SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

LECTURE NOTES
ON

COMPUTER APPLICATION

(DIPLOMA ,2ND SEM)

BRANCH –CIVIL,MECHANICAL ENG.

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UNIT 1

INTERNET SKILLS AND COMPUTER BASICS

BASIC INTERNET SKILLS

What is the Internet?

The Internet is a global network of interconnected computers and devices that use standardized communication protocols to connect and communicate with each other. It allows for the sharing of resources, information, and services across geographical boundaries.

Common Applications of the Internet

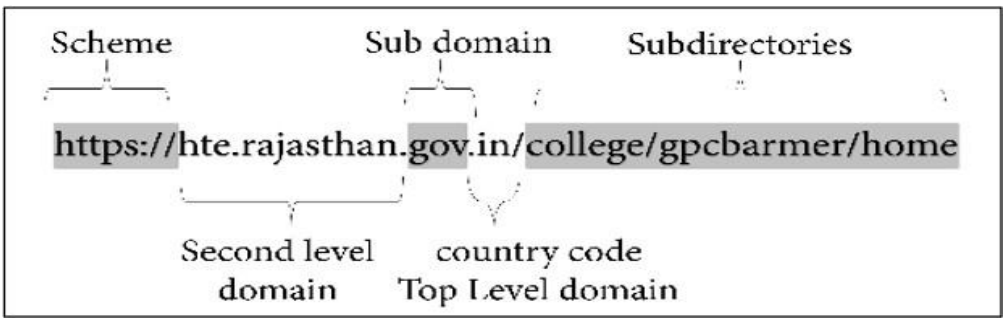
Global Connectivity: It connects millions of private, public, academic, business, and government networks worldwide.

1. **Communication**: Enables communication through various means such as email, instant messaging, voice and video calls, and social media.
2. **Information Sharing**: Facilitates access to vast amounts of information stored on servers and computers around the world through websites, search engines, and online databases.
3. **E-commerce**: Supports online shopping and financial transactions.
4. **Collaboration**: Enables collaboration on projects, sharing of documents, and real-time editing across different locations.
5. **Entertainment**: Provides access to streaming services, online gaming, and multimedia content.

Glossary for the Internet Basics:

Glossary of basic terms related to the internet:

1. Internet: A global network connecting millions of private, public, academic, business, and government networks.
2. World Wide Web (WWW): A system of interlinked hypertext documents accessed via the internet.
3. URL (Uniform Resource Locator): The address of a web page or other resource on the internet.
4. Web Browser: Software used to access and view websites, e.g., Chrome, Firefox, Safari.
5. HTML (Hypertext Markup Language): The standard language for creating and designing web pages.
6. HTTP (Hypertext Transfer Protocol): The protocol used to transfer data over the web.
7. HTTPS (Hypertext Transfer Protocol Secure): An extension of HTTP that ensures secure communication over the internet.
8. Server: A computer or system that provides resources, data, or services to other computers (clients) over a network.
9. IP Address (Internet Protocol Address): A unique string of numbers separated by periods that identifies each computer using the internet.

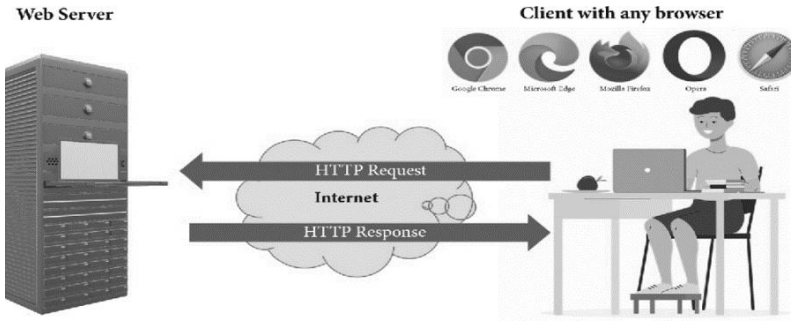


10. Domain Name: A human-readable address for a website, e.g., google.com.
11. DNS (Domain Name System): The system that translates domain names into IP addresses.
12. ISP (Internet Service Provider): A company that provides individuals and organizations with access to the internet.

13. Router: A device that forwards data packets between computer networks.
14. Modem: A device that modulates and demodulates signals for transmitting data over communication lines.
15. Bandwidth: The maximum rate of data transfer across a network or internet connection.
16. Cookie: A small piece of data sent from a website and stored on the user's device.
17. Firewall: A security system that monitors and controls incoming and outgoing network traffic.
18. Phishing: A cyber attack where fraudulent emails or websites trick people into revealing personal information.
19. Malware: Software designed to harm or exploit computers, networks, and data.
20. Cloud Computing: The delivery of computing services (servers, storage, databases, networking, software) over the internet.

1.1 UNDERSTANDING A BROWSER

Understanding a web browser involves grasping its function, components, and how it interacts with the internet. Here's a breakdown to help:



Function:

A web browser is a software application designed to access and display web pages and other resources on the internet. It interprets HTML documents, CSS stylesheets, and executes JavaScript code to render web pages in a visually understandable format for users.

Components:

1. User Interface: The graphical interface that allows users to interact with the browser. It includes menus, toolbars, address bar, and navigation buttons (back, forward, refresh).
2. Rendering Engine: The core component that interprets HTML, CSS, and JavaScript to display web pages. Different browsers use different rendering engines (e.g., Blink for Chrome, Gecko for Firefox).
3. Browser Engine: Coordinates interactions between the rendering engine and the user interface.
4. Networking: Handles communication with servers over the internet using protocols like HTTP and HTTPS. It manages requests for web pages and resources and handles responses.
5. JavaScript Engine: Executes JavaScript code embedded in web pages to make them interactive and dynamic.
6. Browser Extensions/Add-ons: Optional tools that enhance browser functionality, such as ad blockers, password managers, or developer tools.
7. Storage: Manages storage of cookies, cached files, and other browsing data.
8. Security Features: Includes mechanisms like HTTPS support, phishing protection, and sandboxing to protect users from security threats.

Interaction with the Internet:

1. Requesting Web Pages: When you type a URL or click a link, the browser sends a request to the server hosting the web page.
2. Receiving and Rendering: The server responds with the requested content (HTML, CSS, JavaScript, images), which the browser interprets and displays on your screen.
3. Executing Scripts: JavaScript code on the page can modify content dynamically, handle user input, or interact with servers (e.g., form submissions, AJAX requests).
4. Caching: Browsers store copies of resources (like images and CSS files) locally to speed up subsequent visits to the same website.

5. Security Checks: Browsers verify the authenticity of websites (via HTTPS) and warn users about potentially malicious sites or insecure connections.

Popular Web Browsers:

1. Google Chrome: Known for speed, stability, and extensive developer tools.
2. Mozilla Firefox: Emphasizes privacy, customization options, and open-source development.
3. Apple Safari: Integrated with macOS and iOS devices, focusing on performance and energy efficiency.
4. Microsoft Edge: Developed by Microsoft, based on the Chromium engine (same as Chrome), with built-in features like Cortana and integration with Windows services.

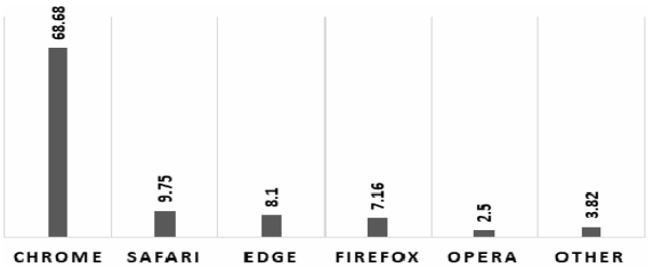


Fig- Web Browser market share percentage

Elements of a chrome browser window

1. **Menu Button**: Opens a menu with various options like settings, history, and extensions.
2. **Title Bar**: Displays the title of the current webpage.
3. **Profile Icon**: Represents your Google account and provides access to profile settings and synchronization.
4. **Extensions**: Icons for installed extensions, located near the profile icon.
5. **Overflow Menu**: Appears when there are more extensions than can be displayed; represented by a puzzle piece icon.
6. **Search/Address Bar**: Where you enter URLs or search queries.
7. **Back Button**: Navigates to the previous page.
8. **Forward Button**: Navigates to the next page.
9. **Reload Button**: Refreshes the current page.
10. **Bookmark Button**: Allows you to bookmark the current webpage.
11. **Tabs**: Display the titles of the open pages and allow switching between them.
12. **Web Page Display Area**: The central area where the content of the currently viewed webpage is shown.
13. **Download Bar**: Shows up at the bottom when files are being downloaded; provides access to the downloaded files

Common Browser Features

It include a range of functionalities designed to enhance user experience, improve efficiency, and offer customization. Here's a rundown of some standard features found across modern web browsers:

1. Tabs and Tab Management
   - Tab Switching: Easily switch between multiple open pages.
   - Tab Pinning: Keep frequently visited sites easily accessible.
   - Tab Grouping: Organize tabs into groups for better management.
   - Tab Muting: Mute sound from specific tabs.
2. Address Bar (Omnibox)
   - URL Entry: Enter website addresses.
   - Search Functionality: Perform web searches directly.
   - Autocomplete: Suggest URLs or search terms as you type.
3. Navigation Controls
   - Back and Forward Buttons: Navigate through previously visited pages.
   - Reload/Refresh Button: Reload the current page.
   - Home Button: Return to the default home page.
4. Bookmarks and Favorites
   - Bookmarking: Save and organize favorite websites.
   - Bookmark Manager: Organize, edit, and manage bookmarks.
   - Bookmark Bar: Quick access to frequently used bookmarks.
5. History
   - Browsing History: View and manage a list of previously visited pages.
   - Search History: Search through past browsing activities.
6. Extensions and Add-ons
   - Extension Support: Add functionality through third-party tools (e.g., ad blockers, password managers).
   - Extension Management: Install, update, and remove extensions.
7. Privacy and Security
   - Incognito/Private Mode: Browse without saving history or cookies.
   - Password Manager: Store and auto-fill passwords securely.
   - Do Not Track: Request websites not to track browsing activity.
   - Pop-up Blocker: Block unwanted pop-up windows.
8. Settings and Customization
   - Themes: Change the browser's appearance with themes.
   - Startup Options: Customize which pages or tabs open on startup.
   - Default Search Engine: Set and change the default search engine.
   - Privacy Settings: Adjust settings for cookies, cache, and site permissions.
9. Developer Tools
   - Console: View and debug JavaScript errors and logs.
   - Inspector: Examine and modify the HTML and CSS of a page.
   - Network Monitor: Analyze network activity and performance.
10. Synchronization
    - Cross-Device Sync: Sync bookmarks, history, and settings across devices using the same account.
    - Cloud Storage: Store data in the cloud for access from different devices.
11. Downloads
    - Download Manager: View and manage downloaded files.
    - Download Progress: Monitor the status of ongoing downloads.
12. Accessibility Features
    - Zoom and Text Size: Adjust zoom levels and text sizes.
    - Screen Reader Support: Compatibility with screen reader tools.
13. Content Management
    - Reader Mode: Simplify and clean up web pages for easier reading.
    - Content Blocking: Block ads, trackers, or specific types of content.
14. User Profiles

- Multiple Profiles: Create and switch between different user profiles, each with its own settings and bookmarks.

15. Web Apps Integration
- Progressive Web Apps (PWAs): Install and run web apps as if they were native applications.

Constituent of a Web Browser

1. User Interface (UI):
- Address Bar: Allows users to input the URL of the web page they want to visit.
- Back and Forward Buttons: Navigate between previously visited web pages.
- Refresh/Reload Button: Reloads the current web page.
- Home Button: Takes the user to the browser's home page.
- Tabs: Enable users to open multiple web pages in a single window.
- Bookmarks: Allow users to save and organize links to their favourite web pages.

2. Browser Engine:
- Acts as a bridge between the User Interface and the Rendering Engine. It interprets the actions taken by the user and translates them into commands for the Rendering Engine.

3. Rendering Engine:
- Responsible for displaying the content of the web page. It parses HTML, CSS, and JavaScript to construct and display the layout and design of the web page.

4. Networking:
- Manages network calls, such as HTTP requests and responses, to retrieve web content from servers. This component handles all aspects of communication over the internet.

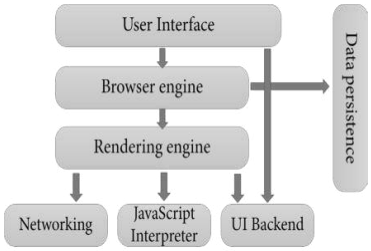
5. JavaScript Engine:
- Executes JavaScript code found in web pages. This engine enables dynamic content and interactivity on websites.

6. UI Backend:
- Used for drawing basic widgets like combo boxes and windows. This backend is shared with the rendering engine, making use of common operating system interfaces.

7. Data Storage:
- Stores various data locally, such as cookies, cache, and user preferences. This allows for a more personalized and faster browsing experience.

8. Privacy and Security Components:
- These include features like HTTPS, incognito mode, tracking protection, and anti-phishing tools, which ensure the user's browsing experience is safe and private.

Fig:-web browser architecture



1.2 EFFICIENT USE OF SEARCH ENGINES

Efficient use of search engines can significantly enhance your ability to find relevant and accurate information quickly.A search engine is a software system designed to carry out web searches, which means searching the internet for information based on user queries. It helps users find specific information from the vast amount of data available on the internet.

Here are the key components and functionalities of a search engine:

Key Components

1. Web Crawler (Spider/Bot):
    - Function: Automatically browses the web and collects data from websites.
    - Process: Visits web pages, reads the content, and follows links to other pages to gather data.
2. Indexing:
    - Function: Organizes and stores the data collected by the web crawler.
    - Process: The information from web pages is indexed and categorized based on keywords, content, and other metadata.
3. Database:
    - Function: Stores the indexed data.
    - Process: The search engine's database holds a vast amount of information that can be quickly retrieved in response to a query.
4. Query Processor:
    - Function: Analyzes user queries and retrieves relevant information from the database.
    - Process: Interprets the search terms entered by users and matches them with the indexed data to find the most relevant results.
5. Ranking Algorithm:
    - Function: Determines the order of search results.
    - Process: Uses complex algorithms to rank web pages based on relevance, quality, and other factors, such as keyword usage, page authority, and user engagement.
6. Search Results Interface:
    - Function: Displays the search results to the user.
    - Process: Presents a list of relevant web pages, often with snippets of information, URLs, and links to the pages.

How It Works

1. User Query: A user enters a search term or phrase into the search engine.
2. Query Processing: The search engine processes the query to understand what the user is looking for.
3. Search and Retrieval: The search engine scans its index for relevant matches to the query.
4. Ranking: The search engine ranks the results based on its algorithm, which considers factors like relevance, authority, and user engagement.
5. Display of Results: The search engine displays the ranked results on the user's screen, typically in a list format.

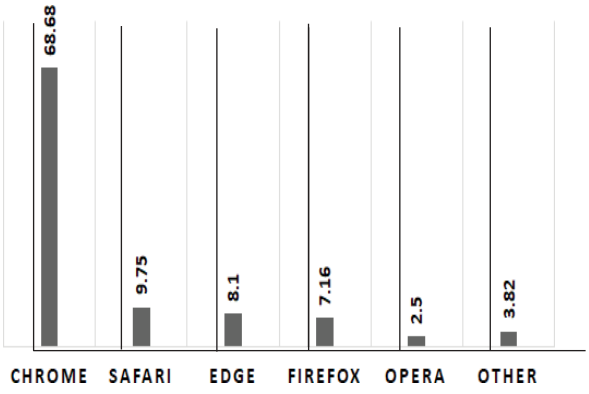


Fig- Search Engine Market Share

Popular Search Engine varients

1. Google: The most widely used search engine, known for its powerful algorithms and vast database.
2. Bing: Microsoft's search engine, offering similar functionality to Google with different ranking algorithms.
3. Yahoo!: One of the older search engines, now powered by Bing.
4. DuckDuckGo: A privacy-focused search engine that doesn't track user activity.
5. Baidu: The leading search engine in China, similar to Google but tailored to Chinese internet users.

Types of web searchs

Web searches can be classified into several types based on the nature of the query and the kind of information the user is seeking. Here are the main types of web searches:

1. Informational Search
- Purpose: To find information about a specific topic.
- Examples:
  - "How does photosynthesis work?"
  - "History of the Roman Empire"

2. Navigational Search
- Purpose: To find a specific website or webpage.
- Examples:
  - "Facebook login"
  - "YouTube"

3. Transactional Search
- Purpose: To perform a specific action such as making a purchase or signing up for a service.
- Examples:
  - "Buy iPhone 13"
  - "Netflix subscription"

How do search engine work

1. Crawling: Crawling is the process where search engines use automated software called "crawlers" or "spiders" to visit and explore web pages.
- How It Works:
  - Crawlers Start with Known Pages: The crawler begins with a list of known URLs, often provided by previous crawls or sitemaps submitted by website owners.
  - Following Links: As the crawler visits a page, it follows the links on that page to discover new pages. This allows the search engine to find content across the web.
  - Regular Crawling: Search engines continually crawl the web to discover new content and update existing pages to keep their data current.

2. Indexing: Indexing is the process of organizing and storing the data collected by the crawlers in a massive database.
- How It Works:
  - Parsing Content: The search engine parses the content of each web page, analyzing text, images, meta tags, and other elements to understand what the page is about.
  - Keyword Identification: The search engine identifies and stores key elements such as keywords, topics, and themes associated with each page.
  - Building an Index: The search engine creates an index, which is like a massive catalog, storing information about all the pages it has crawled. This index is organized by topics, keywords, and other relevant data.
  - Metadata Storage: Along with the content, metadata such as the title, URL, and description of the page are stored to facilitate quick retrieval.

3. Ranking: Ranking is the process of determining the order in which web pages are presented to users in response to a query.

