Bittmanee Nandiree C.E.

Chapter-2 Input Devices

Introduction:

- Input devices are allowing data to be captured and transmitted to the computer system.
- Input can be entered from a keyboard, a mouse, a USB, etc. devices.
- All input devices perform the following functions:
  - It accepts the list of instruction and data from the outside world.
  - It converts these instruction and data in computer acceptable forms.
  - It supplied these converted data to the computer system for further (after) processing.

Types of Input devices:

- Keyboard (05)
- Mouse
- Joystick
- Track Ball
- Touch Pad/ Glide-Pad
- Touch Screen
- Digitizers and Graphic tablet
- Light Pen
- Mic (Sound input)
- Camera(Photo and Video input)
- POS (point of sale)
- Scanners

Chapter-2: I/o and o/p devices

1. Keyboard:

- **Types of Keyboard:**
  1] General Purpose Keyboard:
  2] Special Purpose keyboard:

1] General Purpose Keyboard:

- **Alphanumeric keys**
  - Letters of English alphabet,
  - 0 to 9 numbers,
  - Special characters like? , / ,&, @, etc.
- **Numeric keypad**
  - 0 to 9 digits
  - Mathematical operators (+, - ,*, /)
- **Arrow keys**
  - Up
  - Down
  - Left
  - Right
- **Special Function keys**
  - Enter Caps Lock Page Down
  - Shift Num Lock Insert

- Ctrl
- Alt
- Backspace
- Tab
- Home
- End
- Delete
- **Other Function keys**
  - [F1, F2, F3,.....F12]

2] Special Purpose ke
- Some Compu
operation
- For ex
pri

- Ctrl
- Alt
- Backspace
- Tab
- Home
- End
- Delete
- Escape
- Spacebar
- Page Up

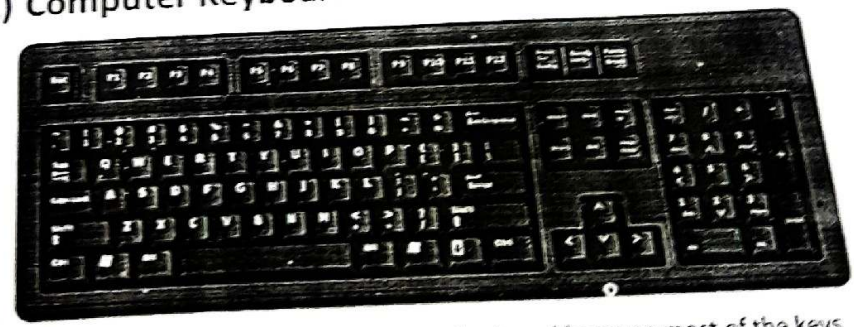
- **Other Function keys**
  - [F1, F2, F3,.....F12]

2] Special Purpose keyboard:

- Some Computer systems special purpose keyboards to enable faster data entry and operation.
- For ex., In fast-food restaurants for registering at that time typing the name and price of a purchased item, say Veg.Pizza, the operator need only press the key labeled "Veg.Pizza" and the system automatically prints the name and price of the item from an internally store database.
- Similarly ATM used in banks for financial transactions by customers needs a simple keyboard with only a few keys for the purpose.
- Keyboard specially designed and used for a specific type of applications are called special purpose keyboards.

• Types of Keyboard:

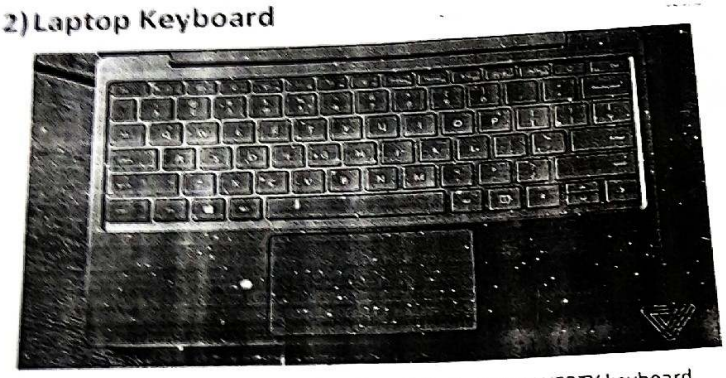
1) Computer Keyboard



→ It is always preferred to use computer keyboard because most of the keys placed on the same position no matter the keyboard is of which company.

➔ It helps you to type faster and has standard keys which are common to all.

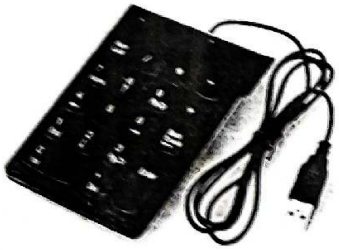
2) Laptop Keyboard



➔ The laptop keyboard is a small version of the typical QWERTY keyboard

➔ A typical laptop has the same keyboard type as a normal keyboard,except for the fact that most laptop keyboards condense the symbols into fewer button to accommodate less space.

3) Numeric keyboard



➔ Numeric keyboard are specially meant to deal with and type Numeric digits.

- Banking sector takes maximum advantages of Numeric Keyboard it has all the keys which are almost similar to Calculator
- The reason behind using Numeric Keyboard is type numbers in a faster way.

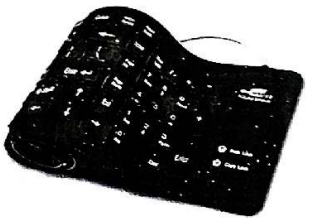
4) Gaming keyboard

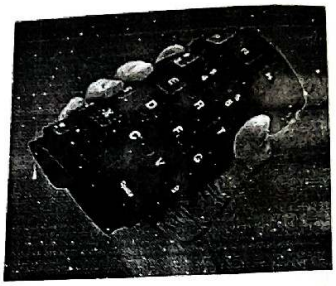
- Gaming ke', board are similar to normal keyboards except they generally contain extra features such as illuminated keys,multimedia keys,an additional LCD screen,palmrest and other features.
- Illuminated keyboards are useful for playing games,during the night when its too dark to see the keyboard normally.

5) Las :r/Infrared Keyboard

→ This types of keyboard is portable enough to be easily used with cellphones , PDAs and wireless capabilities.

6) Rollup Keyboard

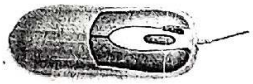




→ Its extremely good for travelling.Simply roll them up and then unroll them when you need them again.

→ Typically the material is either silicone .this device meant to be rolled up,rather than folded,as folding can dan.age the circuitry.

2. Mouse:



- Mouse is also called a Point-and-draw device.
- A mouse is also called as a pointing device.
- A mouse is a small hand-held device, which can comfortably fit in a user's palm.
- Its direction of the movement is detected by to rotating wheels on the underside of the mouse called sensors.

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- Its direction of the movement is detected by to rotating wheels on the underside of the mouse called sensors.

- The first mouse was invented by Douglas Engelbart in 1963 and then developed by Xerox in 1970.
- Generally, it has two buttons called left and right button and scroll bar is present at the middle. Mouse can be used to control the position of cursor on screen, but it cannot be used to enter text into the compu...

