

NETWORKING AND SYSTEMS

ADMINISTRATION LAB RECORD

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ASSIGNMENT-1

COMPONENTS OF MOTHERBOARD

What is a Motherboard?

The motherboard is a thin **printed circuit board** (PCB) which links all different components inside your computer. So, we can say the motherboard acts as a hub in a network. People call motherboard with a different name like mainboard, logic board, baseboard, system board, mobo, etc.

Location of Motherboard:

In Desktop PC: In a desktop PC, you will find a big rectangular computer case. Once you open the case to expose inside the machine, you will find green/blue/brown/red large square printed circuit plate. This plate is the motherboard of the PC.

In laptop: If you open the bottom cover of your laptop, you will get exposed to the large PCB board which is the motherboard.

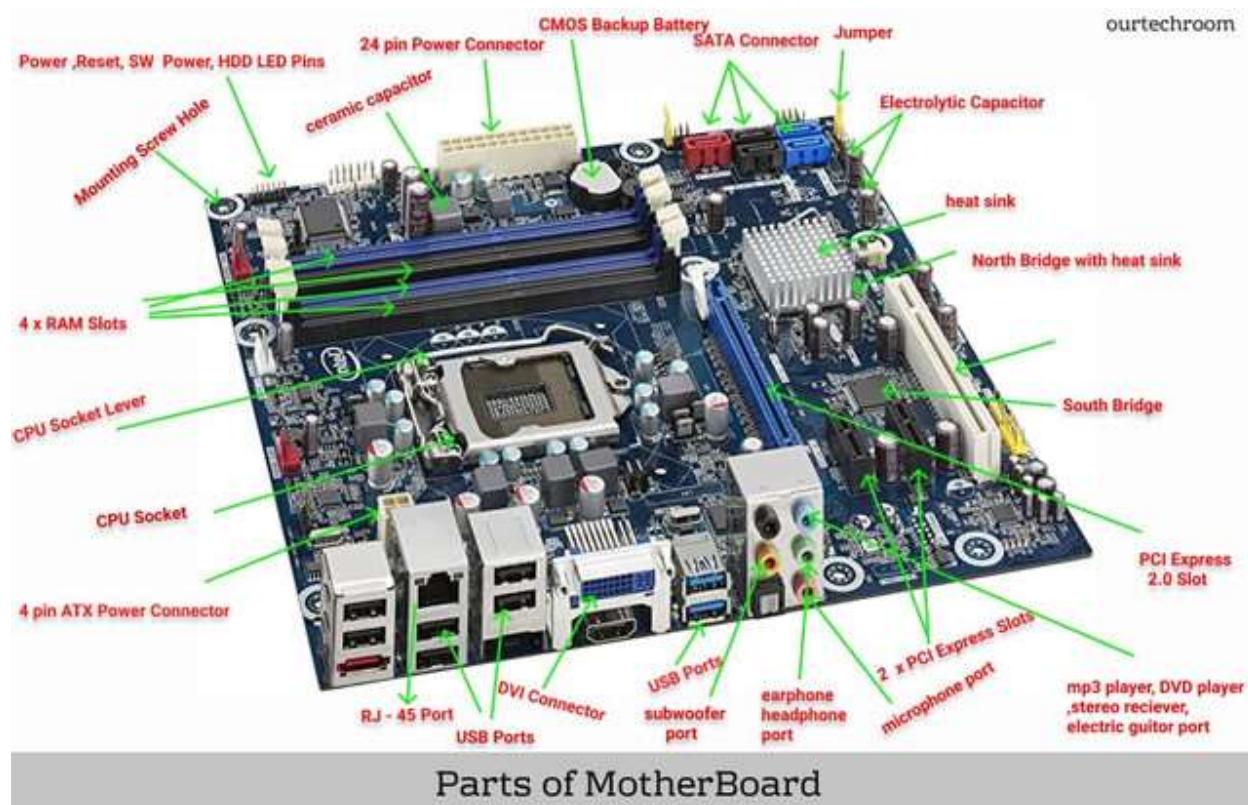
In smartphone: When you open the back cover of the smartphone, and screws up some pins then you will find your motherboard.

Types of Motherboard

In all the programmable electronics devices motherboard is a large PCBs board. The component attached to the board may vary from system to system. The desktop has different kinds of sockets and hardware which may vary from a smartphone. General components like CPU, memory, storage, capacitor, transistor, slots, connectors are common in all electronic devices.

If you know all of these components on the desktop, then you can easily get an idea about components in other electronic devices. So in this article, we focus on desktop components.

Parts of Motherboard



Parts of the Motherboard are as follow.

- RAM Chip and RAM Slot
- CPU Chip and Socket
- PCI Slots
- Accelerated Graphics Port
- North Bridge
- SouthBridge
- CMOS Battery
- Power Supply Plug
- Parallel Port
- Serial Port
- SATA and PATA Connector
- USB Port
- DVI Port
- RJ-45 Port
- HDMI Port
- FDD Connector

- Optical Drive Audio Connector
- 1394 Headers
- F Audio Connectors
- Heat Sink
- Switches and Jumper
- Microphone port, headphone port, subwoofer port, guitar port, DVD player port, stereo receiver port
- Capacitor
- Transistor
- Mounting Screw Hole
- Power, Reset, SW, LED Pins

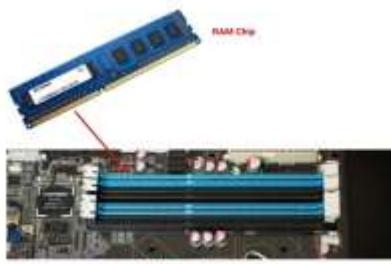
1) RAM chip and RAM Slot

RAM stands for Random Access Memory. It is also called the **main memory**. RAM is a **temporary data storage** device in computers and other devices. Data stored in RAM will get erased as soon as power is turned off.

RAM has **bidirectional data transfer** capacity from CPU to memory during a write operation and from RAM to CPU during the reading operation. It acts as a mediator for data transfer from CPU to other devices like HDD, cdrom, PEN drives.

It is called **Random-access memory** because any memory address of RAM can be accessed directly from any location. If row number and column number are known then data in any memory location can be accessed.

Various types of RAM are available in the market some of them are DRAM, SDRAM, DDR, SRAM, CMOS RAM, VRAM etc. Generally available RAM in the PC market is from 2 GB to 16 GB.

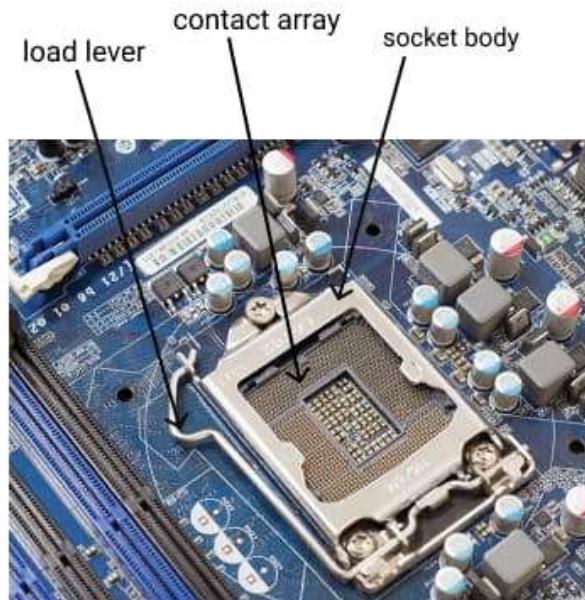


2) CPU Chip and Socket

CPU stands for Central Processing Unit. Considered as the **brain of the computer** and other electronic devices because all the decision making tasks of the computer is performed by the CPU. It is a large printed circuit board where all the components and peripherals are directly or indirectly connected. The main function of the CPU is to execute basics arithmetical, logical, and input/output operations.



CPU Chip



CPU Socket

CPU consists of 3 main typical components. ALU, CU

ALU: Arithmetical Logical Unit (ALU) is a digital circuit(gates) of CPU which is used for performing all arithmetical and logical operations. Some normal arithmetical operations performed by ALU are addition, subtraction, multiplication, and division. Some logical operations performed by ALU is comparisons between numbers and letters. A single CPU may also contain more than one ALU.

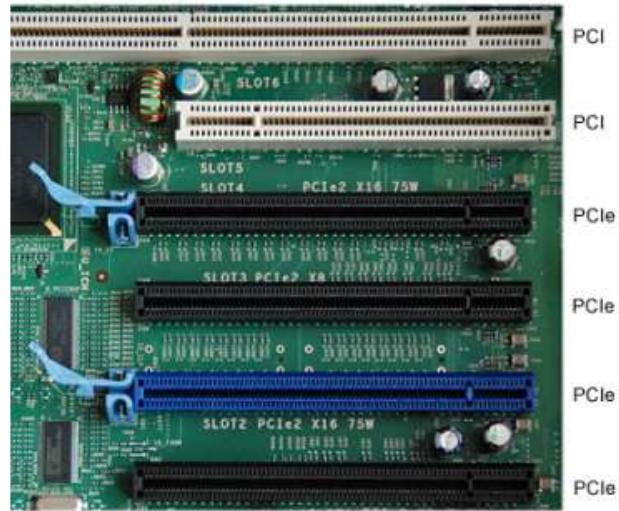
CU: Control Unit (CU) is a digital circuit of CPU which controls all the operations within the CPU. It allows and teaches various logical units, I/O devices, the memory of computer how to respond to a program's instructions of the various components as well as the user.

Memory or Storage Unit:

3) PCI Slots and PCI Chip



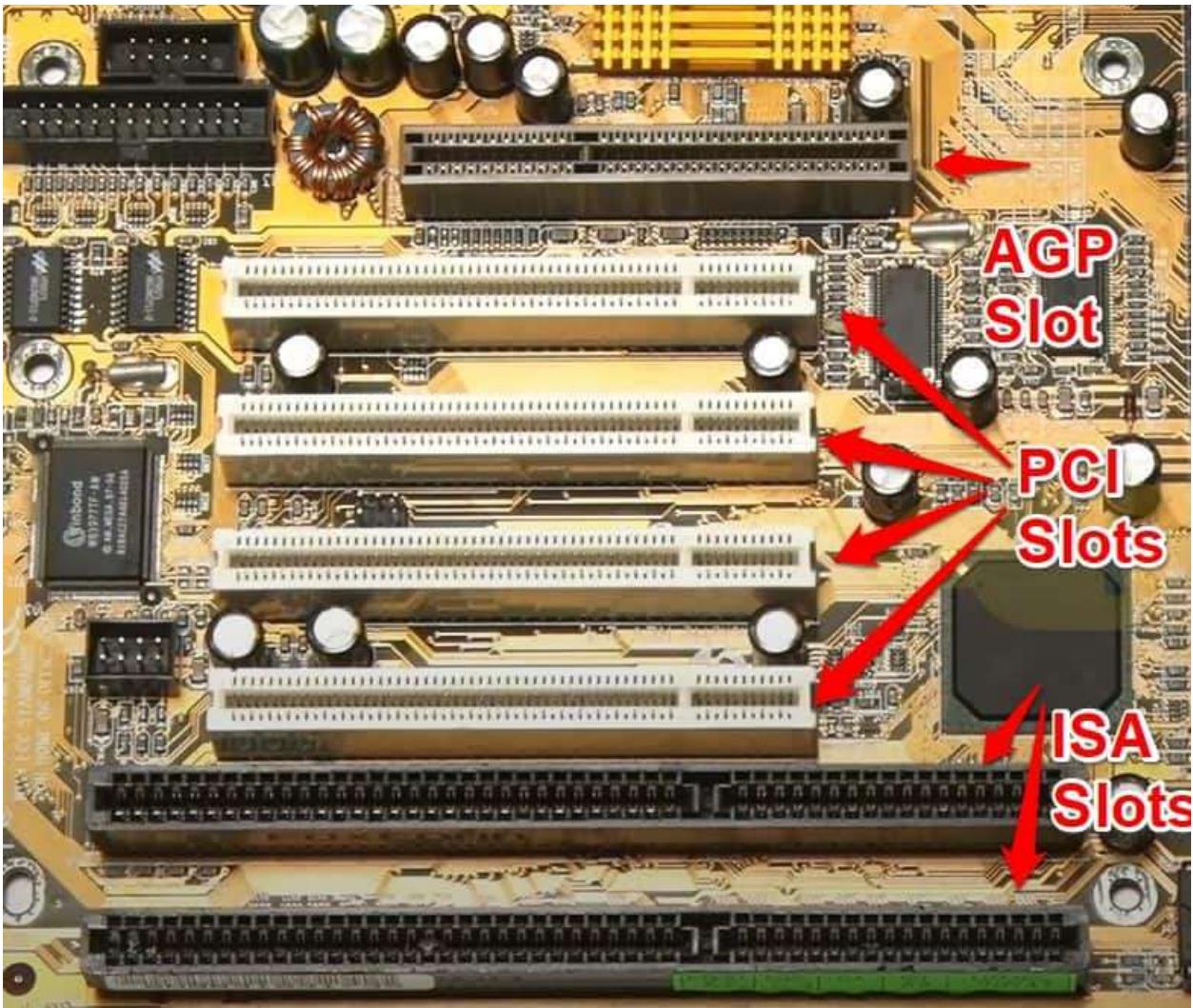
PCI Chip



PCI Slots

Peripheral Component Interconnected(PCI) is an attached hardware component of motherboard for connecting various hardware components like modems, disk controller, NIC cards, Sound Card, graphics cards, SSD add-on cards, RAID cards, extra USB and serial port required so PCI slots help increasing motherboard capabilities without adding or replacing the motherboard.

If you have limited ports and slots on the motherboard to connects various types of hardware devices like saying graphics card port(AGP port) then you can use PCI slots to connects Graphics cards and enjoy the same features. Same way if you have limited USB port in your computer system and want more than you can use a USB expansion card and get more USB port in your system.



4) AGP Slot and Chip

Accelerated Graphics Port Slot(AGP Slot) is a kind of expansion slot like a PCI slot but mainly designed for graphics cards. It was first introduced by Intel in 1996. We can easily locate this expansion slot because it is usually presented in **brown color**.

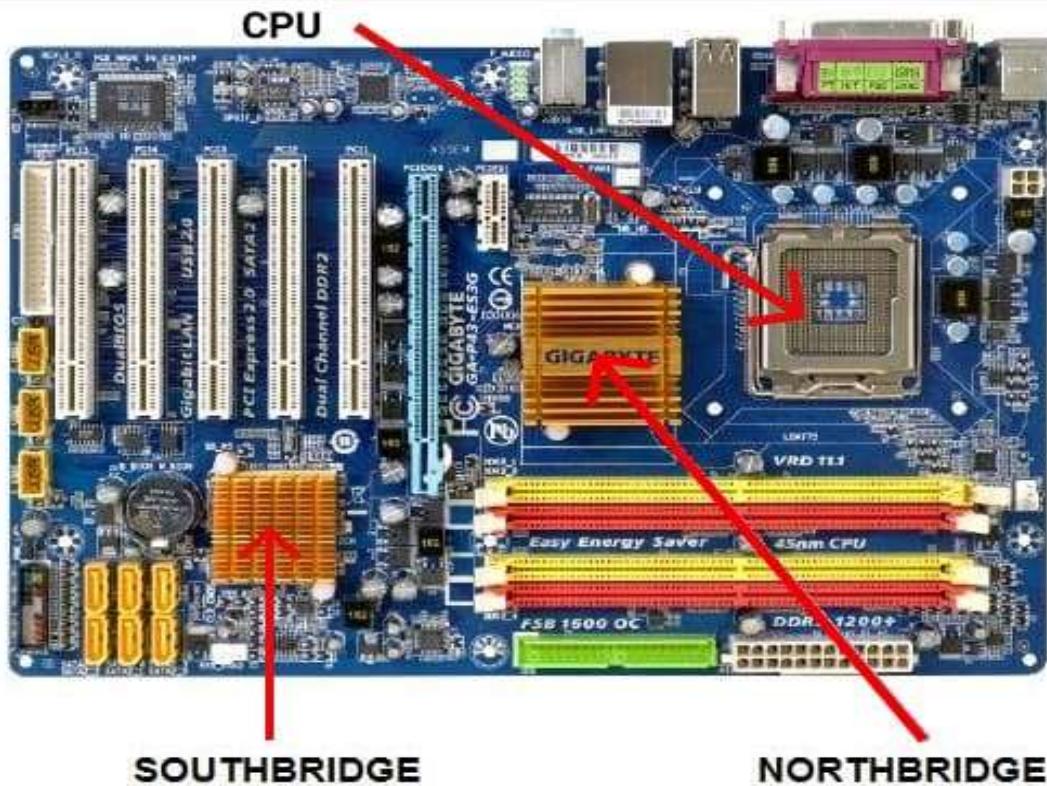
5) North Bridge

North Bridge is also called Host bridge or Memory Controller Hub. It acts as the primary controller in the motherboard which directs traffics to and from the CPU. So, the performance of the computer also depends on the northbridge chip. It does lots of processing so it generally comes with a heatsink.

Characteristics of North Bridge:

- It connects southbridge to the CPU.
- It handles and communicates faster components on the motherboard like Main Memory, AGP, PCIe, ROM, and CPU.
- It acts as a controller in bus speed on the motherboard.
- Generally, it does lots of work with the CPU, so it is located near to the CPU generally with the heatsink.
- It is a core component and is directly connected to the CPU.

In some processors of Intel, all the functioning of northbridge is performed by CPU.



6) South Bridge

Southbridge is an IC chip that generally handles and controls IO functioning in the motherboard. Unlike Northbridge, it does not have direct connection with CPU. It generally handles low-speed devices because its communication speed is lower. Instruction from CPU reaches northbridge then from northbridge to southbridge. It is

connected to the PCI bus, ISA buses, IDE buses, audio, serial devices like mouse, keyboard, USB ports, etc, and SATA hard disk connector.

7)CMOS Backup Battery

CMOS stands for "**Complementary Metal Oxide Semiconductor**" and found in both laptop and desktop PC as a small circular coin shape.CMOS stores a wide range of system information like current system clock, date, time, pulses, mostly used hardware settings, BIOS configuration settings, BOOT sequences, BIOS master/admin password, GPU and virtualization settings,power management, etc. They can save those set for a longer time around 2 to 10 years.CMOS works continuously even if you shut down your system because it is continually holding all those setting mention above.

8)Power Supply Plug

The main work of the Power Supply port in the Motherboard is to provide power to Motherboard and its attached components and peripherals.

i)24(20+4)ATXpowersupply

In modern PCs, ATX power supply is provided which is 24 Pin(20 + 4) Main Power Supply Connector (Older Pcs only have 20 Pin)

ii)4Pinor8PinConnector

This port in the motherboard is to provide dedicated power to the CPU. Older PCs may not have this Plugin motherboard but modern computers can do lots of works like overclocking so, a dedicated cable is provided to the CPU.

8Pin connector can be split into two and each split part can be used as 4 pin connector.

iii)PCI-Express6-Pinor8-PinConnector

This is required to power the PCI-E port.PCI-E slot required 75W power to operates.

THE older PC does not have this.

iv)Molex

Molex pin is 4 power pin which is required to supply power to older CDROM and hard drives. Molex is nowadays used for Case Fan. (some have some do not have)

Molex connector comes with Mini Molex connectors, which is used for floppy disk drives in much older PCs.

v) SATA powersupply

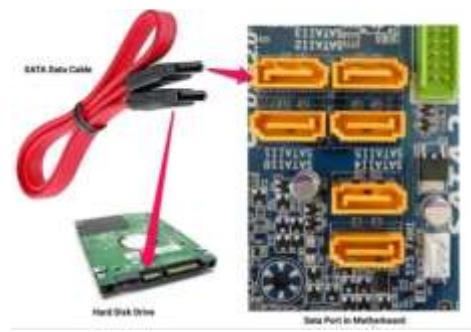
Modern hard drives and CDROM uses SATA cable for power. In motherboard, it is L-shape port and so its cable is connected to SATA port in one way only. In motherboard, it has 15 pins. It provides features of hot-swappable hard drives ie. plug and play hard drive features.

9) SATA and PATA Port and Connector

PATA stands for Parallel Advanced Technology Attachment. It is 40 pins long and wide ribbon cable used for connecting mass storage devices like hard disks(HDD or SSD), optical drives to the computer. It was launched in 1986 by Western Digital and Compaq. Every cable of PATA has two or three connectors, of which one is attached to the adapter interfacing and the remaining are plugged into secondary storage devices.

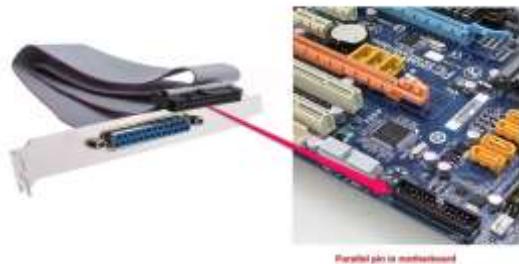
In modern computers, it is not used. It is outdated technology and is replaced by SATA Technology

SATA stands for Serial Advanced Technology Attachment. It is 7 pin cable which is shorter and powerful than the PATA connector and its function is the same as the PATA connector. The first version of SATA was launched in 2000.



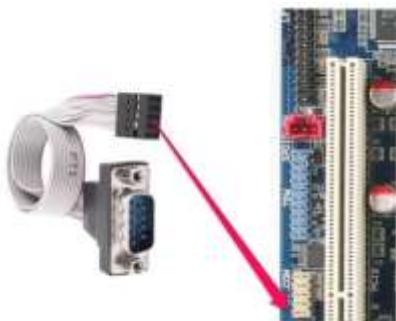
10) Parallel Port

A parallel port is used to transfer in a parallel manner through multiple communication channels. Used for printers, scanner, Zip Drive, external HDD, tape backup devices, external CD ROM, etc.



10) Serial Port

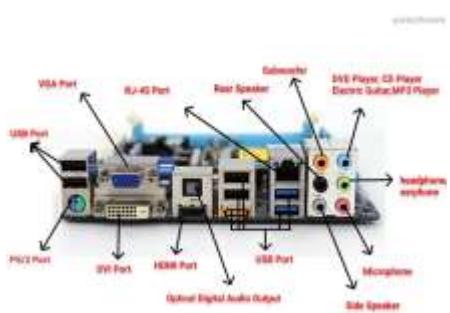
With a serial port, only one bit of data gets transfer at a time. It is found in an older PC to connect older keyboards, PDAs, external modems.



11) PS/2 Port

PS/2 port was popular in older desktop PCs. But now it is obsolete.

- PS/2 (green color) is for the mouse.
- PS/2 (purple) is for the keyboard.



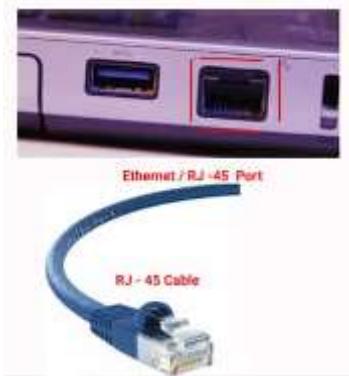
11) USB Port

USB stands for Universal Serial Bus. Its transfer rates is faster than PS/2 connector so modern PC we donot find PS/2 port. There are various types of USB port some of them are :

- Type A
- Type B
- Type C
- Type A Mini
- Type B Mini
- Type A Micro
- Type B Micro
- Type B Micro USB3

12) RJ-45 Port

RJ stands for **Register Jack**. It looks like a telephone jack but slightly bigger. RJ45 is also called Ethernet Port because it is used to provide the internet to the computer. RJ 45 port is used to connect to Local Area Network using twisted pair ethernet cable . Ethernet Cable has a connector this connector is connected to RJ45 port.



13) HDMI port

HDMI stands for **High Definition Multimedia Interface**. It was developed in 2002 AD. It looks like a USB port but it is quite larger in size. HDMI is a digital interface for transmission of audio and video data in a single cable to digital devices like digital TV, projector, gaming console, computer, mobile devices, digital camera, cable box, blu ray, etc.

14) Audio Port

Most of the desktop computer nowadays comes with 3 to 6 port.

- Green Color Port is a Line Out which is for headphones and stereo speakers.
- Pink /Light Pink Port for Microphones input.
- Light Blue Port is line In which is for mp3 players, DVD player, CD player, stereo receiver, turntable, electric guitar, VCR audio outputs.
- Dolby Audio Black Port for rear speaker.
- Orange/yellow port is Center/Bass Channel which is for subwoofer



15) Heatsink

Heatsinks use a thermal conductor to reduce heat generated and prevent overheating from hardware components like CPU, GPU, northbridge, southbridge, RAM modules, etc. In general, that component that generates heats required a heatsink.

CPU has to perform a large number of tasks every second. While performing large tasks, it begins to generate heat and if heat is not maintained then the processor will destroy itself. Also at the top of the heatsink will have a FAN and this FAN helps to cool down the heat sink. This is Air coolant Heatsink

But in the market, we will have liquid coolant heatsink as well generally used in a high-end gaming environment, servers, and datacenter.



CPU Fan and Heatsink



NorthBridge with Heatsink



CPU with Heatsink above it

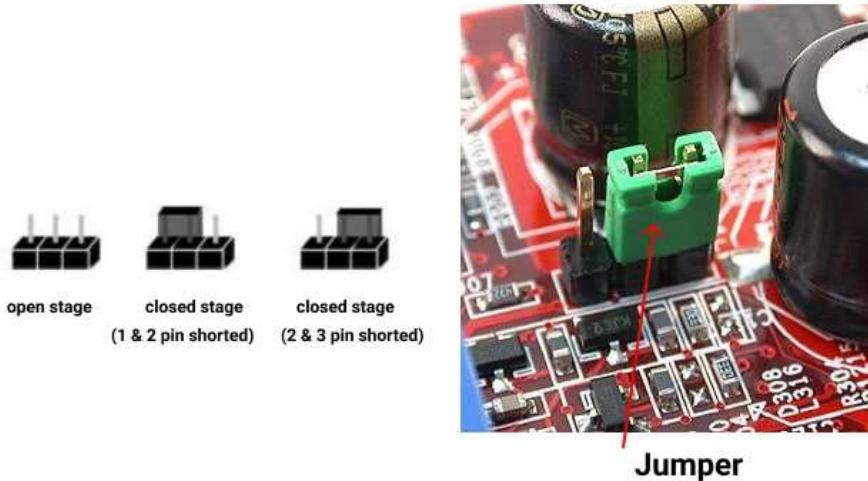
16) Switches and Jumper

Switches and jumpers are used to reconfigure the circuit onto an existing circuit board in a reversible way.

Jumper also called Jumper Shunt is a small circuit board used to close, open or bypass part of an electronic circuit.

Closed Stage Jumper: If the plug is pushed down over two pins, the jumper is referred to as jumpered.

