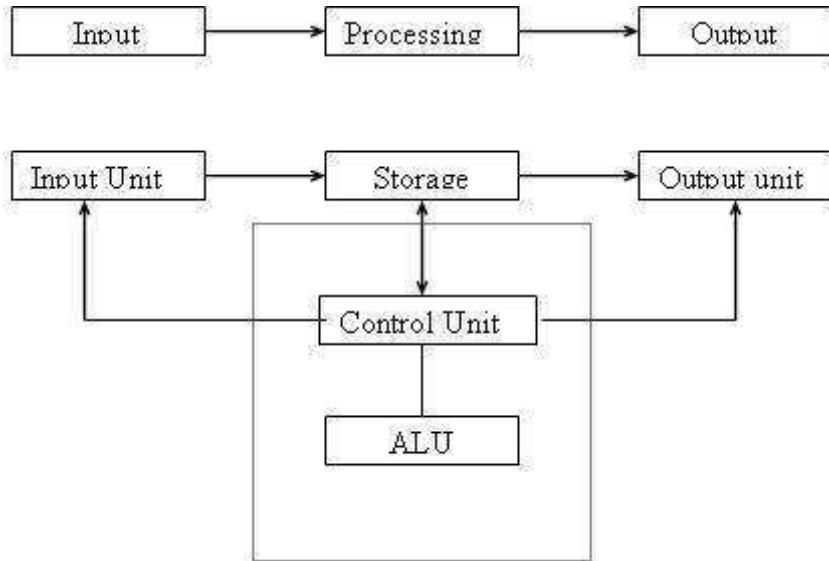


MODULE I

Task 1: Identification of peripherals of a PC, Laptop, Server and Smart Phones: Prepare a report containing the block diagram along with the configuration of each component and its functionality, Input/ Output devices, I/O ports and interfaces, main memory, cache memory and secondary storage technologies, digital storage basics, networking components, and speeds.

Block diagram of computer



1. Input Unit:

Computers need to receive data and instruction in order to solve any problem. Therefore we need to input the data and instructions into the computers. The input unit consists of one or more input devices. Keyboard is the one of the most commonly used input device. Other commonly used input devices are the mouse, floppy disk drive, magnetic tape, etc. All the input devices perform the following functions.

2. Storage Unit:

The storage unit of the computer holds data and instructions that are entered through the input unit, before they are processed. It preserves the intermediate and final results before these are sent to the output devices. It also saves the data for the later use. The various storage devices of a computer system are divided into two categories.

1. Primary Storage:

- Stores and provides very fast.
- This memory is generally used to hold the program being currently executed in the computer, the data being received from the input unit, the intermediate and final results of the program.
- The primary memory is temporary in nature.
- The data is lost, when the computer is switched off. To store the data permanently, the data has to be transferred to the secondary memory.
- The cost of the primary storage is more compared to the secondary storage. Therefore most computers have limited primary storage capacity.

2. Secondary Storage:

- Secondary storage is used like an archive.
- It stores several programs, documents, data bases etc.
- The programs that you run on the computer are first transferred to the primary memory before it is actually run. Whenever the results are saved, again they get stored in the secondary memory.
- The secondary memory is slower and cheaper than the primary memory. Some of the commonly used secondary memory devices are Hard disk, CD, etc.

Memory Size:

- All digital computers use the binary system, i.e. 0's and 1's. Each character or a number is represented by an 8 bit code.
- The set of 8 bits is called a byte. A character occupies 1 byte space. A numeric occupies 2 bytes space. Byte is the space occupied in the memory.
- The size of the primary storage is specified in KB (Kilobytes) or MB (Megabyte). One KB is equal to 1024 bytes and one MB is equal to 1000KB.
- The size of the primary storage in a typical PC usually starts at 16MB. PCs having 32 MB, 48MB, 128 MB, 256MB memory are quite common.

3. Output Unit:

- The output unit of a computer provides the information and results of a computation to outside world. Printers, Visual Display Unit (VDU) are the commonly used output devices.
- Other commonly used output devices are floppy disk drive, hard disk drive, and magnetic tape drive.

4. Arithmetic Logical Unit:

- All calculations are performed in the Arithmetic Logic Unit (ALU) of the computer. It also does comparisons and takes decision.
- The ALU can perform basic operations such as addition, subtraction, multiplication, division, etc and does logic operations viz, $>$, $<$, $=$, 'etc.

- Whenever calculations are required, the control unit transfers the data from storage unit to ALU once the computations are done, the results are transferred to the storage unit by the control unit and then it is sent to the output unit for displaying results.

5. Control Unit:

- It is responsible for directing and coordinating most of the computer system activities.
- It does not execute instructions by itself.
- It tells other parts of the computer system what to do.
- It determines the movement of electronic signals between the main memory and arithmetic logic unit as well as the control signals between the CPU and input/output devices.

6. Central Processing Unit:

- The control unit and ALU of the computer are together known as the Central Processing Unit (CPU). The CPU is like a brain and performs the following functions:
 - It performs all calculations.
 - It takes all decisions.
 - It controls all units of the computer.
- A PC may have CPU-IC such as Intel 8088, 80286, 80386, 80486, Celeron, Pentium, Pentium Pro, Pentium II, Pentium III, Pentium IV, Dual Core, and AMD etc.
- **Components of CPU:**

1. Power supply
2. Heat sink/fans.
3. Cabinet
4. Mother board
5. Processor
6. AGP
7. North bridge
8. South bridge
9. AGP
10. PCI slots
11. BIOS 12. CMOS

1. SMPS (Switching mode power supply)

- The power supply converts the **alternating current (AC)** from your mains (110V input or 220V input) to the **direct current (DC)** needed by the computer.
- In a PC, the power supply is the metal box usually found in a corner of the case.
- The power supply is visible from the back of many systems because it contains the power-cord receptacle

and the cooling fan.

- The typical voltages produced are: •3.3 volts, •5 volts, •12 volts



2. Heat Sinks/Fans:

- As processors, graphics cards, RAM and other components in computers have increased in speed and power consumption, the amount of heat produced by these components as a side-effect of normal operation has also increased.
- These components need to be kept within a specified temperature range to prevent overheating, instability, malfunction and damage leading to a shortened component lifespan.



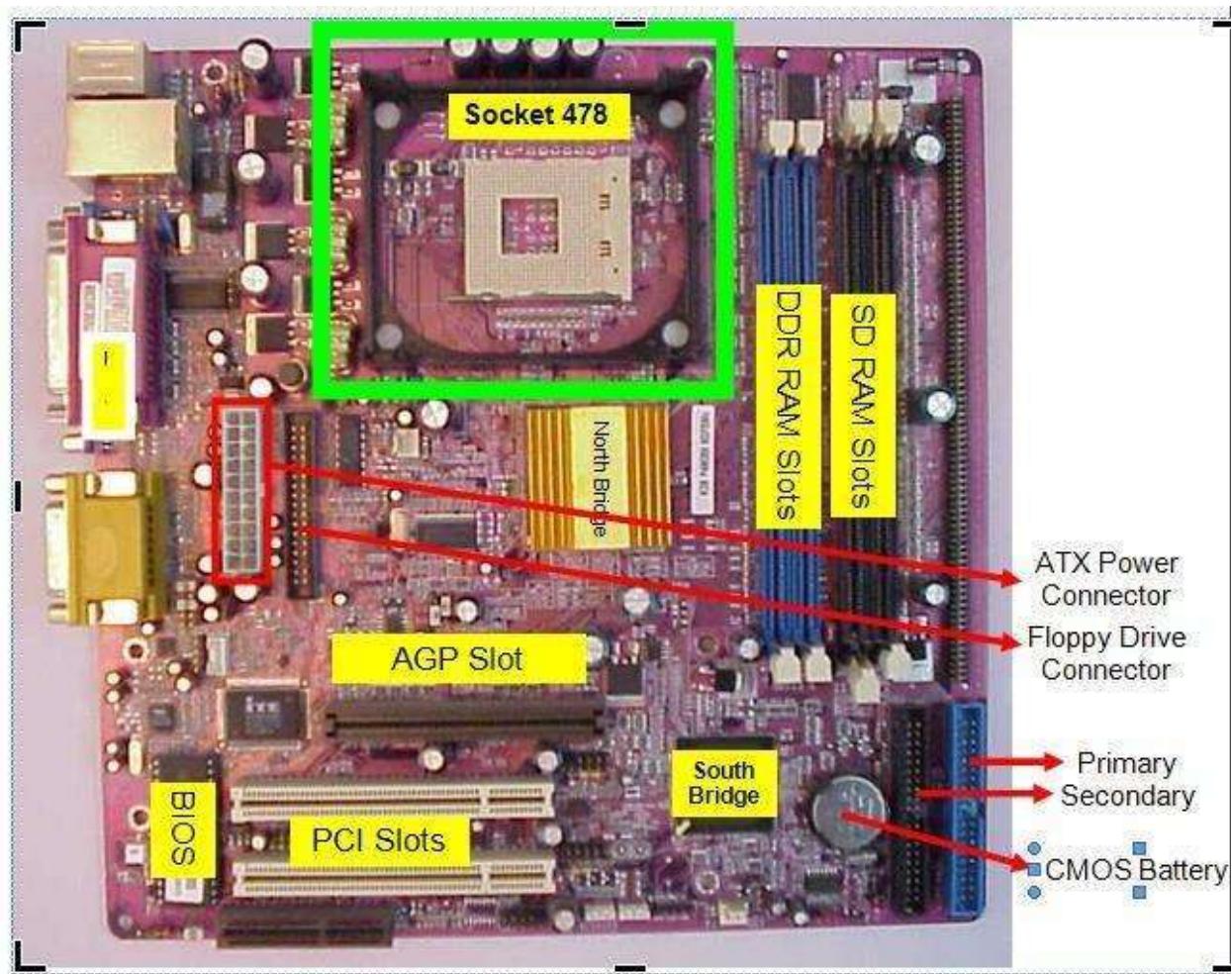
3. Cabinet/Case:

- A computer case (also known as a computer chassis, cabinet, box, tower, enclosure, housing, system unit or simply case) is the enclosure that provides protection to all the components from heat, light and temperature.
- If you are building your own computer, selecting the case will be one of your first choices to make: the type of case, its size, orientation, etc.



4.Motherboard:

- The motherboard is the key circuit board holding the essential processing parts of a Computer.
- It allows all the parts of your computer to **receive power and Communicate with one another**.
- It is usually screwed to the case along its largest face, which could be the bottom or the side of the case depending on the form factor and orientation.
- Attached directly to the motherboard are the CPU, RAM, expansion cards, networking, video, and audio components.



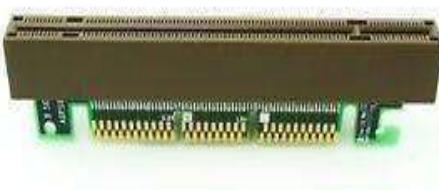
5.Processor/Socket:

- An **integrated circuit** (IC) supplied on a single silicon chip. Its function is to control all the computer's functions. The main processor manufacturers are: AMD & INTEL



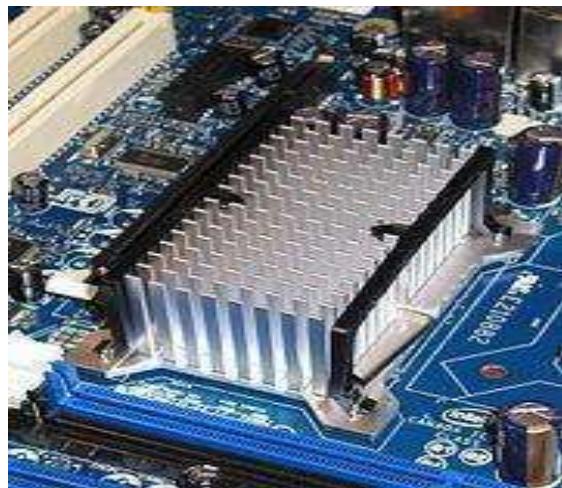
6. AGP(Accelerated graphical port)

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



7.North bridge

- **Northbridge** is an integrated circuit responsible for communications between the CPU interface, AGP, and the memory.
- Unlike the Southbridge, the Northbridge is directly connected to these components and acts like a "bridge" for the Southbridge chip to communicate with the CPU, RAM, and graphics controller



8.South bridge

- The **south bridge** is an IC on the motherboard responsible for the hard drive controller, I/O controller and integrated hardware.
- Integrated hardware can include the sound card and videocard if on the motherboard, USB, PCI, ISA, IDE, BIOS, and Ethernet.



