

Lecture-2

Topics:

- **Input Devices:** examples with explanation
- **Output Devices :** examples with explanation

Input/output Devices

Input Devices

Any device used to input data into the computer
(keyboard, mouse, scanner, etc)

Or

Hardware that allows the user to put data into
the computer



2. Input Devices



Types of Input

▶ Data

- raw facts that a computer receives and processes to produce information

▶ Programs

- instructions that direct the computer operations

▶ Commands

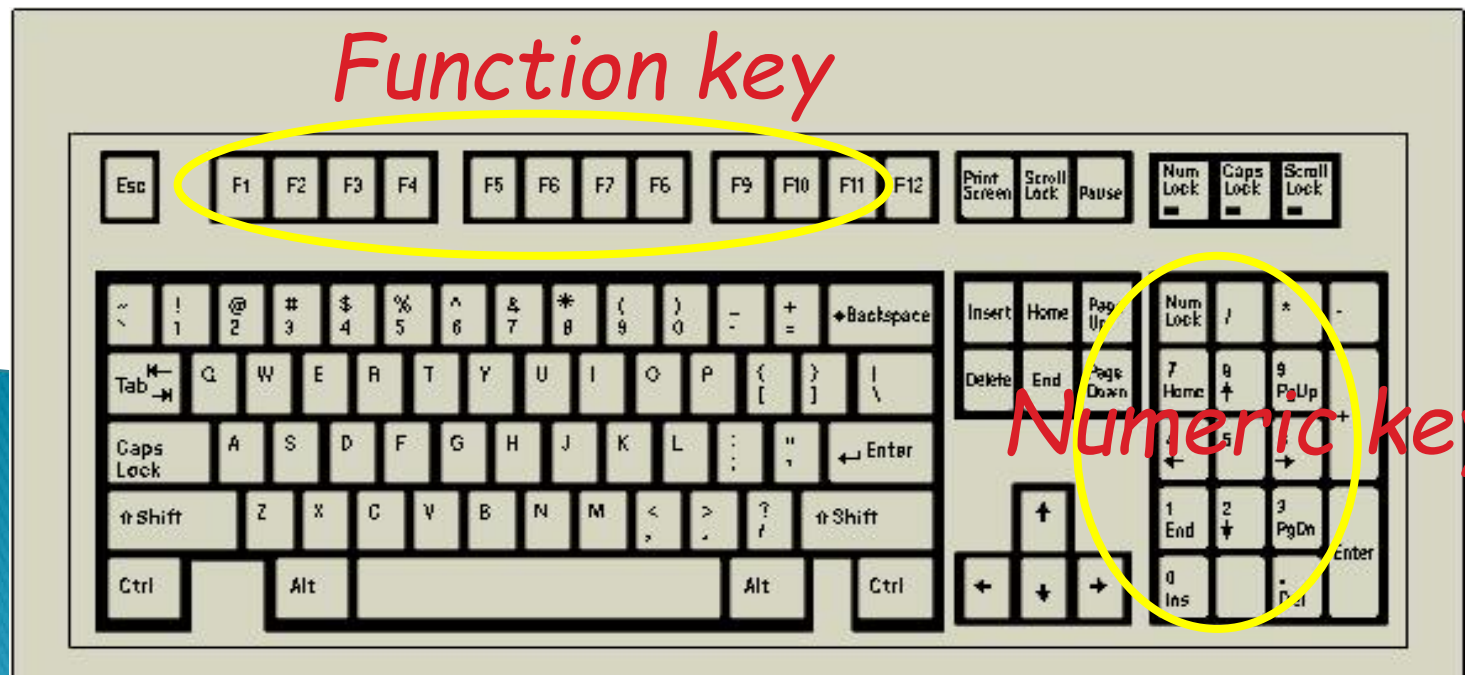
- key words that direct the computer to perform certain activities


▶ User Responses

- data a user enters to respond to a question or message.

A. Keyboards

- The most commonly used input devices.
 - Contains alphanumeric, cursors and function keys.



