CHAMELI DEVI GROUP OF INSTITUTIONS, INDORE

LABORATORY MANUAL

CS-306
COMPUTER WORKSHOP

III SEM (CSE)

DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

CHAMELI DEVI GROUP OF INSTITUTIONS, INDORE

DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

<u>CERTIFICATE</u>

This is to certify that Mr/Ms. …………………………………………………………… with RGTU

Enrollment No. 0832……………….……………………...…………. has satisfactorily completed the

course of experiments in **CS-306** - **Computer Workshop laboratory**, as prescribed by Rajiv

Gandhi Proudyogiki Vishwavidyalaya, Bhopal for III Semester of the **Computer Science and**

Engineering Department during year **2024-25.**

Signature of
Faculty In-Charge

DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING
2024-25

List of Experiments

Student Name: -   **EnrollmentNo.: -**

Expt.No.	List of Experiments	Date of Conduction	Staff Signature
1.	Study of different types of Computer peripherals		
2.	Study of Personal Computer (PC) assembling process		
3.	Study of different types of Computer memories		
4.	Study of different types of hard disk drives		
5.	Study of Basic Input Output Systems (BIOS)		
6.	Study of Linux Operating System		
7.	Study of Ubuntu Operating System		
8.	Study of different types of Computer cables		
9.	Study of hardware and software troubleshooting		
10.	Study of different types of internet threats		

EXPERIMENT No. - 1 Study of different types of Computer peripherals

Aim: To know about the peripherals in a Computer system.

Theory:

A peripheral is a device that is used to put information into or get information out of the computer.

Examples of peripheral devices are:

1. Cabinet or CPU Case:

a. It contains all hardware devices like Motherboard, SMPS (Switch Mode Power Supply), HDD (Hard Disk Drive), SSD (Solid State Drive), RAM (Random Access Memory), CD/DVD ROM (Compact Disk/Digital Versatile Disk Read only Memory) also known as CD/DVD Reader/Writer.

b. It has a Start button, Restart button, Power LED, HDD/SSD Bootup LED, audio and USB (Univeral Serial Bus) connectors and Expansion slots.
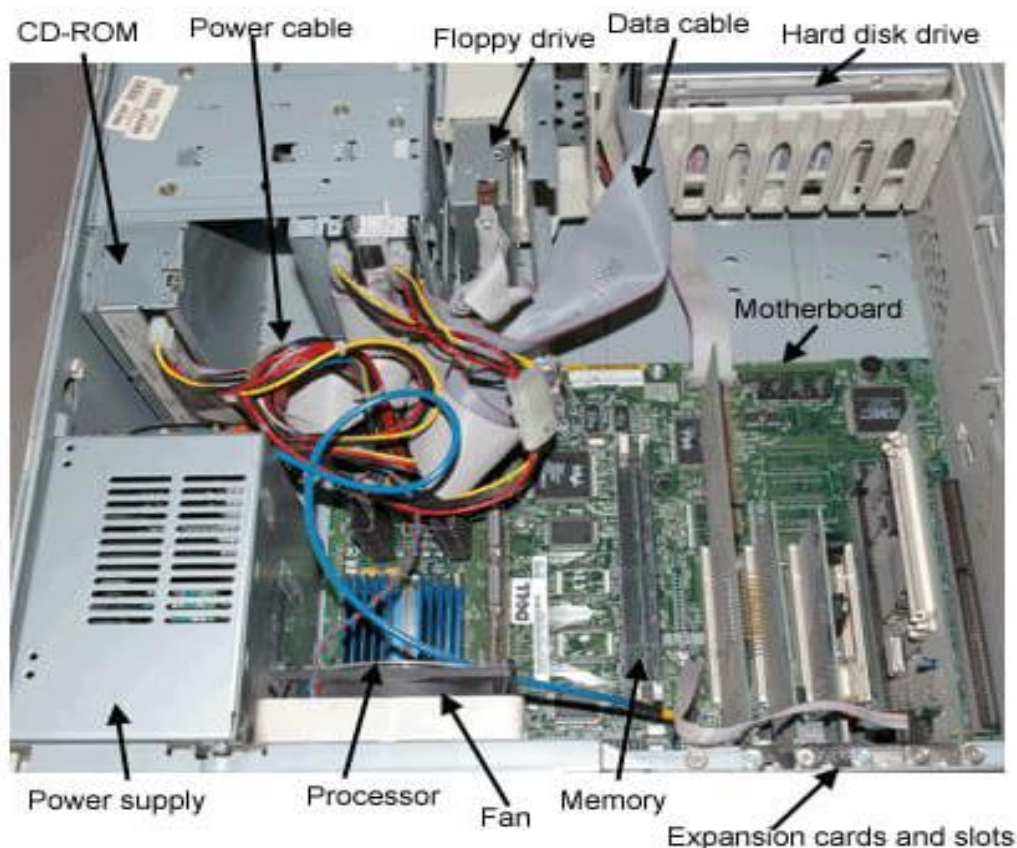
CPU Cabinet (Inside View)

Standard Cabinet

Gaming Cabinets

2. Monitor:

a. The monitor of a computer is like a television screen.

b. It displays text characters and graphics in colors or shades of grey.

c. The monitor is also called a screen or display.

d. In the monitorthe screen will be displayed in pixels format:

   I.   800 by 600 pixels.   II.   1024 by 768 pixels.

Types of Display Screens

| CRT	LCD	LED	Plasma
Cathode Ray Tube	Liquid Crystal Display	Light Emitting Diode	Plasma Display

3. Keyboard:

a. The keyboard is like a typewriter, which contains keys to enter the data or information into the computer.

b. Keyboards are available in two modules. They are-

    I.   Standard keyboard with 83-88 keys.

    II.   Multimedia keyboard

    III.   Enhanced keyboard with 104 keys or above.

**Standard Keyboard**

Multimedia Keyboard

4. Mouse:

a. Mouse has one primary button (left button) and one secondary button (right button).

b. The primary button is used to carry out most of the tasks, whereas the secondary button is used in special cases i.e. to select commands and options.

