

PCS UNIT 3

Opening the PC and identification

Opening a PC involves safely removing the side panel after unplugging it to identify internal components like the motherboard, CPU, RAM, and storage; software tools like System Information or CPU-Z help identify specs digitally, while physical inspection reveals the hardware's main parts (motherboard, PSU, drives, cards) and their connections. Key identification involves looking at labels (motherboard model) and using software for details like CPU/RAM specifics and unique IDs (serial numbers).

Opening the PC (Physical Identification)

1. **Safety First:** Power down the PC, unplug the power cord, and disconnect all peripherals.
2. **Open the Case:** Remove the screws on the back of the case (usually thumb screws) and slide off the side panel to access the internals.
3. **Identify Major Parts:**
 1. **Motherboard:** The large circuit board where everything connects.
 2. **CPU (Processor):** Under a fan/heat sink on the motherboard.
 3. **RAM (Memory):** Long, thin sticks plugged into slots on the motherboard.
 4. **Storage:** Hard drives (HDDs) or solid-state drives (SSDs) in bays.
 5. **Power Supply (PSU):** The box with many cables, usually at the bottom or top.
 6. **Expansion Cards:** Graphics card (GPU), sound card, network card in PCIe slots.
 7. **Cables:** Identify power (from PSU) and data (SATA) cables connecting components.

Identifying PC Specs (Software Methods)

- **Windows Settings (Easy):** Press Windows key + I, go to **System > About** to see processor, RAM, OS, and system type.
- **System Information (Detailed):** Search "System Information" in the Start Menu for detailed hardware and software info.
- **Command Prompt (HWID/Serial):** Open CMD (Win+R, type cmd), then type `wmic bios get serialnumber` for hardware ID.
- **Third-Party Tools (Deep Dive):** Use software like CPU-Z (free) to see detailed CPU, Motherboard, and RAM information.

Study of different blocks

Studying computer blocks involves understanding its core functional units: the **Input Unit** (keyboard, mouse), **CPU** (Control Unit, ALU, Registers for processing), **Memory Unit** (RAM for temp storage, ROM for boot), **Storage** (HDD/SSD for permanent data), and **Output Unit** (monitor, printer). These blocks connect via a **Bus System** to transfer data, forming the basic architecture that executes instructions from programs.

Core Functional Blocks (Hardware)

1. **Input Unit:** Converts user data/commands into a digital format for the computer (e.g., Keyboard, Mouse).
2. **Central Processing Unit (CPU):** The computer's "brain," executing instructions.
 - **Control Unit (CU):** Directs operations, fetches instructions.
 - **Arithmetic Logic Unit (ALU):** Performs calculations (arithmetic) and comparisons (logic).
 - **Registers:** High-speed memory for immediate data storage.
3. **Memory Unit:** Temporarily stores data and programs for quick access.
 - **RAM (Random Access Memory):** Volatile, fast memory for active tasks.
 - **ROM (Read-Only Memory):** Non-volatile, stores firmware (like BIOS).
4. **Storage Unit (Secondary Storage):** Long-term, non-volatile storage for files (e.g., SSD, HDD, USB drives).
5. **Output Unit:** Displays processed results in a human-readable form (e.g., Monitor, Speakers, Printer).
6. **Bus System:** Data pathways (address, data, control buses) connecting all components.

Software & Programming Blocks

- **Operating System (OS):** Manages hardware and software resources.
- **System Software:** Tools like compilers, drivers.
- **Application Software:** Programs for specific tasks (Word, Games).
- **Programming Blocks (e.g., in Scratch):** Visual code snippets (Events, Motion, Control, Looks) that snap together to create scripts, forming logic.

