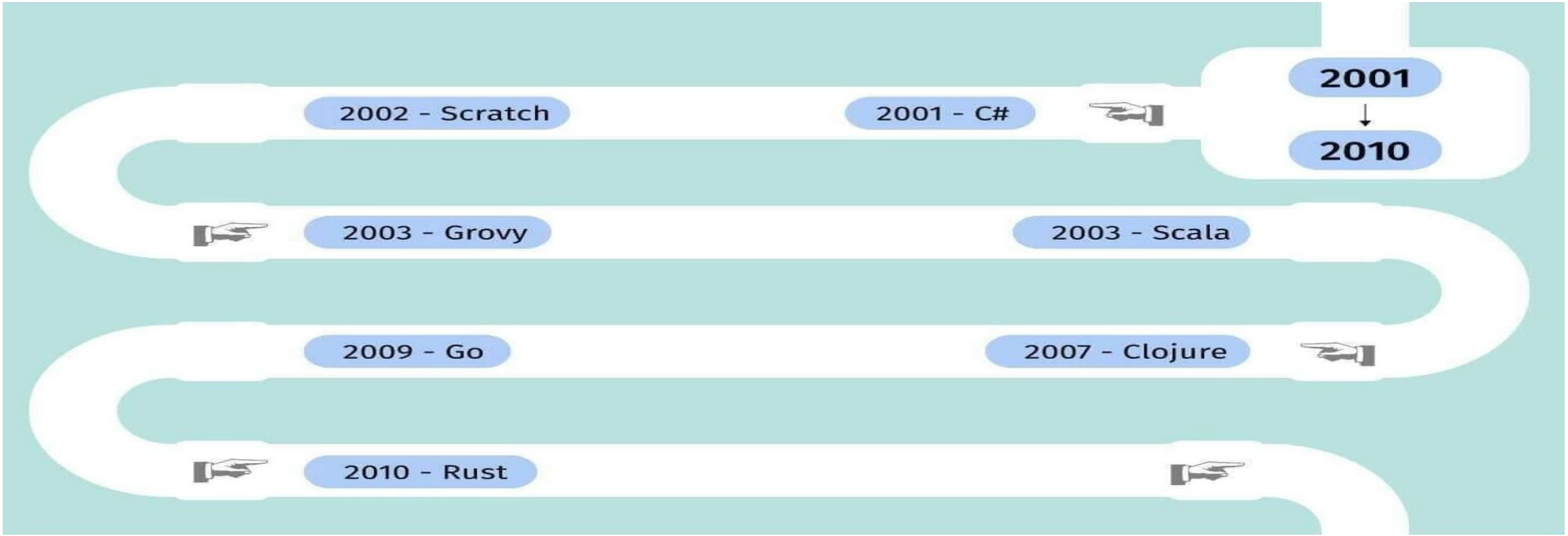
Ruby is a pure object-oriented programming language. It was created in 1993 by Yukihiro Matsumoto of Japan. A dynamic, open source programming language with a focus on simplicity and productivity. It has an elegant syntax that is natural to read and easy to write.

Java is a powerful general-purpose programming language. It is used to develop desktop and mobile applications, big data processing, embedded systems, and so on. According to Oracle, the company that owns Java, Java runs on 3 billion devices worldwide, which makes Java one of the most popular programming languages.

JavaScript is a powerful and flexible programming language. It can execute on a web browser that allows us to make interactive web pages such as popup menus, animations, form validation, etc.

PHP is a server side scripting language. that is used to develop Static websites or Dynamic websites or Web applications. PHP stands for Hypertext Pre-processor, that earlier stood for Personal Home Pages.PHP scripts can only be interpreted on a server that has PHP installed.

ActionScript is an object oriented programming language. The commencement of ActionScript was as an object oriented language to be used for Macromedia's Flash authoring tool, which is now developed as Adobe Flash.



Go and Rust were released by the end of this decade focusing on system programming and competent to each other. Go lang is majorly used for developing Micro services. Learning Rust is a bit difficult whereas Go is easy to learn.

