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HEC'S New Undergraduate Policy 2023

Applications of INFORMATION & Communication Technologies

BS PROGRAMS

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Introduction to Information and Communication Technologies

Information and Communication Technologies (ICT) use computers, phones, and the internet. We use ICT to send messages and talk to people. It helps us learn new things online. We can also play games and watch videos. ICT helps us find information quickly. Many people use ICT at home, school, and work. Teachers use ICT to show lessons and explain topics. It makes our lives easier and keeps us connected. We can also use ICT to work with others and solve problems.

ICT plays a critical role in modern society, influencing how individuals, businesses, and governments operate. From online learning platforms in education to e-commerce in business, ICT facilitates communication, innovation, and efficiency. The integration of ICT in daily life has led to the development of the digital economy, reshaping industries and fostering global connectivity.

Key components of ICT include computers, the internet, telecommunication networks, data storage systems (both local and cloud), and various digital platforms that allow users to collaborate, share information, and stay connected. As technology continues to evolve, ICT remains at the forefront of innovation, driving advances in fields like artificial intelligence, cyber-security, and the Internet of Things (IoT).

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Components of ICT

1. Hardware

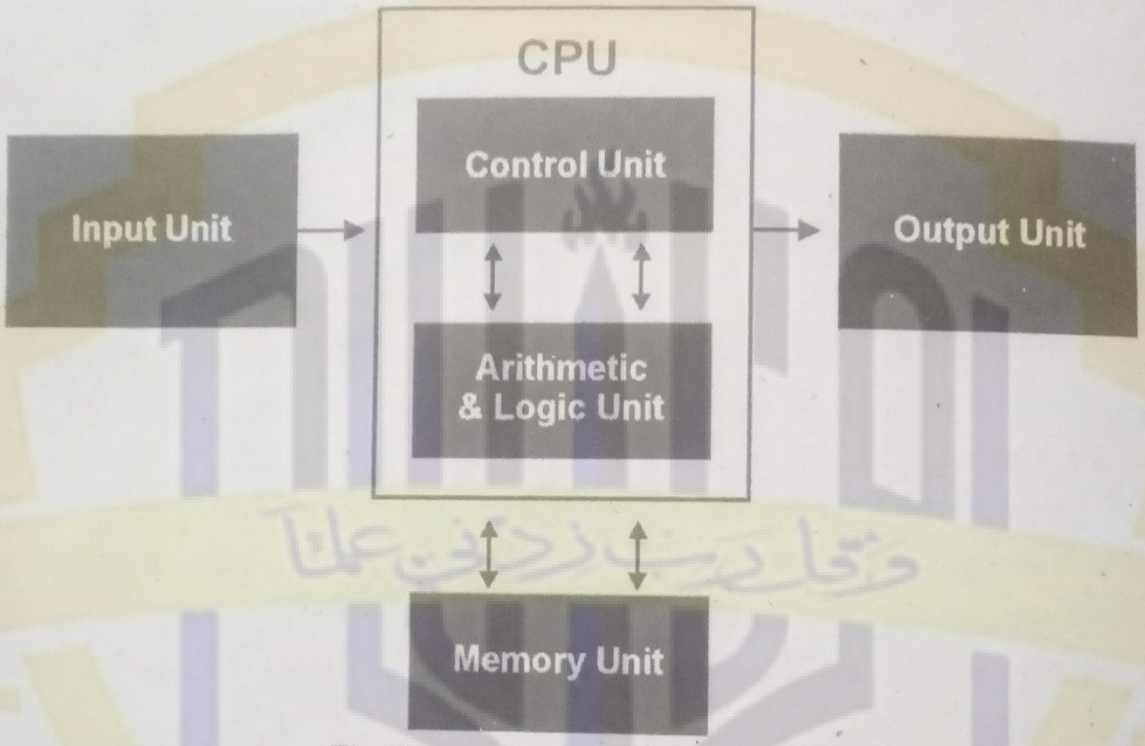
Hardware is what we can touch. It includes things like the computer's screen, keyboard, and mouse. Phones, tablets, and printers are also hardware. Without hardware, we cannot use the computer or any device. Hardware refers to any physical or tangible component of a computer. It could either be mechanical or electronic. Examples of computer hardware include the Central Processing Unit (CPU), computer peripherals, storage media, ports, and connectors.

(A) The Central Processing Unit (CPU)

The CPU is also known as the processor. It is commonly referred to as the "brain" of

a computer. The processor is a programmable device that controls the retrieval, interpretation, and execution of instructions in a computer. It consists of three components namely: "The

- Arithmetic and Logic Unit (ALU)
- The Control Unit (CU)
- The memory units, known as the registers.



The Central Processing Unit (CPU)

i) The Arithmetic and Logic Unit (ALU)

It is the part of the CPU that performs two main functions, namely:

- The arithmetic operations such as addition (+), subtraction (–), division (÷), and multiplication (×).
- The logical operations such as OR, AND, and NOT among others.

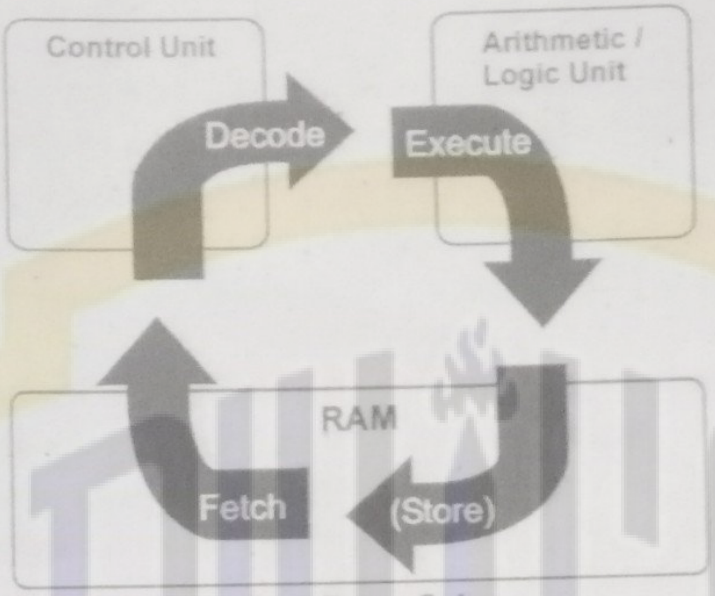
ii) The Control Unit (CU)

It is the part of the CPU that coordinates the activities of different sections of the processor and input/output (I/O) devices. It also performs the following activities:

- Controls, supervises, and oversees all the activities of the computer.
- ***Fetches*** instructions from the main memory (hard drive or RAM).
- ***Decodes*** the instructions in a format that a computer can understand.
- ***Executes*** the instructions by issuing commands to respective components where action is supposed to be taken.
- Determines the next task to be taken up by the processor for execution.
- Processes the data in line with the instructions given.

- Controls the transfer of data and information within the available storage space.

The above functions can be summarized in what is regarded to as Fetch-Execute Cycle.



Fetch-Execute Cycle

iii) Memory Units

The memory units are found in the CPU. Registers: They are temporary storage locations found inside the processor that are used to hold data, instructions or information awaiting processing or output. Some of the types of registers are: instruction register, accumulator register, address register, and storage register.

- ***Instruction register:*** It temporarily holds an instruction before it is converted to machine readable format.
- ***Address register:*** It temporarily stores the address of the next instruction to be processed.
- ***Accumulator register:*** It temporarily holds the last processing step of the Arithmetic Logic Unit (ALU).
- ***Storage register:*** It temporarily holds information waiting to be output.

(B) Computer Peripherals

Peripheral devices are computer components that are connected to the ports in the system unit through cables or wireless media. They include input devices and output devices.

Input devices

These are hardware components that are used to enter data and instructions into a computer. They are classified into:

1. Keying devices
2. Pointing devices

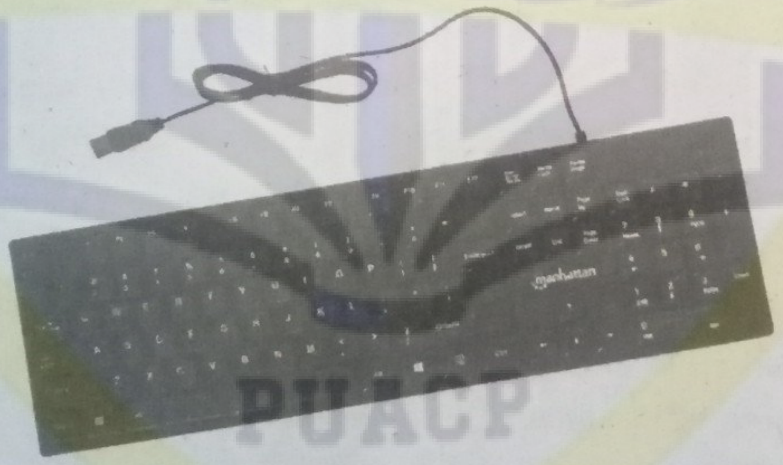
3. Scanning devices
4. Voice input devices

1. Keying devices

These are input devices that enable entry of data into the computer through the use of a set of keys. These devices are used for typing letters, numbers, symbols, and commands by pressing a key or combination of keys. Examples are the keyboard and the keypad.

(a) The keyboard: The keyboard is used for typing letters, numbers and special symbols. It is sometimes referred to as the alphanumeric keyboard. Examples of keyboards are the traditional, flexible, Braille, and ergonomic keyboards.

(i) Traditional keyboard: They are large and rigid keyboards. They are named based on the arrangement of the first six characters in the first row of the alphabet keys. They include QWERTY keyboards, AZERTY, QWERTZ, and HCESAR. These keyboards are widely used for typing in various languages and are designed to provide a tactile experience, allowing users to input text efficiently. Despite the rise of alternative input methods, traditional keyboards remain a staple in both home and office environments due to their familiarity and reliability.

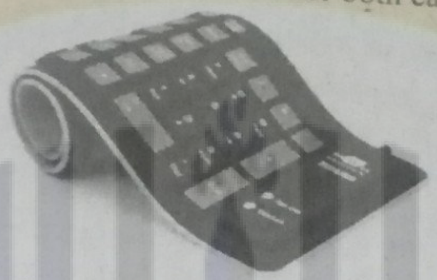


The keyboard is used to key in data.

(ii) Ergonomic keyboard: This is designed to minimize wrist injury. It is connected to the system unit using the Universal Serial Bus (USB) cable. Some ergonomic keyboards are split. They are shaped to provide better support for the hands and wrists. Using an ergonomic keyboard can help reduce discomfort during long typing sessions.

