COMPUTER WORKSHOP

LABORATORY MANUAL

DEPARTMENT OF

COMPUTER SCIENCE AND ENGINEERING

RAJA JAIT SINGH GOVERNMENT POLYTECHNIC,

NEEMKA

S.No.	Experimemts List
1	Study of peripherals of a computer and its functions.
2	Assembling and disassembling of PC
3	Installation of Operating Systems – Windows
4	Installation of Operating Systems –LINUX
5	Hardware Troubleshooting
6	Software Troubleshooting
7	Configuring Firewalls and installation of Antivirus software
8	Providing Internet connectivity

Preparation for the laboratory session

General Instructions to Students

1. Read carefully and understand the description of the experiment in the lab manual. Consult the appropriate references to be completely familiar with the concepts and hardware.
2. Make sure that your observation for previous week experiment is evaluated by the faculty member before entering to the lab/workshop.
3. At the beginning of the class, if the faculty or the instructor finds that a student is not adequately prepared, they will be marked as absent and not be allowed to perform the experiment.
4. Bring necessary material needed to perform the required preliminary analysis.
5. Read the lab manual before coming to the laboratory, unannounced questions may be asked at any time during the lab.
6. Carelessness in personal conduct or in handling equipment may result in serious injury to the individual or the equipment. Always be on the alert for strange sounds.
7. Students must follow the proper dress code inside the laboratory.
8. Maintain silence, order and discipline inside the lab. Don't use cell phones inside the laboratory.

After the laboratory session

1. Clean up your work area.
2. Check with the technician before you leave.
3. Make sure you understand what kind of report is to be prepared and due submission of record is next lab class.
4. Do some preliminary work to verify that the experiment was successful.

Make-ups and late work

Students must participate in all laboratory exercises as scheduled. They must obtain permission from the faculty member for absence, which would be granted only under justifiable circumstances. In such an event, a student must make arrangements for a make-up laboratory, which will be scheduled when the time is available after completing one cycle.

Late submission will be awarded less mark for record and internals and zero in worst cases.

COURSE OBJECTIVE:

The objectives of this course is to make the students to

1. Understand the basic computer hardware and system requirements. •
2. Make them to install Operating system and operate basic software utilities.
3. Familiar with the use of websites and access search engines to find information and troubleshoot basic computer problems.
4. Realize the importance of basic technologies related to an office environment.

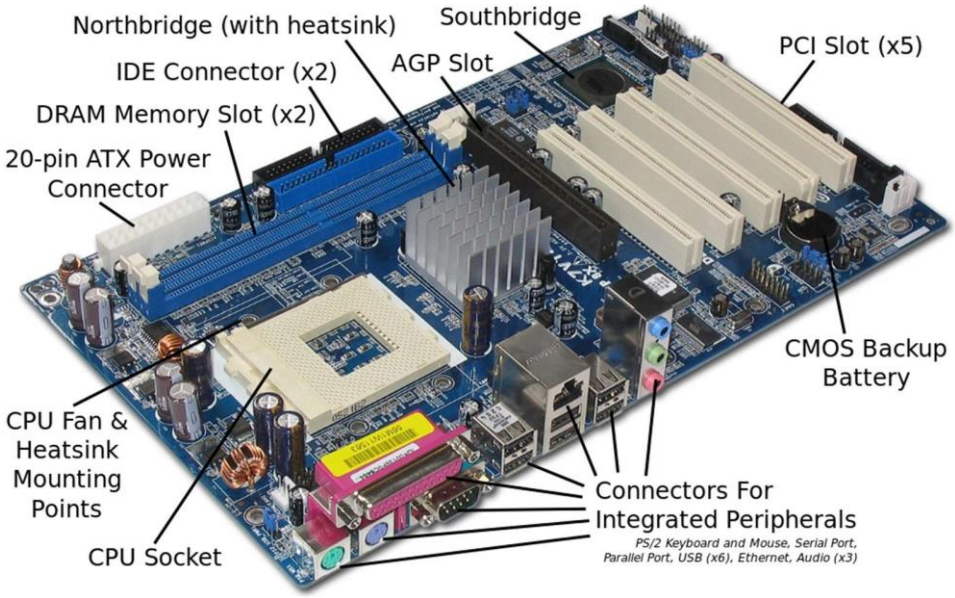
COURSE DESCRIPTION

The main objective of this course is to provide an overview of the basic functions of personal computers and instructs students in how to use them. It is designed for persons who have little or no experience with computers. Its purpose is to make students comfortable with personal computers and to provide the basic knowledge and skills needed to perform the major computer functions without assistance. These skills will be applied to the basics of applications, email and the internet.

Ex.No 1:Study of peripherals of a computer and its functions.

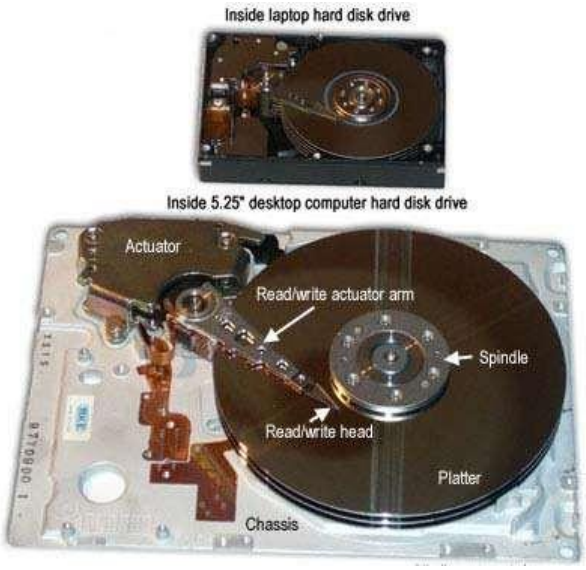
Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor

AIM: To identify the peripherals of a computer.



Hard drive

Alternatively referred to as a **hard disk drive** and abbreviated as **HD** or **HDD**, the **hard drive** is the computer's main storage media device that permanently stores all data on the computer. The hard drive consists of one or more hard drive platters inside of an air sealed casing. Most computer hard drives are in an internal drive bay at the front of the computer and connect to the motherboard using either an ATA, SCSI, or SATA cable and power cable. Below is a picture of what the inside of a hard drive looks like for a desktop and laptop hard drive.



As can be seen in the picture, the desktop hard drive consists of the following components:

- the head actuator,

- read/write actuator arm,
- disk read/write head,
- spindle,
- platter.

On the back of a hard drive is a circuit board called the controller.

How is data read and stored on a hard drive?

Data sent to and from the hard drive is interpreted by the disk controller, which tells the hard drive what to do and how to move the components within the drive. When the operating system needs to read or write information, it examines the hard drive's File Allocation Table (FAT) to determine file location and available areas. Once this has been determined, the disk controller instructs the actuator to move the read/write arm and align the read/write head. Because files are often scattered throughout the platter, the head needs to move to different locations to access all information.

All information stored on a traditional hard drive, like the above example, is done magnetically. After completing the above steps, if the computer needs to read information from the hard drive, it would read the magnetic polarities on the platter. One side of the magnetic polarity is 0 and the other is 1. Reading this as binary data, the computer can understand what the data is on the platter. For the computer to write information to the platter, the read/write head aligns the magnetic polarities, writing 0's and 1's that can be read later.

