



GATE INSTITUTE OF TECHNOLOGY
& MANAGEMENT SCIENCES

(Approved by AICTE, Affiliated to Sri Venkateswara University, TIRUPATI)

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Master of Computer Applications

SEMESTER - 2

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Subject: Computer Organisation (Software Lab)

Year: 2 Semester: 1st Batch 2024-2026



GATE EDUCATIONAL INSTITUTIONS

DEPARTMENT OF COMPUTERS

YEAR 2 SEMESTER 1st

Reg No. 3124167

CERTIFICATE

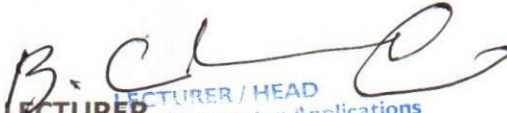
Certified that this is the bonafide record of practical work done in the laboratory

by the candidate Kondapalli Sai Teja during the

academic year 2024 - 2026 subject Software Lab.

No. of Practical's Conducted 23

No. of Practical's Attended 23


LECTURER / HEAD
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TIRUPATI


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And Management Sciences
TIRUPATI

Submitted for the Practical Examination held on _____

Examiners

1.

2.

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	components on the Motherboard	Practical No. :

Identify the components on the Motherboard

The motherboard is the main system board for the computer and connects all of the internal hardware components. This lesson will take a look at various components which are built into the mother board. This lesson will also look at the expansion slots used to add hardware components to a system. The lesson finishes up with a discussion of the BIOS.

1. Mouse and keyboard
2. USB
3. parallel port
4. cpu chip
5. RAM slots
6. Floppy controller
7. IDE controller
8. PCI slot
9. ISA slot
10. CMOS Battery

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11. CPU slot

12. AGP slot

13. power supply plug in

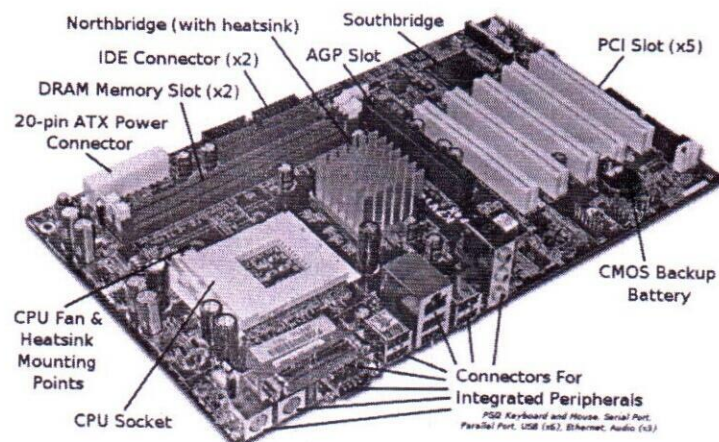
1. Mouse and keyboard:

Keyboard connectors are two types basically. All PCs have a keyboard port connected directly to the motherboard. The oldest but still quite common type, is a special DIN and most PCs until recently retained this style connector. The AT-key-style keyboard connector is quickly disappearing, being replaced by the smaller mini DIN PS/2-style keyboard connector.

You can use an AT-style keyboard with a PS/2-style socket (or the other way around) by using a converter. Although the AT connector is unique in PCs, PS/2-style, mini-DIN is used in more modern PCs for the mouse fortunately.

Some keyboards have a USB connector's, but these are fairly more compared to the PS/2 connection keyboards.

Components on the mother board



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2. USB (Universal Serial BUS):

USB is the general purpose connection for pc. You can find USB versions of many different devices, such as mice, keyboard, scanner, cameras, and even printers. A USB connector's distinctive rectangular shape makes it easily recognizable.

USB has a number of features that makes it particularly on pcs first, USB devices are not swappable. You can insert or remove them without restarting system.

3. Parallel port :- Most printers use a special connector called a parallel port, which uses only one wire. Parallel ports use a 25-pin female DB connector.

4. CPU chip :- The central processing unit, also called the microprocessor performs all the calculations that take place inside a pc. CPU's come in variety of shapes and sizes. Modern CPU's generate a lot of heat and these require a cooling fan or heat sink. The cooling device is removable, although some CPU manufacturers sell the CPU with a fan permanently attached.

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8. PCI slot :- Intel introduce the peripheral components inter connect bus protocol. The PCI bus is used to connect I/O devices (such as NIC (or) RAID controllers) to the main logic of the computer. PCI bus replaced the ISA bus.

9. ISA slot :- (Industry standard Architecture) it is the standard architecture of the expansion bus. Motherboard may contain some slots to connect ISA compatible cards.

10. CMOS Battery :-
 To provide CMOS with the power when the computers is turned off all motherboards comes with a battery. These batteries mount on the motherboard in one of three ways. The absolute external battery, the most common onboard battery, and built-in battery.

11. AGP slot :- If you have a modern motherboard you will almost certainly notice a single connector that looks like a PCI slot, but is slightly shorter and usually brown. You also probably have a video card inserted into this slot. This is an Advanced graphics port (AGP) slot.

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	CMOS Setup	Practical No. :

Setting the CMOS setup

CMOS setup :-

The CMOS and BIOS setup are both specified in the system BIOS. Some computer manufacturers refer to this setup menu as the BIOS setup. The difference b/w the BIOS and CMOS lies in the function of each component on the Mother board. While BIOS contains the settings for boot-up process you configure both groups of settings through the same setup menu.

To enter the CMOS setup you must press a certain key or combination of keys during the initial.

Below is the listing of key sequences to press as the computer is booting to enter the BIOS setup

1. Ctrl + Alt + Esc
2. Ctrl + Alt + Ins
3. Ctrl + Alt + Enter
4. Ctrl + Alt + S
5. Page up key
6. Page down key
7. Ctrl + Alt + Del

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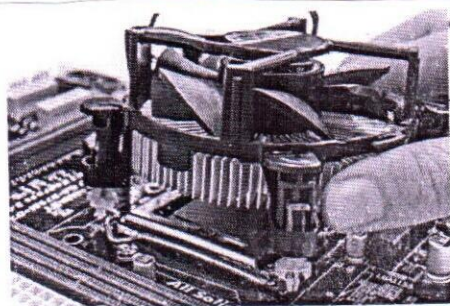
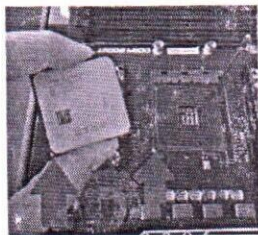
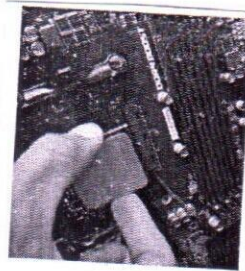
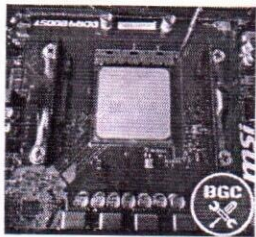
8. F10

9. Delete

once you have entered setup you will see a set of text screens with a number of options some of these are standard, while others vary according to the BIOS manufactures, common options include.

Phoenix - Award BIOS CMOS setup utilities	
* standard CMOS features	* PC health status
* Advanced BIOS features	* Frequency / voltage control
* Advanced chipset features	* Load setup defaults
* Integrated peripherals	* Set password
* Security chip configuration	Save & exit setup
* Power management setup	exit without saving
* PNP / PCI configuration	
ESC quit	↑↓ → ← : select item
F10 : save and exit setup	

Time, Date, Hard disk type



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	processor & heatsink fan installation	Practical No. :

Processor and heat sink fan installation on motherboard.

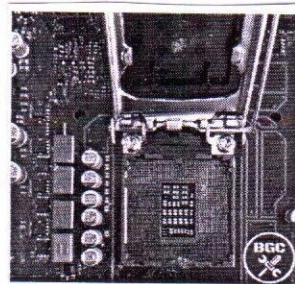
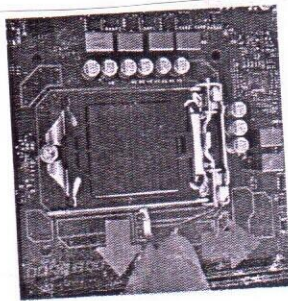
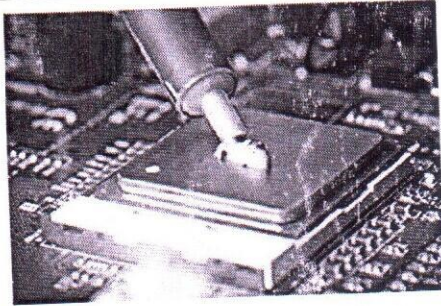
Installation of an Intel processor (produces)

1. Lift the processor cage:- Intel processor sockets are covered by cage. A new motherboard will also have a plastic cover on top. first remove this cover. It should easily unclip. To access the socket, unclip the handle that runs down the side of the socket and lift it up.

2. Install the processor:-

The processor has two cut-out notches on its sides which line up with the ridges in the socket. This prevents the processor from being put in the wrong way round. you will also notice an arrow on the processor. This should line up with the corner of the socket that has its pins arranged diagonally.

Line the processor up and sit it gently in the place. If it doesn't sit properly then you have got it the wrong way round.



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3. Apply thermal paste :-

Thermal paste fills in micro-cracks in the surface of the processor and the surface of the cooler, ensure, that there is efficient heat transfer between the two some fans come precoated with thermal paste in which case you can skip this step.

4. Attach the fan :-

Most intel coolers clip into the four round holes on the outside of the outside of the processor socket. If you are not using an intel reference cooler bundled with your processor, then check the coolers instructions, some need a back plate screwed to the motherboard.

Starting at diagonally opposite sides push the four feet into the place. You will need some force and feet should click into position. When done, check the cooler is seated properly and that isn't wobbly.

Procedure - II

Installing CPU Heat sink and fan:-

Step 1: Ensure the power to the computer is off and the computer is unplugged.

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step 2 : place an anti-static wrist strap band around your wrist and attach the other end to a ground or unpainted metal part of the computer.

step 3 : push the retention level down and outwards to release the cpu retention plate. Move the handle backward until the retention plate is fully open. Do not touch the CPU socket.

step 4 : Remove the processor from the packaging taking care to hold it by the edge and never touch the bottom metal portion of the processor. Remember that a CPU fits only one way in the socket.

Installing the CPU :

Installing the CPU is the most delicate part of the entire build process. Depending on the CPU you choose, your socket may be slightly different. However, the vast majority of commonly available CPUs currently being produced use the ZIF.

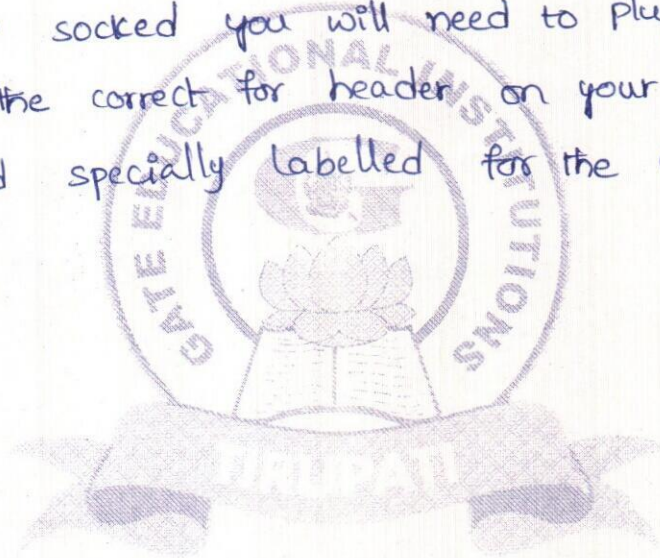
If you are not sure how to do this, consult with the motherboard manufacturer. Inserting the CPU incorrectly can damage the CPU.

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Installing the Heatsink fan combo :-

Heat sink fan combo comes from many different manufactures. They will use the same refention system designed to be issued with your cpu socket type.

Just like cpu do not start your computer up without heat sink being installed correctly. Read the instru-
-ction that come with your motherboard and heat sink for more details on performing this step once installed on the cpu socketed you will need to plug the heat sink fan into the correct for header on your board but one should specially labelled for the cpu fan



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	ASSEMBLING and DISASSEMBLING of a PC	Practical No. :

Assembling and Disassembling a pc

Assembling of the computer :-

The assembling of the computer system is exactly the opposite of disassembling operation. Before starting assembling the computer system, make sure you have the screws and screwdriver for those.

Step 1 : Mount the Processor

The first step for assembling the computer system starts with mounting the processor on the processor socket of the motherboard. To mount the processor, you don't need to apply any force. The special ZIF (Zero Insertion Force) sockets are usually used to prevent any damage to the processor pins.

Step 2 : Fix the motherboard in the tower case :

Now the motherboard is to be fixed vertically in the tower case and screws are fixed from behind the motherboard.

Step 3 : connect the power supply

Now line up the power supply at the top back end of the cabinet and screw it. The power connector for motherboard power supply and CPU fan power supply are to be connected.

Department of Computers

Step 8 : cover the tower

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	Assembling and disassembling of a pc	Practical No. :

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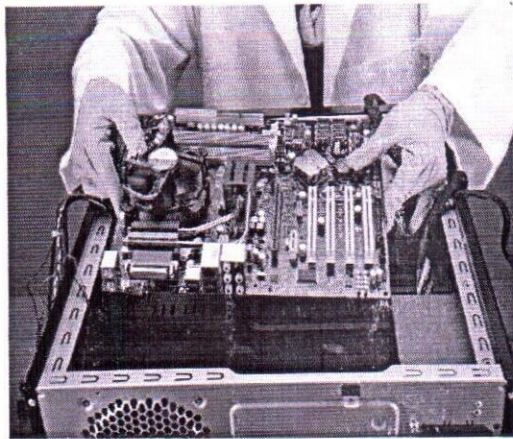
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Step 4: Install the Drives

Install the CD/DVD drives at the top front end of the cabinet and screw it. Install the hard disk drive and floppy disk drive below. CD/DVD drive and screw it.

Step 5: connect cables

Now select the appropriate data cable and connect one end of the cable to its drive socket and another end at its appropriate connection the motherboard.

Step 6: Mount the memory module

It is time now to mount the memory modules on the motherboard by aligning the RAM to its socket on the motherboard.

Step 7: Install the internal cards

Install the internal cards to fit socket and attach the cables or power cable to it to the selection of right socket.

Step 8: cover the Tower

cover the tower by placing it and pressing toward front side and screw it.

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Step 9: connect the external device & power

connect the external devices with CPU at its appropriate socket. It includes mouse and keyboard at PS2 or USB connect - ors monitor.

Disassembling a computer

Step 1: Detach the power cable

The disassembling of the computer system starts with externally connected device detachment. Make sure the computer system is turned off, if not then successfully shut - down the system and then start detaching. The external devices from the computer system.

Step 2: Remove the cover

The standard ways of removing tower cases used to be undo the screws on the back about an inch and lift it off.

Step 3: Remove the adapter cards

Make sure if the card has any cables or wires that might be attached and decided if it would be easier to remove them before or after you remove the card.

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Step 4 : Remove the drives

Removing drives is easier there can be possibly three types of drives presents in your computer system. Hard disk drive, CD/DVD/Blue-ray drives, Floppy disk drives.

The power may be attached using one of the two connections, a molex connector or a berg connector for the drive.

The SATA cables can be removed easily by pressing the tap and pulling the connector straight back. Now remove the screws and slide the drive out of the back of the bay.

Step 5 : Remove the memory module

Memory modules are mounted on the motherboard as the chips that can be damaged by manual force if applied improperly. Be careful and handle the chip only by the edges.

SIMM : Gently push back the metal tabs while handling the SIMM chips.

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DIMM : There are plastic tabs on the end of the DIMM sockets press the tabs down and away.

Step 6 : Remove the power supply

The power supply is attached into tower cabinet at the tab back end of the tower make sure the power connector is detached from the switch board.

Now removes the screws of SMPS from the back of the cabinet & the smps can be detached from the tower cabinet.

Step 7 : Remove the Motherboard

Before removing all the connectors from the mother board, make sure you memorize the connectors for assembling the computer if required.

Now remove the chip from the motherboard. The heatsink will be visible now which can be removed by the pulling the upward.

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	Hard disk Formatting & partitioning	Practical No. :

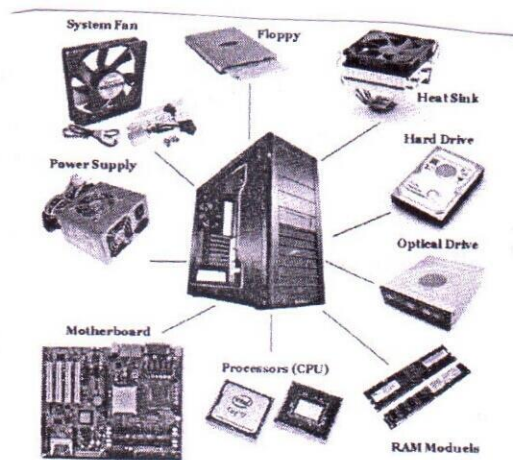
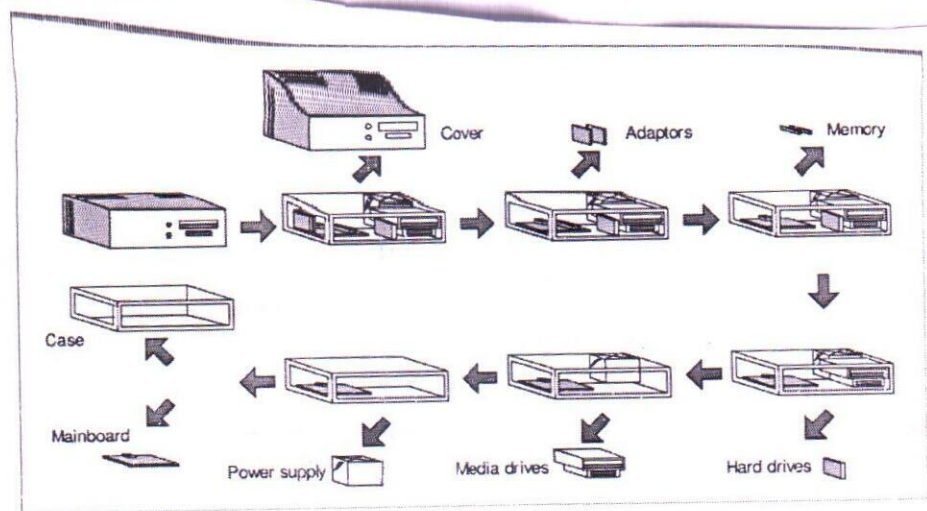
Hard disk Formatting and partitioning

Create and format a harddisk partition :

To create a partition or volume on a hard disk, you must be logged in as an administrator and there must be either unallocated disk space (or) free space within an extended partition on the hard disk.

To create and format a new partition

1. open computer management by selecting the start button, the select control panel > system and security > administrative tools and then double click computer management.
2. In the pane, under storage, select disk management.
3. Right click on unallocated region on your hard disk.
4. In the new simple volume wizard, select next.
5. enter the size of the volume you want to create in megabytes (MB) or accept the maximum default and select next.
6. -Accept the default drive letter or choose a different drive letter to identify the partition and then select next.



