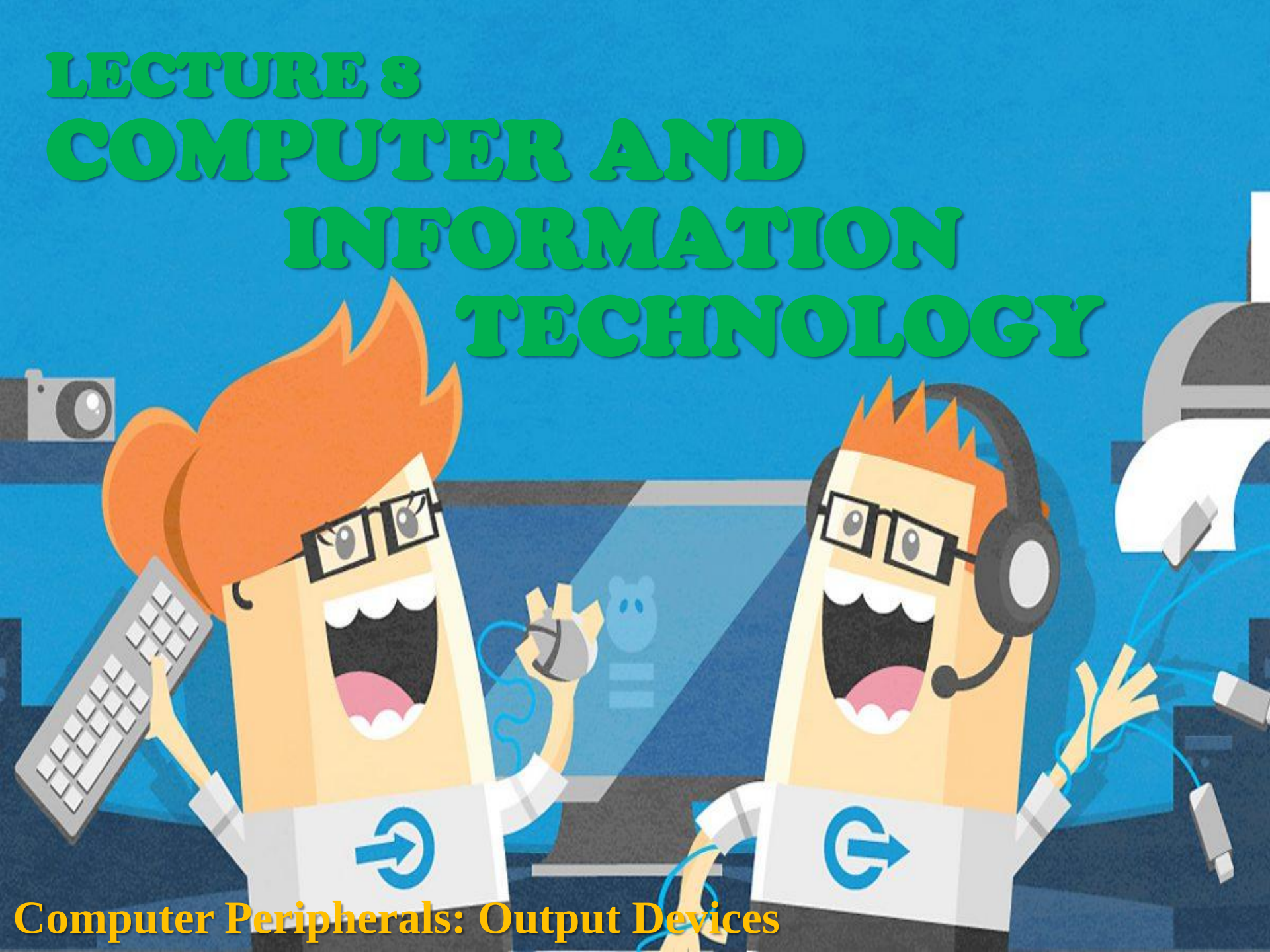
LECTURE 8
COMPUTER AND INFORMATION TECHNOLOGY



Computer Peripherals: Output Devices

Display or Visual Device
<<Monitor>>

A monitor consists of a screen, circuitry, a power supply, buttons to adjust screen settings, and a casing that contains all of these components. A monitor displays data from a computer onto a screen so the user can interact with the data via a digital to GUI interface.

