# Information and Communication Technology


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# Declaration

The E-compendium is designed according to the syllabus offered in under graduate degree programme for the students of Extension Education and Communication Management, College of Community Science, RPCAU, Pusa. The content of this document is preparedwith the help of various text books, resource materials and various sources from material available online. The author does not claim for originality of work. The e-manual is meant to be used for practicals as a reference material for the students of College of Community Sciences, RPCAU, Pusa for the academic purpose of understanding the course.

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**HEM 201 Information and Communication Technology 3(1+2)**

**Objective**

- To empower students on computer application for communication technology

**Theory**

IT and its importance, IT tools, IT-enabled services and their impact on society; computer fundamentals; hardware and software; input and output devices; word and character representation; features of machine language, assembly language, high-level language and their advantages and disadvantages; principles of programming- algorithms and flowcharts; Operating systems (OS) - definition, basic concepts, introduction to WINDOWS and LINUX Operating Systems; Local area network (LAN), Wide area network(WAN), Internet and World Wide Web, HTML and IP; Introduction to MS Office - Word, Excel, Power Point. Audio visual aids - definition, advantages, classification and choice of A.V aids; cone of experience and criteria for selection and evaluation of A.V aids; video conferencing. Communication –concept, elements, Communication process, Models - Berlo' s model, feedback and barriers to communication.

**Practical**

Planning, preparation, presentation of posters, charts, overhead transparencies and slides. Handling of audio-visual equipments. Organization of an audio-visual programme. Exercises on MS Word; MS Excel; MS Power Point; Internet applications- Web browsing, creation and operation of email account; analysis of data using MS Excel. Introduction to World Wide Web (WWW) and its components, creation of scientific website, presentation and management agricultural information through web. Introduction of various programming languages such as Visual Basic, Java, Fortran, C, C++, and their components. Hands on practice on writing small programmes.

## Lecture-1

## IT and its importance

Information technology is the use of computer, network and data management systems to store, process, manipulates and retrieves information. Information technology or IT is an integral component of most business functions, without which communication and collaboration within and outside businesses and organisations aren't possible.

**Why is information technology important?**

Information technology is important for several reasons, including:

1. **Facilitates communication**

- **Global Connectivity:** IT has revolutionised the way people communicate with each other. IT enables instant communication across the globe through emails, video calls, social media, and instant messaging. A large proportion of companies, including small single-person businesses, now have an online presence. The Internet not only allows businesses to engage audiences via different channels, but it also makes it possible for companies to recruit talent, create partnerships and builds their brand reputation with limited budgets.
- **Collaboration:** Tools like Microsoft Teams, Slack, and Zoom facilitate remote work and collaboration, making it easier for teams to work together regardless of location.

2. ***Job search***

Nowadays, many people search for their jobs online as it is quicker and there is a larger variety of job vacancies present. People can publish resume online for prospective job. Some of the web sites providing this service are naukri.com, monster.com, summerjob.com, recuritmentindia.com etc.

3. **Online Shopping**

The internet has also facilitated the introduction of a new market concept consisting of virtual shops. They provide information about products or services for sale through www servers. Using the internet services customers can submit specific product queries and request specific sales quotes. For example amazon.com is a www based bookshop on the internet where information on all types of international books can be found and books can be ordered online.

4. **Stock market updates**

You can sell or buy shares while sitting on computer through internet. Several websites like ndtvprofit.com, moneypore.com, provide information regarding investment

5. **Boosts productivity and efficiency**

- A major importance of IT is that it helps boost productivity and efficiency. With digital systems, people can perform tasks faster compared to manual methods. There are computer applications for various tasks you want to do, which help people to complete tasks faster with fewer errors. Whether you want to perform accounting calculations or process large amounts of data, IT provides tools that simplify and shorten work time.

6. **Supports flexible work arrangements**

- Information technology is also changing how people work by providing the infrastructure to support flexible arrangements, such as remote work and telecommuting. Because of the availability of collaboration tools, employees or contractors can work from locations of their choice while still being able to collaborate with their teams on projects. Being able to provide work flexibility helps employers cut operating expenses and provides access to a larger talent pool since companies can recruit people globally.

7. **Education**

- **Access to Information:** IT provides access to vast amounts of information and educational resources online.
- **E-learning:** Online courses and virtual classrooms have made education more accessible and flexible.

8. **Healthcare**

- **Electronic Health Records (EHR):** Digital records improve patient care and streamline administrative processes.
- **Telemedicine:** IT allows for remote consultations, making healthcare accessible to people in remote areas.

9. **Government and Public Services**

- **E-Government:** IT enhances the efficiency of government services, making them more accessible to citizens.
- **Transparency:** Digital platforms increase transparency and accountability in government operations.

10. **Entertainment**

- **Digital Media:** IT has revolutionized the way we consume media, from streaming services to digital music and e-books.
- **Gaming:** The gaming industry relies heavily on IT for development, distribution, and online multiplayer experiences.

**11. Security**

- **Cyber security:** IT is crucial for protecting data and systems from cyber threats.
- **Surveillance:** IT supports security systems, including surveillance cameras and alarm systems.

**12. Innovation**

- **Research and Development:** IT tools and platforms accelerate research and innovation across various fields.
- **Emerging Technologies:** IT is the backbone of cutting-edge technologies like Artificial Intelligence (AI), the Internet of Things (IoT), and block chain.

**13. Economic Growth**

- **Job Creation:** The IT sector is a significant source of employment and has spawned various new job roles and industries.
- **Productivity:** IT enhances productivity across sectors, driving economic growth and development.

**14. Daily Life**

- **Convenience:** From online banking to smart home devices, IT makes daily life more convenient.
- **Social Interaction:** Social media and other platforms allow people to connect and share experiences.

Overall, IT is an indispensable part of the modern world, driving progress and improving quality of life across multiple domains.

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**Lecture-2**

## IT tools

IT (Information Technology) tools and applications are software programs, hardware devices, and other technologies used to manage, process, and transmit digital information. These tools and applications can be used for a wide range of purposes, including data analysis, communication, collaboration, project management, and more. Some common IT tools and applications include:

Information Technology (IT) tools are essential for various tasks and functions in both personal and professional settings. Here are some key categories and examples of IT tools:

**1. Communication Tools**

- **Email Clients:** Outlook, Gmail, Thunderbird
- **Instant Messaging:** Slack, Microsoft Teams, WhatsApp
- **Video Conferencing:** Zoom, Skype, Google Meet

**2. Productivity Tools**

- **Office Suites:** Microsoft Office (Word, Excel, PowerPoint), Google Workspace (Docs, Sheets, Slides), LibreOffice
- **Project Management:** Trello, Asana, Monday.com
- **Time Management:** Todoist, RescueTime, Clockify

**3. Collaboration Tools**

- **Document Sharing:** Google Drive, Dropbox, OneDrive
- **Collaboration Platforms:** Slack, Microsoft Teams, Basecamp
- **Version Control:** Git, GitHub, Bitbucket

**4. Data Management Tools**

- **Database Management Systems (DBMS):** MySQL, PostgreSQL, Oracle
- **Data Analysis:** Tableau, Power BI, Google Data Studio
- **Big Data Platforms:** Hadoop, Apache Spark, Google BigQuery

**5. Security Tools**

- **Antivirus Software:** Norton, McAfee, Bitdefender
- **Firewalls:** pfSense, Cisco ASA, SonicWall
- **Encryption Tools:** VeraCrypt, BitLocker, OpenSSL

**6. Development Tools**

- **Integrated Development Environments (IDEs):** Visual Studio, IntelliJ IDEA, Eclipse
- **Code Repositories:** GitHub, GitLab, Bitbucket

- **Containerization:** Docker, Kubernetes

**7. Network Tools**

- **Network Monitoring:** Wireshark, Nagios, SolarWinds
- **Remote Access:** TeamViewer, AnyDesk, Remote Desktop Protocol (RDP)
- **VPN Services:** NordVPN, ExpressVPN, Cisco AnyConnect

**8. Cloud Computing Tools**

- **Cloud Platforms:** Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP)
- **Cloud Storage:** Dropbox, Google Drive, Amazon S3
- **Cloud Applications:** Salesforce, Office 365, Google Workspace

**9. Customer Relationship Management (CRM) Tools**

- **CRM Platforms:** Salesforce, HubSpot, Zoho CRM
- **Help Desk Software:** Zendesk, Freshdesk, Help Scout
- **Marketing Automation:** Marketo, Mailchimp, HubSpot

**10. Content Management Systems (CMS)**

- **Web CMS:** WordPress, Joomla, Drupal
- **Enterprise CMS:** Adobe Experience Manager, Sitecore, SharePoint
- **E-commerce Platforms:** Shopify, Magento, WooCommerce

**11. Graphic Design and Multimedia Tools**

- **Graphic Design:** Adobe Photoshop, Illustrator, CorelDRAW
- **Video Editing:** Adobe Premiere Pro, Final Cut Pro, DaVinci Resolve
- **Audio Editing:** Audacity, Adobe Audition, GarageBand

**12. Backup and Recovery Tools**

- **Backup Solutions:** Acronis, Veeam, Carbonite
- **Data Recovery:** Recuva, Stellar Data Recovery, EaseUS Data Recovery
- **Disaster Recovery:** Zerto, Veeam, Commvault

**13. Virtualization Tools**

- **Virtual Machines:** VMware, VirtualBox, Hyper-V
- **Desktop Virtualization:** Citrix, VMware Horizon, Parallels
- **Storage Virtualization:** NetApp, VMware vSAN, IBM Spectrum Virtualize

**14. Learning and Development Tools**

- **Learning Management Systems (LMS):** Moodle, Blackboard, Canvas
- **Online Course Platforms:** Coursera, Udemy, LinkedIn Learning
- **E-learning Authoring:** Articulate 360, Adobe Captivate, iSpring

**15. Web Development Tools**

- **Web Frameworks:** Angular, React, Vue.js
- **Content Delivery Networks (CDN):** Cloudflare, Akamai, Amazon CloudFront
- **Website Analytics:** Google Analytics, Hotjar, Crazy Egg

These tools help in performing specific tasks efficiently and effectively, enhancing productivity, and ensuring smooth operation in various fields.

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## Lecture-3

## IT-enabled services and their impact on society

IT-enabled services (ITES) encompass a broad range of services that leverage information technology to deliver value and efficiency. These services have a significant impact on various aspects of society. Here are some key examples and their impacts:

IT (Information Technology) tools and applications are software programs, hardware devices, and other technologies used to manage, process, and transmit digital information. These tools and applications can be used for a wide range of purposes, including data analysis, communication, collaboration, project management, and more. Some common IT tools and applications include:

1. **Productivity suites**: These are software applications that include tools for word processing, spreadsheets, presentations, and more. Examples include Microsoft Office: as include Drop box, Google Drive, and One Drive.
2. **Email and messaging platforms**: These are software applications used for email communication and instant messaging. Examples include Gmail, Outlook, and Slack.
3. **Cloud storage and file sharing**: These are platforms that allow users to store, access, and share files online. Examples include Drop box, Google Drive, and One Drive.
4. **Project management tools**: These are software applications used to plan, organize, and manage projects. Examples include Trello, Asana, and Jira.
5. **Data analysis tools:** These are software applications used to analyze and interpret data. Examples include Excel, Tableau, and Power BI.
6. **Business Process Outsourcing (BPO)**
   - **Services:** Customer support, data entry, telemarketing, and back-office operations.
   - **Impact:** BPO services have created job opportunities, particularly in developing countries, boosting economic growth and providing a steady income for many families. They also allow companies to focus on their core activities by outsourcing non-core functions, leading to increased efficiency and cost savings.
7. **Knowledge Process Outsourcing (KPO)**
   - **Services:** Market research, legal services, financial analysis, and medical transcription.
   - **Impact:** KPO services enable access to specialized knowledge and expertise, improving decision-making and innovation. They also provide high-value employment opportunities and contribute to skill development in emerging economies.

8. **Consulting**
   - **Services:** IT strategy development, system integration, and technology implementation.
   - **Impact:** IT consulting helps organizations adopt and integrate new technologies, enhancing their operational efficiency and competitiveness. It drives digital transformation, leading to improved customer experiences and business growth.
9. **Cloud Computing Services**
   - **Services:** Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS).
   - **Impact:** Cloud computing offers scalability, flexibility, and cost-efficiency. It allows businesses to access advanced technologies without significant upfront investments. Cloud services also facilitate remote work and collaboration, which has become crucial during the COVID-19 pandemic.
10. **E-commerce**
    - **Services:** Online retail, digital marketplaces, and electronic payment systems.
    - **Impact:** E-commerce has revolutionized the retail industry, providing consumers with convenient access to a wide range of products and services. It has also enabled small businesses to reach a global market and compete with larger companies. The convenience and accessibility of online shopping have transformed consumer behavior and expectations.
11. **Telemedicine**
    - **Services:** Remote consultations, online medical records, and telehealth platforms.
    - **Impact:** Telemedicine improves access to healthcare, particularly in remote and underserved areas. It enhances patient care by enabling continuous monitoring and follow-up. During the COVID-19 pandemic, telemedicine has been crucial in reducing the strain on healthcare systems and maintaining patient care.
12. **E-Government**
    - **Services:** Online tax filing, digital identity services, and electronic voting systems.
    - **Impact:** E-government services increase transparency, reduce corruption, and improve the efficiency of public services. They make government services more accessible to citizens, enhancing civic engagement and trust in government institutions.
13. **Online Education and E-learning**
    - **Services:** Virtual classrooms, online courses, and digital libraries.
    - **Impact:** Online education has democratized access to knowledge, providing learning opportunities to people regardless of their geographic location or financial status. It has

also enabled lifelong learning and skill development, which are essential in a rapidly changing job market.

**14. Financial Technology (FinTech)**

- **Services:** Mobile banking, digital wallets, and online lending platforms.
- **Impact:** Fitch services have improved financial inclusion by providing access to financial services for unbanked and under banked populations. They offer convenience, speed, and security in financial transactions, transforming the way people manage their finances.

**15. Smart Cities**

- **Services:** Smart traffic management, energy-efficient buildings, and digital public services.
- **Impact:** IT-enabled smart city solutions improve urban living by enhancing infrastructure efficiency, reducing environmental impact, and improving public safety. They promote sustainable development and enhance the quality of life for city residents.

**Overall Impact on Society**

- **Economic Growth:** ITES contribute to economic growth by creating jobs, attracting foreign investment, and fostering innovation.
- **Quality of Life:** These services improve access to essential services, enhance convenience, and promote a better quality of life.
- **Education and Skill Development:** ITES provide opportunities for education and skill enhancement, preparing the workforce for future challenges.
- **Social Inclusion:** IT-enabled services promote social inclusion by bridging the digital divide and providing equal opportunities for all.