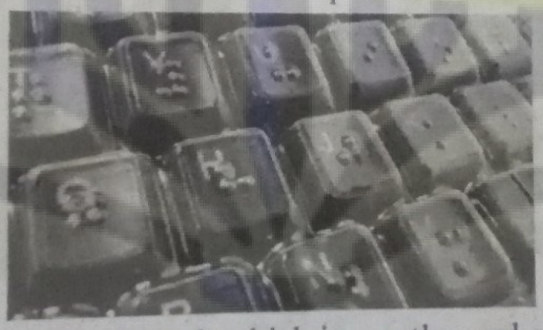
The ergonomic keyboard is designed to minimi

(iii) Flexible keyboard: This is a portable keyboard that can be folded and carried in a bag. It is typically made of soft, durable material that allows for easy storage and transportation. Flexible keyboards are lightweight, making them ideal for travelers and people on the go. They are also waterproof and easy to clean, providing a convenient option for various environments, such as cafes or outdoor settings. Despite their compact design, they offer a functional typing experience, making them suitable for both casual and professional use.

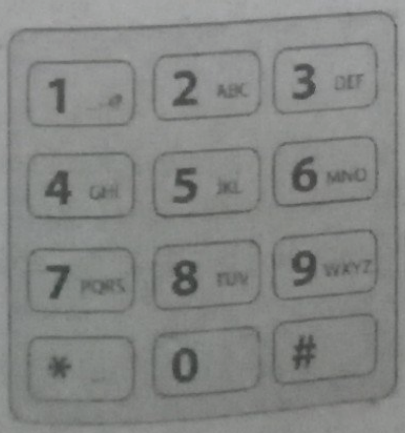


A flexible keyboard can easily be folded and carried in a bag.

(iv) Braille keyboard: This is specifically designed for the visually impaired. The keys have raised dots enabling the user to feel and identify the character or symbol represented by the key. Each key corresponds to a specific Braille character, allowing for efficient typing and communication. Braille keyboards can be used with computers and mobile devices, providing accessibility to technology for those with visual impairments.



(v) The Keypad: This is a small keyboard, which is mostly used on devices such as palmtops, calculators, microwaves, and washing machines, among others. Keypads typically feature a limited number of keys, focusing on essential functions for quick access. They are designed for ease of use and often include numeric keys, function buttons, and symbols specific to the device's purpose. This compact design allows for efficient operation in various electronic devices.



2. Pointing devices

These are devices which control the movement of a cursor or a pointer on the computer screen. Examples of pointing devices are the mouse, trackball, joystick, touch screen, light pen, touch pad and graphic tablet among others.

(a) Mouse: There are three types of computer mouse:

- **Mechanical mouse:** It contains a ball underneath which is rotated when the mouse is moved hence controlling a pointer on the screen.
- **Optical mouse:** It uses digital image processing technology to track the position of the mouse.
- **Wireless mouse:** It does not use cables. It uses infrared and radio waves such as Bluetooth to control the pointer on the screen.

Mouse Actions:

The following are some of the mouse actions:

a) ***Clicking:*** This is pressing and releasing the left mouse button once. It is used when selecting an item. Clicking is essential for navigating menus and interacting with software. A single click can also highlight text or icons. It is a fundamental action for basic computer operations.

b) ***Double-clicking:*** This is pressing and releasing the left mouse button twice in quick succession. It is used when opening a file or folder or starting a program. Double-clicking allows for quicker access to applications and documents. It is a common method for executing files on a desktop. Users can quickly navigate through their systems with this action.

c) ***Right-clicking:*** This is pressing and clicking the right mouse button once. It is used to display the content menu. Right-clicking provides additional options and features relevant to the selected item. It often includes shortcuts for copying, pasting, and

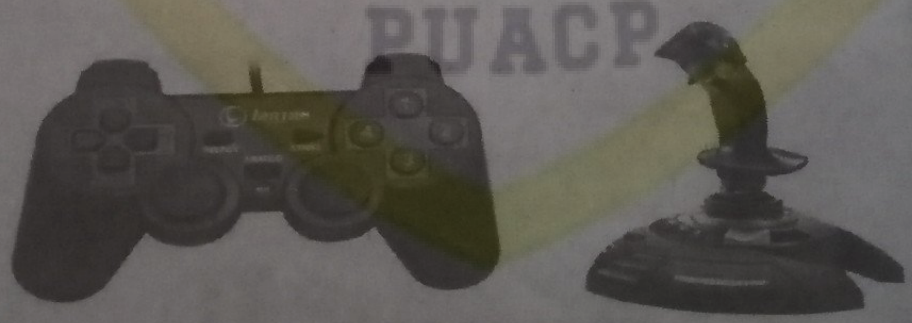
other commands. This action enhances the user experience by offering context-specific menus.

d). ***Drag and drop:*** It is pressing and holding down the left mouse button on an item. The mouse is then dragged to the desired location and the button released in order to move an item. Dragging and dropping is a common way to organize files and folders. It allows for intuitive manipulation of objects on the screen. This action can also be used to copy items by holding specific keys while dragging.

- ***Trackball:*** It is a pointing device with a ball on the top that is rotated with the finger preferably the thumb, or the palm of the user's hand to control the pointer on the screen. Unlike a mouse, a trackball does not need a mouse pad or a smooth surface underneath it to operate. A track ball has the left and the right button just like a mouse that is clicked to perform an action.

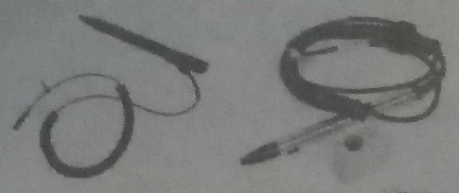
A track ball is a pointing device with a ball on the top that is rotated with the finger.

(b) Joystick: It is a device that looks like a gear lever used to control the movement of the pointer or some objects on the screen. It is mainly used for playing games. A joystick can contain more than three buttons for further manipulation of the object when playing computer games. Many joysticks are designed to provide a more immersive gaming experience, offering precise control and responsiveness. They are also popular in simulations and virtual reality applications, enhancing the overall interaction with digital environments.



A joystick looks like a gear lever. It is used to control the movement of the pointer.

(c) Light pen: It is a hand-held input device that utilizes a light sensitive detector to select objects or to write on the screen. It contains sensors at its tip that send signals to the computer whenever light is recorded. They are often used in design and can also be used for sensing information on magnetic bars and stripes.

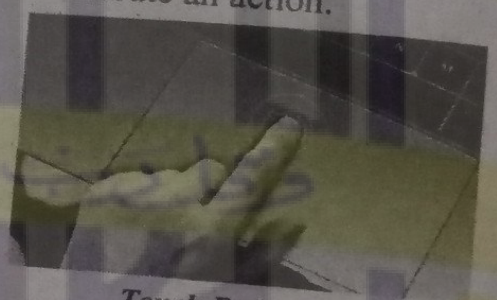


A light pen is an input device that utilizes a light sensitive detector to select objects

(d) Touch screen: It is an input device designed to recognize the location of a touch on its surface. The user can make a selection or move a cursor by touching the screen with the finger. Touch screens provide a user-friendly interface, allowing for direct interaction with applications and content. They are commonly used in smartphones, tablets, and kiosks, offering convenience and accessibility for various tasks.

(e) Touch pad: It is a pointing device commonly found in laptops where the user places or moves the finger across it to control the pointer on the screen. It contains two buttons that are clicked once the desired location is reached in order to execute an action.

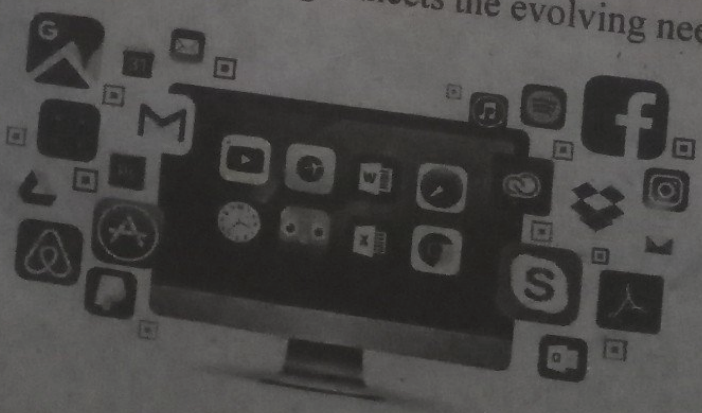
Touch screen



Touch Pad

2. Software

Software refers to a set of instructions that either enable the computer hardware to perform its assigned tasks or help the user to accomplish specific tasks. Software is also referred to as programs. It can be classified into two main categories: system software and application software. System software, such as operating systems, manages the hardware and provides a platform for running application software. Application software includes programs designed for specific user tasks, like word processing or web browsing. The continuous development of software enhances user experience and productivity, making technology more accessible and efficient. Additionally, software can be updated or modified to improve performance and add new features, ensuring it meets the evolving needs of users.



Classification of Computer Software

Computer software can be categorized in two different classes, namely System Software and Application Software.

1. System software:

They are software designed to manage computer resources and provide these resources to the user. There are five types of system software namely: Operating system, Utility software, Firmware, Programming languages and Networking software.

(a) Operating System (OS)

This is a group of programs that provide a platform for loading other programs known as application programs. The OS acts as an interface between the hardware and the application programs. Examples of operating systems include Linux, Ms DOS, MS Windows, OS X, iOS, Android, and UNIX.

(b) Utility software

They are system software that are used to perform routine functions aimed at optimizing, analysing, and maintaining the operations of a computer. They manage computer files, diagnose, repair computer problems and help the computer to run more efficiently. Examples of utility software include Anti-virus, Disk cleaners, Disk Checkers, Disk Compressors, Disk Defragmenter, Disk partitioners, File managers, language translators, graphic editors, and text editors.

(c) Firmware

They are sometimes referred to as stored logic. These are software programs that are stored in the computer's Read Only Memory (ROM), where they are available for immediate use. They are not affected by loss of power, hence the term firm. An example of firmware is Basic Input Output System (BIOS). Firmware may hold utility programs, language processors, or even operating systems.

(d) Programming Language Software

These are formal constructed languages designed to communicate instructions to a computer. They are used to create programs that control the operations of a machine. They have language translators integrated in them.

2. Application software

They are programs that are designed to enable the user to accomplish a given task. There are two groups of application software, namely customised software and off-the-shelf software.

(a) Customised Software

They are also known as in-house developed software. They are tailor-made to solve a specific problem at hand, or to meet a specific need of the user. They can be modified any time at the user's request. They only contain features that are required by the user.

(b) Off-the-Shelf software

They are also known as standard software. They are software written by a software engineer or a programmer, packaged, and then made available through a vendor, a distributor, or a developer. Examples include the general purpose software. Examples are Microsoft Word, Open Office Writer and Ms-Access.

