

20MCA136 - NETWORKING & SYSTEM ADMINISTRATION LAB

Lab Report Submitted By

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AJC21MCA-2092

In Partial fulfillment for the Award of the Degree Of

**MASTER OF COMPUTER APPLICATIONS (2 Year)
(MCA)
APJ ABDUL KALAM TECHNOLOGICAL
UNIVERSITY**



**AMAL JYOTHI COLLEGE OF ENGINEERING
KANJIRAPPALLY**

[Affiliated to APJ Abdul Kalam Technological University, Kerala. Approved by AICTE, Accredited by NAAC with 'A' grade. Koovappally, Kanjirappally, Kottayam, Kerala – 686518]

2021-2023

**DEPARTMENT OF COMPUTER APPLICATIONS
AMAL JYOTHI COLLEGE OF ENGINEERING
KANJIRAPPALLY**



CERTIFICATE

This is to certify that the Lab report, "**20MCA136 NETWORKING & SYSTEM ADMINISTRATION LAB**" is the bonafidework of **Sandra P M AJC21MCA-2092** in partial fulfillment of the requirements for the award of the Degree of Master of Computer Applications under APJ Abdul Kalam Technological University during the year 2021-23.

Grace Joseph

Lab In-Charge

Rev.Fr.Dr.Rubin Thottupuram Jose

Head of the Department

Internal Examiner

External Examiner

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NETWORKING & SYSTEM ADMINISTRATION LAB

Experiment No.: 1

Aim

Introduction to Computer hardware: Physical identification of major components of a computer system such as mother board, RAM modules, daughter cards, bus slots, SMPS, internal storage devices, interfacing ports.

Procedure

Computer hardware includes the physical parts of a computer, such as the case, central processing unit (CPU), random access memory (RAM), monitor, mouse, keyboard, computer data storage, graphics card, sound card, speakers and motherboard.

1.mouse



A mouse is a hardware input device that is used to move the cursor or pointer on computer screens. It can also be used to run computer programs, select items in a graphical user interface, and manipulate objects in the computer world.

Some common examples of how it can be used are clicking on buttons, scrolling up and down the screen, selecting files, opening folders, and so on.

2. Keyboard



A keyboard is an input device that you use to enter data into a computer.

It's also called the input device for your computer. Keyboards are used with PCs, laptops, tablets, and other devices.

There are many different types of keyboards, but the most common one is the QWERTY keyboard.

A QWERTY keyboard has all the letters in alphabetical order on it.

This is different from some other types of keyboards, like Dvorak or Colemak keyboards.

For example, these keyboards have keys arranged differently than what you're used to seeing on a QWERTY keyboard.

And that means that typing on these keyboards will feel like typing in another language at first! But don't worry - once you get accustomed to it, it feels natural

3. Monitor



Personal computers use a monitor to display data, run the software, and interact with the user. A monitor is an electronic visual display that connects to your computer or laptop.

It is used for displaying images, text, videos, games, web pages, and more.

Monitors are available in different sizes depending on the needs of the person using them.

The most common types of monitors are CRT (cathode ray tube), LCD (liquid crystal display), and LED (light-emitting diode).

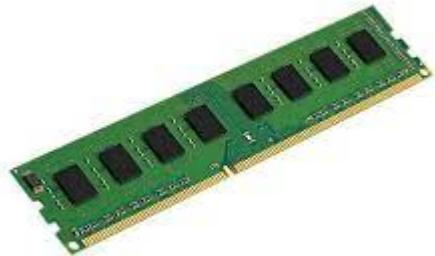


4. CPU (Central Processing Unit)

A CPU, or central processing unit, is the brain of a computer. The CPU processes information and runs programs.

It functions as a control unit that executes programs according to instructions in its program memory.

The CPU contains elements such as registers, an arithmetic logic unit (ALU), and control logic for sequencing instructions.



5. RAM Memory

A computer's RAM is a type of computer memory that stores information so the CPU can access it directly.

Computer systems use main memory to store both data and programs.

The more RAM you have, the more data your system can process at one time.

This will lead to more efficient operations on your computer, which translates into better performance for the user.



6. ROM Memory

ROM stands for a type of memory chip that can be read from but not written to.

In other words, it's a form of data storage that can't be changed after being programmed.

It's sometimes called "non-volatile" memory because the stored information will remain even when not powered up or in use.

ROM is often used to store a computer's basic start-up instructions and certain types of data, such as your car's onboard computer system and a calculator's data tables

7. IO System



The IO system is the set of devices that are used to access data.

There are three major parts of the IO system: input, output, and storage.

Input devices, also called input peripherals, are typically what data is first inputted into the computer. Output devices are where data is displayed. Storage devices store data so it does not need to be present in memory or processed by a CPU.



8.Motherboard

The motherboard is the backbone of our computer system. It's the central processing unit or CPU.

It connects all the other components, like memory and graphics card, to the power supply.

The motherboard is where all the wires are plugged in and it's also where you place your RAM, which is your computer's working memory.

The motherboard is what makes one machine different from another.

Motherboards are made up of tiny transistors that control the flow of electricity through copper tracks on their surface.

These transistors are called Integrated Circuits or ICs for short



9.Hard Disk Drive

A hard disk drive is a piece of hardware inside a computer that stores information.

It's used to store software and data in a safe place, which can be accessed when needed.

With magnetic storage, there are no moving parts - unlike a CD or DVD player in which you need to move a disk in order to access data.

You can think of it as "a closet" where all your stuff is stored safely.

As long as you have power, you can get to your things when you need them.



10. Power Supply Unit

A power supply unit, commonly abbreviated as PSU, does more than just supply your computer with power. It is the point where power enters your system from an external power source and is then allocated by the motherboard to individual component hardware. Not all power supplies are made equally however, and without the right wattage PSU your system will fail to work.

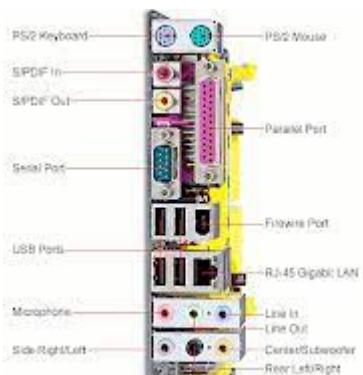
11.Optical Drive



Optical Drives are used in PCs to read and write CDs and DVDs.

The optical drive reads the data from the disc, which can then be transformed into a digital file that is readable by the computer. This makes it easy to backup files, play music or movies, or copy data from one disc to another.

The term "CD" refers to Compact Discs, which are the most common type of optical drive on modern computers. They are often used for installing software on your computer, moving data between computers, or writing new programs.



12. External Ports

External ports are used to connect your computer to other devices like printers and speakers, among many others.

However, not all external ports are the same. You'll find different types of ports on laptops and desktops that allow you to use them in different ways.



13. Video Display Controller

Video display controllers (sometimes shortened to VDC) are circuits found in video cards, which control the video output of the computer.

The controller is responsible for formatting the data that is sent to the monitor or TV.

Video display controllers can be implemented by either an onboard circuit on the motherboard or a separate card that connects to the motherboard through a slot.



13. CPU Fan

The CPU fan in the computer is a very important component for your PC.

If your CPU fan is not working correctly, your computer will be overheating and it may cause damage to other components.

The CPU fan helps cool the CPU and other internal parts of the computer.

It also provides negative pressure and removes dust and debris from the inside.



14.modem

The sole purpose of the modem is to provide you with internet access. If you were to only have one internet-connected device with an Ethernet port (such as a desktop computer), you could connect the modem directly to your computer with no need for a router.



15.network card

The network card operates as a middleman between a computer and a data network. For example, when a user requests a webpage, the computer will pass the request to the network card, which converts it into electrical impulses.

