GOVERNMENT POLYTECNIC, DHENKANAL

LEARNING MATERIAL

ON

SUBJECT: INTRODUCTION TO IT SYSTEM

SEMSTER: 1ST   BRANCH: CSE

PREPARED BY

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CHAPTER-1

BASIC INTERNET SKILLS

Skills required to access various applications of the internet are commonly termed as "Internet Skills". These skills are very important nowadays and we will learn, some basic terms pertaining to the internet, how to access with web browsers and use of search engines to find relevant, reliable & precise information (like pearls) from the web (the information ocean).

DEFINATION OF INTERNET

- Internet is nothing but a collection of various interconnected networks of heterogeneous types across the globe. It comprises of different kinds of devices, specifications for hardware & software to be connected in a global network and a variety of protocols with a common understanding between various countries, universities, companies and global agencies.
- It is also referred as a "network of networks".
- The purpose is to share resources over a global network, a resource can be a simple webpage having information, a network printer, or any digitally accessible service like email, e-commerce, real- time streaming, telnet, etc.

APPLICATIONS OF INTERNET

1. **Communication:** Millions of E-mails arc sent and received worldwide in a day for exchanging information. Online messengers are also popular for real-time communications. With help of VoIP (Voice over the internet protocol) audio and video conversation also takes place.
2. **E-Commerce:** The Internet provides an online market to sell purchase various products and services globally. Now, we can purchase things from our neighboring house to the farthest country as well. These online stores may work round the clock and enable consumers to purchase from home.
3. **Storage & File Transfer:** The user can send and store files of different types. Cloud computing makes it possible to share it among various users with their associated roles to access such files.
4. **Live streaming & podcasts:** Users can send their live videos and audios to large groups Of people in a real-time manner.
5. **News, Entertainment**: Whatever happening in the real world it can be updated as a piece of information on the web. Now it is possible to provide breaking news
6. **Collaborative tasks:** People can meet online, discuss things and work together using collaborative applications.
7. **Research & learning activities:** With the availability of information and online resources, researcher and learners can continually equip themselves.
8. **Interactive gaming:** We can play & interact online with another human being, a computer program having a real-Lime conversation. We can participate in the game across the world.
9. **Social Networking:** Various online platforms provide facility to connect the people or the same interest. Millions or people daily connect with their colleagues, family members and find new persons on such platforms.
10. **Job hunting:** Job providers can post various vacancies on the internet via their portal, third- party portals or social media. Jobseekers search for various jobs on portals, newspapers & apply their applications with resume to concerning human resource managers.
11. **Navigation & Tracking:** Searching best routes on digital maps, tracking the live status of trains, cars, parcels are few widely used location-based services of the internet.

GLOSSARY OF INTERNET

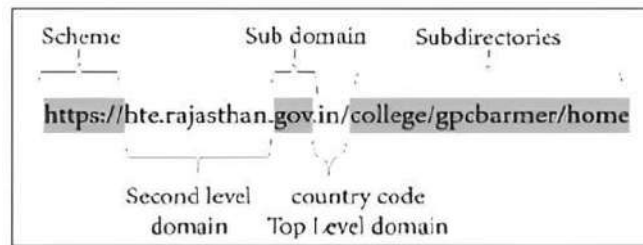Few commonly used terms for the internet basics are:

Fig. 1.1: Structure of a URL

WWW: World Wide Web or simply 'web' is the most popular use case Of the internet. II is an information system where different kinds or files or resources are hosted and uniquely accessed   URL address**.** These resources are interlinked with hyperlinks. The resources can be uploaded or downloaded with application software known as web browser using some standard protocols like HTTP or FTP.

Domain Name: It is a human understandable unique name on the internet to identify a computer system or resources.

URL: Uniform Resource Locator is known as the web address. It is a unique identifier of a web resource with a specification of how to access and from where to access it. The structure of URL is shown in Fig.

HTTP: Hypertext Transfer Protocol is a set of rules (protocol) that define the way how data transfer over the web. It is used to access websites.

HTTPS: It is the secure version Of HTTP using SSL (secure socket layer) encryption.

FTP: File Transfer Protocol is a set of rules (protocol) that define the way how data transfer over the internet. It is used to transfer a large file from one host to another.

Hyperlink: It is a word, phrase or image that refers to another data; it can be followed by the user by clicking or tapping. The reference may belong to another document or specific element of the same document.

Browser: It is an application program with a user interface to display and navigate web pages over WWW.

Webpage: It is a hypertext document designed to view on the web browser.

Website: It is a collection of web pages and related resources that is identified by a common domain name and hosted (published) on a web server.

Search Engine: It is web-based complex software that provides information searching services to its users. The search engine uses various algorithms to search its huge database and produce appropriate search results taking minimal time.

ISP: An Internet Service Provider is a company that provides internet access to other companies or individuals.

Email: Electronic Mail is a method of exchanging digital messages from one electronic device to another device or too many recipients via a network.

Podcast: It is a web resource available on the internet that contains audio information.

File type: Every information available on the internet has a certain format and type which is understood by their file type. Information can be in form of documents, audio, video, etc.

Upload: It is also the process of transferring data from one device to another on the internet but from client to server-side.

DNS: The domain name system translates human understandable domain name (for example, www. ncs.gov.in) to machine readable IP address (for example, 203.129.202.69)

TCP/IP: Transmission Control Protocol and Internet Protocol are set of rules that govern the linking of a computer system to the internet and similar computer networks.

Modem: It is the short name for hardware device modulator-demodulator. It is responsible to convert the digital data of a computer system to an analog signal which can travel over telephone lines (modulator) and vice-versa.

Network equipment: These are networking hardware required for the interconnection and communication in a computer network e.g., bridge, repeater, hub, switch, router, modem, etc.

Cloud Computing: It provides computer resources over the internet as per the demand of the user. Resources can be computer infrastructure, computing power or data Storage, etc.

BROWSER

- A browser is a client-side application program to search and retrieve information from the World Wide Web, available in the form of web pages and display it on the client's machine. It is also termed as "web browser" or -user agent".

- Services & information provided by the internet follows the client-server model. In this model when a client machine seeks some service, it forms a request message (HTTP Request) and sends it via a client-side program to network towards the server machine. On the other side, when a request approaches the server machine it grants or denies the requested service in form of the response message (HTTP Response).
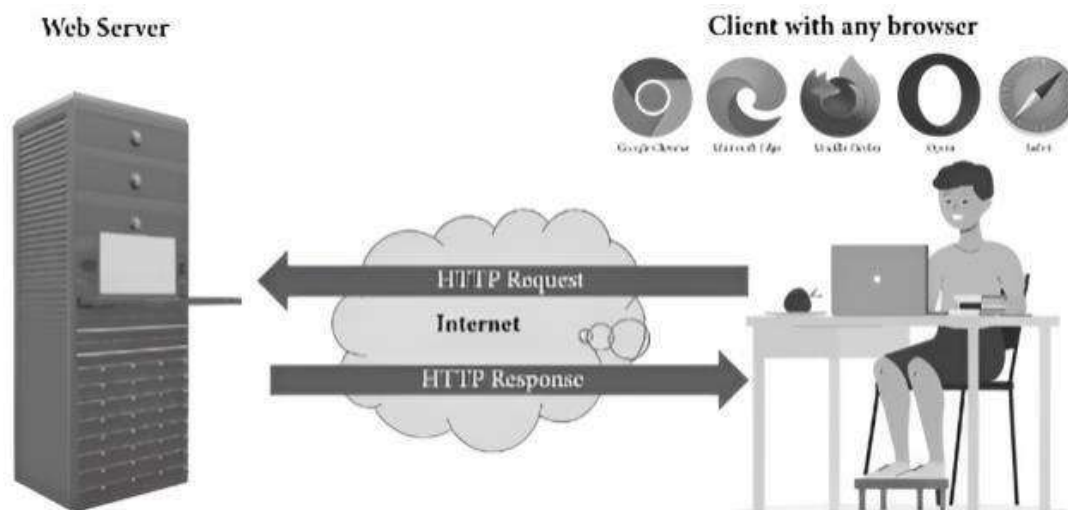

Fig.1.2: HTTP Request and Response

Google Chrome: It is the most widely used web browser developed by Google. It is cross-platform web browser that was firstly released in 2008 for the Windows operating system of Microsoft. It is widely used due to its speed & security capabilities, It is constantly updating and keeps us safe from phishing and malware scams.

Microsoft Edge: It is developed by Microsoft and was firstly released in 2015 for its proprietary operating system Windows 10. It is also integrated with Microsoft's online platform for providing voice control, searching functionality and dynamic content related to searches inside the address bar.

Mozilla Firefox: It is a free and open-source browser developed by Mozilla Foundation and its subsidiary Mozilla corporation. It was initially released in September 2002. It provides an extensive library of extensions & add-ons to its users for customizing their browser experiences & functionality.

Opera: It is a multi-platform browser developed by Opera software. It was initially released in April 1995. It is also available for mobile devices and these mobile versions are known as opera mini & opera mobile. It also supports sharing files, links and notes between user's different devices with the opera flow feature.

Safari: This browser was developed by Apple Inc. and it is not a complete open-source browser. It was initially released on January 2003 as a part of MAC operating system. It is considered as faster browser with considerable high privacy features. Safari also implemented feature or cross site tracking.

ELEMENTS AVAILABLE IN BROWSER WINDOW AND HOW TO OPERATE THOSE ELEMENTS

Fig. 1.4: Elements of Chrome Web Browser

- ✓ To be connected to the internet we have to start or lunch the web browser first. Just click on the icon available at your desktop home screen or on the task bar of your screen.
- ✓ To access a website, we have to inputs its URL or web address into the **Address Bar** of the browser window as shown in fig. (Example – www.gpdhenkanal.org.in)
- ✓ When a webpage is loaded it may show the **title of the webpage** as shown in fig. (Definition of webpage –It is a document on the WWW that can be viewed in a web browser. It is typically written in HTML and can contain text, image, videos and links to other pages.)
- ✓ A browser window has many controls on it for a better web experienced and surfing. **Forward button and backward button** are provided to go back and forth between the pages and these buttons are known as **Navigation button**. Here a **refresh button** is there, it helps to reload the webpage and update the information we are viewing as shown in fig.
- ✓ **Currently open tab** refers to the webpage or web site that you are actively viewing at the moment. If we want to search or browse a new webpage then we may open a **new tab** window using **'+'** control provided next to the last tab.
- ✓ The browser provides the facility of storing and managing frequently visiting web pages with the facility of **bookmarking**. If we want to store the current web address for future reference, we may option to bookmark it using the **'star control'**. It is **located at the rightmost side of the address bar.**

- ✓ **Pinned extension** typically means making it easily accessible from the browser's toolbar or menu. In Google chrome it is present in the upper-right corner of the browser and that symbol looks like in a rectangular shape.
- ✓ Every chrome browser window has four controls on the right upper corner namely search tabs, minimize, restore down and close. The **search tab** feature is a powerful tool to search or select (open) a webpage among these tabs. It can be used to search a tab with a given title by inputting text in the search box. **Minimizes, restore down and close buttons** perform the task as their name implies.
- ✓ Chrome browser provides the capability to synchronize different user settings across different machines via its **synchronization feature**. A user who has stored its bookmarks, passwords, or payment methods or address details may access all such information on a different machine if he/she allows the **Sync**. Chrome browser has browser **customize and control section accessible via an ellipsis** (three vertically aligned dots) it shows various options of the chrome browser.

COMMON BROWSER FEATURES

- ✓ **Bookmarking:** It is the process of storing URI (Uniform Resource Identifier) for future retrieval. With this feature, users can store and manage web addresses of frequently visiting websites in their browser software.
- ✓ **Download management:** This is an inbuilt software tool for browsers that allows the users to manage all the downloaded files. It displays the files in chronological order and gives us the facility to search files by their name.
- ✓ **Password management:** Browsers provide a facility to store usernames and passwords of websites that requires authentication.
- ✓ **Tabbed browsing:** It allows users to browse different websites simultaneously on different tab windows. All these tabs reside in a single web browser window.
- ✓ **Browser history:** Browser can store all web pages visited by its user with associated data like the page title, time of visit, etc. so that user can revisit those web pages if necessary.
- ✓ **Form management:** This feature of the browser is also known as the auto-complete feature. It enables the user to auto-fill the web form entries of a user from its locally saved browser data.
- ✓ **Spell checking:** This browser feature provides the capability to correct the misspelled words.
- ✓ **Privacy mode:** Browsers introduced this feature to enhance the privacy surfing of its user. It allows users to surf the web without recording browsing history, cookies and form data of the user. It is known as "InCognito" in chrome browser and "inPrivate Browsing"' in Microsoft Edge browser.
- ✓ **Auto update:** This feature shows the ability of a browser for self-updating. Nowadays, almost every browser is capable of auto-updating.
- ✓ **Ad blocking:** It is also termed ad filtering. Browsers having this feature are capable of blocking or altering online advertising.
- ✓ **Incremental search:** This feature shows the ability of a browser to find matches on a web page incrementally as search terms are typed in the search box.
- ✓ **Page zooming:** It is the page-level capability of the browser to zoom in or zoom out the web content or images displayed on the webpage.
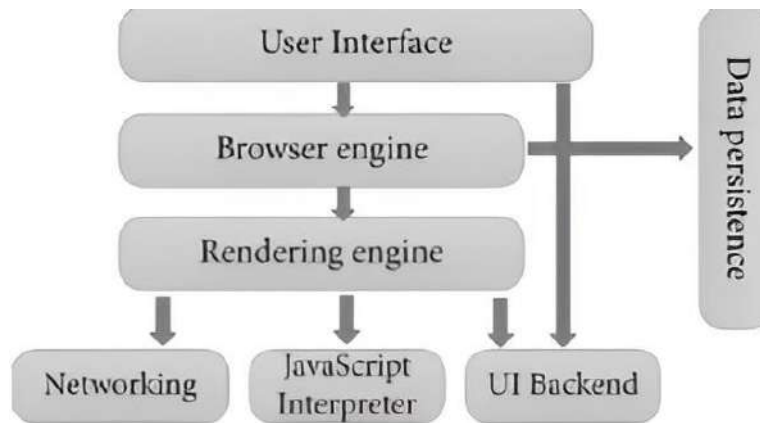
CONSTITUENT OF A WEB BROWSER

Fig.1.7: Web Browser Architecture

A browser is constituted with a user interface, browser engine, rendering engine and other components.

User Interface: This component of the web browser enables the user to interact with visual controls a available on the web page. These controls include the address bar, previous and next button, home button and all other controls which are responsible to fetch and present users desired web pages (except the main window where web pages are presented).

Browser Engine: This is a key component of browser architecture. It operates as a bridge between the user interface and the rendering engine. The browser engine is responsible for creating and manipulating the rendering engine as per inputs provided by the user interface.

Rendering Engine: The main role of this component is to render a requested web page. For rendering, this engine parses HTML documents and images which are formatted with CSS. Rendering engines natively have the capability to display images and HTML and XML documents but with the addition of browser extension, it can display other types too like pdf. Few popular web browsers and their associated rendering engines are listed below.

* Blink: Google Chrome and Opera V. 15+ Microsoft Edge
* Gecko: Mozilla Firefox
* Webkit: Chrome for IOS and Safari

Networking: This component administers the connection with help of HTTP and FTP protocol. It also concerns the secrecy issues during the network communication.

JS interpreter: Passing and executing JS code is handled by this component.

UI Backend: This component is responsible for drawing widgets like windows and combo boxes. The user interface method of underline OS is utilized for this purpose.

Data storage and persistence: It is a persistent layer saving data like cookies on the client's local hard disk.

DEFINATION SEARCH ENGINE

✓ The search engine is a generic name assigned to a software system whose purpose is to systematically search the web pages against supplied search terms, commonly known as 'keywords', 'search query' or 'search phrase'. The result of this search is presented in form of a listing technically referred to as search engine results pages (SERP).

- ✓ There are many search engines available in the world of computer networking. Every search engine works in its way and that's why we get different search results for the same search query in different search engines.
- ✓ Examples :- Google, Bing, Yahoo, Yandex, Ask etc.

SOME POPULAR SEARCH ENGINE

Different search engines have their unique user interface, features and underlying technology.

Google: It is the most trusted search engine worldwide. It was developed by Larry page and Sergey brin in 1996 for their academic research project. It was initially known as Back-Rub. It is written in C, and Python programming languages. It is being used as a default search engine for various web browsers e.g., Chrome, Safari and Mozilla Firefox, etc. Google is using emerging technologies like artificial intelligence (AI). machine learning (ML) to recognize user behavior, likings and other contextual information and produce better results for its users.

Microsoft Bing: It is owned and being maintained by Microsoft. It is the successor Of previous search engines of Microsoft e.g., MSN Search & Windows Live Search. It was launched in June 2009 and written in ASP.NEI'. It provides a variety of search services like web, Image, video and map.

Yahoo: This is the oldest search engine available to internet users. It is founded by Jerry Yang and David filo in January 1994 as "Jerry and David's guide to the World Wide Web". This search engine is owned by Yahoo and originally written in general-purpose scripting language- PHP.

Baidu: It is owned by Chinese company Baidu, Inc. which is one or the largest artificial intelligence and internet companies in the world. II was incorporated in January 2000 by Robin Li and Eric Xu. This search engine holds more than 72% of the Chinese search engine market as of June 2021. It offers various services like Maps Image search, Video search, patent search, legal search, games, etc.

Yandex: It is a search engine prevalently used in Russia and was launched in September 1997. II is owned by Yandex N.V., a Russian-Dutch domiciled multinational. Apart from image searching ; video searching and web searching, it also provides other services like online text and website translator, maps, email, app analytics and marketing platform.

Duckduckgo: Duckduckgo (ddg) is a favorite search engine for millions of users (mine too), especially who cares their privacy and want to keep their searching history anonymous. It is created by Gabriel Weinberg and owned by Duck Duck Go Inc. It was launched in September 2008 and its code is written in Perl, Java Script and Python.

TYPES OF WEB SEARCHES

Web search queries are classified into three types according to the intention behind the search.

1. **Navigational:** The purpose is to navigate a website that is in the mind of the user or he/she think that such website should be there or they have visited the website in past.
2. **Informational:** Here user's intention is to find related information about the given search term which may be on some interlinked static web pages. The purpose is to read those pages to acquire facts about the input text.
3. **Transactional:** The purpose of such web queries to reach a website where further in interaction or web-mediated activity is performed.

HOW DO SEARCH ENGINE WORK

Search engine aims to provide the most relevant search results in minimal time to their users. When we give a search query, we may gel millions of results within a fraction of seconds. Surprisingly, actual work was done long

before the query is supplied. A typical process or how a search engine works is depicted in Fig. Despite searching the whole web instantly, the search engine's query processing module searches databases against supplied keywords in search query. The data bases contain metadata and indexes 01' selected web pages, out or billions of web pages across the WWW for the searching keywords. Out of selected web pages, the most relevant web pages are displayed in search results with the help of the ranking module. A search engine generally performs three functions:

1. **Crawling:** Every Search engine has some automated software (programs) which are known invariably as the bot. robot, web wanderers, spiders, crawler or indexer. The purpose of the spiders is to traverse and scan the World Wide Web for publicly available information.
2. **Indexing:** This is a process to organize and store the results found in the crawling function such that they can be further processed by search engine algorithms. A search engine does not store all information available on the webpage instead it stores details like title & description of the page, date of creation/updating, type of content, associated search terms, links coming to and from this webpage and Other parameters required by its algorithms.
3. **Ranking:** This is the process of showing results in order of their relevance. Most relevant pages are shown first while the least one will be on afterward. This is done using the ranking algorithm of the search engine. Some dominating ranking factors are Links referring to this webpage, website age, associated keywords, mobile-friendly webpage, speed of webpage loading, time spent on a webpage, etc.
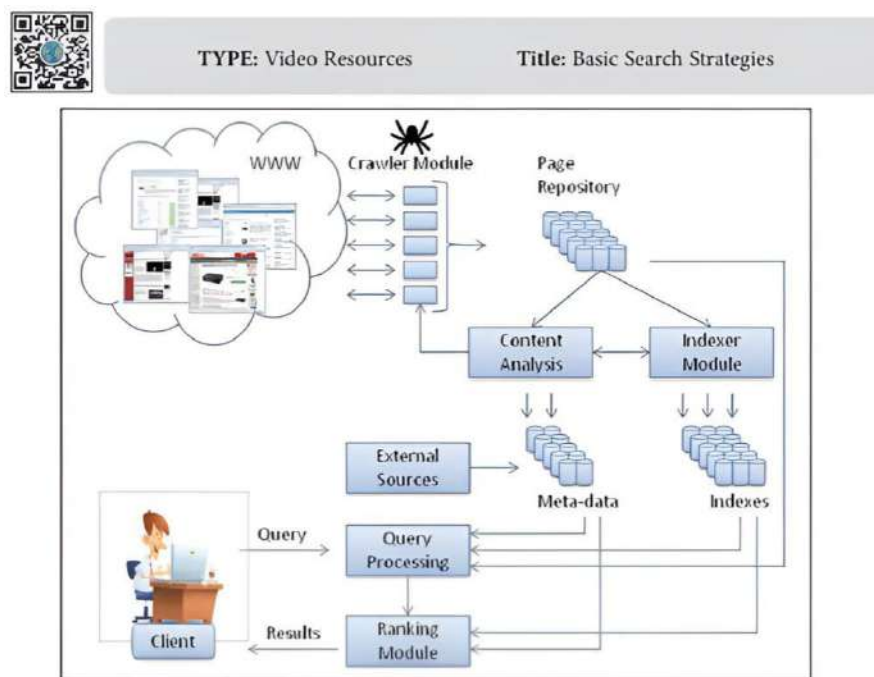

Fig. 1.10: Searching with Search Engines

HOW TO SEARCH THE WEB

- ✓ To perform search, we have to open any desired search engine in our web browser. Now input (type) one or more keywords in the search box and then click on the search button or simply press the 'Enter key' n your keyboard to begin the search.
- ✓ We will get search results most relevant to our search phrase. If you are satisfied with any of the webpage presented in the search results, you may go through that webpage for your desired intention (navigation, information or transaction). Ill case of undesired results, you should redefine your search term with added keywords or you should look upon more options to enhance your searching.

- ✓ Searching can be more precise and enhanced using various operators provided the search engine or by using capabilities Of the search engine's user interface like advanced search options provided in Google search.

GOOGLE ADVANCED SEARCH

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 passing enter or clicking the search button users will be presented with associated search result.
3. Users can view scrutinized results based on various provided categories like news, images, books, videos, maps, flight, finance etc.
4. For each such category, some additional filters are associated, which are visible after clicking on the Tool button.
5. Similarly, other 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 Tool option.

Fig. 1.12: User interface for Google Advanced Search

AWARENESS ABOUT DIGITAL INDIA PORTAL

The government Of India has developed many portals and IT-Based infrastructures to empower its citizens. Those portals in which services and information are presented and updated by the central government and whose aim is nationwide are called National Portals e.g. india.gov.in or mygov.in. The portals to support and implement the digital India program are known as Digital India portals. Every citizen Of India can take leverage and participate in such portals.

DIGITAL INDIA PORTAL

- ✓ The digital India portal is a flagship program by the India government, designed to transform into a digitally empowered society and knowledge economy.
- ✓ Through this portal, the government envisions providing a wide array of services, making governance more transparent, inclusive and participatory.

Digital India Program is centered on three key vision areas as defined below;

1. Digital Infrastructure as a Utility to Every Citizen
   - Availability Of high-speed internet as a core utility for delivery Of services to citizens
   - Cradle 10 grave digital identity that is unique, lifelong, online and authenticable to every citizen
   - Mobile phone & bank account enabling citizen participation in digital & financial space
   - Easy access to a Common Service Centre
   - Shareable private space on a public cloud
   - Safe and secure cyber-space
2. Governance and services on demand
   - Seamlessly integrated services across departments or jurisdictions
   - Availability of services in real time from online & mobile platforms
   - All citizen entitlements to be portable and available on the cloud
   - Digitally transformed services for improving ease Of doing business
   - Making financial transactions electronic & cashless
   - Leveraging Geospatial Information Systems (GIS) for decision support systems & development

3. Digital empowerment of citizens

- Universal digital literacy
- Universally accessible digital resources
- Availability of digital resources/services in Indian languages
- Collaborative digital platforms for participative governance
- Citizens not required to physically submit Govt. documents/certificates.

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- Collaborative digital platforms for participative governance
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| TYPE: Video Resources | Title: What is Digital India? |

1.4.2 Pillars of Digital India Program

Digital India program covers several ministries & departments hence it is an umbrella activity which requires collaborative work among its stakeholders. Different ministries, departments work for their targeted task keeping larger goal and vision areas in their minds. Digital India initiative is also aimed to reinforce the nine pillars of growth areas as depicted in Fig. 1.14.
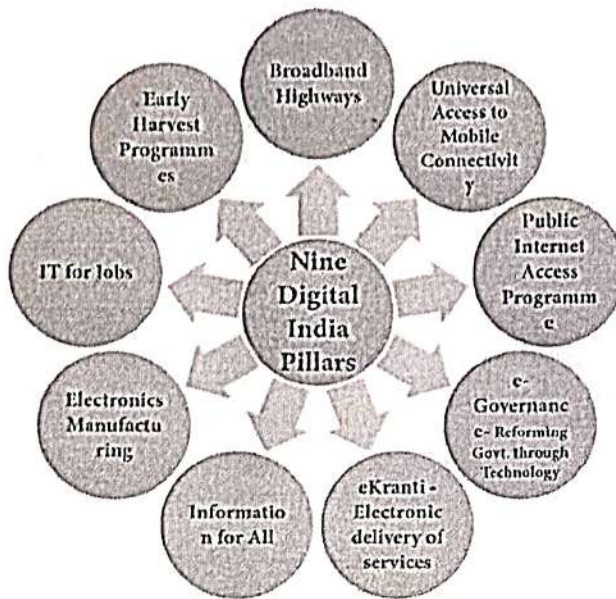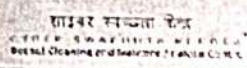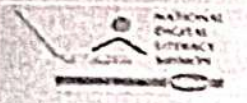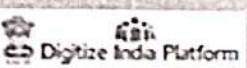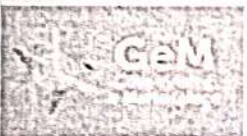
Fig. 1.14: Digital India Pillars

Based on the vision areas of digital India, these portals are classified into three categories. Most commonly used portals and their brief descriptions are included in the below Tables 1.3 to 1.5. Learners are suggested to visit and analyze key features of these portals.

Table 1.3: 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.