- How It Works:
    - Relevance: The search engine determines how relevant a page is to the user's query by analyzing the content and how well it matches the search terms.
    - Authority: Pages that are linked to by many other high-quality websites (a measure of their authority) are usually ranked higher.
    - User Experience: Factors like page load speed, mobile-friendliness, and overall user experience are considered in the ranking process.
    - Freshness: Newer content is often favored, especially for topics where the latest information is most relevant (e.g., news articles).
    - Personalization: The search engine may personalize results based on the user's search history, location, and preferences.

4. Retrieval and Display: This is the process where the search engine retrieves and displays the most relevant results from its index in response to a user's query.

- How It Works:
    - Query Processing: When a user enters a query, the search engine processes the keywords to understand the intent behind the search.
    - Searching the Index: The search engine quickly scans its index to find the most relevant pages based on the processed query.
    - Ranking and Display: The search engine ranks the relevant pages according to its algorithms and displays them on the search engine results page (SERP).
    - Snippet Generation: For each result, the search engine typically provides a snippet, which includes the title, URL, and a brief description or excerpt from the page, helping users decide which link to click.

5. Continuous Updates and Refinement: Search engines are constantly updated to improve accuracy, speed, and relevance.

- How It Works:
    - Algorithm Updates: Search engines regularly update their algorithms to better understand user intent, combat spam, and improve the quality of search results.
    - Learning from User Interaction: Search engines analyse user interactions (such as click-through rates and dwell time) to refine and personalize search results over time.

Summary

- Crawling: Discover and gather information from web pages.
- Indexing: Organize and store the information in a searchable database.
- Ranking: Determine the order of results based on relevance, authority, and other factors.
- Retrieval: Display the most relevant results to the user's query.

Fig Searching with Search Engines

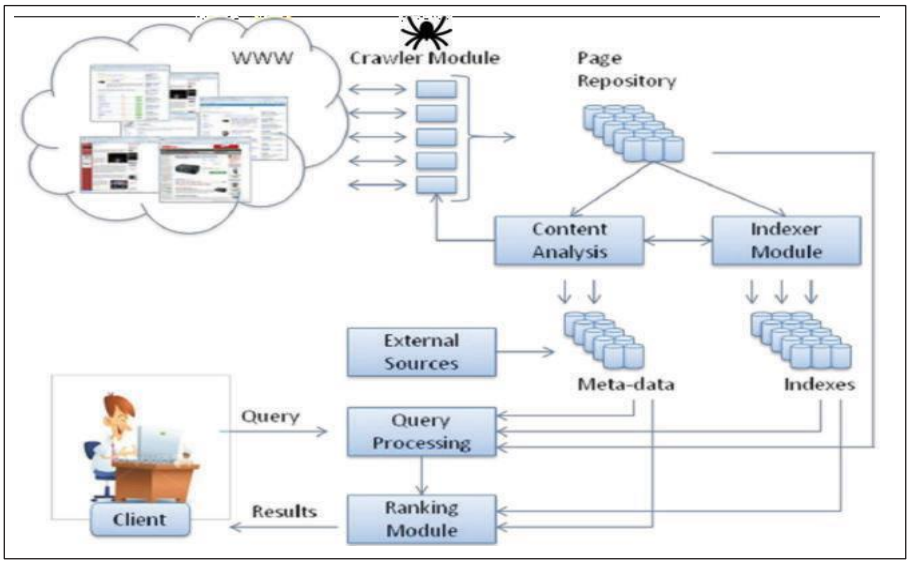


Table: Google Search Symbols, Operators & Commands

Operator	Description	Example
Informational Search Queries		
define	Returns a definition of the given term.	define tolerance
time	Returns the current time at a particular location.	time Australia
to	Convert measurements from one unit to another.	12 inches to feet
in	Convert measurements from one unit to another.	650 EURO in INR
translate	Translates the queried terms into another specified language.	translate hello world german
map	Returns map result by giving map followed by location.	map andhrapradesh
stocks	Returns stock information of given company name.	stock wipro
weather	Returns the weather forecast for the given location or ZIP code.	weather bodhgaya or 824231

Basic Search Symbols		
-	Excludes search results that include this term.	best tablets -drawing
|	Returns search results that match terms on either side of the pipe. The same as writing "OR" between search terms.	computer | tablet
@	Returns search results that match a particular social media site.	aicte @facebook
#	Returns search results that include a specific hashtag.	#largestvaccinedrive
""	Returns search results that include all terms within quotes in the **exact** given order.	"Gods own country"
*	Returns search results where **any** words can be matched in place of the asterisk.	best * in Haryana
..	When placed between two numbers, returns search results that match within the number **range**.	computer 30k..40k inr
()	Used to **group search** terms and control the search logic of the query.	(lata | mukesh) songs lyrics
Most Popular Search Operators		
cache:	Show Google's cached version of a specific page.	cache:makeuseof.com
filetype:	Returns only search results that match a particular file extension.	"ITSystems"filetype:ppt
related:	Returns other websites that are similar to the queried website.	related:nytimes.com
site:	Returns only search results from a particular website.	Parenting site:https://www.unicef.org/india/
Other Search Operators		
inanchor:	Returns pages that are linked to using anchor text matching the search query.	inanchor:mental wellbeing
allinanchor:	Same as inanchor, but matching every term that appears after allinanchor.	inanchor:mental wellbeinghindi
intext:	Returns only search results that match in the page's body.	intext:no tobacco day
intitle:	Returns only search results that match in the page's title.	intitle:india tourism
inurl:	Returns only search results that match in the page's URL.	inurl:indiaculture

How to search the web

Searching the web effectively involves more than just typing a few words into a search engine. To find the most relevant and accurate information, you can use a variety of strategies and tools.

Google Search Symbols, Operators & Commands

Now we discuss some prominent operators, commands of the dominating search engine-Google. Wewill also discuss some tips to cut short our searching results, to the actual required result. The Table 1.2shows operators, their use in searching with examples.

Google Advanced Search

In addition to the above operators google also provide various filters to refine our search results withinthe user interface. Let's check step by step process (see Fig. 1.11) for advance searching:

1. The user has to open a web browser and navigate to the google search engine.
2. Type their search term in the search box e.g. “ecosystem restoration”, by pressing enter or clicking the search button users will be presented with associated search results.
3. Users can view scrutinized results based on various provided categories like news, images, books, videos, maps, flight, finance, etc. For our explanation, I have selected image results byclicking on ***images***.

Fig. : Advanced Filters for Search

4. For each such category, some additional filters are associated, which are visible after clickingon the Tools button. As depicted by the arrow in step 4.
5. Similarly, News, Books, Videos & More categories provide their associated filters to refine search parameters to get more accurate & precise results. You may check them one by one by selecting the category and then *Tools* option

Fig: user interface for google advanced search

1.3 AWARENESS ABOUT DIGITAL INDIA PORTALS

Digital India is a flagship initiative launched by the Government of India to transform the country into a digitally empowered society and knowledge economy. As part of this initiative, several digital portals have been developed to provide citizens with easy access to various government services, information, and resources.

What is digital India ?

Digital India is a flagship initiative launched by the Government of India in 2015 with the vision of transforming India into a digitally empowered society and knowledge economy. The program aims to harness technology to improve governance, make public services more accessible, and promote digital literacy across the country.

Objectives of Digital India

1. Digital Infrastructure as a Core Utility to Every Citizen:
    - High-Speed Internet: Ensuring access to high-speed internet as a basic right.
    - Digital Identity: Providing a unique digital identity (Aadhaar) for every citizen to ensure easy and secure access to various services.
    - Mobile Phone and Bank Account: Enabling easy access to mobile and banking services.
2. Governance and Services on Demand:
    - e-Governance: Reforming government processes through digitization and technology to make them more transparent, efficient, and accountable.
    - Online Services: Delivering government services online and on mobile platforms.
    - Ease of Doing Business: Simplifying processes for businesses through digital tools and online services.
3. Digital Empowerment of Citizens:
    - Digital Literacy: Promoting digital literacy, particularly in rural and underserved areas, to empower all citizens to use digital services.
    - Universal Digital Literacy: Providing training to ensure that every individual has basic digital skills.
    - Availability of Digital Resources: Ensuring that citizens have access to digital resources, including local content in their languages.

Pillars of Digital India Program

The Digital India program is built on nine key pillars, each designed to address different aspects of digital empowerment, connectivity, and governance. These pillars collectively aim to transform India into a digitally empowered society and knowledge economy.

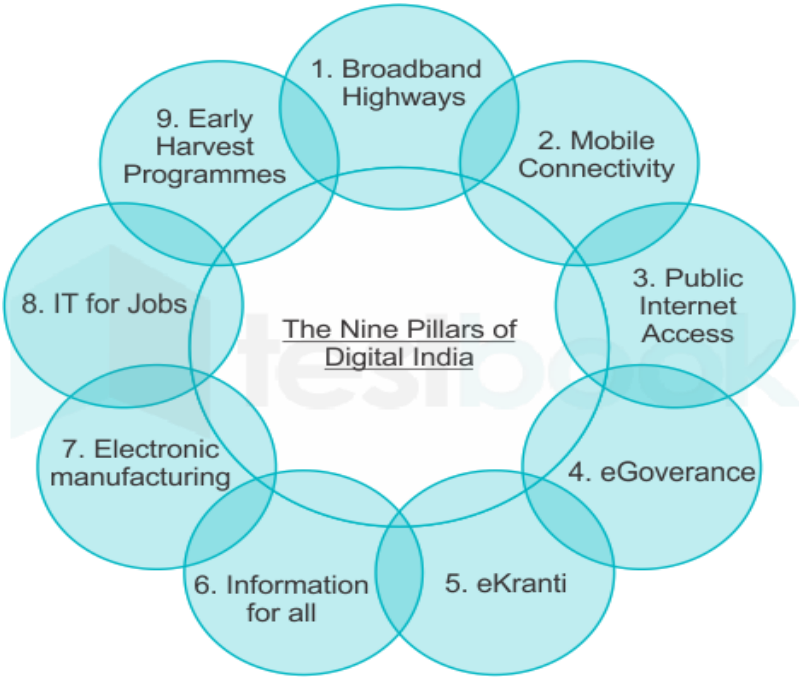


Table: Digital India Portals (Infrastructure)

Digital India Initiative		Website	Description
	AADHAAR	https://uidai.gov.in	The largest biometrics based identification system in the world for effective service delivery to citizens.
	JEEVAN PRAMAAN	https://jeevanpramaan.gov.in/	A biometric enabled digital service for pensioners to streamline the process of issuing life certificate
	MEGHRAJ	https://cloud.gov.in/index.php	Cloud Computing initiative to accelerate delivery of e-services in the country
	MOBILE SEVA APP STORE	https://apps.mgov.gov.in	To facilitate the process of development and deployment of suitable mobile applications
	NSM	https://nsmindia.in	National Super Computing Mission to empower the national academic and R&D institutions, spread across the country
	OPEN DATA	https://data.gov.in/	To publish datasets, documents, services, tools and applications for public use
	RAS	http://ras.gov.in/	Rapid Assessment System for continuous feedback for e-services delivered by Government of India and State Governments
	SWIFT	https://www.icegate.gov.in/SWIFT/	Single window interface for trade- a Project to facilitate the Trading Across Borders in India
	COE-IT	http://www.coe-iot.in	Center for excellence for Internet of Things to build industry capable talent, start-up community and an entrepreneurial ecosystem for IOT
	CERT-IN	http://www.cert-in.org.in	Computer emergency response team-India
	CSCS	https://csc.gov.in/	Common service centers portal
	CYBER SWACHHTA KENDRA	http://www.cyberswachhtakendra.gov.in/	India initiative to create a secure cyber space by detecting botnet infections
	DIGILOCKER	https://digilocker.gov.in/	It's a secure cloud based platform for issuance, sharing and verification of critical lifelong documents.
	(DISHA)	http://www.ndlm.in/	Digital Saksharta Abhiyan or National Digital Literacy Mission to impart IT training
	DIGITIZE INDIA PLATFORM	https://digitizeindia.gov.in/	Programme to provide digitization services for scanned document images
	DBT	https://dbtbharat.gov.in/	Direct benefit transfer aim to reform government delivery system
eSign	ESIGN	http://cca.gov.in/	An online electronic signature service
	ESSO-INCOIS	http://www.incois.gov.in/portal/index.jsp	to provide the best possible ocean information and advisory services
	GOVT. E-MARKETPLACE	https://gem.gov.in/	It is single window solution for online procurement of common use Goods & Services required by various Government Departments / Organizations / PSUs
	IRCTC CONNECT	https://www.irctc.co.in/	Next generation e-ticketing system to facilitates search and book train tickets, check reservations or cancel them, and get upcoming journey alerts

Digital India portals(service based)

Digital India Initiative		Website	Description
	SUGAMYA BHARA'I' ABHIYAAN & Mob App	http://accessibleindia.gov.in/content/	A crowd sourcing platform to comprehensively obtain information on inaccessible places across the country
	BHIM	http://www.bhimupi.org.in/ or App from google play store	An app that makes payment transactions simple, easy and quick using Unified Payments Interface (UPI)
	DIGITAL AIIMS	http://ehospital.nic.in/ehospital/	The Unique IIealth Identification Number gave every Patient visiting AIIMS a Digital Identity
	E-PANCIIAYAT	http://epanchayat.in/	To provide comprehensive software solution attempting automation of Gram Panchayat functions
	EGREETINGS	https://egreetings.gov.in/	Aims to promote a contemporary and eco-friendly method of sharing greetings
	E-IIOSPITAL	http://ehospital.nic.in/ehospital/	A Hospital Management Information System (HMIS) for internal workflows and processes of hospitals
	ENAM	http://www.enam.gov.in/NAM/home/index.html	A pan-India electronic trading portal to create a unified national market for agricultural commodities
	E-PATIISIIALA	http://epathshala.nic.in/	Provide e-resources including textbooks, audio, video, periodicals and a variety of other print and non-print materials through website and mobile app
	ESAMPARK	https://sampark.gov.in	A mechanism to connect the government directly with citizens across India by running mailer, outbound dialing and SMS campaigns
	GSTN	http://www.gstn.org/index.php	Goods and service tax network is a uniform interface for the tax payer and a common and shared I'I' infrastructure between the Centre and States
	KHOYA PAYA	http://khoyapaya.gov.in/mpp/home	A citizen-based website to exchange information on missing and found children
	KISAN SUVIDIIA	http://www.kisaansuvidha.com/	An mobile app developed to help farmers get relevant information instantly
	MRAKTKOSH	http://www.eraktkosh.in/	The web-based mechanism interconnects all the Blood Banks of the State into a single network
	NCS	https://www.ncs.gov.in/	National Career Service portal facilitates registration of job seekers, job providers, skill providers, career counsellors,, etc.
	NVSP	http://www.nvsp.in/	Services such as access the electoral list, apply for voter id card, apply online for corrections in voter's card, view details of Polling booth, Booth Level officer, Electoral Registration Officer, etc.

	PASSPORT SEVA PROJECT	http://www.passportindia.gov.in/	Enables simple, efficient and transparent processes for delivery of passport and related services
	SHAALA DARPAN	https://darpan.kvs.gov.in/shaaladarpan/	An e-Governance platform for all Kendriya Vidyalayas in the country
	SOIL HEALTH CARD	http://www.soilhealth.dac.gov.in/	Aims at promoting Integrated Nutrient Management
	SWAYAM	https://swayam.gov.in	Aim to achieve access, equity and quality for education by best teaching learning resources and online MOOCS courses to all.
	UMANG	https://umang.gov.in App from google play store	Unified Mobile Application for New-Age Governance- a mobile app to facilitate a single point of access to all government services
	UTS APP	https://www.utsonmobile.indianrail.gov.in/RDS/	Enables booking unreserved paperless journey ticket, issue/renew season ticket and platform ticket

Digital india portals(empowerments)

Digital India Initiative		Website	Description
	AEPS	https://www.npci.org.in/	It is a payment service empowering a bank customer to use Aadhaar as his/her identity.
	BPO SCHEME	https://ibps.stpi.in/	Seeks to incentivize establishment of 48,300 seats in respect of BPO/ITES operations across the country.
	MYGOV	https://mygov.in	A unique first-of-its-kind participatory governance initiative involving the common citizen at large.
	NMEICT	http://www.nmeict.ac.in	Scheme to leverage the potential of ICT, in teaching and learning process for the benefit of all the learners in Higher Education Institutions
	PMGDISHA	https://www.pmgdisha.in/	Scheme to make six crore persons in rural areas, across States/uts, digitally literate, by covering one member from every eligible household
	PMKVY	http://www.pmkvyofficial.org/	To enable a large number of Indian youth to take up industry-relevant skill training that will help them in securing a better livelihood
	SMART CITIES	http://smartcities.gov.in/content/	Provide updated information about smart cities projects and related processes.

STATE PORTAL

A **State Portal** is an online platform created by individual state governments in India to provide citizens with access to a variety of government services, information, and resources specific to that state. These portals are part of the broader Digital India initiative, which aims to bring government services closer to citizens through digital means.

Key Features of State Portals

1. **Access to Government Services**:
   - **Online Services**: State portals offer a range of services such as applying for certificates (birth, death, caste), paying taxes, applying for licenses, and more.
   - **Grievance Redressal**: Citizens can file complaints or grievances related to government services directly through the portal and track the status of their submissions.
2. **Information and Resources**:
   - **Government Notifications**: The portal provides updates on government policies, schemes, circulars, and notifications relevant to citizens.
   - **Forms and Downloads**: Citizens can download various forms and documents required for applying to different government services.
3. **Citizen Engagement**:
   - **Feedback and Suggestions**: Portals often have sections where citizens can provide feedback or suggestions on government services and policies.
   - **Discussion Forums**: Some portals include forums where citizens can discuss local issues and interact with government officials.
4. **E-Governance Initiatives**:
   - **Mission Mode Projects**: Implementation of state-specific e-Governance projects, such as e-Districts, which streamline the delivery of government services at the district level.
   - **Integrated Services**: Many state portals integrate services from various departments, providing a one-stop solution for multiple needs.
5. **Local Language Support**:
   - **Multilingual Interface**: State portals are typically available in both the official language of the state and English, making them accessible to a broader audience.