- **Function Keys**, labeled from F1 to F12, allow user to quickly access commands and functions, such as saving a document or calling up a **program's Help feature**.
 - **Cursor-control Keys** govern the movement of the cursor on the screen. They include Up Arrow, Down Arrow, Left Arrow and Right Arrow key on the keyboard.
 - **Special Purpose Keys** are used in conjunction with other keys to enter commands into a computer. Control (Ctrl), Alternate (Alt) and Shift keys are example of special purpose keys.
 - **Toggle Keys** are keys that, when pressed, activates a certain mode or condition, and when pressed again, deactivates the condition. The Num Lock key, Cap Lock key and the Scroll Lock key are examples of toggle keys
 - **Numeric Keypad**, located in the far right portion of the keyboard, is used for entering numbers quickly and for performing the same operations as a calculator.
- 

Types of keyboards

Serial Keyboard

A serial Keyboard is one, which communicate the data to the Central Processing Unit one bit at a time. This means that bit pattern that forms a particular character is sent on a single wire. So, bit-by-bit transmission is made.

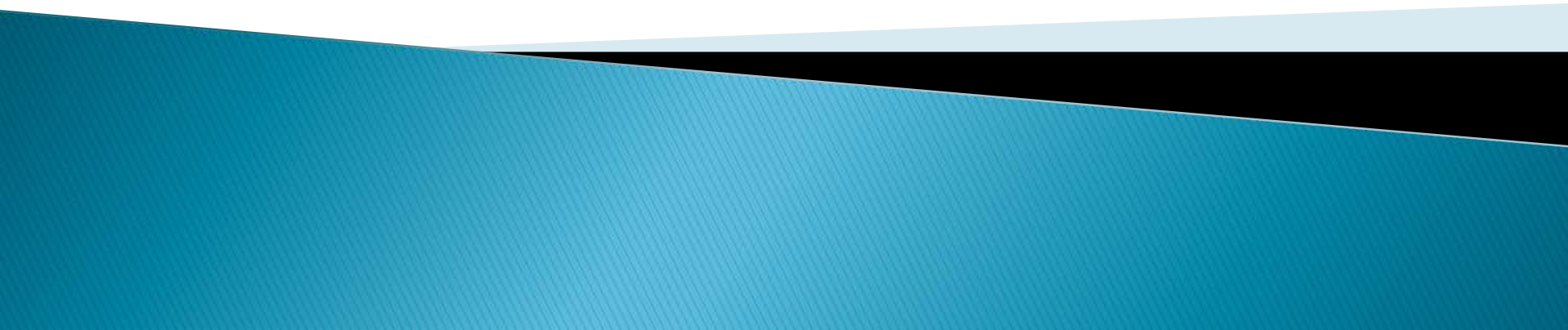


Parallel Keyboard

A Parallel Keyboard carries one Byte (8 bits) at a time to the Central Processing Unit. This means that the bit pattern that forms a character is sent on 8 different wires. Each wire carries



B. Pointing Devices

- ❑ Many people use pointing devices instead of keyboards whenever possible.
 - ❑ Pointing devices minimize the amount of typing (and the number of errors).
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Mouse

- Palm-sized pointing devices
- a ball on the bottom senses its movement
- various actions can be preformed by moving the pointer and then pressing one of the buttons on top of the mouse.



Types of Mouse

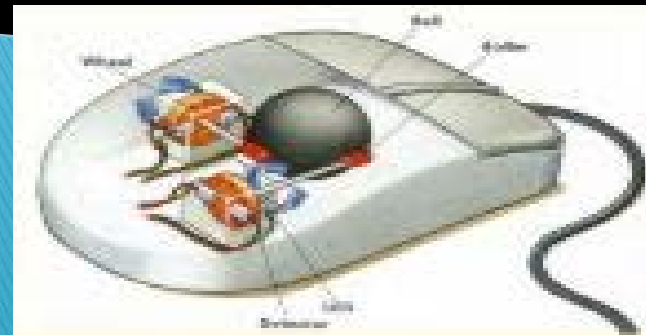
Mechanical Mouse

A mouse that uses a rubber ball that makes contact with wheels inside the unit when it is rolled on a pad or desktop. Mechanical sensors within the mouse detect the direction the ball is rolling and move the screen pointer accordingly



Optomechanical Mouse

Same as a mechanical mouse, but uses optical sensors to detect motion of the ball.