Assembling and disassembling

Assembling and disassembling a computer involves carefully taking apart and putting back together components like the case, motherboard, CPU, RAM, storage, and power supply, focusing on anti-static precautions and correct cable connections for successful building or maintenance, following a general reverse order for disassembly and forward order for assembly. Always unplug the PC and ground yourself to prevent static damage before starting, then proceed from the outside in (case, PSU, drives, motherboard) for removal, and inside out (motherboard components, motherboard, drives, PSU, cables) for reassembly.

Essential Tools & Prep

- **Tools:** Screwdrivers (Phillips head), anti-static wrist strap, anti-static mat, zip ties (for cable management).
- **Preparation:** Turn off PC, unplug all cables, discharge static by touching an unpainted metal part of the case.

Disassembly Steps (Reverse Order for Assembly)

1. **Open Case:** Remove side panel screws and slide off the cover.
2. **Disconnect Cables:** Unplug all internal power (PSU) and data (SATA/IDE) cables from drives, motherboard, and GPU.
3. **Remove Components (General Order):**
 1. Graphics Card (GPU) & other expansion cards.
 2. RAM modules (press clips on sides).
 3. Storage Drives (HDD, SSD, Optical).
 4. CPU Cooler & Fan (carefully unmount).
 5. CPU (open socket lever).
 6. Motherboard (remove mounting screws).
 7. Power Supply Unit (PSU).

Introduction to Computer Hardware

Computer hardware is the physical, tangible parts of a computer system—like the CPU, RAM, motherboard, storage, keyboard, and monitor—that work together to execute instructions provided by [software](#), forming a complete, functional device.

These components are categorized as internal (inside the case, like the processor) and external (peripherals like mice and printers).

Key Internal Components (Inside the Case)

- **Motherboard:** The main circuit board connecting all other components, acting as the central hub.
- **CPU (Central Processing Unit):** The "brain" that executes instructions and performs calculations.
- **RAM (Random Access Memory):** Short-term, volatile memory for actively used data, cleared when the computer shuts down.
- **Storage (HDD/SSD):** Long-term, non-volatile memory for saving files, with SSDs generally faster than traditional Hard Disk Drives (HDDs).
- **PSU (Power Supply Unit):** Converts power from the wall outlet to supply all components.
- **GPU (Graphics Processing Unit):** Processes and renders images and video.

Key External Components (Peripherals)

- **Input Devices:** Allow users to send data to the computer (e.g., keyboard, mouse, microphone).
- **Output Devices:** Display information from the computer (e.g., monitor, speakers, printer).

Components of Mother-boards & its types

A motherboard connects all PC parts, featuring key components like the **CPU Socket, RAM Slots, Chipset, PCIe Slots, Storage Connectors (SATA/M.2), BIOS/UEFI, and Power Connectors**, facilitating communication via buses like PCIe. Common types are distinguished by form factor (e.g., ATX, Micro-ATX, Mini-ITX) and connectivity, with newer boards focusing on integrated chipsets (fewer Northbridge/Southbridge) for modern high-speed interfaces.

Key Motherboard Components

- **CPU Socket:** Houses the Central Processing Unit.
- **RAM Slots:** For installing Random Access Memory modules.
- **Chipset:** Manages data flow between CPU, RAM, and peripherals (historically Northbridge/Southbridge, now often integrated).
- **Expansion Slots (PCIe/PCI):** For graphics cards, sound cards, network cards.

- **Storage Connectors (SATA, M.2):** Connects hard drives (HDDs) and solid-state drives (SSDs).
- **BIOS/UEFI Chip:** Stores firmware for system startup.
- **Power Connectors:** Delivers power from the PSU (24-pin ATX, 4/8-pin CPU).
- **I/O Ports:** Back panel connections for USB, audio, Ethernet, etc..
- **CMOS Battery:** Powers BIOS settings and real-time clock.

