

FUNDAMENTALS OF COMPUTER

What is a Computer?

An electronic device that accepts data and processes it into useful information is called a Computer. There are two main aspects of the computer:

- **Input:** The data we enter into the computer is called the input. Input, basically are raw facts for which we want the system to process and give us an outcome.
- **Output:** The answer that the computer provides in return of the raw data entered, is called output.

Generations of Computer

There are a total of five Generations of Computer, with each Generation something new was discovered to improve the functioning and the use of the computer systems.

First Generation (Vacuum Tubes) – 1940-1956:

This Generation computers relied on Machine Language (the Language of 0s and 1s) and used Vacuum tubes as components of memory. They were huge in size and occupied almost a room-size area to fit in.

Given below are a few characteristic features of the 1st Generation of computer:

- The price of managing these computers was very high.
- They were huge.
- They were not capable of multitasking, and only one task could be performed at a time.
- There was no use of monitors; the output was directly given in the form of print outs.
- The electricity consumption was very high.

Examples of computers developed in this generation are ENIAC – Electronic Numeric Integrated and Computer, UNIVAC- Universal Automatic Computer, EDSAC – Electronic Delay Storage Automatic Calculator and EDVAC – Electronic Discrete Variable Automatic Computer

Second Generation (Transistors) – 1956-1963:

The first-ever transistor was invented in 1947 but could never be used in the computer until the 1950s. Given below are a few characteristic features of the 2nd Generation computers:

- The speed of the transistor decided the speed of the computer.
- It was less expensive in comparison to the 1st Generation computers.
- The electricity consumption had also reduced with the use of transistors.
- There was no change in the output as it was still received through a printout.
- From machine language, there was a change to usage assembly language in computers. Thus, now computers could understand words.
- High-level programming languages were used.

Two significant developments during this phase include the development of FORTRAN or Formula Translation and COBOL or Common Business Oriented Language, which was developed for business use.

Third Generation (Integrated Circuits) – 1964-1971:

The phase when the usage of keyboards and monitors has started for the input and output. The transistors had been reduced in size and were placed on silicon chips. This increased the speed of the computer.

Given below are the features of the 3rd Generation of computers:

- The Integrated circuits were used where small circuits could work as efficiently as the larger ones.
- Multitasking could be done in the computers developed during the 3rd phase.
- Functions of the computer were based on the memory of the monitor.

A few examples from this Generation of computer are PDP 8, IBM 360, ICL 2900, etc.

Fourth Generation (Microprocessors) – 1972-2010:

The maximum developments were done during this time phase as technology has advanced many folds. By this time, millions of transistors could be placed on the silicon circuits.

The characteristic features of this Generation are given below:

- The first microprocessor, Intel 4004 chip was discovered by Ted Hoff and was made commercially available in 1971. This led to the introduction of personal computers.
- This Generation saw revised versions of computers being introduced in the form of laptops and tablets.
- GUI – Graphical User Interface was developed during this phase.
- Speed, memory and storage had also improved in the computers of this Generation

The computers which were introduced during this Generation include Apple II, the first IBM computer, STAR 1000, and many more.

Fifth Generation (Artificial Intelligence) – 2010-till date:

The current generation of computers which have made our lives easier and more convenient is all a part of the fifth generation of the computer.

Given below is some basic information about the 5th generation of computers:

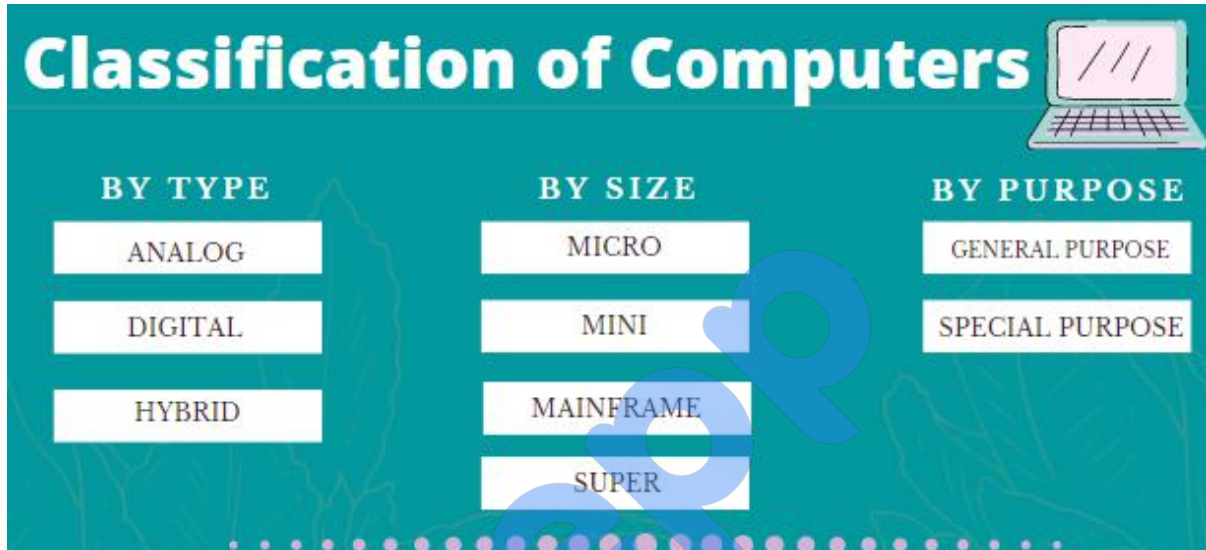
- Artificial intelligence is being used in devices currently which has enabled millions on tasks to be completed within seconds on a device.
- Advancement in the functioning of laptops, palmtops, etc.
- Other robotic devices have started being used to reduce human labour.
- The devices from this generation are cost-effective, faster, consume lesser electricity and are easily portable and convenient to use

Classification of Computers

There are three major categories based on which computers can be classified. These are:

1. Based on Size
2. Based on Purpose
3. Based on Types

The image given below gives a clear classification of the Types of Computers:



Types of Computer-Based on Types

The three types of computers along with their functions are given below:

- **Analog Computer** – An analog computer one that uses the continuously changeable aspects of physical phenomena to model the problem being solved. These phenomena may be such as electrical, mechanical, or hydraulic quantities and they are extremely complex to be used. Such computers are mostly used for scientific and industrial applications. Examples of Analog computers include Thermometer, Operational Amplifiers, Electric Integrators, etc.
- **Digital Computer** – Such computers are capable of solving problems in discrete format. It only operates on data entered in binary language and can perform the dynamic function of managing large amounts of data and regulating the operations of the machine, Examples of Digital computers are Desktop, Laptop, Mobile Phones, etc.
- **Hybrid Computer** – Computers that exhibit features of both Analog and Digital computers are called Hybrid Computers. The logical operations are solved by the digital aspects and the differential equations are solved using the analog features. Few important examples of Hybrid Computers include Space Flights, Food processing Plants, etc.

