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Wednesday.

Q.1. What is a computer?

Meaning:

Computer is a very familiar and household word today. The recognition and appreciation of this wonderful machine has grown at a very fast pace. Computer is the result of man's inquenchable thirst and zeal for achieving sophistication in all fields of his activities.

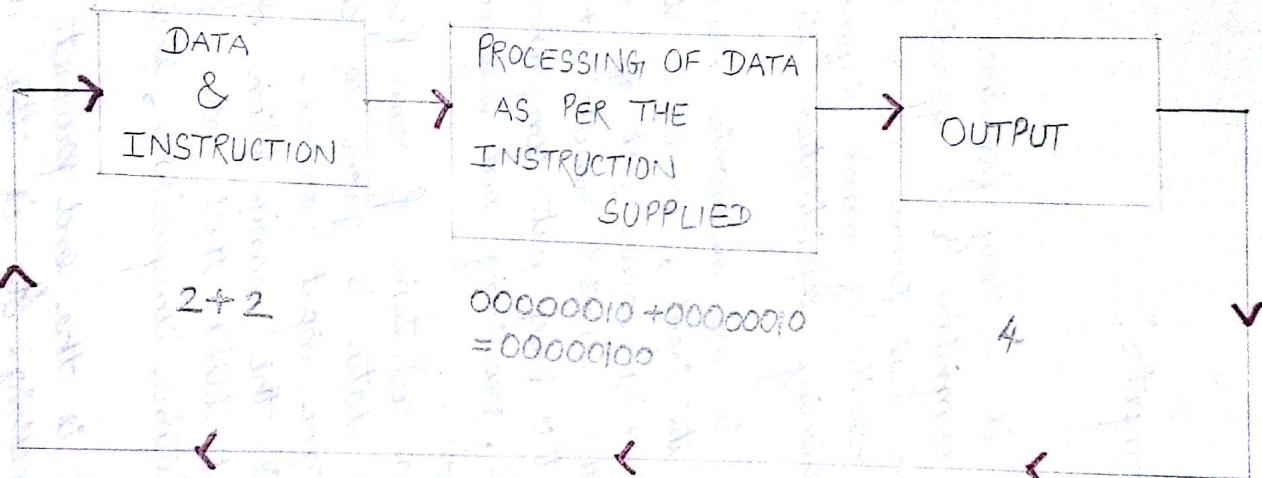
"Computer is an electronic machine that accepts data at its input, processes it at a very high speed by doing some sort of manipulations and produces the expected results at the output. (information)." In this brief but comprehensive definition, the words, data, processing and information needs further explanation.

DATA: It is a collection of raw facts and figures and this data is given to computer with the help of some input devices.

PROCESSING: It is the manipulation of data. The different tasks that are performed under this are calculations, comparison, decision making and logic.

INFORMATION: It is the end product of data processing. It is the data which is summarised in the way one wants it.

The I-P-O Cycle



Data Representation in Input - Process - Output cycle.

Characteristics and Capabilities of computer

The beneficial characteristics of computer that has made it one of the most ~~most~~ powerful tool developed by man in the twentieth century are:

1. Speed:

Computers are very fast and can process millions of instructions per second. It works in fractions of seconds. The speed of computer is measured in terms nano seconds, which is one billionth of a second.

2. Accuracy:

Computers are accurate and does not make any mistakes provided the data fed into the computer is not wrong. It works on the principle of GIGO which means Garbage in Garbage out.

3. Storage Capacity:

Computer provides the advantage of enormous storage capacity. It can store vast amount of information which can be recalled at any time for further use.

4. Versatile:

Computers are capable of performing a variety of jobs ranging from arithmetic calculations to railway and Airline reservations etc.

5. Deligence:

Computer can perform complicated and repeated task

APPLICATION OF COMPUTERS

ENGINEERING

- * Computer Aided Design (CAD)
- * Computer Aided Manufacturing (CAM)

BUSINESS

- * Inventory Control
- * Accounts Management
- * Purchase Management
- * Sales Management

MEDICAL

- * Medical diagnosis
- * Patient Management

TRAINING, AND EDUCATION

- * Computer Aided Instruction (CAI)
- * Computer Aided Learning (CAL)

SCIENTIFIC

- * Number Crunching
- * Astronomical calculations
- * Monitoring of Space Vehicles.