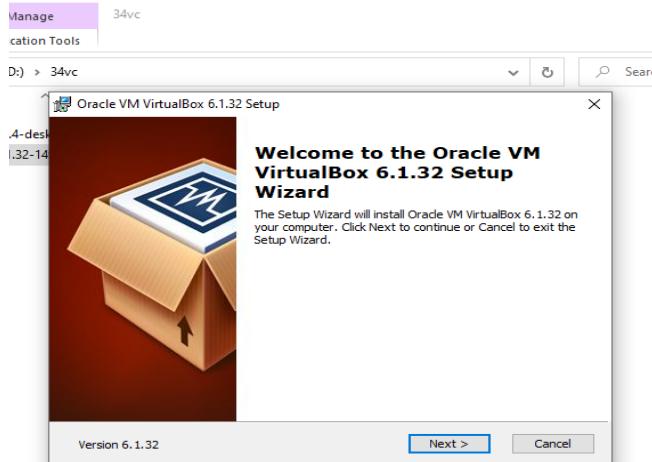
Experiment No.: 2

Aim

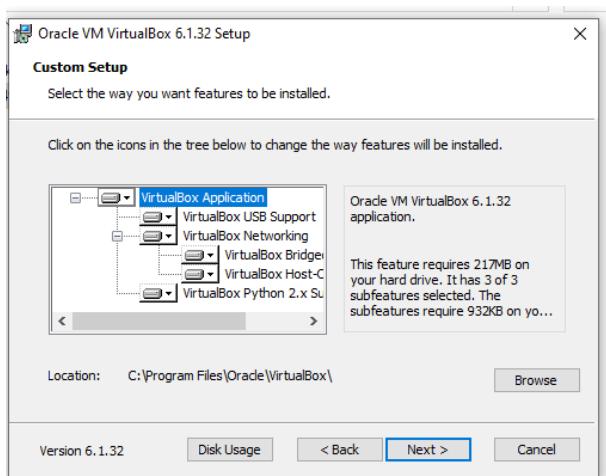
Install latest version of Ubuntu on a virtual box.

Procedure

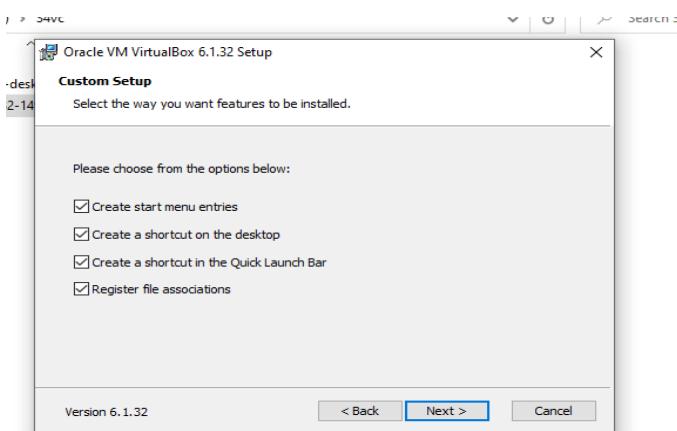
STEP 1: start to install oracle VM VirtualBox 6.1.32 in our computer



STEP 2.To custom setup for change the way features will be installed



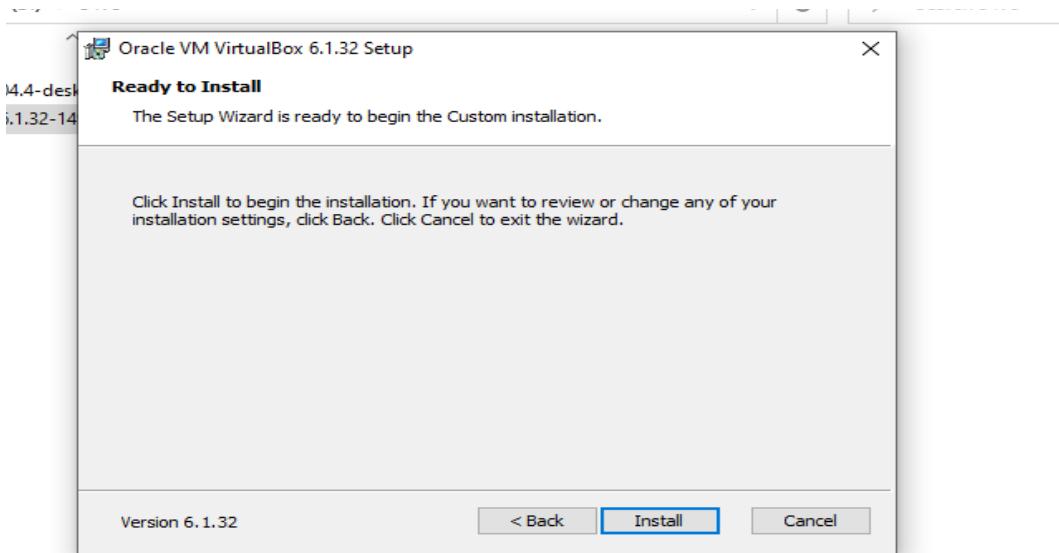
Step 3: Choosing the options for the features installed



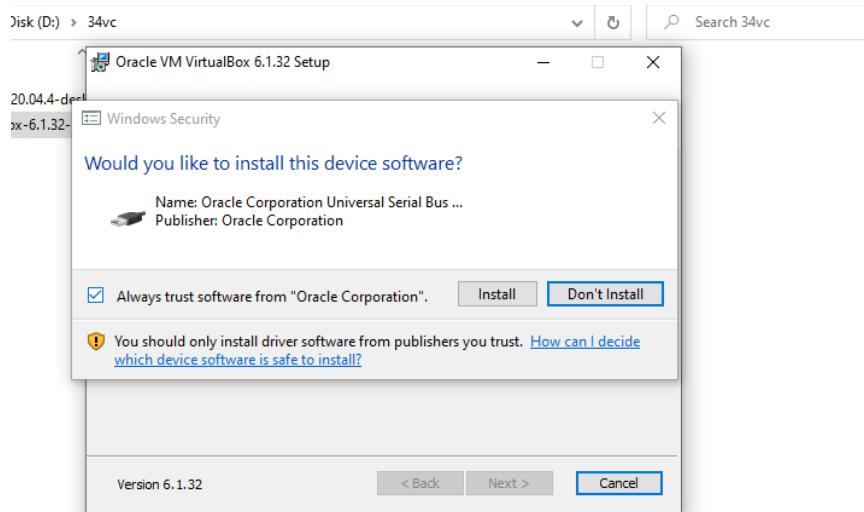
Step 4: proceed for the installation from a networking interfaces



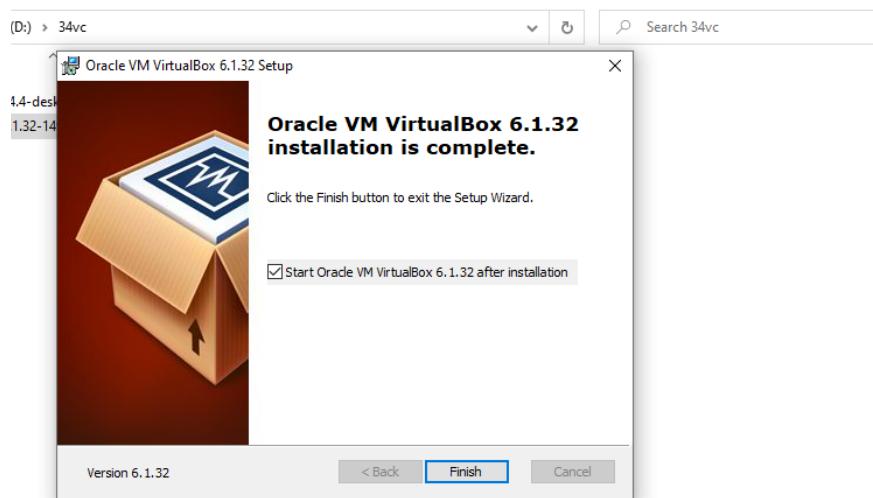
Step 5: click install which ready to installation