In summary, IT-enabled services have a profound impact on society, driving economic development, improving quality of life, and fostering social inclusion. They are pivotal in shaping a more connected, efficient, and equitable world.

## Lecture-4

## Computer fundamentals

Computer is electronic devices which is capable of receiving information or data and perform a series of operations in accordance with a set of operations. This produces results in the form of data or information. Computer is a machine capable of solving problems and manipulating data. It accepts and processes the data by doing some mathematical and logical operations and gives us the desired output.

Computers process data under the direction of sets of instructions called computer programs. Computer programs guide the computer through orderly sets of actions specified by people called computer programmers. The various devices, such as the keyboard, screen, disks, memory and processing units, that comprise a computer system are referred to as hardware. Regardless of differences in physical appearance, virtually every computer may be envisioned as being divided into six logical units or sections. These are as follows:

1. **Input unit:** This is the "receiving" section of the computer. It obtains information (data and computer programs) from various input devices and makes the information available to the other units so that it can be processed. Most information is entered into computers today through keyboards, "mouse" or pointing devices, disks and network connections. Information also is entered by speaking to computers by electronically scanning images and by video recording.
2. **Output unit:** This is the "shipping" section of the computer. It takes information processed by the computer and sends it to various output devices to make the information available for use outside the computer. Information output from computers is displayed on screens printed on paper, played through audio speakers and video devices, sent to other computers and magnetically recorded on disks and tapes. This processed information can be used to control other devices.
3. **Memory unit**: This is the rapid-access, relatively low-capacity "warehouse" section of the computer. It temporarily retains information entered through the input unit so that the information may be made available for processing. The memory unit also retains information which has already been processed unit it can be placed on output devices by the output units. The main memory unit often is called either memory, primary memory or random access memory (RAM)
4. **Arithmetic and logic unit (ALU):** This is the "manufacturing" section of the computer it is responsible for performing calculation. Such as additions, subtraction, multiplication and

division. It contains the decision mechanism that allow the computer, for example, to compare two items from the memory unit to determine whether they are equal.

5. **Central processing unit (CPU):** This is the "administrative" section of the computer. The CPU acts as the computer's coordinator and is responsible for supervising the operation of the other sections. The CPU tells the input unit when information should be read into the memory unit, tells the ALU when information from the memory unit should be used in calculations and tells the output unit when to send information from the memory unit to certain output devices. 6. Secondary storage unit: This is the long-term, high-capacity "warehousing" section of the computer. Programmes or data not being used by the other units are normally placed on secondary storage devices (e.g. hard disk drives) until they are needed, possibly hours, days, months or even years later. Information in secondary storage takes longer to access than information in primary memory. The cost per unit of secondary storage is much less than the cost per unit to primary memory.

**Programming language types**

- Machine language
- Assembly language
- High level language

Computer can understand only its own Machine language and is defined by its hardware design. It generally consists of numbers (1s and 0s)

**HARDWARE AND SOFTWARE**

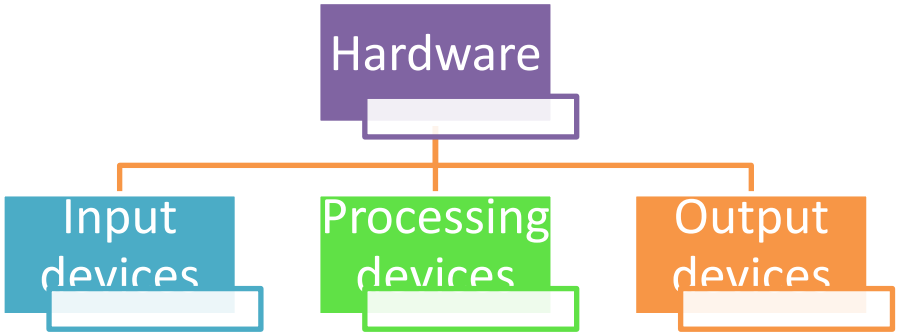
**Hardware**

Hardware refers to the physical equipment used for the input, processing, output and storage activities of a computer system. It consists of mechanical and electronic devices, which we are able to see and touch easily. Some of them are central processing unit (CPU), primary storage devices, secondary storage devices, input and output unit and communication devices.

**Some characteristic of hardware are:**

- You can touch hardware
- Hardware is not changed frequently
- There is wear and tear of hardware over a period of time
- Overall performance of the computer depends on the hardware

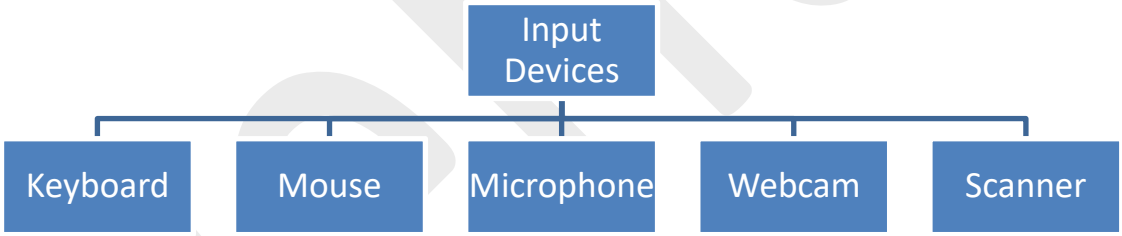
**Hardware is further divided into three categories**




**Categories of Hardware**

**Input Devices**

An input device is used to accept data from various sources. The various types of input devices are:




**Processing Devices**

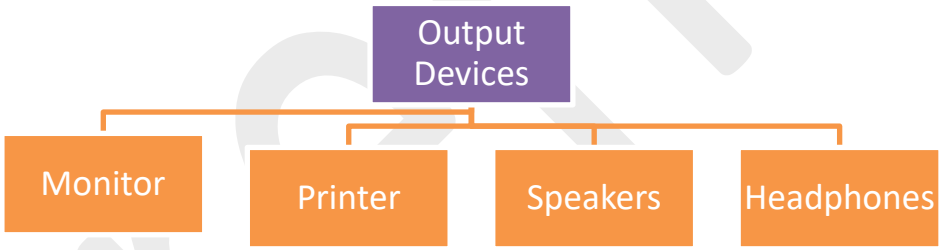
The processing devices process and store the data. They receive input from the input devices, process the required operation on the data, and send output to the output devices. The various processing devices are:

| | | |
|---|---|---|
| Central Processing Unit (CPU) – called the brain of the computer | Motherboard –a circuit board inside the computer cabinet that connects all components of a computer | Graphic or Display card – graphic or display cards that create a picture on display |
| Network card – helps to connect the computer the computer to a network | Sound card- produces sound on the computer that can be heard through speakers | |

**Processing Devices**

**Output Devices**

When a computer processes the data, it provides the output to the output devices. The most commonly used output devices are.




**Output Devices**

**Software**

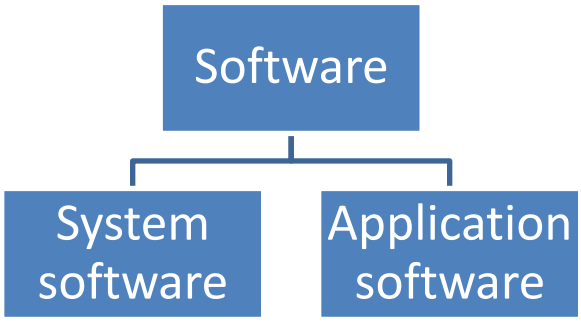
Computer is a machine that does not process any intelligence of its own. It requires a set of instructions to perform any task or operation. This set of instructions is provided through a program. **A Program is a sequence of step-by-step instructions to perform a particular task.** It is always written in a computer language. While each program has a specific name. they are generally referred to as software. Software is stored and run on hardware that helps you to work on the computer.

**Some characteristic of software are:**

- ✓ You can not touch software
- ✓ Software does not wear and tear over a period of time

✓ Unlike hardware, software is updated frequently

**Software is further classified into two categories;**




**Software categories**

**System software**

**System software is a collection of programs designed to control and manage the overall operations of the computer system**. System software helps to run the application software. It reads the data received from input devices and transfers the processed data to output devices. System software consists of **operating system** and **utility progress**.

**Utility programs: Utility programs are used to perform specific tasks related to managing computer resources.** These programs help to improve the performance of the computer.

Anti Virus Software - Examples: Avast, AVG, Norton

Backup software - Example: Dropbox, Google Drive, Box

Compression software- Example: WinZip, 7-Zip, WinRar

Disk Tools - Examples: Test Disk, Win Dir Stat, Clone Zilla

**Utility Software Application software**

Application software are used to perform tasks other than running a computer system. These are used by users for creating documents, performing calculations, drawing images, etc. an application software can be a single program, such as image viewer, Microsoft Paint or Tux Paint, or a collection of programs called a package.

Some examples of packages are Microsoft office. Libre Office, Database Management

System, etc. These packages contain application software. For example, the Microsoft Office package contains application software, such as Word, Excel, Power point, Access, etc.

**Operating systems**

When you switch on a computer, what is the first thing you notice? Well, it is the operating system logo. An operating system is the first program loaded when the computer is switched on. It is the most important program that manages the computer's memory and processes, as well as all the hardware and software. In the previous grade, you learnt about the working of a computer system. In this chapter, you will learn about the working of an operating system and the various types of operating systems available.

**What is an Operating system?**

An operating system is the central structure that allows you to use the computer. It manages computer hardware and software. All computer programs need an operating system to function.

An operating system acts as an intermediary between the software and users, and the hardware.

**Systems and application programs**

Provides Software, such as TuxPaint, MS Office, anti-virus programs

**Operating system**

Controls and co-ordinates use of hardware among various software and users

**Computer Hardware**

Provides basic computing resources, such as CPU, memory, I/O devices, keyboard, mouse

**Components of a Computer System An operating system is required to carry out tasks, such as:**

- ✓ Communicate with different parts of a computer
- ✓ Execute different user programs
- ✓ Control peripheral devices, such as printers, scanner, speakers, etc.
- ✓ Make the computer system easy to use.

**Working of an operating system**

Now, let's understand the working of an operating system. When you type a document in MS Word using the keyboard, the text is displayed on the screen. But, how does a computer understand what to display?

Now, let's understand what role the operating system plays to display the text. When we type text, the input device (keyboard) sends the request to the operating system. The operating system accepts and processes the request. It then sends the request to the output device (monitor) to display the type data in the MS Word document.

An operating system is an essential link of communication between hardware resources and software programs a computer cannot produce any result without an operating system.

**Good to Know**

Computer understands only the binary data that is in the form of 0's and 1's To process any data, the computer first converts the received data to binary format and then performs operations on it.

**Types of Operating Systems**

Operating systems are classified as Character User Interface (CUI) and Graphical User Interface (GUI)

**Character User Interface (CUI)**

The CUI operating system uses commands to interact with the computer. The commands are entered in the form of text using the keyboard and the output produced by the computer is also in the text format. You need to memorize lot of commands to use a CUI. CUI is commonly used by advanced computer user as it provides more control over an operating system's functions. Microsoft Disk Operating System (MS DOS) is the most popular CUI based operating system.

MS DOS is also called as the Command Line Interface (CLI) operating system. It was introduced by Tim Paterson in August 1981. MS DOS uses the command prompt to receive commands and display output.

The command prompt is generally used to perform system configurations used to perform system configurations or networking operations, and is generally used by network administrators.

**Graphical user interface (GUI)**

The GUI operating systems use mouse and keyboard to interact with the computer. GUI based operating systems are easier to use and more user friendly because you can click menus and icons rather than remembering and typing the commands. All recent operating systems, such as Windows 2007, Windows 8, and Windows 10 are GUI based.

**Windows Operating System**

Windows is the most widely used operating system in the world. It uses the WIMP feature, i.e. Windows, Icons, Menus, and Pointers to interact with the computer. Windows has become a popular operating system because of its user friendly interface.

**Some of the key features of the Windows operating system are :**

- ✓ It is fast, reliable, and easy to learn
- ✓ It provides themes and gadgets to place on your desktop
- ✓ It supports many games.
- ✓ It provides various shortcuts to perform tasks faster
- ✓ It has more software available than most other operating systems
- ✓ It has a built-in anti-virus – Windows Defender.

## Elements of Windows Operating System

When you switch on your computer, you see a screen and some small pictures on it.

This screen is called as the desktop and the small pictures on the desktop are called the icons. The taskbar is located at the bottom of the screen. These components together form the user interface in Windows. You have learnt these components in the previous grade. Now, we will learn about the different parts of a window.

**Parts of a Window**

When you open any application on your computer, the application opens in a window. Depending on the type of application, the appearance of the Window charges automatically. However, all windows have some common features or parts.

Let's learn about the different parts of the File Explorer window. To access **File Explorer**, Click **Start – All apps – Windows System – File Explorer**. The file explorer window appears.

**Title bar:** the title bar is present at the top of the window and displays the title of the window. The title bar also consists of a control menu, quick access toolbar, and the control buttons.

**Control menu:** Control menu is an icon present at the left side of the title bar. When you click on the control menu, a drop-down list appears. Using this list, you can restore, move, resize, minimize, maximize, or close the window.

Quick Access Toolbar: The quick access toolbar is a small toolbar that contains a set of commands for quick access. When you click on the Quick Access Toolbar, a drop-down list

appears.

By default, the quick access toolbar is located on the title bar. You can also customize the quick access toolbar.

● **Central processing unit (CPU):** It manipulates the data and controls the tasks performed by the other components.

● **Primary storage**: It stores temporarily data and program instructions during the processing.

● **Primary memory (main memory**): These are RAM (Random Access Memory/Read-Write Memory), and ROM (Read-only-memory).

● **Secondary storage**: These store data and programs for future use. These are Hard Disk (Local Disk) and External Hard Disc, Optical Disks,(CDR, CDRW, DVD-R, DVD-RW ), Pen Drive, Memory Cards, etc.

**Secondary Storage Devices**

**Communication Devices**: These are used for communication or flow of data from one computer to another computer. Some of them are Modem, Switch, Router, TV tuner card, etc.
Communication devices

**Software**

A computer cannot do anything on its own. It has to be guided by the user. We have to give a sequence of instructions to the computer in order to do any specific job.

Software is simply a computer program or a set of instructions. Software guides the computer at every step indicating where to start and stop during a particular job. The process of software development is called programming.

**Types of software**

There are two types of software, namely, system software and application software.

**System software**

System Software are general purpose programs designed to perform tasks such as controlling all operations required to move data into and out of the computer. It communicates with keyboard, printer, card reader, disk, tapes, etc. It also monitors the use of various hardware's like memory, CPU, etc. System software acts as an interface between hardware and application software. Remember that it is not possible to run application software without system software. Some of the system software's are Disc Operating System (DOS), Windows, Unix/Linux, MAC/OS X etc.