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at the same speed continuously without getting tired.

6. Automatic:

Once the instructions are given it does not need any further human intervention as it will stop only after completing the job and giving the result.

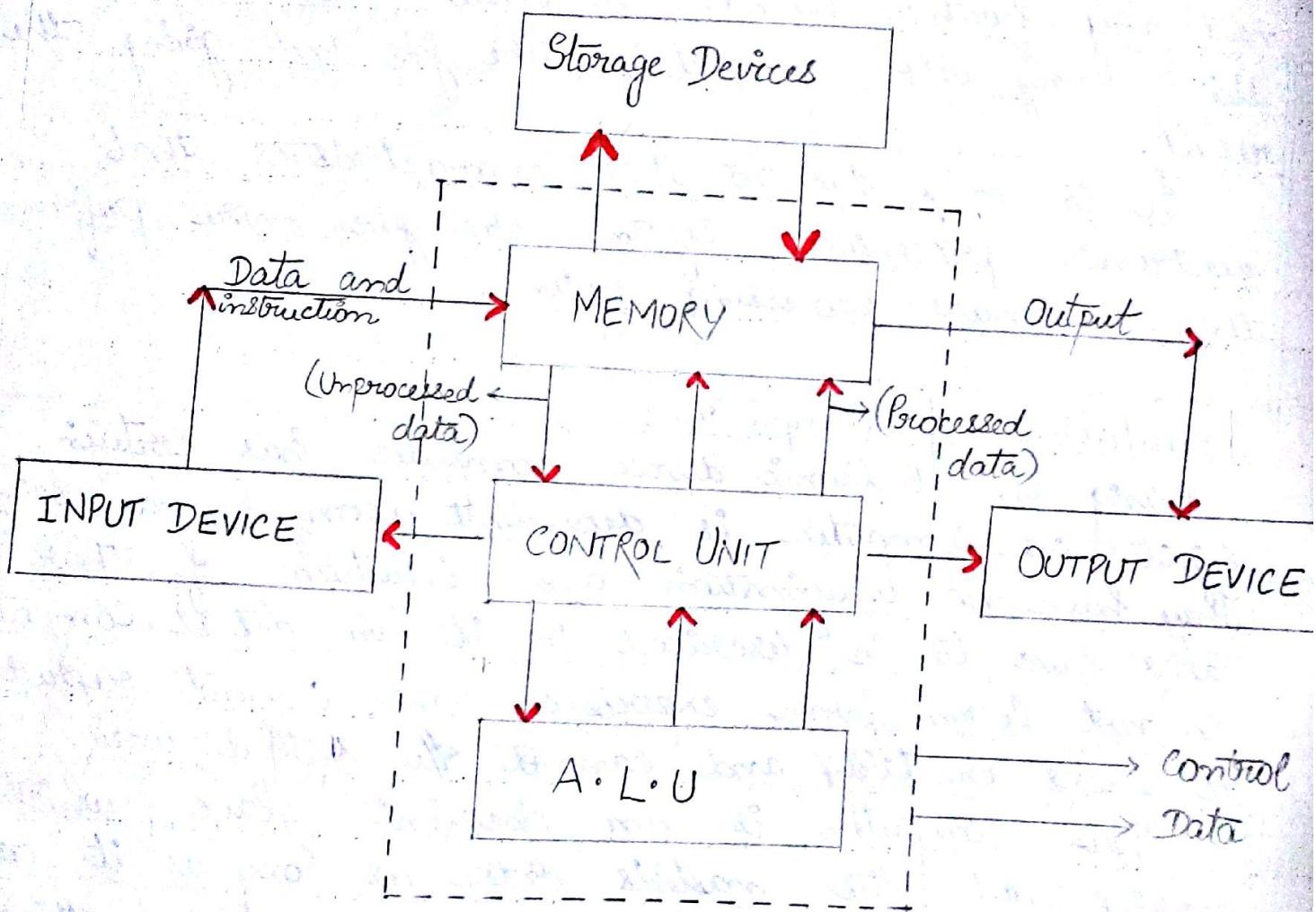
It is only due to this characteristics that electronic processing system are given more preference than manual processing system.