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

- **Types of Mouse:**
  - There are different categories of mouse. Various types of mouse are,

(1) Mechanical Mouse

→ It was introduced by **Duglas Engelbart**. This is a type of computer mouse that has a rubber or metal ball on its underside and it can roll in every direction.

→ The rubber which is inside the mouse is known as **Track Ball** .

(2) Optical Mouse (mostly used today)

→ As a use Optical Mouse is Similar to the mechanical mouse.

→ The only difference in Optical mouse is,it does not have any track ball system

→ Its movement is detected by an **LED** which is kept at the underside or you can seen at the bottom side of the mouse.

(3) Laser Mouse

→ Laser Mouse uses special laser beams to detect the position of mouse.

→ It uses a laser to detect the mouse's movement

(4) Cordless Mouse (Air Mouse)

→ These are not physically connected to the computer. But they rely on infrared or radio waves to communicate with the computer.

→ It is more expensive.

(5) 3D Mouse

→ These type of mouse are used in order to move some objects or in order to play games as a gaming device.

→ Generally other mouse operate on only two degrees((1)Forward-backward (2)Left-right) but 3D mouse provide at least three degrees of freedom.

- **Techniques of Mouse:**

➢ There are different techniques of mouse discussed follows:

1. Pointing:

➢ This is probably the main use of mouse.

➢ You can move mouse along your screen in order to point out any icon or item.

2. Moving:

➢ Mouse may be just used to move around the screen.

➢ You move the mouse in order to take it from one place to another place.

3. Clicking:

➢ You first move mouse pointer on particular item and then press the mouse button and release it.

4. Double-Clicking:

➢ Once you click on mouse TWICE (two times) immediately one after another, it's known as Double clicking.

➢ We mostly double click the mouse in order to start or open some software or to execute some action.

5. Dragging:

➢ While using computer we may need to transfer some files from one folder to another folder at that time we need to DRAG the mouse,

➢ When we drag the mouse, we select some object on screen and then move the mouse by pressing LEFT button which moves the object with mouse.

3. Joy Stick:

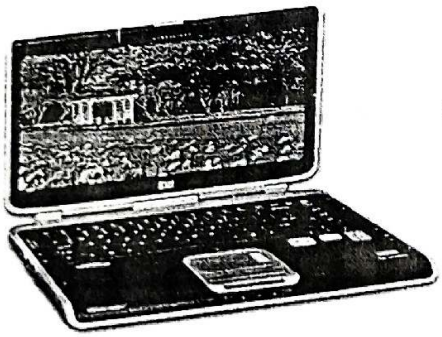
3. Joy Stick:

- Joystick is also a pointing device, which is used to move cursor position on a monitor screen.
- It is a stick having a spherical (rounded) 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 (Left, Right, Backward, Forward).
- The function of joystick is similar to that of a mouse.
- It is mainly used in Computer Aided (dependent) Designing (CAD), Computer Aided Manufacturing (CAM), and playing computer games, controlling robots.
- On most joysticks, a Button on the top is provided to select the option currently pointed by the cursor.
- The button is clicked to make this selection.

4. Track Ball:

- It is another pointing device, which is similar to a mouse.
- It uses a rounded ball which is rolled by the palm of the hand.
- Trackballs are like an upside-down mouse.
- It is common used on laptop, note-book computers.
- Trackballs comes in various shapes but they all have a same functionality.
- Trackball is still (not moved) so it does not require much space to use.
- It is more suitable for designers when they work on large drawings.

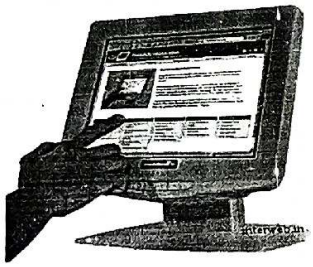
5. Touch Pad:



- Glide Pad (Touch Pad) and Touch Screen are a little different as their functionality.
- It is used along with computer for special functionality to input something.
- Touch Pad is a pointing device on a computer display screen.

- It is an alternative to the mouse.
- A pressure-sensitive and motion sensitive device used in place of a mouse.
- Touch Pad works by sensing the user's finger movement.
- They can also be found on Personal Digital Assistants (PDAs) and some portable media players.
- It is generally used in laptop computer and mobile.

6. Touch Screen:



- It is the most simple and easiest to use of all input devices.
- It enables the users to choose from available options by simply touching with their finger to the proper icon or menu item displayed on the computer's screen.
- Touch Screen is used in ATM, supermarkets.

✓ **How it works?**

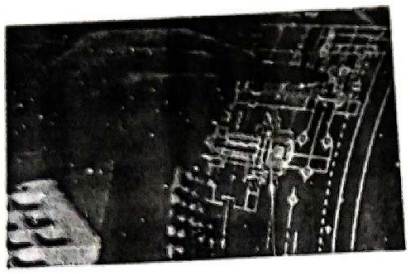
- Computers with touch screen facility use optical sensors that can detect the touch of a finger on the screen.
- The sensors communicate the position of touch to the computer, which interprets the input made by the user.
- Touch screen are very useful for computer system that need to have a simple interface for the new user so that user can use the system without any training.

There are many places in which touch screen technology is used:

- At an **airport or a railway station** to provide information to arriving passengers about hotels, restaurants, etc. in the city.

- In **large department stores and supermarkets** to provide information to the customers about the locations of the various types of products.
- In **large museums or zoo** to guide the visitors to the location of various attractions and facilities and to caution them against things they are not supported to do while they are inside the zoo.
- In a **large bank, post office or insurance company** to introduce the various types of offered services to the customers.

7. Light Pen:



- It is an also pointing device.
- It is used to select and write the text on the CRT.
- It has a switch on top, when we pressed this switch with finger; it operates a shutter, which allows passing the light.
- It is an electronic pen. In a pen- based system.
- A user holds the pen in your hand, and directly point with it on the screen to select menu items or icons, or draw graphics on the screen.
- It has senses light of screen and converts into electrical signal.
- Light Pen does not have any hardware, but it is done by software. It is also known as 'position' device.

8. Mic (Microphone):

- Microphone is also referred to as Mic.
- You use microphone to input your voice.
- The most common use of microphones is live chatting.
- Microphones are used in many applications such as telephones, in computers for recording voice, in radio and television broadcasting.
- It is easy to convert the spoken word to a digital signal for computer input.
- It converts audio signals to electrical waves.

9. Cameras:

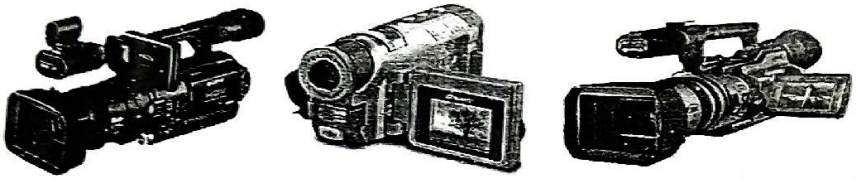
- Camera can be called as "Picture-taking device."
- Various types of camera are used for taking pictures, taking videos or for online video chatting.
- Camera can be categorized into three ways as follows:
  1. Digital Camera / Digicam
  2. Video Camera / Camcorder / Handy Cam
  3. Web Camera / CCTV Camera

1. Digital Camera / Digicam:

- It is mostly used for taking pictures.
- Once a picture has been taken, it can be downloaded to a computer system.