Optical Mouse
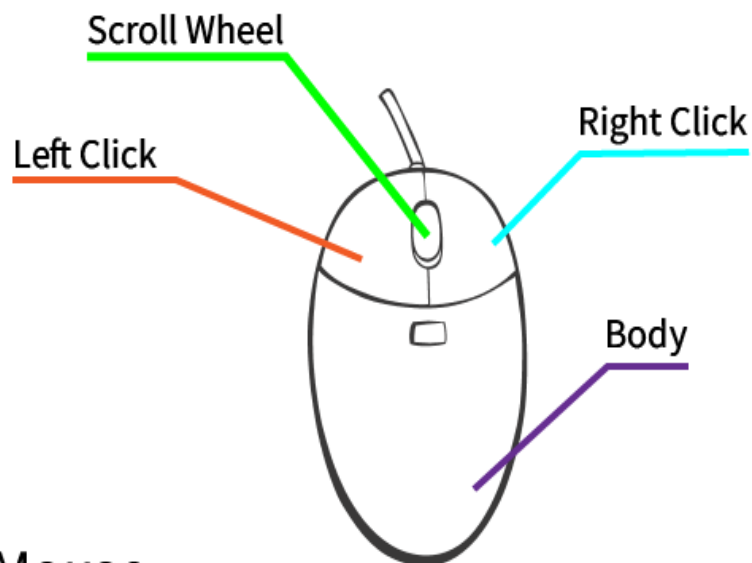
Mechanical Mouse

5. Motherboard:

There are primarily two types of motherboards, AT motherboard and ATX motherboard. Full AT is 12" wide x 13.8" deep and Baby AT is 8.57" wide x 13.04" deep. Full-ATX is 12" wide x 9.6" deep and Mini-ATX is 11.2" wide x 8.2" deep. Other major differences include the power supply connector and keyboard connector. AT has a 5-pin large keyboard connector, whereas ATX has a 6-pin mini connector.

The important components of an ATX motherboard are :

|		
1) Mouse & Keyboard	2) USB PORTS	3) CPU Chip
4) RAM Slots	5) CMOS Battery	6) Power Supply Plug-in
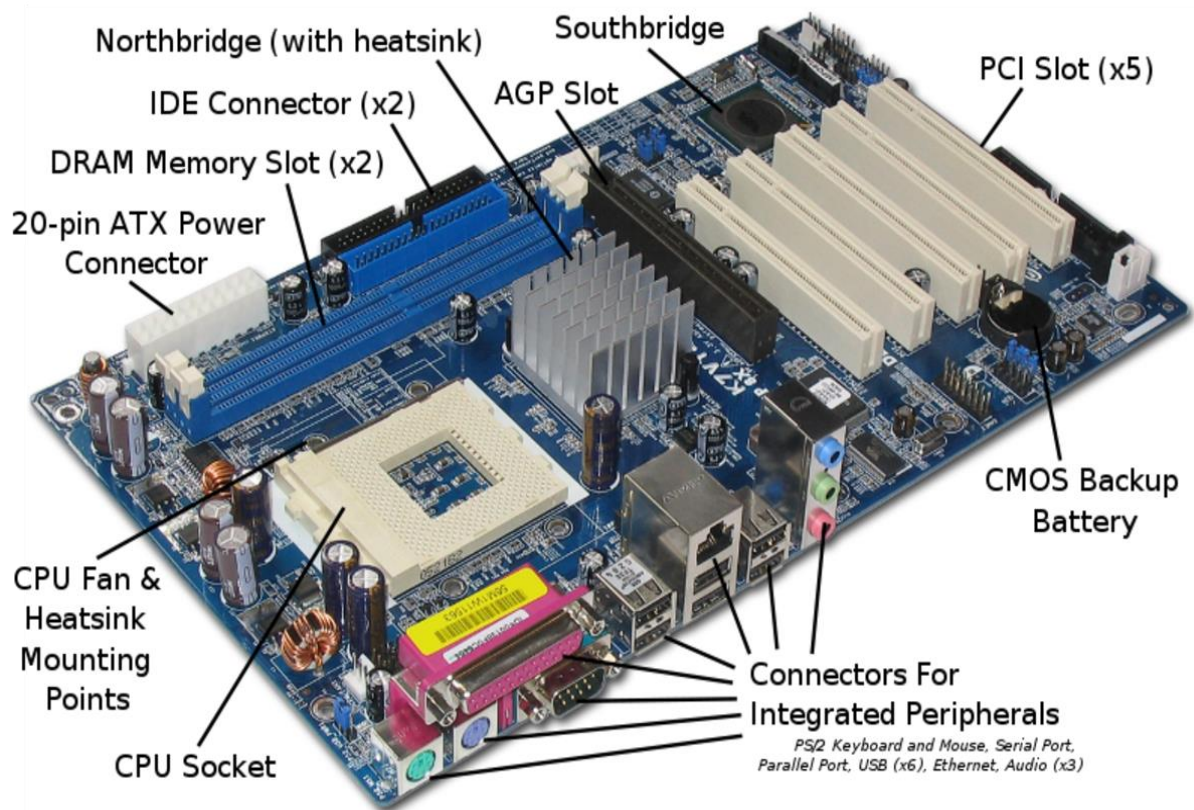
Motherboard

6. RAM (Random-access memory)

RAM is your computer or laptop's short-term memory. It's where the data is stored that your computer processor needs to run your applications and open your files. Random-access memory (RAM) is a form of computer memory that can be read and changed in any order, typically used to store working data and machine code.