Types of Mouse

Optical Mouse

Uses a laser to detect the mouse's movement. You must move the mouse along a special mat with a grid so that the optical mechanism has a frame of reference. Optical mice have no mechanical moving parts. They respond more quickly and precisely than mechanical and optomechanical mice, but they are also more expensive.



CORDLESS MOUSE

aren't physically connected at all. Instead they rely on infrared or radio waves to communicate with the computer. Cordless mice are more expensive than both serial and bus mice, but they do eliminate the cord, which can sometimes get in the way.

Mouse Interfaces



Serial



PS2



USB

TrackPoint t



Touchpad



The mouse is not practical for people using a notebook computer in a small space. **Track Point** or **Touch pad** is therefore used instead to control the pointer.

Touch-Sensitive Screens

- ❑ Touch screens are commonly used in grocery stores, fast-food restaurants, and information kiosks.
- ❑ Touch screens enable the user to select an option by pressing a specific part of the screen.



A touch screen kit solution

Joysticks

- ▶ Use the movement of a vertical stem to direct the pointer.
- ▶ Joysticks are used mostly for computer games, but they are also used occasionally for CAD/CAM systems and other applications.



Devices

Input data with hand written characters, select items by pressing the pen against the screen, and use gestures, which are special symbols, to issue commands.

Light Pen

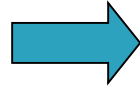
Used to select processing options or to draw on the screen



Devices

Image Scanner

Electronically capture an entire image & convert it into digital form that can be processed by a computer



Image

Scan

Edit

Optical Mark Recognition

- ❑ Optical marks are the filled-in shape, usually ovals or rectangles, on scan sheets.
- ❑ The data collected on the scan sheets are translated into binary form by an **optical mark reader (OMR)**



Use lead pencil to mark on scan sheets. Feed the scan sheets into the OMR.

Output Devices

Output is data that has been processed into a useful form called information.

- Report
- Computer Graphics
- Audio Output
- Video Output

Types of Output

- ▶ Most output can be divided into 2 categories:
Soft copy & hard copy
 - ❑ Soft copy is what you see on the monitor. Soft copy is temporary.
 - ❑ Hard copy can be touched and carried. Hard copy is usually some form of paper output.

Monitors

- ❑ A visual output device of a computer.
- ❑ Monitor output is a most common form of soft copy.



CRT Monitor



Flat-panel Monitor

Resolution of Display

- ❑ Images on the screen are created by configurations of dots called **pixels** (picture elements)
- ❑ The more the pixels, the better the **resolution** of the image
 - SVGA = pixel configuration of 800 by 600
 - XVGA = pixel configuration of 1024 by 768

A printer is a device that accepts text and graphic output from a computer and transfers the information to paper, usually to standard size sheets of paper.

2.PRINTER

Personal computer printers can be distinguished as

impact Printers

non-impact Printers



Printers

- ❑ Produce permanent output (hard copy)
- ❑ consists of 2 main types: impact & non-impact

Types	Impact Printers	Non-impact Printers
Mechanisms	Transfer an image by striking the paper and the ribbon.	Print without striking against a sheet of paper.
Advantages	Cheap consumables; Can print on multiple carbon copies	Fast; High printing quality; Quiet
Disadvantages	Noisy	Expensive consumable

Types of Impact Printers

- Line Printers

- Character Printers

Character Printers

□ Printer that stores individual characters when needed to print. The printer will print one character at a time instead of one line at a time. Today, these printers are rarely used because of speed issues and because only text is capable of being printed.

A. Line Printers

- ✓ The line printer is a form of high speed impact printer in which one line of type is printed at a time.
- ✓ They are mostly associated with the early days of computing, but the technology is still in use.
- ✓ Print speeds of 600 to 1200 lines-per-minute (approximately 10 to 20 pages per minute) were common
- ✓ The disadvantages of line printers are that they cannot print graphics, the print quality is low, and they are noisy.