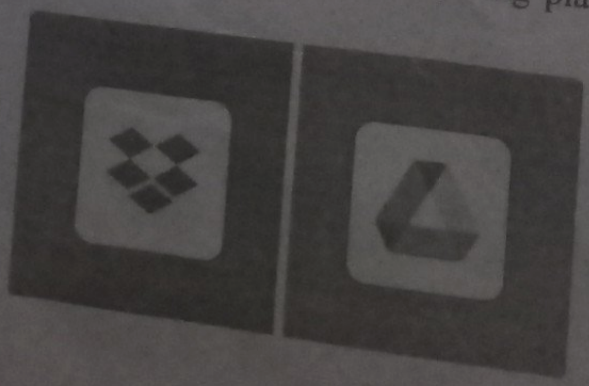
3. ICT Platforms

ICT platforms are systems that enable the use of information and communication technologies. They provide the tools needed for accessing, managing, and sharing information. These platforms are essential for individuals and organizations in today's digital world. They help streamline processes and improve productivity. By offering various services, they cater to different needs. Whether for education, business, or social interactions, ICT platforms play a significant role. Understanding these platforms can enhance user experience. They also foster innovation and creativity. Let's explore the different types, functions, benefits, and challenges associated with ICT platforms.

Types of ICT Platforms

1. Cloud Computing Platforms

These allow users to store and access data online. They help eliminate the need for physical storage devices. Examples include Google Drive and Dropbox, which provide easy sharing options. Users can collaborate on documents in real time. This functionality promotes teamwork and efficiency. Many cloud platforms also offer security features to protect data. They can be accessed from various devices, enhancing convenience. These platforms are scalable, accommodating growing data needs. As technology evolves, more features are added to improve user experience. Overall, cloud computing platforms are fundamental to modern digital operations.



2. Communication Platforms

Tools like Zoom and Microsoft Teams facilitate online meetings and communication. They enable real-time interactions among users. These platforms support video calls, chat, and file sharing. This is particularly useful for remote teams. Users can connect no matter where they are in the world. They also offer features like screen sharing to enhance collaboration. Communication platforms often integrate with other tools, streamlining workflows. Many provide options for recording meetings for future reference. Their popularity has surged, especially in the era of remote work. Ultimately, they foster effective communication in various settings.

Zoom ***Microsoft Teams***

3. Social Media Platforms

Websites like Facebook, Twitter, and Instagram allow users to share information and connect with others. These platforms are used for social interactions and marketing. They enable users to express their thoughts and share experiences. Businesses leverage social media for brand awareness and engagement. Advertising on these platforms can reach a wide audience. Users can follow trends and news in real time. Social media also encourages community building around shared interests. Privacy settings help users control their information. While they offer numerous benefits, users should be mindful of online safety. Overall, social media platforms have transformed how we communicate.

4. Educational Platforms

Universities and academies are provided online courses. They make learning accessible to anyone with an internet connection. Users can learn at their own pace and access a variety of subjects. Many platforms offer certifications upon course completion. This can enhance career opportunities for learners. They often include interactive features like quizzes and forums. Educators can use these platforms to reach a broader audience. They help bridge gaps in traditional education systems. As technology advances, educational platforms continue to evolve. Ultimately, they democratize education for all.

2. Functions of ICT Platforms

i. Data Storage:

Users can save and retrieve information easily on ICT platforms. This eliminates the need for physical storage devices like hard drives. Cloud storage offers flexibility in accessing files from anywhere. Users can organize data in folders for easy navigation. Many platforms provide automatic backup features for added security. This ensures that important information is not lost. Users can share files quickly with others, improving collaboration. Cloud services often allow multiple users to edit documents simultaneously. This real-time collaboration enhances teamwork. Overall, data storage functions are crucial for efficient information management.

ii. Collaboration:

ICT platforms enable multiple users to work together in real time. This functionality is essential for teamwork and project management. Tools like shared documents and task lists promote coordinated efforts. Users can assign tasks and set deadlines within these platforms. Collaborative features enhance communication and reduce misunderstandings. Many platforms include chat functions for quick discussions. This fosters a sense of community among team members. Users can track changes and see contributions from each member. Collaboration tools can significantly improve productivity. Ultimately, they create a more connected working environment.

iii. Communication:

ICT platforms offer various ways to communicate effectively. Users can engage through messaging, video calls, and forums. This enhances information exchange among users. Instant messaging features allow for quick conversations. Video conferencing enables face-to-face interactions, even at a distance. Forums provide a space for discussions and knowledge sharing. Users can share files and resources easily during conversations. Many platforms integrate communication tools into their main services. This creates a seamless user experience. Overall, effective communication is a core function of ICT platforms.

3. Benefits of ICT Platforms:

i. Accessibility:

Users can access information from anywhere with an internet connection. This promotes flexibility and convenience in daily tasks. Whether at home or on the go, users remain connected. ICT platforms cater to various devices, including smartphones and tablets. This ensures that information is always within reach. The ease of access encourages more people to utilize technology. Many platforms offer user-friendly interfaces for ease of use.

This helps individuals of all skill levels engage with the tools. The ability to access data anytime enhances productivity. Overall, accessibility is a major advantage of ICT platforms.

ii. Cost-Effectiveness:

Many ICT platforms offer free or low-cost services. This makes technology accessible to a wider audience. Businesses can save money by using affordable cloud solutions. Users often benefit from free trials to explore services before committing. Many platforms provide tiered pricing, allowing users to choose plans based on their needs. This flexibility encourages experimentation with different tools. Cost-effective options enable startups and small businesses to thrive. Additionally, open-source platforms allow for free use and modification. Overall, cost-effectiveness enhances the appeal of ICT platforms.

iii. Scalability:

Businesses can easily scale their operations using ICT platforms. They can add more users or features as needed without significant investments. This adaptability allows organizations to grow efficiently. Many platforms offer tiered services to accommodate different needs. This ensures that users only pay for what they require. Companies can adjust their subscriptions based on usage patterns. As businesses expand, they can incorporate more advanced features. This scalability promotes sustainability and innovation. Ultimately, ICT platforms support long-term growth for organizations.

4. Challenges of ICT Platforms

i. Security Concerns:

Protecting sensitive information is crucial when using ICT platforms. Users must be aware of privacy issues and potential data breaches. Strong security measures are essential for safeguarding data. Many platforms offer encryption and two-factor authentication to enhance security. Users should regularly update passwords and monitor their accounts. Awareness of phishing scams and other cyber threats is vital. Organizations must implement security protocols to protect user data. Additionally, regular training on data security can help mitigate risks. Overall, security concerns remain a significant challenge for ICT platforms.

ii. Digital Divide:

Not everyone has equal access to technology, leading to a digital divide. This gap can result in inequalities in information access and opportunities. Many rural and underserved areas lack reliable internet connections. This limits their ability to utilize ICT platforms effectively. Addressing the digital divide is essential for promoting equity. Governments and organizations can work together to improve access. Initiatives like community internet programs can help bridge the gap. Educating users about available resources is also

important. Overall, tackling the digital divide is crucial for ensuring everyone can benefit from technology.

4. Networks

A network is a group of connected computers and phones. It lets us send messages and use the internet. The biggest network is the internet. Without networks, we wouldn't be able to connect to websites or talk online. Networks can be wired or wireless, making it easy to connect devices from different locations. They help us share files and access resources quickly and efficiently. Additionally, networks enable online gaming and streaming services, enhancing our entertainment options.

Types of networks

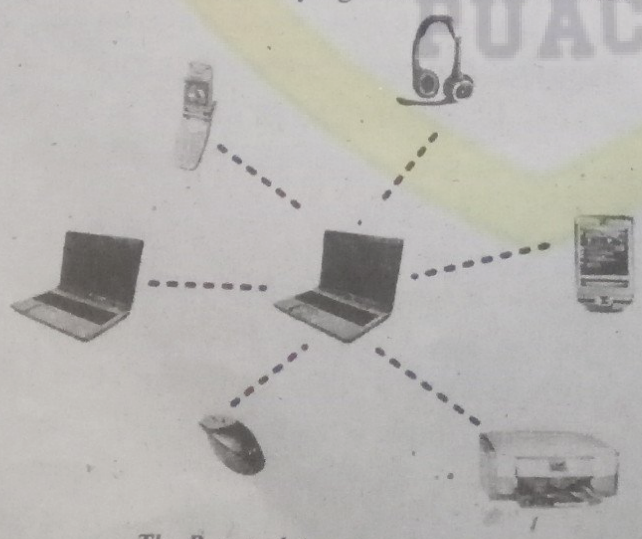
There are four main types of computer networks classified according to geographical areas. They are Personal Area Network (PAN), Local Area Network (LAN), Metropolitan Area Network (MAN) and Wide Area Network (WAN).

a) Personal Area network (PAN)

It is also known as Wireless Personal Area Network (WPAN). It is the smallest network used for data transmission among devices within the environment of an individual user. These devices may include bluetooth-enabled devices or infra-red enabled devices such as a wireless printer, a telephone, a TV remote control, a wireless computer keyboard and a mouse among others.

Bluetooth: This is a wireless protocol that connects electronic devices over a short distance of up-to about 10 meters creating a PAN with a high level of security.

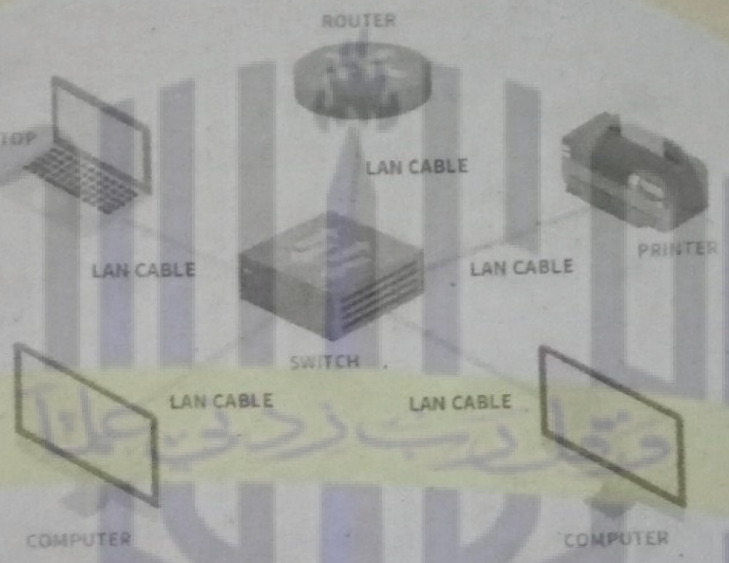
Infra-red: This is a wireless electromagnetic energy technology with a wavelength longer than those of red visible light. It is used in conveying data from one device to another.



The Personal Area Network (PAN).

