
20MCA136 – NETWORKING & SYSTEM ADMINISTRATION LAB

RECORD

JULIA GEORGE

ROLL NO : 04

S2-REG-MCA-B

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.

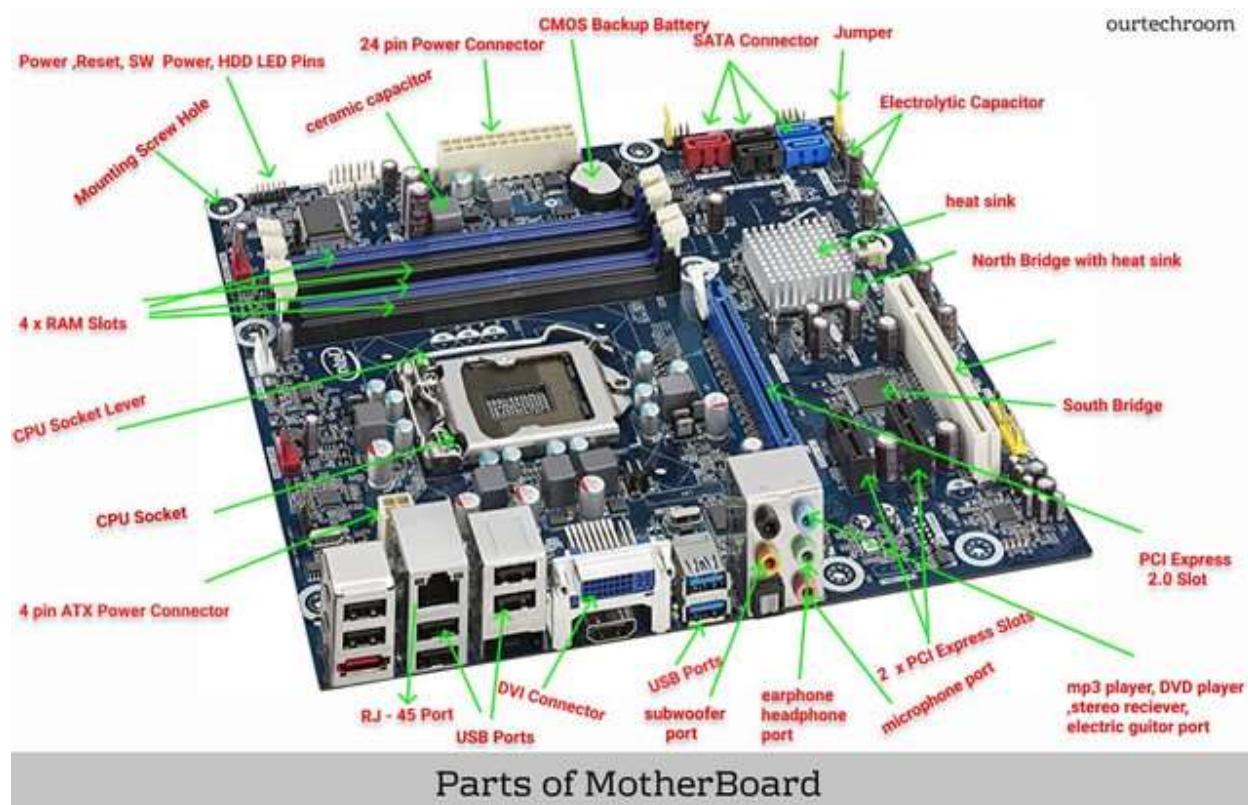
In smartphone: When you open the back cover of the smartphone, and screws up some pins then you will find your motherboard.

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

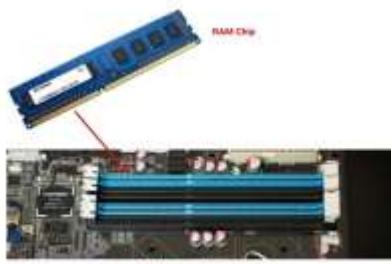
1) RAM chip and RAM Slot

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.

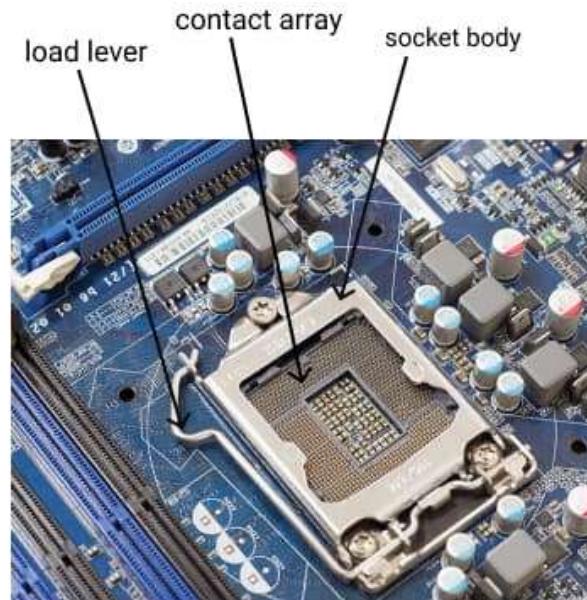


2) CPU Chip and Socket

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



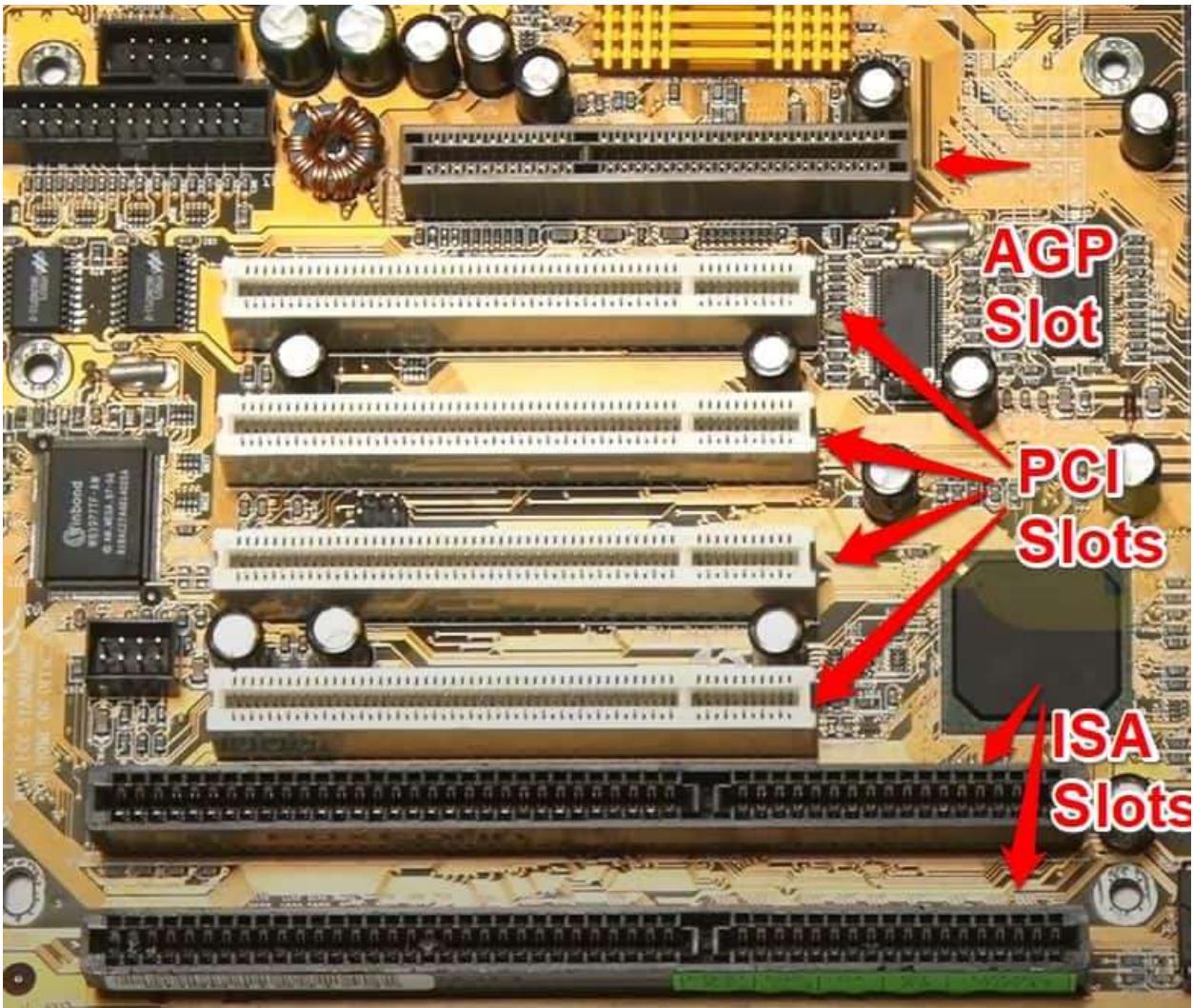
PCI Chip



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**.

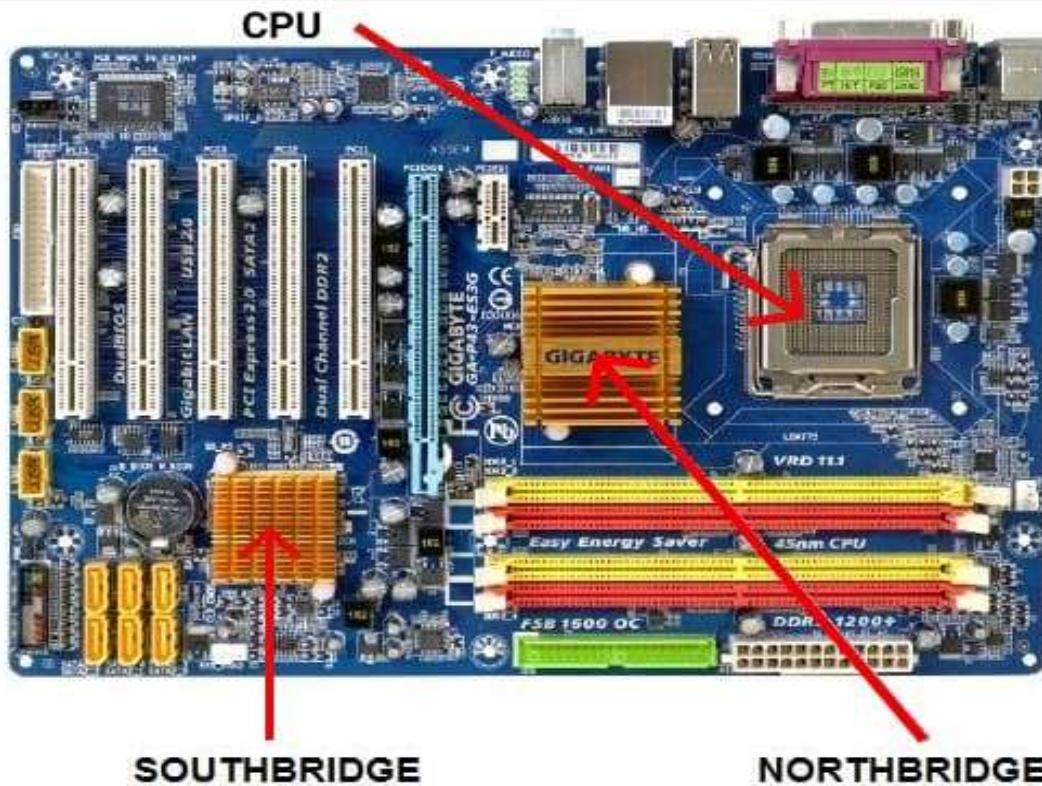
5) North Bridge

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

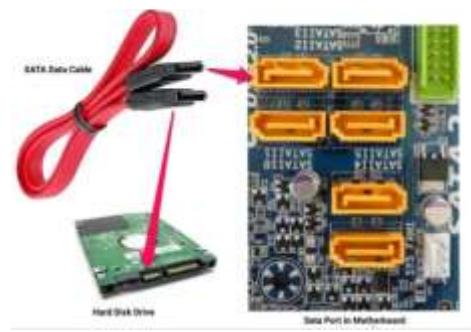
Modern hard drives and CDROM uses SATA cable for power. In motherboard, it is L-shape port and so its cable is connected to SATA port in one way only. In motherboard, it has 15 pins. It provides features of hot-swappable hard drives ie. plug and play hard drive features.

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.

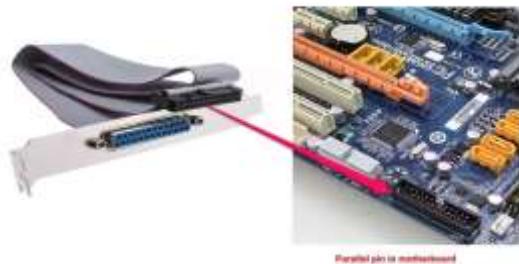
In modern computers, it is not used. It is outdated technology and is replaced by SATA Technology

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

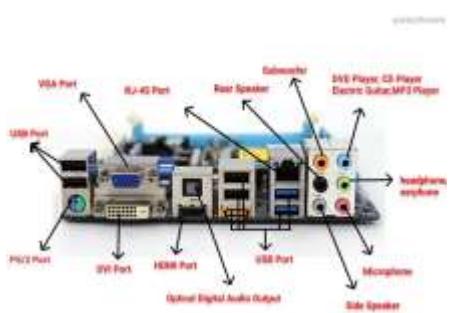
With a serial port, only one bit of data gets transfer at a time. It is found in an older PC to connect older keyboards, PDAs, external modems.



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.



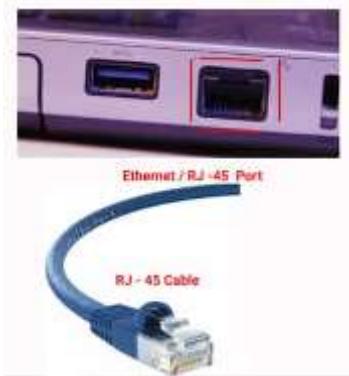
11) USB Port

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

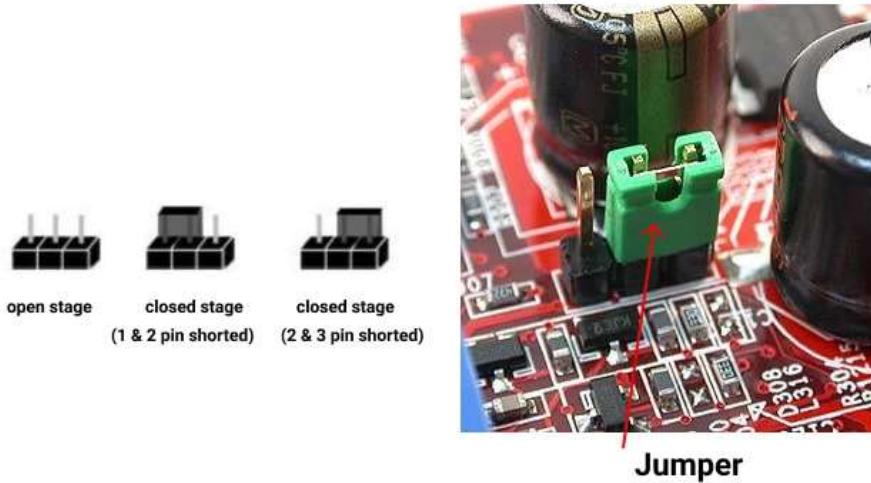
16) Switches and Jumper

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.

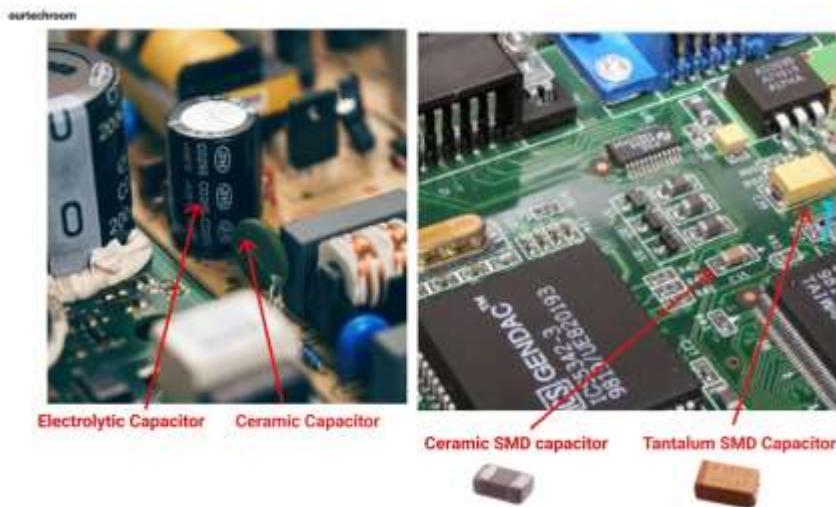
Opened Stage Jumper: If there is no plug into the pin then it is an open stage.



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

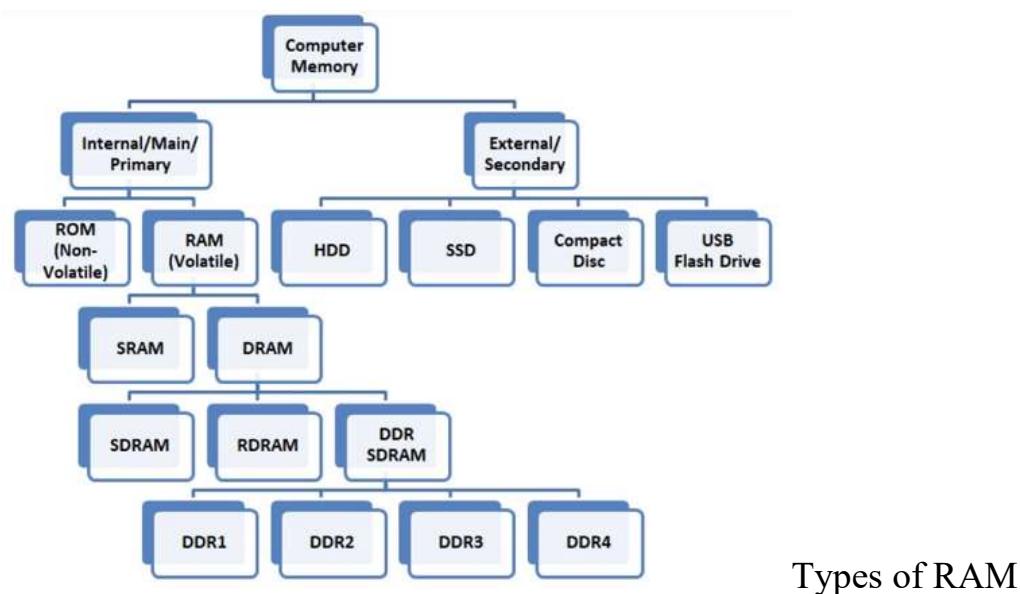
- controlling the amount of current or voltage in the component
- amplification/modulation electronic signal
- switching of an electronic signal and electrical power.

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

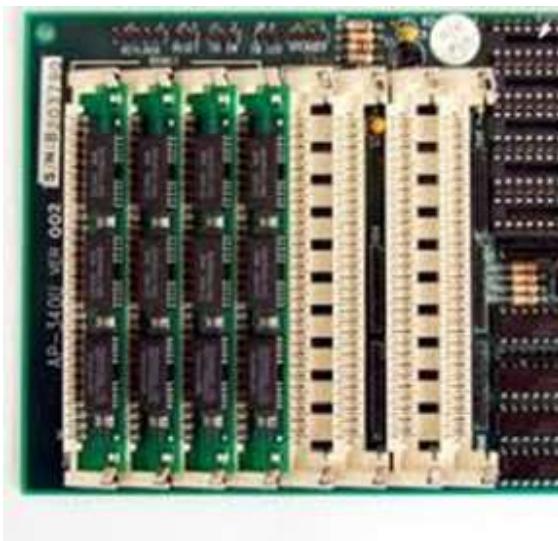
Static RAM is the full form of SRAM. In this type of RAM, data is stored using the state of a six transistor memory cell. Static RAM is mostly used as a cache memory for the processor (CPU).

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.

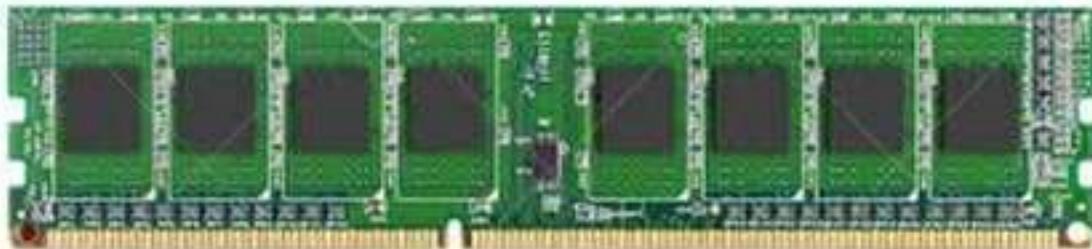
Flash Memory :



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.

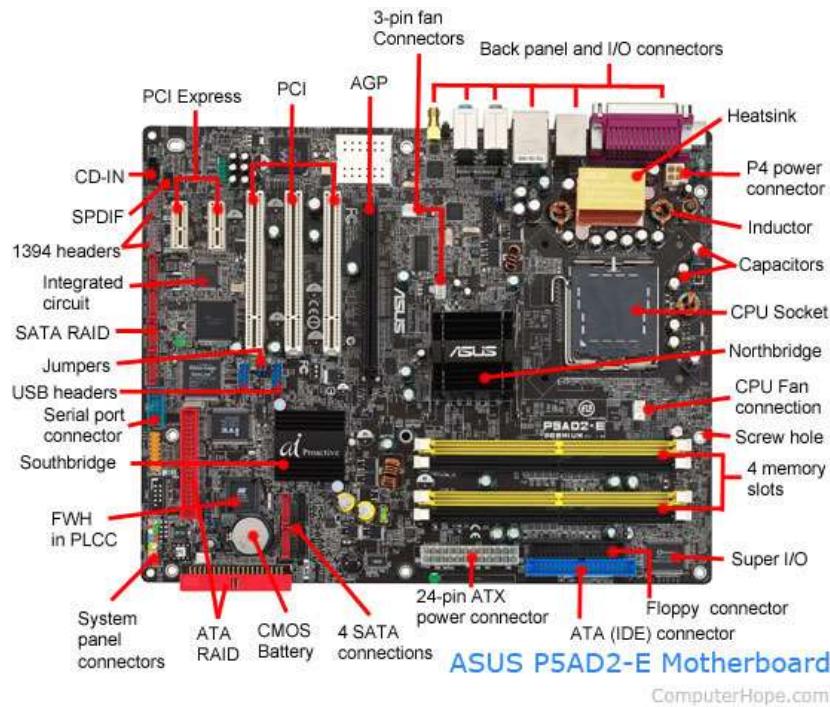
Computer expansion slots

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.

