SOLVED EXCERSICES

COMPUTER SCIENCE

GRADE 9TH

(According to KP Text Book Edition 2023-24)

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Q3. Differentiate between the following.

i. Shareware vs. freeware

Shareware: A commercial software whose license is to be purchased from its vendor. They may be available freely but with limited features only or with full features but for a limited time trail period only.

Freeware: the software which is freely available to download with or without source code. It may be distributed further but with restrictions that cannot be used for commercial purposes. It is prohibited to be sold.

ii. Register vs. cache memory

Registers are high-speed memory locations contained Inside Processor. They are used to save data and instructions temporarily. Many types of registers are there Inside processor for different functions.

Cache Memory: Cache memory is small and fast. Most accessed data is stored on the cache. It has several levels like L1, L2 etc. L1 cache reside inside processor.

iii. Expansion Slots vs. Expansion cards

An **expansion slot** is a socket on mother board into which expansion cards can be inserted. It allows the CPU to communicate to the peripheral devices attached via expansion cards. Its purpose is to extend the capabilities of the computer system. Examples (AGP, PCI, ISA PCIE)

An **expansion card** is a small circuit board than can be attached to the motherboard via an expansion slot. It adds new devices or new capabilities into the computer system. (EXAMPLES Video card, sound card, modem card)

iv. RAM vs. ROM:

NO.	RAM	ROM
1	RAM is temporary memory	ROM is permanent memory
2	RAM memory can be modified	**ROM** cannot be modified.
3	RAM is used for running programs	ROM is used for BIOS and POST.
4	RAM cannot hold data without power	ROM can retain data without power.

v. system software vs. application software.

System software are those, which control the work of computer system hardware. It provides an interface between user and hardware through device drivers. It controls both hardware and Application software.

Example are: Operating system, Device Drivers, Utility software and Language Translators.

Application software are used for some specific kind of Task. For example, we use MS WORD for making documents and MS PAINT for drawing images. They run over the OS. Some of their kinds

are: Productivity software, Business Software, Entertainment Software, Educational Software etc.

Q.4 Give main features of each computer generation.

Ans. Computer generations denote the advancement in computer hardware and software. With each generation, the size becomes smaller and performance becomes better. Main characteristics of all the 5 generation are given below:

The first generation – vacuum tube (1946 – 1959)

The first generation computers used vacuum tubes as the main component for computing logic. They were slow, expensive and unreliable. Thousands of vacuum tubes were used which took a lot of space and produce heat so that is needs AC and consume a lot of electricity. Machine language was used for programming. Examples (ENIAC, EDVAC, UNIVAC)

The second Generation- The Transistor Era. (1959- 1965)

2nd generation of computers used Transistor as their main component. Transistors were small, fast, cheaper and more reliable as compared to vacuum tubes. One transistor replaced about 40 vacuum tubes. Assembly language was used in place of machine language for programming.

Third Generation- Integrated circuits (1965- 1971)

Integrated circuit was the hallmark for the 3rd generation computers. ICs are placed on silicon chips which are called semiconductors. They increased the speed and efficiency of the computers. ICs can pack thousands of transistors into a single silicon chip due to which size was more reduced, as a result the power consumption became less and computers became cheaper.

The fourth Generation-Microprocessor (1971 – 1980)

The main characteristic of the 4th generation is the invention of microprocessor. Microprocessor is made using thousands of transistor on single chip called VLSI. Microprocessor can control all activities of a computer.4th generation computers are faster, compact and less costly. Personal computers were invented at this generation.

Fifth Generation - AI (1980: Present):

The fifth generation Computers are based on ULSI Microprocessor, Parallel Processing and Artificial Intelligence(AI). The main objective of fifth generation computing is to develop devices that think like human, respond to natural language input and are capable of learning and self-organization. Robots, are the result of this generation.

Q.5: Explain different type of digital computers.

Ans: classification of digital computers: -

Super Computers:

Supper computer are huge in size and they are used to for large scale and complex processing like in government organizations, research labs and weather forecasting etc. they are very expensive and their speed is measured in TIPS (Trillion instructions per second). They perform batch processing (one large process at a time)

Mainframe computers:

Mainframe computers lie after super computers based on their cost, size and performance. They can support thousands of users at a time and are used in large companies, universities and factories where they process large amount of data. Their speed is measured in BIPS (billions of instructions per second) and they have large size RAMs.

Mini Computers:

Mini computers are mid-range computers small in size and capacity than Mainframe computers. They can support hundreds of users at a time and are used in small type business organizations and educational institutes. Their speed is measured in MIPS (millions of instructions per second).

Micro Computers:

Micro computers are called PCs (personal computers) they have small size, inexpensive and can be used by single user at time. and are powerful in processing than mini computers of the past. They come in many shapes and sizes and are used in offices home and schools for database management, accounting, spreadsheets internet and playing games.

Q.6 Write down the applications of computers in the following fields.

Education. Business . Defense Media

Education:

The computer provides a lot of facilities in education filed.

- A lot of software used in education system to make learning and management easy called CBE (Computer based education).
- Students can take online classes from best institutes using computer.
- Distance education becomes very easy due to computers.
- It is easy for students to search material using computer.

Business: Computers are an important part of today's business. Showcasing products using websites, ordering products form online stores, shipping information, price checks in retail stores, e-commerce etc. are done using computers.

Customers record keeping and other financial reports are generated using computer.

Defense:

There are many uses computers in defense such as:

- Controlling unmanned air-crafts.
- They are also used on Intercontinental Ballistic Missiles (ICBMs) that uses GPS and Computers to help the missile get to the target.
- Computers are used to track incoming missiles and destroy them.
- Computers are used in tanks, planes, and ships to target enemy forces.
- Computers help design and test new weapons and defense systems.
- Design and testing and of new weapons.

Media: Now day's computers are very important in both print and electronic media. Computers are used for printing newspapers, magazines etc. Internet, Social media, E-mail, Blogging, TV etc. are uses of computers in electronic media.

Q.7: Write note on any 5 input devices?

Ans: Input devices are those which feed data into the computer. Some input devices are below:

1) **Light pen:** Light pen is an input device which is connected to the monitor display. It is sensitive for light and detects its position on the screen. They are used for shape drawing purposes.
2) **Web Cam:** web cam is a camera used to input digital images or live videos into computer for further processing or storage. It comes in various resolution and color profiles.
3) **Scanner:** scanner is a device which converts text and images from paper into digital format to be stored in computer. It has qualities like resolution and color depth. They may have OCR (optical character recognition software) for recognizing text from the image.
4) **Barcode / QR code Reader:**
   Barcode readers use laser light beam to read bars printed on products in retail stores. It is used with POS (point of sale) software to retrieve product information like price, manufacture company etc.
5) **Micro phone:** Micro phone is used to input voice into computer. It is used for recording voice or voice commands to control computer through voice.

Q.8: what is system unit? Explain main parts of SYSTEM UNIT?

Ans: System unit is a Rectangular box to which all the parts of computer are connected. It works like a home for all the components of the computer. In case of desktop computer, the CD-ROM, floppy disk and hard disk drives are fixed inside system unit, while in case of a laptop all the components like keyboard, mouse and screen etc. are all fit in system unit.