How to navigate state portal

Navigating a state portal involves familiarizing yourself with the layout and structure of the website to easily find the services or information you need. Here's a guide to help you navigate a state portal effectively:

1. Access the State Portal
   - Open a Web Browser: Launch a web browser on your device.
   - Enter the URL: Type the URL of the state portal in the address bar (e.g., https://sevasindhu.karnataka.gov.in/ for Karnataka).
   - Homepage Overview: Once the portal loads, you'll typically land on the homepage.
2. Explore the Homepage
   - Header/Navigation Bar: This is usually located at the top of the page and contains links to main sections such as Home, Services, Departments, Citizen Login, Contact Us, and more.
   - Search Bar: Many state portals feature a search bar at the top where you can type keywords to quickly find specific services or information.
   - Main Menu: A menu or drop-down options may list categories like Government Services, Certificates, Schemes, Grievance Redressal, etc.
   - Featured Services: The homepage often showcases popular services or important announcements.
3. Access Specific Services
   - Browse Categories: Click on relevant categories in the menu or navigation bar. For example:
     - Citizen Services: This might include options for applying for birth/death certificates, paying property taxes, or accessing land records.
     - Department Services: Here, you can find services provided by different state departments like health, education, agriculture, etc.

- Quick Links: Some portals offer quick links on the homepage for frequently used services like e-District, Grievances, Employment.

4. Use the Search Function
   - Type Keywords: If you know what you're looking for, type relevant keywords (e.g., "birth certificate application") into the search bar.
   - Filter Results: The portal may offer filters to narrow down the search results to make finding the right service easier.
5. Register or Log In
   - Create an Account: If it's your first time using the portal, you may need to register by clicking on the Sign Up or Register button, typically found in the header or under Citizen Login.
   - Log In: Enter your credentials (username and password) in the Log In section to access personalized services or applications.
6. Fill Out Online Forms
   - Select the Service: Once you've navigated to the desired service, click on it to access the relevant application form.
   - Enter Details: Fill in the required information accurately. The forms may require personal details, document uploads, and other information.
   - Upload Documents: If required, upload scanned copies of necessary documents like ID proof, address proof, etc.
   - Submit the Form: After filling out all the required fields, click the Submit button. You may receive a confirmation or acknowledgment receipt.
7. Make Payments (If Required)
   - Payment Gateway: If the service involves a fee, you'll be redirected to a payment gateway.
   - Choose Payment Method: Select your preferred payment method (credit/debit card, net banking, UPI, etc.).
   - Confirm Payment: Complete the transaction and save the receipt or acknowledgment for future reference.
8. Track Application Status
   - Application Tracking: Many portals offer a section where you can track the status of your application. Look for options like Track Application, Status Check, or similar.
   - Enter Reference Number: Use the reference number or application ID provided during submission to check the status.
9. Download or Print Documents
   - Document Retrieval: Once your application is processed, you may be able to download or print official documents (e.g., certificates, receipts) directly from the portal.
   - My Applications: Some portals have a My Applications or My Account section where all your submissions and issued documents are stored for easy access.
10. Access Support or Help
    - Help Desk: If you encounter issues, look for a Help or Support section on the portal.
    - Contact Information: Most portals provide contact details such as phone numbers or email addresses for technical support or service-related queries.
    - FAQs: Frequently Asked Questions (FAQs) sections are available to assist with common issues or provide guidance on using the portal.
11. Log Out
    - Logout: Once you've completed your tasks, ensure to log out of your account, especially if you're using a shared or public device.

COLLEGE PORTAL

A college portal is an online platform provided by educational institutions that allows students, faculty, and staff to access a variety of academic and administrative services. The portal serves as a centralized hub where users can manage their academic activities, access resources, and stay updated with campus news and events.

Features of a College Portal

1. Student Dashboard
   - Profile Management: Students can update personal information, view academic history, and manage their accounts.
   - Course Registration: Register for courses each semester, view available classes, and check schedules.
   - Attendance Tracking: View attendance records for all registered courses.
   - Grades and Transcripts: Access grades for each semester and download official transcripts.
   - Assignments and Exams: Submit assignments, view deadlines, and check exam schedules.
2. Faculty Dashboard
   - Course Management: Faculty can manage their courses, upload syllabi, and communicate with students.
   - Grade Submission: Enter and submit student grades, track attendance, and monitor student progress.
   - Student Interaction: Communicate with students via messaging systems or discussion forums.
3. Administrative Services
   - Fee Payment: Pay tuition and other fees online, view payment history, and print receipts.
   - Library Access: Search the library catalog, check out books, and access digital resources like e-books and journals.
   - Event Calendar: Stay informed about upcoming campus events, workshops, and seminars.
4. Communication Tools
   - Email and Messaging: Use integrated email services for official communication between students, faculty, and staff.

- Announcements: View important announcements from the college administration, such as changes in academic schedules or policy updates.

5. Learning Management System (LMS) Integration
   - Course Materials: Access lecture notes, presentations, and other learning materials uploaded by faculty.
   - Discussion Forums: Participate in course-related discussions and collaborate with classmates on projects.
6. Support and Helpdesk
   - Technical Support: Contact the IT helpdesk for assistance with portal issues or technical problems.
   - Academic Advising: Schedule appointments with academic advisors or counselors.
   - FAQs: Access frequently asked questions for quick solutions to common issues.

How to Access and Navigate a College Portal

1. Accessing the Portal
   - URL: The college portal can usually be accessed through a specific web address provided by the institution (e.g., https://portal.collegename.edu).
   - Login: Use the credentials provided by the college (such as a student ID and password) to log in.
2. Navigating the Portal
   - Homepage: Upon logging in, the homepage typically displays a dashboard overview with quick links to various sections such as courses, grades, and messages.
   - Menu or Navigation Bar: Use the menu or navigation bar to access different parts of the portal, like academics, finance, library, etc.
   - Search Function: If you're looking for specific information, use the search bar to find courses, services, or resources.
3. Using Services
   - Course Registration: Navigate to the Academics or Courses section to register for classes. Follow the prompts to select your courses and submit your schedule.
   - Viewing Grades: Go to the Grades or Academic Records section to view your grades for each semester.
   - Making Payments: Access the Finance or Fees section to make online payments for tuition or other fees.
4. Communication
   - Check Emails and Messages: Regularly check your portal inbox for important communications from faculty and administration.
   - Announcements: Stay updated by reviewing the announcements section for news about deadlines, events, and policy changes.
5. Support
   - Technical Issues: If you encounter any issues, look for a Support or Helpdesk link, where you can report problems or get assistance.
   - Academic Support: Schedule appointments with advisors or access resources like tutoring through the Support Services section.

1.4 GENERAL UNDERSATANDING OF VARIOUS COMPUTER HARDWARE COMPONENTS

Computer system

A computer system refers to the complete setup that allows a computer to function, including both hardware and software components.

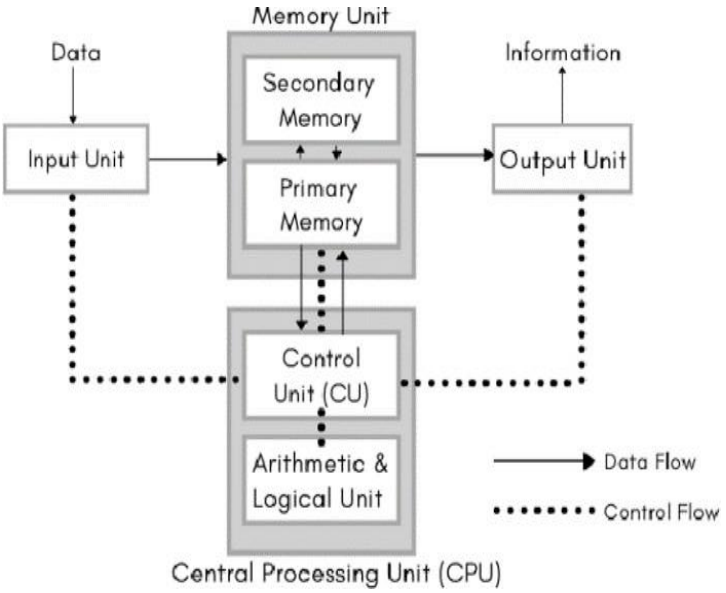


Fig: Block diagram of Computer System.

Input Unit:

- The user interacts with the computer via the input and output unit.
- The Input unit accepts data from the user.
- The Input unit converts the data that it accepts from the user, into a form that is understandable by the computer.
- The input is provided to the computer using input devices like keyboard, trackball and mouse.

Output Unit:

- The Output unit provides the processed data i.e. the information to the user.
- The Output unit provides the output in a form that is understandable by the user.
- Some of the commonly used output devices are monitor and printer.

Central Processing Unit:

CPU controls, coordinates and supervises the operations of the computer. It is responsible for processing of the input data. CPU consists of:1.Arithmetic Logic Unit (ALU) 2.Control Unit (CU) 3.Register Unit.

Arithmetic Logic Unit:

the ALU is made up of three parts:

- Adder where the actual calculations task place.
- Register which stores the information temporarily.
- Accumulator in which the intermittent results of the calculations are kept.
- Performs all the arithmetic and logic operations on the input data.
- Arithmetic operations are addition, subtraction, multiplication, division etc. Also, doing some Logical operations like AND, OR, NOT etc.

Control Unit:

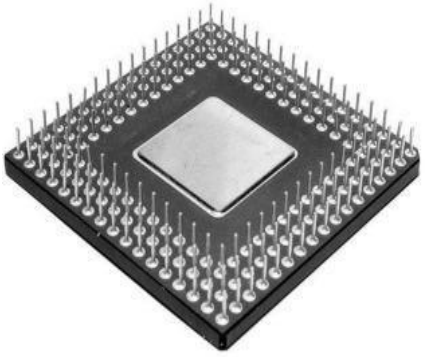
- It controls the overall operations of the computer i.e.
- It checks the sequence of execution of instructions, and, controls and coordinates theoverall functioning of the units of computer.
- It also responsible for decoding the instruction given by the user.

Register Unit:

- CPU also has a set of *registers* for temporary storage of data, instructions, addresses and intermediate results of calculation.
- This is some time called as chip memory. It consists of several high-speed registers.
- CPU uses this memory for its work.

Microprocessor

- It is a silicon chip with ALU, register circuits and control circuits. The microprocessor is capable of carrying out a large number of functions like receiving data, processing and storing the results and outputting the required results on a single integrated circuit.It has the responsibility to perform ALU operations and control the components connected to it like memory, input output devices, etc. Thus, it is a programmable device that takes binary data as input, performs processing as per instructions



loaded in memory and generates results in binary form. A conventional microprocessor chip with pinsis shown in the below figure.

Memory Unit

- The instructions and data given to the computer are stored in the memory or storage unit. This data along with the program instructions are used by the CU and ALU. It is also used to store intermittent results and information (final results). Types of memory are discussed in detail, inthe next topic.
- The smallest unit of memory is called a ‘Bit’. A bit can have the value 1 or 0 which is known as binary values. Groups of eight bits form a Byte and similarly higher order units are formed. The below table shows measurement units for digital data with their denoting symbol and corresponding capacity.

Table : Measurement Units for Digital Data

Unit	Symbol	Capacity
Bit	b	1 or 0 (on or off)
Byte	B	8 bits
Kilobyte	KB	1024 Bytes
Megabyte	MB	1024 Kilobyte
Gigabyte	GB	1024 Gigabyte

Unit	Symbol	Capacity
Terabyte	TB	1024 Gigabytes
Petabyte	PB	1024 Terabyte
Exabyte	EB	1024 Petabytes
Zettabyte	ZB	1024 Exabytes
Yottabyte	YB	1024 Zettabytes

- Computer memory is one of the most important components of the computer system. Computer memory is a vital resource that is managed by the operating system. When the data is sent to the memory it is kept at some particular location called to address. The data can be retrieved by the computer from this address as and when required.

Types of computer memory

- **Memory unit:**

Generally, during the processing of data memory unit stores the data, instructions, intermediateresults and output temporarily. This unit is classified into two types of memory.

- Primary memory
- Secondary memory

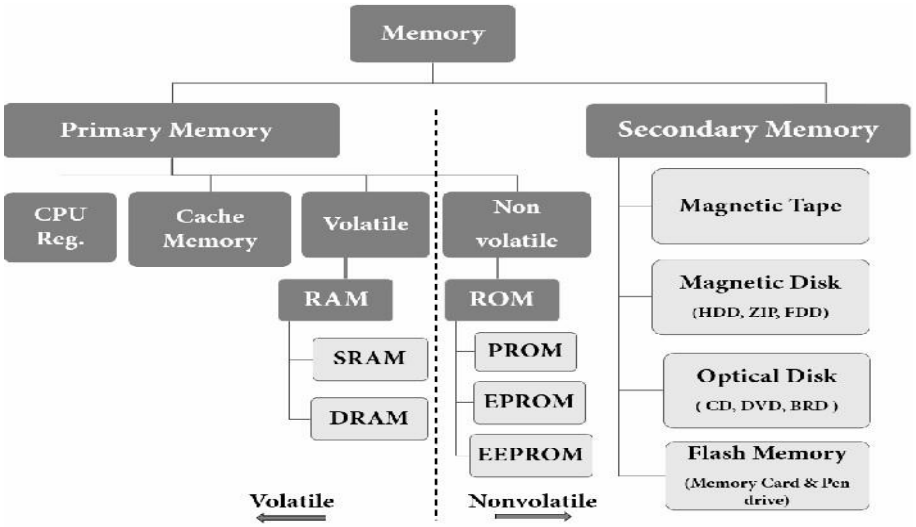
Primary memory, also known as main memory or internal memory, is the memory in a computer that is directly accessible by the cpu. It is used to store data and instructions that are currently in use or being processed by the computer. Primary memory is essential for the computer's operation, as it provides the CPU with the data it needs quickly.

Types of primary memory

1. Random Access Memory (RAM)
    - Volatile Memory: RAM is volatile, meaning it loses its content when the power is turned off. It temporarily stores data that the CPU needs while performing tasks.
    - Types of RAM:
        - Dynamic RAM (DRAM): This type of RAM needs to be refreshed thousands of times per second because it stores each bit of data in a separate capacitor.
        - Static RAM (SRAM): Faster and more expensive than DRAM, SRAM stores data in flip-flop circuits and does not need to be refreshed as often. It's typically used for cache memory.
    - Function: RAM stores the operating system, application programs, and the data being processed. When you open a program, it is loaded from the hard drive into RAM, where the CPU can access it much faster.
2. Read-Only Memory (ROM)
    - Non-Volatile Memory: ROM retains its contents even when the power is turned off. It is used to store firmware, which is the software that is permanently programmed into the hardware.
    - Types of ROM:
        - PROM (Programmable ROM): Can be programmed once by the user after manufacturing.
        - EPROM (Erasable Programmable ROM): Can be erased by exposing it to ultraviolet light and reprogrammed.
        - EEPROM (Electrically Erasable Programmable ROM): Can be erased and reprogrammed using electrical charge, even while the computer is running.
    - Function: ROM typically stores the BIOS (Basic Input/Output System) or firmware, which

is the essential software that boots up the computer and performs basic hardware initialization.

3. Cache Memory
    - Speed: Cache memory is a small amount of high-speed memory located close to the CPU. It stores frequently accessed data and instructions to speed up processing.
    - Levels:
        - L1 Cache: Located within the CPU itself, it is the fastest and smallest cache.
        - L2 Cache: Slightly larger and slower, but still very fast, it is typically located on the CPU or on a separate chip close to the CPU.
        - L3 Cache: Even larger and slower than L2, L3 cache is shared among multiple CPU cores.
    - Function: Cache memory reduces the time the CPU takes to access data from the main memory (RAM), significantly speeding up processing.



Characteristics of Primary Memory

- Speed: Primary memory is much faster than secondary storage devices like hard drives or SSDs. This speed is crucial for the efficient operation of the CPU.
- Volatility: Most of the primary memory (like RAM) is volatile, meaning it needs constant power to retain data.
- Capacity: Primary memory typically has a smaller capacity compared to secondary storage but is crucial for quick data access.
- Direct Access: The CPU can access data in the primary memory directly without any intermediate steps.

Role of Primary Memory in a Computer System

- Data Storage for Active Processes: Primary memory holds data and programs that are actively being used by the CPU. This allows for quick access and processing.
- Temporary Storage: Since RAM is volatile, it only holds data temporarily while the computer is running. All unsaved data is lost when the power is turned off.
- System Performance: The amount and speed of primary memory directly impact the performance of the computer. More RAM allows for more programs to run simultaneously and for more data to be processed quickly.

SECONDARY MEMORY

Secondary memory, also known as **secondary storage** or **external memory**, refers to the storage devices used to store data on a long-term basis. Unlike primary memory (RAM), which is volatile and used for temporary data storage, secondary memory is non-volatile, meaning it retains data even when the computer is turned off. This type of memory is used to store the operating system, software applications, and user data such as documents, photos, and videos.

Types of Secondary Memory

1. Hard Disk Drives (HDD)
2. Solid-State Drives (SSD)
3. Optical Discs
    - CDs, DVDs, and Blu-ray Discs
4. USB Flash Drives
    - Portable Storage: USB flash drives are small, portable devices that use flash memory to store data. They connect to computers via USB ports.
5. Memory Cards
    - Flash Storage: Memory cards, such as SD cards and microSD cards, use flash memory to store data and are commonly used in devices like cameras, smartphones, and tablets.
6. External Hard Drives
    - Portable HDDs/SSDs: External hard drives are portable versions of HDDs or SSDs that connect to computers via USB or other interfaces.
7. Cloud Storage
    - Internet-Based Storage: Cloud storage allows users to store data on remote servers accessed via the internet. Services like Google Drive, Dropbox, and OneDrive are popular examples.