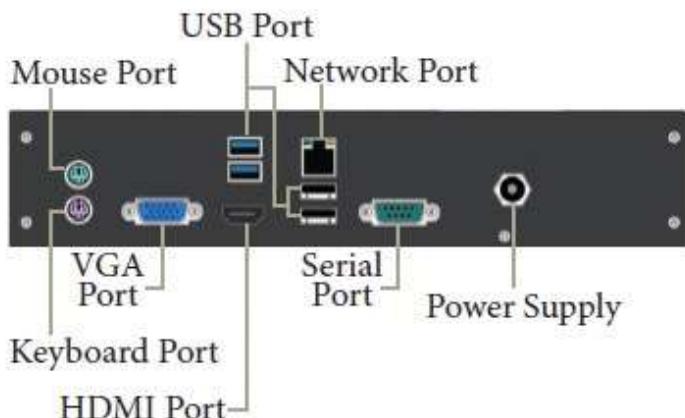


Fig 3.14 Ports and Interfaces

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

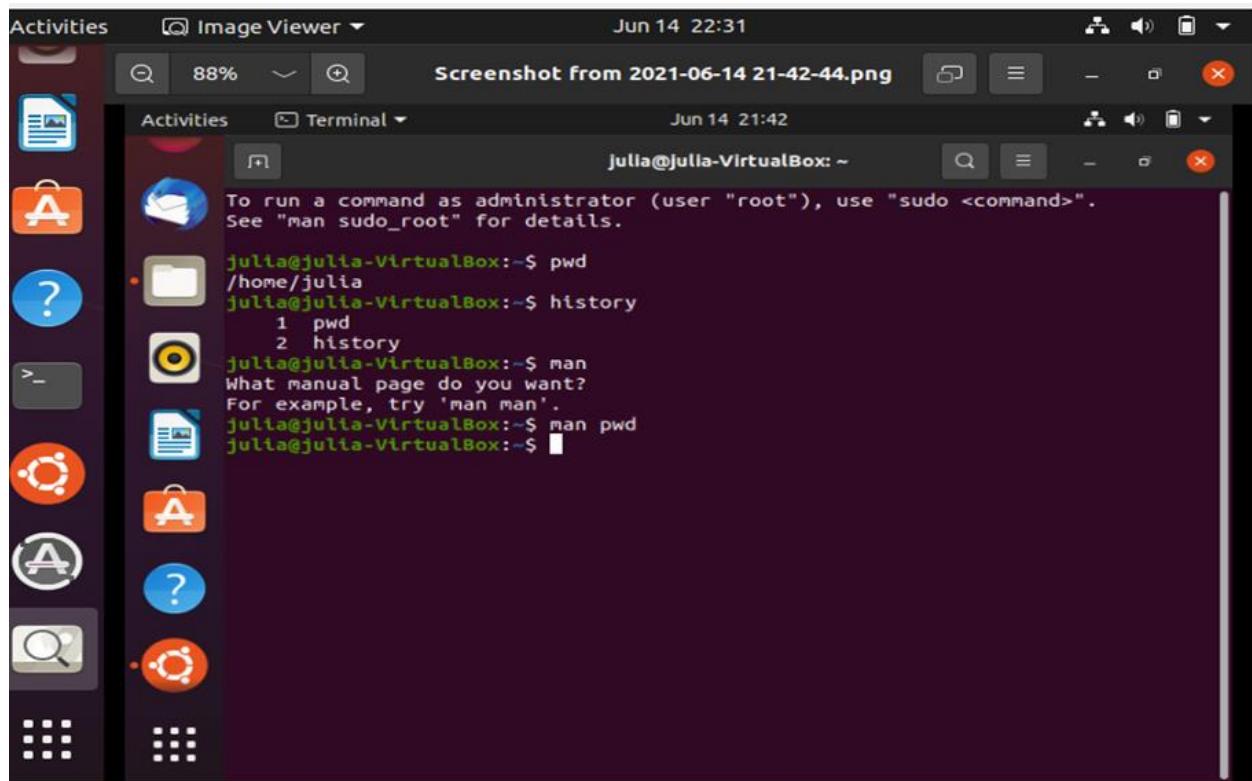
HDMI

Figure 3.15 HDMI Ports

ASSIGNMENT 2

1. pwd

the pwd command to find out the path of the current working directory



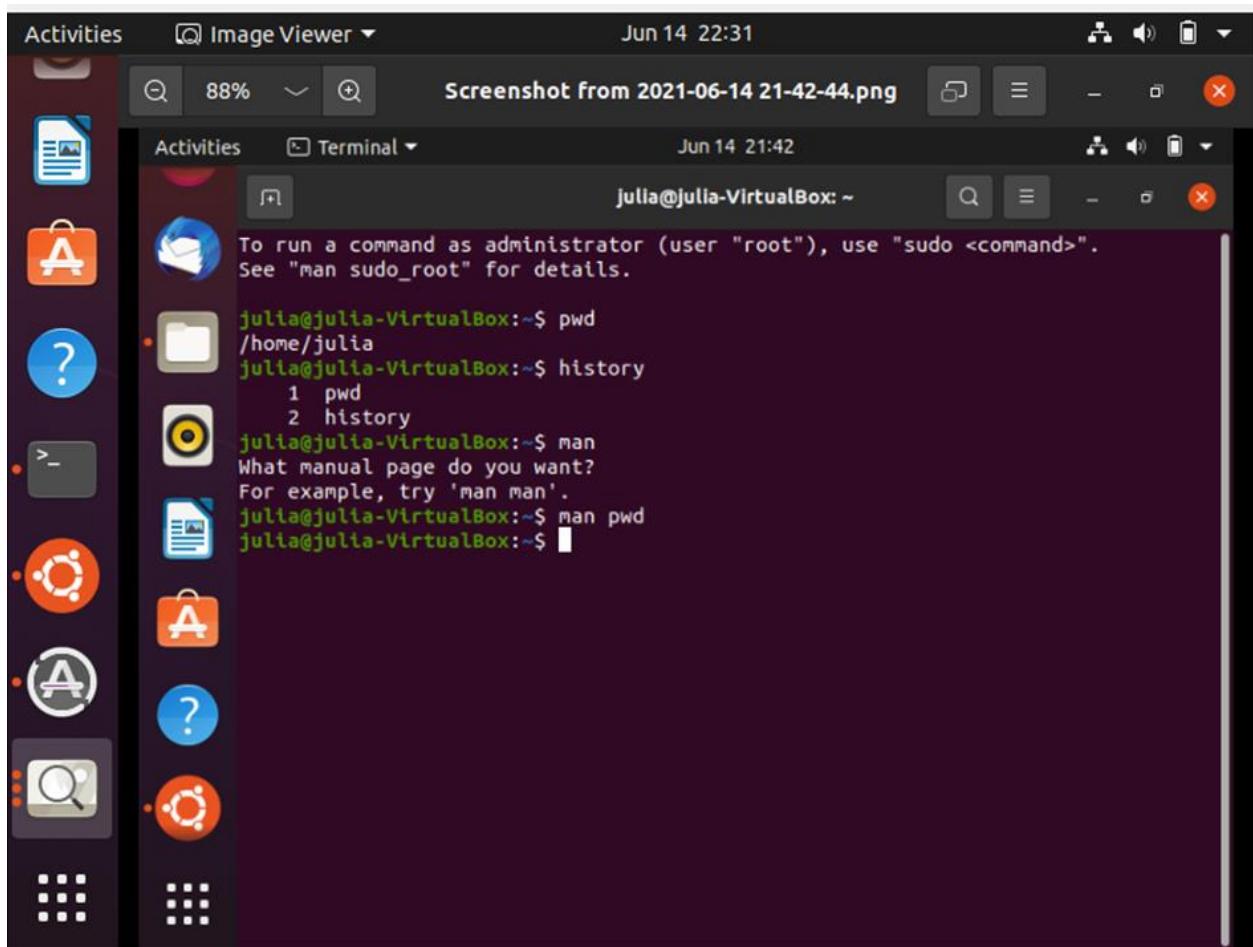
A screenshot of a Linux desktop environment. At the top, there's a dock with various icons. An 'Activities' icon is highlighted. To its right is an 'Image Viewer' window titled 'Screenshot from 2021-06-14 21-42-44.png'. Below the dock is a terminal window titled 'Terminal'. The terminal shows the following session:

```
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

julia@julia-VirtualBox:~$ pwd
/home/julia
julia@julia-VirtualBox:~$ history
 1  pwd
 2  history
julia@julia-VirtualBox:~$ man
What manual page do you want?
For example, try 'man man'.
julia@julia-VirtualBox:~$ man pwd
julia@julia-VirtualBox:~$
```

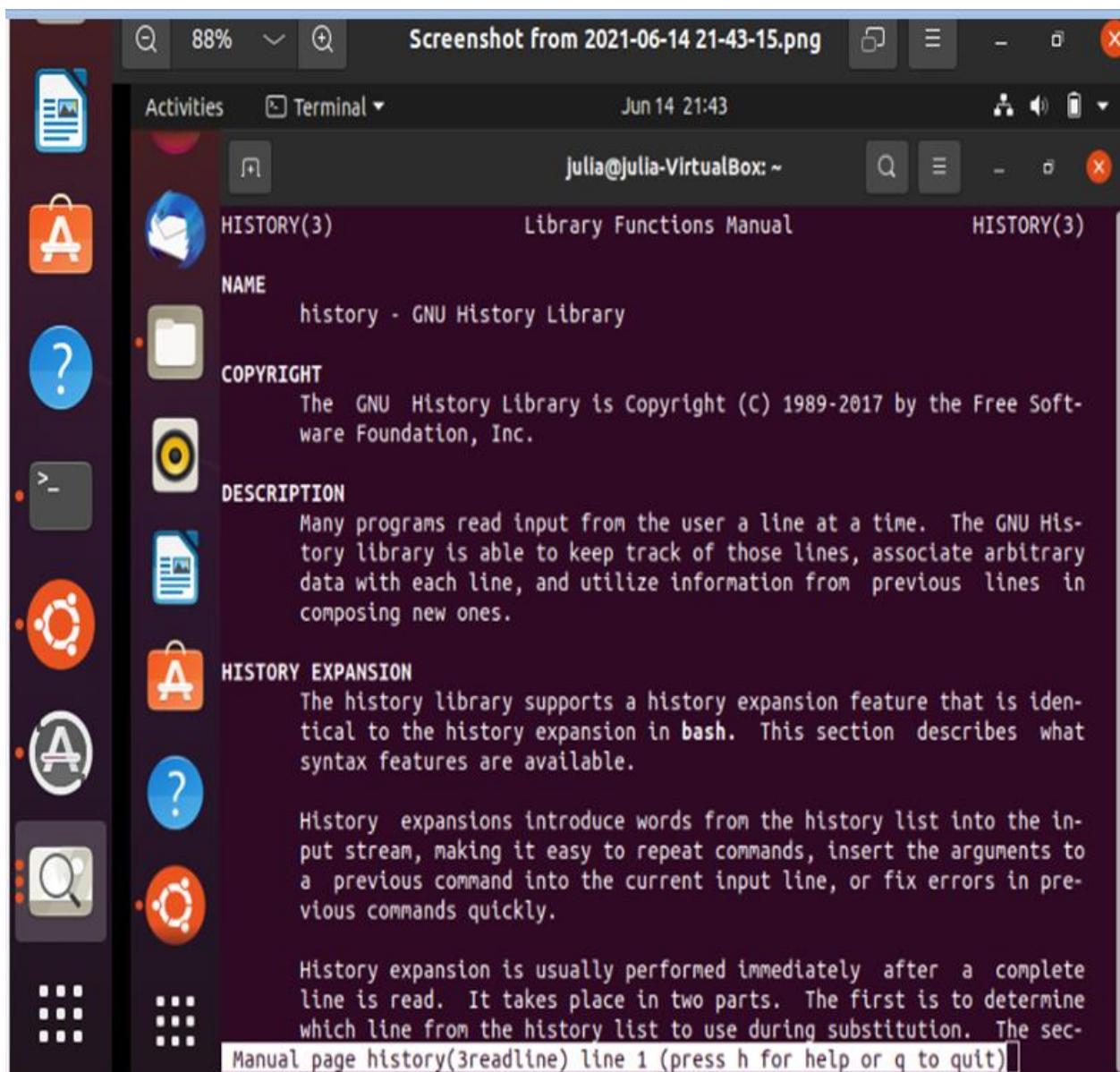
2. history

running history command is particularly useful if you want to review the commands you have entered before.



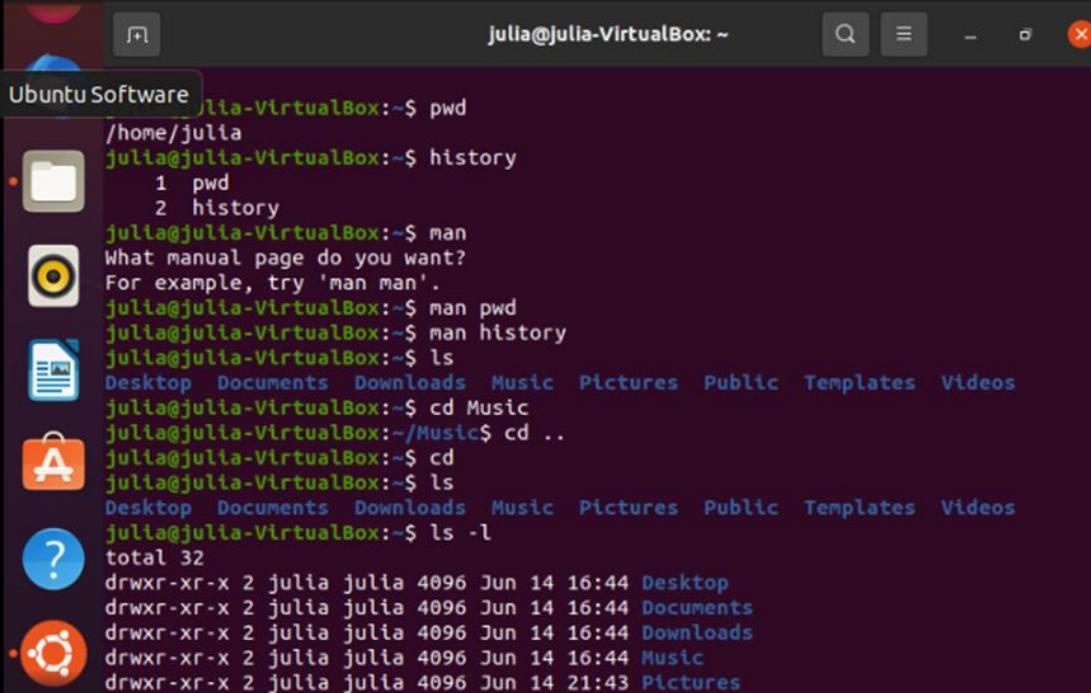
3. man

Confused about the function of certain Linux commands? Don't worry, you can easily learn how to use them right from Linux's shell by using the `man` command.



4. cd

To navigate through the Linux files and directories, use the `cd`.

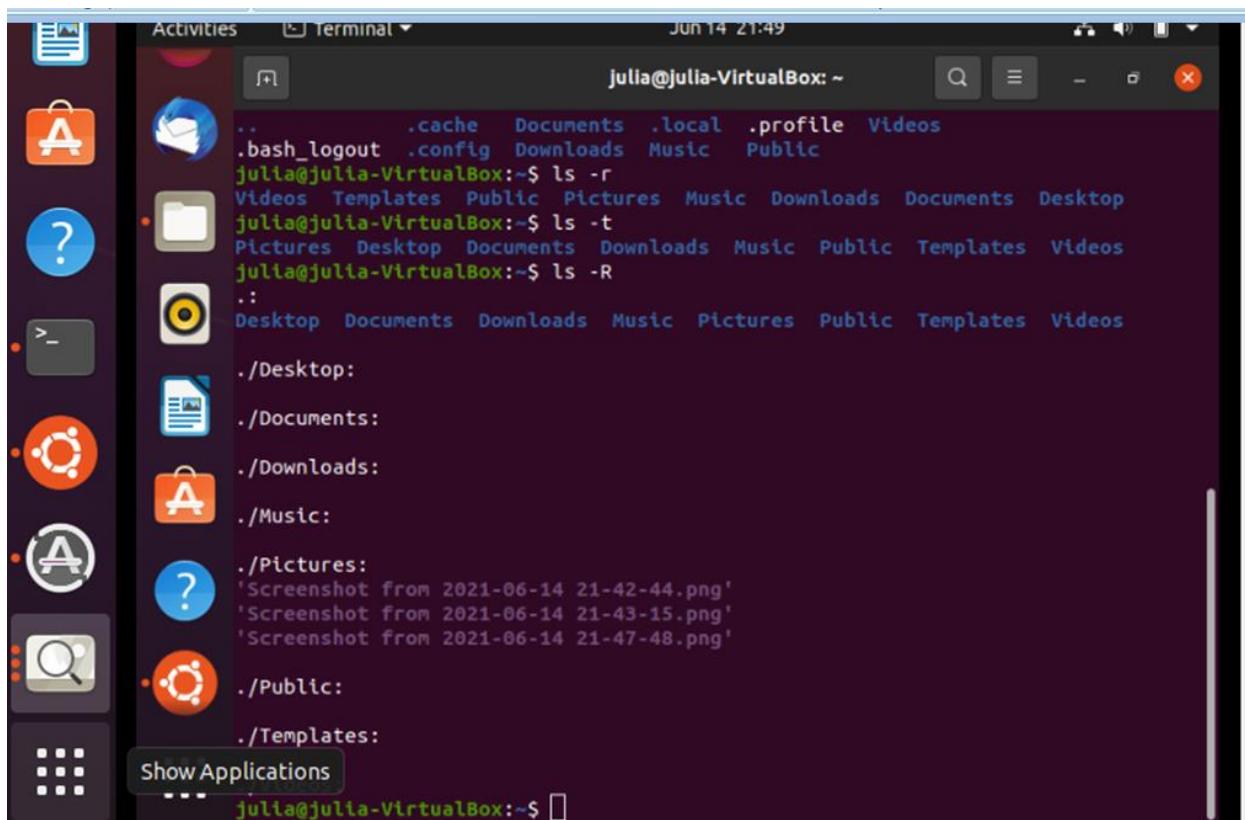


The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is "Ubuntu Software" and the user is at the prompt "julia@julia-VirtualBox:~". The terminal displays a series of commands and their outputs:

```
julia@julia-VirtualBox:~$ pwd  
/home/julia  
julia@julia-VirtualBox:~$ history  
1 pwd  
2 history  
julia@julia-VirtualBox:~$ man  
What manual page do you want?  
For example, try 'man man'.  
julia@julia-VirtualBox:~$ man pwd  
julia@julia-VirtualBox:~$ man history  
julia@julia-VirtualBox:~$ ls  
Desktop Documents Downloads Music Pictures Public Templates Videos  
julia@julia-VirtualBox:~$ cd Music  
julia@julia-VirtualBox:~/Music$ cd ..  
julia@julia-VirtualBox:~$ cd  
julia@julia-VirtualBox:~$ ls  
Desktop Documents Downloads Music Pictures Public Templates Videos  
julia@julia-VirtualBox:~$ ls -l  
total 32  
drwxr-xr-x 2 julia julia 4096 Jun 14 16:44 Desktop  
drwxr-xr-x 2 julia julia 4096 Jun 14 16:44 Documents  
drwxr-xr-x 2 julia julia 4096 Jun 14 16:44 Downloads  
drwxr-xr-x 2 julia julia 4096 Jun 14 16:44 Music  
drwxr-xr-x 2 julia julia 4096 Jun 14 21:43 Pictures  
drwxr-xr-x 2 julia julia 4096 Jun 14 16:44 Public  
drwxr-xr-x 2 julia julia 4096 Jun 14 16:44 Templates  
drwxr-xr-x 2 julia julia 4096 Jun 14 16:44 Videos  
julia@julia-VirtualBox:~$
```

5. Is

The `ls` command is used to view the contents of a directory.

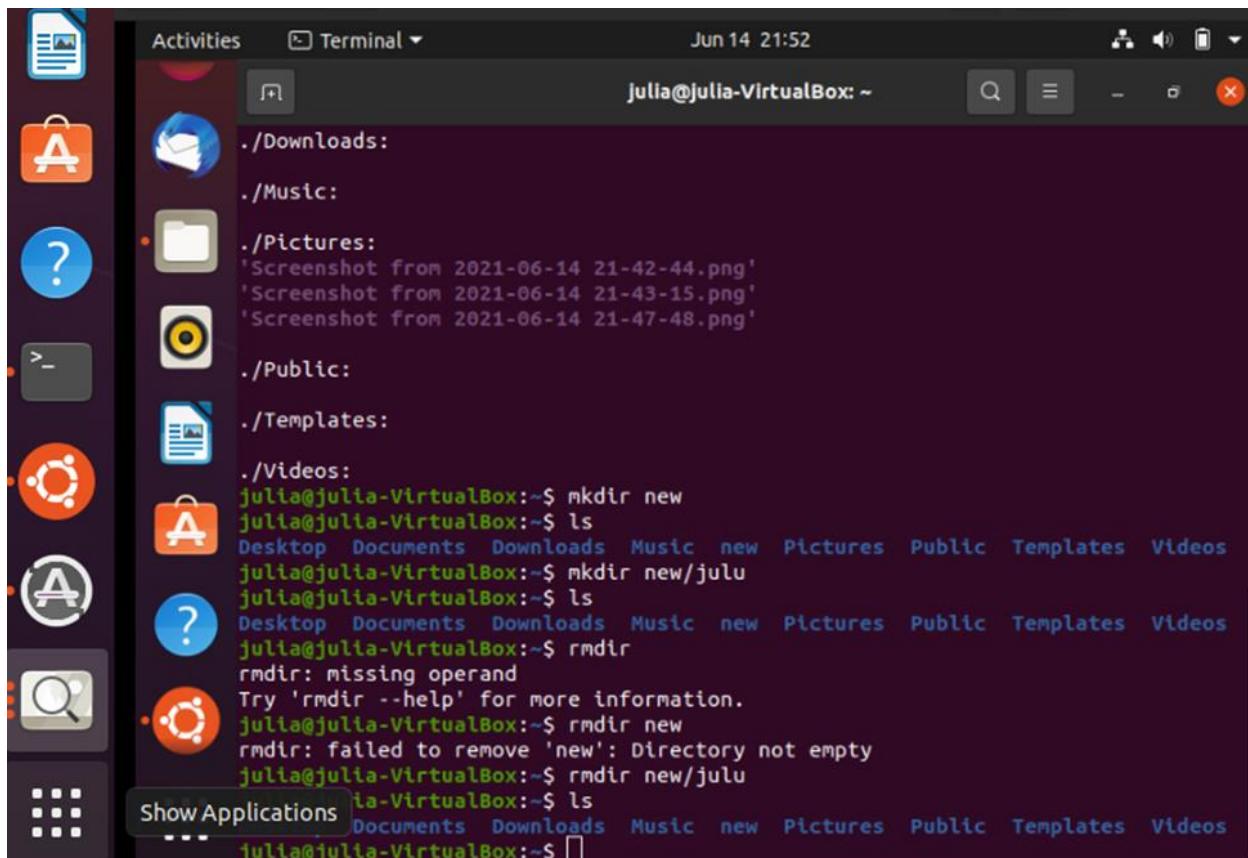


A screenshot of an Ubuntu desktop environment. On the left is a dock with various application icons. In the center is a terminal window titled "Terminal". The terminal shows the user "julia@julia-VirtualBox" at the prompt. The user has run several "ls" commands to list files and directories in the current directory (~). The output of the commands is as follows:

```
julia@julia-VirtualBox:~$ ls -r
..
.cache  Documents .local .profile  Videos
.bash_logout .config Downloads Music  Public
julia@julia-VirtualBox:~$ ls -t
Videos  Templates Public Pictures Music Downloads Documents Desktop
julia@julia-VirtualBox:~$ ls -R
.:
Desktop  Documents Downloads Music Pictures Public Templates Videos
./Desktop:
./Documents:
./Downloads:
./Music:
./Pictures:
'Screenshot from 2021-06-14 21-42-44.png'
'Screenshot from 2021-06-14 21-43-15.png'
'Screenshot from 2021-06-14 21-47-48.png'
./Public:
./Templates:
julia@julia-VirtualBox:~$
```