**Application software**

It is a set of programs, which are written to perform specific tasks of the users of computer. This software's are developed in high level languages to help the user to get the computer to perform various tasks. Some of the application software are MS Office, Macromedia (Dreamweaver, Flash, and Freehand), Adobe (PageMaker, Photoshop), LIBSYS, SOUL, WINISIS, KOHA, etc.

**Input and Output Unit**

An input and output unit consists of two parts namely, input devices and output devices. Normally, an Input and output unit can control one or more peripheral devices. These units are explained below:

**Input Unit**

The data is entered / input into the computer through input devices. The input devices translate the data / information from a natural language in which the user is working, into the machine language which the computer can understand. Computer language is in the form of binary code (0 and 1). Input devices are classified as follows:

● **Human data entry devices** - keyboard, mouse, joystick, trackball, digitizing labels and; pick devices - light pen touch screens.

**Input Devices**

● Source data entry devices (Audio input –speech recognition; video input - digital camera; scanners - optical scanner OCR, OMR, MICR, Barcode Reader).

**Output Unit**

The output unit accepts output data from computer via output devices and transforms the data into human readable form. All the information inside the computer is in the form of binary digits (0 and 1). Output devices convert them to numbers, words, graphics, sound and motion which we can easily understand.

**Output devices are classified as**

● Hard copy device (Printer, Plotter, Computer Output on Micro-film)

● Soft copy devices (Monitor, Visual Display Terminal, Video Output and Audio Response).

**Word and Character Representation**

Word and character representation are fundamental concepts in natural language processing (NLP) and computational linguistics. They provide the basis for understanding, generating, and working with human language in computational systems. Here are the key concepts:

**Word Representation**

1. **One-Hot Encoding**

- **Description**: Each word is represented as a vector the length of the vocabulary, with all elements set to 0 except for one element set to 1, indicating the presence of the word.
- **Advantages**: Simple and easy to understand.
- **Disadvantages**: High dimensionality and sparsity, lacks semantic information.

2. **Bag of Words (BoW)**
- **Description**: Represents text as a collection of words, disregarding grammar and word order, but keeping multiplicity. Often used with term frequency (TF) or term frequency-inverse document frequency (TF-IDF) weighting.
- **Advantages**: Simple, works well for many tasks.
- **Disadvantages**: Ignores context and word order.

3. **Word Embeddings**
- **Description**: Dense vector representations of words in a continuous vector space, capturing semantic meanings. Popular models include Word2Vec, GloVe, and FastText.
- **Advantages**: Captures semantic relationships and similarities between words.
- **Disadvantages**: Requires significant computational resources to train.

4. **Contextualized Word Embeddings**
- **Description**: Word vectors that take context into account, generating different representations for the same word in different contexts. Examples include ELMo, BERT, and GPT.
- **Advantages**: Captures nuanced meanings and context-dependent information.
- **Disadvantages**: Computationally expensive, complex models.

**Character Representation**

1. **Character-Level One-Hot Encoding**
- **Description**: Similar to word-level one-hot encoding, but each character is represented as a vector where only one element is set to 1.
- **Advantages**: Simple, captures all possible characters.
- **Disadvantages**: Very sparse, lacks semantic information.

2. **Character Embeddings**
- **Description**: Dense vector representations of characters, similar to word embeddings but at the character level.
- **Advantages**: Can handle out-of-vocabulary words and misspellings better than word-level models.
- **Disadvantages**: Requires additional computation to aggregate character information into word representations.

3. **Sub word Embeddings**

- **Description**: Breaks words into sub word units (like morphemes) and learns embeddings for these units. Models like Fast Text use this approach.
- **Advantages**: Handles out-of-vocabulary words, captures morphological information.
- **Disadvantages**: More complex than word-level embeddings.

**Applications**

- **Text Classification**: Using word and character representations to classify text into categories (e.g., spam detection, sentiment analysis).
- **Machine Translation**: Representing words and characters to translate text from one language to another.
- **Named Entity Recognition (NER)**: Identifying entities like names, dates, and locations within text.
- **Part-of-Speech Tagging**: Assigning parts of speech to each word in a sentence.
- **Language Modeling**: Predicting the next word or character in a sequence, crucial for tasks like auto complete and text generation.

  By using these representations, NLP systems can better understand and manipulate human language, enabling a wide range of applications and advancements in technology.

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**Lecture-5**

## Word and Character Representation

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### Word Representation

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By using these representations, NLP systems can better understand and manipulate human language, enabling a wide range of applications and advancements in technology.

## Lecture-6

## Features of Machine Language

Machine language, also known as machine code, is the lowest-level programming language and consists of binary code that is directly executed by a computer's central processing unit (CPU). Here are some key features of machine language:

**Key Features of Machine Language**

1. **Binary Format**
   - **Description**: Machine language instructions are written in binary (0s and 1s). Each instruction is a sequence of bits that the CPU can directly interpret and execute.
2. **Direct Execution by CPU**
   - **Description**: Machine code is the only language understood and executed directly by the CPU, without the need for translation or interpretation.
3. **Hardware-Specific**
   - **Description**: Machine language is specific to the architecture of the CPU. Instructions are tailored to the capabilities and design of a particular type of processor.
4. **No Abstraction**
   - **Description**: Machine language operates at a very low level, with no abstractions. It directly manipulates memory addresses and CPU registers.
5. **Efficiency**
   - **Description**: Programs written in machine language can be highly efficient in terms of execution speed and resource usage because they are optimized for the specific hardware.
6. **Difficult to Read and Write**
   - **Description**: Machine language is challenging for humans to read, write, and debug due to its binary format and lack of human-readable syntax.
7. **Fixed Instruction Set**
   - **Description**: The set of instructions available in machine language is fixed and defined by the CPU's architecture. This set is known as the instruction set architecture (ISA).
8. **Low-Level Operations**
   - **Description**: Machine language instructions typically involve low-level operations such as arithmetic, logic, data movement, and control flow (e.g., jumps and branches).
9. **Compactness**
   - **Description**: Machine code is compact in terms of memory usage, as each instruction is a fixed size (often one or more bytes) and packed tightly.
10. **Immediate Execution**

- **Description**: Instructions in machine language are executed immediately by the CPU, without the need for interpretation or compilation at runtime.

**Examples of Machine Language Instructions**

- **Arithmetic Operations**: Addition, subtraction, multiplication, division (e.g., 10101010 might represent an add instruction).
- **Logic Operations**: AND, OR, XOR, NOT (e.g., 10100011 for an AND operation).
- **Data Movement**: Load, store, move data between registers and memory (e.g., 11001001 to load data into a register).
- **Control Flow**: Jump, branch, call, return (e.g., 11110000 to jump to a specific memory address).

**Usage and Application**

- **Firmware**: Machine language is often used in firmware, which is low-level software that directly controls hardware devices.
- **Operating Systems**: Critical parts of operating systems are written in machine language for performance optimization.
- **Embedded Systems**: Embedded systems with limited resources often use machine language for efficient operation.
- **Performance-Critical Applications**: Applications that require maximum performance, such as real-time systems, may use machine language.

Machine language forms the foundation upon which all higher-level programming languages are built. It provides the fundamental instructions that control the CPU and, by extension, the entire computer system.

**Lecture-7**

## Assembly language, high-level language and their advantages and disadvantages

**Assembly language** is a type of low-level programming language which is used for writing instructions for computers or other programmable devices. Since, it is a low-level language, therefore, it can communicate with computer hardware directly.

In assembly language, the computer codes are written using words and expressions that are easier to understand for human. The computer processor can only execute machine codes, hence it is required to convert the assembly codes into machine codes. For this purpose, a utility program is used to convert assembly code into executable machine code. This utility program which converts assembly code into machine code is called **assembler**.

The major advantages of assembly language are less memory requirement, less execution time, easier to write instructions and codes, etc.

**High-Level Language,** also called HLL, is a category of computer programming languages that use English like statements to write the computer instructions and codes. These are the most widely used programming languages because they are easy to understand to human being. However, similar to the assembly language, the CPU cannot process the high-level language codes directly, i.e. they need to be translated first into the executable machine codes. For this, there are two types of language translators used namely, interpreter and compiler.

The major advantages of high-level languages include easy to write, debug, and understand, machine independent, etc. The common examples of high-level languages are C, C++, Java, Python, C#, etc.

### Difference between Assembly Language and High-level Language

The following table highlights all the significant differences between assembly language and high-level language –

| Parameter | Assembly Language | High-Level Language |
|---|---|---|
| Definition | Assembly language is a computer programming language in which abbreviated keywords are used to write instruction codes. | High-level language is a computer program language in which English like statements are used to write codes. |
| Language translator | A language translator called “assembler” is required to convert the assembly language code into the machine code. | High-level language requires an interpreter or a compiler to convert the high-level language codes into the executable machine codes. |
| Level of language | Assembly language is a low-level language. | High-level language, as the name implies, is high-level language. |
| Programmer friendliness | Assembly language is less programmer friendly programming language. | High-level language is highly user friendly programming language. |
| Speed of execution | Computer instructions written in assembly language execute faster. | Computer instructions written in high-level language execute slower. |
| Machine dependency | Assembly language is machine dependent. | High-level language is machine independent. |
| Prone to error | Assembly language is more prone to errors. | The chances of errors in high-level languages are less. |
| Memory requirement | Assembly language codes require less memory space. | High-level language codes require more memory space. |
| Code length | The length of executable codes in assembly language is shorter. | The length of executable codes in high-level language is longer. |
| Debug | Assembly language codes are relatively difficult to debug. It is more challenging and time- | High-level language codes are very easy to debug. |

| | | |
|---|---|---|
| | consuming. | |
| Complexity | Assembly language is a complex programming language, as to write the instruction codes in assembly language, the programmer must have a deep understanding of hardware and system architecture. | High-level languages are easy to write codes without much knowledge about the computer hardware and architecture. |
| Efficiency | Assembly language codes are more efficient. | High-level language codes are less efficient, as the coder has less control over the underlying hardware. |
| Readability | The readability of assembly language codes is less. | High-level language codes are more readable. |
| Development time & effort | Assembly language programs take more time and effort to develop. | High-level language programs require less development time and effort. |
| Memory management | Assembly language codes require manual memory management. | High-level language codes provide automatic memory management. |
| Syntax | Assembly language uses symbolic representation of machine codes. | High-level languages use keywords and statements similar to English language. |
| Applications | Assembly language is primarily used to program processors, microcontrollers, embedded systems, device drivers, etc. | High-level languages are mainly used for developing software applications, web applications, etc. |

## Lecture-8

## Principles of programming- algorithms and flowcharts

### Principles of Programming

- The program or set of programs in a computer that helps in processing the information is called SOFTWARE.
- Software is a detailed writing of stepwise instructions for the computer to carry out the particular task efficiently and properly.
- The art of writing software is called programming.
- Software is an essential part of a computer. Without the software the computer will neither accept information nor give the desired result.

### Algorithm

- A step-by-step procedure to solve the given problem is known as Algorithm.
- The essential properties of Algorithm are:
  - It should be simple
  - It should be clear with no ambiguity
  - It should lead to a unique solution of the problem.
  - It should involve a finite number of steps to arrive at a solution.
  - It should have the capability to handle some-unexpected situations.
- For example if a student wants to purchase a pen, he has to follow the following steps.

| Step | Action |
|---|---|
| 1. | He has to get money from parents. |
| 2. | Come out of the House to cross the road |
| 3. | Check the vehicle movement for safe crossing. |
| 4. | When it is safe to cross the road, he crosses the road. |
| 5. | He gets into the shop. |
| 6. | Asks for a pen. |
| 7. | Selects a pen from the lot shown to him by the shopkeeper. |
| 8. | Pays money to the shopkeeper. |

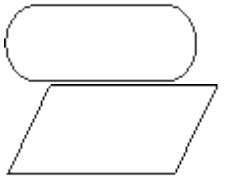
- These numbered steps are known as Algorithm.

**Flow Chart**

- The graphical or visual representation of algorithm is called as flow chart.
- The flow charts are easier to understand the flow of the solution.
- Flow charts are drawn with the standard symbols accepted worldwide.
- Each standard flow chart symbol represents on action to be performed such as Start or Stop, input operations Read or Write, decision making etc.

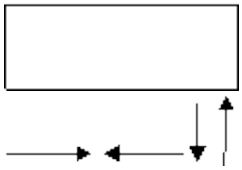
**Standard Flow Chart Symbols**

1.Terminal (Start or Stop Symbol)



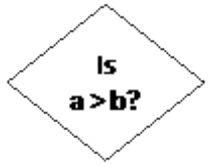
2.Input / Output

3.Processing



4.Flow Lines: These are arrow mark symbols used to connect two boxes and to indicate the direction of data or processing flow.

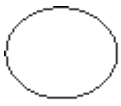
5.Decision Box: This is a diamond shaped box, which is used to indicate logical checking and gives decision after comparing between two or more objects (Eg. Yes or No; True or False, =, >, <, etc.)




False

True

6.Connector: This is a Circular-shaped symbol used to connect different parts of flowchart. When the flow chart is lengthy, it is split into different pages. Then these connectors are used to connect between these pages at the beginning and at the end of each page.



**Illustrations through examples**

- Algorithm and flow chart to read the name and print the name.

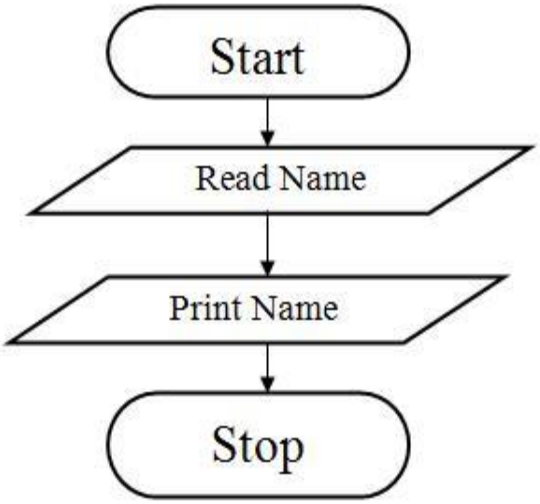
**Algorithm** **Flow Chart**

Step 1 : Start

Step 2 : Read input name

Step 3 : Print name

Step 4 : Stop




Algorithm and flow chart to add two numbers.