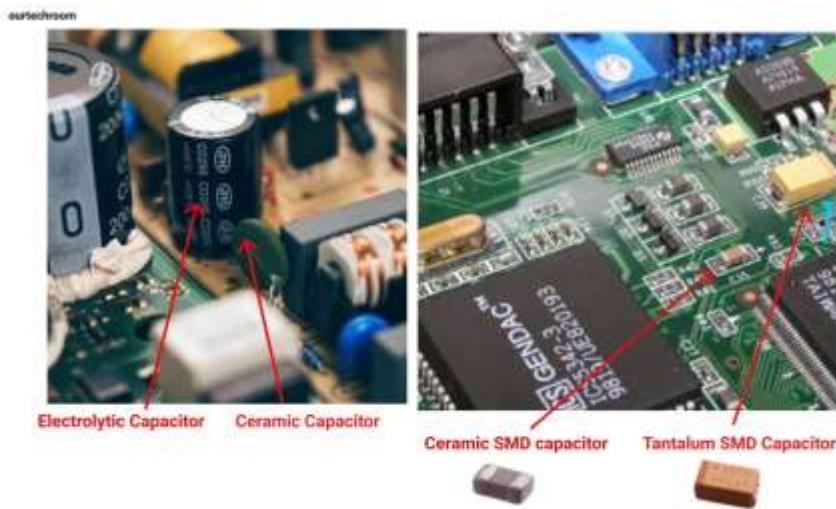
Opened Stage Jumper: If there is no plug into the pin then it is an open stage.



17) Capacitor

A capacitor is an electronic device used for filtering, decoupling, and timing the circuit in the motherboard. There are more capacitors in the motherboard which mostly does decoupling functionality, so those capacitors are called a decoupling capacitor. A decoupling capacitor is used for stabilizing power in each IC used in the system.

It comes with various voltage levels like 3.3 V, 5 V, 12 V.



Suppose a circuit needs 5 V input than before that circuit there will be capacitors in parallel which allow up to 5 V to pass to that circuit.

18) Transistor and MOSFET

Transistor is used in most of the component of motherboard for various purpose like

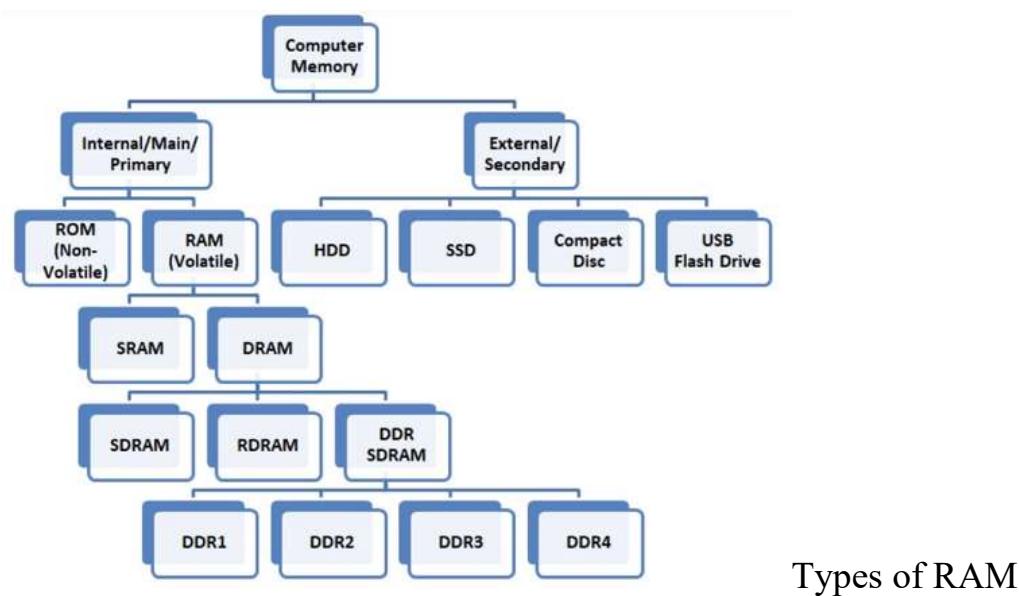
- controlling the amount of current or voltage in the component
- amplification/modulation electronic signal
- switching of an electronic signal and electrical power.

RAM MODULES

What is RAM?

The full form of RAM is Random Access Memory. The information stored in this type of memory is lost when the power supply to the PC or laptop is switched off. The information stored in RAM can be checked with the help of BIOS. It is generally known as the main memory or temporary memory or cache memory or volatile memory of the computer system.

Types of RAM



Two main types of RAM are:

- Static RAM
- Dynamic RAM

Static RAM

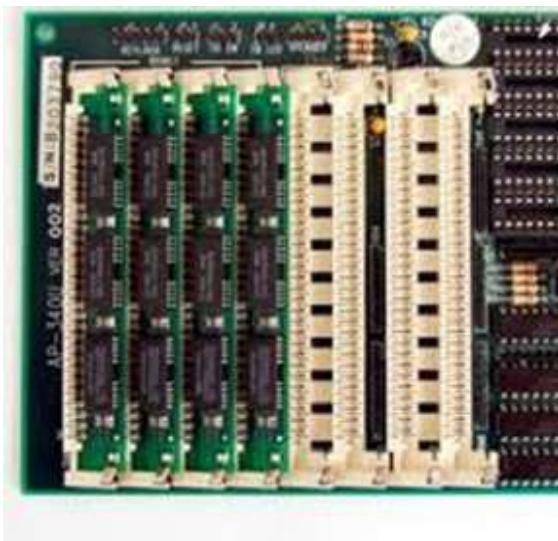
Static RAM is the full form of SRAM. In this type of RAM, data is stored using the state of a six transistor memory cell. Static RAM is mostly used as a cache memory for the processor (CPU).

Dynamic RAM

DRAM stands for Dynamic Random Access Memory. It is a type of RAM which allows you to stores each bit of data in a separate capacitor within a specific integrated circuit. Dynamic RAM is a standard computer memory of the many modern desktop computers.

This type of RAM is a volatile memory that needs to be refreshed with voltage regularly. Else it loses the information stored on it.

Other Important Types of RAM



FPM DRAM

Fast Page Mode Dynamic Random Access Memory is a type of RAM that waits through the entire process of locating a bit of data by column and row and then reading the bit before it begins on the next bit. Max transfer rate is around 176 Mbps.

SDR RAM



SDR RAM

SDR RAM is a full form of synchronous dynamic access memory. It has access times between 25 and 10 ns(nanosecond), and they are in DIMM (dual in-line memory module) modules of 168 contacts.

They store data using capacitors using IC's (Integrated Circuits). On one of its sides, they have terminations, which can be inserted inside of the individual slots for the Motherboard's memory.RD RAM



RD RAM

Rambus Dynamic Random Access Memory is a full form of RDRAM. This type of RAM chips works in parallel, which allows you to achieve a data rate of 800 MHz or 1,600 Mbps. It generates much more heat as they operate at such high speeds.

VRAM (Video):



VRAM

RAM optimized for video adapters is called VRAM. These chips have two ports so that video data can be written to chips at the same time the video adapter regularly reads the memory to refresh the monitor's current display.



EDO RAM

EDO DRAM is an abbreviation of Extended Data Output Random Access Memory. It doesn't wait for the completion of the processing of the first bit before continuing to the next one. As soon as the address of the first bit is located, EDO DRAM begins looking for the next bit.

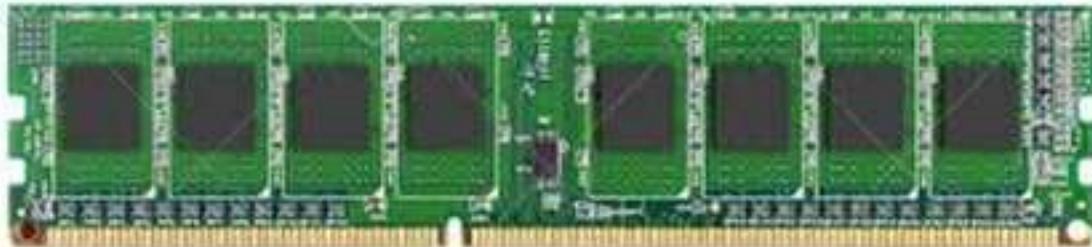
Flash Memory :



Flash Memory

Flash memory is an electrically erasable and programmable permanent type of memory. It uses a one-transistor memory to store a bit. It offers low power consumption and helps to reduce the cost. It is mainly used in digital cameras, MP3 players, etc.

DDR SDRAM



DDR RAM

The full form of DDR SDRAM is Double Data Rate Synchronous Dynamic Random-Access Memory. It is just like SDRAM. The only difference between the

two is that it has a higher bandwidth, which offers greater speed. It's maximum transfer rate to L2 cache which is approximately 1,064 Mbps.

Uses of RAM

Here, are important uses of RAM:

- RAM is utilized in the computer as a scratchpad, buffer, and main memory.
- It offers a fast operating speed.
- It is also popular for its compatibility
- It offers low power dissipation

DAUGHTER CARDS

A **daughterboard** (or *daughter board* , *daughter card* , or *daughtercard*) is a circuit board that plugs into and extends the circuitry of another circuit board. The other circuit board may be the computer's main board (its motherboard) or it may be another board or card that is already in the computer, often a sound card. The term is commonly used by manufacturers of wavetable daughterboards that attach to existing sound cards.

Alternatively known as a **bus slot** or **expansion port**, an **expansion slot** is a connection or port inside a computer on the motherboard or riser card. It provides an installation point for a hardware expansion card to be connected. For example, if you wanted to install a new video card in the computer, you'd purchase a video expansion card and install that card into the compatible expansion slot.

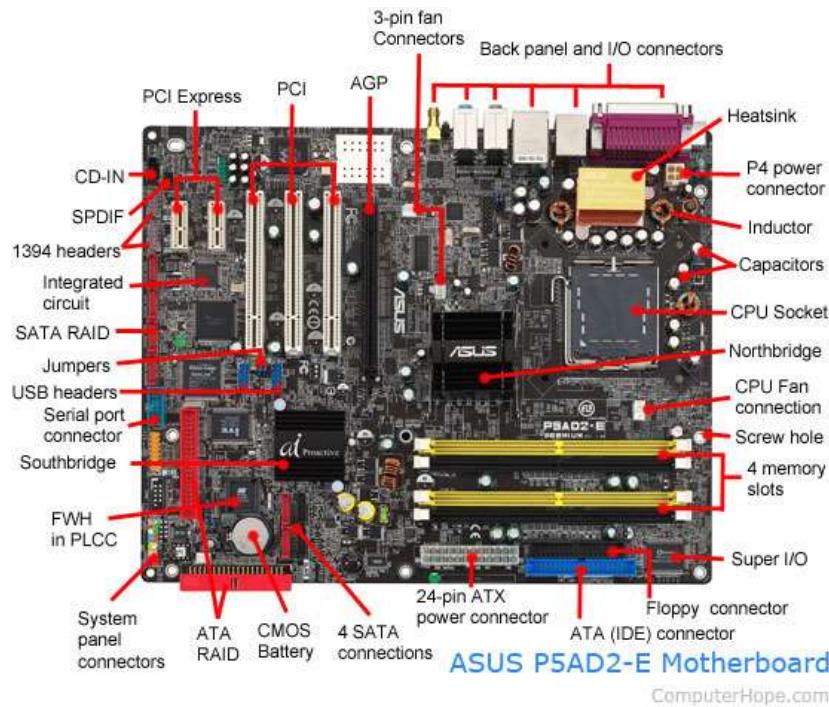
Computer expansion slots

Below is a listing of expansion slots commonly found in a computer and the devices associated with those slots. Clicking any of the links below provide you with additional details.

- [AGP](#) - Video card.

- **AMR** - Modem, sound card.
- **CNR** - Modem, network card, sound card.
- **EISA** - SCSI, network card, video card.
- **ISA** - Network card, sound card, video card.
- **PCI** - Network card, SCSI, sound card, video card.
- **PCI Express** - Video card, modem, sound card, network card.
- **VESA** - Video card.

Many of the expansion card slots above are obsolete. You're most likely only going to encounter AGP, PCI, and PCI Express when working with computers today. The picture below is an example of what expansion slots may look like on a motherboard. In this picture, there are three different types of expansion slots: PCI Express, PCI, and AGP.



How many expansion slots does my computer have?

Every computer motherboard is different, to determine how many expansion slots are on your computer motherboard identify the manufacturer and model of the motherboard. Once you've identified the model of motherboard, you can find complete information about the motherboard in its manual.

Adding additional expansion slots for older motherboards could be accomplished using a riser board, which would add several ISA or PCI slots. Today, riser boards are rarely used with motherboards, as there is limited need for additional expansion slots with modern motherboards.

What type of expansion slots are on my motherboard?

As mentioned above, every motherboard model is unique, so to determine the type of expansion slots on the motherboard, consult the board's specifications and owner's manual. You can also open the computer case and visually examine the motherboard.

Why do computers have expansion slots?

Computers have expansion slots to give the user the ability to add new devices to their computer. For example, a computer gamer may upgrade their video card to get better performance in their games. An expansion slot allows them to remove the old video card and add a new video card without replacing the motherboard.

What is the most common expansion slot today?

Today, the most commonly used expansion slot used and found on computer motherboards is the PCI Express expansion slot.

Does a laptop have an expansion slot?

Laptops do not have expansion slots like a desktop computer. However, some laptops do have PC Cards that can be inserted into the side of the laptop. They may also have a Cardbus slot for an ExpressCard to be added.

SMPS

SMPS is the Switched Mode Power Supply circuit which is designed for obtaining the regulated DC output voltage from an unregulated DC or AC voltage. There are four main types of **SMPS** such as. DC to DC Converter. AC to DC Converter.

The SMPS is mostly used where switching of voltages is not at all a problem and where efficiency of the system really matters. There are few points which are to be noted regarding SMPS. They are

- SMPS circuit is operated by switching and hence the voltages vary continuously.
- The switching device is operated in saturation or cut off mode.
- The output voltage is controlled by the switching time of the feedback circuitry.
- Switching time is adjusted by adjusting the duty cycle.
- The efficiency of SMPS is high because, instead of dissipating excess power as heat, it continuously switches its input to control the output.

Disadvantages

There are few disadvantages in SMPS, such as

- The noise is present due to high frequency switching.
- The circuit is complex.
- It produces electromagnetic interference.

Advantages

The advantages of SMPS include,

- The efficiency is as high as 80 to 90%
- Less heat generation; less power wastage.
- Reduced harmonic feedback into the supply mains.
- The device is compact and small in size.
- The manufacturing cost is reduced.
- Provision for providing the required number of voltages.

Applications

There are many applications of SMPS. They are used in the motherboard of computers, mobile phone chargers, HVDC measurements, battery chargers, central power distribution, motor vehicles, consumer electronics, laptops, security systems, space stations, etc.

Types of SMPS

SMPS is the Switched Mode Power Supply circuit which is designed for obtaining the regulated DC output voltage from an unregulated DC or AC voltage. There are four main types of SMPS such as

- DC to DC Converter
- AC to DC Converter
- Fly back Converter
- Forward Converter

Internal Storage Devices

Internal storage can mean several different things, but most often refers to a computer's **internal** hard drive. This is the primary **storage device** used to store a user's files and applications. If a computer has multiple **internal** hard **drives**, they are all considered part of the computer's **internal storage**

Optical Storage

Optical Storage is a device for storage method in which data is written and readable with a laser and purpose is to store backup. Data written methods such as CDs and DVDs. From some of the years Optical storage is replacement for drives in personal computers and tape backup in mass storage. This is durable and protected to environmental conditions. Now the optical speeds approaching hard drives as said by OSTA(Optical Storage Technology Association). There are some of the new formats introduced Blu-ray and UDO i.e. ultra density optical and also use blue laser to increase capacity.

Magnetic Storage

Magnetic Storage is the most common and enduring form of removable storage device which is used in mostly systems. It is used as a drive which is mechanical device connects to computer in that you can insert the media that actually used as a storage device. The media used in removable storage device is made up of iron oxide and that oxide is ferromagnetic material, here the meaning of the term ferromagnetic is if you expose it into magnetic field it is permanently magnetised that is known as a disk or cartridge. The drive use motor to rotate the device at a

very high speed and access information stored by the heads. There are many types of magnetic storage devices hard drives, Tapes, Floppy disk, Iomega.

Semiconductor Storage

This storage device is used to store digital information that is fabricated by using integrated circuit technology also known as semiconductor technology which is an essential parts of today world. As there is rapid improvement in the requirement of such kind of technologies there are some of the related technologies emerged are ROM, RAM, EPROM, EEPROM, Flash Memory, DRAM and so on. Now we are going to discuss Flash memory its function and features. In this data can written and erased on the individual cell basis. To re-programme different areas of chip at different levels electronic equipment are used. It is non-volatile which make it useful to use. Used in many different fields like mobile phone, memory cards for digital cameras and many other applications.

Ports and Interfaces

The Motherboard of a computer has many I/O sockets that are connected to the ports and interfaces found on the rear side of a computer (Figure 3.13). The external devices can be connected to the ports and interfaces. The various types of ports are given below:

Serial Port: To connect the external devices, found in old computers.

Parallel Port: To connect the printers, found in old computers.

USB Ports: To connect external devices like cameras, scanners, mobile phones, external hard disks and printers to the computer.

USB 3.0 is the third major version of the Universal Serial Bus (USB) standard to connect computers with other electronic gadgets as shown in Figure 3.13. USB 3.0 can transfer data up to 5 Giga byte/second. USB3.1 and USB 3.2 are also released.



Figure 3.13 USB 3.0 Ports

VGA Connector: To connect a monitor or any display device like LCD projector.

Audio Plugs: To connect sound speakers, microphone and headphones.

PS/2 Port: To connect mouse and keyboard to PC.

SCSI Port: To connect the hard disk drives and network connectors.

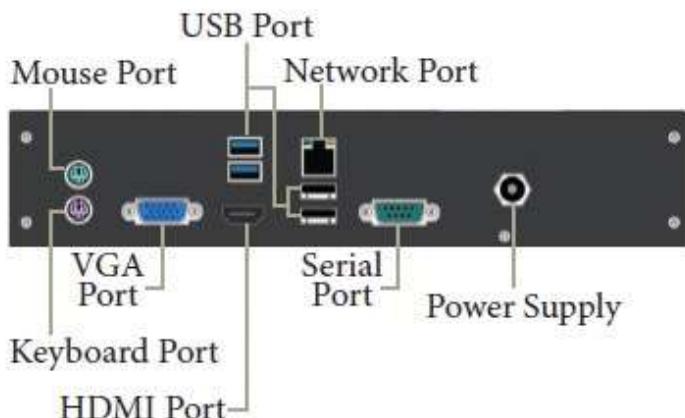


Fig 3.14 Ports and Interfaces

High Definition Multimedia Interface (HDMI)

High-Definition Multimedia Interface is an audio/video interface which transfers the uncompressed video and audio data from a video controller, to a compatible computer monitor, LCD projector, digital television etc.



Micro HDMI

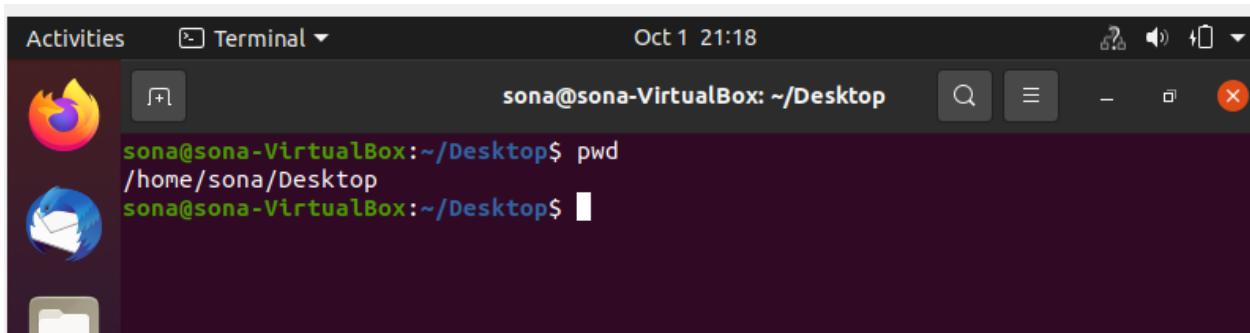
HDMI

Figure 3.15 HDMI Ports

BASIC LINUX COMMANDS

1. pwd

pwd stands for Print Working Directory. It prints the path of the working directory, starting from the root.

A screenshot of a Linux desktop environment. At the top, there is a header bar with "Activities", a "Terminal" icon, the date "Oct 1 21:18", and various system icons. Below the header is a dock with icons for a browser (Firefox), a file manager (Nautilus), and other applications. The main area shows a terminal window titled "sona@sona-VirtualBox: ~/Desktop". Inside the terminal, the command "pwd" is run, and the output "/home/sona/Desktop" is displayed. The terminal window has standard window controls (minimize, maximize, close) at the top right.

```
sona@sona-VirtualBox:~/Desktop$ pwd
/home/sona/Desktop
sona@sona-VirtualBox:~/Desktop$
```

2. history

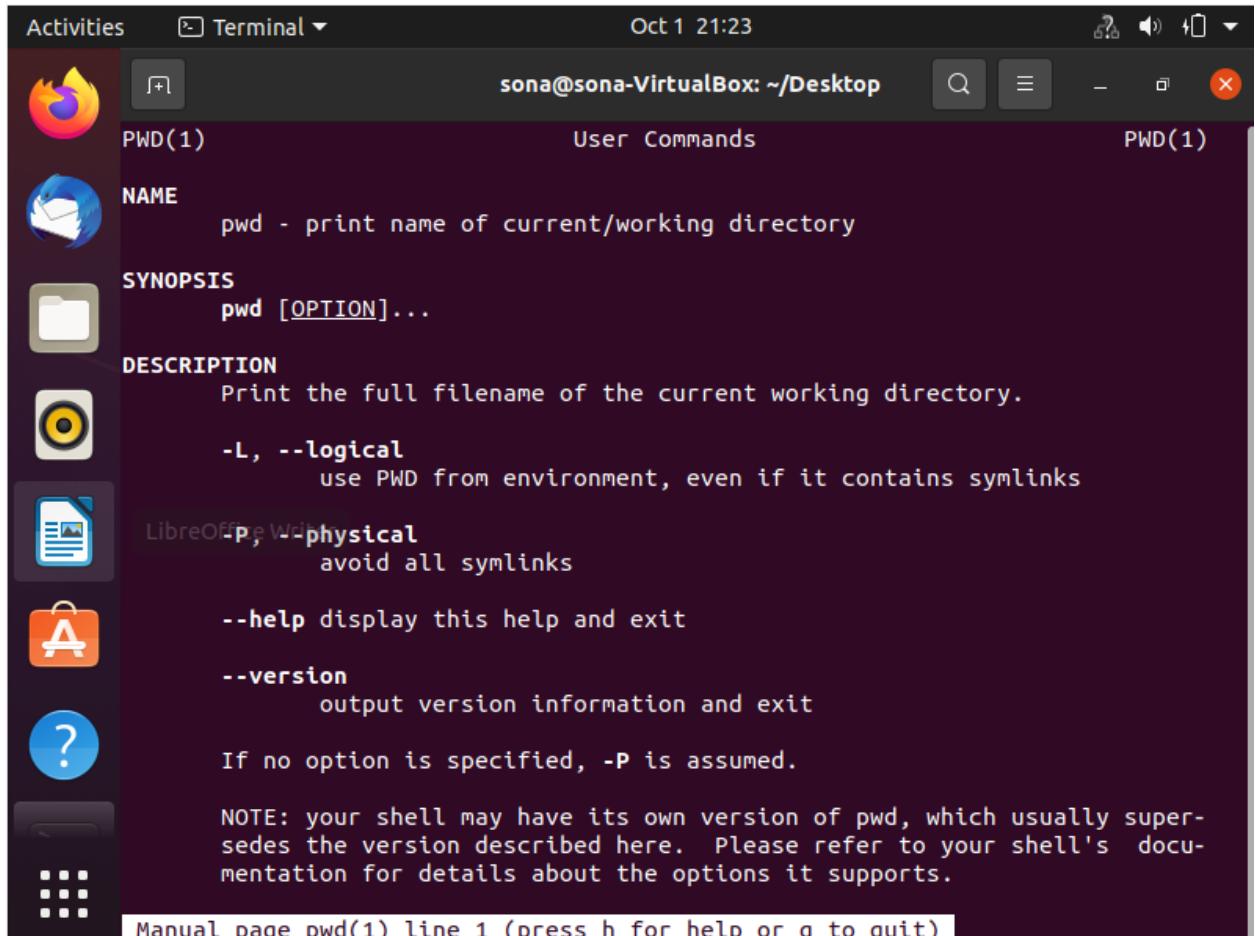
In Linux, there is a very useful **command** to show all of the last **commands** that have been recently used. The **command** is simply called **history**.

```
sona@sona-VirtualBox:~/Desktop$ history
1 sudo apt update
2 sudo apt install apache2
3 sudo apt update
4 sudo apt install apache2
5 sudo systemctl status apache2
6 sudo apt purge "apache2*" -y
7 sudo apt update
8 sudo apt install apache2
9 pwd
10 sudo apt update
```

```
sona@sona-VirtualBox:~/Desktop$ #history
sona@sona-VirtualBox:~/Desktop$ !2
2: command not found
sona@sona-VirtualBox:~/Desktop$ !1
sudo apt update
```

3.man

man command in Linux is used to display the user manual of any command that we can run on the terminal. It provides a detailed view of the command which includes NAME, SYNOPSIS, DESCRIPTION, OPTIONS, EXIT STATUS, RETURN VALUES, ERRORS, FILES, VERSIONS, EXAMPLES, AUTHORS and SEE ALSO.



The screenshot shows a Linux desktop environment with a terminal window open. The terminal title is "sona@sona-VirtualBox: ~/Desktop". The command entered was "man pwd". The output displays the man page for the "pwd" command, which prints the current working directory. The man page includes sections for NAME, SYNOPSIS, DESCRIPTION, and options like -L, -P, --help, and --version. It also notes that the shell's version may differ. The terminal window has a dark theme with icons on the left.

```
PWD(1) User Commands PWD(1)

NAME
    pwd - print name of current/working directory

SYNOPSIS
    pwd [OPTION]...

DESCRIPTION
    Print the full filename of the current working directory.

    -L, --logical
        use PWD from environment, even if it contains symlinks

    -P, --physical
        avoid all symlinks

    --help display this help and exit

    --version
        output version information and exit

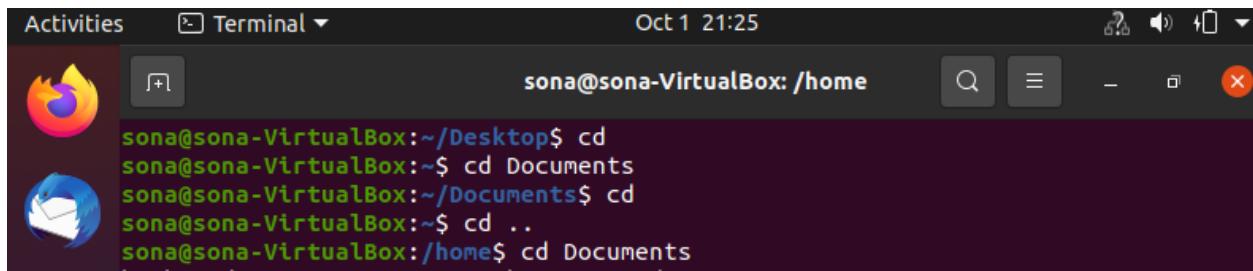
If no option is specified, -P is assumed.

NOTE: your shell may have its own version of pwd, which usually super-
sedes the version described here. Please refer to your shell's docu-
mentation for details about the options it supports.

Manual page pwd(1) line 1 (press h for help or q to quit)
```

4. cd

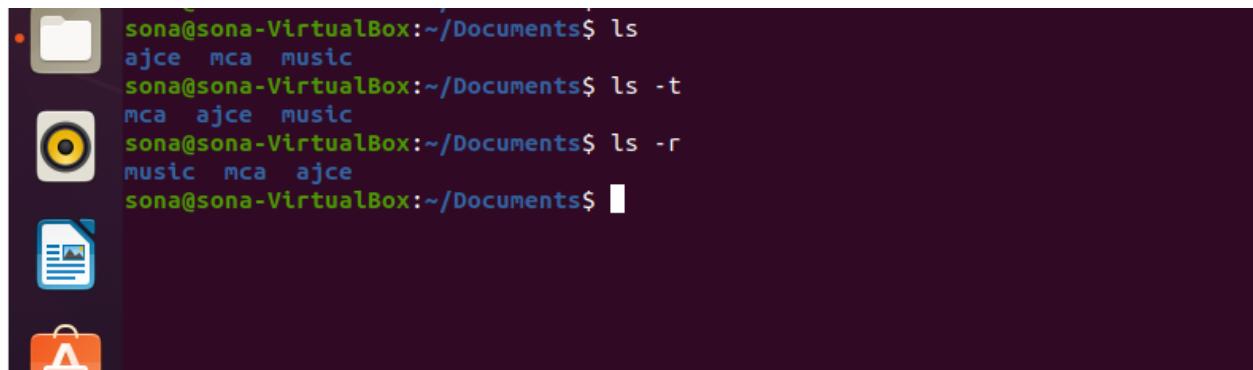
The `cd` (“change directory”) command is used to change the current working directory in Linux and other Unix-like operating systems. It is one of the most basic and frequently used commands when working on the Linux terminal. The current working directory is the directory (folder) in which the user is currently working in. Each time you interact with your command prompt, you are working within a directory.