Limitations of computers:

Being an electronic device computer has certain limitations. Computer is dependent upon human beings. They have no imagination and intuition of their own. Tasks have to be described to it in detail. Computers do not learn from experience and cannot reproduce. It lacks creativity and cannot do skilful work.

Thus computer is an obedient slave which carries out the master's order as long as it can understand them and no matter whether they are right or wrong. In other words computers lack common sense.

BLOCK DIAGRAM OF A COMPUTER



Q. 2. What do you mean by computer system?

A system is defined as a set of interacting elements, responding to inputs so as to produce outputs. The computer system consists of the following elements:

- (a) Hardware
- (b) Software
- (c) Liveware (or) Humanware.

(a) HARDWARE:

It refers to all the physical parts and components of the computer. It consists of central Processing Unit, input devices, output devices and storage devices.

1. Central Processing Unit (CPU) or Microprocessor:

It is the heart of the computer where all the processing of data is carried out. It is a piece of silicon chip, onto which are embedded one or more integrated circuit. Its components are:

* Arithmetical and Logical Unit (ALU): It performs all the arithmetical and logical computation such as addition, subtraction, comparison etc.

* Control Unit (CU): It acts as a manager which controls all activities being carried out within the computer.

* Memory: It stores data & ^{instructions} as well as output after processing.

2. Input Devices:

These devices allow you to communicate with

the computer. These devices can be used to send instructions and data to the computer for processing. The range of input devices available are:

* Keyboard: It is one of the most important device. It is a type-writer like device with some additional keys.

* Mouse: It is a popular input device used to position cursor on the screen. It is a small palm size box. It has a ball underneath, which senses the movement on the flat surface and transmit it to the cursor over the card. It is a pointing device.

* Optical Mark Reader: This device detect the presence or absence of a mark in a standard position on a form using optical technology.

* Optical Image Scanner: This device captures image from the image provided to it. It work like a Xerox machine.

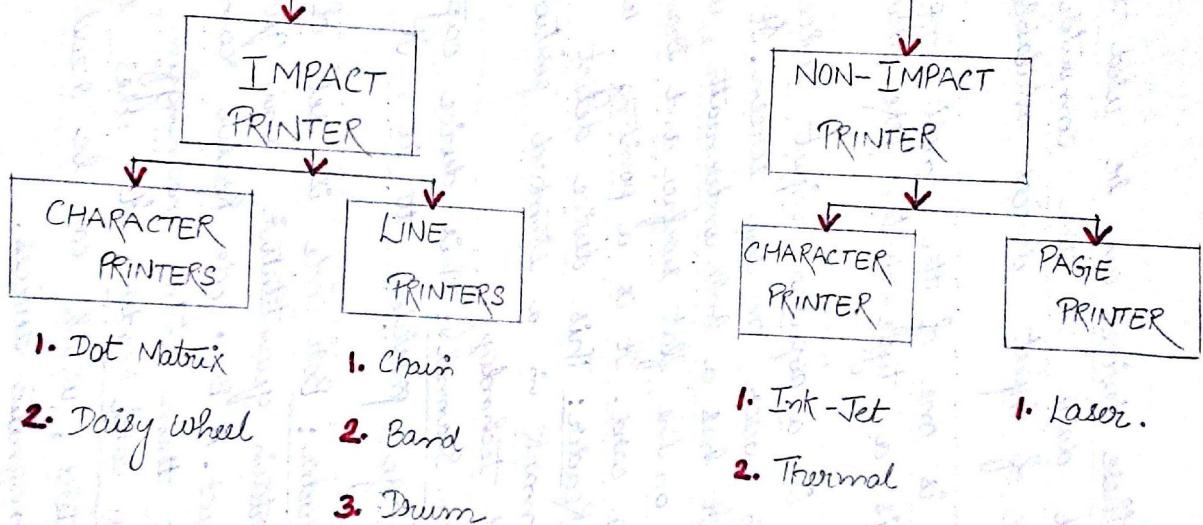
* Bar Code Reader: Bar code is set of strips of lines signifying certain quantitative and qualitative feature of a product. A Bar code Reader scan this Bar-codes and translate them into meaningful information.