External and Internal hard drives

Although most hard drives are internal hard drives, many users also use external hard drives to backup data on their computer and expand the total amount of space available to them. External drives are often stored in an enclosure that helps protect the drive and allow it to interface with the computer, usually over USB or eSATA.

ROM

Short for **Read-Only Memory**, **ROM** is a storage medium that is used with computers and other electronic devices. As the name indicates, data stored in ROM may only be read. It is either modified with extreme difficulty or not at all. ROM is mostly used for firmware updates. A simple example of ROM is the cartridge used with video game consoles, which allows one system to run multiple games. Another

example of ROM is EEPROM, which is a programmable ROM used for the computer BIOS, as shown in the picture below. Unlike Random Access Memory (RAM), ROM is non-volatile, which means it keeps its contents regardless of whether or not it has power.

RAM

Alternatively referred to as main memory, primary memory, or system memory, Random Access Memory (RAM) is a computer storage location that allows information to be stored and accessed quickly from random locations within DRAM on a memory module. Because information is accessed randomly instead of sequentially like a CD or hard drive the computer can access the data much faster than it would if it was only reading the hard drive. However, unlike ROM and the hard drive RAM is a volatile memory and requires power in order to keep the data accessible, if power is lost all data contained in memory lost.

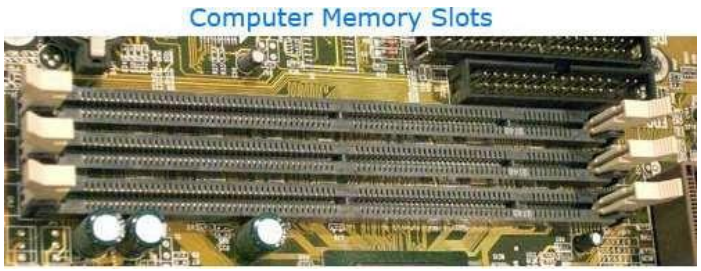
As the computer loads parts of the operating system and drivers are loaded into memory, which allows the CPU to process the instructions much faster and your computer to load faster. After the operating system has loaded, each program you open such as the browser you're using to view this page is loaded into memory while it is running. If too many programs are open the computer will swap the data in the memory between the RAM and the hard disk drive.

Flash memory

Alternatively referred to as flash storage, flash memory is a non-volatile computer memory. This type of memory is an integrated circuit that does not need continuous power to retain the data, but is a bit more expensive than magnetic storage. Today, flash memory is becoming more popular, and solid-state drives are a practical replacement for large hard drives if you have the extra money.

Flash memory is widely used with car radios, cell phones, digital cameras, PDAs, solid-state drives, and printers. The picture is an example of a MicroSD flash memory card.

Memory slot



A **memory slot**, **memory socket**, or **RAM slot** is what allows computer memory (RAM) to be inserted into the computer. Depending on the motherboard, there may be 2 to 4 **memory slots** (sometimes more on high-end motherboards) and are what determine the type of RAM used with the computer. The most common types of RAM are SDRAM and DDR for desktop computers and SODIMM for laptop computers, each having various types and speeds. In the picture below, is an example of what memory slots may look like inside a desktop computer. In this picture, there are three open available slots for three memory sticks.

CPU

Alternatively referred to as the **brain of the computer**, **processor**, **central processor**, or **microprocessor**, the **CPU** (pronounced as C-P-U) is short for **Central Processing Unit**. The computer CPU is responsible for handling all instructions it receives from hardware and software running on the computer. In the picture below, is an example of what the top and bottom of an Intel Pentium processor looks like. The processor is placed and secured into a compatible CPU socket found on the motherboard, and because of the heat it produces it is covered with a heat sink to help keep it cool and running smoothly.

As can be seen by the picture, the CPU chip is usually in the shape of a square or rectangle and has one notched corner to help place the chip into the computer properly. On the bottom of the chip are hundreds of connector pins that plug into each of the corresponding holes on the socket. Today, most CPU's resemble the picture shown above; however, **Intel** and **AMD** have also experimented with slot processors that were much larger and slid into a slot on the motherboard. Also, over the years there have been dozens of different types of sockets on motherboards, each socket only supports so many different processors, and each has its own pin layout.

In the CPU, the primary components are the ALU (Arithmetic Logic Unit) that performs mathematical, logical, and decision operations and the CU (Control Unit) that directs all of the processors operations. Over the history of computer processors, the speed (clock speed) and capabilities of the processor have dramatically improved.

Heat sink

A **heat sink** is an electronic device that incorporates either a fan or a peltier device to keep a hot component such as a processor cool. There are two heat sink types: **active** and **passive**.

Passive heat sinks are 100% reliable, as they have no mechanical components. Passive heat sinks are made of an aluminum-finned radiator that dissipates heat through convection. For Passive heat sinks to work to their full capacity, it is recommended that there is a steady air flow moving across the fins.

PowerSupply

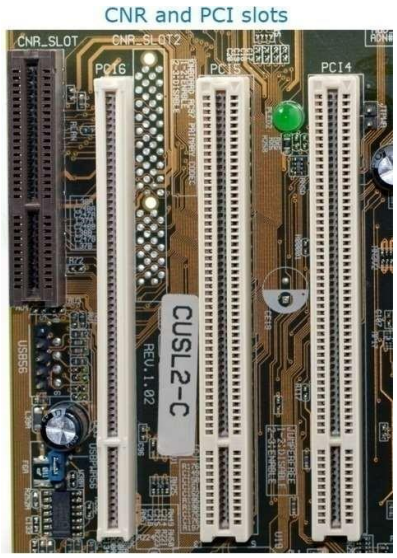
Short for **Power Supply** and sometimes abbreviated as **PSU**, which is short for **Power Supply Unit**. The **PS** is an internal hardware component used to supply the components in a computer with power by converting potentially lethal 110-115 or 220-230 volt alternating current (AC) into a steady low-voltage direct current (DC) usable by the computer.

Caution: Do not open the power supply, it contains capacitors that are capable of holding hold electricity even if the computer is off and unplugged for a week, if not longer.

On the back end of the power supply as shown in the above picture is where you connect the power cord to the computer. In addition to the power cord connection the back also has a fan opening to draw air out of the power supply, a small red switch to change the power supply voltage, and the rocker switch to turn the power supply on and off.

On the front-end, which is not visible unless the computer is opened is several dozen other cables that connect the power supply to each of the devices and the computer motherboard.

PCI



Short for **Peripheral Component Interconnect, PCI** is an expansion to the ISA bus. The PCI bus is a 32-bit (133MBps) computer bus that is also available as a 64-bit bus and was the most commonly found and used computer bus in computers. In the picture, there are three PCI slots, PCI4, PCI5, and PCI6.

Today's computers and motherboards have replaced PCI with PCI Express (PCIe) slots.

Examples of PCI devices

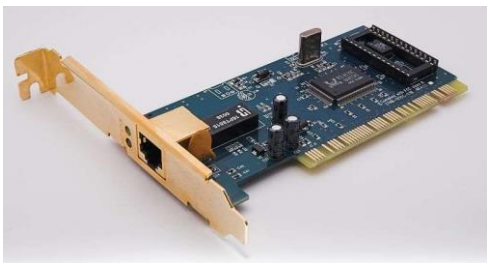
- Modem
- Network card
- Sound card
- Video card

AGP

Short for Accelerated Graphics Port, AGP is an advanced port designed for Video cards and 3D accelerators. Designed by Intel and introduced in August of 1997, AGP introduces a dedicated point-to-point channel that allows the graphics controller direct access the system memory. Below is an illustration of what the AGP slot may look like on your motherboard.