**Algorithm** **Flow Chart**

Step 1 : Start

Step 2 : Input first number A

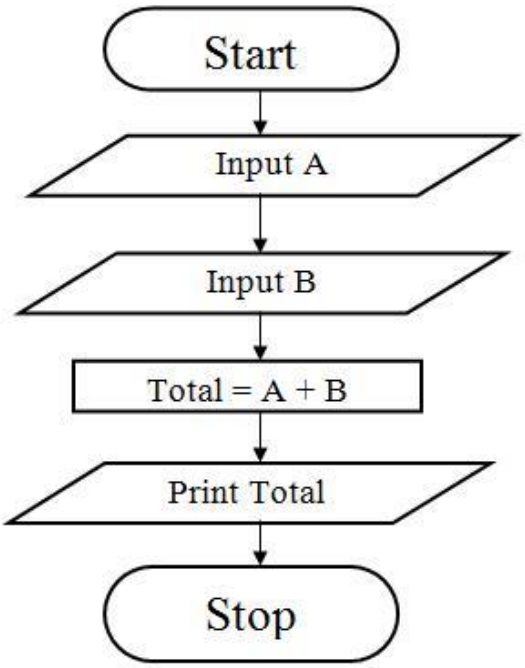
Step 3 : Input second number B

Step 4 : Add the two numbers and store it in

total

Step 5 : Print Total

Step 6 : Stop




- Algorithm and a flow chart to calculate area of square.

**Algorithm** **Flow Chart**

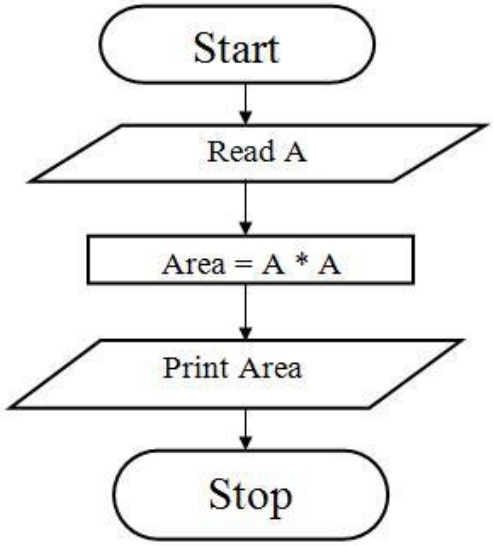
Step 1 : Start

Step 2 : Read value for a (side)

Step 3 : [Compute] Area = A * A

Step 4 : Output Area

Step 5 : Stop




- Algorithm and flow chart to find the average of three numbers.

**Algorithm** **Flow Chart**

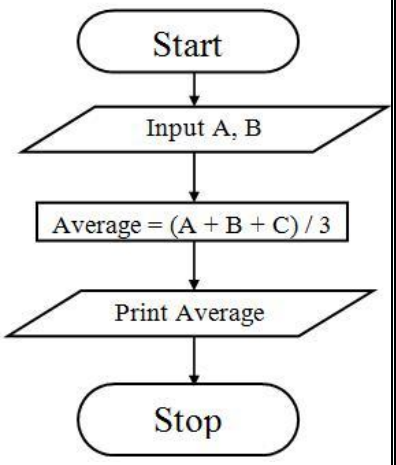
Step1 : Start

Step 2 : Enter Three Numbers A, Band C

Step 3 : Compute Average = (A+B+C)/3

Step 4 : Print Average

Step 5 : Stop




- Algorithm and flow chart to find the largest of two numbers.

**Algorithm**

Step1: Start

Step 2: Enter two numbers A and B

Step 3: Check if A is greater than B if yes go to Step 4 else go to Step 5

Step 4: Print A is greater than B

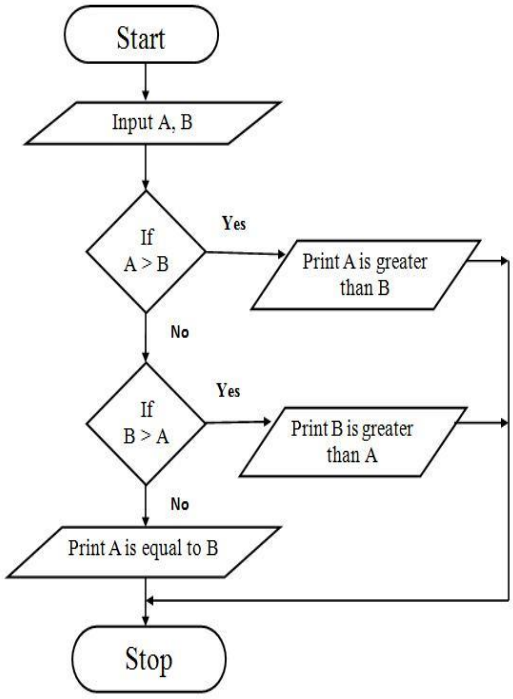
Step 5: Check if B is greater than A if yes go to Step 6 else go to Step 7

Step 6: Print B is greater than A

Step 7: Print A is equal to B

Step 8: Stop

**Flow Chart**




- Algorithm and a flow chart to find the factorial of a number.

**Algorithm**

Step 1: Start

Step 2: Read N

Step 3: [Initialize all counters]  Set FACT= 1, i = 1

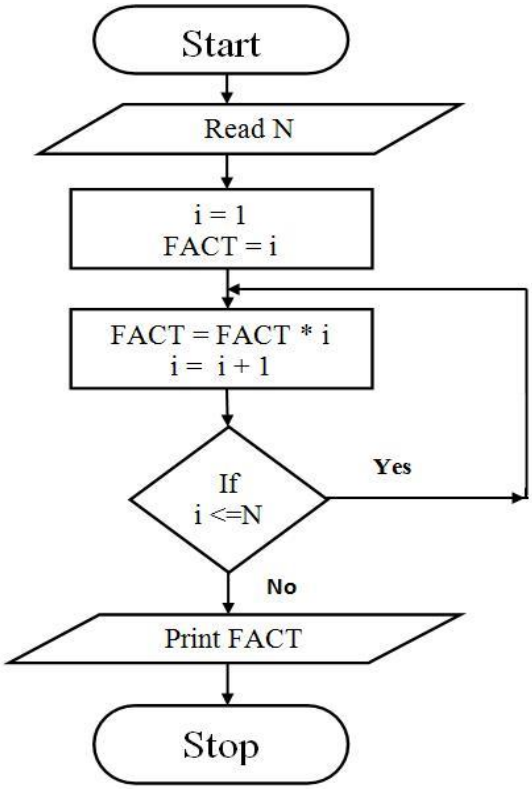
Step 4: Compute Fact = Fact * I  Increment i

Step 5: Check if i < = N if true repeat step 4 if false go to step 6

Step 6: Print fact

Step 7: Stop

**Flow Chart**




**Advantages of Flowchart**

1. **Conveys Better meaning**

Since a flowchart is a pictorial representation of a program, it is easier for a programmer to understand and explain the logic of the program to other programmers.

2. **Analyses the problem effectively**

Flow chart helps the programmers to analyze the problem in detail by breaking the flow chart into detailed parts.

3. **Effective Coding**

It is very easy for the programmers to write the program, because flow chart will give a clear idea of the steps involved.

4. **Systematic Debugging**

Even after taking the full care in program design, some errors may remain in the program because the programmer might have never thought of a particular case.

Using a flow chart can reduce this type of errors. It also enables easy detection of errors.

# Lecture-9

## Operating systems (OS) - definition, basic concepts

An operating system serves as an interface between the program and various computer hardware or software components. The operating system is made to be able to control all of the computer's resources and activities. It is an entirely integrated collection of specialised applications that manage all of the computer's functions. All other programs that are installed on the computer, including applications and other system software, are controlled and monitored by

Examples of Operating systems are listed below:

- Microsoft Windows
- Linux
- Mac OS.

**Classification of the Operating System**

Classification of Operating System can be done as follows:

**Multiprocessing:**

Supports running a program on multiple CPUs within a single computer system.

**Multitasking:**

This allows you to run more than one program at the same time.

**Multi-User:**

This allows multiple users to run the program in the same fraction of time.

**Multithreading**:

Allows every module of a single program to execute simultaneously.

**Real-Time:**

Response to the input is immediate.

**Main Layers in an Operating System**

The software that acts as an interface between various computer parts is referred to as layers in an operating system. A clear benefit of layering is evident in an operating system. Each layer may be designed independently and interacted with as needed.

**The following five-layer model is often used in an Operating System:**

**Kernel:**

It links a computer's hardware with application software. As a result, it controls how applications in the RAM access memory. Additionally, it decides when each program will execute and allots processing time and memory to each application.

**Memory Management:**

It is in charge of restarting the computer's physical memory between processes and managing programs that need more memory than is physically accessible.

**Input/Output:**

This layer manages all physical interactions with other devices, including the keyboard, printer, display, and disc drive. The I/O layer receives a request if a higher layer needs access to a device.

**File Management System:**

It also goes by the name "file system." It is in charge of planning and overseeing the data storage on long-term storage devices including hard drives, and floppy disc drives.

**User Interface:**

It is referred to as the area where human and machine interaction takes place. There are two different types of user interfaces: the icon-based Graphical User Interface (GUI), which is used in Windows and Apple Mac OS, and the text-based Command Line Interface (CLI), which is used in MS-Dos and LINUX.

**Different Types of Operating Systems**

**Microsoft Windows**

It is a form of an operating system that comes in 32 and 64-bit variants Microsoft Windows. Microsoft was the one that created it. It offers a Graphical User Interface (GUI), the ability to manage virtual memory, multitasking features, and compatibility for a wide range of peripheral devices.

**Windows** is a family of operating systems developed by Microsoft. It is known for its graphical user interface (GUI) and widespread use in personal and business computing.

***Key Features***

1. **Graphical User Interface (GUI)**: Windows is known for its user-friendly interface with windows, icons, menus, and a pointer (WIMP).
2. **Multitasking**: Allows multiple applications to run simultaneously, with efficient management of system resources.
3. **File Management**: Uses the NTFS file system, providing robust file management and security features.
4. **Networking**: Built-in support for networking, including Wi-Fi, Ethernet, and remote access.

5. **Software Compatibility**: Supports a wide range of software applications, making it a versatile OS for various tasks.
6. **Security**: Features like Windows Defender, User Account Control (UAC), and BitLocker encryption enhance system security.
7. **Update and Support**: Regular updates and support from Microsoft ensure security patches and feature improvements.

***Common Versions***

- **Windows 10**: A widely used version with features like Cortana, Edge browser, and a unified app platform.
- **Windows 11**: The latest version, offering a refreshed interface, improved performance, and new features like support for Android apps.

**Different Versions of Microsoft Windows**

**UNIX**

The most capable and well-liked operating system for multiple users and tasks is Unix. It is a group of applications that serve as the user's interface with the computer. Dennis Ritchie later contributed to Ken Thompson's original UNIX code. Unix systems are built around a core kernel that manages the system and the other processes.

**Linux** is an open-source operating system kernel first released by Linus Torvalds in 1991. It is widely used in servers, desktops, and embedded systems.

**Key Features**

1. **Open Source**: Linux is free and open-source, with source code available for modification and distribution.
2. **Multitasking and Multiuser**: Supports multiple users and multitasking, allowing efficient resource sharing and management.
3. **File System**: Uses various file systems, with ext4 being the most common. Supports a hierarchical directory structure.
4. **Security**: Strong security features, including user permissions, SELinux, and AppArmor for access control.
5. **Stability and Performance**: Known for its stability and performance, making it ideal for servers and critical applications.

6. **Package Management**: Uses package managers like APT, YUM, and DNF to manage software installations and updates.
7. **Customization**: Highly customizable, allowing users to modify the OS to suit specific needs.

Common Distributions

- **Ubuntu**: A popular desktop distribution known for its ease of use and regular updates.
- **Debian**: A stable and robust distribution, often used as a base for other distributions.
- **Fedora**: A cutting-edge distribution sponsored by Red Hat, featuring the latest software and technologies.
- **Cent OS**: A community-supported distribution derived from Red Hat Enterprise Linux (RHEL), widely used in server environments.

**Comparison Summary**

**Windows**:

**Pros**: User-friendly GUI, broad software compatibility, strong support and updates, widespread use.

**Cons**: Cost (not free), more susceptible to malware, less customizable than Linux.

**Linux**:

**Pros**: Free and open-source, highly customizable, robust security and stability, wide variety of distributions.

**Cons**: Steeper learning curve, less software availability (though this is improving), hardware compatibility issues with some devices.

Both Windows and Linux have their strengths and are suitable for different use cases. Windows is often preferred for desktop computing and applications requiring broad software compatibility, while Linux is favored for server environments, development, and applications needing high customization and security.

# Lecture-10

## Operating Systems; Local area network (LAN), Wide area network (WAN)

### Local Area Network (LAN)

***Definition***

**Local Area Network (LAN):** LAN is a group of network devices that allow communication between connected devices. A **Local Area Network (LAN)** is a network that connects computers and devices within a limited geographic area, such as a home, office, or building. The private ownership has the control over the local area network rather than the public. It covers the smallest area such as College, School Hospital and so on. LANs are used to share resources like files, printers, and internet connections among connected devices.

***Key Features***

1. **Limited Geographic Area**: Typically spans a small area, such as a single building or a group of nearby buildings.
2. **High Data Transfer Rates**: Provides high-speed connectivity, often ranging from 100 Mbps to several Gbps.
3. **Resource Sharing**: Allows sharing of resources like printers, files, and internet connections among connected devices.
4. **Centralized Management**: Can be managed centrally, often using a server to control access and manage resources.
5. **Wired or Wireless**: Can be wired (using Ethernet cables) or wireless (using Wi-Fi).

***Advantages***

1. **Speed**: High data transfer rates facilitate quick sharing and access to resources.
2. **Cost-Effective**: Reduces costs by sharing resources like printers and internet connections.
3. **Ease of Setup**: Relatively easy to set up and configure, especially for small networks.
4. **Security**: Easier to secure and monitor due to the limited geographic scope.

***Disadvantages***

1. **Geographic Limitation**: Restricted to a small area, making it unsuitable for wide geographic distributions.
2. **Scalability**: Can become complex and less efficient as the number of connected devices increases.

**Wide Area Network (WAN)**

***Definition***

A **Wide Area Network (WAN):** WAN covers a large area than LAN as well as MAN such as Country/Continent etc. WAN is expensive and should or might not be owned by one organization. PSTN or Satellite medium is used for wide area networks.

***Key Features***

1. **Large Geographic Area**: Covers vast geographic regions, connecting multiple LANs.
2. **Lower Data Transfer Rates**: Generally offers lower data transfer rates compared to LANs, due to the longer distances and more complex infrastructure.
3. **Resource Sharing Across Locations**: Enables resource sharing and communication between devices in different geographic locations.
4. **Complex Infrastructure**: Requires more complex and robust infrastructure, including leased lines, satellites, and fiber optic cables.
5. **Public or Private**: Can use public networks (like the internet) or private leased lines for connectivity.