Types of Computers – Based on Size

Described below are the four types of Computers based on their sizes along with their functions:

- **Micro Computers** – A relatively inexpensive and small computer comprising a microprocessor and a Central Processing Unit (CPU) is called a Microcomputer. Such computers are made with minimal circuitry mounting over a single circuit board. Examples include Desktop, Laptop, etc.
- **Mini Computer** – Developed in the mid-1960s, Mini computers are comparatively smaller than mainframe computers. They were developed keeping in consideration human interaction, control instrumentation and were cost-effective. For example Smartphones, iPads, etc.
- **Mainframe Computer** – Computers used by large Organisations to manage bulk data are called Mainframe computers. Main functions of such type include managing customer statistics, census and other heavy data in a single device. For example, the system used at Trading companies.
- **Super Computer** – Computers used at Organisations dealing with Weather forecasting, Quantum Mechanics, Climate research, etc., where high level of performance has to be justified are called Super Computers.

Types of Computers – By Purpose

On the basis of purpose, there are just two variety of computers. Those two varieties have been discussed in detail below:

- **General Purpose** – Based on General Purpose, there are these following functions which a device is expected to perform:
 - Basic Input/Output functions
 - Calculations
 - Data Saving on a smaller scale
 - General performing activities

These may include basic calculators, laptops, desktop computers, mobile phones, etc., which can help people with their basic necessary functions are included in the General Purpose computer type.

- **Special Purpose** – When a computer is designed specifically to perform a certain function, such type of computers is known as Special Purpose computer. These types may include:
 - Thermometers to test temperature
 - Generators to manage electricity
 - Devices used for analysing Climate Change
 - Large computers for IT Companies
 - Machines used at Manufacturing Units and the list goes on and on

Important Terms Related to Computer Knowledge

Computer Virus: A computer virus is a malicious piece of code or software which affects the normal functioning of a computer. Viruses may disrupt the system by hijacking system memory, surreptitiously collect data or shut down the system altogether.

Antivirus software: Antivirus software is a program used to protect computers from computer viruses such as malware, trojans and network viruses. Many prominent software companies specialise in antivirus software. Some of the biggest software vendors who develop and market antivirus software are McAfee, Norton, Eset and Kaspersky Labs.

Malware: Malware is a type of virus. It is defined as malicious software which corrupts computer and mobile operations and provides unauthorized access to a private system or displays harmful content. The information on a specific system gets copied without the user's notice and disrupts the normal operation. Usage of malware specific tools or antivirus helps to prevent malware. Malware is spread through careless use of browser extensions, email attachments and storage media.

Computer worm: A computer worm is a standalone malware that spreads through computer networks. It is a self-replicating software that infects computers connected to a network while remaining active in the original system. It is one of the most common viruses.

Trojan horse: A trojan horse is a malicious program which infects a system by masquerading as an innocuous program. It introduces the virus to a system. They do not replicate themselves but are very destructive.

Authorization: Authorization is the function of specifying access rights related to information security or computer security. In organisations, authorisation can only be controlled by a specified user or group of users known as system administrators. An authorisation is an important aspect of computer security and helps to maintain security and confidentiality of company data.

Authentication: When the credentials are compared to those of the database of the original file it is termed as authentication. Authentication can be used to confirm the validity of an authorisation, or the safety of a database etc. It helps the system to give access to legitimate users.

Hacker: A hacker is a person who has complete knowledge about a specific area of computer security and uses it to gain access to the systems. Hackers can be classified as black hat and white hat hackers. White hat hackers use their knowledge to expose flaws in computer security practices and suggest more effective solutions to security issues. Black hat hackers use their knowledge to harm users for monetary or other gains.

Phishing: The practice of sending fake emails or trying to get personal information like name, password or money at times is known as phishing. Phishing is conducted by posing as a legitimate user of a system and collecting data through electronic communication.

Spoofing attack: When a person or program impersonates the identity of another by falsifying important data, thereby gaining an unfair and illegitimate advantage is called spoofing. There are various spoofing attacks that the fraudulent party can use for their purpose.

Computer Input and Output Devices

Input Device Definition: A piece of equipment/hardware which helps us enter data into a computer is called an input device. For example, keyboard, mouse, etc.

Output Device Definition: A piece of equipment/hardware which gives out the result of the entered input, once it is processed (i.e., converts data from machine language to a human-understandable language), is called an output device. For example, printer, monitor, etc.

List of Input Devices

1. Keyboard

- A simple device comprising keys and each key denotes either an alphabet, number or number commands which can be given to a computer for various actions to be performed
- It has a modified version of typewriter keys
- The keyboard is an essential input device and computer and laptops both use keyboards to give commands to the computer

2. Mouse

- It is also known as a pointing device
- Using mouse we can directly click on the various icons present on the system and open up various files and programs
- A mouse comprises 3 buttons on the top and one trackball at the bottom which helps in selecting and moving the mouse around, respectively
- In case of laptops, the touchpad is given as a replacement of the mouse which helps in the movement of the mouse pointer

3. Joy Stick

- It is a device which comprises a stick which is attached at an angle to the base so that it can be moved and controlled
- Mostly used to control the movement in video games
- Apart from a computer system, a joystick is also used in the cockpit of an aeroplane, wheelchairs, cranes, trucks, etc. to operate them well

4. Light Pen

- It is a wand-like looking device which can directly be moved over the device's screen
- It is light-sensitive
- Used in conjunction with computer's cathode ray tube

5. Microphone

- Using a microphone, sound can be stored in a device in its digital form
- It converts sound into an electrical signal
- To record or reproduce a sound created using a microphone, it needs to be connected with an amplifier

6. Scanner

- This device can scan images or text and convert it into a digital signal
- When we place any piece of a document on a scanner, it converts it into a digital signal and displays it on the computer screen

7. Barcode Reader

- It is a kind of an optical scanner
- It can read bar codes
- A source of light is passed through a bar code, and its aspects and details are displayed on the screen

List of Output Devices

The commonly used output devices have been listed below with a brief summary of what their function is and how they can be used.