Types of Motherboards

Motherboard types are mainly categorized by their physical size (form factor) and capabilities:

- **ATX (Advanced Technology eXtended):** Standard full-size board, common in desktops, offering many slots.
- **Micro-ATX (mATX):** Smaller than ATX, fewer expansion slots, fits smaller cases.
- **Mini-ITX:** Compact, ideal for small form-factor (SFF) PCs, fewer slots but supports powerful components.
- **E-ATX (Extended ATX):** Larger than standard ATX for high-end workstations/servers.
- **Server/Workstation Boards:** Often support multiple CPUs, ECC RAM, and robust management features.
- **Embedded Boards:** Custom-designed for specific devices (e.g., industrial PCs, all-in-ones).

Ports, Slots, Connectors, add on cards, Power supply units, and cabinet types

Ports, slots, connectors, add-on cards, power supply units, and cabinet types are all fundamental components of a computer system.

Ports and Connectors

Ports and connectors allow data transfer and connection with external devices (peripherals) [1].

- **USB (Universal Serial Bus):** A standard connector used for a wide variety of peripherals, including keyboards, mice, printers, and external drives. Common types are Type-A, Type-B, Type-C, Mini-USB, and Micro-USB .
- **HDMI (High-Definition Multimedia Interface):** Transmits high-quality audio and video signals between devices like computers, monitors, and TVs.

- **DisplayPort:** Another digital display interface often used in professional settings, supporting high resolutions and refresh rates.
- **Ethernet (RJ45):** Provides a wired connection to a network or the internet.
- **Audio Jacks:** Typically 3.5mm jacks used for speakers, headphones, and microphones.

Slots (Expansion Slots)

Expansion slots on the motherboard are used to connect additional circuit boards (add-on cards).

- **PCIe (Peripheral Component Interconnect Express):** The most common expansion slot type today, used for high-speed components like graphics cards, network cards, and solid-state drives.

Add-on Cards (Expansion Cards)

These cards are inserted into expansion slots to add or upgrade functionality to a computer.

- **Graphics Card (GPU):** Processes and renders images, videos, and animations for display.
- **Network Interface Card (NIC):** Allows a computer to connect to a network.
- **Sound Card:** Enhances audio capabilities beyond basic onboard sound.
- **Wi-Fi Card:** Provides wireless network connectivity.

Power Supply Units (PSUs)

The PSU converts AC power from the wall outlet into the DC power needed by the computer's internal components. Key considerations include:

- **Wattage:** The total power capacity (measured in watts) required to run all components efficiently.
- **Form Factor:** Common form factors like ATX define the physical size and shape.
- **Efficiency Rating:** Ratings (like 80 Plus Bronze, Gold, Platinum) indicate how efficiently the PSU converts power, minimizing wasted energy as heat.

Cabinet Types (Cases/Chassis)

The computer case houses and protects all internal components and helps with cooling.

- **Tower Cases:** The most common type, available in various sizes.
- **Full-Tower:** Large cases with ample space for multiple drives, large motherboards, and advanced cooling systems.

- **Mid-Tower:** A standard balance of space and size, suitable for most general PC builds.
- **Mini-Tower:** Smaller cases designed for micro-ATX or mini-ITX motherboards and space-constrained setups.
- **Small Form Factor (SFF):** Very compact cases for specialized builds where space is a priority.
- **Desktop Cases:** Designed to lie flat horizontally, often used as a base for the monitor.

Storage devices: Primary & Secondary storage medium

Primary storage (like RAM, ROM) is fast, volatile memory for active data, directly used by the CPU, while secondary storage (HDDs, SSDs, USBs, Cloud) is slower, non-volatile, and for permanent, long-term data retention, holding files and the OS when the power is off, notes GeeksforGeeks and IBM.

Primary Storage (Main Memory)

- **Purpose:** Holds data and instructions the CPU is currently using for quick access.
- **Characteristics:** Very fast, directly accessible by the CPU, but often volatile (loses data when power is off).
- **Examples:**
 - **RAM (Random Access Memory):** Volatile, temporary workspace.
 - **ROM (Read-Only Memory):** Non-volatile, stores essential boot-up instructions.
 - **Cache:** Extremely fast memory for frequently used data.