Types of line Printers

- Drum printers

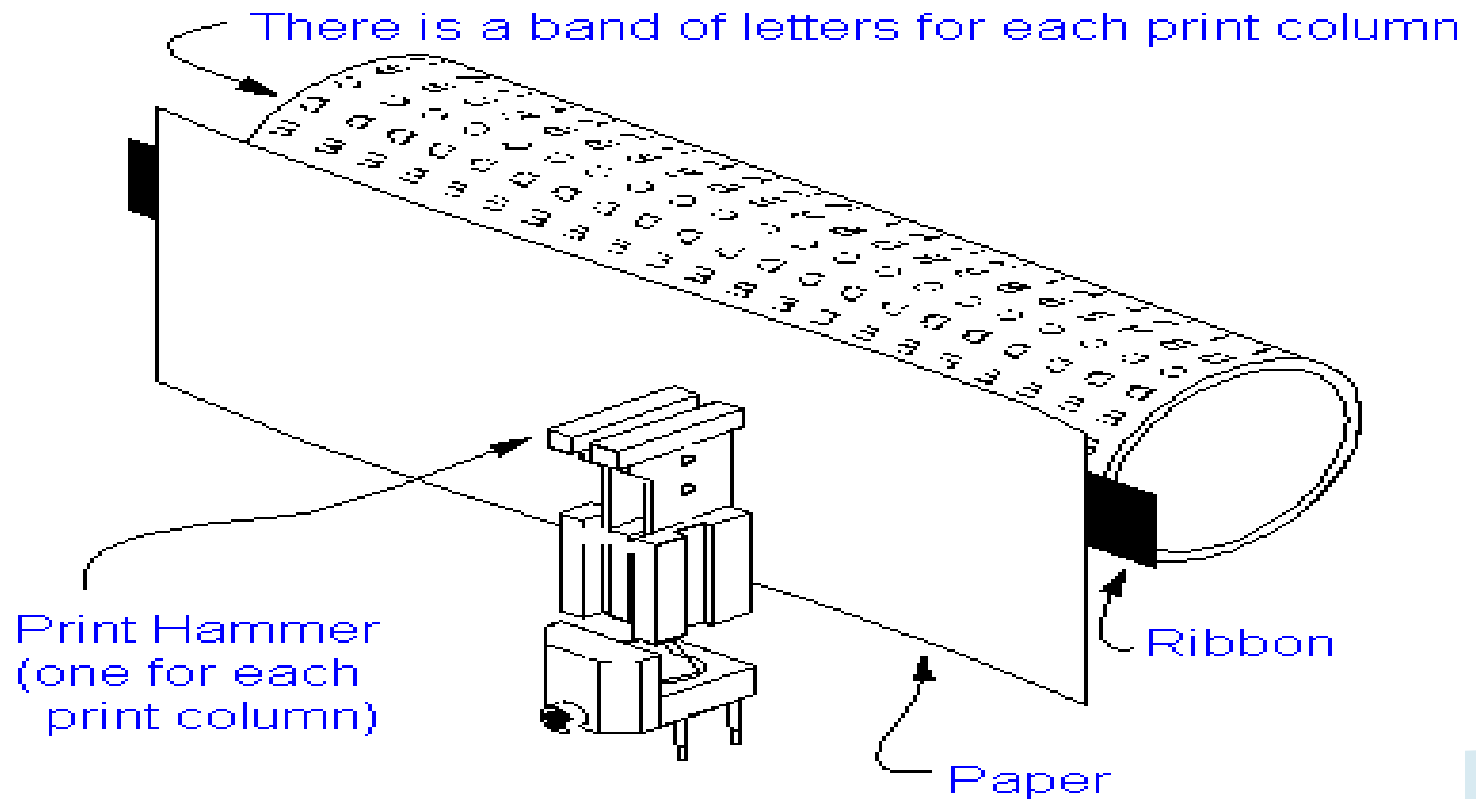
- Chain (train) printers

- Bar printers

- Comb printers

Mechanism

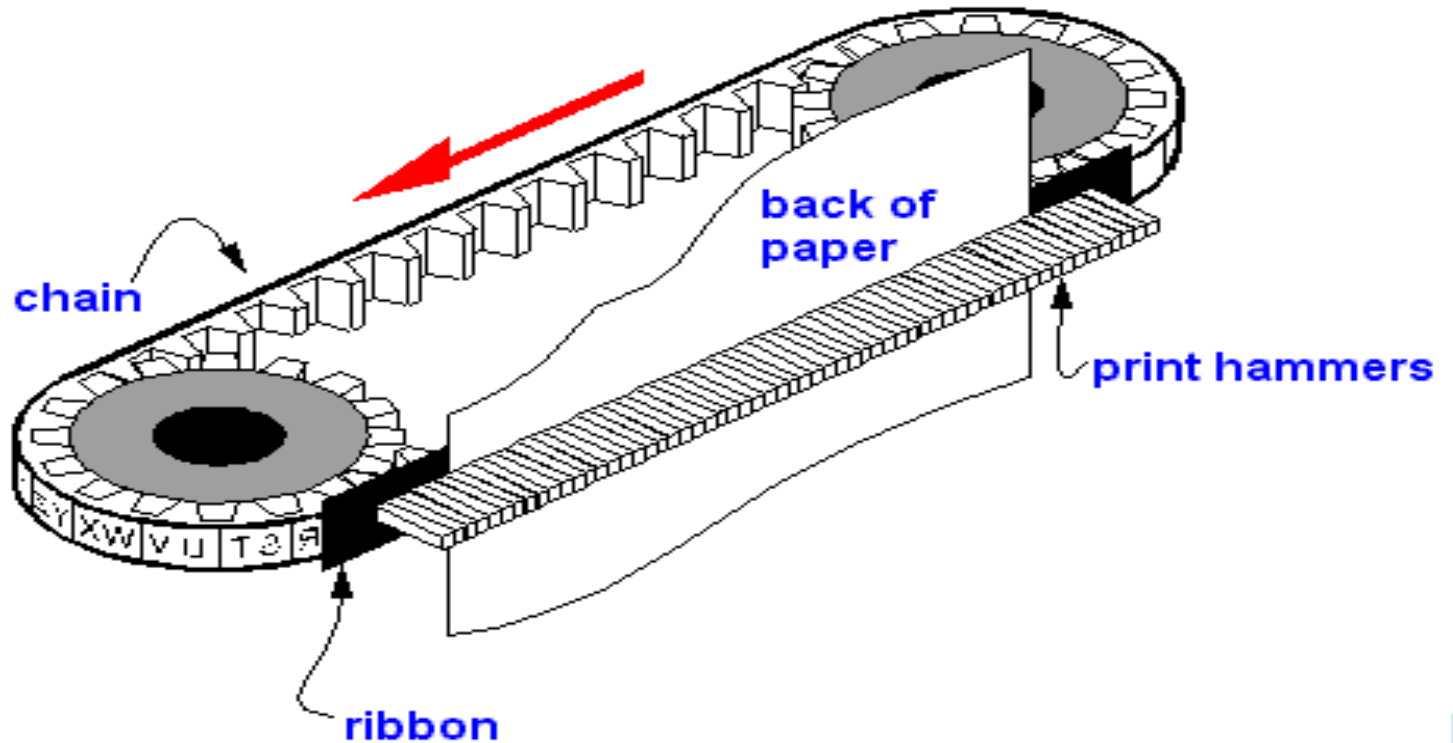
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The hammer pushes the paper into the type slug when it rotated around to the print position. Such printer technologies seem ridiculous compared to the quiet, high-speed workings of today's laser printers.

Mechanism

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When the required character in the chain has revolved to the print column, the hammer pushes the paper into the ribbon and against the type slug of the letter or digit.