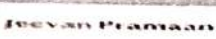|	COE-IT	http://www.coe-iot.in	Center for excellence for Internet of Things to build industry capable talent, start-up community and an entrepreneurial ecosystem for IOT
	CERT-IN	http://www.cert-in.org.in	Computer emergency response team-India
	CSCS	https://csc.gov.in/	Common service centers portal
	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	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
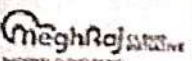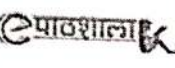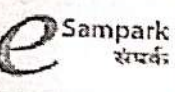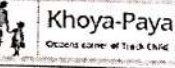
Jeevan Pramaan	JEEVAN PRAMAAN	https://jeevanpramaan.gov.in/	A biometric enabled digital service for pensioners to streamline the process of issuing life certificate
MeghRaj	MEGHRAJ	https://cloud.gov.in/index.php	Cloud Computing initiative to accelerate delivery of e-services in the country
Mobile Seva	MOBILE SEVA APP STORE	https://apps.mgov.gov.in	To facilitate the process of development and deployment of suitable mobile applications
nsm	NSM	https://nsmindia.in	National Super Computing Mission to empower the national academic and R&D institutions, spread across the country
data.gov	OPEN DATA	https://data.gov.in/	To publish datasets, documents, services, tools and applications for public use
ras Rapid Assessment System helps in improving governance	RAS	http://ras.gov.in/	Rapid Assessment System for continuous feedback for e-services delivered by Government of India and State Governments
SWIFT Single Window Interface for facilitating Trade	SWIFT	https://www.icegate.gov.in/SWIFT/	Single window interface for trade- a Project to facilitate the Trading Across Borders in India

Table 1.4: Digital India Portals (Service Based)

Digital India Initiative		Website	Description
Accessible India Campaign	SUGAMYA BHARAT ABHIYAAN & Mob App	http://accessibleindia.gov.in/content/	A crowd sourcing platform to comprehensively obtain information on inaccessible places across the country
BHIM NPCI	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)
AIIMS New Delhi	DIGITAL AIIMS	http://ehospital.nic.in/ehospital/	The Unique Health Identification Number gave every Patient visiting AIIMS a Digital Identity
DP Digital Panchayat	E-PANCHAYAT	http://epanchayat.in/	To provide comprehensive software solution attempting automation of Gram Panchayat functions

eGreetings	EGREETINGS	https://egreetings.gov.in/	Aims to promote a contemporary and eco-friendly method of sharing greetings
e-Hospital	E-HOSPITAL	http://ehospital.nic.in/ehospital/	A Hospital Management Information System (HMIS) for internal workflows and processes of hospitals
NAM	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-पाठशाला	E-PATHSHALA	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
e-Sampark संपर्क	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	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 IT infrastructure between the Centre and States
Khoya-Paya	KHOYA PAYA	http://khoyapaya.gov.in/mpp/home	A citizen-based website to exchange information on missing and found children
	KISAN SUVIDHA	http://www.kisaansuvidha.com/	An mobile app developed to help farmers get relevant information instantly
e-Rakt Kosh	MRAKTKOSH	http://www.eraktkosh.in/	The web-based mechanism interconnects all the Blood Banks of the State into a single network
National Career Service	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.
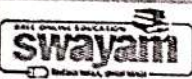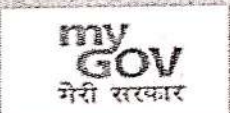
	PASSPORT SEVA PROJECT	http://www.passportindia.gov.in/	Enables simple, efficient and transparent processes for delivery of passport and related services
	SHAALA DARPAN	https://darpan.kvs.gov.in/shaaladarpan/	An e-Governance platform for all Kendriya Vidyalayas in the country
	SOIL HEALTH CARD	http://www.soilhealth.dac.gov.in/	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

Table 1.5: Digital India Portals (Empowerment)

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

	Name	URL	Description
	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

State portal is a website for the state. Any content or information which is displayed on this site needs to be provided by the state.

Features of State Portals

1. The state portals are useful to provide single point information access to schemes and services of concerned departments like health, agriculture, education, employment. Taxes, pension, etc. of the particular state.
2. It transparently provides information and helps in reducing corruption.
3. These are part of e-governance & reduces paperwork and time to disseminate information.
4. These portals make government departments more accountable as they know they are continuously monitored.

How to Navigate a State Portal?

1. To open a state portal of our interested state we need to type its URL into the address bar of the browser and press enter.
2. If URL is not memorized then we should find an authenticated URL in any of the below ways:
   a. We may search it on search engines (e.g. Google) with some precise keywords.
   b. Use hyperlinks from validated social media handles of the Government department.
   c. Physical posters or IEC (Information Education & Communication) material from the state government may have a valid URL for the state portal.
   d. Open any reputed website which contains hyperlinks to the state portal. For our example, we may visit any of the below national portal's URL https://knowindia.gov.in/states-uts/or https://www.india.gov.in/india-glance/states-india both web pages provide links to state web portals of India. You may click on any of the state's name (Hyperlink) or link icon in front of the state name to navigate to the state portal.
3. By clicking on any state, we will see the state portal window of that particular state, for our case we got the portal interface of the Government of Arunachal Pradesh.

COLLEGE PORTAL

A college portal is an online platform that provides student and applications with access to a variety of information and services.

How to Navigate a College Portal?

To open a college portals, types its URL into the address bar of the browser and press enter.

2. If URL is not memorized then we should find an authenticated URL in any of the below ways;

   a) Physical posters or IEC (Information Education & Communication) material from college may have a valid URL for the college portal.
   b) We may search it on search engines (e.g. google) with some precise keywords for college.
   c) Use hyperlinks from validated social media handles of the college or its official person.
   d) We may search it in the national portal or state portal of the desired state having indexing of its colleges. e.g., we may visit below national portal shttps://aishe.gov.inj or http:// www.knowyourcollege-gov.inj
   e) Open any other reputed website with indexing for college portals Of India like shiksha.com,

collegedunia.com, etc.

For our example, if we want IO visit the official website or Government Polytechnic College, Barmer (considering we do not know its URL) we may follow mentioned Steps.

I.   Open state portal of higher and technical education department of Government of Rajasthan by typing uww.hte.rajasthan.gov.in

II. Click on the "Department Of Technical Education" in the menu tab named "Departments". It will redirect to URL https://hte.rajasthan.gov.in/dept/dte/

III. Now click on the "College" menu tab, it will redirect to https://hte.rajasthan.gov.in/ dept/dte/college.php. The page will show a complete list of polytechnic colleges under the department of technical education of Rajasthan state.

COMPUTER SYSTEM

✓ Computers are not only used in commerce and business but also in various fields like medicine, research, educational institutions, launching a satellite, etc.

✓ Computers are available in different sizes and have different capabilities of processing commonly known as configurations. We need different types of hardware to construct a computer.

✓ Computer hardware is a collective term used to explain various tangible components of computers. Each hardware component has its functionality and is attached in a specific manner to form a computer system.

✓ A typical block diagram of a computer system is shown in Fig:
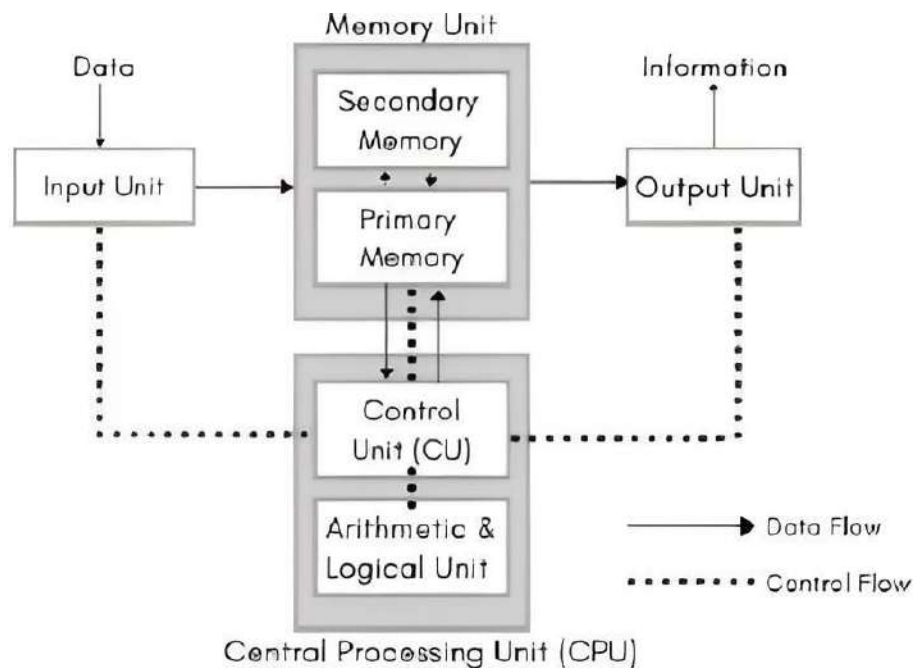
Fig.1.18: Computer System Block Diagram

CENTRAL PROCESSING UNIT (CPU)

✓ The CPU consists of arithmetic and logical unit (ALU), control unit (CU) and memory storage unit. Collectively they form the brain of the computer.

✓ CPU is the place where the actual processing of data takes place on the execution of the program. The CPU is responsible for processing most of the data, turning input data into output data.

✓ The CPU is one of the main components that will improve the performance of your computer. CPU is being used in almost all kinds of digital processing equipment like desktops, laptops, tablet computers, smart phones, even in our television set and many more devices.

✓ Colloquially it is also termed as a processor, microprocessor or central processor. The two main companies

that manufacture the desktop CPU are AMD and Intel.

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.
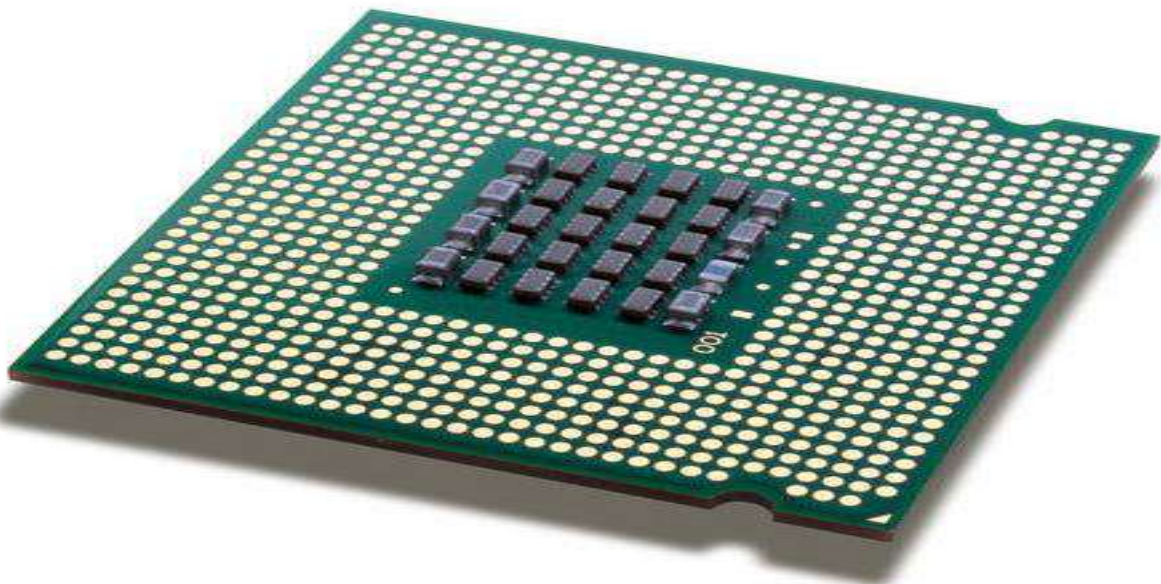
ARITHMETIC AND LOGICAL UNIT (ALU)

- ✓ An ALU is a major component of the CPU of a computer system. It performs all the arithmetic & logical operations for the computer system e.g., addition, subtraction, compare, complement, shift, etc.
- ✓ It is a combinational digital circuit and an ALU can be designed by engineers to calculate any operation. As the operations become more complex, the ALU also becomes more expensive and it will take up more space in the CPU.
- ✓ Generally, the ALU is made up of three parts: a) Adder where the actual calculations task place. b) Register which stores the information temporarily. c) Accumulator in which the intermittent results of the calculations are kept.

CONTROL UNIT (CU)

- ✓ This is an important part of the CPU which supervises all the operations taking place in it. Its main aim to send and receive control signals to all parts of a computer system.
- ✓ The control signals are helpful in the smooth execution of instructions in the CPU, communication over buses to memory and IO devices. Via control signals, CU facilitates that all tasks in computer performed at right time and in the correct order.
- ✓ It also directs other units of the system to carry out their respective function. Thus, CU regulates and integrates the operations of the computer.
- ✓ It fetches an instruction from a program stored at main memory, decodes it and sends control signals to other units of the computer system.

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). 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. 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.

Table 1.6: Measurement Units for Digital Data

Unit	Symbol	Capacity	Unit	Symbol	Capacity
Bit	b	1 or 0 (on or off)	Terabyte	TB	1024 Gigabytes
Byte	B	8 bits	Petabyte	PB	1024 Terabyte
Kilobyte	KB	1024 Bytes	Exabyte	EB	1024 Petabytes
Megabyte	MB	1024 Kilobyte	Zettabyte	ZB	1024 Exabytes
Gigabyte	GB	1024 Gigabyte	Yottabyte	YB	1024 Zettabytes

TYPES OF MEMORY

- ✓ The computer system makes use of different types of memory depending upon the function requirement.
- ✓ Depending on the direct accessibility of memory by CPU, memories are classified as primary and secondary type.
- ✓ Further, the main memory is divided into two types based on the retention by the system memory, volatile and non-volatile.

PRIMARY MEMORY

- ✓ Primary memory is known as main memory or internal storage because it is directly accessible by the CPU. It is used to store program instructions, data and intermittent results.
- ✓ It is made of semiconductor devices, Due to its fast access rate and circuit complexity, it is expensive in comparison Io secondary memory.
- ✓ A computer can't work if [here is no primary memory installed into the system. RAM, Cache Memory are an example of primary memory.

A.RANDOM ACCESS MEMORY

It is called Random access memory due to its feature that access time to any stored information is independent of the physical location of data. RAM is also known as a temporary or volatile memory because whatever data stored in it remains till the computer is switched ON. When the current is switched OFF, all stored data will be lost. RAM is the most essential element of a computer system because without it the system cannot perform its tasks. RAM is further classified into two types (a) Static RAM (b) Dynamic RAM

I .STATIC RANDOM ACCESS MEMORY (SRAM)

The word static indicates that the memory retains its contents as long as power remains supplied. However, data is lost when the power gets down due to its volatile nature. SRAM is faster and much more expensive than DRAM.

II . DYNAMIC RANDOM ACCESS MEMORY (DRAM)

DRAM is constructed of tiny capacitors that leak electricity. Designers use DRAM because it is much denser (can store many bits per chip), uses less power, and generates less heat than SRAM. For these reasons, both technologies are often used in combination: DRAM for main memory and SRAM for the cache.

B.READ-ONLY MEMORY (ROM)

The programs stored in ROM are permanent and are not lost or erased when the current is switched Off, So, it is a nonvolatile memory type. The programs stored in ROM are generally of critical in nature & given by the manufacturer of the computer and includes operating system programs, booting program, etc. ROM is available in different types, including PROM, EPROM and EEPROM.

I.PROGRAMMABLE READ ONLY MEMORY (PROM)

PROM is read-only memory that can be modified only once by a user. The user buys a blank PROM and enters the desired contents using a PROM programmer.

II. ERASABLE PROGRAMMABLE READ ONLY MEMORY(EPROM)

It is programmable with the added advantage of being reprogrammable (erasing an EPROM requires a special tool that emits ultraviolet light).To reprogram an EPROM, the entire chip must first be erased.

III. ELECTRICALLY ERASABLE PROGRAMMALE READ ONLY MEMORY(EEPROM)

The EEPROM programmed and erased electrically. II can be erased and reprogrammed about ten thousand lim. Both erasing and programming take about 4 to 10 ms (millisecond). In EEPROM, any location be selectively erased and programmed. EEPROMs can be erased one byte at a time, rather than erasing the entire chip.

IV. FLASH MEMORY

It is essentially EEPROM with the added benefit that data can be written or erased in blocks, removing the one-byte at-a-time limitation. This makes flash memory faster than EEPROM.

SECONDARY MEMORY

Generally, the amount of storage available in the main/primary storage units becomes insufficient when loading large programs or simultaneous processing of programs e.g. complex business problems. In such situations, it is necessary to use external or auxiliary memory for storing data. Secondary memory is mainly used to store data permanently. It is also termed as 'external memory' due to lack of direct access between CPU and the memory. It is non-volatile memory; data retains even after the computer system is switched off or electric power is disconnected.
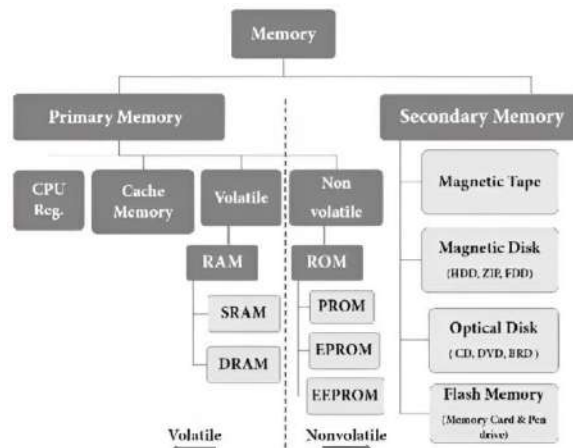
Fig. 1.20: Classification of Memories

DISPLAY

A display is an output device to present information in visual form. It may be an external monitor or built-in screen with the digital device e.g. computer, mobile, ATM, advertising boards etc. A computer display is simply the screen that will give you, your video output from the computer. A computer monitor works with the video card located inside the computer case, to display images and text on screen. Most monitors have some control buttons that allow us to change the display settings of the monitor. With the change in display screen technology, different types of monitors are available in the market.
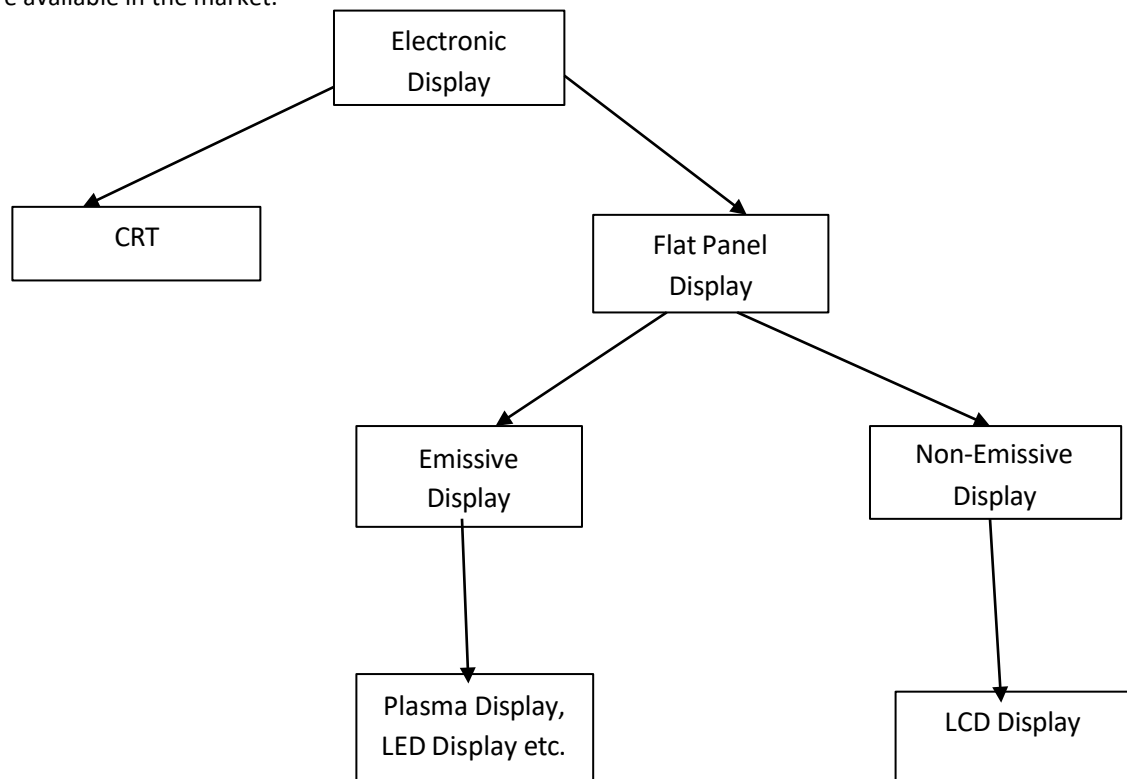
1. **CRT (cathode ray tube) monitors:** These are older computer monitors built using cathode ray tubes (CRTs).The monitors employ CRT technology, which was used most commonly in the manufacturing of television screens. A cathode ray Lube is a vacuum tube containing an electron gun at one end and a fluorescent screen at another end. The use of CRT made them heavy and caused them IO take up a lot of desk space.

2. **LCD (liquid crystal display) monitors:** Most modern monitors are built using LCD technology and are commonly referred IO as flat screen displays. These thin monitors are light weighted, electricity savior and lake up much less space than the older CRT displays. A LCD is composed of two pieces of glasses with a thin layer of liquid crystals in between. When a voltage is applied to the glasses, the orientation of liquid crystals will be changed. This change in the crystals orientation (called polarization) will make either a dark or a light area, creating a character or image on the display. A **TFT monitor** uses thin-film transistor technology in an LCD. It is variant of LCD monitors and is dominantly being used in current monitors.

3. **LED (light-emitting diodes) monitors:** LED monitors are the latest types of monitors in the market today. These are flat panel displays that make use of light-emitting diodes for back-lighting, instead of cold cathode fluorescent (CCFL) backlighting used in LCDs. The advantages Of LED monitors are that they produce images with higher contrast, have a less negative environmental impact when disposed of. Modern electronic devices such as mobile phones, TVs, tablets, computer monitors, laptops screens, etc., use a LED display to display their output.

4. **DLP Monitors:** DLP stands for Digital light Processing, developed by Texas Instruments. It is a technology, which is used for presentations by projecting images from a monitor onto a big screen. It gives better quality pictures that can also be visible in a lit room normally.

5. **Plasma Monitors:** The plasma monitor has a flat screen, and it has small fluorescent lights with colour that are lit up to form images on the screen. Plasma monitors have a very wide screen using very thin materials.

6. **OLED Monitors:** OLED stands for organic light-emitting diode. This type of monitor is thinner and lighter, and it offers incredible contrast and colour. It works without a backlight as it transmits visible light. Flexible and transparent displays are also possible using OLED.

7. **Touch Screen Monitors:** These monitors perform both input and output functions. It enables users to interact with the computer by using a finger or stylus instead of using a mouse or keyboard. When users touch the screen with their finger, it occurs an event and forwards it to the controller for processing. It takes input from the users by touching menus or icons resented on the screen.

KEYBOARD

A keyboard is the primary input device used with the computer similar to an electronic typewriter. It is used to input data and instructions of a user in a computer system. A keyboard is composed of buttons used to create letters, numbers, symbols, and perform functions. A keyboard is connected to a computer system using a cable or wireless connection. Some keyboards also have additional functions like volume control buttons to power down or sleep the device even a built-in trackball mouse, intended to provide the easiest way to use both the keyboard and the mouse. The various types of keyboards are used by users for associated purposes like a qwerty keyboard for general purpose uses, a gaming keyboard for game lovers, a virtual keyboard for software inputting, an ergonomic keyboard for physiological consideration and a multimedia keyboard for convenient web surfing and music play, etc. A keyboard has various keys some are logically grouped and a name is assigned to them.
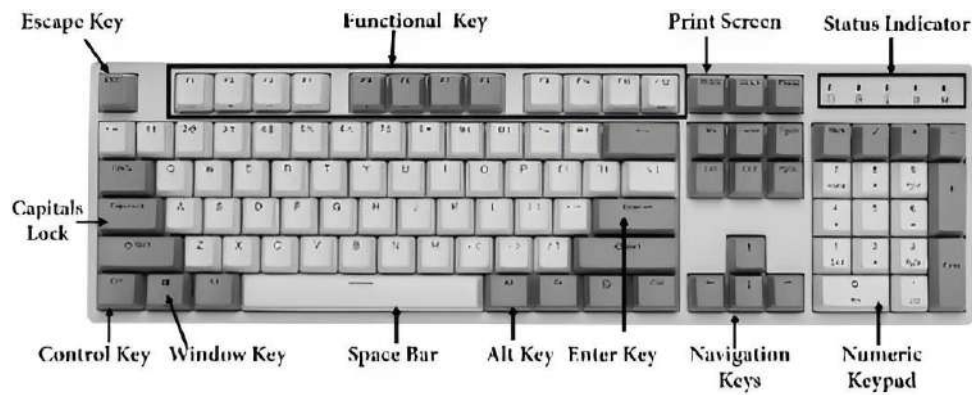
Fig. 1.23: Keys on Keyboard

1. **Function keys:** The topmost row of the keyboard have function keys. These are twelve keys Fl to Fl 2. Each of these keys is used for a special purpose and assigns some system commands to them. For different software, these can be customized to perform a specific task. e.g., some shortcut of command can be assigned.

2. **Character keys:** These are keys which also present in a traditional typewriter too e.g. A-Z, a-z 0-9, Tabs, Caps, are those keys. The keys are used to type letters, punctuation and other characters.

3. **Modifier keys:** These keys do nothing by themselves but with help of these keys. The functions of other keys are modified. Ctrl, Alt, Shift, AltGr comes under this group.

4. **Navigation keys:** These are also termed cursor control keys. Used to navigate cursor in any direction e.g., left ,right ,up and down , beginning of line or screen (Home), end of line or screen (End).

5. **Numeric keypad:** Numeric keys of keypad i.e. 0-9, NumLock, -, +, l, * and Del keys forms this group.

6. **System command keys:** Some keys have important functions other than printing characters, depending on the type of application where they are being used. These can be interpreted by the computer system as formatting or important commands to the system.

a. **PrtSc:** Print Screen key is used to capture the entire screen and send it to the clipboard.

b. **Break/Pause:** Not being used for predefined purpose nowadays. We can still use it to assign other tasks like terminate a program.

c. **Esc:** Escape key is used to quit a dialogue box, as a quit or stop signal

d. **Enter:** In a text editor window, it is used to terminate a paragraph and request for the next new line. For a command line, enter key is a signal to process the command.

e. **Shift:** The shift key is used to type more symbols than visible on the keyboard. e.g. when we press the 'a' key + Shift key it will produce 'A'

f. **Window:** Window key is used to open the start application menu on the windows operating System,

g. **Space Bar:** II is used LO provide space between words during typing. In physical appearance. It is a wide key on the keyboard.

h. **Backspace:** The backspace key erases the text to the left of the cursor's position. It is generally useful for correcting types.

MOUSE

A mouse is a handheld input device that controls the pointer in a GUI (Graphical User Interface). It is the most widely used pointing device and Can move and select icons, files, and folders. The digital Signal is used to move the pointer on the computer screen. Some basic operations of a mouse are as below:

1. **Point:** To move your mouse pointer (k) to a specific location on the screen.
2. **Click:** It is pointing to an item and then single time press and release of the mouse's main button i.e., left mouse button. Generally, this is done to select an item or menu command or to identify a location on a computer screen.
3. **Right-Click** It is the press of right button of a mouse. Generally, to open a dropdown menu list to choose what we can do more with the item, like copy, paste, open, print, etc.
4. **Double Click:** It is pressing & releasing of the left mouse button on a spot twice, rapidly.
5. **Drag & Drop:** It is a process of pointing an icon on the screen, pressing the left mouse button (without releasing it), moving the mouse pointer to a different location and release the left button. To move an item is called dragging where as placing it somewhere is dropping.
6. **Scrolling:** Mouse with single axis digital wheel is very common now a days. It can be depressed and used a third button for scrolling. Scrolling is a process to navigate a web page or document with a given scroll button.

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.