* Magnetic Ink Card Reader: It uses special ink to print characters, which can be read and decoded by special magnetic devices.

* Light Pen: This is used for drawing on the screen.

* Joystick: It is a pointing device which determine the movement on the screen by pushing single vertical stick.

Types of Printers



3. Output Devices:

Output devices are used for extracting the processed values from a computer. Main type of output devices are:

* Printer: An output device that prints results on paper is called Printer. The output produced by printer is called a hard copy. Impact Printers and Non-Impact Printers are the two broad classifications of printers. In impact printer image is formed due to impact of hammer whereas non-impact technology is used in latter case for image formation.

* Visual Display Unit (VDU) or Monitor: This device displays the processed data and information on a cathode Ray Tube screen which looks like a T.V. It is also referred to as an interactive device. The output by VDU is a soft copy. It is available in Black & white and colour.

* Plotter: It is used for plotting the graphical presentation, smooth curves and mechanical drawings etc. This is commonly used in Computer Aided Designing. Plotter may use either pen or inkjet approach. Drum type and Flat bed type are two forms available in Pen plotters. In drum plotters both paper and pen move, while in Flat bed plotters only pen moves and paper is fixed.

4. Storage Devices:

The devices which stores, data, instruction and output of a process are called storage device

Storage devices can be classified as follows:

(i) Primary Storage Devices and (ii) Secondary Storage Devices

(i) Primary Storage Devices:

It is the internal memory of a computer and is essentially a part of CPU. Its components are Random Access Memory (RAM) and Read only Memory (ROM). RAM is also called temporary or volatile memory since the data and information is permanently lost when the power supply is switched off. On the other hand ROM is called permanent or non-volatile memory as data does not get erased when power supply is switched off.

(ii) Secondary Storage Devices:

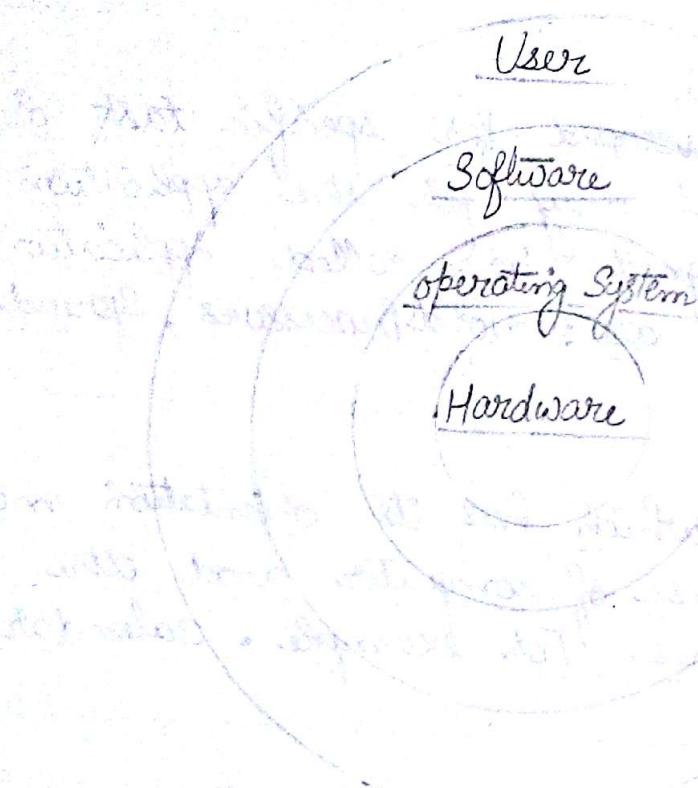
These devices are used for storing data, instructions and output for archival purposes. Its' kinds are:

- * Floppy Disk
- * Hard Disk
- * Optical Disk
- * Cartridge Tape
- * Spool Tape

(b) SOFTWARE:

A set of one or programs to do a task is called software. These programs are written using a programming language. They are categorised

Operating System as an Interface between User and Hardware.