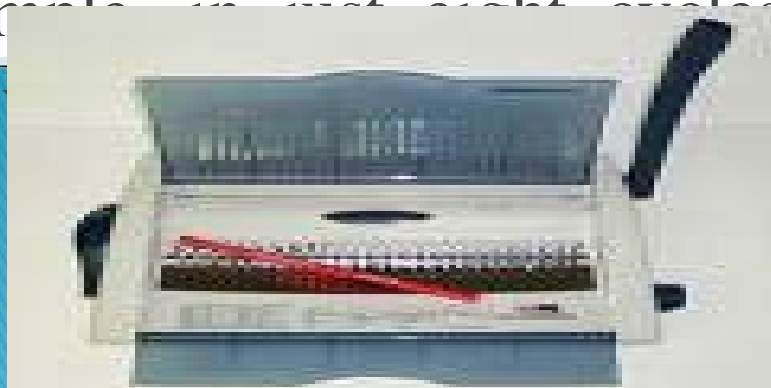
Bar Printers

- ❑ Bar printers were similar to chain printers but were slower and less expensive.
- ❑ Rather than a chain moving continuously in one direction, the characters were on fingers mounted on a bar that moved left-to-right and then right-to-left in front of the paper.
- ❑ An example was the IBM 1443



Comb Printer

- Comb printers, also called line matrix printers, represent the fourth major design.
- These printers were a hybrid of dot matrix printing and line printing. In these printers, a comb of hammers printed a portion of a row of pixels at one time (for example, every eighth pixel).
- By shifting the comb back and forth slightly, the entire pixel row could be printed (continuing the example, in just eight cycles). The paper then advanced and the next pixel row was printed.



B. Character Printers

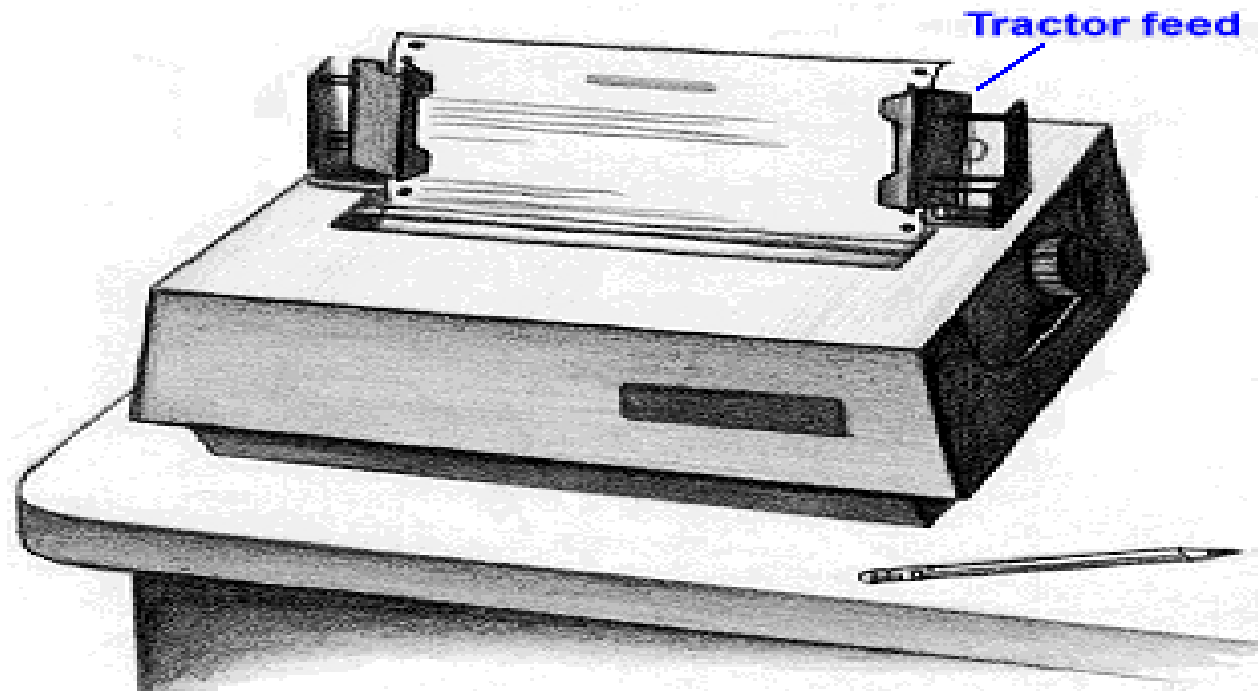
Definition of: **character printer**

A printer that prints one character at a time. The typical character printer is the dot matrix printer.