1. **Mechanical mouse:** As the name implies these mice have some mechanical s a hard rubber ball to detect the motion of the mouse. Sensors inside the assembly the rubber ball movement into the equivalent electronic signal. Due to m 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 the relative movement on the underlying surface. Such mice are not able to work properly on the surfaces which does not reflect light properly like glass, plastic, etc. A laser mouse optical mouse having laser light for sensing mouse movement despite LED or photodiode.
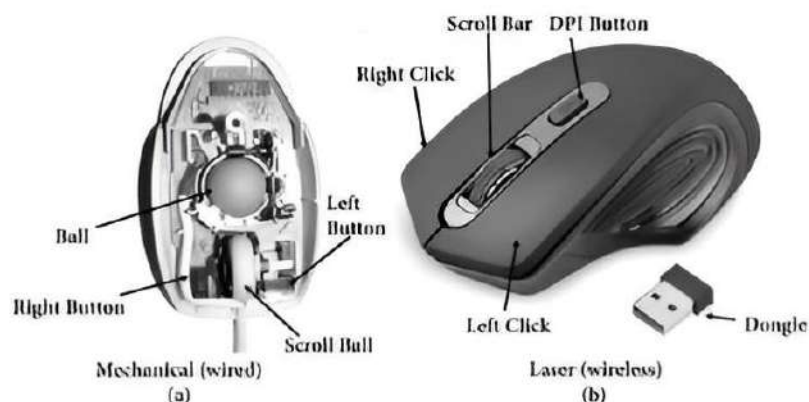
Fig. 1.24: Common Parts of Computer Mice (a) Mechanical (b) Wireless

HARD DISK DRIVE (HDD)

✓ The standard hard disk drive (HDD) is a type of nonvolatile memory (NVM). HDD stores operating systems files, application problems, media and other documents. A hard drive uses a disk and magnets to write data on the disk permanently, even in the event of a power failure. HI)l) can be used to store and retrieve

digital information using platters or rotating disks. Data can be read in a random access manner; means we can store and retrieve data in any order rather than sequentially. A hard device is also required for the installation of any program or files you want to keep on your computer. When we download the files they are permanently saved on our hard disk. The cost per bit stored on the hard disk is very less compared to other storage media.

- ✓ A hard disk is a magnetic storage medium for a microcomputer. A computer's hard drive consists of, various disks with read/write heads, a driver motor (used to spin the disks), and a small amount of circuitry which is sealed with a metal case to protect the disks from dust.
- ✓ The hard disk drives are consists of four key components inside the casing:
1. **Platters:** A HDD consists circular disks called platters sealed with container which store data inside the hard disk in the form of 1s and 0s.To increase the overall capacity of the drive, several platters are used. Platter's speeds correlate with read/write rates.
2. **Spindle:** It is used to place the platters in position and rotate as it requires.
3. **Read/Write arm:** It is used to control the read /write heads. The actual work of reading/ writing arm is to convert the magnetic surface into electric current.
4. **Actuator:** It is used to control the movement of the read/write arm and transfer data to and from the platters. An actuator is responsible for ensuring the exact position of the read/write arm.

HDD Size: The hard drive is mostly capable of storing more data than any other drive, but its size can change depending on the type of drive. Older hard drives had a storage size of several 100MB to several GB. Newer hard drives have a storage size of several hundred GBs to several TBS.

Advantages of HDD It has a Fast start up and produces very little noise. HDDs are environment friendly and produce minimum heat on working. These are light weighted so Ideal for Laptops. As compared to other drives HDDs consume less power.

Solid State Drives (SSDs): Modern computers are now using solid-state drives as the primary storage device, rather than HDD. HDDs are very slow as compare to SSDs, for reading and writing data. SSDs are replacing HDDs. Now the configuration is being made in such a way that SSD is used as the master drive for installing the operating system and other software on it, and HDD is being used as secondary storage to store documents, downloads, and audio or video files. HDDs are less expensive than SSDs. However,more and more laptops are beginning to utilize SSD over HDD, helping IO improve the reliability and Stability of laptops.

Comparison between HDD and SSD

1. SSD and HDD both are Hard Disk Drive
2. SSD has high read/write performance for random and sequential data retrieval as compared to HDD.
3. SSD is now more popular as compared to HDD in desktops and Laptops.
4. SSD uses the newest way to read/write data using tacking chips in a grid whereas HDD uses magnetic properties to read/write data. Thus HDD has a frequent mechanical breakdown as compare to SSD.
5. SSD generates little to no noise and HDD can sometimes be one of the loudest components in a computer.

OTHER PERIPHERAL DEVICES

A peripheral device also called an auxiliary device is any connected device that provides a computer with additional features. Usually, the word peripheral is used to refer to a device external to the computer case, like a scanner, but the devices located inside the computer case are also technically peripherals. Peripheral is commonly divided into three kinds input device, output device, storage device.

INPUT DEVICES

These are used to send data or commands to the computer system. Some commonly used devices are mouse, reader, webcam, microphone, Digital Camera, Light pen, joystick, stylus Graphic tablets Touch screen.

1. **Scanner.** Scanner is an input device that is used for direct entry the source document into the computer system. It converts document image into digital form and saves into the computer for future prospect.
2. **Bar Code Reader:** Barcode reader or barcode scanner is an optical device (scanner) that is used to read barcodes in the form of lines, decode the information contained in the barcode and send the information to a computer. II is being used commonly for automated, fast and reliable data entry operations. We can see its usage in the shopping market to track the price of goods, tracking parcel postage, or in libraries where each book has a bar code to uniquely identify its details.
3. **Webcam:** It is used to capture image and video and convert it into digital form. It has no inbuilt memory so they require computer storage to save captured data.
4. **Microphone:** It is a voice input device that allows users to input audio into the computer system. It is used in a computer system for taking audio input for its various applications like online chatting, computer gaming, voice recording, voice recognition and many more.
5. **Digital Camera:** It is used to take pictures digitally. It allows the user to store the captured media files (audio, video) in a memory card and transfer them to a computer. Digital cameras have become very popular and inexpensive in recent years.
6. **Light Pen:** It looks like a pen. It is light sensitive device, made up of photocells and an optical system in a small tube. It is mainly used to select items on the computer screen, for drawing pictures and writing directly in a document file using a computer screen.
7. **Joystick:** It is generally used to play games conveniently on the computer or other gaming device. It controls the objects, players and vehicles of the computer game.
8. **Graphic Tablet:** It is also known as a digitizer. It is used to convert hand-drawn artwork into digital file formats e.g. png, jpeg, etc. Users use the stylus to draw graphics on a surface as we draw on paper using a pen or pencil.
9. **Stylus:** Using this device we can draw or write on the digitizer's surface and touch screen.
10. **Touch screen:** Widely used for portable devices such as smart phones, tablets, laptops, notebooks. It allows users to input via gestures of hand or stylus.

OUTPUT DEVICES

It provides processed data saved on the computer as output to the users, Some output devices are monitors, projector, printers, speakers, Braille readers, plotters, Television, video card, sound card Radio.

1. **Projector:** It is an output device that projects an image, video onto a large surface, like a white screen or wall.
2. **Printer:** It is an output external hardware device that takes the electronic data or information on a computer or any other device and converts it into a hard copy. In other words, a printer is an output device that prints a paper document that includes text, images, or a combination of both. The printer output is called a hard copy, as it is a physical form of an electronic document. The quality of a printer depends on various factors like printing color, resolution, speed, etc.
3. **Speaker:** A computer speaker is the primary output device for audio output. It is hardware devices that convert a computers sound card signals into audio form. IL was coming as separate external hardware in PCs but now in laptops and modern PCIs it is coming as an onboard preassembled unit.

4. **Braille Reader**. II is a peripheral device that is mainly used for a blind person to read text displayed on a computer screen. Braille readers are also called Braille displays, it is a separate device as a part of the keyboard.
5. **Plotter:** It is similar to printers but was used to produce vector graphics drawings. It uses various writing tools (e.g. pencil, pen, marker, etc.) instead of toner for printing. A conventional printer draws series of dots whereas a plotter device draws multiple, continuous lines onto paper.
6. **Graphics card:** It is an expansion card that attaches to the slot residing on the motherboard. It is used to process the images and videos and enables higher resolution graphics to rapidly visualize on a display screen.
7. **Sound Card:** It controls the output of sound signals, which enable speaker and headphones to work.

STORAGE DEVICES

It stores data processed by the computer. Hard disk drives, flash drives like pen drives or memory cards, floppy disks, optical storage like CD/DVD, all such storages lie in storage device category.

CHAPTER -2

OPERATING SYSTEM

Definition:

- Operating System is software, which is installed in a computer to act as an interface between computer and human user. In other word's operating system is the program that , after being initially loaded into the computer by a boot program, manages all the other program in a computer. The other programs are called application or application programs. User can interact directly with the operating system through a user interface such as a command language or a graphic user interface(GUI).

Some Popular Operating System Variants:

- The operating system which is generally used by people can be classified into three categories: most popular Microsoft Windows operating system, open-source operating systems (Linux is most famous among open-source operating systems) and Macintosh operating system in Apple computers.
- Some of the most used operating systems (Fig. 2.1) are MS-windows, Ubuntu, Mac OS, Fedora, Solaris, Free BSD, Chrome OS, CentOS, Debian, and Android.

Fig. 2.1: Some Popular Personal Computer Operating Systems

- Nowadays computing is done prominently by smartphones and tablet devices other than conventional desktop PCs.
- Several smartphone operating systems (Fig. 2.2) are used to operate those devices. Few facts:
- ✓ The android operating system is the most popular smartphone operating system. It is made of the modified version of the Linux kernel and developed by Google. It was developed in November 2007 and the first commercial android product launched in September 2008.
- ✓ iOS is the operating system exclusively for Apple company products like iPhone, iPad and other Apple mobile devices.
- ✓ Windows 10 Mobile operating system was also used in windows smart phones, but it is discontinued after October 2017.
- ✓ Similarly, Ubuntu Touch is a mobile operating system made & maintained by a non-profit volunteer group i.e. UBports community. It is a lightweight OS specially designed for mobiles and touch screen devices. Ubuntu Touch has a "desktop mode" which made it capable to function as a desktop computer.

Fig. 2.2: Some Smart Phone Operating Systems

- The market share of top trending operating systems is shown in Fig. 2.3. It shows the clear dominance of the android & windows operating systems, The facts show that "computing nowadays is mobile computing".
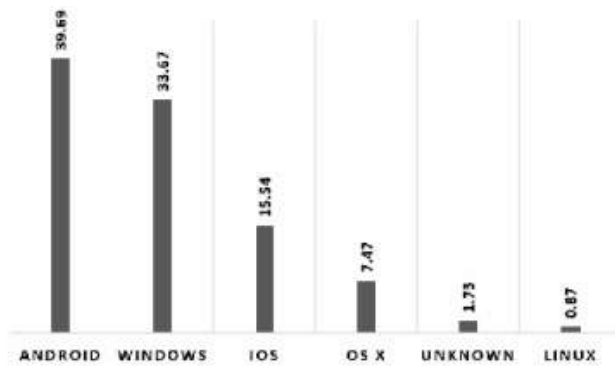
Fig. 2.3: Market Share Percentage of Operating Systems (as of June 2021)

- Life is changing, similarly the digital world also changes. Trends also change over time e.g.; French police switched their operating systems from proprietary Windows OS to open-source Ubuntu, on their 80000 computers and saved 2 million euros.

LINUX OS INSTALLATION:

✓ Linux operating system is the most popular open-source operating system around the world. It is termed Open-source because the source code of the operating system is not hidden but available to everyone. The open-source operating system has many advantages and it has a larger community for providing support.

✓ Linux operating system invented by a resident of Finland in 1991, Linus Torvalds. Due to open-source code, there are many distributions Of I he Linux operating system.

Installation of Ubuntu: A Clean Install

Before installing any operating system, it is advised to check the recommended system requirements system requirements for Ubuntu 20.04 LTS version are:

Table 2.2: Recommended System Requirements for Ubuntu 20.04 LTS

Component	Specification
Processor	2 GHz dual-core
RAM	4 GB (but 1 GB can also work)
Storage	25 GB
VGA	1024 × 768 screen resolution
Internet Access	not mandatory but it helps install updates and other programs

Step-1: Download UBUNTU

- First of all, we need to download Ubuntu operating system from the official website, the link is as mentioned http://www.ubuntu.com/download/desktop/ubuntu
- On the above webpage, various versions of Ubuntu OS are available. It is recommended to download the latest LTS (Long Term Support) version. In our case, we downloaded "Ubuntu 20.04.2.0 L'I'S". It is available in a single file i.e., an ISO file of about 2.5 GBs.

Step2: Create Bootable Media (Live USB)

- Create a bootable USB with the ISO file using various freely available tools e.g., Rufus, Unetbootin, etc. You may visit the below webpage for the step-by-step process to create a live Ubuntu USB media. Alternatively, we may write the downloaded ISO file on the DVD and make a bootable DVD.

Step 3: Boot from the Bootable Media (Live USB)

1. Plug the prepared live Ubuntu USB disk into our system.
2. Now we need to set the booting sequence to USB disk instead of HDD. This is done by

changing boot priority in the BIOS setting (as shown in Fig. 2.4.) at the time of computer start.

3. Restart the computer and access to BIOS setting by pressing function keys Fl or F2 or FIO or F12(or any other) depending on your BIOS and computer manufacturer. It will show your BIOS screen (it may look differ, as per your system). Give a higher priority to your USB drive.

4. Save and exit BIOS settings.
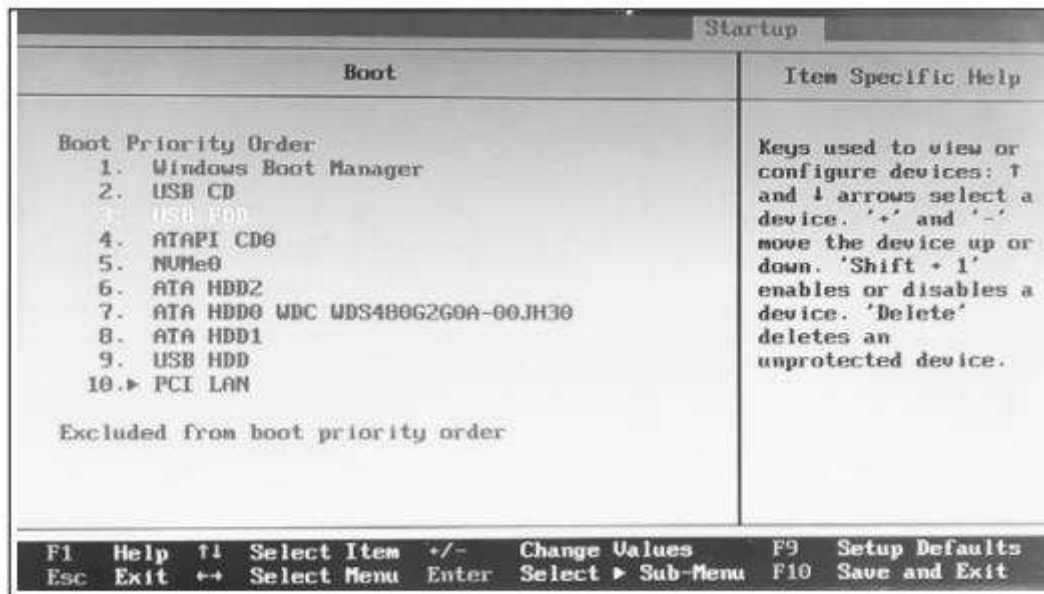
Fig. 2.4: Boot Sequence Options

Step 4: Install Ubuntu

1. The booting process will begin once boot media is detected by the BIOS. The installer will check the disk (file system). The system will prepare to install Ubuntu operating system.
2. After a while, we will see the Ubuntu 20.04 welcome page as shown in Fig. 2.5(a). Here we have to click the Install Ubuntu option.
3. Next, select the language and click continue
4. Thereafter, select the keyboard layout and click the continue as shown in Fig. 2.5(b).
5. Now, we have to select the types of apps we want to begin with. We may choose any of the available options i.e., Normal or Minimal. We can instruct the installer to update the ubuntu while installing by checking the checkmark option. These options are depicted in Fig. 2.6.
6. In this step, we have to choose the actual installation type. Various options are shown in Fig.2.7. We choose the option first i.e., "Erase disk and install Ubuntu" for a fresh installation.
7. By clicking on "Install Now" option we will get a warning window as shown in Fig. 2.8. It alerts us about the disk formatting (data deletion). AS we took backup so just hit on the continue option.
8. As shown in Fig. 2.9 we have to select the time zone i.e., "Kolkata" then press continue,
9. . Now we will be asked to create login credentials and name of the computer. Click on "Continue" button after telling 'Who are you'. See Fig. 2.10.
10. Now we have to wait for 5-10 mins. Meanwhile, we will be presented a slide show about the features of Ubuntu and basic tips for using the OS.
11. After completion of the installation process we will be presented installation complete dialog box as shown in Fig. 2.12, Just hit the 'Restart Now' option to complete the installation process.
12. Remove the USB media, Ubuntu will boot from hard disk and we will be shown the Ubuntu home screen as depicted in Fig. 2.13.

    Note:

    - The world's fast supercomputer operating system Tianhe-2 uses Ubuntu OS.
    - Ubuntu is most used operating system in web servers.
    - Ubuntu's new stable version releases in every six months.
    - Google's self-driving cars, Tesla, Netflix, UBER, Dropbox etc. uses the Ubuntu OS.

Fig. 2.5: Ubuntu Installation (a) Welcome Screen (b) Keyboard Layout

Fig. 2.6: Preparation for Ubuntu Installation

Fig. 2.7: Allocation of Hard Drive Space
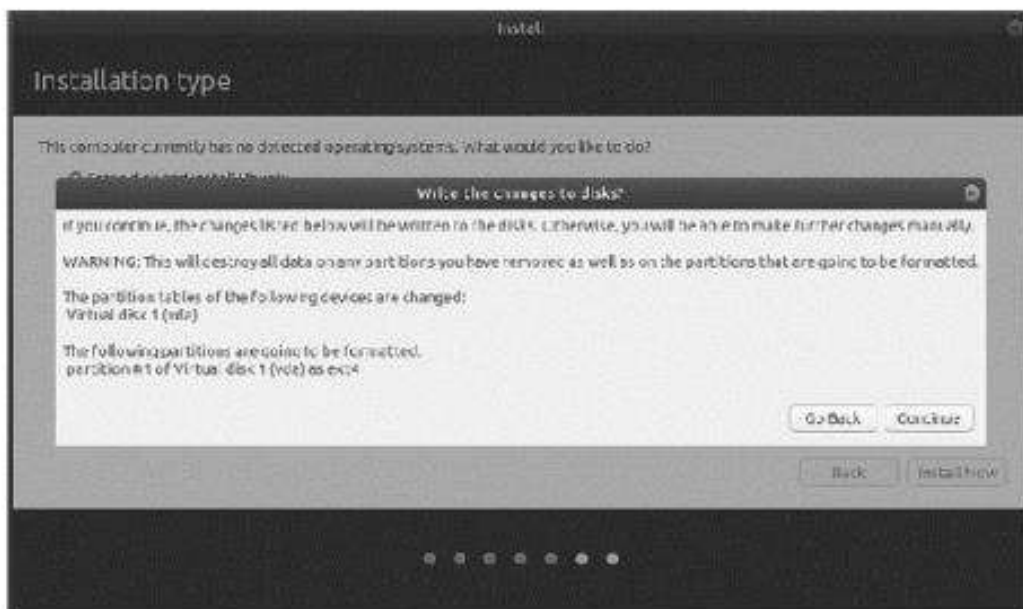
Fig. 2.8: Starting the Installation
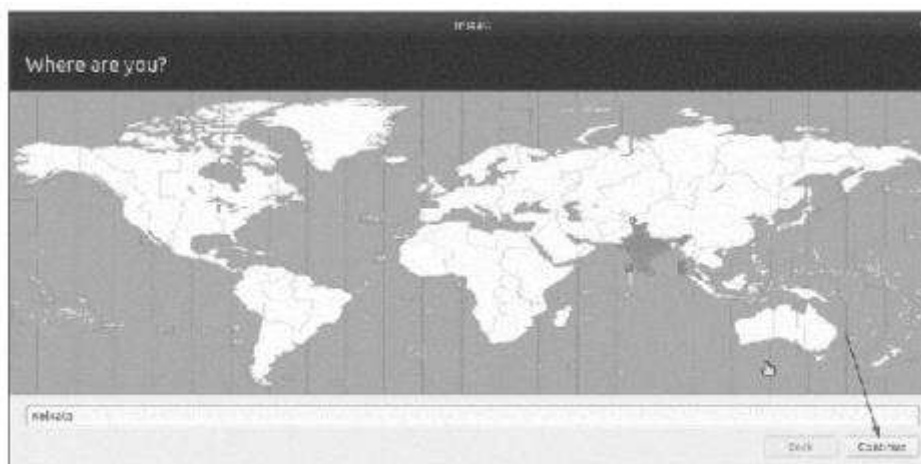
Fig. 2.9: Time Zone

Fig. 2.10: Enter Login Credentials

Fig. 2.11: Progress of the Installation
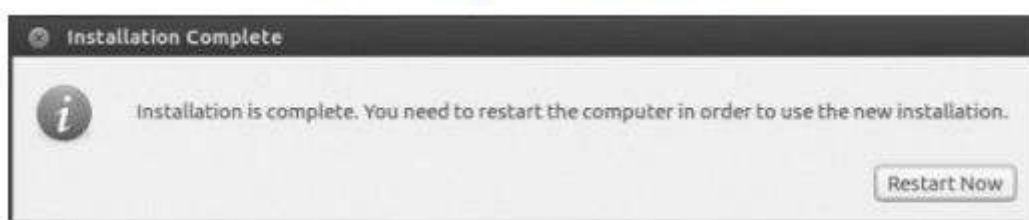
Fig. 2.12: Installation Complete Dialog

Fig. 2.13: Ubuntu 20.04 Desktop

WINDOWS OS INSTALLATION:

Microsoft's Windows operating systems have a long history of successful operating systems. The Windows OS family has various variants over time. These can be observed easily on our nearby computer systems. Some recent popular members were Windows XP, Windows 7, Windows 8 whereas at the end of 2021 there is news of a new member coming i.e., windows 11.

Table 2.3: Recommended System Requirements for Windows 10

Component	Specification
Processor	1 GHz or faster supported processor
RAM	1 GB for 32-bit or 2GB for 64-bit
Storage	32GB of space or more
Graphics card	Direct X 9 compatible or later with WDDM 1.0 driver
Display	800 x 600 resolution or greater
Internet Access	Some versions of Windows 10 require an internet connection during setup

Installation of Windows 10:

Step-1: Download Windows 10

- First, we need a license to install windows 10. We must prepare a bootable DVD or USB flash drive With Windows 10 installer program. You can create Windows 10 installation media with the help of the 'media creation tool' provided by Microsoft. The download link is given:
  https://www.microsoft.com/en-in/software-download/windows 10.

Step2: Boot from the Bootable Media (DVD/Pen drive)

- Now we need to restart the system so that booting the system with help of any boot media. It is necessary to change the boot priority such that the system can boot from the live media. When the system starts with bootable media (Live media) it will show a message to 'press any key to boot from CD or DVIY. Just press any key to begin the installation.

Step3: Install Windows 10

1. We will get the first screen (Fig. 2.14). Choose Language, Time and currency format and keyboard or input method from provided drop down boxes. Click "Next".

2. In the next window (Fig. 2.15) click on "Install Now".

3. The next window (Fig. 2.16) will ask us for the licensed product key that came with the purchase of Windows OS. Type the product key in the given box to activate the Windows and click "Next".

4. The next window (Fig. 2.17) will show the license terms, read and accept terms by marking checkbox checked. Click on "Next".

5. The next screen will ask us to choose the type of installation, select "Custom: Install Windows only (advanced)" by clicking.

6. Now, select the partition where we want to install the OS. Partitions can be changed with this window. At least 20 GB of free storage is recommended. Here, we can delete, create or format partitions. Data will be kept if we don't format or delete the partition.

7. Now the installation of Windows proceeds automatically. PC may reboot several times during the process.

8. After completing the installation process, we have to select the region and then "Yes".

9. Now, we have to select our keyboard layout and then "Yes".

10. Now, select "Set up for personal use" and then "Yes".

11. Now, Sign in with your Microsoft account and Click "Next". If don't have an account, here you may create a new one.

12. Enter your password and click "Next"

13. Now we have to set up a PIN (Personal Identification Number) that will be useful in logging in to the device, applications and services. Firstly, hit on "Set a PIN" then provide PIN and then "OK".

14. If we wish to save our files on OneDrive, we can specify il by clicking "Yes".

15. We can use Microsoft personal assistant i.e., Cortana by clicking "Yes".

16. Now we have to choose our privacy settings by given toggle buttons. Click "Accept".

17. Now it may take few minutes to configure and finally, we will get the home screen or desktop screen of Windows OS as shown in Fig. 2.30.

Fig. 2.14: Windows Setup

Fig. 2.15: Install or Repair Screen

Fig. 2.16: Activate Windows
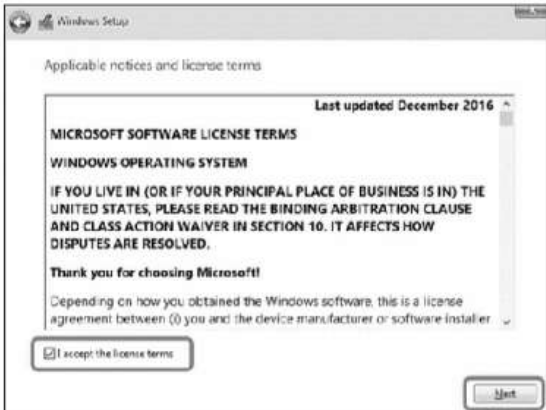
Fig. 2.17: License Terms & Agreement

Fig. 2.18: Installation Types
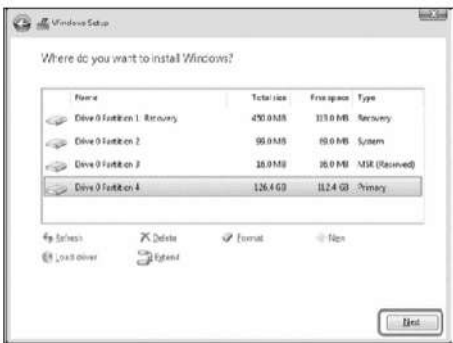
Fig. 2.19: Select Partition to Install Windows

Fig. 2.20: Installation Progress
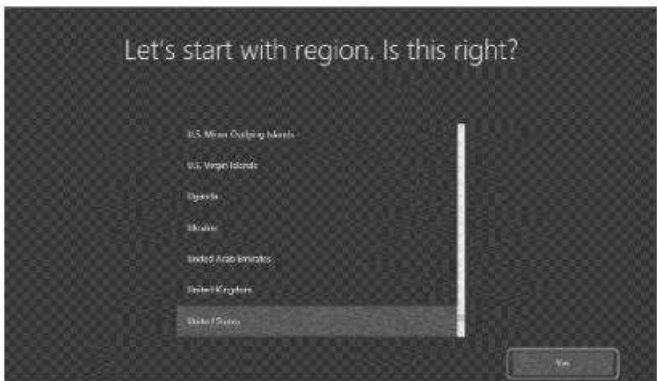
Fig. 2.21: Region Selection

Fig. 2.22: Keyboard Layout Selection
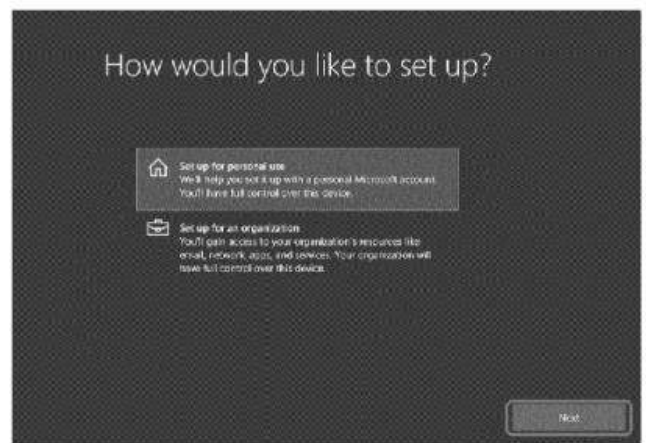
Fig. 2.23: Setup Type Selection

Fig. 2.24: Sign In Window

Fig. 2.25: User Authentication

Fig. 2.26: Set up a PIN

Fig. 2.27: Save Files to OneDrive

Fig. 2.28: Cortana Configuration

Fig. 2.29: On/Off Privacy Settings

Fig. 2.30: Windows 10 Desktop Screen

- Window 1.0 was the first graphical OS of Microsoft that runs on top of the MS-DOS installation (Non graphical, command line OS). It was released on 1985 and requires 192 KB RAM & 256 KB hard disk for installation.
- Window XP was the most successful version among windows operating systems. It was operational for 13 years.