6. mkdir

Use `mkdir` command to make a new directory

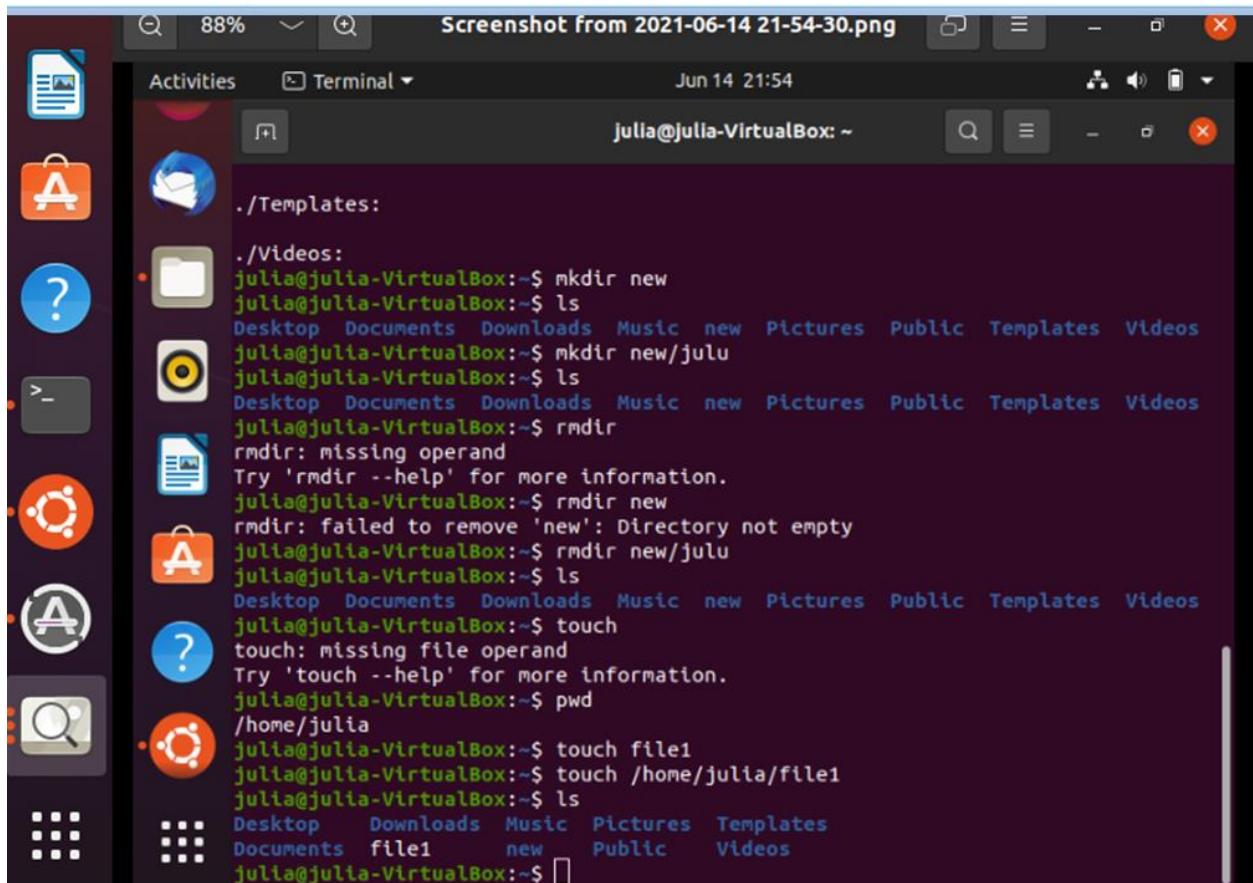


A screenshot of an Ubuntu desktop environment. On the left is the Unity Dash icon bar with various application icons. In the center is a terminal window titled "Terminal". The terminal shows the following command-line session:

```
Activities Terminal Jun 14 21:52
julia@julia-VirtualBox: ~
./Downloads:
./Music:
./Pictures:
'Screenshot from 2021-06-14 21-42-44.png'
'Screenshot from 2021-06-14 21-43-15.png'
'Screenshot from 2021-06-14 21-47-48.png'
./Public:
./Templates:
./Videos:
julia@julia-VirtualBox:~$ mkdir new
julia@julia-VirtualBox:~$ ls
Desktop Documents Downloads Music new Pictures Public Templates Videos
julia@julia-VirtualBox:~$ mkdir new/julu
julia@julia-VirtualBox:~$ ls
Desktop Documents Downloads Music new Pictures Public Templates Videos
julia@julia-VirtualBox:~$ rmdir
rmdir: missing operand
Try 'rmdir --help' for more information.
julia@julia-VirtualBox:~$ rmdir new
rmdir: failed to remove 'new': Directory not empty
julia@julia-VirtualBox:~$ rmdir new/julu
julia@julia-VirtualBox:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
julia@julia-VirtualBox:~$
```

7. rmdir

If you need to delete a directory, use the rmdir command.



A screenshot of an Ubuntu desktop environment. On the left is a dock with various icons: Photos, AppIndicator (orange A), Help (blue question mark), Dash (grey arrow), Dash Home (orange circle), AppIndicator (orange A), Dash (grey arrow), Dash Home (orange circle), and Dash (grey arrow). The main area shows a terminal window titled "Screenshot from 2021-06-14 21-54-30.png". The terminal window has a dark background and displays the following command-line session:

```
Activities Terminal Jun 14 21:54
julia@julia-VirtualBox: ~
./Templates:
./Videos:
julia@julia-VirtualBox:~$ mkdir new
julia@julia-VirtualBox:~$ ls
Desktop Documents Downloads Music new Pictures Public Templates Videos
julia@julia-VirtualBox:~$ mkdir new/julu
julia@julia-VirtualBox:~$ ls
Desktop Documents Downloads Music new Pictures Public Templates Videos
julia@julia-VirtualBox:~$ rmdir
rmdir: missing operand
Try 'rmdir --help' for more information.
julia@julia-VirtualBox:~$ rmdir new
rmdir: failed to remove 'new': Directory not empty
julia@julia-VirtualBox:~$ rmdir new/julu
julia@julia-VirtualBox:~$ ls
Desktop Documents Downloads Music new Pictures Public Templates Videos
julia@julia-VirtualBox:~$ touch
touch: missing file operand
Try 'touch --help' for more information.
julia@julia-VirtualBox:~$ pwd
/home/julia
julia@julia-VirtualBox:~$ touch file1
julia@julia-VirtualBox:~$ touch /home/julia/file1
julia@julia-VirtualBox:~$ ls
Desktop Downloads Music Pictures Templates
Documents file1 new Public Videos
julia@julia-VirtualBox:~$
```

8. touch

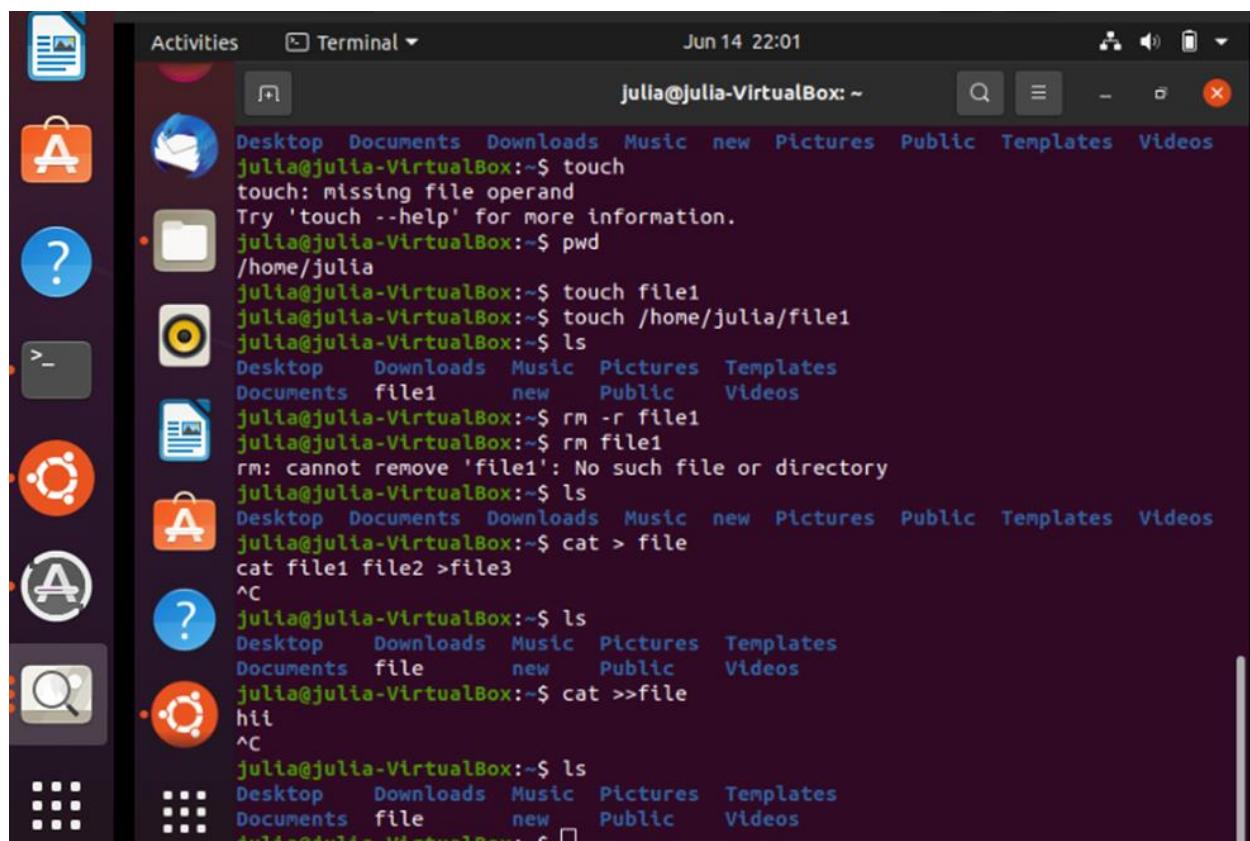
The touch command allows you to create a blank new file through the Linux command line.

```
Activities Terminal Sun 14 22:01

Desktop Documents Downloads Music new Pictures Public Templates Videos
julia@julia-VirtualBox:~$ touch
touch: missing file operand
Try 'touch --help' for more information.
julia@julia-VirtualBox:~$ pwd
/home/julia
julia@julia-VirtualBox:~$ touch file1
julia@julia-VirtualBox:~$ touch /home/julia/file1
julia@julia-VirtualBox:~$ ls
Desktop Downloads Music Pictures Templates
Documents file1 new Public Videos
julia@julia-VirtualBox:~$ rm -r file1
julia@julia-VirtualBox:~$ rm file1
rm: cannot remove 'file1': No such file or directory
julia@julia-VirtualBox:~$ ls
Desktop Documents Downloads Music new Pictures Public Templates Videos
julia@julia-VirtualBox:~$ cat > file
cat file1 file2 >file3
^C
julia@julia-VirtualBox:~$ ls
Desktop Downloads Music Pictures Templates
Documents file new Public Videos
julia@julia-VirtualBox:~$ cat >>file
hi
^C
julia@julia-VirtualBox:~$ ls
Desktop Downloads Music Pictures Templates
Documents file new Public Videos
julia@julia-VirtualBox:~$
```

9. rm

The `rm` command is used to delete directories and the contents within them.



Activities Terminal Jun 14 22:01 julia@julia-VirtualBox: ~

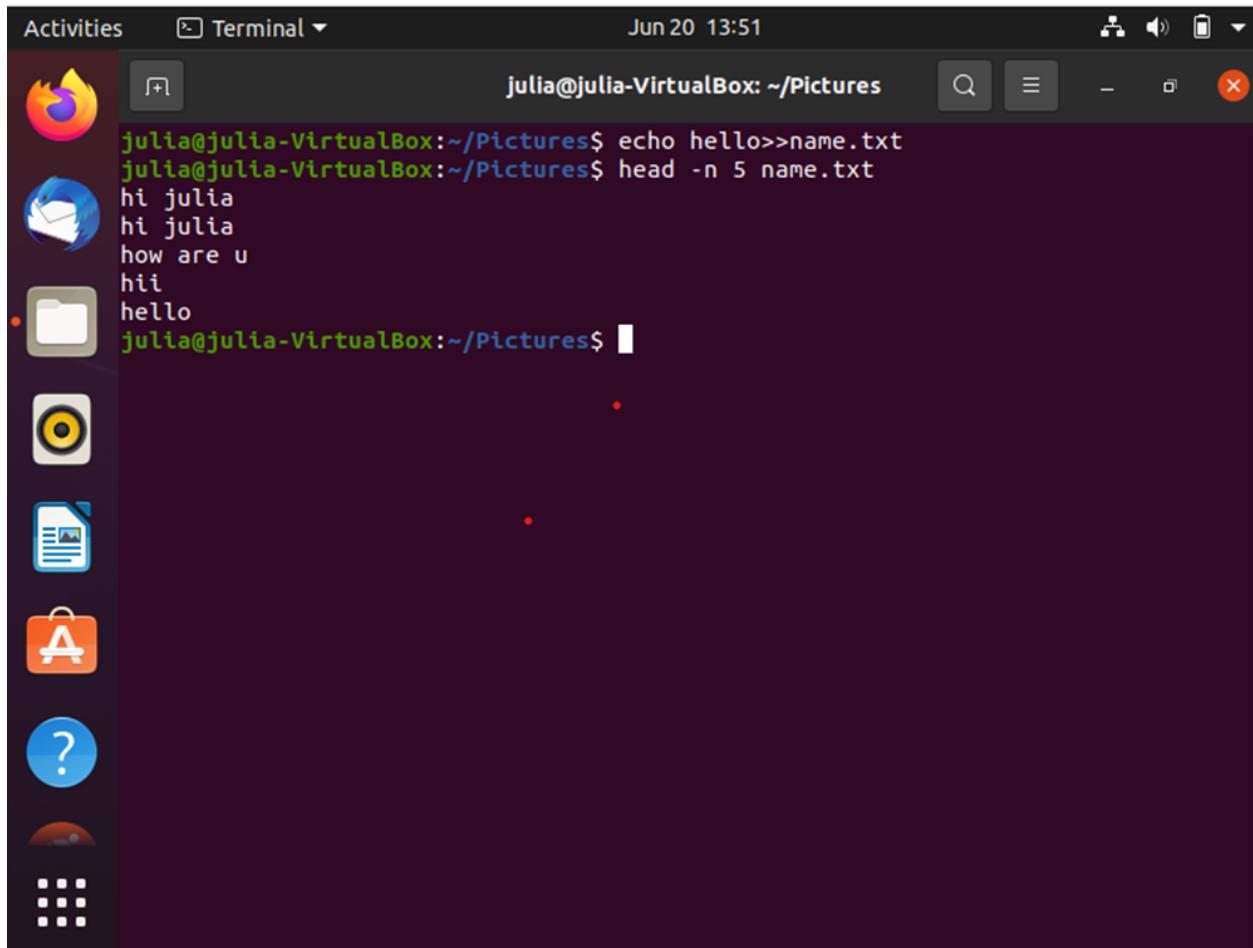
```
Desktop Documents Downloads Music new Pictures Public Templates Videos
julia@julia-VirtualBox:~$ touch
touch: missing file operand
Try 'touch --help' for more information.
julia@julia-VirtualBox:~$ pwd
/home/julia
julia@julia-VirtualBox:~$ touch file1
julia@julia-VirtualBox:~$ touch /home/julia/file1
julia@julia-VirtualBox:~$ ls
Desktop Downloads Music Pictures Templates
Documents file1 new Public Videos
julia@julia-VirtualBox:~$ rm -r file1
julia@julia-VirtualBox:~$ rm file1
rm: cannot remove 'file1': No such file or directory
julia@julia-VirtualBox:~$ ls
Desktop Documents Downloads Music new Pictures Public Templates Videos
julia@julia-VirtualBox:~$ cat > file
cat file1 file2 >file3
^C
julia@julia-VirtualBox:~$ ls
Desktop Downloads Music Pictures Templates
Documents file new Public Videos
julia@julia-VirtualBox:~$ cat >>file
hi
^C
julia@julia-VirtualBox:~$ ls
Desktop Downloads Music Pictures Templates
Documents file new Public Videos
julia@julia-VirtualBox:~$
```

10. cat

It is used to list the contents of a file on the standard output stdout .

ASSIGNMENT 3

1. Echo echo command is used to move some data into a file



A screenshot of an Ubuntu desktop environment. On the left is a dock with various icons: a browser, email, file manager, system settings, dash, help, and a terminal. The main window is a terminal titled "Terminal" with the session ID "julia@julia-VirtualBox: ~/Pictures". The terminal shows the following command-line session:

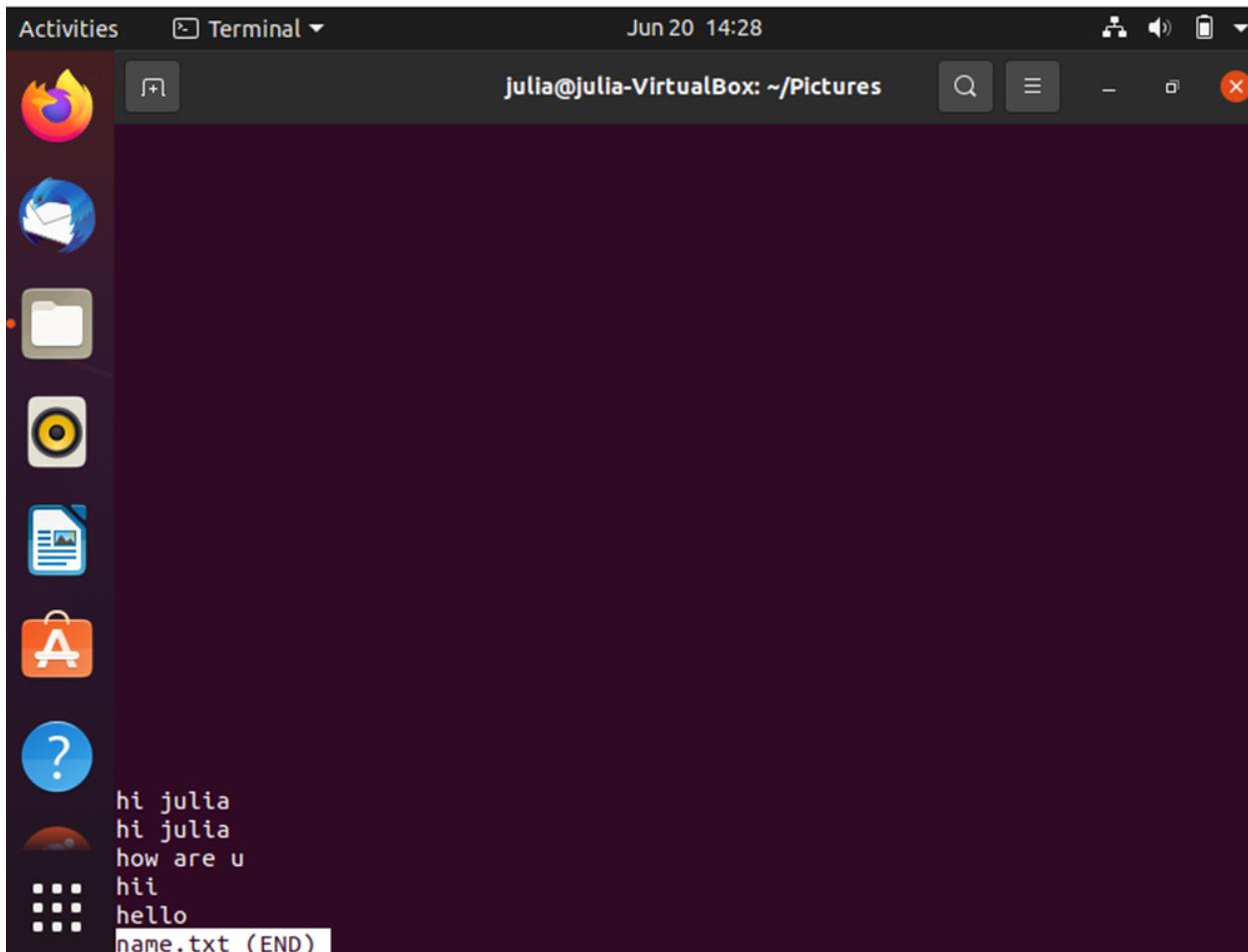
```
julia@julia-VirtualBox:~/Pictures$ echo hello>>name.txt
julia@julia-VirtualBox:~/Pictures$ head -n 5 name.txt
hi julia
hi julia
how are u
hii
hello
julia@julia-VirtualBox:~/Pictures$
```

2. Head: The head command is used to view the first lines of any text file.
3. read: read the contents of a line into a variable.

Activities Terminal ▾ Jun 20 14:24

julia@julia-VirtualBox:~/Pictures\$ echo hello>>name.txt
julia@julia-VirtualBox:~/Pictures\$ head -n 5 name.txt
hi julia
hi julia
how are u
hii
hello
julia@julia-VirtualBox:~/Pictures\$ tail -n 2 name.txt
hii
hello
julia@julia-VirtualBox:~/Pictures\$ read
read v1 v2 v3
julia@julia-VirtualBox:~/Pictures\$ echo ["\\$v1"] ["\\$v2"] ["\\$v3"]
[] [] []
julia@julia-VirtualBox:~/Pictures\$ more name.txt
hi julia
hi julia
how are u
hii
hello
julia@julia-VirtualBox:~/Pictures\$

4.tail :This one has a similar function to the head command, but instead of showing the first lines, the tail command will display the last ten lines of a text file



```
hi julia
hi julia
how are u
hii
hello
name.txt (END)
```

5 more: Like cat command, more command displays the content of a file

6 less: It automatically adjust with the width and height of the teminal window

7 cut: The cut command is used for cutting out the sections from each line of files and writing the result to standard output.

8 paste: 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.

9 uname: The uname command, short for Unix Name.

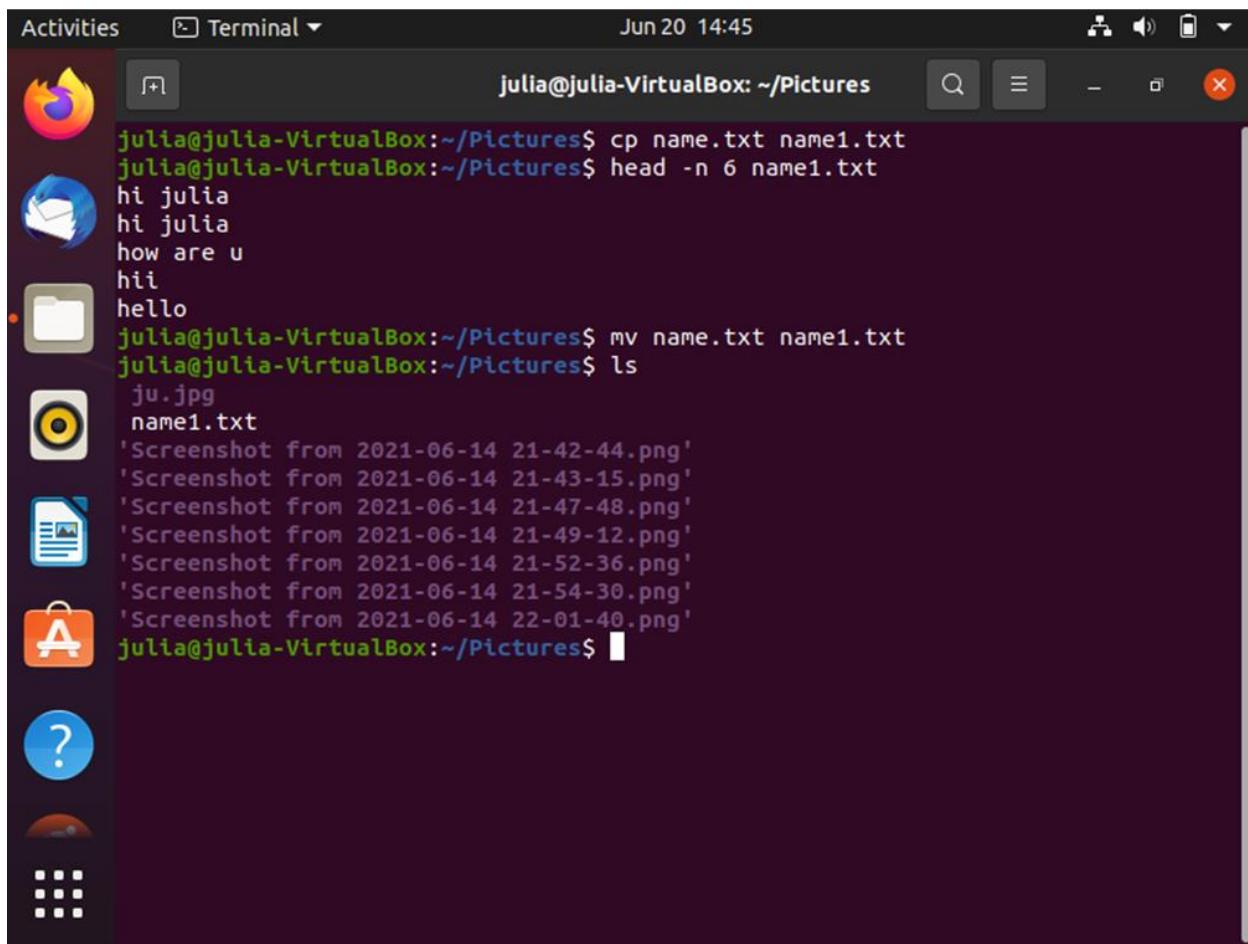
Activities Terminal ▾ Jun 20 14:33

```
[ ] [ ] []
julia@julia-VirtualBox:~/Pictures$ more name.txt
hi julia
hi julia
how are u
hii
hello
julia@julia-VirtualBox:~/Pictures$ less name.txt
julia@julia-VirtualBox:~/Pictures$ less name1.txt
julia@julia-VirtualBox:~/Pictures$ less name.txt
julia@julia-VirtualBox:~/Pictures$ cut -b 1,2,3 name.txt
hi
hi
how
hii
hel
julia@julia-VirtualBox:~/Pictures$ paste name.txt capital.txt
paste: capital.txt: No such file or directory
julia@julia-VirtualBox:~/Pictures$ paste name.txt
hi julia
hi julia
how are u
hii
hello
julia@julia-VirtualBox:~/Pictures$ uname
Linux
julia@julia-VirtualBox:~/Pictures$ uname -r
5.8.0-55-generic
julia@julia-VirtualBox:~/Pictures$ █
```

10 cp: cp command is used to copy files from the current directory to a different directory.

