

Output devices:

hardware components that receive data from a computer and convert it into a human-adaptable form, like images, videos, audio or physical output. Common output devices like:

Monitor

Displays output, such as text, images and videos, on a screen. Display panels or monitors vary in technology, functionality and usefulness. The main [monitor](#) kinds are:

Monitor Based on Technology

- **CRT (Cathode Ray Tube) Monitors:** Older, bulky monitors that use electron beams to display.
- **LCD (Liquid Crystal Display) Monitors:** Thin and lightweight, use liquid crystals for display.
- **LED (Light Emitting Diode) Monitors:** Advanced LCD monitors with LED backlighting for better brightness and energy efficiency.
- **OLED (Organic Light Emitting Diode) Monitors:** Use organic materials to glow light when an electric current is applied it provides the most perfect contrast and color accuracy.
- **Plasma Monitors:** Use ionized gas (plasma) for display, high-quality display but now outdated.

	
A CRT Monitor	LCD Monitor

	
LED Monitor	OLED Monitor

Monitor Based on Resolution and Aspect Ratio

Monitor resolution is the number of pixels displayed on your screen, expressed as width × height (e.g., 1920 x 1080), which determines image sharpness and how much content fits on the display. Higher resolutions have more pixels, resulting in clearer, more detailed images, while the optimal resolution depends on factors like monitor size and intended use, such as gaming or graphic design. Common resolutions include Full HD (1080p), QHD (1440p), and 4K (2160p), with higher options offering greater clarity and detail.

- **HD (High Definition) Monitors:** Resolution of 1280×720 or 1920×1080 (Full HD).
- **4K Monitors:** Ultra HD monitors & resolution of 3840×2160 of high clarity and detail.
- **5K and 8K Monitors:** High-resolution monitors for professional work like video editing and gaming.
- **Ultrawide Monitors:** Wider aspect ratio of 21:9 or more.

Monitor Based on Purpose

- **Gaming Monitors:** High refresh rates (120Hz, 144Hz, or more) and low response times.
- **Professional Monitors:** High color accuracy and resolution for graphic design and video editing.
- **Touchscreen Monitors**

Monitor Based on Shape and Display Style

- Flat Monitors
- Curved Monitors (OLED)

Specialized Monitors

- 3D Monitors
- HDR Monitors

Types of printers:

1. Impact Printers
2. Non-Impact Printers

Print copies of digital documents or images on paper. Printing devices make visible copies of digital files and pictures. They are classified by technology and feature:

Printer Based on Printing Technology

- **Inkjet Printers:** Use liquid ink sprayed through nozzles, high-quality color prints.
- **Laser Printers:** Use toner and laser beams. Fast, high-volume and high-quality prints.
- **Dot Matrix Printers:** Use pins to transfer ink from a ribbon.
- **Thermal Printers:** Use heat-sensitive paper. Receipts and labels.
- **3D Printers**
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Printer Based on Functionality

- **Single-Function Printers**
- **All-in-One (Multifunction) Printers** (Printing, scanning, copying and sometimes faxing)
- **Photo Printers**

Printer Based on Connectivity

- **Wired Printers** (USB or other cables)
- **Wireless Printers** (Wi-Fi, Bluetooth or NFC)

Printer Based on Usage

- Home Printers
- Office Printers
- Commercial/Industrial Printers

3D Printer



A **3D printer** is an **advanced output device** that creates **three-dimensional solid objects** directly from a digital model. It works on the principle of **additive manufacturing**, where material is added layer by layer until the final object is formed.

How It Works:

- **Design Creation:** A 3D model is designed using Computer-Aided Design (CAD) software.
- **Slicing:** The model is divided into thin digital slices using special software.
- **Printing:** The printer deposits material (plastic, resin, metal, etc.) layer by layer according to the slices.
- **Final Product:** A real, solid 3D object is produced.

Materials Used:

- Plastics (PLA, ABS) – common in education & prototyping.
- Resin – used for high-detail models.
- Metals (steel, titanium, aluminum) – used in aerospace, automotive, and medical industries.
- Composites & ceramics – for specialized products.

Applications of 3D Printing:

Medical field: Prosthetics, dental implants, organ/tissue prototypes.

Education: Models for science, engineering, and design.

Engineering/Architecture: Prototyping, blueprints, structural models.

Automotive & Aerospace: Parts manufacturing and testing.

Everyday use: Toys, tools, household items.

Speaker: Audio output, music, sounds and speech.

Headphones: Private audio output for a single user.

Projector: A projector displays computer output (text, images, or video) onto a **large screen or surface**. Used in classrooms, offices, cinemas.



Plotter: A plotter produces **large-scale, precise graphics or drawings** on paper. Used by architects, engineers, and designers for blueprints, CAD drawings, and maps.

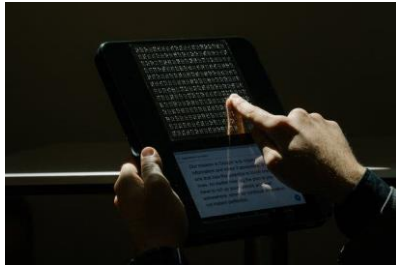


Smart Board / Interactive Whiteboard

A digital whiteboard that projects output from a computer and allows users to interact using touch or a special pen.



Braille Display (for visually impaired users)



Converts computer text into **Braille characters** using raised dots, enabling blind users to read by touch.

LED Indicators

Small lights on devices (like CPU, modem, or keyboard) that show the status of operations (power on, charging, processing).

VR Headset (Virtual Reality):



A head-mounted display that provides immersive **3D visual and audio output**, used in gaming, simulations, and training.

Reference Links:

IO Devices: <https://www.banglacyber.com/list-of-all-input-output-devices-of-computer/>

Vide on 3D printers : <https://www.youtube.com/watch?v=f94CnlQoeq4>

Research:

- Working and applications of 3D printers
- Differentiate between Impact and Non-impact printers
- Differentiate between Laser and Inkjet printers
- 2D printer vs 3D printers
- Speech Recognition vs Voice Recognition
- 2D scanner vs 3D scanner
- Keyboard Vs Ergonomic Keyboard
- MICR, OMR, OBR, OCR

Additional Reading:

How does a POS system Work.

Name the printer that's used in ATM

Name the printer which is used in POS system.