Shiksha Mandal's

G. S. College of Commerce, Wardha

Department of B.Com. Computer Application

B.C.C.A. Part I (Sem. I)

FUNDAMENTALS OF COMPUTER

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Output Devices

Output devices perform the reverse operation of that of an input device. It supplies information obtained from data processing to outside world. Hence, it links a computer with its external environment. As computer work with binary code, results produced are also in binary form. Therefore before supplying the results to outside worlds, the system must convert them to human acceptable form. Units called output interfaces accomplish this task.

Output devices generate computer output, which can be broadly classified into the following types.

1. **Soft copy output:** A soft copy output is an output, which is not produced on a paper or some material, which can be touched and carried for being shown to others. They are temporary in nature, and vanish after use.

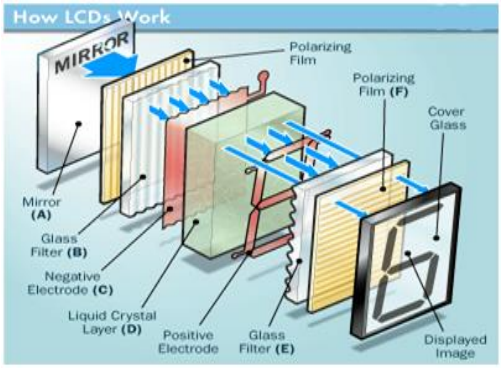
2. **Hard copy output :** A hard copy output is an output, which is produced on a paper or some material which can be touched and carried for being shown to others. They are permanent in nature, and can be kept in paper files or can be looked later.

1) Display Monitor

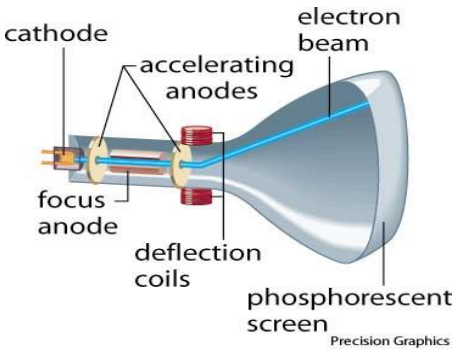
A computer display is also called a display screen or video display terminal (VDT). A monitor is a screen used to display the output. Images are represented on monitors by individual dots called pixels. A pixel is the smallest unit on the screen that can be turned on and off or made different shades.

There are two forms of display

1) **Liquid Crystal Display (LCD) :** Liquid Crystal Display (LCD) Monitor is color set that use LCD technology to produce images. LCD monitor produce a colored image by selectively filtering a white light. The light is typically provided by a series of Cold Cathode Fluorescent Lamps (CCFLs) at the back of the screen. Although some displays use white or colored LEDs instead. The sub-pixels are so small that when the display is viewed from even a short distance, the individual colors blend together to produce a single spot of color, a pixel. The shade of color is controlled by changing the relative intensity of the light passing through the sub-pixel.



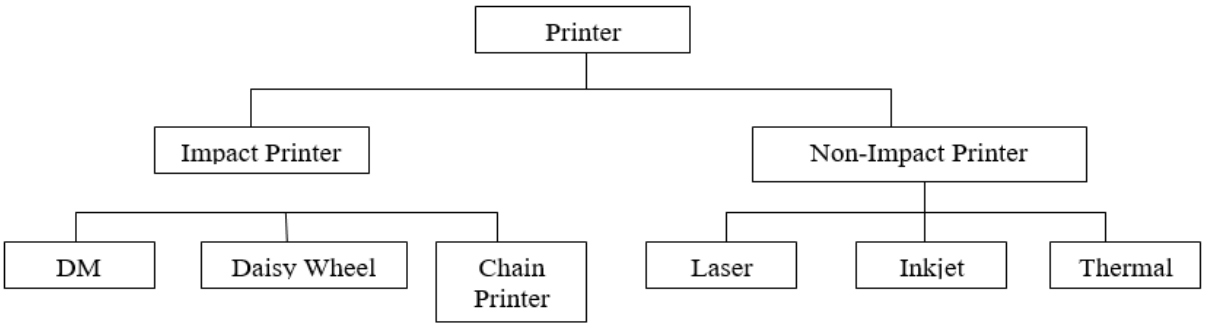
2) **Cathode Ray Tube (CRT):** The cathode ray tube (CRT) is a vacuum tube containing an electron gun and fluorescent screen, with internal or external means to accelerate and deflect the electron beam, used to create images in the form of light emitted from the fluorescent screen. The screen is covered with a crystalline phosphorescent coating which emits visible light when excited by high energy electrons. The beam is deflected either by magnetic or an electric field to move the bright dots to the required position on the screen. The CRT uses an evacuated glass envelope which is large, deep, heavy, and relatively fragile.