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7. In the format partition dialog box, do one of the following.

TO format an existing partition (volume)

1. open computer management by selecting the start button to control panel > system and security administrative tools and then double click computer management.

2. In the left pane, under storage, select disk management

3. Right-click the volume with the default settings in the format dialog box select ok and then select ok again.

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	<u>Identifying various cables</u>	Practical No. :

To identify various cables used in computer communication

Patch Cable:

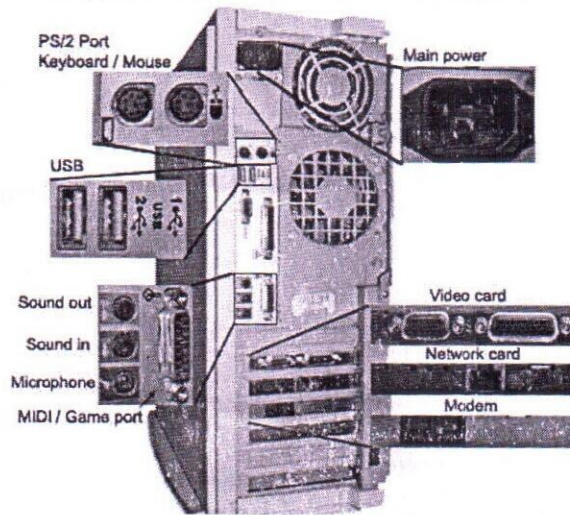
A patch cable is an electrical or optical cable used to connect one electronic or optical device to another for signal routing. Divises of different types are connected with patch cards.

The term patch has been delivered from "patch-in", which means this cable patches a signal from one switch, hub, another hub or the router. It is a type of cable that has two ends which are used to connect an end device to something such as the power source.

Eathernet cross overcode:

An ethernet cross over cable is a cross over cable for ethernet used to connect computing devices together directly. It is most often used to connect two devices of the same type.

Back of computer case and each connection



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USB cable: The term USB stands for "universal serial Bus". USB cable assemblies are some of the mostly to connect computer to peripheral devices.

Unshielded Twisted pair (UTP) cable:

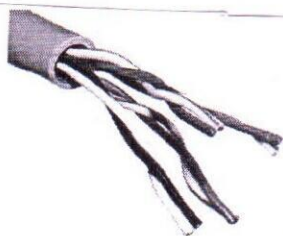
unshielded twisted pair (UTP) cables are used in the computer and telecommunication industry as ethernet cables and telephone wires.

In an UTP cable, conductors, which form a single circuit are twisted around each other in order.

UTP cables are often groups of twisted pairs grouped together with color coded insulators, the number of which depends on the purpose.

Shielded twisted pair (STP):

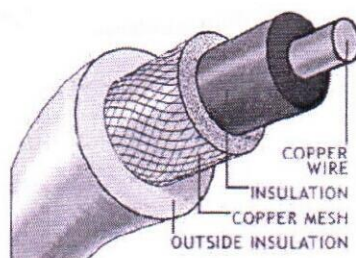
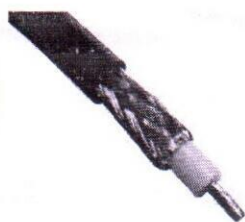
shielded twisted pair (STP) cable was originally designed by IBM for token ring networks that include two individual wires covered with a foil shielding, which prevents electromagnetic interference, thereby transporting data faster.



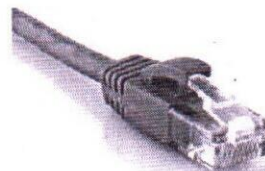
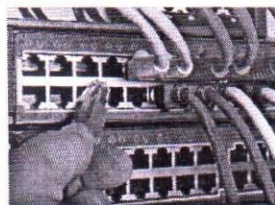
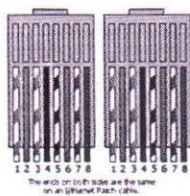
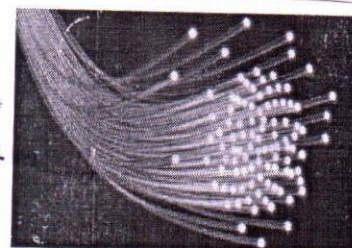
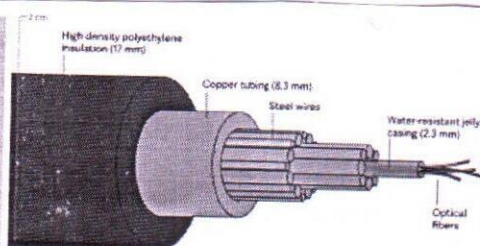
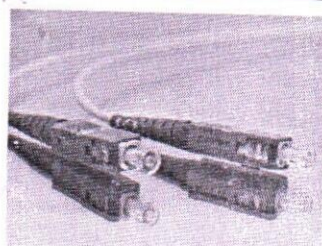
UTP



STP



coaxial cable



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STP is similar to unshielded twisted pair (UTP), however it contains an extra foil wrapping (or) copper braid jacket to help shield the cable signals from interferences.

Coaxial cable:

coaxial cable is commonly used by cable operators, telephone companies and internet providers around the world to convey data, video and voice communications to customers. It has also been used extensively with in homes.

coaxial cable is a type of cable that has an inner conductor surrounded by an insulating layer, surrounded by a conductive shielding. many also have an insulating the construction of a typical cable.

Fiber optic cable:

optical fibre is the technology associated with the data transmission using light pulses travelling along with a long fiber which is usually made of plastic or glass metal wires are preferred.

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	<u>Identifying various connections & parts</u>	Practical No. :

TO Identify various connections and parts used in computer communication PS/2 port, VGA port, serial port, parallel ports, USB, RJ45 connector, ethernet port.

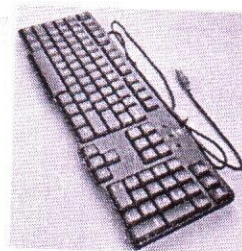
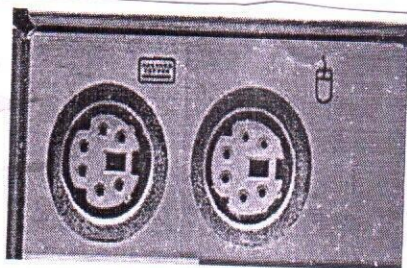
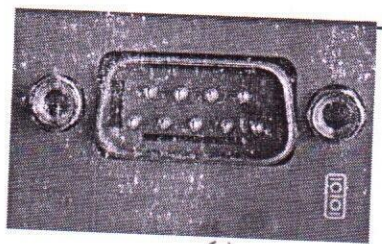
PS/2 (personal system/2) port

The PS/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 mouse or key. The PS/2 port is a mini DIN plug that contains six pins and is still sometimes found on all IBM compatible computers.

Subsequently, PS/2 connectors were replaced with USB. However in the 2000s mother boards with PS/2 ports made a comeback for gamers.

VGA (Video Graphic Array) Port

A VGA cable is mainly used to connect computers and laptops with screens and monitors although you may also find this connection type on older AV equipment.



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It may be labeled as "input" or "output" on the device itself, but if not, you should know what it is by considering what device is for.

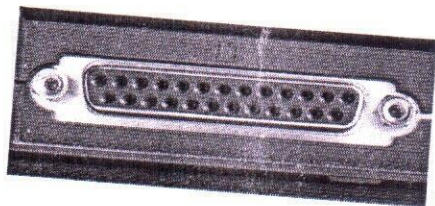
Serial port: The serial port is found on the back of the computer and is the part of the motherboard.

In the above graphic of a serial port you can notice the DB9 serial port connection is easy to identify. The connection is in the shape of the letter D is male connector and has a pins.

Mouse: one of the most common devices for serial ports, usually used with computers with no PS/2 or USB ports and specially mice.

Modem: Another commonly used device for serial ports. used commonly with older computers.

Network: one of the original uses of the serial port, which allowed computers to connect together and allow large files to be transferred between the two.



Parallel port



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Parallel port: The parallel port is found on the back of IBM compatible computers and is a 25-pin computer interface commonly used to connect printers to the computer.

Universal Serial BUS (USB):

The universal Serial BUS gives you a single, standardize easy to use way to connect upto 127 devices to a computers. It is a hardware interface that supports upto 127.

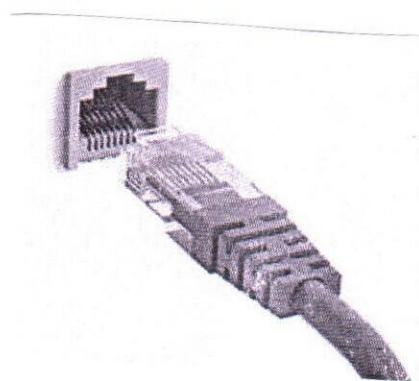
Registered Jack-45 (RJ-45)

-A common networking interface that employ a cable twisted wire pairs and 8-pin modular jack. RJ 45 is used to ethernet.

-A registered jack (RJ) is standardized physical network interface for connecting telecommunications or data equipment. The physical connector that are registered jack.

Ethernet Port:

-A ethernet port is an opening on computer network equipment that ethernet cables plug into their purpose to connect wired network hardware or wide area network.



Ethernet Port

Identifying various cards in a system

TO Identify various cards used in computer system.

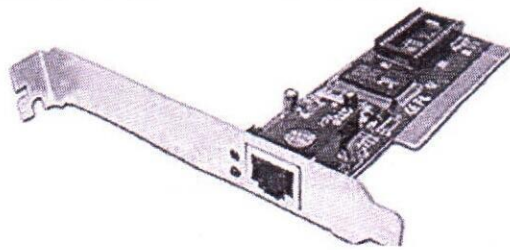
Ethernet card:

-An ethernet card in your computer serves one basic function to transmit data from the network to your computer. Some computers also have on board ethernet cards that sit directly on a hard drive and perform the same tasks.

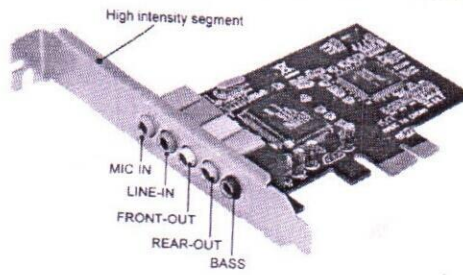
-An ethernet is the communication hub for your computer, it connects to a network using a network cable. ethernet cards can also communicate one-to-one with another ethernet card. These are useful for direct file sharing the cable connection, which connects to a variety of cable types, all capable of different transmission speeds.

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. A though the computer does need a sound card its included on every machine as either in an expansion slot or built into motherboard.



Ethernet card



Sound Card for Desktop

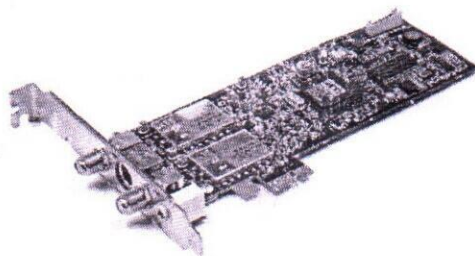
Sound card connection:

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

- * Digital out (white or yellow; words; "Digital" or "Digital-out") - used with surround sound or bud speakers.
- * Microphone or mic (pink) - The connection for a microphone or headphones.
- * Sound out or line out (Green; Arrow pointing out of waves) - The primary sound connection for your speaker or headphones. This sound card also has a second and third sound out connector.

Network Interface Card (NIC):

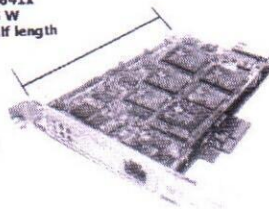
A Network interface card (NIC) is a hardware component without which a computer cannot be connected over network. It is a circuit board installed in a computer that provides a dedicated network; connection to the computer.



TV tuner card

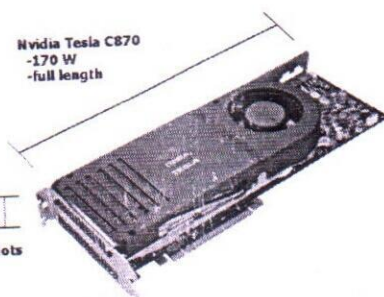
SigC641x
-35 W
-half length

1 slot



Nvidia Tesla C870
-170 W
-full length

2 slots



Accelerator Cards

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		Practical No. :

TV Tuner card:

A TV tuner card is a hardware components that lets your computer receive TV signals so you can watch TV from a computer. many TV tuner cards also provide the ability to record TV programs on your computer's hard disk. TV tuners are available either as a PCI-bus expansion card or as a USB device that you plug into any available USB port on your computer.

Accelerator card:

Accelerator card is a hardware component that your computer receive TV signals. cards designed specially for the purpose of accelerating various workloads. Generally those cards are plugged via a PCIe slot and are seen as standard PCIe devices. by the host processor. A graphics accelerator card is a PCI, AGP, or PCI-expansion card that improves graphics calculation and video performance.

Date :	GATE Educational Institutions	Page No.:
	Identifying various drives	Practical No. :

TO Identify various drives (Floppy disk drive, Hard disk, CD ROM, CD-R/RW, DVD-ROM, DVD recordable drives, DUAL, LAYER DVD+/-RW)

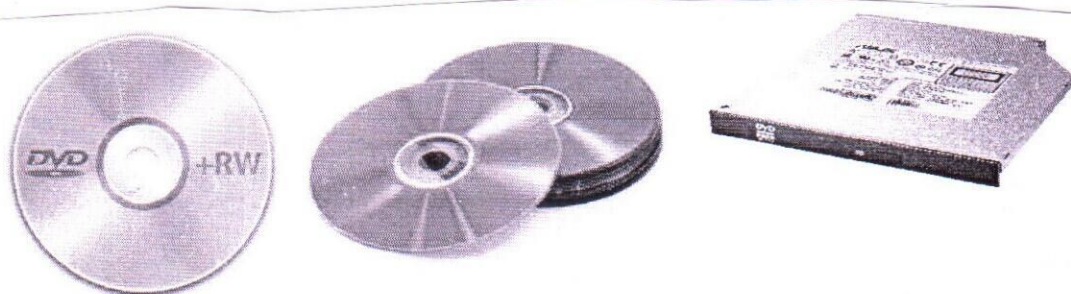
Floppy disk commonly came in three sizes, 8 inches, 5.5 inches, and 3.5 inches, becoming smaller as the technology. eight-inch floppy drives did not connect to the motherboard but rotated on a turnable that was run by an ideal wheel.

1. magnetic read/write heads.
2. A spindle clamping device that held the disk in place.
3. A Frame with levers that opened and closed the device.
4. A circuit board that contained all of the electronics
5. Today, Floppy drives are usually not included on a pc.

compact Disc (CD R/W):

A compact disk is a portable storage medium that can be used to record, store and playback audio, video and other data in digital form.

A CD work by focusing a 780 nanometer wavelength semiconductor laser onto a single track of the disc. As the disc rotates, the way



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		Practical No. :

light is reflected off the polycarbonate layer on the bottom of the disc, converting it to sound.

Digital Versatile Disc (DVD) :

DVD is full digital video disc, type of optical disc used for data storage and as a platform for multi-media. It's most prominent commercial application is for playing back recorded, and even erasable and rewritable versions can be used on personal computers.

DVD laser emits red light at shorter wavelength than the red light of the CD laser. Shorter pits on more narrowly spread tracks, and double-sided versions with one or two layers of information per side.

Date :	GATE Educational Institutions	Page No.:
	Identifying different types of Monitors	Practical No. :

TO identify different types of monitors (CRT (Cathode Ray Tube), LCD (Liquid crystal Display), LED (Light-emitting Diodes)

Types of monitors:

All computer monitors will display video signals from your pc as long as both devices have the appropriate connection.

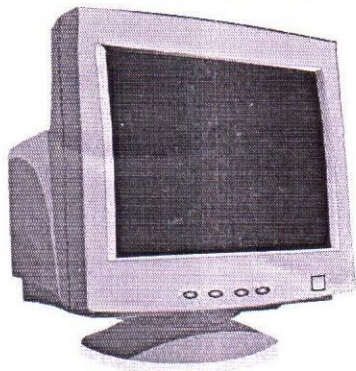
CRT Monitors:

Rarely seen today, CRT monitors were the king's of the 90's and early 20's. These bulky and often loud displays used the same technology as TVs of the era. But gaming or doing any kind of content.

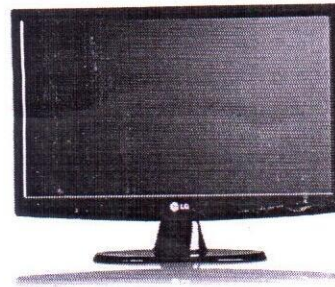
LCD Monitors:

LCD is the most common type of monitor you will find available currently. LCD monitors consist of two panes of glass with liquid in b/w and thousands of rows. That said, they are a cheap alternative to LED and other monitor.

LED Monitors: While LED monitors are technically still LCD, how the device creates images i.e is different. This can result in a transparent copy of a specific image staying present on the screen at all times to avoid this,



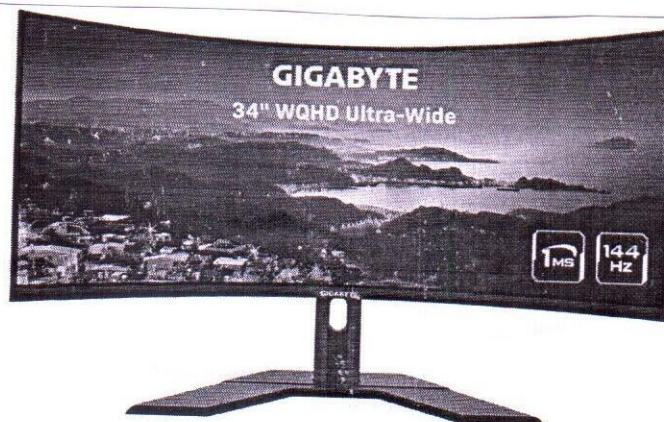
CRT Monitor



LCD Monitor



LED Monitor



Ultra-Wide curved Monitor

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Set a screen saver or on auto screen turnoff after a certain time period.

Ultra-wide curved monitors :

curved screens are becoming more popular they can offer more screen space for less disk real estate and can help to reduce eye strain and fatigue. The add screen size or curvature is simply a matter of preference.