A screenshot of a Linux desktop environment, likely Ubuntu. At the top, there's a dock with icons for the Dash, Home, and several other applications. Below the dock is a header bar with "Activities", "Terminal", the date "Oct 1 21:25", and system status icons. The main area is a terminal window titled "sona@sona-VirtualBox: /home". The terminal shows the following command history:

```
sona@sona-VirtualBox:~/Desktop$ cd
sona@sona-VirtualBox:~$ cd Documents
sona@sona-VirtualBox:~/Documents$ cd
sona@sona-VirtualBox:~$ cd ..
sona@sona-VirtualBox:/home$ cd Documents
```

5. ls

The **ls command** is one of the basic **commands** that any Linux user should know. It is used to list information about files and directories within the file system. The **ls** utility is a part of the GNU core utilities package which is installed on all Linux distributions.

A screenshot of a Linux desktop environment showing a terminal window. The terminal window has a dark background and light-colored text. On the left side of the terminal, there are icons for a folder, a file, and a trash can. The terminal window contains the following command and its output:

```
sona@sona-VirtualBox:~/Documents$ ls
ajce mca music
sona@sona-VirtualBox:~/Documents$ ls -t
mca ajce music
sona@sona-VirtualBox:~/Documents$ ls -r
music mca ajce
sona@sona-VirtualBox:~/Documents$ █
```

6. mkdir

mkdir command in Linux allows the user to create directories (also referred to as folders in some operating systems). This command can create multiple directories at once as well as set the permissions for the directories. It is important to note that the user executing this command must have enough permissions to create a directory in the parent directory, or he/she may receive a ‘permission denied’ error.




```
sona@sona-VirtualBox:~/Documents$ ls
ajce mca music
sona@sona-VirtualBox:~/Documents$ mkdir song
sona@sona-VirtualBox:~/Documents$ ls
ajce mca music song
sona@sona-VirtualBox:~/Documents$
```

7. rmdir

rmdir command is used remove empty directories from the file system in Linux. The **rmdir** command removes each and every directory specified in the **command** line only if these directories are empty. So if the specified directory has some directories or files in it then this cannot be removed by **rmdir** command.





```
sona@sona-VirtualBox:~/Documents$ ls
ajce mca music song
sona@sona-VirtualBox:~/Documents$ rmdir ajce
sona@sona-VirtualBox:~/Documents$ ls
mca music song
sona@sona-VirtualBox:~/Documents$
```

8. touch

The **touch** command is a standard command used in UNIX/Linux operating system which is used to create, change and modify timestamps of a file. Basically, there are two different commands to create a file in the Linux system which is as follows:

cat command: It is used to create the file with content.

touch command: It is used to create a file without any content. The file created using touch command is empty. This command can be used when the user doesn't have data to store at the time of file creation.



```
sona@sona-VirtualBox:~/Documents$ touch dance
sona@sona-VirtualBox:~/Documents$ ls
dance  mca  music  song
sona@sona-VirtualBox:~/Documents$
```



9. rm

rm stands for **remove** . rm command is used to remove files.



```
sona@sona-VirtualBox:~/Documents$ rm dance
sona@sona-VirtualBox:~/Documents$ ls
mca  music  song
sona@sona-VirtualBox:~/Documents$
```

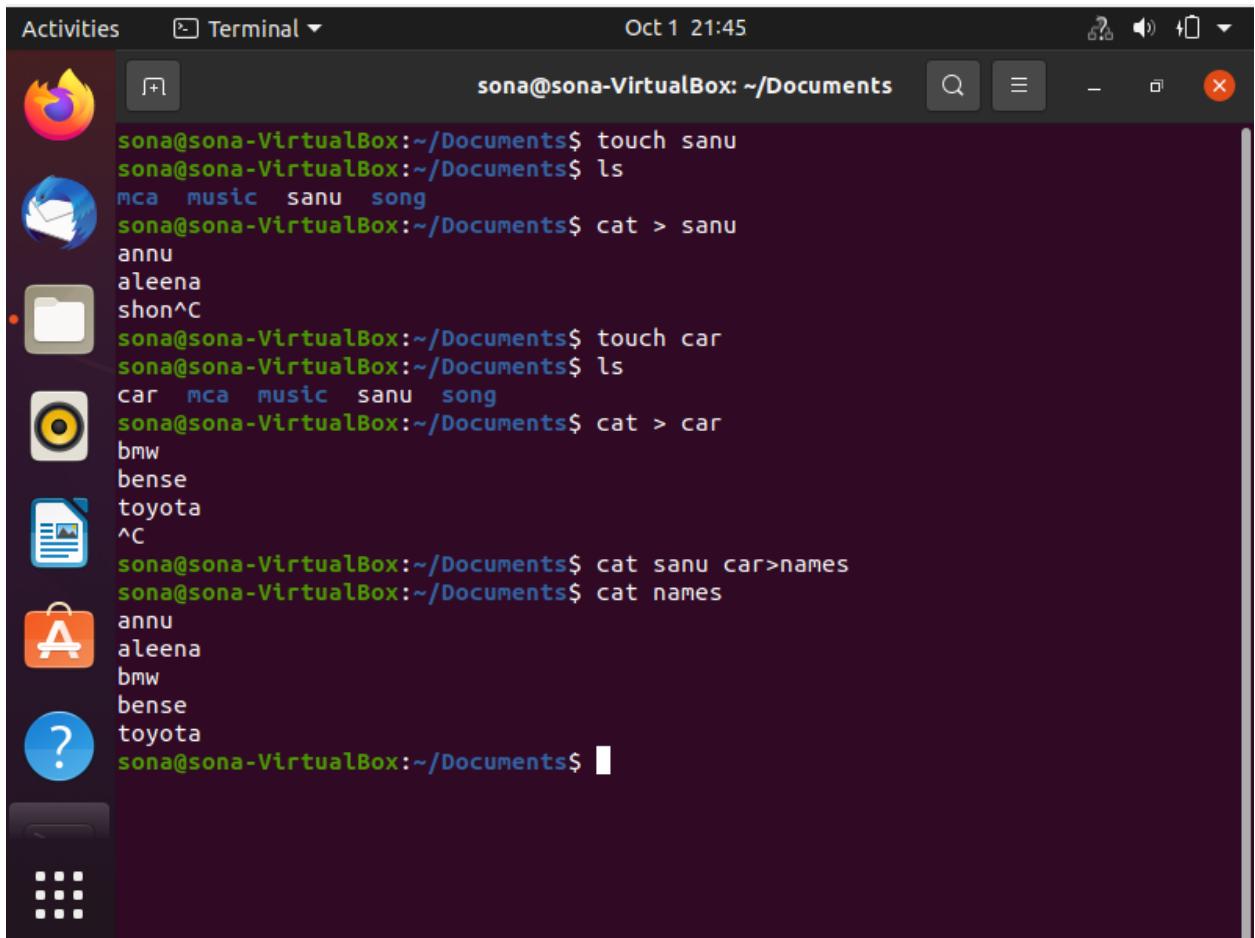


10. cat

The cat command is one of the most widely used commands in Linux.

The name of the cat command comes from its functionality to concatenate files. It can read, concatenate, and write file contents to the standard output.

Activities Terminal ▾ Oct 1 21:45



sona@sona-VirtualBox:~/Documents\$ touch sanu
sona@sona-VirtualBox:~/Documents\$ ls
mca music sanu song
sona@sona-VirtualBox:~/Documents\$ cat > sanu
annu
aleena
shon^C
sona@sona-VirtualBox:~/Documents\$ touch car
sona@sona-VirtualBox:~/Documents\$ ls
car mca music sanu song
sona@sona-VirtualBox:~/Documents\$ cat > car
bmw
bense
toyota
^C
sona@sona-VirtualBox:~/Documents\$ cat sanu car>names
sona@sona-VirtualBox:~/Documents\$ cat names
annu
aleena
bmw
bense
toyota
sona@sona-VirtualBox:~/Documents\$

ASSIGNMENT-3

BASIC LINUX COMMANDS

1. echo

echo command in linux is used to display line of text/string that are passed as an argument . This is a built in **command** that is mostly used in shell scripts and batch files to output status text to the screen or a file.

```
sona@sona-VirtualBox:~/Documents$ cat > arun
hello,arun
^C
sona@sona-VirtualBox:~/Documents$ cat arun
hello,arun
sona@sona-VirtualBox:~/Documents$ echo arun
arun
sona@sona-VirtualBox:~/Documents$ echo how are you >> arun
sona@sona-VirtualBox:~/Documents$ cat arun
hello,arun
how are you
sona@sona-VirtualBox:~/Documents$ █
```

2. head

It is the complementary of Tail command. The head command, as the name implies, print the top N number of data of the given input. By default, it prints the first 10 lines of the specified files. If more than one file name is provided then data from each file is preceded by its file name.

```
sona@sona-VirtualBox:~/Documents$ cat names
annu
aleena
bmw
bense
toyota
sona@sona-VirtualBox:~/Documents$ head -n 3 names
annu
aleena
bmw
sona@sona-VirtualBox:~/Documents$
```

3. tail

It is the complementary of head command. The tail command, as the name implies, print the last N number of data of the given input. By default it prints the last 10 lines of the specified files. If more than one file name is provided then data from each file is preceded by its file name.

```
sona@sona-VirtualBox:~/Documents$ cat names
annu
aleena
bmw
bense
toyota
sona@sona-VirtualBox:~/Documents$ tail -n 5 names
annu
aleena
bmw
bense
toyota
sona@sona-VirtualBox:~/Documents$
```

4. Read

Read command in Linux system is used to read from a file descriptor. Basically, this command read up the total number of bytes from the

specified file descriptor into the buffer. If the number or count is zero then this command may detect the errors. But on success, it returns the number of bytes read.

```
sona@sona-VirtualBox:~/Documents$ read v1 v2 v3
hiiii helloo welcomee
sona@sona-VirtualBox:~/Documents$ echo "[${v1}] [${v2}] [${v3}]"
[hiiii] [helloo] [welcomee]
sona@sona-VirtualBox:~/Documents$ █
```

5. more

more command is used to view the text files in the command prompt, displaying one screen at a time in case the file is large (For example log files). The more command also allows the user do scroll up and down through the page. The syntax along with options and command is as follows. Another application of more is to use it with some other command after a pipe. When the output is large, we can use more command to see output one by one.

```
sona@sona-VirtualBox:~/Documents$ more names
annu
aleena
bmw
bense
toyota
sona@sona-VirtualBox:~/Documents$ more -2 names
annu
aleena
--More-- (41%)
```

6. Less

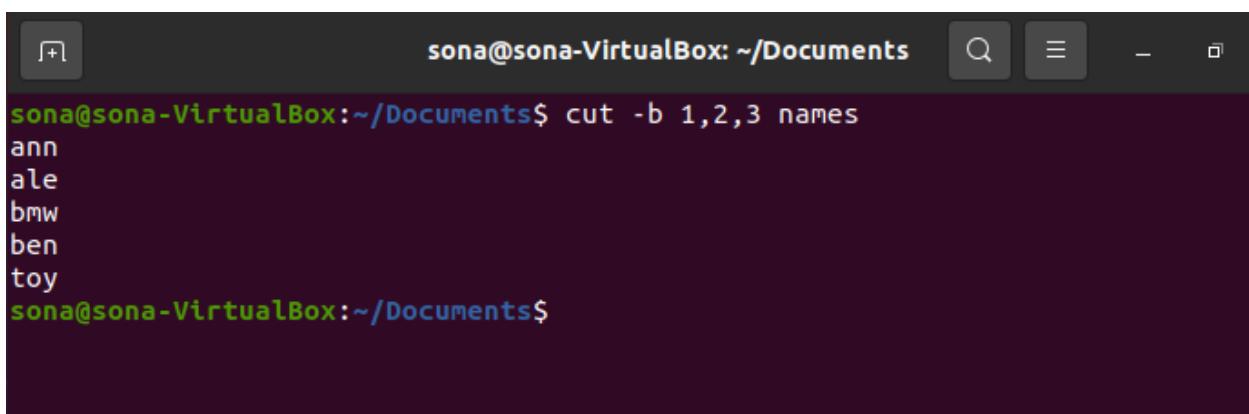
Less command is linux utility which can be used to read contents of text file one page (one screen) per time. It has faster access because if file is large, it don't access complete file, but access it page by page.

```
annu  
aleena  
bmw  
bense  
toyota  
names (END)
```

7. cut

The cut command in UNIX is a command for cutting out the sections from each line of files and writing the result to standard output. It can be used to cut parts of a line by **byte position, character and field**.

Basically the cut command slices a line and extracts the text. It is necessary to specify option with command otherwise it gives error. If more than one file name is provided then data from each file is **not precedes** by its file name.



A screenshot of a terminal window titled "sona@sona-VirtualBox: ~/Documents". The terminal shows the command "cut -b 1,2,3 names" being run. The output displays the first three characters of each line from the "names" file: "ann", "ale", "bmw", "ben", and "toy".

```
sona@sona-VirtualBox:~/Documents$ cut -b 1,2,3 names
ann
ale
bmw
ben
toy
sona@sona-VirtualBox:~/Documents$
```

8. paste

Paste command is one of the useful commands in Unix or Linux operating system. It is used to join files horizontally (parallel merging) by outputting lines consisting of lines from each file specified, separated by **tab** as delimiter, to the standard output.

When no file is specified, or put dash (“-“) instead of file name, paste reads from standard input and gives output as it is until a interrupt command [**Ctrl-c**] is given.

```
sona@sona-VirtualBox:~/Documents$ cat names
annu
aleena
bmw
bense
toyota
sona@sona-VirtualBox:~/Documents$ paste names arun
annu    hello,arun
aleena  how are you
bmw
bense
toyota
sona@sona-VirtualBox:~/Documents$
```

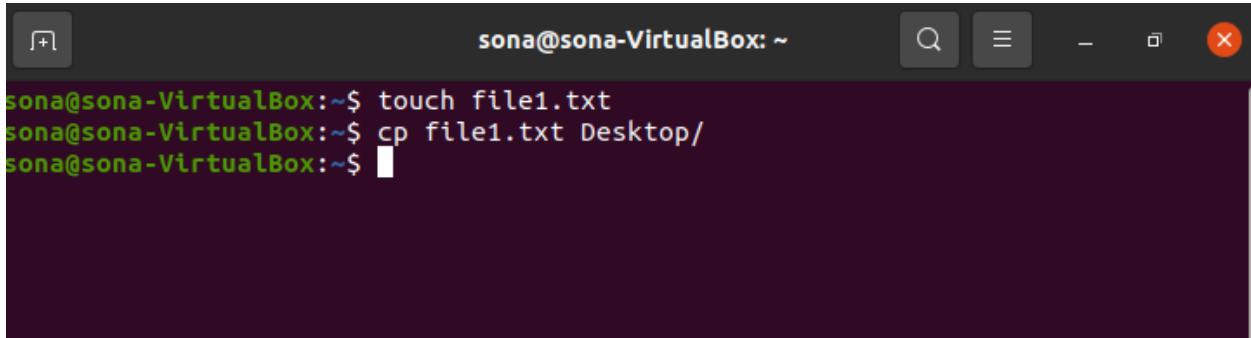
9. uname

The **uname** tool is most commonly used to determine the processor architecture, the system hostname and the version of the kernel running on the system.

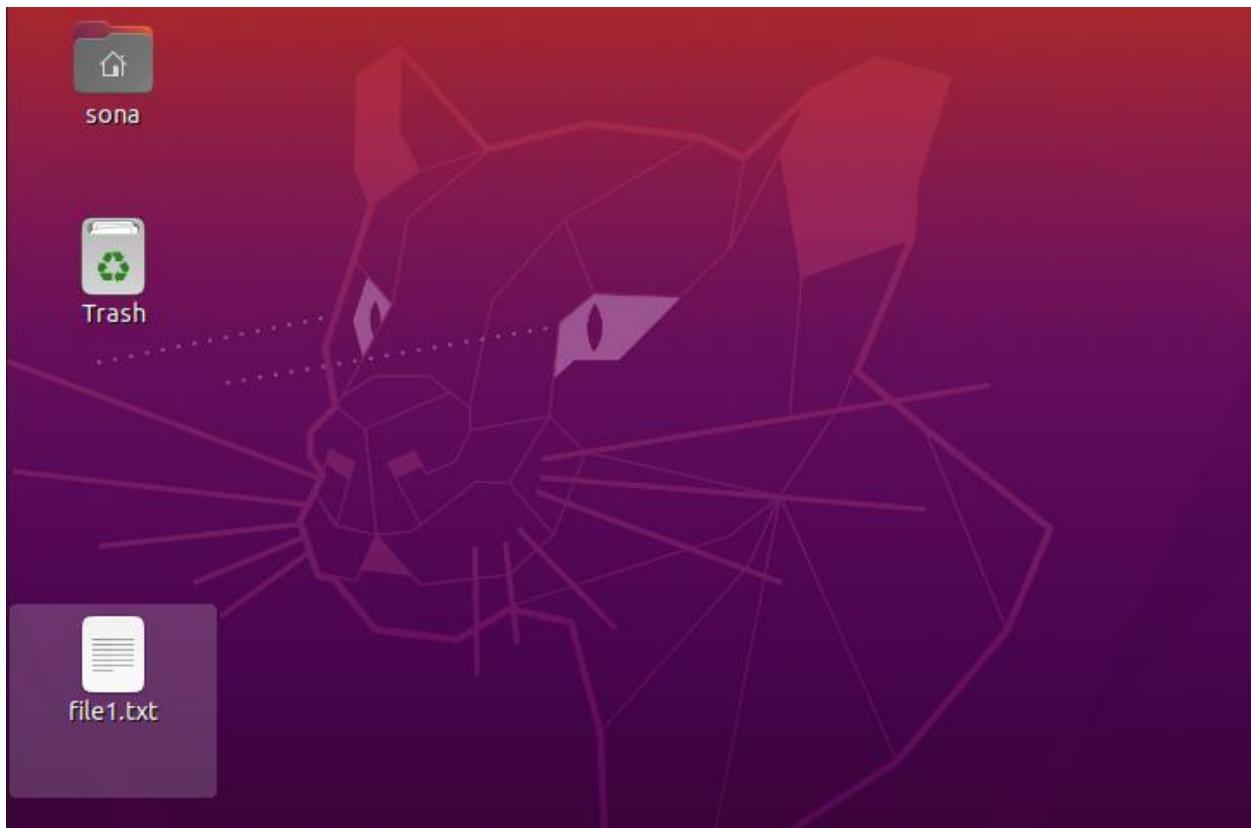
```
sona@sona-VirtualBox:~/Documents$ uname
Linux
sona@sona-VirtualBox:~/Documents$ uname -r
5.11.0-36-generic
sona@sona-VirtualBox:~/Documents$ uname -v
#40~20.04.1-Ubuntu SMP Sat Sep 18 02:14:19 UTC 2021
sona@sona-VirtualBox:~/Documents$ █
```

10. cp

cp stands for **copy**. This command is used to copy files or group of files or directory. It creates an exact image of a file on a disk with different file name. cp command require at least two filenames in its arguments.



```
sona@sona-VirtualBox:~$ touch file1.txt
sona@sona-VirtualBox:~$ cp file1.txt Desktop/
sona@sona-VirtualBox:~$
```

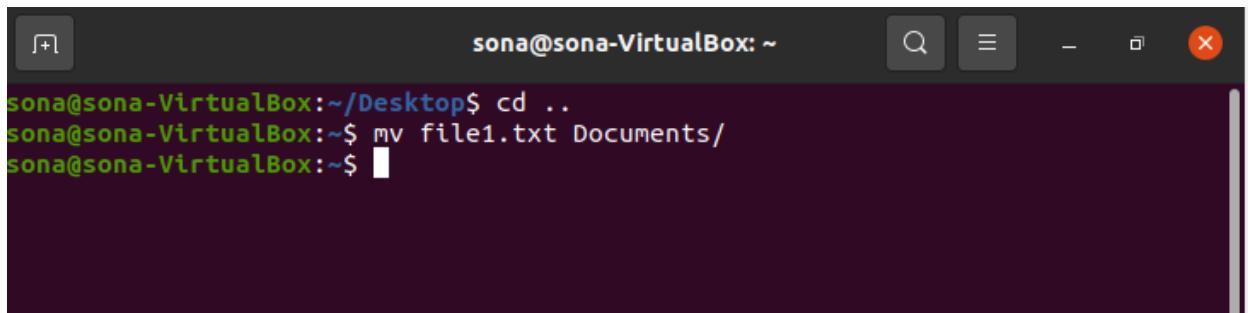
A screenshot of a terminal window titled "sona@sona-VirtualBox: ~". The window contains three lines of text: "touch file1.txt", "cp file1.txt Desktop/", and an empty line. The background of the terminal is dark.

11. mv

mv stands for **move**. mv is used to move one or more files or directories from one place to another in a file system like UNIX. It has two distinct functions:

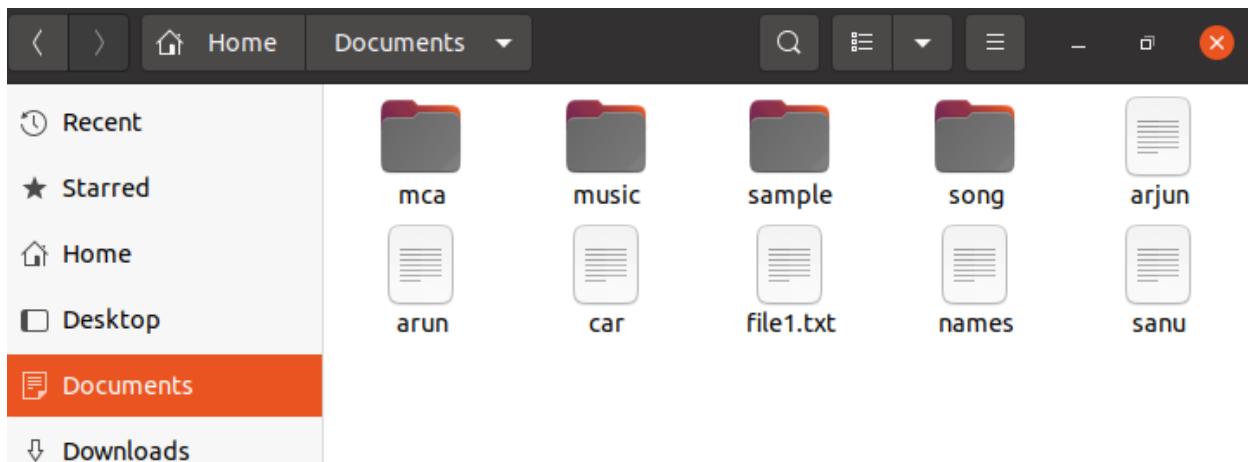
1. It renames a file or folder.
2. It moves a group of files to a different directory.

No additional space is consumed on a disk during renaming. This command normally **works silently** means no prompt for confirmation.



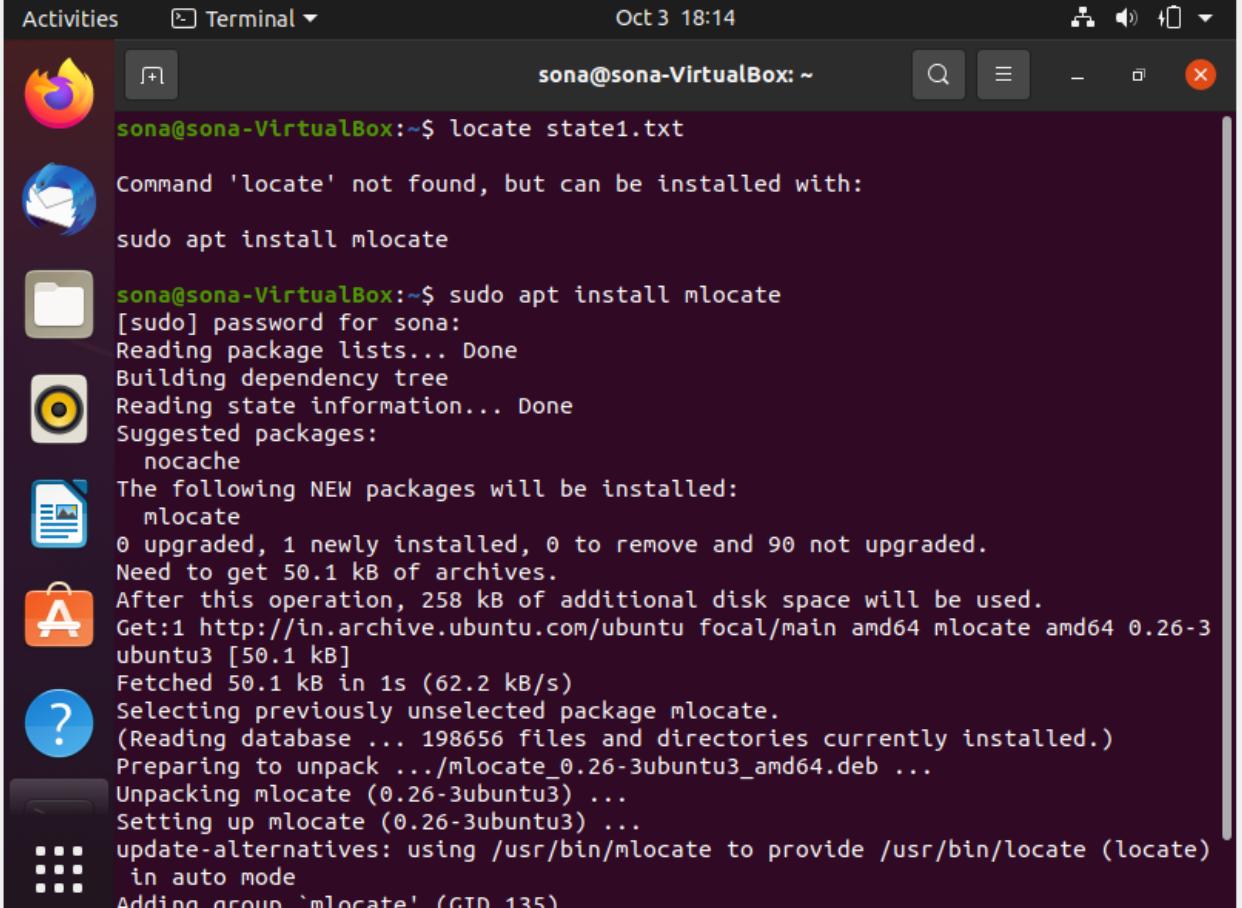
A screenshot of a terminal window titled "sona@sona-VirtualBox: ~". The terminal shows the following command sequence:

```
sona@sona-VirtualBox:~/Desktop$ cd ..  
sona@sona-VirtualBox:~$ mv file1.txt Documents/  
sona@sona-VirtualBox:~$
```



12. locate

The locate command and find command is used to search a file by name. But, the difference between both commands is that locate command is a background process and searches the file in the database whereas, find command searches in the filesystem. The locate command is much faster than find command.