Each computer with AGP support will either have one AGP slot or on-board AGP video. If you needed more than one video card in the computer, you can have one AGP video card and one PCI video card or use a motherboard that supports SLI.

NOTE: Not all operating systems support AGP because of limited or no driver support. For example, Windows 95 did not incorporate AGP support. Today, AGP is being replaced by PCI Express.



NIC

Short for Network Interface Card, the NIC is also referred to as an Ethernet card and network adapter. It is an expansion card that enables

a computer to connect to a network; such as a home network, or the Internet using an Ethernet cable with an RJ-45 connector.

Due to the popularity and low cost of the Ethernet standard, most new computers have a network interface build directly into the motherboard. The top image shows 10/100 PCI network card, one of the more common examples.

The bottom picture shows a PC Card, more specifically the SMC EZ Card 10/100 wireless network card; found in laptop computers that do not have onboard wireless capabilities.

Wireless PCMCIA Network Card

A network card can communicate with each other over the same network using a network switch or if only two computers a direct connection. If computers on your network need to connect to a different network (e.g. the Internet) they must be eventually connected to a router that allows networks to communicate with each other.

SATA

Short for SerialATA, SATA 1.0 was first released in August 2001 and is a replacement for the Parallel ATA interface used in IBM compatible computers. SerialATA is capable of delivering 1.5Gbps (150MBps) of performance to each drive within a disk array, offers backwards compatibility for existing ATA and ATAPI devices, and offers a thin, small cable solution This cable helps make a much easier cable routing and offers better airflow in the computer when compared to the earlier ribbon cables used with ATA drives.

SATA Power Cable

SATA Data Cable

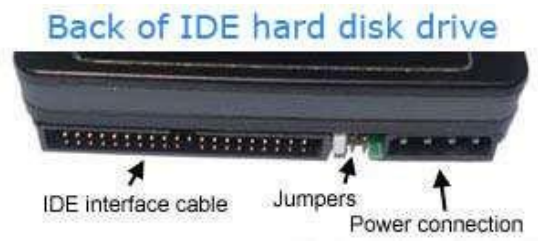
SATA MB Connection

In addition to being an internal solution, SATA also supports external drives through **External SATA** more commonly known as**eSATA**. eSATA offers many more advantages when compared to other solutions. For example, it is hot-swappable, supports faster transfer speeds and no bottleneck issues when compared with other popular external solutions such as USB and Firewire, and supports disk drive technologies such as S.M.A.R.T..
Unfortunately, however, eSATA does have some disadvantages such as not distributing power
through the cable like USB, which means drives will require an external power source and it only supports a maximum cable lengths of up to 2m.

CMOS

Alternatively referred to as a Real-Time Clock (RTC), Non-Volatile RAM (NVRAM) or CMOS RAM, CMOS is short for Complementary Metal-Oxide Semiconductor. CMOS is an on-board semiconductor chip powered by a CMOS battery inside computers that stores information such as the system time and date and the system hardware settings for your computer. The picture shows an example of the most common CMOS coin cell battery used in a computer to power the CMOS memory.

IDE



Short for **Integrated Drive Electronics** or **IBM Disc Electronics**, **IDE** is more commonly known as **ATA** or **Parallel ATA** (**PATA**) and is a standard interface for IBM compatible hard drives. IDE is different from the Small Computer Systems Interface (SCSI) and Enhanced Small Device Interface (ESDI) because its controllers are on each drive, meaning the drive can connect directly to the motherboard or controller. IDE and its updated successor, Enhanced IDE (EIDE), are the most common drive interfaces found in IBM compatible computers today. Above, is a picture of the IDE connector on the back of a hard drive, a picture of what an IDE cable looks like, and the IDE channels it connects to on the motherboard.

Sound card

Alternatively referred to as an audio output device, sound board, or audio card. A sound card is an expansion card or IC for producing sound on a computer that can be heard through speakers or headphones. Although the computer does not need a sound device to function, they are included on every machine in one form or another, either in an expansion slot or built into the motherboard (onboard).

Sound card connections

The picture is an example of a sound card audio ports or audio jacks on the back of your computer, associated colors, and the connector symbols.

- Digital Out (White or Yellow; words: "Digital" or "Digital Out") - Used with surround sound or loudspeakers.
- Sound in or line in (Blue; Arrow pointing into waves) - Connection for external audio sources, e.g. tape recorder, record player, or CD player.
- Microphone or Mic (Pink; Microphone) - The connection for a microphone or headphones.
- Sound out or line out (Green; Arrow pointing out of waves) - The primary sound connection for your speakers or headphones. This sound card also has a second (black) and third (orange) sound out connector.
- Firewire (Not pictured) - Used with some high-quality sound cards for digital video cameras and other devices.
- MIDI or joystick (15 pin yellow connector) - Used with earlier sound cards to connect MIDI keyboard or joystick.

Uses of a computer sound card

- Games
- Audio CDs and listening to music
- Watch movies
- Audio conferencing
- Creating and playing Midi
- Educational software
- Business presentations
- Record dictations
- Voice recognition

Parallel port

Parallel Port (DB25)

Less commonly referred to as the **Centronics interface** or **Centronics connector**after the company that originally designed it, the port was later developed by Epson. The **parallel port** is found on the back of IBM compatible computers and is a 25-pin (type **DB-25)** computer interface commonly used to connect printers to the computer. Below is an example of the DB25 interface found on the back of the computer.

Serial port

An Asynchronous port on the computer used to connect a serial device to the computer and capable of transmitting one bit at a time. Serial ports are typically identified on IBM compatible computers as COM (communications) ports. For example, a mouse might be connected to COM1 and a modem to COM2. With the introduction of USB, FireWire, and other faster solutions serial ports are rarely used when compared to how often they've been used in the past. The picture shows the DB9 serial port on the back of a computer.

USB

Short for Universal Serial Bus, USB (pronounced yoo-es-bee) is a plug-and-play interface that allows a computer to communicate with peripheral and other devices. USB-connected devices cover a broad range; anything from keyboards and mice, to music players and flash drives. For more information on these devices, see our USB devices section.

USB may also be used to send power to certain devices, such as smartphones and tablets, as well as charge their batteries.

USB transfer speeds

USB 1.x is an external bus standard that supports data transfer rates of 12 Mbps and is capable of supporting up to 127 peripheral devices. The picture shows an example of a USB cable being connected into the USB port.

USB 2.0, also known as hi-speed USB, was developed by Compaq, Hewlett Packard, Intel, Lucent, Microsoft, NEC and Phillips and was introduced in 2001. Hi-speed USB is capable of supporting a transfer rate of up to 480 megabits per second (Mbps), or 60 megabytes per second (MBps). Hi-speed USB is backward compatible, meaning it is capable of supporting USB 1.0 and 1.1 devices and cables.

USB 3.0, also known as SuperSpeed USB, was first made available in November 2009by Buffalo Technology, but the first certified devices weren't available until January 2010. USB

3.0 improved upon the USB 2.0 technology with speed and performance increases, improved power management and increased bandwidth capability. It provides two unidirectional data paths for receiving and sending data at the same time. USB 3.0 supports transfer rates up to 5.0 gigabits per second (Gbps), or 640 megabytes per second (MBps). Following the release of USB 3.1, it has been officially renamed to "USB 3.1 Gen1" for marketing purposes. The first certified devices included motherboards from ASUS and Gigabyte Technology. Dell began including USB 3.0 ports in their Inspiron and Dell XPS series of computers in April 2011.