Secondary Storage (Auxiliary Storage)

- **Purpose:** Long-term, permanent storage for the operating system, applications, and user files.
- **Characteristics:** Slower than primary, non-volatile (retains data without power), larger capacity, not directly accessed by the CPU.
- **Examples:**
 - **Magnetic:** Hard Disk Drives (HDDs).
 - **Solid State:** Solid-State Drives (SSDs), USB Flash Drives, Memory Cards.
 - **Optical:** CDs, DVDs, Blu-ray Discs.
 - **Cloud Storage:** Remote servers for data backup and access.

Internet

The **Internet** is a global system of interconnected computer networks that allows billions of devices worldwide to communicate and share information. Often described as a "network of networks," it links private, public, academic, business, and government networks through various electronic, wireless, and optical technologies.

Key Characteristics

- **Infrastructure:** It is a physical system comprising cables (fiber-optic, copper), satellites, routers, and servers.
- **Protocols:** Devices communicate using standardized rules known as the **Internet Protocol suite (TCP/IP)**. TCP handles data assembly, while IP manages addressing and routing.
- **Packet Switching:** Information is broken into small chunks called **packets**, which travel independently across the network and are reassembled at their destination.
- **Decentralization:** There is no single central governing body; instead, it is a distributed system where each constituent network sets its own policies.

Internet vs. World Wide Web (WWW)

While often used interchangeably, they are distinct:

- **The Internet** is the hardware-oriented **infrastructure** (the "road system").
- **The World Wide Web** is a **service** (the "buildings" on those roads) consisting of websites and web pages accessed via a browser using the HTTP protocol.

History

The Internet originated in the late 1960s with **ARPANET**, a project funded by the U.S. Department of Defense to create a resilient communication network for researchers. It grew into the modern global Internet following the adoption of TCP/IP in 1983 and the invention of the World Wide Web in the early 1990s.

Uniform Resource Locator

A Uniform Resource Locator (URL) is the unique web address for any resource on the internet, specifying its location and how to access it, like a postal address for digital items. It tells your browser the protocol (e.g., HTTP/HTTPS), domain name, and file path to find pages, images, videos, or files, enabling navigation and data retrieval.

Key Components of a URL

- **Scheme/Protocol:** `https://` or `http://` (how to connect).
- **Authority/Domain:** `www.example.com` (the server hosting the resource).
- **Port:** (Optional) `:80` or `:443` (specific access point).
- **Path:** `/folder/page.html` (exact file location).

How it Works

When you type a URL or click a link, your browser reads the URL to understand:

1. **What to use:** The protocol (e.g., HTTPS for secure web pages).
2. **Where to go:** The domain name (e.g., `example.com`), which is translated to an IP address.
3. **What to get:** The specific file or resource from that server.

Example

```
https://www.example.com/products/shoes.html
```

- **Protocol:** `https` (secure)
- **Domain:** `www.example.com`
- **Path:** `/products/shoes.html` (finding a shoe product page)

Web Browsers

A web browser is software that lets you access and view websites on the internet, acting as an interface to retrieve, display, and navigate information from web servers, with popular examples including **Google Chrome**, **Safari**, **Microsoft Edge**, and **Mozilla Firefox**, each offering unique features for performance, privacy, or customization across devices like desktops, tablets, and phones.

How They Work

1. **Request:** You type a URL or click a link, and the browser requests the webpage files (HTML, CSS, images, scripts) from a web server.
2. **Retrieval:** The server sends these files back to your browser.
3. **Rendering:** The browser interprets the code and displays it as the interactive page you see on your screen.

Popular Web Browsers

- **Google Chrome:** Known for speed, extensions, and integration with Google services, popular across all devices.