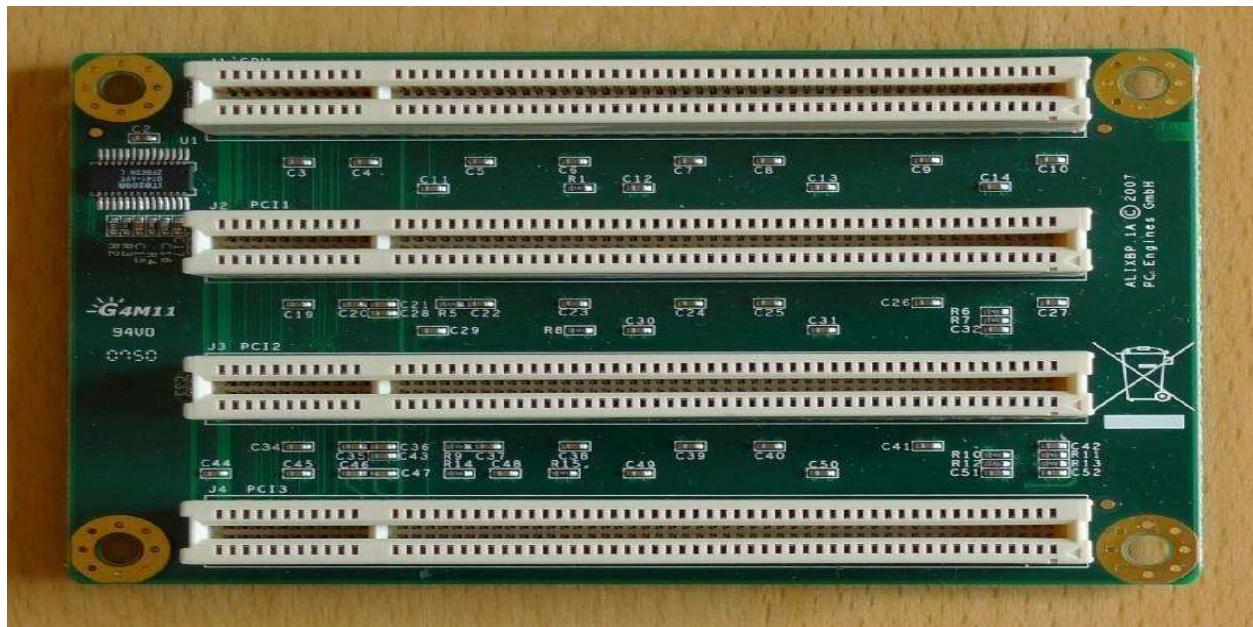
9.ATX Power connector

- ATX power connectors are designed to connect a computer's power supply to a motherboard.
- They are constructed of metal pins laid throughout a nylon matrix.



10.PCI Slots

- Peripheral Component Interconnect (PCI) slot is a connecting apparatus for a 32-bit computer bus.
- These tools are built into the motherboards of computers and devices in order to allow for the addition of PCI devices like modems, network hardware or sound and video cards.



11.BIOS (Basic input and output)

- Short for **Basic Input/Output System**, the **BIOS** (pronounced bye-oss) is a ROM chip found on motherboards that allows you to access and set up your computer system at the most basic level.
- The picture below is an example of what a BIOS chip may look like on a computer motherboard.
- The example picture below is of an early AMIBIOS, a type of BIOS manufactured by AMI.



12.CMOS(complementary metal-oxide-semiconductor)

CMOS is an onboard, battery powered semiconductor chip inside computers that stores information. This information ranges from the system time and date to system hardware settings for your computer.



ComputerHope.com

1.2 Input/ Output devices

1.2.1 Input devices

- In computing, an **input device** is a piece of computer hardware equipment used to provide data and control signals to an information processing system such as a computer or information appliance.
- Examples of **input devices** include keyboards, mouse, scanners, digital cameras, joysticks, and microphones.



1.2.2 Output Devices

- An **output device** is any **device** used to send data from a computer to another **device** or user.
- Most computer data **output** that is meant for humans is in the form of audio or video.
- Thus, most **output devices** used by humans are in these categories.
- Examples include monitors, projectors, speakers, headphones and printers.



1.3 I/O ports and interfaces

- Computer ports are interfaces between peripheral devices and the computer.
- They are mainly found at the back of the computer but are often also built into the front of the computer chassis for easy access.

Ports at the rear of the computer



Ports at the front of the computer



- **Serial port** - a 9-pin port. Often called Com ports - Com1, Com2 etc. Mice and external modems were connected to these ports. They are **turquoise** in colour.



- **Parallel port** - a 25-pin port used to connect printers, scanners, external hard disks etc. to the computer. **Burgundy** in colour, they are often called LPT ports - LPT1, LPT2 etc.



- **Video port** - used to connect a monitor to the computer system. There are two types:

- **VGA port** - This is a 15-pin port and is **blue** in colour. It is an analogue port and is being replaced by the DVI port.



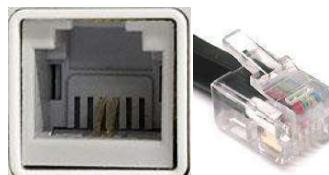
- **DVI port** - **white** in colour, it is a digital port. This means that no conversion is necessary between the computer and the monitor and that means that images can be produced more quickly on the monitor.



- **PS/2 port** - used to connect keyboards and mice to the computer. The keyboard port is **purple** and the mouse port is **green**



- **Modem port** - used to connect a modem to a telephone line. **RJ11** is the technical term for the port.



- **USB port** - Intended to replace Serial, Parallel and PS/2 ports with a single standard. 127 devices can be connected to a single USB port.



- **Ethernet port** - used to connect to a network. Known as **RJ45**, it is larger than a modem port.



- **Audio ports** - used to input and output audio from the computer. Three mini jack ports but there may be more:

Light blue - Line in - connect external devices

Lime - Connect the speakers to this port.

Pink - Connect a microphone to this port.



1.4 Primary Memory (Main Memory)

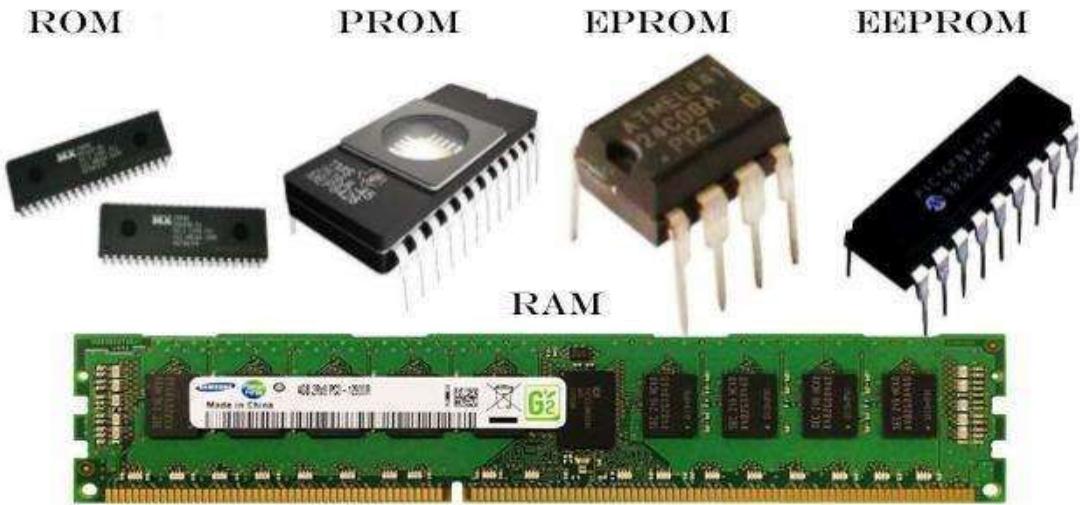
- Primary memory holds only those data and instructions on which the computer is currently working.
- It has a limited capacity and data is lost when power is switched off.
- It is generally made up of semiconductor device.
- These memories are not as fast as registers.
- The data and instruction required to be processed resides in the main memory. It is divided into two subcategories RAM and ROM.

- **Characteristics of Main Memory**

- These are semiconductor memories.
- It is known as the main memory.
- Usually volatile memory.
- Data is lost in case power is switched off.
- It is the working memory of the computer.
- Faster than secondary memories.
- A computer cannot run without the primary memory.

EPROM - Erasable Programmable Read-Only Memory

EEPROM- electrically erasable programmable read-only memory



1.5 Cache memory

- Cache memory, also called CPU memory, is high-speed static random access memory (SRAM) that a computer microprocessor can access more quickly than it can access regular random access memory (RAM).
- This memory is typically integrated directly into the CPU chip or placed on a separate chip that has a separate bus interconnect with the CPU.
- The purpose of cache memory is to store program instructions and data that are used repeatedly in the operation of programs or information that the CPU is likely to need next.
- The computer processor can access this information quickly from the cache rather than having to get it from computer's main memory.
- Fast access to these instructions increases the overall speed of the program.

1.6 Secondary storage devices:

➤ Hard disk

- The hard disk drive is the main, and usually largest, data storage hardware device in a computer.
- The operating system, software titles, and most other files are stored in the hard disk drive.



➤ Floppy disk

- A floppy disk drive (FDD), or floppy drive, is a hardware device that reads data storage information.
- It was invented in 1967 by a team at IBM and was one of the first types of hardware storage that could read/write a portable device.
- FDDs are used for reading and writing on removable floppy discs.
- Floppy disks are now outdated, and have been replaced by other storage devices such as USB and network file transfer.



➤ Flash drive

- Alternatively referred to as a USB flash drive, data stick, pen drive, memory unit, keychain drive and thumb drive, a jump drive is a portable storage device.
- It is often the size of a human thumb (hence the name), and connects to a computer via a USB port.
- Flash drives are an easy way to store and transfer information between computers and range in sizes from 2 GB to 1 TB.

**SanDisk Ultra Flair
128 GB USB Flash Drive**



➤ **SD card**

- Short for Secure Digital card, the SD card is one of the more common types of memory cards used with electronics.
- The SD technology is used by over 400 brands of electronic equipment and over 8000 different models, including digital cameras and cell phones.
- It is considered the industry standard due to the wide use.
- **Types of SD cards :** The three versions of the SD card, along with their physical dimensions, are shown below.
 - **SD** - 32mm x 24mm x 2.1mm.
 - **MiniSD** - 21.5mm x 20mm x 1.4mm.
 - **MicroSD** - 15mm x 11mm x 1.0mm.