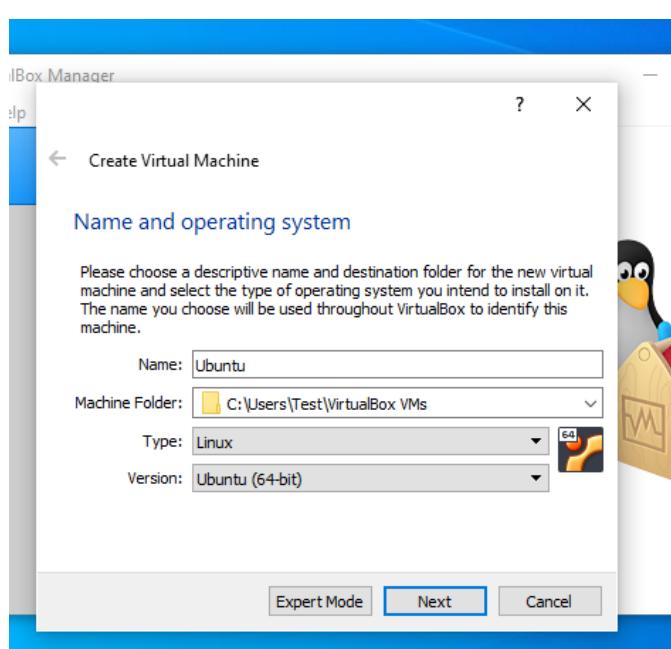
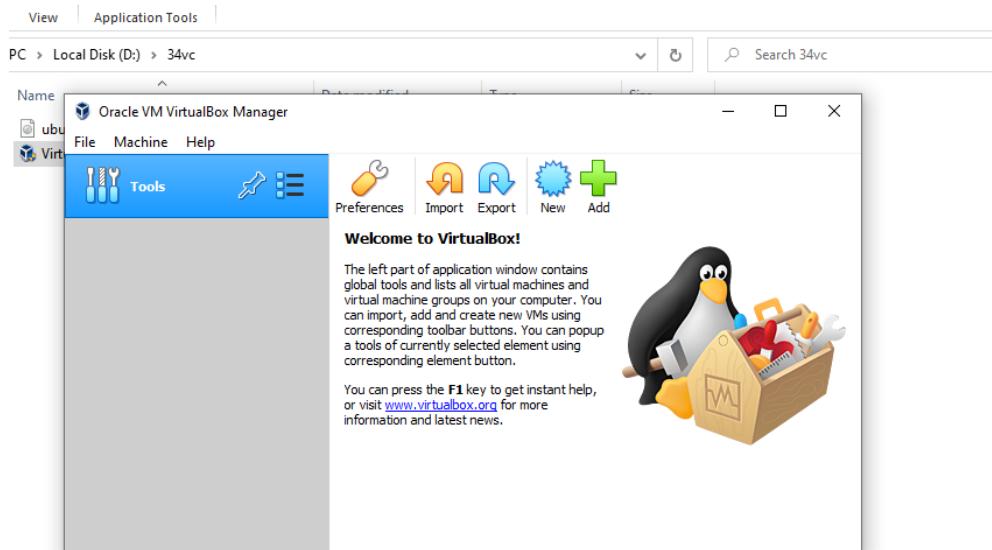
Step 6: Install the device software

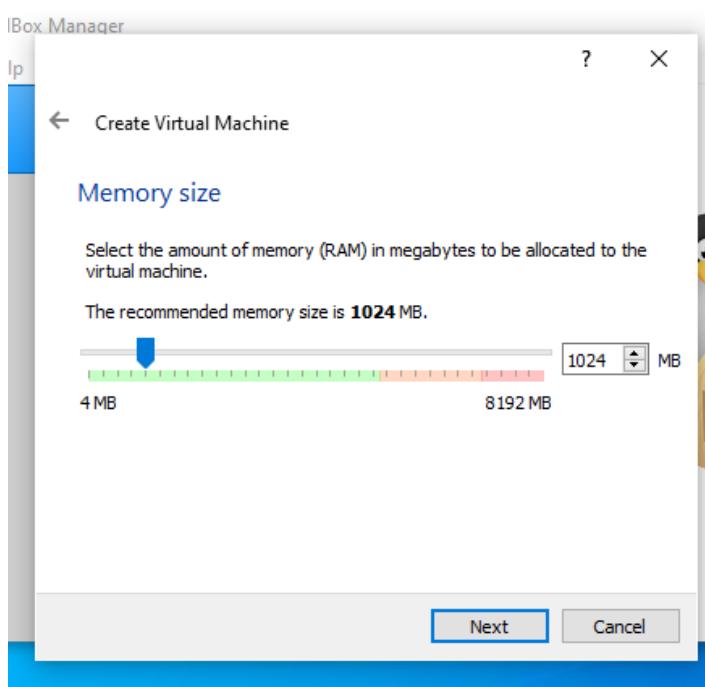
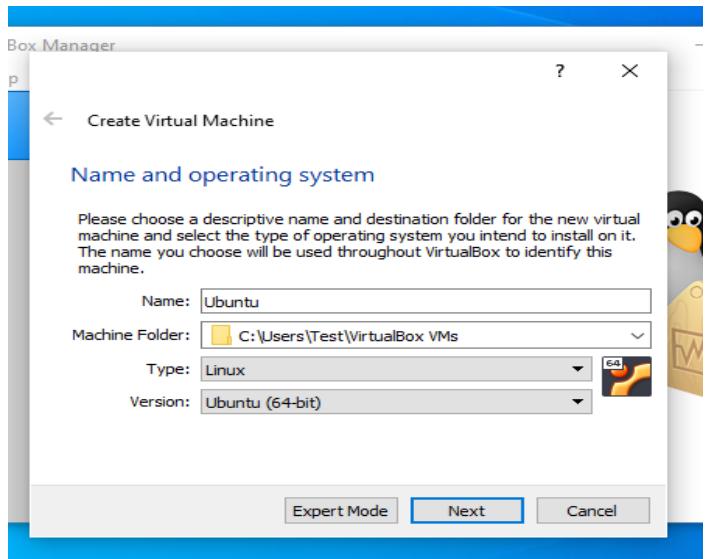