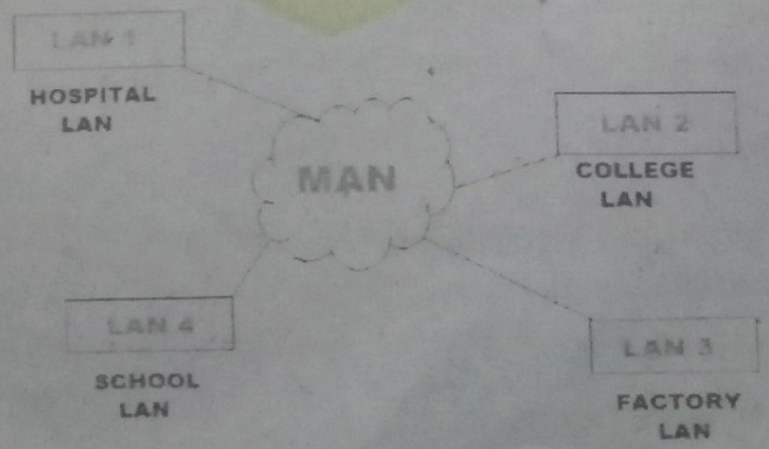
b) Local Area Network (LAN)

This is a network that covers a small geographical area, for example, an office, a building, an institution, or an organization. LANs allow multiple devices to connect and communicate with each other easily. They are typically high-speed connections, making data transfer quick and efficient. LANs are also cost-effective for sharing resources like printers and internet connections. Moreover, they provide a secure environment for local communications, reducing the risk of external threats.



(c) Metropolitan Area Network (MAN)

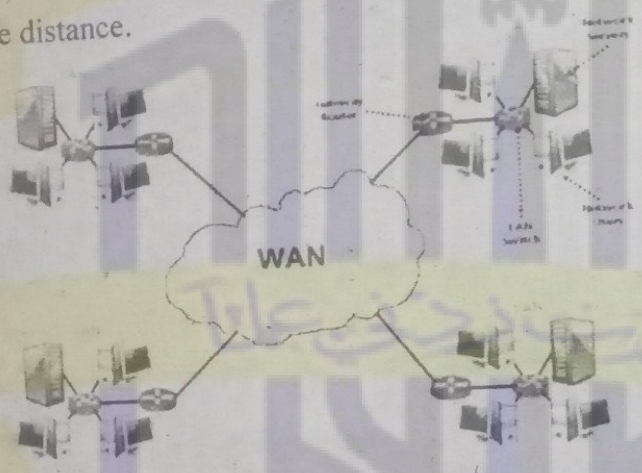
A metropolitan area network covers a city or town. It can be made up of many LANs and can provide internet connectivity in a metropolitan region. MANs are typically faster than WANs but cover a larger area than LANs. They are useful for connecting various institutions, such as schools and businesses, within the same city. MANs can facilitate communication between different departments in a large organization, improving collaboration. They also enable shared access to resources like databases and applications across multiple locations.



The Metropolitan Area Network covers a city or a town.

(d) Wide Area Network (WAN)

This is a network that interconnects LANs and MANs within a very large geographical area and may span across regions, countries, continents, or even the whole world. WANs are essential for global communication, allowing businesses to operate in multiple locations. They typically use a variety of transmission methods, including leased lines, satellites, and public networks. WANs can be more complex and costly to set up and maintain compared to LANs and MANs. They support a wide range of applications, from video conferencing to cloud computing, enabling connectivity for users across different locations. Additionally, WANs help organizations share information and resources efficiently, no matter the distance.



Wide Area Network (WAN)

5. Local Storage

Local storage refers to the method of saving data directly on a user's device, such as a Smartphone, tablet, or computer. This type of storage allows users to keep files locally, ensuring they have immediate access without relying on external servers or internet connectivity. Local storage can include various formats, such as hard drives, solid-state drives (SSDs), USB flash drives, and memory cards. These are devices that are used for storing data, information, and instructions. They are divided into three categories, namely primary memory, secondary memory/mass storage, and tertiary storage.

(a) Primary Memory

Primary memory refers to the computer's memory, which interacts directly with the computer's CPU. It is also known as main memory. There are two types of main memory, namely Random Access Memory (RAM) and Read Only Memory (ROM).

(i) Random Access Memory (RAM)

This is a memory in the form of integrated circuits (IC). It is mounted on a printed

circuit board as modules and designed for use in computing devices. The contents of this memory can be accessed randomly and hence the name "Random Access Memory". RAM is a volatile memory. This means that the contents in it are lost when power is switched off. It holds data temporarily before and after processing; and also holds all the programs currently running together with the data being used by the programs.

RAM is a volatile memory.

Read Only Memory (ROM)

The ROM is a non-volatile memory. This means that the content in it is not lost when power is switched off. The content in ROM can be read but cannot be changed. It is intended for permanent or semi-permanent storage of data necessary for the operation of a computer system.

(i) **Programmable Read Only Memory (PROM)** is a Read Only Memory that allows the user to alter it only once after the content is written on it.

(ii) **Erasable Programmable Read Only Memory (EPROM)** is a Read Only Memory whose contents can be erased and can be reprogrammed again.

(iii) **Electrically Erased Programmable Read Only Memory (EEPROM):** It is a type of ROM that can be erased and programmed again using electricity. For example, BIOS for storing Basic Input Output System (BIOS).

(b) Secondary Memory/Mass Memory

The computer's main memory is always limited in terms of permanency and capacity. As a result, there is a need for having an alternative storage. The secondary storage

devices provide an alternative long-term storage of data, information and programs. Th devices can be classified according to portability, as either removable or fixed stora devices.

1. Removable storage media

They are called removable storage media because they require either a USB port an external drive connected to the motherboard using a cable. Examples are magnetic tape CD/DVD disk, Jaz disk, Zip disk and floppy disk among others. The units for measuri storage capacity is bytes, kilobytes (KB), megabytes (MB), gigabytes (GB), and terabyt (TB).

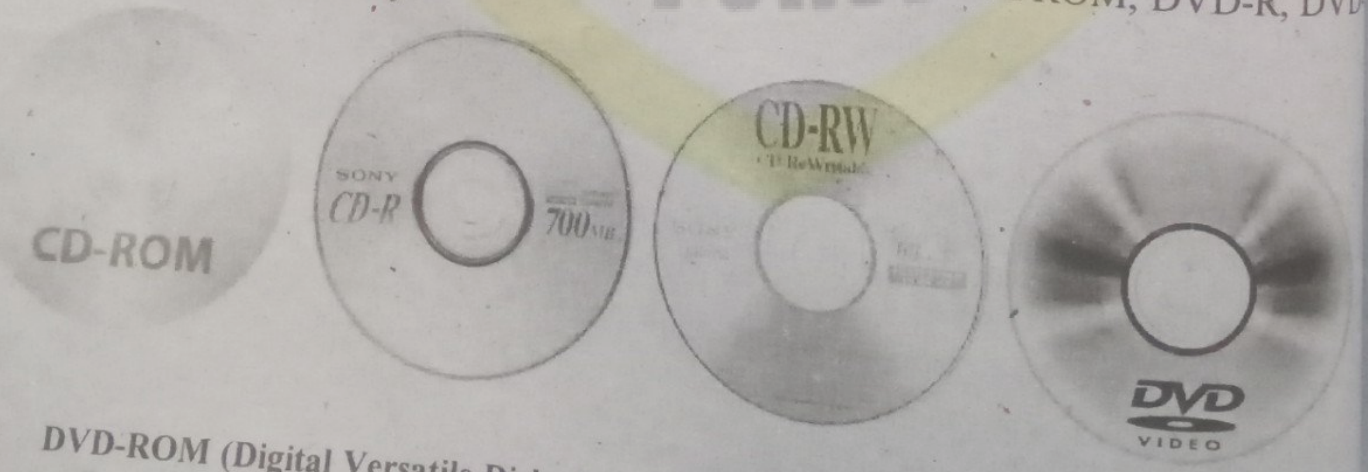
(a) **CD/DVD disk:** They use laser beam of light for reading and writing data.

(i) **Compact Disk (CD):** This is a hard plastic disk on which information such music or computer data is stored. The storage capacity of a CD ranges betwee 650 MB and 700 MB. They are available in three forms:

- **Compact Disk Read Only Memory (CD-ROM):** Data can only be read from it b cannot be written to it. They are popularly used to package and distribute softwa and music among other types of data.
- **Compact Disk Recordable (CD-R):** Once data has been burned on it, it cannot b erased but more data can be added on the empty tracks.
- **Compact Disk Read/Write (CD-RW):** These compact disks allow the user to recor erase, and rewrite new information as many times as desired.

(ii) **VCD (Video Compact Disk):** It is a Compact disk that is able to read and vie graphics, data, audio, and video at the same time.

(iii) **DVD (Digital Versatile Disk):** They are also known as Digital Video Disks. The are optical media used for storing digital data. They resemble CDs but have higher capacity than the CD. Examples of DVDs are DVDROM, DVD-R, DVD RW and Blu-Ray.



- **DVD-ROM (Digital Versatile Disk - Read Only Memory):** In this media, once data ha been written, it cannot be erased or modified. It can only be read. DVD-ROMs are commonly used to store software, movies, and other data that need to remain

unchanged. This makes them ideal for mass distribution where data integrity is crucial.

- **DVD-R (Digital Versatile Disk-Recordable):** Once data has been burned on it, it cannot be erased. It becomes Read Only. DVD-Rs are often used for personal backups and archiving, providing a one-time writing capability. They are suitable for situations where data needs to be permanently stored.
- **DVD-RW (Digital Versatile Disk-Rewritable):** They allow the user to record, erase, amend, and rewrite new information. DVD-RWs are reusable, making them ideal for temporary storage or transferring data between systems. They offer more flexibility compared to DVD-Rs, as they can be rewritten multiple times.
- **Blu-Ray:** It is a high definition DVD format that is intended to replace the current range of DVDs. It is used for distributing large amounts of material such as movies. With its higher storage capacity, Blu-Ray is preferred for HD video content and gaming applications, delivering superior quality compared to DVDs.
- **USB Flash memory:** They are also known as the memory stick. USB flash drives are portable, durable, and commonly used for transferring files between computers. They can store large amounts of data and are compatible with various devices.
- **Memory cards:** They are used in digital cameras and mobile phones for storing or transferring data from a device to another. They are inserted in a special slot for data reading and writing. Memory cards are compact and widely used for expanding the storage of mobile devices, cameras, and gaming consoles.