➤ Compact Disk

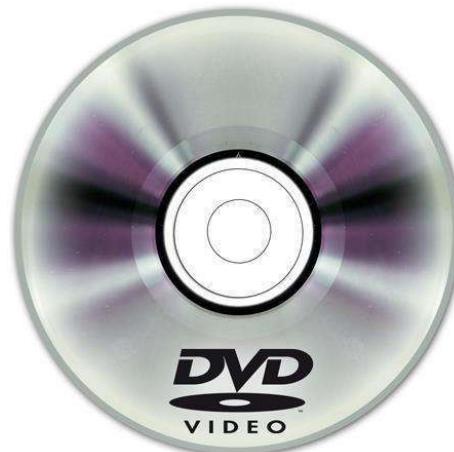
- Abbreviated as **CD**, a **compact disc** is a flat, round, optical storage medium invented by James Russell.
- The first CD was created at a Philips factory in Germany on August 17, 1982.



NOTE: When referring to a round CD, DVD, or Blu-ray it is known as a "disc" and not a "disk." If you are referring to a magnetic media such as a floppy disk or a hard disk drive, it is called to as a "disk" and not a "disc.""

DVD:

- Short for **digital versatile disc** or **digital video disc**, a **DVD** or **DVD-ROM** is a disc capable of storing a significant amount more data than a standard compact disc.
- DVDs are widely used for storing and viewing movies and other data.



- The picture of the Matrix DVD movie disc is an example of a DVD movie. **CD/DVD drives** that utilize both of these discs were first sold in 1997.

1.7 Digital storage and basics

- Digital storage allows you to store information in a way that is more efficient and compact than analog storage methods.
- The advantage of digital storage is that it can hold much more information, take up less space, and be created in a shorter amount of time than analog methods.

- You may wonder how digital storage can hold so much information in a small space.
- The answer is that you can pack more data into the same amount of space using binary code of zeroes and ones instead of analog signals such as voltage levels or magnetic fields.
- In contrast to analog forms of storing information, such as sound waves or photographs, digital data does not fluctuate continuously but instead consists of discrete values (for example, 1's or 0's).
- Digital storage stores information (including text, video, and audio) as long as the data is reduced into a series of symbols representing the content.
- The advantage of digital storage is that it can hold much more information, take up less space, and be created in a shorter amount of time than analog storage methods.
- When you take a photo with your digital camera, it's stored in the camera's memory card until you transfer it to a computer or another device.
- The same is true for any digital audio or video file: it's stored on an electronic device and must be transferred before use.
- You still have a copy elsewhere if something happens to your computer, hard drive, or other device containing the data.
- Digital files are easier to access than analog ones because they don't require physical reading access.

1.7.1 Types of digital storage:

- i. magnetic,
- ii. optical disks, and
- iii. solid state,

i. Optical Disks

- Examples: CDs, DVDs, DVD-Rs, DVD+Rs, CD+Rs, and Blu-Ray
- Optical disks are often used for backing up, storing, or sharing information.
- Optical disks easily store data such as photographs, movies, audio files, and non-changing data.
- While optical disks are often thought of as a long-lasting solution to digital storage, the lifetime of optical disks has not been proven.
- Unlike professional made CDs, in which the data is recorded onto the disc by stamping pits into the plastic, home-burned disks use chemicals that are burned by the laser.
- Transferring data onto new disks every 5-10 years is a good practice to preserve information.

ii. Solid State Storage

- Examples: Memory cards, flash drives, and internal storage in digital recorders, digital cameras, cell phones, Blackberry devices, PDAs, MP3 players, and iPods.
- Solid state devices are a great way to quickly check, update, transfer, and share data. They provide a temporary storage solution for portable information.
- Solid State devices provide a quick, easy, and accessible way to gather, add, and temporarily store genealogical information until it may be organized and stored in more permanent formats.

iii. Magnetic Storage

- Examples: Hard drives (computer hard drives, servers, and external hard drives), floppy disks, and archival magnetic tape (NOT a consumer product).
- Magnetic storage is often used as a long-term storage solution, often with regular backups of information.
- The most common form of magnetic storage is the hard drive. Hard drives help genealogists quickly add, change, locate, and share information.
- Hard drives are used in computers, servers, and external hard drives and are magnetically coated disks with magnetic particles. Unlike solid state devices, damaged hard drive data may often be recovered.

➤ Networking components

- Computer network components include the major parts that are needed to install a network both at the office and home level.
- Before delving into the installation process, you should be familiar with each part so that you could choose and buy the right component that fits with your network system.
- These hardware components include cable, Hub, Switch, NIC (network interface card), modem and router.
- Depending on the type of network you are going to install, some of the parts can be eliminated. For example, in a wireless network you don't need cables, hubs so on.
- **Computer network** is a group of two or more computers that connect with each other to share a resource. Sharing of devices and resources is the purpose of computer network. You can share printers, fax machines, scanners, network connection, local drives, copiers and other resources.

➤ Major computer network components

Computer network requires the following devices (some of them are optional):-

- Network Interface Card (NIC)
- Hub/ Switches
- Cables and connectors
- Router
- Modem

1. Network Interface Card

- **Network adapter** is a device that enables a computer to talk with other computer/network.
- Using unique hardware addresses (MAC address) encoded on the card chip, the data-link protocol employs these addresses to discover other systems on the network so that it can transfer data to the right destination.
- There are two types of network cards: **wired and wireless**. The wired NIC uses cables and connectors as a medium to transfer data, whereas in the wireless card, the connection is made using antenna that employs radio wave technology. All modern laptop computers incorporated wireless NIC in addition to the wired adapter.

Network Card Speed

- **Network Interface card**, one of the main computer network components, comes with different speeds, 10Mbps, 100Mbps, and 1000Mbps, so on.
- Recent standard network cards built with Gigabit (1000Mbps) connection speed. It also supports to connect slower speeds such as 10Mbps and 100Mbps.
- However, the speed of the card depends on your LAN speed.
- For example, if you have a switch that supports up to 100Mbps, your NIC will also transfer a data with this same speed even though your computer NIC has still the capability to transfer data at 1000Mbps (1Gbps).
- In modern computers, network adapter is integrated with a computer motherboard.
- However if you want advanced and fast Ethernet card, you may buy and install on your computer using the PCI slot found on the motherboard (desktop) and ExpressCard slots on laptop .

2. Hub

- **Hub** is a device that splits a network connection into multiple computers. It is like a distribution center.
- When a computer request information from a network or a specific computer, it sends the request to the hub through a cable.
- The hub will receive the request and transmit it to the entire network. Each computer in the network should then figure out whether the broadcast data is for them or not
- Currently Hubs are becoming obsolete and replaced by more advanced communication devices such as Switches and Routers.

3. Switch

- **Switch** is a telecommunication device grouped as one of computer network components. Switch is like a Hub but built in with advanced features.
- It uses physical device addresses in each incoming messages so that it can deliver the message to the right destination or port.
- Like Hub, switch don't broadcast the received message to entire network, rather before sending it checks to which system or port should the message be sent.
- In other words switch connects the source and destination directly which increases the speed of the network.
- Both switch and hub have common features: Multiple RJ-45 ports, power supply and connection lights.

4. Cables and connectors

- **Cable** is one way of transmission media which can transmit communication signals. The wired network typology uses special type of cable to connect computers on a network.

- There are a number of solid transmission Media types, which are listed below. - Twisted pair wire
- It is classified as Category 1, 2, 3, 4, 5, 5E, 6 and 7. Category 5E, 6 and 7 are high-speed cables that can transmit 1Gbps or more. -

i. Coaxial cable

Coaxial cable more resembles like TV installation cable. It is more expensive than twisted-pair cable but provide high data transmission speed.

ii. Fiber-optic cable

It is a high-speed cable which transmits data using light beams through a glass bound fibers. Fiber-optic cable is high data transmission cable comparing to the other cable types. But the cost of fiber optics is very expensive which can only be purchased and installed on governmental level.

5. Router

- When we talk about computer network components, the other device that used to connect a LAN with an internet connection is called Router.
 - When you have two distinct networks (LANs) or want to share a single internet connection to multiple computers, we use a Router
 - In most cases, recent routers also include a switch which in other words can be used as a switch.
 - You don't need to buy both switch and router, particularly if you are installing small business and home networks
 - There are two types of Router: wired and wireless. The choice depends on your physical office/home setting, speed and cost.

6. Modems

- A modem enables you to connect your computer to the available internet connection over the existing telephone line.
- Like NIC, Modem is not integrated with a computer motherboard. It comes as separate part which can be installed on the PCI slots found on motherboard.
- A modem is not necessary for LAN, but required for internet connection such as dial-up and DSL
- There are some types of modems, which differs in speed and transmission rate. Standard PC modem or Dial-up modems (56Kb data transmission speed), Cellular modem (used in a laptop that enables to connect while on the go), cable modem (500 times faster than standard modem) and DSL Modems are the most popular.

TASK 2:

Introduction to operating system. Installation of Windows and Linux operating systems.

Windows: -Evolution of operating system.

Introduction to software.

Types of software (MS office, VLC media player, Win rar), open office, web browser, etc.)

I. AIM: To install Windows XP

Software Requirement: Windows XP Compact Disc **Hardware Requirement:**

Personal computer

PROCEDURE:

1. Keep on press the delete button and go to advanced BIOS feature [BIOS- Basic Input Output System]
2. And go to boot sequence. Select first boot drivers. CD ROM and press F10 to save the bios feature. Yes and then enter. Press any key to boot from CD. Press enter to setup windows XP. F8 = To agree the license.
3. Press ESC to don't repair the windows XP setup.
4. Press _p to delete the previous partitions. Then press enter.
5. Press _L to delete the partition.
6. Press _C to create the partition in the UN partition space.
7. Press enter to setup windows XP on the selected items.

BASIC FILE SYSTEMS:

FAT: File Allocation Table.

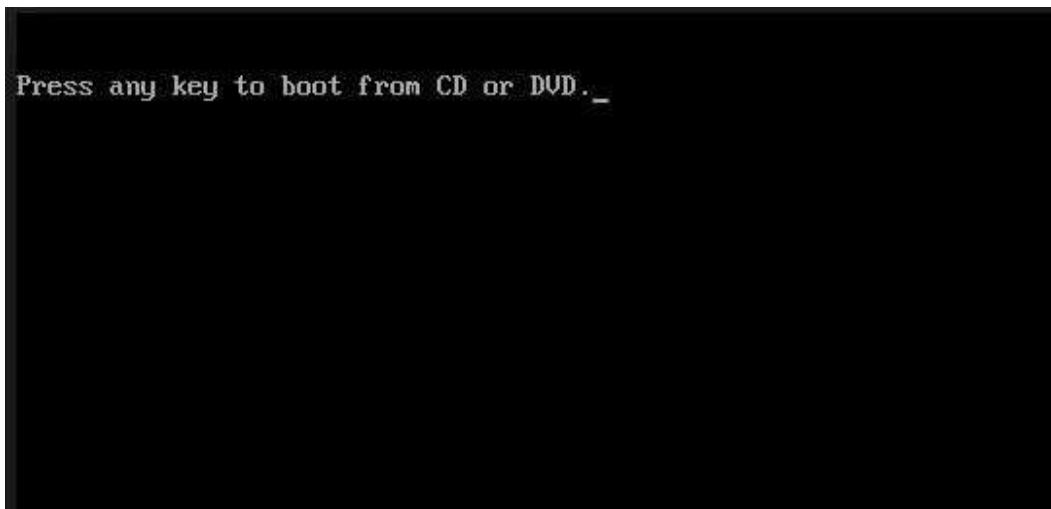
NTFS: New Technology File System. Format the create using NTFS partition.

BASIC STEPS IN INSTALLATION:-

1. Collecting information.
2. Dynamic update
3. Preparing installation
4. Installing windows.
5. Tracking installation

Screen shots of windows XP Installation

1. Insert the Windows XP CD into your computer and restart your computer. If prompted to start from the CD, press SPACEBAR. If you miss the prompt (it only appears for a few seconds), restart your computer to try again.