Date :	GATE Educational Institutions	Page No.:
	Installation of windows XP OS	Practical No. :

Installation of windows XP operating system on PC

Installation of windows XP operating system

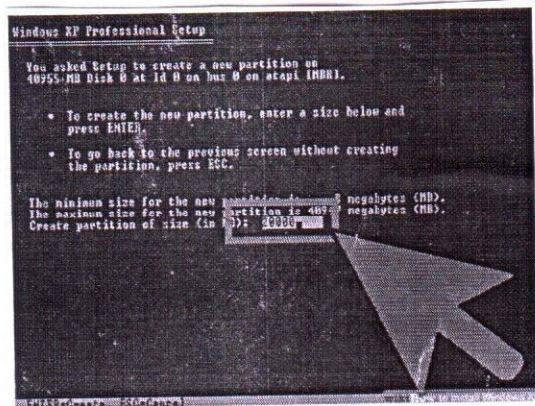
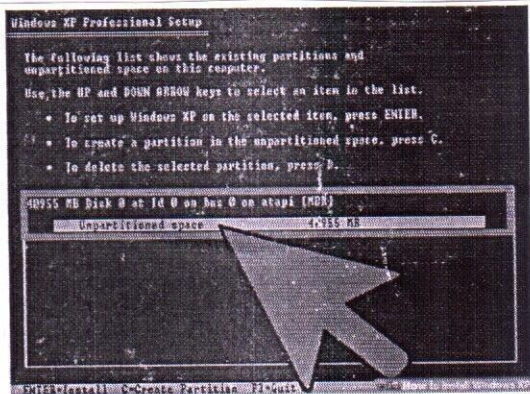
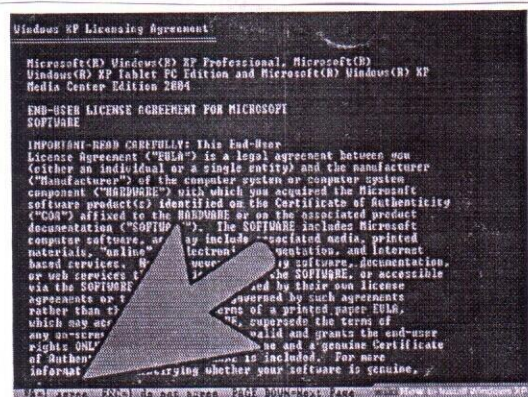
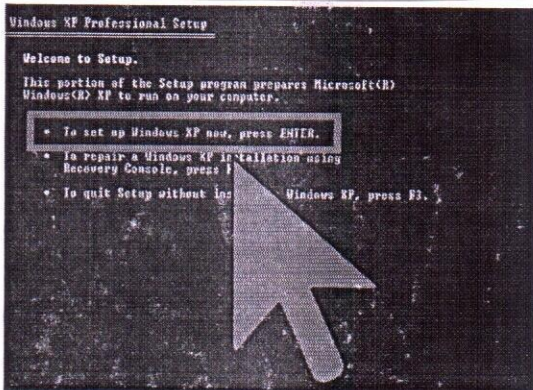
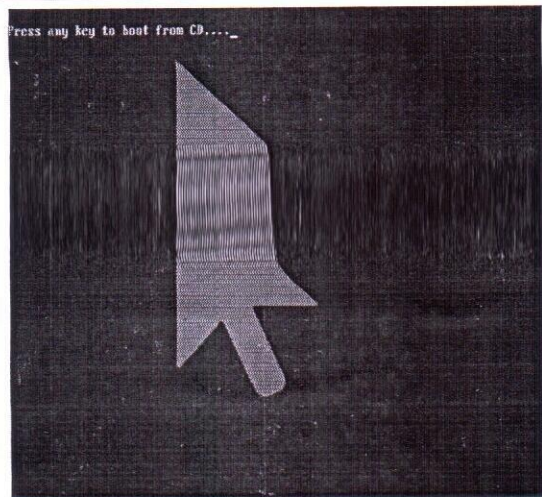
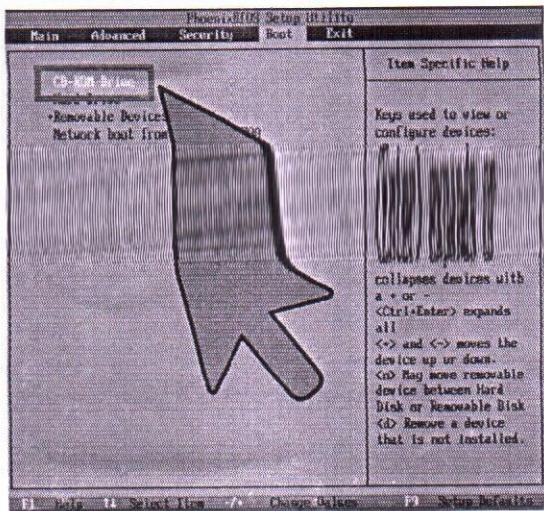
Step 1: Insert your windows XP bootable disk for this step, you will need to open your CD-Rom drive and insert your windows XP disk, you can now close the CD-Rom drive.

Step 2: How to boot from a CD on the most home computers, you will want to shut your station. After the station is off, you can restart it while the station is off, you can restart it. Now that you are in the boot option menu, you will need to use the choice for on board or USB ROM drive press enter.

After you have pressed enter, most windows XP disks will prompt you to press any key to boot from the CD.

Step 3: Beginning the process

After you have chosen to boot from the CD, you will have to wait a few minutes. The disk will check your hard drive. After the disk has made it check you should see a screen like the one in the first picture on this page.



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you will want to press enter because you are planning an installing windows xp on your system. If you realize that you have data on your hard drive and need to back it up.

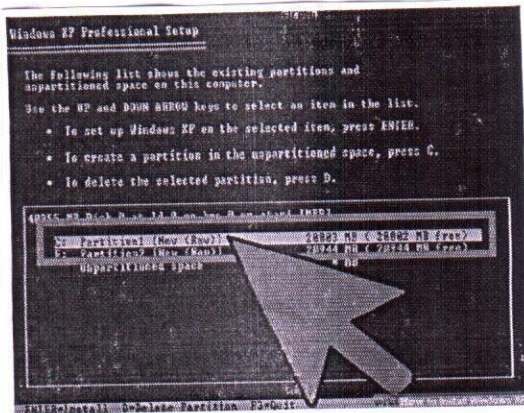
Step 4: Licensing agreement and begin setup. The next page that you will see is the windows XP. Licensing agreement on this page, you can false the time to read through the agreement, but it is that you will not be brealling any laws using this product.

step 5:

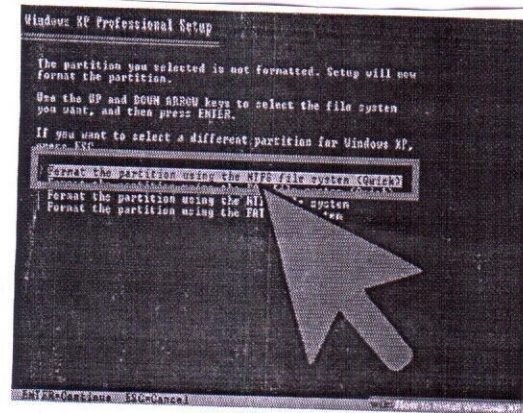
Deleting the current partition.

The next step in installing windows xp is to delete the old partition on your hard drive. you will see a screen similar to the one in the first picture of this page. This will tell the program that you want to delete the current partition.

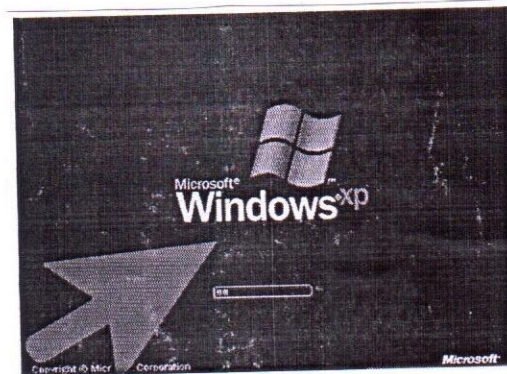
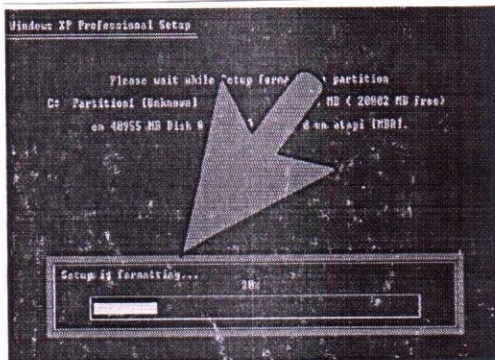
After you click the Dkey, you will see a screen like the one in the second picture. on this screen you will want to press the Lkey to confirm



7



8



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Step 6: Beginning the Install

Now that you have deleted the old partition, you will need to be sure that partition. This will tell the program that you want to install windows xp on that partition.

Step 7: choosing type of Installation.

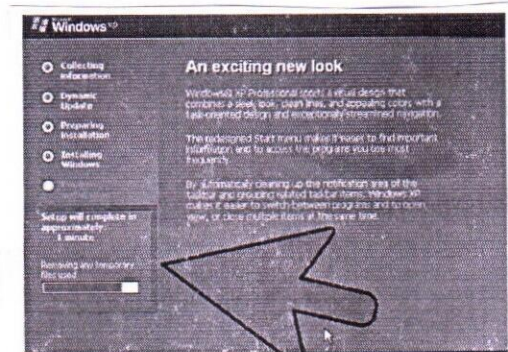
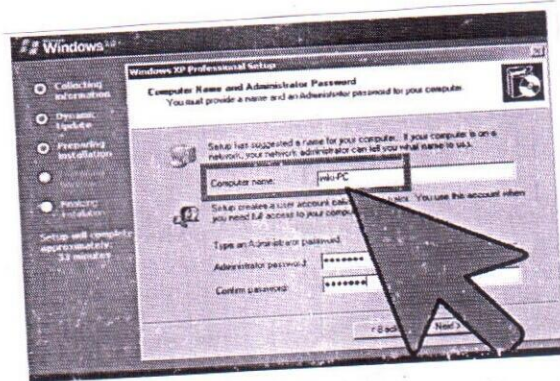
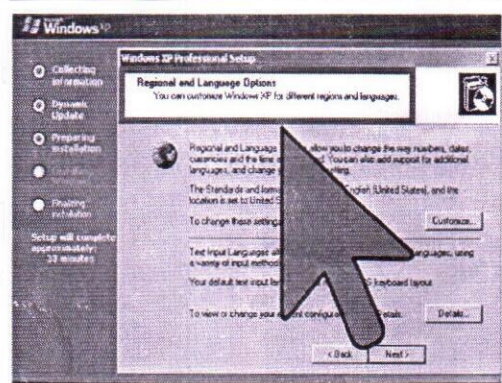
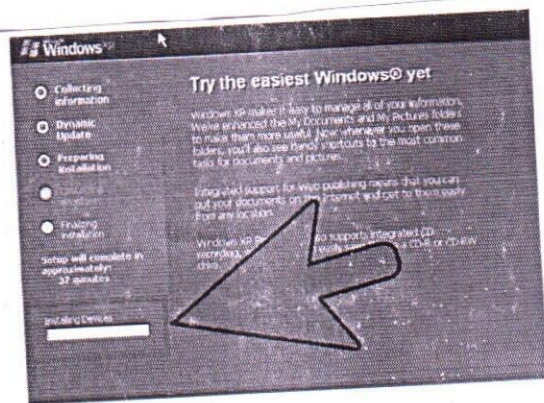
In this step, you will want to choose whether you want to have system do a quick installation or a standard illustration.

Step 8: this step will probably be the largest step.

This is because you are at the mercy of the system and how fast it installs windows xp. After you will see the screen in the first picture.

overtime, the program bar will move across the screen, as shown in the second picture where the progress bar is not at twenty-five percent. It will boot backup and you will see a screen.

Step 9: choosing your keyboard layout, organization and computer Name.



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The first screen that will come up will be a screen for you to select the language and keyboard. I have chosen to use the english language.

Step 10 : choosing your timezone.

You will now see the area for you to choose the time and date to be set on the computer This will correspond to the timezone. you may pick enter you would lie from this menu.

Step 11 : waiting for installation to continue

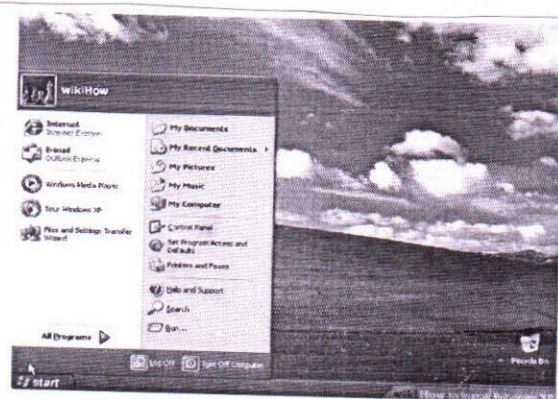
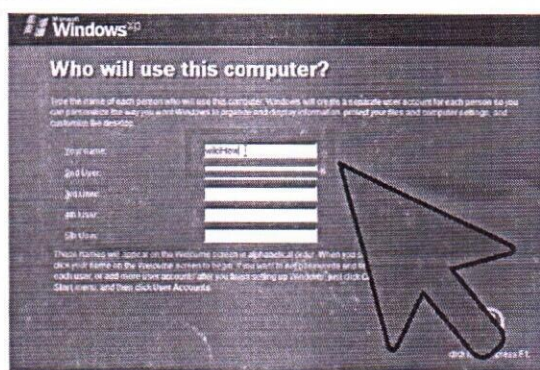
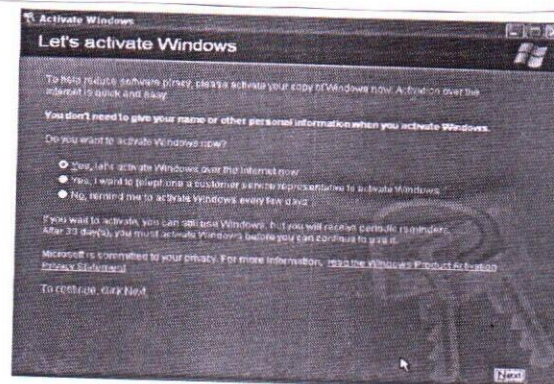
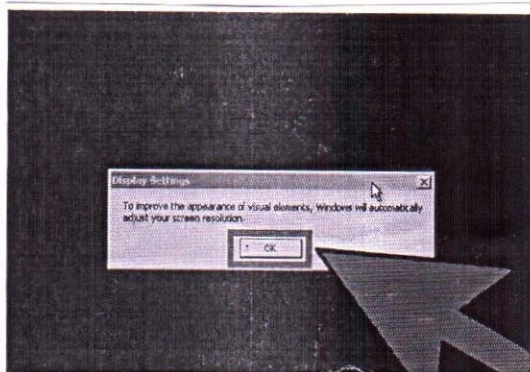
Now you will need to wait for the installation to continue before you can do anything more.

Step 12 : Display settings

The installation will prompt you to improve the display settings you will used to press the ok button for this to continue.

Step 13 : protecting your computer and Giving It a user

After pressing ok in the step, you will see the microsoft windows welcome screen appear. on this page, you will want to press the next button at the buttom right

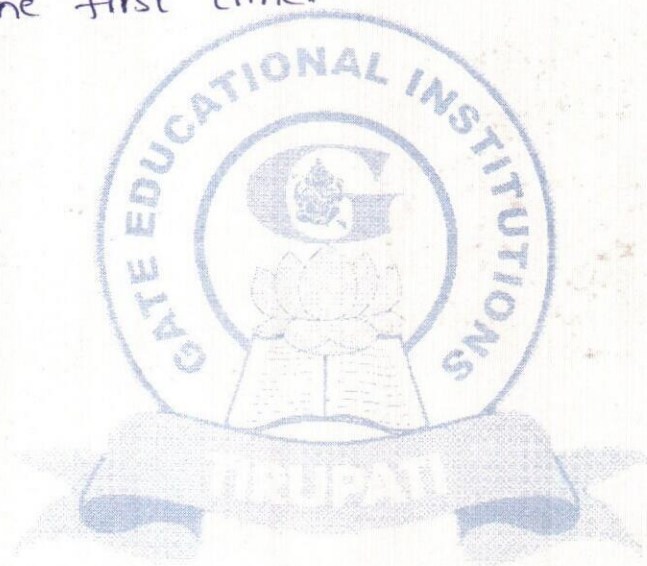


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Now you will be promoted to give the computer a user. After giving the computer at least one user you will need to press the next button.

step 14: Finishing the Installation

After pressing the next button, you will see a thank you screen. Now you will see that the computers has logged you in for the first time.