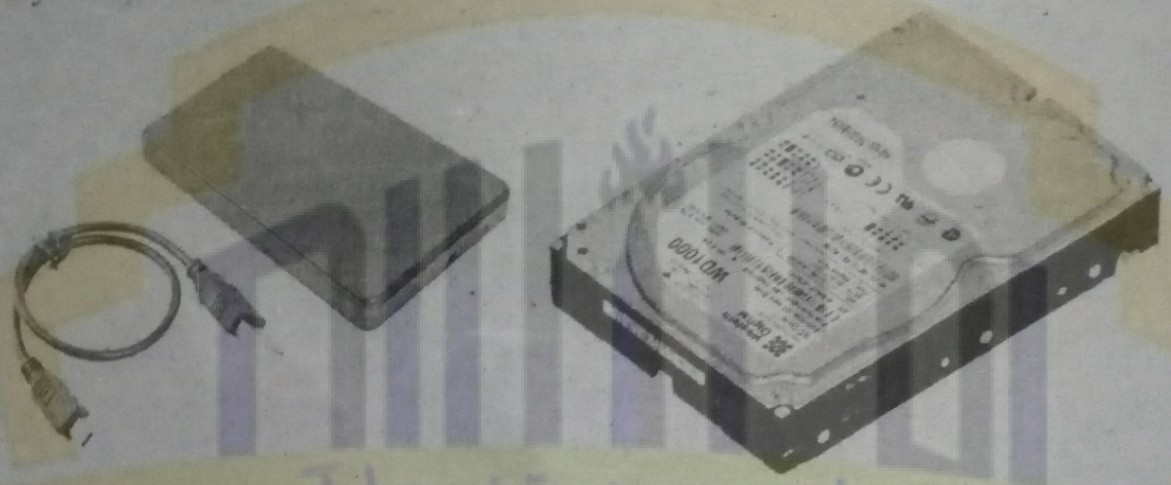
2. *Fixed storage media*

They are known as fixed storage media because they are mounted on the computer motherboard. They are housed inside the computer system unit. An example is the hard disk.

Hard disk

A hard disk consists of one or several inflexible circular disks called platters which are coated with a magnetic material normally Iron II Oxide. On each platter data is stored on

tracks that are concentric. These platters are held vertically above each other by a spindle form cylinders. The platter(s), read/write heads and the mechanisms of moving the hea across the surface of the disk are sealed permanently in an airtight metallic casing to prote the assembly from damage.

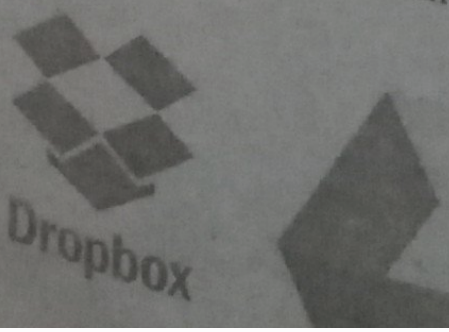


6. *Cloud Storage:*

Cloud storage is a way to save your files on the internet. It lets you access your file from any device with the internet. This means you don't have to keep everything on just on computer or phone. Cloud storage keeps your files safe, even if your computer or phone lost or damaged. It also makes it easy to share your files with others, like friends and family. This means you can open your files from any device, like a tablet or laptop through internet.

Popular cloud storage tools include Google Drive, Dropbox, and OneDrive. These services let you share your files easily with friends or teachers. These services help you store share, and even work with friends on the same project. If your computer or phone breaks your files stay safe in the cloud.

Cloud storage saves your work automatically, so you don't lose it. It helps keep your homework and projects neat. You need the internet to use it, and some services have limited free space. But it is a great way to keep your files safe and easy to find. You can also share your files with others quickly..



Scope of Information and Communication Technologies

Information and Communication Technologies (ICT) have become very vital and integral to our daily lives. They transform the way we communicate, learn, and conduct business. The term ICT encompasses a broad range of technologies. This includes the internet, telecommunications, broadcasting, and software. These technologies facilitate the creation, storage, sharing, and management of information.

The rapid advancement of ICT has led to significant changes across various sectors. It is essential for individuals and organizations to adapt to this digital landscape. The scope of ICT extends beyond mere communication tools. It influences education, healthcare, business operations, and even government functions. ICT enhances accessibility, efficiency, and connectivity. It plays a crucial role in driving economic growth and fostering social development.

As we explore the scope of ICT, we will examine its applications in different domains. We will highlight how it reshapes our world and presents new opportunities and challenges. Understanding the scope of ICT is essential. It helps us harness its potential to improve our lives and create a more interconnected global community.

(a) Use of ICT in Education

ICT has facilitated education through Computer Aided Learning (CAL), Computer Aided Instruction (CAI), Computer Aided Assessment (CAA), E-learning and computer based simulation among others.

(i) Computer Aided Learning (CAL)

This is the integration of ICT into the learning process. It is also known as Computer Based Training (CBT). It involves the use of computers in education and training. CAL techniques include:

- **Educational games:** These are electronic games that have content relevant to a subject area. For example the Carmen sandiego helps students learn World geography.
- **Problem solving tutorials:** These are self-instructional programs that guide the learner through learning and resource material acting as their virtual teacher.
- **Drill and practice:** A set of questions from a database are given to students repeatedly to practice skills and concepts. The questions usually have straightforward answers and are therefore very easy for the computer to mark.
- **Simulation:** Multimedia content is used to mimic real learning activities. For example it can be used to mimic a chemistry experiment.

(ii) Computer Aided Instruction (CAI)

This involves the use of computers to teach academic skills to students. CAI is used to develop communication and language skills. It includes computer modelling and computer tutors, for example, the typing tutor.

(iii) Computer Aided Assessment (CAA)

It is a computerised innovation used in marking multiple choice examination papers where a box is marked in pencil to indicate the candidate's preferred answer. An Optical Mark Reader (OMR) can identify the box having a mark and award a score appropriately.

(iv) E-learning

It is the delivery of educational programs, training or learning materials by electronic means. It involves the use of electronic devices such as mobile phones, tablets, computers and the Internet.

(v) Computer Simulation

This is the modelling of a real situation using a computer. It is used to model industrial processes enabling better understanding and improvement of production systems. The idea of simulation is to try and find out what mechanisms to control. A simulation also shows how a production system behaves. It can also predict or influence the behaviour of the system in the future. In industries, simulation can be used to;

- Train workers such as pilots.
- Study the efficiency of a production process.
- Evaluate how safe the activities in a factory are.

Simulation is also applied in the learning of mathematics and biological sciences. In the latter, it is used to simulate body systems such as the digestive, respiratory, and circulatory systems.

(b) Use of ICT in Business

Business refers to commercial activities carried out for profit. Electronic business (e-business) is the application of ICT in support of business activities. Examples of ICTbased business activities include:

(i) **Online Shopping:** The use of plastic money, that is, money held in electronic credit cards or mobile devices makes it possible to order for goods and services from the comfort of one's home or office.

(ii) **Advertising and Marketing:** Through the use of websites, organizations are able to advertise at a low cost. Most businesses now use websites with high web traffic as platforms for creating awareness about their products and services. For example the

OnLine eXchange(OLX) website is used for selling second hand items.

(iii) **Use of electronic billboards:** These are created using graphic software such as Adobe Illustrator and Adobe Photoshop.

(iv) **Promotional Presentations:** These could be created using PowerPoint presentations, video presentations, and animation software.

Banking

ICT is very important in banking because it makes money transactions easy and quick. With electronic fund transfers (EFT), people can send money to others without needing to go to the bank. Internet banking and mobile banking allow customers to manage their accounts from home or on the go using their phones or computers. Automated Teller Machines (ATMs) let customers withdraw cash anytime, and SMS alerts keep them updated on their bank activities. This technology makes banking more convenient and efficient for everyone.

Manufacturing and Production

In manufacturing, ICT helps improve how factories operate. Systems like Computer Integrated Manufacturing (CIM) allow different machines to work together smoothly. Computer Aided Design (CAD) helps designers create detailed plans for products, making it easier to visualize their ideas. Computer Aided Engineering (CAE) assists in testing and improving products before they are made. Overall, ICT makes production faster and more efficient, leading to higher quality products.

Mobile Banking and Financial Services

Mobile banking helps people send money easily using their phones. This means you can transfer money to friends and family without going to the bank. Some banks are even helping people in villages by providing banking services where there are no banks nearby. This way, everyone can access their money and manage their finances better. Mobile banking makes it easy to handle money from anywhere.

E-Business

E-business means doing business online. With the help of technology, people can buy and sell things using the internet. They can use credit cards or online banking to pay for their purchases without having to go to a store. Businesses can also advertise their products online to reach more customers. This makes shopping easier and faster for everyone.

Market Survey

In Rwanda, people can get daily updates about the Stock Exchange on their phones. This helps them know how the market is doing and what their investments are worth. With

this information, they can make smart choices about buying and selling. It's like having a news report about money right in their hands! This way, people can feel more confident about where to invest their money.

E-Soko

E-Soko is a project that helps farmers know the prices of their crops. This means they can find out how much to sell their products for. With this information, farmers can make better choices about when and where to sell. This helps them earn more money for their hard work. E-Soko helps farmers be successful and improves their lives.

(c) Use of ICT in Governance

Information and Communication Technologies (ICT) play a vital role in modern governance. They enhance how governments interact with citizens, making services more accessible and efficient. With the rise of e-government services, people can now complete tasks like applying for permits or paying taxes online, reducing the need for physical visits. ICT also improves communication, allowing governments to share important updates and engage with the public through social media and websites. Moreover, by promoting transparency and accountability, ICT helps build trust between the government and its citizens. Overall, the use of ICT in governance leads to better decision-making, greater citizen participation, and improved public services.

i. E-Government Services

ICT helps governments provide services online. Citizens can access important services like applying for permits, paying taxes, and accessing information from their homes. This makes it easier for people to interact with government agencies and reduces the need for physical visits.

In many countries, citizens can use online portals to apply for building permits, such as the UK's Gov.uk website, which allows users to complete various government services online. For example, countries like Estonia have implemented comprehensive e-government services, where citizens can pay taxes, vote, and access health records online.

ii. Improved Communication

With ICT, governments can communicate more effectively with citizens. They can share important news, updates, and alerts through websites and social media. This keeps people informed and engaged in government activities.

The White House in the United States utilizes its website and social media platforms like Twitter and Facebook to share updates and announcements with the public. For example: the UK government launched the Gov.uk Notify service to send important messages to

citizens via email and text, improving communication effectiveness.

iii. Transparency and Accountability

ICT promotes transparency in governance. By making information available online, citizens can easily see how government resources are used. This helps hold government officials accountable and reduces corruption.

Websites like OpenSecrets.org in the U.S. provide information about political donations and lobbying, promoting transparency in government spending and influence. For example: the Public Expenditure and Financial Accountability (PEFA) framework allows governments to assess their financial management systems and make data available for public scrutiny.

iv. Data Management and Analysis

Governments use ICT to collect and analyze data efficiently. This helps them make informed decisions and develop better policies. Data-driven decision-making can improve public services and resource allocation.