11 mv: The primary use of the mv command is to move files, it can also be used to rename files.

12 locate: To locate a file, just like the search command in Windows.



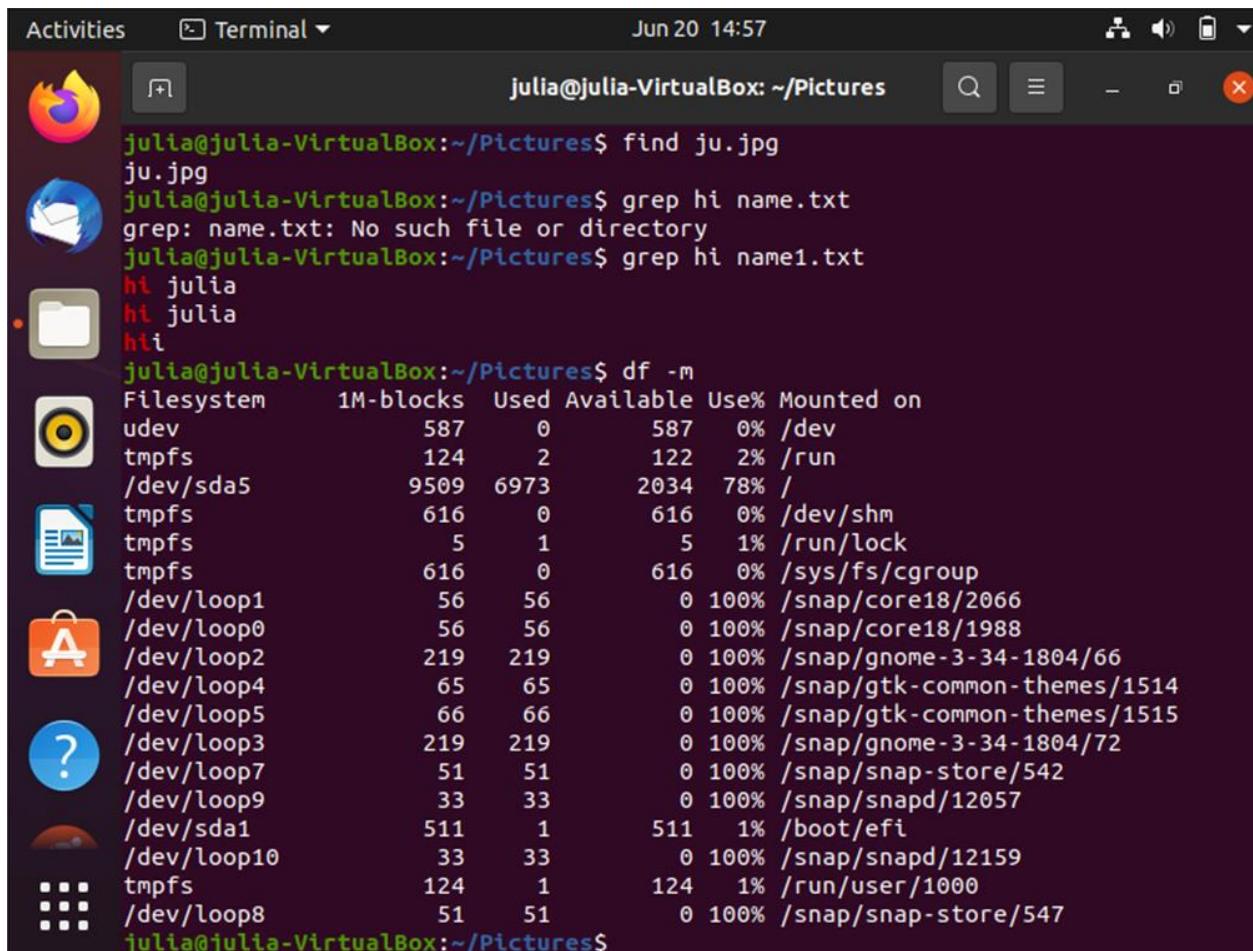
A screenshot of a Linux desktop environment showing a terminal window. The terminal window is titled "Terminal" and has the command "cp name.txt name1.txt" entered. The output shows the contents of the file "name.txt" which are "hi julia", "hi julia", "how are u", "hii", and "hello". The terminal then runs the command "mv name.txt name1.txt" followed by "ls" which lists files like "ju.jpg", "name1.txt", and several screenshots from June 14, 2021.

```
julia@julia-VirtualBox:~/Pictures$ cp name.txt name1.txt
julia@julia-VirtualBox:~/Pictures$ head -n 6 name1.txt
hi julia
hi julia
how are u
hii
hello
julia@julia-VirtualBox:~/Pictures$ mv name.txt name1.txt
julia@julia-VirtualBox:~/Pictures$ ls
ju.jpg
name1.txt
'Screenshot from 2021-06-14 21-42-44.png'
'Screenshot from 2021-06-14 21-43-15.png'
'Screenshot from 2021-06-14 21-47-48.png'
'Screenshot from 2021-06-14 21-49-12.png'
'Screenshot from 2021-06-14 21-52-36.png'
'Screenshot from 2021-06-14 21-54-30.png'
'Screenshot from 2021-06-14 22-01-40.png'
julia@julia-VirtualBox:~/Pictures$
```

13 find: Similar to the locate command, using find also searches for files and directories.

14 grep: Another basic Linux command that is undoubtedly helpful for everyday use is grep.

15 df: Use df command to get a report on the system's disk space usage



A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window titled "Terminal". The terminal window has a dark background and displays a command-line session. The session starts with the user "julia" at the prompt "julia@julia-VirtualBox: ~/Pictures\$". The user runs several commands: "find ju.jpg" which finds a file named "ju.jpg"; "grep hi name.txt" which fails because "name.txt" does not exist; "grep hi name1.txt" which finds "hi" in the file "name1.txt"; and "df -m" which shows disk usage statistics for various filesystems. The terminal window is part of a desktop interface with other icons visible in the background.

```
julia@julia-VirtualBox:~/Pictures$ find ju.jpg
ju.jpg
julia@julia-VirtualBox:~/Pictures$ grep hi name.txt
grep: name.txt: No such file or directory
julia@julia-VirtualBox:~/Pictures$ grep hi name1.txt
hi julia
hi julia
hi
julia@julia-VirtualBox:~/Pictures$ df -m
Filesystem      1M-blocks  Used Available Use% Mounted on
udev              587     0     587   0% /dev
tmpfs             124     2     122   2% /run
/dev/sda5        9509   6973    2034  78% /
tmpfs             616     0     616   0% /dev/shm
tmpfs               5     1      5   1% /run/lock
tmpfs             616     0     616   0% /sys/fs/cgroup
/dev/loop1          56     56      0 100% /snap/core18/2066
/dev/loop0          56     56      0 100% /snap/core18/1988
/dev/loop2          219    219      0 100% /snap/gnome-3-34-1804/66
/dev/loop4          65     65      0 100% /snap/gtk-common-themes/1514
/dev/loop5          66     66      0 100% /snap/gtk-common-themes/1515
/dev/loop3          219    219      0 100% /snap/gnome-3-34-1804/72
/dev/loop7          51     51      0 100% /snap/snap-store/542
/dev/loop9          33     33      0 100% /snap/snapd/12057
/dev/sda1           511     1     511   1% /boot/efi
/dev/loop10          33     33      0 100% /snap/snapd/12159
tmpfs             124     1     124   1% /run/user/1000
/dev/loop8           51     51      0 100% /snap/snap-store/547
julia@julia-VirtualBox:~/Pictures$
```

16 du: If you want to check how much space a file or a directory takes, the du (Disk Usage) command is the answer.

17 userad: This is available only to system admins

18 userdel: Remove a user is very similar to adding a new user.

19 sudo: Short for “SuperUser Do”, this command enables you to perform tasks that require administrative or root permissions.

20 passwd: Changes passwords for user accounts.

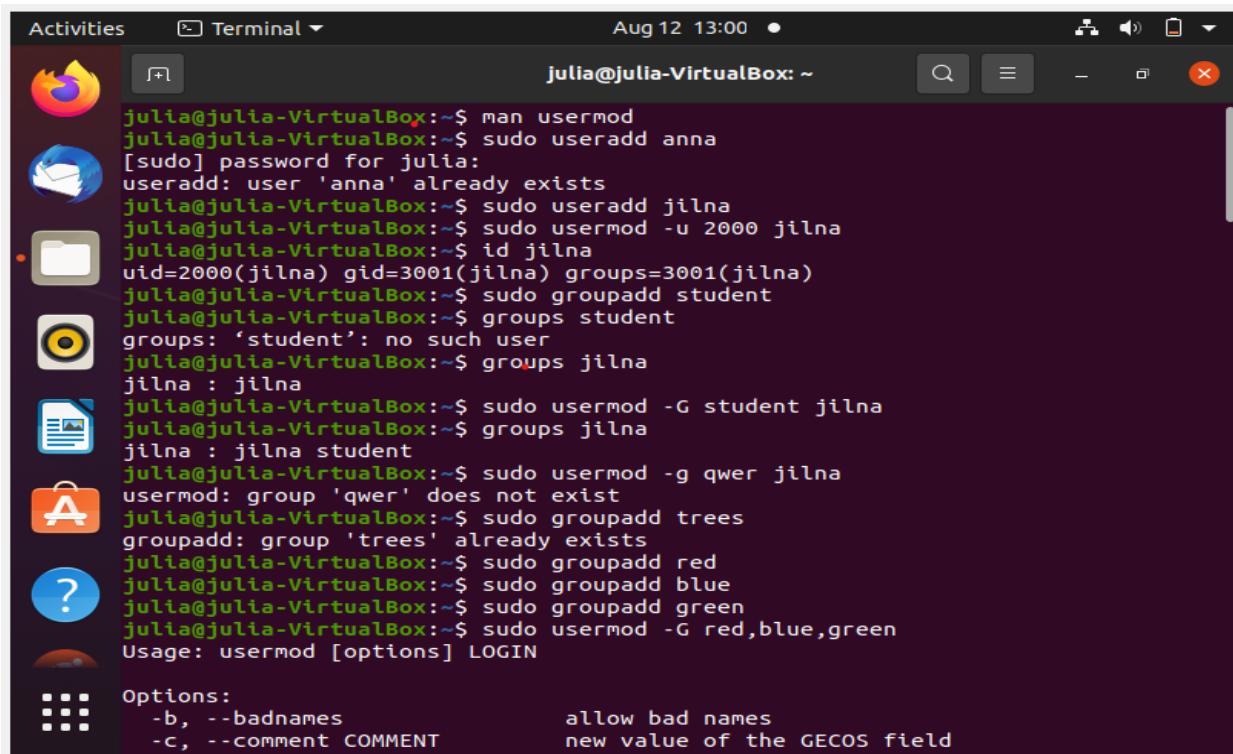
Activities Terminal ▾ Jun 20 15:01

```
julia@julia-VirtualBox: ~/Pictures
/dev/loop1      56   56      0 100% /snap/core18/2066
/dev/loop0      56   56      0 100% /snap/core18/1988
/dev/loop2     219  219      0 100% /snap/gnome-3-34-1804/66
/dev/loop4      65   65      0 100% /snap/gtk-common-themes/1514
/dev/loop5      66   66      0 100% /snap/gtk-common-themes/1515
/dev/loop3     219  219      0 100% /snap/gnome-3-34-1804/72
/dev/loop7      51   51      0 100% /snap/snap-store/542
/dev/loop9      33   33      0 100% /snap/snapd/12057
/dev/sda1     511   1      511  1% /boot/efi
/dev/loop10     33   33      0 100% /snap/snapd/12159
tmpfs        124   1      124  1% /run/user/1000
/dev/loop8      51   51      0 100% /snap/snap-store/547
julia@julia-VirtualBox:~/Pictures$ du -h
936K .
julia@julia-VirtualBox:~/Pictures$ sudo useradd mary
[sudo] password for julia:
Sorry, try again.
[sudo] password for julia:
Sorry, try again.
[sudo] password for julia:
Sorry, try again.
[sudo] password for julia:
sudo: 3 incorrect password attempts
julia@julia-VirtualBox:~/Pictures$ sudo userdel mary
[sudo] password for julia:
Sorry, try again.
[sudo] password for julia:
Sorry, try again.
[sudo] password for julia:
sudo: 3 incorrect password attempts
julia@julia-VirtualBox:~/Pictures$
```

ASSIGNMENT 4

JULIA GEORGE

usermod : usermod command is used to change the properties of a user in Linux through the command line

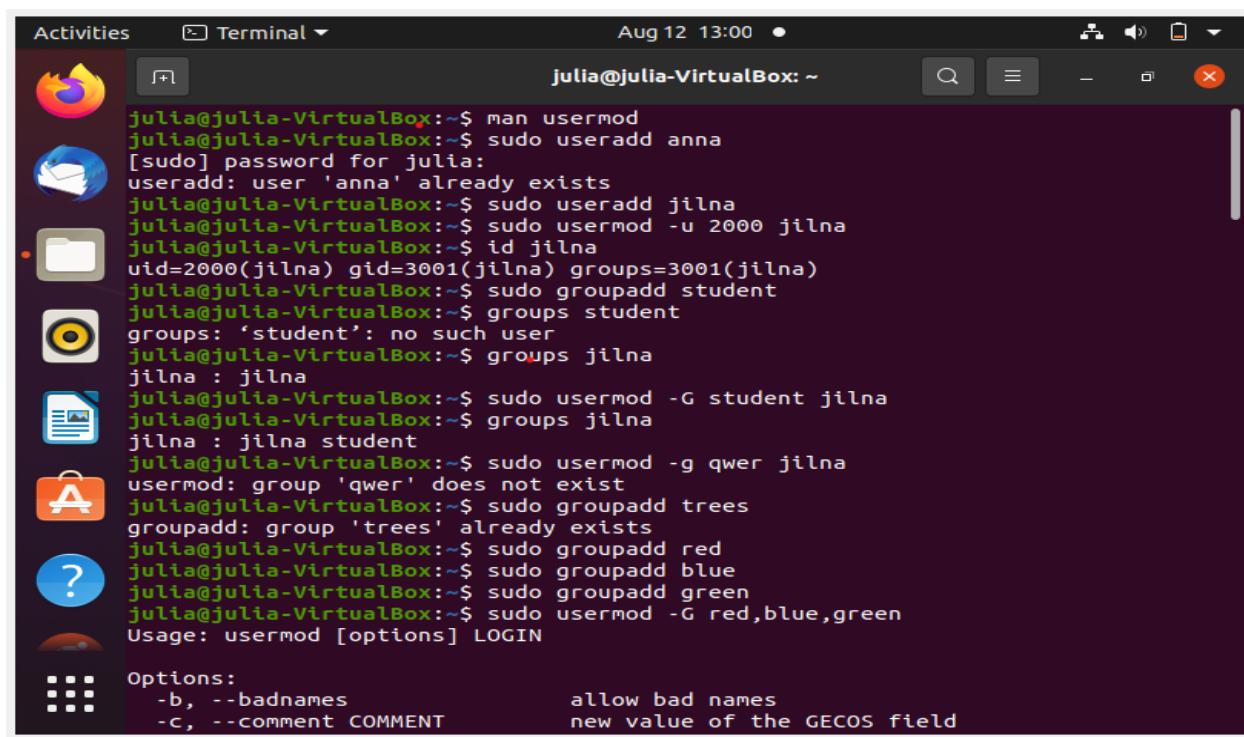


The screenshot shows a terminal window titled "Terminal" with the command line "julia@julia-VirtualBox: ~". The terminal displays the following session:

```
julia@julia-VirtualBox:~$ man usermod
julia@julia-VirtualBox:~$ sudo useradd anna
[sudo] password for julia:
useradd: user 'anna' already exists
julia@julia-VirtualBox:~$ sudo useradd jilna
julia@julia-VirtualBox:~$ sudo usermod -u 2000 jilna
julia@julia-VirtualBox:~$ id jilna
uid=2000(jilna) gid=3001(jilna) groups=3001(jilna)
julia@julia-VirtualBox:~$ sudo groupadd student
julia@julia-VirtualBox:~$ groups student
groups: 'student': no such user
julia@julia-VirtualBox:~$ groups jilna
jilna : jilna
julia@julia-VirtualBox:~$ sudo usermod -G student jilna
julia@julia-VirtualBox:~$ groups jilna
jilna : jilna student
julia@julia-VirtualBox:~$ sudo usermod -g qwer jilna
usermod: group 'qwer' does not exist
julia@julia-VirtualBox:~$ sudo groupadd trees
groupadd: group 'trees' already exists
julia@julia-VirtualBox:~$ sudo groupadd red
julia@julia-VirtualBox:~$ sudo groupadd blue
julia@julia-VirtualBox:~$ sudo groupadd green
julia@julia-VirtualBox:~$ sudo usermod -G red,blue,green
Usage: usermod [options] LOGIN

Options:
  -b, --badnames          allow bad names
  -c, --comment COMMENT   new value of the GECOS field
```

groupadd : groupadd command creates a new group account using the values specified on the command line and the default values from the system



```

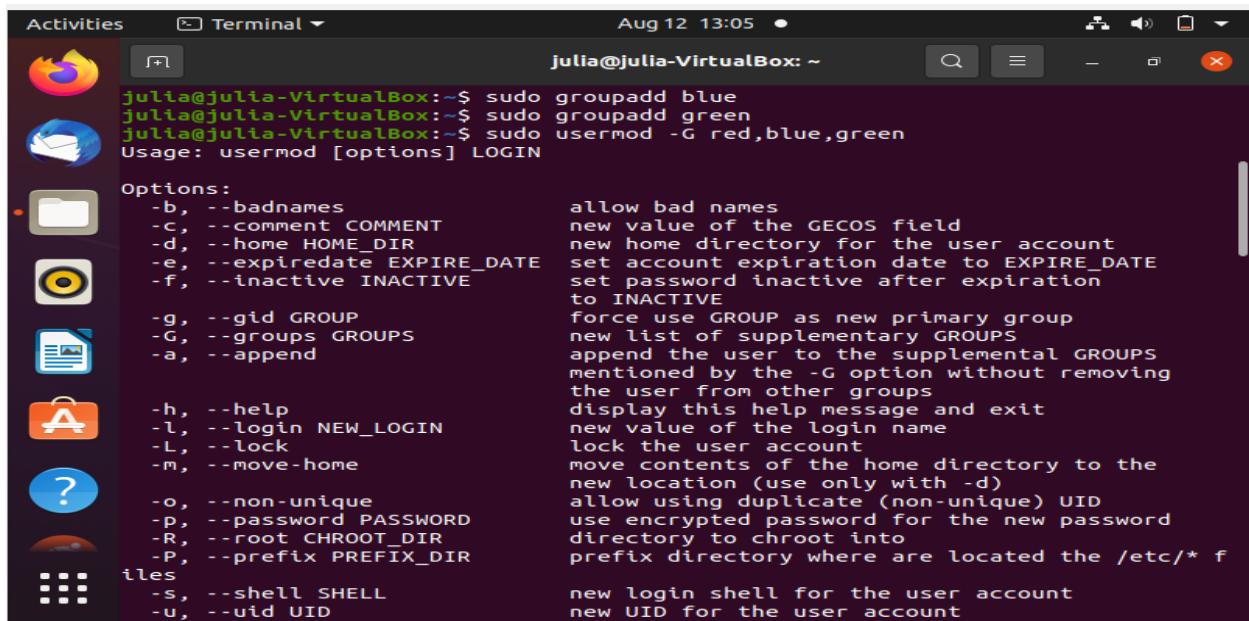
Activities Terminal Aug 12 13:00
julia@julia-VirtualBox:~$ man usermod
julia@julia-VirtualBox:~$ sudo useradd anna
[sudo] password for julia:
useradd: user 'anna' already exists
julia@julia-VirtualBox:~$ sudo useradd jilna
julia@julia-VirtualBox:~$ sudo usermod -u 2000 jilna
julia@julia-VirtualBox:~$ id jilna
uid=2000(jilna) gid=3001(jilna) groups=3001(jilna)
julia@julia-VirtualBox:~$ sudo groupadd student
julia@julia-VirtualBox:~$ groups student
groups: 'student': no such user
julia@julia-VirtualBox:~$ groups jilna
jilna : jilna
julia@julia-VirtualBox:~$ sudo usermod -G student jilna
julia@julia-VirtualBox:~$ groups jilna
jilna : jilna student
julia@julia-VirtualBox:~$ sudo usermod -g qwer jilna
usermod: group 'qwer' does not exist
julia@julia-VirtualBox:~$ sudo groupadd trees
groupadd: group 'trees' already exists
julia@julia-VirtualBox:~$ sudo groupadd red
julia@julia-VirtualBox:~$ sudo groupadd blue
julia@julia-VirtualBox:~$ sudo groupadd green
julia@julia-VirtualBox:~$ sudo usermod -G red,blue,green
Usage: usermod [options] LOGIN

Options:
  -b, --badnames          allow bad names
  -c, --comment COMMENT    new value of the GECOS field