EXPLANATION

1. System Software:

Software developed to run the whole system is called system software. For example, DOS, windows 95 etc. They are concerned primarily with co-ordinating and controlling hardware resources.

2 Application Software:

Software developed for specific task or software which can be used only for the application for which they have been designed are called Application Software. Examples for this are: Wordprocessors, Spreadsheets etc.

3. Utility Software:

Software which has its orientation more towards facilitating the use of computer and the various application softwares. For example, calendar, calculator, etc.

(C) HUMANWARE:

The people operating the hardware using a software are called Humanware. They can be a:

1. Hardware Engineer
2. Software Engineer
3. Programmer
4. User.

Q.3. What is an operating system? Define its features?

Meaning:

An operating system is a system software. It manages the resources of a computer system and provides an easy use interface to the user. To make use of a computer a person has to understand its operating system. A person can make use of a computer even with a limited knowledge of its operating system.

An operating system is a set of programs which manages hardware resources and software resources and connects them all. Hardware is useless without an operating system. Operating system bridges the gap between the user and the computer.

The functions of operating system are:

1. Operating System provides user friendly interface:

An OS provides a platform for user to communicate and interact with the machine. The user interface is also called shell. The shell interprets the command given by the user and initiates appropriate action.

2. It manages the resources of computer:

An OS acts as a resource manager and like a real life manager sees that the work is done

efficiently. This includes:

- * Memory Management Functions
- * Process Management Functions
- * Device Management Functions
- * Information Management Functions.

3. Operating System Provides Utilities:

An OS also provides a collection of utility program for end users and software developers. It provides utility programs for common tasks like disk formatting, displaying the contents of a file, printing, linking, loading and editing.

Classification of operating system:

On the basis of their importance operating system is classified as follows:

Operating Systems

1. Open or Standard DOS
2. Proprietary Company; IBM: MVS, DEC: VMS
3. Single User MS-DOS
4. Single user multitasking MS-WINDOWS, OS/2
5. Multi user UNIX and VMS
6. Network WINDOWS NT, NOVELL NETWARE

As the nervous system controls the different parts of human body, similarly the operating system controls the different components of a computer.

Q.4 What do you mean by Booting?

Booting is the process by which the computer starts itself, loads the operating system into the memory and gets ready to process commands. It is the process of initialising the computer for use.

The two sets of programs required in the starting and running of a computer are:

- ROM based - the instructions available in ROM
- Disk based - the instructions available on the disk.

1. ROM based instructions:

This software is categorised in two types of routines. (ie)

* BIOS Routines: Basic Input output System (BIOS) helps CPU in communicating with the hardware.

* Startup Process: Starts the booting process.

(i) Power on self test Routines (POST) checks and initializes the hardware devices.

(ii) Initialization Routines: Sets the peripherals in ready to operate condition.

(iii) Bootstrap Loader: Loads the bootstrap program from the Boot sector of the disk. Bootstrap program is the Sector 1 of track 0 of side 0 of the disk.

2. Disk based instructions:

It consists of three system files or bootable files namely 10.SYS, MSDOS.SYS and COMMAND.COM and the disk containing them is called bootable or sys

or system disk.

* 10.sys: It has two modules, DISK BIOS & SYSINIT

(i) DISK BIOS: It acts as a device drivers and communicates with CPU, printer & Keyboard etc.

(ii) SYSINIT: Loads MSDOS.sys from ~~main~~ disk to memory.

* MSDOS.sys or Kernel: Provides interface between Hardware and Software

* COMMAND.COM or Shell: It is the command processor and acts as interpreter and carrier of instructions. It displays system prompt on the screen. It has three portion:

(i) Initialization Portion: Looks for the existence of file called AUTOEXEC.BAT and gets it executed.

(ii) Resident Portion: Its task is to handle error and load and unload the transient portion when required.

(iii) Transient Portion: This portion executes the commonly used commands.

After this prompt appears on the screen called system prompt which indicates that booting is over and system is ready for use.

Three Stages of Virus attacks

Transmission

The Virus gets transmitted through the infected floppies networks, E-mail systems and then they reside on computers hard disk or floppy disk the infected file is copied

Destruction

The virus residing on the disk waits for a particular event to occur. When that event occurs, the virus gets activated and starts to be

The result of this might be flashing of message or the hard disk.