2.3 UNIX SHELL

A shell is a special program that acts as an intermediary between the user and the Kernel of the operating system. A kernel is a backbone of the Unix operating system that is loaded into the memory on system start up (boot-up time) and manages the overall system until shutdown. Shell is a utility program that starts up when we log on. UNIX shell provides a platform or environment by which any user can interact with the computer system by typing commands. The shell interprets the commands typed by the user in the command line or a script file. A Unix system structure is shown in Fig.
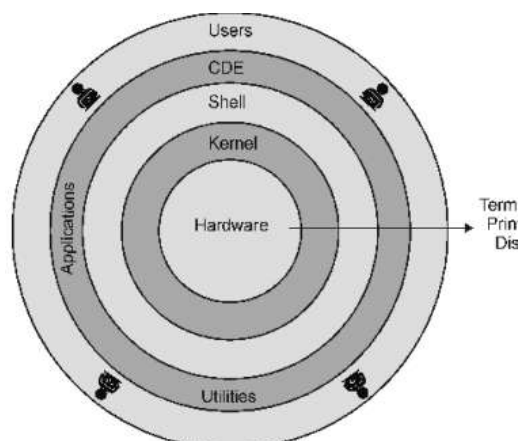
Fig. 2.31: Unix System Structure

In Unix operating systems, there are two types of command inputs: First one is using command line shells like sh- the Bourne Shell, bash-the Bourne Again Shell and csh- the C shell. Second one is using Graphical User Interfaces (GUIs) like KDE and GNOME managers (runs on Linux systems).

Features of Shell

Basic features of all Unix/Linux shells are as below:

1. **Prompt:** Shell displays a character or group of characters (such as $ or #) when it is ready to accept a new command.
2. **Command Interpretation:** When a user enters a command, it is the shell that determines which program to run in order to perform the command.
3. **Multitasking:** Users are provided the facility Io run more than one command at a time. It controls the jobs and lets us multitask.
4. **Command History:** Shell keeps track of all the back-to-back supplied commands. II enables the user to repeat the previous commands or similar one.
5. **Wildcards and Aliases**: Shell provides the functionality to use some meta characters (e.g., an asterisk (*) , question mark (?)etc.) to abbreviate filenames or pathnames that match a certain set of characters, known as wildcards. In addition, the shell enables a user to avoid typing long commands using aliases.
6. **Piping and I/O Redirection:** Using this functionality, the output of one program can directly be supplied to another program or file.

Shell Types

Some prominent and supported shells on most Unix systems are depicted in Fig. Bourne Shell and C Shell are two major types of Shells. By default, the '$' symbol is used as a prompt in Bourne shell. In a C-type shell '%' character is the default prompt symbol. The most popular Unix Shell is Bash (the Bourne again shell). After typing a command, we need to press ENTER key to execute the command.
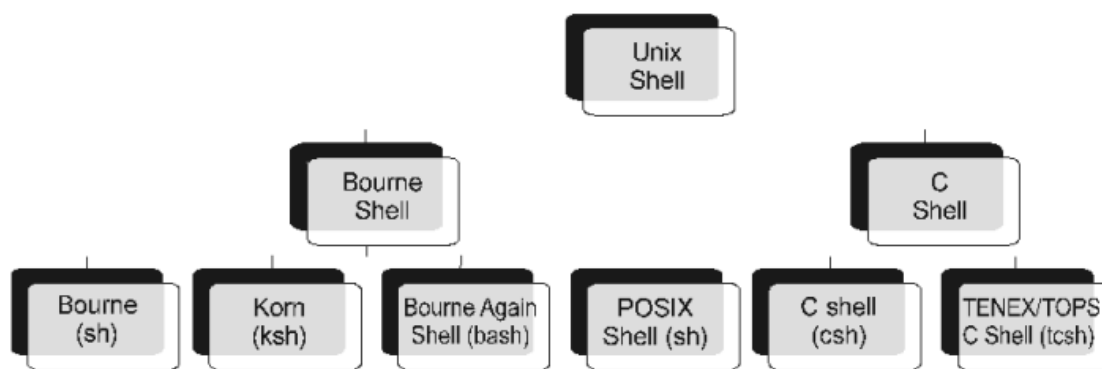
Fig. 2.32: Types of Shells

SHELL COMMANDS

Shell commands consist of a single or more word separated by white spaces. The first word is the main command to run and subsequent words are options or arguments to the command. A general Unix command structure is: **Command <options><arguments>**

Shells also have some commands that are built into the shells, termed as 'built-in' commands. Built-in commands are also known as "internal commands". Some examples of built-in commands are alias, bg, bind, break.

Directory and File Manipulation Commands

- **pwd: print working directory**

The pwd command prints the name of the current or present working directory. It prints the complete path or the current working directory. II is a shell built-in command.   **Syntax: $pwd**

- **cd: change directory**

The cd command is used Io change the current working directory. It is used to move inside a subdirectory.

Syntax: $cd Dir Name

Various symbols can be used with the command. Symbols with their meaning are as under:

Single dot (.): current directory

Double dot(..): upper directory or parent directory

Tilde (~): home directory

ls: lists content of directory

The ls command lists files and subdirectories in a directory. There various important options available

with the command.

-l: list all files in long format. (permissions, users, file size, date, and time will be displayed)

-a: list all the hidden files (those beginning with a ".")

-F: list files distinguishing directories/ executables *symbolic links.

-R: recursively list subdirectories encountered

mkdir: create a new directory

The mkdir command is used to create new directory.

Syntax: $ mkdir<name of directory>

rmdir: remove a directory if its empty

The rmdir command is used to remove directory. To remove directory rmdir command is used.

Syntax: $rmdir<name of directory >

rm: remove files

The rm command use to remove files which is no longer needed.

Syntax: $rm <filename>

mv: move

The mv command used to Move or Rename files or directories.

Syntax: mv [options]

mv [options] <old-file path><new-file path>

mv [options] <old-file name><new-file name>

Options: -i query user for confirmation.

touch: create file

The touch conunand creates a new empty file. Multiple files can be created at once using lhe command.

It is also used to change the timestamps of files and directories. 'I'he various supported options are:

-a: changes access time of file

 -c: checks whether created or not

-m: used to change the modification time. It changes last modification time.

Syntax: $touch <filename>

cat: view complete file content

The cat (concatenate) command is used to create, view and concatenate files. The cat command can

be used in the following ways:

Syntax: $ cal <filename> (to view a file)

Syntax: $cat <filename1><filename2> (to view multiple files)

Syntax: $cal —n filename (to view content of file preceding wilh line numbers)

Syntax: $cat >[new filename] (to create a file)

Syntax: $ cat [sourcefilenamej]> [destination file name] (Copy lhe contents or one file to another file.)

Syntax: $ cat file1 file2 (append the contents of one file to the end of another file.)

cp: copy files

The cp command is used to copy files and directories. cp command requires two filenames as arguments.

Terminal, Information & Utility Commands

clear: clears the terminal

This command clears the terminal. **Syntax: $clear**

echo: write a string to standard output device

Syntax: $echo <string> E.g., Secho I love my India

repeat: repeats commands

Syntax: repeat<number><command>

history: lists the commands typed during the session

Options: -r displays lhe list in reverse**.**

help: display information about built-in commands

Displays summaries of built-in commands.

Syntax: help [-dms] [pattern...]

Options: -d: output short description for each topic

 -m: display usage in pseudo-manpage format

-s: output only a short usage synopsis for each topic matching

Ex: $rm —-help, this command will show us help topics on terminal about rm command.

wc: word count

Counts and displays the number of lines, words and characters of a file.

Syntax: wc [options]

Options: -c count character only

 -l count lines only

-w count words only

diff: display differences

This command uses to display differences between two files by comparing line by line. It shows

differences in form of special symbols a, c, d which stands for add, change and delete.

Syntax: diff [options) <filenamel><filename2>

cmp: compare two files

 The cmp command compares two files that the two files are identical or not.

syntax: $cmp<filename1><filename2>

grep: globally search for regular expression and print out

This filter is used to search a file for a matching pattern or regular expression.

Syntax: grep [options] <regular expression><file name>

Options: -n print lines and line numbers where pattern matches

-v prints all the lines that do not contain Ihe expression

-c This prints only a count of the lines that match a pattern

 -h Display the matched lines, but do not display the filenames.

VI EDITOR

- In Unix, various text editors are provided to edit the files. There are line editors ed and ex which present a line of the file on the screen; there exist screen editors like vi and Emacs.
- Vi is a default standard editor that is available in almost all the flavors of Unix operating systems.
- Vi is the short form of Visual editor. Itcan be used to edit an existing file or create a new file. It can also be used to simply read atext file. There is the latest version of Vi editor which is known as VIM which stands for Vi Improved.
- 'vi' is a built-in shell command which is used to invoke the vi editor.
- **Syntax: $ vi <filename>**
- Vi editor has two modes of operation; command mode and insert mode.

Command mode

The vi editor opens in lhe command mode. As the name implies il mode is used to perform some

commands which in turn causes some actions on the file, In command mode, we can move the cursor

and cut, copy, paste the text. Command mode also saves the changes we have made to the file. Hence

it performs administrative tasks for file editing. Commands in command mode are case sensitive.

Insert mode

This mode is used for inserting text into the file by vi editor. Whatsoever is typed in this mode is treated

as input and placed in temporary memory and after a command from the user it goes to the file.

Table 2.4: vi Editor Editing Commands

Key	Function
i	Insert at cursor (goes into insert mode)
a	Write after cursor (goes into insert mode)
A	Write at the end of line (goes into insert mode)
ESC	Terminate insert mode
u	Undo last change
U	Undo all changes to the entire line
o	Open a new line (goes into insert mode)
dd	Delete line
3dd	Delete 3 lines.
D	Delete contents of line after the cursor
C	Delete contents of a line after the cursor and insert new text. Press ESC key to end insertion.
dw	Delete word
4dw	Delete 4 words
cw	Change word
x	Delete character at the cursor
r	Replace character
R	Overwrite characters from cursor onward
s	Substitute one character under cursor continue to insert
S	Substitute entire line and begin to insert at the beginning of the line
~	Change case of individual character

Table 2.5: Moving within a File

Key	Function
k	Move cursor up
j	Move cursor down
h	Move cursor left
l	Move cursor right

Table 2.6: Saving and Closing the File

Key	Function
Shift+zz	Save the file and quit
:w	Save the file but keep it open
:q	Quit without saving
:wq	Save the file and quit

UNIT-3   HTML AND CSS

<u>**HYPER TEXT MARKUP LANGUAGE 4 (HTML4)**</u>

- HTML is a useful tool for building webpages and displaying them in web browsers. The existence of the World Wide Web (WWW) consists of innumerable webpages that are interconnected. When these webpages take the form group, organized for a specific purpose, they are called websites. The contribution of HTML in the creation of the WWW is incomparable. From time to time, many versions of HTML have become popular in the web programming world. HTML4 is a recent version of HTML.HTML4 is a markup language that is easily understood on almost all web browsers at present.
- HTML4 supports scripting languages, Style sheets, and other important features. HTML4 supports more multimedia options, it enhances HTML with frames, embedding objects, improved support for the right to left and mixed direction text, richer tables, and enhancements to forms, offering improved accessibility for people with disabilities.
- In general HTML document comprises of two functionalities:
  1. Hypertext: It is a regular text having the capability within the text to connect or reference other documents (Hyper linking). It can be stored, read, searched, and edited like regular text.
  2. Markup: It is a system for annotating a document such that it displays intended text in a visually distinguishable manner from other content in the document.
- An HTML document is formed with many tags. A tag is a special word enclosed within angular brackets '<'and '>'.This tag is a signal to the web browser about the structuring or formatting of content on a webpage. If a tag conveys structuring information, then it is known as structural tags like <HTML>, <BODY>, <HEAD> etc. If it is informing web browser about the formatting of content then it is known as a formatting lag like <B>, <BR>, <HR>, <IMG>.
- In HTML there are two types of tags:
  1. **Paired Tags**: Some tags in HTML are used in pairs e.g., <B> tag is used with</B> tag. This tag is used to bold the text in between both of these. Here <B> is called opening tag whereas</B> is termed as companion tag or closing tag. Paired tags are also known as **container tags.**
  2. **Singular Tags**: Such type of tags does not require companion tag or closing tags e.g., <BR. Singular tags are also known as **non-container tags.**
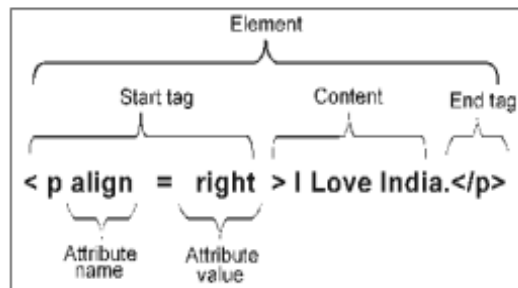
Fig. 3.1: Parts of HTML Container Element

- The part of HTML coding from starting tag up to the closing tag is called an element. In the case of singular tags, the tag itself is an element and known as an empty element. Every tag has its default behaviour if we want to change it, we may use an **attribute** of that tag. Attributes are defined in opening tags and they control the behaviour of an element. As shown in Fig, the default behaviour of paragraph tag <p> is left that is changed to right by assigning right value to attribute name align.

<u>**STRUCTURE OF AN HTML DOCUMENT**</u>

- A general structure of a webpage or HTML document is shown in Fig. It contains the structural tags and is created in a default text editor of windows i.e., notepad. Any HTML document starts with <HTML> tag and contains two elements i.e., an optional **Head element** and mandatory **Body element**. The **head element** contains additional information about the document like the version of HTML, the title of the webpage, metadata, etc. Information contained in this element is not displayed by the browsers but it is to enable the browser about the document. Web browsers display the content written in the Body element. The BODY tag contains all the text and graphics of the document with all the HTML, tags that are used and of page.
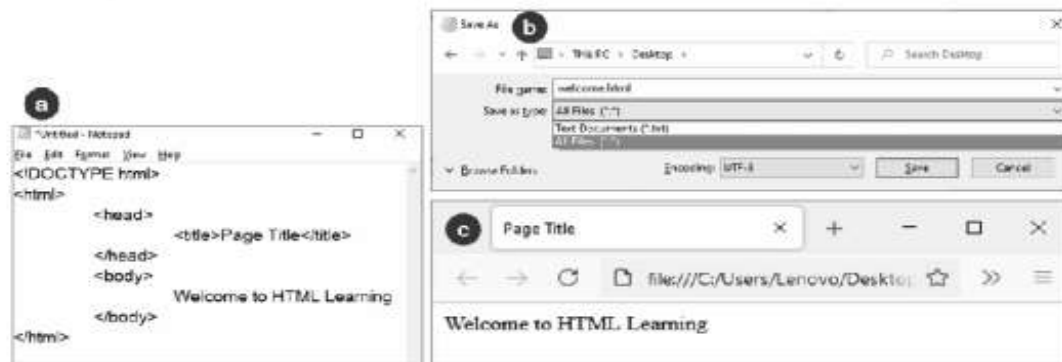
Fig. 3.2: HTML Document (a) General Structure (b) Save as .html (c) Browser Window Output

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HOW TO CREATE A WEBPAGE

- An HTML document can be created using any text editor e.g., notepad, notepad++ etc. Along with the normal text editor, WYSIWYG editor (like Dreamweaver) is also popular, In WYSIWYG editors, along with The convenience of writing HTML coding, a preview of how the coding output will look in a web browser is also shown, To learn it practically just follow the below steps:
  1. First Of all, open any text editor of choice (Notepad) and type the code .
  2. After creating a text file, we have to save it with .htm or .html extension. To do so, click on the, File→save as option. It will show Save as dialog box. We have to select All Files(*) list option from Save as type .Now change the name Of Our file from Untitled.txt' to 'welcome.html' and click on the Save option.
  3. The saved file can be now opened in any web browser using one of the below methods,
     a. Just browse the file and double-click on the file
     b. Press Ctrl + 'O' keys and select file.
     c. Open your browser and 'Drag & Drop' your html/htm file on the browser window.

Now, the HTML document will be displayed in your default web browser (Mozilla Firefox in our case) like a normal webpage.

BASIC HTML TAGS

Tags are the main building blocks of HTML .Using predefined tags HTML conveys to the web browser about content display property i.e., how a particular content has to be displayed. Like <p></p> is used to create a paragraph. is used to bolden a text.

Table 3.2: Formatting Tags

Tag	Description
<CENTER>..</CENTER>	To center align any part of the text.
<P>..</P>	To start a paragraph with new line.
 	Puts a line break in the text. The text appearing after appears in the next line.
<B>..</B>	To **Bold** any part of the text.
<U>..</U>	To Underline any part of the text.
<I>..</I>	To *Italic* any part of the text.
<BLOCKQUOTE>.. </BLOCKQUOTE>	To indent the text from both sides.
<FONT>..</FONT>	To set a specific font for any part of text e.g., face, color, size, etc.
<Hn>..</Hn>	To format headings. Here n is a natural number between 1 to 6.
<HR>	To draw a Horizontal Rule (horizontal line)
^{..}	To superscript any part of the text. E.g., $e=mc^2$ (2 is superscripted)
_{..}	To subscript any part of the text. E.g., H_2O (2 is subscripted)

Table 3.3: Attributes of <P> and <FONT> Tags

Tag	Attribute	Possible Values of the Attribute
<P>	ALIGN	LEFT, RIGHT, CENTER, JUSTIFY
	FACE	Any valid font name
<FONT>	SIZE	Any integer from 1 to 7
	COLOR	Any valid color name or color code e.g., RED or #FF0000

- When we design a webpage, tags can be contained in another tag which is known as the nesting of tags. Using nesting, we can apply multiple formatting to a given text e.g., we can format text "Fit India" with bold, italic, and underline formatting via nesting of tags i.e. <B> <U> <I> Fit India </I> </U> </B>. It will show format text in the browser window as ***Fit India.***

Fig. 3.3: HTML Code with Formatting Tags in notepad++ Editor

PAGE SETTING TAGS:

- These tags are used to set the title or the webpage, its background color, and color or text, etc. A page title is a text which is shown on the title bar of the web browser window. In case of a missing title tag in HTML coding, by default, it will show the name of the document. The Title tag is used Inside the Head tag, it is depicted in Fig. 3.3, line number 3. Color of page background and text can be set using various attributes of <BODY> tag. These attributes are:

Table 3.4: Attributes of <BODY> Tag

Attribute	Possible Values of the Attribute
BACKGROUND	Used to display an image in background of webpage
BGCOLOR	Used to specify background color of webpage. Color name can be given in name or RGB Values
TEXT	Used to set the color of the normal text in the document. Color name can be given in name or RGB Values

LISTING TAGS:

- HTML provides three ways to specify a list or information. All types of lisLS must contain one or more list elements. Various listing tags are given in a tale(below). The list types are:
1. **Unordered list:** This list starts with <UL> and ends with </UL>. Each list item starts with <LI> and </LI> is optional to use. It supports to TYPE attributes which can be assigned value FILLROUND (for a solid round black bullet) or SQUARE (for a solid square black bullet) or DISC (a hollow round black bullet).
2. **Ordered list**: This list is contained within <OL>…</OL> tags. Each list item starts with<LI> tag and </LI> tag is optional to use. Attributes of ordered list items are presented in the Table 3.6.
3. **Definition lists**: HTML definition lists are used when we require to describe the listed items. The <DL> tag defines the description list, the <DT> Lag defines the term (name), and the <DD>tag describes each term.

Table 3.5: Listing Tags

Tag	Description
<UL>	Used to Define an unordered list
<OL>	Used to Define an ordered list
<LI>	Used to Define a list item
<DL>	Used to Define a description list
<DT>	Used to Define a term in a description list
<DD>	Used to Describe each term

EXAMPLE OF LIST TAG:

Fig. 3.5: HTML List an Example (a) Coding Window (b) Browser Window

Table 3.6: Attributes of Ordered List Item

Attribute	Possible Values of the Attribute
TYPE	This attribute controls the numbering scheme. 1: will give counting numbers (1, 2.....) A: will give uppercase letters (A, B,....) a: will give lowercase letters (a,b,....) I: will give uppercase roman numerals (I, II,....) i: will give lowercase roman numerals (i, ii,.....)
START	Used to change the numbering sequence.
VALUE	Used to change the numbering sequence in the middle of ordered list.

ADDING GRAPHICS TO HTML:

- In addition to text formatting and listing, HTML also provides the facility to add graphics and images to a document. Graphic images are added in HTML using <img> tag. The <img> tag is an empty (singular) tag that contains attributes only, it does not require a closing tag.

Table 3.7: Attributes of <IMG> Tag

Attribute	Possible Values of the Attribute
ALIGN	This attribute controls the alignment of text following the image. Values: TOP, MIDDLE, BOTTOM, LEFT, CENTER & RIGHT
BORDER	Used to specify the size of border, around the image.
WIDTH	Used to specify width of the image in pixels or %
HEIGHT	Used to specify height of the image in pixels or %
HSPACE	Indicates horizontal space between the table and surrounding text
VSPACE	Indicates vertical space between the table and surrounding text
ALT	It is alternative text to be displayed when image not found or loaded
SRC	Location and name of source image file is given by this attribute

- The <IMG> tag, type the source code shown in Fig.In any text editor and save it with .html or, html extension. You should use any available image of your choice for your hands-on purpose, ensure that the image which you are going to include must be present in the same folders where you save the HTML code. Now open the webpage in any web to see the difference between using <IMG> tag with no attributes and with given attributes, as shown in Fig. 3.6. The source code is having two <IMG>tags.

```
<body>
    <img src="swami vivekanand.png" > Swami Vivekananda (January 1863 – 4 July 1902), was
    an Indian Hindu monk. He was a chief disciple of the 19th-century Indian mystic
    Ramakrishna.He was a key figure in the introduction of the Indian philosophies of
    Vedanta and Yoga to the Western world
    <HR>

    <img src="swami vivekanand.png" width=300 height=150 align=right alt="swami vivekanand"
    vspace=20 hspace=20 border=2> Swami Vivekananda (January 1863 – 4 July 1902), was an
    Indian Hindu monk. He was a chief disciple of the 19th-century Indian mystic
    Ramakrishna.He was a key figure in the introduction of the Indian philosophies of
    Vedanta and Yoga to the Western world
</body>
```

Fig. 3.6: Adding Graphics in HTML (Source Code)

WORKING WITH HTML TABLES:

- To display data in form of a two-dimensional matrix or more precisely, in form of rows and columns, <Table> tag is used. It is paired tag and ends with </TABLE> Rows of table are defined between <TR>...</TR> tags whereas columns are defined between <TD>..<TD> tags. HTML tables are strengthened by Header Row. It is a special row that spreads across columns of a table, Header row is defined between <TH>--</TH> tags.

Table 3.8: Attributes of <TABLE> Tags

Attribute	Possible Values of the Attribute
ALIGN	This attribute controls the horizontal alignment. Values: LEFT, CENTER, or RIGHT
VALIGN	Controls the vertical alignment of cell contents. Values: TOP, MIDDLE, or BOTTOM
WIDTH	Used to specify the width in form of pixel values or % of available screen
BORDER	Used to specify the border around the table, table width is given in pixels
CELLPADDING	Used to specify the distance between data and boundaries of the cell.

CELLSPACING	Used to specify the distance between nearby cells.
COLSPAN	Indicates the browser to take up space more than one column. This attribute is used inside <TH> or <TD> tags.
ROWSPAN	Indicates the browser to take up space more than one row. This attribute is used inside <TH> or <TD> tags.

- H TML tables have one more important table related tag i.e., **<CAPTION>--</CAPTION>.** It is used to provide metadata about the table content. The caption for the table can be placed above or below the table structure with the ALIGN attribute set to TOP or BOTTOM.
- To practice in HTML, an example of is demonstrated 3.8 to Fig3.10 source code for depicted a default table and corresponding browser output is shown in Fig. 3.8(a) and Fig.3.9 (a) respectively. Source code illustrates the use of **<CAPTION>** tag and sets its position to the bottom of the table structure. Use of **<TH>** tag for a Table header. **<TR>** for table row definition, and **<TD>** for table data is also presented. Fig 3.8(a) shows the use of basic table tags without specifying attributes (except Align=bottom). The HTML source code in Fig 3.8(b) shows the use of various supported attributes (e.g., BORDER=5 WIDTH=50% align=center cellpadding and cellspacing=2).

```
2   <body>
3   Default Table
4   <HR>
5   <table >
6   <CAPTION ALIGN=BOTTOM>
7   Table 1: Medals in Field Hockey
8   & Shooting</CAPTION>
9       <tr>
10          <th>Sport</th>
11          <th>Gold</th>
12          <th>Silver</th>
13          <th>Bronze</th>
14          <th>Total</th>
15      </tr>
16      <tr>
17          <td>Field hockey</td>
18          <td>8</td>
19          <td>1</td>
20          <td>3</td>
21          <td>12</td></tr>
22      <tr>
23          <td>Shooting</td>
24          <td>1</td>
25          <td>2</td>
26          <td>1</td>
27          <td>4</td>
28      </tr>
29  </table>
```

```
3   <body>
4   Table with cellpadding=5 and
    cellspacing=2
5   <HR>
6   <table BORDER=5 WIDTH=50% align=
    center cellpadding=5 cellspacing=2>
7   <CAPTION ALIGN=BOTTOM>Table 1:
    Medals in Field Hockey & Shooting
    </CAPTION>
8       <tr>
9           <th bgcolor=gray>Sport</th>
10          <th>Gold</th>
11          <th>Silver</th>
12          <th>Bronze</th>
13          <th>Total</th>
14      </tr>
15      <tr>
16          <td>Field hockey</td>
17          <td>8</td>
18          <td>1</td>
19          <td>3</td>
20          <td>12</td></tr>
21      <tr>
22          <td>Shooting</td>
23          <td>1</td>
24          <td>2</td>
25          <td>1</td>
26          <td>4</td>
27      </tr>
28  </table>
```

Fig. 3.8: HTML Table (Source Code) (a) Table with Align Attribute (b) Various Table Tag Attributes

Default Table

Sport	Gold	Silver	Bronze	Total
Field hockey	8	1	3	12
Shooting	1	2	1	4

Table 1: Medals in Field Hockey & Shooting

Table with border=5 and width=50%

Sport	Gold	Silver	Bronze	Total
Field hockey	8	1	3	12
Shooting	1	2	1	4

Table 1: Medals in Field Hockey & Shooting

Fig. 3.9: Browser Output (a) A Default HTML Table (b) Table with Border and Width Attribute

- The output of the source code in Fig. 3.8(b) is presented in Fig. 3.10(b). Browser window output in Fig. 3.9(b) and Fig. 3.10(a) is due to the use of different sets of attributes. Fig. 3.10 shows table is presented at the center of the screen due to attribute align=center. Cell number one is having a dark background color, as it is assigned by attribute bgcolor=gray in first<TH> tag of first <TR>tag (see Fig. 3.8(b)).