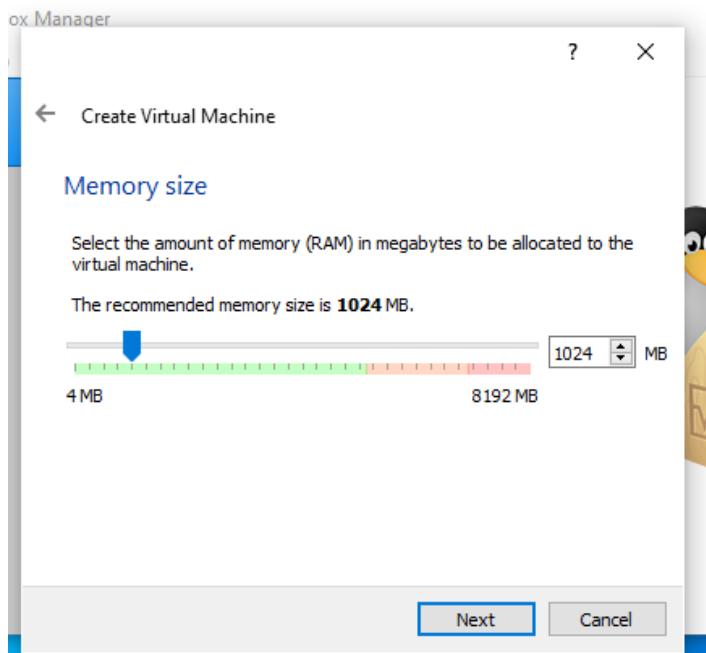
Step 7: Finish the installation

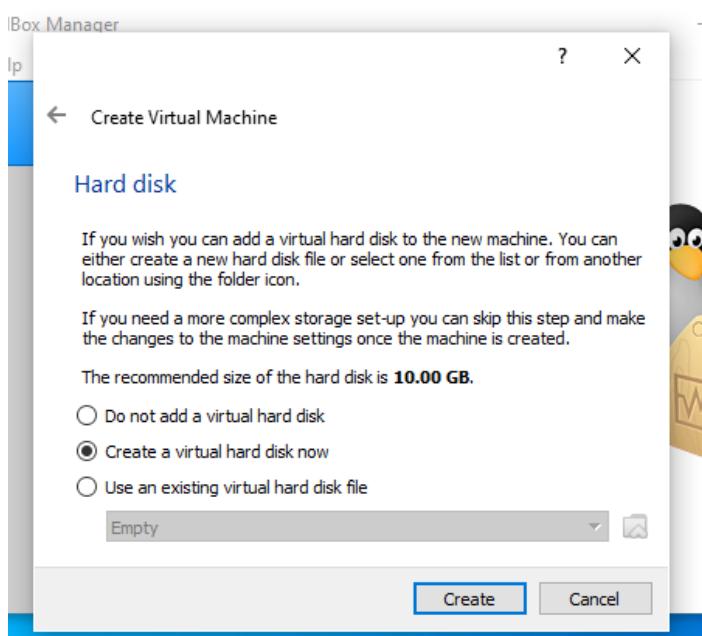
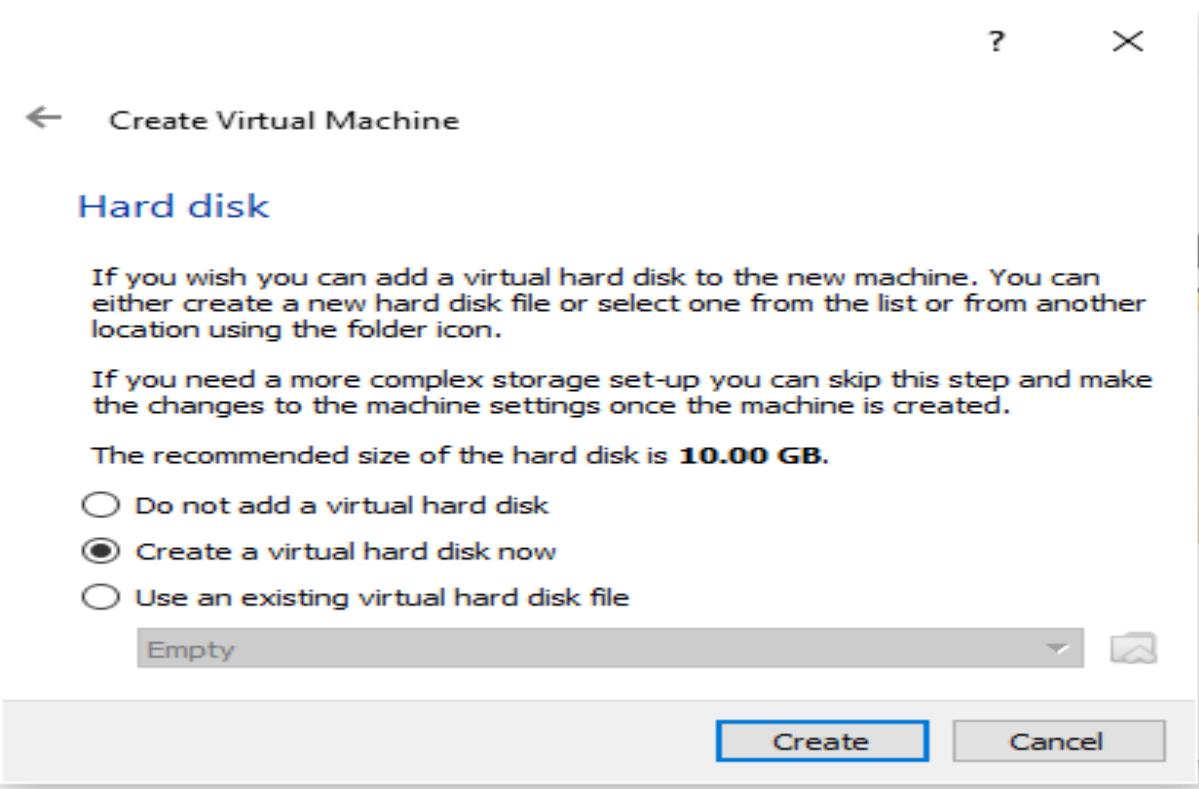


Step 8: Open the VirtualBox

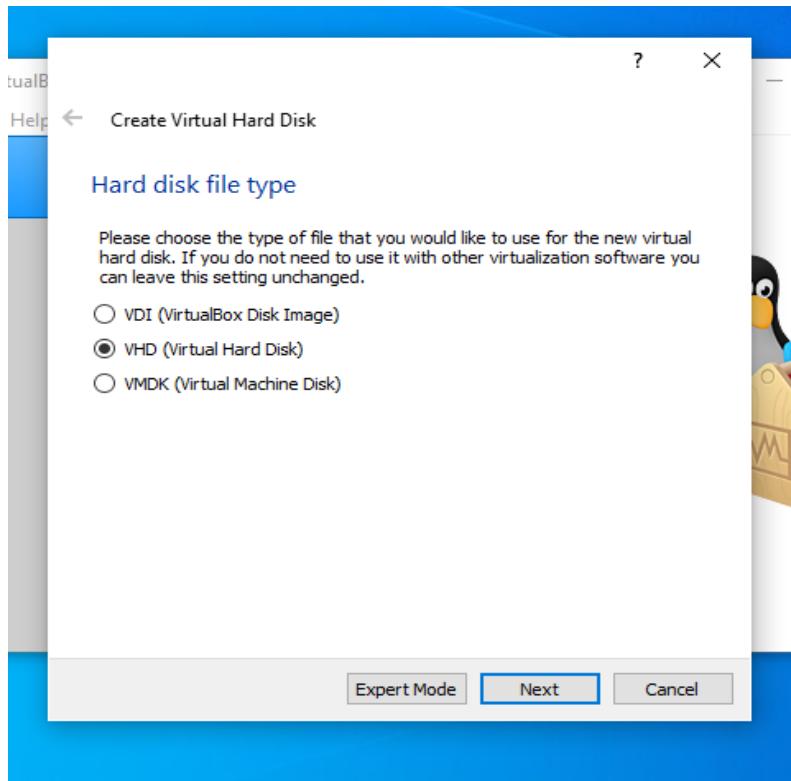




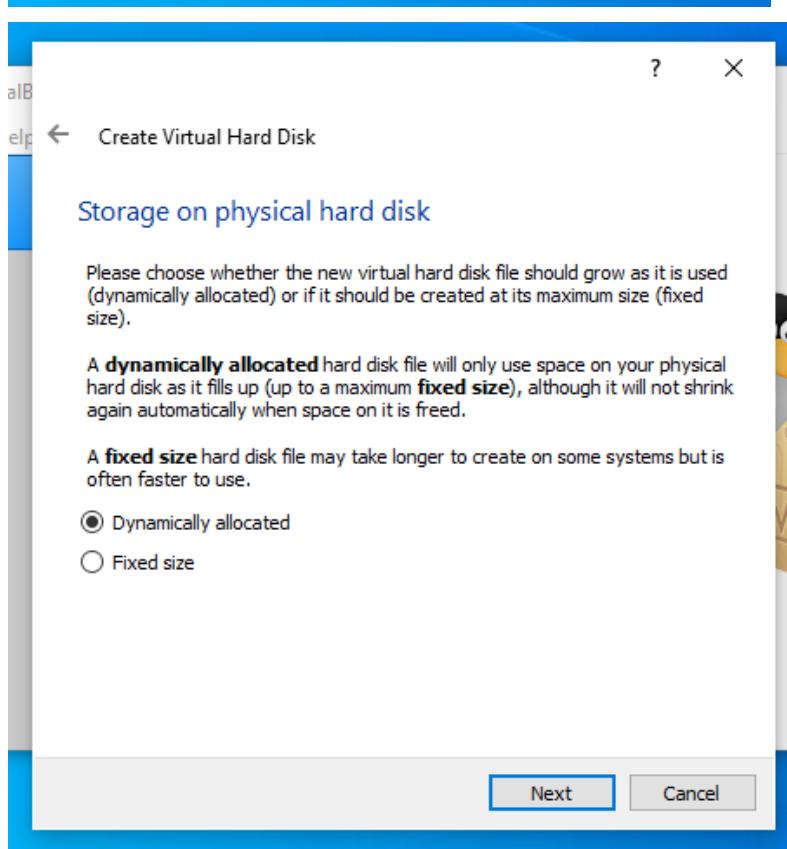
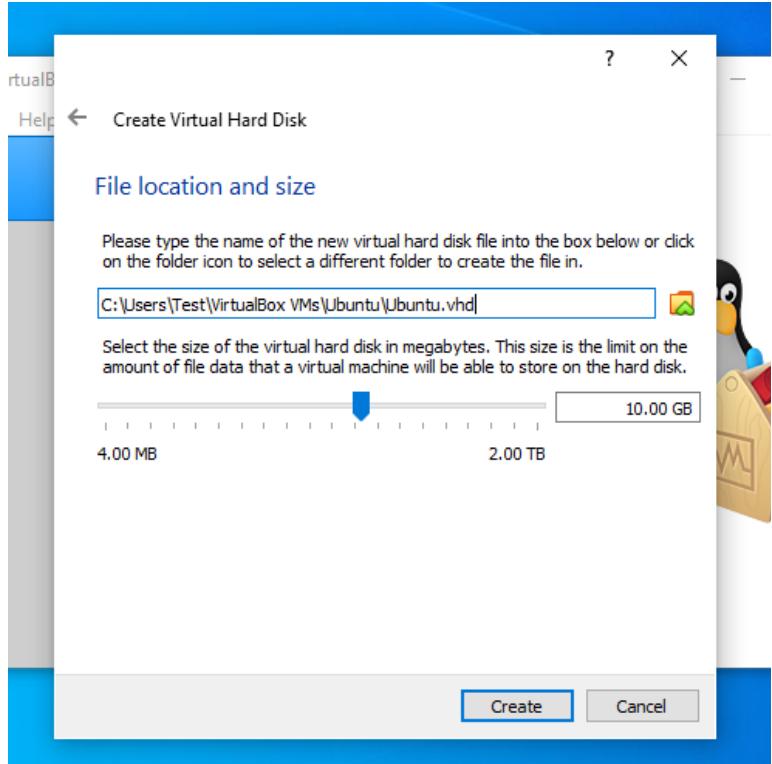