Printers

A printer prints information and data from the computer on to a paper. Some printer produces only textual information whereas other can produce graphical as well. Printer is divided tow basic categories.

a) Impact Printer
b) Non impact printer



a) Impact Printer

They use variations of standard typewriter printing mechanism where a hammer strikes the paper through an inked ribbon. These printers have a mechanism that touches the paper in order to create an image. Dot matrix printers and character printer fall under this category. Impact printers are cheaper, slower and generate low quality output.

b) Non-Impact Printer

They do not touch the paper when creating an image. They use chemical, heat or electrical signals to each symbol on paper. Many of these require special coated or treated paper, inkjet, laser and thermal printers fall under this category of printers. Non Impact printers are expensive faster and generate good quality output.

Difference between Impact Printers and Non-Impact Printers

Impact Printers	Non-Impact Printers
1. Produce worst quality print than Non-impact printers	1. Produce better quality print than impact printers.
2. Non-impact printers generate noise (because of the hitting activity)	2. Non-impact printers are quieter i.e. noiseless.
3. The character and images are printed by making physical contact with paper.	3. The character and images are printed without any direct physical contact with the paper.
4. Impact printers are cheaper than non-impact printer.	4. Non-impact printers are usually more expensive than impact printers.
5. Impact printer are slower than non-impact printer	5. Non-impact printers are faster then impact printers.
6. Speed of impact printer is generally measured in character per seconds (CPS) or line per minutes.(LPM)	6. Speed of non-impact printer is generally measured in pages per minute (PPM)
7. Examples: Dot Matrix, Daisy Wheel Printer etc.	7. Example: Laser printer, Inkjet printer, Thermal Printer etc.

a) Impact Printer

1) Dot Matrix Printer

Dot Matrix printers were one of the more common types of printers used for general use- such as for home and small office use. Such printers would have either 9 or 24 pins on the print head. 24-pin print heads were able to print at a higher quality.

Dot matrix printers are still commonly used in low-cost, low quality applications like cash registers, or in demanding, very high volume applications like invoice printing. Dot matrix printers are now rapidly being superseded even as receipt printers.

The technology behind dot matrix printing is quite simple. The paper is pressed against a rubber coated cylinder and is pulled forward as printing progresses. The printer consists of an electromagnetically driven print head, which is made up of numerous print wires. The characters are formed by moving the electro-magnetically driven print head across the paper, which strikes the printer ribbon situated between the paper and print head pin. As the head stamps onto the paper through the inked ribbon, a character is produced that is made up of these dots. These dots seem to be very small for the normal vision and appear like solid human readable characters.

Advantages

1. Impact printers have one of the lowest printing costs per page.
2. As the ink is running out, the printout gradually fades rather than suddenly stopping partway through a job.
3. They are able to use continuous paper rather than requiring individual sheets making them useful for data logging.
4. They are good, reliable workhorses ideal for use in situations where printed content is more important than quality.

Disadvantage

1. Impact printers are usually noisy.
2. They can only print low resolution graphics, with limited color performance, limited quality and comparatively low speed.

2) Daisy Wheel Printer


Daisy Wheel Printer

Daisy wheel printer is an impact printing technology invented in 1969 by David S. Lee at Diablo Data System. These printer have print heads composed of metallic or plastic wheel. A raised character is placed on the tip of each of the daisy wheel 'Petals'. Each petal has an appearance of letter (Upper case and Lower case), Number or punctuation mark on it. To print, the print wheel is rotated around until the desired character is under the print hammer. The petal is then struck from behind by the print hammer, which strikes the character, pushing it against the ink ribbon, and onto the paper, creating the character.

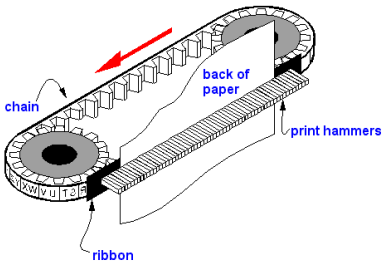
Advantages:

1. Different typefaces and sizes can be used by replacing the daisy wheel.
2. It is possible to use multiple fonts within a document.
3. It produces high resolution output and more reliable than dot matrix printers.

Disadvantages:

1. Daisy wheel printers are noisy.
2. It is slower and more expensive than dot matrix.
3. It cannot print graphics.

3) Chain Printer



An early line printer that used type slugs linked together in a chain as its printing mechanism. The chain spins horizontally around a set of hammers. When the desired character is in front of the selected print column, the corresponding hammer hits the paper into the ribbon and onto the character in the chain. It consist of a metallic chain band on which all characters of the character set supported by the printer are embossed.

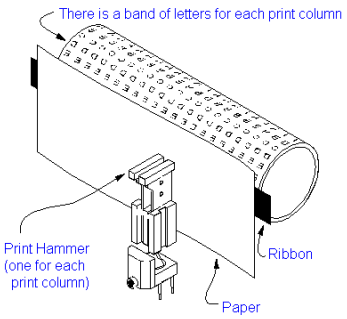
Advantages:

1. It is line printers that print one line at a time.
2. Its cost is low.
3. It can print multiple copies.

Disadvantages:

1. Chain printer are also noisy in operation and often use cover to reduce the noise level.

4) Drum Printer



In Drum printer design, a fixed font character set is engraved onto the periphery of a number of print wheels, the number matching the number of columns the printer could print. The wheels joined to form a large drum, spin at a high speed and paper and an inked ribbon are stepped past the print position. As the desired character for each column passes the print position, a hammer strikes the paper from the rear and presses the paper against the ribbon and the drum, causing the desired character to be recorded on the continuous paper.