C# is a simple, modern, general-purpose, object-oriented programming language developed by Microsoft within its .NET initiative led by Anders Hejlsberg. C# programming is very much based on C and C++ programming languages, so if you have a basic understanding of C or C++ programming, then it will be fun to learn C#.

Kotlin has emerged as the major alternative to Java since Java was overtaken by Oracle. Kotlin is being widely used for Android development with its easy syntax as compared to Java.

Swift is another important language introduced by Apple as an alternative to Objective C. Swift is easier to learn as compared to Objective C and also need less code, hence becoming a popular choice of programmers to develop iOS applications.

Feature of Good Programming Language

1) Clarity, Simplicity And Unity: A Programming language provides both a conceptual framework for Algorithm planning and means of expressing them. It should provide a clear, simple and unified set of concepts that can be used as primitives in developing algorithms.

2) Orthogonality: It is one of the most important feature of PL orthogonality is the property that means **" Changing A does not change B".** If I take Real world example of an orthogonal system Would be a radio, where changing the station does not change the volume and vice versa. When the features of a language are orthogonal, language is **easier to learn** and **programs are easier to write** because only few exceptions and special cases to be remembered.

3) Support for Abstraction:- There is always found that a substantial gap remaining between the abstract data structure and operations that characterize the solution to a problem and their particular data structure and operations built into a language.

4) Programming Environment: An appropriate programming environment adds an extra utility and make language to be implemented easily like

- **The availability of-** Reliable- Efficient - Well documentation
- **Speeding up creation and testing by-special Editors- testing packages**
- **Facility- Maintaining and Modifying- Multi Version of program software product.**

5) Ease of program verification:- Reusability:

The reusability of program written in a language is always a central concern. A program is checked by various testing technique like Formal verification method Desk checking Input output test checking. We verify the program by many more techniques. A language that makes program verification difficult maybe far more troublesome to use.

6) portability of programs: Programming language should be portable means it should be easy to transfer a program from which they are developed to the other computer.

A program whose definition is independent of features of a Particular machine forms can only support **Portability. Example: FORTRAN, C, c++, Java, etc.**

Starting a Computer

- Step 1**:** Switch ON the Power Supply.
- Step 2**:** Switch ON the CPU and
- Step 3 : Switch ON the Screen (Monitor)
- Step 4: **Wait for the computer to boot up.** A screen showing a logo "starting window“ will appear - this is the initial 'boot up' screen.
- Step 5: **Wait until everything is loaded.** The more programs that are set to load when the computer is started, the longer it will take. You may not want to attempt to start up programs or open files right away, as this creates more work for the computer, and this will mean it takes more time before you can begin using the computer

Stopping a Computer

Before shutting down the Computer, close all opened windows at first. Then,

1. Click on Start button.
2. Click on Shutdown (Turn Off Computer).

Then, Computer asks you:

What do you want the Computer to do?

- Standby
- Shutdown (Turn Off)
- Restart
- Restart in MS-DOS mode.

3. Choose 2nd option (i.e. Shutdown/Turn Off).
4. Click on OK.

Then, wait until the message “It’s now safe to turn off your Computer”.

5. Then, Switch Off the screen.
6. Switch Off the CPU.
7. At last, Switch Off the power supply.

Installing Computer Software

- Installing software using downloaded media (Downloaded from a website or an App-store)

1. Click or Double-click the software's icon on the desktop to begin installation
2. Follow the onscreen prompts
3. Select the Hard drive you wish to install the software on; (This is usually a small picture of a hard drive)
4. Continue to follow onscreen prompts until installation is finalized
5. Right click desktop install icon if still present and select eject
6. Double-click installed application icon to ensure installation was successful

Installing Computer Software

- **App Store**: Future distribution method of applications where software is purchased and installed with a single click
  - Currently available on portable devices (Tablets/Smartphones).
  - Same technology is coming to PC operating systems.
  - Allows for simplified purchasing and updating of Apps.

Uninstalling Computer Software

- Uninstalling Software on a PC

1. Click the **Start** button in the bottom left of the window pane
2. Select the **Control Panel**
3. Select **Programs** (May also be **Add/Remove Programs**)
4. Select **Programs and Features**
5. Select the program and click **Uninstall**