Type of RAM	Year Invented
FPM-(Fast page mode RAM)-	1990
EDO RAM (Extended data out random access memory)	1994
SDRAM (Single dynamic RAM)	1996
RDRAM (Rambus RAM)	1998
DDR (Double Data Rate)	2000
DDR2	2003
DDR3	2007
DDR4	2012
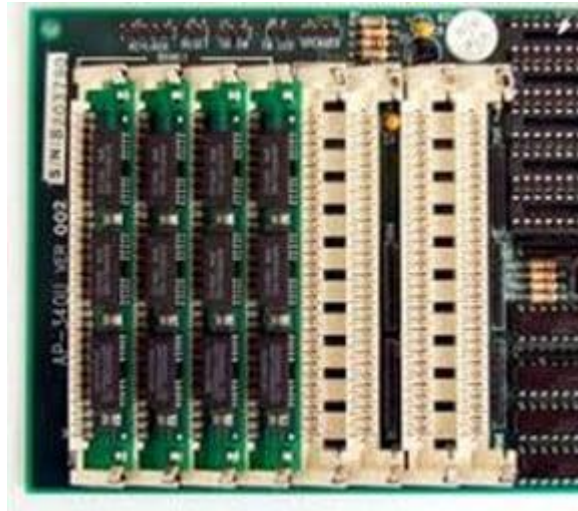
FPM DRAM

SDR RAM

RD RAM

VRAM

EDO RAM

DDR RAM

Performance Comparison of RAM Types

Standard	Time in Market	Bus Clock(MHZ)	Data rate(MT/s)	Tranfer rate(GB/s)	Voltage
SDRAM	1993	100-166	100-166	0.8-1.3	3.3
DDR	2000	133-200	266-400	2.1-3.2	2.5/2.6
DDR2 SDRAM	2003	266-400	533-800	4.2-6.4	1.8
DDR3	2007	533-800	1066-1600	8.5-14.9	1.35/1.5
DDR 4	2014	1066-1600	2133-3200	17-21.3	1.2

Viva Questions:

1. Explain the different types of peripheral devices.
2. Explain the different types of storage devices in acomputer system.
3. Explain any five types of input devices.
4. Explain the output devices with suitable examples.
5. Describe the various components of a motherboard.

EXPT. No. - 2. Study of Personal Computer (PC) assembling process

Aim: To understand the processofassembling of PC

Theory:

Assembling of a computer:

Assembling of a computer means accumulating all the hardware devices required for the computer to function.

Components required to assemble a computer:

- Processor
- Motherboard
- Hard disk
- RAM
- Cabinet
- Monitor
- Keyboard
- Mouse

1. **Install motherboard in the cabinet**

Figure2.1:MotherboardPanel

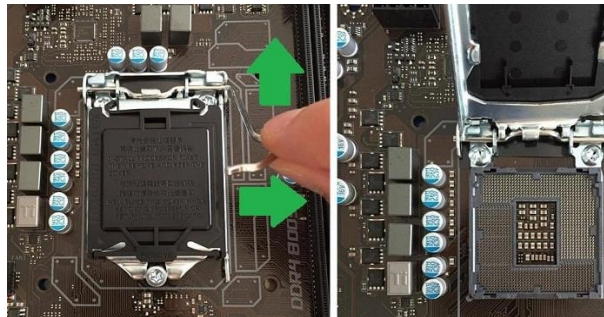2. **Fixing the processorinto the socket**

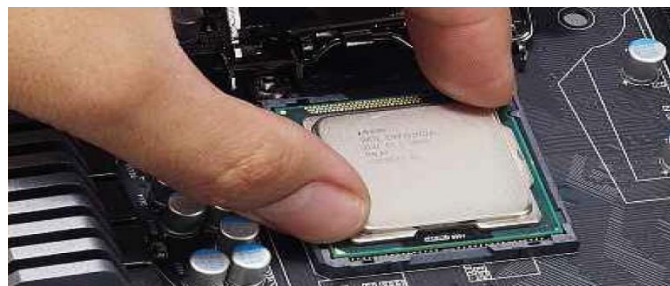

Figure 2.2:Socket Locking Lever

Figure 2.3:Placing the CPU into the socket

3. Installing RAM

The ways of inserting the RAM will vary with the different kinds of RAM available. There are different kinds of RAM like SDRAM, DDRAM and RDRAM.
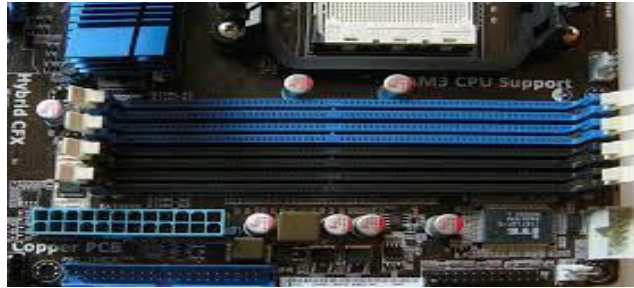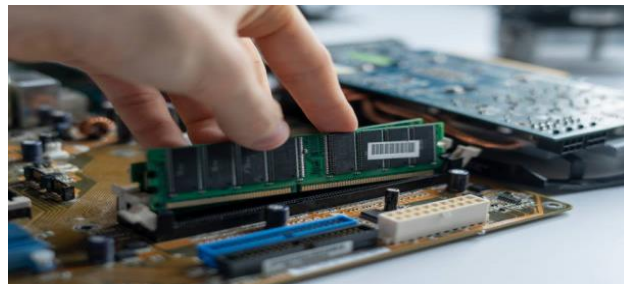

Figure2.4:RAM slots

Figure 2.5: Inserting the memory chip into its slot
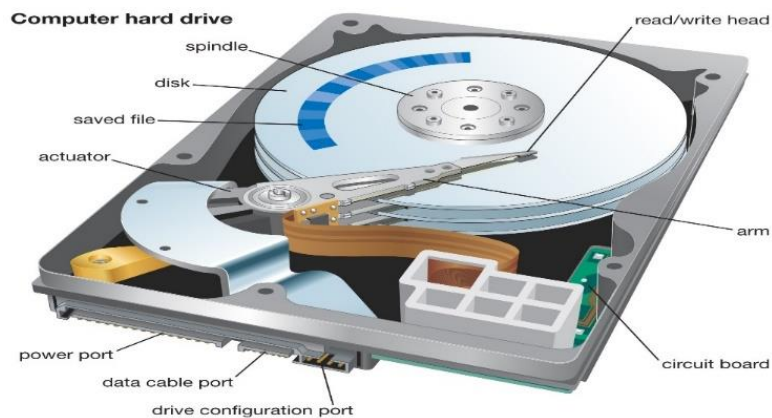
4. Installing Hard disk