Display or Visual Device «Monitor»

Monitor Selection Criteria

Specification	Example	Why should I?
Connection Type	VGA, DVI, HDMI	Compatibility with the output of the graphics unit.
Dimension	11.5, 14, 18.5, 21.5, 22, 24, 32 etc.(in inch)	Related to ease of use & accommodation.
Aspect Ratio	16:9, 16:10, 4:3 (old)	Ratio of width to height.
Resolution	1366x768 (HD) 1920x1080 (Full-HD) 2560x1440 (WQHD) 3840x2160 (4K UHD) 5120x2160 (5K WUHD)	Resolution interprets into the total number of pixel of the display unit. The higher the resolution, the sharper the output.

Display or Visual Device «Monitor»

Monitor Selection Criteria

Specification	Example	Why should I?
Refresh Rate	60, 75, 80, 96, 144, 165 (all in Hz or Hertz)	Refresh rate is the number of times the display updates the contents per second. Higher refresh rate is better for prolonged use.
Brightness	250 to 400 (cd/m^2)	Higher brightness ensures comfort in well lit room.
Contrast	600:1 to 1000:1 (static)	It is the ratio of luminance of darkest black & brightest white a monitor can show. Higher contrast is more pleasing.

Display or Visual Device «Monitor»

Monitor Selection Criteria

Specification	Example	Why should I?
Response Time	Typically 1ms to 5ms	It is the amount of time (in millisecond or ms 1000ms = 1s) required by a pixel to go dark from bright or vice versa. Higher response time ensures less ghosting or blurring.
Touch	Capacitive or Resistive	Touch screen gives significant flexibility but may hinder brightness.
Price	Typically starts from 5,000/-	$ $ $ $ $

Display or Visual Device <<Projector>>

This output device "projects" computer images or video onto a wall or screen. Computer projectors are cheaper and simpler compared to movie theatre projectors.

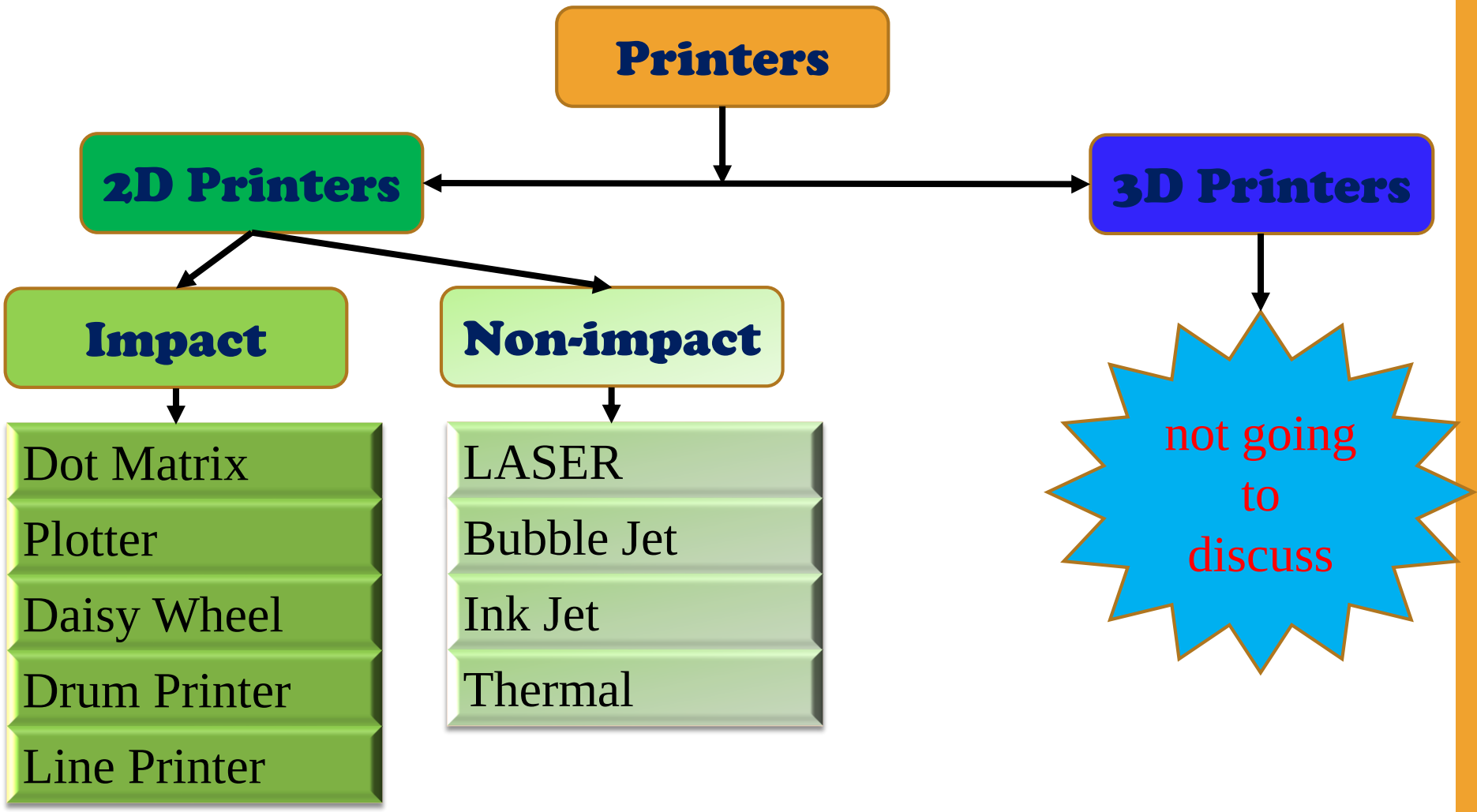
Projectors have similar interfaces like a monitor. But they offer more connectivity options like S-video and composites. Wireless casting over HDMI and W-LAN provides ease of operation.