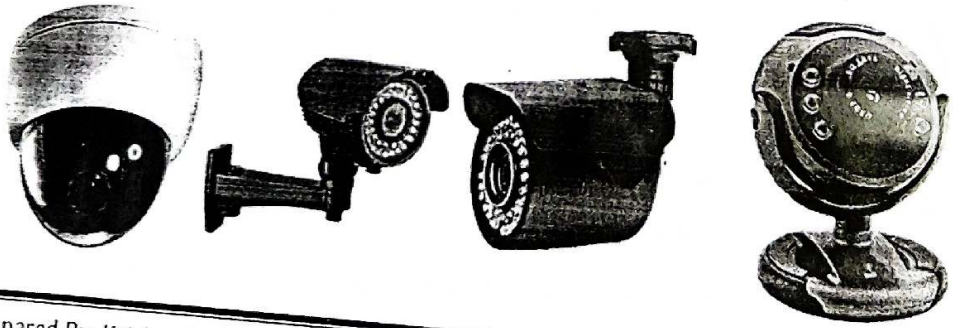
- Digital camera can be used to record video.
- Today most of the digital cameras allow video shooting.
- Its main advantage is to take digital photographs and then stored it in computer.
- Disadvantage: Does not have proper resolution or proper sound effect than Video Camera.

2. Video Camera / Camcorder / Handy Cam:



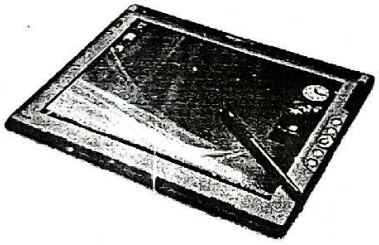
- Video cameras are mostly used for video shooting.
- Video camera was initially invented for Film and Television industry in order to record movies or plays with high resolution.
- It's advantage of shooting in high resolution than Digital cameras.
- We often call a small video camera as camcorder and a bigger one as video camera.
- CAMCORDER comes from CAMERA RECORDER.
- Camcorder is an electronic device that combines a video camera and a video recorder into one unit.

3. Web Camera / CCTV Camera:



- Webcam is a video camera that is connected to a computer, either directly or wirelessly via USB, Wi-Fi or Broadband.
- Web Camera plays in important role when you want to chat with your friend that possible by online video conferencing.
- CCTV (Close Circuit Television) is mostly used to view live motions and recording also.
- CCTV cameras may be connected to computers for Security and Monitoring purpose.
- Difference between Web & CCTV camera: Web cameras are used for live chatting, CCTV cameras are used for security but does not used for live chatting.

10. Digitizer or Graphic tablet:



- Digitizer is an electronic tool.
- A digitizer is an input device used for converting (digitizing) pictures, maps and drawings into digital from.
- This enables re-creation of the drawing from the stored information.
- This also enables the changes in the drawing, when required.
- The digitizing tablet is flat surface that contains hundreds of copper wire forming a grid.
- Each copper wire receives electric pulses.
- The stylus is like pen. In a lens is work like cursor.
- Pen is connected to the tablet.
- On moving the stylus on the tablet, the cursor on computer's screen moves on.
- This tablet is also used to capture data or handwritten signatures.

- They are commonly used in the area of computer Aided Design (CAD) by archit and designers to design cars, buildings, robots, mechanical parts, etc.

11. POS(point of sale):

- All of you know a word called "super market" or mostly "mall" where you go for different types of shopping.
- If you have been visited any of the "super market" or "mall", you will be able to understand POS immediately.
- When you buy anything from the "super market" or "mall", at the end of your shopping you go to a counter where you pay the bill.
- The person who is standing at the cash counter, scans your goods with a special machine called "bar code reader".
- Machine also has monitor and a printer connected with bar code reader.
- After the whole scanning is done, person at cash counter opens a drawer and keeps the cash given by you.
- If you don't have cash you can also pay with the help of credit card or debit card or any other type of card.
- This whole machine and the process of selling are known as POS (point of sale).

12. Scanners:

- What is scanner?
  - A scanner is an input device that translates paper documents into can be stored in a computer.
  - The input document may be typed text, pictures, graphic
  - The two commonly types of scanners are:
    1) Flat-bed Scanner
    2) hand-held Scanner

1) Flat-bed scanner:

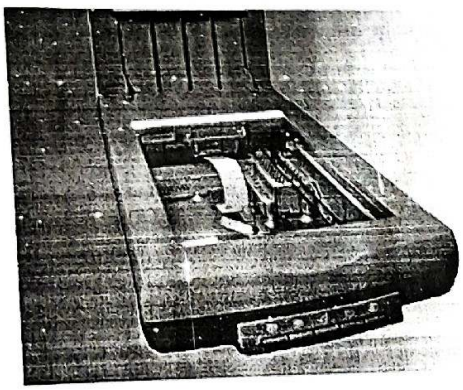
2. Scanners:

- **What is scanner?**
  - A scanner is an input device that translates paper documents in to an electronic format that can be stored in a computer.
  - The input document may be typed text, pictures, graphics or even handwritten material.
  - The two commonly types of scanners are:

    1) Flat-bed Scanner

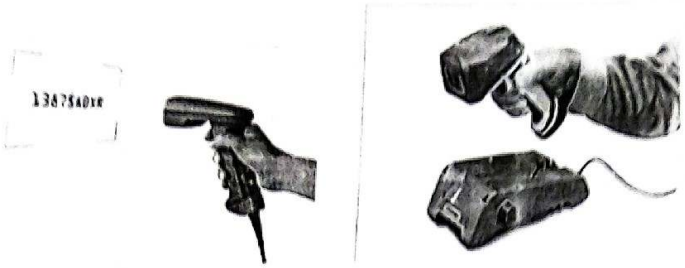
    2) hand-held Scanner

1) Flat-bed scanner:



- A flat-bed scanner is like a copy machine consisting of a box having a glass plate.
- The document to be scanned is placed upside down on the glass plate.
- The light is below the glass plate and moves horizontally from left to right when activated.
- After scanning one line the light beam moves up a little and scans the next line.
- The process is repeated for all the lines.

2) Hand-held scanner:



- A hand-held scanner to scan a document, the scanner is slowly dragged from one end of the document to its other end with its lights on.
- The scanner has to be dragged very carefully over the document.
- Otherwise the conversion of the document into its equivalent bitmap will not be correct.
- Due to this reason hand-held scanners are used only in cases where high accuracy is not needed.
- They also much cheaper as compared to flat-bed scanner.