Figure 2.6:Hard Disk

5. Power supply

Figure 2.7: Power Supply
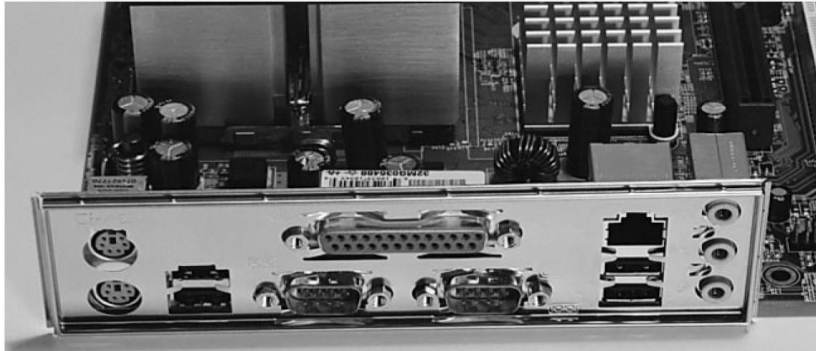
6. Input and Output connections

Figure 2.8: Mainboard sits behind the I/O Shield

7. Closing the cabinet

Figure2.9: Computer System

Viva Questions:

1. Explain the various steps in the assembly of a computer.
2. Explain about the tools required for assembling a computer.
3. Describe the main function of a motherboard.
4. Describe the installation process ofa RAM inside the computer.
5. What are the major components in a CPU?

EXPT. No. - 3. Study of different types of computer memories

Aim: To understand the concept of computer memoryand their types

Theory:A memory is just like a human brain. It is used to store data and instructions. Computer memory is the storage space in a computer, where data is to be processed and instructions required for processing are stored. The memory is divided into a large number of small parts called cells. Computer memory is a physical device capable of storing information temporarily, like RAM (Random Access Memory) or permanently, like ROM (Read Only Memory). Memory devices utilize integrated circuits and are used by operating systems, software and hardware.

The memory of a computer is divided into two categories:
1. Primary memory
2. Secondary memory

1. **Primary memory:** This is the main memory of the computer. The CPU can directly read or write on this memory. It is fixed on the motherboard of the computer. Primary memory are of two types -
   • RAM (Random Access Memory)
   • ROM (Read Only Memory)

RAM: RAM is a temporary memory. The information stored in this memory is lost as the power supply to the computer is turned off. That's why it is also called volatile memory**.** It stores the data and instructions given by the user and also the results produced by the computer temporarily.
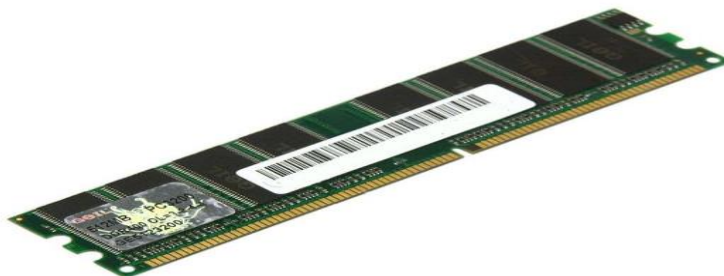

Figure 3.1: Random Access Memory

ROM: Information stored in ROM is permanent, i.e., it holds the data even if the system is switched off. It holds the starting instruction for the computer. ROM cannot be overwritten by the computer. It is also called non-volatile memory.

2. **Secondary memory:** This memory is permanent. It is used to store different programs and information permanently. It holds the information till the user erases it.

Different types of secondary storage devices are:
1. HDD (Hard Disk Drive)
2. Compact Disk
3. DVD
4. Flash Drive
5. Blu-ray Disc

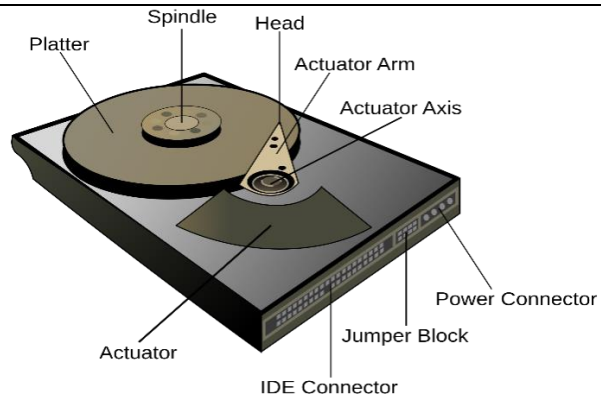**Figure 3.2: Hard Disk Drive**

Figure 3.3: Compact Disk

Figure 3.4: DVD

Figure 3.5: Flash Drive

Figure 3.6: Blu-ray Disc

<u>Viva Questions:</u>

1. What are the similarities between primary and secondary memory?
2. Describe the purpose of using RAM.
3. What are the advantages of cache memory?
4. Explain the working of a ROM.
5. Differentiate between a RAM and a ROM.

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EXPT. No. - 4. Study of different types of hard disk drives

Aim: To understand the concept of a hard diskdriveand their types

Theory: The hard drive of a computer is a device that stores all the software installed on a computer, as well as all the data files created and used by the software. This includes documents created and downloaded by users, such as photos and files. A hard drive is a form of permanent storage. This means that when the user turns off the computer, the files remain safely stored on the drive so that the user can use them again when it is required. There are two general types of hard drives:

1. **Hard Disk Drive (HDD)**
2. **Solid-State Drive(SSD)**

1. **Hard Disk Drive (HDD):**A hard disk drive consists of a rigid disc made of non-magnetic material, which is coated with a thin layer of magnetic material. Data is stored by magnetizing the thin film. A typical hard disk drive operates at a speed of 7,200 rpm (rotations per minute).
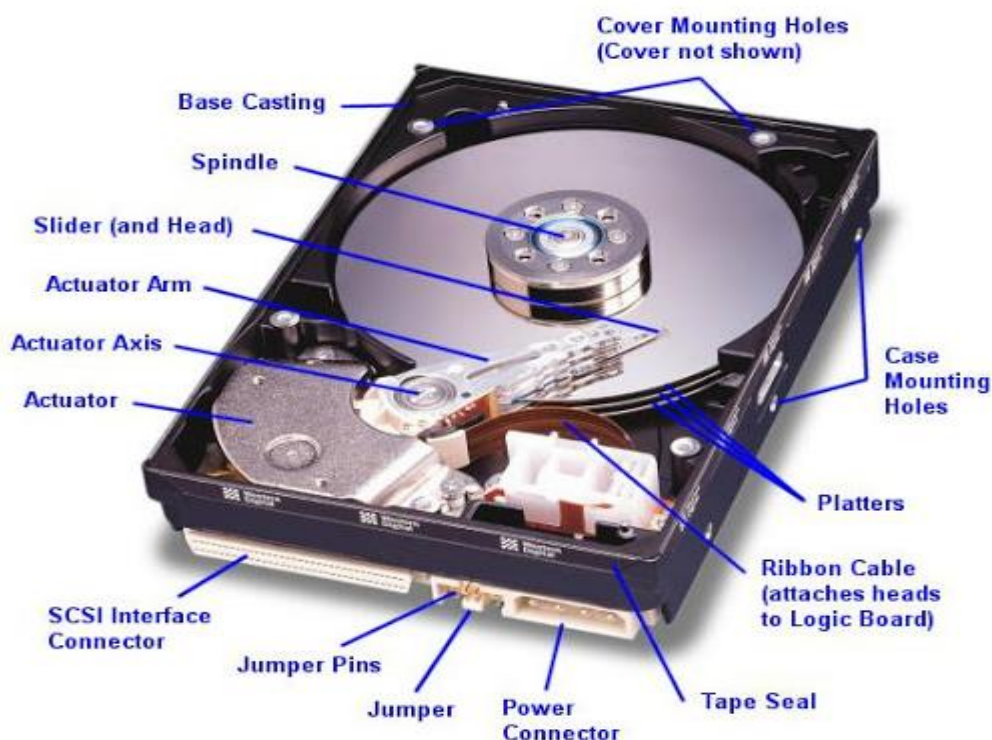
Figure 4.1: Hard Disk

2. **Solid-State Drive (SSD):**Solid-state drive is a relatively new alternative to more traditional hard disk drives. Solid-state drives do not have moving parts and data is stored electrically instead of magnetically. Most solid-state drives use flash memory, which is also used in memory cards for digital cameras and USB flash drives.

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Figure 4.2: Solid State Drive

Viva Questions:
1. Describe various types of hard disk drives available.
2. Discuss the similarities betweena hard disk anda RAM.
3. What are the reasonsbehind the failure of a hard disk?
4. What is the procedure adopted to read and write data on a hard disk?
5. Explain the working ofahard disk drive.

EXPT. No. - 5. Study of Basic Input Output Systems (BIOS)

Aim: To understand the concept of Basic Input Output Systems (BIOS)

Theory:BIOS (basic input/output system) is the program a computer's microprocessor uses to start the computer system after it is powered on. It also manages data flow between the computer's operating system (OS) and attached devices, such as the hard disk, video adapter, keyboard, mouse and printer.
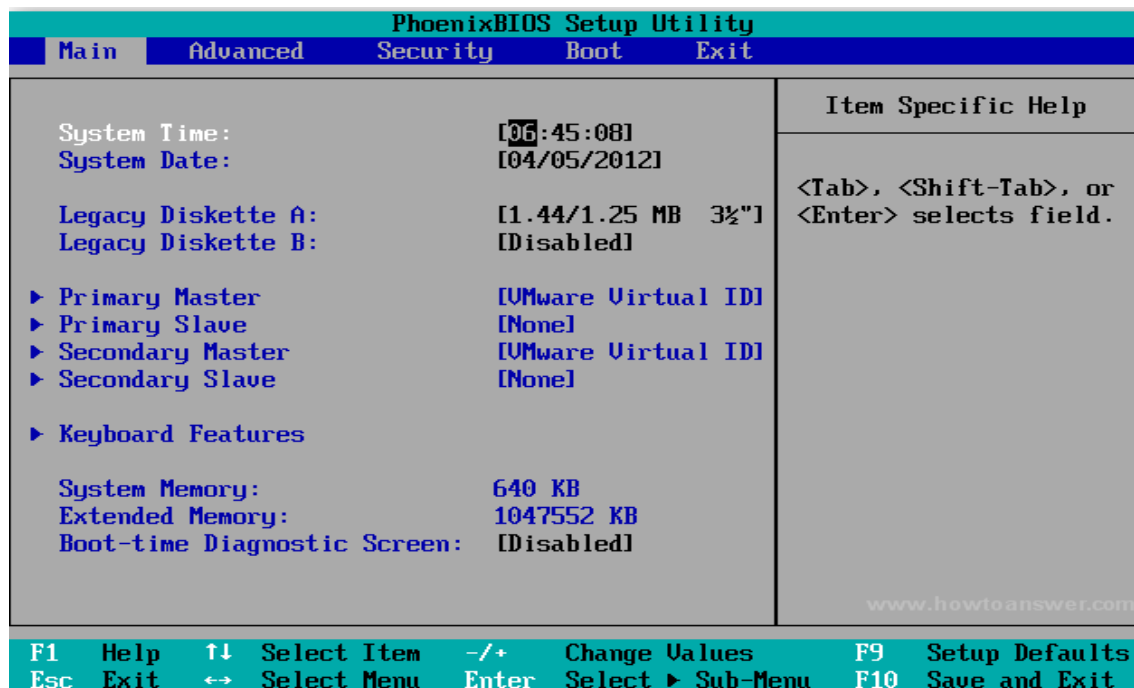

Figure 5.1: BIOS setup utility

BIOS identifies, configures, tests and connects computer hardware to the OS immediately after a computer is turned on.

The four main functionsof a BIOSare:

  I.   Power-on self-test (POST). This tests the hardware of the computer before loading the OS.

 II.   Bootstrap loader. This locates the OS.

III.   Software/drivers. This locates the software and drivers that are interfaced with the OS once it starts running.

IV.   Complementary metal-oxide-semiconductor (CMOS) setup. This is a configuration program that enables users to alter hardware and system settings. CMOS is the name of BIOS' non-volatile memory.