Typically projectors offer up to Full HD resolution. XGA (1024x768) and WXGA (1280x800) are more common. Better brightness (measured in Lumen) is desirable as it helps in producing brighter image in not so dark room.

Display or Visual Device
<<Projector>>

Display or Visual Device
<<Projector>>

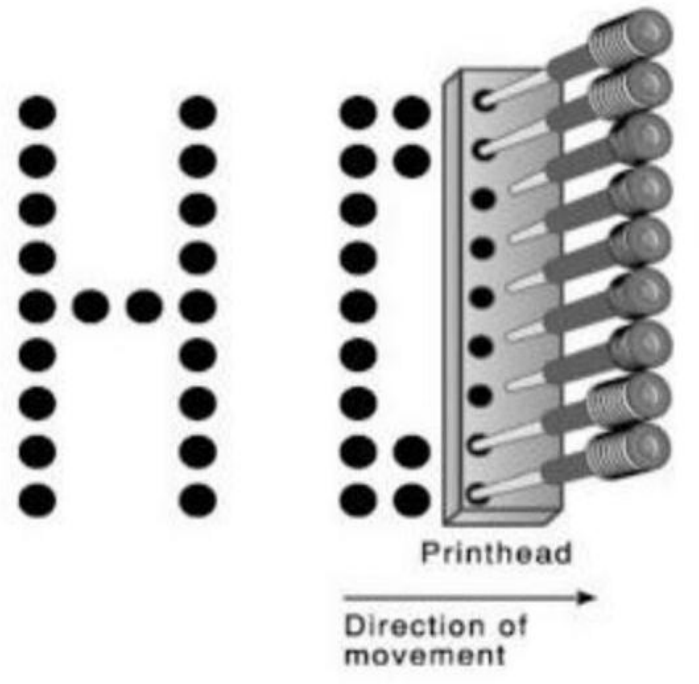
Document or Image Printing Device



Document or Image Printing Device

	Impact	vs.	Non-impact
How	During printing, printing head hits or touches the paper.		Printing head doesn't touch the paper.
Noise	Loud, produces disturbing sound during printing.		Near silent.
Speed	Print output is slow compared to most non-impact printers		Faster printing speed.
Cost	Printing cost is low.		Little bit expensive.