1. Monitor

- The device which displays all the icons, text, images, etc. over a screen is called the Monitor.
- When we ask the computer to perform an action, the result of that action is displayed on the monitor.
- Various types of monitors have also been developed over the years.

2. Printer

- A device which makes a copy of the pictorial or textual content, usually over a paper is called a printer.
- For example, an author types the entire book on his/her computer and later gets a print out of it, which is in the form of paper and is later published.
- Multiple types of printers are also available in the market, which can serve different purposes.

3. Speakers

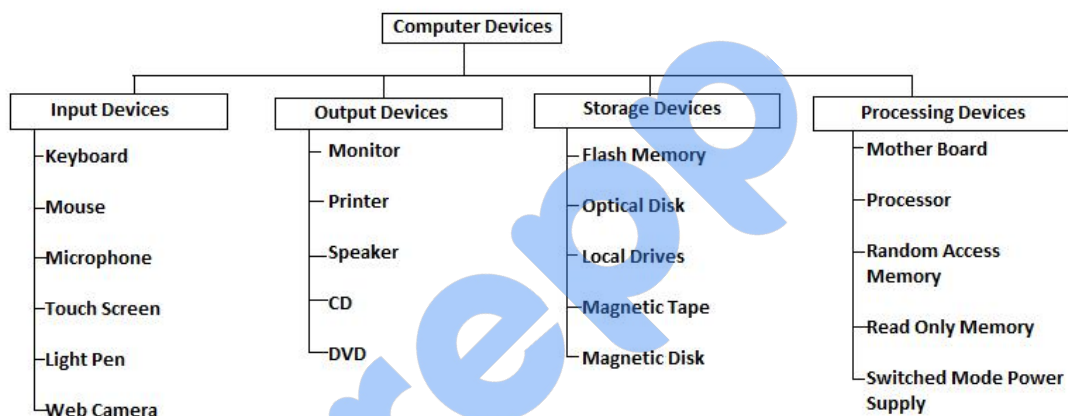
- A device through which we can listen to a sound as an outcome of what we command a computer to do is called a speaker.
- Speakers are attached with a computer system and also are a hardware device which can be attached separately.
- With the advancement in technology, speakers are now available which are wireless and can be connected using BlueTooth or other applications.

4. Projector

- An optical device which presents an image or moving images onto a projection screen is called a projector.
- Most commonly these projectors are used in auditoriums and movie theatres for the display of the videos or lighting.
- If a projector is connected to a computer, then the image/video displayed on the screen is the same as the one displayed on the computer screen.

5. Headphones

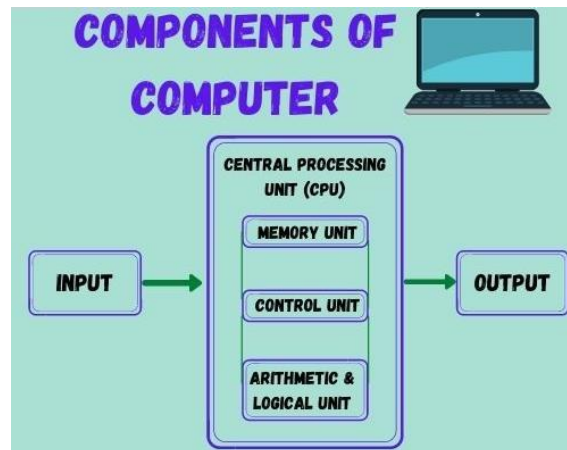
- They perform the same function as a speaker, the only difference is the frequency of sound.
- Using speakers, the sound can be heard over a larger area and using headphones, the sound is only audible to the person using them.
- Also known as earphones or headset



Basic Components of Computer

By definition, components of a computer system are the primary elements which make the functioning of an electronic device smooth and faster. There are five basic components which include:

1. Input Unit
2. Output Unit
3. Memory Unit
4. Control Unit
5. Arithmetical and Logical Unit



Input Unit

- A computer will only respond when a command is given to the device. These commands can be given using the input unit or the input devices.
- For example: Using a keyboard we can type things on a Notepad and the computer processes the entered data and then displays the output of the same of the screen.
- The data entered can be in the form of numbers, alphabet, images, etc. We enter the information using an input device, the processing units convert it into computer understandable languages and then the final output is received by a human-understandable language.

Output Unit

- When we command a computer to perform a task, it reverts back for the action performed and gives us a result. This result is called output. There are various output devices connected to the computer. The most basic of which is a monitor. Whatever we write using a keyboard or click using a mouse, is all displayed on the monitor.
- Thus, the output unit gives us the final result once the entire processing is done within the mechanism of a device.
- For example: when we visit an ATM, we enter our details like language, pin, amount to be withdrawn, etc. and then the final money which the cash dispenser releases is our outcome. In this case, the cash dispenser acts as an output unit.

Memory Unit

- When we enter the data into the computer using an input device, the entered information immediately gets saved in the memory unit of the Central Processing Unit (CPU). Because of the presence of some existing programming, the Memory Unit transmits the data further to the other parts of the CPU.
- Similarly, when the output of our command is processed by the computer, it is saved in the memory unit before giving the output to the user.

Control Unit

- This is the core unit which manages the entire functioning of the computer device. It is one of the most essential components of the computer system.
- The Control Unit collects the data entered using the input unit, leads it on for processing and once that is done, receives the output and presents it to the user. It can be said to be the centre of all processing actions taking place inside a computer device.
- Basically, the instructions taken, interpretation of entered data, issuing signals to execute the data and then finally retrieving the data is all done in the Control Unit.

Arithmetic & Logical Unit

- As the name suggests, all the mathematical calculations or arithmetic operations are performed in the Arithmetic and Logical Unit of the CPU.
- It can also perform actions like a comparison of data and decision-making actions. The ALU comprises circuits using which addition, subtraction, multiplication, division and other numerical based calculations can be performed.