- **Safari:** Apple's default browser, offering excellent integration and performance on macOS, iOS, and iPadOS.
- **Microsoft Edge:** Built on Chromium, it's the default for Windows and offers strong AI features and performance.
- **Mozilla Firefox:** An open-source option focused on privacy and security, with strong customization.
- **Brave:** Blocks ads and trackers by default, focusing on privacy and speed.
- **Vivaldi:** Highly customizable with extensive controls over its interface and layout.
- **Opera:** Features built-in ad blocking, VPN, and social media integrations.

Key Features

- **Tabbed Browsing:** Managing multiple pages in one window.
- **Bookmarks/Favorites:** Saving web pages for quick access.
- **History:** Keeping track of visited sites.
- **Extensions/Add-ons:** Adding functionality (e.g., ad blockers, password managers).
- **Incognito/Private Mode:** Browsing without saving history or cookies.

You can use different browsers for different needs, such as Chrome for work, Firefox for privacy, and Safari on your Apple devices.

IP Address

An **IP (Internet Protocol) address** is a unique numerical identifier assigned to every device connected to a computer network. It serves as a digital "mailing address," allowing devices to find each other and exchange data packets across the internet or local networks.

Main Functions of an IP Address

- **Identification:** It identifies a specific host or network interface.
- **Location:** It provides the location of a device within the network to enable data routing.

Common Versions

There are two versions of IP addresses currently in use:

- **IPv4:** The legacy standard, consisting of four numbers (0–255) separated by periods (e.g., 192.158.1.38). It supports approximately 4.3 billion unique addresses.

- **IPv6:** The modern standard, developed to replace IPv4. It uses a 128-bit format represented as eight groups of hexadecimal characters separated by colons (e.g., `2001:0db8:85a3:0000:0000:8a2e:0370:7334`). It supports a virtually unlimited number of addresses.

Types of IP Addresses

- **Public vs. Private:**
 - **Public:** Assigned by an ISP (Internet Service Provider) and visible to the global internet.
 - **Private:** Used within a local network (like your home Wi-Fi) and assigned by a router.
- **Static vs. Dynamic:**
 - **Static:** Manually configured and stays permanent (often used for servers or hosting).
 - **Dynamic:** Automatically assigned by the network and changes periodically.

How to Find Your IP Address

- **Public IP:** The easiest way is to search "What is my IP address?" on Google or visit tools like [WhatIsMyIP.com](https://www.whatismyip.com)
- **Local (Private) IP:**
 - **Windows:** Open the **Command Prompt** and type `ipconfig`.
 - **Mac:** Go to **System Settings > Network > Details**.
 - **iPhone/Android:** Look under **Wi-Fi Settings** by tapping the info icon (i) next to your connected network.

Domain Name

A domain name is a human-friendly text address (like `google.com`) that points to a website's numerical IP address, making it easy for people to find and access online services instead of memorizing long numbers. It acts as a unique digital identifier for a website, business, or online service, allowing for professional email addresses and building brand identity, with parts like `.com` or `.org` being the top-level domain (TLD).

Key aspects of domain names:

- **Human-Readable:** Translates complex IP addresses (e.g., 192.0.2.1) into memorable words.

- **Unique Identifier:** Each domain name is unique and serves as a distinct address for a website or service.
- **Structure:** Consists of labels separated by dots, read from right to left (e.g., `example.com`, where `example` is the second-level domain and `.com` is the TLD).
- **Function:** Used in web addresses (URLs), email addresses (e.g., `user@example.com`), and for branding.
- **DNS (Domain Name System):** The system that translates domain names into IP addresses so your browser can find the correct server.

Why you need one:

- **Establish Online Presence:** Creates a professional and recognizable address for your business or brand.
- **Build Credibility:** Makes your business appear more legitimate and trustworthy online.
- **Professional Email:** Allows for custom email addresses (e.g., `info@yourbusiness.com`).
- **Branding:** Provides a unique identity that's easy for customers to remember and share.