- **Types of Scanners:**

  - OCR [Optical Character Reader]
  - OMR [Optical Mark Reader]
  - OBR [Optical Bar Code Reader]
  - MICR [Magnetic-Ink Character Recognition]

- **OCR (Optical Character Reader)**

A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m
n o p q r s t u v w x y z
0 1 2 3 4 5 6 7 8 9
! @ # $ % ^ & * ( )

- These devices are capable of detecting alphabets and typing characters printed on paper.
- These texts may be typewritten or handwritten.
- If the texts are handwritten, then they are of [illegible].
- If the characters are typewritten, then they must be typed using special type of font called an OCR font.
- **How it works?**
- In this, the scanner is equipped with character recognition software called OCR software.
- The software first creates the bitmap image of the document and then the OCR software translates it to ASCII text which the computer can interpret as letters, numbers and special characters.
- If the document contains italic or boldface letters or fonts other than that for which the OCR software has been designed, the OCR software will not work efficiently.
- Note - ASCII stand for
- **Advantages:**
- Speed up data input
- OCR device can now accept a wide range of fonts, using ordinary inks.

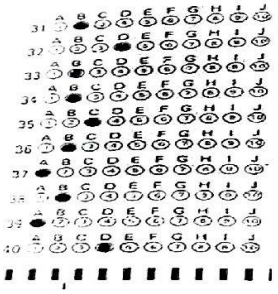
✓ **Disadvantages:**

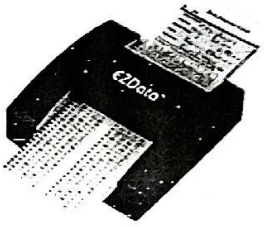
- OCR devices are expensive and so used only for large-volume processing aplica[illegible]

haracters can be scanned properly only if they are of standard size.

- Roughly handled and dusty papers cannot be scanned with accuracy.

• OMR [Optical Mark Reader]





- These scanners are capable of recognizing a type of mark made by pencil or pen.
- For Example, in many exams there is an objective type test in which they had to mark their answers darkening a small square or circular space by a pencil.

✓ **How it works?**

- These answer sheets are directly fed to a computer for grading with the use of an optical mark reader.
- Pencil marks made with a soft lead pencil reflect the light enabling the reader to determine which responses are marked.
- The technique used by an OMR device recognition of marks involves focusing a light on the page being scanned and detecting the reflected light pattern from the marks.

✓ **Advantages:**

- Very cheap
- Checking of papers made fast, accurate and without corruption.

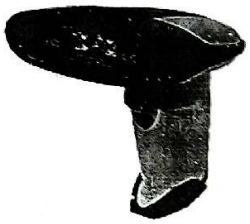
✓ **Disadvantages:**

- Can't read Characters.
- Erasing or cancellation not possible.
- The main disadvantage is need for good-quality expensive papers.

- **OBR [Optical Bar Code Reader]**

Bar Code

Bar Code Reader



- Data coded in the form of small lines are known as bar-codes.
- Bar-codes represent alphanumeric data by a combination of adjacent vertical line by their width and the spacing between them.
- They are particularly used for unique identification of all types of goods (items), books, postal packages, badges (ex., ID-card), etc.

✓ **How it works?**

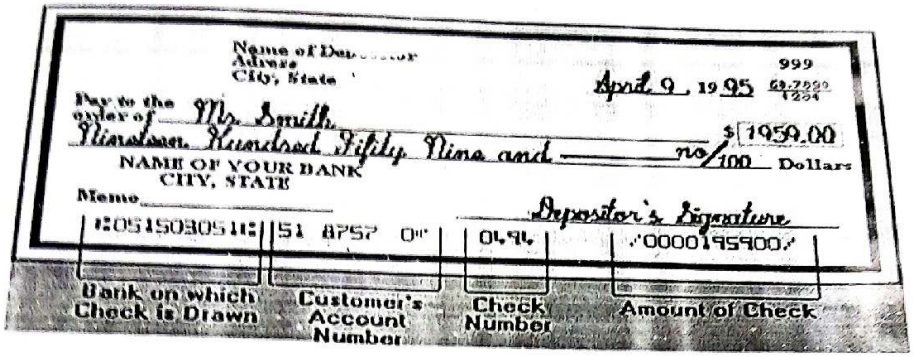
- A barcode reader uses laser-beam scanning technology.
- The laser beam is stroked across the pattern of bars of barcode.
- Thus, Bar-code reader scans the barcode image and converts it into alphanumeric values and these values are then fed to the computer which is connected to the barcode reader.

- There are many types of bar-coding system.
- But the most widely known bar-coding system is the UPC -> Universal Product Co
- It appears on almost all retail packages in USA and now in India as well on many products.
- The UPC originally used for supermarkets items.
- The UPC barcode patterns are decoded as **10** digits.
- The first **5** of these digits identify the **manufacture or supplier of the product** and next **5** digits identify a **specific product of the manufactures.**

✓ **Example :**

- Barcode readers are commonly found in supermarkets and department stores.
- When a customer picks up a product for purchasing and bring it to the cash counter for payment, the sales person at the counter use a barcode reader to scan the barcode printed on the product.
- The barcode reader converts the barcode into an alphanumeric value and feeds it to the computer to prepare a bill for the customer.

- **MICR[Magnetic-Ink Character Recognition]**



- MICR is similar to OCR.
- It is used by the banking industry for faster processing of the large volume of cheques.
- This cheques are special type of cheque includes→ **banks identification code, account no** and the **cheque no.** are pre-printed using special characters with a special ink which contains magnetizable particles of iron oxide.

✓ **How it works?**

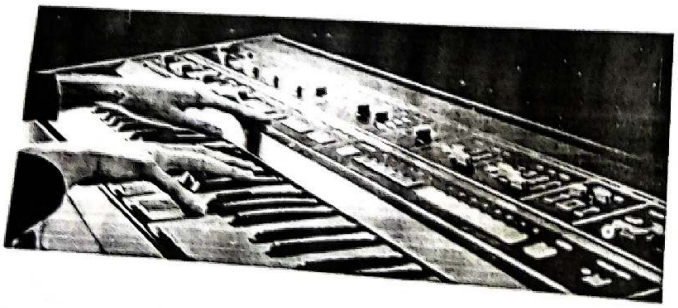
- When a customer presents a filled-in cheque at a bank, the bank employee manually enters the amount written on the cheque.
- This cheque is then process by using an MICR which can recognize magnetic ink characters.
- The MICR reads the data on the cheques or it takes it for further processing.
- This cheque also ensures accuracy of data entry because most of the information is pre-printed on the cheque and this is directly fed to computer.

- **Advantages:**
- Even roughly handled, folded, smeared and over stamped cheques can still be read with a high degree of accuracy
- Speed up data input for the banking industry because cheques can be directly fed into input device

- **Limitations:**
- No alphabets can be used
- Special ink is required, hence expensive

MIDI (Musical Instrument Digital Interface) Keyboard

- MIDI (Musical Instrument Digital Interface) is a protocol designed for recording and playing back music on digital synthesizers.
- that is supported by many makes of personal computer sound cards.
- Originally intended to control one keyboard from another, it was quickly adopted for the personal computer.
- Rather than representing musical sound directly, it transmits information about how music is produced. The command set includes note-ons, note-offs, key velocity, pitch bend and other methods of controlling a synthesizer.
- The sound waves produced are those already stored in a wavetable in the receiving instrument or sound card.