The process of configuring the BIOS:

It is easy to make changes to BIOS when required. The most common change people make in BIOS is to change the BOOT ORDER. While the computer is booting, the DEL key is pressed to enter BIOS

Popular BIOS manufacturers:

Some of the most popular BIOS vendors are:

- Phoenix Technologies
- IBM
- Dell
- Gateway
- BYOSOFT
- American Megatrends (AMI)
- Insyde Software

Viva Questions:

1. Describe the functionality of a BIOS.
2. What are the different types of BIOS?
3. Describe a Boot Manager.
4. Explain the four functions of a BIOS.
5. What is the procedure used to update a BIOS chip?

EXPT. No. -6.Study of a LinuxOperating System

Aim: To understand the working of a Linux operating system

Theory: Linux is a community of open-source Unix-like operating systems that are based on the Linux Kernel. It was initially released by Linus Torvalds on September 17, 1991. It is a free and open-source operating system and the source code can be modified and distributed to anyone commercially or noncommercially under the GNUGeneral Public License. Initially, Linux was created for personal computers and gradually it was used in other machines like servers, mainframe computers and supercomputers.

Linux Architecture:
The architecture of a Linux operating system contains:
The Kernel, System Library, Hardware layer, System and **Shell utility**.
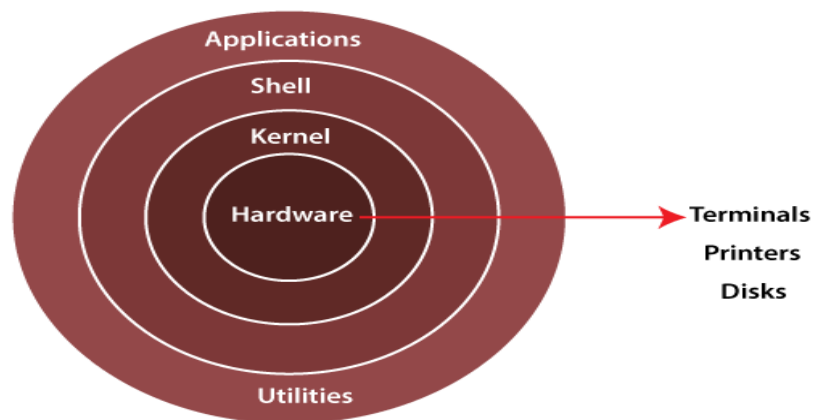

Figure 6.1: Architecture of Linux system

1. Kernel: The kernel is one of the core sections of an operating system. It is responsible for each of the major actions of the Linux OS. This operating system contains distinct types of modules and co-operates with the underlying hardware directly.
2.System Libraries: These libraries can be specified as some special functions. These are applied for implementing the operating system's functionality and don't need code access rights of the modules of the kernel.
3. System Utility Programs: It is responsible for doing specialized level and individual activities.
4. Hardware layer: Linux operating system contains a hardware layer that consists of several peripheral devices like CPU, HDD and RAM.
5. Shell: It is an interface between the kernel and the user. It can afford the services of the kernel. It can take commands through the user and run the functions of the kernel

Installation of Linux:
Choose a boot option:
Step - 1: Download a Linux OS.
Step - 2: Create a bootable CD/DVD or USB flash drive.

Step - 3: Boot that media on the destination system.

How to Install Linux from USB:

1. Insert a bootable Linux USB drive.
2. Click the start menu.
3. Then hold down the SHIFT key while clicking restart.
4. Then select 'Use a device'.
5. Find the device in the list.
6. The computer will now boot Linux.
7. Select Install Linux.
8. Go through the installation process.

Viva Questions:

1. Describe the features of aLinux operating system.
2. What are the different permissions available in Linux?
3. Explain any five commandsin Linux.
4. Explain the importance of a kernel in Linux.
5. Describe CLI and GUI.

EXPT. No. – 7.Study of Ubuntu Operating System

Aim: To understand the installation process of the Ubuntu Operating System

Theory: Ubuntu is an open-source operating system (OS) based on the Debian GNU/Linux distribution. Ubuntu incorporates all the features of a Unix OS with added customizable GUI. Ubuntu is primarily designed to be used on personal computers, although a server edition also exists.

Ubuntu consists of many software packages, which are licensed under GNU General Public License. This allows users to copy, change, develop and redistribute their version of the program. Ubuntu comes with a wide range of software programs, including Firefox and LibreOffice.

Following are the steps for installation of the Ubuntu operating system:

Step 1: Downloading Ubuntu into the flash drive
The user can burn the ubuntu**.**iso image into the old USB stick.

Step 2: Boot from DVD/flash drive
The booting process can start either by DVD or flash drive

Step 3: Preparations for installing Ubuntu.
Post the language selection and select the keyboard layout.

Step 4: Allocate drive space
There will be a couple of checkboxes to choose from.

Step 5: Begin installation

Step 6: Select location
Location of the deviceis detected automatically if a user is connected to the internet. Check, if the location is accurate. If so, click on forward to proceed.

Step 7: Login
The installer shall suggest a computer name, automatically and also the username.

Step 8: Background installation
The installer begins by mentioning a little bit about how awesome Ubuntu is, while it completes the installation process in the background.

Step 9: Installation complete
The distribution of Ubuntu has been installed and configured. A small window will appear and inform to restart the machine.

Viva Questions:

1. Explain the features of Ubuntu.

2. What is the role of a kernel in the Ubuntu operating system?

3. What is the purpose of sudo command in Ubuntu?

4. Describe the Bash and Shell.

5. Why Ubuntu is a open source OS?

EXPT. No. - 8. Study of different types of computer cables

Aim: **To understand about the different types of computer cables and their interconnection**

Theory:

A computer cable consists of one or more wires which are covered by an insulation that transmits power or data between devices or locations. There are two main types of computer cables, a data cable and a power cable. A data cable is one that provides communication between devices. For example: DVI, HDMI or VGA. A power cable is one that powers the device.

Types of cables are:

1. VGA cable
2. DVI cable
3. HDMI cable
4. PS/2 cable
5. Ethernet cable
6. 3.5mm Audio Cable

1. **VGA cable:** A video graphics array connector is a standard connector used for computer video output. VGA cable is also known as D-sub cable, analog video cable.
   Connect one end to: Computer monitor, television (PC input port).
   Connect the other end to: VGA port on the computer.