Impact Printer
<<Dot Matrix>>



Dot Matrix Printer

Dot matrix is an impact printer. Its printhead consists of needles that hammers the paper to be printed on to a ribbon soaked in ink. A typical printhead can have 9 to 24 sharp hammering needles. High number of needle count (and sharpness) ensures fine print quality.

Like any LASER printer, dot matrix printers support any font size and type. However dot matrix can't print any image (graph and sketch only), can't produce color but support carbon copies.

Impact Printer
<<Dot Matrix>>

Let’s check this video of a dot matrix printer printing a paper.

High Pitch Loud Sound Alert!

Impact Printer
<<Dot Matrix>>

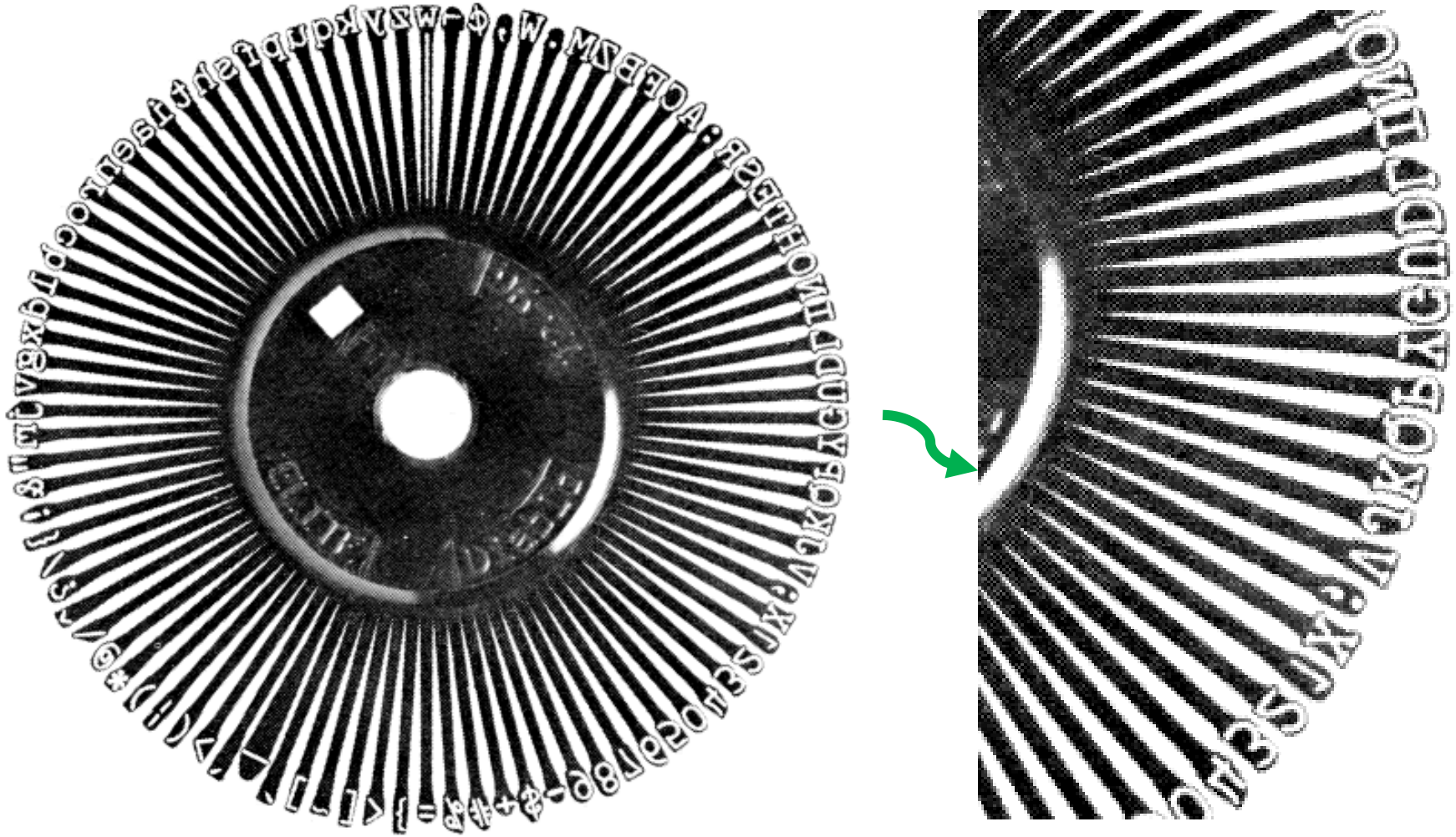
Impact Printer
<<Daisy Wheel>>

Daisy Wheel Printer

Daisy wheel printer's printing head has a wheel with spokes bearing the letters and symbol to be printed.

The print head carrying the wheel in spin moves across the paper while a hammers strikes whenever the letter/symbol to be printed comes in position. The paper then get pressed onto an ink soaked ribbon and the letter/symbol gets printed on the paper. Daisy wheel printers do not support font variation or any kind of illustration