Characteristics of Secondary Memory

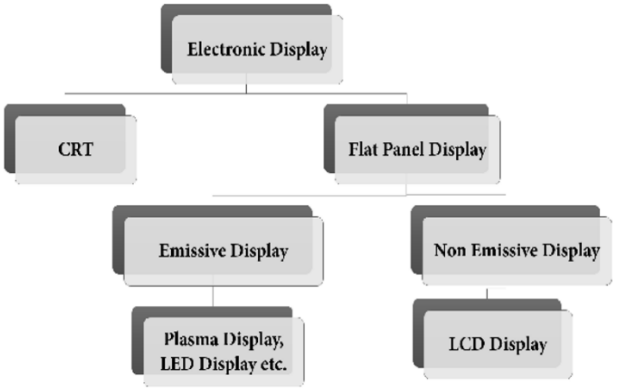
- Non-Volatile: Secondary memory retains data even when the computer is turned off, making it suitable for long-term storage.
- Higher Capacity: Secondary memory typically offers much larger storage capacities than primary memory, allowing for the storage of vast amounts of data.
- Slower Access: Data access speeds in secondary memory are generally slower compared to primary memory, especially in the case of traditional HDDs.
- Portability: Devices like USB drives and external hard drives are portable, allowing for easy data transfer between different computers and locations.
- Durability: Secondary storage devices like SSDs and flash drives have no moving parts, making them more durable and less prone to mechanical failure than HDDs.

Role of Secondary Memory in a Computer System

- Data Storage: Secondary memory is essential for storing the operating system, software applications, and user data permanently.
- Backup and Recovery: Secondary memory devices are used to create backups of important data, ensuring that it can be recovered in case of primary memory failure or data loss.
- Archival: Secondary memory is used for archiving data that is not frequently accessed but needs to be retained for long-term purposes.
- Data Transfer: Portable secondary storage devices like USB drives and external hard drives are used to transfer data between different computers or to different locations.

DISPLAY

A **display**, also known as a **monitor** or **screen**, is an output device that visually presents information generated by a computer, such as text, images, and videos. Displays are crucial components of a computer system, enabling users to interact with the computer and view its output.



Types of Displays

1. Cathode Ray Tube (CRT) Monitors
    - Technology: CRT monitors use electron beams to excite phosphor dots on the inside of a glass screen, creating images. They were once the standard for computer monitors and televisions.
    - Characteristics:
        - Bulky and Heavy: CRT monitors are large and heavy due to the vacuum tubes and glass components.
        - Low Resolution: Compared to modern displays, CRT monitors offer lower resolution and less sharpness.
    - Use Case: CRT monitors have been largely phased out and replaced by flat-panel displays but were once widely used in desktop computers.
2. Liquid Crystal Display (LCD) Monitors
    - Technology: LCD monitors use liquid crystals sandwiched between layers of glass or plastic. When electric current passes through, the liquid crystals align to allow varying levels of light to pass through, creating images.
    - Characteristics:
        - Thin and Lightweight: LCD monitors are much thinner and lighter than CRTs, making them more space-efficient.
        - Energy Efficient: They consume less power compared to CRT monitors.
        - Good Resolution: LCD monitors typically offer good resolution and image quality, with sharp text and images.
    - Use Case: LCD monitors are commonly used in desktops, laptops, smartphones, and tablets.
3. Light Emitting Diode (LED) Monitors
    - Technology: LED monitors are a type of LCD that uses light-emitting diodes for backlighting instead of the traditional cold cathode fluorescent lamps (CCFLs).
    - Characteristics:
        - Better Brightness and Contrast: LED monitors offer better brightness, contrast, and color accuracy compared to standard LCDs.
        - Energy Efficient: They are more energy-efficient than CCFL-backlit LCDs.
        - Slim Design: LED technology allows for even thinner and lighter monitors.
    - Use Case: LED monitors are now the standard for modern computer displays, televisions, and mobile devices.
4. DLP MONITOR

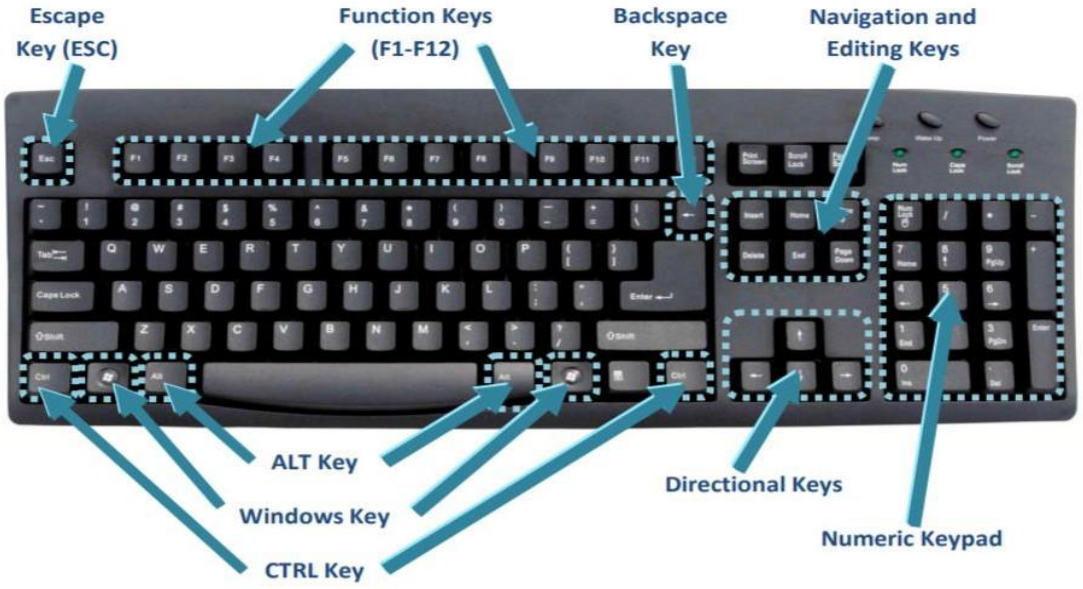
   A DLP monitor refers to Digital Light Processing (DLP) is a display technology developed by Texas Instruments that uses a digital micromirror device (DMD) to project images. The DMD is a chip that contains millions of tiny mirrors, each representing a single pixel in the projected image. These mirrors tilt rapidly to reflect light either toward or away from a projection lens, creating the image.

5. Organic Light Emitting Diode (OLED) Displays
    - Technology: OLED displays use organic compounds that emit light when an electric current is applied. Each pixel in an OLED display is self-illuminating, eliminating the need for a separate backlight.
    - Characteristics:
        - Superior Contrast: OLED displays offer true blacks and very high contrast ratios, as pixels can be completely turned off.
        - Wide Viewing Angles: OLED screens maintain color accuracy and brightness across wide viewing angles.
        - Fast Response Time: OLEDs have very fast response times, reducing motion blur in fast-moving images.
    - Use Case: OLED displays are used in high-end smartphones, televisions, and some laptops, particularly for media consumption and professional work where image quality is critical.

6. Plasma Displays
    - Technology: Plasma displays use small cells containing electrically charged ionized gases (plasma) to produce images.
    - Characteristics:
        - High Contrast and Brightness: Plasma displays offer high contrast ratios and bright images.
        - Wide Viewing Angles: Like OLED, plasma screens maintain quality across different angles.
        - Heavier and Less Energy Efficient: Plasma screens are heavier and consume more power than LCDs or LEDs.
    - Use Case: Plasma displays were once popular for large-screen televisions but have been largely replaced by LED and OLED technologies.
7. Touchscreen Displays
    - Technology: Touchscreen displays allow users to interact with the computer directly through the screen using their fingers or a stylus. They can be based on LCD, LED, or OLED technology.
    - Characteristics:
        - Interactive: Touchscreens combine input and output, allowing for more intuitive user interfaces.
        - Versatile: Used in a wide range of devices, from smartphones and tablets to interactive kiosks and ATMs.
    - Use Case: Common in mobile devices, 2-in-1 laptops, and public information systems.

KEY BOARD

A **keyboard** is one of the primary input devices used with a computer. It allows users to input data, commands, and interact with the operating system and software applications by pressing keys.



A keyboard has various types of keys, each serving different functions. Here's an overview of the different types of keys found on a typical keyboard:

1. Alphanumeric Keys

- **Letters**: A-Z keys, used for typing text.
- **Numbers**: 0-9 keys, found in the main section of the keyboard.
- **Special Characters**: Includes keys like @, #, &, *, (,), -, +, =, !, etc., usually accessed with the Shift key.

2. Modifier Keys

- **Shift**: Used to capitalize letters or access the secondary function of other keys (e.g., Shift + 2 produces @ on a QWERTY keyboard).
- **Ctrl (Control)**: Often used in combination with other keys to perform shortcuts (e.g., Ctrl + C for

copy).

- **Alt (Alternate)**: Used in combination with other keys for shortcuts and special characters (e.g., Alt + Tab to switch between open applications).
- **AltGr**: Found on some keyboards, used to access additional characters on keys, typically in combination with the right-hand Alt key.
- **Fn (Function)**: Found on compact keyboards (especially laptops), used to access secondary functions of keys (e.g., volume control, screen brightness).

3. Function Keys

- **F1 to F12**: Located at the top of the keyboard, these keys have different functions depending on the software. Common uses include:
  - F1: Opens help.
  - F2: Renames selected item.
  - F5: Refreshes the page or window.
  - F12: Opens the Save As dialog in many programs.

4. Navigation Keys

- **Arrow Keys**: Used to move the cursor or selection up, down, left, or right.
- **Home**: Moves the cursor to the beginning of a line or document.
- **End**: Moves the cursor to the end of a line or document.
- **Page Up/Page Down**: Scrolls the view up or down by a screenful.
- **Insert**: Toggles between insert mode (where typed characters are inserted at the cursor position) and overwrite mode (where typed characters overwrite existing text).
- **Delete**: Removes the character after the cursor or the selected item.
- **Backspace**: Deletes the character before the cursor.

5. Numeric Keypad

- **Numbers (0-9)**: Found on the right side of the keyboard, used for quick number entry.
- **Arithmetic Operators**: +, -, *, / keys are used for basic calculations.
- **Num Lock**: Toggles the numeric keypad between numbers and navigation functions (e.g., arrow keys).
- **Decimal Point (.)**: Used for entering decimal numbers.
- **Enter**: Similar to the main Enter key but located on the numeric keypad for convenience.

6. Special Keys

- **Enter/Return**: Used to submit input or execute a command. On some keyboards, this key may be labeled "Return."
- **Spacebar**: Inserts a space between words or characters.
- **Caps Lock**: Toggles uppercase typing on or off.
- **Tab**: Moves the cursor to the next tab stop or field in forms.
- **Esc (Escape)**: Cancels or exits a process or dialog box.
- **PrtScn (Print Screen)**: Captures a screenshot of the entire screen. Often used with Alt to capture only the active window.
- **Scroll Lock**: A less commonly used key that historically controlled scrolling in text windows.
- **Pause/Break**: Rarely used today, this key was once used to pause output in command-line interfaces or to break out of loops.

7. Multimedia Keys

- **Volume Control**: Keys to increase, decrease, or mute the system volume.
- **Play/Pause**: Controls media playback.
- **Next/Previous Track**: Skips to the next or previous media track.
- **Stop**: Stops media playback.

8. Shortcut Keys (Hotkeys)

- These are keys or combinations of keys that perform specific actions. Some keyboards have dedicated shortcut keys for opening web browsers, email clients, or performing system commands like opening the calculator or launching specific applications.

MOUSE

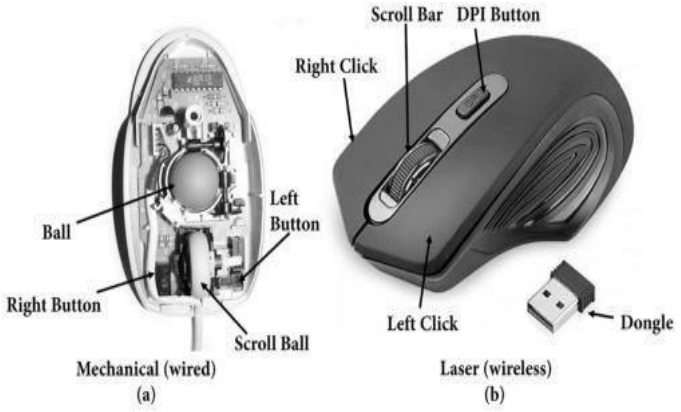
A **mouse** is a pointing device used to interact with a computer's graphical user interface (GUI). It allows users to move a cursor on the screen, select items, and perform various actions through clicking, dragging, and scrolling. The mouse is an essential input device for desktop computers and is also used with laptops, though touchpads may serve as an alternative.

Components of a Mouse

1. **Buttons**:
   - **Left Button**: The primary button used for selecting items, clicking on icons, and interacting with various elements on the screen.
   - **Right Button**: Typically opens context menus, providing additional options related to the selected item or area.
   - **Middle Button**: Sometimes integrated into the scroll wheel, this button can be used for special functions like opening links in new tabs in web browsers.
2. **Scroll Wheel**:
   - **Vertical Scrolling**: The scroll wheel is primarily used for scrolling up and down within documents, web pages, and applications.
   - **Horizontal Scrolling**: Some mice have tilt wheels that allow for horizontal scrolling, useful for wide documents and spreadsheets.
   - **Button Functionality**: The scroll wheel often doubles as a middle mouse button when pressed.
3. **Sensors**:
   - **Optical Sensor**: Most modern mice use an optical sensor to detect movement. The sensor emits light, which reflects off the surface beneath the mouse and is captured by a camera to determine the direction and speed of movement.
   - **Laser Sensor**: A more advanced type of sensor that provides higher precision and works on a wider variety of surfaces compared to optical sensors.
4. **Mouse Feet (Skates)**:
   - **Smooth Movement**: Located on the bottom of the mouse, these small pads reduce friction between the mouse and the surface, allowing for smooth movement.
5. **Connection Type**:
   - **Wired**: Connected to the computer via USB. Wired mice offer a stable connection with no latency and don't require batteries.
   - **Wireless**: Connects to the computer using Bluetooth or a wireless USB receiver. Wireless mice offer more flexibility and portability but require batteries or recharging.

Some mouse has some extra buttons for performing other special tasks like webpage forward or backward, volume up or down. Mice are available in both wireless and physical wired connections. Below Fig. shows the traditional mechanical mouse and the most popular wireless mouse of nowadays.

Common Parts of Computer Mice (a) Mechanical (b) Wireless



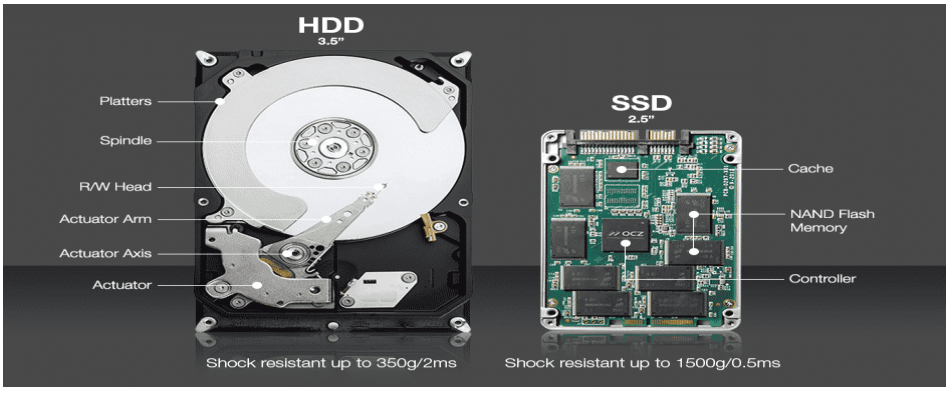
1. **Mechanical mouse**: As the name implies these mice have some mechanical structure witha hard rubber ball to detect the motion of the mouse. Sensors inside the assembly interpret the rubber ball movement into the equivalent electronic signal. Due to mechanical driven functionality, its parts like wheels and sensors will wear out over time.
2. **Optical and laser mouse**: Uses an LED sensor and imaging arrays of photodiodes to detect the relative movement on the underlying surface. Such mice are not able to work properly onsurfaces which does not reflect light properly like glass, plastic, etc. A ***laser mouse*** is also anoptical mouse having laser light for sensing mouse movement despite LED or photodiode.

- **Hard Disk Drives (HDD)**
  - **Magnetic Storage**: HDDs store data on spinning magnetic disks, known as platters, which are read and written to by a moving read/write head.
  - **Capacity**: HDDs typically offer large storage capacities, ranging from hundreds of gigabytes (GB) to several terabytes (TB).
  - **Speed**: HDDs are slower compared to solid-state drives (SSDs) because they rely on mechanical movement to access data.
  - **Use Case**: HDDs are commonly used for storing large amounts of data that do not require fast access speeds, such as operating systems, software applications, and multimedia files.

- **Solid-State Drives (SSD)**
  - **Flash Memory**: SSDs use flash memory (NAND) to store data, which has no moving parts, making them faster and more reliable than HDDs.
  - **Speed**: SSDs offer significantly faster data access and retrieval speeds compared to HDDs, leading to quicker boot times and faster file transfers.
  - **Capacity**: SSDs generally have lower storage capacities compared to HDDs, but larger SSDs (up to several terabytes) are becoming more common.
  - **Use Case**: SSDs are often used in modern laptops and desktops for faster system performance, and as the primary drive for operating systems and frequently used applications.