***Advantages***

1. **Geographic Reach**: Connects devices and networks across large distances, enabling global communication and collaboration.
2. **Scalability**: Can scale to accommodate a large number of devices and networks across vast regions.
3. **Centralized Data**: Allows centralized data management and access across multiple locations.

***Disadvantages***

1. **Cost**: Expensive to set up and maintain due to the complex infrastructure and long-distance connections.

2. **Speed**: Typically offers lower data transfer rates compared to LANs.
3. **Security**: More challenging to secure due to the larger geographic scope and use of public networks.

**Comparison Summary**

- **LAN**:
  - **Pros**: High speed, cost-effective, easy to set up, secure within a limited area.
  - **Cons**: Limited to a small geographic area, scalability issues.
- **WAN**:
  - **Pros**: Large geographic reach, scalable, centralized data management.
  - **Cons**: Higher costs, lower speed, complex infrastructure, security challenges.

Both LANs and WANs are essential for modern networking, each serving different purposes based on the scale and geographic scope of the network. LANs are ideal for localized networks needing high-speed connectivity, while WANs are crucial for connecting distributed networks and facilitating long-distance communication.

**Internet and World Wide Web, HTML and IP**

**Internet and World Wide Web**

***Internet***

**Definition**: The Internet is a global network of interconnected computers that communicate through standardized protocols. It enables the sharing of information and resources across vast distances.

***Key Components***

1. **Protocols**: Set of rules governing data communication. The most common protocols include:
   - **TCP/IP (Transmission Control Protocol/Internet Protocol)**: Fundamental protocol suite for the Internet, providing reliable data transfer.
   - **HTTP/HTTPS (Hypertext Transfer Protocol / Secure)**: Protocols used for transferring web pages on the World Wide Web.
2. **IP Addresses**: Unique numerical labels assigned to each device connected to the Internet, used for identifying and locating devices.

3. **Domain Names**: Human-readable addresses for websites (e.g., www.example.com), mapped to IP addresses by the Domain Name System (DNS).
4. **Routers and Switches**: Devices that direct data traffic between different networks, ensuring data packets reach their intended destination.
5. **Internet Service Providers (ISPs)**: Companies that provide Internet access to individuals and organizations.

***Key Features***

1. **Global Connectivity**: Connects millions of private, public, academic, business, and government networks.
2. **Data Exchange**: Facilitates the exchange of data and information between devices worldwide.
3. **Services**: Supports various services, including email, file sharing, and online communication.

***Advantages***

1. **Information Access**: Provides access to vast amounts of information and resources.
2. **Communication**: Enables real-time communication through email, instant messaging, and video conferencing.
3. **Commerce**: Facilitates e-commerce and online business activities.

***Disadvantages***

1. **Security**: Vulnerable to cyberattacks, hacking, and data breaches.
2. **Privacy**: Risks related to personal data exposure and privacy infringement.
3. **Dependence**: Over-reliance on the Internet can lead to issues if connectivity is lost.

***World Wide Web (WWW)***

**Definition**: The World Wide Web (WWW or Web) is a system of interlinked hypertext documents and multimedia content accessed via the Internet. It uses web browsers to display content hosted on web servers.

***Key Components***

1. **Web Pages**: Documents formatted in HTML (Hypertext Markup Language), accessible via web browsers.
2. **Web Browsers**: Software applications used to retrieve, present, and traverse information on the Web (e.g., Google Chrome, Mozilla Firefox).

3. **Web Servers**: Computers that store and serve web pages to users over the Internet.
4. **URLs (Uniform Resource Locators)**: Addresses used to locate resources on the Web.

***Key Features***

1. **Hypertext**: Allows linking between web pages using hyperlinks, enabling easy navigation.
2. **Multimedia**: Supports various types of content, including text, images, videos, and interactive elements.
3. **Interactivity**: Enables interactive web applications through technologies like JavaScript, CSS, and AJAX.

***Advantages***

1. **Ease of Access**: Provides easy access to a wide range of information and services.
2. **User-Friendly**: User-friendly interfaces through web browsers.
3. **Rich Content**: Supports diverse and rich multimedia content.

***Disadvantages***

1. **Quality Control**: Varying quality and reliability of information.
2. **Security Risks**: Exposure to malicious websites and cyber threats.
3. **Digital Divide**: Access disparity between different regions and populations.

**HTML (Hypertext Markup Language)**

***Definition***

HTML is the standard markup language for creating web pages and web applications. It structures the content on the Web by defining elements like headings, paragraphs, links, images, and other multimedia.

***Key Components***

1. **Elements**: Building blocks of HTML documents, defined by tags (e.g., <h1>, <p>, <a>).
2. **Attributes**: Provide additional information about elements (e.g., href in <a> tag for links).
3. **Document Object Model (DOM)**: Hierarchical structure representing the content of HTML documents.

***Key Features***

1. **Structure**: Organizes web content into a hierarchical structure.
2. **Hyperlinks**: Enables linking to other web pages or resources.

3. **Multimedia Support**: Embeds images, audio, video, and other multimedia content.
4. **Forms**: Creates interactive forms for user input.

***Advantages***

1. **Simplicity**: Easy to learn and use for creating basic web pages.
2. **Compatibility**: Supported by all major web browsers.
3. **Extensibility**: Can be extended with CSS (Cascading Style Sheets) for styling and JavaScript for interactivity.

***Disadvantages***

1. **Static Nature**: By itself, HTML creates static pages; dynamic behavior requires additional technologies.
2. **Design Limitations**: Limited design capabilities without CSS.

**IP (Internet Protocol)**

***Definition***

Internet Protocol (IP) is a set of rules governing the format of data sent over the Internet or local network. It is responsible for addressing and routing packets of data so they can travel across networks and arrive at the correct destination.

***Key Versions***

1. **IPv4 (Internet Protocol version 4)**: The fourth version of IP, widely used and providing over 4 billion unique addresses.
2. **IPv6 (Internet Protocol version 6)**: The latest version, designed to address the limitations of IPv4 by providing a vastly larger address space.

***Key Features***

1. **Addressing**: Assigns unique IP addresses to devices on a network, ensuring proper data routing.
2. **Packetization**: Breaks down data into packets for efficient transmission.
3. **Routing**: Determines the best path for data packets to travel from source to destination.

***Advantages***

1. **Scalability**: Supports large networks and multiple devices.
2. **Flexibility**: Enables routing across diverse networks and devices.

3. **Interoperability**: Ensures compatibility and communication between different network systems.

***Disadvantages***

1. **Security**: IP packets can be intercepted or spoofed, leading to security risks.
2. **Complexity**: Managing and routing IP addresses can be complex in large networks.
3. **IPv4 Limitations**: Limited address space in IPv4, necessitating the transition to IPv6.

**Summary**

- **Internet**: A global network for data exchange, enabling services like email and the Web.
- **World Wide Web**: A system of interlinked hypertext documents accessed via the Internet.
- **HTML**: The markup language for structuring web pages.
- **IP**: The protocol for addressing and routing data packets over networks.

Understanding these concepts is crucial for navigating and utilizing modern digital communication and information systems effectively.

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# Lecture-11

## Introduction to MS Office - Word, Excel, Power Point

Microsoft Word, Microsoft Excel, and Microsoft PowerPoint are all part of the Microsoft Office suite , a collection of productivity software developed by Microsoft . These three programs are commonly used in business, education, and personal settings for creating documents, spread sheets, and presentations, respectively . Microsoft Office also includes other programs such as Outlook, Access, and Publisher.

**MS Word (Microsoft Word)**

Ms Word as word processor is used for printing letters, preparing mailing lists, creating documents and reports. The speed of these operations is much faster and easier. Even spellings can be checked from documents.

**Word processing terminologies**

**Word wrap:** A word processor automatically moves to the next line when you type beyond the right margin. This known as word wrap.

**Editing text:** On type writers, when you miss the word or a line you need to type the whole letter again. But using Word you can insert new word, new sentences or paragraphs anywhere in the text typed in the earlier.

**Selection:** A selection is a group of words that are put together. Word can perform various operations such as copying, moving or deleting.

**Moving/ copying selected block of text:** You can move a selected block of text to another location in the same document or copy the text at another location with help of word. This saves the effort of retyping the text.

**Search and replace:** Word can conduct a search for any specified word or character in a document and replace it with another word as desired.

**Dictionary /grammar check:** You can check spellings and locate errors in your document using Word**.**

**Character style and sizes:** Using word you can change the type and the size of characters so that a printed document appears more attractive and professional. You can use bigger and bold, italic, underline, and strikeout in the word.

**Header, footer and page numbering:** Word can generate page numbers automatically in document and print headers and footers on each pages.

**Margin and columns:** Using word print text in two or more columns as in news paper.

**Justification of the text:** Justification is the alignment of the text, typed within given

margins. The text can be left, right, center, or even justified.

**Line spacing**

In the word the spacing between the lines can be adjusted.

## MS Excel

MS Excel or Microsoft Excel can be described as a spreadsheet program particularly utilized for analyzing and recording statistical and numerical data. MS Excel provides a variety of features that allows the user to perform several operations including pivot tables, calculations, macro programming, graph tools, etc. Microsoft Excel is compatible with different types of Operating Systems such as Apple macOS, Apple IOS, Microsoft Windows, and Android.

A spread sheet is essentially a matrix of rows and columns. Consider a sheet of paper on which horizontal and vertical lines are drawn to yield a rectangular grid. The grid namely a cell is the result of the intersection of a row with a column. Such a structure is called a Spread sheet. A spread sheet package contains electronic equivalent of a pen, an eraser and large sheet of paper with vertical and horizontal lines to give rows and columns. The cursor position uniquely shown in dark mode indicates where the pen is currently pointing. We can enter text or numbers at any position on the worksheet. We can enter a formula in a cell where we want to perform a calculation and results are to be displayed. A powerful recalculation facility jumps into action each time we update the cell contents with new data. MS-Excel is the most powerful spreadsheet package brought by Microsoft.

The three main components of this package are

- **Electronic spread sheet**
- **Database management**
- **Generation of Charts**.

An Excel spreadsheet can be seen to be a collection of rows and columns that together form a table. Rows are generally assigned by numbers whereas columns are generally assigned by Alphabetical letters. The particular point where a row and column meet is known as a cell. A cell’s address is specifically given by the letter that represents the column together with the number that represents the row.

**MS PowerPoint**

MS PowerPoint is one of the basic functions of MS Office which is often abbreviated as PPT or PP. It is essentially a presentation program that Microsoft initially developed to create a

slideshow with vital charts, information as well as images in the form of a presentation. Often it can be seen that the function is being used for school presentations and business.

**Power point: A Tool for Effective Presentation**

Power Point's innovative tools and easy approach can help you make professional looking presentation quickly and easily. You can also augment your presentation with speaker 's notes, outline pages and audience handouts. PowerPoint is very popular presentation graphics software package. It has set new standards for working of presentation graphics. PowerPoint helps you bringing ideas and information that you want convey to your audience with no difficulty.

**Presentations:** A Power Point Presentation is a collection of Slides, handouts, speaker's notes and your outline, all one file, As you create slides, you are creating a presentation.

**Slides:** Slides are individual pages of your presentation. Slides can have titles, text, graph, drawn objects, and shapes, clip art, visuals created with other application . You can print slides as black and white or colour overhead transparencies or have 35mm slides made using a film printer.

**Understanding the Power Point Window:** The major elements in the Power Point window are:

**The status bar:** Messages appear at the bottom of the window in an area called the status bar. These messages describe what you are seeing and doing in the Power Point window as you work.

**The scroll bar :** There's a vertical scroll bar on the right side of the Power Point window The scroll bar Has all' elevator as well as double arrow buttons you can use to move from slide to slide.

**The toolbars :** You can use toolbars for quick access to commonly used commands and tools.

**Uses of PowerPoint**

- **Presentations:** make presentation in the form of slides, handouts or speaker notes.
- **Slides:** slides or individual "pages" of presentation, it may contain text, graphs, clipart etc
- **Hand-outs:** Handout consists of printed versions of slides- 2 or 3 or six slides per page

**Adding text to slides**

Text can be entered in a presentation in two ways

- Inserting new slide with text place.
- Inserting text in an existing slide.

**PowerPoint shortcut keys :** In PowerPoint bullets and numbering van be done. table slide can be insert, and one can create various the charts, smart art graphic, organization chart, clipart from gallery.

**What is a Presentation?**

Presentation is simply the way an idea or a thought is communicated to another person. We 'present' or communicate our thoughts and ideas to several people all through our lives without actually realizing that we are making a presentation.

Thus, It can be said that a presentation is actually a type of communication where you put your thoughts, ideas and feelings across to an individual or an a group such that they are accepted by the audience.

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# Lecture-12

## Audio visual aids - definition, advantages, classification and choice of A.V aids;

Audio visual material must be seen in their relationship to teaching as a whole and to the learning process as a whole, until the teacher understands the relationship between audio visual material and teaching learning process. Audio visual materials are produced, distributed and used as planned components of educational programs. It helps the process of learning that is motivation, classification and stimulation. A.v. aids are multisensory materials which motivate and stimulate the individual. It makes dynamic learning experience more concrete realistic and clarity. It provides significant gains in thinking and reasoning. Audio visual aids are sensitive tools used in teaching and as avenues for learning. These are planned educational materials that appeal to the senses of the people and quicken learning facilities for clear understanding.

**Definitions**:

1. **According to Kinder S. James**: Audio visual aids are any device which can be used to make the learning experience more concrete, more realistic and more dynamic.
2. **According to Burton**: audio visual aids are those sensory objects or images which initiate or stimulate and reinforce learning.
3. **According to Carter.v.Good**: audio visual aids are those aids which help in completing the triangular process of learning that is motivation, classification and stimulation.
4. According to good's dictionary of education: audio visual aids are any thing by means of which learning process may be encouraged or carried on through the sense of hearing or sense of sight.
5. According to Edger Dale: audio visual aids are those devices by the use of which communication of ideas between persons and groups in various teaching and training situations is helped. These are also termed as multi-sensory materials.
6. According to McKean and Roberts: audio visual aids are supplementary devices by which the teacher, through the utilization of more than one sensory channel is able to clarify, establish and correlate concepts, interpretations and appreciations.
7. According to KP. Neeraja: an audio visual aid is an instructional device in which the message can be heard as well as seen

**Classification of Audio – Visual aids**

The audio – visual aids may be classified into three categories as follows. This is traditionalway of categorisation.

| **Audio aids** | **Visual aids** | **Audio visual aids** |
|---|---|---|
| Tape recorder<br>1. Public address system<br>2. Telephone<br>3. Radio<br>4. Mobile phones | **Non projected**<br>1. Chalk board<br>2. Bulletin board<br>3. Picture and photograph<br>4. Flannel graph, flash card<br>5. Posters<br>6. Charts and graphs, diagram, map<br>7. Specimen, model, diorama<br>8. Translide<br>**Projected**<br>1. Transparencies<br>2. Slides<br>3. Film strip<br>4. Opaque materials | **Non projected**<br>1. Drama<br>2. Puppet show<br>3. Talking doll<br>**Projected**<br>1. Motion picture (cinema)<br>2. video |

**Recent classification**

Recent classification tends to categorize the AV aids into Hardware aids and software aids.