Impact Printer
<<Daisy Wheel>>



Impact Printer
<<Daisy Wheel>>

Daisy wheel
in
slow motion

Impact Printer
<<Daisy Wheel>>

Impact Printer <<Plotter>>

Plotter

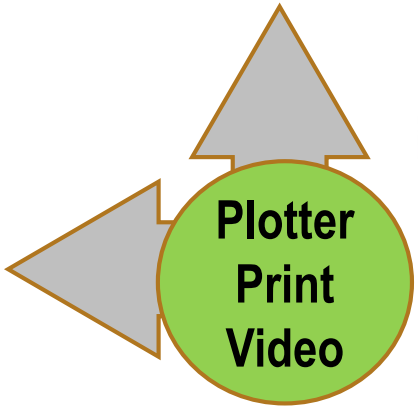
A plotter is basically a large printer that is used to print vector graphics and continuous lines. Dot printers cannot draw continuous lines, it makes lines out of dots. Plotters can print large blue prints made by CAD (Computer-aided design) and CAE (Computer-aided engineering). It is more precise than a traditional printer.

Plotters are typically used for more technical types of drawings such as mechanical drawings, building plans, circuit diagrams, charts, and more. Old plotters are sometimes mentioned as pen plotters and now are slowly being phased out by wide format printers. These new type of plotters works just like any modern day inkjet printers and they are of non-impact type.