USB 3.1, also known as SuperSpeed+, was made available as of July 31, 2013 and is the latest version of the USB protocol. USB 3.1 is capable of transfer rates of up to 10 Gbps, putting it in line with the first generation of Apple's Thunderbolt channel. Today, many devices use the USB 3.0 and 3.1 revisions for improved performance and speed.

USB Type-C was developed around the same time as USB 3.1 and is a reversible-plug, 24-pin, double-sided connector for use with USB devices.

Viva Questions:

1) Differentiate the following: Dual Core, Core 2Duo, i3, i5, i7
2) Differentiate between DDR2, DDR3, DDR4
3) What is meant by Firmwire?
4) What is meant by hot swappable
5) Compare HDD vs SDD.
6) Compare FAT, FAT32 with NTFS.
7) Write the memory storage specification from smallest unit
8) Write down any 15 Keyboard Shortcut keys with description.

EX. NO 2: ASSEMBLING AND DISASSEMBLING OF PC

Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

AIM: To assemble and disassemble the system

Why should one learn about hardware?

1. Troubleshoot you and save time.
2. Knowing about system internals and components.
3. Very easy installation for modern hardware.
4. Install extra memory.
5. Removing components.

Safety Precautions:

1. Beware of electrostatic discharge (ESO)
2. Build computer on a hard surface, away from concepts.
3. Wear shoes and the short sleeved cotton wear.
4. Use Phillips, head screw driver.
5. Keep the components away from moisture.
6. Avoid using pressure while installing.

Steps for Assembling

1. Setting the cabinet ready.
2. Preparing to fit the components.
3. Fitting the mother board.
4. Fitting the RAM, processor and cooler.
5. Installing PCI cards.
6. Fitting the hard disk and floppy drive.
7. Installing the CD ROM drives.
8. Connecting the ribbon cables.
9. Powering the drives and mother board.
10. Connecting the cables for the case front panel.
11. Final check.

Getting the Cabinet ready:

1. Check how to open the cabinet and determine where to fix the components.
2. Determine if the case has the appropriate risers installed.

Preparing to fit the Components:

1. Network adapter drive.

2. Cables.
3. Hard disk.
4. CD-ROM Drive.
5. RAM
6. CPU
7. Heat sink / cooler / fan.
8. Mother board.

Fitting the Mother board.

1. Line up the patch on the motherboard (ps/l, USB, etc) with the appropriate holes in the block panel I/O shield of the case.
2. Check the points where you and to install
3. Install them and make the mother board sit on them and fix screws if required.

Mother board parts:

1. ACR slot.
2. PCI Slot.
3. AGP Slot.
4. ATX Connectors.
5. CPU Fan.
6. Chipset North Bridge.
7. CPU socket.
8. System memory.
9. Chipset south bridge.
10. Panel connector.
11. Power supply.
12. IDE connectors.

ATX Connectors:

1. PS, Mouse.
2. Key board.
3. USB.
4. Parallel (Prints)
5. Serial COM1.
6. Serial COM 2.
7. Joystick.
8. Sound.

Fitting the processor:

1. Raise the small lever at the side of the socket.
2. Notice that there is a pin missing at one corner, determine the direction to fit in the processor.
3. You should not force the CPU. When inserting it. All pins should slide smoothly into the socket.
4. Lock the lever back down.
5. Install the heat sink over it (Different type for each processor). Heat sink / CPU fan.

Fitting the RAM:

1. The RAM must be suitable for motherboard.
2. There are currently 3 types of RAM available.
    a) SD RAM.
    b) DDR SD RAM.
    c) RD RAM.
3. The mother board's chipset determines which type of RAM may be used.

Installing the PCI Cards:

1. Most of the cards are inbuilt these days.
2. NIL, Sound Cards etc. are fitted into PCI slots.

Fitting the hard disk and Floppy disk:

1. Place the floppy and hard disks in their slots.
2. Leave some space above HDD to prevent heat building.
3. Check the jumper configuration.
4. Fix the screws.

Installing the CD-ROM Drives:

1. CD-ROM drive is similar to installing a hard disk.
2. 1ST check that the jumper configuration is correct.
3. Fix the screw.

Connecting the Cables:-

1. Attach the long end of the cable to the IDEU connector on the motherboard first.
2. The red stripe on the IDE cable should be facing the CD Power.

Powering the driver and motherboard:

Connecting the cables for the case front pane

1. SD, SPK or SPEAK: The loud speakers o/p. it has 4 pins.
2. RS, RE, RS or RESET: Connect the two pin Reset cable here.
3. PWR, PW, PWSW, PS or power SW: Power switch, the pc's on (switch, the plug is two pin).
4. PWLED, PWRLED or Power LED: The light emitting diode on the front panel

of the case illuminates when the computer is switched on. It's a 2-pin cable.

5. HD, HDD, and LED: These two pins connect to the cable for the hard disk activity LED.

Final Check:-

1. Mother board jumper configurations are the settings for the processor operator.
2. Drive jumper settings, master/ slave correct?
3. Are the processor, RAM modules and plug in cards finally seated in there sockets?
4. Did you plug all the cables in? Do they all fit really?
5. Have you frightened all the screws in plug- in cards or fitted the clips?
6. Are the drive secure?
7. Have u connected the power cables to all driver?

Powering up for the first time:

1. Ensure that no wires are touching the CPU heat sink fan.
2. Plug your monitor, mouse and keyboard.
3. Plug in power card and switch the power supply.
4. If everything is connected as it should be
    - All system, fans should start spinning.
    - U should hear a single beep and after about 5-10 sec.
    - Amber light on monitor should go green.
    - You will see computer start to boot with a memory check.
    - Now check front LED'S to see if u plugged them in correctly.
    - Check all other buttons.
    - Power afford change any wrong settings.

Viva Questions:

1) Define assembling of a system?
2) Explain the steps involved in the installation of the mother board>
3) What is the use of pin 1 indicated on the processor?
4) What is the use of locking level at the processor slot?
5) Define a port?

EX. NO 3: Installation of Operating Systems – Windows

Every student should individually install MS windows OS on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

INSTALLATION OF WINDOWS OS:

AIM: To install Windows 7 Operating System

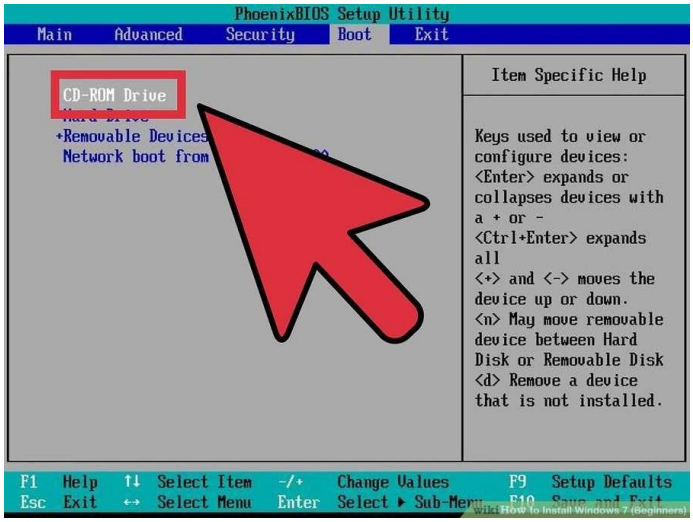
BASIC FILE SYSTEMS:

- FAT: File Allocation Table.
- NTFS: New Technology File System. Format and create using NTFS partition

BASIC STEPS IN INSTALLATION:-

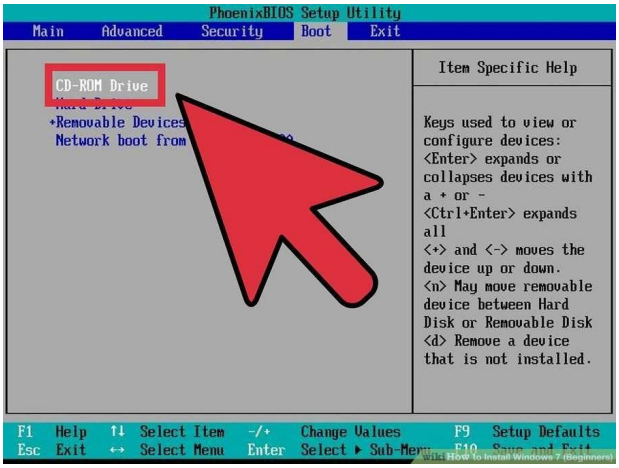
A clean install is intended for users who want to freshly install Windows on their computer (by deleting all of the data on the hard disk and then installing Windows) or computers that do not have an operating system yet.

1. **Enter your computer's BIOS.** Turn off the computer that you want to install Windows on then turn it back on. When the BIOS screen appears or you are prompted to do so, press Del, Esc, F2, F10, or F9 (depending on your computer's motherboard) to enter the system BIOS. The key to enter the BIOS is usually shown on the screen.



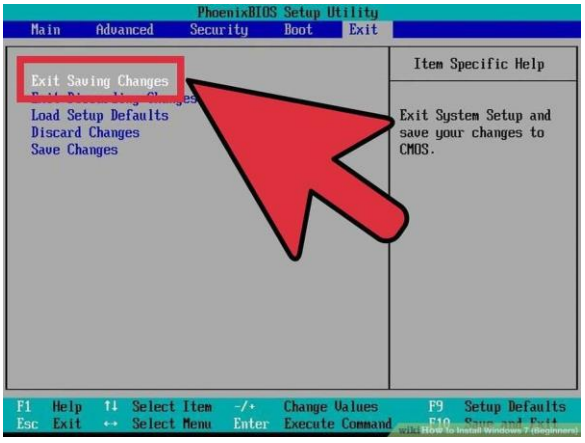
2. **Find your BIOS's boot options menu.** The boot options menu of your BIOS may vary in location or name from the illustration, but you may eventually find it if you search around.

   If you can't find the boot options menu, search the name of your BIOS (most likely located in the BIOS menu) online for help.

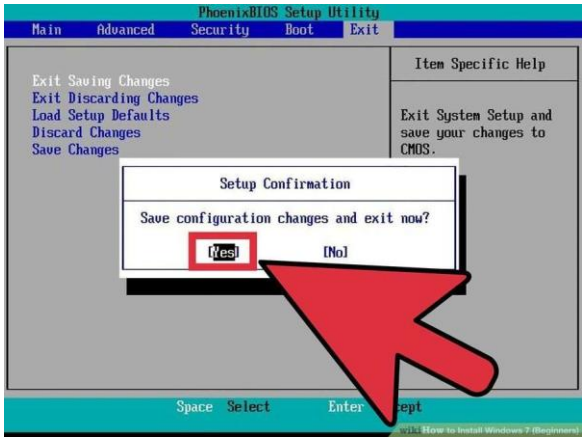


3 Select the CD-ROM drive as the first boot device of your computer.

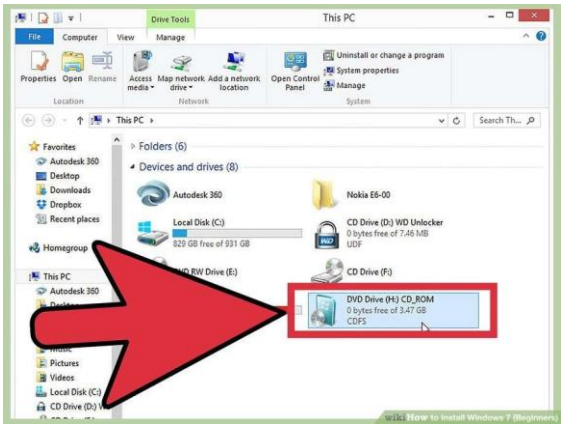
Although this method may vary among computers, the boot options menu is typically a menu of movable device names where you should set your CD-ROM drive as the first boot device. It can also be a list of devices that you can set the order of their boot on. Consult a manual or the internet for help if you're stuck.



4 Save the changes of the settings. Press the button indicated on the screen or select the save option from the BIOS menu to save your configuration.



5. Shut off your computer. Either turn off the computer by choosing the shut-down option in your current operating system, or hold the power button until the computer powers off.

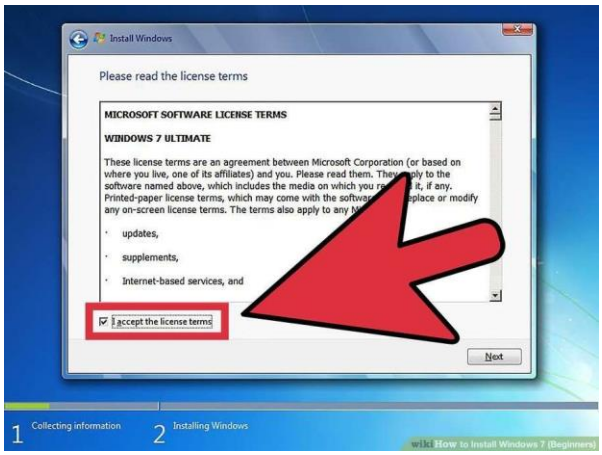


6. **Power on the PC and the insert the Windows 7 disc into your CD/DVD drive.**
7. **Start your computer from the disc.** After you have placed the disc into the disc drive, start your computer. When the computer starts, press a key if you are asked if you would like to boot from the disc by pressing any key. After you choose to start from the disc, Windows Setup will begin loading.
    - If you are not asked to boot from the disc, you may have done something wrong. Retry the previous steps to solve the problem.

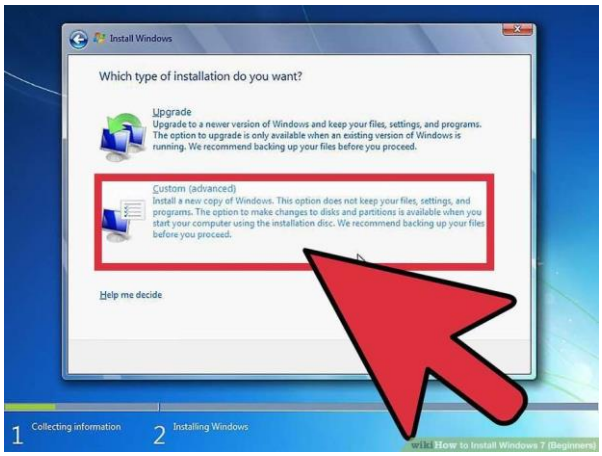
8. **Choose your Windows Setup options.** Once Windows Setup loads, you'll be presented with a window. Select your preferred language, keyboard type, and time/currency format, then click *Next*.