2. Windows XP Setup begins. During this portion of setup, your mouse will not work, so you must use the keyboard. On the **Welcome to Setup** page, press ENTER.



3. On the **Windows XP Licensing Agreement** page, read the licensing agreement. Press the PAGEDOWN key to scroll to the bottom of the agreement. Then press F8.

Windows XP Licensing Agreement

**END-USER LICENSE AGREEMENT FOR MICROSOFT SOFTWARE
WINDOWS XP PROFESSIONAL EDITION SERVICE PACK 2**

IMPORTANT - READ CAREFULLY:

This End-User License Agreement ("EULA") is a legal agreement between you (either an individual or a single entity) and Microsoft Corporation or one of its affiliates ("Microsoft") for the Microsoft software that accompanies this EULA, which includes computer software and may include associated media, printed materials, "online" or electronic documentation, and Internet-based services ("Software"). An amendment or addendum to this EULA may accompany the Software.

YOU AGREE TO BE BOUND BY THE TERMS OF THIS EULA BY INSTALLING, COPYING, OR OTHERWISE USING THE SOFTWARE. IF YOU DO NOT AGREE, DO NOT INSTALL, COPY, OR USE THE SOFTWARE; YOU MAY RETURN IT TO YOUR PLACE OF PURCHASE FOR A FULL REFUND, IF APPLICABLE.

1. GRANT OF LICENSE.

Microsoft grants you the following rights provided that you comply with all terms and conditions of this EULA:

1.1 Installation and use. You may install, use, access, display and run one copy of the Software on a single computer, such as a workstation, terminal or other device ("Workstation Computer"). The Software may not

F8=I agree ESC=I do not agree PAGE DOWN=Next Page

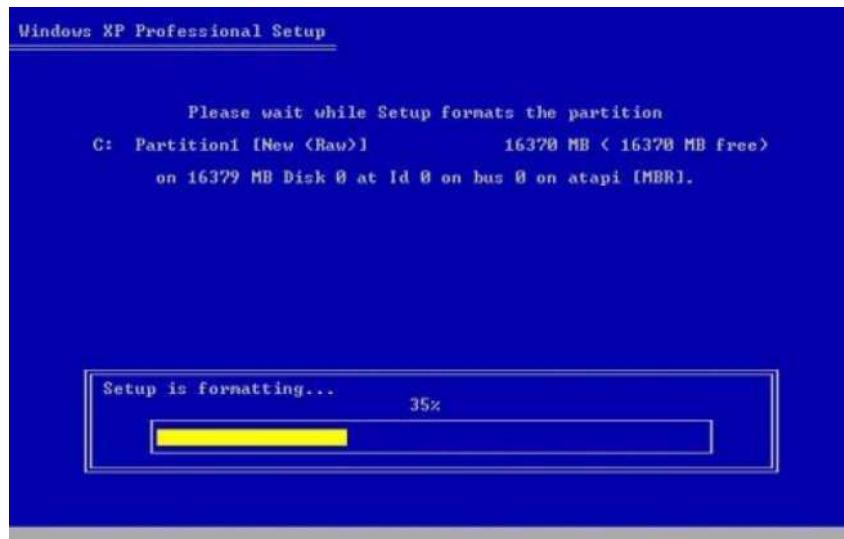
4. This page enables you to select the hard disk drive on which Windows XP will be installed. Once you complete this step, all data on your hard disk drive will be removed and cannot be recovered. It is extremely important that you have a recent backup copy of your files before continuing. When you have a backup copy, press D, and then press L when prompted. This deletes your existing data. Press ENTER to select **Un partitioned space**, which appears by default.



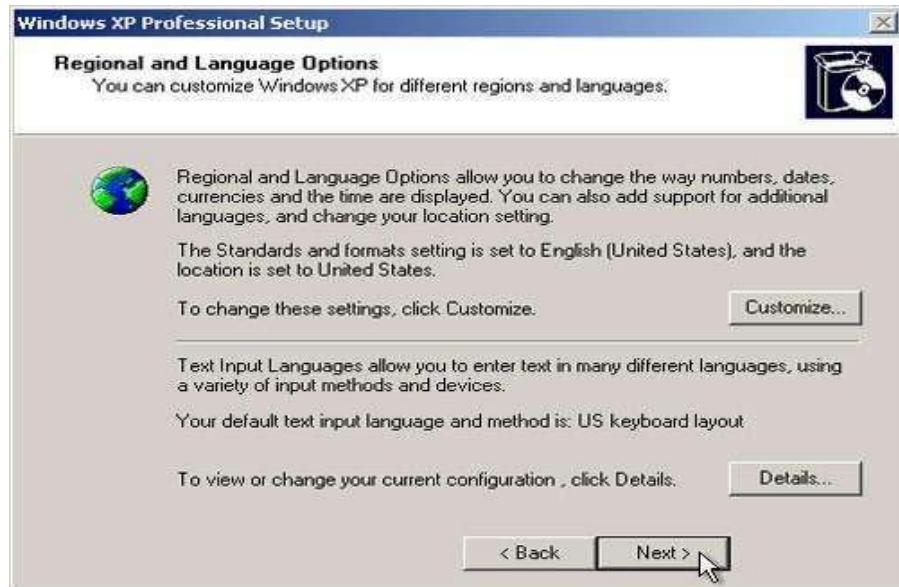
5. Press ENTER again to select **Format the partition using the NTFS file system**, which appears by default.



6. Windows XP erases your hard disk drive using a process called formatting and then copies the setup files. You can leave your computer and return in 20 to 30 minutes.



7. Windows XP restarts and then continues with the installation process. From this point forward, you can use your mouse. Eventually, the **Regional and Language Options** page appears. Click **next** to accept the default settings. If you are multilingual or prefer a language other than English, you can change language settings after setup is complete



8. On the **Personalize Your Software** page, type your name and your organization name. Some programs use this information to automatically fill in your name when required. Then, click **Next**.



9. On the **Your Product Key** page, type your product key as it appears on your Windows XP CD case. The product key is unique for every Windows XP installation. Then, click **Next**.



10. On the **Computer Name and Administrator Password** page, in the Computer name box, type a name that uniquely identifies your computer in your house, such as FAMILYROOM or TOMS. You cannot use spaces or punctuation. If you connect your computer to a network, you will use this computer name to find shared files and printers. Type a strong password that you can remember in the **Administratorpassword** box, and then retype it in the **Confirm password** box. Write the password down and store it in a secure place. Click **Next**.



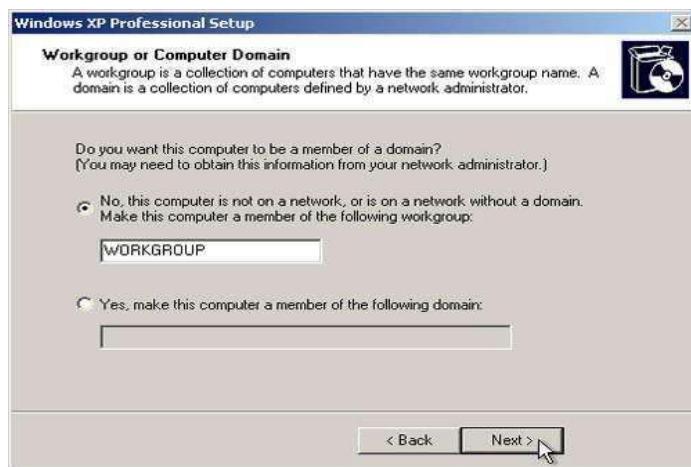
11. On the **Date and Time Settings** page, set your computer's clock. Then, click the **Time Zone** down arrow, and select your time zone. Click **Next**.



12. Windows XP will spend about a minute configuring your computer. On the **Networking Settings** page, click **Next**.

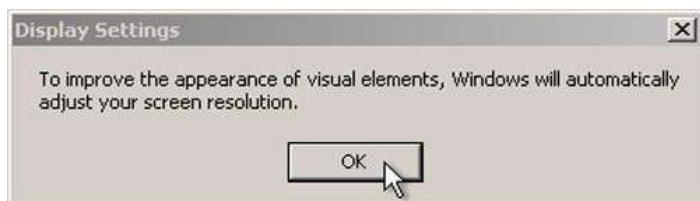


13. On the **Workgroup or Computer Domain** page, click **Next**.



14. Windows XP will spend 20 or 30 minutes configuring your computer and will

automatically restart when finished. When the **Display Settings** dialog appears, click **OK**



15. When the **Monitor Settings** dialog box appears, click **OK**.



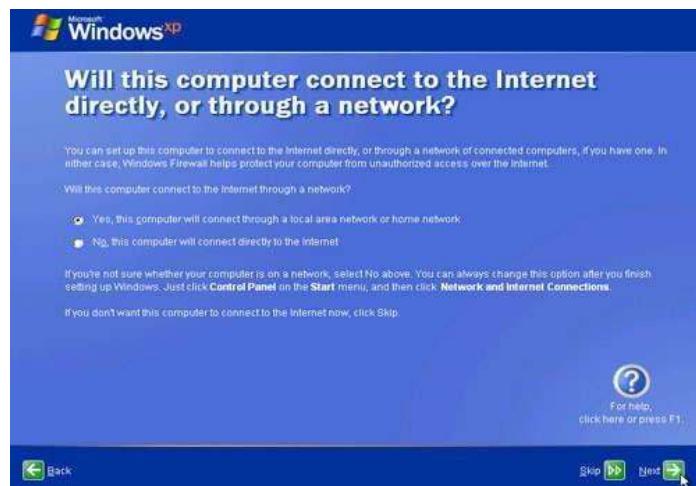
16. The final stage of setup begins. On the **Welcome to Microsoft Windows** page, click **Next**.



17. On the **Help protect your PC** page, click **Help protect my PC by turning on Automatic Updates now**. Then, click



18. Windows XP will then check if you are connected to the Internet: If you are connected to the Internet, select the choice that describes your network connection on the **Will this computer connect to the Internet directly, or through a network?** Page. If you're not sure, accept the default selection, and click **Next**



19. If you use dial-up Internet access, or if Windows XP cannot connect to the Internet, you can connect to the Internet after setup is complete. On the **How will this computer connect to the Internet?** Page, click **Skip**.



20. Windows XP Setup displays the **Ready to activate Windows?** Page. If you are connected to the Internet, click **Yes**, and then click **Next**. If you are not yet connected to the Internet, click **No**, click **Next**, and then skip to step 24. After setup is complete, Windows XP will automatically remind you to activate and register your copy of Windows XP



21. On the **Ready to register with Microsoft?** Page, click **Yes**, and then click **Next**.



22. On the **collecting registration information** page, complete the form. Then, click **Next**.



23. On the **Who will use this computer?** page, type the name of each person who will use the computer. You can use first names only, nicknames, or full names. Then click **Next**. To add users after setup is complete or to specify a password to keep your account private, read Create and customize user accounts.



24. On the **Thank you!** Page, click **Finish**.



Congratulations! Windows XP setup is complete. **TEST DATA:** No Test data for this Experiment

II. AIM: To install Linux in system

Software Requirement: Linux Compact Discs

Hardware Requirement: Personal computer

PROCEDURE:

1. Language Selection

- Using your mouse select the language you would prefer to use for the installation
- Click next to continue.

2. Key Board Configuration:

- Using your mouse select the correct layout type for the keyboard you would prefer to use for the installation and as the system default.
- Once you have made the selection click next to continue.

3. Mouse Configuration:

- If you have a PS/2, USB or Bus mouse you do not need to pick a port and device. If you have a serial mouse, you should choose the correct port and device that your serial mouse is on.
- The Emulate 3 buttons checkbox allows you to use a two-button mouse as if it had three buttons. If you select this check box you can emulate a third —middle| button by pressing both mouse buttons simultaneously.