Comparison of HDD vs. SSD

Feature	HDD	SSD
Speed	Slower due to mechanical parts	Faster with no moving parts
Durability	More vulnerable to physical damage	More durable, no moving parts
Capacity	Larger capacities available (up to 16 TB)	Smaller capacities, typically up to 4 TB
Cost	Cheaper per GB	More expensive per GB
Noise	Generates noise due to spinning parts	Silent operation
Heat	Generates more heat	Produces less heat
Power Consumption	Higher power usage	Lower power usage



OTHER PERIPHERAL DEVICE

Peripheral devices are external devices connected to a computer to add functionality or provide input and output capabilities. They can be broadly classified into input devices, output devices, and storage devices. Here's an overview of common peripheral devices:

1. Input Devices

Input devices are used to provide data and control signals to a computer.

- Keyboard: Used for typing and data entry, consisting of alphanumeric keys, function keys, and special keys.
- Mouse: A pointing device used to interact with the computer's graphical user interface by moving a cursor and selecting items.
- Scanner: Converts physical documents and images into digital form. Types include flatbed scanners, handheld scanners, and document scanners.
- Microphone: Captures audio input, often used for voice commands, communication, and recording.
- Webcam: Captures video input, commonly used for video conferencing, streaming, and taking pictures.
- Touchscreen: A display that can detect and respond to touch, used in smartphones, tablets, and some laptops and monitors.
- Graphics Tablet: Allows users to draw or write directly onto a surface, with input captured digitally, often used by artists and designers.
- Joystick/Game Controller: Used for gaming, providing directional control and additional buttons for gameplay.
- Barcode Reader: Scans and inputs barcodes into a computer, commonly used in retail and inventory management.
- Fingerprint Scanner: Captures fingerprint data for security and authentication purposes.

2. Output Devices

Output devices provide data from the computer to the user in various forms, such as visual, audio, or printed content.

- Monitor: Displays visual output from the computer, ranging from simple text to complex graphics. Types include LCD, LED, and OLED monitors.
- Printer: Converts digital documents into physical form. Types include inkjet, laser, dot matrix, and 3D printers.
    - Inkjet Printer: Sprays tiny droplets of ink onto paper to produce high-quality images and text.
    - Laser Printer: Uses laser technology to produce sharp text and graphics quickly.
    - 3D Printer: Creates three-dimensional objects by layering materials based on digital models.
- Speakers: Produce audio output, ranging from simple system sounds to high-quality music and multimedia playback.
- Headphones: Provide personal audio output, often used for private listening or in environments where speakers would be disruptive.
- Projector: Displays visual content from the computer onto a larger surface, such as a wall or screen, often used in presentations and entertainment.

3. Storage Devices

Storage devices are used to store and retrieve digital data.

- External Hard Drive: Provides additional storage outside the computer, commonly used for backups and transferring large files.
- USB Flash Drive: A portable storage device that plugs into a USB port, used for transferring and

- Memory Card: A small storage device used in cameras, smartphones, and other portable devices, typically SD or microSD cards.
- Optical Drive: Reads and writes data from optical discs like CDs, DVDs, and Blu-rays, though they are becoming less common in modern computers.
- Network Attached Storage (NAS): A storage device connected to a network, allowing multiple users and devices to access files over the network.

4. Other Peripheral Devices.

- External Graphics Card (eGPU): Provides additional graphics processing power, commonly used by gamers and professionals working with graphics-intensive applications.
- Docking Station: Expands the connectivity of laptops by providing additional ports, including USB, HDMI, Ethernet, and more, often used with laptops that have limited ports.
- Uninterruptible Power Supply (UPS): Provides backup power to a computer in case of a power outage, allowing time to save work and shut down the system safely.
- External Sound Card: Enhances audio input and output capabilities, often used by audiophiles and professionals in audio production.
- Modem: Converts digital data to analog signals and vice versa for internet connectivity, particularly for dial-up and DSL connections.
- Router: Directs data between the computer and the internet, commonly used in homes and businesses to manage local networks and internet access.
- Smart Card Reader: Reads data from smart cards, often used in security systems and for payment processing.
- Bluetooth Adapter: Allows computers without built-in Bluetooth to connect to Bluetooth devices, such as headphones, keyboards, and mice.

UNIT 2

OPERATING SYSTEMS

An operating system (OS) is the fundamental software that manages computer hardware and software resources, providing services for computer programs.Some popular operating systems are:

1. Windows

- **Developer:** Microsoft
- **First Released:** 1985
- **Latest Version:** Windows 11
- **Key Features:**
  - User-friendly interface with the Start menu.
  - Wide compatibility with a variety of software and hardware.
  - Extensive support for gaming.
  - Frequent updates and security patches.
- **Common Use Cases:** General computing, gaming, business, and enterprise environments.

2. macOS

- **Developer:** Apple
- **First Released:** 2001 (originally as Mac OS X)
- **Latest Version:** macOS Sonoma
- **Key Features:**
  - Sleek and consistent user interface.
  - Strong integration with other Apple devices and services (like iPhone, iPad, iCloud).
  - Unix-based, providing a robust and secure environment.
  - Built-in software like Safari, Mail, and Photos.
- **Common Use Cases:** Creative work (design, video editing, music production), general computing, and software development.

3. Linux

- **Developer:** Open-source community (originally created by Linus Torvalds in 1991)
- **Latest Versions:** Various distributions (e.g., Ubuntu, Fedora, Debian)
- **Key Features:**
  - Highly customizable and configurable.
  - Open-source, free to use.
  - Strong security and stability.
  - Command-line interface for advanced users.
- **Common Use Cases:** Servers, software development, cybersecurity, IoT devices, and as an alternative to Windows/macOS for general computing.

4. Other Operating Systems

- **Chrome OS:** Developed by Google, focused on web-based applications and integrated with Google services. Commonly used in Chromebooks.
- **Android:** Primarily designed for mobile devices, developed by Google. It's the most widely used mobile OS globally.
- **iOS:** Apple's mobile operating system, used in iPhones and iPads, known for its smooth performance and security.

linux os installation

Before installing any operating system, it is advised to check the recommended system requirement.

Installing a Linux operating system can be a straightforward process, but it can vary slightly depending on the distribution you're choosing. Below is a general guide on how to install a Linux OS, using **Ubuntu** (one of the most popular Linux distributions) as an example.

Steps to Install Ubuntu Linux OS

1. Download the Ubuntu ISO File

- Visit the official Ubuntu website and download the latest version of the Ubuntu ISO file.

2. Create a Bootable USB Drive

- **Windows:** Use tools like Rufus or UNetbootin to create a bootable USB drive.
- **macOS:** Use Etcher to create a bootable USB drive.
- **Linux:** Use the dd command in the terminal, or tools like UNetbootin.

Example command for dd (be careful with this as it can erase data).

CODE:

```
sudo dd if=/path/to/ubuntu.iso of=/dev/sdX bs=4M
```

Replace /path/to/ubuntu.iso with the path to your ISO file and /dev/sdX with your USB drive.

3. Boot from the USB Drive

- Insert the USB drive into your computer.
- Restart the computer and enter the BIOS/UEFI settings (usually by pressing a key like F2, F12, ESC, or DEL during startup).
- Set the USB drive as the first boot device.
- Save and exit the BIOS/UEFI settings. Your computer should now boot from the USB drive.

4. Start the Installation Process

- Once the computer boots from the USB drive, you'll see the Ubuntu welcome screen.
- Choose the option to "Try Ubuntu" or "Install Ubuntu" directly.
- Select your preferred language and click "Continue."

5. Set Up the Installation

- **Keyboard Layout:** Choose your keyboard layout and click "Continue."
- **Updates and Software:** You can choose to download updates and install third-party software during the installation. It's often recommended to check these options.
- **Installation Type:**
  - **Erase disk and install Ubuntu:** This will delete everything on the disk and install Ubuntu.
  - **Install alongside existing OS:** This option allows you to dual-boot with another operating system like Windows.
  - **Something else:** Advanced option for manual partitioning.
- Choose the option that fits your needs and click "Install Now."

6. Configure Time Zone and User Information

- **Time Zone:** Select your time zone and click "Continue."
- **User Information:**
  - Enter your name, computer name, username, and password.
  - Decide if you want to log in automatically or require a password.

7. Complete the Installation

- The installation process will start. This may take some time depending on your system and the options you've selected.
- Once the installation is complete, you'll be prompted to restart the computer.

8. Remove the USB Drive and Boot into Ubuntu

- Remove the USB drive when prompted.
- Your computer will restart, and you'll boot into your new Ubuntu Linux OS.

9. Post-Installation Setup

- After the first boot, you might want to check for updates and install additional software.
- You can access the terminal by pressing Ctrl + Alt + T and run the following commands:

CODE:

```
sudo apt update
sudo apt upgrade
```

- Install any necessary drivers, set up your preferred desktop environment, and customize your settings as needed.

Additional Tips

- **Backup your data:** Always make sure to back up important data before installing a new OS, especially if you're going to erase the disk.
- **Partitioning:** If you're familiar with disk partitioning, you can manually create partitions for /, /home, and swap for better management.
- **Support:** If you run into issues, Ubuntu has extensive online documentation and a helpful community.

This guide should help you get Ubuntu or any similar Linux distribution installed on your computer.

Window OS installation

Installing a Windows operating system is a easy process, and you can installing through **Windows 11** as an example. The steps are similar for Windows 10.

Steps to Install Windows 11

1. Prepare the Installation Media

- **Download the Windows 11 ISO File:**
  - Visit the official Microsoft website and download the Windows 11 ISO file or use the Media Creation Tool to create installation media directly.
- **Create a Bootable USB Drive:**
  - Use the Windows Media Creation Tool to create a bootable USB drive.
  - Alternatively, you can use third-party tools like Rufus to create the bootable USB from the ISO file.

2. Prepare Your PC for Installation

- **Backup Your Data:** Ensure all your important files are backed up. Installing a new OS can erase your data.
- **Check System Requirements:** Ensure your PC meets the Windows 11 minimum requirements, such as TPM 2.0 and Secure Boot. You can check this using the PC Health Check tool.

3. Boot from the USB Drive

- **Insert the USB Drive:** Plug the bootable USB drive into your computer.
- **Access BIOS/UEFI:** Restart your computer and enter the BIOS/UEFI settings (usually by pressing a key like F2, F12, ESC, or DEL during startup).
- **Set USB as Boot Device:** Change the boot order to prioritize the USB drive.
- **Save and Exit:** Save the changes and exit the BIOS/UEFI settings. Your computer should now boot from the USB drive.

4. Start the Installation Process

- **Windows Setup:** After booting, the Windows Setup screen will appear.
- **Language and Preferences:** Select your language, time, and keyboard preferences, and click "Next."
- **Install Now:** Click the "Install Now" button to begin the installation.

5. Enter the Product Key

- If prompted, enter your Windows 11 product key. You can also choose "I don't have a product key" if you want to enter it later.
- Select the edition of Windows 11 you want to install if necessary.

6. Accept the License Terms

- Read and accept the Microsoft software license terms, then click "Next."

7. Choose Installation Type

- **Upgrade:** This option keeps your files, settings, and applications. Use this if you're upgrading from Windows 10.
- **Custom:** This option allows a clean installation. It will erase the disk where you install Windows, so make sure your data is backed up.

8. Partition the Hard Drive

- If you're performing a clean installation, you'll see a list of your drives and partitions.
- **Delete Partitions:** You can delete existing partitions to install Windows on unallocated space (this will erase all data).
- **Create New Partition:** If needed, create a new partition and select it for installation. Windows will automatically create additional partitions for system files.

9. Begin the Installation

- After selecting the drive/partition, click "Next."
- Windows will begin copying files and installing the OS. This process may take some time, and your computer will restart several times during the process.

10. Configure Windows

- **After Installation:** Once the installation is complete, Windows will prompt you to configure your settings.
- **Region and Keyboard Layout:** Choose your region and keyboard layout.
- **Connect to a Network:** Connect to a Wi-Fi or Ethernet network.
- **Sign in to Microsoft Account:** Sign in with your Microsoft account, or create a new one. You can also choose to set up a local account.
- **Set Up PIN:** Create a PIN for quick access to your system.
- **Privacy Settings:** Configure privacy settings like location, diagnostic data, and advertising preferences.

11. Complete the Setup

- Windows will finalize the setup, which might take a few more minutes.
- Once done, you'll be taken to the Windows desktop.

12. Post-Installation Setup

- **Install Updates:** It's recommended to check for updates by going to Settings > Windows Update.
- **Install Drivers:** Windows will automatically install most drivers, but you may need to install specific ones from your hardware manufacturer's website.
- **Install Software:** Install any additional software you need, like web browsers, office suites, or productivity tools.

Additional Tips

- **Keep Your Product Key:** If you skipped entering the product key during installation, you'll need it to activate Windows later.
- **Backup Drivers:** If you're doing a clean install, it's a good idea to backup your current drivers, especially for devices like network adapters.
- **Security:** Consider installing antivirus software and setting up a firewall if not using Windows Defender.

This guide should help you successfully install Windows 11 or Windows 10 on your computer.

UNIT 3

HTML AND CSS

HTML

Hypertext- Hypertext refers to text that contains links (hyperlinks) to other pieces of text or resources. It enables navigation between different documents or sections within a document.
Markup- Markup refers to a system for annotating a document to define its structure and format. It provides instructions to the browser or application on how to display or organize content.
HTML (HyperText Markup Language) is the standard markup language used to create web pages. It provides the structure of a webpage, allowing you to define elements such as headings, paragraphs, links, images, and more.
In HTML
HTML (HyperText Markup Language) combines both:

- **HyperText**: Facilitates linking through tags like <a>.
- **Markup**: Structures the document with tags like <h1>, <p>, and .

3.1.1 Structure of an HTML Document

```
<!DOCTYPE html>
<html>
<head>
  <title>My First Webpage</title>
</head>
<body>
  <h1>Welcome to HTML!</h1>
  <p>This is a sample webpage.</p>
</body>
</html>
```

1. **DOCTYPE**: Specifies the document type as HTML.
2. **HTML**: Root element containing all HTML content.
3. **HEAD**: Metadata, title, and links (e.g., CSS).
4. **BODY**: Contains the visible content displayed in the browser.

3.1.2 How to Create a Webpage?

Steps to create a basic webpage:

1. Open a text editor (e.g., Notepad).
2. Write HTML code as shown in the example above.
3. Save the file with a .html extension (e.g., index.html).
4. Open the file in any web browser to view the webpage.

3.1.3 Basic HTML Tags

HTML tags are used to define elements within a webpage. Commonly used tags include:

1. **Heading Tags**
    - Define headings in different sizes from <h1> (largest) to <h6> (smallest).

```
<h1>Main Heading</h1>
<h2>Subheading</h2>
<h3>Smaller Heading</h3>
```

2. **Paragraph Tag**

- <p>: Defines a paragraph.

```
<p>This is a paragraph of text.</p>
```

3. **Bold and Italic Tags**

- <b>: Makes text bold.
- <i>: Makes text italicized.

```
<b>Bold Text</b>
<i>Italicized Text</i>
```

4. **Line Break**

-
: Inserts a line break.

```
First Line<br>Second Line
```

5. **Horizontal Line**

- <hr>: Creates a horizontal rule.

```
<p>Section 1</p>
<hr>
<p>Section 2</p>
```

6. **Hyperlinks**

- <a>: Creates a hyperlink.

```
<a href="https://www.example.com">Visit Example</a>
```

3.1.4 Page Setting Tags

Tags that define metadata or configure page-specific settings.

1. **Title Tag-** Sets the title of the webpage displayed on the browser tab.

```
<head>
  <title>My Webpage Title</title>
</head>
```

2. **Meta Tags-** Provides metadata about the document, such as character encoding or keywords.

```
<head>
  <meta charset="UTF-8">
  <meta name="description" content="Learn HTML basics">
</head>
```

3.1.5 Listing Tags

Used to create ordered, unordered, or definition lists.

1. **Ordered List** (<ol>)
    - Displays a list with numbers.

```
<ol>
  <li>Item One</li>
  <li>Item Two</li>
  <li>Item Three</li>
</ol>
```

2. **Unordered List** (<ul>)

- Displays a list with bullet points.

```
<ul>
  <li>Apple</li>
  <li>Banana</li>
  <li>Cherry</li>
</ul>
```

3. **Definition List** (<dl>)

- Used for terms and their descriptions.

```
<dl>
  <dt>HTML</dt>
  <dd>HyperText Markup Language</dd>
  <dt>CSS</dt>
  <dd>Cascading Style Sheets</dd>
</dl>
```

3.1.6 Adding Graphics to HTML

Graphics are added using the <img> tag.

1. **Image Tag**

```
<img src="image.jpg" alt="Sample Image" width="300" height="200">
```

- **src**: Path to the image.
- **alt**: Alternative text if the image cannot load.
- **width** and **height**: Specifies dimensions.

2. **Background Image**

```
<body style="background-image: url('background.jpg');">
```

3.1.7 Working with HTML Tables

Tables organize data in rows and columns using <table>.

1. Basic Table

```
<table border="1">
  <tr>
    <th>Name</th>
    <th>Age</th>
  </tr>
  <tr>
    <td>John</td>
    <td>25</td>
  </tr>
  <tr>
    <td>Jane</td>
    <td>30</td>
  </tr>
</table>
```

- <th>: Table header.
- <td>: Table data.
- <tr>: Table row.

3.1.8 Linking Webpages

1. **Hyperlink to Another Pag**

```
<a href="page2.html">Go to Page 2</a>
```

2. **Open Link in a New Tab**

```
<a href="https://www.example.com" target="_blank">Visit Example</a>
```

3. **Image as a Link**

```
<a href="https://www.example.com">
  <img src="logo.jpg" alt="Logo">
</a>
```

3.1.9 HTML Forms

Forms collect user input using various tags.