Central Processing Unit (CPU)

The Central Processing Unit is the core of any computer devices. It comprises of three major components of the computer which have been discussed above:

- Memory Unit
- Control Unit
- Arithmetic and Logical Unit

All these three units are elements of CPU and together help in the efficient working and processing of data. It is also known as the “Brain of Computer” and no action can be conducted by a device without the execution and permission of the Central Processing Unit.

The device is a close-knit circuit comparison microprocessor which helps in fetching the data and providing suitable results to the user. Thus, CPU is the main processing unit of the computer.

Computer Hardware & Software

What is Computer Hardware?

Computer hardware is the physical components of a computer that we can touch and feel. These are machinery or primary electronic devices that are used to build up the computer or data processing system. Computer hardware consists of interconnected electronic devices that we can use to control a computer's operation, input and output.

Computer hardware examples:

Few examples of computer hardware are –

- Motherboard – it is the circuit board that contains IC sockets and slots.
- Central Processing Unit (CPU) – it is the heart of the computer
- Peripheral of CPU such as Keyboard, Mouse, Monitor, Printer, Speaker, UPS etc.

What is Computer Software?

Computer Software is a programming code executed on a computer processor. It is a set of programs that can do particular work of the user. The software simply is a collection of documentation, instructions, and procedures that are capable of performing different tasks on a computer system.

The computer software is divided into two major parts:

- **System Softwares** – System software operates directly on hardware devices of the computer. It provides a platform to run an application and helps to run the hardware of the computer and the system itself. Operating systems, diagnostic tools, device drivers are some included in system software. These are mostly pre-installed on computers. Examples are Windows, Linux, Unix, etc.
- **Application Softwares** – Designed for user-benefit to complete different tasks. These are either pre-installed in the computers or can be installed as per the need. It includes word processing, Language processors, web browsing, translators, editors and almost any other task for which we install the software. Examples are Word, Excel, PowerPoint, Oracle, etc.

Software is generally written or created in a high-level programming language. The language that is readable by people. These instructions in high-level languages are then converted into “machine language” instructions, represented in the form of binary code before the hardware can “run the code”. When we install any software, it is generally already in this machine language or binary form.

Computer Virus and its Types

A computer virus is a program which can harm our device and files and infect them for no further use. When a virus program is executed, it replicates itself by modifying other computer programs and instead enters its own coding. This code infects a file or program and if it spreads massively, it may ultimately result in crashing of the device.

Across the world, Computer viruses are a great issue of concern as they can cause billions of dollars' worth harm to the economy each year.

Since the computer virus only hits the programming of the device, it is not visible. But there are certain indications which can help you analyse that a device is virus-hit. Given below are such signs which may help you identify computer viruses:

- **Speed of the System** – In case a virus is completely executed into your device, the time taken to open applications may become longer and the entire system processing may start working slowly
- **Pop-up Windows** – One may start getting too many pop up windows on their screen which may be virus affected and harm the device even more
- **Self Execution of Programs** – Files or applications may start opening in the background of the system by themselves and you may not even know about them

- **Log out from Accounts** – In case of a virus attack, the probability of accounts getting hacked increase and password protected sites may also get hacked and you might get logged out from all of them
- **Crashing of the Device** – In most cases, if the virus spreads in maximum files and programs, there are chances that the entire device may crash and stop working

Types of Computer Virus

- **Boot Sector Virus** – It is a type of virus that infects the boot sector of floppy disks or the Master Boot Record (MBR) of hard disks. The Boot sector comprises all the files which are required to start the Operating system of the computer. The virus either overwrites the existing program or copies itself to another part of the disk.
- **Direct Action Virus** – When a virus attaches itself directly to a .exe or .com file and enters the device while its execution is called a Direct Action Virus. If it gets installed in the memory, it keeps itself hidden. It is also known as Non-Resident Virus.
- **Resident Virus** – A virus which saves itself in the memory of the computer and then infects other files and programs when its originating program is no longer working. This virus can easily infect other files because it is hidden in the memory and is hard to be removed from the system.
- **Multipartite Virus** – A virus which can attack both, the boot sector and the executable files of an already infected computer is called a multipartite virus. If a multipartite virus attacks your system, you are at risk of cyber threat.
- **Overwrite Virus** – One of the most harmful viruses, the overwrite virus can completely remove the existing program and replace it with the malicious code by overwriting it. Gradually it can completely replace the host's programming code with the harmful code.
- **Polymorphic Virus** – Spread through spam and infected websites, the polymorphic virus are file infectors which are complex and are tough to detect. They create a modified or morphed version of the existing program and infect the system and retain the original code.
- **File Infector Virus** – As the name suggests, it first infects a single file and then later spreads itself to other executable files and programs. The main source of this virus are games and word processors.
- **Spacefiller Virus** – It is a rare type of virus which fills in the empty spaces of a file with viruses. It is known as cavity virus. It will neither affect the size of the file nor can be detected easily.
- **Macro Virus** – A virus written in the same macro language as used in the software program and infects the computer if a word processor file is opened. Mainly the source of such viruses is via emails.

What is an Anti-Virus?

An anti-virus is a software which comprises programs or set of programs which can detect and remove all the harmful and malicious software from your device. This anti-virus software is designed in a manner that they can search through the files in a computer and determine the files which are heavy or mildly infected by a virus.

Given below is a list of few of the major antivirus software which is most commonly used:

- Norton Antivirus
- F-Secure Antivirus
- Kaspersky Antivirus
- AVAST Antivirus
- Comodo Antivirus
- McAfee Antivirus

Internet - Description, History & Uses

History and Evolution of the Internet

The Internet completely revolutionised communication and technology across the Globe. Initially, computerised devices were only used for large industries but later its usage increased massively.

It is also mandatory for people to know that it is not possible for a single person to develop something as broad and wide as the Internet all by himself/herself. It was a combined effort of multiple researchers and programmers that the Internet was discovered.

Given below are a few important points which played an extremely important role in the development of the Internet and making it one of the most widely used resources across the world.