The City of Chicago uses the Chicago Data Portal to share datasets with the public, enabling data analysis for better city planning and policy-making. For example: the World Bank's Open Data Initiative collects and analyzes global data to inform policies aimed at reducing poverty and promoting sustainable development.

v. Citizen Participation

ICT encourages citizen participation in governance. People can give feedback, participate in discussions, and voice their opinions through online platforms. This involvement fosters a sense of community and helps shape policies that reflect the needs of the public.

The participatory budgeting process in cities like Paris allows citizens to propose and vote on budget projects online, involving them directly in government spending decisions. For example: platforms like Change.org enable individuals to create and sign petitions, allowing citizens to express their opinions and influence policy discussions directly.

(d) Use of ICT in Health

Information and Communication Technologies (ICT) are very helpful in healthcare. They are used to keep records of patients, making it easier for doctors to access important information. In the Intensive Care Unit (ICU), ICT helps control life support machines to ensure patients get the care they need. It is also used for different types of scans, like brain scans, X-rays, and ultrasounds, which help doctors see inside the body. Patients can even get medical advice from experts around the world using computer systems. Many doctors and

pharmacists use the internet to stay updated and do research on medical topics. They also take online courses to learn more and provide better care. Finally, advanced machines like MRI, X-ray, and CT scans use ICT to help diagnose complex medical conditions. Here are some uses of ICT in the health sector:

(i) Record Keeping

Record keeping is very important in healthcare. Systems like Open Medical Records System (OpenMRS) help keep track of patient information all over the country. This means doctors can see important health information quickly, which helps them provide better care. It also helps ensure that patient records are safe and organized.

(ii) Mobile e-Health Systems

Mobile e-Health systems help health workers collect information about patients. For example, community health workers can use tools like OpenMRS and TRACnet to record details about people's health. This makes it easier to help patients and manage their care. It also allows health workers to reach more people in different areas.

(iii) Telemedicine

Telemedicine is a way for doctors and hospitals to share information without being in the same place. For example, King Faisal Hospital connects with other hospitals to help patients in remote areas. This means people can get specialized medical help without needing to travel far. Telemedicine makes it easier for everyone to receive the care they need.

(e) Use of ICT in Digital media & Entertainment

Information and Communication Technology (ICT) plays a big role in digital media and entertainment. It helps us enjoy movies, music, and games in new ways. With ICT, we can stream videos and listen to songs online. We can also play games with friends, no matter where they are. This technology makes our entertainment experiences fun and exciting!

(i) Video Conferencing

This refers to communication between individuals in different locations by use of simultaneous two-way audio and video transmissions. The users are able to communicate with each other as though they were in the same room. In this way conversations are facilitated. In Rwanda, video conferencing is used in the following situations:

- ***Holding meetings:*** Video conferencing provides a platform to work with others across a distance. For example, local government leaders in Rwanda from all districts are able to hold meetings and interact with the minister of local government through video conferencing technology.
- ***Facilitate distance learning:*** Students in Rwanda are able to register and take

courses offered in foreign universities through online learning.

- ***Interview employees remotely:*** Public and private institutions in Rwanda are able to conduct job interviews without requiring the inteviewees to be physically present within their premises. A popular platform for this is Skype for Business.
- ***Television and video broadcasting:*** Radio and television reporters are able to relay news on location for broadcasting. Video conferencing also enables a reporter to interview news sources across the world. The technology allows the new sources to interact live with the news anchor.

(ii) E-mail

E-mail stands for Electronic Mail. It is a method of exchanging typed messages and attachments electronically between individuals. It is used in Rwanda to communicate with employees, customers, friends, and family. It has enabled people to communicate with others outside Rwanda. Examples of e-mail software include Yahoo! mail, gmail, and hotmail. Some benefits of email are:

(a) It allows individuals and groups to communicate with one another efficiently.

(b) It allows for affordable communication since envelopes and stamps are not needed.

(c) It is convenient since the user does not have to go to the post office to send

(iii) Internet

The following are some of the application areas of the Internet:

Research: Internet has a lot of information which can be used for research materials. For example, sites such as www.kidsclick.org can be used for research.

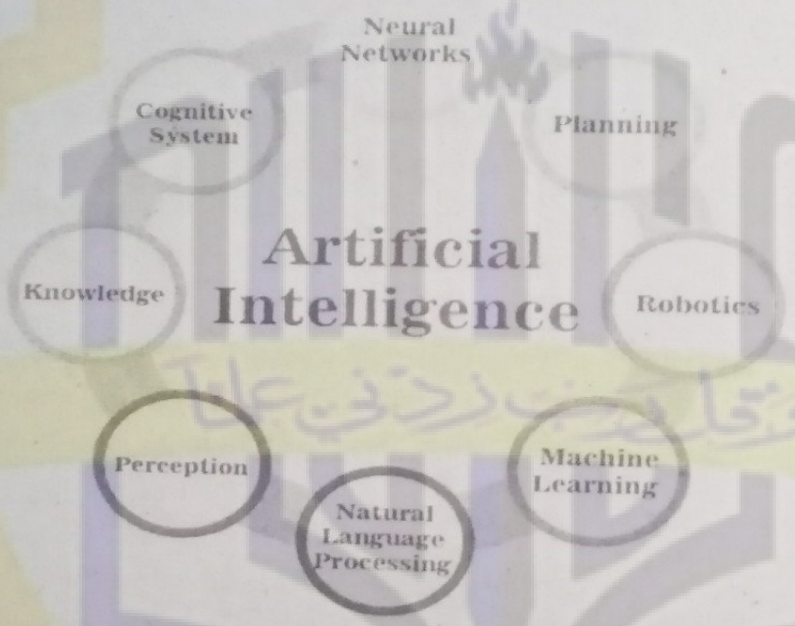
- ***Library:*** The Internet has enabled libraries to be accessed from anywhere at any time. An example of an online library is www.memphislibrary.org.
- ***Online books:*** Internet has enabled the availability of books online. A book can be accessed easily by many readers. An example of an online book site is www.magickeys.com/books.
- ***Socializing:*** The internet enables the creation of social network services that develop online communities of people who have common interests and activities. Examples of sites are www.fanlala.com and www.facebook.com.

Emerging Technologies and Future Trends

Emerging technologies are new tools and innovations that can greatly change our lives and work. They address current problems and improve efficiency in various sectors, including healthcare, education, business, and entertainment. As these technologies develop, they reshape how we interact with our environment and each other.

❶ *Artificial Intelligence (AI)*

Artificial Intelligence (AI) is a technology that helps computers and machines learn and make decisions on their own, without needing people to tell them what to do. You might have used AI when talking to voice assistants like Siri or Alexa, which can understand what you say and answer your questions. "Google Maps" also uses AI to show you the best routes and tell you about traffic.



i. Applications in Everyday Life

AI is widely used in personal devices like smartphones, smart speakers, and voice assistants such as Siri and Alexa. These AI-powered systems can understand voice commands, respond to questions, and perform tasks like setting reminders or playing music. AI also powers the algorithms behind services like Google Maps, which can recommend the best routes based on real-time traffic data.

ii. AI in Healthcare

In the medical field, AI is being used to analyze medical data and assist doctors in diagnosing diseases. AI algorithms can quickly process and interpret medical images like X-rays and MRIs, helping identify conditions such as tumors and heart diseases. AI can also predict patient outcomes and recommend personalized treatment plans. In the future, AI may lead to significant advances in diagnostics, treatment, and drug discovery, revolutionizing healthcare delivery.

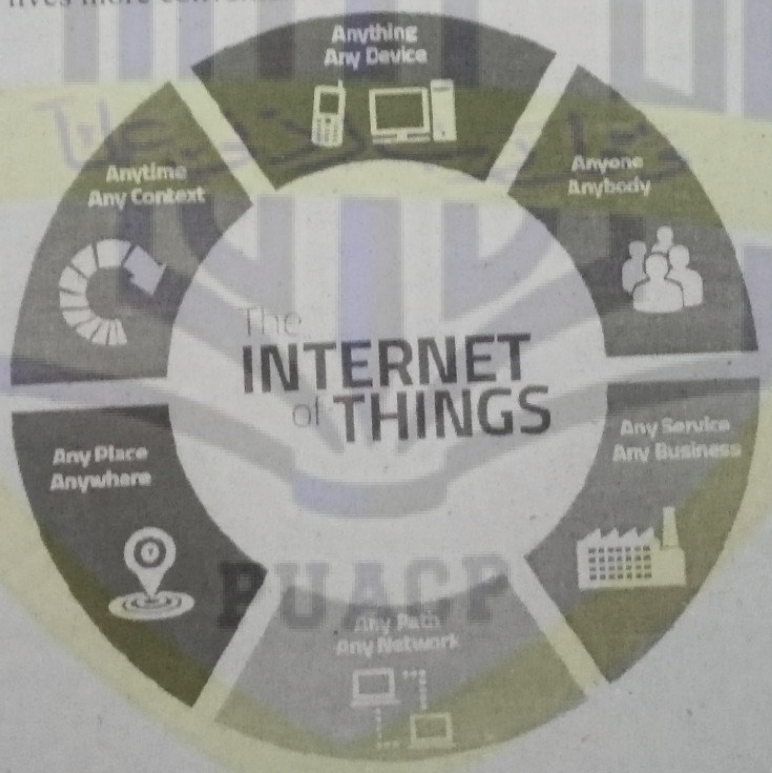
iii. AI in Business and Industry

AI is becoming a key player in the business sector, automating repetitive tasks.

enhancing customer service through chatbots, and enabling more precise marketing strategies. In industries like manufacturing, AI-powered robots are improving production efficiency and reducing human error. As AI continues to evolve, it is expected to drive innovation in areas such as autonomous vehicles, smart cities, and advanced robotics.