A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window has a dark background and contains the following text:

```
sona@sona-VirtualBox:~$ locate state1.txt
Command 'locate' not found, but can be installed with:
sudo apt install mlocate

sona@sona-VirtualBox:~$ sudo apt install mlocate
[sudo] password for sona:
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  nocache
The following NEW packages will be installed:
  mlocate
0 upgraded, 1 newly installed, 0 to remove and 90 not upgraded.
Need to get 50.1 kB of archives.
After this operation, 258 kB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 mlocate amd64 0.26-3
ubuntu3 [50.1 kB]
Fetched 50.1 kB in 1s (62.2 kB/s)
Selecting previously unselected package mlocate.
(Reading database ... 198656 files and directories currently installed.)
Preparing to unpack .../mlocate_0.26-3ubuntu3_amd64.deb ...
Unpacking mlocate (0.26-3ubuntu3) ...
Setting up mlocate (0.26-3ubuntu3) ...
update-alternatives: using /usr/bin/mlocate to provide /usr/bin/locate (locate)
  in auto mode
Adding group 'mlocate' (GID 135)
```

13. find

The **find** command in UNIX is a command line utility for walking a file hierarchy. It can be used to find files and directories and perform subsequent operations on them. It supports searching by file, folder, name, creation date, modification date, owner and permissions. By using the ‘-exec’ other UNIX commands can be executed on files or folders found.

```
sona@sona-VirtualBox:~/Documents$ find /home/ -name names
/home/sona/Documents/names
sona@sona-VirtualBox:~/Documents$ find /home/ -name file1.txt
/home/sona/Desktop/file1.txt
/home/sona/Documents/file1.txt
sona@sona-VirtualBox:~/Documents$ find /home/ -name arun
/home/sona/Documents/arun
```

14. grep

The grep filter searches a file for a particular pattern of characters, and displays all lines that contain that pattern. The pattern that is searched in the file is referred to as the regular expression (grep stands for globally search for regular expression and print out).

```
sona@sona-VirtualBox:~/Documents$ cat names
annu
aleena
bmw
bense
toyota
sona@sona-VirtualBox:~/Documents$ grep bmw names
bmw
sona@sona-VirtualBox:~/Documents$ grep sona /etc/passwd
sona:x:1000:1000:Sona Joseph,,,:/home/sona:/bin/bash
sona@sona-VirtualBox:~/Documents$ █
```

15. df

Linux df command is used to display the disk space used in the file system. The '**df**' stands for "disk filesystem." It defines the number of blocks used, the number of blocks available, and the directory where the file system is mounted.

```
sona@sona-VirtualBox:~/Documents$ df -m
Filesystem      1M-blocks  Used Available Use% Mounted on
udev              588     0      588   0% /dev
tmpfs             124     2      122   2% /run
/dev/sda5       11597  7584     3405  70% /
tmpfs              617     0      617   0% /dev/shm
tmpfs                5     1       5   1% /run/lock
tmpfs              617     0      617   0% /sys/fs/cgroup
/dev/loop0            56     56      0 100% /snap/core18/2128
/dev/loop3            1     1      0 100% /snap/bare/5
/dev/loop4            66     66      0 100% /snap/gtk-common-themes/1519
/dev/loop5            51     51      0 100% /snap/snap-store/547
/dev/loop6            33     33      0 100% /snap/snapd/12704
/dev/loop7            33     33      0 100% /snap/snapd/13170
/dev/loop2            66     66      0 100% /snap/gtk-common-themes/1515
/dev/loop1           219    219      0 100% /snap/gnome-3-34-1804/72
/dev/sda1            511     1      511   1% /boot/efi
tmpfs              124     1      124   1% /run/user/1000
sona@sona-VirtualBox:~/Documents$
```

16. du

The **du command** is a standard Linux/Unix **command** that allows a user to gain disk usage information quickly. It is best applied to specific directories and allows many variations for customizing the output to meet your needs.

```
sona@sona-VirtualBox:~/Documents$ du -h
4.0K    ./sample/trial/emp
16K    ./sample/trial
20K    ./sample
4.0K    ./music
4.0K    ./song
4.0K    ./mca
56K    .
sona@sona-VirtualBox:~/Documents$
```

17. useradd

Create a new user or update default new user information.

```
sona@sona-VirtualBox:~/Documents$ sudo su -
[sudo] password for sona:
root@sona-VirtualBox:~# useradd sona
useradd: user 'sona' already exists
root@sona-VirtualBox:~# useradd son
root@sona-VirtualBox:~# tail /etc/passwd
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/n
ologin
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
sssd:x:126:131:SSSD system user,,,:/var/lib/sss:/usr/sbin/nologin
sona:x:1000:1000:Sona Joseph,,,:/home/sona:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
mysql:x:127:134:MySQL Server,,,:/nonexistent:/bin/false
son:x:1001:1001::/home/son:/bin/sh
root@sona-VirtualBox:~#
```

18. userdel

Delete a user account and related files.

```
root@sona-VirtualBox:~# userdel son
root@sona-VirtualBox:~# tail /etc/passwd
whoopsie:x:120:125::/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/n
ologin
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
sssd:x:126:131:SSSD system user,,,:/var/lib/sss:/usr/sbin/nologin
sona:x:1000:1000:Sona Joseph,,,:/home/sona:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
mysql:x:127:134:MySQL Server,,,:/nonexistent:/bin/false
root@sona-VirtualBox:~# █
```

19. sudo

The sudo command allows you to run programs with the security privileges of another user (by default, as the superuser). It prompts you for your personal password and confirms your request to execute a command by checking a file, called sudoers, which the system administrator configures.

```
root@sona-VirtualBox:~# sudo useradd son
root@sona-VirtualBox:~# tail /etc/passwd
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/n
ologin
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
sssd:x:126:131:SSSD system user,,,:/var/lib/sssd:/usr/sbin/nologin
sona:x:1000:1000:Sona Joseph,,,:/home/sona:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
mysql:x:127:134:MySQL Server,,,:/nonexistent:/bin/false
son:x:1001:1001:/home/son:/bin/sh
root@sona-VirtualBox:~#
```

20. passwd

The `passwd` command changes passwords for user accounts. A normal user may only change the password for their own account, while the superuser may change the password for any account. `passwd` also changes the account or associated password validity period.

```
root@sona-VirtualBox:~# sudo su -
root@sona-VirtualBox:~# useradd son
useradd: user 'son' already exists
root@sona-VirtualBox:~# useradd sona
useradd: user 'sona' already exists
root@sona-VirtualBox:~# passwd sona
New password:
Retype new password:
passwd: password updated successfully
root@sona-VirtualBox:~#
```

ASSIGNMENT – 4

BASIC LINUX COMMANDS

Explain linux commands usermod, groupadd, groups, groupmod, groupdel, chmod, chown, id, ps, top with examples

1. usermod

- usermod command is used to change the properties of a user in Linux through the command line
- command-line utility that allows you to modify a user's login information
- #usermod --help
- #usermod -u 2000 son

```
sona@sona-VirtualBox:~/Documents$ sudo usermod -u 1001 son
sona@sona-VirtualBox:~/Documents$ id son
uid=1001(son) gid=1001(son) groups=1001(son)
sona@sona-VirtualBox:~/Documents$ sudo usermod -u 1001 son
usermod: no changes
sona@sona-VirtualBox:~/Documents$
```

2. groupadd

- groupadd command creates a new group account using the values specified on the command line and the default values from the system.
- #groupadd student

```
sona@sona-VirtualBox:~/Documents$ sudo groupadd student
sona@sona-VirtualBox:~/Documents$ sudo groupadd student
groupadd: group 'student' already exists
sona@sona-VirtualBox:~/Documents$ sudo groupadd student1
sona@sona-VirtualBox:~/Documents$ sudo groupadd student2
sona@sona-VirtualBox:~/Documents$ compgen -g student
student
student1
student2
sona@sona-VirtualBox:~/Documents$
```

3. groups - print the groups a user is in

- #groups son

```
sona@sona-VirtualBox:~/Documents$ groups
sona adm cdrom sudo dip plugdev lpadmin lxd sambashare
sona@sona-VirtualBox:~/Documents$ groups son
son : son
sona@sona-VirtualBox:~/Documents$
```

4. groupdel - groupdel command modifies the system account files, deleting all entries that refer to group. The named group must exist

- #groupdel student1

```
sona@sona-VirtualBox:~/Documents$ compgen -g student
student
student1
student2
sona@sona-VirtualBox:~/Documents$ sudo groupdel student1
sona@sona-VirtualBox:~/Documents$ compgen -g student
student
student2
sona@sona-VirtualBox:~/Documents$
```

5. groupmod - The groupmod command modifies the definition of the specified group by modifying the appropriate entry in the group database.

```
# groupmod -n group1 group2
```

```
sona@sona-VirtualBox:~/Documents$ compgen -g student
student
student2
sona@sona-VirtualBox:~/Documents$ sudo groupmod -n new_group student1
groupmod: group 'student1' does not exist
sona@sona-VirtualBox:~/Documents$ sudo groupmod -n new_group student2
sona@sona-VirtualBox:~/Documents$ compgen -g student
student
sona@sona-VirtualBox:~/Documents$ compgen -g new_group
new_group
sona@sona-VirtualBox:~/Documents$ █
```

6. chmod - To change directory permissions of file/ Directory in Linux.

#chmod whowhatwhich file/directory

- chmod +rwx filename to add permissions.
- chmod -rwx directoryname to remove permissions.
- chmod +x filename to allow executable permissions.
- chmod -wx filename to take out write and executable permissions.

#chmod u+x test #chmod g-rwx test #chmod o-r test

```
sona@sona-VirtualBox:~/Documents$ mkdir books
sona@sona-VirtualBox:~/Documents$ ls books
sona@sona-VirtualBox:~/Documents$ ls -l books
total 0
sona@sona-VirtualBox:~/Documents$ ls -ld books
drwxrwxr-x 2 sona sona 4096 Oct  2 11:47 books
sona@sona-VirtualBox:~/Documents$ chmod g-w books
sona@sona-VirtualBox:~/Documents$ ls -ld books
drwxr-xr-x 2 sona sona 4096 Oct  2 11:47 books
sona@sona-VirtualBox:~/Documents$ chmod o+w books
sona@sona-VirtualBox:~/Documents$ ls -ld books
drwxr-xrwx 2 sona sona 4096 Oct  2 11:47 books
sona@sona-VirtualBox:~/Documents$ ls
arjun arun books car file1.txt mca music names sample sanu song
sona@sona-VirtualBox:~/Documents$ █
```

7. chown - The chown command allows you to change the user

and/or group ownership of a given file, directory.

#chown son books

```
sona@sona-VirtualBox:~/Documents$ sudo chown son books
sona@sona-VirtualBox:~/Documents$ ls -ld books
drwxr-xrwx 2 son sona 4096 Oct  2 11:47 books
sona@sona-VirtualBox:~/Documents$ █
```

8. id - id command in Linux is used to find out user and group names and numeric ID's (UID or group ID) of the current user.

#id

```
sona@sona-VirtualBox:~/Documents$ id
uid=1000(sona) gid=1000(sona) groups=1000(sona),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),120(lpadmin),132(lxd),133(sambashare)
sona@sona-VirtualBox:~/Documents$ █
```

9. ps - The ps command, short for Process Status, is a command line utility that is used to display or view information related to the processes running in a Linux system.

- PID – This is the unique process ID
- TTY –This is the type of terminal that the user is logged in to
- TIME – This is the time in minutes and seconds that the process has been running
- CMD – The command that launched the process

#ps -a

```
sona@sona-VirtualBox:~/Documents$ ps
  PID TTY      TIME CMD
 2389 pts/0    00:00:00 bash
 2560 pts/0    00:00:00 ps
sona@sona-VirtualBox:~/Documents$ ps -a
  PID TTY      TIME CMD
 941 tty2    00:00:29 Xorg
1089 tty2    00:00:00 gnome-session-b
 2561 pts/0    00:00:00 ps
sona@sona-VirtualBox:~/Documents$
```

10. top - top command is used to show the Linux processes.

It provides a dynamic real-time view of the running system

```
#top -u son
```

```
sona@sona-VirtualBox:~/Documents$ top -u son
```



```
top - 11:50:58 up 56 min,  1 user,  load average: 0.32, 0.18, 0.11
Tasks: 172 total,   1 running, 171 sleeping,   0 stopped,   0 zombie
%Cpu(s):  2.7 us,  0.7 sy,  0.0 ni, 96.6 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem : 1232.3 total,   104.8 free,   686.2 used,   441.3 buff/cache
MiB Swap:  547.4 total,   545.4 free,     2.0 used.   398.9 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
-----	------	----	----	------	-----	-----	---	------	------	-------	---------

ASSIGNMENT – 5

BASIC LINUX COMMANDS

1. wc

wc stands for word count.

Used for counting purpose.

It is used to find out number of lines, word count, byte and characters count in the files specified in the file arguments.

```
#wc state.txt
```

```
sona@sona-VirtualBox:~$ wc mywords.txt
 7 7 47 mywords.txt
sona@sona-VirtualBox:~$ wc -l mywords.txt
7 mywords.txt
sona@sona-VirtualBox:~$ wc -w mywords.txt
7 mywords.txt
sona@sona-VirtualBox:~$ wc -c mywords.txt
47 mywords.txt
sona@sona-VirtualBox:~$ wc -m mywords.txt
47 mywords.txt
sona@sona-VirtualBox:~$
```

2. tar

The Linux ‘tar’ stands for tape archive, is used to create Archive and extract the Archive files. Linux tar command to create compressed or uncompressed Archive files

Options:

-c : Creates Archive

-x : Extract the archive

-f : creates archive with given filename

-t : displays or lists files in archived file

-u : archives and adds to an exist

-v : Displays Verbose Information
existing archive file

-A : Concatenates the archive files

-z : zip, tells tar command that creates tar file using gzip

-j : filter archive tar file using tbzip

-W : Verify a archive file

-r : update or add file or directo

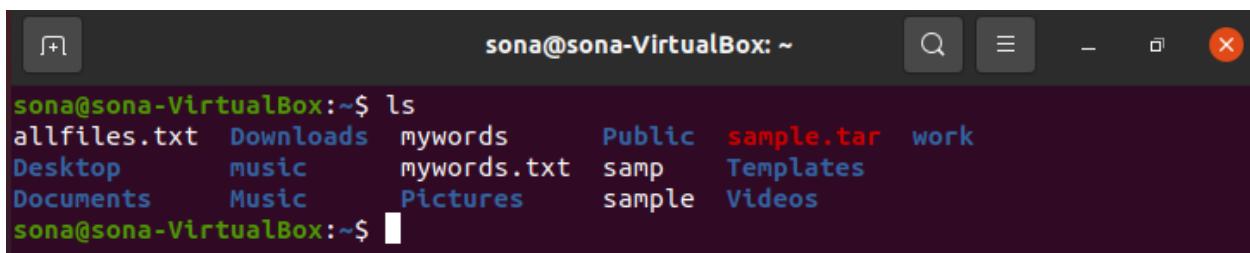
#tar cf archive.tar state.txt capital.txt //create archive file

#ls archive.tar #tar tf /archive.tar // list contents of tar archive file

Extract an archive created with tar

#mkdir backup#cd backup

#tar xf /home/meera/Documents/Meera_Linux/archive.tar



```
sona@sona-VirtualBox:~$ ls
allfiles.txt  Downloads  mywords      Public   sample.tar  work
Desktop       music      mywords.txt  samp     Templates
Documents     Music      Pictures    sample   Videos
sona@sona-VirtualBox:~$
```

3. expr

The expr command evaluates a given expression and displays its corresponding output. It is used for:

Basic operations like addition, subtraction, multiplication, division, and modulus on integers.

Evaluating regular expressions, string operations like substring, length of strings etc.

Performing operations on variables inside a shell script

```
#expr 10 + 2
```

directory in already existed .tar file

```
e/
```

```
sona@sona-VirtualBox:~$ expr 10 + 20
30
sona@sona-VirtualBox:~$
```

4. Redirections & Piping

A pipe is a form of redirection to send the output of one command/program/process to another command/program/process for further processing.

Pipe is used to combine two or more commands, the output of one command acts as input to another command, and this command's output may act as input to the next command and so

```
#ls -l | wc - l #cat /etc.passwd.txt | head
```

```
sona@sona-VirtualBox:~$ ls -l|wc -l
17
sona@sona-VirtualBox:~$
```

5. ssh

ssh stands for “Secure Shell”.

It is a protocol used to securely connect to a remote server/system.

ssh is secure in the sense that it transfers the data in encrypted form between the host and the client.

It transfers inputs from the client to the host and relays back the output. Ssh runs at TCP/IP port 22.

```
#ssh user_name@host(IP/Domain_name) #ssh
```

d/on.

```
-7 | tail -5
```

```
-X root@server1.example.com
```

```
sona@sona-VirtualBox:~$ ssh --help
unknown option -- -
usage: ssh [-46AaCfGgKkMNnqsTtVvXxYy] [-B bind_interface]
           [-b bind_address] [-c cipher_spec] [-D [bind_address:]port]
           [-E log_file] [-e escape_char] [-F configfile] [-I pkcs11]
           [-i identity_file] [-J [user@]host[:port]] [-L address]
           [-l login_name] [-m mac_spec] [-O ctl_cmd] [-o option] [-p port]
           [-Q query_option] [-R address] [-S ctl_path] [-W host:port]
           [-w local_tun[:remote_tun]] destination [command]
sona@sona-VirtualBox:~$
```

6. scp

SCP (secure copy) is a command

copy files and directories between two locations.

With scp, you can copy a file or directory:

From your local system to a remote system.

From a remote system to your local system.

Between two remote systems from your local system.

Remote file system locations are specified in format

[user@]host:/path

Syntax:

```
scp [OPTION]
```

```
[user@]SRC_HOST:]file1[user@]DEST_HOST:]file2
```

```
$scp /etc/yum.config /etc/hosts ServerX:/home/student
```

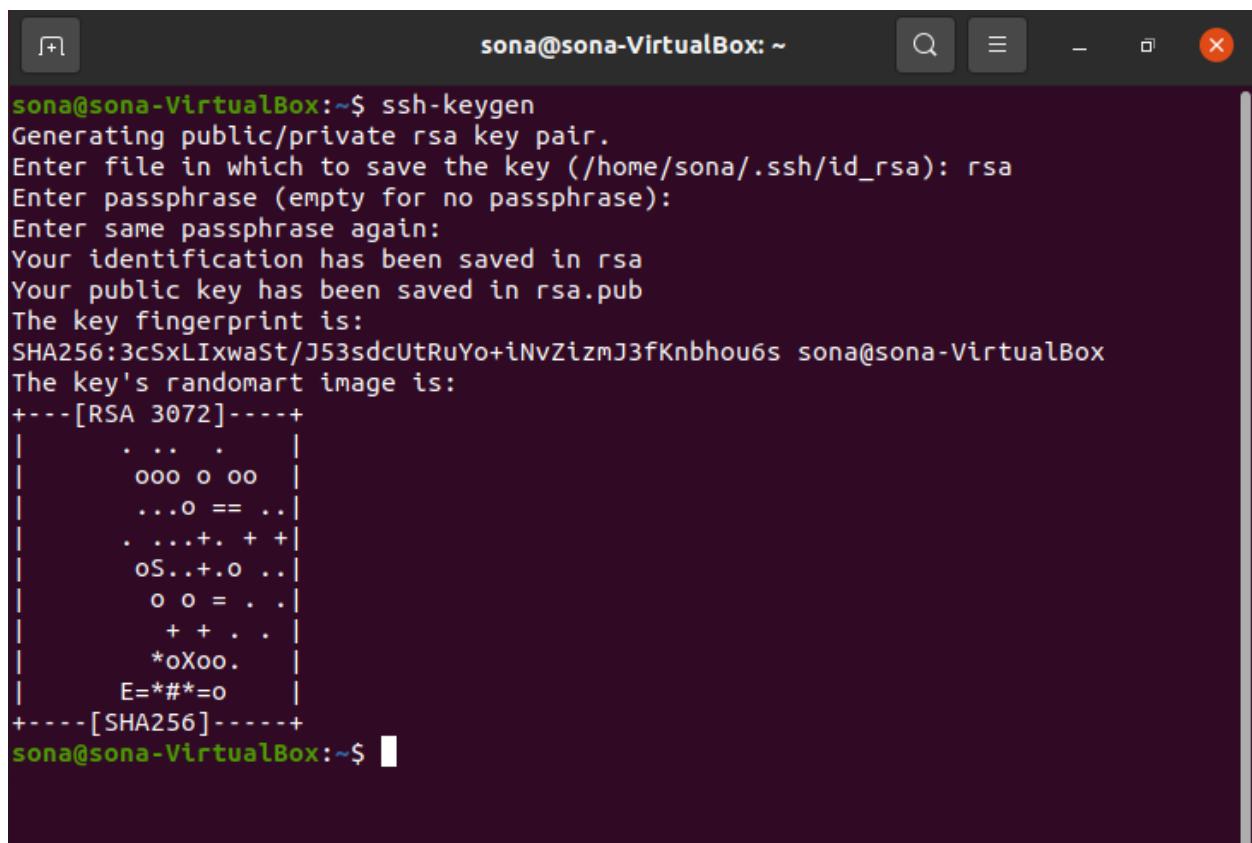
```
$scp ServerX:/etc/hostname /home/student
```

7. ssh-keygen

ssh-keygen command to generate a public/private authentication key pair. Authentication keys allow a user to connect to a remote system without supplying a password. Keys must be generated for each user separately. If you generate key pairs as the root user, only the root can use the keys.

```
$ssh-keygen -t rsa
```

command-line utility that allows you to securely password.



The screenshot shows a terminal window titled "sona@sona-VirtualBox: ~". The window contains the following text:

```
sona@sona-VirtualBox:~$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/sona/.ssh/id_rsa): rsa
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in rsa
Your public key has been saved in rsa.pub
The key fingerprint is:
SHA256:3cSxLIXwaSt/J53sdcUtRuYo+iNvZizmJ3fKnbhous sona@sona-VirtualBox
The key's randomart image is:
+---[RSA 3072]----+
|      . . .
|      ooo o oo |
|      ...o == ..|
|      . ....+.. + +|
|      oS..+.o ..|
|      o o = . .|
|      + + . . |
|      *oXoo. |
|      E=*#*=o |
+---[SHA256]-----+
sona@sona-VirtualBox:~$
```

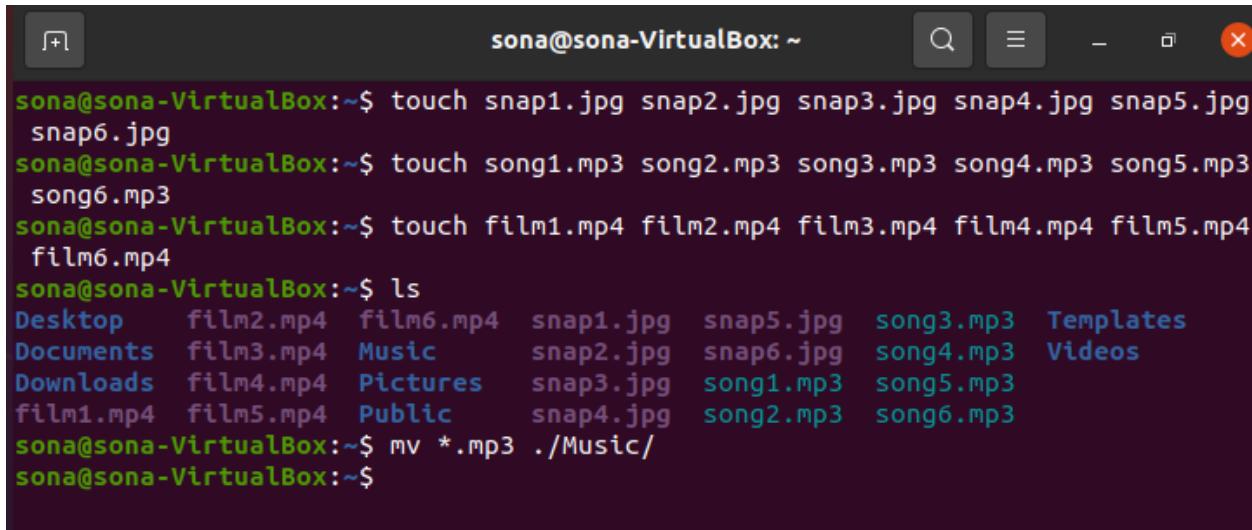
8. ssh-copy-id

The ssh-copy-id command allows you to install an SSH key on a remote server's authorized keys.

This command facilitates SSH key login, which removes the need for a password for each login, thus ensuring a password-less, automatic login process.

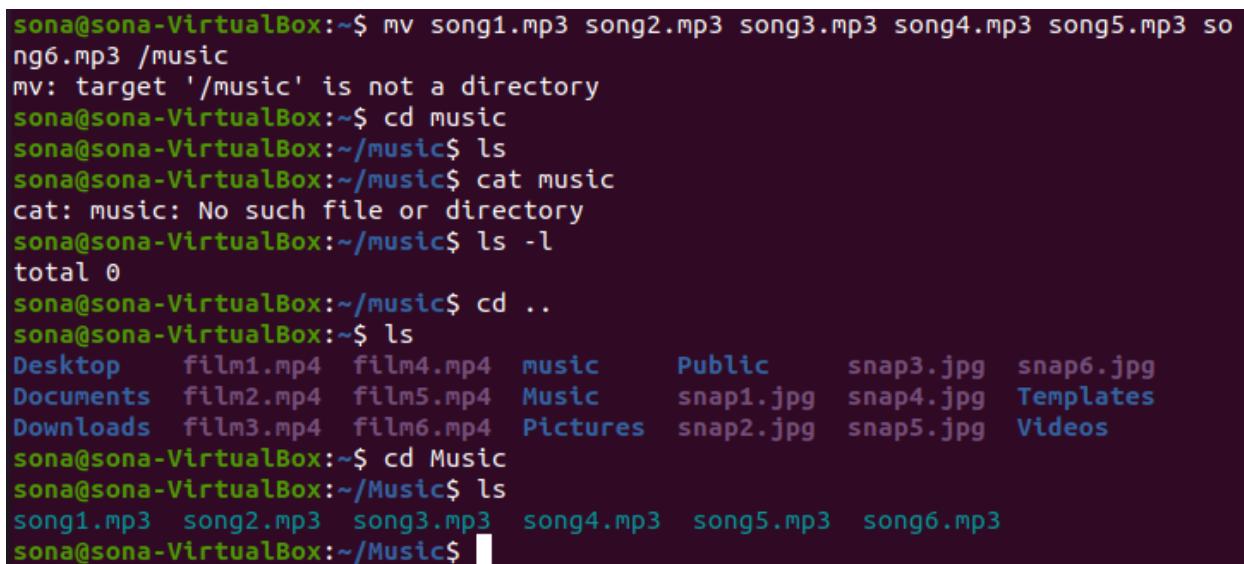
```
$ssh-copy-id username@remote_host
```

- 1.a. Create six files with name of the form songX.mp3
- b. Create six files with name of the form snapX.jpg
- c. Create six files with name of the form filmX.mp4 (In each set, replace X with the numbers 1 through 6)



```
sona@sona-VirtualBox:~$ touch snap1.jpg snap2.jpg snap3.jpg snap4.jpg snap5.jpg
snap6.jpg
sona@sona-VirtualBox:~$ touch song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3
song6.mp3
sona@sona-VirtualBox:~$ touch film1.mp4 film2.mp4 film3.mp4 film4.mp4 film5.mp4
film6.mp4
sona@sona-VirtualBox:~$ ls
Desktop    film2.mp4  film6.mp4  snap1.jpg   snap5.jpg  song3.mp3  Templates
Documents  film3.mp4  Music      snap2.jpg   snap6.jpg  song4.mp3  Videos
Downloads  film4.mp4  Pictures   snap3.jpg   song1.mp3  song5.mp3
film1.mp4  film5.mp4  Public     snap4.jpg   song2.mp3  song6.mp3
sona@sona-VirtualBox:~$ mv *.mp3 ./Music/
sona@sona-VirtualBox:~$
```

2. From your home directory, move the song files into your music subdirectory, the snapshot files into your pictures subdirectory, and the movie files into videos subdirectory.