- The first development was the introduction of host-to-host network interactions. This was first observed in ARPANET in 1969. It was developed by Advanced Research Projects Agency (APRA) of the Department of Defence, U.S. It was one of the first general usage of computer networks.
- Next step was commercialising the usage and making the transistors and transmitters fit in smaller devices for convenient Internet usage for the general public. This was introduced in the 1970s
- Moving forward, satellites and wireless communication was the main target. Defence Advanced Research Projects Agency (formerly ARPA), supported satellite-based radio packets for mobile usage of networks
- The next was the development of Transmission Control Protocol (TCP). This enabled different machines and networks across the world to assemble data packets. It was in the 1980s that the TCP/IP approach was adapted by researchers and technologists, following the footsteps of the U.S. Department of Defence
- With the introduction of personal computers, the demand for commercial Internet usage increased. This was the time when Ethernet and other Local Area Networks came in the foreground
- In 1993, the web browser was introduced, which followed the point-and-click approach and is now a widely used operation for Internet users

- The late 1990s was the time when thousands of Internet Service Providers has taken up the market and most of them were from the U.S.
- And then the 21st century brought in an amalgamation of technology and wireless Internet accessibility for its users. Wherein, wireless broadband services came in as a boon for Internet users

Ways To Connect To Internet

The different ways in which one can connect to the Internet are discussed below in brief:

- **Dial-Up** – In such connections, users are required to link their phone line to a computer to access the Internet. Under this connection, the user cannot make or receive phone calls through tier home phone service.
- **Broadband** – Provided either through cable or phone companies, Broadband is a high-speed internet connection which is widely used today.
- **Wireless Connection** – Wi-fi and Mobile service providers fall under this category. Internet connectivity is made via radio waves and the Internet can be connected anywhere, irrespective of the location. Given below are a few examples of wireless connection:
 - **Wi-fi** – Wireless Fidelity or wi-fi allows high-speed internet connectivity without the use of wires.
 - **Mobile Phones** – All smartphones are now equipped with an option for Internet connectivity which can be availed using Internet vouchers and packs. No external connection or wire is required for these.
 - **Satellite** – Where broadband connections are unavailable, satellites are used for wireless Internet connectivity.
 - **Integrated Services Digital Network** – ISDN allows users to sent audio or video data using telephone lines.

Internet Connection Protocols

Protocols are a set of rules that help in governing the way in which any particular body or technology works. Internet Connection Protocols can be divided into three major types:

- **TCP/IP Network Model** – Transmission Control Protocol (TCP) and Internet Protocol (IP) are the most widely used protocols for connecting networks. It divides any message into a series of packets which are sent from source to destination
- **File Transfer Protocol** – Program files, multimedia files, text files, documents, etc. can be transferred from one device to another, using FTP
- **Hypertext Transfer Protocol** – Used for transferring a hypertext from one device to two or more devices. HTML tags are used for creating links and these links may be in the form of text or images

Pros and Cons of Using the Internet

Intentionally or unintentionally, Internet usage is a part in the day to day lives of every individual. The Internet has made lives easy and comfortable, but at the same time made human being dependable for the smallest or biggest of information. Discussed below are the uses of the internet, along with a few cons that it brings along.

Pros of Internet

- **Easy Access to Information** – Information on anything and everything are available online. The Internet makes it convenient to learn about new things at any point in time and get details on various subjects, irrespective of time and place
- **Platform for Online Education** – With the advanced technology, even students and adults wish to learn new things and gaining knowledge at various online portals has become more accessible
- **Job Hunting** – Employers can look for employees on the internet and the job seekers can apply online for jobs using the Internet
- **Platform to become an Entrepreneur** – Today, thousands of people have started their own websites and getting good business and users/customers by making their own websites and selling products or services. This has become accessible due to Internet connectivity
- **Visual and Graphical Representation of Things** – Various researches have shown that a person tends to get more engaged with a graphical representation of things. Internet has made this facility also convenient for both user and creator
- **Reduced the parameter of Distance** – Social media has reduced the distance between people as communication has become much easier because of Internet connection

With the Internet being an extremely essential part of daily life, it is important that a person is well aware of the disadvantages of the Internet and its excess usage.

Cons of Internet

- **Dependency** – The dependency of people for looking things and information online has increased massively since the introduction of Internet and its easy access
- **Cyber Crime** – People do not just use internet for learning purposes, cybercrime has also been at a distinctive high because of effortless availability of resources
- **Distraction** – People can easily find online games, interesting information, etc. online which may be a cause of distraction for many
- **Bullying and Trolls** – Online platforms are being used for unethical practises like bullying people and trolling them

Computer Networks

What is a Computer Network?

A group of computers which are connected to each other and follow similar usage protocols for the purpose of sharing information and having communications provided by the networking nodes is called a Computer Network.

A network may be small where it may include just one system or maybe as large as what one may want. The nodes may further be classified into various types. These include:

- Personal Computers
- Servers
- Networking Hardware
- General Hosts

Networking can be classified into three types:

1. Types of Computer Networks
2. Topology
3. Interpreters

Types of Computer Networks

There are five main types of Computer Networks:

1. LAN (Local Area Network)

- Systems connected in a small network like in a building or a small office.
- It is inexpensive.
- It uses Ethernet or Token-ring technology.
- Two or more personal computers can be connected through wires or cables acting as nodes.
- Transfer of data is fast and is highly score.

2. PAN (Personal Area Network)

- The smallest computer network.
- Devices may be connected through Bluetooth or other infra-red enables devices.
- It has a connectivity range of upto 10 metres.
- It covers an area of upto 30 feet.
- Personal devices belonging to a single person can be connected to each other using PAN.

3. MAN (Metropolitan Area Network)

- A network that can be connected within a city, for example, cable TV Connection.
- It can be in the form of Ethernet, ATM, Token-ring and FDDI.
- It has a higher range.
- This type of network can be used to connect citizens with the various Organisations.

4. WAN (Wide Area Network)

- A network which covers over a country or a larger range of people.
- Telephonic lines are also connected through WAN.

- Internet is the biggest WAN in the world.
- Mostly used by Government Organisations to manage data and information.

5. VPN (Virtual Private Network)

- A network which is constructed by using public wires to connect to a private network.
- There are a number of systems which enable you to create networks using the Internet as a medium for transporting data.
- These systems use encryptions and other security mechanisms to ensure only authorised users can access.