4. Installation Type:

- Choose the type of installation you would like to perform.
- Your options are **Personal desktop, Workstation, Server, Custom and upgrade**

5. Disk partition Setup:

- You can chose automatic partitioning or manual partitioning using **Disk Druid of fdisk**.
- Automatic partitioning allows you to perform an installation without having to partition your drives yourself.
- Automatic partitioning allows you to have some control concerning what data is removed from your system.
- Your options are:
 - Remove all Linux partitions on this system.
 - Remove all partitions on this system

Keep all partitions and use existing free space.

- To partition manually choose either Disk druid or fdisk partitioning tool.
- Click next once you have made your selections.

6. Partitioning your system:

- If you chose automatic partitioning and did not select **Review** skip ahead
- If you choose automatic partitioning and selected **review** you can either accept the current partition settings (click next) or modify the setup using **Disk Druid**, the manual partition tool.
- If you choose manual partition with disk skip ahead.
- At this point you must tell the installation program where to install Linux. This is done by defining mount points for one or more disk partitions in which Linux will be installed.

7. Adding Partitions:

To add a new partition select new button, a dialogue box appears. Select the options and click ok.

8. Boot Loader Configuration:

- Boot loader is the first software program that runs when a computer starts. The installation program provides two boot loaders **GRUB (GR and Unified Boot Loader)** which is the default and **LILO**
- If you do not want GRUB as your boot loader click **Change Boot Loader**.
- You can then choose to install LILO or choose not to install boot loader at all by clicking **Do not install boot loader** on the **change boot loader** button.
- Network devices are automatically detected and displayed in **NetworkDevices** list,
- Select a network device and click **Edit**
- Here you can configure IP address and net mask of the device.

9. Firewall configuration:

- Offers firewall protection for enhanced protection.
- A properly configured firewall can greatly increase the security of the system.

10. Time zone configuration:

You can set your time zone by selecting your computer's physical location or by specifying your time zone's offset from Universal Time.

11. Account Configuration:

- Allows to set Root password or user accounts
- Root count is similar to the administrator password that you set up in WinNT.
- Click **add** button to add a new non-root user.
- Enter the details and click **OK**.

12. Package group selection:

- You can select package groups which groups components together or individual packages or a combination of the two.

Evolution of OS

- ✓ Operating System is a type of software that acts as an interface between the user and the hardware.
- ✓ It is responsible to handle various critical functions of the computer or any other machine.
- ✓ Various tasks that are handled by OS are file management, task management, garbage management, memory management, process management, disk management, I/O management, peripherals management, etc.

➤ Evolution of Operating System:

- ✓ Operating Systems, has evolved in past years. It went through several changes before getting its original form.
- ✓ These changes in the operating system are known as the **evolution of operating systems**.
- ✓ The evolution of the operating system went through four generations. Let us see these generations in detail:

Note:

- ✓ First Generation of Operating Systems: Vacuum Tubes and Plugboards. ...
- ✓ Second Generation of Operating Systems: Transistors and Batch Systems. ...
- ✓ Third Generation of Operating Systems: Integrated Circuits and Multiprogramming. ...
- ✓ Fourth Generation of Operating Systems: Personal Computers.

➤ Software

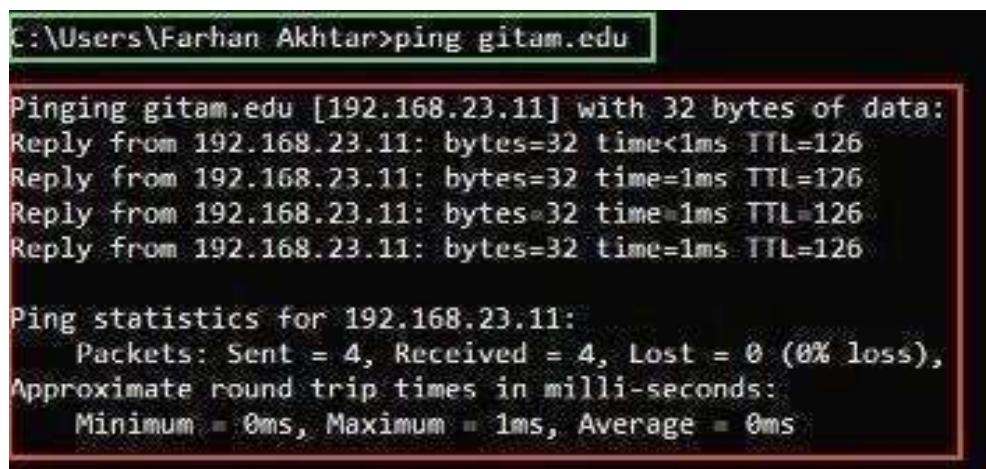
- ✓ Software is a set of instructions, data or programs used to operate computers and execute specific tasks.
 - ✓ It is the opposite of hardware, which describes the physical aspects of a computer.
 - ✓ Software is a generic term used to refer to applications, scripts and programs that run on a device.

Task 3: This task covers basic commands and system administration in Linux, including basic Linux commands in bash, ping, ssh, ifconfig, scp, netstat, ipstat, nslookup, traceroute, telnet, host, ftp, arp, wget,route.

- | | |
|--------------|----------------|
| 1. ping | 2. nslookup |
| 3. dig | 4. wget |
| 5. telnet | 6. ftp |
| 7. ssh | 8. ifconfig |
| 9. ethtool | 10. netstat |
| 11. route | 12. traceroute |
| 13. tcpdump | 14. scp |
| 15. hostname | 16. ipstat |
| 17. host | 18. arp |

1. “ping” command in Linux

ping command in Linux is a very useful command to check network connectivity between two servers. The full form of **ping** is **Packet InterNet Groper**. **ping command in Linux** or UNIX is used to check the connectivity status between two network resources like servers or switches or routers.
[Windows cmd/Linux cmd/Online cmd]



```
C:\Users\Farhan Akhtar>ping gitam.edu

Pinging gitam.edu [192.168.23.11] with 32 bytes of data:
Reply from 192.168.23.11: bytes=32 time<1ms TTL=126
Reply from 192.168.23.11: bytes=32 time=1ms TTL=126
Reply from 192.168.23.11: bytes=32 time=1ms TTL=126
Reply from 192.168.23.11: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.23.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

2. “nslookup” command in Linux

nslookup command is Linux also a very useful command for finding DNS-related information. DNS is a tool used for name resolution IP to host and host to IP as it is easy to remember name versus remembering IP Address which is a 32-bit address if we consider IP Version 4. [Windows cmd/Linux cmd/Online cmd]

```
C:\Users\Farhan Akhtar>nslookup gitam.edu
Server: UnKnown
Address: 192.168.23.21

Non-authoritative answer:
Name: gitam.edu
Addresses: 192.168.23.10
           192.168.23.11
           192.168.23.12
           172.21.255.12
```

3. “dig” command in Linux

dig command in Linux is another useful Linux networking command. dig stands for **domain information groper** and is a flexible tool. dig is a Linux command-line tool for interrogating DNS name servers.

dig performs DNS lookups and displays the answers returned from the name server’s primary and secondary queries.

Most DNS administrators use the dig tool to troubleshoot DNS-related problems because of its flexibility, ease of use, and clarity of output compared to other tools. [\[Linux cmd\]](#)

```
khushi@ubuntu:~/geeksforgeeks$ dig geeksforgeeks.org
; <>> DiG 9.16.1-Ubuntu <>> geeksforgeeks.org
; global options: +cmd
; Got answer:
; >>>HEADER<<- opcode: QUERY, status: NOERROR, id: 18925
; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1
;
; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
; QUESTION SECTION:
;geeksforgeeks.org.      IN      A
;
; ANSWER SECTION:
geeksforgeeks.org.    10      IN      A      34.218.62.116
;
; Query time: 15 msec
; SERVER: 127.0.0.53#53(127.0.0.53)
; WHEN: Sun May 17 22:58:43 IST 2020
; MSG SIZE  rcvd: 62
```

4. “wget” command in Linux

wget command in Linux is a free Linux command-line utility that is non-interactive in nature and used to download files from the web. It supports protocols like HTTP, HTTPS, and FTP.

Syntax: \$ wget <source URL> [Linux cmd]

```
adam@a:~$ wget https://en.wikipedia.org/wiki/Wget
--2014-02-09 07:38:43-- https://en.wikipedia.org/wik
i/Wget
Resolving en.wikipedia.org (en.wikipedia.org)... 208.
80.154.224, 2620:0:861:ed1a::1
Connecting to en.wikipedia.org (en.wikipedia.org)|208
.80.154.224|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [text/html]
Saving to: 'Wget'

[ <=>           ] 91,646      583K/s   in 0.2s

2014-02-09 07:38:43 (583 KB/s) - `Wget' saved [91646]

adam@a:~$ █
```

5. “telnet” command in Linux

telnet command in Linux is used to communicate with another host using the TELNET protocol. It is known as a **teletype network** in the networking arena used to connect remote hosts. telnet port number in Linux is 21. [Linux cmd]

Syntax: \$ telnet <IP ADDRESS OF SERVER PC><PORT>

```
javatpoint@javatpoint-Inspiron-3542:~$ telnet localhost
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^].
Ubuntu 18.04.2 LTS
javatpoint-Inspiron-3542 login: javatpoint
Password:
Last login: Sun Mar 29 22:39:18 IST 2020 from localhost on pts/1
Welcome to Ubuntu 18.04.2 LTS (GNU/Linux 5.3.0-40-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

 * Canonical Livepatch is available for installation.
   - Reduce system reboots and improve kernel security. Activate at:
     https://ubuntu.com/livepatch

304 packages can be updated.
29 updates are security updates.

Your Hardware Enablement Stack (HWE) is supported until April 2023.
```

6.“ftp” command in Linux

ftp command in Linux is another very good file transfer Linux command-line tool ftp. ftp is the user interface available to transfer files to and from a remote network. It uses its protocol called **File Transfer Protocol**. ftp port number in Linux is 23.

By default, most of the Linux system telnet and FTP are always restricted due to their natural to have vulnerability. If you want to use ftp you can use secure FTP programs like vsftpd. [Linux cmd]

Syntax: \$ ftp ftp.microsoft.com

```
C:\>Users\Rahul>ftp ftp.tecadmin.net
Connected to ftp.tecadmin.net.
220 vsFTPd 3.0.2 (ext.1) ready...
User <ftp.tecadmin.net:<none>>: rahul
331 Please specify the password.
Password:
230 Login successful.
ftp>
```

7. “ssh” command in Linux

ssh command in Linux is a command which you need to access to any server security. ssh is a short form of secure shell. This is widely used to connect the remote server. The ssh port number in Linux is Unlike all other remote connectivity tools, it is the safest one.

[Windows cmd/Linux cmd/Online cmd]

Syntax: \$ ssh <remote host>/<remote IP>

```
C:\>Users\hp.com>ssh archit@192.168.254.129
archit@192.168.254.129's password:
Welcome to Ubuntu 18.04.1 LTS (GNU/Linux 4.15.0-29-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

 * Canonical Livepatch is available for installation.
   - Reduce system reboots and improve kernel security. Activate at:
     https://ubuntu.com/livepatch

437 packages can be updated.
198 updates are security updates.