9. Click the ***Install*** *Now* button.

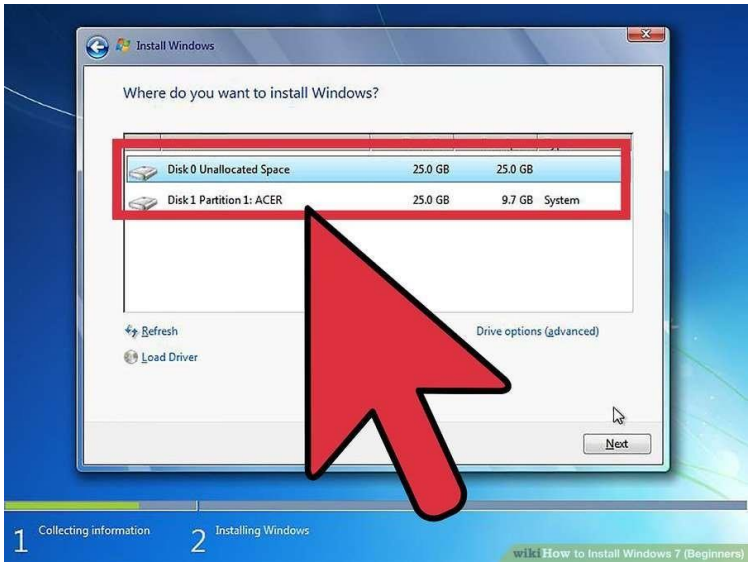
10. **Accept the License Terms.** Read over the Microsoft Software License Terms, check *I accept the license terms*, and click *Next*.



11. Select the ***Custom*** **installation.**

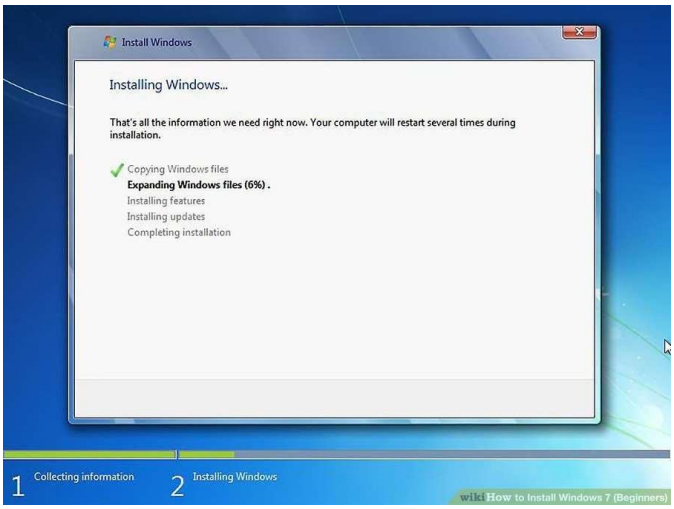


12. **Decide on which hard drive and partition you want to install Windows on.** A hard drive is a physical part of your computer that stores data, and partitions "divide" hard drives into separate parts.



- If the hard drive has data on it, delete the data off of it, or **format** it.
- Select the hard drive from the list of hard drives.
- Click *Drive options (advanced)*.
- Click *Format* from Drive options.
- If your computer doesn't have any partitions yet, create one to install Windows on it.
- Select the hard drive from the list of hard drives.
- Click *Drive options (advanced)*.
- Select *New* from Drive options.
- Select the size, and click *OK*.

13. **Install Windows on your preferred hard drive and partition.** Once you've decided on where to install Windows, select it and click *Next*. Windows will begin installing.



Viva Questions:

1) NTFS stands for ?
2) What is the use of product key in the installation process of a software?
3) Installing - What does "upgrade" mean?
4) Write the procedures to create bootable disc?
5) Describe different kinds of Microsoft Operating systems?
6) What are the pre-arrangements for installing the windows OS?

7) What is virtual memo

Ex. No 5:Hardware Troubleshooting

It is a process of sorting out the problems.

The set of steps we follow during trouble shooting are:

a) Identify the problem.

b) Identify the set of solutions.

c) Analyze any one solution which is less costly and more efficient.

d) Apply the solution.

e) Test the output.

Trouble shooting is generally of 2 types:

1) Hardware troubleshooting:deals with the process of eliminating bugs related to PC components.
2) Software trouble shooting:refers to removal of problems rising due to system software or application software.

HARDWARE TROUBLESHOOTING:

The list of techniques under this are:

- Hard disk troubleshooting
- Monitor troubleshooting
- Modem troubleshooting
- Keyboard troubleshooting.

a) HARD DISK TROUBLESHOOTING

It contains platters, head arms, classes and headaqualators. Most of the HDDS are connected by either the ATA(i.e.; another name for IDE) or we use SCSI(small computer system interphase) cables.

The difference between SCSI and IDE is

- Using IDE we can connect almost two hard disks
- Using SCSI we can connect 7to 15 hard disks
- Maintenance of SCSI is very difficult when compared to IDE
- The cost of SCSI is more compared to IDE.

Problems related to Hard disk

- ✓ If the HDD is not detected inside the configurations
- ✓ If the system files on the hard disk drive are missing or if they because corrupt.
- ✓ The computer does not boot up when turned on.

Solutions related to hard disk

- ✓ Check whether HDD is physically available or NOT.
- ✓ Check if the bias is connected to the hard disk and if it is detected.
- ✓ On the existing hard disk make sure that you scan the disk very well using the current version of antivirus
- ✓ Make sure that you setting up a disk or charge of its partitions.

b) MONITOR TROUBLESHOOTING:

Which is physically connected to video cards like TV monitor also contains CRT (cathode ray tube).CRT contains 3guns, red, green and blue. These guns stream electrons from left to right.

Set of troubleshooting etc:

PROBLEM: If the picture is not visible

SOLUTION: Check the signal cable is into the power socket or not.

Set of troubleshooting steps are: Check if the signal cable is connected to graphic admor.

Check brightness of the screen.

PROBLEM: If the screen is too bright or dark.

SOLUTION: Check the brightness value. Check if the specified voltage is applied or not. Check if the frequency is horizontal as well as vertical.

PROBLEM: If the screen is blurred

SOLUTION: More all the objects that emit magnetic field away. Check whether the specified is applied or not.Check if the signal timing of system is with in the specification.

MONITOR ICONS:

- ✓ Power
- ✓ Brightness
- ✓ Contrast
- ✓ Horizontal size
- ✓ Vertical size
- ✓ Full screen
- ✓ Degauss(de magnetizers the crt)
- ✓ Comer(user can more the picture)
- ✓ Monitor status
- ✓ Language

c) MODEM TROUBLESHOOTING:

We can call a modem as translator, demodulator, which describes a method by which digital data is converted to analog while receiving the data by the computer it is converted to digital from analog.

There are 2 types of modem which are available they are RJ11 and RJ45.RJ11 consists of 6 pins and RJ45 of 8 pins.

Steps of troubleshooting for modem are:

- ✓ Check the telephone cable connections 10 feet or less than contain a RJ11 cable connection.
- ✓ Check to ensure that you are plugged to the correct modem jack i.e; RJ45 will not fit in RJ11 but RJ11 will fit into RJ45.
- ✓ Check for the error message i.e wrong user name and password the contact your ISP (Internet service provider)for the correct account settings.
- ✓ Reduce your port speed in your modem settings.
- ✓ Check the initialization settings
- ✓ Use hyper terminal on another tool to test the modem.

d) KEYBOARD TROUBLESHOOTING:

- ✓ If the keyboard is not working then check if the keyboard cable is inserted properly in the connector on the motherboard.
- ✓ Swap a non-functional keyboard with a functioning one.