```
sona@sona-VirtualBox:~$ mv song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 so
ng6.mp3 /music
mv: target '/music' is not a directory
sona@sona-VirtualBox:~$ cd music
sona@sona-VirtualBox:~/music$ ls
sona@sona-VirtualBox:~/music$ cat music
cat: music: No such file or directory
sona@sona-VirtualBox:~/music$ ls -l
total 0
sona@sona-VirtualBox:~/music$ cd ..
sona@sona-VirtualBox:~$ ls
Desktop    film1.mp4  film4.mp4  music      Public     snap3.jpg   snap6.jpg
Documents  film2.mp4  film5.mp4  Music      snap1.jpg   snap4.jpg   Templates
Downloads  film3.mp4  film6.mp4  Pictures   snap2.jpg   snap5.jpg   Videos
sona@sona-VirtualBox:~$ cd Music
sona@sona-VirtualBox:~/Music$ ls
song1.mp3  song2.mp3  song3.mp3  song4.mp3  song5.mp3  song6.mp3
sona@sona-VirtualBox:~/Music$
```

```
sona@sona-VirtualBox:~$ mv snap1.jpg snap2.jpg snap3.jpg snap4.jpg snap5.jpg snap6.jpg Pictures/
sona@sona-VirtualBox:~$ ls
Desktop    film1.mp4  film4.mp4  music      Public
Documents   film2.mp4  film5.mp4  Music      Templates
Downloads   film3.mp4  film6.mp4  Pictures   Videos
sona@sona-VirtualBox:~$ cd Pictures
sona@sona-VirtualBox:~/Pictures$ ls
snap1.jpg  snap2.jpg  snap3.jpg  snap4.jpg  snap5.jpg  snap6.jpg
sona@sona-VirtualBox:~/Pictures$
```

```
sona@sona-VirtualBox:~$ mv film1.mp4 film2.mp4 film3.mp4 film4.mp4 film5.mp4 film6.mp4 Videos/
sona@sona-VirtualBox:~$ ls
Desktop    Downloads  Music      Public      Videos
Documents   music     Pictures   Templates
sona@sona-VirtualBox:~$ cd Videos
sona@sona-VirtualBox:~/Videos$ ls
film1.mp4  film2.mp4  film3.mp4  film4.mp4  film5.mp4  film6.mp4
sona@sona-VirtualBox:~/Videos$
```

3. In your home directory, create three subdirectories for organizing your files.

Call these directories friends, family, and work. Create all three with one command.

```
sona@sona-VirtualBox:~/Videos$ cd ..
sona@sona-VirtualBox:~$ mkdir -p {friends,family,work}
sona@sona-VirtualBox:~$ cp /home/sona/Music song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3 /home/sona/friends/
cp: -r not specified; omitting directory '/home/sona/Music'
cp: cannot stat 'song1.mp3': No such file or directory
```

4. Copy song files to the friends folder and snap files to family folder

```
sona@sona-VirtualBox:~$ cp Music/song1.mp3 friends
sona@sona-VirtualBox:~$ cp Music/song2.mp3 friends
sona@sona-VirtualBox:~$ cp Music/song3.mp3 friends
sona@sona-VirtualBox:~$ cp Music/song4.mp3 friends
sona@sona-VirtualBox:~$ cp Music/song5.mp3 friends
sona@sona-VirtualBox:~$ cp Music/song6.mp3 friends
sona@sona-VirtualBox:~$ ls -R friends
friends:
song1.mp3  song2.mp3  song3.mp3  song4.mp3  song5.mp3  song6.mp3
sona@sona-VirtualBox:~$ cp Pictures/snap.jpg family
cp: cannot stat 'Pictures/snap.jpg': No such file or directory
sona@sona-VirtualBox:~$ cp Pictures/snap1.jpg family
sona@sona-VirtualBox:~$ cp Pictures/snap2.jpg family
sona@sona-VirtualBox:~$ cp Pictures/snap3.jpg family
sona@sona-VirtualBox:~$ cp Pictures/snap4.jpg family
sona@sona-VirtualBox:~$ cp Pictures/snap5.jpg family
sona@sona-VirtualBox:~$ cp Pictures/snap6.jpg family
sona@sona-VirtualBox:~$ ls -R family
family:
snap1.jpg  snap2.jpg  snap3.jpg  snap4.jpg  snap5.jpg  snap6.jpg
sona@sona-VirtualBox:~$
```

5. Attempt to delete both family and friends projects with a single rmdir Command
6. Use another command that will succeed in deleting both the family and friends folder.

```
sona@sona-VirtualBox:~$ rmdir {family,friends}
rmdir: failed to remove 'family': Directory not empty
rmdir: failed to remove 'friends': Directory not empty
sona@sona-VirtualBox:~$ rm -r friends family
sona@sona-VirtualBox:~$ ls
Desktop   Downloads  Music    Public    Videos
Documents  music     Pictures  Templates  work
sona@sona-VirtualBox:~$ █
```

7. Redirect a long listing of all home directory files, including hidden, into a file named allfiles.txt. Confirm that the file contains the listing

```
sona@sona-VirtualBox:~$ ls -al>allfiles.txt
sona@sona-VirtualBox:~$ ls
allfiles.txt  Documents  music  Pictures  Templates  work
Desktop      Downloads  Music   Public    Videos
sona@sona-VirtualBox:~$ ls -al
total 92
drwxr-xr-x 18 sona sona 4096 Oct  2 12:33 .
drwxr-xr-x  3 root root 4096 Sep 28 07:56 ..
-rw-rw-r--  1 sona sona 1230 Oct  2 12:33 allfiles.txt
drwxrwxr-x  3 sona sona 4096 Sep 29 17:04 .ansible
-rw-----  1 sona sona 3476 Oct  2 11:57 .bash_history
-rw-r--r--  1 sona sona 220 Sep 28 07:56 .bash_logout
-rw-r--r--  1 sona sona 3771 Sep 28 07:56 .bashrc
drwx----- 13 sona sona 4096 Sep 28 23:03 .cache
drwx----- 12 sona sona 4096 Oct  2 11:50 .config
drwxr-xr-x  2 sona sona 4096 Oct  2 11:57 Desktop
drwxr-xr-x  7 sona sona 4096 Oct  2 11:47 Documents
drwxr-xr-x  2 sona sona 4096 Sep 28 08:25 Downloads
drwx-----  3 sona sona 4096 Sep 28 08:24 .gnupg
drwx-----  3 sona sona 4096 Sep 28 08:24 .local
drwx-----  5 sona sona 4096 Sep 28 23:03 .mozilla
drwxr-xr-x  2 sona sona 4096 Oct  2 12:11 music
```

8. In the command window, display today's date with day of the week, month,date and year

```
sona@sona-VirtualBox:~$ date
Saturday 02 October 2021 12:35:05 PM IST
sona@sona-VirtualBox:~$
```

9. Add the user Juliet

10. Confirm that Juliet has been added by examining the /etc/passwd file

```
sona@sona-VirtualBox:~$ sudo useradd juliet
[sudo] password for sona:
sona@sona-VirtualBox:~$ cat /etc/passwd | grep juliet
juliet:x:1002:1002::/home/juliet:/bin/sh
sona@sona-VirtualBox:~$
```

11. Use the passwd command to initialize Juliet's password

```
sona@sona-VirtualBox:~$ sudo passwd juliet
New password:
Retype new password:
passwd: password updated successfully
sona@sona-VirtualBox:~$
```

12. Create a supplementary group called Shakespeare with a group id of 30000

13. Create a supplementary group called artists

14. Confirm that Shakespeare and artists have been added by examining the /etc/group file.

```
sona@sona-VirtualBox:~$ sudo groupadd -g 30000 Shakespeare
groupadd: GID '30000' already exists
sona@sona-VirtualBox:~$ sudo groupadd -g 30001 Shakespeare
groupadd: GID '30001' already exists
sona@sona-VirtualBox:~$ sudo groupadd -g 3000 Shakespeare
sona@sona-VirtualBox:~$ sudo groupadd -g 5000 Shakespeare
groupadd: group 'Shakespeare' already exists
sona@sona-VirtualBox:~$ sudo groupadd -g 50000 artists
sona@sona-VirtualBox:~$ cat /etc/groups
cat: /etc/groups: No such file or directory
sona@sona-VirtualBox:~$ cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,sona
tty:x:5:syslog
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
uucp:x:10:
man:x:12:
proxy:x:13:
kmem:x:15:
dialout:x:20:
fax:x:21:
voice:x:22:
cdrom:x:24:sona
```

```
avahi-autoipd:x:116:  
rtkit:x:117:  
ssh:x:118:  
netdev:x:119:  
lpadmin:x:120:sona  
avahi:x:121:  
scanner:x:122:saned  
saned:x:123:  
nm-openvpn:x:124:  
whoopsie:x:125:  
colord:x:126:  
geoclue:x:127:  
pulse:x:128:  
pulse-access:x:129:  
gdm:x:130:  
sssd:x:131:  
lxd:x:132:sona  
sona:x:1000:  
sambashare:x:133:sona  
systemd-coredump:x:999:  
mysql:x:134:  
college:x:30000:  
son:x:1001:  
student:x:30001:  
new_group:x:30003:  
juliet:x:1002:  
Shakespheare:x:3000:  
artists:x:50000:  
sona@sona-VirtualBox:~$ █
```

15. Add the Juliet user to the Shakespeare group as a supplementary group.

```
sona@sona-VirtualBox:~$ sudo usermod -a -G Shakespeare juliet  
sona@sona-VirtualBox:~$ groups juliet  
juliet : juliet Shakespeare  
sona@sona-VirtualBox:~$ █
```

16. Confirm that Juliet has been added using the id command.

```
sona@sona-VirtualBox:~$ groups juliet  
juliet : juliet Shakespeare  
sona@sona-VirtualBox:~$ id juliet  
uid=1002(juliet) gid=1002(juliet) groups=1002(juliet),3000(Shakespeare)  
sona@sona-VirtualBox:~$ sudo usermod -a -G Shakespeare Hamlet  
usermod: user 'Hamlet' does not exist  
sona@sona-VirtualBox:~$ sudo usermod -a -G Shakespeare Romeo  
usermod: user 'Romeo' does not exist  
sona@sona-VirtualBox:~$
```

17. Add Romeo and Hamlet to the Shakespeare group

```
sona@sona-VirtualBox:~$ sudo useradd Romeo
sona@sona-VirtualBox:~$ sudo useradd Hamlet
sona@sona-VirtualBox:~$ sudo usermod -G Shakespeare Romeo
sona@sona-VirtualBox:~$ sudo usermod -G Shakespeare Hamlet
sona@sona-VirtualBox:~$ groups Romeo
Romeo : Romeo Shakespeare
sona@sona-VirtualBox:~$ groups Hamlet
Hamlet : Hamlet Shakespeare
sona@sona-VirtualBox:~$
```

18. Add Reba, Dolly and Elvis to the artists group.

```
sona@sona-VirtualBox:~$ sudo useradd Reeba
sona@sona-VirtualBox:~$ sudo useradd Doly
sona@sona-VirtualBox:~$ sudo usermod -a -G artists reeba
```

19. Verify the supplemental group memberships by examining the
/etc/group

file.

20. Attempt to remove user Dolly.

ASSIGNMENT -7

Submitted by

Sona Joseph

Roll No:23

RMCA b batch

1. Try out these network commands in Window as well as in Linux and perform at least 4 options with each command: ping, route, traceroute, nslookup, Ip Config, NetStat .

WINDOWS

Ping:

```
Windows Command Prompt
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.

C:\Users\user>ping google.com

Pinging google.com [142.250.182.14] with 32 bytes of data:
Reply from 142.250.182.14: bytes=32 time=75ms TTL=116
Reply from 142.250.182.14: bytes=32 time=108ms TTL=116
Reply from 142.250.182.14: bytes=32 time=63ms TTL=116
Reply from 142.250.182.14: bytes=32 time=95ms TTL=116

Ping statistics for 142.250.182.14:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 63ms, Maximum = 108ms, Average = 85ms

C:\Users\user>
```

```
C:\Users\user>ping -a google.com

Pinging google.com [142.250.182.14] with 32 bytes of data:
Reply from 142.250.182.14: bytes=32 time=120ms TTL=116
Reply from 142.250.182.14: bytes=32 time=70ms TTL=116
Reply from 142.250.182.14: bytes=32 time=106ms TTL=116
Reply from 142.250.182.14: bytes=32 time=139ms TTL=116

Ping statistics for 142.250.182.14:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 70ms, Maximum = 139ms, Average = 108ms
```

```
on Command Prompt - ping -t google.com
Reply from 142.250.182.14: bytes=32 time=79ms TTL=116
Reply from 142.250.182.14: bytes=32 time=76ms TTL=116
Reply from 142.250.182.14: bytes=32 time=108ms TTL=116
Reply from 142.250.182.14: bytes=32 time=141ms TTL=116
Reply from 142.250.182.14: bytes=32 time=96ms TTL=116
Reply from 142.250.182.14: bytes=32 time=127ms TTL=116
Reply from 142.250.182.14: bytes=32 time=80ms TTL=116
Reply from 142.250.182.14: bytes=32 time=115ms TTL=116
Reply from 142.250.182.14: bytes=32 time=147ms TTL=116
Reply from 142.250.182.14: bytes=32 time=80ms TTL=116
Reply from 142.250.182.14: bytes=32 time=113ms TTL=116
Reply from 142.250.182.14: bytes=32 time=119ms TTL=116
Reply from 142.250.182.14: bytes=32 time=141ms TTL=116
Reply from 142.250.182.14: bytes=32 time=94ms TTL=116
Reply from 142.250.182.14: bytes=32 time=118ms TTL=116
Reply from 142.250.182.14: bytes=32 time=118ms TTL=116
Reply from 142.250.182.14: bytes=32 time=72ms TTL=116
Reply from 142.250.182.14: bytes=32 time=97ms TTL=116
Reply from 142.250.182.14: bytes=32 time=104ms TTL=116
Reply from 142.250.182.14: bytes=32 time=136ms TTL=116
Reply from 142.250.182.14: bytes=32 time=82ms TTL=116
Reply from 142.250.182.14: bytes=32 time=114ms TTL=116
Reply from 142.250.182.14: bytes=32 time=66ms TTL=116
Reply from 142.250.182.14: bytes=32 time=100ms TTL=116
Reply from 142.250.182.14: bytes=32 time=132ms TTL=116
Reply from 142.250.182.14: bytes=32 time=84ms TTL=116
Reply from 142.250.182.14: bytes=32 time=118ms TTL=116
Reply from 142.250.182.14: bytes=32 time=68ms TTL=116

```

```
C:\Users\user>ping -j google.com

Pinging google.com [142.250.182.14] with 32 bytes of data:
General failure.
General failure.
General failure.
General failure.

Ping statistics for 142.250.182.14:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
C:\Users\user>ping -4 google.com

Pinging google.com [142.250.182.14] with 32 bytes of data:
Reply from 142.250.182.14: bytes=32 time=83ms TTL=116
Reply from 142.250.182.14: bytes=32 time=117ms TTL=116
Reply from 142.250.182.14: bytes=32 time=72ms TTL=116
Reply from 142.250.182.14: bytes=32 time=105ms TTL=116

Ping statistics for 142.250.182.14:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 72ms, Maximum = 117ms, Average = 94ms
```

Route

```
C:\Users\user>route print
=====
Interface List
12...20 1a 06 d5 6d 99 .....Broadcom NetLink (TM) Gigabit Ethernet
16...12 f0 2f c7 66 85 .....Microsoft Wi-Fi Direct Virtual Adapter
15...40 f0 c7 66 85 .....Qualcomm Atheros AR956x Wireless Network Adapter
7...40 f0 2f c7 c3 7d .....Bluetooth Device (Personal Area Network)
1..... ....Software Loopback Interface 1
13...00 00 00 00 00 e0 Microsoft ISATAP Adapter
17...00 00 00 00 00 e0 Teredo Tunneling Pseudo-Interface
=====

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask          Gateway        Interface Metric
          0.0.0.0        0.0.0.0   192.168.43.1    192.168.43.17    55
         127.0.0.0    255.0.0.0        On-link       127.0.0.1    331
         127.0.0.1    255.255.255.255        On-link       127.0.0.1    331
 127.255.255.255    255.255.255.255        On-link       127.0.0.1    331
         192.168.43.0    255.255.255.0        On-link     192.168.43.17    311
 192.168.43.17    255.255.255.255        On-link     192.168.43.17    311
 192.168.43.255    255.255.255.255        On-link     192.168.43.17    311
         224.0.0.0    240.0.0.0        On-link       127.0.0.1    331
         224.0.0.0    240.0.0.0        On-link     192.168.43.17    311
 255.255.255.255    255.255.255.255        On-link       127.0.0.1    331
 255.255.255.255    255.255.255.255        On-link     192.168.43.17    311
=====
Persistent Routes:
  None
```

```
C:\Users\user>route print -4
=====
Interface List
 12...20 1a 06 d5 6d 99 ....Broadcom NetLink (TM) Gigabit Ethernet
 16...12 f0 2f c7 66 85 ....Microsoft Wi-Fi Direct Virtual Adapter
 15...40 f0 2f c7 66 85 ....Qualcomm Atheros AR956x Wireless Network Adapter
 7...40 f0 2f c7 c3 7d ....Bluetooth Device (Personal Area Network)
 1.....Software Loopback Interface 1
 13...00 00 00 00 00 e0 Microsoft ISATAP Adapter
 17...00 00 00 00 00 e0 Teredo Tunneling Pseudo-Interface
=====

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask        Gateway       Interface Metric
          0.0.0.0        0.0.0.0    192.168.43.1   192.168.43.17    55
         127.0.0.0    255.0.0.0     On-link        127.0.0.1    331
         127.0.0.1    255.255.255.255  On-link        127.0.0.1    331
 127.255.255.255  255.255.255.255  On-link        127.0.0.1    331
         192.168.43.0   255.255.255.0     On-link   192.168.43.17    311
 192.168.43.17    255.255.255.255  On-link   192.168.43.17    311
 192.168.43.255  255.255.255.255  On-link   192.168.43.17    311
         224.0.0.0    240.0.0.0     On-link        127.0.0.1    331
         224.0.0.0    240.0.0.0     On-link   192.168.43.17    311
 255.255.255.255  255.255.255.255  On-link        127.0.0.1    331
 255.255.255.255  255.255.255.255  On-link   192.168.43.17    311
=====
Persistent Routes:
  None
```

```
C:\Users\user>route -6

Manipulates network routing tables.

ROUTE [-f] [-p] [-4|-6] command [destination]
      [MASK netmask] [gateway] [METRIC metric] [IF interface]

-f           Clears the routing tables of all gateway entries. If this is
            used in conjunction with one of the commands, the tables are
            cleared prior to running the command.

-p           When used with the ADD command, makes a route persistent across
            boots of the system. By default, routes are not preserved
            when the system is restarted. Ignored for all other commands,
            which always affect the appropriate persistent routes.

-4           Force using IPv4.

-6           Force using IPv6.

command      One of these:
              PRINT    Prints a route
              ADD     Adds a route
              DELETE   Deletes a route
              CHANGE   Modifies an existing route
destination   Specifies the host.
MASK         Specifies that the next parameter is the 'netmask' value.
netmask       Specifies a subnet mask value for this route entry.
              If not specified, it defaults to 255.255.255.255.
gateway      Specifies gateway.
interface    the interface number for the specified route.
METRIC       specifies the metric, ie. cost for the destination.
```

All symbolic names used for destination are looked up in the network database file NETWORKS. The symbolic names for gateway are looked up in the host name database file HOSTS.

If the command is PRINT or DELETE. Destination or gateway can be a wildcard, (wildcard is specified as a star '*'), or the gateway argument may be omitted.

```

If Dest contains a * or ?, it is treated as a shell pattern, and only
matching destination routes are printed. The '*' matches any string,
and '?' matches any one char. Examples: 157.*.1, 157.*, 127.*, *224*.

Pattern match is only allowed in PRINT command.

Diagnostic Notes:
    Invalid MASK generates an error, that is when (DEST & MASK) != DEST.
    Example> route ADD 157.0.0.0 MASK 155.0.0.0 157.55.80.1 IF 1
              The route addition failed: The specified mask parameter is invalid. (Destination & Mask) != Destination.

Examples:
> route PRINT
> route PRINT -4
> route PRINT -6
> route PRINT 157*      .... Only prints those matching 157*
> route ADD 157.0.0.0 MASK 255.0.0.0 157.55.80.1 METRIC 3 IF 2
      destination^      ^mask        ^gateway      metric^      ^
                           Interface^
    If IF is not given, it tries to find the best interface for a given
    gateway.
> route ADD 3ffe::/32 3ffe::1

> route CHANGE 157.0.0.0 MASK 255.0.0.0 157.55.80.5 METRIC 2 IF 2
    CHANGE is used to modify gateway and/or metric only.

> route DELETE 157.0.0.0
> route DELETE 3ffe::/32

```

```

C:\Users\user>route print *157
=====
Interface List
12...20 1a 06 d5 6d 99 .....Broadcom NetLink (TM) Gigabit Ethernet
16...12 f0 2f c7 66 85 .....Microsoft Wi-Fi Direct Virtual Adapter
15...40 f0 2f c7 66 85 .....Qualcomm Atheros AR956x Wireless Network Adapter
7...40 f0 2f c7 c3 7d .....Bluetooth Device (Personal Area Network)
1.....Software Loopback Interface 1
13...00 00 00 00 00 00 e0 Microsoft ISATAP Adapter
17...00 00 00 00 00 00 e0 Teredo Tunneling Pseudo-Interface
=====

IPv4 Route Table
=====
Active Routes:
  None
Persistent Routes:
  None

IPv6 Route Table
=====
Active Routes:
  None
Persistent Routes:
  None

```

```
C:\Users\user>tracet 192.168.1.1
'traset' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\user>tracert 192.168.1.1

Tracing route to 192.168.1.1 over a maximum of 30 hops

 1  40 ms    2 ms    2 ms  192.168.43.1
 2  *         *         * Request timed out.
 3  96 ms    87 ms    34 ms  10.45.1.226
 4  80 ms    38 ms    29 ms  10.56.17.149
 5  97 ms    91 ms    53 ms  172.16.101.42
 6  *         *         * Request timed out.
```

```
C:\Users\user>tracert www.google.com

Tracing route to www.google.com [142.250.196.36]
over a maximum of 30 hops:

 1  2 ms    2 ms    1 ms  192.168.43.1
 2  *         *         * Request timed out.
 3  93 ms    74 ms    35 ms  10.45.1.226
 4  251 ms   75 ms    75 ms  10.56.17.149
 5  86 ms    73 ms    46 ms  172.16.101.42
 6  *         *         * Request timed out.
 7  *         *         * Request timed out.
 8  130 ms   81 ms    75 ms  72.14.218.250
 9  121 ms   81 ms    78 ms  216.239.47.9
10  88 ms    85 ms    121 ms  142.251.55.31
11  206 ms   79 ms    85 ms  maa03s45-in-f4.1e100.net [142.250.196.36]

Trace complete.
```

```
C:\Users\user>tracert -d www.google.com

Tracing route to www.google.com [142.250.196.36]
over a maximum of 30 hops:

 1   5 ms    2 ms    3 ms  192.168.43.1
 2   *         *         * Request timed out.
 3   89 ms    49 ms    45 ms  10.45.1.226
 4   53 ms    60 ms    56 ms  10.56.17.149
 5   59 ms    51 ms    54 ms  172.16.101.42
 6   *         *         * Request timed out.
 7   *         *         * Request timed out.
 8   182 ms   160 ms   79 ms  72.14.218.250
 9   111 ms   79 ms   158 ms  216.239.47.9
10   111 ms   157 ms   79 ms  142.251.55.31
11   112 ms   78 ms   76 ms  142.250.196.36

Trace complete.
```

```
C:\Users\user>tracert 22.110.0.1

Tracing route to 22.110.0.1 over a maximum of 30 hops

 1   1 ms    1 ms    1 ms  192.168.43.1
 2   *         *         * Request timed out.
 3   154 ms   56 ms   46 ms  10.45.1.226
 4   93 ms    33 ms   37 ms  10.56.17.149
 5   101 ms   38 ms   43 ms  172.16.101.42
 6   *         *         * Request timed out.
 7   *         *         * Request timed out.
 8   114 ms   81 ms   74 ms  203.101.76.113
 9   363 ms   315 ms  319 ms  182.79.222.237
10   303 ms   317 ms  315 ms  ipv4.decix-newyorkcity.core1.nyc6.he.net [206.82.104.
11   357 ms   282 ms  278 ms  100ge13-1.core1.nyc4.he.net [184.105.64.177]
12   313 ms   313 ms  319 ms  100ge16-1.core1.ash1.he.net [184.105.223.165]
13   353 ms   315 ms  318 ms  100ge5-1.core2.ash1.he.net [72.52.92.226]
14   *         *         * Request timed out.
```

Nslookup

```
C:\Users\user>nslookup
Default Server:  UnKnown
Address:  192.168.43.1
```

```
C:\Users\user>nslookup -g=MX google.com
*** Invalid option: g=MX
Server: UnKnown
Address: 192.168.43.1

Non-authoritative answer:
Name: google.com
Addresses: 2404:6800:4007:819::200e
           142.250.182.14
```

Ipconfig

```
C:\Users\user>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . :

Wireless LAN adapter Local Area Connection* 3:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . :

Wireless LAN adapter Wi-Fi:
  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::ece3:f534:49ca:8449%15
  IPv4 Address . . . . . : 192.168.43.17
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 192.168.43.1

Ethernet adapter Bluetooth Network Connection:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . :

Tunnel adapter isatap.{CB1157D2-E45E-4122-AD3A-17686E89A635}:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . :

Tunnel adapter Teredo Tunneling Pseudo-Interface:
  Connection-specific DNS Suffix . :
  IPv6 Address . . . . . : 2001:0:348b:fb58:34f5:857:3f57:d4ee
  Link-local IPv6 Address . . . . . : fe80::34f5:857:3f57:d4ee%17
  Default Gateway . . . . . : ::
```

```
C:\Users\user>ipconfig /displaying
Error: unrecognized or incomplete command line.