Last login: Wed Feb 13 18:52:44 2019 from 192.168.254.1
archit@ubuntu: ~ ls
Desktop Documents Downloads examples.desktop Music Pictures Public Templates Videos
archit@ubuntu: ~ cd Desktop/
archit@ubuntu: ~/Desktop$ ls
archit@ubuntu: ~/Desktop$ cd ..
archit@ubuntu: ~ cd Downloads/
archit@ubuntu: ~/Downloads$ ls
archit@ubuntu: ~/Downloads$ touch test.txt
archit@ubuntu: ~/Downloads$ ls
test.txt
archit@ubuntu: ~/Downloads$ -
```

8. “ifconfig” command in Linux

ifconfig command in Linux is one of the most important commands to configure and display the network card configuration.

If you simply type ifconfig it will display network configuration like below. It saves all the network configurations in

/etc/sysconfig/network-scripts/ifcfg-eth0 interface wise.

[Windows cmd/Linux cmd/Online cmd]

Syntax: \$ ifconfig

```

sssit@JavaTpoint: ~
sssit@JavaTpoint:~$ ifconfig
eth0      Link encap:Ethernet HWaddr 94:de:80:87:c3:c
          UP BROADCAST MULTICAST MTU:1500 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)
          Interrupt:40 Base address:0xc000

lo       Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:16436 Metric:1
          RX packets:2466 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2466 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:228069 (228.0 KB) TX bytes:228069 (228.0 KB)

wlan0     Link encap:Ethernet HWaddr c8:3a:35:c2:a4:cd
          inet addr:10.0.0.11 Bcast:10.0.0.255 Mask:255.255.255.0
          inet6 addr: fe80::ca3a:35ff:fe2:a4cd/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:36408 errors:0 dropped:0 overruns:0 frame:0
          TX packets:18520 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:15698000 (15.6 MB) TX bytes:4489507 (4.4 MB)

sssit@JavaTpoint:~$ 

```

9. “ethtool” command in Linux

ethtool command in Linux is a really important tool to verify the physical connectivity status and allother properties of the interface cards.

[Linux cmd]

Syntax: \$ sudo ethtool **eth0** (eth0 is the first Ethernet Interface)

```

Iphoenixnap@localhost ~$ ethtool em0
Settings for em0:
  Supported ports: [ TP ]
  Supported link modes:  10baseT/Half 10baseT/Full
                        100baseT/Half 100baseT/Full
                        1000baseT/Full
  Supported pause frame use: No
  Supports auto-negotiation: Yes
  Supported FEC modes: Not reported
  Advertised link modes:  10baseT/Half 10baseT/Full
                        100baseT/Half 100baseT/Full
                        1000baseT/Full
  Advertised pause frame use: No
  Advertised auto-negotiation: Yes
  Advertised FEC modes: Not reported
  Speed: 1000Mb/s
  Duplex: Full
  Port: Twisted Pair
  PHYAD: 0
  Transceiver: internal
  Auto-negotiation: on
  MDI-X: off (auto)
  Cannot get wake-on-lan settings: Operation not permitted
  Current message level: 0x00000007 (7)
                                drv probe link
  Link detected: yes

```

10. “netstat” command in Linux

netstat command in Linux is a useful command-line tool to print network connections routing tablesinterface statistics and multicast memberships.

[Linux cmd]

Syntax: \$ sudo netstat -r (Kernel IP routing table)

```
maverick@maverick-Inspiron-5548:~$ netstat -r
Kernel IP routing table
Destination     Gateway         Genmask        Flags   MSS Window irtt Iface
default         172.16.176.1   0.0.0.0       UG        0 0          0 wlp3s0
link-local      *              255.255.0.0   U         0 0          0 wlp3s0
172.16.176.0   *              255.255.240.0 U         0 0          0 wlp3s0
maverick@maverick-Inspiron-5548:~$
```

Syntax: \$ sudo netstat -i (Kernel Interface table)

```
admin@tecmint ~ % sudo netstat -ltnu
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State      PID/Program name
tcp    0      0 *:http                    *.*                  LISTEN     1423/nginx -g daemon
tcp    0      0 tecmint:domain            *.*                  LISTEN     2992/dnsmasq
tcp    0      0 *:ssh                     *.*                  LISTEN     1409/sshd
tcp    0      0 localhost:ipp             *.*                  LISTEN     2738/cupsd
tcp    0      0 *:https                   *.*                  LISTEN     1423/nginx -g daemon
tcp6   0      0 [::]:http                 [::]:*               LISTEN     1423/nginx -g daemon
tcp6   0      0 [::]:ssh                 [::]:*               LISTEN     1409/sshd
tcp6   0      0 ip6-localhost:ipp        [::]:*               LISTEN     2738/cupsd
tcp6   0      0 [::]:https                [::]:*               LISTEN     1423/nginx -g daemon
udp    0      0 *:ipp                     *.*                  LISTEN     2740/cups-browsed
udp    0      0 *:mdns                   *.*                  LISTEN     1022/avahi-daemon:
udp    0      0 *:36390                  *.*                  LISTEN     2992/dnsmasq
udp    0      0 *:59072                  *.*                  LISTEN     1022/avahi-daemon:
udp    0      0 tecmint:domain            *.*                  LISTEN     2992/dnsmasq
udp    0      0 *:bootpc                 *.*                  LISTEN     2982/dhcclient
udp    0      0 tecmint:ntp                *.*                  LISTEN     1465/ntpd
udp    0      0 localhost:ntp              *.*                  LISTEN     1465/ntpd
udp    0      0 *:ntp                     *.*                  LISTEN     1465/ntpd
udp6   0      0 [::]:43740                [::]:*               LISTEN     1022/avahi-daemon:
udp6   0      0 [::]:mdns                 [::]:*               LISTEN     1022/avahi-daemon:
udp6   0      0 fe80::dd8c:3d40:817:ntp  [::]:*               LISTEN     1465/ntpd
udp6   0      0 ip6-localhost:ntp        [::]:*               LISTEN     1465/ntpd
udp6   0      0 [::]:ntp                 [::]:*               LISTEN     1465/ntpd
```

11. “route” command in Linux

route command in Linux is another useful command to display and modify IP routing configurations. [Linux cmd]

Syntax: \$ sudo route

```
manav@ubuntu:~$ route
Kernel IP routing table
Destination     Gateway         Genmask        Flags Metric Ref  Use Iface
default         _gateway       0.0.0.0       UG    100    0      0 enp0s3
10.0.2.0        0.0.0.0       255.255.255.0 U     100    0      0 enp0s3
link-local      0.0.0.0       255.255.0.0   U     1000   0      0 enp0s3
manav@ubuntu:~$
```

12. “traceroute” command in Linux

Another really good networking-related Linux command is called traceroute. **traceroute command in Linux** as the name suggests prints the route packets tracing to the destination network host using your present

network and DNS infrastructure.

[Linux cmd]

```
prabhakar@Inspiron-3542:~$ traceroute google.com
traceroute to google.com (172.217.20.200), 30 hops Max, 80 byte packets
 1  192.168.43.45 (192.168.43.45)  2.014 ms  2.313 ms  2.588 ms
 2  * * *
 3  10.45.1.230 (10.45.1.230)  75.449 ms  115.244 ms  115.224 ms
 4  10.45.8.178 (10.45.8.178)  93.856 ms  115.138 ms  93.822 ms
 5  10.45.8.187 (10.45.8.187)  115.116 ms  115.106 ms  115.070 ms
 6  * * *
 7  218.248.235.141 (218.248.235.141)  120.589 ms  108.033 ms  106.962 ms
 8  218.248.235.142 (218.248.235.142)  114.489 ms * *
 9  72.14.211.114 (72.14.211.114)  98.076 ms  93.232 ms  93.781 ms
10  108.170.253.113 (108.170.253.113)  98.688 ms  91.388 ms  108.170.253.97 (108.170.253.97)  107.241 ms
11  74.125.253.69 (74.125.253.69)  95.120 ms  72.14.237.165 (72.14.237.165)  102.594 ms  103.137 ms
12  maa03s23-in-f14.1e100.net (172.217.26.206)  101.794 ms  97.987 ms  97.165 ms
prabhakar@Inspiron-3542:~$
```

13. “tcpdump” command in Linux

tcpdump command in Linux is a really helpful command if you want to track traffic to a specific network to find out any issue related to the network.

You can simply type tcpdump to see network statistics. This will be helpful to print all packets arrivingat or departing from server1.

[Linux cmd]

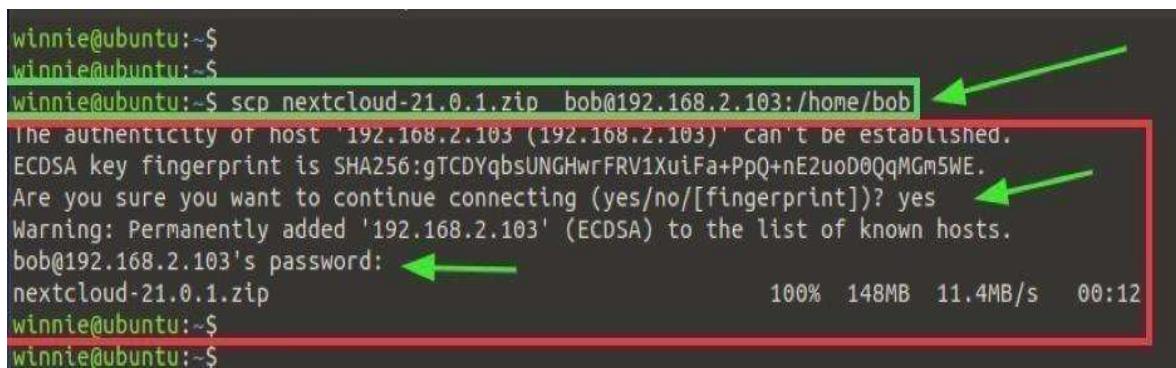
```
sam@sam:~$ sudo tcpdump -D
1.enp0s3 [Up, Running]
2.lo [Up, Running, Loopback]
3.any (Pseudo-device that captures on all interfaces) [Up, Running]
4.bluetooth-monitor (Bluetooth Linux Monitor) [none]
5.nflog (Linux netfilter log (NFLOG) interface) [none]
6.nfqueue (Linux netfilter queue (NFQUEUE) interface) [none]
7.dbus-system (D-Bus system bus) [none]
8.dbus-session (D-Bus session bus) [none]
sam@sam:~$
```

14. “scp” command in Linux

SCP command in Linux is a frequently used command to copy files between servers. SCP stands for secure copy. While cp is being used inside the Linux system. FTP is not secure for file transactions there comes SCP. You can copy files securely to and from remote hosts.

This will copy a file from your local server to the target server

in the home directory.[\[Linux cmd\]](#)



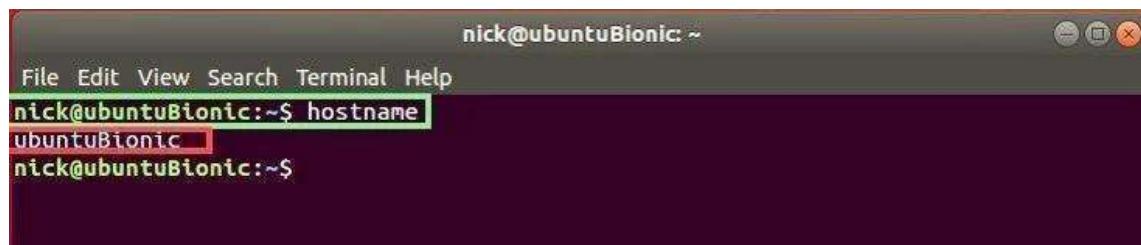
```
winnie@ubuntu:~$  
winnie@ubuntu:~$  
winnie@ubuntu:~$ scp nextcloud-21.0.1.zip bob@192.168.2.103:/home/bob  
The authenticity of host '192.168.2.103 (192.168.2.103)' can't be established.  
ECDSA key fingerprint is SHA256:gTCDYqbsUNGHwrFRV1XuiFa+PpQ+nE2uoD0QqMGm5WE.  
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes  
Warning: Permanently added '192.168.2.103' (ECDSA) to the list of known hosts.  
bob@192.168.2.103's password: ←  
nextcloud-21.0.1.zip 100% 148MB 11.4MB/s 00:12  
winnie@ubuntu:~$  
winnie@ubuntu:~$
```

15.“hostname” command in Linux

hostname command in Linux does the work as its name. If you need to check your server name you can simply type hostname and it will print the hostname for you.

[\[Windows\]](#)

[cmd/Linux](#)