Network Topologies

Given below are the eight types of Network Topologies:

- **Point to Point Topology** – Point to Point topology is the simplest topology that connects two nodes directly together with a common link.
- **Bus Topology** – A bus topology is such that there is a single line to which all nodes are connected and the nodes connect only to the bus.
- **Mesh Topology** – This type of topology contains at least two nodes with two or more paths between them.
- **Ring Topology** – In this topology every node has exactly two branches connected to it. The ring is broken and cannot work if one of the nodes on the ring fails.
- **Star Topology** – In this network topology, the peripheral nodes are connected to a central node, which rebroadcasts all the transmissions received from any peripheral node to all peripheral nodes on the network, including the originating node.
- **Tree Topology** – In this type of topology nodes are connected in the form of a tree. The function of the central node in this topology may be distributed.
- **Line Topology** – in this topology all the nodes are connected in a straight line.
- **Hybrid Topology** – When two more types of topologies combine together, they form a Hybrid topology.

Network Devices

Discussed below are a few important network devices from the exam point of view:

- **Network Repeater** – Used to generate incoming electrical, wireless or optical signals.
- **Network Hub** – It is a small network device. It joins multiple computers together to form a single network segment. On this segment, all computers can interact with each other.
- **Network Switch** – It is a small hardware device which joins multiple computers together with a single LAN.
- **Network Router** – This device interfaces in multiple networks whose task is to copy packages from one network to another. It provides connectivity inside enterprises, between Enterprises and the Internet and within an ISP.
- **Network Bridge** – It reads the outermost section of the data packet to tell where the message is going. It reduces the traffic on other network segments.

- **Modem** – This device converts digital signals into analogue signals. It is always placed between a telephone and a computer system.

Operating System

An Operating System is the interface between the computer hardware and the end-user. Processing of data, running applications, file management and handling the memory is all managed by the computer OS. Windows, Mac, Android etc. Are examples of Operating systems which are generally used nowadays.

All modern computing devices including Laptops, Tablet, mobile phones, etc. comprise an Operating System which helps in the smooth working of the device.

History of the Operating System

It took years to evolve the Operating Systems and make them as modernised and advanced as they are today. Given below are the details about the evolution and history of Operating systems.

- Initially, the computers made did not have an Operating system and to run each program a different code was used. This had made the processing of data more complex and time taking
- In 1956, the first operating systems were developed by General Motors to run a single IBM computer
- It was in the 1960s that IBM had started installing OS in the devices they launched
- The first version of the UNIX operating system was launched in the 1960s and was written in the programming language C
- Later on, Microsoft came up with their OS on the request of IBM
- Today, all major computer devices have an operating system, each performing the same functions but with slightly different features

Types of Operating System

1. Batch Operating System

- There is no direct communication between the computer and the OS.
- There is an intermediate, the Operator, which needs to distribute the work into batches and sort similar jobs.
- Multiple users can use it.
- Can easily manager a large amount of work.

2. Real-Time Operating System

- It has a data processing system.
- The processing time is very small between the user's command and the output.
- Used in fields where the response needs to be quick and rapid.

3. Time-Sharing Operating System

- Multiple people at various terminals can use a program at the same time.
- The main motive is to minimize the response time.

4. Distributed Operating System

- When two or more systems are connected to each other and one can open files which are not present in their system but in other devices connected in the network.
- Its usage has now increased over the years.
- They use multiple central processors to serve real-time applications.
- Failure of one system does not affect the other systems connected in the network.

5. Embedded Operating System

- These special Operating systems are built into larger systems.
- They generally are limited to single specific functions like an ATM.

6. Network Operating System

- They have one main server which is connected to other client servers.
- All the management of files, processing of data, access to sharing files, etc. are performed over this small network.
- It is also a secure operating system for working with multiple users.

7. Mobile Operating System

- With the advancement in the field of technology, smartphones now are released with an Operating system.
- They are designed in a manner that they can help a small device work efficiently

Functions of Operating System

- It helps with memory management. It keeps a track of the files being saved in the Main memory and the primary memory of the computer device
- Whenever a computer is turned on, the Operating system automatically starts to work. Thus, the booting and rebooting process of a computer device is also an important function of the OS
- It provides a user interface
- Managing of basic peripheral devices is done by the operating system
- Using the password protection option of an operating system, the data in the device can be kept secure
- It coordinates with the software and the user

- Easy navigation and organisation of files and programs are managed by the OS
- Any kind of program which needs to be run through the system is done by the operating system
- If any kind of error or bug is found during the program is detected using the operating system

List of Common Operating Systems

Name of the OS	Release Date
Android	2008
iOS	2007
Windows	1985
Mac OS	2001
MS-DOS	1981
Chrome OS	2011
Windows Phone	2010
Blackberry OS	1999
Firefox OS	2013
UNIX	1969

Microsoft Office

Microsoft Office is a software which was developed by Microsoft in 1988. This Office suite comprises various applications which form the core of computer usage in today's world.

MS Office Applications & its Functions

Currently, MS Office 2016 version is being used across the world and all its applications are widely used for personal and professional purposes.

Discussed below are the applications of Microsoft Office along with each of their functions.

1. MS Word

- First released on October 25, 1983.
- Extension for Doc files is ".doc"
- It is useful in creating text documents.
- Templates can be created for Professional use with the help of MS Word.
- Work Art, colours, images, animations can be added along with the text in the same file which is downloadable in the form of a document.
- Authors can use for writing/ editing their work.

2. MS Excel

- Majorly used for making spreadsheets.

- A spreadsheet consists of grids in the form of rows and columns which is easy to manage and can be used as a replacement for paper.
- It is a data processing application.
- Large data can easily be managed and saved in tabular format using MS Excel.
- Calculations can be done based on the large amount of data entered into the cells of a spreadsheet within seconds.
- File extension, when saved in the computer, is “.xls”

3. MS PowerPoint

- It was released on April 20, 1987.
- Used to create audiovisual presentations.
- Each presentation is made up of various slides displaying data/ information.
- Each slide may contain audio, video, graphics, text, bullet numbering, tables etc.
- The extension for PowerPoint presentations is “.ppt”
- Used majorly for professional usage.
- Using PowerPoint, presentations can be made more interactive.