Wireless keyboard

- A wireless keyboard is a computer keyboard that allows the user to communicate with computers, tablets, or laptops with the help of radio frequency (RF), such as WiFi and Bluetooth, or with infrared technology.
- Wireless keyboards based on infrared technology use light waves to transmit signals to other infrared-enabled devices.
- But, in case of radio frequency technology, a wireless keyboard communicates using signals which range from 27 MHz to up to 2.4 GHz.
- Most wireless keyboards today work on 2.4 GHz radio frequency.
- Bluetooth is another technology that is being widely used by wireless keyboards. These devices connect and communicate to their parent device via the Bluetooth protocol.
- A wireless keyboard can be connected using RF technology with the help of two parts, a transmitter and a receiver. The radio transmitter is inside the wireless keyboard.
- The radio receiver plugs into a keyboard port or USB port. Once the receiver and transmitter are plugged in, the computer recognizes the keyboard and mouse as if they were connected via a cable.

Cordless mouse(wireless mouse)

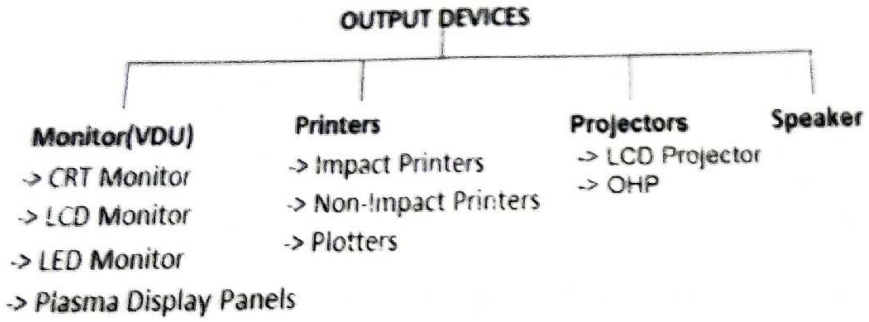
- A cordless mouse, also called a wireless mouse, is a mouse that connects to a computer without the use of wires.
- Instead, the mouse uses some manner of wireless technology, like Bluetooth, RF, or infrared radio waves.
- Usually, a USB receiver is plugged into the computer and receives signals from the cordless mouse.
- The first wireless was named the Logitech Metaphor, invented in 1984.

Chapter-2 Output Devices

Introduction:

- An output device is an electro mechanical device that accepts data from a computer and translates them into a form suitable for use by the outside world.
- Output devices convert information from computer readable form to human readable form
- A wide range of output devices are available today that can be classified into the following categories.

Types of Output devices



• Monitors

- Monitors are the most popular output device used today for producing soft-copy output.
- They display the generated output on a television like screen.
- Two basic types of monitors are used today.
  - CRT monitor
  - Non-CRT monitor / FPD (Flat Panel Display)
    - LCD Monitor (Liquid Crystal Display)
    - LED Monitor (Light Emitting Diode)
    - PDPs (Plasma Display Panels)

- **CRT (Cathode Ray Tube) monitor**

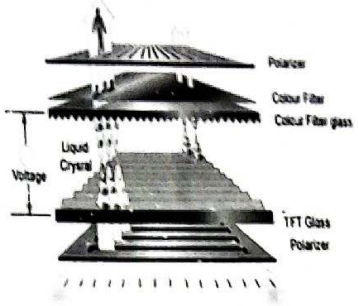
- CRT displays are the most common type of computer displays.
- CRT monitors which are rarely used today.
- "Vacuum Tubes" are used in TV since it invented CRT is nothing but a vacuum tube.So you can say Vacuum tubes are called CRT Monitors.
- Most desktop computer displays make use of CRTs or some small business which makes use of CRT.
- These electrons are accelerated by applying a positive voltage to a control grid.
- If the grid voltage is negative, then no electrons will be allowed to pass. And the beam is said to be blanked.
- Then these electrons are focused by electron lens.
- The backside of monitor's screen is coated with phosphor.
- Phosphor is a chemical that glows for a short time when it is hit by the electron beam.
- The screen's phosphor coating is organized into a grid of dots called pixels.
- Disadvantages: large size, heavy weight and more power requirement, Non-portable than Flat-Panels.

- **FPD (Flat Panel Display) :** OR Non-

(a) LCD (Liquid Crystal Display) Monitor

- **FPD (Flat Panel Display) : OR Non-CRT Display:**

(a) LCD (Liquid Crystal Display) Monitor



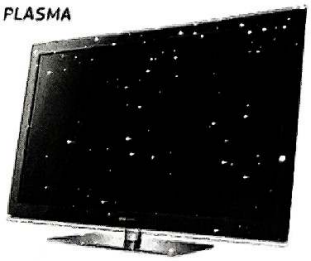
- A flat panel monitor is only about one-inch thick, is light in weight and consumes less electricity as a compared to a CRT monitor.
- LCD is the technology used for displays in laptop, notebook, and other smaller computers.
- As the name implies, LCD monitor use a special kind of liquid crystals to display images on the screen.
- The liquid crystal used in these monitors is normally transparent.
- One problem that remains with LCD screen is that the image created by them is best viewed only by sitting in front.
- With changes in viewing angles, the picture becomes unclear.
- They Save power and occupy less space, they are also softer on eyes as compared to CRTs.
- LCD is also Know as TFT(Thin Film Transistor) as it work as a thin film where the data is displayed with the help of electronic transistor which are arrange as a grid(Rows and Columns)
- You probably use items containing an LCD every day.Ex. Laptop,digital clock and watches,microwave ovens,CD players etc..

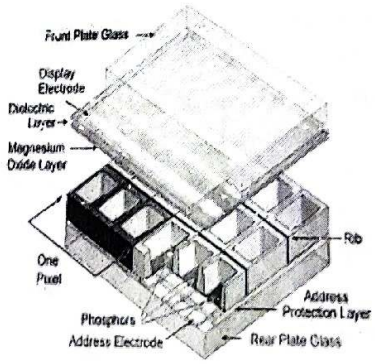
(b) LED (Light Emitting Diode)Monitor

- An LED display is a flat-panel display, which uses light emitting diodes as a video display.
- LED TVs and computer monitors are normally brighter and thinner than LCD.
- LED is the better technology because of its color richness, high brightness, low power consumption, long life etc.
- LED monitor are also a lot softer on eyes than LCD monitor.
- LED monitor are expensive than LCD monitor.
- Different type of LED are there out of which "Tri Color Backlighting LED" can have proper color accurancy.
- Over period of time LED backlight won't have any degradation in its power and the quality Of display remains good over period of time

(c) PDPs (Plasma Display Panels)

PLASMA





- A plasma display panel (PDP) is a type of flat panel display commonly used for large TV display.
- Many tiny cells located between two panels of glass hold an inert mixture of noble gases(neon and xenon)

- The gas in the cells is electrically turned into plasma which then excites phosphor to emit light.
- It is often used in home environment and is becoming increasingly popular in modern cultures.
- Plasma display are thinner than CRT display and brighter than LCD.
- Unlike many LCD displays, a plasma display offers a very wide viewing angle and also in size up to 60 inches for home theater and high definition television.