Motherboard:

motherboard is the main circuitry board inside the system unit it wires up all the components of the computer system. The important components on the mother board are **CPU** (Processor) and the **memory** (RAM, ROM). besides this, many components like memory chips, cooling fan etc. are fixed on the motherboard. Other devices like keyboard, mouse and CD-ROM etc. are connected to mother board via cables.

CPU(Processor):

CPU or processor is the main component of the system unit fixed over the motherboard. It functions like a brain for the computer. It performs operation according to the instructions given to the system by the user. It has three basic units

ALU; arithmetic logic unit for calculations and logic operations.

CU: control unit for controlling the instruction execution and data flow inside the computer system.

Registers: register stores small data for quick retrieval during CPU calculations.

Q.9: what is CPU? Explain main parts of CPU.

Ans: CPU(Processor): Central processing unit or simply processor functions like the brain of the computer system. It carries out all the instructions given to computer by the user. It performs arithmetic and logical operations. The main parts of the CPU are given below:

i. **ALU: (Arithmetic and Logic Unit):** this part of CPU performs the arithmetic operations like addition, subtraction, division and multiplication and logical operations like comparing objects to find big and small.
ii. **Control unit:** This part of CPU controls data flow to and from the hardware devices of the system. It repeats it cyclic operation to **fetch** data from memory, **decodes** into computer commands **execute** it and **Store** the result in memory.
iii. **Registers:** Registers are small high speed memory locations inside the CPU which are used to store temporary data during calculations. Their size may be 16,32 or 64 bits.

Q.10: How many Storage Devices are used? Briefly discuss any three storage devices?

Ans: Storage Device is also called Backing storage or secondary storage. It is permanent storage and does not volatile itself if power goes off.

i. **Hard Disk:** hard disk drive (HDD) is a permanent storage device. it has circular disks inside it which are fixed and sealed in a case to be saved from dust and smoke. The data is stored on the disk through light beam electronically. It is fit inside system unit.
ii. **Compact Disk:** compact disk (CD) is in form of flat rounded disc. They are portable and can be inserted into CD-ROM of the computer. They store data using laser beam.
iii. **Memory Card:** it special kind of small memory device which can be read through card reader. It uses solid state technology to store data. Data can be read from or written to it. They are used in mobile phone, digital cameras, laptops, mp3 players and other video devices they retain data even with no power.

Q11: what is computer Memory? explain different types of computer memory in detail?

Ans: The place inside a computer which holds temporary data is called memory.it is called **main storage** or **primary storage.** Programs are loaded into memory for execution and it works faster than Backup Storage Devices. Some of its types are mentioned below:

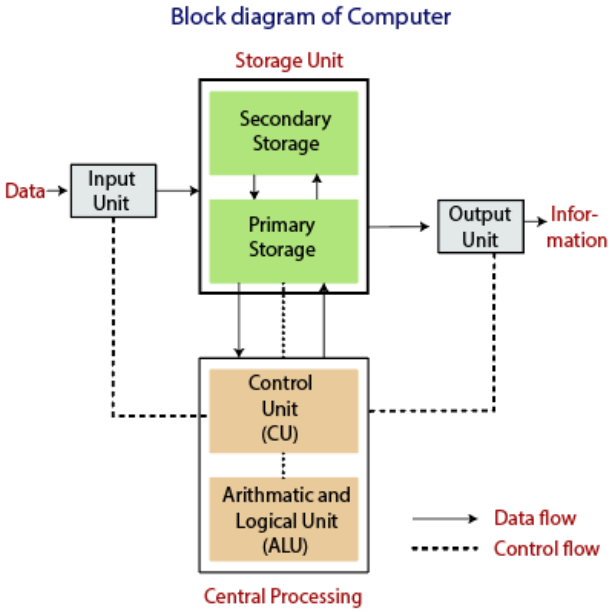
RAM: Random Access Memory is Volatile memory fixed on the motherboard. It holds data as long as the computer is Powered On. Programs are loaded into RAM for running. It has two basic types ***static RAM*** and ***Dynamic RAM.***

ROM: Read Only Memory is non-volatile permanent memory. We can read its data but cannot change it. ROM Contains BIOS which are instructions for turning on the computer and loading OS files.

Cache Memory: Cache memory is small and fast. Most accessed data is stored on the cache.

It has several levels like L1, L2 etc.

Q.12: Draw the block diagram of a computer.



Q13: write down three real life example of application software used in different organizations?

Ans: Application software are those software which help the user to perform something specific and creative. They are used for Business, Education and Entertainment purposes. They may be freely available or purchased. Some example of Application software:

MS Word: for making documents

MS Excel: for making spread Sheets.

MS PowerPoint: for making attractive presentations.

Wonder Share Filmora: For Video Editing

Q.14: Briefly discuss the responsibilities of system analyst.

A person who is responsible for analysis of a business department or project and to recommend software and systems. He coordinates the developers to develop software for the organization. System analyst has good knowledge of hardware, software and operating systems.

Q3: Differentiate the following.

i. Single User Vs. Multi user operating system.

Single user operating system: single user operating system is the one, which can be accessed by one user at a time. These are normally used at home and office computers. Examples of single user OS include: MS-DOS and windows.

Multi-user operating system: A multi user operating system can be accessed by many users at the same times using different machines (terminals). The benefit of a multi user operating system is that resources are installed on one central system can be used by many users at the same time. These are used in organizations where all users (employees) need to access the same resources. Multi user OS handles the requests from every user and allocates the resources they need. Examples of multiuser OS are UNIX, Linux and windows Server etc.

ii. Unix Vs. Linux Operating system

UNIX:

UNIX operating system was developed in 1960s by MULTICS. it is open source, command line and multi user operating system. It supports multi-tasking and is used for server and desktop computers.

Linux:

LINIUX is a GUI operating system and easy to use just like windows OS. Linux is free and open source OS. Its source code can be downloaded, modified and distributed. Linux is very popular and is used in offices and homes.

iii. Batch Processing system vs. time sharing processing system?

Batch Processing system is kind of multi user operating system which combines task and program into batches (groups) and then perform them in queue. It schedules tasks according to priority. Batch processing takes full advantage of the processor but it cannot be interfered during performing the processing.

Time sharing processing system is used by many users through different terminals for different tasks at the same time. The processing capabilities of a single computer are shared among different users. It is done through the processor allocates individual slice of time to a number of users on the system one by one.

iv. file vs. folder.

File: file is a collection of related records. It can be stored permanently on storage devices like HDD or USB etc. Every file has its own name for identification. Name consist of two

parts, part to the left of dot (.) is file name and to the right is its extension to specify application to open the file. Example "csbook.doc"

Folder: Folder is a collection of files.it is given a name for identification and can be cut or copied as one entity. We can store files and folders inside a folder. Folders inside folder are called subfolders.

v. Copy vs. Cut Command.

Copy: Copy command creates duplicate of a data. If we copy a data to another location, the original data will remain at its place.

Cut: Cut command moves data from one location to another. The data will not be retained at its original place.

vi. CLI vs. GUI Operating system?