❷ *The Internet of Things (IoT)*

The Internet of Things (IoT) is a network of devices that connect to the internet and can talk to each other. This includes everyday things like "refrigerators, thermostats, and even smartwatches". For example, a smart thermostat like "Nest" learns what temperature you like and adjusts it automatically. In farming, IoT devices can check how wet the soil is, helping farmers water their plants better. As more people use IoT, we can create "smarter cities" where traffic lights and buses work together to make travel easier and less crowded. Overall, IoT helps make our lives more convenient and uses resources like energy more efficiently.



i. Smart Homes and Cities

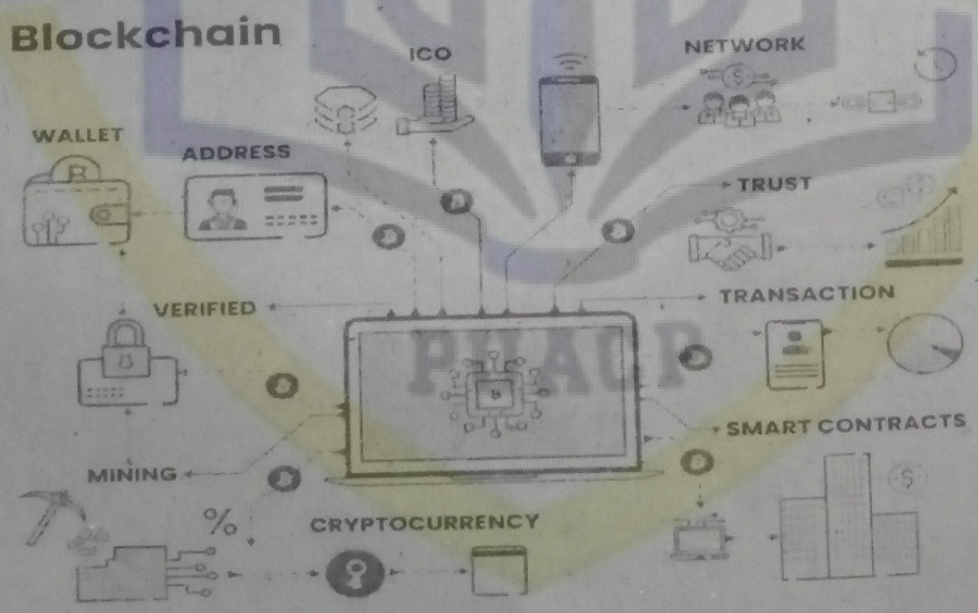
In the home, IoT devices such as smart thermostats, lights, and security cameras can be controlled remotely through smartphones. These devices can learn your preferences and automate tasks like adjusting the temperature or turning off lights when you leave the house. IoT is also helping create smarter cities by improving transportation systems, reducing energy consumption, and managing resources like water and waste more efficiently. Smart traffic lights and public transport systems can work together to reduce congestion and improve city life.

ii. IoT in Agriculture and Industry:

IoT is making a significant impact in agriculture by enabling farmers to monitor soil conditions, track weather patterns, and automate irrigation systems. This leads to more efficient farming practices and better crop yields. In industries like manufacturing and logistics, IoT devices track inventory, monitor equipment performance, and prevent breakdowns by predicting maintenance needs. As IoT technology continues to evolve, its applications are expected to grow, improving efficiency and sustainability across multiple sectors.

❸ Blockchain technology

"Blockchain technology" is becoming popular, especially because of cryptocurrencies like "Bitcoin". But it can do much more than just finance. For example, the "IBM Food Trust" uses blockchain to track food from farms to our plates, making sure the food is safe and we know where it comes from. In healthcare, blockchain can keep patient records safe, allowing only certain people to see important information. In the future, more businesses might use blockchain for things like secure contracts, digital identities, and even voting, helping everyone trust each other more and be responsible.



i. Blockchain in Finance and Beyond

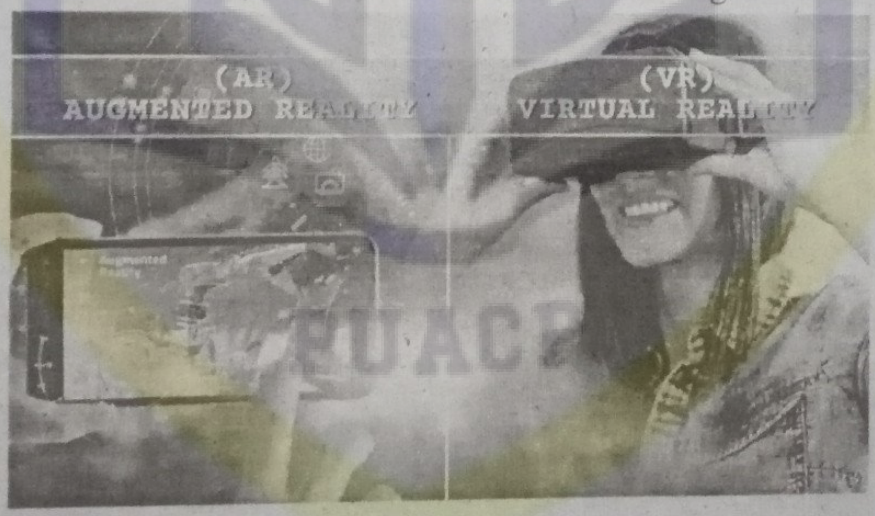
In the financial sector, blockchain technology facilitates secure and transparent transactions without the need for intermediaries like banks. This reduces costs and transaction times. However, blockchain is also finding applications in areas like supply chain management, where it can track products from origin to end-user, ensuring transparency and accountability. For instance, IBM's Food Trust uses blockchain to trace food from farms to stores, helping ensure food safety.

ii. Blockchain in Healthcare and Governance

In healthcare, blockchain technology offers a way to securely store and share patient records while ensuring privacy. Only authorized personnel can access sensitive information, reducing the risk of data breaches. In governance, blockchain has the potential to revolutionize voting systems by creating tamper-proof records, ensuring fair and transparent elections. Smart contracts—self-executing contracts coded into blockchain—are also being used for secure digital agreements in various industries.

❹ *Augmented Reality (AR) and Virtual Reality (VR)*

Augmented Reality (AR) and Virtual Reality (VR) are changing how we enjoy the digital world. "AR" adds digital information to the real world using devices like smartphones or smart glasses. For example, the IKEA Place app lets you see how furniture would look in your home before you buy it, helping you choose better. VR, on the other hand, creates complete digital environments that make you feel like you're somewhere else. For instance, the Oculus Rift allows you to play games and explore amazing virtual worlds. In college, tools like "Google Expeditions" let students go on virtual field trips to places like historical sites or outer space. In the future, AR and VR could make learning more fun and interactive!



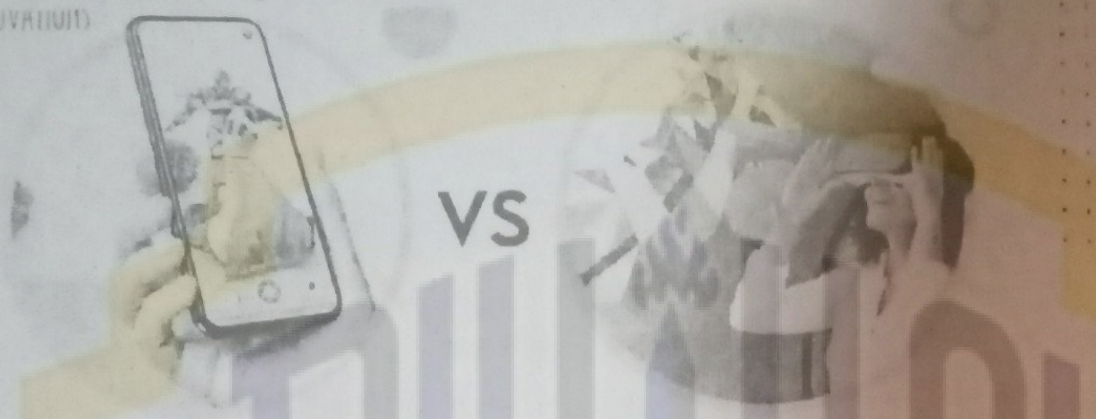
i. AR in Retail and Education

AR is making waves in retail, where apps like IKEA Place allow customers to visualize how furniture would look in their homes before purchasing. This helps buyers make more informed decisions. In education, AR is being used to enhance learning experiences. Apps like Google Lens can provide real-time information about objects, landmarks, and texts when viewed through a smartphone camera.

ii. VR in Entertainment & Healthcare

Virtual Reality (VR) is transforming the entertainment industry by creating immersive gaming and movie experiences. VR headsets like the Oculus Rift transport users

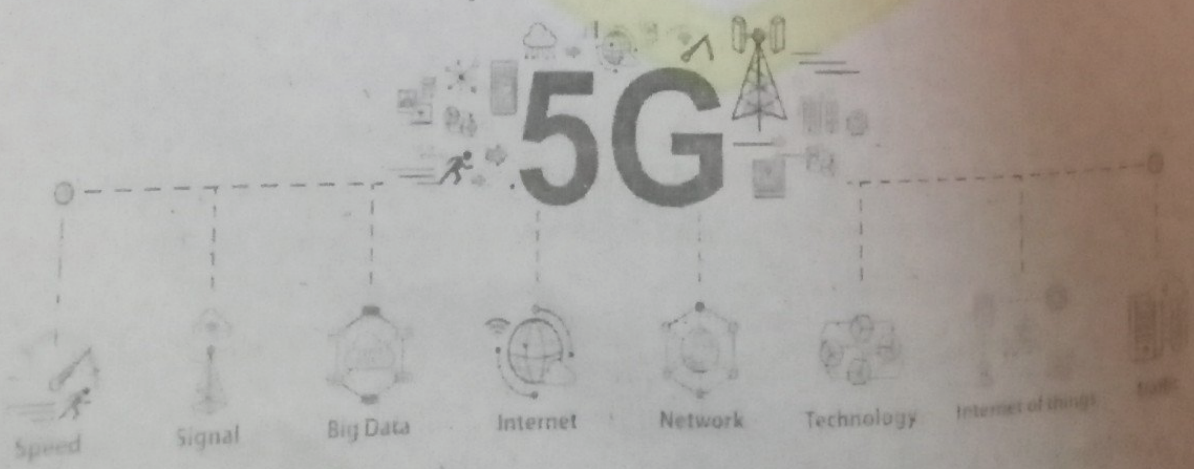
to virtual worlds, making gaming more interactive and engaging. In healthcare, VR is being used for therapy, such as helping patients with anxiety and PTSD by creating controlled, immersive environments where they can confront and overcome their fears. Medical students also use VR simulations to practice surgeries and other procedures in a risk-free environment.