Table with center alignment and bgcolor attribute

Sport	Gold	Silver	Bronze	Total
Field hockey	8	1	3	12
Shooting	1	2	1	4

Table 1: Medals in Field Hockey & Shooting

Table with cellpadding=5 and cellspacing=2

Sport	Gold	Silver	Bronze	Total
Field hockey	8	1	3	12
Shooting	1	2	1	4

Table 1: Medals in Field Hockey & Shooting

Fig. 3.10: Browser Output for Table with (a) Align and BGCOLOR Attribute (b) CELLPADDING and CELLSPACING attribute

LINKING WEBPAGES

- Connecting one HTML document to others is the key reason for the development of the world wide web. This capability of linking several web resources (HTML documents, images. or other multimedia content) is known as hyperlinking. The hyperlinks can be created on a webpage with text or images. The text or image having linking functionality is known as hypertext or hyperlink. The browser displays hyperlinks in a distinguishable manner than normal content as listed below:
    - Normally appears in blue color. (We can customize if we require)
    - The hypertext/ image is underlined.
    - On moving the arrow cursor upon a hyperlink our default arrow mouse cursor will turn into the shape of a little hand.
- The HTML anchor tags i.e., <A>...</A> are used to create hyperlinks. Anything between <A>...<A> becomes a hyperlink. <A> tag requires to specify the destination URL where we want to navigate on the click at the link. This is done by supplying URL value to the mandatory HREF attribute. Below is the Syntax for Creating a hyperlink:
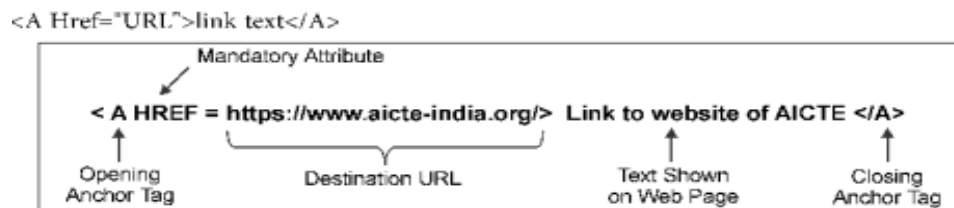
Fig. 3.11: An Anchor Tag Syntax

- An example of the anchor tag is depicted in Fig. 3.11 which illustrates that the website www.aicte-india.org will be navigated by clicking on the text Link to website of AICTE.

INTERNAL DOCUMENT REFERENCE

- In addition to external web resources linking HTML, provides a mechanism to reference information on the same webpage. It is done by naming the locations of a webpage such that these named locations can be referenced when required.
- SYNTAX:

<A Name = "LocationName" >
<A HREF=LocationName>..</A>

IMAGES AS HYPERLINKS

Images can also be used for hyperlinks. We need to use <IMG> tag between the <A>--</A>.

Syntax: <A HREF=LocationName><IMG source= "image_name.jpg" ></A>

```
1   <html>
2       <head>
3           <title>Education-India</title>
4       </head>
5       <body>
6           <A HREF="#about_aicte"> About AICTE</A>   <A
            HREF="#about_ugc"> About UGC</A><br><HR>
7           <A HREF=https://www.aicte-india.org/><img src=
            "AICTE_LOGO.jpg" width=90 height=90 align=right alt=
            "Logo AICTE"  ></A>
8           <A HREF=https://www.aicte-india.org/> Link to website
            of AICTE</A><br><br>
9           <A NAME="about_aicte">All India Council for Technical
            Education (AICTE) was set up in November 1945 as a
            national-level Apex Advisory Body to conduct a survey
            on the facilities available for technical education
            and to promote development in the country in a
            coordinated and integrated manner.</A><br>
10          <HR>
11          <A HREF=https://www.ugc.ac.in/><img src="ugc_logo.png"
            alt="Logo UGC"  ></A>
12          <A HREF=https://www.ugc.ac.in/> Link to website of UGC
            </A><br><br>
13          <A NAME="about_ugc">
14      The University Grants Commission (UGC) came into existence on
        28th December, 1953 and became a statutory Organization of the
        Government of India by an Act of Parliament in 1956, for the
        coordination,determination and maintenance of standards of
        teaching, examination and research in university education.</A>
15      </body>
16  </html>
```

Fig. 3.12: Linking Webpages (Source Code: Anchor.htm)

- Hyperlinking with anchor tag <A> is demonstrated in Fig. 3.12 (source code). The webpage is designed with the intention to clarify different attributes and ways to use anchor tags. The document is logically divided into three parts each separated by a <HR> tag. The first part shows two hyperlinks that reference a named location on the same webpage. The sound part incorporates information pertaining to AICTE, a text hyperlink (About AICTE) and an image hyperlink (Logo image of AICTE). This can be observed between both horizontal lines in Fig, 3.13(a). Similarly, the third part contains the same tags for information related to IJGC.

HTML FORMS:

- HTML form is a method to interact with the users. Such interaction can be to take information from the users e.g., registration form, feedback form. etc, HTML forms are composed of various components like text boxes, radio buttons, list boxes, command buttons, and so on. A webpage equipped with form components, takes user choices and submits them to the server for processing via POST or GET method.

- The syntax is as under:

    <FORM METHOD="GET|POST"ACTION = URL>

    <INPUT>

    <INPUT>

    </FORM>

- Here, Action specifies the URL, to which content of the form is submitted whereas Method specifies how to send form data. The form data can be sent as URL variables (with method= "get") or as HTTP post transaction (with method= "post").

INPUT TAG

- Input tag is used to collect information from the users. The various attributes ofthe input tags are depicted in Table 3.9. Various input types supported by <INPUT>tags are as under:
a.   Textbox field: It is used to accept single line input from the user. It is defined as <input type=" Text">. Along with this the TextBox field accepts value, size, name, maxlength, align and tabindex within the <input> tag.
b.   Radio Buttons: It is used to accept one option of various provided options. It is defined as <input type = "Radio">.
c.   Checkboxes: It is used in web forms to select multiple options out of various provided options. It is defined as <input type = "checkbox">.
d.   Command Button: If the value of the type attribute is "Submit" i.e. <input type= "submit | reset">, the form will show a command button. A submit button submits a form. A form may contain more than one submit button. A reset button resets all controls to their initial values.

Table 3.9: Attributes of <INPUT> Tag

Attribute	Possible Values of the Attribute
NAME	Assigns internal name for the field, as a group of characters
SIZE	Define width of the field, value in integer
MAXLENGTH	Define maximum number of characters accepted by the field, value in number
TYPE	takes the value of the field. It can take the value as "text" or "radio" or "checkbox" or "submit".

TEXT AREA

- This form component is used to take multiline input from the user. It is defined between <TEXTAREA>...</TEXTAREA> tags. Various attributes are presented in Table 3.10. Use of Text Area is shown in Fig. 3.14 for taking Address input from the user.

Table 3.10: Attributes of Text Area Component

Attribute	Possible Values of the Attribute
COLS and ROWS	Defines length of text area (COLS) and number of rows to be visible with text at a time (ROWS), Numbered input allowed
NAME	Internal name of field for programming purpose
TABINDEX	Used to assign order number of activation for control
WRAP	Defines Wrap Text functionality for control. Three possible values: wrap off, virtual and physical.

DROP DOWN BOX

- This webform component contains a list of items. Users have to select one out of them. This component is formed in webpage within <SELECT> and <OPTION> tags. Attributes of this field are presented in Table 3.11. Use of this component is shown in Fig. 3.14 for taking Branch and Year input from user.

Table 3.11: Attributes of Drop Down Box Component

Attribute	Possible Values of the Attribute
NAME	Internal name of the field for programming purpose
SIZE	Defines number of items visible when user opens the drop down list
MULTIPLE	When configured allows user to select multiple items
VALUE	Defines the actual value to be transferred when an item is selected

Table 3.12: Web Form (HTML Code) for Annual Day Participation

```
1   <html>
2           <head>
3                   <title> Web Form and its components</title>
4           </head>
5   <body>
6   <table border=3 width=50% align=left cellpadding=5><tr><td>
7   <form action="local_server" method="post" name="form1">
8   <h3>Participation form for annual day function.</h3>
9   Your Name: <input type="text" name="text1"><br><br>
10  I am a<input name="radio1" type="radio" value="radio1"> Girl
11          <input name="radio1" type="radio" value="radio2">Boy <br><br>
12  Branch:<select name="select">
13          <option selected>Computer Science</option>
14          <option>Civil</option>
14          <option>Mechanical</option>
16          <option>Electrical</option>
17          </select>   
18  Year:<select name="select">
19          <option>First</option>
20          <option>Second</option>
21          <option>Third</option>
22          </select><br><br>
23  Address:<textarea name="textarea" cols=20 rows=3></textarea> <br><br>
24  Mail ID:<input type="text" name="text2">
25  Mobile No.:<input type="text" name="text3"><br><br>
26  Choose your participation<br>
27          <input type="checkbox" name="cb" value="song"> Song
28          <input type="checkbox" name="cb" value="instrument">Instrument Play
29          <input type="checkbox" name="cb" value="poem">Poem
30          <input type="checkbox" name="cb" value="deb">Debate<br><br>
31          <input type="reset" name="Reset" value="Reset">
32          <input type="submit" name="Submit" value="Submit">
33  </form></td></tr></table></body>
34  </html>
```

Fig. 3.14: Web Form and Components

CASCADED STYLE SHEETS (CSS)

- CSS is a stylesheet language used to style the content of a webpage. CSS is the acronym for Cascading Style Sheets.
- The key concept behind the CSS is to separate the content and formatting information from the webpages. Thus, HTML should include content only whereas CSS files will sure the styling and formatting information.
- CSS explains how HTML elements will be displayed on the webpage other than web browser default settings. It eliminates redundant work by defining style information once and reusing it at many places.
- A CSS can control the layout of multiple webpages at once. With the help of CSS, webpages load faster and become more presentable. CSS is easy to maintain and provides extended styles to HTML. Presently CSS version 3 is being used.
   DISAVANTAGEOF CSS:
1. CSS faces the problem with browser compatibility, sometimes a webpage presented on web browser may look very different on other web browsers.

WAYS TO APPLY CSS TO AN HTML DOCUMENT:

- There are three ways:
   1. Inline (the attribute style): In this way, CSS is applied directly with the style attribute. Thus, it is like specifying an attribute to an HTML tag.
      Example: To change background color or a webpage to blue, inline CSS can be applied in body tag with style attribute as:
      <body style— "background-color: #0000FF > (see Table 3.13(a))
   2. Internal (the tag style): In this way CSS is applied in the tag style. Style rule is defined between <style>..</style> tag in the <HEAD> tag of HTML document (see the Table 3.13(b))

Table 3.13: Ways to Apply CSS to an HTML Document (a) Inline (b) Internal

`<html>`
`<head>`
`</head>`
`<body style="background-color:`
`#00FF00;">`
`<p>The background is`
`green.</p>`
`</body>`
`</html>`
	`<html>`
	`<head>`
	`<style type="text/css" >`
	`h3 {background-color: #0000FF; color: #FFFFFF }`
	`</style>`
	`</head>`
	`<body>`
	`<h3> The background is blue and font color is white.`
	`</h3></body>`

3. **External CSS:** In this method, a separate CSS file (external) is linked to an HTML code file. HTML webpage must include a reference to the external style sheet file inside the<LINK> element, inside the<HEAD> section. Table 3.14 shows the linking of the HTML content file (external.html) to the style sheet file (mystyle.css). The file mystyle.css contains a rule to format the background color of the body tag to grey (#808080). Hence the output with grey background is shown in the browser output of Table 3.14.

- An external style sheet can be written in any simple text editor and must be saved with a .css extension. The separate .css file holds all the formatting rules which can be applied to multiple webpages parallelly. Each rule begins with a selector, which states that wherever this selector is used on a webpage, the new formatting described in the ruleset will apply.

Table 3.14: Apply an External CSS to an HTML Document

File: external.html	File: mystyle.css

`<html><head>`
`<link rel="stylesheet" type="text/css"`
`href="mystyle.css" /></head>`
`<body>`
`<h1>Motivational Quote</h1>`
`Never fear failure. We learn more from failures`
`than successes. Treat failures like results.<h3`
`align=right>- Rajyavardhan Singh`
`Rathore</h3>`
`</body></html>`
	`body {`
	`background-color: #808080;`
	`}`
	
	Browser Output
	
	Motivational Quote
	
	Never fear failure. We learn more from failures than successes. Treat failures like results.
	
	- **Rajyavardhan Singh Rathore**

- Every ruleset has al least one declaration, enclosed within curly brackets. The declaration consists of:
  a. Property: This refers to characteristics (like size, color) whose associated value defines how the browser is supposed to display the element.
  b. Colon: The colon symbol (:) is segregate property and value.
  c. Value: This is the value of the CSS declaration.
  d. Semicolon: The semicolon symbol marks the end of the declaration.

Declaration Block

Selector	
h1	{ color: red; font-size:14px; }

Property Value Property Value
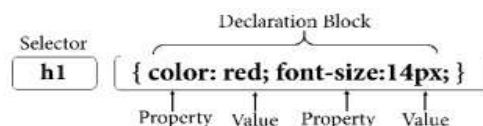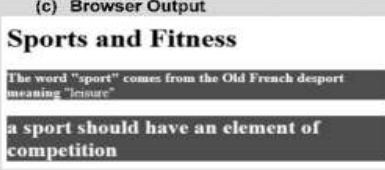
Fig. 3.15: CSS Syntax (Selector, Property, and Values)

Table 3.15: Class Selector in CSS

(a) File: class selector.html	(b) File: mystyle1.css

1 `<html><head>`
2 `<link rel="stylesheet" type="text/css"`
3 `href="mystyle1.css" /></head>`
4 `<body>`
5 `<h1 id="Sports">Sports and Fitness</h1>`
`<p class="fitness">The word "sport" comes from the Old French desport meaning "leisure"</p>`
6 `<h3 class="fitness">a sport should have an element of competition</h3>`
`</body>`
`</html>`
	`.fitness{color:white; background-color:green}`
	
	(c) Browser Output
	
	Sports and Fitness
	
	The word "sport" comes from the Old French desport meaning "leisure"
	
	a sport should have an element of competition

CSS SELECTORS

- Selectors are used to finding the HTML elements that are to be styled. There are three types of selectors available in CSS namely element selector, class selector, and id selector.

1. **Element selector:** It is used to style all instances of a specific element in a webpage. It is done by choosing an element by its tag name and then style is applied to that element. Fig. 3.15 is an example of an element selector.

Table 3.16: ID Selector in CSS

	(a) File: id selector.html	(b) File: mystyle2.css
1	`<html><head>`	`#shooting{color:blue; font-size:18px;}`
2	`<link rel="stylesheet" type="text/css"`	
3	`href="mystyle2.css" /></head>`	
4	`<body>`	**(c) Browser Output**
5	`<h4 id="boxing">` People used to say that boxing is for men and not for women and I thought I will show them some day. I promised myself and I proved myself.` <b>-Mary Kom</b></h4>`	People used to say that boxing is for men and not for women and I thought I will show them some day. I promised myself and I proved myself. Mary Kom
6	`<h4 id="shooting">` Practice is a talent. Perseverance is a talent. Hard work is a talent.` <b>`- Abhinav Bhindra`</b></h4>`	Practice is a talent. Perseverance is a talent. Hard work is a talent. - Abhinav Bindra
7	`</body>`	
8	`</html>`	

2. **Class Selector:** It is used to apply the same style to all elements belonging to a specific (defined) class e.g., we applied the mystyle.css (color: white; background-color: green) style to various elements on the webpage with class= "fitness".
3. **ID Selector:** It is used to apply a style to a specific element in a document which can be selected by its ID e.g., we applied the mystyle2.css (color: blue; font-size:18px:) style to all the elements having ID as "shooting". Table shows the use of CSS with id selector.

CSS PROPERTIES

- The strength of cascading style sheets resides in the long list of its powerful properties and associated values. The use of CSS properties enables web browsers to render an aesthetically rich webpage in minimal time.
- CSS uses hundreds of property-value pairs to enrich web development and granular control over web elements.

TEXT EDITOR AND WEB BROWSER METHOD (THE ULTIMATE WAY):

1. Create a webpage (say content.html) with various HTML elements like different heading levels, paragraph,lists, tables, images, etc. Thus, this content.html file will be used for our hands- on purpose.
2. Create a separate style.css file in any text editor and include the code (one code at a time).
3. Apply the ruleset of this style.css file to the content.html file using "External CSS method" .
4. Open content html in the browser window and Observe the Change in the output due to the newly applied CSS rule.
5. Follow steps 2 to 4 for each example .

Table 3.17: CSS Font Properties

Property	Description	Example
font-family	Used to customize type of font to be shown on webpage	h1 {font-family: Courier, Prestige, monospace;} p {font-family: arial, comic sans-serif, "Times New Roman";}
font-size	Used to control the size of font Values: pixels, point etc.	h1 {font-size: 20px;} p {font-size: 14pt;}
font-style	Used to control the style of font Values: normal, italic or oblique	h2 {font-family: "Times New Roman", serif; font-style: italic;}
font-variant	Used to control the variant of font	h1 {font-variant: small-caps;} h2 {font-variant: normal;}
font-weight	Used to control the boldness of font	p {font-family: arial, verdana, sans-serif; font-weight: normal;}

Table 3.18: CSS Text Properties

Property	Description	Example
letter-spacing	Used to customize space between each letter in a section of text	h1 {letter-spacing: 6px;} p {letter-spacing: 3px;}
text-align	Used to control the alignment of a section of text Values: left, right, or center	td {text-align: center;}
text-decoration	Used to control the look of text Values: underline, overline, line-through	h1 {text-decoration: underline;}
text-indent	Used to control the indentation of first line in text	p {text-indent: 60px;}
text-transform	Used to change case of text Values: capitalize, uppercase or lowercase	li {text-transform: uppercase;}

Table 3.19: CSS Color/Background Properties

Property	Description	Example
color	Used to control color of text Values: By name, Hexadecimal, RGB values	h1 {color: #0000FF;} or h1 {color:blue;}
background-attachment	Controls the scrolling of the background	td {text-align: center;}
background-color	Used to control background's color	p {background-color: #FFCC60;}
background-image	Used to set image of background	h2 {background-image: url("tile.jpeg");}
background-repeat	Allows background image repetition patterns. Values: repeat-x, repeat-y, repeat, no-repeat	h2 {background-image: url("tile.jpeg"); background-repeat: repeat; }

COMBINING PROPERTIES:

- All the different properties can be combined in one single properly.
- For example, to apply different properties for tag following code can be used:

```
P   {   font-style: italic;
        font-weight: bold;
        font-size: 40px;
        font-family: arial, sans-serif; text-align: center;
        letter-spacing: 3px;
        text-transform: capitalize;
        color: white;
        background-color: IndianRed;
    }
```

SUMMARY

1. HTML is a language to build webpages.

2. In HTML there are two types of tags: paired tags and singular tags.

3. An HTML document starts with tag and contains an optional Head element and mandatory Body element.

4. HTML documents can be created with simple text editor e.g., notepad, notepad++ etc. with .htm/.html extension.

5. HTML tags are classified as structural and formatting tags.

6. HTML uses attributes to redefine the default behaviour of its tags.

7. HTML supports three types of lists i.e., unordered list, ordered list, and definition list.

8. <IMG> tag is used for adding graphic/images in HTML.

CHAPTER-4

OPEN OFFICE TOOL

INTRODUCTION:

- ⬚ OpenOffice is a free, open-source office productivity suite that can be used to create and edit documents, spreadsheets, presentations, graphics, databases, and mathematical formulas:

- • **Writer**: A word processor for creating and editing documents

- • **Calc**: A spreadsheet application

- • **Impress**: A presentation application

- • **Draw**: A drawing application

- • **Math**: A formula editor

- • **Base**: A database management application

- ⬚ OpenOffice is compatible with many common file formats, including those used by Microsoft Office, and can also open and save files in these formats. OpenOffice's default file format is OpenDocument Format (ODF), an international standard. ODF has several file extensions, including ODT for documents, ODS for spreadsheets, and ODP for presentations.
- ⬚ OpenOffice is available for Linux, macOS, and Microsoft Windows, and supports over 40 languages. It's free to use and can be used by private, commercial, educational, or governmental entities.

INSTALLATION OF OPENOFFICE:

- ⬚ To install OpenOffice, it is recommended to go through the system requirements. Depending on the hardware and operating system of our computer system, we should download and install the package from the OpenOffice project's home page.
- ⬚ The following steps describe the process to install Apache OpenOffice (AOO):

1. First of all, we need to download the current version from the OpenOffice website i.e., https://www, openoffice.org/download/index.html.

2. On the above webpage, we have to choose appropriate options for the operating systems, language, and version of the OpenOffice package to be downloaded. Other than various international languages, Apache is also available in Hindi and Tamil languages. Click on the 'Download full installation' button. A full installation file, sized about 135 MB will be downloaded.

Fig. 4.1: Download Apache OpenOffice

3. Start the installation with the downloaded file in the previous step, As depicted in Fig 4.2(a) an installation wizard will appear to guide the installation process. By clicking Next, we will be shown a window to choose the installalion location. Click on the Install button. The installation process will begin and show some installing intarmation via intermediate screens.
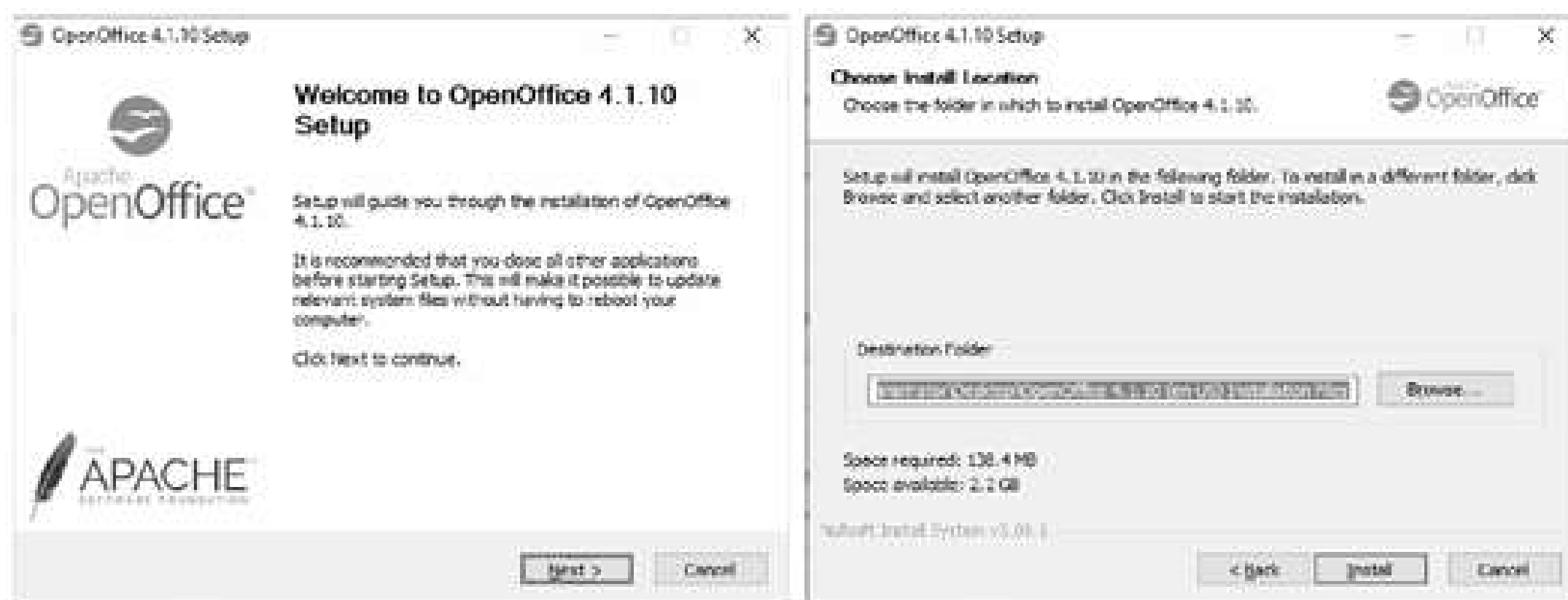
Fig. 4.2: Installation Wizard Screens (a) Welcome Screen (b) Install Location

4. 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. Click Next, after setup type selection. (see Fig. 4.3)
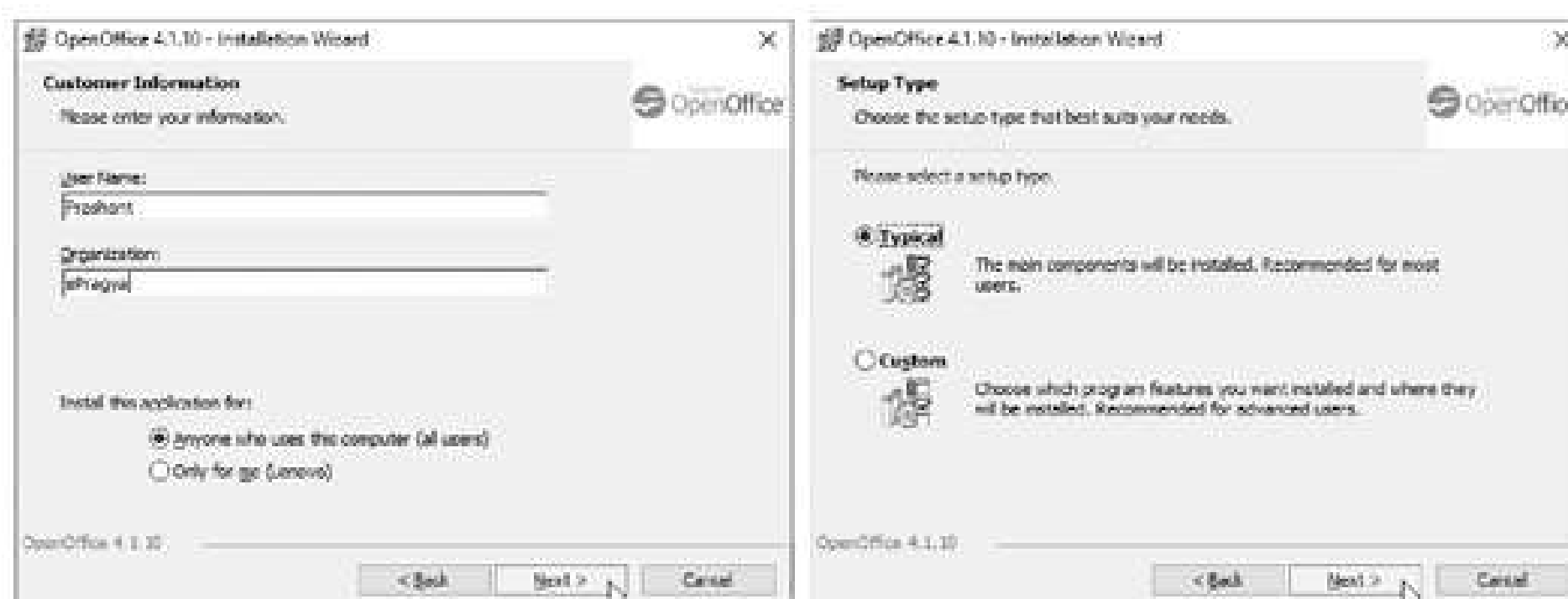
Fig. 4.3: Installation Wizard Screens (a) Customer Information (b) Setup Type Selection

5. The window depicted in the figure.Click on the install button to begin the installation process. After some time, the OpeOffice installation completed wizard appears the Click on Finish.