CLI: Command line interface is the type of operating system interface where a user types in commands to work with the system. User must know commands and type it correctly. Common type of CLI system are **DOS** and **UNIX.**

GUI: A graphical user interface consists of a lot of menus and command icons and buttons. It easy to use. Commands can be selected with a mouse. Its examples are Windows OS by Microsoft, Macintosh by Apple etc.

Q.4 What is an operating system? Explain some common tasks or functions of an operating system.

Ans: Operating system is a set of programs with such instructions that coordinate all the activities of the computer system. Every computer must have OS wit out OS, a computer is useless. It works like a manager for the computer. It manages both hardware and software.

Functions of Operating System:

a) **Memory Management:**
OS allocates memory to the computer programs for use. It monitors the memory and clears it when it is not used by the program for processing anymore.

b) **Input output I/O management:**
OS manages input output operation and data of all the connected peripheral devices. It uses device drivers to control flow of data.

c. **Files Management:**
OS manages all the files stored on storage devices and keep track of file on the disk space. Its presents us file in the form tree directory, i.e. Drives, folders and sub-folders. It helps the user to move, rename ,edit or delete and search a file.

d. **Resource management:**

When a process executes over the CPU it needs certain resources like CPU time, Memory and I/O operations. Since a lot of tasks run at the same time therefore OS manages these resources for all the tasks and make system run smoothly.

e. **Users Management:**

In a multi user system, OS manages the access privileges and data for all the users. Provides protection from unauthorized access and thus keeps the system and data secure to prevent any damage to the information in the system.

Q.5 write short note the following.

I. DOS:

It is called Disk Operating system. It was first widely installed operating system for the personal computers. It has no graphical interface and is command line.it was created by Bill Gates for IBM computers. It is still used as a part in windows operating system known as CMD.

II. UNIX:

UNIX operating system was developed in 1960s by MULTICS. it is open source, command line and multi user operating system. It supports multi-tasking and is used for server and desktop computers for more than 30 years.

III. MACINTOSH:

Macintosh is often called 'Mac'. It was introduced by ***Apple computer company*** in 1984. It was the first widely-sold personal computer. It has a user friendly graphical user interface which includes icons and buttons for actions to be used through mouse.

IV. Windows:

Windows operating system was introduced by Microsoft in 1985. It is graphical user interface which contains buttons, menus and icons that can be operated with a mouse. It has many versions, the current stable one in the market is Windows 10.

Q.6 Explain different Component/ Features of graphical user interface.

Ans: Graphical user interface is the one where user interacts with the system using on screen buttons, icons and lists easily with a mouse. The first ever GUI based system was developed by *Apple computers* called **Macintosh.** Other GUI based operating system are **Microsoft windows** and **Linux** etc.

Some component of GUI based operating system:

Icon: The small image which represent a command, a file, folder or a program is called icon.

Pointer: pointer or cursor is like an arrow which is used to point to a command, file, folder or program. It is controlled through a mouse, touch pad or trackball etc.

Desktop: the first ever screen of GUI system where different commands and shortcuts are placed is called desktop.

This PC: this icon shows all the resources in the computer including drives, control panel and data.

Recycle Bin: deleted file go to recycle bin ; files can be permanently deleted or restored form here.

Control panel: this is the control center for the computer. All settings and programs can be changed from here.

Network: this icon is used to view and access network resources like storage and printing devices.

User Accounts: user accounts are used to create and modify user access credentials to access the computer. There can be separate accounts for every user.

Q3: Give short answers to the following questions.

i. **Define a spreadsheet software?**
Ans: an application software which show data in the form row and columns i.e. table or gird is called spread sheet software. It is used to organize numeric and non-numeric data

ii. **Give Few examples of word processing software?**
Ans: The software which is used for creating, editing, formatting and printing documents is called word processor. Examples of word processing software include:
Microsoft Word, Word perfect, Open Office Word, Text Edit (Mac OS), etc.

iii. **how you can insert a symbol in a word document?**
Ans:
- place the cursor in the place where you want to insert a symbol.
- Click **insert** tab from ribbon then click **Symbol** in symbols group.
- Symbol dialogue box will appear. Scroll to your desired symbol and double click it to insert into document.

iv. **How equation editor can be used in a word document?**
Ans: Equation editor can be used to write mathematical formulas. To use equation editor:
- place the cursor in the place where you want to insert equation.
- Click **insert** tab from ribbon then click **Equation** in symbols group.
- Select equation of you need.

v. **How you can insert Header, Footer and Ruler in a word window.**
Ans: To insert header or footer in a document, click on ***Insert*** Tab in the ribbon menu, and then click ***header*** or ***footer*** in the **"header & footer"** group. Select suitable layout for header or footer.
To show Ruler, click **view** tab and check **Ruler** in the **show group.**

vi. **What is the use of hyperlink in a word document?**
Ans: The hyperlink connects the user to another portion in the same document or to another document or webpage.

vii. **What is a function in Excel? Explain different parts of a function with one example.**
A predefined formula in excel that perform some specific task in called function. It saves time of the user as no need to write lengthy formulas.
Parts of function:
- Function should begin with equal = sign.
- Name of the function is followed by = sign.
- Argument of the function are enclosed in parentheses next to the name of the function.
- Example **=SUM(A3:A9)**
  - **SUM** is the function name and (A3:A9) is the argument part.

viii. **What is the purpose of using Urdu editor?**
Ans: The purpose of using Urdu editor is to create documents in national language of Pakistan. It is used for composing Urdu newspapers, pamphlets and magazines etc. it is also useful for composing in Arabic language.

ix. **What is the purpose of office automation software?**

Ans: Office automation is bunch of software developed by Microsoft to facilitate office file and clerical work. It consists of software viz. MS Word, PowerPoint, Excel, outlook, Access etc. to create documents, spreadsheets, presentation, emailing and database respectively.

Q.4 Differentiate the following:

i. **Word Art Vs. Clip Art**

word Art:

There is a Word Style Gallery in MS Word, which is called **Word Art.** This contain different decorative Text styles like bended, shadowed and mirrored etc. user adds it to the document to create attractive documents.

Clip Art:

Clip art is an art which is created by numerous artists to fit numerous different categories such as people, animals, school, furniture and vegetables. They can be inserted into word document.

ii. **Save vs. Save As**

"**Save**" Command has two uses; to save a new file, or to save changes to same file you opened and edited.

While "**Save as**" Command is used in cases where you opened an existing file, made changes to it but want to keep the original file as it is and save changes as another file.

iii. **Paste vs. paste special**

Paste option is used to used copied content into any cell in excel while

Paste special is used to copy content with some special attributes or apply mathematical operations on it before pasting.

iv. **Formula vs. Function**

Formula is a user defined equation that perform a calculation using values in the excel work sheet cells.

Function is a predefined formula that perform calculation using specific values in a particular order. It saves users time.

v. **Page Break vs . Section Break**

Page break allows a user to partition body of the text in a document and starts on next page. The **section break** allows users to partition text body, headers, footers, page numbers and margins of the document.

vi. **Work book vs. work sheet**

Workbook is single Excel File containing one or more worksheets.

Worksheet is a collection of cells arranged in table form where user enters data.

vii. **Cut vs. copy**

Copy command create a duplicate of the data.