Advantages:

1. It can print multiple copies.
2. Its speed is higher than dot matrix and daisy wheel printer.

Disadvantage:

1. Drum printers are also noisy in operation.
2. It is very expensive and its character fonts cannot be changed.

b) Non – Impact Printers

Non impact printers work by using techniques other than physically striking the page to transfer ink onto the page.

1) Laser Printer

It is non-impact printer. Laser printer uses dry ink (toner), static electricity, and heat to place and bond the ink onto the paper. They use a combination of laser and photocopier technology. Printing is achieved by making an image using laser beam on the photosensitive surface of a drum. As the paper rolls by the drum, the toner is transferred to the paper and fixed into a permanent image. To make the printing permanent, the head and pressure is applied on the paper by passing it through a hot roller.

Advantages:

1. Its print quality is very good.
2. It can print a page in a minute.

Disadvantages:

1. It is very expensive.

2) Inkjet Printer

It is non-impact printer. Inkjet printer uses a series of nozzles to spray drops of ink directly on the paper. The print head of an inkjet printer consists of a number of tiny nozzles to spray ink on paper by making electrical field on paper. Inkjet printers are slower than dot-matrix printers, cheaper to buy but are more expensive in running costs. Typical inkjet printers produce 17 to 19 pages per minute of black/White output and 13 to 15 pages of color output.

Advantages:

1. They are quieter in operation than impact dot matrix or daisy wheel printer.
2. They can print finer, smoother details through higher print head resolution.
3. It comparison to more expensive technologies like thermal vex, dye sublimations, and laser printer, inkjets have the advantage of practically no warm up time and lower cost per page.

Disadvantages:

1. The ink is often very expensive.
2. Many ‘intelligent” ink cartridges contain a micro chip that communicates the estimated ink level to the printer.
3. The lifetime of inkjet prints produced by inkjet using aqueous ink is limited.

3) Thermal Printer

A thermal printer produces a printed image by selectively heating coated thermochromic paper, or thermal paper (heat sensitive paper), when the paper passes over the thermal print head. The coating turns black in the areas where it is heated, producing an image. Thermal printer can also print in two different colour i.e. in black and an additional color, by applying heat at two different temperatures.

Advantages:

1. Its print quality is very good.
2. Thermal printers print faster and quieter than dot matrix printers.

Disadvantages:

1. Thermal printer paper is more expensive than average paper.

Plotter

Plotter are used to produce graphical output on paper. It is a device capable of producing charts, drawings, graphics, maps etc. it is much similar to printer but it is designed to print graphs instead of alphanumeric characters. Plotters are available in any size to generate bigger output.

There are two different types of plotters.

a) Drum Plotters
b) Flatbed Plotters

a) Drum Plotter


Drum Plotter

In drum plotters, the paper on which the design is to be printed is placed over a drum. These plotters consist of one or more pen that is mounted on a carriage which is horizontally placed across the drum. The drum can rotate in either clockwise or anticlockwise direction under the control of plotting instruction sent by computer. Drum plotter are used to produce continuous output, such as plotting earthquake activity.

b) Flatbed Plotter

Flatbed plotter consist of a stationary horizontal plotting surface on which paper is fixed. The pen is mounted on a carriage, which can move horizontally, vertically, leftwards, or rightwards to draw lines. In flatbed plotters, the paper does not move, the pen holding mechanism provide all the motion. These plotters are instructed by the computer on the movement of pens in the x-y coordinates on the page. Flatbed plotter are used in designing of ships, aircrafts, buildings and so on.

Voice Output System

Voice output system enable the computer to talk to its users. It consists of an audio response device that produces the audio output. To facilitate voice response computer must have a sound card attached / inbuilt into the computer system. Sound cards having digital-to analog converter, that converts recorded or generated digital data into an analog format.

Voice response system are typically of three types:

1. Audio-output devices
2. Voice reproduction system
3. Speech synthesizer.

1) Audio output devices

Audio output devices translate audio information from the computer into sounds that people can understand.

2) Voice reproduction system

It produces an audio output by selecting the appropriate response from a pre-defined set of response. These responses may be in the form of speech, musical sounds, alarms or other sounds. These are used in automatic answering machines, audio help on how to operate a system, talking alarms clocks etc.

3) Speech Synthesizer:

It converts the text or disp lay into verbal output. Users can hear their keystrokes and mouse actions spoken aloud and can perform the appropriate action using combination of specific software and hardware. It is used by the people of disabilities for ex. Blinds to hear his / her movement and keystrokes.

Projector

A projector is an output device that can take images generated by a computer and reproduce them on a large, flat (usually lightly colored) surface. For example, projectors are used in meetings to help ensure that all participants can view the information being presented.

All modern televisions and projectors have one or more ports that allows them to receive and display an image generated by a computer. Both desktop and laptop computers are capable of connecting to a TV or projector, provided that they have the appropriate cables.