Figure 8.1: VGA Cable

2. **DVI Cable:** Digital Visual Interface (DVI) is a video display interface developed by the Digital Display Working Group (DDWG). The digital interface is used to connect a video source, such as a video display controller to a display device, such as a computer monitor. However, there are 2 types of DVI, DVI-I and DVI-D. DVI-D does not have the extra pins around the long pin, this is also a pure digital signal over DVI-I.
   Connect one end to: Computer monitor.
   Connect the other end to: DVI port on the computer.

Figure 8.2: DVI Cable and Port

3. **HDMI Cable:** HDMI stands for High Definition Multimedia Interface; HDMI is a connector and cable capable of transmitting high-quality and high-bandwidth streams of audio and video between devices.
   Connect one end to: Computer monitor, television.
   Connect the other end to: HDMI port on the computer.

Figure 8.3: HDMI Cable and Port

4. **PS/2 Cable:** The PS/2 (Personal System/2) port, also referred to as the mouse port or keyboard port was developed by IBM. It is used to connect a computer mouse or keyboard to an IBM-compatible computer.
   Connect one end to: PS/2 keyboard, PS/2 mouse.
   Connect the other end to: PS/2 ports on the computer
   - Purple PS/2 port: keyboard
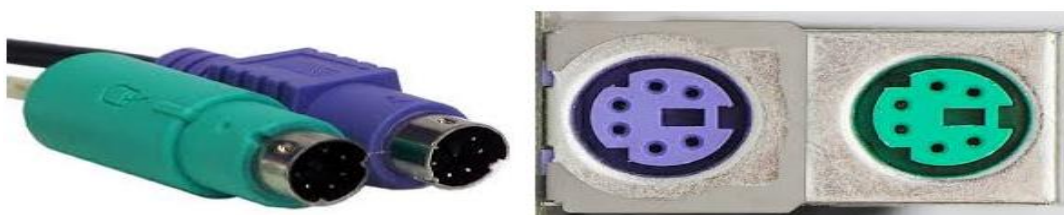   - Green PS/2 port: mouse

Figure 8.4: PS/2 Cable and Port

5. **Ethernet Cable:** Ethernet cable is also known as RJ-45 cable. An Ethernet cable is a common type of network cable used with wired networks. Ethernet cables connect devices such as PCs, routers and switches within a local area network.

Connect one end to: Router, network switch.

Connect the other end to: Ethernet port on the computer.

Figure 8.5: Ethernet Cable and Port

6. **3.5mm audio cable:** A 3.5mm aux cable is a standard cable used for stereo input and output. It can be used with a compatible jack or auxiliary input to link an audio source to a vehicle's stereo system. This cable can be used with cell phones, portable MP3 players, portable navigation devices, remote mount DVD players or other electronic devices.

Connect one end to: Computer speakers, 3.5mm headphones, 3.5mm microphone.

Connect the other end to: Audio ports on the computer.

Green audio port: Computer speakers or headphones

Pink audio port: Microphone

Blue audio port: MP3 player, CD player, DVD player, turntable or electric guitar.

Figure 8.6: Audio Cable

Viva Questions:
1. Explain the different types of internet cables used.
2. Explain the importance of a VGA cable.
3. Describe the use of a HDMI cable.
4. What is the use of a PS/2 cable?
5. What is the use of a DVI-D cable?

EXPT. No. - 9: Study of hardware and software troubleshooting

Aim: **To understand the troubleshooting process in a computer system**

Theory:
Troubleshooting is a form of problem-solving, often applied to repair failed products or processes on a machine or a system. It is a logical, systematic search for the source of a problem to solve it and make the product or process operational again. Troubleshooting is needed to identify the symptoms.

To run a troubleshooter:
1. Select Start > Settings > Update & Security > Troubleshoot, or select the Find troubleshooters shortcut.
2. Select the type of troubleshooting, then run the troubleshooter.
3. Allow the troubleshooter to run and then answer the questions that appear on the screen.

1. Hardware troubleshooting
Troubleshoot:-
1. If a user hits the power button & nothing happens, then:
  • The user needs to check all power connections.
  • The user needs to check for power on the motherboard.
2. If the system turns on but does not beep or begin to boot up
  • Remove all components except motherboard as well as CPUand check once again by switching ON thepower.

Computer error beep codes:
  • **No beep**: Short, no power, bad CPU/ MD, loose peripherals.
  • **One beep**: Everything is normal &Computer Power On Self Test is OK.
  • **Two beeps**: Power On Self Test (POST) / CMOS error.
  • **One long beep one short beep**: Motherboard problem.
  • **One long beep two short beep**s: Video problem.
  • **One long beep three short beeps**: Video problem.
  • **Three long beeps**: Keyboard error.
  • **Repeated long beep**: Memory error.

2. Software troubleshooting
Software troubleshooting is the process of scanning, identifying, diagnosing and resolving problems, errors and bugs in the software.
It is a systematic process that aims to filter out and resolve problems and restore the software to normal operation condition. It is a subcategory of IT troubleshooting.

Some important points for troubleshooting software:
1) Free up RAM by closing other open programs.
2) Restart the software.

3) Shut down and restart the computer.
4) Undo any recent hardware or software changes.
5) Use the Internet to find help.
6) Uninstall the software and then reinstall it.
7) Scan for viruses and malware.
8) Check for a firewall conflict.
9) Boot up in Safe Mode.
10) Defragment the hard drive.

Viva Questions:
1. What is the procedure to troubleshoot keyboard related issues?
2. What do you mean by troubleshooting?
3. What is the process to configure system restore?
4. Explain the process to run a troubleshooter.
5. What is the process to defragment a hard drive?

EXPT. No. - 10. Study of different types of internet threats

Aim: To understand the concept of Internet threats

Theory: Internet threats spread over a network. These can generally refer to worms or viruses that spread over the network. Internet threats compromise the security of systems that are connected over a network, these can be servers or any computers or mobile devices. The devices need not be in the same network as the hacker to get affected by network threats. A threat can be spread via an email, link or any phishing site.