Hardware aids are the machines/ equipments used for imparting audio visual education. These may involve simple mechanism such as magic lantern, epidiascope,overhead projector or may be highly complex such as computer, multimedia, video etc.,

| **Audio – Visual aids** | |
|---|---|
| **Hardware aids** | **Software aids** |

| Simple | Complex | |
|---|---|---|
| 1. Magic Lantern | 1. Radio, TV | 1. Slide |
| 2. Epidiascope | 2. Computer | 2. Film Strips |
| 3. Overhead projector | 3. Tape recorder | 3. Transparencies |
| 4. Slide projector | 4. Telephone | 4. Charts |
| 5. Film projector | | 5. Maps |
| 6. LCD projector | | 6. CDs, DVDs, Pen Drive |

**Planning and selection of Audio – visual Aids**

*In Planning for the selection of visual and audio – visual aids, three points must bekept in mind:*

a) Decide what you want to say why it is important to say it.

b) Outline the subject- matter point by point.

c) Visualize the key points in the outline. Make aids, or select them from commercially prepared ones.

*The following points would help the extension worker to select appropriate AV aids*

a) Select the best aid or combination of aids to meet the specific objective.

b) The aids should not be new to the learner's environment. The effective extensionworker should make use of indigenous materials.

c) The aid should be appropriate to the age, intelligence, sex, education, experience etc.

d) The aid should not be too old or damaged.

e) Too many aids should not be used unnecessarily.

f) Simple aids, if equally effective, should be preferred to expensive aids. Effective aidsneed not necessarily be expensive.

g) An aid should help learners to make better thinkers and critical minded.

h) Selected aid should be worth the time, expense and efforts involved.

i) A teacher should know his own capabilities while making selection.

j) The nature of subject matter being taught.

k) The size of audience should also be considered while selecting the aids.

**Advantages of Audio Visual aids**

*Research has shown that audio visual aids help to*

1. Reduce verbalism.
2. Make learning permanent.

3. Clarify ideas being presented.
4. Capture audience attention, arouse their interest and involvement.
5. Vitalize and make teaching more real.
6. Overcome the language barrier.
7. Stimulate thinking and motivate action.
8. Provide experiences otherwise difficult to get.
9. Help to reach more people irrespective of their level of literacy and language.
10. Speed up the process of learning.
11. Save time of teacher and learner because they make learning easier and faster.
12. Can adapt the speed of presentation to the reactions of the audience.
13. Highlight main points of the message clearly.
14. The possibility of misinterpreting concepts is reduced.
15. Structure the learning process more effectively.
16. Messages perceived with several senses are understood and retained better.

**Disadvantages/ Limitations**

1. Learner may sometimes form distorted impressions, unless audio –visual are supplemented with required explanation.
2. Temptation for the teacher to narrow down his teaching to only a few big ideas, notgiving the
3. Some teachers acquire the mistaken idea that they have little to do when audio –visuals are u
4. Over – reliance on audio visual aids may convert teaching to showmanship.
5. Because of cultural difference, the audience may form a mistake or distorted impression about the audio visual aids.
6. Teaching may be scratchy instead of being complete.

**AUDIO AIDS**

**1. Tape Recorder**

The tape recorder is audio equipment which helps us to record the sound in a magnetictape and reproduces it when it is required.

**Advantages of Tape Recorder**

1) Simple to operate.
2) We can record programmes of our choice and reproduce them whenever necessary.
3) Cost is very low and widely available.
4) Less storage space is needed for the tapes.
5) Portable, we can carry easily to all the places.
6) Prerecorded lesions can be made available to the farmers.

**Limitations**

1) One way communication. Limited interaction is possible with the learner.
2) Not suitable for all types of programmes.

**2. Public Address System (PAS)**

The public address system helps the extension worker to address a large size ofaudience. The public address system includes a microphone, amplifier and a speaker. The microphone receives the sound and converts it into electrical waves and transmits to amplifier.

**Advantages**

I. Helps to minimize the efforts of the communicator and relieves from the stress oftalking loudly.
II. A huge size of audience can be covered easily.
III. Increases the listening capacity of the audience.
IV. Easy to operate and transport from place to place.
V. Where there is no power supply, it can be operated with the battery.

**Telephone**

Telephone provides for instant interpersonal communication at high speed and at considerable saving of time, money and labor. Use of mobile telephones has spread rapidly even in the rural areas and may be considered as a necessity rather than a luxury. A cell phoneoffers full Duplex Communication and transfer the link when the user moves from one cell to another.

**Benefits**

- Relatively inexpensive opportunities, as the cost of mobile devices are significantlyless than PCs and laptops
- Multimedia content delivery and creation options
- Continuous and situated learning support
- Decrease in training costs
- Potentially a more rewarding learning experience

**NON-PROJECTED VISUAL AIDS**

**Meaning-Importance**

The non-projected visuals like black board, picture, posters, charts, flash cards, flip books, flip charts, flannel graphs, picture strips, exhibits hoardings, etc do

not require any equipment, like a projector, for their display. These aids are very easy to make, easy to carry and can be made with locally available inexpensive material.

*The non-projected aids and be divided into:*

a. Teaching aids

b. Display type.

**a. Teaching aids:** The teaching aids which are non-projected visuals and can be prepared and used by teachers or extension workers are: (1) Chalk board, (2) Pictures includingphotographs and hand drawn pictures, (3) Flash cards, (4) Flib books-similar to a set of flash cards but bound at the top in the form of a calendar, (5) Flip charts—few charts on a particular theme put together and bound together at the top, and (6) Flannel graph.

**b. Display visuals:** These include posters, hoardings, charts and exhibits. Once they are displayed they stand on their legs and convey the message to whosoever sees them. There is no necessity for anyone to stand by their side and explain.

**Importance of Non-Projected Aids**

I. Can be made with locally available inexpensive material.
II. Capture audience attention and arouse their interest.
III. Highlight main points of the message clearly.
IV. The possibility of misinterpreting concepts is reduced.
V. Structure the learning process more effectively.
VI. Messages perceived with several senses are understood and retained better.
VII. Provide experiences otherwise difficult to get.
VIII. Help reach more people irrespective of their level of literacy and language.
IX. Speed up the process of learning.
X. Can adapt the speed of presentation to the reactions of the audience.
XI. Save time of teacher and learner.

**1. Chalk board / Black board**

A blackboard or chalkboard is a reusable writing surface on which text or drawings are made with sticks of calcium sulfate. These sticks are known as chalk. Chalkboards were originally made of smooth, thin sheets of black or dark grey slate stone. Modern versions are often green or brown and are thus sometimes called a

green board or brown board instead.

**Advantages and disadvantages**

It is easier to write legibly and draw accurately on a chalkboard than on a whiteboard because whiteboards are slippery and blackboards are not.

Chalkboards have disadvantages relative to whiteboards: they produce dust, the amount depending on the quality of chalk used. Some people find this uncomfortable or may be allergic to it, and there has been speculation about links between chalk dust and respiratory problems.

1. **Bulletin Board**

A bulletin board is used to deliver the message and produce action. Photographs, publications, drawings, posters, wall newspapers, leaflets, specimen cuttings, cutout figures and illustrations are some of the items that are generally displayed on a bulletin board.

2. **Pictures and PhotographsPictures**

In extension teaching the pictures are used to focus the attention, arouse interest, introduce a new technology or innovation and illustrate or explain a thing which is otherwise difficult to understand for the learner. Pictures provide a real world experience to the viewers.

3. **Photographs**

The word photography means writing with, light. Photographs provide an opportunity to capture those important life events for future day references. Memories fade away; photograph lasts to rekindle our memory. The photographs pay an important role in the extension teaching.

4. **Flannel board**

Flannel board is otherwise called as cloth boards or felt boards. . The flannel board is particularly used with instruction storytelling, to develop diverse visualization patterns before the audience and to explain various steps to follow in an innovation adoption process. While using flannel boards the following suggestions shall be kept in mind.

**Advantages**

- Simple to use and easy to prepare visual.
- Less costly and very much flexible in its usage.

- Holds attention and keeps the teaching learning process interesting.
- Variety of visual materials can be displayed.

**Disadvantages**

- Transportation and storing of boards and materials is a problem. Suitable tables tosupport boards must be available.
- Time and cost of making material for presentation present a problem.

Cost of boards themselves can't be overlooked.

**5. Poster**

A visual combination of bold design, colour and message which is intended to catch and hold the attention of the passer-by long enough to implant or to reinforce a significant idea in his mind.

"Posters are the graphic aids with short quick and typical messages with attention capturing paintings." Posters in extension education are used to focus attention, arouse interest and attract the audience towards a particular information/message. Posters of 28 x 22 inches are convenient and ideal for use under different circumstances. A poster may contain a written message, diagram, map, picture or a cartoon. In short anything that will help to convey a fact, an idea or a message for which attention is called for is the content of a poster.

**Advantages**

- It attracts attention.
- It conveys the message very quickly.
- It does not require a detailed study.
- Good poster leads to action with good motivation
- It can stand alone and is self explanatory.

**Disadvantages**

- Poster does not always give enough information
- When a poster is seen for longer time it may not attractive. So it should be dynamic

**6. Charts**

It is a graphic representation. In other words, charts are combinations of such pictorial,graphic, numerical, or verbal materials which together will be most likely to present clear visual summaries of important processes or relationships.

Chart is defined as a visual aid which depicts pictorial and written key information insystematic way to summarize, compare, ex: anatomical charts and figure, diagrams etc.

Charts are used to present the information in a more understandable way to the audience. In the extension teaching learning situation, the charts are used mainly to analyse a problem or a situation. They show a proper sequence and relationship. The different types of charts that are commonly used in extension education are as follows

1) Time and sequence chart
2) Table chart
3) Strip chart
4) Flow chart and
5) Flip chart

**Types**

**Pie graph:** These are called as circle diagram. The data are presented thorough the sections ofportions of a circle.

- In determining the circumference of a circle we have to take in to consideration aquantity known as pie.
- The surface area of a circle is to cover 360 degree.
- The total frequencies or value us equated to 360 degree and then the angles corresponding to component parts are calculated.
- After determining their angle, the required sectors in the circle are drawn.

**Bar graph:** The graphic presentation extends the scale horizontally along the length of bars. Each bar must be of the same width, height of the bar over a period represents the corresponding time of the variable. Graphs are available in 2 forms that are vertical and horizontal.

**Line graph:** To show the trends and relationships ex: single line shows the relation and the variation in the quantity. Quantitative data are plotted or when the data is continuous. The concepts are represented with the help of lines drawn either horizontally or vertically. The plotted points are connected to one another, instead of the base thus producing the curve.

**Pictorial graph:** It is an outstanding method of graphic representation. Pictures are used for the expression of ideal; they are more attractive and easily understood. Vivid pictures will be used to create rapid association with the graphic message; each visual

symbol may be used to indicate quantity.

**7. Diagrams**

A diagram is a graphic design that explains about a concept or a thing. In the diagram, drawings are made to show the arrangement and relationship of various parts. It is a line drawing made for mathematical or scientific explanation during the teaching, learning process.

**8. Map**

A map is a graphic aid representing the proportionately as a diagram, the surface of the earth, world or parts thereof. It conveys the message by lines, symbols, words and colors.

**Types of maps**

- Political maps: these maps show political divisions of the world, a continent, a nation.
- Physical maps: shows the physical contour of a place, area, and region.
- Relief maps: it shows the actual elevations and depressions in a place, area, andregion.
- Weather maps: shows the amount of rains, temperature extremes, humidity in an area,region country.
- Population maps: shows the distribution of population in various parts of region,country.
- Picture or tourist maps: shows historical spots monumental sites.etc.
- Road maps: shows the roads of a region connecting various parts and points together.
- Railway maps: shows the railway links between various points.
- Air maps: shows the air routes between various points.
- Sea root maps: shows the sea routes between various sea ports

**9. Specimen**

A specimen is a small pièce, part or sample representative of the real object or material. In the extension teaching specimen or representative sample of the real things plays an important role in showing the farmer about a new innovation, a hybrid

seed, weeds, diseaseaffected parts etc. The types and forms of specimen selected for showing to the farmer depends upon the purposes for which they are used.

**10. Models**

Many times under practical conditions the real objects are not always available. Even when they are available, they might be too big, too complex and too cumbersome to handle in the teaching learning situation. For example an extension worker cannot bring a real cow or a tractor or a pneumatic cart into his classroom for demonstration or explanation.

**11. Mockups**

Mockups are the simulated substitutes of real things. The mockups of tractor, pesticidesprayer, milking machine, reproductive system of a cattle help as a substitute of real model to demonstrate and teach the functions of a real model.

**PROJECTED VISUAL AIDS**

**1. Slides**

Slides in 2 x 2 inches mounts are available in different formats such as 35 mm, half frame and super slides.

**2. Film-strip projector**

Film-strips provide an economical means of presentation of information. Film-strips are cheaper than separate 2 x 2 inch slides. Although slides are projecting the same size screen image they usually produce a brighter picture.

**Advantages**

1. Film-strips and film-strip cheap in cost. projector are easy to maintain andcomparatively
2. Easy to operate and handle.
3. Very compact to handle, light weight and easy transportation is possible.
4. Easy to prepare the film-strip and simple to project them.
5. Very much flexible to use. The rate of presentation can be adjusted at the convenienceof the user.
6. Attention is focused on one aspect at a time and that particular aspect represented inthe frame can be discussed at length.

7. Modifications according to the needs of the audience are possible.

**Limitations**

1. The sequence or order of the film-strip cannot be changed.
2. While presenting, it is not possible to skip the frames.
3. Since the pictures are not mounted on any material, the edges are prone for easydamage.
4. The effect of a motion picture cannot be achieved in it.

### 3. Overhead Projector

The new visual aid overhead projector is at present widely used for and has become very much popular due to its easy operation and versatility. Through overhead projection it if possible to project a wide number of visual aids such as charts, graphs, pictures, maps and diagrams In comparison to slide projector, projection equipment contains a large aperture (10x10 inches).