1. **Input Tag**

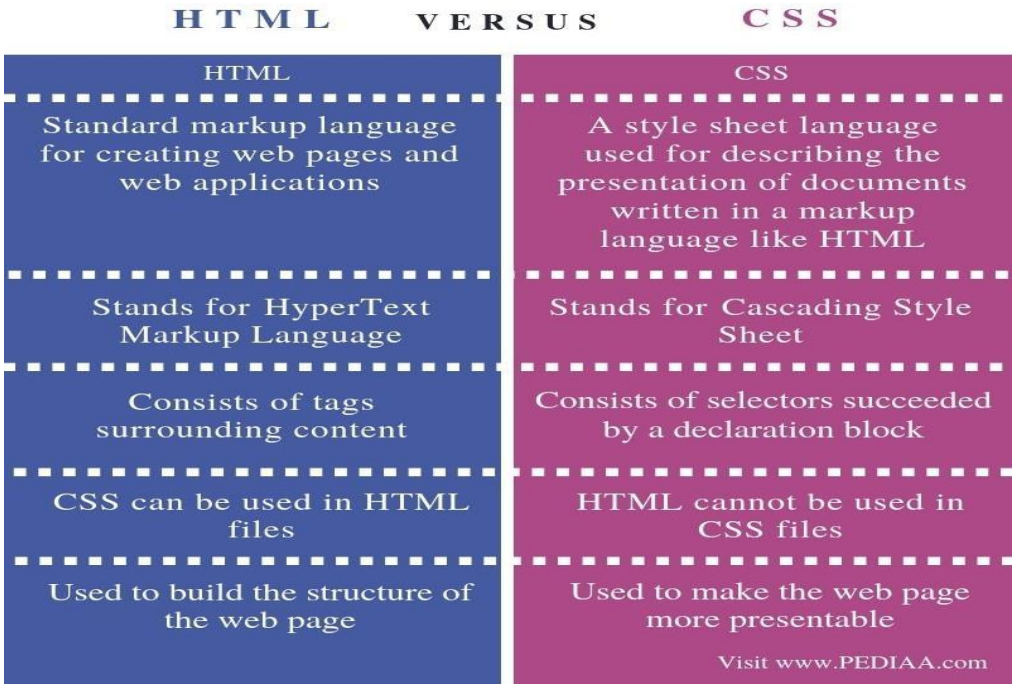
```
<form>
  Name: <input type="text" name="name"><br>
  Email: <input type="email" name="email"><br>
  <input type="submit" value="Submit">
</form>
```

2. **Text Area**

```
<form>
  Comments:<br>
  <textarea name="comments" rows="4" cols="50"></textarea>
</form>
```

3. Dropdown Box

```
<form>
  Choose an option:
  <select name="options">
    <option value="1">Option 1</option>
    <option value="2">Option 2</option>
  </select>
</form>
```



3.2 Cascaded Style Sheets (CSS)

CSS (Cascading Style Sheets) is a stylesheet language used to describe the presentation of a document written in HTML or XML. It controls the layout, design, and appearance of web pages, allowing developers to create visually engaging websites.

3.2.1 Ways to Apply CSS

1. **Inline CSS**

Inline CSS is a method of applying styles directly to an HTML element using the style attribute. Unlike external or internal CSS, inline styles are written directly in the HTML document, within the opening tag of an element.

- Applied directly to HTML elements using the style attribute.

```
<p style="color: blue; font-size: 16px;">This is styled text.</p>
```

2. **Internal CSS**

Internal CSS is a way to apply styles within the same HTML document, using a <style> block inside the <head> section. This method allows you to define styles for the entire page without linking an external stylesheet.

- Defined within a <style> block in the <head> section.

```
<style>
  body { background-color: lightgray; }
  p { color: green; }
</style>
```

3. **External CSS**

External CSS is a method of linking an external stylesheet to your HTML document. It allows you to define all styles in a separate .css file, which is then linked to one or more HTML pages. This is the most efficient way to manage styles for larger or multi-page projects.

- Linked to an external .css file using the <link> tag.

<link rel="stylesheet" href="styles.css">

3.2.2 CSS Selectors

A CSS selector is a pattern used to select and style elements in HTML. CSS selectors are an essential part of CSS as they determine which HTML elements are targeted and styled.

1. **Element Selector**

   An **element selector** in CSS, also known as a **type selector**, is used to select all HTML elements of a specific type (tag name) in a document. It applies styles to every instance of the specified HTML element.

p { color: red; }

2. **Class Selector**

   A class selector in CSS is used to select and style HTML elements with a specific class attribute. It allows you to apply the same style to multiple elements by assigning them the same class.

css

.highlight { background-color: yellow; }

html

This text is highlighted.

3. **ID Selector**

An ID selector in CSS is used to select and style a single HTML element with a unique id attribute. IDs are intended to be unique within a page, so they should only be used for elements that need distinct styling.

css

#unique { font-weight: bold; }

html

This is a bold paragraph.

3.2.3 CSS Properties

1. **Text Styling**

Text styling in CSS refers to formatting and customizing the appearance of text in HTML elements. This includes properties to set the font, size, color, alignment, decoration, spacing, and more.

Css

h1 { color: blue; text-align: center; }

2. **Box Model**

The **CSS Box Model** is a fundamental concept in web design that describes how every HTML element is represented as a rectangular box. It defines the element's dimensions and spacing, consisting of the following components:

- margin, padding, border, width, height.

Css

```
div {
   width: 300px;
   height: 200px;
   border: 2px solid black;
   padding: 10px;
   margin: 20px;
}
```

UNIT 4

OPEN OFFICE TOOLS

Definition:

- It is Application Software that assist used in regular office jobs like creating, updating and maintaining documents, handling large amounts of data, creating presentations, scheduling etc. are called office tools and open office software.
- Using office tools saves time, effort and lots of repetitive tasks can be easily.
- The office productivity software suite is available in many languages and its compatible with all major operating system including Apple OS, MS Windows and Linux etc.

4.1 How to installation of Open Office

- Visit the official Apache OpenOffice website.
- Click the **Download** button.
- Select your operating system (Windows, macOS, or Linux), preferred language, and version.
- The download will start automatically.
- Start the installation with downloaded file.
- Next a customer Information form will be presented to take complete customer information. After filling the form click on next and then another window will be presented to choose setup type.
- After continue, the open office installation completed wizards appears then click on Finish.
- Now, we will have a start link on desktop.

ADAVANTAGE OF OPEN OFFICE

- No licensing fees - It's a free software. Anyone can use and distribute it without any change.
- Open source- Source code is openly available
- Cross platform- The software can be installed in several.
- Extensive Language Support- Its user interface is available is more than 40 language including Hindi,Tamil,etc.
- Consistent Interface- It provide user interfaces with similar look and feel for better administration.
- File Compatibility-It includes the ability to import and edit some PDF files.
- Granularity- AOO options can be set at the component level or even document level.
- No vendor lock in-It supports open document format an XML, it can be opened in any text editor.
- Community Support- Worldwide community to fix the software issue and software enhancement.

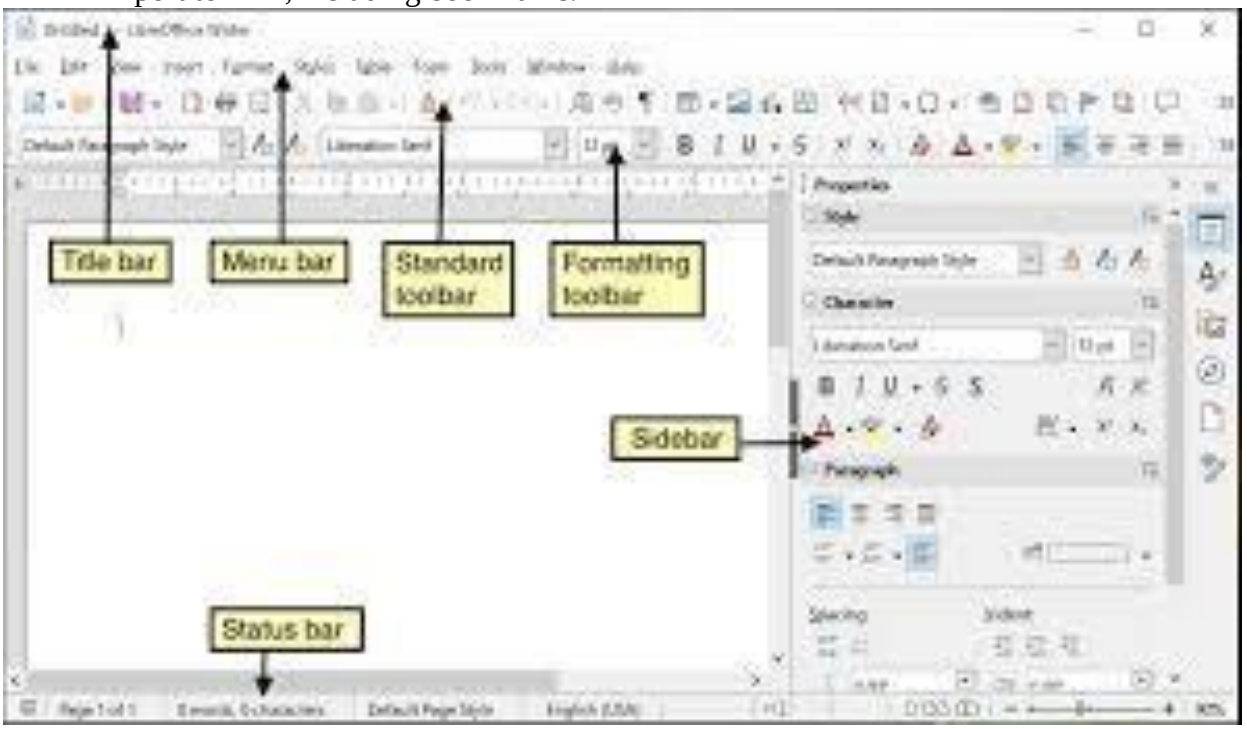
4.2 OPEN OFFICE WRITER

- The writer is the word processor component of **Apache Open Office(AOO).**
- It is a free alternative to Windows MS Word.
- It is a free alternative to Windows MS word.
- The writer has all features we expect from a Modern Fully equipped word processor.
- Using Writer, we can create documents such as reports, letter, create complete book with contents, diagrams, indexes, agendas, minutes or carrying out more complex tasks such as mail merges.
- It provides the usual features of word processor : edit, enter, text, spelling check, autocorrect, find and replace.

Writer provides these features
Templates and styles

Formula	Description
=A1+10	Displays the contents of cell A1 plus 10.
=A1*16%	Displays 16% of the contents of A1.
=A1*A2	Displays the result of multiplying the contents of A1 and A2.
=ROUND(A1,1)	Displays the contents of cell A1 rounded to one decimal place.
=EFFECT(5%,12)	Calculates the effective interest for 5% annual nominal interest with 12 payments a year.
=B8-SUM(B10:B14)	Calculates B8 minus the sum of the cells B10 to B14.
=SUM(B8,SUM(B10:B14))	Calculates the sum of cells B10 to B14 and adds the value to B8.
=SUM(B1:B1048576)	Sums all numbers in column B.
=AVERAGE(BloodSugar)	Displays the average of a named range defined under the name BloodSugar. It is possible to establish ranges for inclusion by naming them using Sheet > Named Ranges and Expressions > Define, for example BloodSugar representing a range such as B3:B10.
=IF(C31>140, "HIGH", "OK")	Logical functions can also be performed as represented by the IF statement which results in a conditional response based upon the data in the identified cell. In this example, if the contents of C31 is greater than 140, then HIGH is displayed, otherwise OK is displayed.

- Page Layouts methods, including frames, columns and tables.
- Embedding or linking graphics, spreadsheets and other objects.
- Built in drawing tools.
- Master documents to group a collection of documents into single documents.
- Changes tracking during revision
- Database integration, including a bibliography database.
- Export to PDF, including bookmarks.



4.2.1 PARTS OF WRITER INTERFACE

- TITLE BAR- It is situated at the top of the writer window and shows the file name of the current document.
- Menu Bar- The menu Bar is just below the title bar has having various menus. When a menu is clicked it drop down and display several commands.
- File Menu- Contain commands which apply to the entire documents such as open, close, save,digital signature, print and exports as PDF drop down menu with various commands is depicted.
- EDIT MENU- Contain commands which apply to the entire documents such as undo, repeat, Auto, Text, Find and replace. It also contain commands to cut, copy and paste the content of your document.
- View Menu- Contain commands which control the display the documents such as print layout, web layout, Full-screen view, zoom control, etc.
- Insert Menu- contain commands for inserting elements into header footers and pictures in the document. It has a command to insert, manual breaks special characters, section, hyperlinks, bookmarks and cross reference, Frame, objects,movies and sound can be inserted with corresponding commands.
- Format Menu-It contain formatting layout commands for our documents using styles, formatting, paragraph,bullets and numbering options.
- Tools Menu- It contain various utility functions like spelling and grammar,mail merge, wizard,Autocorrect and options.

TOOLBARS:

- The toolbars is also available in calculate,impress and draw program of AOO.
- The various toolbars as listed below:-
- To display or hide toolbars choose view-Toolbars then click on the name of the toolbar in the list.
- To move a docked toolbar, place the mouse pointer over the toolbar handle,hold down the left mouse button, drag the toolbar to the new location and then release the mouse button.
- To move a floating toolbar, click on its title bar and drag it to a new location.

RIGHT-CLICK(context)Menus-

- User can right-click on a paragraph, other graphics or other objects to open the content menu.
- Tool->Options->open office.org writer->view and select->vertical ruler.
- Status Bar
- The writer status bar is located at the bottom of the workspace.
- It contain page number, page style,language,writer mode, file save status, digital signature, document view layout, page zoom controls etc.

4.2.2 STARTING A DOCUMENT

- There are many ways to open a fresh text document in AOO writer
- Via operating System Menu-We can open any AOO program by using the operating system menu.
- To do so, open the application by selecting start-> program writer-> impress cal and draw.
- Via quick starter
- Tool menu->options->open office->menu
- Via start center-> start-> programs->open office
- Via File Menu->File menu->new->text document(shortcut key control)can be used.

4.2.3 SAVING A DOCUMENT

- A newly created can be saved in many ways:
- Select File- save
- Select file-save as
- Click on the save as Icon
- Shortcut key(ctrl+S)

4.2.4 CLOSING A DOCUMENT

- A document can be closed in many ways:
- Select file-close
- Cross icon at right most of the menu bar.
- If our document is not saved after the last modification then it will alert us and display a dialog box.
- Click on save modification.
- Select discard if don't want to save the last modification.
- Select cancel if you want to work on the document again.

4.2.5 PRINTING A DOCUMENT

- Quick Printing- This option can be utilized to quickly saved a document to your default printer.
- Controlled printing- to execute this command, select file-> print or keyboard shortcut ctrl+P will open a print dialog box.

4.2.6 SELECTION, CUTTING AND PASTING IN A DOCUMENT

- To cut or copy (with text selected) you can use
- When pasting text, the formatting results depends on the sources and how you paste it.
- Keyboard shortcut paste-ctrl+v
- Menu selection-Edit+paste
- Contextual menu-Right click and choose paste

4.2.7 CHARCTER FORMATTING:

- We can apply many formats at the character level using the commands buttons on the formatting tool bar
- Style and formatting window
- Apply Style
- Font name
- Font size
- Bold
- Italic
- Underline
- Superscript
- Subscript
- Increase Font
- Reduce font
- Font color
- Highlighting
- Background color
- Character formating dialog.

4.2.8 PARAGRAPH FORMATTING

- You can apply many formats to paragraph using the buttons on the formatting toolbar.
- Formatting toolbar showing Icons for paragraph formatting.
- Style and Formatting Window
- Apply style
- Align left
- Centered
- Alight right
- Justified
- line Spacing 1
- Line spacing 1.5
- Line spacing 2
- Numbering on /off

- Bullets on/off
- Decrease/Increase indent
- Paragraph format dialog

4.2.9 FINDING AND REPLACING OF TEXT

- The writer program supports the facility to find a specific text and replace it with other text with its Find and Replace dialog box.
- The find and replace dialog can be utilized for various search tasks as described below.
- Find and replace words and phrases.
- Use wildcards and regular expression to fine-tune a search.
- Find and replace specific formatting
- Find and replace paragraph styles.
- Type the text you want to find in the search box.
- Type the new text in the replace with box.

4.2.10 SPELLING AND PARAGRAPH CHECKING

- The writer provides a spelling and grammar checking facility in open office tools.
- -For spelling and grammar-> use of shortcut key F7
- It is having a auto spell check each word as it is a type and display a wavy red line under any misspelled words.
- Once the word is corrected the line disappear.
- Spelling and grammar dialog-> to perform and spelling check on the document(or a text selection).check the spelling and grammar buttons.
- Dictionary language can be changed on the spelling and grammar dialog box.
- By default, a grammar checker is not available but can be installed as a extension(navigate to toolbox->language-> more dictionaries online)
- You can add a word to a dictionary (click add in the spelling and grammar dialog box and pick the dictionary to add it do.

4.2.11 AUTOCORRECT

- The writer auto-correct function has a long list of common misspelling and typing error which is correct automatically.
- Select tools-> auto correct options to open the auto correct dialog box.