```

groups : - print the groups a user is in

groupdel : groupdel command modifies the system account files, deleting all entries that refer to group.



```

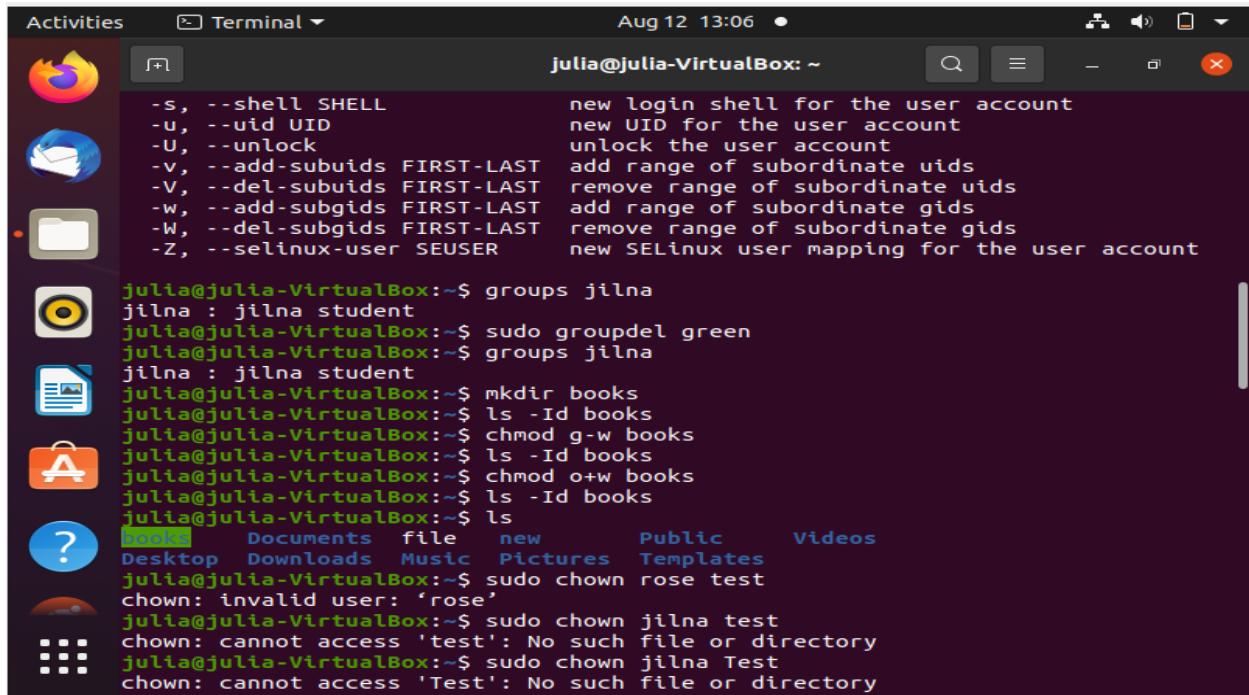
Activities Terminal Aug 12 13:05
julia@julia-VirtualBox:~$ sudo groupadd blue
julia@julia-VirtualBox:~$ sudo groupadd green
julia@julia-VirtualBox:~$ sudo usermod -G red,blue,green
Usage: usermod [options] LOGIN

Options:
  -b, --badnames          allow bad names
  -c, --comment COMMENT    new value of the GECOS field
  -d, --home HOME_DIR      new home directory for the user account
  -e, --expiredate EXPIRE_DATE  set account expiration date to EXPIRE_DATE
  -f, --inactive INACTIVE   set password inactive after expiration
                            to INACTIVE
  -g, --gid GROUP          force use GROUP as new primary group
  -G, --groups GROUPS      new list of supplementary GROUPS
  -a, --append               append the user to the supplemental GROUPS
                             mentioned by the -G option without removing
                             the user from other groups
  -h, --help                  display this help message and exit
  -l, --login NEW_LOGIN     new value of the login name
  -L, --lock                  lock the user account
  -m, --move-home            move contents of the home directory to the
                             new location (use only with -d)
  -o, --non-unique           allow using duplicate (non-unique) UID
  -p, --password PASSWORD    use encrypted password for the new password
  -R, --root CHROOT_DIR      directory to chroot into
  -P, --prefix PREFIX_DIR    prefix directory where are located the /etc/* f
                             iles
  -s, --shell SHELL          new login shell for the user account
  -u, --uid UID                new UID for the user account

```

groupmod : The groupmod command modifies the definition of the specified group by modifying the appropriate entry in the group database

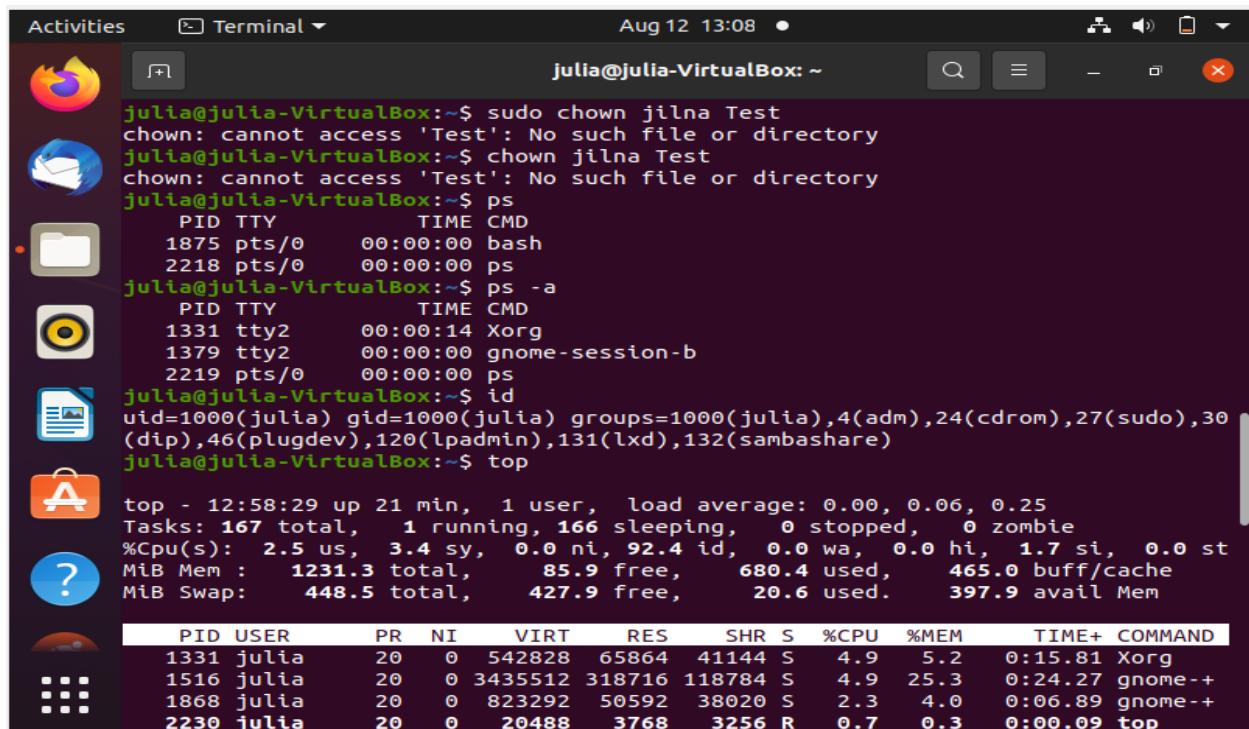
chmod : To change directory permissions of file/ Directory in Linux



```
Activities Terminal Aug 12 13:06
julia@julia-VirtualBox: ~
-s, --shell SHELL      new login shell for the user account
-u, --uid UID          new UID for the user account
-U, --unlock            unlock the user account
-v, --add-subuids FIRST-LAST add range of subordinate uids
-V, --del-subuids FIRST-LAST remove range of subordinate uids
-w, --add-subgids FIRST-LAST add range of subordinate gids
-W, --del-subgids FIRST-LAST remove range of subordinate gids
-Z, --selinux-user SEUSER new SELinux user mapping for the user account

julia@julia-VirtualBox:~$ groups jilna
jilna : jilna student
julia@julia-VirtualBox:~$ sudo groupdel green
julia@julia-VirtualBox:~$ groups jilna
jilna : jilna student
julia@julia-VirtualBox:~$ mkdir books
julia@julia-VirtualBox:~$ ls -Id books
julia@julia-VirtualBox:~$ chmod g-w books
julia@julia-VirtualBox:~$ ls -Id books
julia@julia-VirtualBox:~$ chmod o+w books
julia@julia-VirtualBox:~$ ls -Id books
julia@julia-VirtualBox:~$ ls
books  Documents  file  new  Public  Videos
Desktop  Downloads  Music  Pictures  Templates
julia@julia-VirtualBox:~$ sudo chown rose test
chown: invalid user: 'rose'
julia@julia-VirtualBox:~$ sudo chown jilna test
chown: cannot access 'test': No such file or directory
julia@julia-VirtualBox:~$ sudo chown jilna Test
chown: cannot access 'Test': No such file or directory
```

chown : The chown command allows you to change the user and/or group ownership of a given file, directory

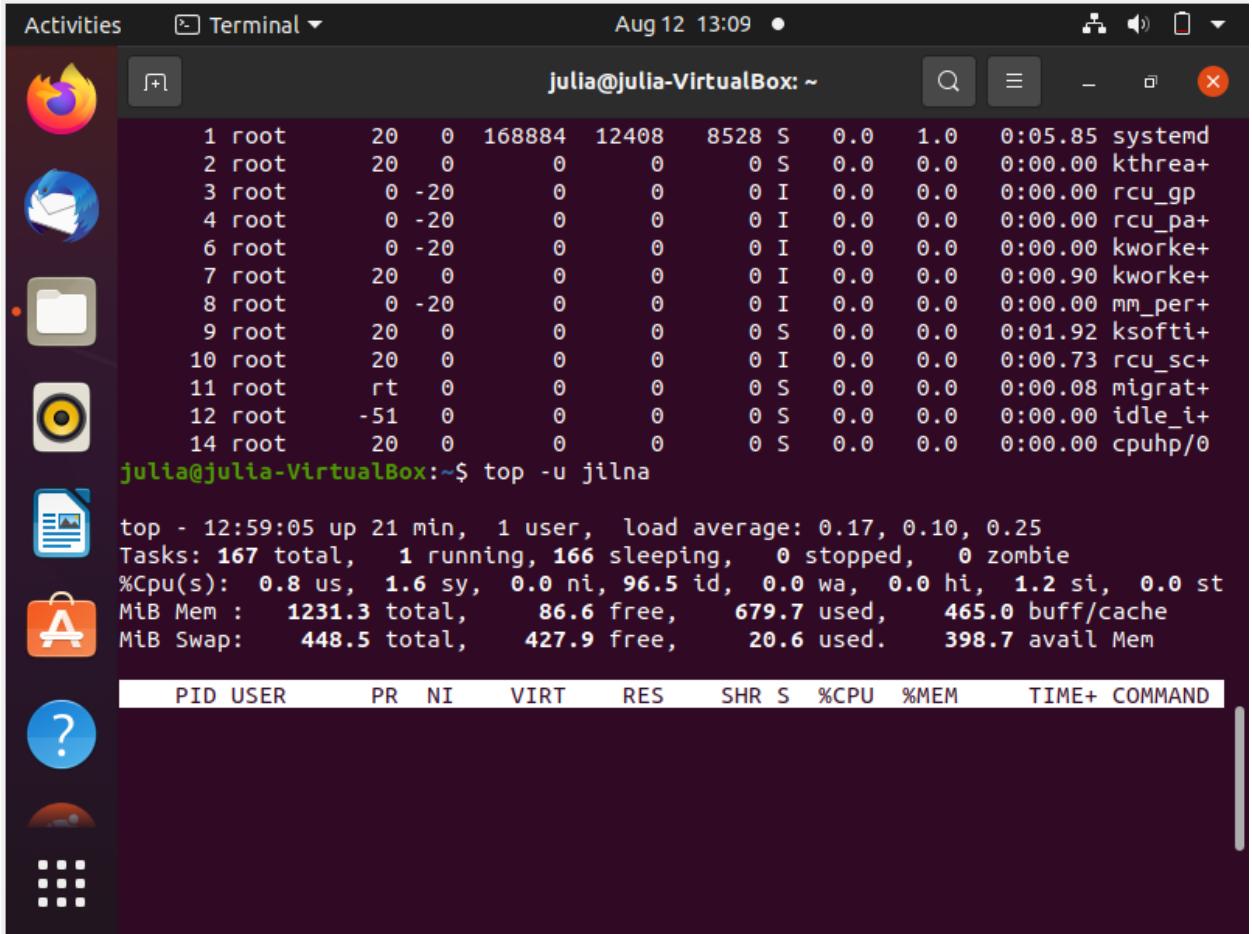


```
Activities Terminal Aug 12 13:08
julia@julia-VirtualBox: ~
julia@julia-VirtualBox:~$ sudo chown jilna Test
chown: cannot access 'Test': No such file or directory
julia@julia-VirtualBox:~$ chown jilna Test
chown: cannot access 'Test': No such file or directory
julia@julia-VirtualBox:~$ ps
    PID TTY      TIME CMD
  1875 pts/0    00:00:00 bash
  2218 pts/0    00:00:00 ps
julia@julia-VirtualBox:~$ ps -a
    PID TTY      TIME CMD
  1331 tty2    00:00:14 Xorg
  1379 tty2    00:00:00 gnome-session-b
  2219 pts/0    00:00:00 ps
julia@julia-VirtualBox:~$ id
uid=1000(julia) gid=1000(julia) groups=1000(julia),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),120(lpadmin),131(lxd),132(sambashare)
julia@julia-VirtualBox:~$ top
top - 12:58:29 up 21 min, 1 user, load average: 0.00, 0.06, 0.25
Tasks: 167 total, 1 running, 166 sleeping, 0 stopped, 0 zombie
%CPU(s): 2.5 us, 3.4 sy, 0.0 ni, 92.4 id, 0.0 wa, 0.0 hi, 1.7 si, 0.0 st
MiB Mem : 1231.3 total, 85.9 free, 680.4 used, 465.0 buff/cache
MiB Swap: 448.5 total, 427.9 free, 20.6 used. 397.9 avail Mem

      PID USER      PR  NI    VIRT    RES    SHR S %CPU %MEM     TIME+ COMMAND
  1331 julia     20   0  542828  65864  41144 S  4.9  5.2  0:15.81 Xorg
  1516 julia     20   0 3435512 318716 118784 S  4.9 25.3  0:24.27 gnome-+
  1868 julia     20   0  823292  50592  38020 S  2.3  4.0  0:06.89 gnome-+
  2230 julia     20   0   20488   3768   3256 R  0.7  0.3  0:00.09 top
```

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

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



A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window titled "Terminal". The terminal displays the output of the "top" command. The top half of the terminal shows a list of processes with columns for PID, USER, PR, NI, VIRT, RES, SHR, S, %CPU, %MEM, and TIME+. The bottom half shows system statistics: tasks, CPU usage (%Cpu(s)), and memory usage (MiB Mem and MiB Swap). The desktop background features a dark theme with various application icons in the dock.

```
julia@julia-VirtualBox:~$ top -u jilna
top - 12:59:05 up 21 min,  1 user,  load average: 0.17, 0.10, 0.25
Tasks: 167 total,   1 running, 166 sleeping,   0 stopped,   0 zombie
%Cpu(s):  0.8 us,  1.6 sy,  0.0 ni, 96.5 id,  0.0 wa,  0.0 hi,  1.2 si,  0.0 st
MiB Mem : 1231.3 total,     86.6 free,    679.7 used,   465.0 buff/cache
MiB Swap:  448.5 total,    427.9 free,    20.6 used.   398.7 avail Mem

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

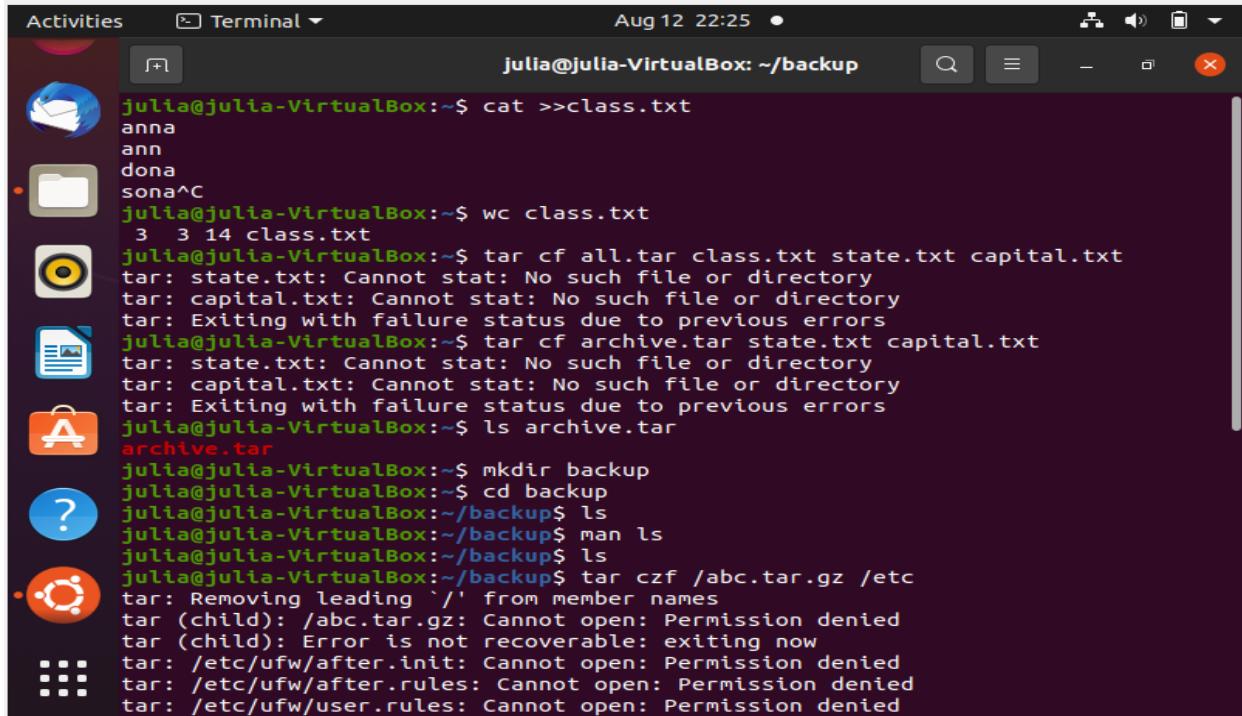
```

top : top command is used to show the Linux processes.

ASSIGNMENT 5

JULIA GEORGE

WC : Used for counting purpose

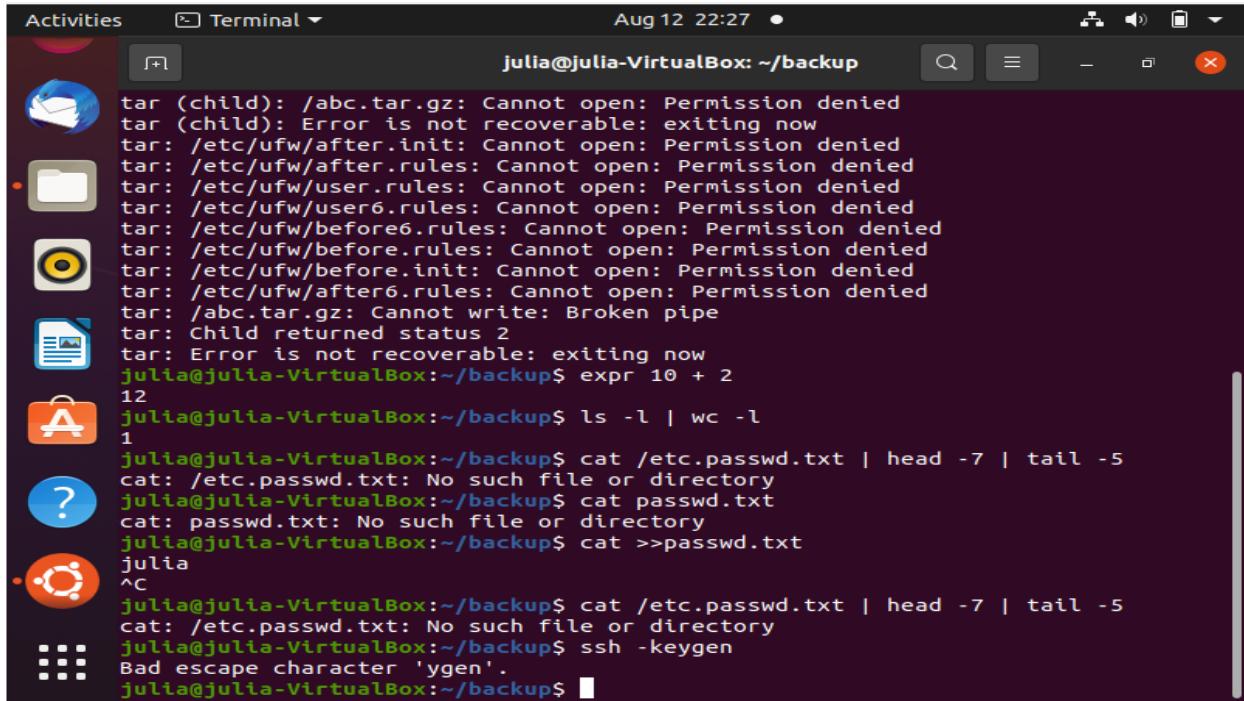


The screenshot shows a terminal window in a Linux desktop environment. The terminal title is "Terminal" and the current user is "julia@julia-VirtualBox". The terminal window displays the following commands and their outputs:

```
julia@julia-VirtualBox:~$ cat >>class.txt
anna
ann
dona
sona^C
julia@julia-VirtualBox:~$ wc class.txt
 3 3 14 class.txt
julia@julia-VirtualBox:~$ tar cf all.tar class.txt state.txt capital.txt
tar: state.txt: Cannot stat: No such file or directory
tar: capital.txt: Cannot stat: No such file or directory
tar: Exiting with failure status due to previous errors
julia@julia-VirtualBox:~$ tar cf archive.tar state.txt capital.txt
tar: state.txt: Cannot stat: No such file or directory
tar: capital.txt: Cannot stat: No such file or directory
tar: Exiting with failure status due to previous errors
julia@julia-VirtualBox:~$ ls archive.tar
archive.tar
julia@julia-VirtualBox:~$ mkdir backup
julia@julia-VirtualBox:~$ cd backup
julia@julia-VirtualBox:~/backup$ ls
julia@julia-VirtualBox:~/backup$ man ls
julia@julia-VirtualBox:~/backup$ ls
julia@julia-VirtualBox:~/backup$ tar czf /abc.tar.gz /etc
tar: Removing leading '/' from member names
tar (child): /abc.tar.gz: Cannot open: Permission denied
tar (child): Error is not recoverable: exiting now
tar: /etc/ufw/after.init: Cannot open: Permission denied
tar: /etc/ufw/after.rules: Cannot open: Permission denied
tar: /etc/ufw/user.rules: Cannot open: Permission denied
```

tar : The Linux 'tar' stands for tape archive, is used to create Archive and extract the Archive files

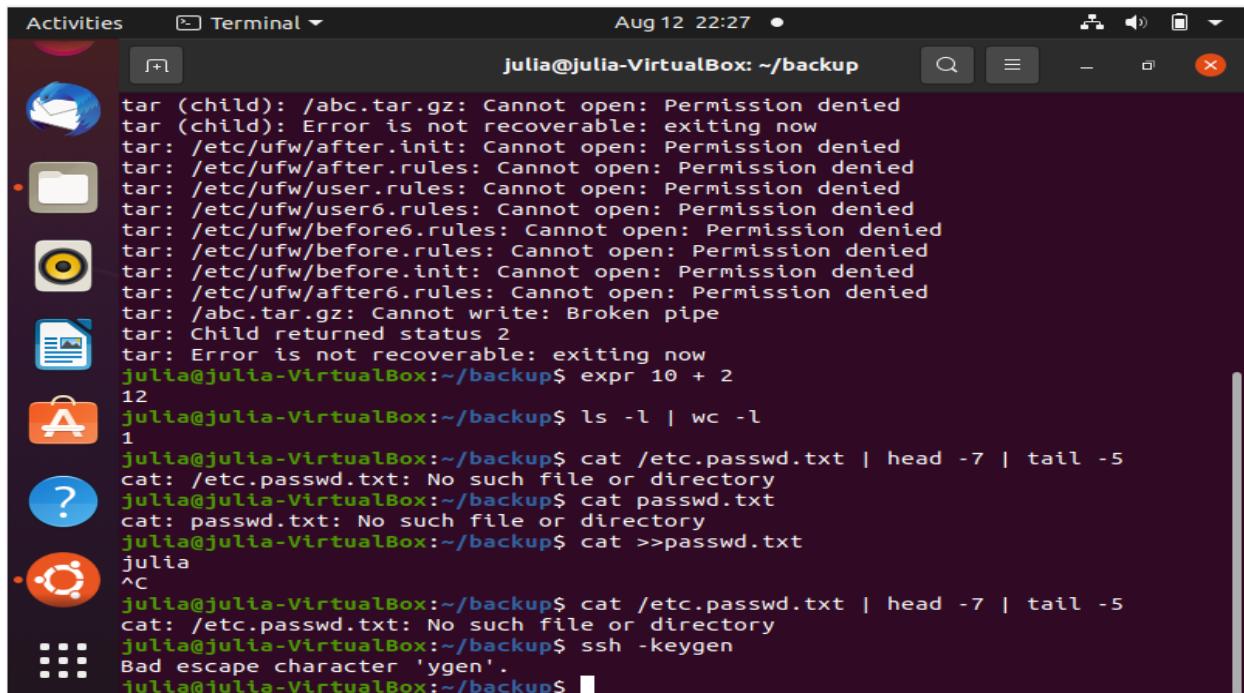
expr : The expr command evaluates a given expression and displays its corresponding output



A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window titled "Terminal". The terminal window has a dark background and contains the following command-line session:

```
Activities Terminal Aug 12 22:27 julia@julia-VirtualBox: ~/backup
tar (child): /abc.tar.gz: Cannot open: Permission denied
tar (child): Error is not recoverable: exiting now
tar: /etc/ufw/after.init: Cannot open: Permission denied
tar: /etc/ufw/after.rules: Cannot open: Permission denied
tar: /etc/ufw/user.rules: Cannot open: Permission denied
tar: /etc/ufw/user6.rules: Cannot open: Permission denied
tar: /etc/ufw/before6.rules: Cannot open: Permission denied
tar: /etc/ufw/before.rules: Cannot open: Permission denied
tar: /etc/ufw/before.init: Cannot open: Permission denied
tar: /etc/ufw/after6.rules: Cannot open: Permission denied
tar: /abc.tar.gz: Cannot write: Broken pipe
tar: Child returned status 2
tar: Error is not recoverable: exiting now
julia@julia-VirtualBox:~/backup$ expr 10 + 2
12
julia@julia-VirtualBox:~/backup$ ls -l | wc -l
1
julia@julia-VirtualBox:~/backup$ cat /etc.passwd.txt | head -7 | tail -5
cat: /etc.passwd.txt: No such file or directory
julia@julia-VirtualBox:~/backup$ cat passwd.txt
cat: passwd.txt: No such file or directory
julia@julia-VirtualBox:~/backup$ cat >>passwd.txt
julia
^C
julia@julia-VirtualBox:~/backup$ cat /etc.passwd.txt | head -7 | tail -5
cat: /etc.passwd.txt: No such file or directory
julia@julia-VirtualBox:~/backup$ ssh -keygen
Bad escape character 'ygen'.
julia@julia-VirtualBox:~/backup$
```

redirections and 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



A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window titled "Terminal". The terminal window has a dark background and contains the same command-line session as the previous screenshot, demonstrating the use of redirection and piping.