Fig 4.4: Installation Wizard Screen (a) Begin installation (b) Finish Installation

6. Now, we will have a start link on desktop. We can open the OpenOffice4 by double-clicking the link. Initial screen with all the OpenOffice programs will be shown as depicted in Fig.4.5

Fig. 4.5: OpenOffice Start Center

ADVANTAGES OF OPENOFFICE:

OpenOffice software possesses several benefits over other office suite counterparts. Some of these are:

1.**No licensing fees:** It's free software. Anyone can use and distribute it without any charges.

2.**Open source**: Source code is openly available. Users can dislribute, copy and modify the software as per the AOO's Open-source licenses.

3. **Cross-platform**: The software can be installed in several hardware architectures and under multiple operating systems.

4. **Extensive language support**: Its user interface is available in more than 40 languages including Hindi, Tamil. etc. It also supports spelling, hyphenation, and thesaurus dictionaries in over 70 languages.

5. **Consistent interface**: Provides user interfaces with a similar look and feel for better administration.

6. **Integration**: AOO's components are integrated e.g., spelling checker is used consistently across the suite. Drawing tools available in Writer are also usable in Calc, Impress and Draw.

7. **Granularity:** AOO options can be set at the component level or even document level.

8.**File compatibility**: In addition Io its native OpenDocument formats, AOO includes PDF and Flash export capabilities, as well as support for opening and saving files in many common formats including Microsoft Office, HTML, XML, etc. It also includes the ability to import and edit some PDF files.

9. **No vendor lock-in:** Supports Open Document format i.e., an XMl , it Can be opened in any text editor.

10. **Community support**: Worldwide community to fix the software issues and software enhancement.

OPENOFFICE WRITER

- ▢ The writer is the word processor component Of Apache OpenOffice (AOO). It is a free alternative to Windows MS Word.
- ▢ Using writer, we can create documents such as reports, letters, create complete books with contents, diagrams. indexes, agendas minutes, or carrying out more complex tasks such as mail merges.
- ▢ It provides the usual features or a word processor: enter and edit text, spelling checks Ihesaurus, hyphenation. autocorrect, find and replace, automatic generation Of tables Of contents and indexes, mail merge, and others.
- ▢ In addition, the Writer provides these important features:
- • Templates and styles
- • Page-layout methods, including frames, columns. and tables
- • Embedding or linking Of graphics spreadsheets, and Other Objects
- • Built-in drawing tools
- • Master documents—to group a collection of documents into a single document
- • Change tracking during revisions
- • Database integration, including a bibliography database
- • Export to POF, including bookmarks

PARTS OF WRITER INTERFACE
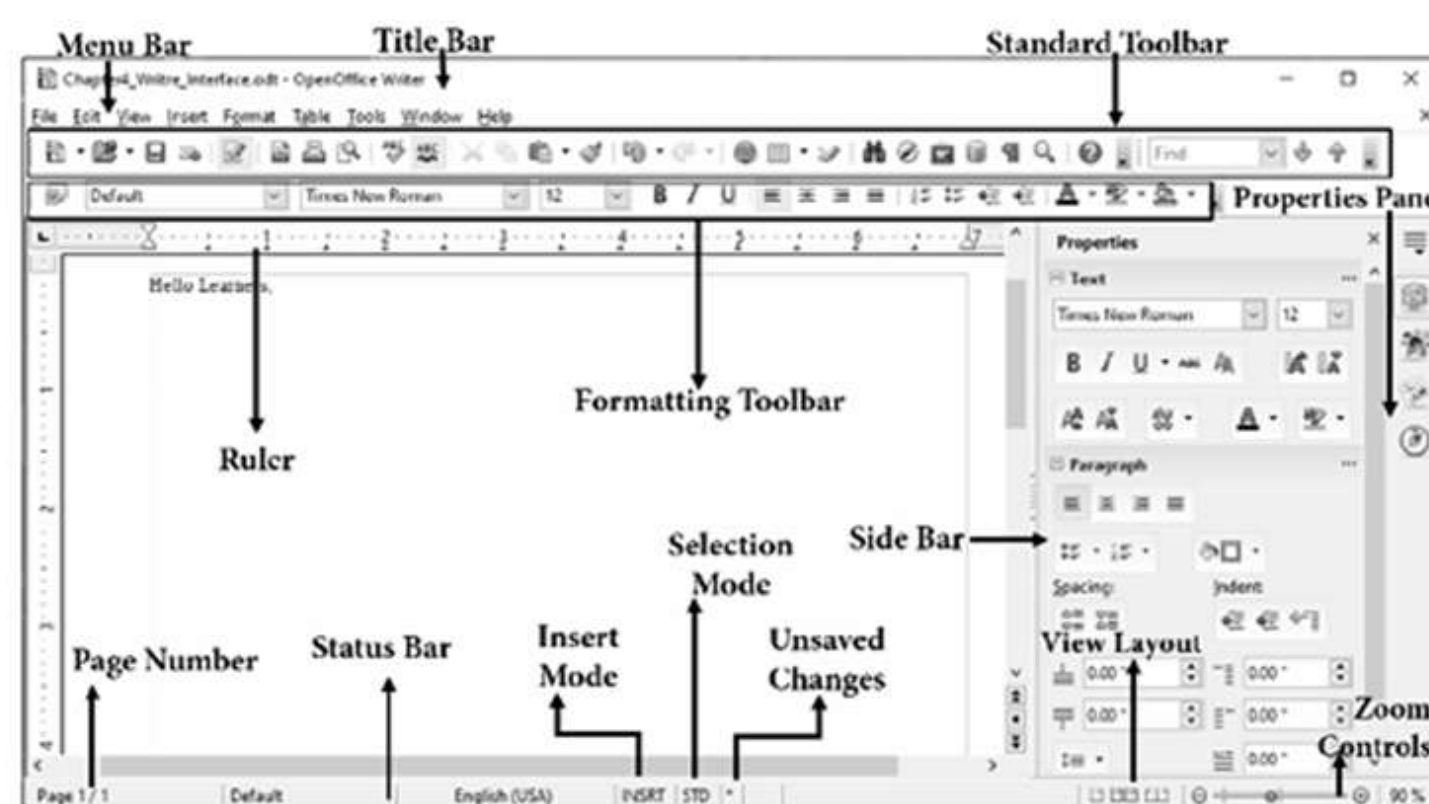
Fig. 4.6: OpenOffice Writer Interface

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 having various menus. When a menu is clicked it dropdowns displays several commands.They are:

1.**File Menu** – It contains commands which apply to the entire document such as Open, Close, Save As, Digital Signature, Prim, and Export as PDF.

2.**Edit Menu** – It contains commands which apply to the entire document such as Undo, Repeat, Auto Find and Replace, It also contains conunands to cut, copy and paste the contents of your document.

3. **View Menu**- It contains commands which control the display of documents such as print layout, web layout, Fullscreen view, Zoom control, etc. It also can show/hide various toolbars on the main window.

4. **Insert Menu** – It contains commands for inserting elements into header, footers, and pictures in the document, it also has commands to insert manual breaks, special characters, sections, hyperlinks, bookmarks, and cross-reference. Frames. objects, Movies, and sound can also be inserted with corresponding commands.

5.**Format Menu**-It contains formatting layout commands for our documents using Styles, Formatting, Paragraph, Bullets, and Numbering options.

6. **Table Menu** -It contains commands about manipulation of table structure e.g., insert, delete, merge, split, select. In addition, it also contains content formatting commands like AutoFormat, Autofit, sorting, etc.
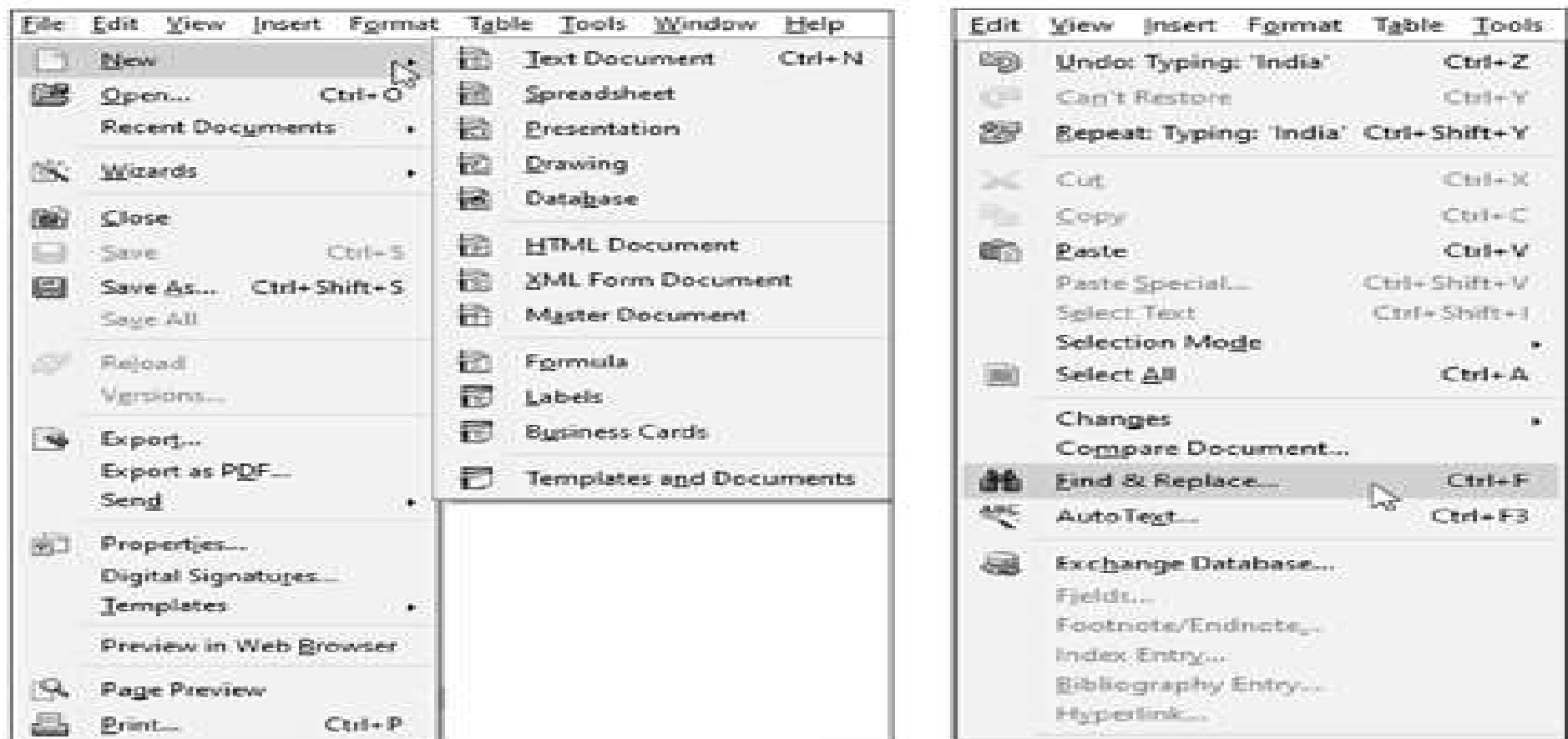
Fig. 4.7: Writer Interface Menus (a) File Menu (b) Edit Menu
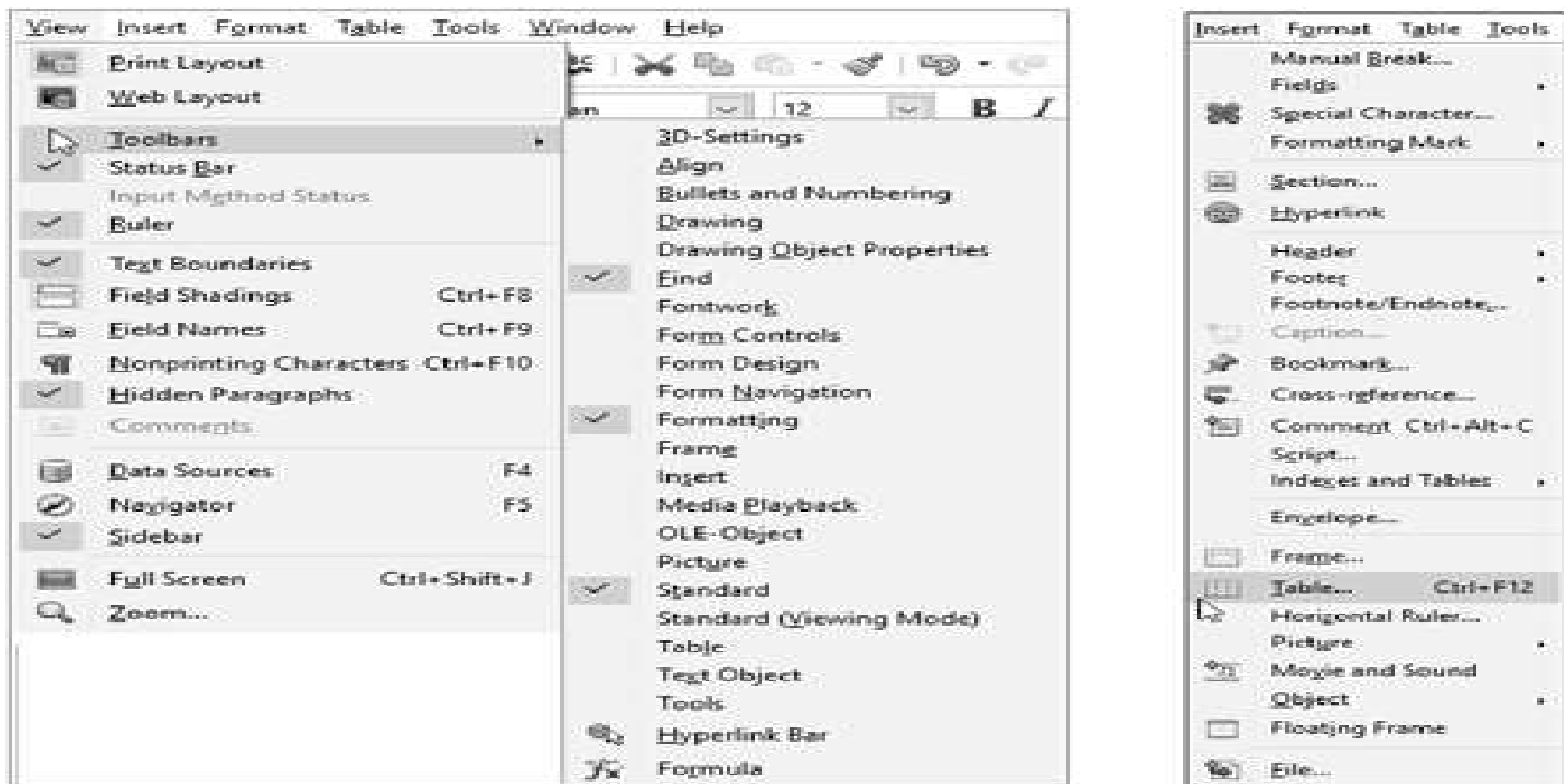
Fig. 4.8: Writer Interface Menus (a) View Menu (b) Insert Menu

7. **Tool Menu**-It contains various utility functions like Spelling and Grammar, Mail Merge Wizard, AutoCorrect, and Options.

8. **Window Menu** -It contains various commands to control the display of various opened writer windows. The new window command opens another window whereas the close command closes the current document. A list of opened documents can also be presented to switch between the documents.

9. **Help** contains open help file. options for any
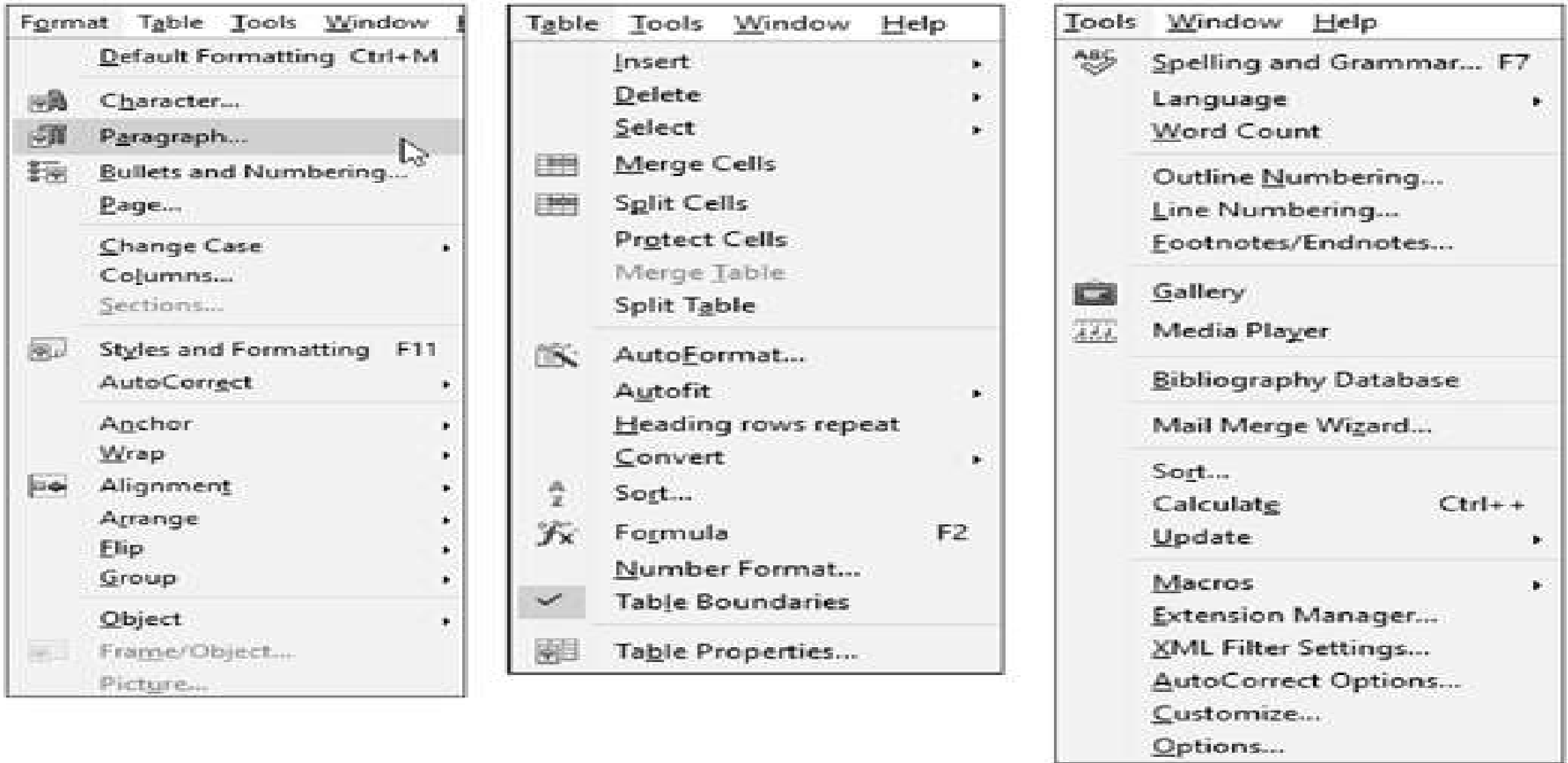
Menu-It link to the AOO Update check

Fig. 4.9: Writer Interface Menus (a) Format Menu (b) Table Menu (c) Tools Menu

available update for the software. It also gives information about the version and license information of the program.

Toolbars: As per mobility of toolbars, the writer supports several toolbars i.e., docked, floating. and tear-off toolbar. A docked toolbar is fixed by default, but it can be moved to different locations. The standard toolbar is a docked toolbar. The standard toolbar is also available in Cale, Impress and Draw programs or AOO. Floating toolbars are context-sensitive. It appears as per the current cursor position or selection. Tear-off toolbars can be opened via a triangle on toolbar icons. We may hide or move various toolbars are listed below:

• To display or hide toolbars, choose View ⬜ Toolbars, then click on the name of a 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.
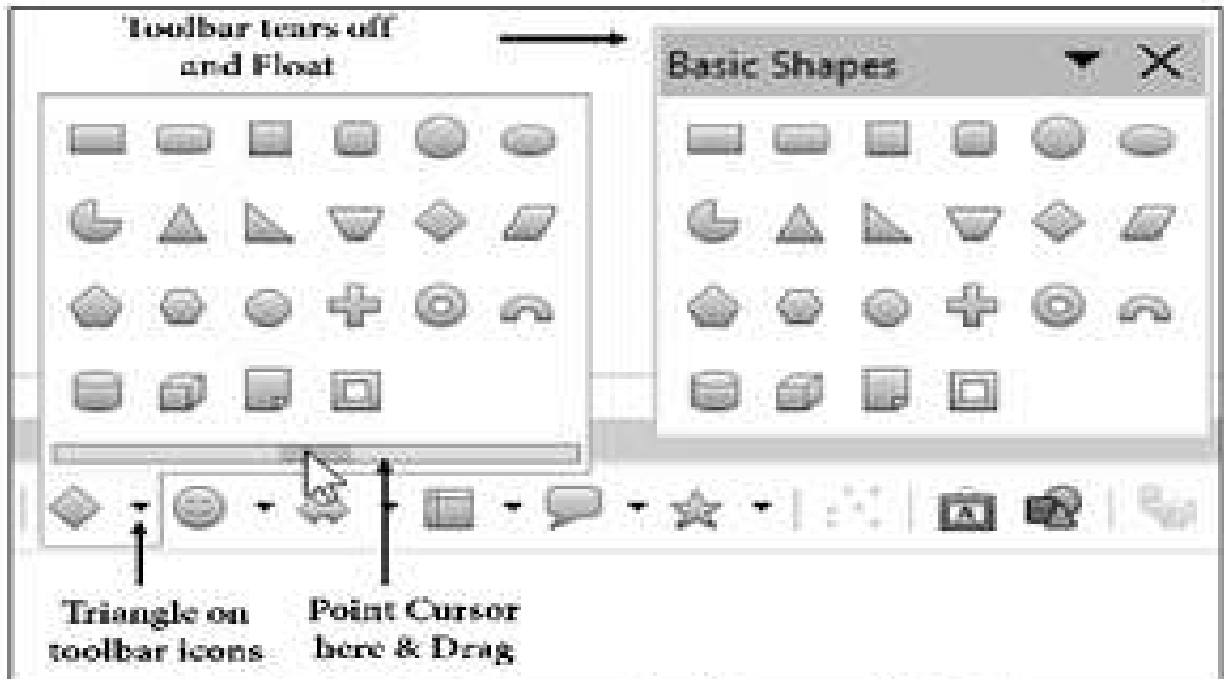
Fig. 4.10: An Example of Tear-off Toolbar

Right-click (context) menus: Users can right-click on a paragraph, graphic, or other objects to open a context menu. It is the fastest and easiest way to reach a function of the right-clicked object, If you're not sure where in the menus or toolbars a function is located, you can often find it by right-clicking.

Rulers: Rulers are used to control and see page margins, paragraph indents, and various alignment of writer objects. It can be shown or hidden via ruler check mark in view menu. To enable the vertical ruler, navigate to Tool ▯ Options ▯ OpenOffice.org Writer ▯ View and select Vertical ruler.

Status bar: The Writer status bar is located at the bottom of the workspace. It provides information about the document and convenient ways to quickly change some document features. It is shown at the bottom of Fig. 4.6. It contains page number, page style, language, writer mode, file save status, digital signature, document view layout, page zoom controls, etc.

STARTING A DOCUMENT: There are many ways to open a fresh text document in AOO Writer.

1. 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 Programs ▯ Writer or "Impress, Cal & Draw".
- Alternatively, you may just hit the windows key/ search button on the bottom right corner of windows 10 and simply type "writer"; it will show an icon for the Writer App; Clicking the icon, we will have new document opened.

2. Via QuickStarter:

- We can use this method to open a fresh document. For the purpose we have to enable this feature one time by Tools Menu ▯ Options ▯ OpenOffice ▯ Memory ▯ OpenOffice QuickStarter.

3. Via Start Center:

- Open Start Center by clicking on the OpenOffice icon (either on desktop Shortcut icon or by Start ▯ Programs ▯ OpenOffice App). Now we Can open a new document With the start center option "Text Document" or by Templates ▯ New Document.

4. Via File Menu:

- If a document is opened and we want another to open, then the option of the File menu ▯ New Text Document (Shortcut Key Ctrl + N) can be used.

OPENING A DOCUMENT : An already created document can be opened in several ways.

1. **Via QuickStarter**: Open QuickStarter and then click on the open document. It will show an open dialog box to browse for the desired file Io be open.
2. **Via Start Center**: Open Start Center by clicking on the OpenOffice icon (either on the desktop shortcut icon or by Start ▯ Programs ▯ OpenOffice App).
   - Click on the Open... icon, We can open from a list of recent documents.
   - The document can also be open from the menu option File ▯ Open (shortcut key Ctrl + O)
   - Recent Documents list of the File menu

SAVING A DOCUMENT: A newly created document can be saved in many ways.

- Select File ▯ save
- Select File ▯ Save As
- Click on the Save Icon (floppy icon) on the standard toolbar.
- Short cut key (Ctrl + S)

When we apply any of the above actions, a save as dialog box will open. We have to provide Ihe name of the file, its type, and the location where we want to save the file. We can save a document in various supported formats.

CLOSING A DOCUMENT: A document can be closed in many ways.

- Select File —+ Close
- Cross Icon at right most Of 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 to save the modifications. Select Discard if do not want to save the last modifications and select cancel if you want to work on the document again.

PRINTING A DOCUMENT

1. Quick Printing: This option can be utilized to quickly send a document to your default printer, Click on the "Print File Directly (Default printer name)" icon on the standard toolbar.

2.Controlled Printing: It is a customized printing option. We can set parameters for printing. To execute this command, select File ▯ Print or Keyboard shortcut Ctrl + P will open a print dial box. We have to provide our printing preferences like page range to be pint, printer name, number of copies, order of printing, page setup, quality Of printing, layout (pages per sheet), etc. Then click on the Print button.

SELECTION, CUTTING, AND PASTING IN A DOCUMENT: Selection, cut and Paste operation in the AOO Writer application is the same as in other applications of a computer system. We can use mouse, keyboard, menu commands to perform these operations. Text can be copied within the document or between various other documents.