Characteristics of PDP:

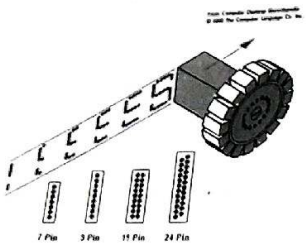
- Plasma displays are bright, have a wide color range, and can be produced in large sizes up to 103 inches diagonally.
- The display panel is only about 2.5 inch thick.
- The lifetime of the plasma display is expected at 60,000 hours of actual display time.

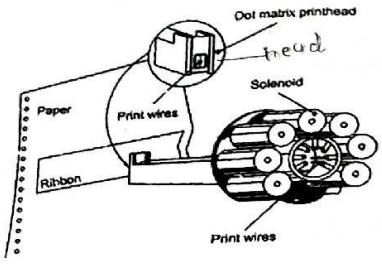
❖ Printers 5 13 Marks
Most Imp

- **What is printer?**
  - Printers are the most commonly used output device today for producing hard-copy output.
  - There are many types of printers available today.
  - **But mainly there are two types of printer.**
    - 1. Impact printers
    - 2. Non-Impact printers
- **1. Impact Printers**
  1. Dot-matrix Printer
  2. Daisy- wheel Printer
  3. Drum Printer
  4. Chain/Band Printer
- **2. Non-impact Printers**
  1. Ink-jet Printer
  2. Laser Printer

- **Impact Printers**

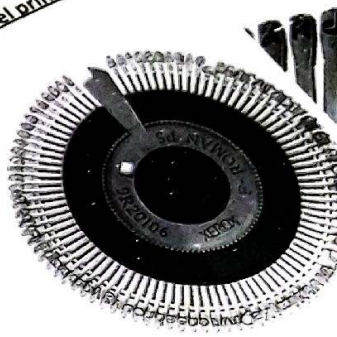
1. Dot-Matrix printer





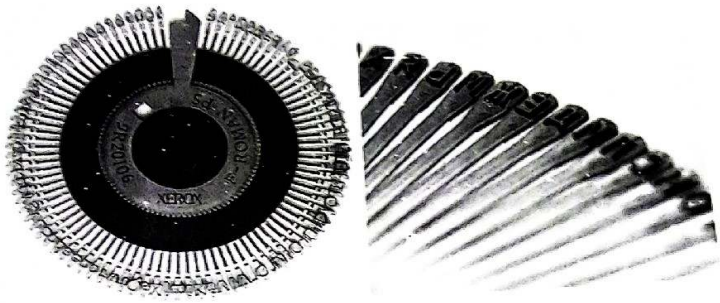
- Dot-matrix printers are the character printers, which print one character at a time.
- They form the characters and all kind if images as a pattern of dots.
- A dot-matrix printer has a print-head, which can move horizontally across the paper.
- The print head contains the array of pins, which can be activated independent of each other and strike against an inked ribbon to form a pattern of dots on the paper.
- To print a character, the printer activates the appropriate set of pins as the print head moves horizontally.
    - Dot-matrix printers are impact printers because they print by hammering the pins on the inked ribbon to leave ink impressions on the paper.
    - However due to impact printing, **dot-matrix printers are noisy** as compared to non-impact printers.
- Dot-matrix printers are normally slow with speeds usually ranging from **30 to 600 characters per second.**

2. Daisy-wheel printer



- It is an impact
- Use a prin
- Each

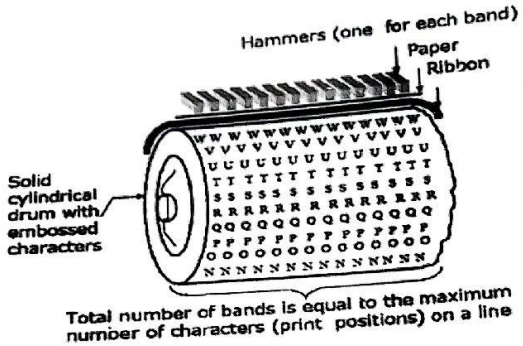
2. Daisy-wheel printer



- It is an impact printer.
- Use a printwheel known as a **daisy wheel.**
- Each petal of daisy wheel has a fixed size character embossed on it.
- When a desired character moves to the correct position, a print hammer strikes it to produce the output.
- They are noisy and slow.
- Daisy wheel printers can't print graphics.
- **Print quality** : Good
- **Speed:** 10 to 50 characters per second.

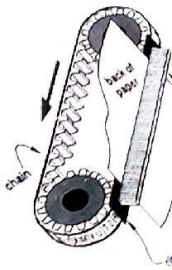
use only character print

3. Drum Printer



- Drum printers are **line printer**, which **prints one line at a time.**
- It consists of a **solid drum** with characters embossed on its surface in the form of circular bands.
- There are many bands.
- Each band contains all the possible characters.
- The printers have a set of hammers mounted in a front of drum.
- The **drum rotates at the high speed** and a character at a print position is printed by activating the appropriate hammer.
- The drum of a printer is expensive and can't be changed often.
- Drum printers are impact printers because they print by hammering on the paper.
- Typical speed of drum printer is in the range of **300 to 2000 lines per minute.**

4. Chain/Band Printers:



- Chain printers are
- It consists
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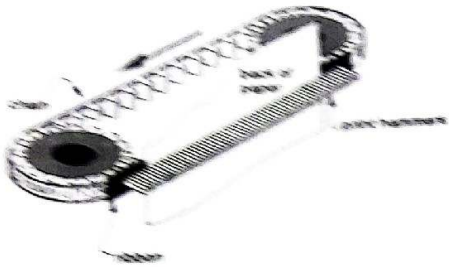
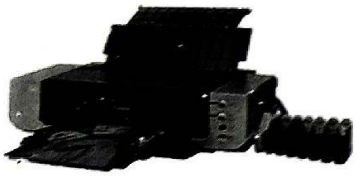
4. Chain/Band Printers:

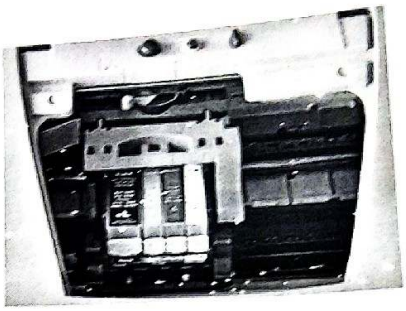


- Chain printers are line printers which print one line at a time.
- It consists of a metallic chain on which all characters are embossed.
- The printer has a set of hammers mounted in front of the chain in a manner that an inked ribbon can be placed between the hammers and the chain.
- The chain rotates at a high speed and a character is printed by activating the proper hammer.
- Just like drum printers, chain printers can only print pre-defined set of characters, which are embossed on chain.
- Due to this reason, chain printers do not have the facility to print any shape of characters and different types of graphics.
- Speed of chain printer is in the range of 400 to 3000 lines per minute.