Check if the cable is twisted or damaged.

Other Hardware Issues:

1. Disk Boot Failure
2. S.M.A.R.T Command Failed
3. Automatic Restart of your Computer
4. Fix MBR issues
5. Hide computer Hard disk Drive
6. How to Change Computer Hard Disk Drive Letters
7. Protect your PC from Over heating
8. Use Flash Memory (USB Memory) as Virtual RAM
9. Problems in booting computer in safe mode
10. Connect two Systems using USB cable
11. Bios Backdoor Passwords for Laptops
12. Reset Bios Passwords

Viva Questions:

1) Define trouble shooting?
2) Mention a few problems associated with Modem.
3) What is the function of a modem?
4) What are the different key board problems?
5) Give the preventive measures for better computer utilization?

Ex. No 6: Software Troubleshooting

Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up by the viva.

AIM: Software troubleshooting

PROCEDURE:

✓ **Error messages encountered during boot before Windows loads**

Ensure that your computer BIOS settings are correctly configured to the hardware that is installed in your computer

1. **Issues and questions related to the Windows taskbar.**
2. **Information about the Taskbar.**

✓ **Verify Auto hide is not activated by following the below steps**

1. Press CTRL + ESC or your Windows key to make Start menu appear
2. Click Settings and choose Taskbar & Start menu
3. Verify that Auto Hide is not checked

✓ **If Auto Hide is not enabled move the task bar up by following the below steps**

Press CTRL + ESC or your Windows key to make Start menu appear
Try to notice where the Start menu appeared; generally, it should be the bottom left corner.
Press ESC. You should now notice a small gray line at the location of where the start was.

✓ **Issues and questions related to Rundll**

Rundll and rundll32 enable users to run a DLL file as an application.

Below are some examples of how the rundll.exe rundll32.exe files can be used in Microsoft Windows to perform numerous windows commands from the command prompt. Because of the different versions of rundll and rundll32, not all of the below options will work. If rundll or rundll32

encounter an error, it is possible that the command will fail without any error messages.

- ✓ **Shutdown, restart, logoff, and/or poweroff the computer**

Users can shutdown Windows through the command line using rundll32 and the shell32.dll file.

- ✓ **Additional information and help with the boot.ini:**

The "boot.ini" is a Microsoft initialization. This file is always located on the root directory of the primary hard disk drive. In other words, it is located at "C:\" directory or the "C Drive". This file is used by Microsoft Windows as a method of displaying a menu of operating systems currently n the computer and allowing the user to easily select which operating system to load. In addition, this file is also used to point to the locations of each of the operating systems.

Basic example of the boot.ini file:

```
[boot loader]
timeout=5
default=multi(0)disk(0)rdisk(1)partition(1)\WINDOWS
[operating systems]
multi(0)disk(0)rdisk(1)partition(1)\WINDOWS="Microsoft Windows XP
Home
Edition" /fastdetect
```

In the above example, the boot.ini contains two sections, the "[boot loader]", and "[operating systems]". Within the boot loader section there are two lines. The "timeout" line is used for how long the boot menu time should be displayed, in seconds; we recommend that the timeout be set to at least five if you wish the computer to boot faster and commonly use the default operating systems. The "default" line is the default operating system that the boot.ini will load. If multiple operating systems are in the boot.ini, the default operating system will be automatically selected and used if the user does not specify a different operating system by the time the timeout value expires.

How to modify the boot.ini:

The boot.ini file is a hidden system file located in the root directory of your primary hard disk drive. To edit this file we recommend you follow the below steps.

1. From Windows, open an MS-DOS prompt by clicking "Start" and then "Run" and typing "cmd" in the text box. If you are

not able to get into a MS-DOS prompt to edit the boot.ini file, boot into the recovery console to edit the file.

2. At the MS-DOS prompt, type:
   c: <press enter>
   cd\ <press enter>
   attrib -r -a -s -h boot.ini <press enter>
   edit boot.ini <press enter>

✓ **Windows restarts without warning**

This issue could be caused by any of the below possibilities

1. Software issue or error
2. Hardware issue or error
3. Heat related issue.
4. Computer virus.
5. Issue with operating system.

✓ **Error messages while windows loading**

1. If you have recently installed or changed something that could have caused normal windows to stop loading, try loading the last known good configuration
2. If you are unable to get into Normal windows and believe that removing or uninstalling a program or changing a setting may help enable you to get into windows, boot the computer into Windows OS safe mode
3. If your computer has worked fine in the past but recently has been experiencing the issue you are encountering run the system restore option to restore the computer to an earlier date

Other error messages that occur while windows is loading or after windows is loaded

1. If error occurs but windows still loads, verify no issues or conflict exits in device manager
2. Ensure that if programs are loading automatically that these errors are not associated with these programs
3. Make sure Windows OS is up to date by checking Microsoft windows update page
4. If your computer has virus protection installed make sure that it is up to date and that no virus are being detected
5. If your computer has worked fine in the past but recently has been experiencing the issue you are encountering run the system restore option to restore the computer to an earlier date

Viva questions:

1) Define a software
2) How to perform BIOS update?

3) What are the general software problems we encounter?
4) Define virus
5) What is the minimum free space required?
6) What are the reasons for slow running ?

Ex.No 9:Configuring Firewalls and installation of Antivirus software

Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an anti virus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms

PURPOSE: To learn various threats on the internet and configure the computer to be safe on the internet.

THEORY: Antivirus:

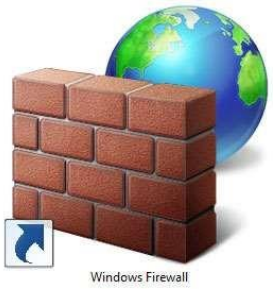
Antivirus software is a program that either comes installed on your computer or that you purchase and install yourself. It protects your computer against most viruses, worms, Trojan horses and other unwanted invaders that can make your computer sick.

Firewall:

A firewall is a special software or hardware designed to protect a private computer network from unauthorized access. A firewall is a set of related programs located at a network gateway server which protects the resources of the private network from users from other networks.

Software firewalls

Software firewalls are designed to protect a computer by blocking certain programs from sending and receiving information from a local network or the Internet. The image to the right shows the icon for Windows Firewall, an example of a firewall software program.



Hardware firewalls

Hardware firewalls are found on most network routers and can be configured through the router setup screen. The image shows the ZyXELZyWALL, which is a Unified Security Gateway with a firewall and other security features.

PROCEDURE:

Installing Symantec antivirus for Windows:

- Insert Symantec antivirus CD into your CD drive

- Double click on the Symantec-setup.exe
- The installer will open
- Click **next** to proceed
- License agreement will open . Click **I accept the terms of the license agreement** and then click **next.**
- Follow the instruction on the screen to complete the installation.