```
nick@ubuntuBionic: ~  
File Edit View Search Terminal Help  
nick@ubuntuBionic:~$ hostname  
ubuntubionic  
nick@ubuntuBionic:~$
```

Syntax: \$ hostname -a (linuxa.google.com)

```
sk@ostechnix:~$  
sk@ostechnix:~$ hostnamectl  
  Static hostname: ostechnix  
    Icon name: computer-laptop  
    Chassis: laptop  
   Machine ID: 09bfdb996ad847c782739db185f3e634  
    Boot ID: 97d0b5bdeacd4f8e852a042c9228be74  
Operating System: Ubuntu 20.04.1 LTS  
      Kernel: Linux 5.4.0-62-generic  
Architecture: x86-64  
sk@ostechnix:~$
```

16.“ipstat” command in Linux

ipstat command in Linux is used to gather and report statistics about IP traffic on a server based on the selected output mode and sort order that is specified in the command syntax. This command enables you To observe network traffic at the IP layer, aggregated on the source, destination, higher-layer protocol, and interface.

[Linux cmd]

# ipstat -c 3				
SOURCE	DEST	PROTO	INT	BYTES
zucchini	antares	TCP	net0	72.0
zucchini	antares	SCTP	net0	64.0
antares	zucchini	SCTP	net0	56.0
amadeus.foo.example.com	10.6.54.255	UDP	net0	40.0
antares	zucchini	TCP	net0	40.0
zucchini	antares	UDP	net0	16.0
antares	zucchini	UDP	net0	16.0
Total: bytes in: 192.0 bytes out: 112.0				

17. “host” command in Linux

host command in Linux is used for DNS (Domain Name System) lookup operation. In simple words, this command is used to find the IP address of a particular domain name or if you want to find out the domainname of a particular IP address the host command becomes handy. [Linux cmd]

```
anshul@anshul-VirtualBox:~$ host
Usage: host [-aCdILTvVw] [-c class] [-N ndots] [-t type] [-W time]
            [-R number] [-m flag] hostname [server]
  -a is equivalent to -v -t ANY
  -c specifies query class for non-IN data
  -C compares SOA records on authoritative nameservers
  -d is equivalent to -v
  -i IP6.INT reverse lookups
  -l lists all hosts in a domain, using AXFR
  -m set memory debugging flag (trace|record|usage)
  -N changes the number of dots allowed before root lookup is done
  -r disables recursive processing
  -R specifies number of retries for UDP packets
  -s a SERVFAIL response should stop query
  -t specifies the query type
  -T enables TCP/IP mode
  -v enables verbose output
  -V print version number and exit
  -w specifies to wait forever for a reply
  -W specifies how long to wait for a reply
  -4 use IPv4 query transport only
  -6 use IPv6 query transport only
anshul@anshul-VirtualBox:~$
```

18.“arp” command in Linux

Arp, command in Linux allows users to manipulate the neighbor cache or