To cut or copy (With text selected) you can use:

- Keyboard shortcuts: Control + X (cut) or Control + C (copy)
- Menu selections: Edit ▯ Cut or Edit ▯Copy
- Contextual menus: Right-click text selection and choose Cut or Copy
- Icon sources: Cut or Copy

Pasting text places, the cut or copied text in the document. When pasting text, the formatting result depends on the source and how you paste it. To paste and retain original formatting use:

- Keyboard shortcut: Control + V
- Menu selection: Edit ▯ Paste
- Contextual menu: Right-click and choose Paste
- Icon Source: Paste

CHARACTER FORMATTING: We can apply many formats at the character level using the command buttons on the Formatting toolbar. The Formatting toolbar is shown below as a floating toolbar, customized to show only the icons for character formatting.
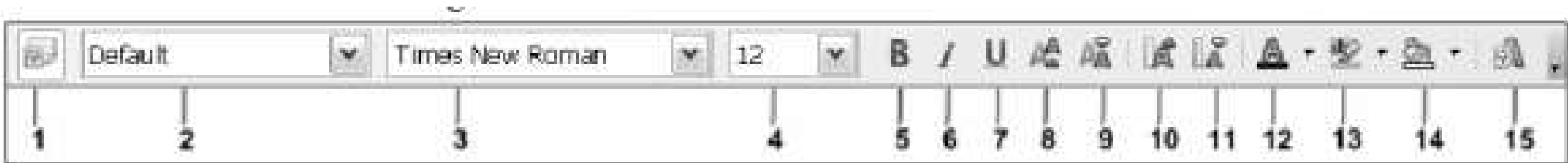
Fig. 4.16: Formatting Toolbar Showing Icons for Character Formatting

1. Style and Formatting Windows 2. Apply Style 3. Align left 4. Centered 5. Align Right 6. Justified 7. Line spacing:1

8. Line spacing :1.5 9.Line spacing:2 10. Numbering On/Off 11. Bullets On/Off 12. Decrease Indent 13. Increase Indent 14.Paragraph format dialogue

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 & Replace" dialog box. The dialog box can be opened via the standard toolbar's binocular icon or Ctrl + F Keys or Edit Menu ▯ Find & Replace command

The Find & Replace dialog can be utilized for various search tasks as described below:

- Find and replace words and phrases
- Use wildcards and regular expressions to fine-tune a search
- Find and replace specific formatting
- Find and replace paragraph styles

The Find & Replace process is performed as:

1. Type the text you want to find in the Search for box.
2. Type the new text in the Replace with box.
3. You can select various options such as matching the case, matching whole words only, or doing a search for similar words.
4. When you have set up your search, click Find. To replace text, click Replace instead.

SPELLING AND GRAMMAR CHECKING

The Writer provides a spelling and grammar checking facility, accessed via Tools ⯈ Spelling and Grammar or F7 shortcut Key or by clicking on icons on the standard toolbar .

- Dictionary language can be changed on the Spelling and Grammar dialog box.
- By default, a Grammar checker is not available but that can be installed as an extension. Navigate to Tools ⯈ 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 Io add it do.

AUTOCORRECT

The writer's AutoCorrect function has a long list of common misspellings and typing errors, which it corrects automatically. Select Tools ⯈ AutoCorrect options to open the AutoCorrect dialogue box .There you can define what strings of text and corrected and how. To stop the Writer from replacing a specific spelling , go to the Replace tab, highlight the word pair and click Delete.

OPENOFFICE CALC

Calc is the spreadsheet component of Apache OpenOffice. It contains most of the features found in spreadsheets. Spreadsheets allow us to organize, analyze and Store data in tabular form. In spreadsheet we can manipulate this data to produce certain results. Calc is similar to Microsoft Excel and capable of opening and saving various spreadsheet file formats. Other features provided by Calc include:

- Calc consists of several individual sheets, each sheet of cells arranged in rows and columns.
- Functions, which can be used to create formulas to perform complex calculations on data
- Database functions, to arrange, store, and filter data
- Dynamic charts; a wide range Of 2D and 3D charts
- Macros, for recording and executing repetitive tasks
- Ability to open, edit and save Microsoft Excel spreadsheets
- Import and export of spreadsheets in multiple formats, including HTML, CSV, PDF, etc.

Introduction to Spreadsheet, Sheets, and Cells:

In Calc, we create files that are called spreadsheets consists of several separable sheets. Each sheet containing cells arranged in rows and columns. A specific cell is identified by its row number and column letter. Each spreadsheet can have many sheets, and each sheet has a large number of individual cells. In Calc, each sheet can have a maximum Of 1,048,576 rows and a maximum Of 1024 columns.

PARTS OF CALC INTERFACE
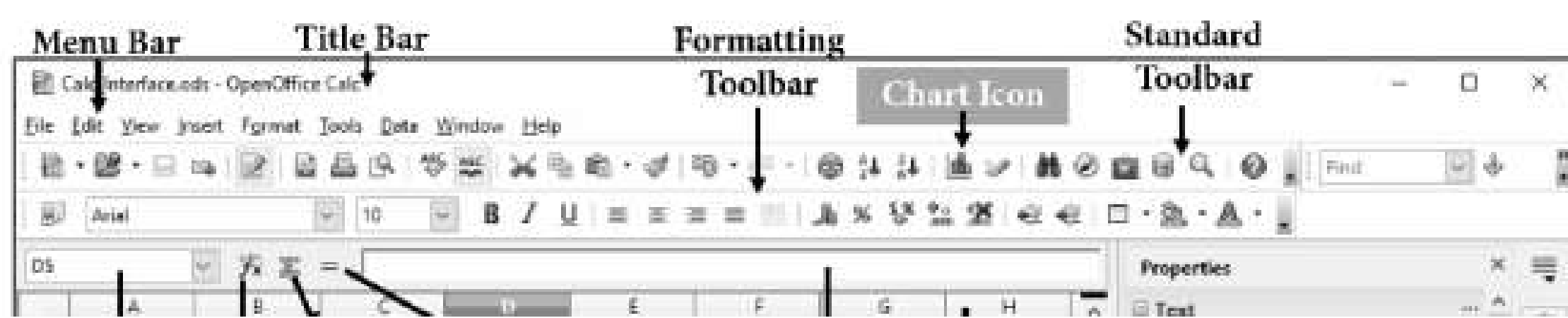
Formula bar

It consists of various controls which are annotated with dark background color. The Name box holds the address of the currently selected cell which is D5 in our case. The Function Wizard is used to view or insert available inbuilt functions. It also shows the parameter list and syntax of the functions. Clicking the Sum button inserts a formula into the current cell that totals the numbers in the cells above the current cell, Clicking the Function button inserts an equal (=) sign into the selected cell and the input line, thereby enabling the cell to accept a formula.

Individual cells

The main section of the screen displays the cells in the form of a grid, will each cell being at the intersection of a column and a row. At the top of the columns and at the left end of the rows are a series of gray boxes containing letters and numbers. These are the column and row headers. The columns Start at A and go on to the right, and the rows start at 1 and go down.

Sheet tabs

At the bottom of the grid of cells are the sheet tabs. These tabs enable access to each individual sheet, with the visible (active) sheet having a white tab. Clicking on another sheet tab displays that sheet, and its tab turns white. You can also select multiple sheet tabs at once by holding down the Control key while you click the names.

Starting, Opening, Saving, and Closing a Document

Starting of CALC document can be via an Operating system Menu, Via Quick Starter, and Via Start Centre. An already created CALC document can be opened Via QuickStarter or Via Start Centre as discussed previously. Similarly, saving and closing of a document also follow The AOO's standard procedure as we discussed during the Writer component.

Freezing/Unfreezing Rows and Columns

Freezing locks, several rows at the top of a spreadsheet or several columns on the left of a spreadsheet or both. Then when scrolling around within the sheet, any frozen columns and rows remain in view.

Freezing a row and a column

1. Click into the cell that is immediately below the row you want frozen and immediately to the right of the column you want to be frozen.
2. Choose Window ⯈ Freeze. A dark line appears, indicating where the freeze is put.

Unfreezing

To unfreeze rows or columns, choose Window ⯈ Freeze. The checkmark by Freeze will be removed.

CREATING A CHART

- Calc supports a variety of charts and graphs to present numeric data efficiently and conveniently. Using Calc, you can customize charts and graphs to a considerable extent. Many of these options enable you to present your information in the best and clearest manner.
- step-by-step process will help us for easier understanding:
1. Insert data into the CALC which is Io be graphically presented.
2. Select the data to be included in Chart/Graph formation.
3. Either press The Chart icon on standard toolbar or click on Insert ⬜Chart option.
4. It will show a Chart Wizard with the default formation of the chart as per the given data. Now with chart wizard, we can customize our chart.

The Chart Wizard has three main parts: a list of steps involved in setting up the chart, a list of chart types and the options for each chart type. Chart wizard includes four steps to draw a powerful chart:

1. Choosing a chart type: A variety of chart types are provided; we can select any of them by clicking the icon of the chart type. A preview will be shown to us for better selection.
2. Data Range: We can manually reselect the data range (if any error in the previous selection)
3. Data Series: We can fine-tune the data that we want to include in the chart.
4. Chart elements: With the chart elements page, we can give title, subtitle, legends to our chart.

CREATING FORMULAS

In CALC, we can enter formulas in two ways, either directly into the cell itself or at the input line, Either way, we need to start a formula with one of the following symbols=,+ or -- . Starting with anything else causes the formula to be treated as if it were text. Each cell on the worksheet can be used as a data holder or a place for data calculations. Entering data is accomplished simply by typing in the cell and moving to the next cell or pressing Enter. With formulas, the equals sign indicates the cell will be used for a calculation.

Table 4.3: Common Ways to Enter Formulas in CALC

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 the multiplication of A1 and A2.
=ROUND(A1;1)	Displays the contents of cell A1 rounded to one decimal place.
=EFFECTIVE(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:B65536)	Sums all numbers in column B.
=AVERAGE(BloodSugar)	Displays the average of a named range defined under the name BloodSugar.
=IF(C31>140; "HIGH"; "OK")	Displays the results of a conditional analysis of data from two sources. If the contents of C31 is greater than 140, then HIGH is displayed, otherwise OK is displayed.

Fig. 4.23: Creating Chart with Chart Wizard

OPENOFFICE IMPRESS

Impress is Apache OpenOffice's slide show (presentation) program. Impress creates presentations in the ODP format , which can be opened by other presentation software or can be exported in different presentation format. We can create slides that contain different elements , including text, bulleted and numbered list, table charts, clip art, and wide range of graphic objects. Impress also includes a spelling checker, a thesaurus, prepackaged text styles, and attractive background styles.

CREATING NEW PRESENTATION

Firstly, start the impress in one of the following ways:

- If no component of AOO is open, from the Start Center: click on the presentation icon.
- From the system menu or the AOO Quickstarter.
- From any open component of AOO: click the triangle to the right of the new icon on the main toolbar and select Presentation from the drop-down menu or choose File ⯈ New ⯈ Presentation from the menu bar.

When you start Impress for the first time, the presentation wizard is shown.

1. Under Type , choose one of the options:
    - Empty presentation creates a blank presentation.
    - From template uses a template design already created as the basis for a new presentation. The wizard changes to show a list of available templates .Choose the template you want.
    - Open existing presentation continues work on a previously created presentation. The wizard changes to show a list of existing presentations. Choose the one you want.
2. Click next.
3. Choose a design under Select a slide design. The slide design section gives you two main choice: Presentation Background and Presentations. Each one has a list of choices for slide designs. If you want to use one of these other than <Original>, click to select it. When you click an item, a preview of the slide design appears in the Preview window. <Original> is an empty background. Click an item to see preview of the slide design in the Preview window.
4. Select how the presentation will be used under Select an output medium.
5. Click Next. Select the desired speed for the transition between the different slides in the presentation from the speed drop-down menu. We have chosen "Fast Speed" with "Wipe Right" effect .
6. Click Create .A new presentation is created.

PARTS OF IMPRESS INTERFACE
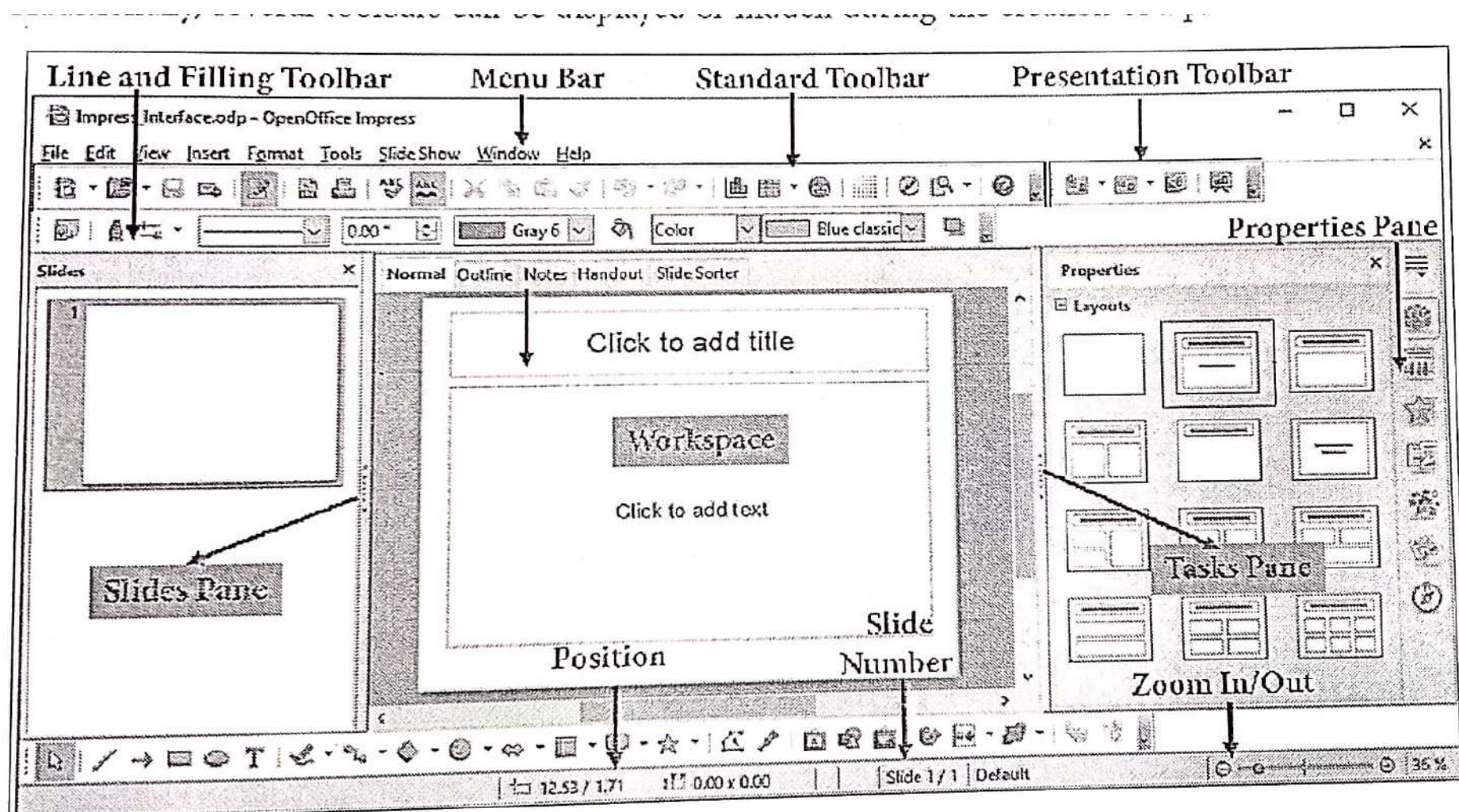

Fig. 4.27: Open Office IMPRESS Interface

Slides Pane: The Slides pane contains thumbnail pictures of the slides in your presentation. Clicking a slide in this pane selects it and places it in the Workspace. When a slide is in the Workspace, you can apply to it any changes desired. Several additional operations can be performed on one or more slides simultaneously in the Slides pane:

- Add new slides to the presentation.
- Mark a slide as hidden, delete a slide from the presentation if it is no longer needed.
- Rename a slide, duplicate a slide or move it to a different position in the presentation.

Tasks Pane: The Tasks pane has several sections. To expand the section you wish to use, click on the right-pointing triangle to the left of the caption. Only one section at a time can be selected:

1. **Master Pages**: Here you define the page style for your presentation.

2. **Layout**: The pre-packaged layouts are shown here. You can choose the one you want, use it as it is, or modify it to your requirements.

3. **Custom Animation**: A variety of animations for selected elements of a slide are listed. Animation can be added to a slide, and it can also be changed or removed later.

4. **Slide Transition**: We can select transition type. its speed (slow, medium, fast), choose between an automatic or manual transition, and choose how long the selected slide will be shown.

WORKSPACE: The Workspace has five tabs: Normal, Outline, Notes, Handout, and Slide Sorter. These five tabs are called View buttons. The Workspace below the View buttons changes depending on the chosen view.

1. **Normal view**: Normal view is the main view for working with individual slides. Use this view to format and design and to add text, graphics, and animation effects.
2. **Outline view**: The outline view contains all the slides of the presentation their numbered sequence. It shows topic titles, bulleted lists, and numbered lists for each slide in outline format. Only the text contained in the default text boxes in each slide is shown.
3. **Notes view**: Use the Notes view to add notes to a Slide.

    a. Click the Notes Lab in the Workspace.

    b. Select the slide to which you want to add notes.

    c. In the text box below the slide, click on the words Click to add notes, and begin typing.

4. **Handout view:** The handout view is for setting up the layout of your slide for a printed handout. Click the Handout tab in the workspace, then choose Layouts in the Tasks pane. We can choose to print 1, 2, 3, 4. 6, or 9 slides per page.

5. **Slide Sorter view**: Slide Sorter view contains all of the slide thumbnails. Use this view to work with a group of slides or with only one slide.

TOOLBARS

Many toolbars can be used during slide creation; they can be displayed or hidden by clicking View Toolbars and selecting from the menu.

STATUS BAR

The Status bar, located at the bottom of the Impress window, contains information that you may find useful when working on a presentation.

NAVIGATOR

The Navigator displays all Objects contained in a document. It provides another convenient way to move around a document and find items in it. To display the Navigator, click its icon on the Standard toolbar, choose View Navigator on the menu bar, or press Ctrl+Shift+F5.

FORMATTING A PRESENTATION:

A new presentation only contains one empty slide.

Inserting slides: This can be done in a variety of ways:

- Insert Slide.

- Right-click on the present slide and select Slide -9 New Slide from the pop-up menu.
- Click the Slide icon in the Presentation toolbar.

Sometimes, rather than starting from a new slide, want to duplicate a slide you have already inserted. To do so select the slide you want to duplicate from the Slides pane and then choose Insert Duplicate Slide.

Selecting a layout: In the Tasks pane, select the Layout drawer to display the available layouts. The Layouts differ in the number of elements a slide will contain, from a blank slide to a slide with six contents boxes and a title. To select or change the layout, place the slide in the work area and select the desired layout from the layout drawer in the task Pane. Several layouts contain one or more content boxes. Each of these boxes can be configured to contain one of the following elements: Text, Media clip. Picture, Chart, or Table. You can choose the type of content by clicking on the icon that is displayed in the middle of the contents box. If instead. you intend to use the contents box for text, just click anywhere on the box to get a cursor.

Modifying the slide elements: Our slide contains elements as per our chosen layout slide; We may remove unneeded elements and add objects (such as pictures), as well as insert text. To add any pictures or objects to the slide. follow these steps:

1. To add pictures from graphic files to places other than the clipart frame:

a. Insert ▯ Picture ▯ From File. The Insert Picture dialog box opens.

b. Browse to the graphic file. To see a preview of the picture, check Preview at the bottom of

the Insert picture dialog box. Select a picture and click Open.

c. Move the picture to its location.

d. Resize the picture, if necessary.

 2. To add text to a slide that contains a text frame, Click to add an outline in the text frame and then type your text. The   outline styles are automatically applied to the text as you insert it. You can change the outline level of each paragraph as well as its position within the text by using the arrow buttons on the Text Formatting toolbar.

3. 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.

Applying an Animation Effect: In Normal view, display the desired slide. Select the text or object want to animate. An object such as a graphic or an entire text box will have green handles around it when selected. In the Tasks pane, choose Custom Animation Click Add. The Custom Animation dialog box appears. Choose an effect from one of the pages of this dialog box and choose the speed or duration of that effect.

To choose the animation to be applied when the object is placed on the screen, use an effect from **the Entrance page**, for example, Fly In or Dissolve In. Use the **Emphasis page** to apply a basic effect, such as changing the font color, or to add special effects such as blinking text. To choose the effect to be applied when the object is leaving the screen, use the **Exit page** If you want the object to move along a line or curve, select an animation from the **Motion Paths page** Click to save the effect and return to the Custom Animation page on the Task pane. Here you can choose how to start the animation, change the speed. and apply some additional properties to the selected effect.

Starting an animation effect:

You have three choices for starling 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 the previous animation ends.

 Running the Slide Show:

To run the slide show, do one of the following:

- Click Slide Show —s Slide Show on the main menu bar.
- 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, let the slide show run by itself. If the slide transition is on mouse click, do one of the following to move from one slide to the next.

- Use the arrow keys on the keyboard to go to the next slide or IO go back to the previous one.
- Click the mouse button to advance to the next slide
- Press the Spacebar on the keyboard Io advance to the next slide.

When you advance past the last slide, the message Click to exit presentation...appears. Click the mouse or press any key to exit the presentation. To exit the slide show at any time including at the end, press the Esc key.

Printing a Presentation: Impress provides many options for printing a presentation: with multiple slides on one page, with a single slide per page, with notes, as an outline, with date and time, with page name, and more.

For more 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 and copies are also given in this tab. What we want to print is selected from the dropdown box under Print option. We may choose slides, Handouts, Notes, or Outline.

OpenOffice Impress tab is used to include slide-specific contents (slide name, date & time, etc.), color, size for the printing. The left pane is showing preview with two slides, it is configured in the **Page Layout tab** by pages per sheet set to 2. The options tab can be used for the "print to file" command.

Chapter- 05

Information Security Best Practices

5.1 INTRODUCTION TO INFORMATION SECURITY

5.1.1 What is information?

- Information is referred to as the act of informing. When any kind of meaningful data is processed in a meaningful form, it is termed information. Different kinds of data are face photo, name, address, Aadhar details, bank details, mobile no., email address, location, and biometric details.

5.1.2 What is Information Security?

- Information Security is defined as the processes and methodologies to protect the print, electronic, or any other form of confidential, private, and sensitive information or data from unauthorized access, use, misuse, disclosure, destruction, modification, or disruption.
- It is also termed InfoSec in short.

5.1.3 What are Information Security Goals?

There are three main goals protected by information security, collectively known as CIA triads.

1. **Confidentiality:** This feature indicates that authorized users should be allowed to access data or computer systems, it prevents unauthorized users from the disclosure of data hence protect the privacy of information. Confidentiality is maintained through access control mechanisms. Breaches of confidentiality can occur due to human error, physical theft, and system glitches, intentional sharing, skimming, etc.
2. **Integrity:** In the InfoSec integrity principle explains data should not be modified without authorization. It ensures the authenticity and accuracy of information. Integrity is achieved by imposing restrictions to modify the data. Users having permission to edit can only make changes.
3. **Availability:** It ensures that information should be available, whenever required. A legitimate (reasonable or acceptable) user reliably accesses demanded information with this attribute of information. For an ideal information system, it should avoid any kind of service disruption like power failure, hardware failure, etc. Continuity of access procedures, scheduled backups, and regular maintenance is useful to achieve this attribute.

- In addition to the above three key principles of InfoSec, there are two more, authenticity and non-repudiation.
  Authenticity: It ensures that only legitimate users can have access to the system resources. It is done via confirming their identities before granting any system resources to them. User name, password, email, biometrics, etc. is used to achieve authenticity.
  Non-repudiation: This principle ensures that the sender of data is provided with proof or delivery and the recipient is provided with proof of the sender's identity, so neither party can deny sending, receiving, or accessing the data. Security principles should be used to prove identities and to validate the communication process.

5.2 THREATS TO INFORMATION SECURITY:

5.2.1 Malware

These are the software created Io fulfil malicious intentions. Some malware is as under:

Ransomware: It prevents the user to access their operating systems or certain applications or any data by encrypting their data. Hackers demand money from victims to decrypt their files. The motive behind ransomware attacks is monetary. Crypto Locker, Conti, WannaCry are some examples of ransomware.

Trojan: It is a malware that appears to have normal functionality but in reality, its malicious activity creates backdoors entry into the target computer. Flame, Banker, Downloader, Zeus, and Beast are an example of some popular Trojans.

Worm: It is a vulnerable computer attack tool for the system. It works on the law of exponential growth thus it infects many more computers in a very short period. I LOVEYOU, Code Red, Explorer.zip, Love Bug, W32.Nimdas and W32.Sluxnel is an example of some popular worms.

Spyware: A malware that spy the user's information with the aim to harm them e.g., cookies on webpages and key loggers can log everything including your credentials.

Adware: It is malware that is designed to create revenue for its developers. It is also termed advertising-supported software. It tracks user's behaviour and sells out that information to interested third parties. To avoid adware, use an ad blocker.

Key loggers: A spyware that is designed for stealing the data via recording the keystrokes pressed by the user on their keyboard. An attacker may track your typing in a real-lime manner or afterward via a file used to store the keystrokes. Computer Spy, Kid logger, syprix are some examples of keyloggers.

Virus: It is computer programs that replicates and attaches itself to another legitimate computer program Io infect the computer system. Viruses disrupt the working of CPU, personal files, computer systems, etc. MyDoom, ILOVEYOU, Slammer, Stuxnet are some scariest viruses.

Sweepers: These are programs to wipe out data from the targeted machines.

Backdoor: If malicious users gain access to the system, they can install a program, used to create another way (backdoor) to enter into the system. The purpose is to gain unauthorized access to the system. Deep Throat, Portal of Doom, Subseven, NetBus are some popular backdoors.

5.2.2 Social Engineering Attacks

The people can be tricked or psychologically manipulated with help of technology to take some actions or divulge confidential information. Some popular attack is as under:

Phishing: It is one of the common types of social engineering scams. The hacker typically sends an email or text to the target, seeking information that might help with a more significant crime. For example, a hacker might send emails that appear to come from a source trusted by the victim. That source might be a bank for instance, asking email recipients to click on a link to log in to their accounts. Those who click on the link, though, are taken to a fake website that, like the email, appears to be legitimate. If they log in at that fake site, they are essentially handing over their login credentials and giving the crook access to their bank accounts

Vishing: It is the voice version of phishing. "V" stands for voice, but otherwise, the scam attempt is the same. The hacker uses the phone to trick a victim into handing over valuable information. For example, a hacker might call an officer, posing as a government officer. The hacker might prevail upon the victim to provide login credentials or other information that could be used to target the organization.

Smishing: It is the text version of phishing which is an acronym for SMS phishing.

Baiting: In such a scam a USB drive or other electronic media is preloaded with malware and supplied to users. When a user plugs this device into their system, malware will enable hackers to hack your computer.

Quid pro quo scam: It is another type of social engineering attack that involves an exchange as I give you this, and you give me that. Hackers make the victim believe as a fair exchange, but that's far from the case, as the cheat always comes out on top.

5.2.3 Network Threats

1. **Sniffers:** Sniffers are programs to monitor network traffic via tracing network packets. These canbe used to gather important information which will be helpful in the attack. Windump, tcpdum, wireshark are some examples of sniffers.
2. **Botnet:** An infected device is termed as the compromised device. When a group of suchcompromised devices (zombies) are under the control of some malicious user then the user can use this network of zombies to attack other systems. Such a zombie network is termed a botnet.
3. **Pharming:** Pharming is a process of illegal installation of malware on a computer or a network.
4. **Man-in-the-middle (MitM) attack:** Such an attack happens due to insecure communication. Insuch a cyber-attack attackers relay or possibly alter the ongoing communication between sender and receiver without their knowledge. An attacker can intercept requests and responses and hence becomeable to read the contents between the sender and receiver. There are various types of MitM attacks as under:

a. **IP spoofing:** IP spoofing is the creation of Internet Protocol (IP) packets that have a modified source address to either hide the identity of the sender, impersonate another computer system or both. It is atechnique often used by bad actors to invoke DDoS attacks against a target device or the surrounding infrastructure.

b. **Session hijacking:** A session between the user and the server can be hijacked by the attacker. Some of the methods used in Ibis regard are session fixing and session prediction. Here, usually, a valid session between the user and server is taken over by the attacker.

5. **Distributed denial of service (DDoS):** DDoS attacks occur when attackers overload server's orresources with requests. Attackers can perform these attacks manually or through botnets, networks of compromised devices used to distribute request sources. The purpose of a DDoS attack is to preventusers from accessing services or to distract security teams while other attacks occur.