USAGE:
  ipconfig [/allcompartments] [/? | /all |
    /renew [adapter] | /release [adapter] |
    /renew6 [adapter] | /release6 [adapter] |
    /flushdns | /displaydns | /registerdns |
    /showclassid adapter |
    /setclassid adapter [classid] |
    /showclassid6 adapter |
    /setclassid6 adapter [classid] ]

where
  adapter      Connection name
  (wildcard characters * and ? allowed, see examples)

  Options:
    /?
    /all        Display this help message
    /release   Display full configuration information.
    /release6  Release the IPv4 address for the specified adapter.
    /renew     Release the IPv6 address for the specified adapter.
    /renew6    Renew the IPv4 address for the specified adapter.
    /flushdns  Renew the IPv6 address for the specified adapter.
    /registerdns Refreshes all DHCP leases and re-registers DNS names
    /displaydns Display the contents of the DNS Resolver Cache.
    /showclassid Displays all the dhcp class IDs allowed for adapter.
    /setclassid Modifies the dhcp class id.
    /showclassid6 Displays all the IPv6 DHCP class IDs allowed for adapter.
```

```
/showclassid       Displays all the IPv4 DHCP class IDs allowed for adapter.
/setclassid6      Modifies the IPv6 DHCP class id.
```

The default is to display only the IP address, subnet mask and default gateway for each adapter bound to TCP/IP.

For Release and Renew, if no adapter name is specified, then the IP address leases for all adapters bound to TCP/IP will be released or renewed.

For Setclassid and Setclassid6, if no ClassId is specified, then the ClassId is removed.

Examples:

```
> ipconfig           ... Show information
> ipconfig /all      ... Show detailed information
> ipconfig /renew    ... renew all adapters
> ipconfig /renew EL* ... renew any connection that has its
                        name starting with EL
> ipconfig /release *Con* ... release all matching connections,
                            eg. "Wired Ethernet Connection 1" or
                                "Wired Ethernet Connection 2"
> ipconfig /allcompartments ... Show information about all
                                compartments
> ipconfig /allcompartments /all ... Show detailed information about all
                                compartments
```

```
C:\Users\user>ipconfig /displaying
Error: unrecognized or incomplete command line.

USAGE:
  ipconfig [/allcompartments] [/? | /all |
    /renew [adapter] | /release [adapter] |
    /renew6 [adapter] | /release6 [adapter] |
    /flushdns | /displaydns | /registerdns |
    /showclassid adapter |
    /setclassid adapter [classid] |
    /showclassid6 adapter |
    /setclassid6 adapter [classid] ]

where
  adapter           Connection name
                    (wildcard characters * and ? allowed, see examples)

Options:
  /?
  /all
  /release
  /release6
  /renew
  /renew6
  /flushdns
  /registerdns
  /displaydns
  /showclassid
  /setclassid
  /showclassid6
  /setclassid6      Display this help message
                    Display full configuration information.
                    Release the IPv4 address for the specified adapter.
                    Release the IPv6 address for the specified adapter.
                    Renew the IPv4 address for the specified adapter.
                    Renew the IPv6 address for the specified adapter.
                    Purges the DNS Resolver cache.
                    Refreshes all DHCP leases and re-registers DNS names
                    Display the contents of the DNS Resolver Cache.
                    Displays all the dhcp class IDs allowed for adapter.
                    Modifies the dhcp class id.
                    Displays all the IPv6 DHCP class IDs allowed for adapter.
                    Modifies the IPv6 DHCP class id.

The default is to display only the IP address, subnet mask and
default gateway for each adapter bound to TCP/IP.

For Release and Renew, if no adapter name is specified, then the IP address
leases for all adapters bound to TCP/IP will be released or renewed.

For Setclassid and Setclassid6, if no ClassId is specified, then the ClassId is removed.
```

Examples:

> ipconfig	... Show information
> ipconfig /all	... Show detailed information
> ipconfig /renew	... renew all adapters
> ipconfig /renew EL*	... renew any connection that has its name starting with EL
> ipconfig /release *Con*	... release all matching connections, eg. "Wired Ethernet Connection 1" or "Wired Ethernet Connection 2"
> ipconfig /allcompartments	... Show information about all compartments
> ipconfig /allcompartments /all	... Show detailed information about all compartments

NetStat

```
C:\Users\user>netstat
```

```
Active Connections
```

Proto	Local Address	Foreign Address	State
TCP	192.168.43.17:49985	20.198.162.78:https	ESTABLISHED
TCP	192.168.43.17:49987	20.198.162.78:https	ESTABLISHED
TCP	192.168.43.17:49989	a-0001:https	ESTABLISHED
TCP	192.168.43.17:58635	20.198.162.78:https	ESTABLISHED
TCP	192.168.43.17:58639	20.198.162.78:https	ESTABLISHED

```
C:\Users\user>netstat -n
```

```
Active Connections
```

Proto	Local Address	Foreign Address	State
TCP	192.168.43.17:49985	20.198.162.78:443	ESTABLISHED
TCP	192.168.43.17:49987	20.198.162.78:443	ESTABLISHED
TCP	192.168.43.17:49989	204.79.197.200:443	ESTABLISHED
TCP	192.168.43.17:58635	20.198.162.78:443	ESTABLISHED
TCP	192.168.43.17:58639	20.198.162.78:443	ESTABLISHED

```
C:\Users\user>netstat -n 5
```

```
Active Connections
```

Proto	Local Address	Foreign Address	State
TCP	192.168.43.17:49985	20.198.162.78:443	ESTABLISHED
TCP	192.168.43.17:49987	20.198.162.78:443	ESTABLISHED
TCP	192.168.43.17:49991	204.79.197.200:443	TIME_WAIT
TCP	192.168.43.17:49992	204.79.197.200:443	ESTABLISHED
TCP	192.168.43.17:49993	204.79.197.200:443	ESTABLISHED
TCP	192.168.43.17:49994	13.105.28.18:80	ESTABLISHED
TCP	192.168.43.17:58635	20.198.162.78:443	ESTABLISHED
TCP	192.168.43.17:58639	20.198.162.78:443	ESTABLISHED

```
C:\Users\user>netstat -a
```

Active Connections

Proto	Local Address	Foreign Address	State
TCP	0.0.0.0:135	DESKTOP-4ATJ8BD:0	LISTENING
TCP	0.0.0.0:445	DESKTOP-4ATJ8BD:0	LISTENING
TCP	0.0.0.0:49664	DESKTOP-4ATJ8BD:0	LISTENING
TCP	0.0.0.0:49665	DESKTOP-4ATJ8BD:0	LISTENING
TCP	0.0.0.0:49666	DESKTOP-4ATJ8BD:0	LISTENING
TCP	0.0.0.0:49667	DESKTOP-4ATJ8BD:0	LISTENING
TCP	0.0.0.0:49668	DESKTOP-4ATJ8BD:0	LISTENING
TCP	0.0.0.0:49669	DESKTOP-4ATJ8BD:0	LISTENING
TCP	192.168.43.17:139	DESKTOP-4ATJ8BD:0	LISTENING
TCP	192.168.43.17:49985	20.198.162.78:https	ESTABLISHED
TCP	192.168.43.17:49987	20.198.162.78:https	ESTABLISHED
TCP	192.168.43.17:49991	a-0001:https	TIME_WAIT
TCP	192.168.43.17:49992	a-0001:https	ESTABLISHED
TCP	192.168.43.17:49993	a-0001:https	ESTABLISHED
TCP	192.168.43.17:49994	13.105.28.18:http	ESTABLISHED
TCP	192.168.43.17:58635	20.198.162.78:https	ESTABLISHED
TCP	192.168.43.17:58639	20.198.162.78:https	ESTABLISHED
TCP	[::]:135	DESKTOP-4ATJ8BD:0	LISTENING
TCP	[::]:445	DESKTOP-4ATJ8BD:0	LISTENING
TCP	[::]:49664	DESKTOP-4ATJ8BD:0	LISTENING
TCP	[::]:49665	DESKTOP-4ATJ8BD:0	LISTENING
TCP	[::]:49666	DESKTOP-4ATJ8BD:0	LISTENING
TCP	[::]:49667	DESKTOP-4ATJ8BD:0	LISTENING
TCP	[::]:49668	DESKTOP-4ATJ8BD:0	LISTENING
TCP	[::]:49669	DESKTOP-4ATJ8BD:0	LISTENING
UDP	0.0.0.0:123	*:*	
UDP	0.0.0.0:5050	*:*	
UDP	0.0.0.0:5353	*:*	
UDP	0.0.0.0:5355	*:*	
UDP	127.0.0.1:1900	*:*	
UDP	127.0.0.1:57502	*:*	
UDP	192.168.43.17:137	*:*	
UDP	192.168.43.17:138	*:*	

Ubuntu

```
sona@sona-VirtualBox:~$ ping www.facebook.com
PING star-mini.c10r.facebook.com (157.240.192.35) 56(84) bytes of data.
64 bytes from edge-star-mini-shv-02-maa2.facebook.com (157.240.192.35): icmp_se
q=1 ttl=51 time=113 ms
64 bytes from edge-star-mini-shv-02-maa2.facebook.com (157.240.192.35): icmp_se
q=2 ttl=51 time=82.5 ms
64 bytes from edge-star-mini-shv-02-maa2.facebook.com (157.240.192.35): icmp_se
q=3 ttl=51 time=77.5 ms
64 bytes from edge-star-mini-shv-02-maa2.facebook.com (157.240.192.35): icmp_se
q=4 ttl=51 time=162 ms
64 bytes from edge-star-mini-shv-02-maa2.facebook.com (157.240.192.35): icmp_se
q=5 ttl=51 time=72.7 ms
64 bytes from edge-star-mini-shv-02-maa2.facebook.com (157.240.192.35): icmp_se
q=6 ttl=51 time=112 ms
64 bytes from edge-star-mini-shv-02-maa2.facebook.com (157.240.192.35): icmp_se
q=7 ttl=51 time=105 ms
64 bytes from edge-star-mini-shv-02-maa2.facebook.com (157.240.192.35): icmp_se
q=8 ttl=51 time=103 ms
64 bytes from edge-star-mini-shv-02-maa2.facebook.com (157.240.192.35): icmp_se
q=9 ttl=51 time=66.3 ms
64 bytes from edge-star-mini-shv-02-maa2.facebook.com (157.240.192.35): icmp_se
q=10 ttl=51 time=70.3 ms
64 bytes from edge-star-mini-shv-02-maa2.facebook.com (157.240.192.35): icmp_se
q=11 ttl=51 time=100 ms
^C
--- star-mini.c10r.facebook.com ping statistics ---
11 packets transmitted, 11 received, 0% packet loss, time 10012ms
rtt min/avg/max/mdev = 66.301/96.787/162.286/26.417 ms
sona@sona-VirtualBox:~$
```

Traceroute

```
sona@sona-VirtualBox:~$ traceroute www.facebook.com
traceroute to www.facebook.com (157.240.192.35), 30 hops max, 60 byte packets
 1 _gateway (10.0.2.2)  3.097 ms  3.295 ms  3.251 ms
 2 * * *
 3 * * *
 4 * * *
 5 * * *
 6 * * *
 7 * * *
 8 * * *
 9 * * *
```

Nslookup

```
sona@sona-VirtualBox:~$ nslookup google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.205.238
Name:   google.com
Address: 2404:6800:4007:82d::200e

sona@sona-VirtualBox:~$
```

Ifconfig

```
sona@sona-VirtualBox:~$ sudo ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::df44:d5ea:ad59:e09c  prefixlen 64  scopeid 0x20<link>
          ether 08:00:27:ca:c5:40  txqueuelen 1000  (Ethernet)
            RX packets 2042  bytes 1057818 (1.0 MB)
            RX errors 0  dropped 0  overruns 0  frame 0
            TX packets 2043  bytes 163450 (163.4 KB)
            TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
          loop  txqueuelen 1000  (Local Loopback)
            RX packets 311  bytes 26371 (26.3 KB)
            RX errors 0  dropped 0  overruns 0  frame 0
            TX packets 311  bytes 26371 (26.3 KB)
            TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0

sona@sona-VirtualBox:~$
```

NetStat

```
sona@sona-VirtualBox:~$ netstat -l
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address          Foreign Address      State
tcp      0      0 localhost:domain        0.0.0.0:*
tcp      0      0 localhost:ipp          0.0.0.0:*
tcp      0      0 localhost:mysql        0.0.0.0:*
tcp6     0      0 ip6-localhost:ipp       [::]:*
udp      0      0 0.0.0.0:mdns          0.0.0.0:*
udp      0      0 0.0.0.0:41369         0.0.0.0:*
udp      0      0 0.0.0.0:631           0.0.0.0:*
udp      0      0 localhost:domain        0.0.0.0:*
udp6     0      0 [::]:mdns            [::]:*
udp6     0      0 [::]:58927           [::]:*
raw6     0      0 [::]:ipv6-icmp        [::]:*                7
Active UNIX domain sockets (only servers)
Proto RefCnt Flags       Type      State      I-Node Path
unix    2 [ ACC ]     STREAM    LISTENING  26349  /run/user/1000/syste
md/private
unix    2 [ ACC ]     STREAM    LISTENING  26431  /run/user/1000/bus
unix    2 [ ACC ]     STREAM    LISTENING  26432  /run/user/1000/gnupg
/S.dirmngr
unix    2 [ ACC ]     STREAM    LISTENING  26433  /run/user/1000/gnupg
/S.gpg-agent.browser
unix    2 [ ACC ]     STREAM    LISTENING  26434  /run/user/1000/gnupg
/S.gpg-agent.extra
unix    2 [ ACC ]     STREAM    LISTENING  26435  /run/user/1000/gnupg
/S.gpg-agent.ssh
unix    2 [ ACC ]     STREAM    LISTENING  26472  /run/user/1000/gnupg
/S.gpg-agent
```

2. Identify and perform 5 more network commands and it's working.

1) ARP

The ARP command corresponds to the Address Resolution Protocol. Although it is easy to think of network communications in terms of IP addressing, packet delivery is ultimately dependent on the Media Access Control (MAC)

address of the device's network adapter. This is where the Address Resolution Protocol comes into play. Its job is to map IP addresses to MAC addresses.

Windows devices maintain an ARP cache, which contains the results of recent ARP queries. You can see the contents of this cache by using the ARP -A command. If you are having problems communicating with one specific host, you can append the remote host's IP address to the ARP -A command.

```
C:\Users\user>arp -a

Interface: 192.168.43.17 --- 0xf
Internet Address      Physical Address      Type
 192.168.43.1          86-9b-2d-69-a1-2b    dynamic
 192.168.43.255        ff-ff-ff-ff-ff-ff    static
 224.0.0.22             01-00-5e-00-00-16    static
 224.0.0.251            01-00-5e-00-00-fb    static
 224.0.0.252            01-00-5e-00-00-fc    static
 239.255.255.250       01-00-5e-7f-ff-fa    static
 255.255.255.255       ff-ff-ff-ff-ff-ff    static
```

ii. NbtStat.

Computers that are running a Windows operating system are assigned a computer name. Oftentimes, there is a domain name or a workgroup name that is also assigned to the computer. The

computer name is sometimes referred to as the NetBIOS name. Windows uses several different methods to map NetBIOS names to IP addresses, such as broadcast, LMHost lookup, or even using the nearly extinct method of querying a WINS server. Of course, NetBIOS over TCP/IP can occasionally break down. The NbtStat command can help you to diagnose and correct such problems. The NbtStat -n command for example, shows the NetBIOS names that are in use by a device. The NbtStat -r command shows how many NetBIOS names the device has been able to resolve recently.

```
C:\Users\user>nbtstat -r

NetBIOS Names Resolution and Registration Statistics
-----
Resolved By Broadcast      = 0
Resolved By Name Server    = 0

Registered By Broadcast   = 45
Registered By Name Server = 0
```

iii. Hostname

The previously discussed NbtStat command can provide you with the host name that has been assigned to a Windows device, if you know which switch to use with the command. However, if you're just looking for a fast and easy way of verifying a computer's name, then try using the Hostname command. Typing Hostname at the command prompt returns the local computer name.

```
C:\Users\user>hostname
DESKTOP-4ATJ8BD
```

iv. PathPing Earlier,

I talked about the Ping utility and the Tracert utility, and the similarities between them. As you might have guessed, the

PathPing tool is a utility that combines the best aspects of Tracert and Ping. Entering the PathPing command followed by a host name initiates what looks like a somewhat standard Tracert process. Once this process completes however, the tool takes 300 seconds (five minutes) to gather statistics, and then reports latency and packet loss statistics that are more detailed than those provided by Ping or Tracert.

```
C:\Users\user>pathping www.google.com

Tracing route to www.google.com [142.250.196.36]
over a maximum of 30 hops:
  0  DESKTOP-4ATJ8BD [192.168.43.17]
  1  192.168.43.1
  2  *           *           *
Computing statistics for 25 seconds...
```

v. getmac

Command Another very simple command that shows the MAC address of your network interfaces

```
C:\Users\user>getmac

Physical Address      Transport Name
=====  =====
20-1A-06-D5-6D-99    Disconnected
40-F0-2F-C7-66-85    \Device\Tcpip_{CB1157D2-E45E-4122-AD3A-17686E89A635}
40-F0-2F-C7-C3-7D    Media disconnected
```


ASSIGNMENT ON LAMP INSTALLATION

Install Apache

- Update your system
 - sudo apt update
- Install Apache using apt:
 - sudo apt install apache2
- Confirm that Apache is now running with the following command:
 - sudo systemctl status apache2
- if it is not working
 - sudo systemctl start apache2
- Once installed, test by accessing your server's IP in your browser:
 - <http://youripaddress>

(find out your ip address using ifconfig)

Install MariaDB

- Update your system

- sudo apt update
- Install Apache using apt:
 - sudo apt install apache2
- Confirm that Apache is now running with the following command:
 - sudo systemctl status apache2
- if it is not working
 - sudo systemctl start apache2
- Once installed, test by accessing your server's IP in your browser:
 - http://youripaddress
 - (find out your ip address using ifconfig

Install PHP and commonly used modules

- sudo apt install php libapache2-mod-php php-opcache php-cli php-gd php-curl
- php-mysql
- Restart apache2
 - sudo systemctl restart apache2
- Now you can check php installation
 - sudo echo "<?php phpinfo(); ?>" | sudo tee -a /var/www/html/phpinfo.php >
 - /dev/null
- Open a browser

- `http://127.0.0.1/phpinfo.php`

Install phpmyadmin

- `sudo apt install phpmyadmin php-mbstring php-zip php-gd php-json php-curl`
- (It ask for webserver select apache2, select db configuration and set password)

If phpmyadmin is not found error

- `sudo -H gedit /etc/apache2/apache2.conf`

Then add the following line to the end of the file:

- `Include /etc/phpmyadmin/apache.conf`

Then restart apache:

- `sudo systemctl restart apache2`

Then install phpmyadmin again

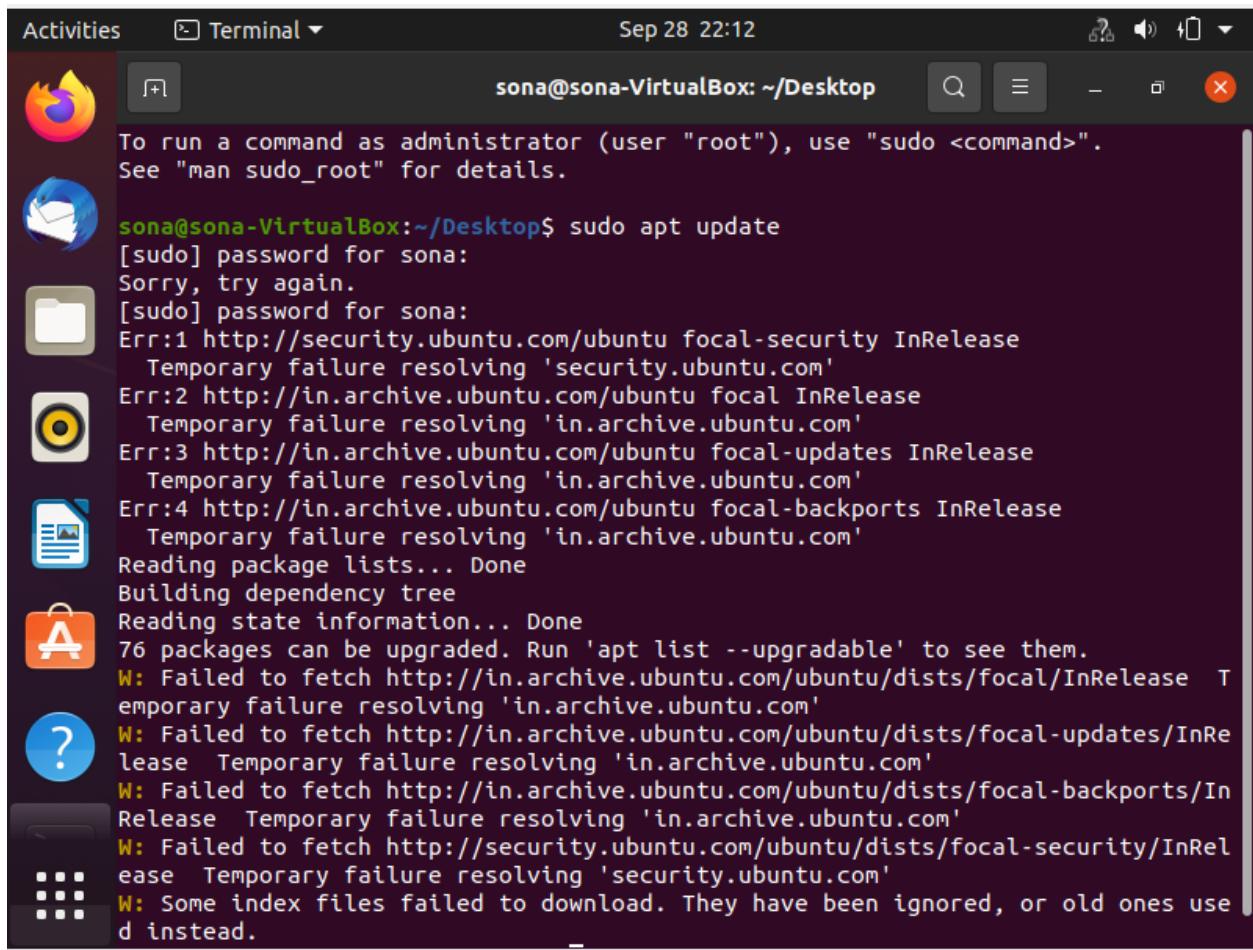
- `sudo apt install phpmyadmin php-mbstring php-zip php-gd php-json php-curl`

Install phpmyadmin

- Install phpmyadmin
 - `sudo apt install phpmyadmin php-mbstring php-zip php-gd php-json php-curl`
 - (It ask for webserver select apache2, select db configuration and set password)

- Restart apache2
 - sudo systemctl restart apache2
- Check phpmyadmin
- Open a browser
 - http://localhost/phpmyadmin

STEPS



```

Activities Terminal Sep 28 22:12
sona@sona-VirtualBox: ~/Desktop
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

sona@sona-VirtualBox:~/Desktop$ sudo apt update
[sudo] password for sona:
Sorry, try again.
[sudo] password for sona:
Err:1 http://security.ubuntu.com/ubuntu focal-security InRelease
  Temporary failure resolving 'security.ubuntu.com'
Err:2 http://in.archive.ubuntu.com/ubuntu focal InRelease
  Temporary failure resolving 'in.archive.ubuntu.com'
Err:3 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease
  Temporary failure resolving 'in.archive.ubuntu.com'
Err:4 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease
  Temporary failure resolving 'in.archive.ubuntu.com'
Reading package lists... Done
Building dependency tree
Reading state information... Done
76 packages can be upgraded. Run 'apt list --upgradable' to see them.
W: Failed to fetch http://in.archive.ubuntu.com/ubuntu/dists/focal/InRelease  Temporary failure resolving 'in.archive.ubuntu.com'
W: Failed to fetch http://in.archive.ubuntu.com/ubuntu/dists/focal-updates/InRe lease  Temporary failure resolving 'in.archive.ubuntu.com'
W: Failed to fetch http://in.archive.ubuntu.com/ubuntu/dists/focal-backports/In Release  Temporary failure resolving 'in.archive.ubuntu.com'
W: Failed to fetch http://security.ubuntu.com/ubuntu/dists/focal-security/InRel ease  Temporary failure resolving 'security.ubuntu.com'
W: Some index files failed to download. They have been ignored, or old ones used instead.

```

Activities Terminal Sep 28 22:58

```
sona@sona-VirtualBox:~/Desktop$ sudo apt install apache2
[sudo] password for sona:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libapr1 libaprutil1
  libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.2-0
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils libapr1 libaprutil1
  libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.2-0
0 upgraded, 9 newly installed, 0 to remove and 76 not upgraded.
Need to get 1,819 kB of archives.
After this operation, 7,942 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libapr1 amd64 1.6.5-1ubuntu1 [91.4 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libaprutil1 amd64 1.6.1-4ubuntu2 [84.7 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libaprutil1-dbd-sqlite3 amd64 1.6.1-4ubuntu2 [10.5 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libaprutil1-ldap amd64 1.6.1-4ubuntu2 [8,736 B]
Get:5 http://in.archive.ubuntu.com/ubuntu focal/main amd64 liblua5.2-0 amd64 5.2.4-1.1build3 [106 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 apache2-bin amd64 2.4.41-4ubuntu3.5 [1,180 kB]
```

```
sona@sona-VirtualBox:~/Desktop$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor pres>
   Active: active (running) since Tue 2021-09-28 22:57:02 IST; 3min 35s ago
     Docs: https://httpd.apache.org/docs/2.4/
 Main PID: 3548 (apache2)
    Tasks: 55 (limit: 1409)
   Memory: 4.6M
      CGroup: /system.slice/apache2.service
              └─3548 /usr/sbin/apache2 -k start
                  ├─3550 /usr/sbin/apache2 -k start
                  ├─3551 /usr/sbin/apache2 -k start

Sep 28 22:57:02 sona-VirtualBox systemd[1]: Starting The Apache HTTP Server...
Sep 28 22:57:02 sona-VirtualBox apachectl[3547]: AH00558: apache2: Could not r>
Sep 28 22:57:02 sona-VirtualBox systemd[1]: Started The Apache HTTP Server.
lines 1-15/15 (END)
^C
sona@sona-VirtualBox:~/Desktop$
```



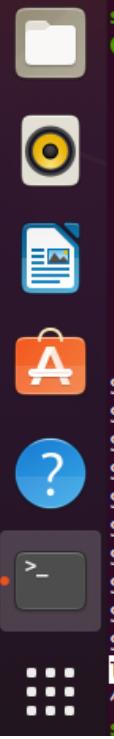
Activities Terminal Sep 28 23:12