Replication

On execution of the infected program, the virus becomes active on the system and injects itself to other program files causing them to become larger.

Q.5. What are Viruses?

Meaning:

Virus is a set of harmful instructions designed to corrupt your secured data. Viruses were initially developed to discourage "pirated" software. It hides itself either in the boot sector or in one of executable file. Once active it operates in the background.

Preventive measures that should be taken to protect PC against Viruses:

- ① On a hard disk system, avoid booting from a floppy disk unless it is original write protected system disk.
- ② Avoid using pirated software.
- ③ External floppy disk should be scanned.
- ④ Always take regular backup of data and programs.
- ⑤ Use vaccine programs which helps us in fighting the viruses. Some of the popular vaccine programs are. Red Alert, NashShot, Smart Dog, and Scan.
- ⑥ Some companies have even introduced hardware cards which prevents viruses from entering a PC.
- ⑦ The system and program disks should be kept write protected.

Names of some common viruses are:

- | | | |
|----------------|------------|------------------------|
| * C-Brain | * Raindrop | * Marijuana |
| * Madonna | * Die Hard | * One half |
| * Michelangelo | * Vienna | * Happy Birthday Joshi |
| * I Love You. | | |

Q.6. What do you mean by internal and external commands?

Meaning:

Internal Commands

- * They are those commands which are frequently used.
- * They are present in the transient portion of COMMAND.COM file, thus they are always present in the memory.
- * For example: DIR, COPY, CLS.

DOS Internal Commands :

1. Directory (DIR): It displays list of existing files on disk.
 SYNTAX : DIR Drive : [Path] [File(s) or Directory(es)] /Switches.

2. Clear Screen (CLS): This command clears the screen.
 $C > CLS < Enter >$. This will display Dos prompt in the top left corner of the screen.

3. Copying Files (COPY): This makes an exact replica of a file.
 SYNTAX: COPY Drive : [Path] <Source File> <Target File>

4. Make Directory (MD): This command makes a directory.
 SYNTAX: MD [Drive] : [Path] <Directory Name> .

DOS External Commands :

5. FORMAT Command: This command initializes a disk.
 The command for formatting disk in drive A is
 $C > FORMAT A: < Enter >$.

This command can also be used to format an old ^{floppy} disk or even fixed disk (Hard disk). In this case all the data present on these disks will be lost.

Q.7. What do you mean by networking? Explain with example.

Network:

A group of interconnected computers is called a Network, where a computer Network is a logical extension of a data communication system. In simple words, Networking means connecting people through computers for information interchange.

Importance of Networking:

- ① Sharing information
- ② Sharing computer resources
- ③ Reliability
- ④ Data duplication can be avoided

Types of Networking:

1. LAN - Local Area Networks:

It is a digital communication system capable of interconnecting computers in a single room, building or a campus. The transmission speed is very high in LAN. It helps in sharing data, program & hardware resources.

2 MAN - Metropolitan Area Networks:

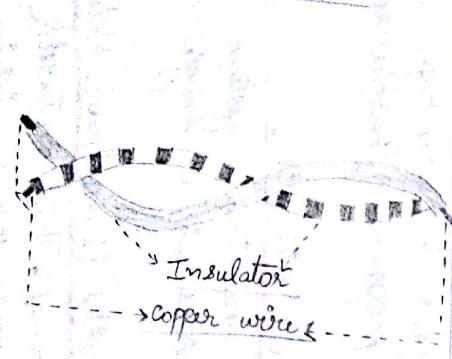
It is a digital communication system capable of interconnecting various LANs in a single city.

3. WAN - Wide Area Networks (Long Haul Network)

It is also called internet. This network may function nationwide or worldwide. In this transmission cost is high and transmission speed is slow compared to LAN.