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

scp : copy files and directories between two locations

ASSIGNMENT 6

JULIA GEORGE

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

```
julia@julia-VirtualBox:~$ touch snap1.mp3
julia@julia-VirtualBox:~$ touch snap2.mp3
julia@julia-VirtualBox:~$ touch snap3.mp3
julia@julia-VirtualBox:~$ touch snap4.mp3
julia@julia-VirtualBox:~$ touch snap5.mp3
julia@julia-VirtualBox:~$ touch snap6.mp3
julia@julia-VirtualBox:~$ ls
all.tar      class.txt  file      Public    snap4.mp3  song2.mp3  song6.mp3
archive.tar  Desktop    Music     snap1.mp3  snap5.mp3  song3.mp3  Templates
backup       Documents  new      snap2.mp3  snap6.mp3  song4.mp3  Videos
books        Downloads  Pictures  snap3.mp3  song1.mp3  song5.mp3  work
julia@julia-VirtualBox:~$
```

```
julia@julia-VirtualBox:~$ ls
all.tar      class.txt  file      Public    song4.mp3  Videos
archive.tar  Desktop    Music     song1.mp3  song5.mp3  work
backup       Documents  new      song2.mp3  song6.mp3
books        Downloads  Pictures  song3.mp3  Templates
julia@julia-VirtualBox:~$
```

```
julia@julia-VirtualBox:~$ touch film1.mp3
julia@julia-VirtualBox:~$ touch film2.mp3
julia@julia-VirtualBox:~$ touch film3.mp3
julia@julia-VirtualBox:~$ touch film4.mp3
julia@julia-VirtualBox:~$ touch film5.mp3
julia@julia-VirtualBox:~$ touch film5.mp3
```

- 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

```
julia@julia-VirtualBox:~$ mv song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3  
song6.mp3 music  
julia@julia-VirtualBox:~$ cd music  
julia@julia-VirtualBox:~/music$ ls  
song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3  
julia@julia-VirtualBox:~/music$ cd ..  
julia@julia-VirtualBox:~$ mv snap1.mp3 snap2.mp3 snap3.mp3 snap4.mp3 snap5.mp3  
snap6.mp3 picture  
julia@julia-VirtualBox:~$ cd picture  
julia@julia-VirtualBox:~/picture$ ls  
snap1.mp3 snap2.mp3 snap3.mp3 snap4.mp3 snap5.mp3 snap6.mp3  
julia@julia-VirtualBox:~/picture$ cd ..  
julia@julia-VirtualBox:~$ mv film1.mp3 film2.mp3 film3.mp3 film4.mp3 film5.mp3  
film6.mp3 videos  
julia@julia-VirtualBox:~$ cd videos  
julia@julia-VirtualBox:~/videos$ ls  
film1.mp3 film2.mp3 film3.mp3 film4.mp3 film5.mp3 film6.mp3  
julia@julia-VirtualBox:~/videos$ cd ..  
julia@julia-VirtualBox:~$
```

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.



```
julia@julia-VirtualBox:~$ rm -r family  
julia@julia-VirtualBox:~$ rm -r works  
julia@julia-VirtualBox:~$ mkdir friends family work  
julia@julia-VirtualBox:~$ ls  
all.tar books Documents file Music Pictures videos  
archive.tar class.txt Downloads friends new Public Videos  
backup Desktop family music picture Templates work  
julia@julia-VirtualBox:~$
```

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



```
cp: cannot stat 'song0.mp3': No such file or directory  
julia@julia-VirtualBox:~$ cp music/song1.mp3 music/song2.mp3 music/song3.mp3 mu  
sic/song4.mp3 music/song5.mp3 music/song6.mp3 friends  
julia@julia-VirtualBox:~$ cp picture/snap1.mp3 picture/snap2.mp3 picture/snap3.  
mp3 picture/snap4.mp3 picture/snap5.mp3 picture/snap6.mp3 family  
julia@julia-VirtualBox:~$ ls
```

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



```
Backup Desktop Family Music Picture Temp  
julia@julia-VirtualBox:~$ rmdir family friends  
rmdir: failed to remove 'family': Directory not empty  
rmdir: failed to remove 'friends': Directory not empty  
julia@julia-VirtualBox:~$ rm -r family friends  
julia@julia-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

```
julia@julia-VirtualBox:~$ ls -al >allfiles.txt
julia@julia-VirtualBox:~$ ls
allfiles.txt  backup      Desktop     file      new      Public      Videos
all.tar        books       Documents   music    picture   Templates   work
archive.tar    class.txt  Downloads  Music    Pictures  videos
julia@julia-VirtualBox:~$ ls -al
total 140
drwxr-xr-x  23 julia julia  4096 Aug 17 20:59 .
drwxr-xr-x  3 root  root  4096 Jun 14 16:18 ..
-rw-rw-r--  1 julia julia     0 Aug 17 20:59 allfiles.txt
-rw-rw-r--  1 julia julia 10240 Aug 12 22:07 all.tar
-rw-rw-r--  1 julia julia 10240 Aug 12 22:10 archive.tar
drwxrwxr-x  2 julia julia  4096 Aug 12 22:22 backup
-rw-----  1 julia julia 3555 Aug 17 15:19 .bash_history
-rw-r--r--  1 julia julia   220 Jun 14 16:18 .bash_logout
-rw-r--r--  1 julia julia 3771 Jun 14 16:18 .bashrc
drwxr-xrwx  2 julia julia  4096 Aug 12 12:52 books
drwx----- 15 julia julia  4096 Aug 12 16:24 .cache
-rw-rw-r--  1 julia julia    14 Aug 12 22:05 class.txt
drwx----- 13 julia julia  4096 Aug 12 12:58 .config
drwxr-xr-x  2 julia julia  4096 Jun 14 16:44 Desktop
drwxr-xr-x  2 julia julia  4096 Jun 14 16:44 Documents
drwxr-xr-x  2 julia julia  4096 Jun 14 16:44 Downloads
-rw-rw-r--  1 julia julia    27 Jun 14 22:00 file
drwx-----  3 julia julia  4096 Jun 14 22:25 .gnupg
-rw-rw-r--  1 julia julia     0 Jun 20 15:03 .lesshsQ
drwxr-xr-x  3 julia julia  4096 Jun 14 16:44 .local
```

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

9. Add the user Juliet

```
julia@julia-VirtualBox:~$ date
Tuesday 17 August 2021 09:02:02 PM IST
julia@julia-VirtualBox:~$ sudo useradd juliet
[sudo] password for julia:
```

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

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

```
julia@julia-VirtualBox:~$ cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:6:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106::/nonexistent:/usr/sbin/nologin
syslog:x:104:110::/home/syslog:/usr/sbin/nologin
_apt:x:105:65534::/nonexistent:/usr/sbin/nologin
```

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

```
julia@julia-VirtualBox:~$ sudo groupadd -g 30000 shakespeare
julia@julia-VirtualBox:~$ sudo groupadd -g 20000 artists
julia@julia-VirtualBox:~$ cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,julia
tty:x:5:syslog
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
LibreOffice Writer:x:10:julia
man:x:12:
proxy:x:13:
kmem:x:15:
dialout:x:20:
fax:x:21:
voice:x:22:
cdrom:x:24:julia
floppy:x:25:
tape:x:26:
sudo:x:27:julia
audio:x:29:pulse
dip:x:30:julia
www-data:x:33:
backup:x:34:
```

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

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

```
julia@julia-VirtualBox:~$ groups juliet
juliet : juliet
julia@julia-VirtualBox:~$ sudo usermod -a -G shakespeare juliet
julia@julia-VirtualBox:~$ id juliet
uid=3001(juliet) gid=3005(juliet) groups=3005(juliet),30000(shakespeare)
julia@julia-VirtualBox:~$ █
```

17 Add Romeo and Hamlet to the Shakespeare group.

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

```
julia@julia-VirtualBox:~$ sudo useradd romeo
julia@julia-VirtualBox:~$ sudo useradd hamlet
julia@julia-VirtualBox:~$ sudo usermod -a -G shakespeare romeo
julia@julia-VirtualBox:~$ sudo usermod -a -G shakespeare hamlet
julia@julia-VirtualBox:~$ id romeo
uid=3002(romeo) gid=30001(romeo) groups=30001(romeo),30000(shakespeare)
julia@julia-VirtualBox:~$ id hamlet
uid=3003(hamlet) gid=30002(hamlet) groups=30002(hamlet),30000(shakespeare)
julia@julia-VirtualBox:~$ █
```

```
julia@julia-VirtualBox:~$ sudo useradd reba
julia@julia-VirtualBox:~$ sudo useradd dolly
julia@julia-VirtualBox:~$ sudo useradd elvis
julia@julia-VirtualBox:~$ sudo usermod -a -G artists reba
julia@julia-VirtualBox:~$ sudo usermod -a -G artists dolly
julia@julia-VirtualBox:~$ sudo usermod -a -G artists elvis
julia@julia-VirtualBox:~$ █
```

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

20. Attempt to remove user Dolly

```
julia@julia-VirtualBox:~$ cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,julia
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:julia
floppy:x:25:
tape:x:26:
sudo:x:27:julia
audio:x:29:pulse
dip:x:30:julia
www-data:x:33:
backup:x:34:
operator:x:37:
list:x:38:
```

```
julia@julia-VirtualBox:~$ userdel -r dolly
userdel: Permission denied.
userdel: cannot lock /etc/passwd; try again later.
julia@julia-VirtualBox:~$ █
```


1. Ping & traceroute tests

Ping and Trace Route tests can help to identify any connection issues between your network and a specified server (or website) address.

PING test

The PING command is used to test the connection and latency between two network connections. The PING command sends packets of information to a specified IP Address and then measures the time it takes to get a response from the specified computer or device.

```
C:\Users\DA>ping google.com

Pinging google.com [2404:6800:4002:820::200e] with 32 bytes of data:
Reply from 2404:6800:4002:820::200e: time=157ms
Reply from 2404:6800:4002:820::200e: time=253ms
Reply from 2404:6800:4002:820::200e: time=160ms
Reply from 2404:6800:4002:820::200e: time=108ms

Ping statistics for 2404:6800:4002:820::200e:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 108ms, Maximum = 253ms, Average = 169ms

C:\Users\DA>ping -a google.com

Pinging google.com [2404:6800:4002:820::200e] with 32 bytes of data:
Reply from 2404:6800:4002:820::200e: time=1297ms
Reply from 2404:6800:4002:820::200e: time=186ms
Reply from 2404:6800:4002:820::200e: time=186ms
Reply from 2404:6800:4002:820::200e: time=187ms

Ping statistics for 2404:6800:4002:820::200e:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 186ms, Maximum = 1297ms, Average = 464ms

C:\Users\DA>ping -j google.com

Pinging google.com [142.250.195.14] with 32 bytes of data:
General failure.
General failure.
General failure.
General failure.

Ping statistics for 142.250.195.14:
  Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\DA>ping -4 google.com

Pinging google.com [142.250.195.14] with 32 bytes of data:
Reply from 142.250.195.14: bytes=32 time=143ms TTL=113
```

Trace Route test

The TRACERT command is used to conduct a similar test to PING, but instead of displaying the time it takes to connect, it looks at the exact server hops required to connect your computer to the server.

You should already have the CMD prompt dialogue box open, after performing the PING test above.

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

Tracing route to www.google.com [2404:6800:4007:827::2004]
over a maximum of 30 hops:

 1    45 ms      97 ms      97 ms  2409:4073:4e01:18b8::58
 2    *          *          *          Request timed out.
 3    183 ms     97 ms      97 ms  2405:200:365:eeee:20::344
 4    81 ms       42 ms      45 ms  2405:200:801:1100::3da
 5    147 ms     54 ms      46 ms  2405:200:801:1100::3d9
 6    191 ms     94 ms      49 ms  2405:200:100::1:0:37e
 7    146 ms     64 ms      63 ms  2001:4860:1:1::171
 8    158 ms     112 ms     68 ms  2001:4860:1:1::8f2
 9    137 ms     56 ms      64 ms  2404:6800:8133::1
10    183 ms     62 ms      67 ms  2001:4860:0:1::55d0
11    181 ms     54 ms      65 ms  2001:4860:0:1::559d
12    158 ms     55 ms      76 ms  2404:6800:4007:827::2004

Trace complete.

C:\Users\DA>
C:\Users\DA>tracert www.google.com

Tracing route to www.google.com [2404:6800:4007:827::2004]
over a maximum of 30 hops:

 1    57 ms      97 ms      96 ms  2409:4073:4e01:18b8::58
 2    *          *          *          Request timed out.
 3    123 ms     97 ms      97 ms  2405:200:365:eeee:20::344
 4    82 ms       55 ms      85 ms  2405:200:801:1100::3da
 5    55 ms       83 ms      56 ms  2405:200:801:1100::3d9
 6    150 ms     62 ms      66 ms  2405:200:100::1:0:37e
 7    177 ms     96 ms      52 ms  2001:4860:1:1::171
 8    67 ms       55 ms      62 ms  2001:4860:1:1::8f2
 9    118 ms     63 ms      57 ms  2404:6800:8133::1
10    127 ms     54 ms      64 ms  2001:4860:0:1::55d0
11    69 ms       54 ms      67 ms  2001:4860:0:1::559d
12    177 ms     54 ms      65 ms  maa03s42-in-x04.1e100.net [2404:6800:4007:827::2004]

Trace complete.
```

```
C:\Users\DA>tracert 192.168.1.1

Tracing route to 192.168.1.1 over a maximum of 30 hops

 1      4 ms      4 ms      4 ms  192.168.43.199
 2      *          *          *      Request timed out.
 3    112 ms     97 ms     98 ms  56.8.126.61
 4     70 ms     43 ms     44 ms  172.26.104.197
 5   184 ms     97 ms     97 ms  172.26.104.211
 6   168 ms     97 ms     97 ms  192.168.14.38
 7     80 ms     44 ms     44 ms  192.168.14.37
 8   116 ms     97 ms     97 ms  172.16.3.14
 9   135 ms     56 ms     35 ms  172.16.81.0
10   110 ms     44 ms     56 ms  172.16.0.159
11   123 ms     98 ms     97 ms  172.16.3.15
12   104 ms     97 ms     97 ms  172.16.5.70

C:\Users\DA>route print *157
=====
Interface List
 2...b4 b6 86 0d 60 71 .....Realtek PCIe GBE Family Controller
 12...0a 00 27 00 00 0c .....VirtualBox Host-Only Ethernet Adapter
 18...82 c5 f2 7c 3b 59 .....Microsoft Wi-Fi Direct Virtual Adapter
 8...80 c5 f2 7c 3b 59 .....Microsoft Wi-Fi Direct Virtual Adapter #2
 10...80 c5 f2 7c 3b 59 .....Realtek RTL8723DE 802.11b/g/n PCIe Adapter
 7...80 c5 f2 7c 3b 58 .....Bluetooth Device (Personal Area Network)
 1.....Software Loopback Interface 1
=====

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

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

C:\Users\DA>
```

```
C:\Users\DA>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.
```

```
C:\Users\DA>route print -4
=====
Interface List
 2...b4 b6 86 0d 60 71 .... Realtek PCIe GBE Family Controller
 12...0a 00 27 00 00 0c .... VirtualBox Host-Only Ethernet Adapter
 18...82 c5 f2 7c 3b 59 .... Microsoft Wi-Fi Direct Virtual Adapter
  8...80 c5 f2 7c 3b 59 .... Microsoft Wi-Fi Direct Virtual Adapter #2
 10...80 c5 f2 7c 3b 59 .... Realtek RTL8723DE 802.11b/g/n PCIe Adapter
  7...80 c5 f2 7c 3b 58 .... Bluetooth Device (Personal Area Network)
  1..... Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask        Gateway       Interface Metric
          0.0.0.0        0.0.0.0    192.168.43.199  192.168.43.31    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
          169.254.0.0      255.255.0.0        On-link    192.168.56.1    30
 169.254.255.255      255.255.255.255  On-link    192.168.56.1   281
          192.168.43.0      255.255.255.0        On-link  192.168.43.31   311
          192.168.43.31      255.255.255.255  On-link  192.168.43.31   311
 192.168.43.255      255.255.255.255  On-link  192.168.43.31   311
          192.168.56.0      255.255.255.0        On-link  192.168.56.1   281
          192.168.56.1      255.255.255.255  On-link  192.168.56.1   281
 192.168.56.255      255.255.255.255  On-link  192.168.56.1   281
          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    192.168.56.1   281
          224.0.0.0        240.0.0.0        On-link  192.168.43.31   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    192.168.56.1   281
 255.255.255.255      255.255.255.255  On-link  192.168.43.31   311
=====

Persistent Routes:
  None
```

```
        224.0.0.0      240.0.0.0      On-link      192.168.43.31      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          192.168.56.1      281
  255.255.255.255 255.255.255.255  On-link      192.168.43.31      311
=====
Persistent Routes:
  None

IPv6 Route Table
=====
Active Routes:
  If Metric Network Destination      Gateway
  10      71  ::/0                  fe80::560e:2dff:fea5:352d
    1     331  ::1/128              On-link
  10      71  2409:4073:4e01:18b8::/64  On-link
  10     311  2409:4073:4e01:18b8:fca3:b447:9b86:7707/128
                                              On-link
  10     311  2409:4073:4e01:18b8:fdee:575c:b600:3049/128
                                              On-link
  12     281  fe80::/64            On-link
  10     311  fe80::/64            On-link
  12     281  fe80::1d38:6d43:d631:edb4/128
                                              On-link
  10     311  fe80::fca3:b447:9b86:7707/128
                                              On-link
    1     331  ff00::/8            On-link
  12     281  ff00::/8            On-link
  10     311  ff00::/8            On-link
=====
Persistent Routes:
  None

C:\Users\DA>
```

```
C:\Users\DA>route print
=====
Interface List
 2...b4 b6 86 0d 60 71 .... Realtek PCIe GBE Family Controller
 12...0a 00 27 00 00 0c .... VirtualBox Host-Only Ethernet Adapter
 18...82 c5 f2 7c 3b 59 .... Microsoft Wi-Fi Direct Virtual Adapter
  8...80 c5 f2 7c 3b 59 .... Microsoft Wi-Fi Direct Virtual Adapter #2
 10...80 c5 f2 7c 3b 59 .... Realtek RTL8723DE 802.11b/g/n PCIe Adapter
  7...80 c5 f2 7c 3b 58 .... Bluetooth Device (Personal Area Network)
  1..... Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask        Gateway        Interface Metric
          0.0.0.0      0.0.0.0    192.168.43.199  192.168.43.31    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
        169.254.0.0  255.255.0.0        On-link     192.168.56.1    30
 169.254.255.255  255.255.255.255        On-link     192.168.56.1   281
        192.168.43.0  255.255.255.0        On-link     192.168.43.31   311
        192.168.43.31  255.255.255.255        On-link     192.168.43.31   311
 192.168.43.255  255.255.255.255        On-link     192.168.43.31   311
        192.168.56.0  255.255.255.0        On-link     192.168.56.1   281
        192.168.56.1  255.255.255.255        On-link     192.168.56.1   281
 192.168.56.255  255.255.255.255        On-link     192.168.56.1   281
        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     192.168.56.1   281
        224.0.0.0    240.0.0.0        On-link     192.168.43.31   311

C:\Users\DA>tracert 22.110.0.1
Tracing route to 22.110.0.1 over a maximum of 30 hops

 1     8 ms      7 ms      2 ms  192.168.43.199
 2     *          *          * Request timed out.
 3  135 ms     97 ms     97 ms  56.8.126.45
 4  194 ms     96 ms     97 ms  172.26.104.197
 5  109 ms     41 ms     52 ms  172.26.104.211
 6  112 ms     50 ms     66 ms  192.168.14.32
 7  157 ms    128 ms    166 ms  192.168.14.35
 8  124 ms    198 ms    97 ms  172.16.3.14
 9  182 ms     97 ms    199 ms  172.16.81.2
10  117 ms     61 ms     74 ms  172.16.0.159
11  191 ms    199 ms    200 ms  172.16.3.15
12  105 ms    115 ms    119 ms  172.16.2.60
13  395 ms    302 ms    302 ms  103.198.140.106
14  615 ms    301 ms    302 ms  103.198.140.54
```

2. Nslookup

Microsoft Windows includes a tool called NSLOOKUP that you can use via the command prompt. This tool can be used to check DNS records propagation and resolution using different servers, and perform other troubleshooting steps.

```
C:\Users\DA>nslookup
Default Server: UnKnown
Address: 192.168.43.10

>
C:\Users\DA>nslookup -g=MX google.com
*** Invalid option: g=MX
Server: UnKnown
Address: 192.168.43.10

Non-authoritative answer:
Name: google.com
Addresses: 2404:6800:4007:81d::200e
           142.250.194.46

C:\Users\DA>
```

3. Netstat

On Windows 10, netstat (network statistics) has been around for a long time, and it's a command-line tool that you can use in Command Prompt to display statistics for all network connections. It allows you to understand open and connected ports to monitor and troubleshoot networking problems for system or applications.

```
C:\Users\DA>netstat
Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.43.31:63272   20.197.71.89:https    ESTABLISHED
  TCP    192.168.43.31:63338   20.44.229.112:https  TIME_WAIT
  TCP    192.168.43.31:63339   20.44.229.112:https  ESTABLISHED
  TCP    [2409:4073:4e01:18b8:a094:fcde:e73c:2dc5]:63333  [2606:2800:147:120f:30c:1ba0:fc6:265a]:https  CLOSE_WAIT

C:\Users\DA>
```

netstat -n

command to display active connections showing numeric IP address and port number instead of trying to determine the names .

netstat -n INTERVAL

In the command, make sure to replace INTERVAL for the number (in seconds) you want to redisplay the information.