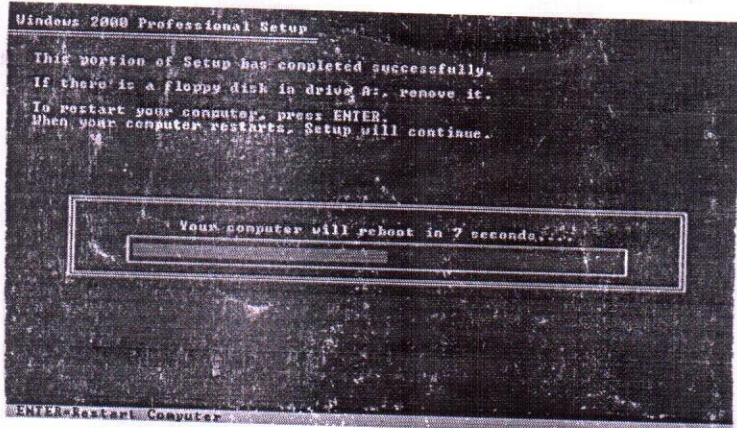
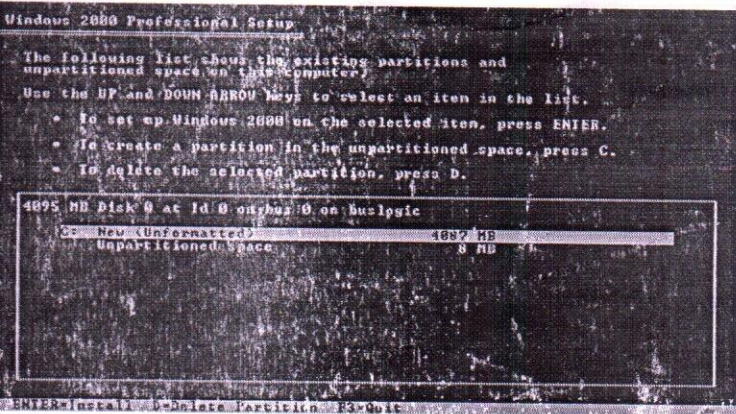
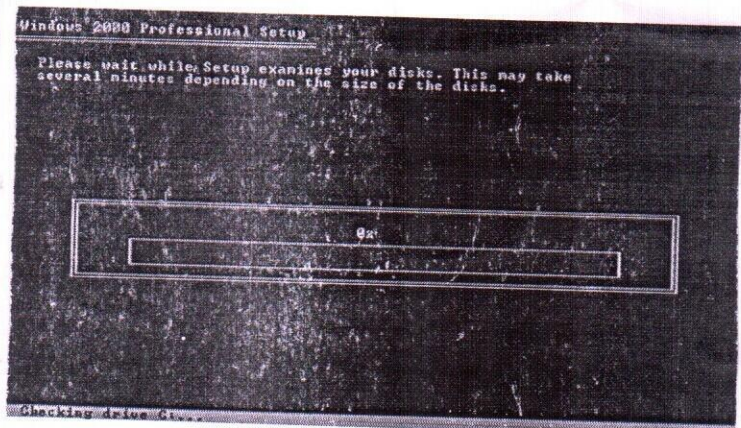
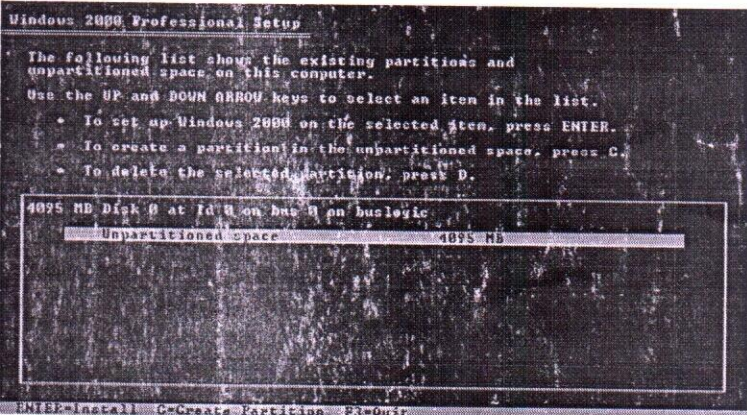
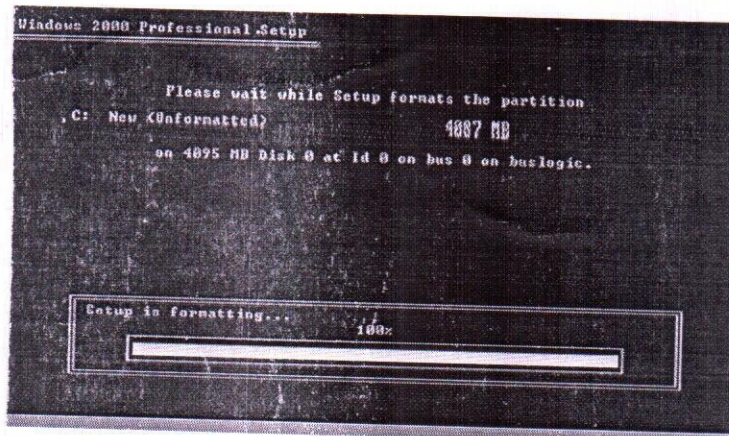
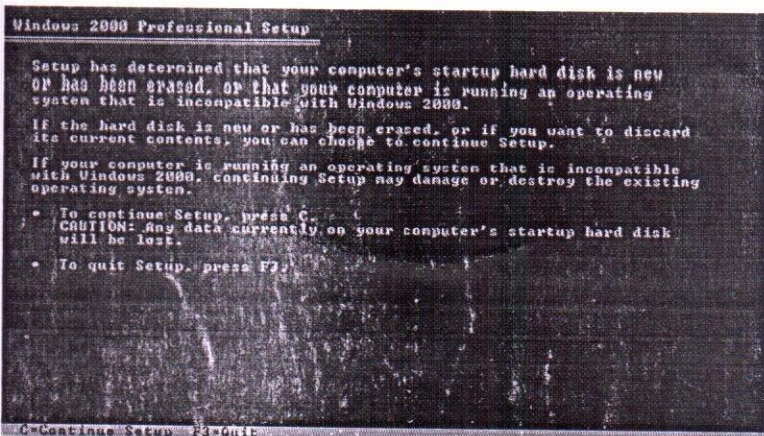
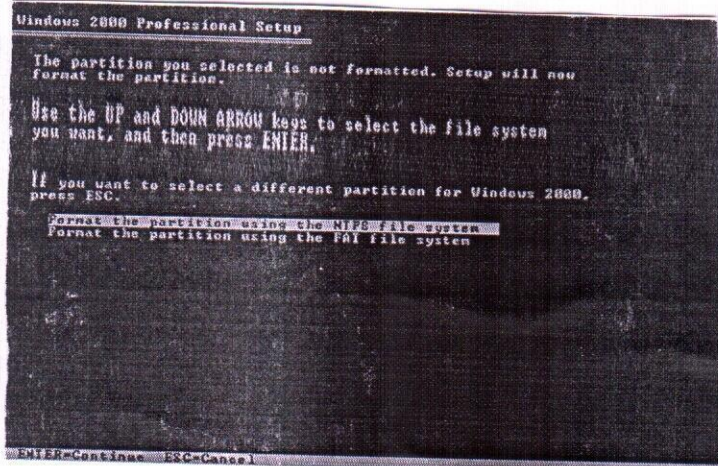
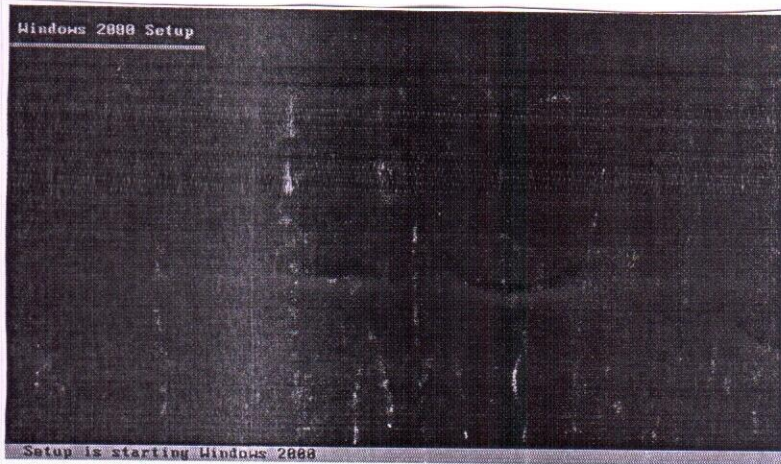


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	Installation of windows 2000 OS	Practical No. :

Installation of windows 2000 operating system on pc.

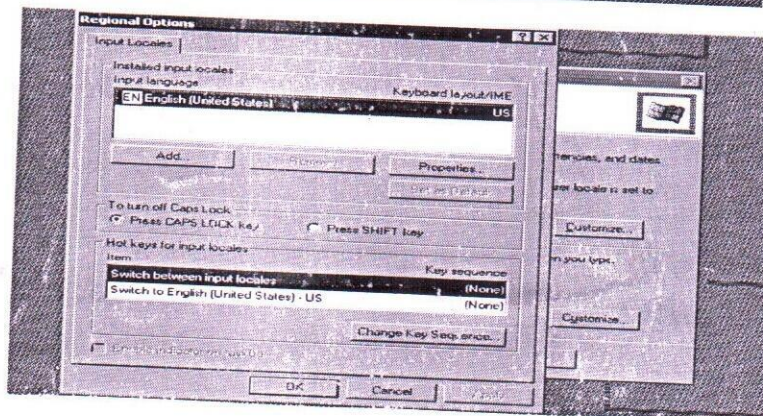
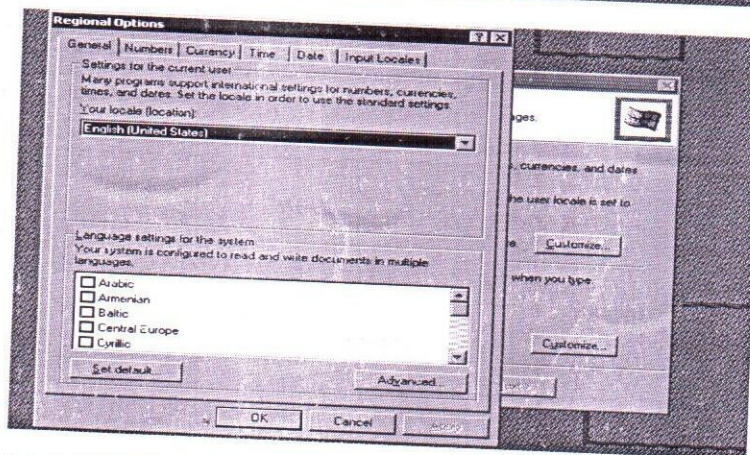
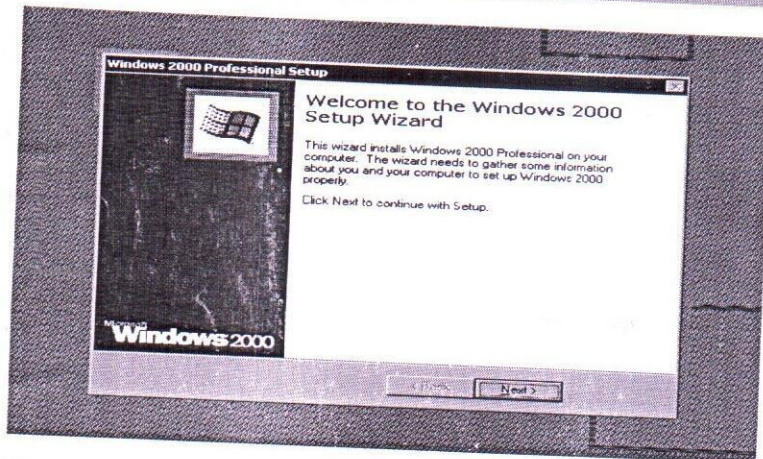
Windows 2000 professional installation:

- 1) set your computer to boot from the CD-ROM drive by changing computer.
- 2) Insert windows 2000 professional installation CD into the CD-ROM drive will boot from windows.
- 3) After your computer boot the windows 2000 professional installation CD-ROM, the windows 2000 setup then start checking the system configuration.
- 4) windows 2000 professional setup screen, then display the welcome to setup- press ENTER key to proceed with the installation process.
- 5) windows 2000 professional setup, detect that the hard disk is now or has erased, or that your computer.
- 6) windows 2000 the licensing agreement carefully, use the key to scroll down and up the licensing agreement.
- 7) windows 2000 professional setup screen then display the existing partition information. here, on this screen you can create new partition to this hard disk.



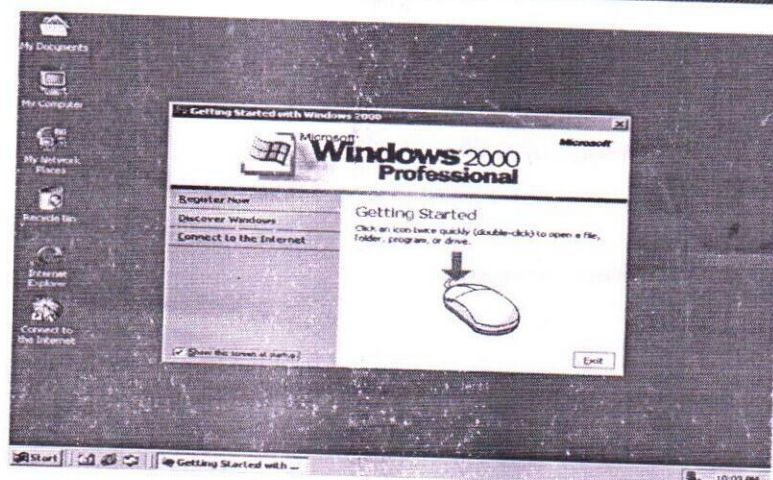
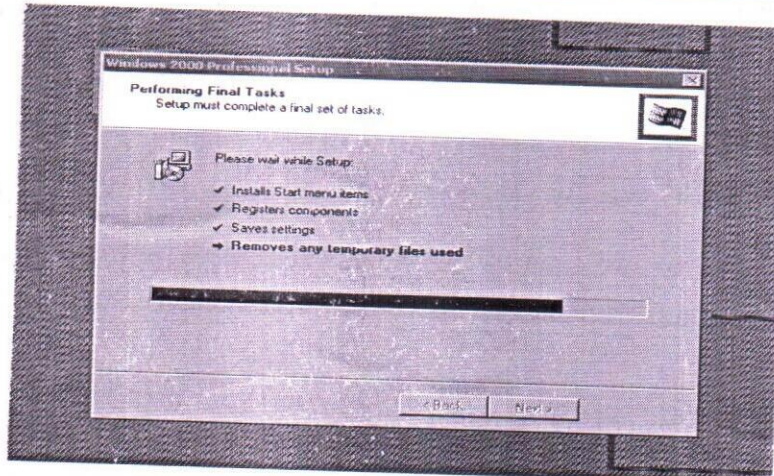
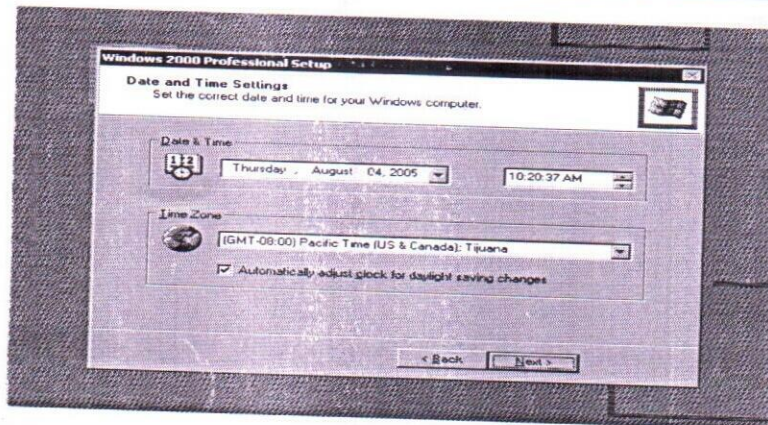
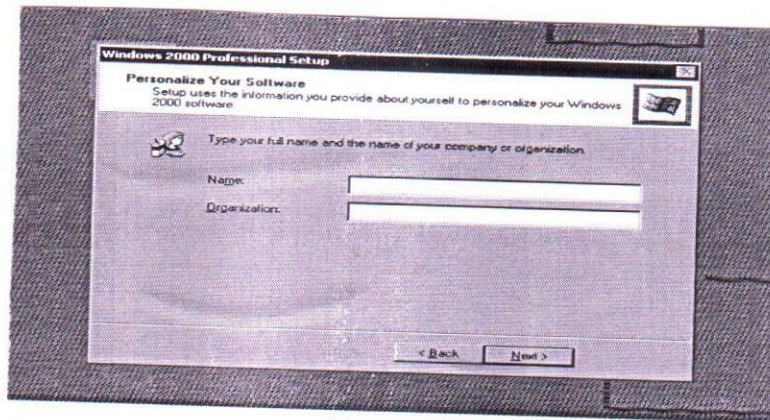
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- 8) windows 2000 professional setup then display the size of unpartition space on the disk that. We select in the above procedure.
- 9) windows 2000 professional setup screen then display the disk partition information.
- 10) windows 2000 professional setup screen the prompt that the partition selected is not formatted. In order to make your disk usable.
- 11) windows 2000 professional setup screen the display that the partition is being formatting the progress bar. show percentage of the formatted. wait for a while.
- 12) windows 2000 professional setup screen the copies files to the windows 2000 installation folder. The program bar show percentage.
- 13) windows 2000 professional setup screen then display that the portion of setup.
- 14) After restart, the microsoft windows 2000 professional screen will be display.
- 15) windows 2000 setup screen display. please wait
- 16) windows 2000 professional setup screen the display, welcome to windows 2000 setup wizard.



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- 17) windows 2000 professional setup screen display installing devices.
- 18) windows 2000 professional setup screen then display regional settings.
- 19) windows 2000 professional setup screen then display personali-ze your software.
- 20) windows 2000 professional setup screen then display your product key.
- 21) windows 2000 professional setup screen then display computer Name and Administrator password.
- 22) windows 2000 professional setup screen then display.
- 23) windows 2000 professional setup screen then display date and Time settings.
- 24) After windows install networking components progressbar.
- 25) windows 2000 professional setup screen then display work group or computer domain settings.
- 26) windows 2000 professional setup screen then display progress bar on the status of installing windows 2000 components.
- 27) windows 2000 professional setup screen then display performing final tasks window on this progress bar.

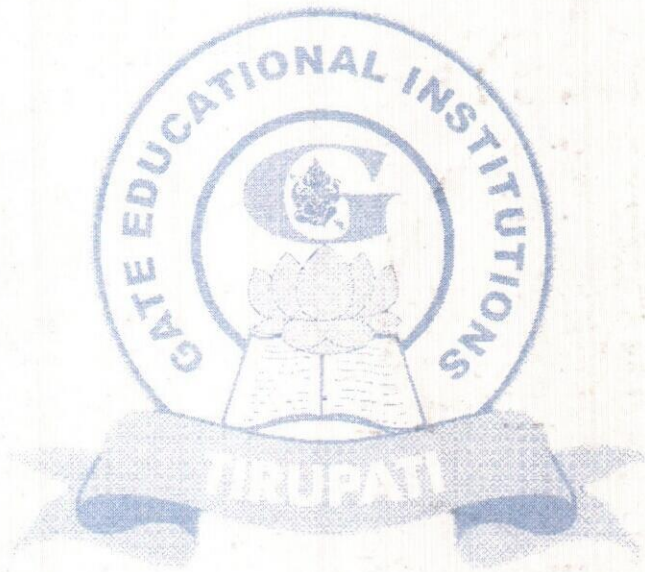


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28) After setup complete performing final tasks, the windows 2000 professional setup screen.

29) splash screen display windows 2000 professional is starting up on the first boot up after installation.

30) After windows finish loading, then the screen of windows 2000 professional, display the welcome window of the "Network Identification wizard".



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	Installation of windows NT OS	Practical No. :

Installation of windows NT operating system on pc.