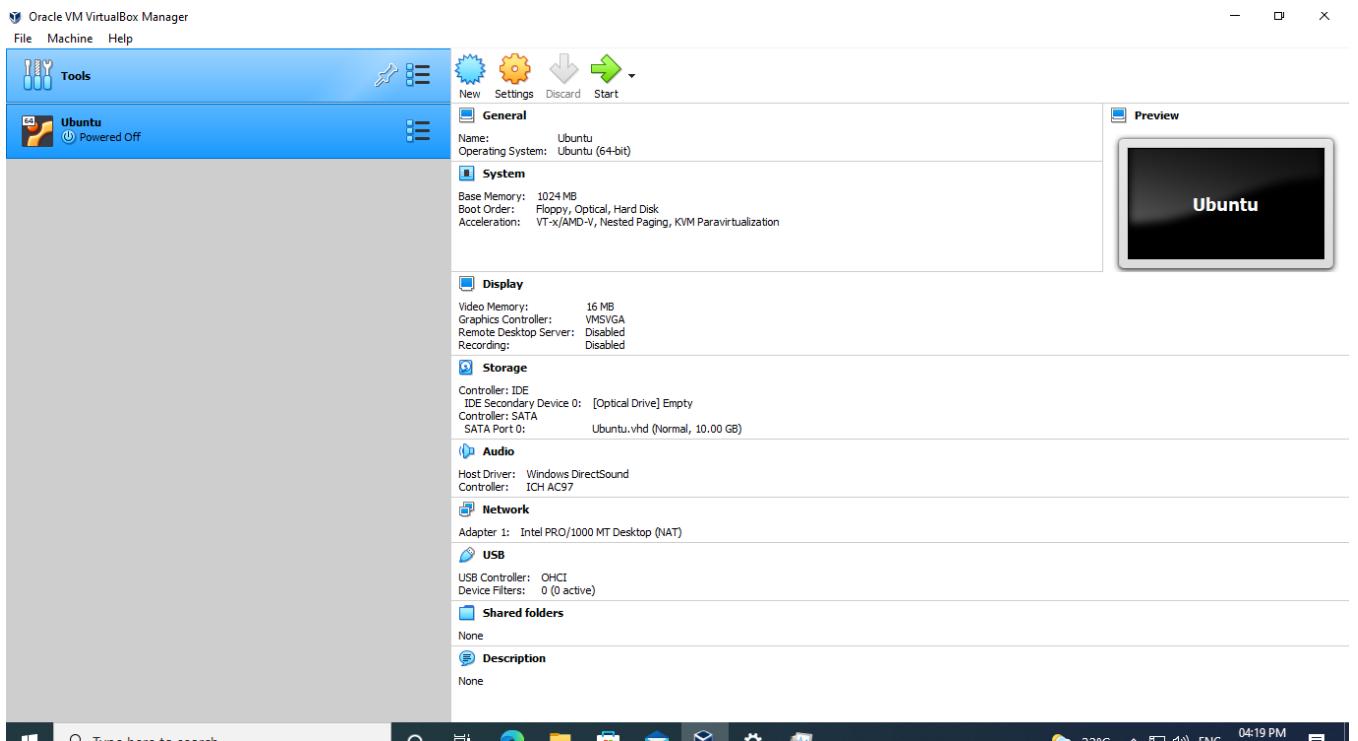
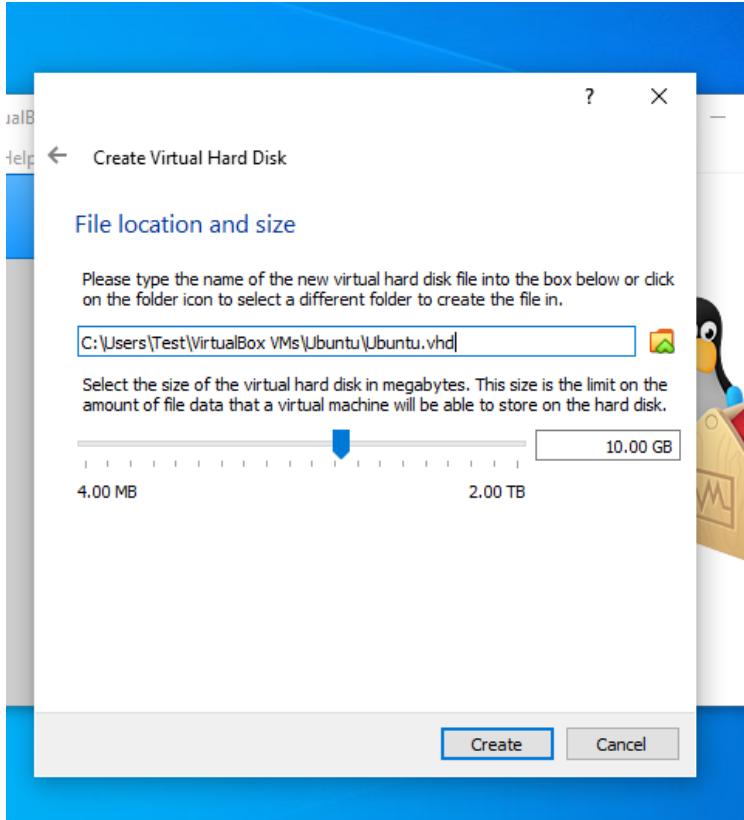