Impact Printer
<<Plotter>>

Original Plotter

Non-impact Color Plotter



Non-impact Printer
≪LASER Printer≫

LASER Printer

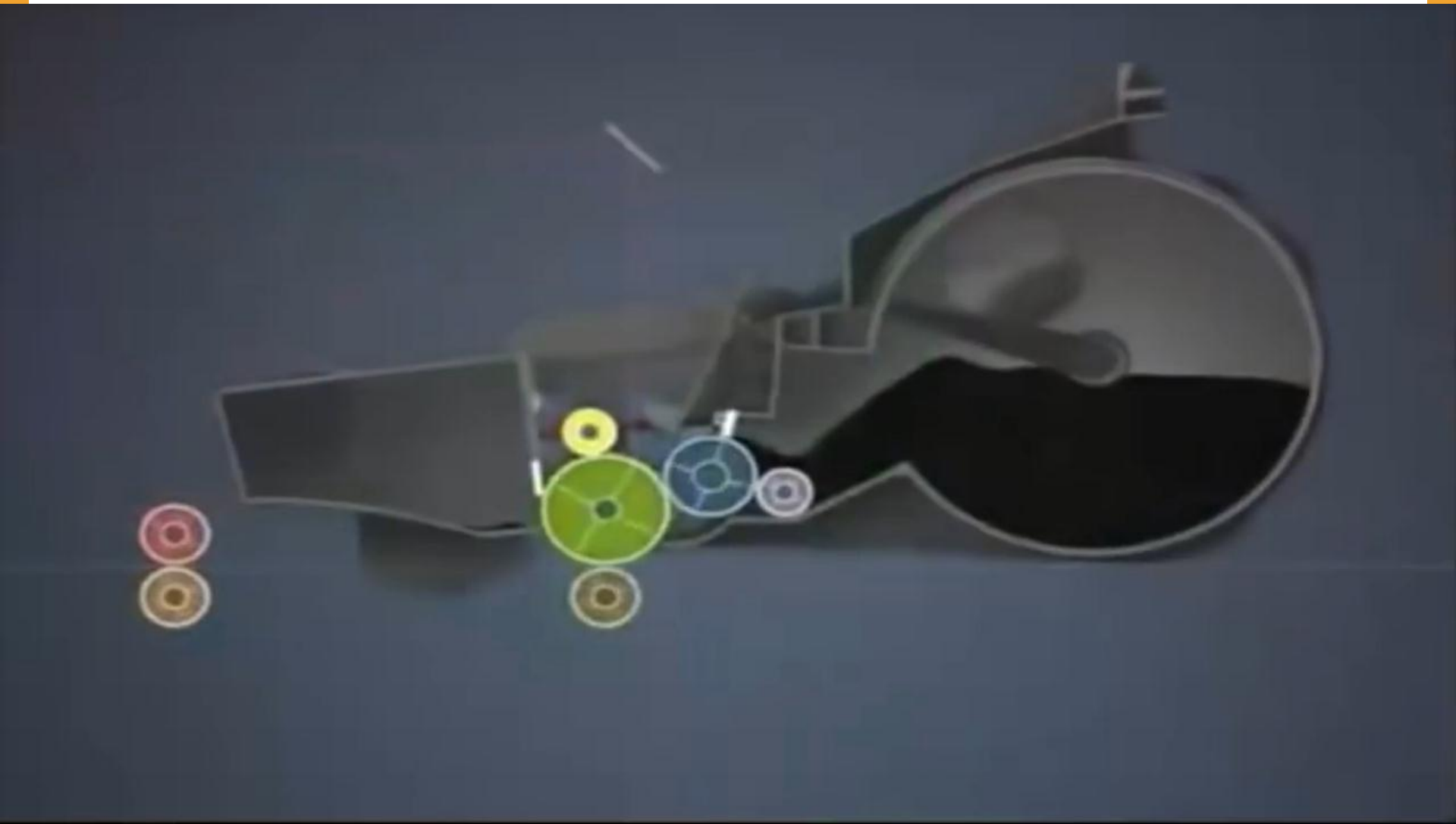
Laser printer uses a laser (Light Amplification by Stimulated Emission of Radiation) and a photoconductor drum to print texts and gray scale images maintaining unmatched sharpness and speed. Now a days, laser printers are the most cost effective gray scale printing option. Laser printer with color printing ability is also available.

Non-impact Printer
<<LASER Printer>>

LASER Printer Working Principle

Before describing the working principle of a LASER printer, let's check the following video

Non-impact Printer
<<LASER Printer>>



Non-impact Printer
≪LASER Printer≫

LASER Printer Working Principle

- The photoconductive drum, which was negatively charged is written upon by the LASER. The LASER writes the mirrored version of the document on the photoconductive drum.
- Positions where the LASER strikes get positively charged and attract negatively charged toner (the black powder ink) from the surface of developer roller.
- The photoconductive drum now has a visible document on its surface and it then rolls itself on the surface of the paper to deposit the toner on the paper.
- The paper now has a visible print made of loose toner powder.
- The fuser melts loose toner and makes permanent print.