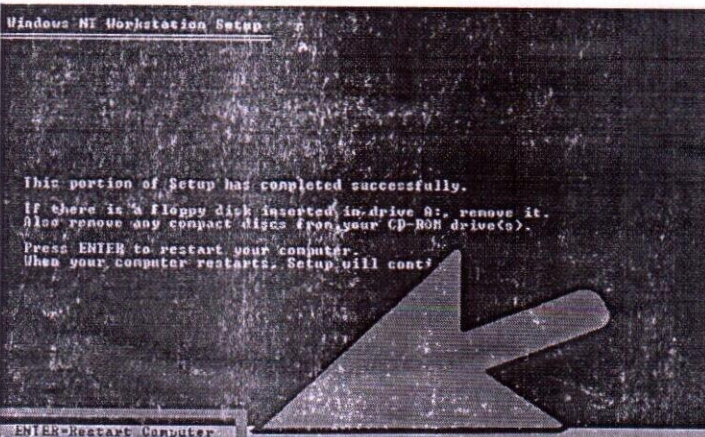
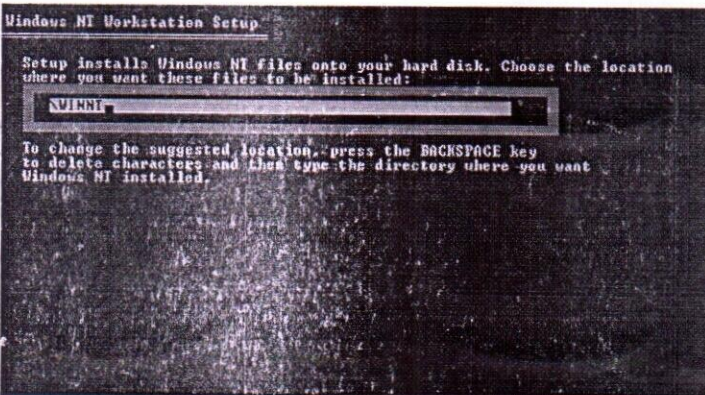
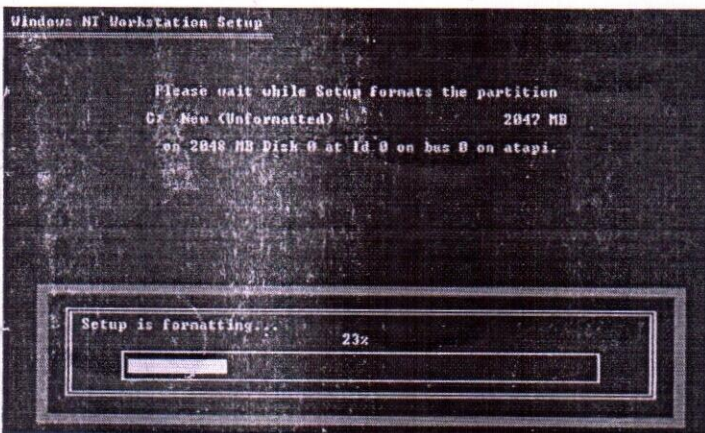
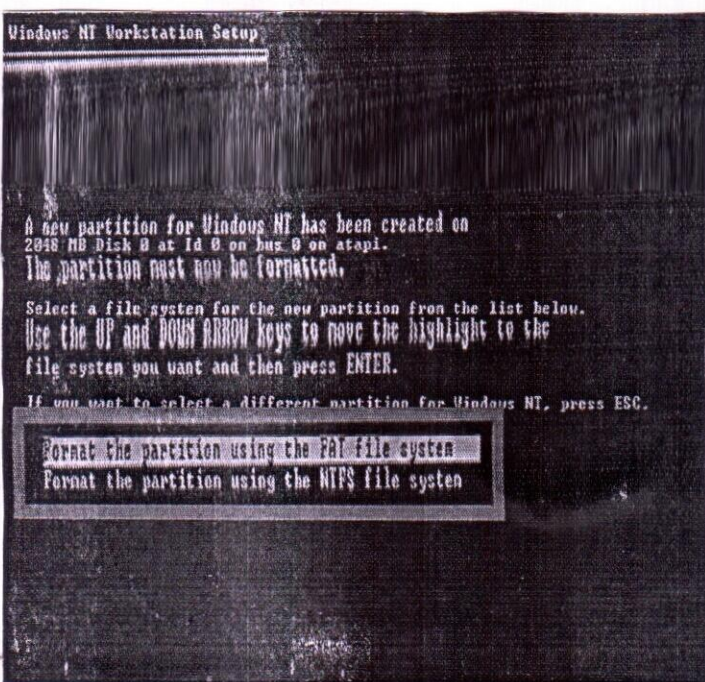
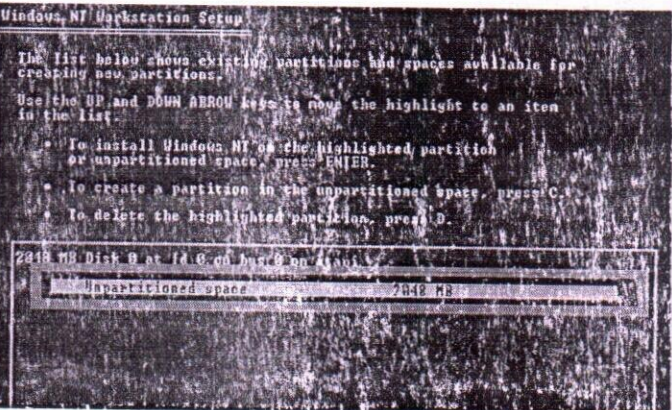
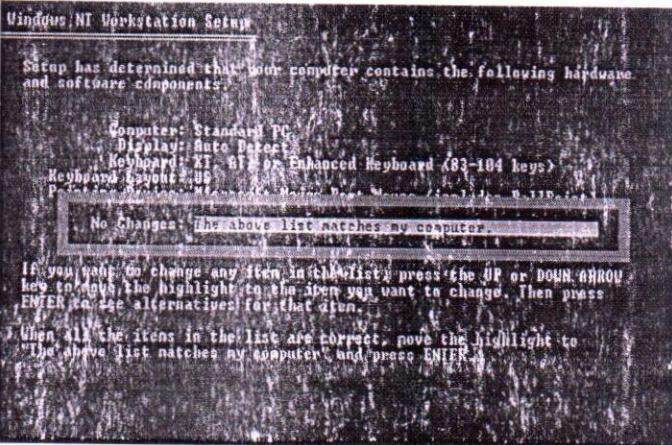
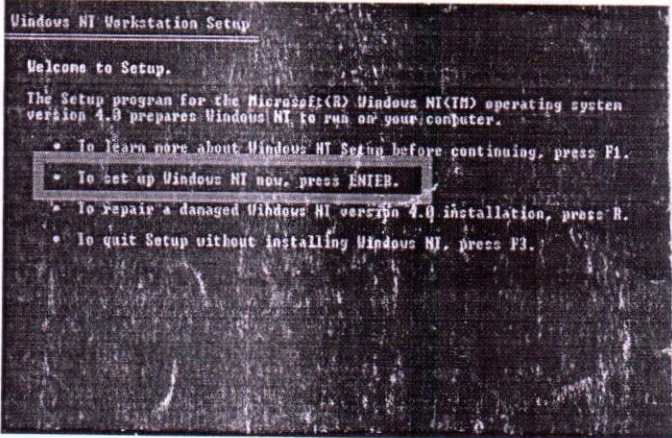
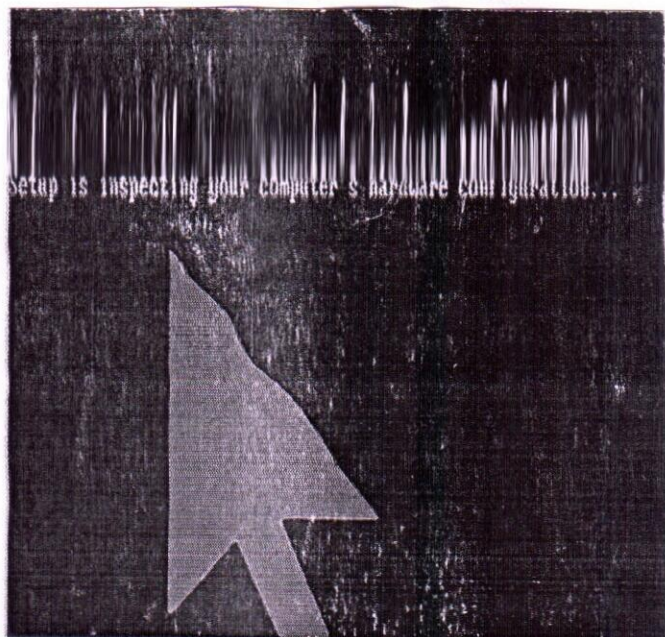
Installation of windows NT 4.0:

If you have a much older pc laying around that doesn't support the latest versions of windows, why not install an earlier version like windows NT well know you how to boot a pc from a windows NT 4.0 installation disc, install windows NT, and even get online!

Preparing to Install:

setup is inspecting your computer's hardware configuration. - - - - -

- * enter the windows NT 4.0 installation disc.
- * press enter to continue with the installation
- * press F8 to accept the terms and conditions.
- * check to see that the above list matches the specifications of your computer.
- * select the partitioning of your hard drive that you want to install windows NT 4.0 on and press enter.
- * choose the file system you would like to partition your hard drive.



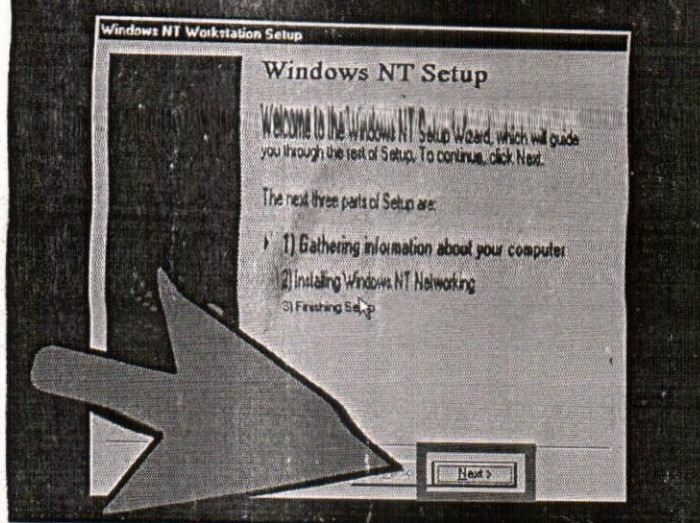
Date :

GATE Educational Institutions

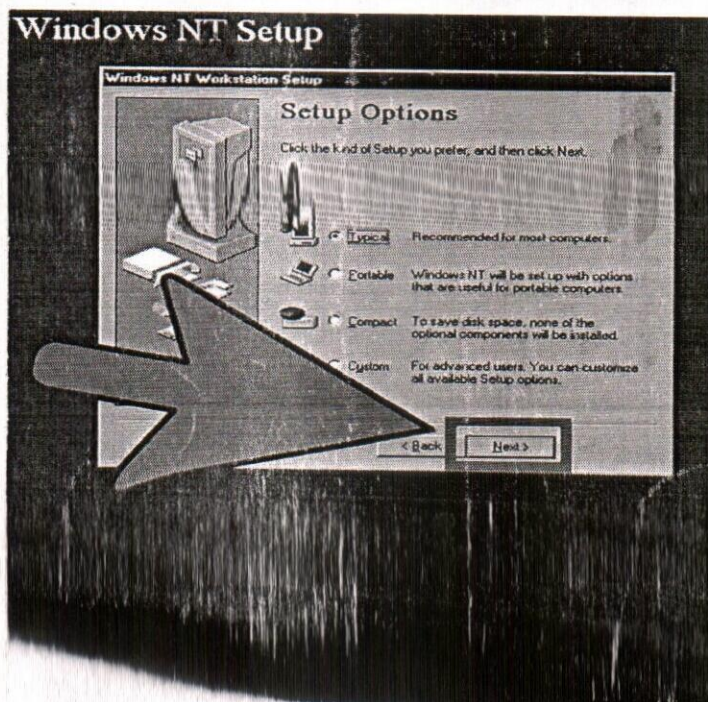
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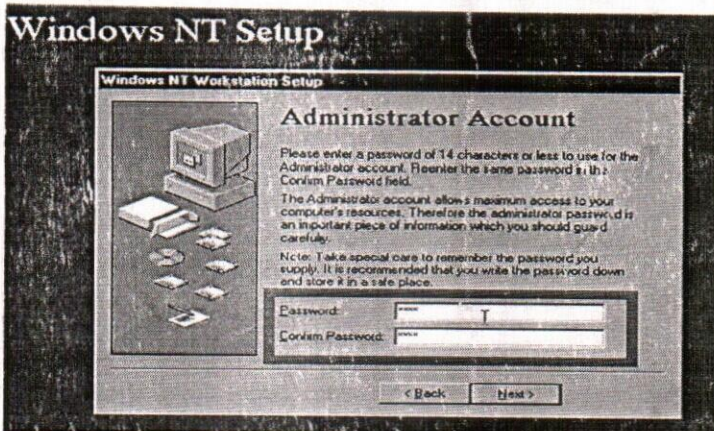
Windows NT Setup



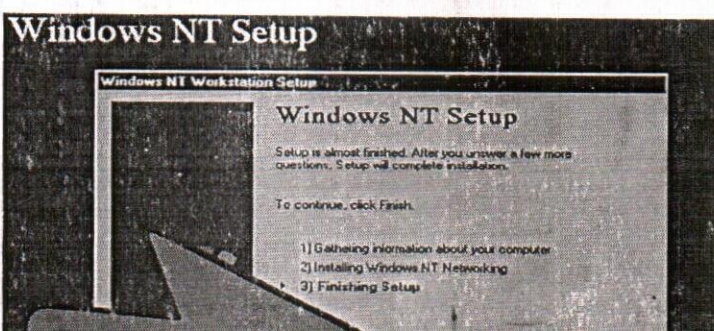
Windows NT Setup

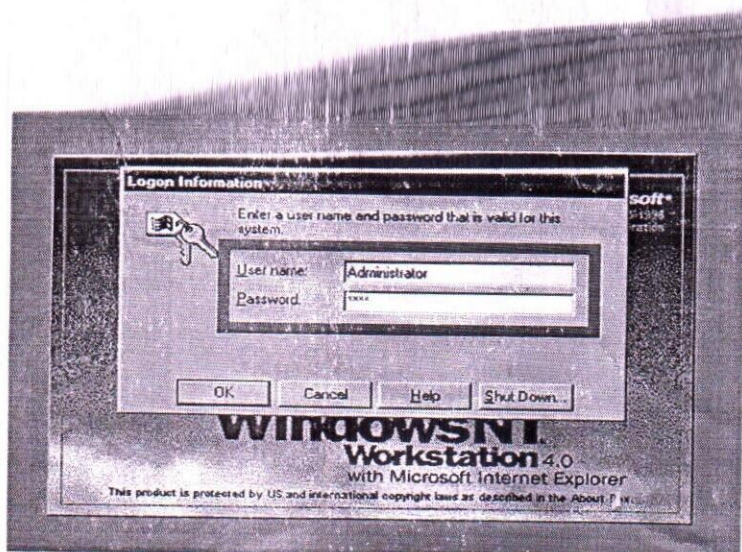
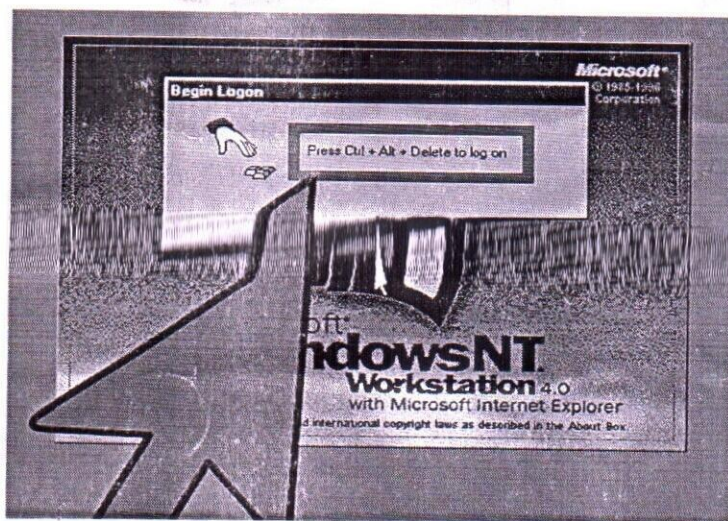


Windows NT Setup



Windows NT Setup





Date :	GATE Educational Institutions	Page No.:
	Installation of MS office	Practical No. :

Installation of MS office on PC.

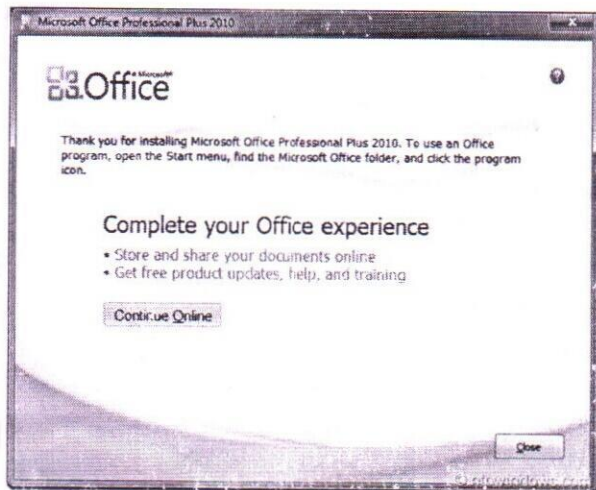
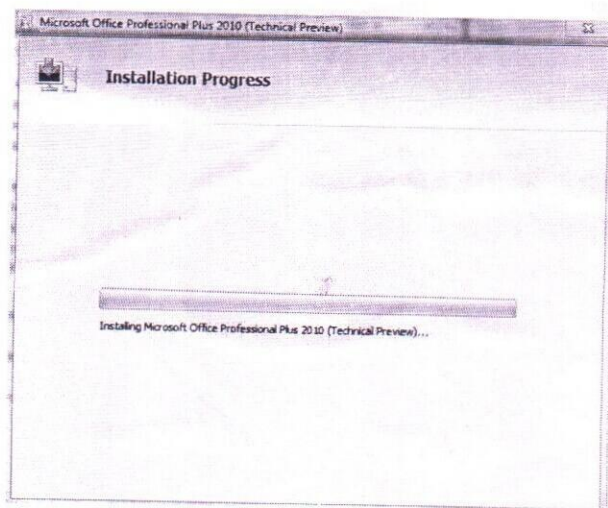
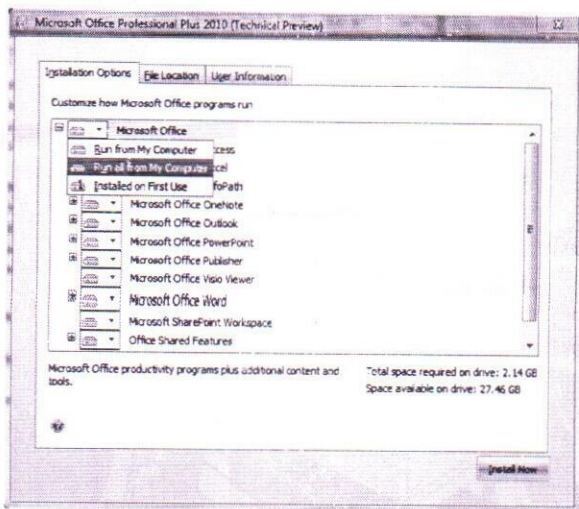
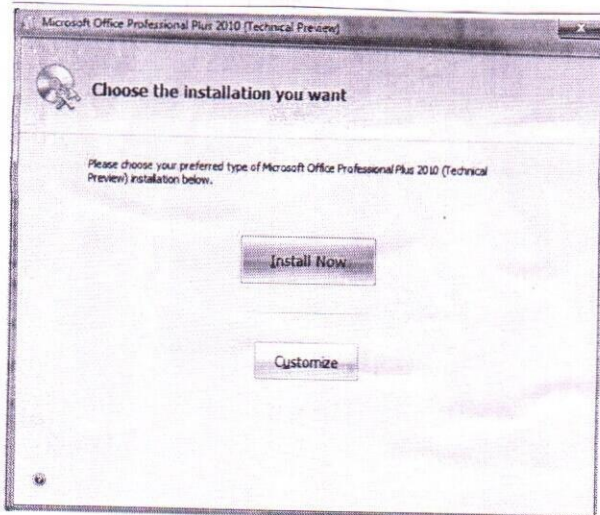
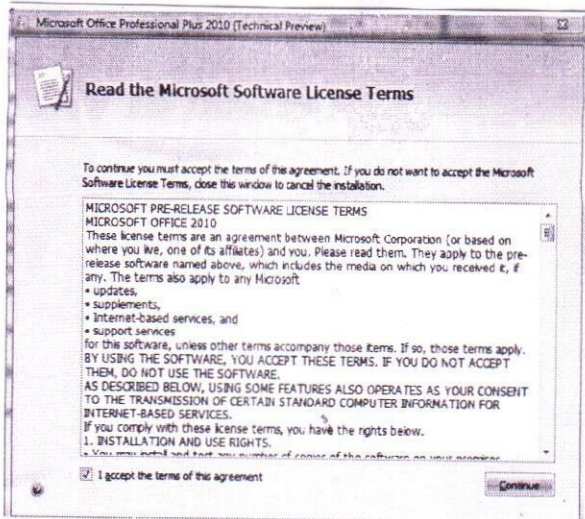
Installation Microsoft office Home includes the four foundation programs of the Microsoft office suite. Word, Excel, PowerPoint and OneNote. This is an excellent all-around version for those who are not using the suit for business purposes.