- **Non-Impact printers:**

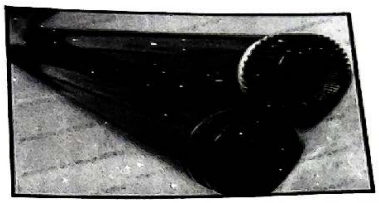
1. Ink-jet printers





- Ink-jet printers are character printers that form characters and all kind of images **by spraying small drops of ink** on to the paper.
- Inkjet printers produce **higher quality output** than dot-matrix printer.
- Inkjet printer produce printed output as a pattern of tiny dots.
- Inkjet printer can print any shape of characters that a programmer can describe.
- Inkjet printers are non-impact printers because they print by spraying ink on the paper.
- Inkjet printer cannot be used to produce multiple copies of a document in a single printing.
- Inkjet printers are **slower** than dot-matrix printers with speeds ranging between **40 to 300 characters per second.**
- An ink-jet printer is **more expensive** than a dot-matrix printer.

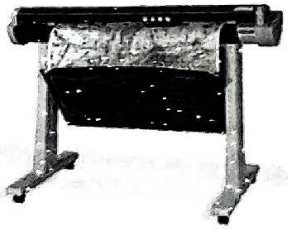
2. Laser Printer



- Laser printers are page printers that **print one page at a time.**
- The main components of a laser printer are a laser beam source.
- To print a page of output the laser beam is focused on the electro statically charged drum by the multi sided mirror.
- The mirror focused the laser beam on the surface of the drum in such a manner that it created the pattern of characters/images to be printed on the page.
- The toner then permanently focused on the paper with heat and pressure to generate the printed output.
- The drum is then rotated and cleaned with rubber blade to remove the toner sticking to its surface to prepare the drum for the next page printing.
- Laser printers produce **very high quality output.**
- They have **high resolution.**
- Because of high resolution these printers **give excellent graphics art quality**.
- They can print any shape that a programmer can describe.
- Laser printer cannot be used to **produce the multiple copies of a single document in a single printing.**

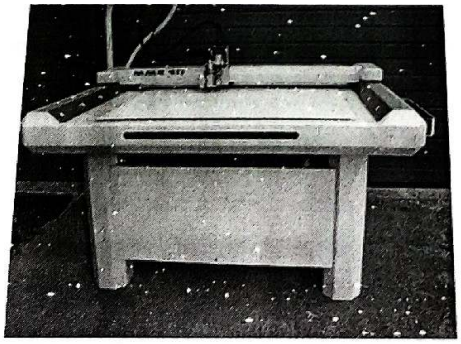
- **Plotters:**
  - Plotters are more expensive than printers.
  - Plotter may be use either pen or inkjet approach.
  - Plotters are used to produce output containing graphical diagrams.
  - Multicolor plotters are used for preparing financial documents, annual reports and engineering drawings.
  - There are different types of plotter:
    1. **Drum Plotter**
    2. **Flatbed Plotter**

1. Drum Plotter:



- A drum plotter is also known as Roller Plotter.
- It consists of a drum or roller on which a paper is placed and the drum rotates to produce the graph on the paper.
- In drum plotter both paper and pen moves simultaneously.
- Drum plotter are used to produce continuous output.

2. Flatbed Plotter:



- A flatbed plotter is also known as Table Plotter.
- Paper is spread and fixed over a rectangular flatbed table.
- In Flatbed plotter paper is fixed and only pen moves.
- A plotter may use multiple pens.
- It is more expensive because it can produce accurate drawings.

Projectors:

- **LCD Projector**

- A flatbed plotter is also known as Table Plotter.
- Paper is spread and fixed over a rectangular flatbed table
- In Flatbed plotter paper is fixed and only pen moves
- A plotter may use multiple pens.
- It is more expensive because it can produce accurate drawings.

❖ Projectors:

• LCD Projector

- LCD projector is also known as Screen image projector.
- LCD projector is an output device used to display project information from a computer on a large screen.
- So that a group of people can view it simultaneously.
- It is very useful for making presentations to a group of people with direct use of a computer.
- It can be plugged to a computer system directly.
- And a presenter can make a presentation to a group of people by projecting. The presentation material one after another on a large screen with the help of computer's screen with the help of computer's keyboard or mouse.
- If presenter want to edit the certain portions of a displayed material during the presentation.
- Moreover, multimedia presentation with audio, video, image, and animation can be made by using this facility to make the presentation more lively and interesting.

- **OHP (Over Head Projector):**

- An overhead projector is a reliable form of a projector.
- The overhead projector displays images into a screen or wall.
- It consists of a large box containing a cooling fan and a very bright light.
- At the end of the arm there is a mirror that catches and redirects the light towards the screen.
- An overhead projector can be used to enlarge images on to the screen or wall for audiences to view.
- The overhead projector was once a common feature in classroom and business meetings.
- Now-a-days they are rarely used because more a sophisticated projectors are developed.

❖ Speaker:

- Speakers are internal and external output device.
- An electro-acoustic transducer that converts electrical signals into sounds, loud enough to be heard at a distance.
- Synonyms with loudspeaker.
- Computer speaker, or multimedia speakers, are external speakers and are usually set with a phone plug for computer sound cards.
- Generally, the simplest computer speakers come with computers.
- There are advanced forms of computer speakers that have graphic equalization features (ex. Bass) for dynamic audio flexibility.

- Some computer displays have basic speakers built-in. Laptops come with integrated speakers.

❖ Fascimile(FAX)

- Fax (short for facsimile), sometimes called telecopying or telefax (the latter short for telefacsimile), is the telephonic transmission of scanned printed material (both text and images)
- normally to a telephone number connected to a printer or other output device. The original document is scanned with a fax machine (or a telecopier), which processes the contents (text or images) as a single fixed graphic image, converting it into a bitmap, and then transmitting it through the telephone system in the form of audio-frequency tones.
- The receiving fax machine interprets the tones and reconstructs the image, printing a paper copy.[1]
- Early systems used direct conversions of image darkness to audio tone in a continuous or analog manner.
- Since the 1980s, most machines modulate the transmitted audio frequencies using a digital representation of the page which is compressed to quickly transmit areas which are all-white or all-black.

❖ Headphones

- Headphones are a pair of small loudspeaker drivers worn on or around the head over a user's ears.
- They are electroacoustic transducers, which convert an electrical signal to a corresponding sound.
- Headphones let a single user listen to an audio source privately, in contrast to a

loudspeaker, which emits sound into the open air for anyone nearby to hear.

- Headphones are also known as earspeakers, earphones and headphones use a band over the top of the head to hold the speakers in place.
- Headphones connect to a signal source such as an audio amplifier, radio, CD player, portable media player, mobile phone, video game console, or electronic musical instrument, either directly using a cord, or using wireless technology such as Bluetooth, DECT or FM radio.
- The first headphones were developed in the late 19th century for use by telephone operators, to keep their hands free.