```
root@kali:~# arp -a
_gateway (10.0.2.1) at 52:54:00:12:35:00 [ether] on eth0
root@kali:~# ping 10.0.2.4
PING 10.0.2.4 (10.0.2.4) 56(84) bytes of data.
64 bytes from 10.0.2.4: icmp_seq=1 ttl=64 time=0.541 ms
64 bytes from 10.0.2.4: icmp_seq=2 ttl=64 time=0.280 ms
^C
--- 10.0.2.4 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1031ms
rtt min/avg/max/mdev = 0.280/0.410/0.541/0.132 ms
root@kali:~# arp -a
? (10.0.2.4) at 08:00:27:ad:87:b3 [ether] on eth0
_gateway (10.0.2.1) at 52:54:00:12:35:00 [ether] on eth0
root@kali:~#
```

ARP table. It is contained in the Net-tools package along with many other notable networking commands (such as ifconfig). The arp command has since been replaced by the IP neighbour command. The IP command suite was introduced in Linux 2.2. [\[Windows cmd/Linux cmd/Online cmd\]](#).

TASK 4

Every student should individually set up and configuring a new Virtual Machine and Exporting and packaging an existing Virtual Machine into a portable format.

Theory:

Oracle VM VirtualBox comes in many different packages, and installation depends on your host OS. If you have installed software before, installation should be straightforward. On each host platform, Oracle VM VirtualBox uses the installation method that is most common and easy to use.

Oracle VM VirtualBox is split into the following components:

- **Base package.** The base package consists of all open source components and is licensed under the GNU General Public License V2.
- **Extension packs.** Additional extension packs can be downloaded which extend the functionality of the Oracle VM VirtualBox base package. The extension pack provides the following added functionality:
 - VirtualBox Remote Desktop Protocol (VRDP) support
 - Host webcam passthrough
 - Disk image encryption with AES algorithm.
 - Cloud integration features.

Procedure:

After installation, you can start Oracle VM VirtualBox as follows:

- **Windows hosts.** In the **Programs** menu, click on the item in the **VirtualBox** group. On some Windows platforms, you can also enter **VirtualBox** in the search box of the **Start** menu.
- **macOS hosts.** In the Finder, double-click on the **VirtualBox** item in the Applications folder. You may want to drag this item onto your Dock.
- **Linux or Oracle Solaris hosts.** Depending on your desktop environment, an Oracle VM VirtualBox item may have been placed in either the System or System Tools group of your **Applications** menu. Alternatively, you can enter **VirtualBox** in a terminal window.

When you start Oracle VM VirtualBox, the VirtualBox Manager interface is shown.

VirtualBox Manager is the user interface for Oracle VM VirtualBox. You can use VirtualBox Manager to create, configure, and manage your virtual machines.

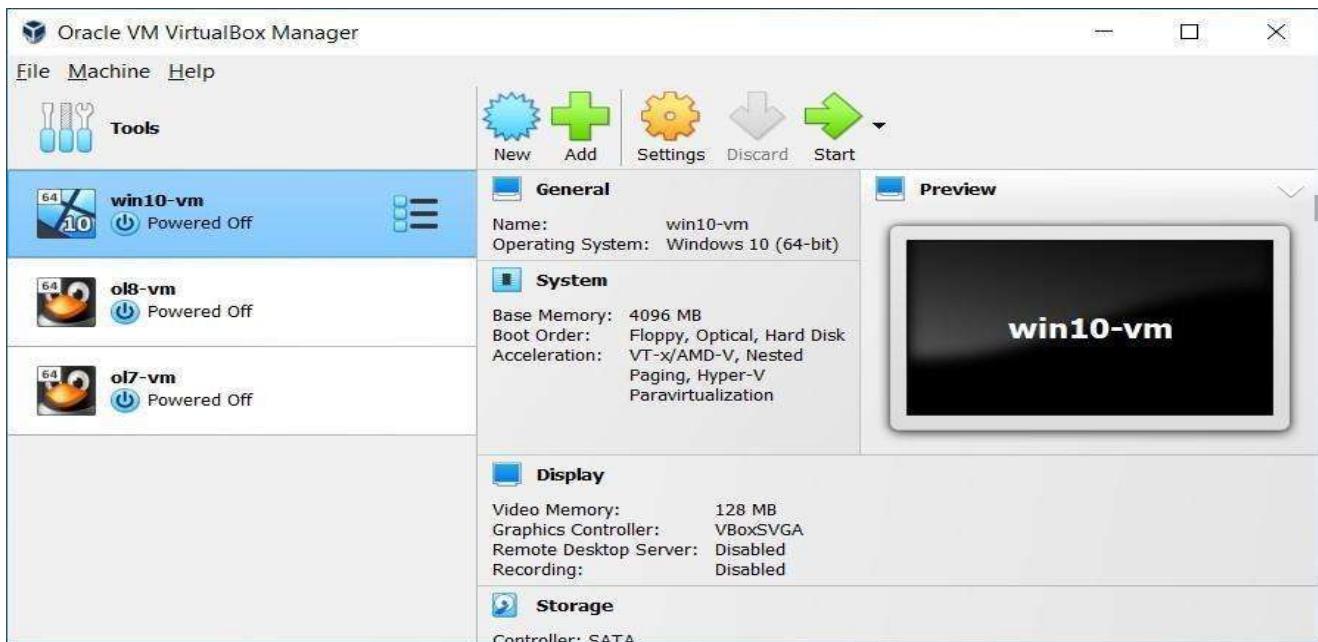
This section describes the main features of the VirtualBox Manager user interface. Subsequent sections and chapters describe how to use VirtualBox Manager to perform tasks in Oracle VM VirtualBox.

When you start Oracle VM VirtualBox, the **VirtualBox Manager** window is displayed.

VirtualBox Manager, Showing Welcome Screen After Initial Startup



VirtualBox Manager Window, After Creating Virtual Machines



The main components of the VirtualBox Manager window are as follows:

- **The machine list.** The left pane of the **VirtualBox Manager** window lists all your virtual machines. If you have not yet created any virtual machines, this list is empty.
- **The Details pane.** The pane on the right displays the properties of the currently selected virtual machine. If you do not have any machines yet, the pane displays a welcome message.

The toolbar buttons on the Details pane can be used to create and work with virtual machines.

- **Help Viewer.** A window that displays context-sensitive help topics for VirtualBox Manager tasks.

VirtualBox Manager Details Pane, Including Toolbar



A toolbar at the top of the Details pane contains buttons that enable you to configure the selected virtual machine, or to create a new virtual machine.

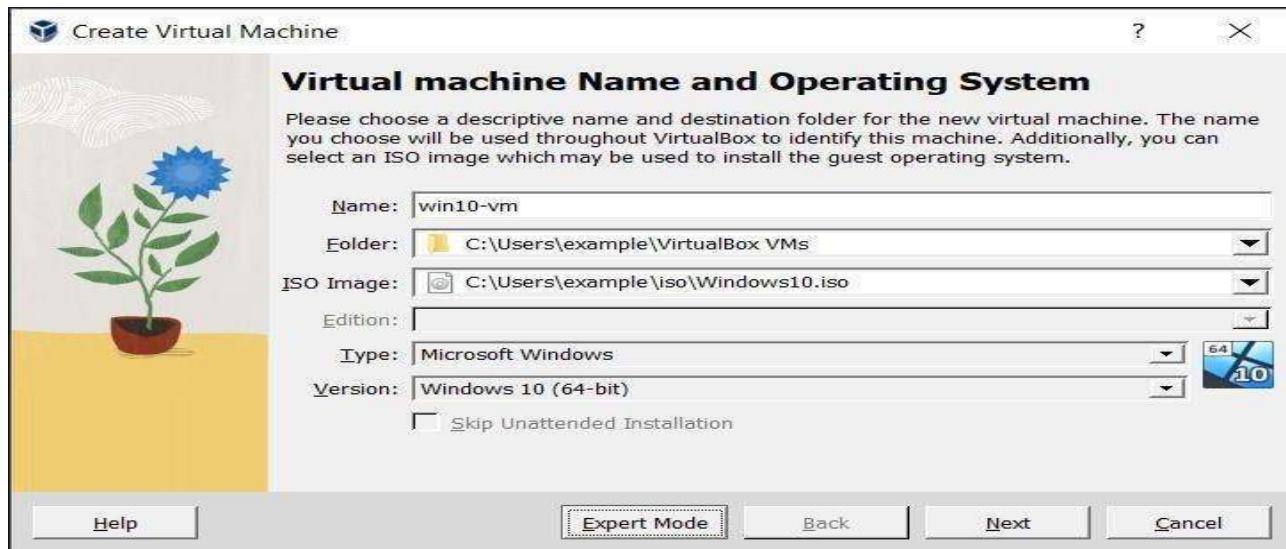
The toolbar includes the following buttons:

- **New.** Creates a new virtual machine, and adds it to the machine list.
- **Add.** Adds an existing virtual machine to the machine list.
- **Settings.** Displays the **Settings** window for the virtual machine, enabling you to make configuration changes.
- **Discard.** For a running virtual machine, discards the saved state for the virtual machine and closes it down.
- **Show/Start.** For a running virtual machine, **Show** displays the virtual machine window. For a stopped virtual machine, **Start** displays options for powering up the virtual machine.

Creating Your First Virtual Machine

Click **New** in the VirtualBox Manager window. The **Create Virtual Machine** wizard is shown, to guide you through the required steps for setting up a new virtual machine (VM).

Creating a Virtual Machine: Name and Operating System



Use this page to specify a name and operating system (OS) for the virtual machine and to change the storage location used for VMs.

The following fields are available on this wizard page:

- **Name.** A name for the new VM. The name you enter is shown in the machine list of VirtualBox Manager and is also used for the virtual machine's files on disk.

Be sure to assign each VM an informative name that describes the OS and software running on the VM. For example, a name such as Windows 10 with Visio.

- **Folder.** The location where VMs are stored on your computer, called the *machine folder*. The default folder location is shown.

Ensure that the folder location has enough free space, especially if you intend to use the snapshots feature. See also [“The Machine Folder”](#).

- **ISO Image.** Select an ISO image file. The image file can be used to install an OS on the new virtual machine or it can be attached to a DVD drive on the new virtual machine.
- **Type and Version.** These fields are used to select the OS that you want to install on the new virtual machine.

The supported OSes are grouped into types. If you want to install something very unusual that is not listed, select the **Other** type. Depending on your selection, Oracle VM VirtualBox will enable or disable certain VM settings that your guest OS may require. This is particularly important for 64-bit guests. It is therefore recommended to always set this field to the correct value.

If an ISO image is selected and Oracle VM VirtualBox detects the operating system for the ISO, the **Type** and **Version** fields are populated automatically and are disabled.

- **Skip Unattended Installation.** Disables unattended guest OS installation, even if an ISO image is selected that supports unattended installation. In that case, the selected ISO image is mounted automatically on the DVD drive of the new virtual machine and user interaction is required to complete the OS installation.

Click **Next** to go to the next wizard page.

Creating a Virtual Machine: Hardware

The following fields are available on this wizard page:

- **Base Memory.** Select the amount of RAM that Oracle VM VirtualBox should allocate every time the virtual machine is started. The amount of memory selected here will be taken away from your host machine and presented to the guest OS, which will report this size as the virtual machines installed RAM.

Caution

Choose this setting carefully. The memory you give to the VM will not be available to your host OS while the VM is running, so do not specify more than you can spare.

For example, if your host machine has 4 GB of RAM and you enter 2048 MB as the amount of RAM for a particular virtual machine, you will only have 2 GB left for all the other software on your host while the VM is running. If you run two VMs at the same time, even more memory will be allocated for the second VM, which may not even be able to start if that memory is not available.

On the other hand, you should specify as much as your guest OS and your applications will require to run properly. A guest OS may require at least 1 or 2 GB of memory to install and boot up. For best performance, more memory than that may be required.

Always ensure that the host OS has enough RAM remaining. If insufficient RAM remains, the system might excessively swap memory to the hard disk, which effectively brings the host system to a standstill.

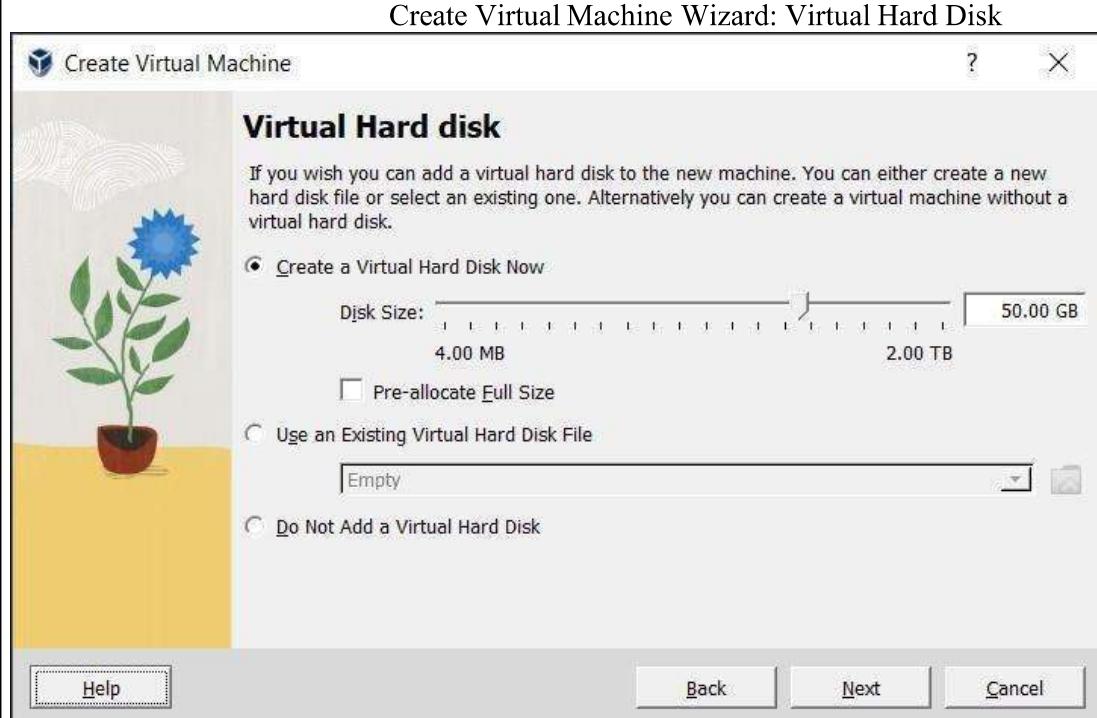
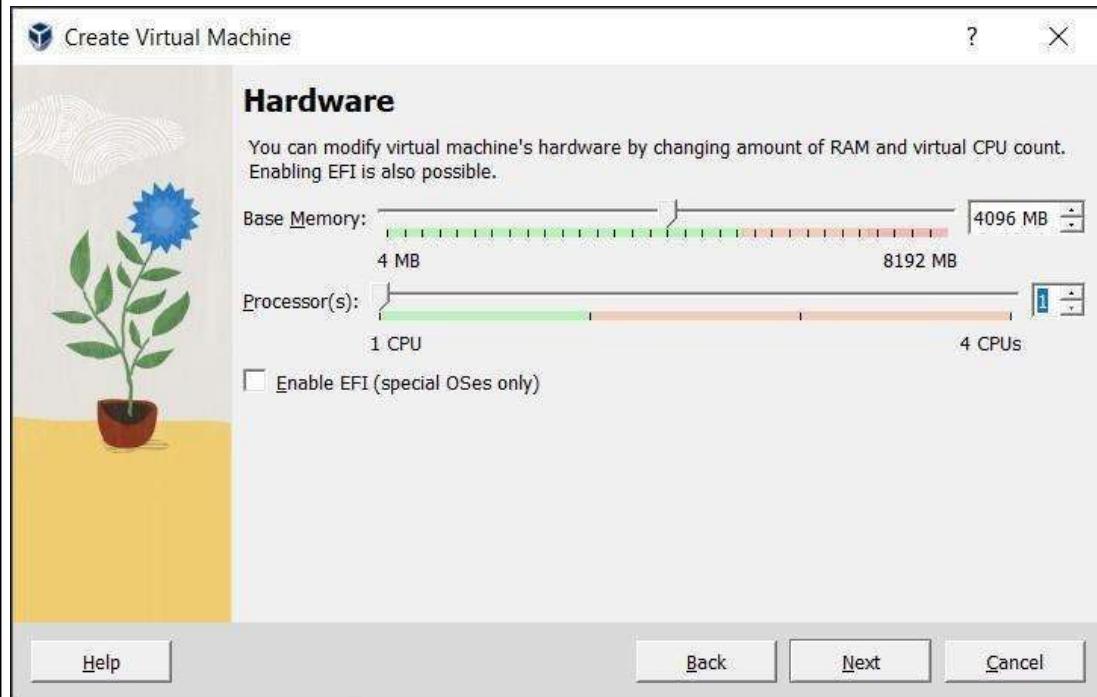
As with other **Create Virtual Machine** wizard settings, you can change this setting later, after you have created the VM.

- **Processor(s).** Select the number of virtual processors to assign to the VM.

It is not advised to assign more than half of the total processor threads from the host machine.

- **Enable EFI.** Enables Extensible Firmware Interface (EFI) booting for the guest OS.

Click **Next** to go to the next wizard page.



Create a Virtual Hard Disk Now. Creates a new empty virtual hard disk image, located in the VM's machine folder.

Enter the following settings:

- **Disk Size.** Use the slider to select a maximum size for the hard disk in the new VM.
- Pre-Allocate Full Size.** This setting determines the type of image file used for the disk image. Select this setting to use a *fixed-size file* for the disk image. Deselect this setting to use a *dynamically allocated file* for the disk image.

The different types of image file behave as follows:

Dynamically allocated file. This type of image file only grows in size when the guest actually stores data on its virtual hard disk. Therefore, this file is small initially. As the drive is filled with data, the file grows to the specified size.

Fixed-size file. This type of image file immediately occupies the file specified, even if only a fraction of that virtual hard disk space is actually in use. While occupying much more space, a fixed-size file incurs less overhead and is therefore slightly faster than a dynamically allocated file.

Use an Existing Hard Disk File. Enables you to select an *existing* disk image file to use with the new VM.

The drop-down list presented in the window lists all disk images which are known by Oracle VM VirtualBox. These disk images are currently attached to a virtual machine, or have been attached to a virtual machine.

Alternatively, click on the small folder icon next to the drop-down list. In the **Hard Disk Selector** window that is displayed, click **Add** to select a disk image file on your host disk.

- **Do Not Add a Virtual Hard Disk.** The new VM is created without a hard disk.

After having selected or created your image file, click **Next** to go to the next wizard page.

Exporting an Appliance in OVF Format

The following steps show how to export an appliance in OVF format.

1. Select **File, Export Appliance** to display the **Export Virtual Appliance** wizard.

On the initial **Virtual Machines** page, you can combine several VMs into an OVF appliance.

Select one or more VMs to export, and click **Next**.

2. The **Format Settings** page enables you to configure the following settings:
 - **Format:** Selects the **Open Virtualization Format** value for the output files.

The **Oracle Cloud Infrastructure** value exports the appliance to Oracle Cloud Infrastructure.

- **File:** Selects the location in which to store the exported files.
- **MAC Address Policy:** Specifies whether to retain or reassign network card MAC addresses on export.

- **Write Manifest File:** Enables you to include a manifest file in the exported archive file.
- **Include ISO Image Files:** Enables you to include ISO image files in the exported archive file.

3. Click **Next** to show the **Appliance Settings** page.

You can edit settings for the virtual appliance. For example, you can change the name of the virtual appliance or add product information, such as vendor details or license text. Double-click the appropriate field to change its value.

4. Click **Finish** to begin the export process. Note that this operation might take several minutes.