Hardware and Software requirements.

1. 500 MHz or faster processor
2. 256 MB or more RAM memory
3. 3 GB or larger available hard disk space.
4. 1024 x 578 display resolution
5. Windows XP SP3 (32-bit)
6. Windows Vista SP1 (32 or 64-bit)
7. Windows Server 2003 R2 (32 or 64-bit) with MSXML 6.0
8. Windows Server 2008 or later
9. Windows 7 (32 or 64-bit)
10. Windows Terminal Server and Windows on Windows applications are supported as well.

Installation Steps:

- 1) Before you do anything else, make sure that no program is running.
- 2) Wait for the installation window to appear. When the next window appears, click on 'Install' after selecting Microsoft Office 2010.



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		Practical No. :

3) select the features you want to install from the installation options tab.

4) enter the product key, this consists of 25 characters.

5) then a window will appear with agreement terms.

6) on the window that appears next choose upgrade to install or custom.

7) your program will appear next automatically install once you click on upgrade.

8) if you choose custom, modify your settings by clicking on configure preferences.

9) the installation will start and a bar will appear.

10) click on close and run microsoft office from the programs in the start menu.

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	preventive maintainance of a pc	Practical No. :

Preventive Maintenance of a PC

Preventive maintainance for Computer

Like many other places of technology, computers are constant wear and tear from being used simple things like downloading files, clicking on harmful sites by accident, and allowing dust to settle on the keyboard can build up to the computer slowing down and possibly being unusable. Whether they are tasks that should be done, below is a list of maintainence task to perform to get the most out use of your computer.

Daily :

1. Try to backup your data atleast once per-day-no one wants to lose projects you spent hours, if not days working on.
2. Run a malware scan to stay on top of virus prevention. If you have any real time prevention tools even then some viruses may slip by.
3. check for updates everyday so you don't miss any crucial upgrades, nor will you have to spend hours.
4. If you use your computer for many hours at a time during the day, then plan to restart it atleast once.

Department of Computers

1. use the defragmentation tool to keep your pc running fast and efficiently.
2. scan your hard drive for errors to make sure there are no physical problem occuring. This doesn't check for viruses or malware, but more so physical and logical problems.
3. clean out your disk drive every few weeks. similar to

Date :	GATE Educational Institutions	Page No.:
	control panel settings	Practical No. :

understanding control panel settings.

control panel settings:

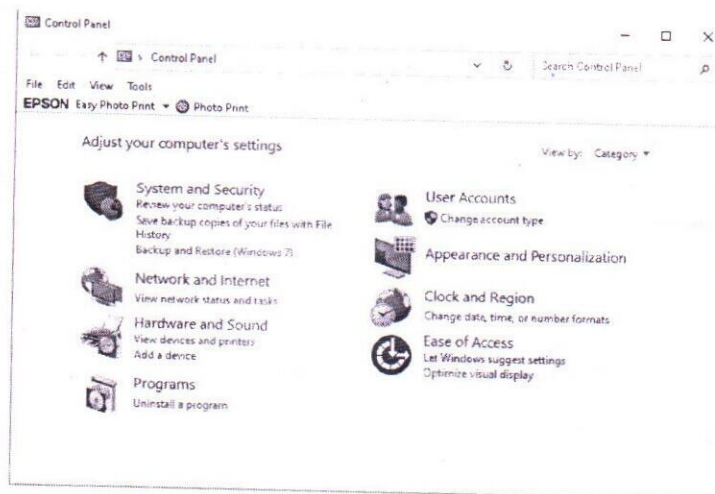
since its introduction in windows 95, the control panel has undergone many changes including adding, removing and removing of icons and the introduction of categories. This page helps you a better understand the control panel.

Below is a listing of each of the categories that are found in the windows control panel. Click one of the links below to jump to a section or scroll through them are to learn more about the control panel.

control panel categories:

1. Appearance and personalization
2. clock, language, and region
3. ease of Access.
4. hardware and sound
5. Network and Internet
6. programs
7. system and security
8. user Accounts

Control Panel:



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Appearance and personalization:

The appearance and personalization category allows you to change the look and feel of windows, which includes adjusting the theme, Below is a list of each of the sub categories of clock, Language and Region in windows 10.

clock, Language, and Region:

The clock, Language, and Region category is seen when viewing the control panel as categories and allows you viewing the control panel as categories and allows you the date, time and region settings in windows.

Date and Time:

opens the date and time window with the "change date and time" button that allows you to change the time zone.

Add clocks for different time zones:

opens the date and Time window in the Additional clocks tab that lets you to change the clocks when hovering over the taskbar clock.

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		Practical No. :

Language : open the language window that allows you to adjust, add and remove the display language and the input and handwriting language.

Add a Language : opens the language window and allows you to add a new language, remove languages, or set the language priorities if more than one language is selected.

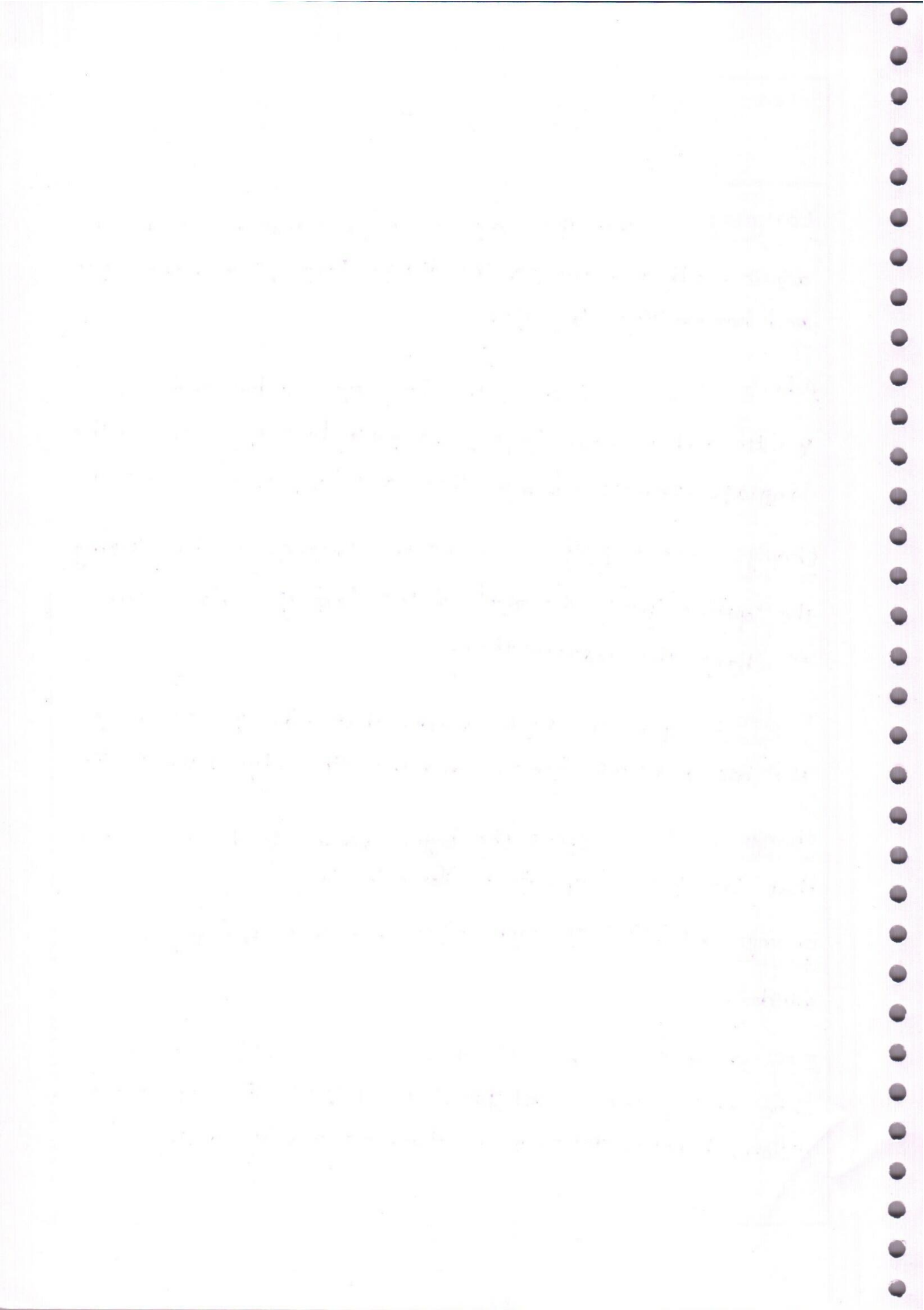
change Input Methods : opens the language window clicking the options link to the right of the language allows you to change the input methods.

Region : opens the Region window that allows you to change the date and time formats and the first day of the week.

change Location : opens the Region window in the location tab that lets you to specify the home location.

change date, time, or Number formats : opens the Region window.

Ease of Access : The ease of access is a category shown when viewing the control panel as categories that adjust the vision, hearing, speech recognition, and mobility settings.



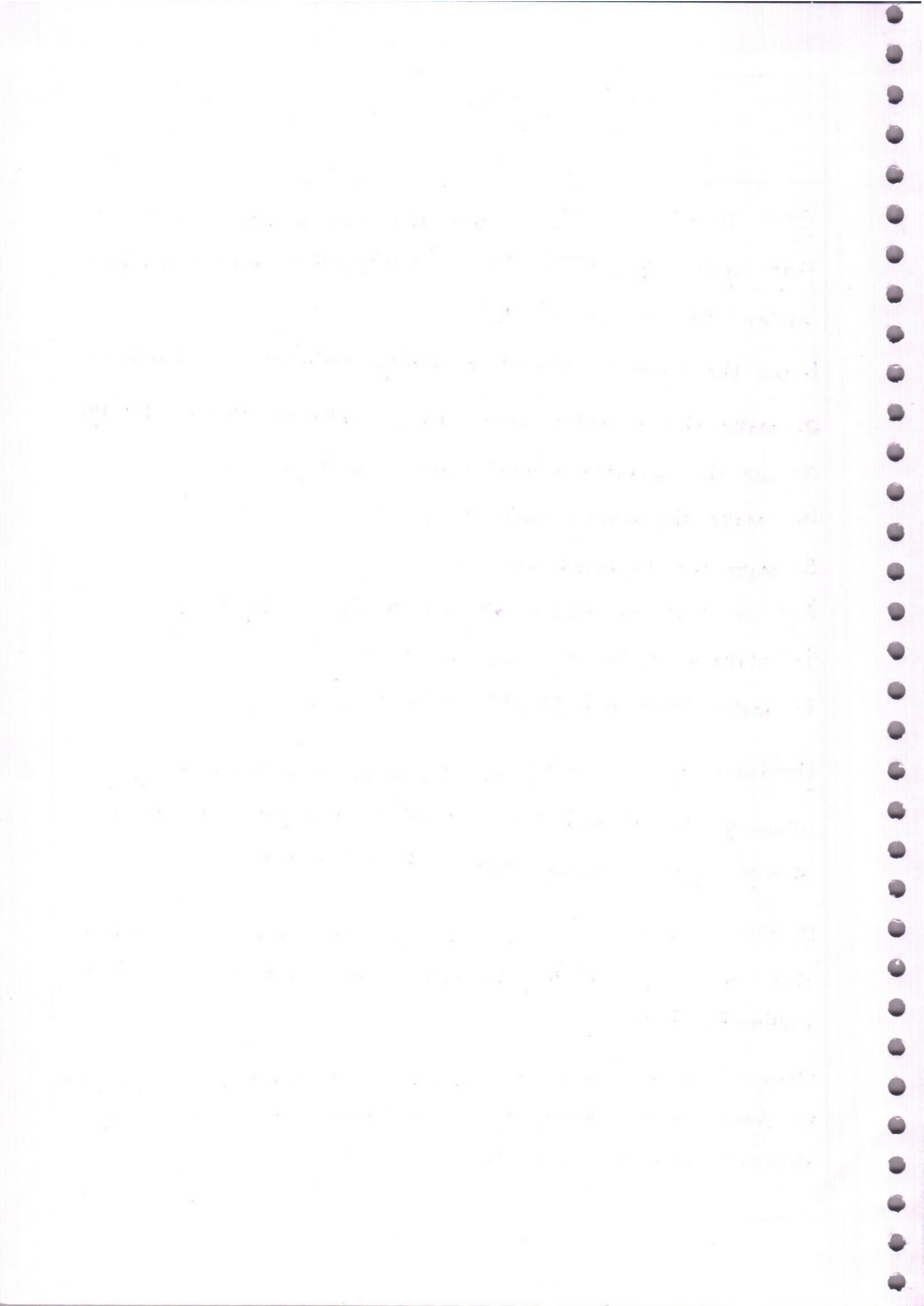
Ease of Access center: open the ease of Access center that gives you access to all settings. that makes windows easier to use for all users.

1. use the computer without a display - optimize for blindness
2. Make the computer easier to see - optimize visual display.
3. use the computer without a mouse or keyboard.
4. Make the mouse easier to use.
5. Make the keyboard easier to use.
6. use text or visual alternative for sounds.
7. Make it easier to focus on tasks
8. Make touch and tablets easier to use.

Hardware and Sound: The hardware and sound category allows you to add and Remove printers and other hardware, change system sounds, update drivers and more.

Devices and Printers: open the devices and printers window that shows you all the hardware devices, printers, and multimedia devices.

Network and Internet: The Network and Internet category is shown when viewing the control panel as categories of Network and Internet in windows 10.



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		Practical No. :

Network and sharing center: opens the Network and sharing center window to view basic networking information, set up a new connection, and troubleshoot network problems.

Programs: The programs category is shown when viewing the control panel as categories and allows you to get new programs and uninstall programs on your computer.

Programs and features: opens the program and features window that allows you to change, repair and uninstall any program that is installed on the computer.

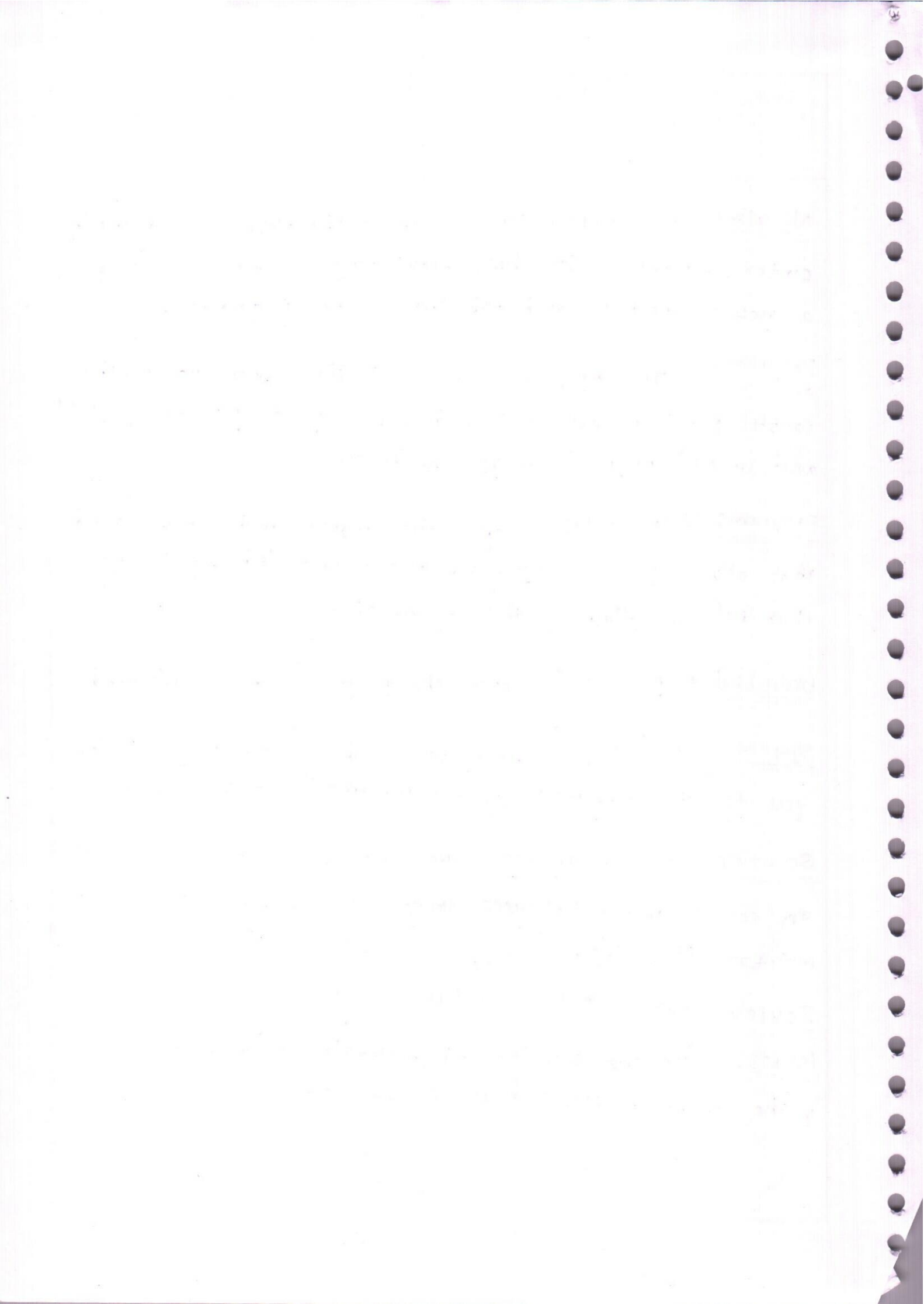
Uninstall a program: opens the program and feature window.

System and Security: The system and security category allows you to view computer system information and settings.

Security and maintenance: view the system security system. In security and maintenance, you're also able to adjust your maintenance settings.

Review your computer's status and Resolve:

Issues: open the security and maintenance and show any of the computer issues that are detected

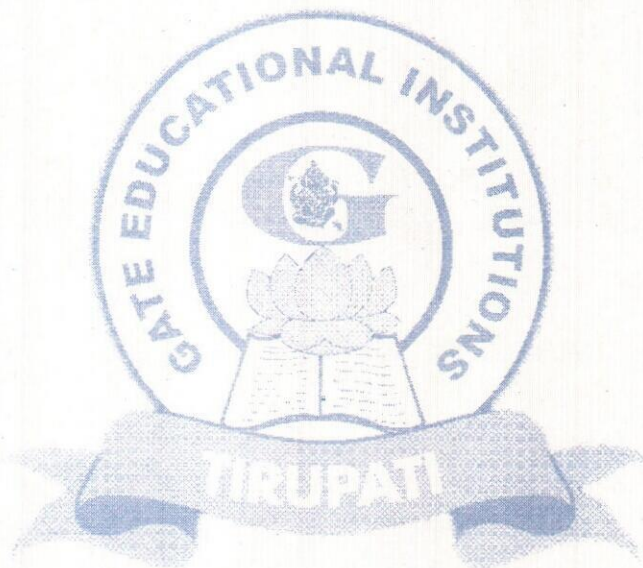


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User Accounts: The user accounts category is shown when viewing the control panel as categories and allow you to view user accounts, adjust her settings, and adjust the user settings.

change Account Type: opens the manage accounts window to adjust the account type of one or more of the users on the computer.