Internet Services Providers

An Internet Service Provider (ISP) is a company that gives individuals and businesses access to the internet, acting as a gateway to the online world by connecting your devices to the global network using technologies like fiber, DSL, cable, or wireless. ISPs provide essential internet connectivity and often offer extra services such as email accounts, web hosting, domain registration, and security features, charging a subscription fee for their service.

How they work

- **Network Infrastructure:** ISPs maintain the physical infrastructure (lines, cables, towers) and network connections needed to transmit data.
- **Connectivity:** They connect your home or business to their larger network, which then connects to other networks, allowing you to browse, stream, and communicate online.

Common services offered

- **Internet Access:** The primary service, available through various speeds and technologies (broadband, fiber, satellite).

- **Email & Web Hosting:** Providing email addresses and space to host websites.
- **Domain Registration:** Helping users register unique web addresses (like .com, .in).
- **Technical Support:** Offering help with connection issues and network setup.

Types of ISPs

- **Commercial:** Most common providers (e.g., Verizon, Jio, AT&T).
- **Community-owned/Non-profit:** Organizations serving specific local areas.

Internet Security

Internet security involves the tools, policies, and practices to protect internet-connected systems, networks, and data from online threats like malware, phishing, and hacking, ensuring confidentiality, integrity, and availability of information through measures like firewalls, encryption, and antivirus software to safeguard users and assets from cyberattacks.

Key Components & Threats

- **Malware Protection:** Defending against viruses, ransomware, Trojans, and worms.
- **Phishing Prevention:** Securing against deceptive attempts to steal sensitive info.
- **Network Security:** Using firewalls and secure configurations to control traffic.
- **Data Encryption:** Scrambling data to prevent unauthorized reading.
- **Browser Security:** Protecting web applications and browsing activities.
- **Identity Protection:** Safeguarding personal information from theft.

Core Goals (CIA Triad)

- **Confidentiality:** Keeping private data secret.
- **Integrity:** Preventing data from being altered or tampered with.
- **Availability:** Ensuring systems and services remain accessible.

Search Engines

A search engine is a software tool that finds information on the World Wide Web or within a database by indexing and searching content. Popular search engines include Google, Bing, and DuckDuckGo, with Google being the most popular globally, according to Search Engine Journal, SE Ranking, and Statcounter Global Stats. They work by using automated software ("spiders" or "bots") to crawl the web, creating a searchable index of content that is then ranked by algorithms to provide users with relevant results based on their search queries.

How search engines work

- Search engines use automated software, called "spiders" or "bots," to crawl the internet and follow links from page to page.
- The information gathered by these spiders is used to create a searchable index of the web.
- When a user enters a search query, the search engine's algorithm quickly scans its index to find and rank the most relevant results based on factors like keywords, location, and other data.

Examples of search engines

Search Engine	Key Features
Google	The world's most popular search engine, known for its advanced and relevant results.
Bing	Microsoft's search engine, which integrates well with Microsoft products and includes a rewards program.
Yahoo!	A search engine that is powered by Bing technology.
Baidu	The leading search engine in China.
Yandex	Popular in Russia and other countries.

Net Etiquette

Netiquette (network etiquette) is the code of polite, respectful behavior for online interactions, covering everything from emails and social media to forums, ensuring clear communication and avoiding misunderstandings in digital spaces where non-verbal cues are missing. Key principles include treating others as you would in person, thinking before posting (avoiding all caps, spam, or oversharing), respecting privacy, and checking facts, helping to build a positive online reputation and safe environment.

Core Principles of Netiquette

- **Remember the Human:** Treat real people with respect, even when you disagree.
- **Think Before You Post:** Avoid impulsive comments; your digital footprint is permanent.
- **Be Respectful of Others' Time & Bandwidth:** Be concise and avoid sending large files unnecessarily.

- **Maintain Privacy:** Don't share others' personal info without permission; manage your own privacy settings.
- **Avoid Flaming & Trolling:** Keep discussions civil and don't engage in online shouting (all caps) or personal attacks.
- **Check Your Facts:** Share accurate information and give credit where it's due.