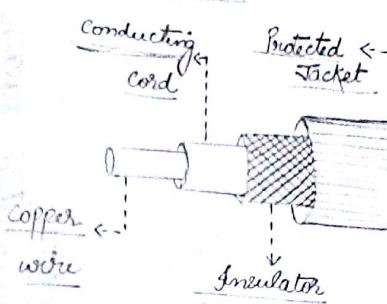
Wired transmission media in a Network

• Twisted Pair cable



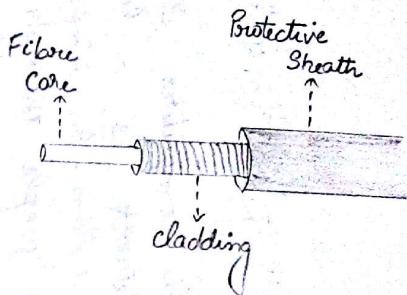
- * Least expensive
- * Least reliable
- * Least transmission rate
- * Disturbing

• Coaxial cable



- * comparatively expensive
- * comparatively more reliable
- * comparatively more transmission rate
- * comparatively less disturbing

• Fibre optic cable.



- * Most expensive
- * Most reliable
- * highest transmission rate
- * least disturbing

Q.8. Explain the components of LAN.

A LAN is a system made from building blocks that can be added and removed as needed. The basic building blocks or components are:

1. Workstations:

It is any computer capable of supporting hardware and software necessary to connect to a LAN.

2. Peripherals:

They are the expensive resources that can be shared by all the computers on the network. They are also called dedicated resources. e.g.: Printers, scanners.

3. Servers:

Servers perform services to other workstations on the network and fulfill requests from other workstation. They could be file server, disk server, print server, modem server and database server.

4. Transmission Media:

They are the electronic roadways along which the signals are transferred. They are classified into wired transmission and wireless transmission.

wired media are:

* Twisted Pair Cable: It is the oldest and cheapest type of cables. It suffers from noise interference and low transmission rate.

* Coaxial cable: It consists of one or more small

NETWORK ARCHITECTURE

User Application

utilities

Network operating System

Disk operating System

Hardware

H/W

DOS

NOS

utilities

User Application

Explain the components of LAN?

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Wired media are:

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* Coaxial cable: It consists of one or more small

cables enclosed in a protective covering. It is used for long distance networking system.

* Fibre Optic cables: These cables are made of plastic or glass and are as thick as human hair. It is most expensive and reliable transmission media.

Wireless media are:

~~Wire~~ Microwaves or Line of sight transmission.

Radiowaves.

Satellites.

5. Network Interface Cards: (NIC)

It is that device through which the workstations are connected functionally and physically to the network. It is LAN Hardware. It is also called network adapter.

6. Network Operating System: (NOS)

It is responsible for:

- * controlling access to data
- * Allocating disk space
- * controlling & sharing of network printers. It acts as the interface between the network hardware and the application software running on the network.

Q.9. What do you mean by NT executive?

Windows NT executive consists of :

1. Object Manager:

It is the most fundamental of the executive system. It is responsible for managing, creation and destruction of system objects. It includes :

- * Event: User input or signal from an application.
- * File : A bit of data on a hard disk.
- * Thread: Series of simultaneous action being placed on a single application.
- * Mutex: It is the thread in execution.
- * Named Pipe: It is used for linking.
- * File mapping: It is the way the file is being stored.

Thus object manager keeps track of how often that object is referenced.

2. Process Manager:

It creates new processes and provides each one its own unique process ID. It does not schedule processes it simply provides them on request.

3. Kernel:

It is responsible for scheduling of threads, keeping CPU(s) as busy as possible.

4. Virtual Memory Manager:

It is responsible for maintaining the address translation between physical storage and process address.

space.

5. Security Reference Monitor (SRM):

Verifies that other processes have permission to access the system they are trying to get to.

6. Input Output Manager:

It takes care of input and output to the system via the communication ports.

7. File system:

It maintains physical organisation of data on the disk.

8. Device Drivers:

It interacts with Hardware to get the job done.
It exists for tape devices, sound cards, network interface.

9. Hardware Abstraction Layer (HAL):

It is a thin layer of software provided by the hardware manufacturers that hides, or abstracts, hardware differences from higher layers of the operating system. The goal for HAL is to provide routines that allow a single device driver to support the same device on all platforms.

Thus HAL is responsible for hiding the details of symmetric multi-processor hardware from rest of the operating system.