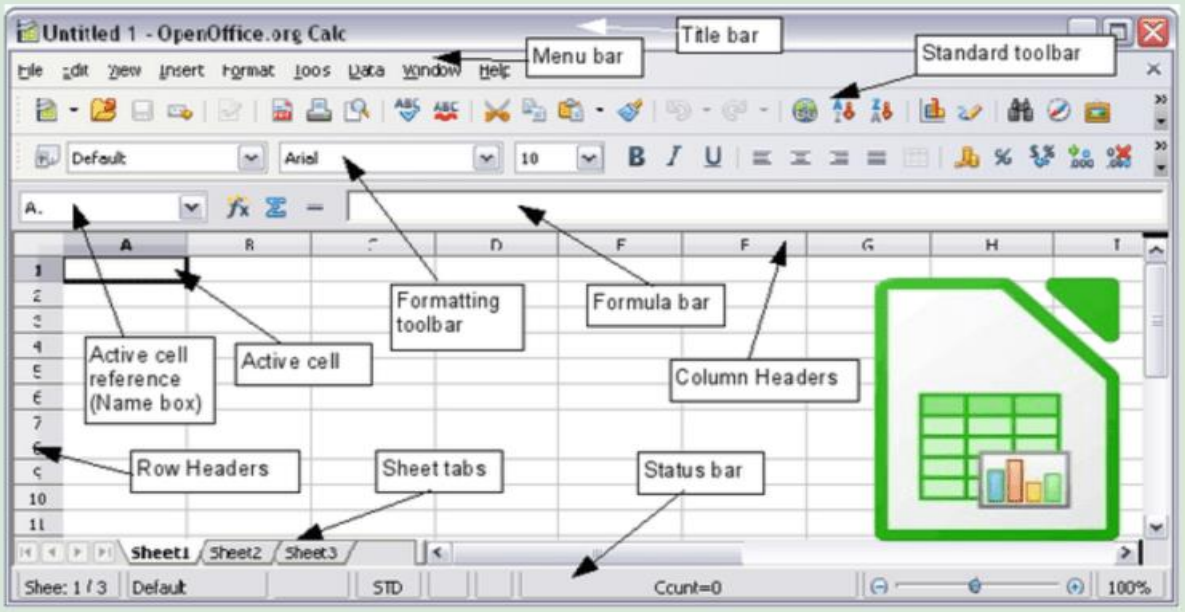
4.3 OPEN OFFICE CALC

- Calc is the spreadsheet component of Apache Open office(AOO).It contains most of the features found in the spreadsheets. Spreadsheets allows us to organize, analyses and store data in the tabular form.
- Other features provided by calc include:
- Calc consists of several individual sheets, each sheet of cells arranged in rows and columns.
- Function which can be used to create formulas to perform complex calculations in data.
- Database function, to arrange, store and filter data.
- Dynamic charts a wide range of 2D and 3D charts.
- Macros for recording and executing repetitive tasks.

4.3.1 INTRODUCTION TO SPREADSHEETS SHEETS AND CELLS

- In calc we create file that are called spreadsheets consists of several separate sheets.
- Each sheets containing cell arranged in rows and columns.
- Each spreadsheets can have many sheets and each sheets has a large number of individual cells.

4.3.2 PARTS OF CALC INTERFACE



FORMULA BAR

- It consists of various controls which are annotated with dark background color.
- Individual Cells
- The main section of the screen displays in the cell in the form of a grid, with each cell being at the interaction of a column and a row.

Sheet tabs

- At the bottom of the grid of cells are the sheet tabs. These tabs enable access to each individual sheet, and with the visible(action) sheet having a white tab.
- Clicking on another sheets tab displays the sheet and its tab turns white.

4.3.3 STARTING,OPENING, SAVING and CLOSING A DOCUMENT

Starting of calc document can be via operating system menu, via quick starter and via start center.
The process is already illustrated in above notes.

4.3.4 FREEZING/UNFREEZING ROWS AND COLUMNS

click into the cell that is immediately below the row you want to frozen and immediately to the right of the column.(choose window->freeze.

UNFREEZING

To unfreeze rows and columns choose window->freeze(then check marking freeze will be removed)

4.3.5 CREATING FORMULAS:

- To creating a chart step by step process will be help us for easier understanding.
- Insert data into the calc which is to be graphically presented.
- Select the data to be included in the chart/graph formation.
- Either press the chart icon on standard toolbar or click on Insert->chart option.
- It will show the chart wizard with the default formation of the chart as per the given data.
- The chart wizard has three main parts.
- List od steps involved in setting up the charts.
- List of chart types.
- Option for each chart types.

CREATING formulas TABLE:

Element	Description	Example	Explanation
Starting a Formula	Begin any formula with an equals sign =	=A1+B1	Adds the values in cells A1 and B1.
Cell Reference	Refers to the value in another cell.	=C5	Displays the value in cell C5.
Addition	Adds two or more values or cell references.	=A1+A2+A3	Sums the values in A1, A2, and A3.
Subtraction	Subtracts one value or cell from another.	=B1-B2	Subtracts the value in B2 from B1.
Multiplication	Multiplies two or more values or cell references.	=A1*B1	Multiplies the values in A1 and B1.
Division	Divides one value or cell by another.	=A1/B1	Divides the value in A1 by B1.
Functions	Built-in calculations for specific tasks.	=SUM(A1:A10)	Adds all values from A1 to A10.
IF Function	Performs a logical test and returns different results based on the condition.	=IF(A1>10, "Yes", "No")	Returns "Yes" if A1 is greater than 10, otherwise "No".
Concatenation	Combines text strings.	=A1 & " " & B1	Joins values in A1 and B1 with a space in between.
Absolute Reference	Locks a cell reference with $ so it doesn't change when copied.	=A1*B1	Always uses A1, even if the formula is copied to another cell.
Logical Operators	Compares values or expressions.	=A1>10	Returns TRUE if A1 is greater than 10.
Nested Functions	Uses one function inside another.	=IF(SUM(A1:A5)>50, "Pass", "Fail")	Checks if the sum of A1 to A5 is greater than 50.
Error Handling	Handles errors in formulas.	=IFERROR(A1/B1, "Error")	Returns "Error" if dividing A1 by B1 fails.

4.4 OPEN OFFICE IMPRESS

Impress creates presentation in the ODP formats which can be open by the other presentation software or can be exported in different presentation formats.

Impress Includes a spelling checker, a thesaurus prepackaged text style and attractive background styles.

4.4.1 CREATING NEW PRESENTATION:

- If no component of AOO is open, from the start center. Check on the presentation icon.
- From the system menu or the AOO quick starter.
- From any other component of AOO. check the triangle to the right of the new icon on the main toolbar.
- Select presentation from the drop-down menu or choose file->new presentation from the menu bar.
- Empty presentation creates or blank presentation will be appeared.
- You can design according to the list of the templates.
- Click on next to show the presentation wizard in the previous box.
- A slide design section gives you two main choices: presentation background.
- Click it and select it.
- Select how the presentation will be used under select an output medium.
- Click on next and click create and a new presentation is created

4.4.2 PARTS OF IMPRESS INTERFACE

Part	Description
Menu Bar	Located at the top of the window, it contains menus like *File*, *Edit*, *View*, *Insert*, *Slide*, and more. These menus provide access to various commands and features.
Toolbar	Positioned below the Menu Bar, it offers quick access to frequently used tools like font settings, alignment, slide layout, and more.
Sidebar	Typically, on the right, it provides additional options for slide properties, transitions, animations, and master slides. You can toggle it on or off.
Slide Pane	Located on the left, it displays a thumbnail view of all slides in the presentation, allowing for quick navigation and rearrangement.
Workspace(Slide Editor)	The central area where you design and edit individual slides. This is where you can add text, images, shapes, and other elements.
Status Bar	Positioned at the bottom of the window, it shows information about the current slide, such as its number, total slides, zoom level, and layout.
Navigator	Accessed via the *View* menu or shortcut, this helps you manage slides, objects, and elements in your presentation.
Slide-Sorter View	Found under the *View* menu, it allows you to see all slides at once and reorder them easily.
Notes View	Lets you add speaker notes to slides. This view is useful for preparing presentations with additional commentary.
Master-Slide View	Enables editing of slide layouts and themes, which affect the design and formatting of multiple slides in the presentation.
Drawing Toolbar	Located at the bottom, it provides tools for adding shapes, lines, arrows, and other graphic elements.
Properties Pane	Part of the Sidebar, it shows detailed formatting options for the selected object, such as text, images, or shapes.
Slide Transition Pane	Found in the Sidebar, it lets you apply and customize transitions between slides.

4.4.3 FORMATTING PRESENTATION:

- A new presentation only contains one empty slide. We will start adding new slides and preparing them for the intended contents.
- Inserting slides
- Insert->slide
- Right click on the present slides and select slides->new slide from the pop-up menu.
- Click the slide icon in the presentation toolbar.

SELECTING A LAYOUT:

- To select or change the layout, place the slide in the work area and select the designed layout from the layout drawer in the task pane.
- Select the layout drawer the available layout.
- The layout differ in the number of elements and slide will contain from the blank slide to a slide with six contents boxes and a title.

MODIFYING THE SLIDE ELEMENTS:

- To modify the slide elements, you can add pictures from the graphics files to place other than the clipart frame.
- Insert->picture->from file to insert picture dialog box opens
- Browser the graphic file to see the preview of the picture, check preview at the buttons of the insert picture dialog box. Select the picture and click open.
- Move the picture to its location.
- Resize the picture of necessary.
- To add text to a slide that contain a text frame, click on add an outline in the text frame and then type your text.
- To remove any element on the slide that is not required click the element to select it. The green handles show that it is selected. Press the delete key to remove it.

4.4.4 APPLYING AN ANIMATION EFFECT

- You have three choices for starting an animation effect
- On click-> the animation does not start until you click the mouse.
- With previous-> the animation runs at the same time as the previous animation.
- After previous-> the animation runs as soon as previous animation ends.

4.4.5 RUNNING THR SLIDE SHOW

- Click slide show-> slide shows on the main menu box.
- Click the slide show button on the presentation toolbar or the slide sorter toolbar.
- Press F5 or F9.
- If the slide transition is automatically after x seconds and let the slide show run by itself.
- Use the arrow keys on the keyboard to go to the next slide or to go the previous one.
- Click the mouse button to advance to the next slide.
- Press the space bar on the keyboard to advance to the next slide.

4.4.6 PRINTING PRESENTATION:

- Impress provides many options for printing presentation slide as multiple slide on a page, with single slide per page, with notes, as an outline, with date and time, with page name and many more.
- For control over printing a presentation
- Choose file->print to display the print dialog.
- The general tab is used to select the printer and its related properties.
- Range, copies are also given in the tab but what we want to print is selected from the drop don box under print option.

UNIT 5

INFORMATION SECURITY BEST PRACTICES

5.1 Introduction to Information Security

- **What is Information?**
  - Data that is processed to be meaningful, valuable, and actionable.
  - Examples: personal details, bank account information, business secrets, etc.
- **What is Information Security?**
  - The practice of protecting information from unauthorized access, use, modification, or destruction.
- **Goals of Information Security (CIA Triad):**
  - **Confidentiality:** Ensures information is accessible only to authorized persons.
  - **Integrity:** Protects information from unauthorized alterations.
  - **Availability:** Ensures authorized users have access to information when needed.

5.2 Threats to Information Security

1. **Malware:**
   - Malicious software like viruses, worms, ransomware, and spyware that harm devices or steal data.
   - Example: A virus corrupts files or locks systems.
2. **Social Engineering Attacks:**
   - Manipulative tactics to trick users into divulging confidential information.
   - Examples: Phishing emails, fake tech support calls.
3. **Network Threats:**
   - Risks to network security, such as unauthorized access, eavesdropping, or denial-of-service (DoS) attacks.

5.3 Combating Information Security Threats

1. **Firewall:**
   - Monitors and controls incoming/outgoing network traffic based on security rules.
2. **Data Backup:**
   - Regularly saving copies of data to protect against loss or corruption.
3. **Virtual Private Network (VPN):**
   - Encrypts internet connections to provide privacy and security over public networks.
4. **Encryption:**
   - Converts data into unreadable formats for unauthorized users.
5. **Anti-Virus Software:**
   - Detects and removes malicious programs.

6. **Intrusion Detection System (IDS):**
    - Monitors network traffic to detect suspicious activities.
7. **Intrusion Prevention System (IPS):**
    - Proactively blocks identified threats.

5.4 Information Security Best Practices

5.4.1 General Computer Usage:

Use Strong Passwords:

Create complex passwords with a mix of uppercase, lowercase, numbers, and symbols.

Avoid using easily guessable passwords like birthdays or names.

Update Software Regularly:

Keep your operating system, software, and applications up to date with the latest patches and security updates.

Install Reliable Antivirus Software:

Use trusted antivirus programs to protect against malware, viruses, and spyware.

Keep the antivirus software updated regularly.

Avoid Downloading Untrusted Files or Programs:

Download files and software only from trusted and verified sources.

Be cautious of free software from unknown websites.

Enable Firewalls:

Ensure the built-in firewall is enabled on your system to block unauthorized access.

Regularly Backup Data:

Save copies of important data on external drives or cloud storage to prevent data loss.

Avoid Connecting to Unsecured Networks:

Use secure and encrypted Wi-Fi connections.

Avoid public Wi-Fi for sensitive tasks like online banking.

Secure Physical Access:

Keep your computer in a secure location and lock it when unattended.

Be Cautious with External Devices:

Scan USB drives, CDs, and external hard drives for malware before use.

Disable Auto-Run for External Media:

Prevent automatic execution of programs from external devices to reduce the risk of infections.

Monitor System Activity:

Check for unusual activity like slow performance, unknown files, or unexpected pop-ups.

Enable Multi-Factor Authentication (MFA):

Use MFA for accessing important accounts to add an extra layer of security.

5.4.2 General Internet Browsing:

Use Secure Websites:

Always check for "https://" in the URL before entering sensitive information.

Avoid using websites with expired or invalid security certificates.

Avoid Clicking on Suspicious Links:

Do not click on pop-ups, advertisements, or links from untrusted sources.

Hover over links to verify their destination before clicking.

Keep Your Browser Updated:

Regularly update your browser to ensure it has the latest security patches.

Use Privacy and Security Settings:

Enable privacy settings in your browser to block cookies, trackers, and third-party access.

Use ad-blockers to avoid malicious ads.

Be Wary of Phishing Attempts:

Avoid responding to emails or messages that ask for personal or financial information.

Look for misspelled URLs or poorly written content in suspicious websites or emails.

Enable Pop-Up Blockers:

Prevent malicious pop-ups by enabling a pop-up blocker in your browser.

Use Secure Connections:

Avoid using public Wi-Fi for sensitive activities like online shopping or banking.

Use a Virtual Private Network (VPN) for additional security, especially on public networks.

Limit Personal Information Sharing:

Do not share personal details like phone numbers, addresses, or financial information unnecessarily.

Clear Browsing History and Cache:

Regularly delete browsing history, cookies, and cache to protect your privacy.

Use "Incognito" or "Private Browsing" mode if you don’t want to save your browsing history.

Be Careful When Downloading Files:

Only download files or software from reputable websites.

Scan downloads with antivirus software before opening.

Avoid Clicking "Remember Me" on Shared Computers:

Do not save login credentials on public or shared computers.

Use Strong, Unique Passwords for Online Accounts:

Avoid reusing passwords across different websites and services.

5.4.3 Password Management:

Create Strong Passwords:

Use a mix of uppercase, lowercase, numbers, and special characters.

Make passwords at least 12–16 characters long.

Avoid using personal information like names, birthdays, or phone numbers.

Use Unique Passwords for Each Account:

Do not reuse the same password across multiple websites or services.

A unique password ensures one account remains safe even if another is compromised.

Avoid Predictable Passwords:

Avoid common passwords like "password123," "admin," or "123456."

Never use sequential or repetitive patterns like "abcd1234" or "111111."

Use a Password Manager:

Use trusted password manager tools to securely store and manage your passwords.

Many password managers can generate strong passwords automatically.

Enable Two-Factor Authentication (2FA):

Add an extra layer of security by requiring a secondary code sent via SMS, email, or an authenticator app.

Regularly Update Passwords:

Change passwords every 3–6 months or immediately if you suspect a breach.

Do Not Share Passwords:

Avoid sharing passwords with anyone, even trusted individuals.

If sharing is necessary, use secure sharing options provided by password managers.

Avoid Writing Passwords Down:

Do not store passwords on sticky notes, notebooks, or unencrypted digital files.

Log Out from Shared Devices:

Always log out after accessing accounts on shared or public devices.

Check for Password Breaches:

Use tools like "Have I Been Pwned" to check if your credentials were leaked in a data breach.

If compromised, update the password immediately.

Enable Biometrics Where Possible:

Use fingerprint or face recognition for added security on devices and apps.

Be Cautious with Password Recovery Options:

Keep security questions strong and difficult to guess.

Avoid using easily available answers, such as pet names or favorite colors, as recovery information.

5.4.4 Removable Information Storage Media:

Scan for Malware:

Always scan USB drives, external hard drives, CDs, or any removable storage device with antivirus software before using them.

Avoid using untrusted or unknown devices.

Encrypt Sensitive Data:

Use encryption to protect sensitive data stored on removable media.

This ensures that even if the device is lost or stolen, the data remains inaccessible to unauthorized users.

Backup Data Regularly:

Maintain backups of important data stored on removable devices to prevent loss due to corruption or damage.

Avoid Using Devices from Unknown Sources:

Do not use USB drives or other media handed out at events or from unknown sources, as they may contain malicious software.

Disable Auto-Run:

Turn off the auto-run feature for external devices to prevent automatic execution of potentially harmful files.

Safely Eject Devices:

Always use the "eject" or "safely remove hardware" option before unplugging a removable device to avoid data corruption.

Limit Sharing of Devices:

Avoid sharing USB drives or external media with others to reduce the risk of malware spreading between systems.

Store Devices Securely:

Keep removable storage media in a safe place when not in use to prevent loss or theft.

Use Password Protection:

Protect removable media with a password to restrict unauthorized access to the stored data.

Keep Firmware Updated:

If your removable storage device has firmware, ensure it is updated to fix vulnerabilities.

Delete Data When No Longer Needed:

Securely erase data from the device when it is no longer required, especially before discarding or passing the device to someone else.

Use Trusted Devices:

Purchase storage media from reliable brands or vendors to ensure quality and security.

5.4.5 Email Communication:

Avoid Suspicious Emails:

Do not open emails from unknown senders.