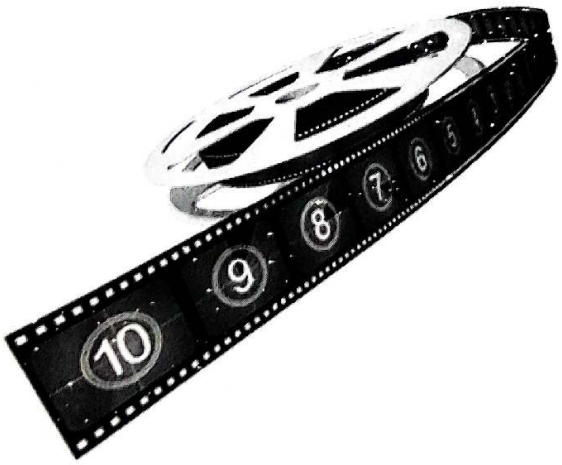
❖ SGD (Speech Generating Device)

- Speech-generating devices (SGDs), also known as voice output communication aids, are electronic augmentative and alternative communication (AAC) systems.
- it used to supplement or replace speech or writing for individuals with severe speech impairments, enabling them to verbally(મૌખિક) communicate.
- SGDs are typically tablet-like units that allow a person to communicate thoughts by electronic voice generation when he or she is no longer able to speak.
- Without an SGD, which is highly personalized and uniquely programmed, many people are isolated and awake, trapped inside a body they cannot control, with no ability to communicate.

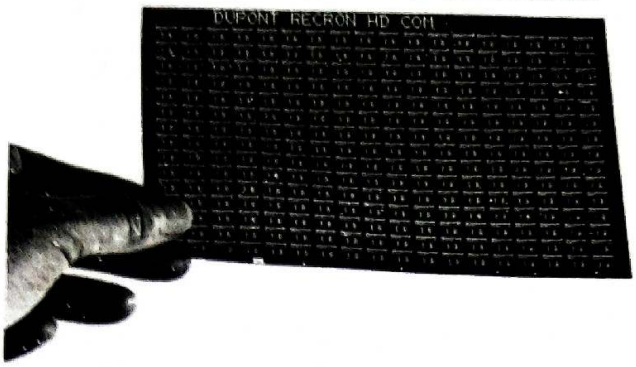
- AAC devices not only have robust language systems to allow for effective and efficient communication, but they also provide alternative ways to select letters, words and messages.
- For example, an individual can make a selection on an SGD by
  - Using their eyes
  - The tilt of the head to activate a switch
  - Using a finger with the help of a keyguard, to isolate the keys
- A major advantage of SGDs is that the device allows the individual to say and play with words, which helps the process of acquiring new words and language.
- In addition, pairing the communicated word with voice output may help the child with the auditory processing of spoken language.
- Using an SGD is different than using a communication app on a mobile device such as an iPad.
- As AAC devices are especially designed for the varying and specific needs of individuals with complex communication profiles.
- In some cases, an AAC device may be recommended even if a child has had some success using an app on a mobile device to communicate.
- SGDs features:
  - A more robust language system
  - More flexible software
  - More durable construction
  - A larger screen size
  - Alternative access options

❖ COM (Computer Output Microfilm)

- A system in which digital data is converted into an image on dry processed microfilm.
- COM machines were used to take print-image output from the computer either online or via tape or disk and create a film image of each page.
- Microfilm has long been a popular means for storing information in less space than is taken up by paper documents.
- Today **computer output microfilm** (COM) has become a popular method of obtaining and storing computer output.
- COM recorders produce outputs much faster than large impact printers; speeds of 20,000 lines or more per minute are common.
- Organizations that use COM often have millions of pages of information on microfilm. With **computer-assisted image processing** (see Figure), any one of these images can be located and displayed in seconds.



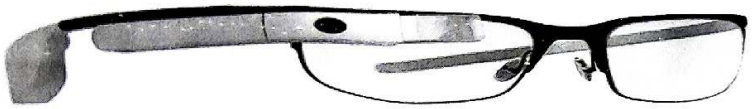
- Most COM systems output information onto **microfiche**, 4-inch by 6-inch film cards that can hold hundreds of pages of computer output (see below Figure). Information on fiche can only be read with special magnifying devices; hand-held microfiche readers, desktop readers, and reader-printers are all popular.



- **Advantages.**
- Computer outputs can be produced much faster than with impact printers and can be made available sooner to users.
- Fiche(roll) can be duplicated quickly and economically to produce multiple copies of reports.
- Fiche require far less storage space than paper reports, and they can be mailed for a small fraction of the cost.
- **Disadvantages.**
- Fiche can only be read with the assistance of magnifying devices.
- The user cannot make marks or comments on the film, and fiche cannot be modified.
- If a file of information changes frequently and needs to be kept current, new fiche must be produced, which may be expensive.

❖ Google Glass

- Google Glass is a wearable, voice- and motion-controlled Android device that resembles a pair of eyeglasses and displays information directly in the user's field of vision.
- Google Glass offers an augmented reality experience by using visual, audio and location-based inputs to provide relevant information.
- For example, upon entering an airport, a user could automatically receive flight status information.
- When the first version was launched in 2013, consumers immediately voiced their concern(ચિંતા) of the glasses being an invasion of privacy.
- Google Glass represented inescapable(અનિવાર્ય) recording in everyday life. At first, Google attempted to rebrand the glasses as a tool for professionals such as surgeons or factory workers.
- In 2017 work resumed with Glass Enterprise Edition. This relaunch of the project focused all efforts on making a product that would benefit workplaces like factories and warehouses. In 2019, a new version of Google Glass was released -- the Glass Enterprise Edition 2.
- **How Google Glasses work**
- The Google Glass operating system (OS) is based on a version of Android.
- The OS can run application virtualization tools called Glassware that are optimized for the device.
- Glassware allows the device to deliver an app to the user, instead of a full desktop. The glasses have built-in Wi-Fi and Bluetooth connectivity and a camera for taking photographs and videos.
- The smart eyewear uses motion and voice recognition to process commands from the wearer.
- A touchpad is also available on the glasses' rim. To provide the requested information, the device relies on sending small packages of information straight to the wearer through a micro-projector, using a private channel of communication that can only be accessed by the user.



features of Google Glass include:

- The ability to take photos and videos and then share exactly what the user is seeing through Google Hangouts.
- The option to use the Google search engine through the glasses, using Wi-Fi or a smartphone's data connection.
- The ability to have translations streamed straight to the wearer through the screen.
- The ability to sync the glasses to calendars stored on phones or computers in order to receive reminders of events and meetings.
- Support of both voice and video calls. In the video calls, wearers can show the other person exactly what they're looking at instead of talking face-to-face.
- The ability to answer emails and text messages using voice dictation.
- Collaboration with Google Maps to provide step-by-step directions with a map displayed on the screen.
- The ability to respond to facial and head movements, such as allowing the user to tilt their head to scroll through a page or operate the device with eye movements.