Cut command moves the data from one location to another.

Q.6 Explain different components of word window.

Ans: Different components of MS word window are discussed below:

Title Bar: this is the topmost bar contains file name.

The Ribbon/Tabs: This contain menus/tabs of commands.

Toolbar: This contain the commands icons used for various actions.

Quick Access Toolbar: it contains some shortcut commands for quick use like save, undo and redo etc.

Document Window: The white area where actual document is typed.

Scrollbars: the bars used to scroll document horizontally or vertically.

Zoom Slider: used to control zoom of the document.

Ruler: a vertical and horizontal ruler to position text in the document.

Status bar: used to show important information about the document like pages, paragraphs and word count.

Q.6 Define the following.

Spread sheet: The computer application or the document which show data in the form of rows and columns (two dimensional matrix or grid) is called spread sheet. These are normally used for financial information and data including calculations.

Work book: a single Excel file is called workbook. It stores data and may contain several other worksheets.

Worksheet: a worksheet is single spreadsheet inside a workbook which can used to store separate data. Many work sheet inside a workbook are used to store different kind of information.

Cell: the intersection of a row and column in a spreadsheet is called a cell. Cell may contain numeric, non-numeric data or a formula.

Cell Address: each cell in excel has a unique location identified by column letter and row number called cell address.

Cell reference: When a cell address is used in a function or a formula in the spreadsheet for fetching data, it is called cell reference.

Formula: A formula is an expression written inside a cell that performs numeric or logical calculations or other text manipulations.

Function: A function is a predefined formula identified by its own name and passed some arguments and which is used to perform some specific task.

Chart: The graphical representation of data is called Chart. It is also called graph.

Q.8: What is the purpose of autofill command in Excel?

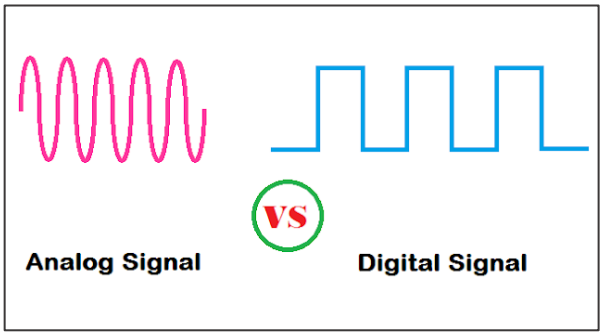
Ans: The auto fill command is used to fill a data series or formula into other cells. For example, number series, days of week, months and date can be auto filled just by writing one of them in a cell and use autofill handle to drag to other cells. the highlighted cells will automatically be filled up with data.

Q3: Differentiate between the following.

i. analog and digital signals?

Ans: The signal which varies continuously with time and can take any number from an infinite range of values is called **analog signal**. Its graph represents a wave form. The light waves, sound waves and radio waves are examples of analog signals.

The signal which do not vary irregularly but take value from finite range of values is called **digital signal.** Digital signal represents data bits (**0s and 1s**) grouped together called bytes. Computer works with and process digital signals.



ii. Guided and unguided Transmission Media?

Ans: Guided media: those Media which uses some physical object for transmission of data signals are called guided media. Examples are Twisted pair cable, coaxial cable and fiber optic cable.

Unguided Media: Those media which do not use any cable medium for transmission, instead it uses air (magnetic waves) for data transmission. Examples are: Radio waves, Microwaves, Infra-red waves and Wi-Fi etc.

iii. Data Rate Vs Baud Rate

Ans: Date Rate: the speed at which binary digits transmit through a communication line in unit time is called Data rate. It is measured in bps (bits per second).

Baud Rate: the number of times a signal changes its state is called baud rate. One baud can transfer one or more bits.

iv. Router vs Switch

Ans: <u>Router:</u>

Router is an intelligent communication device. it knows where to send the data using best path. It works with IP addresses and helps in connecting two different networks together. Some routers support wireless communication.

<u>Switch:</u>
Switch is communication device which is used to connect computers in the same network. Switch used MAC (media access control) address for communication with in the network. A switch enables connected devices to share information and talk to each other.

v. Radio vs Micro Wave

Ans: Radio waves is a wireless data transmission medium. Radio signals propagate in air as well as in space. It has a wavelength ranging from 1m up to Kilo meters. Due to its high wavelength it can pass obstacles like tall building and mountains. In radio communication a transmitter is used to send data(message) and a receiver is used to receive message. Sometimes a transceiver is used which both send and receives message. Its speed is up to 54 Mbps.

Micro waves:

vi. Synchronous vs Asynchronous transmission mode

Ans : <u>Synchronous Transmission Mode:</u> In this kind of transmission data is sent **block by block** in the form of stream. There is no gap between the data blocks. It is controlled through a clock which is synchronized between the sender and the receiver. No start/stop bits are required between the data blocks. This kind of transmission is expensive but provides greater speed.

<u>Asynchronous Transmission Mode:</u>

in this kind of transmission data is send one byte at a time.it does not need any regular or predetermined interval. No synchronization needed between the sender and the receiver. Every packet of data is marked by start and stop bit. Additional parity bit is included for error checking. Data is sent intermittently (وقفے وقفے سے) Asynchronous transmission is relatively slow.

Q4: What is Data communication? Explain the basic components of a communication system?

Ans: Data Communication is the exchange of data from device to another device electronically in the form signals through some medium. The basic components which forms a communication system are: sender, Receiver, Message, Protocol, Transmission medium.

Sender: The device which sends the Message(Data) is called sender. It is also called ***Source*** or ***Transmitter.*** examples are: Computer, mobile phone, video camera and radio and TV stations (all of them sends data).

Receiver: The device which receives the message(data) sent to it by the sender. It is also called ***sink.*** Examples are: computer, work station, telephone set, mobile phone, television set, printer, fax and radio set etc.

Message: the data which sent called the message. It may include text, pictures, sounds, video or other files.

Protocol: the set of rules which control the data flow from sender to receiver are called protocol. All the communicating devices must follow the protocol for communication.

Transmission medium: The Path through which the data is sent or received from one device to another is called Transmission medium. It may be wired or wireless. Examples:

Wired (twisted pair cable, coaxial cable, Fiber optic cable)

wireless (Radio waves, micro waves, infrared).

Q5: why communication devices are used In communication system ? explain with reason?

Ans: communication devices are electronic devices that can send and receive data on the network. They enable the data transfer across the network among users. They convert data for sending and receiving. Examples are: Dialup modem, Network interface card(NIC) Router, Switch etc..

Q6: what is guided transmission media? Explain different types of guided media with advantages and disadvantages of each.

Ans: Guided Transmission media:

The media which connect devices using some physical links like wires and cables is called Guided Transmission media. Some Guided Media are discussed below:

Twisted Pair Cable:

Twisted cable is the most commonly used cable for networking. It may consist up to **8** wires in pairs; each pair is twisted together to cancel the electromagnetic interference. There are two types of twisted pair cable: Unshielded twisted pair (**UTP**), and Shielded twisted pair (**STP**). The pairs of **STP** are covered with a metal foil or mesh to stop noise and cross talk.