4. MS Access

- It was released on November 13, 1992.
- It is Database Management Software (DBMS).
- Table, queries, forms and reports can be created on MS Access.
- Import and export of data into other formats can be done.
- The file extension is “.accdb”

5. MS Outlook

- It was released on January 16, 1997.
- It is a personal information management system.
- It can be used both as a single-user application or multi-user software.
- Its functions also include task managing, calendaring, contact managing, journal logging and web browsing.
- It is the email client of the Office Suite.
- The file extension for an Outlook file is “.pst”

6. MS OneNote

- It was released on November 19, 2003.
- It is a note-taking application.

- When introduced, it was a part of the Office suite only. Later, the developers made it free, standalone and easily available at play store for android devices.
- The notes may include images, text, tables, etc.
- The extension for OneNote files is “.one”
- It can be used both online and offline and is a multi-user application.

Microsoft Office Versions

Version name	Release Date/ Year
Microsoft Office for Windows	October 1990
Microsoft Office 3.0	August 30, 1992
Microsoft Office 4.x	1994
Microsoft Office 1995	August 24, 1995
Microsoft Office 1997	1997
Microsoft Office 2000	June 7, 1997
Microsoft Office XP	May 31, 2001
Microsoft Office 2003	October 21, 2003
Microsoft Office 2007	January 30, 2007
Microsoft Office 2010	June 15, 2010
Microsoft Office 2013	January 30, 2012
Microsoft Office 2016	September 22, 2015

Important Computer Abbreviations

S. No.	Computer Abbreviation	Full Form
1	AAC	Advanced Audio Coding
2	ABR	Average Bit Rate
3	ADSL	Asymmetric Digital Subscriber Line
4	AGP	Advanced Graphics Port
5	AI	Artificial Intelligence
6	AIM	AOL Instant Messenger
7	ALGOL	Algorithmic Language
8	ALU	Arithmetic Logic Unit
9	AOL	America Online
10	AMD	Advanced Micro Devices
11	API	Application Program Interface
12	APT	Automatically Programmed Tooling
13	ARP	Address Resolution Protocol
14	ARPANET	Advanced Research Projects Agency Network
15	ARQ	Automatic Repeat Request

16	AS	Autonomous System
17	ASCII	American Standard Code for Information Interchange
18	ASP	Active Server Pages
19	ASPI	Advanced SCSI Programming Interface
20	ATA	Advanced Technology Attachment
21	ATDT	Attention Dial Tone
22	AUI	Attachment Unit Interface
23	AUTOEXEC	Autoexec Automatic Execution file
24	AVI	Audio Video Interleave
25	BASIC	Beginner's All-purpose Symbolic Instruction Code
26	BCC	Blind Carbon Copy
27	BCD	Binary Coded Decimal
28	BCR	Bar Code Reader
29	BDSL	Broadband DSL
30	BEDO	Burst Extended Data Out (RAM)
31	BGP	Border Gateway Protocol
32	BHTML	Broadcast Hyper Text Markup Language
33	BIOS	Basic Input Output System
34	BIPS	Billion Instruction Per Second
35	BIU	Bus Interface Unit
36	BMP	Bitmap
37	BRD	Blu-Ray Disc
38	CC	Carbon Copy
39	CD	Compact Disk
40	CD-R	Compact Disk – Recordable
41	CDROM	Compact Disk Read Only Memory
42	CDRW	Compact Disk Rewritable
43	CD-WO	Compact Disk – Write Once
44	CD-XA	Compact Disk – Extended Architecture
45	CGI-BIN	Common Gateway Interface – Binary (programming for Web forms)
46	CIS	CompuServe Information Service
47	CISC	Complex Instructions Set Computers
48	CMD	Command
49	CMYK	Cyan-Magenta-Yellow-Black (color model)
50	CNM	Circulatory Network Mode
51	COAX	Coaxial Cable (for Ethernet and similar networks)
52	COBOL	Common Business Oriented Language
53	COMPUTER	Commonly Operated Machine Particularly Used for Trade/Technology, Education, and Research.
54	CPI	Clock / Cycle Per Instruction

55	CPU	Central Processing Unit
56	CROM	Computerized Range of Motion
57	CRT	Cathode Ray Tube (standard type computer monitor display)
58	CSLIP	Compressed Serial Line Interface Protocol (Internet)
59	CSS	Cascading Style Sheets
60	CTRL	Control (computer keyboard key)
61	CUI	Character User Interface
62	DAC	Data Acquisition and Control
63	DAT	Digital Audio Tape
64	dB	Decibel
65	DBMS	Data Base Management System
66	DDL	Data Definition Language
67	DHTML	Dynamics Hyper Text Markup Language
68	DML	Data Manipulation Language
69	DNS	Domain Name System
70	DOC	Data Optimizing Computer
71	Doc	Document
72	DOS	Disk Operating System
73	DRAM	Dynamic Random Access Memory
74	DVD	Digital Video/Versatile Disc
75	DVDR	Digital Versatile Disk Recordable
76	DVDRW	Digital Versatile Disk Rewritable
77	DCE	Data Communications Equipment
78	DVI	Digital Visual Interface
79	DVR	Digital Video Recorder
80	E-Commerce	Electronic Commerce
81	EDC	Electronic Digital Computer
82	EDI	Electronic Data Interchange
83	EDP	Electronic Data Processing
84	EEPROM	Electronically Erasable Programmable Read Only Memory
85	EFS	Encrypted File System
86	EIDE	Enhanced Integrated Drive Electronics
87	E-Mail	Electronic Mail
88	EPROM	Erasable Programmable Read Only Memory
89	EROM	Erasable Read Only Memory
90	FDD	Floppy Disk Drive
91	GB	Giga Byte
92	GDI	Graphical Device Interface
93	GUI	Graphical User Interface