**Advantages**

1. The equipment can be used in a well lighted room and unlike in other projected aids,no darkening is heeded.
2. The speaker is facing his audience all the times and can therefore observe the audiencereaction well.

3. It is possible to maintain eye contact with the audience and there is no turning of backto the audience.

4. Instant use of the aid is possible without any prior preparation of the aids.

5. Comparatively the transparencies can be prepared economically and reuse of thematerial is possible after wiping them with alcohol or xylol.

6. Easy handling and less storage space is required for both the projector and its visual materials.

7. Progressive disclosure is an important feature that can be accomplished readily on overhead projector. This can be done by simply covering that portion of transparency sheet which is not to be seen with an opaque page or material.

**Limitations**

1. The light source is so bright that it often irritates the eyes of the communicator.

2. The heat generated by the lamp also causes discomfort.

3. Only very restricted movements can be shown with the help of this projector.

**Opaque Projector**

The use of opaque projector or epidiascope in the extension teaching helps the communicator to (i) stimulate attention (ii) arouse interest, (iii) clarify information and (iv) help the receiver to gain knowledge more rapidly and retain it for a longer period. It can also be used to introduce subjects or topics of interest, to present specific information, documents and to ensure teacher learner participation.

**NON PROJECTED AV AIDS**

**1. Drama**

Drama is one of the most popular forms of traditional media. Let us understand this form by using an example from the rural areas. After completing the work in the fields, you very often find that farmers celebrate their joy of leisure.

**2. Street Theatre**

This is a performance medium drawing its techniques from traditional drama forms in India. They are performed in any nukkad (street corner), street, market place etc.

### 3. Puppet show

One of the old and popular arts in Indian villages is puppetry. Puppetry is an education cum entertaining aid in which puppets manipulated by the performer is a person termed as a characters in a story to be depicted.

**PROJECTED AV AIDS**

1. **Motion pictures**

   One picture is equal to ten thousand words is the time honored generalization. If a single picture is effective of ten thousand words, pictures presented in sequence have an accumulative effectiveness which cannot be measured in terms of volumes or any other measurement.

2. **Video and video production**

   Television is a very powerful medium of mass communication, which is used for communication, entertainment and education. Video has gained its importance as an extension education tool for the purpose of agricultural communication. Video is widely used as it is very. Handy, less expensive, easy operation and simple to use, Wide range of extension films are available in the video cassetteswhich can be readily used by the extension workers.

3. **LCD projector**

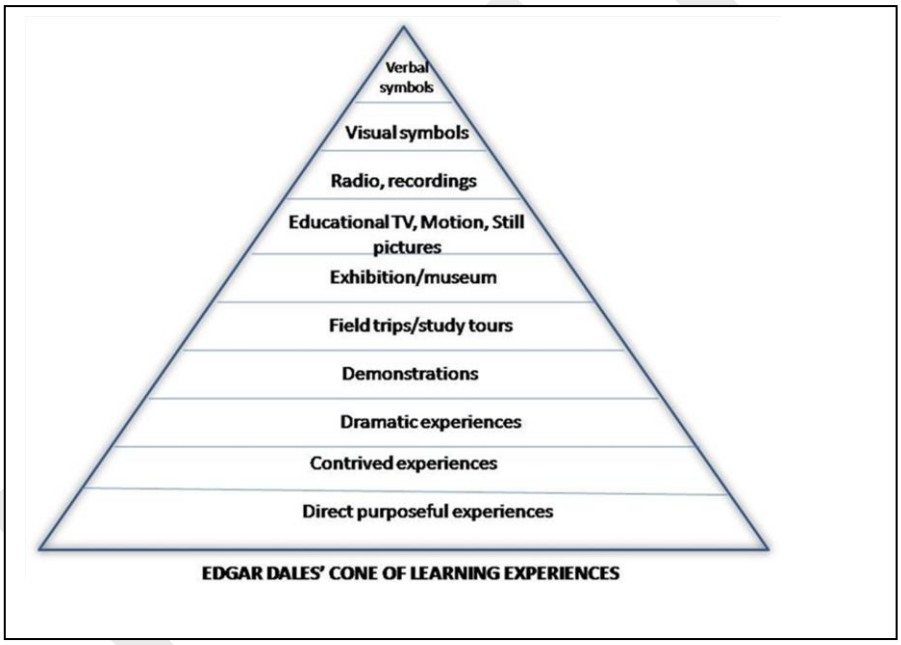
   An **LCD projector** is a type of video projector for displaying video, images or computer data on a screen or other flat surface. It is a modern equivalent of the slide projector or overhead projector.

# Lecture-13

**Cone of Experience and Criteria for Selection and Evaluation of A.V Aids; Video Conferencing.**

## Cone of Experience and Criteria for Selection and Evaluation of A.V Aids; Video Conferencing.

The "Cone of Experience" devised by Edgar Dale in explaining the inter relationship of the various types of audio visual materials as well as their individual "position" in the learning process.




In this cone each division represents a stage between the two extremes direct experience at the base, and pure abstraction at the apex. (The bands on the cone are not rigid divisions).

1. Direct, purposeful experience: it is the unabridged version of life itself, with three elements directness, purposefulness and responsibility for the outcome. e.g., making a piece of furniture ploughing, cultivating any crop.
2. Contrived Experiences: a contrived experience in an "editing" of reality, differing or not from the original in size, in complexity or in both e.g., models of animals, mock-ups of machinery, objects, specimens.
3. Dramatized Experiences: i.e., participating in a reconstructed experience, e.g., dramas, puppet shows.

4. Demonstrations
5. Field Trips
6. Exhibits (or Exhibition): a planned display of models, specimens, charts, posters etc., presented to public view for instruction, judging in a competition, advertising or entertainment.
7. a)Television
8. b) Motion Pictures or Films –silent pictures or combination of sight and sound.
9. a) Radio –dealt with already in this chapter.
   b) Recordings –on disc, tape or wire.

   Still pictures:

   a) Non-projected (for individual use)e.g. photographs, illustrations.

   b) Projected (for group use) e.g. photographs, illustrations (used in opaque projector), slides, filmstrips.

10. Visual symbols – e.g. flat maps, chalkboards, sketchers cartoons, posters, diagrams, charts, graphs, bulletin boards, flash cards, flannel graphs.

Verbal symbols – designation that bears no physical resemblance to the objects of ideas for which they stand. These are used together with every other material on the "cone of experience". The audio-visual aids.

**CRITERIA FOR CHOOSING AUDIO-VISUAL AIDS**

Introduction

The audio-visual aids are primarily used to increase the effectiveness of the learning process in a teaching situation. However, choosing the audio-visual aids for a specific learning task is a difficult task which requires a series of decisions on the part of the teacher or trainer. Precisely, the nature of audio-visual aids and the diversity of the learners' make the teaching task more complex. · Nature of audio-visual aids - Audio-visual aids consist of both the machine/ media (e.g. photo and video camera, computer hardware and software) and the material developed using them (e.g. photographs, multimedia, expert system). Besides, the audio-visual aids are either in the form of a

(i) Media – the physical or virtual form of the audio-visual aid (e.g. poster represents physical form while the powerpoint presentation indicates virtual forms) or

**(ii)** Method by which the media are delivered (e.g. individual use or presentation before a group). The trainer is expected to have expertise in both operating the machine, produce physical/ virtual audio-visual forms and deliver them effectively. · Diversity of

learners – Learners differ in terms of biological, psychological and social characters. Matching the needs of the learners is a demanding task .

**Criteria for choosing audio-visual aids**

Though audio-visual aids are extensively used in the learning process, there is no systematic theory or model which underlines the criteria required to select the "most appropriate" aid for learning. A popular approach for selecting the audio-visual aids was suggested by Kemp et al (1994), based on the learning conditions and learner abilities. They suggested three methods of choosing audio-visual aids viz.

(i) Selecting from readily available materials;

**(ii)** Selecting the audio-visual aids which are familiar to the teacher and

**(iii)** Selecting the audio-visual aids in a more objective way by following guidelines from the cognitive psychology and related theories. The first two approaches represent a pragmatic way of selecting audio-visual aids, while the later signifies an objective way.

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## Lecture-14

**Communication –concept, elements, Communication process, Models - Berlo' s model, feedback and barriers to communication.**

**COMMUNICATION: MEANING AND CONCEPT**

**THE MEANING:** The origin of the word "communication" is "communicare" or "communis" which means "to impart", "to participate", "to share" or "to make common." The sense of sharing is inherent in the very origin and meaning of "communication."

**DEFINITIONS OF COMMUNICATION**

The sociologists, the educationists and the psychologists have defined communication in various ways. A few definitions may be given below.

**According to Rogers and Shoemaker (1971)** Communication is the process by which message are transferred from a source to a receiver.

**According to Ban and Hawkins (1988)** Communication is the process of sending and receiving messages through channels which establish common meaning between a source and a receiver.

**According to Hovland(1964)** Communication is the process by which the individual (the Communicator) transmits knowledge to modify the behaviour of others (Communicatee).

**According to Leagans (1961)** Communication is the process by which two or more people exchange ideas, facts, feelings or impressions in ways that each gains a common understanding of the meaning, intent and use of messages.

Communication then is conscious attempt to share information, ideas, attitudes and the like with others. From the above definitions it can be concluded that Communication is the process of social interaction. i.e. in a communication situation two or more people interact. They try tangibly to influence the ideas, attitudes, knowledge and behaviour of each other. Several elements are involved in communication process / encounter. In simplest sense, communication means that a sender and receiver tuned together for sharing/exchange a particular message or series of message.

**FUNCTIONS OF COMMUNICATION:** Communication has been considered to be the bottleneck of Management, where any management function is just not possible to take place without making use of Communication.

a. **The information function** serves to provide knowledge to the individuals need for guidance in their actions. It also fulfils worker's desires for awareness of things that affect them

b. **The command and instructive functions** serve to make the employee aware of his obligations to the formal organization and to provide him with additional guidance on how to perform his duties adequately.

c. **The influence and persuasion function (also known as motivational function)** encourages the appropriate individual to perform or to exhibit a certain behaviour. Messages communicated are used to convince individuals that their actions can be personally or organizationally beneficial.

d. **The integrative function** refers to the fact that the communication of messages / ideas, if properly handled, should help to relate the activities of the workers to their efforts complement rather than detract from each other. Work efforts are unified rather than fragmented as a result of properly integrative communication. Employees can perform well and be involved in their work only when they understand their job duties and responsibilities. Unless the organization's key goals, values and strategies are communicated to employees, they will not work in that direction.

## Elements of Communication

Communication can be expected to have taken place only if the message is encoded by the sender that is relayed with use of signals and subsequently decoded at the destination. This process occurs basically due to the presence of five important elements of communication. Each of these elements have been explained as under:

### I. Source

Source is the originator of message who is an individual of formal or informal institution and initiates a message. In other words, source is a person who starts the process of communication. Several things determine how a source will successfully operate in communication process. This includes the communication skills of the source like abilities to speak and think; and create visual messages; the attitude towards audience, the subject matter content and towards oneself; the knowledge regarding the subject and the audience; and finally, the roles and norms that shape the communication behaviour in context to the social and cultural background of the source and the audience.

### II. Message

The recommendations from research, the technology, constitute the content or subject matter, the message. Information which is relevant to a particular set of audiences constitutes the

message, otherwise for them this is noise. A good message should clearly state what to do, how to do, where to do & what would be the result. Message deals with the package of information or the content to be transferred by the source. In fact message is the physical product from the source that supply information, creates feelings and impressions and change attitudes of the receivers. Message as per Berlo's S-M -C- R model has various components - content, code, treatment, elements and structure. Content is 'what's-it-about' in the message selected by the source to be passed on to the audience (receiver), that should be neither too much nor too little that may reduce communication effectiveness. Therefore, the message should be of just right quantity for the target audience. Content appears in some code - English or Hindi, pictures or words.

**III. Channel**

It is the carrier of the message. Channel may be natural that involves one of the sense modalities like seeing, hearing, touching, smelling, tasting or it may be artificial such as newspaper, radio, television, telephone etc. All the mass media, the audiovisual aids, the local leaders, the demonstration and the like are the various channels of communication. The total communication output is governed by the selection and patterning of channels. Channels are physical bridges between the sends and the receives of a message. They are avenues between a communicator and an audience on which messages travel to and fro. They are transmission lives used for carrying messages to their destination.

Some common channels in extension are meetings, radio, books, bulletins, newspapers, letters, tours, personal contacts, telephones, TV and leaders at work all these make it possible for a communicator to transinct his message to the intended audience. These channel serve as essential tools of communication.

**IV. Treatment**

It means the way a message is handled, dealt with, so that the information gets across to the audience. It relates to the technique or details of procedure or manner of performance to effective preservation of the message. The purpose of treatment is to make the message clear, understanding & realistic to the audience

Treatment of the message by the communicator shall depend to a great extent on choice of the channel and the nature of the audience. The task cannot be reduced to a formula or a recipe. Treatment is a creative & that has to be ‘tailor made’ for each communication function for example, the treatment of a message will be different when it is conveyed in a meeting or published in folder or broadcast. Similarly there will be difference in treatment of

the message according to the level of literacy, socio economic status & progressiveness of the audience.

Designing treatment usually require original thinking, deep insight into the principles of human behavior and skill in creating & using refined techniques of message presentation.

**V. Audience**

The audience or receiver of message is the target of communication function. An audience may consist of a single person or a number of persons. It may comprise men, women and youth. An audience may be formed according to occupation groups such as crop farmers, fruit farmers, dairymen, poultry keepers, fish farmers, homemakers etc. Audience may also be categorized according to farm size such as marginal, small, medium or big farmers

**COMMUNICATION PROCESS**

Communication is a two way process, involving at least two persons — a sender and a receiver—irrespective of the mode of communication. The sender conceives the idea, gives it a shape, decides the mode or channel of communication which may be used to convey the idea and conveys it. The receiver receives it, tries to understand it and finally takes action which may be either to store the information or to send the message to the original source or take any other line of action as required by the source.

The Communication process follows in the sequence as mentioned below:

I. **Developing an idea**: The sender perceives that he/she has some important message to be conveyed to the receiver.

II. **Encoding the message**: Encoding refers to conversion of thoughts of the sender into a form in which they can be transmitted through a channel. The message that develops in the mind of the sender has to be encoded before it can reach the intended person(s). The process of conversion of the subject matter into symbols is called encoding. In other words, it involves changing an intangible and abstract entity into something that can be shared with another person and be understood. Transmission of message requires use of certain symbols. A communicator plans and organizes his/her ideas into symbols, signs, words, actions, pictures and audio-visuals to ensure that it reaches the receiver. It is up to the sender to select a medium that one feels appropriate to communicate effectively to the intended listener or receiver.