Advantages:

- It can be used to carry both analog and digital data.
- It is the least expensive media of transmission for short distances.
- It gives high throughput especially in Local Area Networking(LAN).
- It gets little influence from nearby electrical devices.

Disadvantages:

- it does not work in a distance more than 100 Meters and repeaters are to be used.
- It has a very high attenuation rate.
- It has low durability and needs regular maintenance.
- It has low security as the cable can easily be broken.

Coaxial Cable:

Coaxial able also called coax, it can carry signals of high frequency than twisted pair cables. It consists of a single copper wire which covered by an insulating cover, then another conductor in the form a metallic mesh and then the outer most insulating material cover. The whole cable is externally protected by a plastic cover.

It can be used for voice and data transmission and supports speed form 10 Mbps to 200 Mbps.

Advantages:

- It supports high bandwidth signal transmission compare to twisted pair.
- The cost of coaxial cable is less.
- It is less susceptible to noise or interference compared to twisted pair cable.

Disadvantages:

- It is expensive to install for longer distances due to its thickness.
- A single cable is used for data transmission across the whole network, so if one cable fails, the entire network will be down.
- The signal may loss in case of Long distance.

Fiber Optic Cable:

Fiber optic cable also called optical fiber cable, is made thin threads of glass or transparent plastic through which signals are passed in the form of pulses of light.one thread of the optical fiber is as thin as a human hair, called core, which is then surrounded by a concentric layer of glass known as cladding, which makes the light refraction possible.

Advantages:

- it has greater bandwidth than copper cables since it uses speed of light instead of electrical current.
- It can carry data to longer distance since no loss occurs in light as compared to electrical current.
- It does not get effected by environmental changes like temperature or humidity.

Disadvantages:

- Optical fiber is rather fragile and can easily be damaged compared to copper wires.
- Their installation is expensive as they as they need specialist technicians to install.
- They need to kept almost straight as if we bend it they get damaged.

Q7: Explain the following unguided transmission media?

i) Radio waves ii) Microwaves iii) Satellite

Ans: Radio Waves:

Radio waves is a wireless data transmission medium. Radio signals propagate in air as well as in space. It has a wavelength ranging from 1m and above. Due to its high wavelength it can pass obstacles like tall building and mountains. In radio communication a transmitter is used to send data(message) and a receiver is used to receive message. Sometimes a transducer is used which both send and receives message. Its speed is up to 54 Mbps.

Microwaves:

Microwaves provide a high speed transmission. They travel in straight line and transmit data from one station to another. Each station contains an antenna or transceiver for sending and receiving. Micro waves cannot bend or diffract. They cannot pass thorough obstacles. Their stations are installed on height to avoid obstacle.

Satellite:

A satellite is a station that resides about 22300 miles above the earth in the space. It receives microwave signals from the earth station called ***up-link*** *Transmission*. the satellite then amplifies and spreads the signals in air/space called ***down-linking.***

It is used in radio and television broadcasting, GPS (Global positioning system). Its speed is very high which reaches up to 1 Gbps. At least 3 satellites are needed to cover the whole earth.

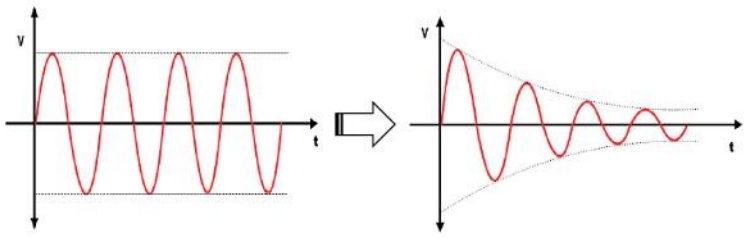
Q8: what are transmission impairments? Explain different causes of transmission impairments.

Ans: Impairment is a condition during transmission, which causes data to be lost. Communication lines are usually not perfect and the receiver does not receive the same signal as sent by the sender. The causes of impairments are:

- Attenuation
- Distortion
- Noise
    - Cross talk

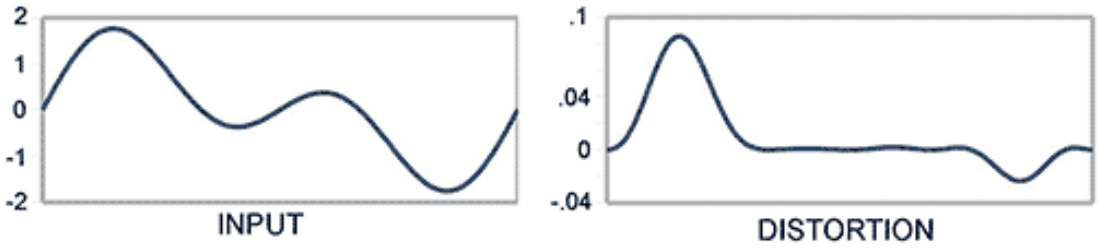
Attenuation:

The attenuation is the loss of energy as the signal propagates from sender. The attenuation lowers down the frequency and hence energy is lost. If attenuation is too much, signal will disappear and receiver will receive nothing.



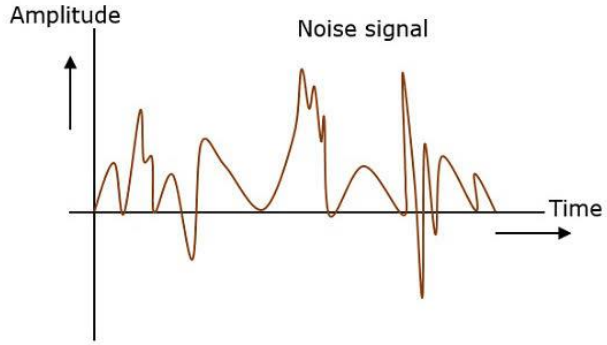
Distortion:

The impairment due to which signal changes its shape and form is called distortion. Multiple frequencies in same transmission channel having different speeds cause to change the shape of signal as compared to its shape and sending time.



Noise:

Noise such as cross Talk is an impairment, which corrupts the signal. Cross talk is due the electromagnetic effect of the current in one wire on another wire thus effecting the signal. We sometimes hear background voices on telephone conversation, which is due to the cross talk.



Q9: Explain any five-communication devices?

Ans: Communication Device:

communication devices are electronic devices that can send and receive data on the network. They enable the data transfer across the network among users. They convert data for sending and receiving. Some communication devices are discussed below:

Internal Modem:

Internal modem is communication device in the form of an expansion card which is inserted into the expansion slot inside system unit of the computer. It used to modulate and demodulate the data and send/ receive it using PSTN (Public switched telephone network) or simply telephone line.

Its speed is slow. And uses a dialup mechanism to connect to internet. Its use is obsolete after the arrival of the DSL system.

External Modem:

External Modem is a standalone modem with that modulates and demodulates data and uses Ordinary Telephone line to send and receive it across the network. It is used to connect to the internet over DSL (Digital subscriber line). It provides high speed data transmission. Many devices can be connected to it using Ethernet cable. Some external

modems have a built in WIFI so devices can be connected to it wirelessly. It also works as router to form a LAN (local area network).