5.3 COMBATING INFORMATION SECURITY THREATS

5.3.1 Firewall

A firewall is a dedicated device, or a computer, that monitors network traffic passing through it and allows routes to be rejected or approved based on rules. It is software or hardware that is usually placed between a secure network and an unsecured network, and it acts as a gateway that ensures that nothing private and malicious things can go out, is not coming in.

5.3.2 Data Backup

Data backup is the process of creating copies or duplicating the data. Data backup strategy is very common and useful in case or loss, deletion, or corruption of our data. It restores us work till last taken backup. Data backup keeps us capable of maintaining the integrity and availability goal of information security. Backup can be taken in three ways: incremental backup, differential backup and full back up.

5.3.3 Virtual Private Network (VPN)

The virtual private network is a network that is constructed by using public wires (usually the Internet) to connect to a private network, such as a company's internal network. Many systems enable the creation of networks using the Internet as the medium for transporting data. These systems use encryption and other security mechanisms to ensure that only authorized users can access the network and that the data cannot be intercepted.

5.3.4 Encryption

Plain data can be converted into a no readable format by applying some techniques. Encryption is such technique that disguises plain text to hide the actual data for the sake of achieving security. Cryptographic encryption techniques are used to protect the data and enforce confidentiality during its transmission and storage.

5.3.5 Anti-Virus Software

Anti-virus software not only protects & clean user from malware infection but it provides from several other attacks and keeps our information safe. Effective Anti-Virus Software is expected to provide the following features:

- Anti-Virus Features.
- Anti-Trojan Features.
- Anti-Spyware Features.
- Scan even compressed files.
- Automatically detect USB.
- Quarantine infected files.
- Instant Messaging Protection.
- Anti- Worm Features.
- Anti-Rootkit Features.
- Anti-Phishing Features.
- Scan e-mails.
- Automatically clean infected files.
- Registry Protection.

Some popular anti-virus software is Symantec Norton Anti-Virus, MacAfee Anti-Virus, KasperskyAnti-Virus, Bitdefender Anti-virus Plus, Avg Anti-Virus, Quick Heal, etc.

5.3.6 Intrusion Detection System (IDS)

IDS contain various tools for real-time monitoring of inbound and outbound traffic in suspect of threats. IDS system alerts the user in case of any fraudulent traffic approaches to our system.

5.3.7 Intrusion Prevention System (IPS)

IPS security solutions are advanced systems; these not only detect the fraudulent traffic source but prevent our system from their attack by blocking requests or ending user sessions. Mostly IDS and IPS are often used together. In IPS various rules and policies are created for incoming and outgoing packets. Policies check the packet information and depending on the traffic rule action to allow or deny is issued.

5.4 INFORMATION SECURITY BEST PRACTICES

5.4.1 General Computer Usage

Following is some or the best for computer use on day-to-day basis:

1. All classified work should be strictly carried out only on a standalone computer that is not connected to the internet.
2. Create strong passwords for login by using a combination of letters, numbers, and special characters with a minimum of 10 characters.
3. Computers should be protected from viruses/worms using Antivirus software permitted for use by your organization.
4. Make sure your operating system, application, and software patches including anti-virussoftware are up to date; and auto-updates are turned on in your computer.
5. Don't leave the computer unattended with sensitive information on the screen.
6. Always lock your computer before leaving workplace to prevent unauthorized access. A user canlock computer by pressing "ctrl +alt+del" and choosing "lock this computer" or "Window Key+ L".
7. Enable a password-protected screen saver with a timeout period of 2 minutes to ensure thatcomputers that were left unsecured will be protected.
8. Be careful of what you plug into your computer. Malware can spread through infected USBdrives, external hard drives, and even smart phones.
9. Use non-administrator account privileges for login to the computer and avoid accessing with administrator privileges for day-to-day usage.
10. Treat sensitive data very carefully and use encryption to securely encode sensitive information.
11. Back up your important files at regular intervals to avoid unexpected loss.
12. Remove unnecessary programs or services which are not required for day-to-day operation.
13. Do not give remote access, file, and print sharing option to other computers.
14. Do not use file-sharing software as file-sharing opens your computer to the risk of malicious files and attacks.
15. Avoid entering sensitive information onto a public computer like cybercafe, librarycomputers, etc.
16. If you store or download any personal information on computers in a cybercafe, make sureyou delete permanently all the documents after you are done with your work. You may pressthe Shift and Delete buttons together to make it difficult to recover deleted files.
17. Remove files or data you no longer need to prevent unauthorized access to such data. Merely deleting sensitive material is not sufficient, as it does not remove the data from your system. File shredder software should be used to delete sensitive files on computers.
18. Ensure to use an uninterrupted power supply to computers through UPS or other backup sources.
19. Do not plug the computer directly into the wall outlet as power surges may damage the computer. Instead, use a genuine surge protector to plug a computer.
20. The systems should be placed in a room that is dust-free and has good ventilation to avoid overheating of the CPU.
21. Supervise maintenance or rectification of faults in the system by service engineers.
22. Don't eat food or drink near the PC.

5.4.2 General Internet Browsing

Following is some of the best practices to keep in mind when browsing on the Internet

1. Always be careful when clicking on links or downloading. If it's unexpected or suspicious for any reason, don't click on it.
2. Do not download any type of files/software from any source other than those allowed by your system administrator/department.
3. Use a web browser that has been permitted by your organization.
4. Always use an updated web browser for browsing. An old version browser may contain security vulnerabilities and you risk having your computer compromised. Depending on the security exploit, your personal information (including emails, banking details, online transactions, photos, and other sensitive information) could be stolen or destroyed.
5. Do not store/ share any sensitive information on any device that is connected to the Internet,
6. The 'Save password' option prompted by the browser should not be selected. Don't save account information, such as passwords or credit card information in web browsers.
7. Look for the "https" sign with a green padlock icon in the browser address bar to verify thatsite is secure. The "s" in "https" stands for secure, meaning that the website is employing SSL encryption.
8. Enable multi-factor authentication (MFA) to all possible online accounts and services. It isused to verify your identity via a separate channel.
9. Make a habit of clearing history from the browser after each logout session.
10. No classified information of government can be stored on private cloud services (Google Drive,Dropbox, iCloud, etc.,) and doing so may make you liable for penal action, in case or data leakage.
11. When on tour, avoid using services that require location information, unless it is necessary for the discharge of official duties.
12. While browsing, some pop-up may appear with the option of a close button. These may be fake and may try to install spyware when you click. Beware of such pop-ups and avoid clicking on them.
13. Popup blocker option should be kept turned ON in the browser and may be selectively allowed for trusted sites if required. Doing so will help prevents any nuisance web ads or malware embedded in ads from appearing on screen.
14. Remember that things on the internet are rarely free. "Free" Screensavers etc., often contain malware. So be aware of such online free offers.
15. Avoid using public computers and public Wi-Fi connections to access and carry out any financial or sensitive transactions.
16. If your job requires you to access certain information systems in a secure way, it is advisable to use security controls such as MPLS link, VPN over the internet, etc., for such access.

5.4.3   Password Management

Unauthorized access is a major problem for anyone who uses a computer or devices such as smartphonesor tablets. The consequences for victims of this break-in can include the loss of valuable data such asclassified information, personal data, etc. One or the most common ways that hackers break into computers are by guessing passwords. Simple and commonly used passwords enable intruders to easily gain access and control a computing device. Following is some of the best practices to consider whileselling up and managing a password,

1. Create a strong password with a minimum length of ideally 10 characters and comprising of a mix of alphabets, numbers, and characters.
2. All passwords (e.g., email, computer, etc.) should be changed at least once every three months.
3. Don't reuse old passwords.
4. Passwords should not be stored in readable form in computers, notebooks, notice boards, or in any other location where unauthorized persons might discover or use them.
5. Treat passwords as sensitive information and do not share it with anyone.
6. Always use different passwords for every log-in account you have. Using the same password for more than one account risks multiple exposures if one site you use is hacked.
7. If your work requires you to communicate passwords, such as while sending a password for an encrypted file sent as an attachment through email it must be communicated through adifferent channel such as over a phone call or SMS.
8. Always decline the use of the "Remember Password" feature wherever it is prompted.
9. Remember weak passwords have Ihe following characteristics:
   - The password contains less than 10 characters.
   - The password is a word found in a dictionary (English or foreign).

- The password is a common usage words such as Names of family, pets, friends, colleagues,Movie / Novel / Comics characters, etc. Computer terms and names, commands, sites, companies' hardware, software.
- Birthdays and other personal information such as addresses and phone numbers.
- Word or number patterns like 123456, aaaaa, qwerty, asdfg, zxcvb, name@year, etc.

10. Some suggested ways to construct a strong password are as follows,
- A secure password not only consists of must also use numbers, special charactersand caps. One suggested way to replace letters with numbers and special characters, so an "i" will become "!", an "o" turns into a "0" and "s" is written as "$" This way, the simple term "Microsoft" changes to the substantially harder word "M!cr0$0ft".
- Password length matters, the longer the password, the harder it is to crack.
- Think of a sentence and select the first letters of each word in a row will get a complex password and easy to remember as well.

11. Password history should be enforced wherever possible to ensure that the users are forced to select different passwords with a user account.
12. Maximum password age should be configured to enforce the period (e.g., 90 days) that a password can be used before the system forces the user to change it.
13. Do not reveal a password in email, chat or other electronic communication.
14. Do not speak about a password in front of others.
15. Do not hint at the format of a password.
16. Do not reveal a password on questionnaires or security forms.

5.4.4 Removable Information Storage Media

Removable Information Storage Media (RISM) means any device which is capable of storing electronic information in any form. Device or media that is readable and/or writeable by the end user and can be moved from computer to computer without modification to the computer.

For example, CDR (multi sessions), CD-RW, DVD-RW, BluRay Disk, MOD, USB Storage devices (Pen Drives, Media Cards, etc.), MP3 Players, MP4 Players, Smart Phones, Digital Cameras Watches with memory, Various types of Memory cards, Internet Data Card, External Hard Disk, or any other gadget having memory space and could be connected to a system through USB or COM or any otherports or device connected through Network Share falls under Removable Information Storage Media.

Following is some of the best practices to be considered while dealing with Removable storage media:

1. Auto run/ Auto play feature must be disabled for all removable media.
2. The classified data should be encrypted before copying into the removable storage media designated to store classified information.
3. Classified information should be stored only on organization allocated removable storage media for work purposes.
4. The computers should be enabled with the "Show hidden file and folders" option to view the hidden malicious files in USB storage devices
5. It is advisable to scan all removable media with anti-virus software before use.
6. Removable media like USB's, CDs, etc., must not be left unattended.
7. Technical controls may be implemented to restrict the use of portable storage media drives outside of the Government network.
8. Removable media should not be taken out of office unless permitted by the competent authority in your Office.
9. In order to minimize physical risk, loss, theft or electrical corruption, all storage media must be stored in an appropriately secure and safe environment.
10. In case or damage or malfunction of device, the same should be returned to the designated authority in your office for repair/replacement. Never hand over such devices to outsiders or other vendors for repair as they might have classified information.
11. If the USB device is no longer a functional requirement after issuance, then the same should be returned to the issuing authority.
12. The contents of removable media must be removed/erased after the official purpose has been served.
13. Avoid Baiting. (Someone gives you a USB drive or other electronic media that is preloadedwith malware in the hope, you will use the device and enable them to hack your computer).Do not use any electronic storage device unless you know its origin is legitimate and safe.
14. Scan all electronic media for Malware before use.

5.4.5 Email Communication

Following is some of the best practices in regards to email communication:

1. Avoid downloading email attachments or clicking on suspicious links received in emails from unknown or untrusted sources.
2. Classified information be not communicated via emails. In case or emergent requirements to do so, the approval of competent authority should be obtained.
3. Avoid accessing official email accounts from public Wi-Fi connections.
4. Auto save of password for email accounts should not be enabled.
5. Logout from mail accounts after your work is done.
6. User should type the complete URL in the browser instead of clicking links received in an email.
7. Do not open / forward / reply to any suspicious e-mails.
8. Be cautious on tiny or shortened URL's (appears like hltp://tiny.cc/balj5y) and don't click on it as it may take you to a malware infected website.
9. Do not open attachments having extension such as EXE, DLL VBS, SHS, PIE SCR. Typicalexamples, .lxt.exe, doc.exe
10. Enable multi-factor authentication for login into your email client program.
11. Users must Check their last login details While accessing the Email account.
12. Use of encryption and digital signature certificate (DSC) may be considered for emails deemed necessary.
13. Email IDs should have a strong password (at least 13 characters with alphanumeric and specialcharacters).
14. Once in every 30 days, the email passwords should be changed.
15. Before opening any attachment, the same should be scanned through an updated anti-virus for malicious contents.
16. Do not keep mails in Inbox, sent box, draft, etc. which are no longer required.
17. Before accepting the SSL certificate, the user should verify the authenticity of the certificate.
18. Make a habit of clearing history from the browser after each logout session.
19. DO not click any URLs mentioned in the body Of the E-Mail text until you are sure that it is a legitimate URL.
20. Some malicious program starts executing as soon as they appear on the Outlook Expresspreview pane. Disable that option (view → layout→uncheck "show preview pane").
21. Don't open unsolicited or unexpected attachments. If you can't verify an attachment islegitimate, delete it.
22. Don't log in to websites or online applications unless the login page is secure (HTTPS).
23. Don't enter personal or sensitive information online unless you are using a trusted, secure webpage.

5.4.6 Home Wi-Fi Network

In order to secure home Wi-Fi network, following are some ofthe best practices:

1. Turn on WPA2 or higher encryption feature in wireless routers.
2. Change the default network device name, also known as its service set identifier or "SSID."When a computer with a wireless connection search for and displays the wireless networks nearby, it lists each network that publicly broadcasts its SSID. It is advisable to have an SSID name which does not disclose your identity in any manner.
3. Change the network device default password. Unauthorized users may be familiar with thedefault passwords, so it is important to change the router device's password.
4. Consider using the Media Access Control, or " MAC," address filter in your wireless router. Every device that can connect to a Wi-Fi network has a unique ID called the "physical address"or "MAC" address. Wireless routers can screen the MAC addresses of all devices that connect to them, and users can set their wireless network to accept connections only from devices with MAC addresses that the router will recognize.
5. Turn off your wireless router when not needed for any extended period.
6. Update Ihe firmware of wireless devices regularly as it will reduce the number of security loopholes in the device.
7. Disable remote management feature in routers to protect against unauthorized access.
8. Information/Data on the Wi-Fi Network should always be in encrypted form.
9. Do not connect the access point directly Io the wired network. As there is a chance of compromised wireless client, in turn, affecting the systems in the wired network, a firewall and an antivirus gateway should be placed between the access point and the wired network.
10. Do not auto-Connect to open Wi-Fi Networks.
11. Do not use WEP encryption use WPA2 or higher graded encryption.

12. When the number of users accessing the access point is less, it is recommended to disable the DHCP service. As this may make the attackers easy, to connect to the network once they get associated with the access point.
13. All ADSL Broadband routers should be adequately secured.
14. Disable web and telnet services from outside the network.
15. Change the default passwords of all the network devices.
16. Turn Off the Network during extended periods of non -Use.
17. Disable DHCP service.
18. Try to use your ISP DNS rather than open DNS IP addresses.
19. Always configure ISP provided DNS IP address in the computer rather than automatically obtaining the same from ADSL device.
20. If the update option is available in the ADSL device, update the firmware from the legitimatevendor's website.

5.4.7 Avoiding Social Engineering Attacks

Social Engineering is an approach to gain access to information through misrepresentation. It is the conscious manipulation of people to obtain information without realizing that a security breach is occurring. It may take the form of impersonation via telephone or in person and through email.

Following is some of the best practices should follow to avoid social engineering attacks:
1. Be careful to unsolicited phone calls, visits, or email messages from individuals asking about personal or other Government information. If an unknown individual claim to be from alegitimate organization, try to verify his or her identity directly with the company.
2. To protect yourself from phishing do not reveal personal, sensitive, or financial information in email or messages, and do not respond to such emails.
3. Don't reveal any sensitive information over phone calls to protect against vishing.
4. Don't reveal any sensitive information over SMS to be safe against smishing.
5. Avoid online conversations to strangers to be safe from Quid pro quo scams.
6. Be cautious of the URL of a website. Malicious websites may look identical to a legitimate site, but the URL may use a variation in spelling or a different domain (e.g., .com vs. -net). In general, all government websites have **gov.in or nic.in** at the end of their names. For example, a malicious website may have name as www.mhagov.in or www.mha-gov.in against the actual name www.mha.gov.in.
7. It's safer to type a URI, into your browser instead of clicking on a link. Hovering over links in email will show the actual URL at the bottom, but a good fake can still steer you wrong.
8. Hacker wants you to act first and think later. If the message conveys a sense of urgency oruses high-pressure sales tactics be skeptical; never let the urgency influence your careful review.
9. If you receive an email from a foreign lottery or sweepstakes, money from an unknown relative, or requests to transfer funds from a foreign country for a share of the money it is guaranteed to be a scam and do not respond and delete such emails.
10. Immediately change any passwords you might have revealed to anyone. If you used the same password for multiple resources, make sure to change it for each account, and do not use that password in the future.
11. Some emails entice the recipient into opening an attachment that activates a virus or malicious program into your computer.
12. Be suspicious of unsolicited phone calls, visits, or email messages from individuals asking about employees or other internal information. If an unknown individual claim to be from a legitimate organization, try to verify his or her identity directly with the company.
13. Do not provide personal information or information about your organization, including its structure or networks, unless you are certain of a person's authority to have the information.
14. Do not reveal personal or financial information m an email, and do not respond to email solicitations for this information. This includes the following links sent in email.
15. If you are unsure whether an email request is legitimate, try to verify it by contacting the company directly. Do not use contact information provided on a website connected to the request instead, check previous statements for contact information.
16. Install and maintain anti-virus software, firewalls, and email filters to reduce some of this traffic.
17. Take advantage of any anti-phishing features offered by your email client and web browser.
18. Immediately change any passwords you might have revealed. If you used the same password for multiple resources, make sure to change it for each account, and do not use that password in the future.

5.4.8 Smart Device (Smart Phone, Tabs, etc.)

The smart device is a device having any of the features like computation power, Internet access, storage capability, camera, recordings, GPS, etc. Smartphone, Tablets, etc. falls under this category. Most of the Smart

Phones and Tablets (Tabs) are having equal computing power to normal Desktop / Laptop systems. Gadgets are capable of delivering many services on Video, Voice, GPS, and Other computational apps like any other computer. Therefore, all cyber security issues related to computers are also applicable to these devices. Some important practices for safeguard are enlisted:

1. Smart devices must not be used for sensitive telephonic conversation. The Wi-Fi and blue-tooth should be kept in turned-off mode.
2. A low-end basic mobile phone without a camera / internet / Wi-Fi may be carried for sensitive voice conversation and contact details.
3. Internet connection in the Smart device Will normally be kept in off-mode and it Will be made'on' on a need basis to access the internet.
4. No free Apps should be loaded in the Smart device.
5. During repairs, don't leave the device unattended to protect it from malware installation.
6. Relevant anti-virus software should be installed in the smart device too.
7. If the Smart device gets de-activated for any reason for a few hours/one days, the service provider should be contacted immediately to ascertain the reason for deactivation.
8. If the battery gets unusually discharged very fast or the device gets heated up without any useractivity, then it is very likely some malicious traffic is consuming the battery.
9. Free Wi-Fi should not be used at public places such as airports. Turn Off blue-tooth and when the use of the same is not required for operational purposes. Even when the same is in use, set the default blue-tooth / Wi-Fi configuration to "non-discoverable".
10. A compromised smart device should not be connected to a computer even to charge.
11. Turn off the applications which are not needed.
12. When a device is idle, it should get locked and require a password/pin or swipe pattern. Set the device to lock in a relatively short time.
13. Don't reply or click on the link on SMS or messages sent by strangers.
14. Don't jail-break your device as jail-breaking removes the restrictions on which apps can be installed or not installed. This removes the protection set by the company.
15. Watch for unauthorised GPRS/data connection during an idle mode of the Smart device.
16. Check the memory frequently if any unusual data is stored there. Malware stores temporarily, the data collected in the memory of the phone till the same is sent to the destination.
17. A suitable non-transparent tape/sticker may be applied to block the camera view.
18. Think before you click, download, forward, or open. Before responding, registering,downloading, or providing information, get the facts.
19. Understand the terms of use. Some applications claim extensive rights to accessing and leveraging your personal information. If the app requires more access to your account and/or device than is needed to run the service, do not continue. In addition, be aware that terms can change over time. Review your terms of use often.
20. Be cautious with public Wi-Fi. To be safe, avoid logging into accounts, especially financial accounts when using public wireless networks.
21. Disable Bluetooth and Near Field Communication (NFC) capabilities when not in use.
22. Enable encryption. Enabling encryption on your Smartphone is one of the best ways to safeguard information stored on the device, thwarting unauthorized access.
23. You must wipe the information from your smartphone before disposal. Additionally, make sure any SD cards are removed and erased. If you are not redeploying the SIM card to another device, then make sure your personal information stored on the SIM card is erased or destroyed.

5.4.9 Social Networking
1. Do not store any information you want to protect on any device that connects to the Internet.
2. Always use high security settings on social networking sites, and be very limited in the personal information you share. Monitor what others are posting about you in their online discussions.
3. Use anti-virus and firewall software. Keep them and your browser, and operating systemspatched and updated.
4. Change your passwords periodically, and do not reuse Old passwords. DO not use the same password for more than one system or service.
5. Do not post anything that might embarrass you later, or that you don't want strangers to know.
6. Do not automatically download, or respond to content on a website or in an email. Do notclick on links in email messages claiming to be from a social networking site. Instead, go to the sile directly to retrieve messages.

7. Only install applications or software that come from trusted, well-known Sites. "Free" software may come with malware.
8. Avoid accessing your personal accounts from public computers or through public Wi-Fi spots.
9. Disable Global Position System (GPS) encoding. Many digital cameras encode the GPS location of a photo when it is taken.
10. If that photo is uploaded to a site, so are the GPS coordinates, which will let people know that exact location.
11. Whenever possible, encrypt communications with websites. It may be a feature (like HTTPS site rather than HTTP site) social network sites allow you to enable.
12. Beware of unsolicited contacts from individuals in person, on the telephone, or on the Internet who are seeking corporate or personal data
13. Monitor your bank Statements, balances, and credit reports.
14. Do not Share usernames, passwords, credit cards, bank information, salaries computer network details, security clearances. Home and office physical security and logistics, capabilities and limitations of work systems, or schedules and travel itineraries.
15. No legitimate service or network administrator will ask you for your password.
16. Do not provide information about yourself that will allow others to answer your security questions such as when using the "I forgot my password" feature.
17. Be thoughtful and limit the personal information you share such as job titles, locations, hobbies. likes , and dislikes, or names and details of family members, friends and co-workers.
18. Verify those you correspond with. It is easy for people to fake identities over the Internet.
19. Do not click advertisements shown on the social web pages.

5.4.10 Instant Messaging (IM)

Instant Messaging networks provide the ability to not only transfer text messages, but also the transfer of files. Consequently, IM can transfer Malware and other programs. Many IM allows peer-to-peer file sharing, a malware can configure the IM client to share all files on the system with full access to everyone.

Hackers can impersonate other users in many different ways. The most frequently used attack issimply stealing the account information of an unsuspecting user. WhatsApp, messenger, telegram, WeChat are few examples Of Instant Messaging networks.

1. Careful when creating a screen name. Each IM program asks you to create a screen name.Screen names should not provide or allude to personal information. Use a nickname instead of a full name.
2. Never provide sensitive personal information. Do not share credit card numbers/ passwords etc. over IM.
3. Create a barrier against unwanted IM. Do not list your name or email address in public areas or to strangers.
4. Only communicate with people who are on your contact lists. If you decide to meet a stranger that you know only from IM communication, take appropriate safety precautions. For example,do not meet that person alone, take a friend or colleague with you. Always meet and stay in apublic place such as a cafe or other places.
5. Never open pictures, download files or click links in messages from people you do not know.
6. Do not send personal or private IM at work.
7. If you use a public computer, do not select the feature that allows you to log on automatically.

5.4.11 Online transaction / ATM

1. Before you buy, check out the reputation of store and the seller through website reviews or physical address verification to ascertain the legitimacy of the party you are going to deal with.Keep in mind however that online reviews can be manipulated to credit or discredit reputation.
2. Be aware of what details legitimate sites ask for before entering into a transaction.
3. Be wary of unsolicited mail, especially those with email attachments and embedded links.
4. Learn to distinguish bogus communications that Claim to be from banks, auction Sites, andother financial institutions, specifically those asking for personal or account information as these are never requested electronically by institutions.
5. Review financial and credit card statements for unknown expenses. Incorrect entries or suspicious transactions serve as a warning bell that online financial accounts are compromised. If so, contact the financial institution immediately, consider reporting the attack tothe police,reset online pass-words, ATM PINS, and check for malware on your home computer
6. Cancel unused debit/credit cards (cutting them up is not enough).
7. Check your credit card statements and immediately report unauthorized purchases.
8. Never write down PINS and passwords: memorize them.

9. Always use phishing filters in your Internet browser.
10. Be cautious while providing bank details online, before proceed further confirm with the bank about the email you received. Think that if something is important or urgent why don't bank calling me instead of sending an email?
11. Delete all cookies and history files before you perform online transactions.
12. Always use a virtual keyboard while accessing online banking.
13. Register your mobile number and email with banking transactions for timely SMS and Email alerts. Use multi-factor authentication (MFA) IO log on to your banking website.
14. Vishing is a form of phishing, where instead of people receiving an email to lure them into giving personal information, the criminal uses a phone call, either live or automated, to attack the bank or credit union customer and get critical information.
15. While you receive the money, you will never ask to provide your credentials.
16. Be cautious while scanning QR codes for payments it has very similar consequences likefraudulent hyperlinks or short URLs.

Automated Teller Machine (ATM):

Automated teller machines are electro-mechanical machines adopted by the international community for banking transactions in the present digital era. Few safeguards for its usage are as under:

1. Always protect your PIN, Do Not give the number to anyone.
2. Cover the keypad while you are entering the PIN.
3. Do not operate ATM in lonely places / unguarded ATMs.
4. Be wary of anything about the ATM that looks out of the ordinary, such as odd-looking equipment or wires attached to the device.
5. Look for a "no tampering" sign. Crooks often place these to stop anyone curious about a newpiece of equipment.
6. Regularly check bank accounts to make sure that no unusual or unauthorized transactions (even smaller amounts).

5.4.12 Public Computer

1. If you store or download any personal information on a Desktop in a cybercafé make sure you delete all the documents after you're done with your work.
2. When surfing the Internet, you should always check the browser's security aspects.
3. Beware Of keyloggers, these are spyware and logs or records your keystrokes so that your username and password are made available to the Cybercafe owner or any Attacker. These records may type into directly into Hacker's machine or collected afterward through a file transfer. Some cybercafes may use Hardware key loggers so that you check that there is an intermediate device between your keyboard and CPU.
4. Cybercafe computers are public computers and shared computers. Your data or communication may be exposed to all users at the same time. So be aware that sensitive information like personal details like username, passwords, etc. should be deleted.
5. Whenever you go to Cybercafe, you ensure that it has up-to-date Anti-virus and Anti-spamsoftware. These may help to stop some of the key loggers, Trojans, and other malware.
6. Don't leave the computer unattended with sensitive information on the screen.
7. Don't enter sensitive information into a public computer.
8. Always make sure to log out properly when you leave Cybercafe.