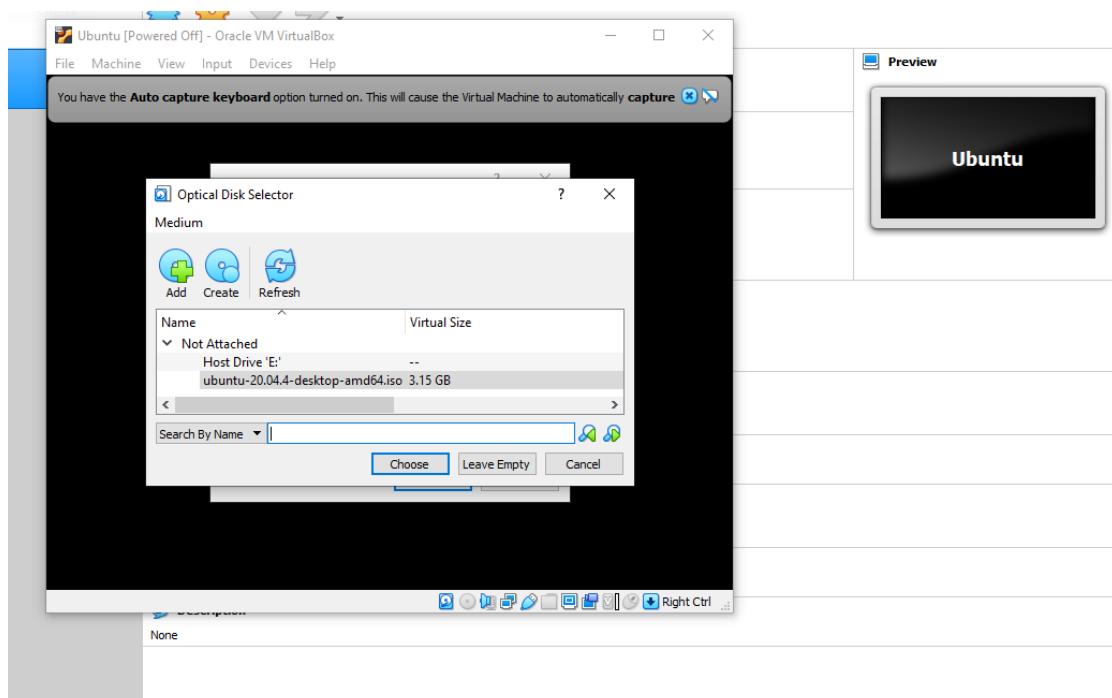
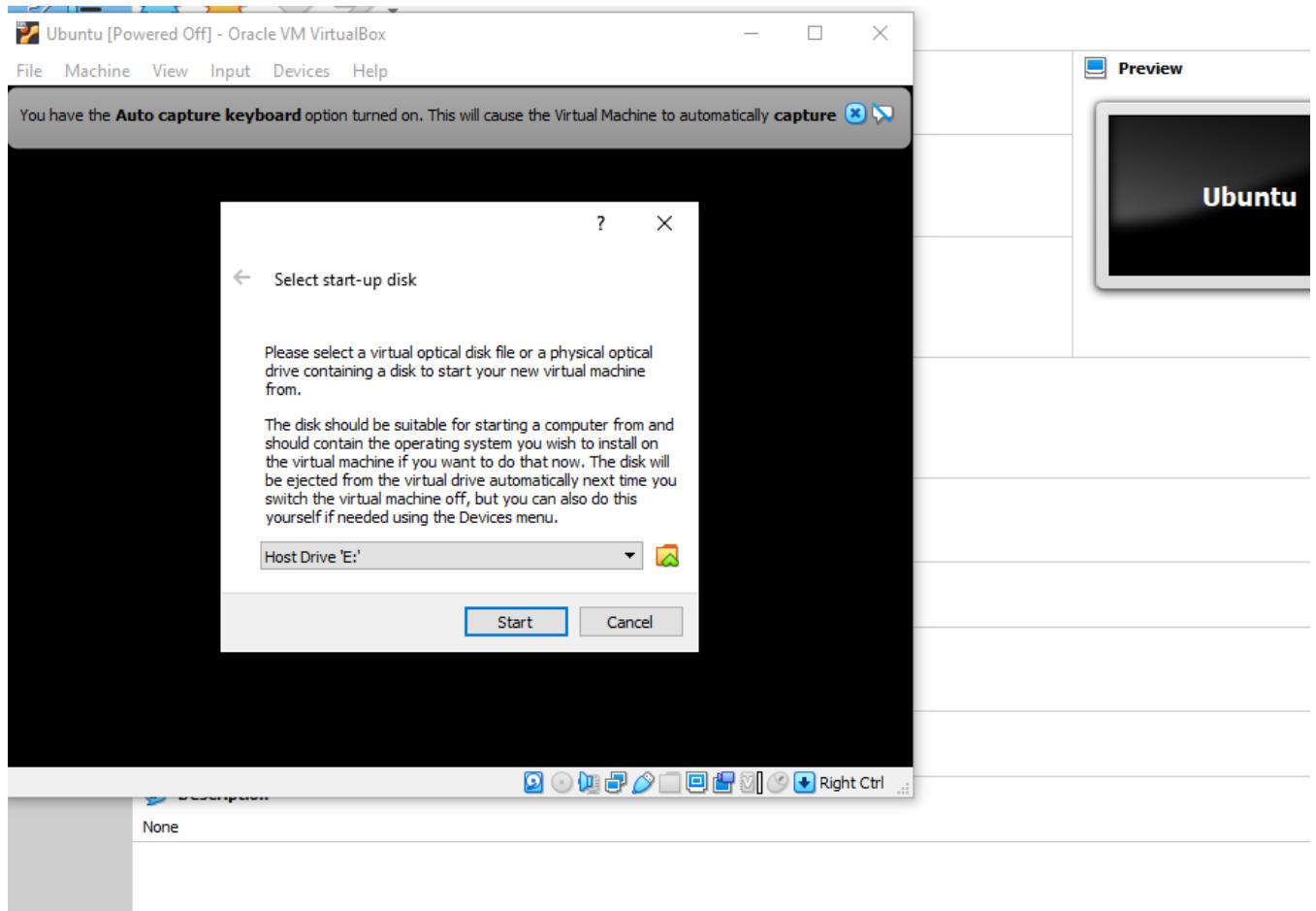
STEP 10: Set hard disk file type as VDI and click “next”

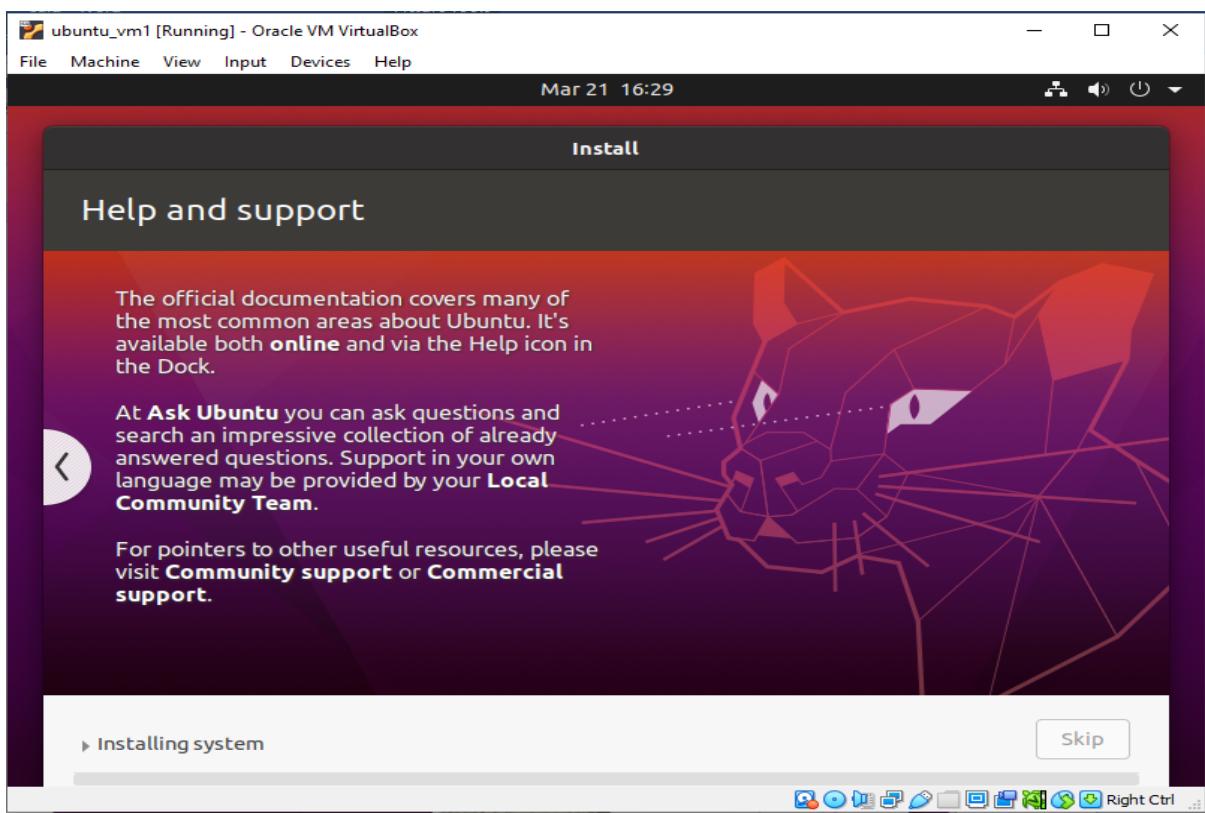
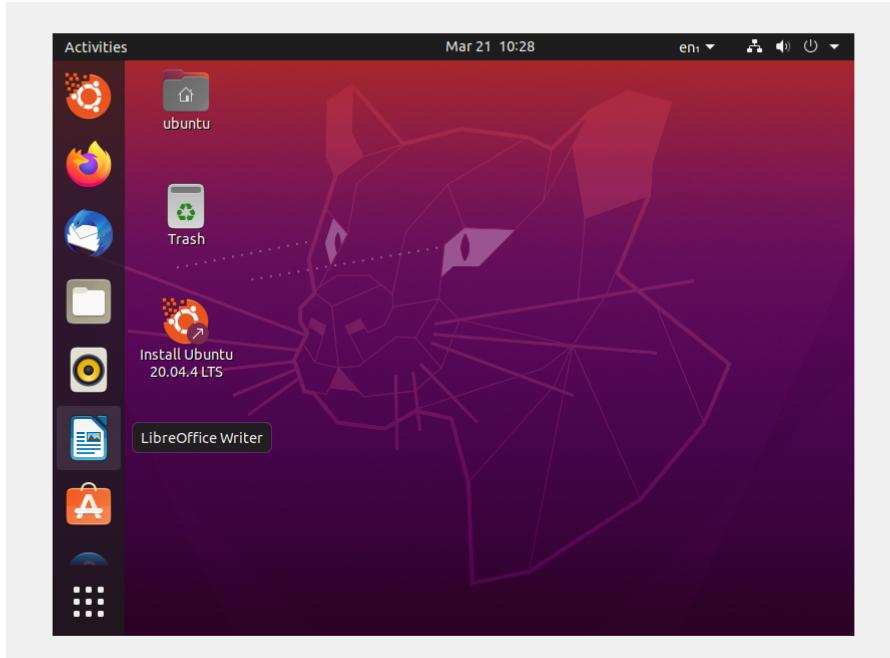