Network Interface card:

Network interface card (NIC) is also known as LAN adapter or LAN CARD. It is used to connect computer to local area network. It is normally fixed in PC (personal computers). It provides connectivity using Ethernet cable. Some NICs also provide wireless connectivity if they have a WIFI Antenna in it. Each NIC has a unique address associated with it called MAC (machine, Media Access control) address.

Router:

Router is communication device which Is intelligent in such a way that it knows where to send the data using a short distance. It works with IP addresses and helps in connecting the logical and physical layers together. Some routers support wireless communication.

Switch / Access Point:

Switch is communication device which is used to connect computers in the same network. Switch used MAC (media access control) address for communication with in the network. A switch enables connected devices to share information and talk to each other.

Q10: which is the best transmission medium? Explain with properties.

Ans: Fiber optic cable is the best transmission medium. It is made of glass strands in which light signals pass. Since light has a high speed therefore data is transmitted very fast. In contrast to electric signals, light signals are not impacted by electromagnetic fields therefore no noise and no data loss occur in fiber optic cable.

Q3: Differentiate the following.

i. Data transmission vs. data communication

Ans: **Data transmission** is the flow of data through any wired or wireless transmission medium. This flow may be in the form of electrical, electromagnetic and light signals. Data transmission is a part of data communication.

Data communication is the flow of any message (data) from sender device to receiving device through some transmission medium connected via some communication device and under some protocol.

ii. Client vs Server

Ans: **Client:** the computer which is relies on the server for services. It requests the sever computer for any kind of service and the server responds to it.

Server is the dedicated central computer in the network which control the whole network. All other computers are connected to it via hub or switch. It is a powerful computer which serves as file, mail or print server.

iii. Ring Topology Vs Mesh Topology

Ans: Ring Topology:

Ring topology is in the form of a closed group or Ring; each node is connected to two adjacent nodes to form a ring. Data travels in one direction and passes through all the nodes until it reaches the destination.

Mesh Topology:

In mesh topology, each node is directly connected through a dedicated link to every node in the network. Each node has n(n-1)/2 connections. Mesh topology is usually implemented when connecting backbones routers.

iv. LAN vs WAN?

Ans: **LAN (**local area network) is a small computer network that connects computers inside an office, a building or a campus. LAN has limited number of computers/devices and is cheaper to install and manage.

WAN (wide area network) is a network which covers the entire world. It is made up of small LANs. WAN connects unlimited number devices and computers. It is expensive as high quality cables like fiber optic and other powerful communication devices are needed to operate the network.

v. Peer to peer Network Vs Point to point network

Ans: Peep to peer Network:

In peer to peer network each computer can communicate to any other computer directly without the need of any server computer in between. Each computer can send and receive data to and from any computer. This kind of network is cost effective and supports lessor number of computers.

Point-to-point Network:

Point to point network is the simplest of all network because it needs only two nodes(devices). Both nodes are connected with a communication line. This is a cheapest and most effective network. An example of this is the printer connected to a computer via a USB cable.

vi. Dial up Modem vs DSL modem

Ans: Dial-up Modem:

Dialup modem is used to connect a computer to internet using Public Switched Telephone network (PSTN). They use a telephone number to establish connection with the ISP (internet service provider). Dial up modems normally do not allow the telephone lines to be used for voice communication at the same time. They may be internal or external. Internal modems fits inside SYSTEM UNIT while external modes can be stand-alone.

DSL Modem:

A DSL modem is a stand-alone modem that can connect a computer to a faster internet service provider called **Digital Subscriber Line** using existing telephone lines. They provide high-speed upload and download speeds.

Q4: What are the different uses of a computer network? Explain in detail.

Ans: Computer network is used everywhere in computer world. Some of their uses are as below:

<u>Resource Sharing:</u>

Resource sharing is one of the popular use of a computer network. A printer shared on a network is can be used by all the computers connected to that network and saves a lot of hardware expense. In the same manner files can be shared via network across the connected devices.

<u>Communication:</u>

People working in different locations for an organization can contact and discuss their work activities using internet. Computer network works as a backbone in top to bottom level communication in an organization.

<u>Data/ information sharing:</u>

Any kind of file and documents like accounts information, multimedia and other reports can be shared through a network. Many firms and banks also share their working software through network.

E-Commerce:

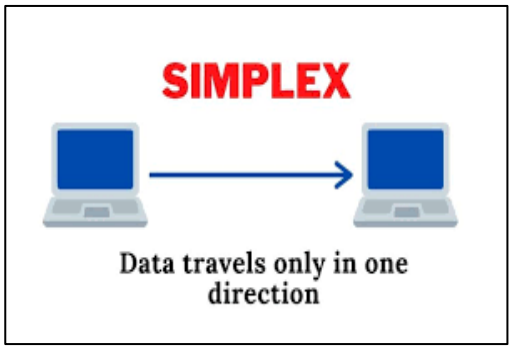
Computer network are now widely used for online business. We can check stock prices online. Online shopping, air ticketing and utility bill payments are available through internet.

Q5: Explain different modes of data transmission with examples and diagrams.

Ans: The directions of data flow through a medium is called Data Transmission mode. There are three modes of transmission in a medium.

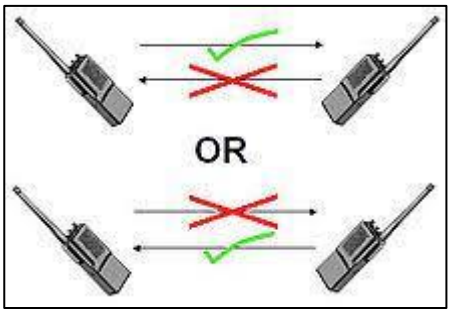
Simplex Mode:

In simplex mode data flow only in one direction i.e. from sending device to receiving device. No response is sent from receiving device to sending device. It is also called **unidirectional** Communication. Examples are: Radio and satellite communication.



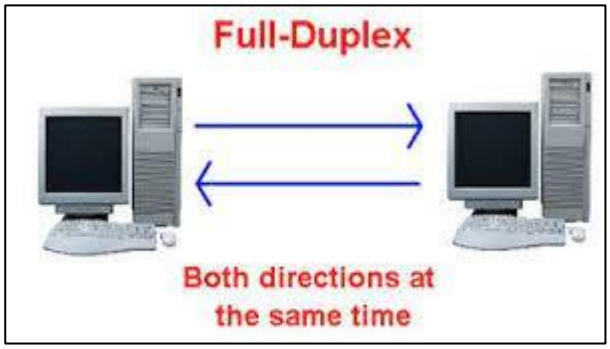
Half-Duplex Mode:

In half duplex transmission mode, data can flow in both directions but one at a time. When sending devices finish sending data, receiver starts sending the response. So data is sent and received alternatively. Example is walkie-talkie device.



Full-duplex Mode:

In full duplex mode, data can flow in both directions at the same time. It is the fastest mode of communication. Examples is a regular telephone line which supports both way talk at the same time.



Q6: What Is network architecture? Explain different types of network architecture.

Ans: Network architecture is the design of a communication network. It is a framework for the specification of a network's physical components and their functional organization and configuration, its operational principles and procedures, as well as data formats use.