```
sona@sona-VirtualBox:~/Desktop$ sudo apt install mariadb-server mariadb-client
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
galera-3 gawk libaio1 libcgi-fast-perl libcgi-pm-perl
libconfig-inifiles-perl libdbd-mysql-perl libdbi-perl libfcgi-perl
libhtml-template-perl libreadline5 libsigsegv2 libsnappy1v5
libterm-readkey-perl mariadb-client-10.3 mariadb-client-core-10.3
mariadb-common mariadb-server-10.3 mariadb-server-core-10.3 socat
Suggested packages:
gawk-doc libclone-perl libmldb-perl libnet-daemon-perl
libsq1-statement-perl libipc-sharedcache-perl mailx mariadb-test tinyca
The following NEW packages will be installed:
galera-3 gawk libaio1 libcgi-fast-perl libcgi-pm-perl
libconfig-inifiles-perl libdbd-mysql-perl libdbi-perl libfcgi-perl
libhtml-template-perl libreadline5 libsigsegv2 libsnappy1v5
libterm-readkey-perl mariadb-client mariadb-client-10.3
mariadb-client-core-10.3 mariadb-common mariadb-server mariadb-server-10.3
mariadb-server-core-10.3 socat
0 upgraded, 22 newly installed, 0 to remove and 76 not upgraded.
Need to get 20.2 MB of archives.
After this operation, 167 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libsigsegv2 amd64 2.12-2 [13.9 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal/main amd64 gawk amd64 1:5.0.1+dfsg-1 [418 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 mariadb-
```



```
sona@sona-VirtualBox:~/Desktop$ sudo systemctl status mysql
● mariadb.service - MariADB 10.3.31 database server
    Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor pres>
    Active: active (running) since Tue 2021-09-28 23:09:27 IST; 4min 25s ago
      Docs: man:mysqld(8)
             https://mariadb.com/kb/en/library/systemd/
   Main PID: 6018 (mysqld)
     Status: "Taking your SQL requests now..."
        Tasks: 31 (limit: 1409)
       Memory: 68.8M
      CGroup: /system.slice/mariadb.service
              └─6018 /usr/sbin/mysqld

Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: Processing data>
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: information_sch>
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: mysql
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: performance_sch>
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: Phase 6/7: Chec>
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: Processing data>
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: information_sch>
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: performance_sch>
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: Phase 7/7: Runn>
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: OK
```



```
sona@sona-VirtualBox:~/Desktop$ sudo systemctl start mysql
sona@sona-VirtualBox:~/Desktop$ sudo systemctl status mysql
● mariadb.service - MariADB 10.3.31 database server
    Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor pres>
    Active: active (running) since Tue 2021-09-28 23:09:27 IST; 8min ago
      Docs: man:mysqld(8)
             https://mariadb.com/kb/en/library/systemd/
   Main PID: 6018 (mysqld)
     Status: "Taking your SQL requests now..."
        Tasks: 30 (limit: 1409)
       Memory: 68.8M
      CGroup: /system.slice/mariadb.service
              └─6018 /usr/sbin/mysqld

Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: Processing data>
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: information_sch>
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: mysql
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: performance_sch>
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: Phase 6/7: Chec>
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: Processing data>
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: information_sch>
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: performance_sch>
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: Phase 7/7: Runn>
Sep 28 23:09:30 sona-VirtualBox /etc/mysql/debian-start[6056]: OK
lines 1-22/22 (END)
^C
sona@sona-VirtualBox:~/Desktop$
```

Activities Terminal Sep 28 23:25

```
sona@sona-VirtualBox:~/Desktop$ sudo apt install php libapache2-mod-php php-oc  
ache php-cli php-gd php-curl php-mysql  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Note, selecting 'php7.4-opcache' instead of 'php-opcache'  
The following additional packages will be installed:  
  libapache2-mod-php7.4 php-common php7.4 php7.4-cli php7.4-common  
  php7.4-curl php7.4-gd php7.4-json php7.4-mysql php7.4-readline  
Suggested packages:  
  php-pear  
The following NEW packages will be installed:  
  libapache2-mod-php libapache2-mod-php7.4 php php-cli php-common php-curl  
  php-gd php-mysql php7.4 php7.4-cli php7.4-common php7.4-curl php7.4-gd  
  php7.4-json php7.4-mysql php7.4-opcache php7.4-readline  
0 upgraded, 17 newly installed, 0 to remove and 76 not upgraded.  
Need to get 4,209 kB of archives.  
After this operation, 18.8 MB of additional disk space will be used.  
Do you want to continue? [Y/n] y  
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 php-common all 2:75  
[11.9 kB]  
Get:2 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 php7.4-commo  
n amd64 7.4.3-4ubuntu2.6 [980 kB]  
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 php7.4-json  
amd64 7.4.3-4ubuntu2.6 [19.2 kB]  
Get:4 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 php7.4-opcac  
he amd64 7.4.3-4ubuntu2.6 [198 kB]  
Get:5 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 php7.4-readl  
ine amd64 7.4.3-4ubuntu2.6 [12.6 kB]
```

Activities Terminal Sep 28 23:46

```
sona@sona-VirtualBox:~/Desktop$ sudo apt install php libapache2-mod-php php-oc  
ache php-cli php-gd php-curl php-mysql  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Note, selecting 'php7.4-opcache' instead of 'php-opcache'  
The following additional packages will be installed:  
  libapache2-mod-php7.4 php-common php7.4-cli php7.4-common  
  php7.4-curl php7.4-gd php7.4-json php7.4-mysql php7.4-readline  
Suggested packages:  
  php-pear  
The following NEW packages will be installed:  
  libapache2-mod-php libapache2-mod-php7.4 php php-cli php-common php-curl  
  php-gd php-mysql php7.4 php7.4-cli php7.4-common php7.4-curl php7.4-gd  
  php7.4-json php7.4-mysql php7.4-opcache php7.4-readline  
0 upgraded, 17 newly installed, 0 to remove and 76 not upgraded.  
Need to get 4,209 kB of archives.  
After this operation, 18.8 MB of additional disk space will be used.  
Do you want to continue? [Y/n] y  
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 php-common all 2:75  
[11.9 kB]  
Get:2 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 php7.4-commo  
n amd64 7.4.3-4ubuntu2.6 [980 kB]  
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 php7.4-json  
amd64 7.4.3-4ubuntu2.6 [19.2 kB]  
Get:4 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 php7.4-opcac  
he amd64 7.4.3-4ubuntu2.6 [198 kB]  
G Show Applications archive.ubuntu.com/ubuntu focal-updates/main amd64 php7.4-readl  
ine amd64 7.4.3-4ubuntu2.6 [12.6 kB]
```

ASSIGNMENT ON ANSIBLE INSTALLATION

Submitted by

Sona joseph

RollNo:23

1. sudo apt-get install ansible

Activities Terminal Sep 29 17:02

```
sona@sona-VirtualBox:~/Desktop$ sudo apt-get install ansible
[sudo] password for sona:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  ieee-data python3-argcomplete python3-crypto python3-distutils
  python3-dnspython python3-jinja2 python3-jmespath python3-kerberos
  python3-libcloud python3-netaddr python3-ntlm-auth
  python3-requests-kerberos python3-requests-ntlm python3-selinux
  python3-winrm python3-xmldict
Suggested packages:
  cowsay sshpass python-jinja2-doc ipython3 python-netaddr-docs
The following NEW packages will be installed:
  ansible ieee-data python3-argcomplete python3-crypto python3-distutils
  python3-dnspython python3-jinja2 python3-jmespath python3-kerberos
  python3-libcloud python3-netaddr python3-ntlm-auth
  python3-requests-kerberos python3-requests-ntlm python3-selinux
  python3-winrm python3-xmldict
0 upgraded, 17 newly installed, 0 to remove and 76 not upgraded.
Need to get 9,865 kB of archives.
After this operation, 92.0 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 python3-jinja2 all 2
.10.1-2 [95.5 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal/main amd64 python3-crypto amd64
  2.6.1-13ubuntu2 [237 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 python3-dist
  utils all 3.8.10-0ubuntu1~20.04 [141 kB]
```

2. ansible --version

```
sona@sona-VirtualBox:~/Desktop$ ansible --version
ansible 2.9.6
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/home/sona/.ansible/plugins/modules', '/usr
  /share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  executable location = /usr/bin/ansible
  python version = 3.8.10 (default, Jun  2 2021, 10:49:15) [GCC 9.4.0]
sona@sona-VirtualBox:~/Desktop$
```


ANALYSING NETWORK PACKET STREAM USING TCPDUMP

Submitted by

Sona joseph

RMCA b batch

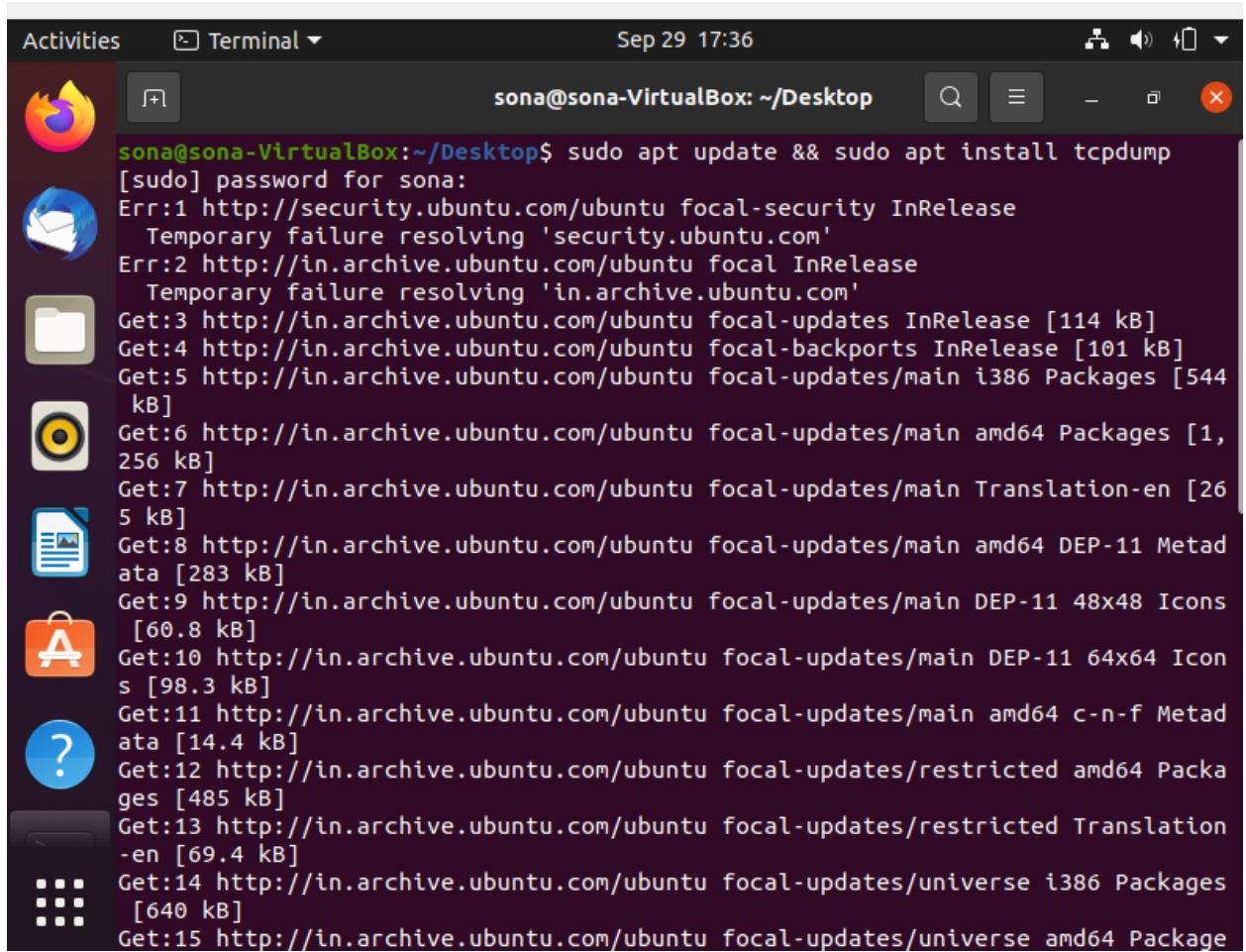
Roll No : 23

TCPDUMP

Tcpdump Installation

- ◎ On Debian based distributions tcpdump can be installed with the APT command :

```
#sudo apt update && sudo apt install tcpdump
```



```
Activities Terminal Sep 29 17:36
sona@sona-VirtualBox: ~/Desktop
sona@sona-VirtualBox:~/Desktop$ sudo apt update && sudo apt install tcpdump
[sudo] password for sona:
Err:1 http://security.ubuntu.com/ubuntu focal-security InRelease
  Temporary failure resolving 'security.ubuntu.com'
Err:2 http://in.archive.ubuntu.com/ubuntu focal InRelease
  Temporary failure resolving 'in.archive.ubuntu.com'
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease [101 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu focal-updates/main i386 Packages [544 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [1,256 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu focal-updates/main Translation-en [265 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 DEP-11 Metadata [283 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu focal-updates/main DEP-11 48x48 Icons [60.8 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu focal-updates/main DEP-11 64x64 Icons [98.3 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 c-n-f Metadata [14.4 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [485 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu focal-updates/restricted Translation-en [69.4 kB]
Get:14 http://in.archive.ubuntu.com/ubuntu focal-updates/universe i386 Packages [640 kB]
Get:15 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages
```

To invoke `tcpdump` without any options and filters:

- **`sudo tcpdump`**

```
sona@sona-VirtualBox: ~/Desktop$ sudo tcpdump
[sudo] password for sona:
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
21:01:08.772546 IP6 sona-VirtualBox > ff02::16: HBH ICMP6, multicast listener report v2, 2 group record(s), length 48
21:01:08.778193 IP 0.0.0.0.bootpc > 255.255.255.255.bootps: BOOTP/DHCP, Request from 08:00:27:ca:c5:40 (oui Unknown), length 299
21:01:08.778626 IP _gateway.bootps > sona-VirtualBox.bootpc: BOOTP/DHCP, Reply, length 548
21:01:08.778678 ARP, Request who-has _gateway tell sona-VirtualBox, length 28
21:01:08.779023 ARP, Reply _gateway is-at 52:54:00:12:35:02 (oui Unknown), length 46
21:01:08.779035 IP sona-VirtualBox > _gateway: ICMP sona-VirtualBox udp port bootpc unreachable, length 556
21:01:09.496216 IP6 sona-VirtualBox > ff02::16: HBH ICMP6, multicast listener report v2, 2 group record(s), length 48
21:01:11.942977 IP sona-VirtualBox.33340 > 192.168.43.1.domain: 59035+ [1au] A? connectivity-check.ubuntu.com. (58)
21:01:11.945117 IP sona-VirtualBox.36920 > 192.168.43.1.domain: 42947+ [1au] PTR? 1.43.168.192.in-addr.arpa. (54)
21:01:11.947233 IP sona-VirtualBox.49850 > 192.168.43.1.domain: 56745+ [1au] AA? connectivity-check.ubuntu.com. (58)
21:01:12.609131 IP6 sona-VirtualBox.mdns > ff02::fb.mdns: 0 [2q] PTR (QM)? _ipp.s._tcp.local. PTR (QM)? _ipp._tcp.local. (45)
21:01:12.768589 IP sona-VirtualBox.mdns > 224.0.0.251.mdns: 0 [2q] PTR (QM)? _ipp._tcp.local. PTR (QM)? _ipp._tcp.local. (45)
21:01:13.387124 IP 192.168.43.1.domain > sona-VirtualBox.33340: 59035 3/0/1 A 34.122.121.32, A 35.224.170.84, A 35.232.111.17 (106)
```

```
er, length 48
21:01:23.181973 IP 192.168.43.1.domain > sona-VirtualBox.57810: 15259 1/0/0 PTR
golem.canonical.com. (77)
21:01:53.698734 IP sona-VirtualBox.49623 > golem.canonical.com.ntp: NTPv4, Client, length 48
21:01:54.169757 IP golem.canonical.com.ntp > sona-VirtualBox.49623: NTPv4, Server, length 48
21:02:58.198716 IP sona-VirtualBox.51065 > golem.canonical.com.ntp: NTPv4, Client, length 48
21:02:58.495343 IP golem.canonical.com.ntp > sona-VirtualBox.51065: NTPv4, Server, length 48
21:03:03.360226 ARP, Request who-has _gateway tell sona-VirtualBox, length 28
21:03:03.360556 ARP, Reply _gateway is-at 52:54:00:12:35:02 (oui Unknown), length 46
21:03:30.698522 IP sona-VirtualBox.58728 > golem.canonical.com.ntp: NTPv4, Client, length 48
21:03:31.105729 IP golem.canonical.com.ntp > sona-VirtualBox.58728: NTPv4, Server, length 48
^C
61 packets captured
61 packets received by filter
0 packets dropped by kernel
sona@sona-VirtualBox:~/Desktop$
```

\$ sudo tcpdump -i any

```
sona@sona-VirtualBox: ~/Desktop
om.http: Flags [.], ack 1, win 64240, length 0
21:11:16.285477 IP sona-VirtualBox.44942 > 84.170.224.35.bc.googleusercontent.c
om.http: Flags [P.], seq 1:88, ack 1, win 64240, length 87: HTTP: GET / HTTP/1.
1
21:11:17.509615 IP 84.170.224.35.bc.googleusercontent.com.http > sona-VirtualBo
x.44942: Flags [P.], seq 1:149, ack 88, win 65535, length 148: HTTP: HTTP/1.1 2
04 No Content
21:11:17.509657 IP sona-VirtualBox.44942 > 84.170.224.35.bc.googleusercontent.c
om.http: Flags [.], ack 149, win 64092, length 0
21:11:17.510500 IP sona-VirtualBox.44942 > 84.170.224.35.bc.googleusercontent.c
om.http: Flags [F.], seq 88, ack 149, win 64092, length 0
21:11:17.511078 IP 84.170.224.35.bc.googleusercontent.com.http > sona-VirtualBo
x.44942: Flags [.], ack 89, win 65535, length 0
21:11:17.512719 IP 84.170.224.35.bc.googleusercontent.com.http > sona-VirtualBo
x.44942: Flags [F.], seq 149, ack 89, win 65535, length 0
21:11:17.512810 IP sona-VirtualBox.44942 > 84.170.224.35.bc.googleusercontent.c
om.http: Flags [.], ack 150, win 64092, length 0
21:12:04.948562 IP sona-VirtualBox.48939 > golem.canonical.com.ntp: NTPv4, Cli
ent, length 48
21:12:05.360774 IP golem.canonical.com.ntp > sona-VirtualBox.48939: NTPv4, Serv
er, length 48
21:12:10.176164 ARP, Request who-has _gateway tell sona-VirtualBox, length 28
21:12:10.176497 ARP, Reply _gateway is-at 52:54:00:12:35:02 (oui Unknown), leng
th 46
^C
50 packets captured
82 packets received by filter
20 packets dropped by kernel
sona@sona-VirtualBox:~/Desktop$
```

tcpdump -D

```
sona@sona-VirtualBox:~/Desktop$ 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]
sona@sona-VirtualBox:~/Desktop$
```

To capture packets flowing through a specific interface, use the **-i** flag
with the

interface name. Without the -i interface tcpdump will pick up the first network

interface it comes across.

```
# tcpdump -i enp2s0
```

```
sona@sona-VirtualBox:~/Desktop$ sudo tcpdump -i enp0s3
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
21:16:23.698692 IP sona-VirtualBox.36934 > golem.canonical.com.ntp: NTPv4, Client, length 48
21:16:23.702819 IP sona-VirtualBox.46950 > 192.168.43.1.domain: 37405+ PTR? 15.2.0.10.in-addr.arpa. (40)
21:16:23.708132 IP 192.168.43.1.domain > sona-VirtualBox.46950: 37405 NXDomain 0/0/0 (40)
21:16:23.710663 IP sona-VirtualBox.59229 > 192.168.43.1.domain: 2441+ PTR? 1.43.168.192.in-addr.arpa. (43)
21:16:23.713578 IP 192.168.43.1.domain > sona-VirtualBox.59229: 2441 NXDomain 0/0/0 (43)
21:16:23.929347 IP golem.canonical.com.ntp > sona-VirtualBox.36934: NTPv4, Server, length 48
^C
6 packets captured
6 packets received by filter
0 packets dropped by kernel
sona@sona-VirtualBox:~/Desktop$
```

To capture only a set of lines, say 5, use the -c flag:

```
#tcpdump -c 5
```

```
sona@sona-VirtualBox:~/Desktop$ sudo tcpdump -c 5
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
21:18:01.198557 IP sona-VirtualBox.53064 > golem.canonical.com.ntp: NTPv4, Client, length 48
21:18:01.201684 IP sona-VirtualBox.35716 > 192.168.43.1.domain: 53399+ PTR? 15.2.0.10.in-addr.arpa. (40)
21:18:01.204756 IP 192.168.43.1.domain > sona-VirtualBox.35716: 53399 NXDomain 0/0/0 (40)
21:18:01.206819 IP sona-VirtualBox.60607 > 192.168.43.1.domain: 2711+ PTR? 1.43.168.192.in-addr.arpa. (43)
21:18:01.209695 IP 192.168.43.1.domain > sona-VirtualBox.60607: 2711 NXDomain 0/0/0 (43)
5 packets captured
5 packets received by filter
0 packets dropped by kernel
sona@sona-VirtualBox:~/Desktop$
```

port filter

Use port filter to view packets arriving at a specific port:

```
#sudo tcpdump -i enp2s0 -c 5 port 80
```

```
sona@sona-VirtualBox:~/Desktop$ sudo tcpdump -i enp0s3 -c 5 port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
^C
0 packets captured
0 packets received by filter
0 packets dropped by kernel
sona@sona-VirtualBox:~/Desktop$
```

host filter

To capture all packets arriving at or leaving from the host with IP address of 10.0.2.15:

```
# tcpdump host 10.0.2.15
```

```
sona@sona-VirtualBox:~/Desktop$ sudo tcpdump host 10.0.2.15
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
^C
0 packets captured
0 packets received by filter
0 packets dropped by kernel
```

To capture packets of a specific protocol type, for example, icmp, on eth1 interface:

```
# tcpdump -i eth1 icmp
```

```
sudo tcpdump -n net 10.1
```

```
sona@sona-VirtualBox:~/Desktop$ sudo tcpdump -n net 10.10
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
```

Saving packet headers to a file

Since the output of tcpdump can scroll past the screen quite fast, you can store packet headers to a file with the -w flag. The files to save the output use

pcap format and have an extension of .pcap.

PCAP stands for packet capture.

The following command saves 10 lines of output on the eth1 interface to icmp.pcap.

```
# tcpdump -i eth1 -c 10 -w icmp.pcap
```

You can read this file with -r flag:

```
tcpdump -r icmp.pcap
```

Viewing packet details

So far we have only seen the packet headers, to view packet contents use -A option. This prints the packet contents in ASCII, which can be of help in network troubleshooting. Also -X flag can be used to display output in hex format. This may not be of much help if the connection is encrypted.

```
# tcpdump -c10 -i eth1 -n -A port 80
```

ASSIGNMENT ON SHELL SCRIPTING

Submitted by
Sona Joseph
RMCA b batch
RollNo:23

- 1.** Write a shell script to ask your name, and college name and print it on the screen.

```
echo "enter details and view"
echo enter your name
read name
echo enter your college name
read c
clear
echo Details you entered
echo Name:$name
echo College:$c
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 1.sh
enter details and view
enter your name
sreya
enter your college name
amal jyothi college

Details you entered
Name:sreya
College:amal jyothi college
user@user-VirtualBox:~$
```

2. Write a shell script to set a value for a variable and display it on command line interface.

```
echo "Display value of a variable"
a=50
echo $a
```

OUTPUT:

```
user@user-VirtualBox: ~$ bash 2.sh
Display value of a variable
50
```

3. Write a shell script to perform addition, subtraction, multiplication, division with two numbers that is accepted from user.

```
echo enter a number
read a
echo enter another number
read b
echo enter operation
echo "\n1.addition \n2.subtraction \n3.multiplication \n4.division"
read op
case "$op" in
"1") echo "a+b=$((a+b));;
"2") echo "a-b=$((a-b));;
"3") echo "a*b=$((a*b));;
"4") echo "a/b=$((a/b));;
esac
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 3.sh
enter a number
7
enter another number
8
enter operation
\n1.addition \n2.subtraction \n3.multiplication \n4.division
2
a-b=-1
```

4. Write a shell script to check the value of a given number and display whether the number is found or not.

```
echo enter a number
read a
if [ $a -eq 10 ];
then
echo "number found"
else
echo "not found"
fi
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 4.sh
enter a number
9
not found
```

5. Write a shell script to display current date, calendar.

```
echo "Today is $(date)"
echo "calender:"
cal
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 5.sh
Today is Saturday 02 October 2021 05:53:45 PM IST
calender:
      October 2021
Su Mo Tu We Th Fr Sa
          1  2
 3  4  5  6  7  8  9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
```

6. Write a shell script to check a number is even or odd. #!/bin/bash

```
echo enter a number
read n
x=$(( $n % 2 ))
if [ $x -eq 0 ];
then
echo "number is even"
else
echo "number is odd"
fi
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 6.sh
enter a number
4
number is even
```

7. Write a shell script to check a number is greater than, less than or equal to another number.

```
echo enter first number
read a
echo enter second number
read b
if [ $a -gt $b ];
then
```

```
echo "$a is larger"
elif [ $b -gt $a ];
then
echo "$b is larger"
else
echo "both are equal"
fi
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 7.sh
enter first number
54
enter second number
34
54 is larger
```

8. Write a shell script to find the sum of first 10 numbers.

```
s=0
for ((i=0;i<=10;i++))
do
s=`expr $s + $i`
done
echo "sum of first 10 numbers=$s"
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 8.sh
sum of first 10 numbers=55
```

9. Write a shell script to find the sum, the average and the product of the four integers entered.

```
echo please enter your first number
read a
echo please enter your second number
read b
echo please enter your third number
read c
echo please enter your fourth number
read d
sum=$((a + b + c + d))
prod=$((a * b * c * d))
avg=$(echo $sum/4 | bc -l)
```

```
echo "the sum is:$sum
echo "the average is:$avg
echo "the product is:$prod
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 9.sh
please enter your first number
1
please enter your second number
2
please enter your third number
3
please enter your fourth number
4
the sum is:10
the average is:2.50000000000000000000000000
the product is:24
```

10. Write a shell script to find the smallest of three numbers.

```
echo enter first number
read a
echo enter second number
read b
echo enter third number
read c
if [ $a -lt $b ];
then
if [ $a -lt $c ];
then
echo "$a is smallest"
fi
elif [ $b -lt $c ];
then
echo "$b is smallest"
else
echo "$c is smallest";
fi
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 10.sh
enter first number
5
enter second number
2
enter third number
6
2 is smallest
```

11. Write a shell program to find factorial of given number.

```
echo enter a number
read n
f=1
for ((i=2;i<=n;i++))
do
f=$((f*i))
done
echo "factorial is $f"
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 11.sh
enter a number
5
factorial is 120
```

12. Write a shell program to check a number is palindrome or not.

```
echo enter a number
read n
rev=$(echo $n | rev)
if [ $n -eq $rev ];
then
echo "number is palindrome"
else
echo "number is not palindrome"
fi
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 12.sh
enter a number
1221
number is palindrome
```

13. Write a shell script to find the average of the numbers entered in command line.

```
echo enter size
read n
i=1
s=0
echo "enter numbers"
while [ $i -le $n ]
do
read num
s=$((s+num))
i=$((i+1))
done
avg=$(echo $s/$n | bc -l)
echo "average is $avg"
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 13.sh
enter size
5
enter numbers
6
7
8
9
4
average is 6.800000000000000000000000
```

14. Write a shell program to find the sum of all the digits in a number.