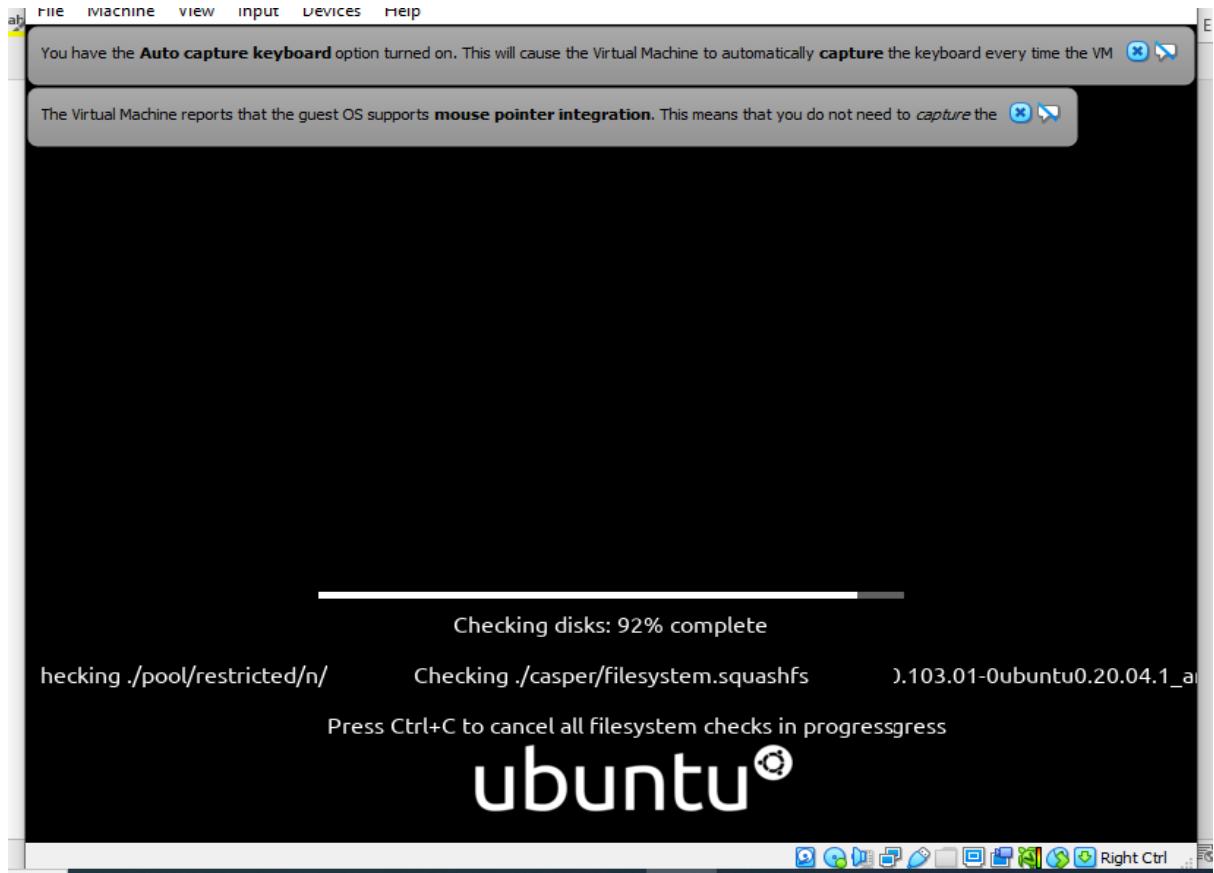
STEP 11: Set storage on physical hard disk as dynamically allocated











Experiment No.: 3

Aim

Study of a terminal based text editor such as Vim or Gedit, Basic Linux commands: -
familiarity with following commands/operations expected

1. man
2. ls, echo, read
3. more, less, cat
4. cd, mkdir, pwd, find
5. mv, cp , rm ,tar
6. wc, cut, paste
7. head, tail, grep, expr
8. chmod, chown
9. Redirections & Piping
10. useradd, usermod, userdel, passwd
11. df,top, ps
12. ssh, scp, ssh-keygen, ssh-copy-id

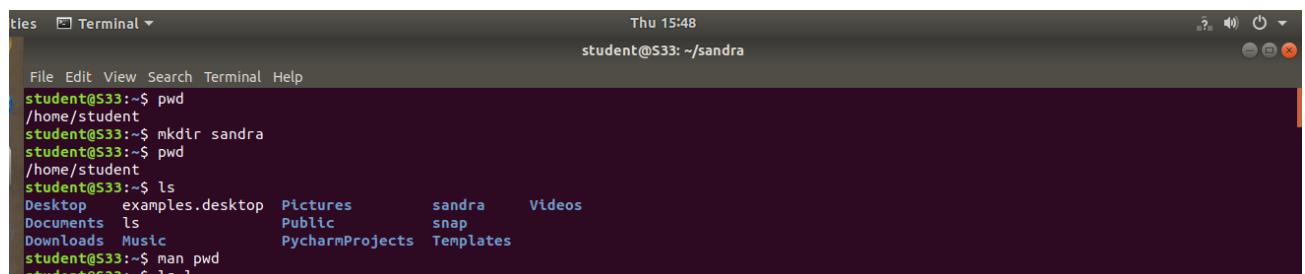
Procedure:

1. man

is used to display the manual of any command that we can run on terminal.

Syntax:

```
$man pwd
```



A screenshot of a terminal window titled "Terminal". The window shows the following session:

```
File Edit View Search Terminal Help
student@S33:~$ pwd
/home/student
student@S33:~$ mkdir sandra
student@S33:~$ pwd
/home/student
student@S33:~$ ls
Desktop examples.desktop Pictures sandra Videos
Documents ls Public snap
Downloads Music PycharmProjects Templates
student@S33:~$ man pwd
student@S33:~$
```

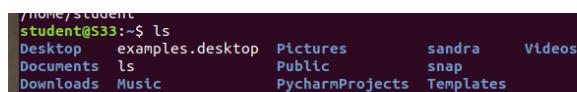
2. ls

ls command is used to display a list of content of a directory.