Common Guidelines by Platform

- **Email:** Use clear subject lines, professional greetings, and proofread for grammar.
- **Social Media:** Be mindful of your audience (public vs. private) and avoid oversharing personal details.
- **Chat/Forums:** Use emoticons to convey tone, and don't spam or self-promote excessively.

Intranet, Extranet

An [intranet](#) is a private network for internal employees, like a company's own internet, used for sharing info, collaboration, and workflows, while an [extranet](#) extends this private network to authorized external users (customers, suppliers, partners) for secure, controlled collaboration, acting as a bridge between internal and public access using web tech and firewalls for security. The internet is public; intranets are internal; extranets are for specific external partners.

Intranet

- **Audience:** Employees only (internal).
- **Purpose:** Internal communication, document management, HR info, training, collaboration.
- **Security:** High, behind firewalls, restricted access.

Extranet

- **Audience:** Internal staff *plus* select external partners (vendors, clients, suppliers).
- **Purpose:** Secure data sharing, order tracking, project collaboration with outside entities.
- **Security:** High, uses firewalls and VPNs for controlled access.

Key Differences

- **Access:** Intranet is closed; Extranet is semi-open to trusted external parties.
- **Ownership:** Intranet is owned by one organization; Extranet can involve multiple organizations.

- **Function:** Intranet = internal efficiency; Extranet = external collaboration.

E-mail, advantages and disadvantages of Email, format of email addresses

Email (Electronic Mail) is a digital messaging system for sending and receiving text, files, and multimedia online, offering advantages like speed, low cost, and global reach, but disadvantages such as spam, security risks (viruses/phishing), and potential for miscommunication due to lack of tone; the standard format is `username@domain.com`, with a local part (username), the '@' symbol, and the domain name.

Advantages of Email

- **Speed & Convenience:** Instantaneous delivery worldwide, accessible 24/7 from various devices.
- **Cost-Effective:** Often free or very low cost compared to traditional mail or calls.
- **Global Reach:** Connects people across countries easily.
- **Attachment Capability:** Send documents, images, videos, etc..
- **Record Keeping:** Easy to store, search, and retrieve past messages.
- **Mass Communication:** Send one message to many recipients at once.
- **Environmentally Friendly:** Reduces paper usage.

Disadvantages of Email

- **Security Risks:** Vulnerable to viruses, spam, and phishing scams.
- **Information Overload:** Can lead to overwhelming, overflowing inboxes.
- **Misinterpretation:** Lack of body language/tone can cause misunderstandings.
- **Requires Internet:** Cannot be used without internet access.
- **Not for Official Signatures:** Not suitable for legally binding documents needing physical signatures.
- **Distraction:** Can be a time-waster and hinder focus.

Format of Email Addresses

An email address follows the structure: `local-part@domain-name`.

- **local-part (Username):** The unique identifier for the user (e.g., `john.doe`, `support123`).
- **@ (At Symbol):** Separates the local part from the domain.

- **domain-name** : Identifies the mail server or service (e.g., `gmail.com`, `company.org`).

Influences or impacts of internet to society, education, research etc.

The internet has profoundly transformed modern life, acting as a catalyst for significant advancements across society, education, and research while also introducing new challenges.

Influence on Society

The internet has reshaped how people interact, access services, and engage with the world.

Positive Impacts:

- **Enhanced Communication:** Instant messaging, email, and video conferencing allow for seamless and cost-effective communication across the globe, transcending geographical barriers.
- **Economic Opportunities:** It has spurred e-commerce, the gig economy, and remote work, creating new business models and job opportunities.
- **Access to Information and Services:** A vast ocean of information is instantly accessible. Online banking, shopping, and access to news have made daily life more convenient.
- **Social and Civic Engagement:** Social media platforms allow individuals to connect with global communities, share experiences, and mobilize for social and political movements.