```
echo enter a number
read n
s=0
while [ $n -gt 0 ]
do
mod=$((n%10))
s=$((s+mod))
n=$((n/10))
done
echo "sum of digit is $s"
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 14.sh
enter a number
678
sum of digit is 21
```

15. Write a shell Script to check whether given year is leap year or not.

```
echo enter year
read y
a=$((y%4))
b=$((y%100))
c=$((y%400))
if [ $a -eq 0 -a $b -ne 0 -o $c -eq 0 ];
then
echo "$y is leap year"
else
echo "$y is leap year"
fi
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 15.sh
enter year
1994
1994 is leap year
```

ASSIGNMENT ON DOCKER INSTALLATION

Submitted by

Sona joseph

RollNo:23

RMCA b batch

Download Docker Desktop installer for Windows from
<https://desktop.docker.com/win/main/amd64/Docker%20Desktop%20Installer.exe>



Docker Desktop Installer

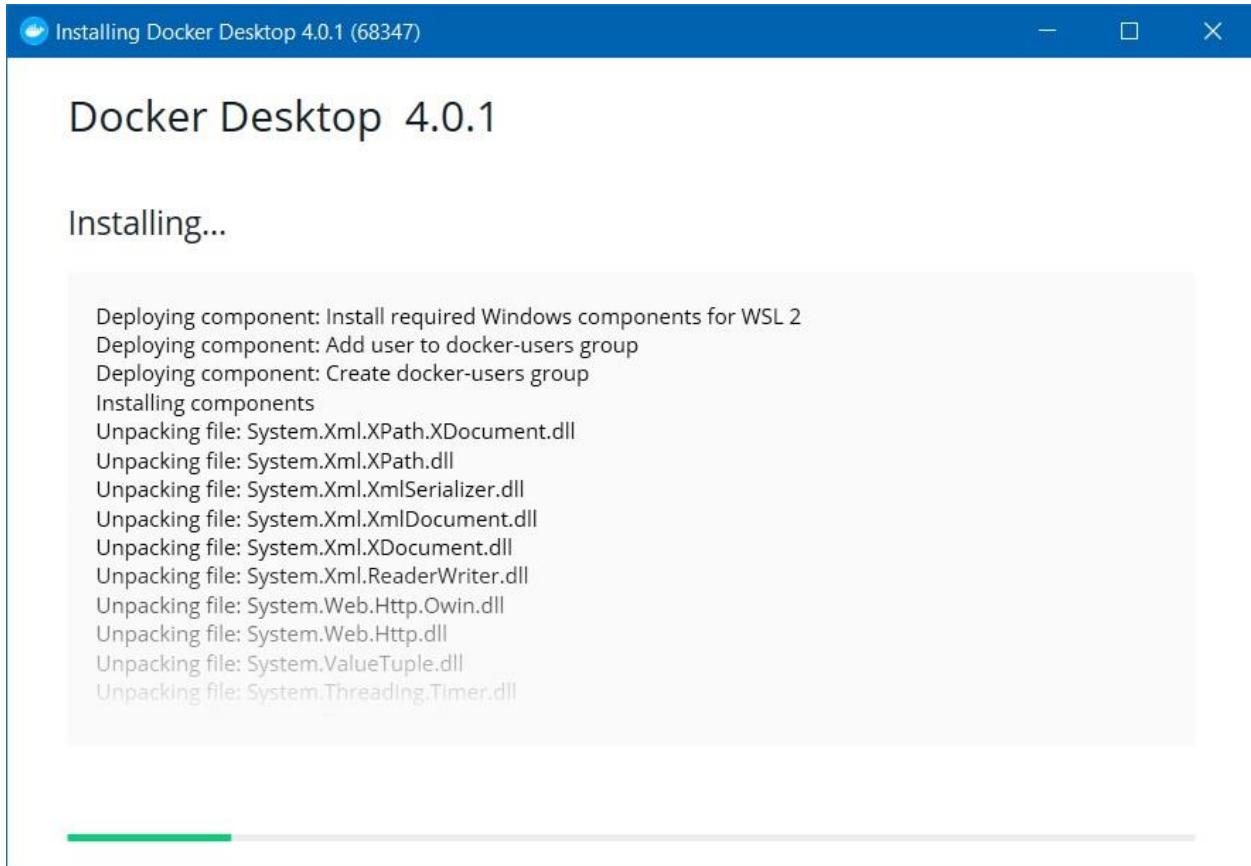
9/29/2021 2:51 PM

Application

522,896 KB

Step-II

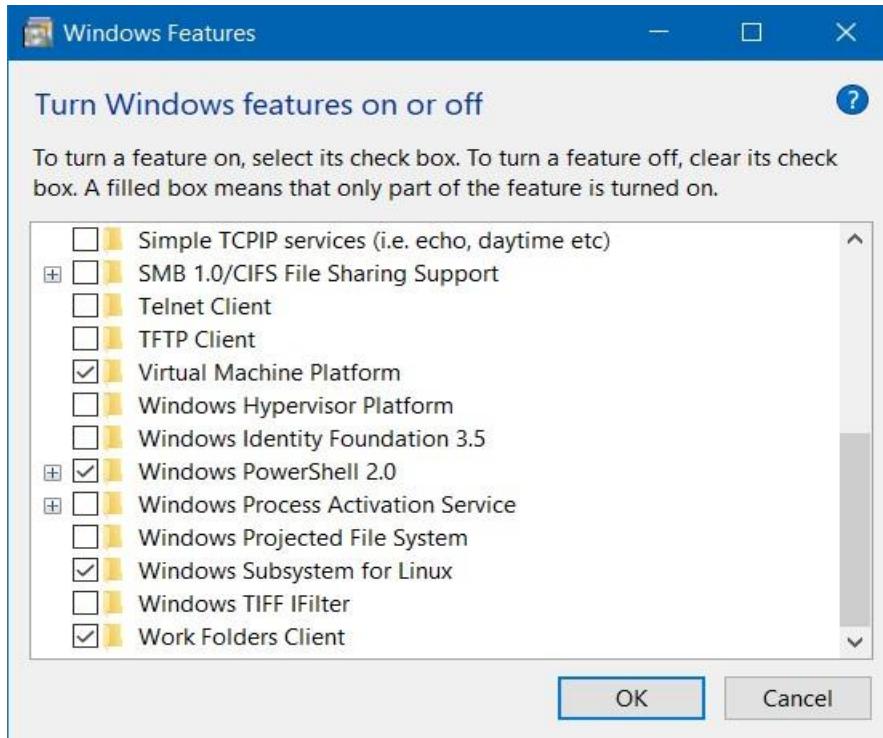
Open the .exe file and follow the steps after clicking install button.



Step-III

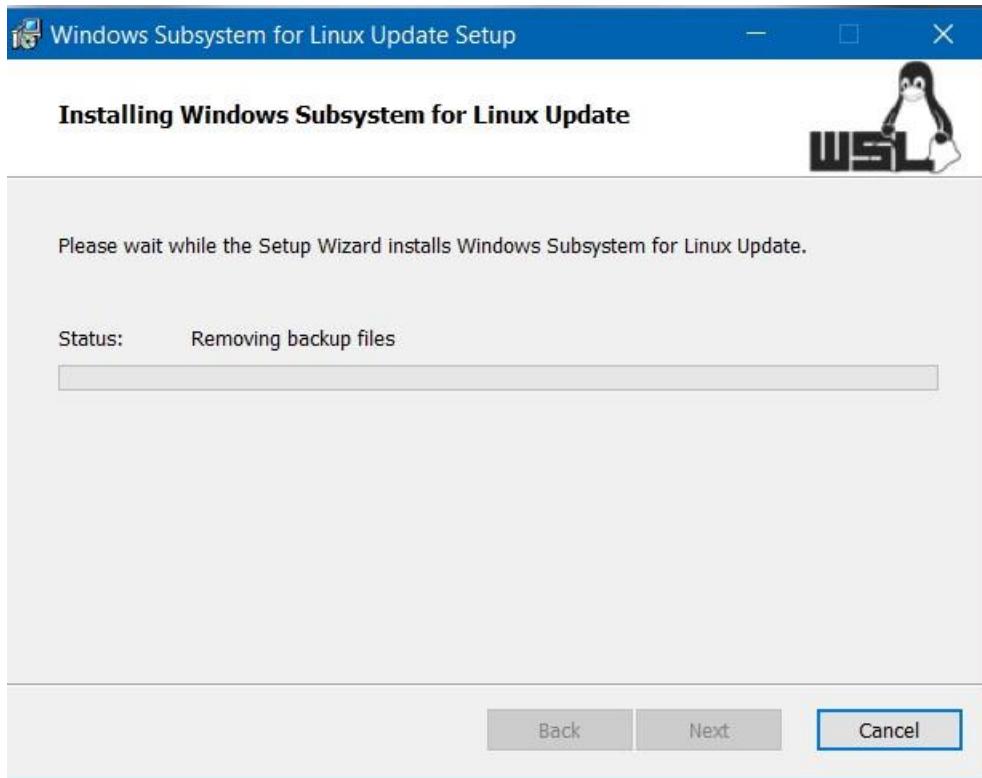
Once installed go to programs and features and click turn on windows features on or off

Scroll to the bottom and select windows subsystem for Linux



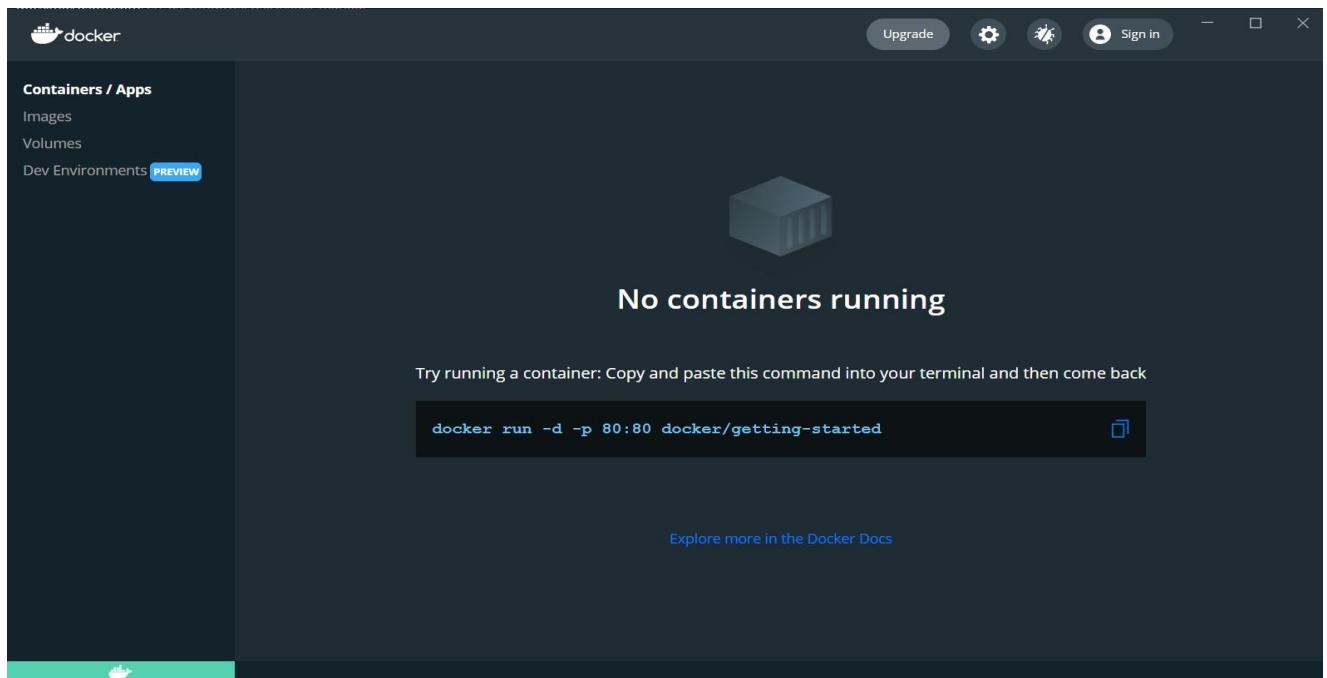
Step-IV

If any WSL 2 error occurs download windows subsystem for linux update package and install the .exe file, after the installation restart the windows device.



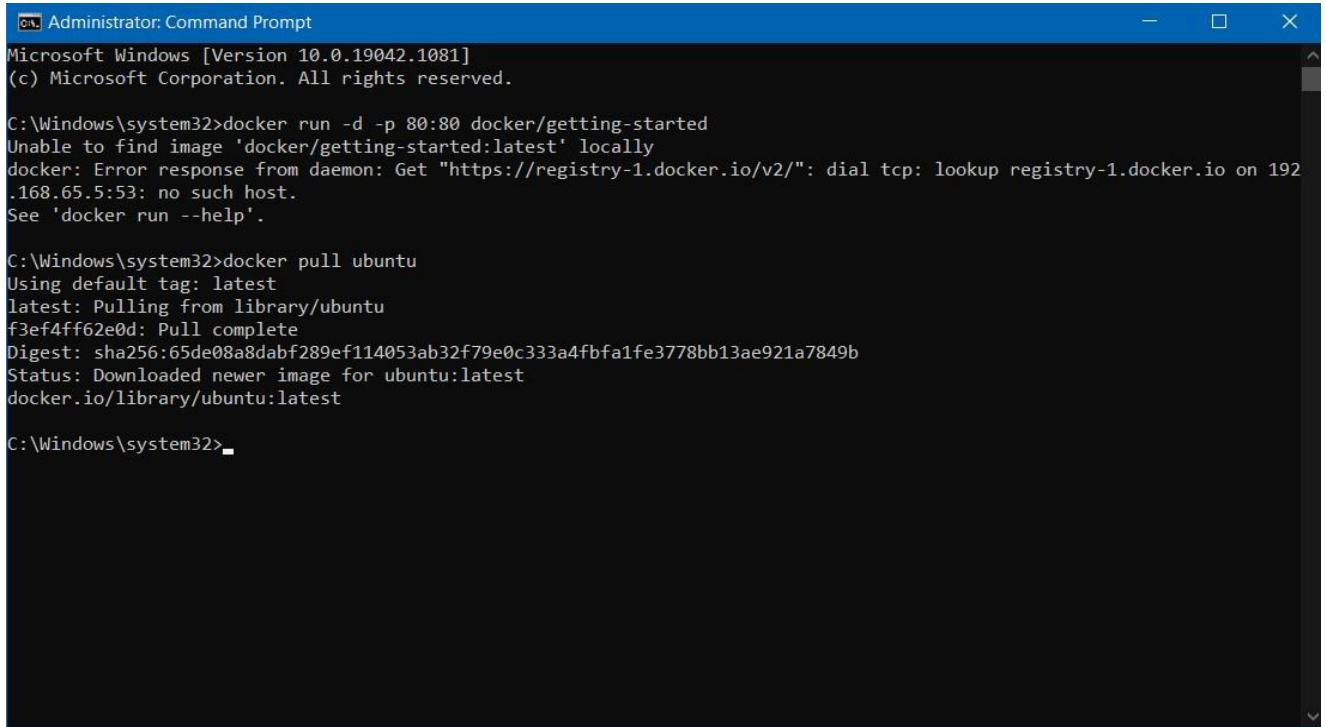
Step-V

Once installed, open the docker desktop app, and signin using the dockerID



Step-VI

Now pull any image from docker hub using the docker pull command in the command prompt (eg: docker pull ubuntu)



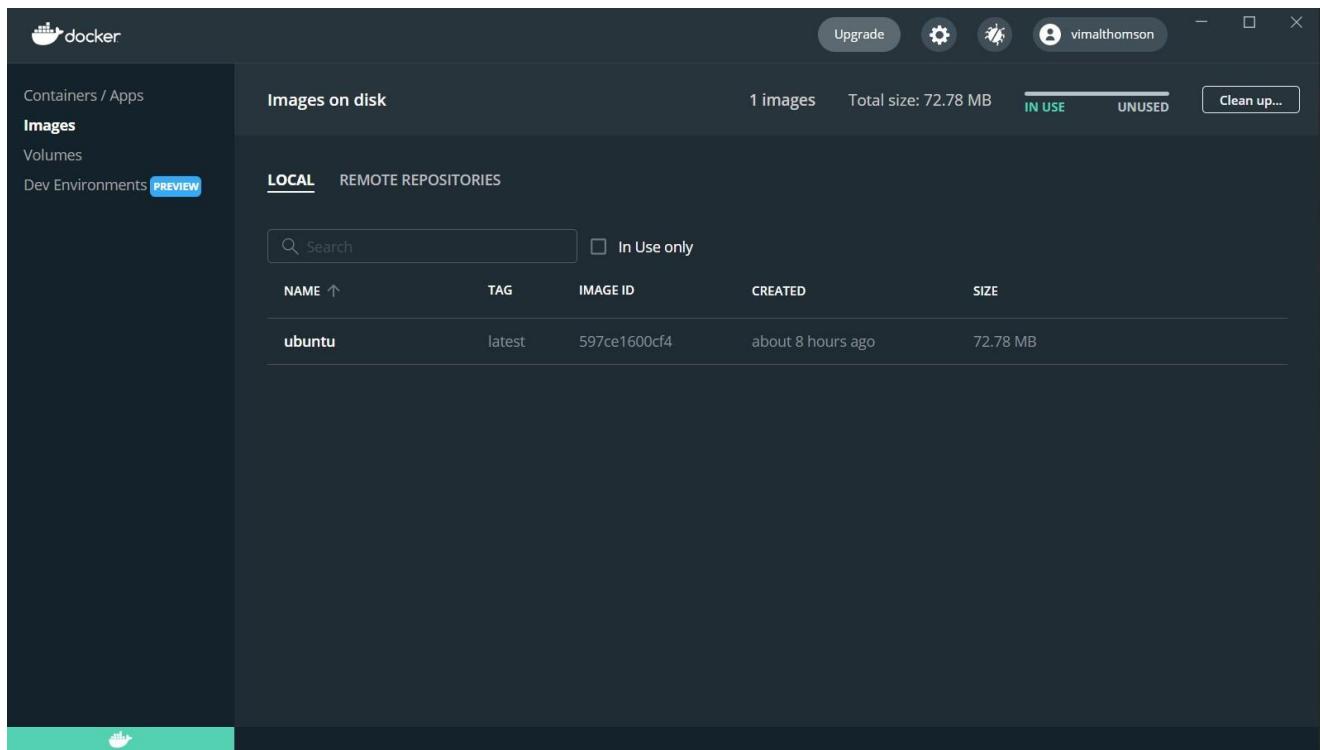
The screenshot shows an Administrator Command Prompt window on Windows 10. The command history is as follows:

```
C:\Windows\system32>docker run -d -p 80:80 docker/getting-started
Unable to find image 'docker/getting-started:latest' locally
docker: Error response from daemon: Get "https://registry-1.docker.io/v2/": dial tcp: lookup registry-1.docker.io on 192.168.65.5:53: no such host.
See 'docker run --help'.

C:\Windows\system32>docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
f3ef4ff62e0d: Pull complete
Digest: sha256:65de08a8dabf289ef114053ab32f79e0c333a4fbfa1fe3778bb13ae921a7849b
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest

C:\Windows\system32>
```

Now in the images tab an image of ubuntu will be displayed, we can run the ubuntu instance using the cli.

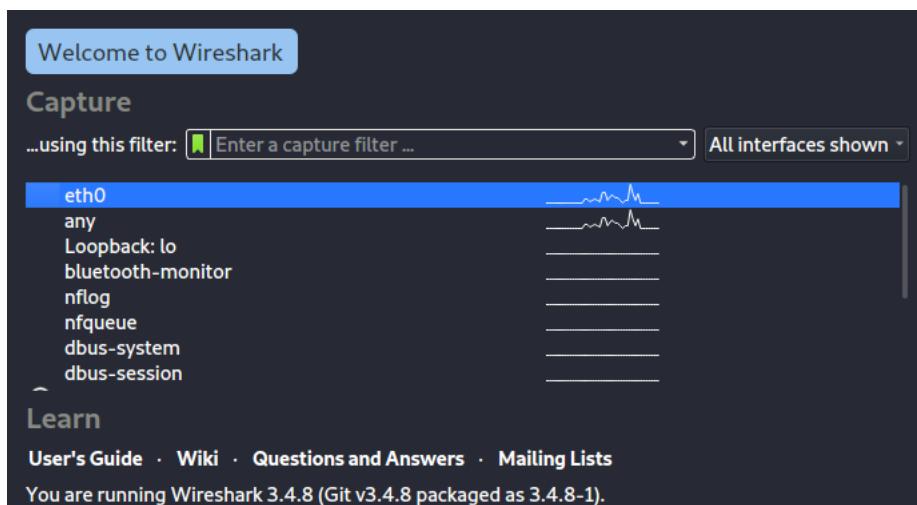


ASSIGNMENT ON ANALYSING PACKET STREAM USING NC AND WIRESHARK

sudo apt-get install wireshark

```
(reddevil㉿kali)-[~] $ sudo apt-get install wireshark
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
libbcg729-0 libbc-ares2 libgnutls30 liblua5.2-0 libminizip1 libqt5multimedia5 libqt5multimedia5-plugins
libqt5multimediasupports5 libqt5multimediacomponents5 libqt5printsupport5 libsmi2lqlib libspandsp2 libwireshark-data
libwireshark14 libwiretap11 libwsutil12 wireshark-common wireshark-qt
Suggested packages:
gnutls-bin snmp-mibs-downloader geoipupdate geoip-database geoip-database-extra libjs-leaflet
libjs-leaflet.markercluster wireshark-doc
The following NEW packages will be installed:
libbcg729-0 libbc-ares2 libgnutls30 liblua5.2-0 libminizip1 libqt5multimedia5 libqt5multimedia5-plugins
libqt5multimediasupports5 libqt5multimediacomponents5 libqt5printsupport5 libsmi2lqlib libspandsp2 libwireshark-data
libwireshark14 libwiretap11 libwsutil12 wireshark wireshark-common wireshark-qt syntax' error.
The following packages will be upgraded:
libgnutls30
1 upgraded, 18 newly installed, 0 to remove and 512 not upgraded.
Need to get 25.1 MB of archives.
After this operation, 124 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://ftp.harukasan.org/kali kali-rolling/main amd64 libgnutls30 amd64 3.7.2-2 [1,350 kB]
Get:2 http://ftp.harukasan.org/kali kali-rolling/main amd64 libbcg729-0 amd64 1.1.1-2 [33.1 kB]
Get:3 http://ftp.harukasan.org/kali kali-rolling/main amd64 libbc-ares2 amd64 1.17.2-1 [104 kB]
Get:4 http://ftp.harukasan.org/kali kali-rolling/main amd64 liblua5.2-0 amd64 5.2.4-1.1+b3 [108 kB]
Get:5 http://ftp.harukasan.org/kali kali-rolling/main amd64 libminizip1 amd64 1.1-8+b1 [20.4 kB]
Get:6 http://ftp.harukasan.org/kali kali-rolling/main amd64 libqt5multimedia5 amd64 5.15.2-3 [287 kB]
Get:7 http://ftp.harukasan.org/kali kali-rolling/main amd64 libqt5multimediacomponents5 amd64 5.15.2-3 [44.1 kB]
Get:8 http://ftp.harukasan.org/kali kali-rolling/main amd64 libqt5multimediasupports5 amd64 5.15.2-3 [101 kB]
Get:9 http://ftp.harukasan.org/kali kali-rolling/main amd64 libqt5multimedia5-plugins amd64 5.15.2-3 [156 kB]
Get:10 http://ftp.harukasan.org/kali kali-rolling/main amd64 libqt5printsupport5 amd64 5.15.2+dfsg-12 [231 kB]
Get:11 http://ftp.harukasan.org/kali kali-rolling/main amd64 libsmi2lqlib amd64 0.4.8+dfsg2-16 [123 kB]
Get:12 http://ftp.harukasan.org/kali kali-rolling/main amd64 libspandsp2 amd64 0.0.6+dfsg-2 [279 kB]
Get:13 http://ftp.harukasan.org/kali kali-rolling/main amd64 libwireshark-data all 3.4.8-1 [1,559 kB]
Get:14 http://ftp.harukasan.org/kali kali-rolling/main amd64 libwsutil12 amd64 3.4.8-1 [101 kB]
```

```
(reddevil㉿kali)-[~] $ sudo dpkg-reconfigure wireshark-common
```



No.	Time	Source	Destination	Protocol	Length	Info
29	7.990850823	10.0.2.15	142.250.76.34	TCP	54	583
30	7.991143356	10.0.2.15	142.250.205.226	TCP	54	472
31	13.238462786	10.0.2.15	52.84.6.56	TCP	54	[TCP]
32	13.238861425	52.84.6.56	10.0.2.15	TCP	60	[TCP]
33	17.334396657	10.0.2.15	142.250.67.67	TCP	54	[TCP]
34	17.335486185	142.250.67.67	10.0.2.15	TCP	60	[TCP]

Frame 1: 93 bytes on wire (744 bits), 93 bytes captured (744 bits) on interface
Ethernet II, Src: RealtekU_12:35:02 (52:54:00:12:35:02), Dst: PcsCompu_21:53:0e
Internet Protocol Version 4, Src: 142.250.195.67, Dst: 10.0.2.15
Transmission Control Protocol, Src Port: 443, Dst Port: 51518, Seq: 1, Ack: 1, L
Transport Layer Security

0000 08 00 27 21 53 0e 52 54 00 12 35 02 08 00 45 00 .!S RT .5..E.
0010 00 4f 67 9f 00 00 40 06 b4 bd 8e fa c3 43 0a 00 Og..@..C..
0020 02 0f 01 bb c9 3e 1e 48 f7 00 61 6a ac cb 50 18 ..>H ..aj..P..
0030 ff ff 53 0a 00 00 17 03 03 00 22 d1 62 6c 52 db .S .." blR..
0040 50 05 71 a9 36 46 9f b3 41 b1 c8 ad 11 c6 c3 d8 P..q..6F..A.....
0050 93 4d 05 55 a1 0b 5f dd a8 c9 8c bd d7 ..M.U..

● eth0: <live capture in progress> | Packets: 34 · Displayed: 34 (100.0%) | Profile: Default

Netcat

```
[reddevil㉿kali)-[~] ~ your stock trading and ...
$ nc -z -v 10.0.2.255 20-80
10.0.2.255: inverse host lookup failed: Unknown host
(UNKNOWN) [10.0.2.255] 80 (http) : Network is unreachable
(UNKNOWN) [10.0.2.255] 79 (finger) : Network is unreachable
(UNKNOWN) [10.0.2.255] 78 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 77 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 76 (?) : Network is unreachable e Quote
(UNKNOWN) [10.0.2.255] 75 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 74 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 73 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 72 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 71 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 70 (gopher) : Network is unreachable
(UNKNOWN) [10.0.2.255] 69 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 68 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 67 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 66 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 65 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 64 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 63 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 62 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 61 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 60 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 59 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 58 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 57 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 56 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 55 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 54 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 53 (domain) : Network is unreachable
(UNKNOWN) [10.0.2.255] 52 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 51 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 50 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 49 (tacacs) : Network is unreachable
(UNKNOWN) [10.0.2.255] 48 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 47 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 46 (?) : Network is unreachable
(UNKNOWN) [10.0.2.255] 45 (?) : Network is unreachable
```