Their printing speed lies in the range of 30 to 600 character per second .

Printer

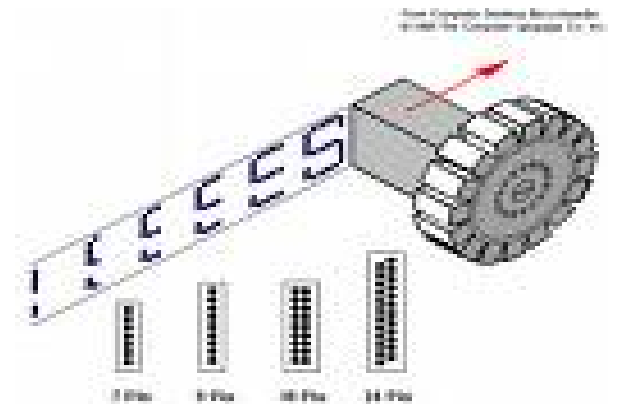
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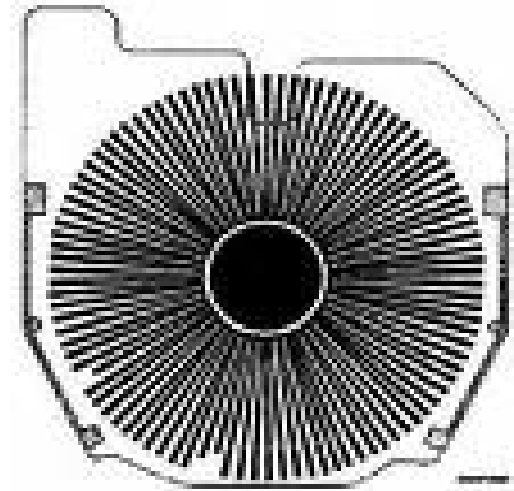
Types of Character Printer

- ❑ Dot Matrix Printer
- ❑ Letter Quality Printer

Dot Matrix Printers



Letter Quality Printer



A daisywheel printing

Types of non-impact printer
are:

Thermal Printer

Laser Printer

Ink Jet Printer

Electromagnetic Printer

Ink Jet Printers

Characters are formed as a result of electrically charged or heated ink being sprayed in fine jets onto the paper. Individual nozzles in the printing head produce high resolution (up to 400 dots per inch or 400 dpi) dot matrix characters



Colour cartridge showing inkjet nozzles

Inkjet printers use colour cartridges which combine to create colour tones. A black cartridge is also used for crisp monochrome output. This method of printing can generate up to 200 cps and allows for good quality, cheap colour printing.

Thermal Printers

Characters are formed by heated elements being placed in contact with special heat sensitive paper forming darkened dots when the elements reach a critical temperature.



- Thermal printer paper tends to darken to sunlight and heat. The standard of print produced is poor.
- Thermal printers are widely used in battery powered equipment such as portable calculators

Laser Printer

Laser Printers use a laser beam and dry powdered ink to produce a fine dot matrix pattern. This method of printing can generate about 4 pages of A4 paper per minute.



The standard of print is very good and laser printers also produce very good quality printed graphic images too

Other Output Devices

□ Plotter

- produce high-quality line drawings
- A continuous-curve plotter is used to draw maps from stored data.



❑ **LCD Projectors**

- project a computer image onto screen

❑ **Voice Output Devices**

- generate spoken words from text

❑ **Computer Output microfilm (COM)**

- records output as microscopic images on roll film.

❑ **Facsimile (FAX) Machine**

- transmit & receives document over telephone line.

❑ **Multifunctional Devices (MFD)**

- can print, copy and fax
- 