Be cautious of emails with generic greetings like "Dear User" or ones that seem too good to be true (e.g., winning prizes or unexpected rewards).

Beware of Phishing Scams:

Look out for fraudulent emails pretending to be from trusted organizations asking for sensitive information.

Verify email authenticity by checking the sender's email address and hovering over links to see their true destination.

Do Not Share Sensitive Information via Email:

Avoid sending passwords, banking details, or other confidential data over email.

Use secure file-sharing methods if sensitive information must be shared.

Enable Two-Factor Authentication (2FA):

Secure your email account with 2FA for additional protection against unauthorized access.

Use Encryption for Confidential Communication:

Use email encryption tools to secure sensitive messages and attachments.

Be Cautious with Attachments:

Do not download or open email attachments unless they come from trusted sources.

Scan attachments with antivirus software before opening.

Avoid Clicking Links Directly from Emails:

Instead, type the website URL directly into your browser to ensure you're visiting the legitimate site.

Regularly Update Your Email Password:

Change your password periodically and use a strong, unique password.

Check for Security Features in Your Email Client:

Use features like spam filters, email authentication protocols (e.g., DKIM, SPF), and warnings for untrusted senders.

Monitor Your Email Account for Unusual Activity:

Check for unauthorized access or unfamiliar sent emails, which may indicate your account is compromised.

Log Out of Shared Devices:

Always log out of your email account when using shared or public devices.

Avoid Public Wi-Fi for Email Access:

Use a secure connection or a VPN when accessing your email over public networks.

Use Separate Emails for Personal and Professional Use:

Keep work and personal emails separate to better manage risks and avoid overlap.

Avoid Clicking "Unsubscribe" Links in Suspicious Emails:

Clicking fake unsubscribe links can confirm your email address to attackers. Instead, mark such emails as spam.

Regularly Clean Your Inbox:

Delete old, unnecessary emails that may contain sensitive information.

5.4.6 Home Wi-Fi Network:

Change the Default SSID and Password:

Update the default Wi-Fi network name (SSID) to something unique but not personally identifiable.

Use a strong, complex password for your Wi-Fi network.

Enable WPA3 or WPA2 Encryption:

Use WPA3 or WPA2 (Wi-Fi Protected Access) encryption for your Wi-Fi security settings.

Avoid using outdated protocols like WEP, which are less secure.

Change the Default Router Login Credentials:

Update the default admin username and password for your router to prevent unauthorized access.

Disable Remote Management:

Turn off remote access to your router's settings unless absolutely necessary.

Enable a Firewall:

Use the router's built-in firewall to add a layer of protection against external threats.

Keep Your Router Firmware Updated:

Regularly check for and install firmware updates provided by the router manufacturer to patch vulnerabilities.

Use a Guest Network for Visitors:

Set up a separate guest network for visitors to prevent them from accessing your main devices and data.

Limit the Number of Connected Devices:

Monitor and restrict the number of devices connected to your Wi-Fi to reduce vulnerabilities.

Turn Off Wi-Fi When Not in Use:

Disable your Wi-Fi network when you're away for an extended period to minimize potential risks.

Disable WPS (Wi-Fi Protected Setup):

Turn off WPS to prevent attackers from exploiting vulnerabilities in this feature.

Enable MAC Address Filtering:

Restrict access to your Wi-Fi network by allowing only specific device MAC addresses to connect.

Monitor Network Activity:

Regularly review the list of connected devices to identify and disconnect any unauthorized users.

Place the Router Securely:

Position your router centrally within your home to optimize coverage and minimize the signal's reach outside your property.

Use a VPN on Your Network:

Consider using a Virtual Private Network (VPN) to encrypt all traffic on your home network for added privacy.

Hide Your SSID (Optional):

Turn off SSID broadcasting to make your network less visible to outsiders, though this is not foolproof.

5.4.7 Avoiding Social Engineering Attacks:

Be Skeptical of Unsolicited Requests:

Do not provide personal or sensitive information to anyone over phone calls, emails, or messages unless you are certain of their identity.

Verify the Source:

Cross-check the authenticity of requests by contacting the individual or organization directly through official channels.

Beware of Urgency or Pressure Tactics:

Social engineers often create a sense of urgency to make you act without thinking. Always take your time to verify the situation.

Avoid Sharing Sensitive Information Publicly:

Do not post personal details like your address, phone number, or workplace on social media or public platforms.

Educate Yourself and Others:

Learn about common social engineering tactics like phishing, baiting, pretexting, and tailgating.

Share this knowledge with colleagues, friends, and family.

Do Not Click on Unknown Links or Attachments:

Avoid clicking on links or downloading attachments from untrusted emails, messages, or websites.

Use Multi-Factor Authentication (MFA):

Protect your accounts with MFA, making it harder for attackers to gain access even if they steal your credentials.

Verify Requests for Financial Transactions:

Double-check any requests for fund transfers or payments by contacting the person or organization directly.

Be Cautious with Pop-Ups and Fake Websites:

Avoid entering personal details on pop-up forms or websites that do not look authentic.

Secure Your Devices:

Keep devices locked when not in use.

Install antivirus software and regularly update your systems to protect against malware and keyloggers.

Limit Access to Personal Information:

Be mindful of what you share during casual conversations or online surveys.

Shred Physical Documents:

Shred bills, bank statements, or any documents containing sensitive information before discarding them.

Report Suspicious Activity:

Notify your organization, bank, or relevant authorities if you suspect a social engineering attempt.

Avoid Oversharing on Social Media:

Attackers often use information from your social media profiles to craft convincing pretexts for social engineering.

Test Yourself with Simulated Attacks:

Participate in awareness programs or simulated phishing exercises to improve your ability to recognize social engineering tactics.

5.4.8 Smart Device (Smartphone, Tablets, etc.):

Use Strong Passwords or Biometrics:

Set a strong PIN, password, or pattern to lock your device.

Enable biometric authentication (fingerprint or face recognition) for additional security.

Keep Your Device Software Updated:

Regularly update your operating system and apps to patch security vulnerabilities.

Install Apps from Trusted Sources:

Download apps only from official stores like Google Play Store or Apple App Store.

Avoid installing apps from unknown or third-party sources.

Enable Remote Tracking and Wiping:

Use features like “Find My Device” (Android) or “Find My iPhone” (iOS) to locate, lock, or erase your device if it’s lost or stolen.

Be Cautious with Public Wi-Fi:

Avoid accessing sensitive information or conducting financial transactions over public Wi-Fi.

Use a VPN to encrypt your data if you must use public Wi-Fi.

Review App Permissions:

Check and restrict app permissions to prevent unnecessary access to your location, contacts, or camera.

Install Security Software:

Use trusted antivirus or anti-malware apps to protect your device from malicious software.

Avoid Jailbreaking or Rooting Your Device:

Do not modify your device's operating system, as it makes it more vulnerable to attacks.

Backup Your Data Regularly:

Store backups of your device’s data on the cloud or an external storage device.

Disable Bluetooth and NFC When Not in Use:

Turn off Bluetooth and Near Field Communication (NFC) to prevent unauthorized connections.

Be Cautious with Messaging Links and Attachments:

Avoid clicking on links or downloading attachments in unsolicited messages.

Secure Your Cloud Accounts:

Use strong passwords and enable two-factor authentication for cloud services linked to your device.

Protect Sensitive Information:

Avoid storing sensitive information like passwords, PINs, or financial details in plain text on your device.

Enable Automatic Lock:

Set your device to automatically lock after a short period of inactivity.

Turn Off Unnecessary Features:

Disable features like location services, voice assistants, or Wi-Fi auto-connect when not in use to reduce risk exposure.

Monitor Battery and Data Usage:

Sudden spikes in battery drain or data usage may indicate the presence of malicious apps or malware.

Be Wary of USB Connections:

Avoid connecting your device to untrusted computers or charging stations. Use a "data blocker" if necessary.

Educate Yourself About Device-Specific Threats:

Stay informed about emerging threats and vulnerabilities specific to your device's operating system or model.

Checklist for Secure Android Devices:

- Use Google Play for app downloads.
- Disable app permissions that seem unnecessary.
- Enable remote wipe options in case of theft.

5.4.9 Social Networking:

Set Strong Privacy Settings:

Adjust privacy settings on platforms (e.g., Facebook, Instagram, Twitter) to control who can see your posts, personal information, and friend lists.

Limit access to your profile and only share with trusted individuals.

Be Cautious with What You Share:

Avoid oversharing personal information like your address, phone number, or travel plans that could be exploited by attackers.

Keep sensitive data such as financial information, passwords, or identification details off social media.

Use Unique and Strong Passwords:

Set strong, unique passwords for each social media account.

Avoid using the same password across multiple platforms and enable two-factor authentication (2FA) for added security.

Be Aware of Phishing Scams:

Be cautious of messages or posts asking for personal or financial information, even if they seem to come from trusted sources.

Always verify the legitimacy of requests by contacting the person or organization directly.

Monitor Tagged Photos and Posts:

Review photos and posts in which you are tagged to ensure they do not reveal sensitive information.

Consider disabling the feature that automatically tags you in photos or posts.

Limit Third-Party App Access:

Be mindful of which apps have access to your social media accounts.

Revoke access to apps that you no longer use or trust.

Beware of Fake Profiles and Impersonators:

Always verify the identity of individuals before accepting friend requests or engaging in private conversations.

Be cautious if someone is asking for money or personal details, even if they appear to be someone you know.

Think Before You Post:

Remember that anything posted on social media can be seen by many people, even if you delete it later.

Avoid posting content that could negatively affect your reputation or safety.

Be Careful with Social Media Login Options:

Avoid using your social media account to log into third-party websites unless absolutely necessary.

This can expose your account to security breaches if the third-party website is compromised.

Enable Two-Factor Authentication (2FA):

Set up 2FA on your social media accounts to add an extra layer of protection against unauthorized access.

Beware of Social Engineering Attacks:

Be cautious of anyone who tries to manipulate or trick you into revealing personal information by pretending to be someone you trust.

Always verify requests for sensitive information through other means.

Keep Your Profile Picture and Bio Professional (if Needed):

If you use social media for professional purposes, ensure that your profile picture and bio are appropriate and do not reveal unnecessary personal details.

Monitor Your Account Activity:

Regularly check your social media account for unusual or suspicious activity.

If you notice anything suspicious, report it immediately to the platform.

Educate Yourself About Platform-Specific Risks:

Stay informed about the security features and privacy settings of the platforms you use and be aware of new threats or scams.

Log Out of Shared or Public Devices:

Always log out of your social media accounts when using shared or public devices to avoid unauthorized access.

5.4.10 Instant Messaging (IM):

Use Strong Authentication Methods:

Enable two-factor authentication (2FA) for your messaging apps to add an extra layer of security to your accounts.

Set a strong, unique password for each messaging platform.

Be Cautious with Unknown Contacts:

Avoid engaging with unknown contacts or accepting messages from strangers unless you are certain of their identity.

If you don't recognize the contact, verify who they are before responding.

Don't Share Sensitive Information:

Avoid sending sensitive or private information (e.g., passwords, financial details, personal identification numbers) through messaging apps.

Use encrypted messaging services or secure file-sharing options if you need to share sensitive information.

Verify Links Before Clicking:

Be cautious when clicking on links sent via IM, especially if they are from unknown or unexpected sources.

Hover over links to check the URL and ensure it's legitimate before clicking.

Install Updates Regularly:

Keep your instant messaging apps and the operating system of your device up to date to protect against security vulnerabilities.

Enable automatic updates if possible to ensure your apps are always secure.

Use End-to-End Encrypted Messaging Services:

Choose messaging platforms that provide end-to-end encryption (e.g., Signal, WhatsApp) to ensure that only you and the recipient can read the messages.

Avoid using platforms that don't offer robust encryption, as they may allow third-party access to your messages.

Be Wary of Phishing and Scams:

Be cautious of unsolicited messages that ask for personal information or attempt to get you to click on malicious links.

Verify any requests you receive by contacting the person through another communication method.

Avoid Public Wi-Fi for Sensitive Conversations:

Do not use public Wi-Fi networks for private or sensitive messaging, as these networks are more vulnerable to attacks.

Use a VPN to secure your connection if you must use public Wi-Fi.

Don’t Auto-Download Media:

Disable the auto-download feature for images, videos, and other media in messaging apps to prevent malicious files from being downloaded to your device.

Manually review and open media only from trusted contacts.

Log Out of Shared Devices:

Always log out of your messaging accounts on shared or public devices to prevent unauthorized access to your messages.

Block Suspicious Contacts:

Block any contacts that send spam, phishing attempts, or otherwise suspicious messages.

Report such contacts to the platform to help prevent future attacks.

Be Mindful of Group Chats:

Be cautious when joining group chats or sending messages to large groups of people.

Ensure that only trusted contacts are included, and avoid sharing sensitive information in group chats.

Use Disappearing Messages (When Necessary):

Use disappearing message features available in some apps (e.g., WhatsApp, Signal) for more secure, temporary communication.

This ensures that your messages are not stored indefinitely.

Educate Yourself About App-Specific Security Features:

Familiarize yourself with the security settings and features of the messaging platforms you use.

Enable any privacy options that can further protect your conversations.

Regularly Review Your Contacts:

Periodically review your contact list and remove any unnecessary or suspicious contacts.

Ensure that you have only trusted contacts on your IM apps.

5.4.11 Online Transactions / ATM:

Online Transactions:

1. **Use Secure Websites:**
    - Always ensure that the website is secure by checking for “https” in the URL and a padlock symbol before entering any personal or financial information.
    - Avoid using public Wi-Fi networks for online transactions. Use a trusted network or a VPN for added security.
2. **Check for SSL Certificates:**
    - Ensure the website has a valid SSL certificate (evident by "https" and the padlock symbol), which ensures encrypted communication between your browser and the website.
3. **Enable Two-Factor Authentication (2FA):**
    - Enable 2FA on your online banking or shopping accounts to provide an extra layer of security for transactions.
    - This will require a second form of identification (e.g., a code sent to your phone) in addition to your password.

4. **Use Trusted Payment Methods:**
    - Use secure and trusted payment gateways like PayPal, credit cards, or apps that provide additional fraud protection.
    - Avoid entering credit card details directly on websites you don't trust.
5. **Monitor Your Bank and Credit Card Statements:**
    - Regularly check your bank statements for unauthorized transactions.
    - Report any suspicious activity to your bank immediately.
6. **Avoid Saving Payment Information on Websites:**
    - Refrain from saving your credit card or payment details on e-commerce websites to reduce the risk of unauthorized access.
7. **Keep Your Computer and Browser Updated:**
    - Ensure that your device and web browser are up to date with the latest security patches to protect against online threats like phishing and malware.
8. **Be Cautious of Phishing Attempts:**
    - Avoid clicking on links in emails or messages that ask for personal or financial details.
    - Always verify the authenticity of such requests directly with the organization.

ATM Usage:

1. **Protect Your ATM PIN:**
    - Always cover the keypad when entering your PIN to prevent others from seeing it.
    - Use your free hand to shield the keypad or stand in a way that blocks the view from others.
2. **Avoid Using ATMs in Isolated or Unattended Locations:**
    - Use ATMs located in well-lit and secure areas, such as inside bank branches or public places with security.
    - Avoid using ATMs in isolated or unguarded locations, especially at night.
3. **Check the ATM for Suspicious Devices:**
    - Inspect the ATM for any unusual attachments, such as card skimming devices or hidden cameras.
    - If the machine looks tampered with, report it to the bank immediately and avoid using it.
4. **Always Take Your Card and Receipt:**
    - After completing a transaction, ensure you take your card, cash, and receipt before leaving the ATM.
    - Don't leave your transaction details or card behind.
5. **Report Lost or Stolen Cards Immediately:**
    - If your ATM or debit card is lost or stolen, report it to your bank immediately to block the card and prevent unauthorized transactions.
6. **Monitor Your Bank Statements Regularly:**
    - Regularly check your bank statements or online banking for any unauthorized or suspicious ATM withdrawals.
    - Contact your bank immediately if you notice any discrepancies.

5.4.12 Public Computer:

Avoid Entering Sensitive Information:

Do not enter sensitive personal information, such as passwords, credit card numbers, or bank account details, when using public computers.

If necessary, use a secure and private device for any sensitive transactions.

Delete Personal Files and Browser History After Use:

Always delete any personal files, downloads, or documents stored during your session.

Clear the browser history, cache, and cookies to ensure that no personal information is left behind. This can usually be done in the browser settings.

Check for Keyloggers (Hardware or Software):

Before typing any sensitive information like passwords, check for keyloggers (devices or software that record keystrokes).

Look for any unusual devices connected to the computer, such as extra cables or attachments.

Be aware of software keyloggers, which may be harder to detect, and avoid using the computer for sensitive transactions if you suspect any risk.

Ensure Antivirus Software is Installed and Updated:

Verify that the public computer has up-to-date antivirus software installed and running.

If the system does not have antivirus protection or appears outdated, avoid using it for any confidential activities.

Always Log Out After Use:

Always log out of your accounts (email, social media, banking, etc.) when you finish using the public computer.

Ensure that you log out properly and close any windows that were used during your session to prevent unauthorized access.

Avoid Saving Passwords or Personal Information:

Never save passwords, form data, or personal details in the browser or on the public computer.

Do not select the “remember me” or “save password” option on websites when using a public system.

Use Private Browsing or Incognito Mode:

Use private browsing or incognito mode to avoid saving browsing history, cookies, or cache.

This helps protect your privacy, as no trace of your session will be stored once you close the window.

Use a Virtual Private Network (VPN):

If available, consider using a VPN (Virtual Private Network) to encrypt your internet connection and prevent eavesdropping while using public computers, especially when accessing sensitive information.

Be Cautious with USB Devices:

Avoid plugging in USB devices (e.g., flash drives) into public computers, as they could be infected with malware.

If necessary, scan your USB device for malware before using it on a public system.