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

Active Connections

Proto Local Address          Foreign Address        State
TCP   192.168.43.31:63272  20.197.71.89:443    ESTABLISHED
TCP   192.168.43.31:63338  20.44.229.112:443   TIME_WAIT
TCP   192.168.43.31:63339  20.44.229.112:443   TIME_WAIT
TCP   192.168.43.31:63340  20.44.229.112:443   ESTABLISHED
TCP   [2409:4073:4e01:18b8:a094:fcdc:e73c:2dc5]:63333 [2606:2800:147:120f:30c:1ba0:fc6:265a]:443 CLOSE_WAIT

C:\Users\DA>netstat -n 5

Active Connections

Proto Local Address          Foreign Address        State
TCP   192.168.43.31:63272  20.197.71.89:443    ESTABLISHED
TCP   192.168.43.31:63339  20.44.229.112:443   TIME_WAIT
TCP   192.168.43.31:63340  20.44.229.112:443   ESTABLISHED
TCP   [2409:4073:4e01:18b8:a094:fcdc:e73c:2dc5]:63333 [2606:2800:147:120f:30c:1ba0:fc6:265a]:443 CLOSE_WAIT

Active Connections
```

netstat -a

The netstat -a command displays all active and inactive connections, and the TCP and UDP ports the device is currently listening.

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

Active Connections

Proto Local Address          Foreign Address        State
TCP   0.0.0.0:135             DA:0                LISTENING
TCP   0.0.0.0:445             DA:0                LISTENING
TCP   0.0.0.0:5040            DA:0                LISTENING
TCP   0.0.0.0:5357            DA:0                LISTENING
TCP   0.0.0.0:49664           DA:0                LISTENING
TCP   0.0.0.0:49665           DA:0                LISTENING
TCP   0.0.0.0:49666           DA:0                LISTENING
TCP   0.0.0.0:49667           DA:0                LISTENING
TCP   0.0.0.0:49668           DA:0                LISTENING
TCP   0.0.0.0:49669           DA:0                LISTENING
TCP   127.0.0.1:5354          DA:0                LISTENING
TCP   192.168.43.31:139       DA:0                LISTENING
TCP   192.168.43.31:63272    20.197.71.89:https  ESTABLISHED
TCP   192.168.43.31:63339    20.44.229.112:https  TIME_WAIT
TCP   192.168.43.31:63340    20.44.229.112:https  ESTABLISHED
TCP   192.168.43.31:63341    20.44.229.112:https  ESTABLISHED
TCP   192.168.56.1:139        DA:0                LISTENING
TCP   [::]:135                DA:0                LISTENING
TCP   [::]:445                DA:0                LISTENING
TCP   [::]:5357                DA:0                LISTENING
TCP   [::]:49664               DA:0                LISTENING
TCP   [::]:49665               DA:0                LISTENING
TCP   [::]:49666               DA:0                LISTENING
TCP   [::]:49667               DA:0                LISTENING
TCP   [::]:49668               DA:0                LISTENING
TCP   [::]:49669               DA:0                LISTENING
TCP   [2409:4073:4e01:18b8:a094:fcdc:e73c:2dc5]:63333 [2606:2800:147:120f:30c:1ba0:fc6:265a]:https CLOSE_WAIT
UDP  0.0.0.0:123              *:*
```

netstat -b

The netstat -b command lists all the executables (applications) associated with each connection. Sometimes, applications may open multiple connections.

```
C:\Users\DA>netstat -b  
The requested operation requires elevation.
```

netstat -e

The netstat -e command generates a statistic of the network interface, which shows information like the number of bytes, unicast and non-unicast sent and received packets. You can also see discarded packets and errors and unknown protocols, which can you troubleshoot networking problems.

```
C:\Users\DA>netstat -e  
Interface Statistics  
  
          Received          Sent  
  
Bytes          108066      502866  
Unicast packets      511        448  
Non-unicast packets      0        3780  
Discards          0          0  
Errors            0          0  
Unknown protocols      0          0  
  
C:\Users\DA>
```

4. ipconfig

Displays all current TCP/IP network configuration values and refreshes Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) settings. Used without parameters, ipconfig displays Internet Protocol version 4 (IPv4) and IPv6 addresses, subnet mask, and default gateway for all adapters.

PARAMETERS:

/all: Displays the full TCP/IP configuration for all adapters. Adapters can represent physical interfaces, such as installed network adapters, or logical interfaces, such as dial-up connections.

/displaydns: Displays the contents of the DNS client resolver cache, which includes both entries preloaded from the local Hosts file and any recently obtained resource records for name queries resolved by the computer. The DNS Client service uses this information to resolve frequently queried names quickly, before querying its configured DNS servers.

/flushdns: Flushes and resets the contents of the DNS client resolver cache. During DNS troubleshooting, you can use this procedure to discard negative cache entries from the cache, as well as any other entries that have been added dynamically.

/registerdns: Initiates manual dynamic registration for the DNS names and IP addresses that are configured at a computer. You can use this parameter to troubleshoot a failed DNS name registration or resolve a dynamic update problem between a client and the DNS server without rebooting the client computer. The DNS settings in the advanced properties of the TCP/IP protocol determine which names are registered in DNS.

```
C:\Users\DA>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet 2:

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

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::1d38:6d43:d631:edb4%12
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :

Wireless LAN adapter Local Area Connection* 2:

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

Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . :
    IPv6 Address. . . . . : 2409:4073:4e01:18b8:fca3:b447:9b86:7707
    Temporary IPv6 Address. . . . . : 2409:4073:4e01:18b8:a094:fcde:e73c:2dc5
    Link-local IPv6 Address . . . . . : fe80::fca3:b447:9b86:7707%10
    IPv4 Address. . . . . : 192.168.43.31
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::560e:2dff:fea5:352d%10
                                         192.168.43.10

Ethernet adapter Bluetooth Network Connection:
```

```
C:\Users\DA>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:
    /?                Display this help message
    /all              Display full configuration information.
    /release          Release the IPv4 address for the specified adapter.
    /release6         Release the IPv6 address for the specified adapter.
    /renew            Renew the IPv4 address for the specified adapter.
    /renew6           Renew the IPv6 address for the specified adapter.
    /flushdns         Purges the DNS Resolver cache.
    /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.
    /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.
```

Other Networking Commands

1. Hostname Command

A very simple command that displays the host name of your machine. This is much quicker than going to the control panel>system route.

```
C:\Users\DA>hostname  
DA  
  
C:\Users\DA>
```

2. getmac Command

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

```
C:\Users\DA>getmac  
  
Physical Address      Transport Name  
=====  =====  
B4-B6-86-0D-60-71    Media disconnected  
80-C5-F2-7C-3B-59    \Device\Tcpip_{7AF4A79E-A298-41C9-BFB2-27D0A55D94E5}  
80-C5-F2-7C-3B-58    Media disconnected  
0A-00-27-00-00-0C    \Device\Tcpip_{A6724B0B-8BD9-4EE1-AA48-B2E657220F4E}  
  
C:\Users\DA>
```

3.arp Command

This is used for showing the address resolution cache. This command must be used with a command line switch arp -a is the most common.

```
C:\Users\DA>arp -a  
  
Interface: 192.168.43.31 --- 0xa  
  Internet Address        Physical Address      Type  
  192.168.43.10          54-0e-2d-a5-35-2d  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  
  
Interface: 192.168.56.1 --- 0xc  
  Internet Address        Physical Address      Type  
  192.168.56.255         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  
  
C:\Users\DA>
```

4. Nbtstat

Diagnostic tool for troubleshooting netBIOS problems.

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

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

Registered By Broadcast   = 37
Registered By Name Server = 0

C:\Users\DA>
```

5. Net Command

Used for managing users,service,shares etc..

```
C:\Users\DA>net
The syntax of this command is:

NET
[ ACCOUNTS | COMPUTER | CONFIG | CONTINUE | FILE | GROUP | HELP |
  HELPMMSG | LOCALGROUP | PAUSE | SESSION | SHARE | START |
  STATISTICS | STOP | TIME | USE | USER | VIEW ] 

C:\Users\DA>
```

ASSIGNMENT 8

LAMP INSTALLATION

*Update Your System

sudo apt update

```
Processing triggers for php7.4-fpm (7.4.3-4ubuntu2.6) ...
Processing triggers for php7.4-fpm (7.4.3-4ubuntu2.6) ...
julia@julia-VirtualBox:~$ sudo apt update
Hit:1 http://in.archive.ubuntu.com/ubuntu focal InRelease
Hit:2 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease
Get:4 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Fetched 114 kB in 3s (39.5 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
340 packages can be upgraded. Run 'apt list --upgradable' to see them.
julia@julia-VirtualBox:~$ sudo apt install apache2
Reading package lists... Done
```

*Install Apache

- sudo apt install apache2

```
julia@julia-VirtualBox:~$ sudo apt install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils
0 upgraded, 4 newly installed, 0 to remove and 340 not upgraded.
Need to get 1,519 kB of archives.
After this operation, 6,837 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://security.ubuntu.com/ubuntu focal-security/main amd64 apache2-bin amd64 2.4.41-4ubuntu3.6 [1,180 kB]
Get:2 http://security.ubuntu.com/ubuntu focal-security/main amd64 apache2-data all 2.4.41-4ubuntu3.6 [159 kB]
Get:3 http://security.ubuntu.com/ubuntu focal-security/main amd64 apache2-utils amd64 2.4.41-4ubuntu3.6 [84.3 kB]
Get:4 http://security.ubuntu.com/ubuntu focal-security/main amd64 apache2 amd64 2.4.41-4ubuntu3.6 [95.5 kB]
Fetched 1,519 kB in 22s (70.5 kB/s)
```

*Confirm Apache is running

- sudo systemctl status apache2

```
julia@julia-VirtualBox:~$ 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 22:09:23 IST; 54s ago
     Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 17914 (apache2)
      Tasks: 55 (limit: 1408)
     Memory: 5.5M
        CPU: 0.000 CPU(s) since start
       CGroup: /system.slice/apache2.service
               └─17914 /usr/sbin/apache2 -k start
                  ├─17915 /usr/sbin/apache2 -k start
                  ├─17916 /usr/sbin/apache2 -k start
```

MariaDB

Status Checking

*

```
julia@julia-VirtualBox:~$ sudo systemctl status mysql
● mariadb.service - MariaDB 10.3.30 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor pres>
   Active: active (running) since Tue 2021-09-28 21:01:50 IST; 1h 10min ago
     Docs: man:mysqld(8)
           https://mariadb.com/kb/en/library/systemd/
   Main PID: 719 (mysqld)
      Status: "Taking your SQL requests now..."
     Tasks: 30 (limit: 1408)
```

*Install PHP

```
sudo apt install php libapache2-mod-php php-ocpache php-cli php-gd php-curl
```

php-mysql

```
julia@julia-VirtualBox:~$ sudo apt install php libapache2-mod-php php-ocpache p
hp-cli php-gd php-curl php-mysql
Reading package lists... Done
Building dependency tree
Reading state information... Done
Note, selecting 'php7.4-ocpache' instead of 'php-ocpache'
php is already the newest version (2:7.4+75).
php-cli is already the newest version (2:7.4+75).
php-curl is already the newest version (2:7.4+75).
php-gd is already the newest version (2:7.4+75).
```

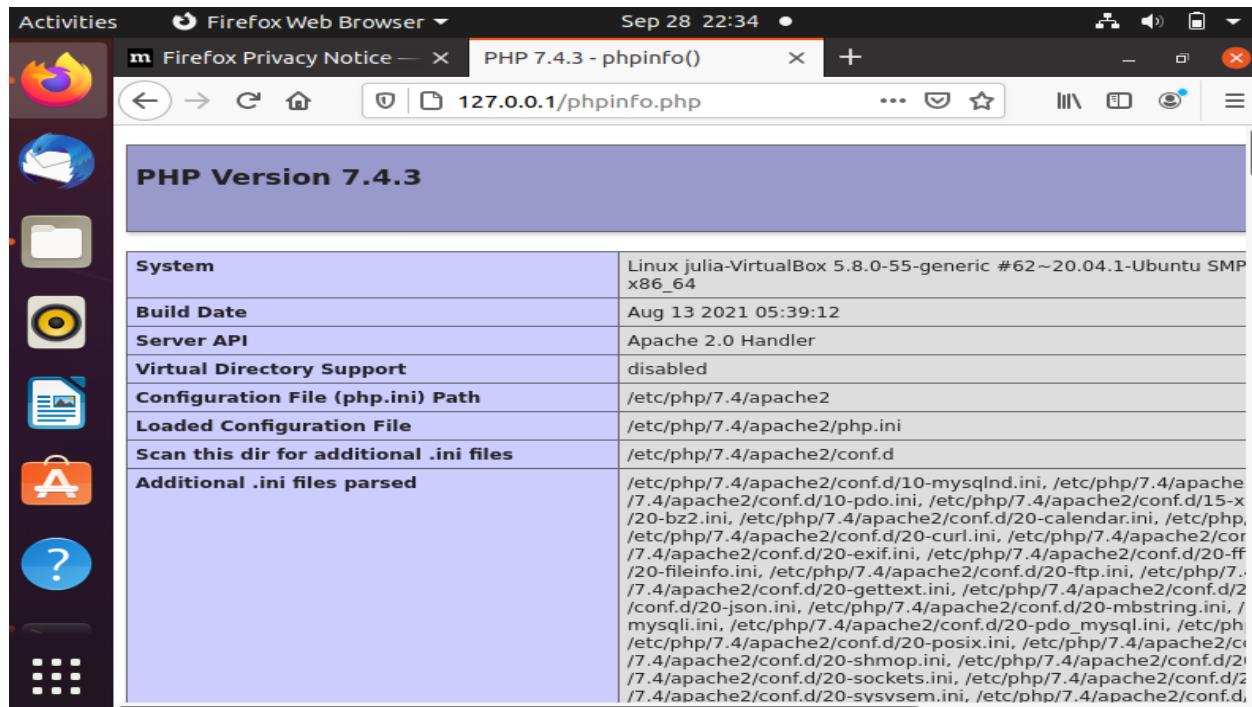
*Restart and check php

- sudo systemctl restart apache2
- sudo echo "<?php phpinfo(); ?>" | sudo tee -a /var/www/html/phpinfo.php > /dev/null

```

Processing triggers for libapache2-mod-php7.4 (7.4.3-1ubuntu2.6) ...
julia@julia-VirtualBox:~$ sudo systemctl restart apache2
julia@julia-VirtualBox:~$ sudo echo "<?php phpinfo();?>" |sudo tee -a/var/www/html/phpinfo.php>/dev/null
tee: invalid option -- '/'
Try 'tee --help' for more information.
julia@julia-VirtualBox:~$ sudo echo "<?php phpinfo();?>" | sudo tee -a/var/www/html/phpinfo.php>/dev/null
tee: invalid option -- '/'
Try 'tee --help' for more information.
julia@julia-VirtualBox:~$ sudo apt install phpmyadmin php-mbstring php-zip php-gd php-json php-curl
Reading package lists... Done
Building dependency tree
Reading state information... Done
php-curl is already the newest version (2:7.4+75).
php-gd is already the newest version (2:7.4+75).
php-json is already the newest version (2:7.4+75).

```



*Install phpmyadmin

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

```
Julia@julia-VirtualBox:~$ sudo apt install phpmyadmin php-mbstring php-zip php-gd php-json php-curl
[sudo] password for julia:
Reading package lists... Done
Building dependency tree
Reading state information... Done
php-curl is already the newest version (2:7.4+75).
php-gd is already the newest version (2:7.4+75).
php-json is already the newest version (2:7.4+75).
php-mbstring is already the newest version (2:7.4+75).
```

*Restart Apache2

- sudo systemctl restart apache2



Welcome to phpMyAdmin

Cannot log in to the MySQL server

Language: English

Log in

Username: root

Password:

The screenshot shows the phpMyAdmin login interface. At the top, there's a logo of a sailboat and the text "Welcome to phpMyAdmin". Below that, a red banner displays the message "Cannot log in to the MySQL server". The "Language" dropdown is set to "English". The main login form has "root" entered into the "Username" field and four dots ("....") entered into the "Password" field. A "Log in" button is visible above the input fields.

ASSIGNMENT 9

ANSIBLE INSTALLATION

Syntax:

```
sudo apt-get install ansible
```

```
julia@julia-VirtualBox:~$ sudo apt-get install ansible
[sudo] password for julia:
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-lib2to3 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
The following packages will be upgraded:
```

```
ansible --version
```

```
Processing triggers for man-db (2.9.1-1) ...
julia@julia-VirtualBox:~$ ansible --version
ansible 2.9.6
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/home/julia/.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 = 3.8.5 (default, Jul 28 2020, 12:59:40) [GCC 9.3.0]
julia@julia-VirtualBox:~$
```

ASSIGNMENT 10

TCPDUMP INSTALLATION

sudo tcpdump

```
julia@julia-VirtualBox:~$ sudo tcpdump
[sudo] password for julia:
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
20:14:18.258379 IP julia-VirtualBox.33161 > alphyn.canonical.com.ntp: NTPv4, cl
ient, length 48
20:14:18.292323 IP julia-VirtualBox.59902 > 192.168.43.1.domain: 34620+ PTR? 15
7.91.189.91.in-addr.arpa. (44)
20:14:18.869614 IP alphyn.canonical.com.ntp > julia-VirtualBox.33161: NTPv4, Se
rver, length 48
20:14:18.972463 IP 192.168.43.1.domain > julia-VirtualBox.59902: 34620 1/0/0 PT
R alphyn.canonical.com. (78)
20:14:18.974878 IP julia-VirtualBox.50846 > 192.168.43.1.domain: 7080+ PTR? 15.
2.0.10.in-addr.arpa. (40)
```

sudo tcpdump -i any

```
0 packets dropped by kernel
julia@julia-VirtualBox:~$ sudo tcpdump -i any
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on any, link-type LINUX_SLL (Linux cooked v1), capture size 262144 by
tes
20:19:10.008057 IP julia-VirtualBox.59515 > alphyn.canonical.com.ntp: NTPv4, cl
ient, length 48
20:19:10.013881 IP localhost.57016 > localhost.domain: 26623+ [1au] PTR? 157.91
.189.91.in-addr.arpa. (55)
20:19:10.014673 IP localhost.domain > localhost.57016: 26623 1/0/1 PTR alphyn.c
anonical.com. (89)
20:19:10.015002 IP localhost.36351 > localhost.domain: 26334+ [1au] PTR? 15.2.0
```

Sudo tcpdump -D

```
0 packets dropped by kernel
julia@julia-VirtualBox:~$ 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]
```

sudo tcpdump -i enp0s3

```
julia@julia-VirtualBox:~$ 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
20:23:28.757806 IP julia-VirtualBox.55779 > alphyn.canonical.com.ntp: NTPv4, Client, length 48
20:23:28.763467 IP julia-VirtualBox.52071 > 192.168.43.1.domain: 17139+ PTR? 15.2.0.10.in-addr.arpa. (40)
20:23:28.874290 IP 192.168.43.1.domain > julia-VirtualBox.52071: 17139 NXDomain 0/0/0 (40)
20:23:28.876856 IP julia-VirtualBox.56048 > 192.168.43.1.domain: 20834+ PTR? 1.
```

sudo tcpdump -c 5

```
julia@julia-VirtualBox:~$ 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
20:25:37.507366 IP julia-VirtualBox.47496 > alphyn.canonical.com.ntp: NTPv4, Client, length 48
20:25:37.512041 IP julia-VirtualBox.47148 > 192.168.43.1.domain: 44766+ PTR? 15.2.0.10.in-addr.arpa. (40)
20:25:37.636537 IP 192.168.43.1.domain > julia-VirtualBox.47148: 44766 NXDomain 0/0/0 (40)
20:25:37.638510 IP julia-VirtualBox.55017 > 192.168.43.1.domain: 1104+ PTR? 1.4
```

Sudo tcpdump -i enp0s3 -c 5 port 80

```
julia@julia-VirtualBox:~$ 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
```

sudo tcpdump host 10.0.2.15

```
julia@julia-VirtualBox:~$ 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
julia@julia-VirtualBox:~$ sudo tcpdump -n net 10.10
```

sudo tcpdump -n net 10.10