Types of Network architecture:

Client Server Architecture:

in client server network architecture, there is a dedicated computer called the ***server***. Other computers connected to server are called ***clients*** or ***workstations*****.** Server has more memory, storage and processing power than the clients. All the clients are dependent over the server. They request the server for files and other services like email printing and internet. Client server architecture is useful in case of limited resources. However, if server is down the whole network will down.

Peep to peer Network:

In peer to peer network each computer can communicate to any other computer directly without the need of any server computer in between. Each computer can send and receive data to and from any computer. This kind of network is cost effective and supports lessor number of computers.

File like videos, audios, pictures, spreadsheets and other media files can be sent and received. Printers, scanners and internet can be shared to all the connected computers.

Point-to-point Network:

Point to point network is the simplest of all network because it needs only two nodes(devices). Both nodes are connected with a communication line. This is a cheapest and most effective network. An example of this is the printer connected to a computer via a USB cable.

Q7: Explain different types of network on the basis of spatial distance.

Ans: On the basis of geographic range or spatial distance, networks are divided into three main categories.

<u>Local Area Network (LAN):</u>

The network which connects computers in a local area such a building, an office, home or a university department is called *LOCAL AREA NETWORK.* Local area network is designed and used for sharing resources between personal computers(workstations). LAN has limited number of computers. It is less expensive and easy to manage.

<u>METROPOLITAN AREA NETWORK (MAN):</u>

A metropolitan area network convers a whole city or a state. it is larger than LAN and smaller than WAN. It may be a single network or a group of LANs connected together to interlink different offices and to share files and resources among them. MAN has larger number of computers than LAN and expensive. High quality medium is required for fast speed.

<u>WIDE AREA NETWORK(WAN):</u>

Wide area network is a communication network that convers countries, continents or the whole world. A WAN is combination of different LANs and MANs. It uses different technologies like satellite, fiber optic cables, microwave and copper wire etc. for connections.it connects computers and other devices across the globe. It is useful for today's web, email and internet services.

Q8. What is network topology? Explain Mesh Topology along with advantages and disadvantages and also draw its diagram.

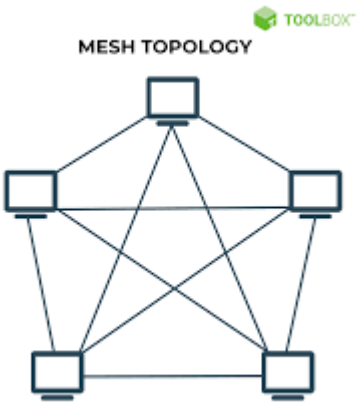
Ans: The physical layout of connecting computer or nodes in a network is called topology.

Mesh Topology:

In mesh topology, each node is directly connected through a dedicated link to every node in the network. Each node has n(n-1)/2 connections. Mesh topology is usually implemented to when connecting backbones routers. It is having the fastest speed as each link is used only between tow devices. Each device must have n-1 ports to establish connections.

Advantages:

- Each device linked with another so if one link gets down the other will work.
- Can manage high data traffic.
- Adding and removing devices are easy.



Disadvantages:

- It is expensive network.
- Large cables are required.
- Takes long time to install and configure.

Q.9: Explain different Types of Modems. Which one is the fastest modem in term of speed?

Ans: **Modem** Is derived from **Mod**ulator and **Dem**odulator. It is an electronic device that can convert digital data to analogue and analogue data to digital. Different types of modems are as under.

Dial-up Modem:

Dialup modem is used to connect a computer to internet using Public Switched Telephone network (PSTN). They use a telephone number to establish connection with the ISP (internet service provider). Dial up modems normally do not allow the telephone lines to be used for voice communication at the same time. They may internal or external. Internal modems fits inside SYSTEM UNIT while external modes can be stand-alone.

DSL Modem:

A DSL modem is a stand-alone modem that can connect a computer to a faster internet service provider called Digital Subscriber line using existing telephone lines. They provide high-speed upload and download speeds.

ISDN Modem:

ISDN is called integrated service digital Network. Unlike a dialup modem, it can transmit voice and data simultaneously using telephone line. It is faster than Dialup modem but slower than DSL modem.

The DSL modem is the fastest of all modems.

Q.10: compare different data communication lines in terms of data transfer rate and cost.

Ans:

Communication line	Transfer Rate	Cost per month	Advantages	Disadvantages
Dial up lines	2400 bps to 56 Kbps	Cheapest	Inexpensive available everywhere	Slow low speed due to line noise
ISDN	64 Kbps to 128 Kbps	costly than dialup lines	Faster than dialup use PSTN line	more expensive than dialup
DSL	128 Kbps to 8Mbps	Cheaper than ISDN costly than Dialup	Fast Download always on Higher Security	Need to close to telephone company

Q3: Give short answers to the following questions.

i. What is computer security?

Ans: computer security is also known as information security. Its aim is to protect computer hardware, software and data(information) from theft, corruption or natural disaster.

ii. what Is difference between a computer crime and conventional crime?

Ans: Computer Crime:

Any criminal activity that uses computer as a tool, means or target is called computer crime or cybercrime. It involves stealing of confidential data, passwords, or breaking and cracking the security of a system.

Conventional crime:

Any activity that is odd to the society or state; breaking the law and rule set for a specific society which may in consequence lead one to the floor of judge-court and punishment.

iii. Differentiate between hacking and cracking.

Ans: **Hacking:** Getting an unauthorized access to computer or the networking system is called hacking. Hacking is sometime exposing the faults and flaws in the system of an organization. The person who perform hacking is called hacker. Hacking is punishable activity in the court of law.

Cracking: Cracking is the process of bypassing registration (key purchasing) option in a paid software to avoid payment. It is also used to remove a disable features in a software that are undesirable by the user. Or to turn demo version into full version.

iv. What is the difference between a virus and a worm?

Ans: **Virus:** virus is a harmful program(software) that is intended to enter a computer system without user knowledge. It can replicate itself inside the computer and takes control of the system thus effects the performance and processing of the system.

Worm: Computer worms having the same harmful behavior as that of virus. However, worms can reproduce itself, can execute independently and can travel across network connections and spread on its own. A virus is dependent on a host file while a worm doesn't need any host.

v. What is adware? How a user can get rid of and remove adware?

Ans: Adware is advertising-supported software, which gets the online ads to play automatically without user permission. These programs overload the system and make them slow and could suddenly make the content of the computer open to the world.

to get rid of adware, a user need to use anti-virus software to remove any program that is loading the ads and also install ad-blocker in browser.

vi. How virus spread through internet in computers?

Ans: if we download files from websites or direct from file sharing servers using internet, it may contain virus and effect our system upon opening the file. Non-secure websites are the most common places for virus hosting and spreading.

vii. Differentiate between authentication and authorization.

Ans: **Authentication:** The process through which a user is identified to a system using username, passwords or biometric etc. is called authentication.

Authorization comes after authentication, to find out if a user is permitted to a certain resource or not. It defines the access lever group or privilege of a user.

viii. Compare authorized access with unauthorized access.

Ans: **Authorized** access is the user of computer or network resources with permission, while **unauthorized** access the user of computer and network resources without permission.

ix. What is biometrics technology? Give an example.