Non-impact Printer
<<Inkjet Printer>>

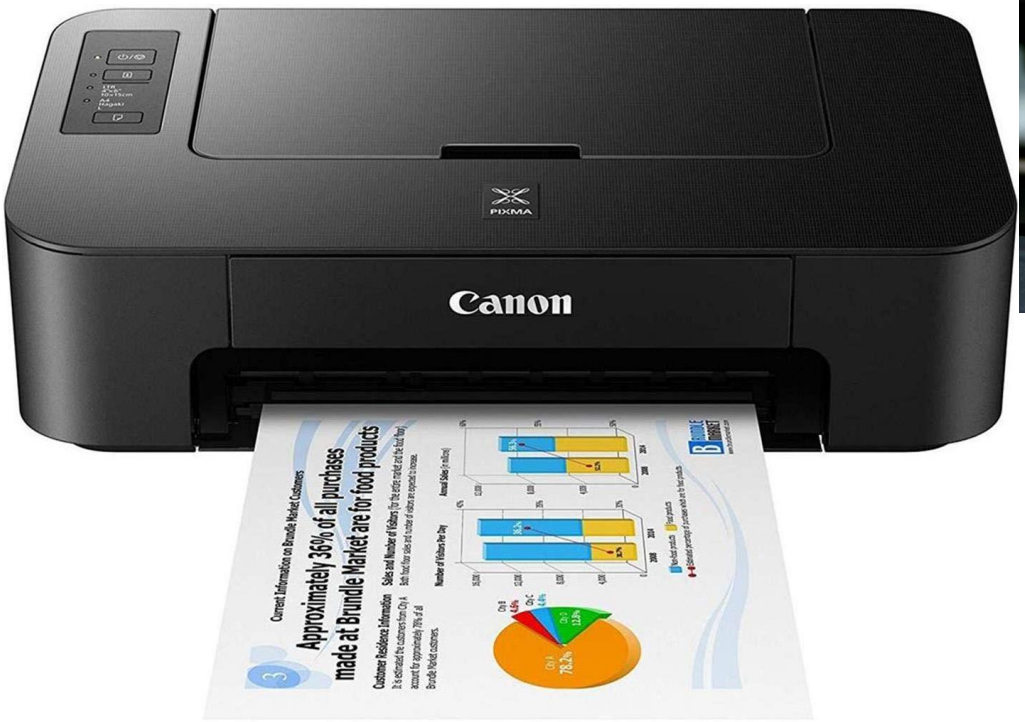
Inkjet Printer

Inkjet printers are capable of printing document with color photos. A typical inkjet printer has four different liquid color ink tank (Cyan, Magenta, Yellow and blacK). These printers are known as CMYK printers. Each tank has tiny nozzles underneath through which inks are sprayed onto the paper upon which the printer head carrying the tank travels from side to side.

Six tank variations of inkjet printers offer good quality photo printing on special photo papers. These printers have Cyan, Photo Cyan, Magenta, Photo Magenta, Yellow and Black colored ink tanks.

Non-impact Printer
<<Inkjet Printer>>

Inkjet Non-impact
Color Printer



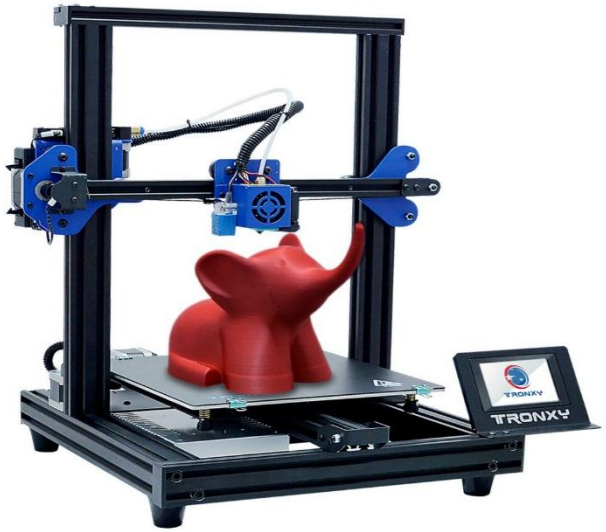
6 Color Ink Tanks
in a print head

3D Printer

3D Printers

3D printers can manufacture any model created in CAD or similar 3D modelling softwares. Most 3D printers use special plastic like filament which they melt and systematically molds into the exact 3D model designed in a computer using 3D modelling software.

3D printers are used by both amateurs and professionals to test their designed models or parts of various devices.



Scan this for 5 cheap 3D printers

Sound Output
<<Speaker & Headphone>>

Speaker and Headphone

Speakers and headphones are attached to computers to facilitate the output of sound; sound cards are required in the computer for them to function. This sound card or the sound processing unit may be built into the main board or can be embedded into the speaker or headphone. In later case, the speaker/headphone connects via USB instead of 3.5mm analog audio interface.

Digital audio can be streamed via Bluetooth interface and requires speaker/headphone with Bluetooth support.

Stay Home, Stay Safe

Always put on a mask when you are in public!