Remove user Accounts: opens the manage Accounts window



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	<u>Anti-virus software</u>	Practical No. :

Working with Anti-virus software:

Antivirus software usually works on the one of the two principles. either it scans programs and files as they enter your device and compares them to known viruses, or it scans programs already on your device.

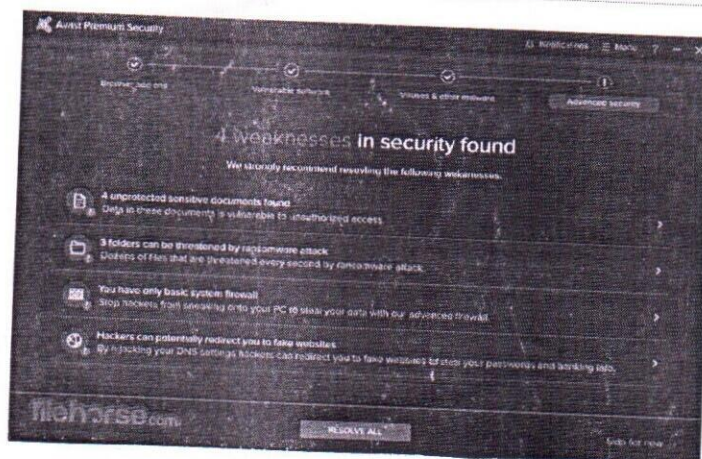
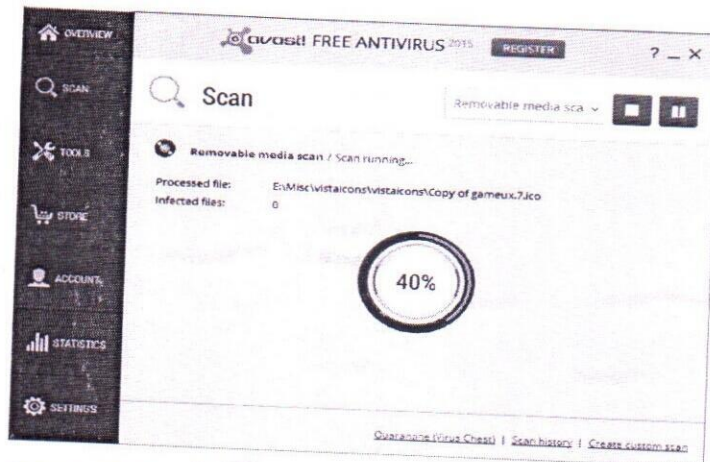
An anti-virus software is a great tool for protecting your computer. Most anti-virus soft accessed tools. scanning your computer for viruses may take a while, but doing it will ease your worries and secure your files.

Scanning for viruses

Locate your Anti-virus Software: Assuming you already have an anti-virus setup you can launch the software by accessing the system tray icon at the lower-right corner for windows.

- 1) click on the up arrow icon next to the system clock on windows. this should open the tray icon list
- 2) view the anti-virus interface once the anti-virus user interface has opened, you will see a menu that lets you select the tools to use along either the left or right side of the screen.

Anti-virus software;



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		Practical No. :

3) click the scan tool this usually resembles a magnifying glass or any icon related to searching.

4) select a scan option. At this point, your anti-virus will let you choose what sort of scan you want it to perform:

i) you can opt for a "Quick scan" which usually take a short amount of time and is less through out generally gets the job done.

ii) If you want a more through scan, you can choose "complete scan" to really let the program take, it's time to look for threats.

5) start scanning for viruses. After you've selected the scan option, click "start" to begin scanning for viruses.

6) wait for the anti-virus to finish scanning. Most anti-viruses will provide you a list of potential and actual threats either in real time or after time scan has completed

7) Removing virus threats

8) Restart your computer. This is to finalize the threat removal.

B. C. P.

Date :	GATE Educational Institutions	Page No.:
	Factorial of a Number	Practical No. :

Problem Definition:

Design and develop a java program to find out factorial of a number.

Description:

* The factorial of a non-negative integer 'n' denoted by $n!$ is the product of all positive integer less than or equals to n.

* The factorial of 'n' equals to the product of 'n' with the next small factorial.

Algorithm:

- step 1: start
- step 2: import package
- step 3: declare main method
- step 4: create factorial function
- step 5: check the condition and return the value.
- step 6: create an instance of scanner class.
- step 7: declare and initialize the variables.
- step 8: call the argument in the function
- step 9: print the factorial value.
- step 10: stop

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		Practical No. :

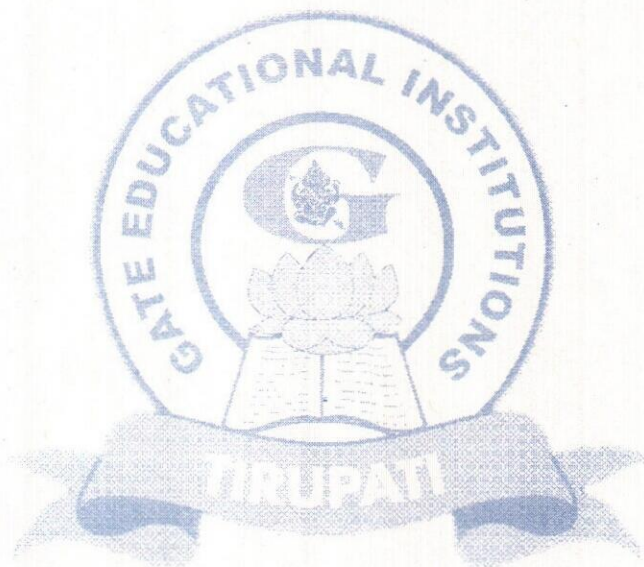
output:

Enter Number : 7

Factorial of the Number 7 is : 5040

conclusion:

The above Java program is executed successfully.



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		Practical No. :

1.recursive algorithm(Factorial).

```
//Java Program to find the Factorial of a Number import java.util.*; public class Main
{ static int factorial(int n){
    if (n == 0) return 1;
    else
        return(n * factorial(n-1));
} public static void main(String []args)
{
    //Take input from the user
    //Create an instance of the Scanner Class
    Scanner sc=new Scanner(System.in);
    //Declare and Initialize the variable int n,fact=1;
    int n=sc.nextInt(); fact =
    factorial(number);
    System.out.println("Factorial of "+n+" is: "+fact);
}
}
```

Output:

Enter the number: 5
Factorial of the number: 120

Date :	GATE Educational Institutions	Page No.:
	pigeonhole sort	Practical No. :

problem definition:

Design and develop a java program to implement pigeonhole sort.

Description:

- * The pigeonhole principle states that if we want must put $N+1$ or more pigeons into " N " pigeonholes, then some pigeonholes must contain two or more pigeons.
- * It is used to sort the numbers.
- * This principle is applicable in many fields like number theory, probability etc.

Algorithm:

- step 1: start
- step 2: Import package
- step 3: create main class
- step 4: create a function as pigeonhole sort
- step 5: declare and initialize the variables
- step 6: check the condition
- step 7: print the value of Range
- step 8: create while loop and increment array index to check.

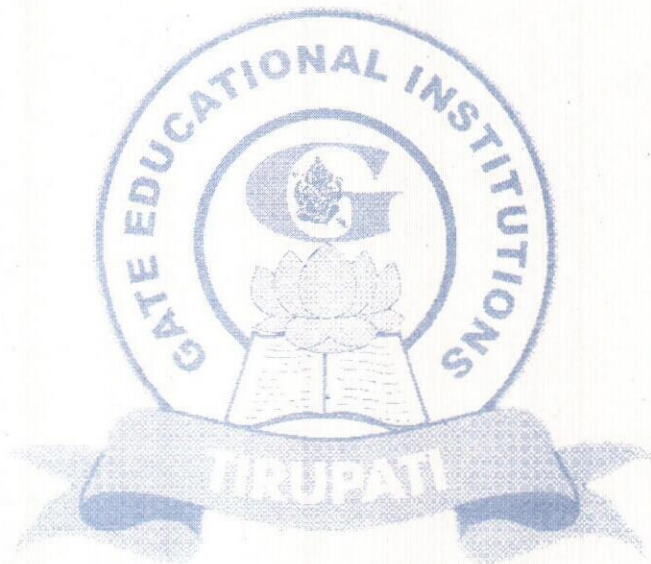
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step 9 : Declare main method

step 10 : Initialize the element in the array.

step 11 : sort the element or numbers of the array
in order.

step 12 : stop.



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		Practical No. :

output :

sorted order is :

2

3

4

6

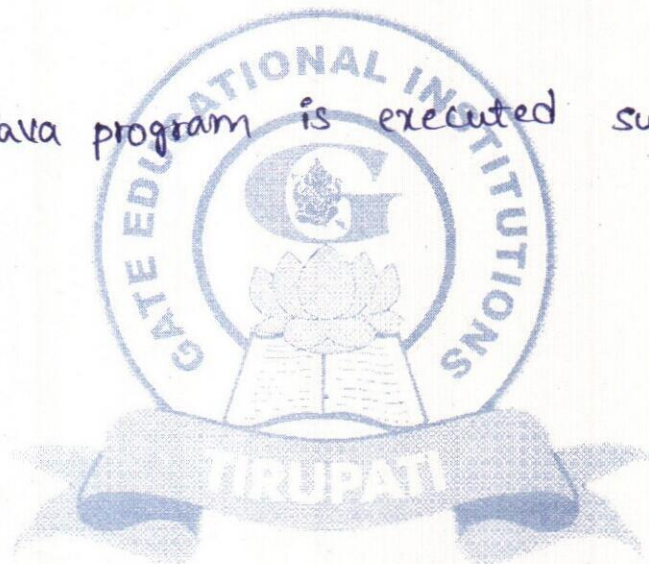
7

8

8

conclusion :

The above java program is executed successfully.




```
/* Java program to implement Pigeonhole Sort */ import  
java.lang.*; import java.util.*; public class GFG {
```

Practical No. : _____

```
public static void pigeonhole_sort(int arr[], int n) { int min  
= arr[0]; int max = arr[0]; int range, i, j, index; for (int a =  
0; a < n; a++) { if (arr[a] > max)
```

```
max = arr[a]; if (arr[a] < min)  
min = arr[a];
```

```
}
```

```
range = max - min + 1; int[] phole = new  
int[range]; Arrays.fill(phole, 0); for (i = 0; i  
< n; i++) phole[arr[i] - min]++; index = 0;  
for (j = 0; j < range; j++)
```

```
while (phole[j]-- > 0) arr[index++] = j +  
min;
```

```
} public static void main(String[] args)
```

```
{
```

```
GFG sort = new GFG();
```

```
int[] arr = { 8, 3, 2, 7, 4, 6, 8 };
```

```
System.out.print("Sorted order is : ");
```

```
sort.pigeonhole_sort(arr, arr.length);
```

```
for (int i = 0; i < arr.length; i++)
```

```
System.out.print(arr[i] + " ");
```

```
}
```

```
}
```

Output:

Sorted order is : 2 3 4 6 7 8 8

Date :	GATE Educational Institutions	Page No.:
	Binomial coefficient	Practical No. :

Problem Definition:

Design and develop a java program for Binomial coefficient.

Description:

* In mathematics, the binomial coefficient are the positive integer that occur as coefficient in the binomial theorem.

* commonly, Binomial coefficient of the indexed by a pair of integers as $n \geq k \geq 0$ and is written $\binom{n}{k}$.

It is the coefficient of x^k term in the polynomial expansion of binomial power $(1+x)^n$.

Algorithm:

step 1: start

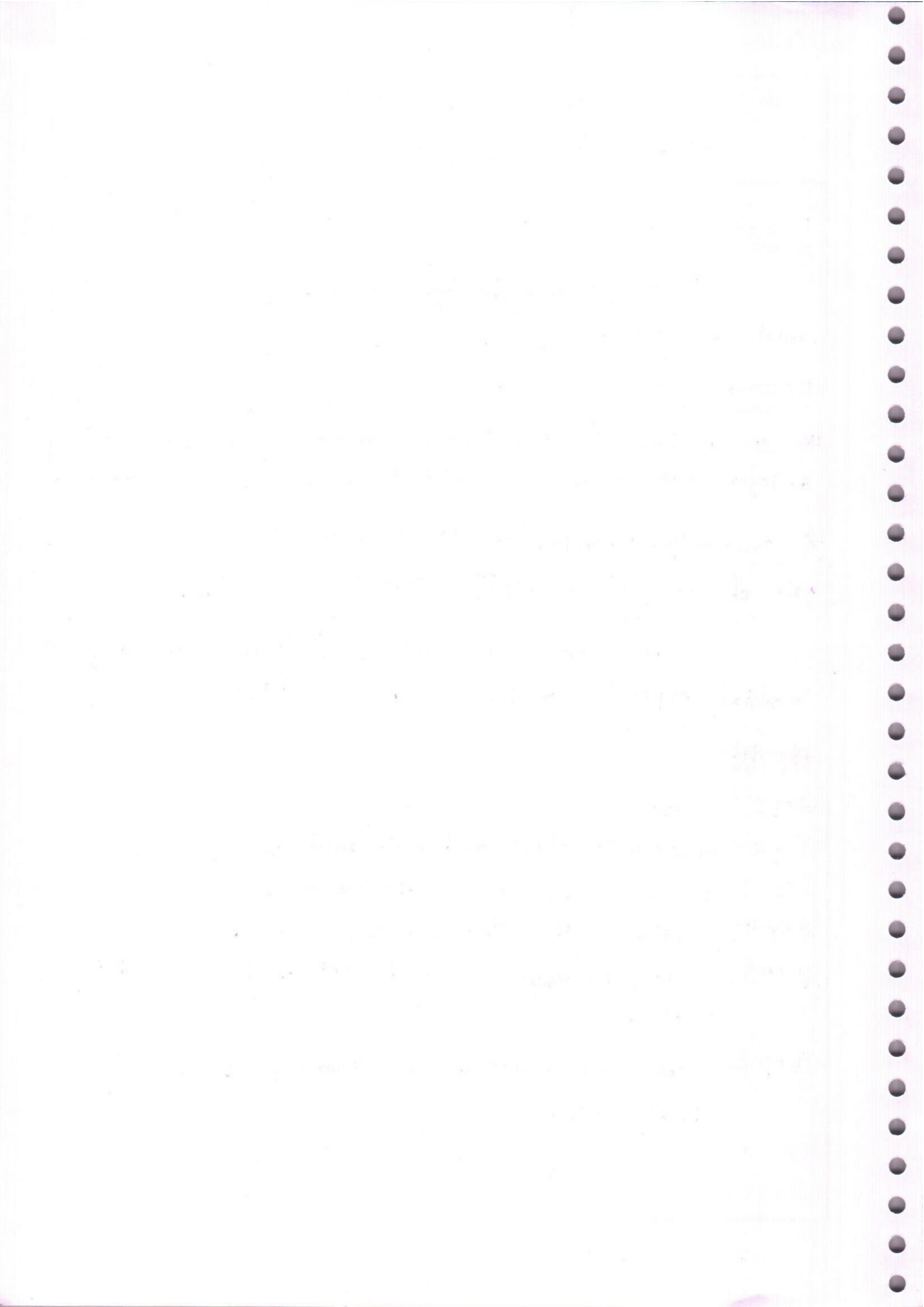
step 2: create main class and main method.

step 3: Declare and initialize the variables.

step 4: initialize the first row of binomial

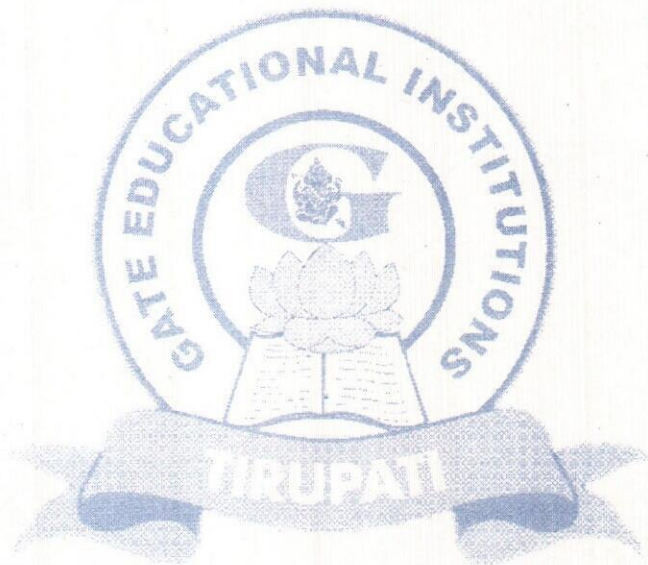
step 5: enter the values in co-efficient of binomial distribution.

step 6: enter the values in co-efficient as binomial distribution.



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step 7: start loop and check the condition
 step 8: print binomial co-efficient
 step 9: start loop and check the condition
 step 10: print the binomial coefficient
 step 11: stop.



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		Practical No. :

output:

243 1620 4320 5760 3840 1024

conclusion:

The above java program is executed successfully.