The sender codifies the message selecting appropriate words, figures, charts or symbols, to convey an idea as clearly as possible. The sender also decides on the

medium of transmission so that the words and symbols constituting the message can be organized in a suitable manner.

III. **Transmitting the message:** This step involves transmission of the message using an appropriate medium of communication such as letter, phone call or personal interaction. While transmitting the message, a sender tries to ensure that the timing of the message is right. A sender also takes care that transmission of the message doesn't encounter any barriers or interference, which may impede the flow of communication. Ensuring that the communication channel is free from barriers or interference increases the chance of the message reaching the target audience and holding their attention.

IV. **Reception of the message**: The receiver, the person for whom the message was intended, receives the message. If a message is communicated orally, the receiver has to be a good listener in order to avoid loss of information during transmission of the message.

V. **Decoding the message**: The message is decoded and understood by the receiver. Decoding may be defined as the process of conversion of an encoded message. The receiver converts the symbols, words or signs received from the sender to get meaning of the message.Decoding may also be understood as assigning meanings by the receiver to the signs and symbols sent by the sender.

VI. **Acceptance or rejection of the message**: A receiver is free to accept or reject the decoded message. The receiver can also decide whether to accept the message fully or in part. The acceptance decision of the receiver is influenced by factors such as his perception regarding accuracy of the message, authority of the sender and the implications of accepting the information.

VII. **Feedback:** Feedback occurs when a receiver sends back some response to the sender or acknowledges receipt of the message. The communication loop is complete only after feedback has been provided.

The exchange of meanings is not complete unless the information goes back to the communicator from the receiver. Feedback enables the sender to know whether his/ her message has been understood correctly by the receiver or not. Feedback is the response of the receiver to the message sent by the sender. It ensures that the receiver has received the message and understood it in the same manner in which it was intended by the sender. Feedback allows a communicator to carry out corrections,

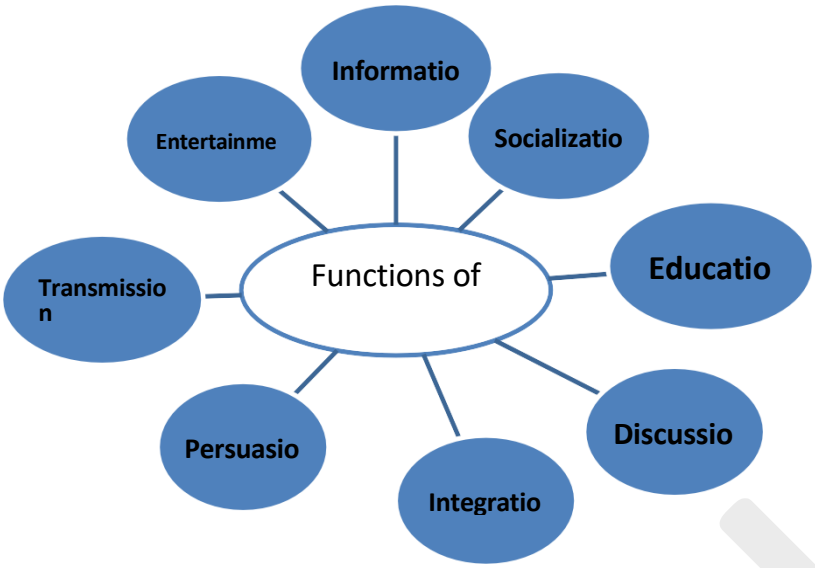
amendments or change the message to make it more effective. Just like the message, feedback can be verbal or non-verbal.

The process of communication performs several functions. These are:

- **Information Function:** Information function refers to sharing of knowledge and involves collection, storage, processing and dissemination of data, facts etc. that is required in order to understand, react and adjust to the ever changing environment.
- **Instruction/ Education Function:** This refers to the transmission of knowledge which leads to intellectual development and acquisition of skills that enables a person to function as an effective member of the society.
- **Socialization Function:** Socialization function of communication may be understood as bringing about an order in the society by fostering social cohesion among the members of a society. This is accomplished by creating awareness about social norms and values.
- **Persuasion Function:** One of the main objectives of communication is to influence others. This may involve an attempt to change the beliefs, values, orientation etc. of others in a direction deemed desirable by the speaker or to make them act in a certain manner.
- **Integration Function:** A major function of communication is to bring about a sense of belongingness among the members of the social system. Rituals, literature, folklore, beliefs etc. help in fostering a sense of togetherness.**Entertainment Function:** Communication entertains members of the society and provides an opportunity to diffuse tension and stress. Literature, music, drama, dance, art, comedy, sports etc. provide avenues for personal as well as collective recreation.
- **Discussion Function**: It provides an opportunity for exchange of views, facts and information that is needed for consensus building and collective action.

Functions of Communication

- **Transmission of Heritage:** This function involves dissemination of cultural and artistic products for the purpose of preserving the heritage of the past. Transmission function occurs both spatially and temporally

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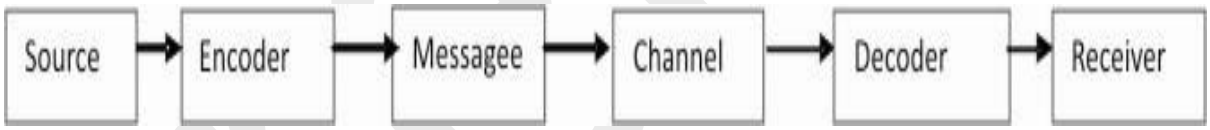
**Models - Berlo' s model**

According to Berlo (1960) the model of communication includes the following elements: Source; Encoder; Message; Channel; Decoder and Receiver.

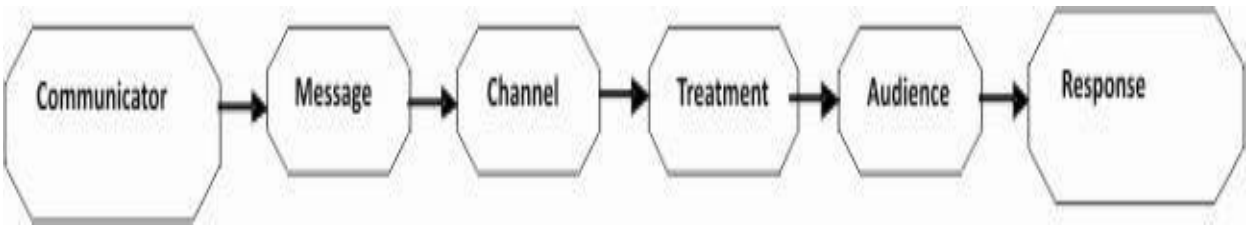
According to this model, any communication has some source. The source has ideas, information, and a purpose for communicating which is expressed in terms of a message. The encoder codifies ideas into meaningful message which is carried through an effective medium




or channel, chosen by the source. The receiver decodes the message and converts it in a form that it can be easily understood.

**Leagan's model**

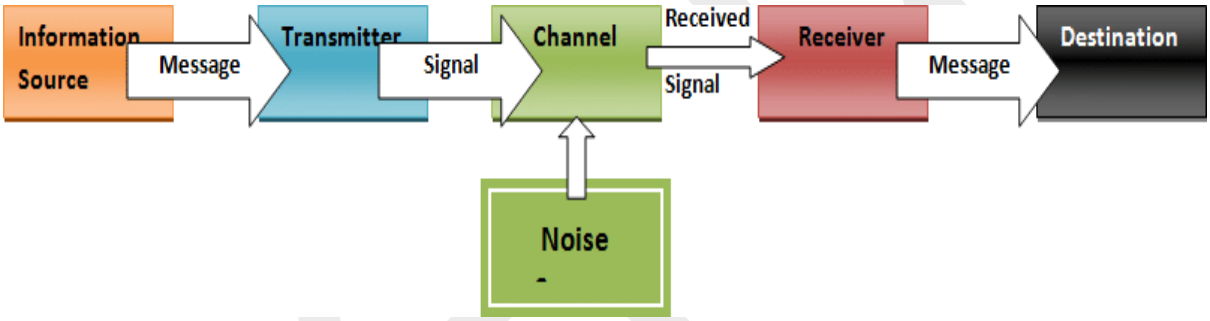
The communication model given by Leagan (1963) has the following elements - Communicator; Message; Channel; Treatment of message; Audience and Audience Response.



The task of communication, according to Leagan is to provide powerful incentives for change. Success at this task requires thorough understanding of the six elements of communication, a skillful communicator sending useful message through proper channel, effectively treated, to an appropriate audience that responds as desired. More emphasis is on treatment of the message and audience response/feedback.

Shannon and Weaver Model

Claude Shannon and Warren Weaver's model (1948) contains an information Source, which usually yields a message; a Transmitter, which encodes a particular communication into signals suitable for transmission; a Channel, which carries signals to the receiver; a Receiver, which transfers the signals to the Destination – the final consumer of the message. In this model, they indicated a sixth element, noise as a dysfunctional factor. The model is shown below:




**Feedback and barriers to communication**

We may define communication barriers as those factors/ obstacles which hinder the process of communication. They can be classified into four categories – (a) Physical/ Mechanical barriers, (b) Psychological barriers, (c) Semantic barriers, (d) and Organizational barriers.

- **Physical/ Mechanical Barriers**: These include all those factors which physically obstruct transmission/ transfer of message or signal from a sender to the receiver. Examples of physical barriers include:
- **Noise**: It is any random or persistent disturbance that obscure, reduces or confuses the message being communicated. It may include any undesired sound or interference during the exchange of information or transmission/ reception of signal. Noise may be any (physical) disturbances - any unnecessary sound, physical interference, - at the site of communication, particularly during an inter-

personal communication. Communication through mass media may also be obstructed by disturbances during transmission of signal as in the case of a radio or a television. Even signal transmission through telephone may also be obstructed through some technical fault in the telephone lines. That's why 'noise' is sometimes identified as one of the single largest problem in communication.

- **Physical disability**: Disability of a person (sender or receiver) may also become a barrier in certain situation. For example, a person who is deaf may face difficulty in receiving the communication. A person who stammers may not be able to communicate clearly and this disability will adversely affect his delivery of speech and it will create problem at the level of receiver.
- To overcome this situation, a communicator has to rely more on the body language, facing the receiver directly (straight-on), use of short and simple sentences, reduce the pace of speech delivery and making sure that the hearing aids, if any , being used by receiver/s, are working properly.
- **Bad/Extreme weather conditions**: Sometimes extreme weather may create a situation in which sending and receiving of any message may be negatively affected. This
- may include storm (sand storm, hailstorm), heavy rains, very high temperature during summer or very low temperature during winter. These adverse climatic conditions will have negative impact on the ability of a sender to send a message or the ability of a receiver to receive the message. This will not only create physical barriers during message transfer and reception but will also adversely affect the comfort level of the sender and the receiver to send/ receive any stimuli or give feedback.
- **Choice of medium**: If a person is not familiar with the media, the medium itself may become a barrier for the receiver. Alternatively, if a sender is not skilled enough in the use of media, he will not be able to make good use of the media while communicating.
- **Psychological Barriers**: This includes those conditions/ situations wherein interpretation of the message is adversely affected as intended by the sender. The examples include:
- **Stress**: When a person is under stress, his behavior and thinking will not be

normal. Consequently, he may intentionally inject something (add some unnecessary words or meanings) which may be misunderstood. Stress may compromise his ability to think, communicate as well as receive communication.

- **Anger**: This may lead to aggression, which will ultimately affect an individual's capability to communicate adversely. It may involve lots of moralizing and preaching, ordering and threatening and even commanding and directing.
- **Prejudice**: This refers to unreasonable dislike or preference of a particular group of persons or things over others. It may be a reason for bias towards a person based on past experience, caste or community. This may consequently affect ability of a person to communicate or interpret the message properly and impartially.
- **Attitude**: It is the mental disposition of a person towards something, be it a person or an object. A negative attitude will have an adverse or undesirable effect on the communication ability of a person to interpret the communication received. It may lead to some misunderstandings or give an inappropriate feedback about a message received/ communicated.
- **Inferiority Complex:** It refers to a feeling of inferiority in the sender of a communication. Due to this feeling, a communicator may feel depressed, have low self- esteem or may have a fear of rejection. This will ultimately be negatively reflected in his ability to communicate.
- **Cultural Barriers:** A culture is defined as the sum of social heritage. Every culture has its own rules and regulations about acceptable behavior in the society. Norms, values and belief system are part of one's culture and it governs their life and lifestyle. Some of the cultural barriers are discussed below:
- **Stereotyping**: It refers to having a set of pre-conceived notions, assumptions, or fixed image about a person or a group of persons. There is a tendency among people to have pre-conceived notions about someone or being biased. This affects exchange of information between a sender and a receiver. A very good idea may be ignored by a receiver just because of having a stereotypical image of the sender or vice-versa.
- **Values**: The different socio-cultural values and behavior may also create problems

in communication. So while communicating with people from different cultural backgrounds, we have to ensure it does not go against the values and norms of the people.

- **Ethnocentrism**: This refers to the tendency among people to consider themselves or their culture superior to others. This may become a barrier to communication, especially in case of inter-personal communication in face-to-face situation. People may just ignore what you want to communicate or switch-off mentally leading to break down of communication.
- **Body Language**: Use of appropriate body language can help increase effectiveness of communication. However, there may be some aspects of body language which can adversely affect communication and become barriers to communication itself. For example, eye contact or use of certain gestures and posture may not be acceptable in some
- cultures and therefore, may communicate wrong message, or lead to misunderstandings. For example, in U.S., people look at each other in the eyes while speaking whereas the same may be misunderstood in Indian context as being aggressive or even intimidating.
- **Semantic Barriers**: Semantics refer to the meaning that we assign to words, concepts or objects. A semantic barrier occurs when a person chooses some words or assigns meaning to them which are not shared by the receiver. It includes those factors which alter meaning of the message not intended by the communicator. A person communicates according to his/ her own understanding of the words, meanings, experience or exposure. The words, signs, symbols and meanings are encoded by a communicator and they may be different or not shared in equal measures by the receiver. It may include words we use and the meanings we attach with those words. Semantic barriers may include:
- **Language**: Misunderstandings as well as differences are common among people, even though they speak the same language. Use of appropriate and accurate language is therefore, necessary for communication. Language is a type of figurative phrase used to communicate shared meanings and explain core concepts and contexts. Typically we are accustomed to the use of a particular language or its dialect; and if this is not understood by a receiver, it becomes a barrier to communication. Communication will take place only if the language

used during the communication is well understood by both the parties. Sometimes, regional accents and tones can itself be a barrier to communication.

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