Ans: Biometric technology is an authentication mechanism, which gets data and metrics for processing from human body parts and /or combined with username and passwords.

Examples of biometrics include Finger print authentication used by many mobile phones and ATMs. Iris authentication used at the airports and voice or face recognition.

x. What is multimodal authentication?

Ans: The act of using more than one authentication mechanism when accessing a system is called multimodal or multifactor authentication. This provides additional security to computer and other systems.

Q4: What is importance of computer security?

Ans: computer security deals with the process which are used to protect computer system and its data. It was introduced in 1970's. computer security aims at securing data keeping it intact and accessible all the time. The importance of computer security grows very rapidly in today's online world.

Q5: What is cybercrime, explain different types of cybercrime?

Ans: Cyber Crime refers to the crime that involves a computer and Internet. Types of cybercrime include:

- Modifying computer input without authority
- Stealing output, to do unauthorized transactions.
- Modification of deletion of stored data.
- Cracking software features.
- Phishing: using fraud emails to steal users' login credentials.
- Bank fraud, identity theft stealing of usernames and passwords etc.

Q6: "Virus is a great threat to computers" why? Explain different types of computer virus?

Ans: **Virus:** virus is a harmful program (software) that is intended to enter a computer system without user knowledge. It can replicate itself inside the computer and takes control of the system thus effects the performance and processing of the system. No virus should be assumed as less harmful and left on the system.

Types of viruses:

Resident Virus: this kind of virus resides inside the RAM (memory) and effects all those files and programs that are opened, closed copied or renamed.

Boot Virus: this kind of virus effects the boot sector of the hard disk.

Trojan horse virus: Trojans are viruses that present itself in the form of a very useful software program. When downloaded and installed it start effecting the system. They don't replicate themselves.

Logic Bomb/Time Bomb virus: is some kind of malicious code written into a software program that runs at a specific condition or time. They effect system files and data when run.

Email Virus: Email Virus travel as an email attachment. They replicate themselves by mailing itself to dozens of other email contacts of the victim user.

Q7: Differentiate between malware and spyware.

Ans: **Spyware:** spyware are malicious software programs that collect personal information form computer when installed. They send this information to other organization without the user permission. They may take control of the computer system without the user knowledge, like changing browser search behavior etc.

Malware: Mal-ware stands for malicious software. It means any kind of software that is harmful for the computer system. For example, viruses, worms, Trojans horses, spyware, adware and other unwanted software. Malware get installed form website or USB file sharing or peer-to-peer networks. They try to remain unnoticed in the system and work in conceal manner.

Q8: What are different ways of spreading computer virus?

Ans: There are many ways of spreading computer virus. Some of the means are as below:

Through infected flash drive /CDs: These are among the most common means of spreading viruses. If we insert USB flash drive or CD in an infected computer, the virus gets copied, by inserting it to another computer, virus spreads to new computer and make it infected.

Through Pirated Software: Pirated software is unauthorized copy of original software. Gaining illegal access to protected software by any means is also known as software piracy. Pirated software's usually contains viruses.

Via Networks and internet: Files shared on a network and downloaded directly from the internet (either through file-sharing programs.

Through E-mail Attachments: Most of the viruses that spread on your computer are attachments that are sent via email most often from people you know. Emails infected with a virus usually appear like any normal email in your inbox. When the unsuspected user opens the email and the attachment, the virus executes itself and will begin to infect your computer system and other files on the computer.

Q9: How computer virus affects a computer system? Elaborate your answer by listing various symptoms of an attack by virus.

Ans: Computer virus spread into the computer system without user knowledge. They most often replicate themselves. It effects the running process and stored data in the computer system. If a computer system is attacked by virus, it may have the following symptoms:

- Runs slowly than normal
- Stops responding or freezes.
- Windows show errors and restarts.
- Some application software not work properly
- Showing unusual error messaging.
- Files not showing on disk.
- Showing advertisements.

Q10: How a computer can be protected against virus?

Ans: Computer can be protected from different kind of virus and spyware by using an antivirus software.

Antivirus: Anti-virus is a software that is designed to prevent, search for, detect, and remove viruses and malicious programs, and other harmful software like worms, Trojans horses, adware, and more. These tools are critical for users to have installed. Antivirus software should be updated frequently so that newly developed virus may be known to it. A computer without an anti-virus software installed will be easily infected if any virus program enters into it.

Anti- Spyware: Anti-spyware is a type of software that is designed to detect and remove unwanted **spyware** programs. **Spyware** is a type of malware that is installed on a **computer** without the user's knowledge in order to collect information about them and spread to organizations. Anti-spyware software must be updated regularly. Microsoft security essential is the example anti-spyware software.

Q11. Explain Different Authentication Methodologies in Detail.

Ans. Some important authentication methodologies are given below:

Username and password: username is a public key which usually email address or reflect the name of the user and password is a private key. Combination of both is used for authentication.

Personal Identification Number(PIN):

PIN is a special numeric password used for authentication. It is used with user ID or Cards For example in ATMs.

Access cards:

Access cards are usually RF ID cards used for entrance into places with restrictions. Access card provide ID number and other information about individual.

Biometrics:

Biometric technology is an authentication mechanism, which gets data and metrics for processing from human body parts and /or combined with username and passwords. A biometric system consist of three components:

1. Sensor that gets Human organ Data.
2. A Computer to store data.
3. A software to compare the data and perform authentication.

Examples of biometrics include Finger print authentication used by many mobile phones and ATMs. Iris authentication used at the airports and voice or face recognition

Q12.What are computer ethics? Give a sample code of conduct suggested by the Computer Ethics Institute (CEI).

Ans: Computer ethics are the issues concerning the legal, professional, social and moral responsibilities of computer professionals and end users.

Moral guidelines for the use of Computers suggested by the CEI:

1. Do not use computer to harm other people.

2. Do not watch around in other people's computer files.

3. Do not use computer to steal.

4. Do not use computer to bear false witness.

5. Do not copy or use licensed software without payment.

6. Do not use other people resources without permission.

7. Before developing a software, think about its social consequences.

Q13: Explain different areas of computer ethics.

Ans: The following are few major areas of computer ethics.

1. Information Accuracy:

Information accuracy deals with correct handling of personal information. Accurate information is essential to business, non-profit organizations, consumers and government.

2. Copyright and intellectual property rights:

Intellectual property (IP) refers to creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce.

Copyright is a legal term used to describe the rights that creators have over their literary and artistic works.

3. Software Piracy:

Software Piracy define as unauthorized duplication, distribution or use of computer software which includes making copies of software, installing, sharing, downloading, selling multiple copies to personal or work computers. We should avoid software piracy because it is illegal and it destroy a commercial product market.

4. Information Privacy:

Information privacy, or data privacy, is the relationship between the collection and distribution of data, technology and the other issues related to them. The challenge in data privacy is to protect data from misuse and mishandle.

Q14. why antivirus software is necessary for a computer?

Ans: Anti-virus software is a program or set of programs that are designed to prevent, search for, detect, and remove software viruses, and other malicious software like worms, Trojans, adware, and more. These tools are critical for users to have installed and up-to-date because a computer without anti-virus software installed, will be infected within minutes of connecting to the internet.

THE END

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