Date :	GATE Educational Institutions	Page No. :
<u>Binomial Coefficient. Program-i</u>		Practical No. :
<pre> public class BinomialDistribution { public static void main(String[] args) { int n = Integer.parseInt(args[0]); double[][] binomial = new double[n+1][]; // initialize first row binomial[1] = new double[1 + 2]; binomial[1][1] = 1.0; // fill in coefficients of binomial distribution for (int i = 2; i <= n; i++) { binomial[i] = new double[i+2]; for (int k = 1; k < binomial[i].length - 1; k++) binomial[i][k] = 0.5 * (binomial[i-1][k-1] + binomial[i- 1][k]); } // print binomial coefficients for (int i = 1; i <= n; i++) { for (int k = 1; k < binomial[i].length - 1; k++) { System.out.print(binomial[i][k] + " "); } System.out.println(); } } } Program-ii import java.io.*; class GFG { // function to calculate factorial of // a number static int factorial(int n) { int f = 1; for (int i = 2; i <= n; i++) f *= i; return f; } // function to print the series static void series(int A, int X, int n) { // calculating the value of n! int nFact = factorial(n); // loop to display the series for (int i = 0; i < n + 1; i++) { // For calculating the // value of nCr int niFact = factorial(n - i); int iFact = factorial(i); // calculating the value of </pre>		

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		Practical No. :

```
// A to the power k and X to // the power k
int aPow = (int)Math.pow(A, n - i);
int xPow = (int)Math.pow(X, i); // display the series
```

```
System.out.print((nFact * aPow * xPow)
```

```
/(niFact * iFact) + " ");
```

```
}
```

```
}
```

```
// main function started
public static void main(String[] args)
```

```
{ int A = 3, X = 4, n = 5;
```

```
series(A, X, n);
```

```
}
```

```
}
```

Output:

243 1620 4320 5760 3840 1024



Date :	GATE Educational Institutions	Page No. :
		Practical No. :

Move disk 2 from rodB to rod A

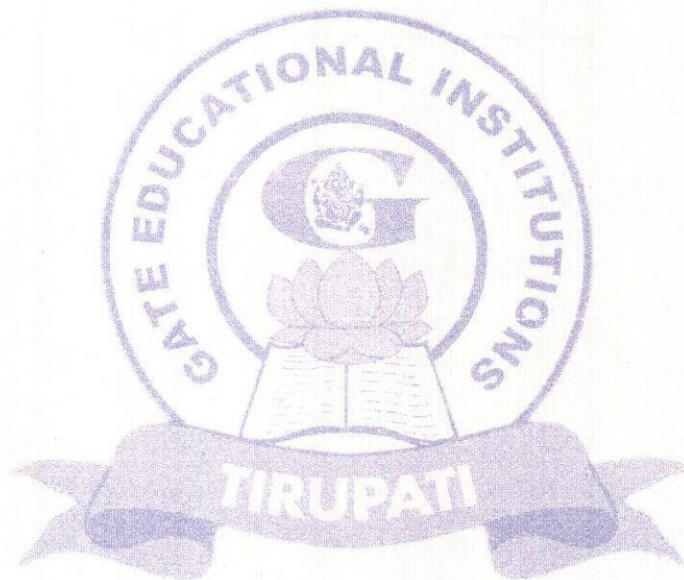
Move disk 1 from rod C to rod A

Move disk 3 from rod B to rod C

Move disk 1 from rod A to rod B

Move disk 2 from rod A to rod C

Move disk 1 from rod B to rod C



Date :	GATE Educational Institutions	Page No.:
	TOWERS of Hanoi	Practical No. :

Problem Definition :

Design and develop a java program to solve tower of Hanoi.

Description :

* Tower of Hanoi is a mathematical puzzle where we have three rods and n disks.

* The objective of the puzzle is to move the entire stack to another rod, obeying the following rules.

- 1) only one disk can be moved at a time.
- 2) each move consists of taking the upper disk, from one of the stack and placing it on top of another stack.
- 3) No disk may be placed on top of a smaller disk.

Algorithm :

step 1: start

step 2: create main class

step 3: Create a function to solve tower of Hanoi puzzle.

step 4: call the parameters in the function

step 5: if $(n==1)$ print the first moved disk

step 6: Again move the disks and print the moved disks.

Date :	GATE Educational Institutions	Page No.:
		Practical No. :

step 7: Create main method
step 8: Initialize number of disks
step 9: stop.



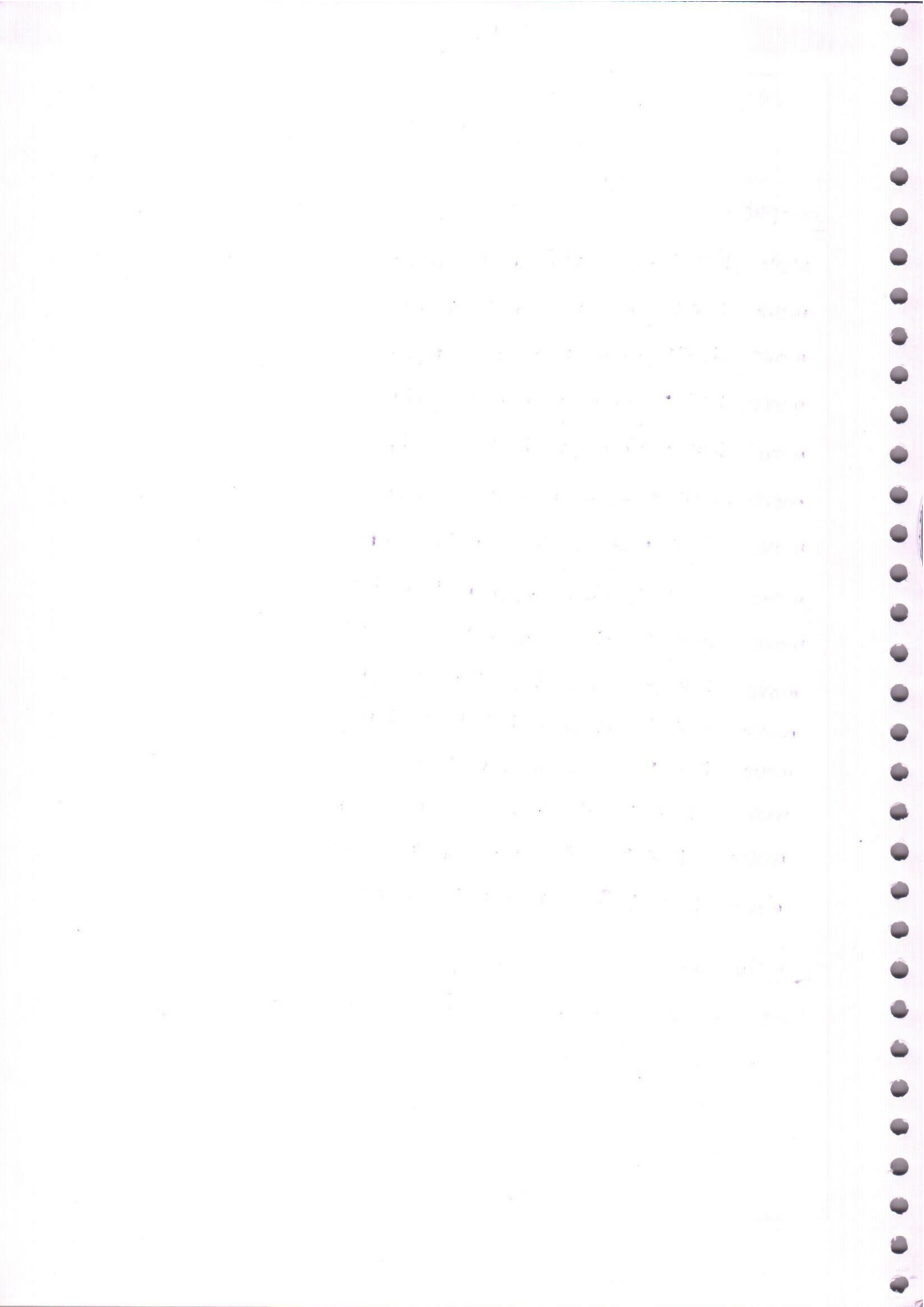
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		Practical No. :

output:

Move disk 1 from rod A to rod B
 move disk 2 from rod A to rod c
 move disk 1 from rod B to rod c
 move disk 3 from rod A to rod B
 move disk 1 from rod c to rod A
 move disk 2 from rod c to rod B
 move disk 1 from rod A to rod B
 move disk 4 from rod A to rod c
 move disk 1 from rod B to rod c
 move disk 2 from rod B to rod A
 move disk 1 from rod c to rod A
 move disk 3 from rod B to rod c
 move disk 1 from rod A to rod B
 move disk 2 from rod A to rod c
 move disk 1 from rod B to rod c

conclusion:

The above java program is executed successfully.



Date : Recurrence Relations (Towers of Hanoi) I Java program to solve tower of hanoi	GATE Educational Institutions	Page No. : Practical No. :
<pre> class GFEG { //Java recursive function to solve tower of hanoi puzzle static void towerOfHanoi(int n, char from_rod, char to_rod, char aux_rod) { if (n== 1) { System.out.println("Move disk 1 from rod "+ from_rod+ " to rod "+to_rod); return; } towerOfHanoi(n-1, from_rod, aux_rod, to_rod); System.out.println("Move disk " +n+ " from rod " + from_rod+ " to rod "+to_rod); towerOfHanoi(n-1, aux_rod, to_rod, from_rod); } // Driver method public static void main(String argsl) { int n = 4;// Number of disks towerOfHanoi(n, 'A', 'C', 'B'); //A, B and C are names of rods } } Out put: Move disk 1 from rod A to rod B Move disk 2 from rod A to rod C Move disk 1 from rod B to rodC Move disk 3 from rod A to rod B Move disk 1 from rod C to rod A Move disk 2 from rod C to rod B Move disk 1 from rod A to rod B Move disk 4 from rod A to rod C Move disk 1 from rodB to rod C </pre>		

Date :	GATE Educational Institutions	Page No.:
	Divide and conquer Techniques	Practical No. :

Problem definition :

design and develop a java program for divide and conquer technique.

Description :

- * Divide and conquer is an algorithm design paradigm.
- * A divide and conquer algorithm recursively breaks down a problem into two or more sub problems of the same or related type the solution to the sub-problem are then combined to give a solution to the original problem.

Algorithm:

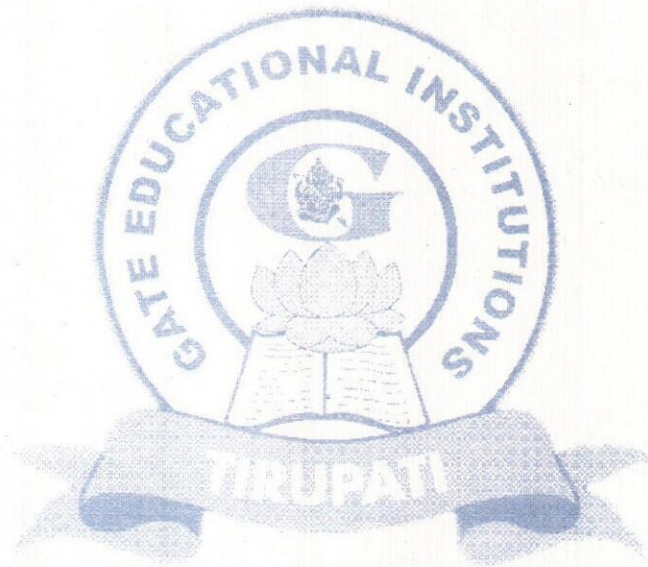
- step 1: start
- step 2: create main class
- step 3: create function and call the arguments
- step 4: declare array length
- step 5: if ($n < 2$) return array
- step 6: Divide the given array into half.
- step 7: Again divide that sub Array.
- step 8: Divide the sub-array until modules or single element.
- step 9: Merge these stored values one by one

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step 10: Merge or sort the total array.

step 11: Return result

step 12: stop.



Date :	GATE Educational Institutions	Page No.:
		Practical No. :

output:

{7,9,2,3,1}

{7,9} {2,3,1}

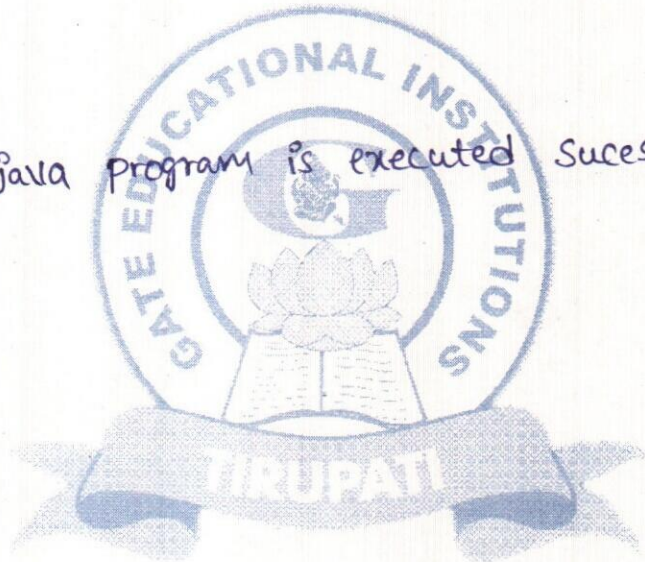
{7,9} {1,2,3}

{1,2,3} {7,9}

1,2,3,7,9

conclusion:

The above java program is executed successfully



Date :	GATE Educational Institutions	Page No. :
Divide and conquer		Practical No. :


```

import java.util.Arrays; public class
MergeSortTopDown { public int[] sort(int[] arr) {
int n = arr.length; if (n < 2) { return arr;
}

// divide the array in half int[] left =
Arrays.copyOfRange(arr, 0, n/2); int[] right =
Arrays.copyOfRange(arr, n/2, n);

// sort/conquer each half int[] sortedLeft =
sort(left); int[] sortedRight = sort(right);

// merge/combine the sorted halves return
merge(sortedLeft, sortedRight, n);
}

private int[] merge(int[] left, int[] right, int n) { int[] result =
new int[n]; int l = 0; int r = 0; for (int i = 0; i < n; i++) { if (l <
left.length && (r >= right.length || left[l] <
right[r])) {
result[i] = left[l]; l++; } else {
result[i] = right[r]; r++;
}
} return result;
} public static void main(String[] args) { int[] a = {7, 9,
2, 3, 1};

a = new MergeSortTopDown().sort(a);
Arrays.stream(a).forEach(System.out::println);
}
}

```


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Problem Definition:

Design and develop a java program for graph-coloring.

Description:

- * Graph coloring is also called as vertex coloring.
- * Graph coloring is away of coloring the vertices of a graph such that no two adjacent vertices are of the same color called vertex coloring.

Algorithm:

Step 1: start

Step 2: Declare the variables

Step 3: create function to assign color.

Step 4: Initialize the values to the variables

Step 5: Declare try and catch blocks to write the statements.

Step 6: create functions as solve to assign colors recursively and throws an exception.

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Step 7 : check the condition

Step 8 : compare the vertex colors and assign colors

Step 9 : Create a function to check whether the entered color is valid for the vertex or not.

Step 10 : create main method

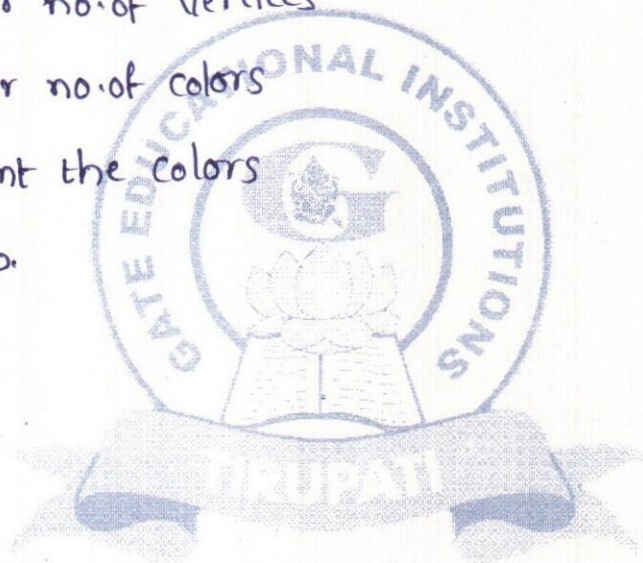
Step 11 : declare instance of scanner class

Step 12 : enter no. of vertices

Step 13 : enter no. of colors

Step 14 : print the colors

Step 15 : stop.



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Output:

enter the number of matrices

10

enter matrix

0 1 0 0 0 1 0 0 0 0

1 0 1 0 0 0 1 0 0 0

0 1 0 1 0 0 0 1 0 0

0 0 1 0 1 0 0 0 1 0

1 0 0 1 0 0 0 0 0 1

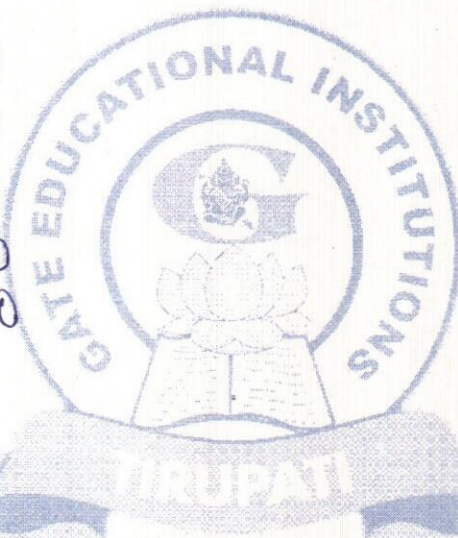
1 0 0 0 0 0 0 1 1 0

0 1 0 0 0 0 0 0 1 1

0 0 1 0 0 1 0 0 0 1

0 0 0 1 0 1 1 0 0 0

0 0 0 0 1 0 1 1 0 0



conclusion:

The above java program is executed successfully.

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.import java.util.Scanner; 6.

7 /** Class GraphColoring **/

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8 public class GraphColoring

9 {

10. private int V, numOfColors;

11. private int[] color; 12. private int[][] graph; 13.

14. /** Function to assign color **/

15. public void graphColor(int[][] g, int noc)

16. {

17. V = g.length;

18. numOfColors = noc;

19. color = new int[V]; 20. graph = g; 21.

22. try

23. {

24. solve(0);

25. System.out.println("No solution");

26. }

27. catch (Exception e)

28. {

29. System.out.println("\nSolution exists ");

30. display();

31. }

32. }

33. /** function to assign colors recursively **/

34. public void solve(int v) throws Exception

35. {

36. /** base case - solution found **/

37. if (v == V)

38. throw new Exception("Solution found");

39. /** try all colours **/

40. for (int c = 1; c <= numOfColors; c++)

41. {

42. if (isPossible(v, c))

43. {

44. /** assign and proceed with next vertex **/

45. color[v] = c;

46. solve(v + 1);

47. /** wrong assignement **/

48. color[v] = 0;

49. } 50. }

51. }

52. /** function to check if it is valid to allot that color to vertex **/

53. public boolean isPossible(int v, int c)

54. {

55. for (int i = 0; i < V; i++)
56. if (graph[v][i] == 1 && c == color[i])

57. return false;

58. return true;

59. }

60. /** display solution **/

61. public void display()

62. {

63. System.out.print("\nColors : ");

64. for (int i = 0; i < V; i++)

65. System.out.print(color[i] + " ");

66. System.out.println();

67. }

68. /** Main function **/

69. public static void main (String[] args)

70. {

71. Scanner scan = new Scanner(System.in);

72. System.out.println("Graph Coloring Algorithm Test\n");

73. /** Make an object of GraphColoring class **/74. GraphColoring gc = new GraphColoring(); 75.

76. /** Accept number of vertices **/

77. System.out.println("Enter number of vertices\n");78. int V = scan.nextInt(); 79.

80. /** get graph **/

81. System.out.println("\nEnter matrix\n");

82. int[][] graph = new int[V][V];

83. for (int i = 0; i < V; i++)

84. for (int j = 0; j < V; j++) 85. graph[i][j] = scan.nextInt(); 86.

87. System.out.println("\nEnter number of colors"); 88. int c =

scan.nextInt(); 89.

90. gc.graphColor(graph, c); 91.

92. }

93. }

Graph Coloring Algorithm Test

Enter number of vertices

10

Enter matrix

0 1 0 0 0 1 0 0 0 0

1 0 1 0 0 0 1 0 0 0

0 1 0 1 0 0 0 1 0 0

0 0 1 0 1 0 0 0 1 0

1 0 0 1 0 0 0 0 0 1

1 0 0 0 0 0 0 1 1 0

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0100000011

0010010001

0001011000

0000101100

Enter number of colors.