94	HD	Hard Disk
95	HTML	Hyper Text Markup Language
96	HTTP	Hyper Text Transfer Protocol
97	I/O	Input/Output (serial and parallel ports)
98	IC	Integrated Circuit
99	IMAP	Internet Message Access Protocol
100	INTEL	Integrated Electronics
101	IOP	Input Output Processor
102	IP	Internet Protocol
103	ISDN	Integrated Services Digital Network
104	ISP	Internet Service Provider
105	IVR	Interactive Voice Response
106	KB	KILOBYTE
107	Kbps	Kilobits/Kilobytes Per Second
108	LAN	Local Area Network
109	LED	Light Emitting Diode
110	LLL	Low Level Language
111	LPT	Line Printer
112	MAC	Media Access Control
113	MAN	Metropolitan Area Network
114	MB	Motherboard/ Megabyte
115	MBASIC	Microsoft BASIC (Microsoft)
116	MBPS	Megabytes Per Second
117	Mbps	Megabits Per Second
118	MICR	Magnetic Ink Character Recognition
119	MMX	Multimedia Extensions
120	MODEM	Modulator Demodulator
121	MSCDEX	Microsoft Compact Disc Extension
122	MS-DOS	Microsoft – Disk Operating System
123	NAT	Network Address Translation
124	NTP	Network Time Protocol
125	OCR	Optical Character Reader
126	OMR	Optical Mark Reader
127	OOP	Object Oriented Programming
128	OS	Operating System
129	P2P	Point to Point Protocol
130	PAN	Personal Area Network
131	PC	Personal Computer
132	PCB	Printer Circuit Board

133	PCI	Peripheral Component Interconnect
134	PHP	Hypertext Preprocessor
135	PIXEL	Picture Element
136	PNG	Portable Network Graphics
137	PPP	Point to Point Protocol
138	PRN	Printer
139	PROM	Programmable Read Only Memory
140	RAM	Random Access Memory
141	RARP	Reverse Address Resolution Protocol
142	RDBMS	Relational Data Base Management System
143	RIP	Routing Information Protocol
144	RISC	Reduced Instruction Set Computer
145	ROM	Read Only Memory
146	SAM	Software Asset Management
147	SAN	Storage Area Network
148	SCSI	Small Computer System Interface
149	SDRAM	Synchronous Dynamic Random Access Memory
150	SFTP	Secure File Transfer Protocol
151	SGML	Standard Generalized Markup Language
152	SGRAM	Synchronous Graphics RAM
153	SIP	Session Initiation Protocol
154	SIU	Serial Interface Unit
155	SMTP	Simple Mail Transfer Protocol
156	SNAP	Sub Network Access Protocol
157	SNMP	Simple Network Management Protocol
158	SRAM	Static Random Access Memory
159	SYSOP	System Operator
160	TCP	Transmission Control Protocol
161	UI	User Interface
162	URL	Uniform Resource Locator
163	USB	Universal Serial Bus
164	VCD	Video Compact Disk
165	VDU	Visual Display Unit
166	VIRUS	Vital Information Resource Under Siege
167	VRAM	Video Random Access Memory
169	VxD	Virtual Extended Driver
170	WAN	Wide Area Network
171	WAP	Wireless Application Protocol
172	WBMP	Wireless Bitmap Image

173	WIFI	Wireless fidelity
174	WLAN	Wireless Local Area Network
175	WML	Wireless Markup Language
176	WWW	World Wide Web
178	XGA	Extended Graphics Array
179	XHTML	Extensible Hyper Text Markup Language
180	XMF	Extensible Music File
181	XML	Extensible Markup Language
182	XMS	Extended Memory Specification
183	FORTRAN	Formula Translation

Important Computer Shortcut Keys

S.No.	Shortcut Keys	Function
1	Alt+F	Displays the File menu options
2	Alt+E	Opens the Edit options
3	Alt+Tab	Switch between open programs
4	F1	Used by every Windows program for Help
5	F2	To Rename a selected file
6	F5	Refresh the page or current window
7	Ctrl+D	To Bookmarks the current page (for most Browsers)
8	Ctrl+N	Create a new or blank document or open a new tab in the Internet Browser
9	Ctrl+O	To Open a file
10	Ctrl+A	Select the entire text at once
11	Ctrl+B	Change the text to Bold
12	Ctrl+I	Change the Text to Italics
13	Ctrl+U	Underline the selected text
14	Ctrl+S	Save the file or document you are working on
15	Ctrl+X	Cut selected part of the text or image
16	Shift+Del	Remove the selected items
17	Ctrl+C	To copy the text or image
18	Ctrl+V	To Paste
19	Ctrl+Y	Redo last action
20	Ctrl+Z	Undo last action
21	Ctrl+K	Insert hyperlink for selected text.
22	Ctrl+P	To print the document
23	Home	Moves the beginning of the current line
24	Ctrl+Home	Moves to the beginning of the document
25	End	Moves to the end of the line

27	Ctrl+End	Moves to the end of the document
28	Ctrl+Left arrow	Moves one word to the left at a time.
29	Ctrl+Right arrow	Moves one word to the right at a time.
30	Alt+F4	To close the program currently active
31	Alt+Enter	Open the properties for the selected item
32	Ctrl + Shift + Spacebar	Create a non-breaking space
33	Ctrl + Shift+ <	Decrease font size one value
34	Ctrl + Shift + >	Increase the font size one value
35	Ctrl + [Increase the font size by 1 point
36	Ctrl +]	Decrease the font size by 1 point
37	Ctrl + Spacebar	Remove paragraph or character formatting
38	Ctrl + Alt + V	Paste special
39	Ctrl + Shift + V	Paste formatting only
40	Ctrl+F10	Maximise the document window
41	Ctrl + Shift + T	Enter the current time
42	Ctrl + ;	Enter the current date
43	Shift + F3	Open the Excel formula window
44	Shift + F5	Bring up search box.
45	Ctrl + F9	Minimise current workbook
46	Ctrl + F10	Maximise currently selected workbook
47	Ctrl + F6	Switch between open workbooks/window
48	Ctrl + Page Down	Move between Excel worksheets in the same Excel document
49	Ctrl + Tab	Move between two or more open Excel files
50	Ctrl + Page Up	Move between Excel worksheet in the same Excel document
51	Alt + =	Create a formula to sum all of the cells
52	Ctrl + '	Insert the value of the above cell into cell currently selected.
53	Ctrl + Arrow key	Move to next section to text
54	Ctrl + Space	Select entire column
55	Shift + Space	Select entire row
56	Ctrl+L	To left-align the selected text
57	Ctrl+R	To right-align the selected text
58	Ctrl+J	To justify the selected text
59	Ctrl+E	To centre align the text
60	Ctrl+Del	To delete the word to the right
61	Shift+Del	To permanently delete a file