Get Computer Updates:

- Click **start> settings>control panel**
- Click **Automatic Updates** icon to open Automatic Updates dialog box
- Check the box **Keep my computer up to date**
- Choose a setting
- Click OK

Block Pop ups:

- In the IE open **tools>pop-up blocker**
- Click on **Turn on Pop- up blocker**

Windows Firewall:

- Go to **Start>control panel>Network and Internet Connections>windows firewall**
- In the general tab check the **On(recommended)** box
- If you don't want any exceptions check on **Don't allow exceptions box**

Viva Questions:

1) What is antivirus software?
2) Define virus
3) Define worm
4) What are the advantages of antivirus software?
5) What are the types of antivirus software's available?

Ex.No 7:Providing Internet connectivity

Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally, students should demonstrate, to the instructor, how to access the websites and email. If there are no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN

AIM: To learn Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally, students should demonstrate, to the instructor, how to access the websites and email

THEORY:

The internet is a worldwide, publicly network of interconnected computer networks

Network Cables

Several standard types of **network cables** exist, each designed for specific purposes.

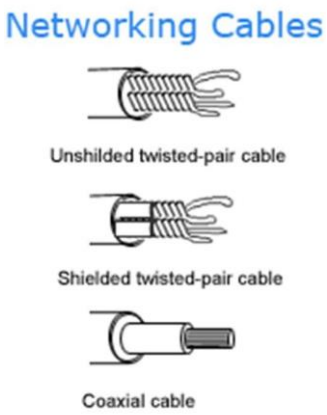
Coaxial Cables

A Coaxial cable is a cable used in the transmission of video, communications, and audio. This cable has high bandwidths and greater transmission capacity. Most users relate to a coaxial or coax cable as a cable used to connect their TVs to a cable TV service. However, these cables are also used in networks and what allow a broadband cable Internet connection using a cable modem. The picture is an example of a coaxial cable. As can be seen in this picture, the cable is a thick cable with a metal male connector end that is screwed onto a female connector.

Twisted-pair cable

A twisted-pair cable is a cable made by intertwining two separate insulated wires. There are two twisted pair types: shielded and unshielded. A Shielded Twisted Pair (STP) has a fine wire mesh surrounding the wires to protect the transmission;

an Unshielded Twisted Pair (UTP) do not. Shielded cable is used in older telephone networks, as well as network and data communications to reduce outside interference. The illustration gives an example of how the inside of these looks.



Straight Through

A network cabling that connects a computer to a network device. For example, straight through cables connect a computer to a network hub, network switch, and network routers.

Crossover Cable

Networking cable that connects two computers or network devices directly to one another. When purchasing this cable, the packaging must indicate that it's a crossover cable for the required network interface; otherwise, it's likely a typical straight through cable. Often, crossover cables are used to connect two computers with network cards together without using a network hub, network router, or network switch.

CAT5

Alternatively referred to as an Ethernet cable, a CAT5 or Category 5 is a description of network cabling that consists of four twisted pairs of copper wire terminated by an RJ-45 connector. Cat5 has a maximum length of 100m, exceeding this length without the aid of bridge or other network device could cause network issues. The picture shows an example of what a CAT5 cable may look like with the connector, as well as the other end of the cable with each of the wires it contains.

Fiber Optic Cable

A fiber optic cable defined in IEEE 802.8 is cable that contains optical fibers (usually glass) coated in plastic that are used to send data by pulses of light. The coating helps protect the fibers from heat, cold,

electromagnetic interference from other types of wiring, as well as some protection from ultraviolet rays from the sun. Fiber optics allow for a much faster data transmission than standard copper wires, because they have a much higher bandwidth. They are common amongst corporate networks or world-wide networks, such as Internet backbones, because of the capabilities of the cable.

Networking Devices:

Hub

When referring to a network, a hub is the most basic networking device that connects multiple computers or other network devices together. Unlike a network switch or router, a network hub has no routing tables or intelligence on where to send information and broadcasts all network data across each connection. Most hubs can detect basic network errors such as collisions, but having all information broadcast to multiple ports can be a security risk and cause bottlenecks. In the past, network hubs were popular because they were cheaper than a switch or router. Today, switches do not cost much more than a hub and are a much better solution for any network.

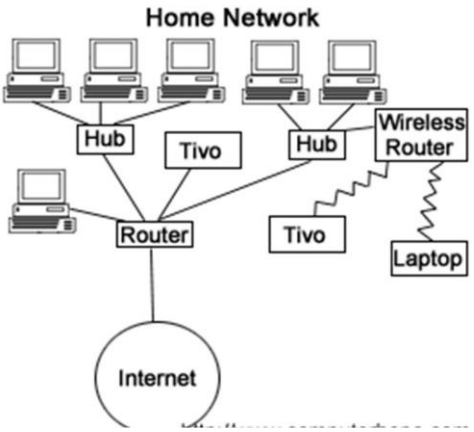
Switch

A switch is a piece of a physical circuitry component that governs the signal flow. Having a switch or toggle switch allows a connection to be opened or closed. When opened, the switch allows a signal or power to flow through the connection. When closed, the switch stops the flow and breaks the circuit connection.

On a network, a switch is a hardware device that filters and forwards network packets, but often not capable of much more A network switch is more advanced than a hub but not as advanced as a router. The picture shows an example of a NETGEAR5 port switch.

Router

A router is hardware device designed to receive, analyze and move incoming packets to another network. It may also be used to convert the
packets to another network interface, drop them, and perform other actions relating to a network.



A router has a lot more capabilities than other network devices, such as a hub or a switch that are only able to perform basic network functions. For example, a hub is often used to transfer data between computers or network devices, but does not analyze or do anything with the data it is transferring. By contrast, routers can analyze the data being sent over a network, change how it is packaged, and send it to another network or over a different network. For example, routers are commonly used in home networks to share a single Internet connection between multiple computers.

In the above example, of a home network, there are two different types of a router: the router and the wireless router. In this example, the router allows all the computers and other network devices to access the Internet. The wireless router allows a laptop to wirelessly connect to the home network and access the Internet as well. Below are some additional examples of different types of routers used in a large network.

TCP/IP(Transmission Control Protocol/Internet Protocol): Collection of methods used to connect servers on the internet and to exchange data.
HTML(Hyper Text Markup Language): The coding used to control the look of documents on the web
HTTP(Hyper Text Transfer Protocol): Part of a url that identifies the location as one that uses HTML
IP(Internet Protocol): A format for contents and addresses of packets of information sent over the internet
IP ADDRESS: An identifier for a computer or device on a TCP/IP network

PROCUDURE:

- Goto start>control Panel
- open Network Connections
- Click create a new connection and then click next
- The new conection wizard window opens , click next to continue

- Choose one of the options in the next dialog box
- Choose one of the three options in the next dialog box
  - ✓ If you do not have an internet account click choose from a list of ISPsand then click next
  - ✓ If you have an account click Set up my connection manually
  - ✓ If you have a CD from the ISP click use the CD I got from an ISP andthen click next
- Follow the next steps as per the option you selected.

LAN Proxy Settings:

- select **tools** menu in Internet Explorer
- Select **Internet Options**
- Select **Connections**
- You end up in two options
  - ✓ **Dial-up and virtual network settings**
  - ✓ **LAN setting**
- The selection at this step is dependent on the kind of connection you are tryingto

  configure. They are:
  - ✓ **Dial-up modem connection**
  - ✓ **LAN connection**
  - ✓ **DSL or Cable modem**

Viva Questions:

1. What is subnet mask?
2. What do you mean by network?
3. Briefly describe NAT.
4. What is NIC?
5. What is a private IP address? Give some examples
6. What is DHCP?
7. What is Ping?
8. What is ipconfig?