Internet threats are using the world wide webto initiate cybercrimes. It is also known as web threats. There are different techniques to steal internet user data and make use of them to do malicious activities like hacking accounts, hack the PC and asking for ransom.
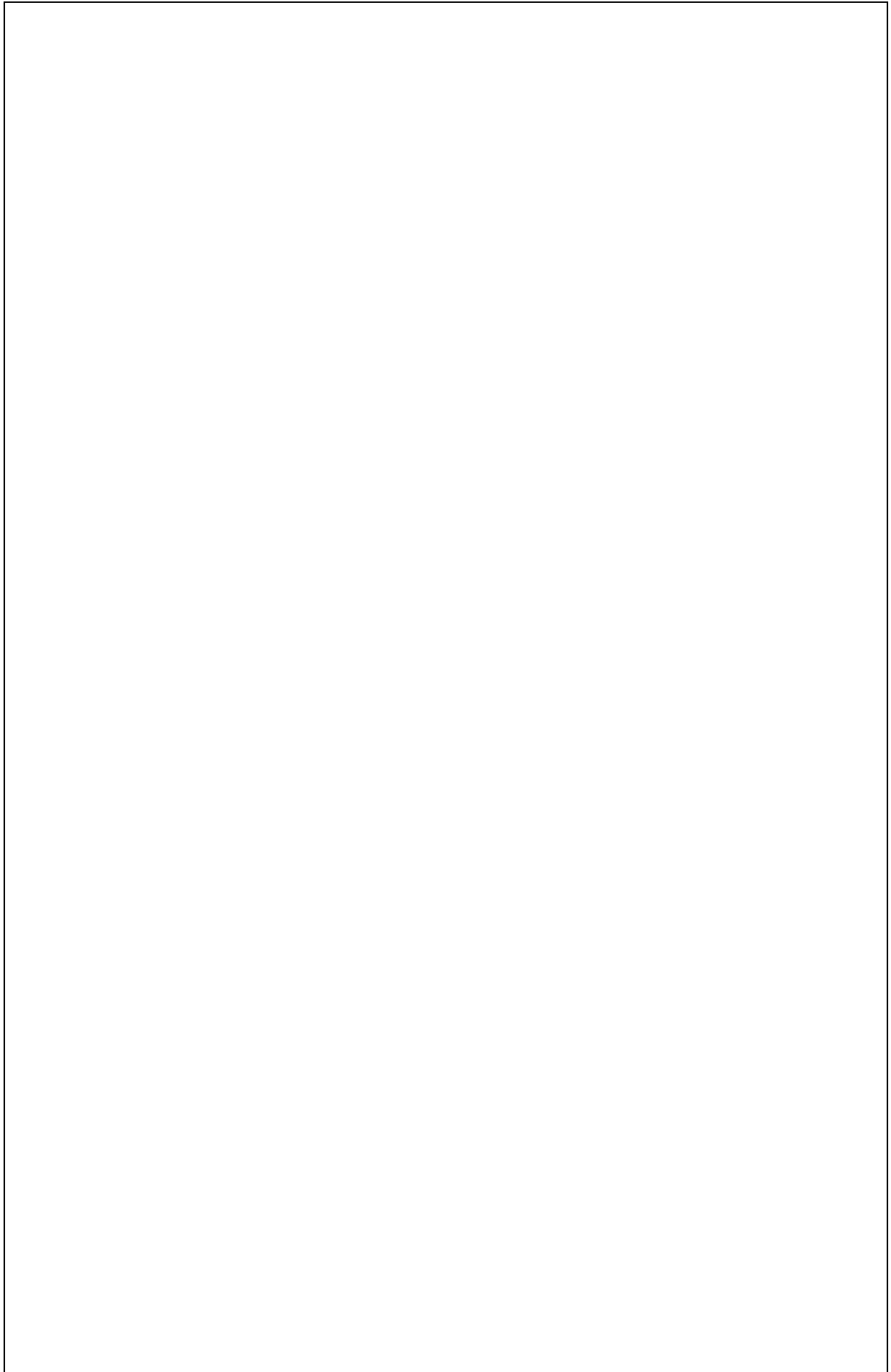
Types of internet threats:
1. Virus
2. Network worm
3. Trojan
4. Spyware/Adware

1) **Virus: -** A virus is much like a flu virus, that is designed to spread from host to host and can replicate itself. Similarly, in the same way, flu viruses cannot reproduce without a host cell, computer viruses cannot reproduce and spread without programming such as a file or document. A virus attack can produce a variety of symptoms. Some of them are:

2) **Network worm:** Network worms are similar to viruses as they replicate functional copies of themselves and can cause the same type of damage. In contrast to viruses, which require the spreading of an infected host file, worm is a standalone software and does not require a host program or human help to propagate. To spread worms the vulnerability on the target system has to be exploited or some kind of social engineering trick has to be used to make the userto execute them.

3) **Trojan:** A Trojan horse or Trojan is a type of malware that is often disguised as a legitimate software. Trojans can be employed by cyberthieves and hackers trying to gain access to the users' system. Users are typically tricked by some form of social engineering into loading and executing Trojans on their systems. Once activated, Trojans can enable cyber-criminals to spy on the user, steal user's sensitive data and gain backdoor access to the user's system.

4) **Spyware/Adware:**Spyware is unwanted software that infiltrates the user computing devices, stealing user internet usage data and sensitive information. Spyware is classified as a type of malware (malicious software) designed to gain access to or damage the user's computer, often without the knowledge of the user. Spyware gathers user's personal information and relays it to advertisers, data firms or external users.

Adware: Adware, or advertising-supported software, is a software that displays unwanted advertisements on the user's computer. Adware programs will tend to serve the user's pop-up ads, can change user browser's homepage, add spyware and just bombard the user device with advertisements. Adware is a more succinct name for potentially unwanted programs.

Viva Questions:
1. Describe about the boot sectorvirus.
2. Explain about the different types of computer viruses.
3. Explain any two types of worms in detail.
4. What do you mean by a DDoS attack?
5. How does the trojan horse virus infect a computer?