```
0 packets dropped by kernel
julia@julia-VirtualBox:~$ 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
0 packets captured
0 packets received by filter
```

ASSIGNMENT 11

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:2.50000000000000000000000000000000
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 12

DOCKER INSTALLATION

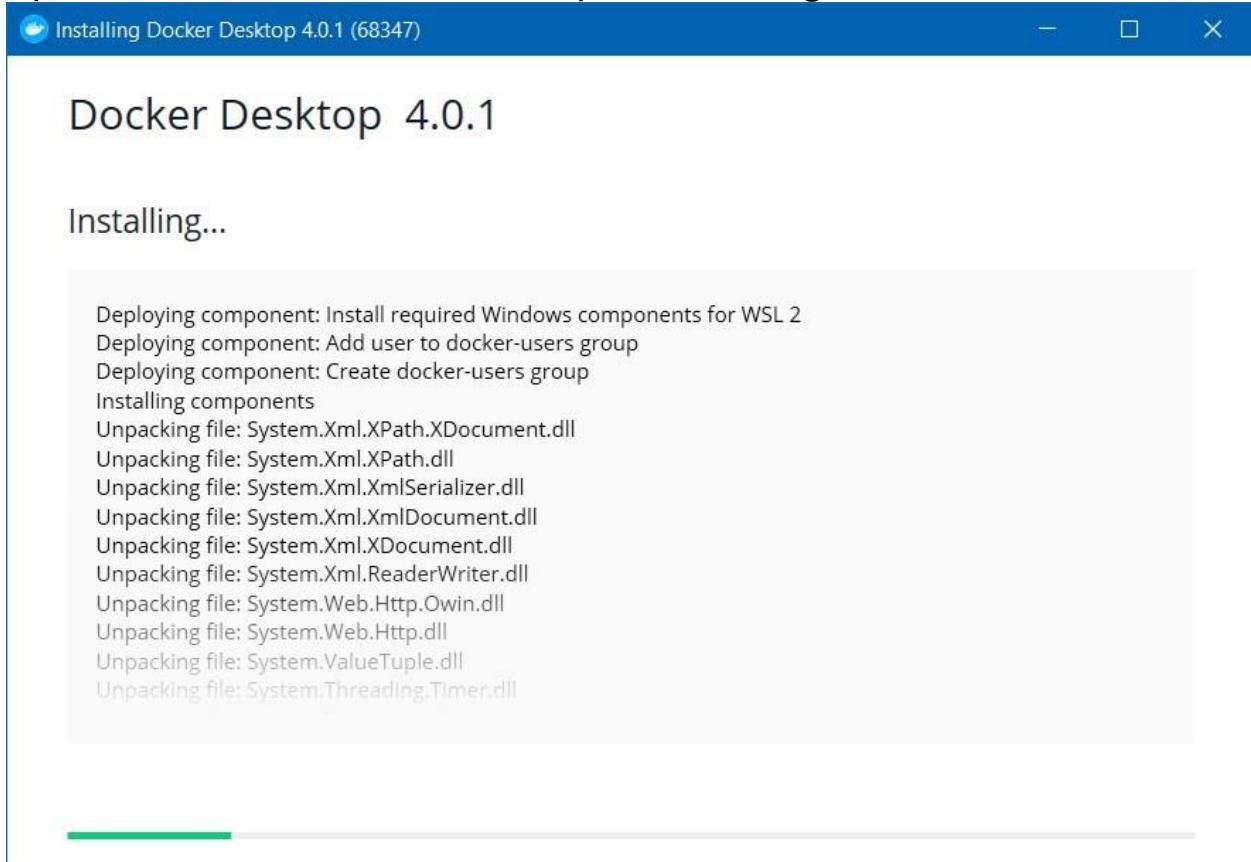
Step-I

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



Step-II

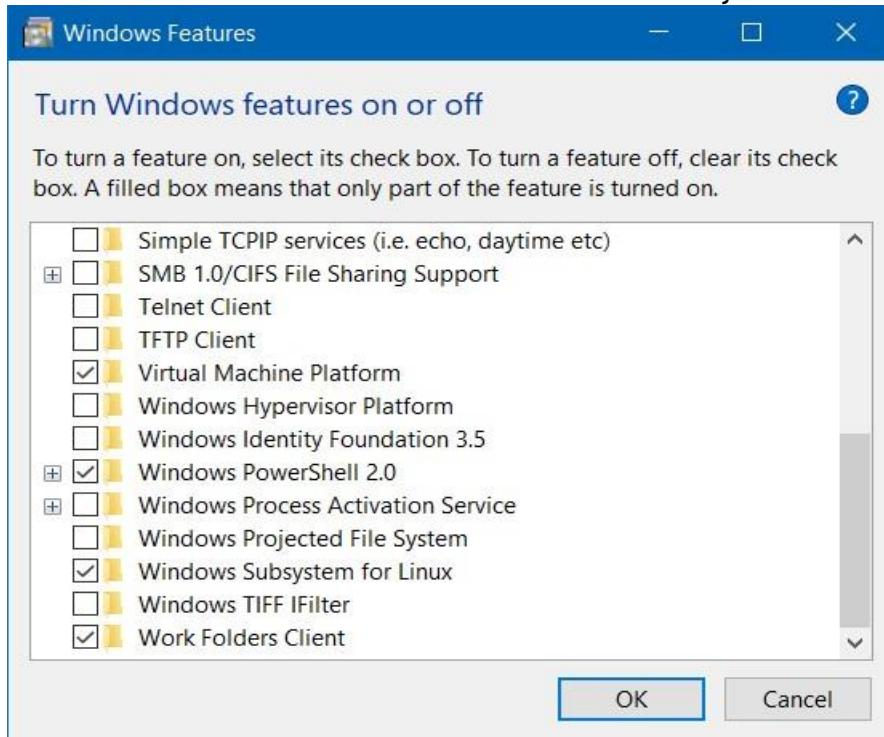
Open the .exe file and follow the steps after clicking install button.



Step-III

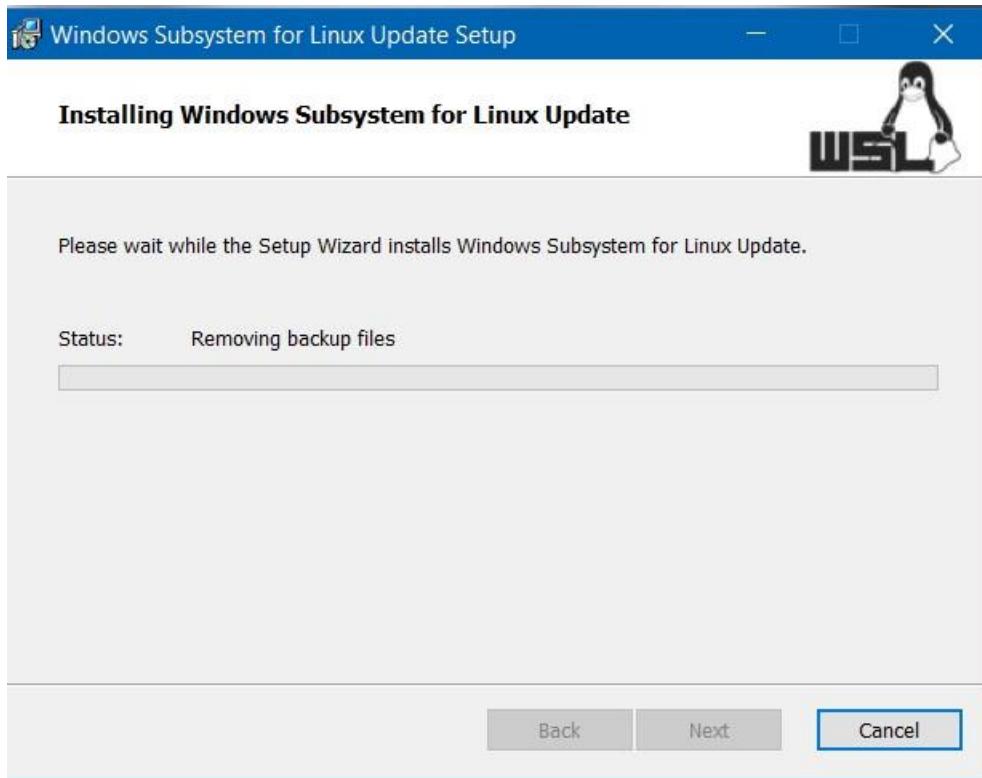
Once installed go to programs and features and click turn on windows features on or off

Scroll to the bottom and select windows subsystem for Linux



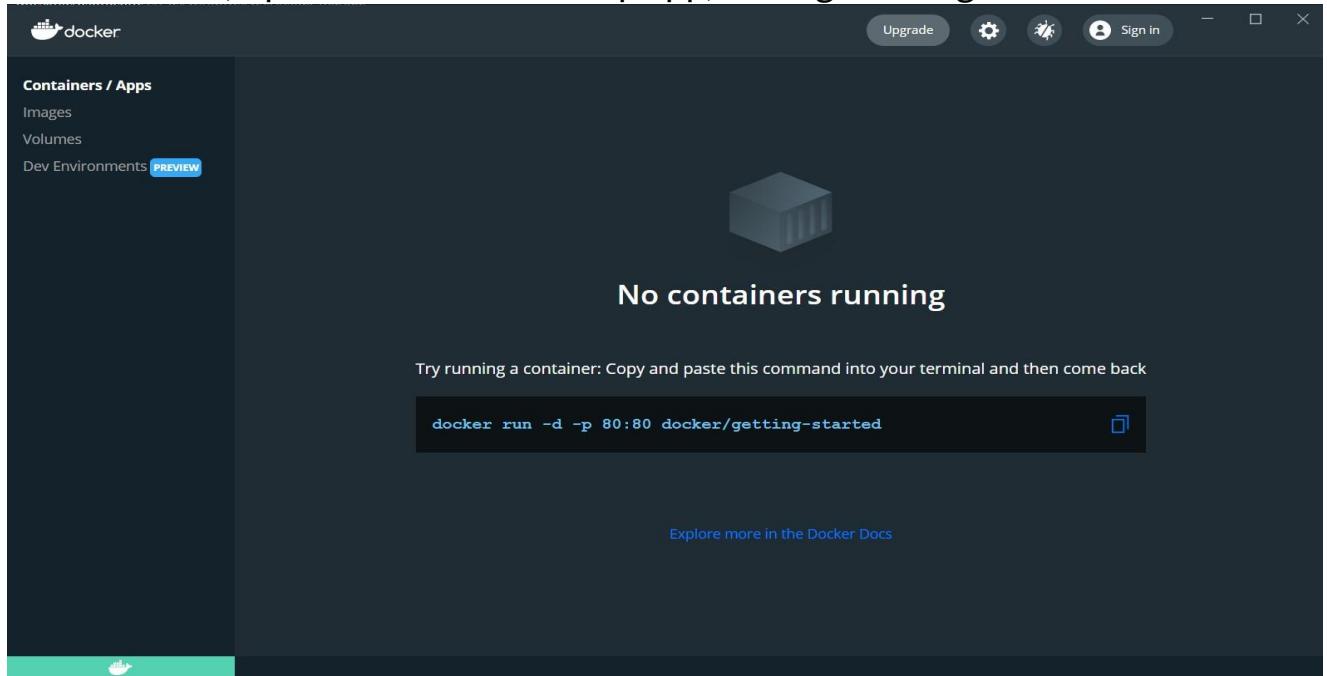
Step-IV

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

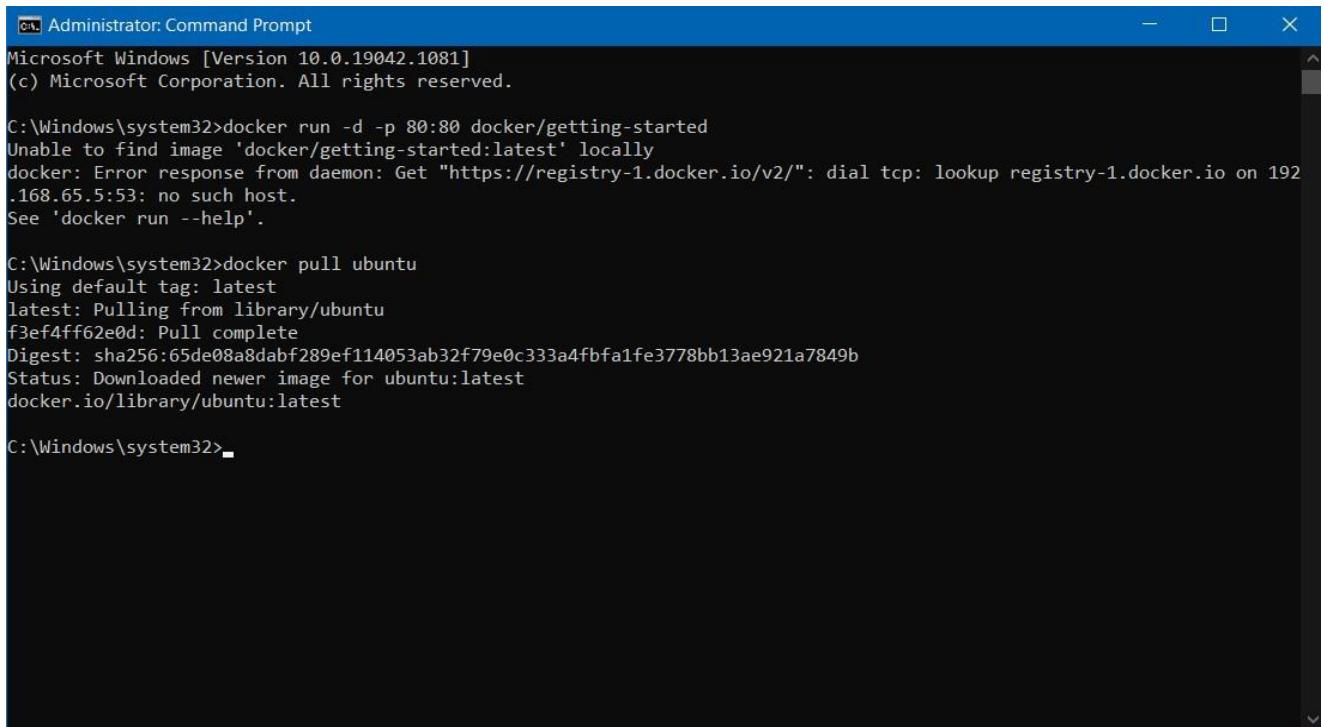
Once installed, open the docker desktop app, and signin using the dockerID



Step-VI

Now pull any image from docker hub using the docker pull command in the

command prompt (eg: docker pull ubuntu)



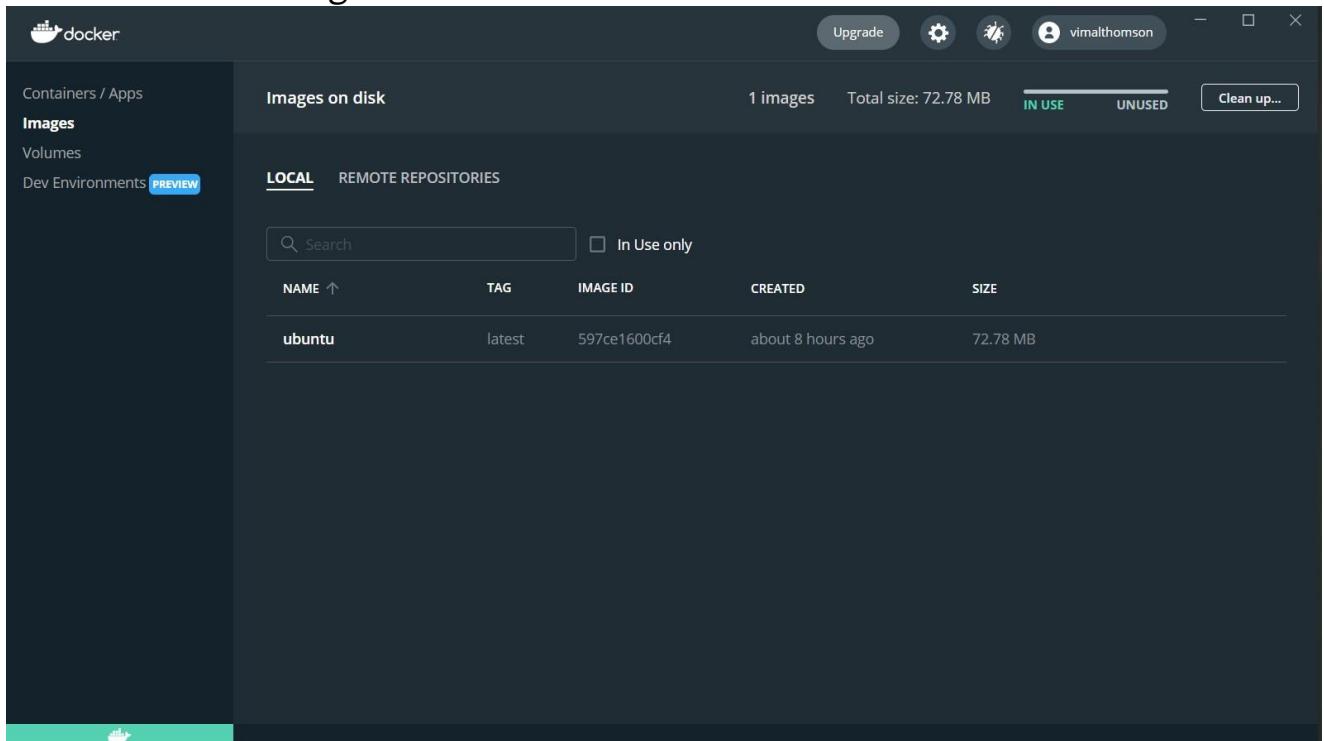
```
C:\Administrator: Command Prompt
Microsoft Windows [Version 10.0.19042.1081]
(c) Microsoft Corporation. All rights reserved.

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.

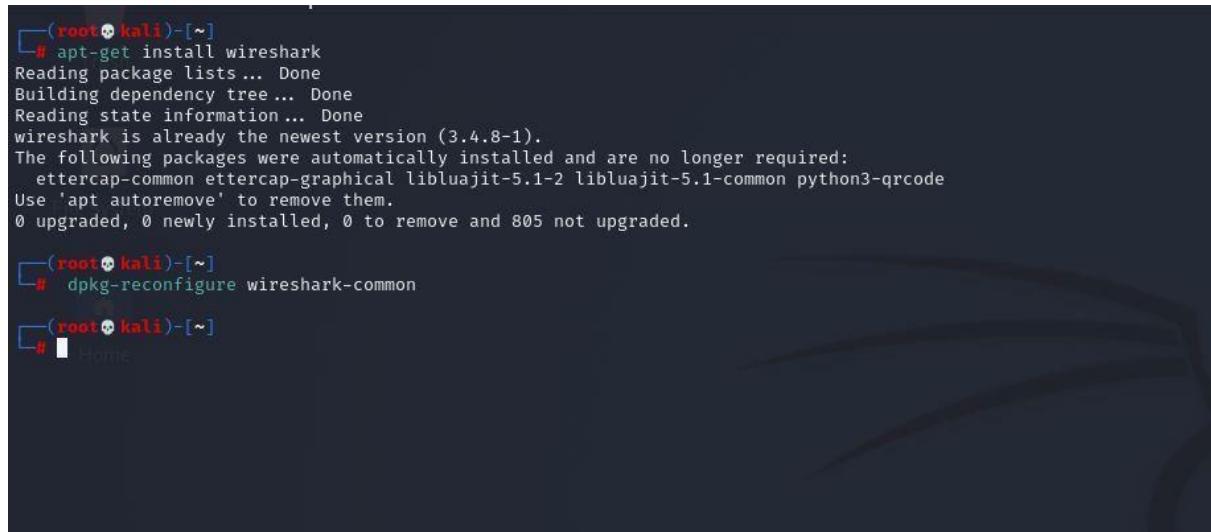


ASSIGNMENT 13

WIRESHARK INSTALLATION

Step1:

- **sudo apt-get install wireshark**



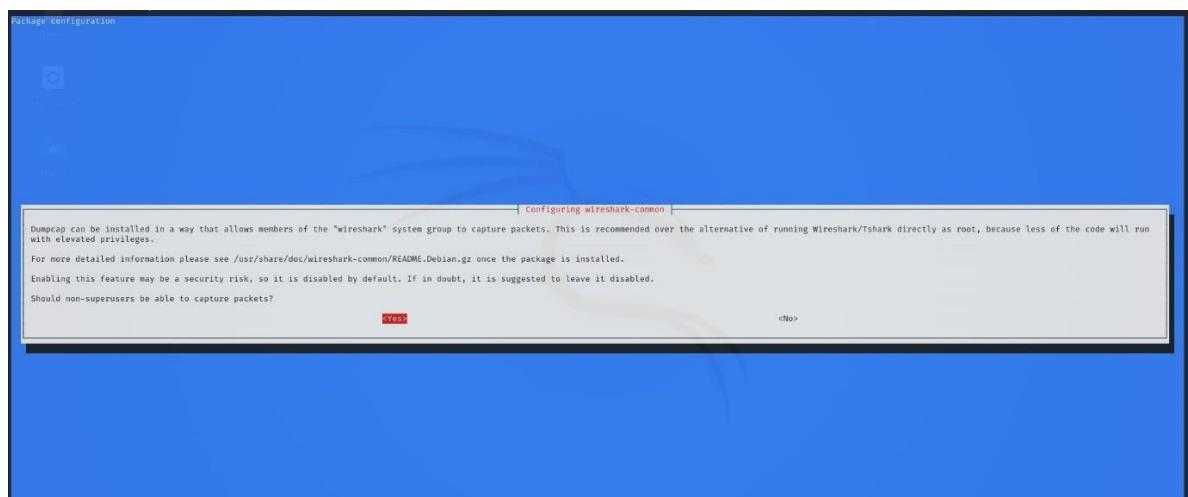
```
(root㉿kali)-[~]
# apt-get install wireshark
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
wireshark is already the newest version (3.4.8-1).
The following packages were automatically installed and are no longer required:
  ettercap-common ettercap-graphical libluajit-5.1-2 libluajit-5.1-common python3-qrcode
Use 'apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 805 not upgraded.

(root㉿kali)-[~]
# dpkg-reconfigure wireshark-common

(root㉿kali)-[~]
# Home
```

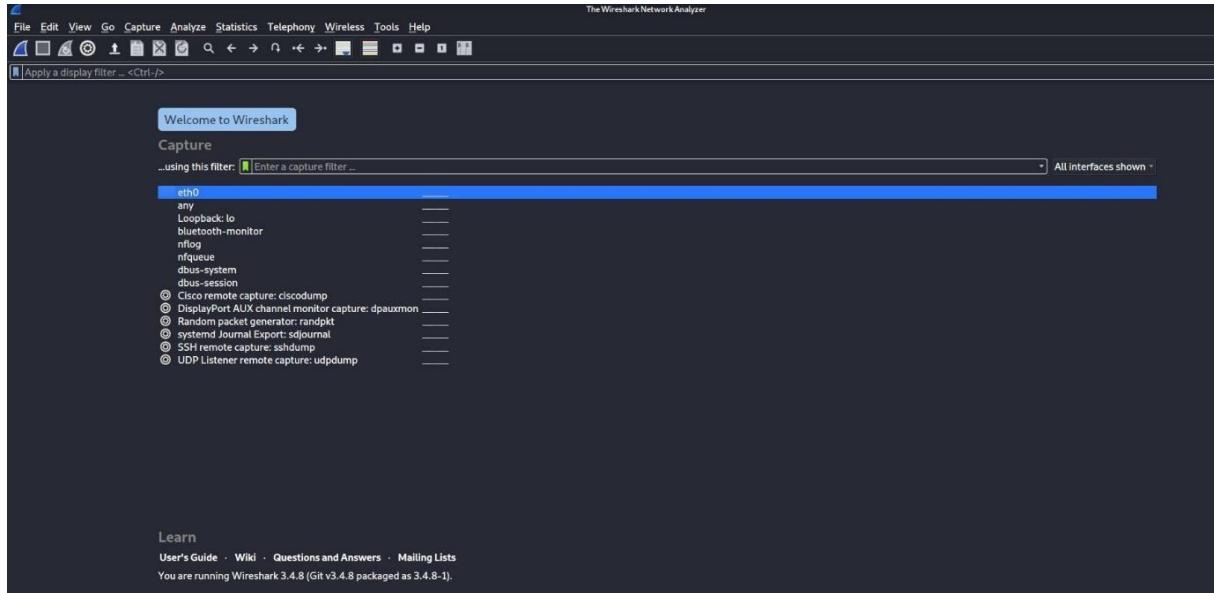
Step2:

- **sudo dpkg-reconfigure wireshark-common**



Step3.

open wireshark from the applist



No.	Time	Source	Destination	Protocol	Length	Info
149	58.539048681	2402:3a80:535:789f::	2606:4700:10::6816	UDP	107	55218 → 443 Len=45
150	58.630802776	2606:4700:10::6816	2402:3a80:535:789f::	UDP	87	443 → 55218 Len=25
151	59.486797796	2402:3a80:535:789f::	64:ff9b::976b:f104	TCP	86	[TCP Retransmission] 60149 → 443 [SYN] Seq=0 Win=65535 Len=0 MSS=1440 WS=256 SACK_PERM=1
152	60.231272124	2402:3a80:535:789f::	2606:4700:10::6816	UDP	107	55218 → 443 Len=45
153	60.365811439	2606:4700:10::6816	2402:3a80:535:789f::	UDP	87	443 → 55218 Len=25
154	61.486713335	2402:3a80:535:789f::	64:ff9b::976b:f104	TCP	86	[TCP Retransmission] 60149 → 443 [SYN] Seq=0 Win=65535 Len=0 MSS=1440 WS=256 SACK_PERM=1

Frame 1: 107 bytes on wire (856 bits), 107 bytes captured (856 bits) on interface eth0, id 0
Ethernet II, Src: AzureWave_9b:65:ff (08:c0:a6:9b:65:ff), Dst: 96:2d:01:da:8e:4a (96:2d:01:da:8e:4a)
Internet Protocol Version 6, Src: 2402:3a80:535:789f:a5fd:2b34:b55b:18a2, Dst: 2606:4700:10::6816:1883
User Datagram Protocol, Src Port: 55218, Dst Port: 443
Data (45 bytes)

Hex dump:

```
0000  96 2d 01 da 8e 4a d8 c9 a6 9b 65 ff 86 dd 60 06 .J.e.  
0010  43 63 00 35 11 3f 24 02 3a 80 05 35 78 9f a5 fd cc 5 2$ .5x.  
0020  2b 34 b5 1b a2 26 06 47 00 00 10 00 00 00 00 +4 [ .& G ..  
0030  00 00 68 16 18 83 d7 b2 01 bb 00 35 10 c0 5e 01 h..... 5.  
0040  92 49 67 8e ba b5 23 28 93 d5 67 96 ba a2 b3 13 lg--# --g...  
0050  d9 ae 40 13 d1 b2 5a b4 d3 81 c8 e9 a9 fb 00 15 ..0..Z.....  
0060  97 88 85 f6 4d 95 f4 a6 a4 76 fd ..M....v.
```