AUGMENTED REALITY	VIRTUAL REALITY
Overlays computer generated 3D content on the real world	Visually immerse the user with simulated objects and environment
User is able to interact with real world and virtual world	Completely shut down the real world and make user think that they are really in the virtual world
User can clearly distinguish between both the worlds.	User finds it hard to differentiate between virtual and real world
It is achieved by smartphones, tablets or AR wearables	It is achieved by VR headsets

5G technology

5G technology is the latest mobile network that gives us faster internet and better connections than before. For example, with 5G, you can download a movie in just seconds instead of waiting for minutes! This super-fast speed allows for amazing things, like remote surgeries, where doctors can operate on patients using robots from far away. It also helps self-driving cars communicate with each other and the roads to stay safe. As more people start using 5G, it will change how we connect with others, work, and find information!



i. Impact on Communication and Industry

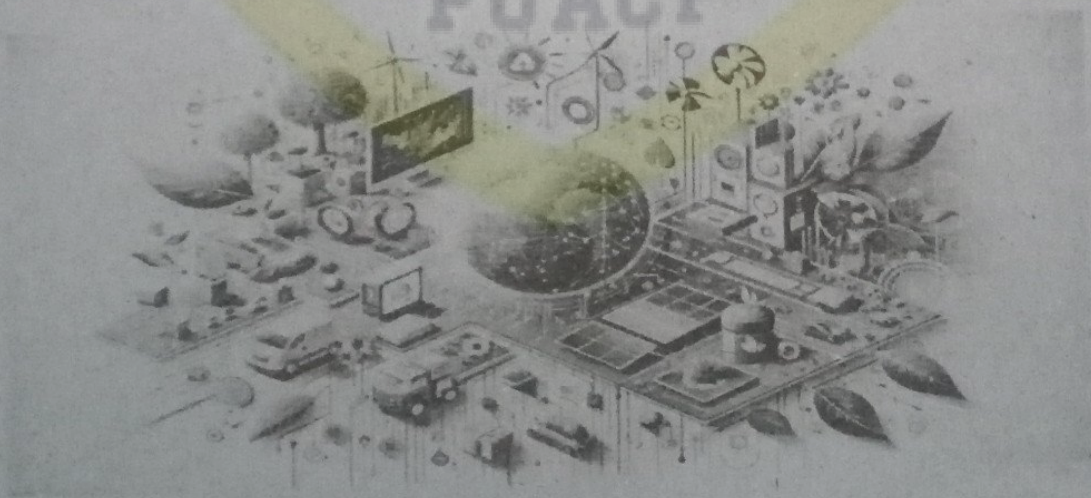
The high-speed internet provided by 5G will enhance communication by allowing real-time video calls, seamless streaming, and faster downloads. In industry, 5G will enable advancements in automation and the Internet of Things, supporting applications like real-time monitoring of industrial processes and machine-to-machine communication in factories. The low latency of 5G is also critical for technologies like self-driving cars, which need to make split-second decisions to ensure safety.

ii. Advancing Healthcare and Education

In healthcare, 5G technology is enabling remote surgeries where doctors can perform procedures on patients in different locations using robotic systems. This has the potential to expand access to specialized medical care in remote areas. In education, 5G can support remote learning by providing high-speed internet connections that make virtual classrooms more accessible and interactive. As 5G networks expand, they will continue to transform many aspects of society.

Sustainable technologies

Sustainable technologies are becoming very important because they help us fight climate change and protect our planet. Things like solar panels, wind turbines, and electric vehicles are helping us use less energy and create a cleaner environment. For example, Tesla's electric cars are a green choice because they don't use gasoline and produce less pollution. Solar energy systems, like those made by SunPower, let people make their own electricity, so they don't have to rely on fossil fuels. In the future, we will likely see more energy-efficient buildings and smart systems that help us use energy better. By using sustainable technologies, we can keep our planet healthy for the next generations!



i. Renewable Energy Solutions

Solar panels, wind turbines, and hydroelectric power are examples of sustainable

technologies that harness renewable energy sources. These technologies reduce our reliance on fossil fuels and decrease greenhouse gas emissions. For instance, Tesla's electric cars are an example of sustainable transportation because they produce zero emissions, helping to reduce air pollution.

ii. Green Buildings and Energy Efficiency

Sustainable technologies are also being used to create energy-efficient buildings. Smart energy systems can monitor and optimize energy use, reducing waste and lowering utility bills. For example, smart thermostats and lighting systems can adjust automatically based on occupancy and usage patterns. Sustainable building materials, such as bamboo and recycled steel, are being used to reduce the environmental impact of construction.

iii. The Future of Sustainable Technologies

As we continue to face environmental challenges, sustainable technologies will play a crucial role in creating a greener future. Innovations like carbon capture and storage, electric aviation, and biodegradable materials are emerging as key solutions to combat climate change. These technologies will not only help protect the environment but also create new industries and jobs in the green economy.

iv. Sustainable Waste Management

Innovative waste management technologies are helping to reduce pollution and landfill use. Recycling systems are becoming more advanced, turning waste into reusable materials, while waste-to-energy plants convert non-recyclable waste into electricity or heat. Composting technologies help break down organic waste into nutrient-rich fertilizer, reducing the amount of waste sent to landfills and helping enrich the soil.

v. Sustainable Transportation

In addition to electric vehicles, sustainable transportation solutions are advancing. Electric buses, hydrogen fuel cells, and high-speed rail systems offer eco-friendly options for public and long-distance travel, reducing our dependence on fossil fuels. Bike-sharing programs and electric scooters are also making cities more sustainable and reducing traffic congestion and pollution.

To conclude, sustainable technologies are paving the way toward a greener future by providing solutions that reduce environmental harm and encourage the use of renewable resources. From renewable energy solutions to sustainable transportation and waste management, these technologies are transforming industries and creating new opportunities in the green economy. By continuing to innovate and invest in these technologies, we can help combat climate change, protect natural resources, and ensure a healthier, more sustainable planet for future generations.

Short Questions with Answers

What does ICT stand for?

ns. ICT stands for Information and Communication Technologies. It involves using computers and telecommunications for processing, storing, and transmitting data.

What is the main function of the CPU?

ns. The CPU, or Central Processing Unit, is the brain of the computer. It processes all instructions and manages the operations of other hardware components.

What is an example of input hardware?

ns. A keyboard is an example of input hardware. It allows users to enter data and commands into the computer.

What is an operating system?

ns. An operating system is system software that manages hardware resources and provides a platform for applications to run. For examples include Windows, macOS, and Linux.

What are two types of computer software?

ns. The two main types of software are system software, like operating systems, and application software, like word processors or games.

What is the purpose of a mouse?

ns. A mouse is an input device used to control the pointer on the computer screen. It allows users to interact with the graphical user interface.

What is a trackball?

ns. A trackball is a pointing device with a ball that rotates inside a socket. It performs the same function as a mouse but requires less movement.

Write the name one type of utility software.

ns. Antivirus software is a type of utility software. It helps protect computers from malware and viruses by scanning and removing harmful files.

What is the function of memory registers?

ns. Memory registers temporarily hold data or instructions that the CPU is currently processing. They are a crucial part of the CPU's operation.

10. **What is a Braille keyboard used for?**

Ans. A Braille keyboard allows visually impaired users to input text. The keys are marked with raised dots representing Braille characters.

11. **What are ICT platforms?**

Ans. platforms are systems that enable the use of information and communication technologies, providing tools for accessing, managing, and sharing information in various fields.

12. **Write the name one benefit of cloud computing platforms.**

Ans. Cloud computing platforms allow users to store and access data online, eliminating

the need for physical storage devices and promoting real-time collaboration.

13. **What is the primary function of communication platforms like Zoom?**

Ans. Communication platforms facilitate real-time interactions through video calls, chat, and file sharing, enhancing collaboration, especially for remote teams.

14. **How do social media platforms benefit businesses?**

Ans. Businesses leverage social media platforms for brand awareness and marketing, enabling them to reach a wide audience and engage with customers effectively.

15. **What is a Personal Area Network (PAN)?**

Ans. A PAN is a small network used for data transmission among personal devices, such as Bluetooth-enabled devices, typically within a short distance of about 10 meters.

16. **What distinguishes a Local Area Network (LAN)?**

Ans. A LAN covers a small geographical area, like an office or building, allowing multiple devices to connect and communicate easily with high-speed data transfer.

17. **Define a Wide Area Network (WAN).**

Ans. A WAN interconnects LANs and MANs over large geographical areas, supporting global communication and enabling businesses to operate in multiple locations.

18. **What is primary memory in a computer?**

Ans. Primary memory refers to the computer's main memory that interacts directly with the CPU, including Random Access Memory (RAM) and Read Only Memory (ROM).

19. **Why is data security important in ICT platforms?**

Ans. Protecting sensitive information is crucial due to privacy issues and potential data breaches; strong security measures help safeguard user data.

20. **What is a challenge posed by the digital divide?**

Ans. The digital divide results in unequal access to technology, limiting opportunities for those in rural or underserved areas to utilize ICT platforms effectively.

21. **What is cloud storage?**

Ans. Cloud storage allows you to save files on the internet, making them accessible from any device with internet access. It ensures your files are safe, even if your device is lost or damaged.

22. **Write the name of three popular cloud storage services.**

Ans. Popular cloud storage services include Google Drive, Dropbox, and OneDrive. These services help store, share, and collaborate on files easily.

23. **How does ICT impact education?**

Ans. ICT enhances education through tools like e-learning and computer-assisted learning. It enables interactive and accessible learning experiences for students.

24. **What is Computer Aided Learning (CAL)?**

Ans. CAL integrates computers into the learning process through techniques like educational games. It provides interactive ways to learn and practice skills.

25. **How does ICT improve business operations?**

Ans. ICT facilitates online shopping, advertising, and banking, making business processes

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faster and more efficient. It enables companies to reach a wider audience through the internet.

26. What is the role of ICT in governance?

Ans. ICT enhances government services by making them accessible online, improving communication and transparency. It helps citizens interact with government agencies more easily.

27. What is telemedicine?

Ans. Telemedicine allows healthcare providers to share information remotely, improving access to medical care. It connects patients in remote areas with specialists without the need for travel.

28. How does ICT aid in patient record keeping?

Ans. ICT systems like Open Medical Records System (OpenMRS) help keep patient information organized and accessible. This improves healthcare delivery by allowing quick access to vital health data.

29. What are some uses of ICT in digital media?

Ans. ICT enables streaming of videos, online music, and gaming experiences with friends. It enhances entertainment through interactive and diverse digital platforms.

30. How does mobile banking benefit users?

Ans. Mobile banking allows users to manage finances and transfer money easily from their phones. It provides convenient access to banking services, even in remote areas without physical banks.

31. What are emerging technologies?

Ans. Emerging technologies are new tools and innovations that can significantly change how we live and work. They improve efficiency in various sectors like healthcare and education.

32. How does Artificial Intelligence (AI) function?

Ans. AI enables computers to learn and make decisions without human input. It powers applications like voice assistants and traffic routing in maps.

33. What is the Internet of Things (IoT)?

Ans. IoT is a network of connected devices that communicate with each other. It includes smart home devices that enhance convenience and resource efficiency.

34. What is a key use of blockchain technology?

Ans. Blockchain technology is used for secure transactions and data tracking without intermediaries. It's popular in finance. It improve supply chain transparency.

35. How is Augmented Reality (AR) applied in retail?

Ans. AR allows customers to visualize products in their environment before purchasing. For example, the IKEA Place app shows how furniture fits in a home.

36. What advantages does 5G technology provide?

Ans. 5G technology offers faster internet speeds and lower latency. This enables real-time communication and advancements like remote surgeries and smart transportation.