Negative Impacts:

- **Privacy and Security Concerns:** The collection of vast amounts of personal data and the rise of cybercrime, hacking, and identity theft are major issues.
- **Misinformation and Disinformation:** The ease of publishing information has led to the rapid spread of fake news and harmful content.
- **Social Isolation and Mental Health:** Excessive use can lead to social network addiction, potentially resulting in reduced face-to-face interaction and feelings of loneliness or anxiety.
- **Digital Divide:** Unequal access to the internet and digital technologies exacerbates existing inequalities, particularly between developed and developing regions.

Influence on Education

The internet has revolutionized teaching and learning methods, making education more accessible and flexible.

Positive Impacts:

- **Democratized Knowledge:** Students and educators have instant access to an immense repository of information, including e-books, scholarly articles, and online databases, that was previously limited to physical libraries.
- **Online Learning Platforms:** The rise of e-learning, virtual classrooms, and MOOCs (Massive Open Online Courses) has made education available to anyone with an internet connection, often at a lower cost.
- **Personalized and Engaging Learning:** Multimedia resources, educational games, and adaptive learning platforms cater to different learning styles and paces, enhancing student engagement and comprehension.
- **Global Collaboration:** Students can collaborate on projects with peers and experts from around the world through forums and video conferencing, fostering a global perspective.

Negative Impacts:

- **Distractions:** The wealth of online entertainment can distract students from their academic work.
- **Over-reliance and Plagiarism:** Students may become overly dependent on search engines for quick answers or engage in plagiarism by easily copying and pasting content without proper citation.
- **Quality of Information:** Not all online educational material is reliable or accurate, requiring students to develop critical evaluation skills.

Influence on Research

The internet has dramatically accelerated the pace and scope of scientific inquiry and knowledge sharing.

Positive Impacts:

- **Enhanced Information Retrieval:** Researchers can quickly access vast amounts of data, academic publications, and digital libraries through search engines like Google Scholar or databases like PubMed.
- **Global Collaboration:** The internet facilitates communication and collaboration among scientists across different institutions and countries, enabling large-scale international projects and real-time data sharing.
- **Faster Dissemination of Findings:** Online platforms and open-access journals allow research results to be published and accessed more quickly, accelerating scientific progress.

Negative Impacts:

- **Information Overload:** The sheer volume of available information can be overwhelming, making it challenging to filter and find the most relevant and quality sources.
- **Data Security and Privacy:** Handling sensitive research data online raises concerns about security breaches and the need for robust data protection measures.
- **Source Credibility:** The ease of self-publishing means researchers must critically evaluate sources, as not all online information is peer-reviewed or authoritative.

Cybercrimes

Cybercrimes are illegal activities using computers/internet (theft, fraud, harassment); a **Hacker** is a skilled person, often ethical ("white hat"), who finds system flaws to improve security; while a **Cracker** (or "black hat") is a malicious hacker who exploits those flaws for personal gain, damage, or theft, making them the actual cybercriminals. The key difference is intent: hackers build/protect, crackers break/harm.

Cybercrime

- **Definition:** Any crime involving computers or networks, often using technology to commit offenses like identity theft, fraud, malware distribution, or online harassment.
- **Examples:** Phishing, ransomware attacks, data breaches, creating viruses.

Hackers

- **Intent:** Curiosity, problem-solving, improving security, or ethical reasons (white hat).
- **Actions:** Find vulnerabilities, test systems, build security measures, often work for organizations to protect data.
- **Ethics:** Operate ethically, sometimes legally certified (e.g., CEH).

Cracker

- **intent:** Malicious (black hat) – personal gain (money), revenge, disruption, or theft.
- **Actions:** Break into systems, steal data, damage systems, deploy malware, launch attacks (DoS, phishing).
- **Ethics:** Illegal and unethical; they break codes to exploit weaknesses.