Syntax:

```
$ls
```

output:



```
/home/student
student@S33:~$ ls
Desktop examples.desktop Pictures sandra Videos
Documents ls Public snap
Downloads Music PycharmProjects Templates
```

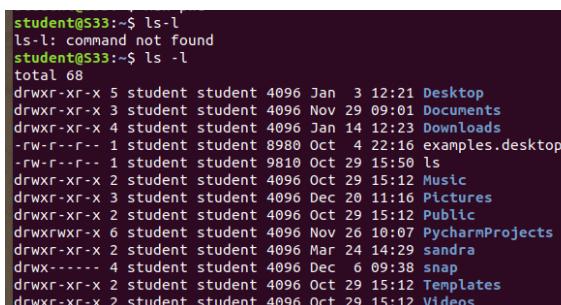
ls -l

It will show the list in long list format.

syntax:

```
$ ls -l
```

output:



```
student@S33:~$ ls -l
ls: command not found
student@S33:~$ ls -l
total 68
drwxr-xr-x 5 student student 4096 Jan  3 12:21 Desktop
drwxr-xr-x 3 student student 4096 Nov 29 09:01 Documents
drwxr-xr-x 4 student student 4096 Jan 14 12:23 Downloads
-rw-r--r-- 1 student student 8980 Oct  4 22:16 examples.desktop
-rw-r--r-- 1 student student 9810 Oct 29 15:50 ls
drwxr-xr-x 2 student student 4096 Oct 29 15:12 Music
drwxr-xr-x 3 student student 4096 Dec 20 11:16 Pictures
drwxr-xr-x 2 student student 4096 Oct 29 15:12 Public
drwxrwxr-x 6 student student 4096 Nov 26 10:07 PycharmProjects
drwxr-xr-x 2 student student 4096 Mar 24 14:29 sandra
drwx----- 4 student student 4096 Dec  6 09:38 snap
drwxr-xr-x 2 student student 4096 Oct 29 15:12 Templates
drwxr-xr-x 2 student student 4096 Oct 29 15:12 Videos
```

ls -R

It will display the content of the sub- directories also.

syntax:

```
$ls -R
```

output:

```
drwxr-xr-x 2 student student 4096 Oct 29 15:12 Videos
student@533:~$ ls -R
.:
Desktop examples.desktop Pictures sandra Videos
Documents ls Public snap
Downloads Music PycharmProjects Templates

./Desktop:
aparna exam1.cpp 'python lab' test1 test.o
exam1 exam1.o test test.cpp
```

Show file types ("/" = directory, "*" = executable)

syntax:

```
$ls -a
```

```
./Videos:
student@T70:~$ ls -a
.. Downloads .netbeans sandra
.. examples.desktop .oracle_jre_usage snap
.bash_history .gnupg Pictures ssh
.bash_logout .ICEauthority .pki Templates
.bashrc .java .profile .thunderbird
.cache kk Public Videos
.config .local .PycharmCE2019.3
Desktop .mozilla PycharmProjects
Documents Music salu
```

ls -al

ordering sequence

syntax:

```
$ls -al
```

```
student@T70:~$ ls -al
total 148
drwxr-xr-x 27 student student 4096 Mar 24 14:29 .
drwxr-xr-x  6 root   root   4096 Jan 13 14:34 ..
-rw-----  1 student student 119 Nov 11 10:02 .bash_history
-rw-r--r--  1 student student 220 Oct  4 16:24 .bash_logout
-rw-r--r--  1 student student 3771 Oct  4 16:24 .bashrc
drwx----- 18 student student 4096 Feb 21 10:32 .cache
drwx----- 16 student student 4096 Nov 22 11:19 .config
drwxr-xr-x  3 student student 4096 Mar 21 14:48 Desktop
drwxr-xr-x  8 student student 4096 Dec 17 10:20 Documents
drwxr-xr-x  2 student student 4096 Jan 14 12:43 Downloads
-rw-r--r--  1 student student 8980 Oct  4 16:24 examples.desktop
drwx-----  3 student student 4096 Nov  1 11:19 .gnupg
-rw-----  1 student student 11016 Mar 24 14:04 .ICEauthority
drwxrwxr-x  4 student student 4096 Nov  1 11:19 .java
drwxr-xr-x  2 student student 4096 Oct 29 15:53 kk
drwx-----  3 student student 4096 Oct 29 21:04 .local
drwx-----  5 student student 4096 Oct 29 15:14 .mozilla
drwxr-xr-x  2 student student 4096 Oct 29 21:04 Music
drwxrwxr-x  3 student student 4096 Dec 20 12:45 .netbeans
drwxr-xr-x  2 student student 4096 Nov 22 11:19 .oracle_jre_usage
```

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

syntax:

```
$echo contents
```

output:

```
student@S33:~/doc$ echo hai this is a sample  
hai this is a sample  
student@S33:~/doc$ head -2 new.txt
```

read

to read the content of a variable.

syntax:

```
$read name
```

output:

```
my name is sandra  
student@S33:~$ read name  
my name is sandra  
student@S33:~$ echo $sandra  
my name is sandra  
student@S33:~$ ls
```

more

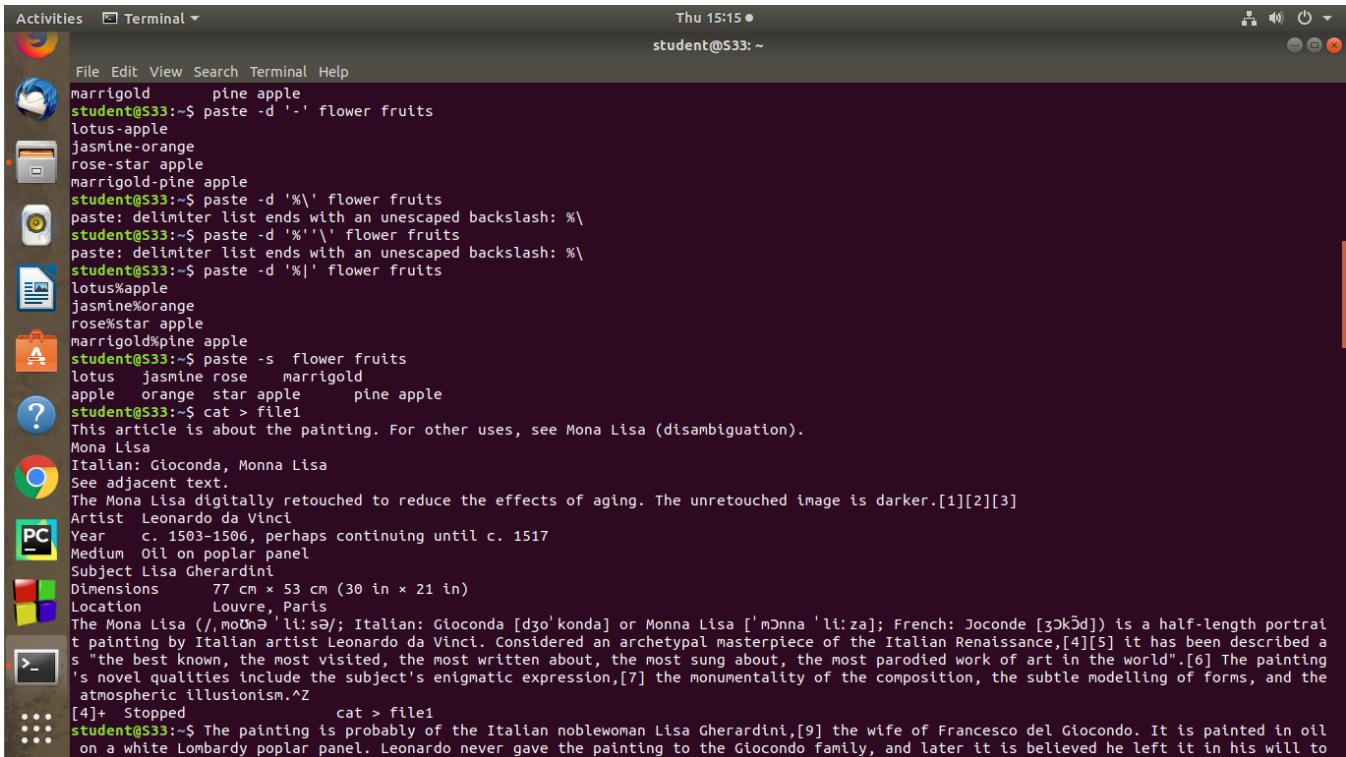
more commands is used to view the text files in the command prompt, displaying one screen at a time in case the file is large. The more command also allows the user do scroll up and down through the page.

syntax:

```
$more file1
```

output:

```
b: command not found  
student@S33:~$ more file1  
This article is about the painting. For other uses, see Mona Lisa (disambiguation).  
Mona Lisa  
Italian: Gioconda, Monna Lisa  
See adjacent text.  
The Mona Lisa digitally retouched to reduce the effects of aging. The unretouched image is darker.[1][2][3]  
Artist Leonardo da Vinci  
Year c. 1503–1506, perhaps continuing until c. 1517  
Medium Oil on poplar panel  
Subject Lisa Gherardini  
Dimensions 77 cm × 53 cm (30 in × 21 in)  
Location Louvre, Paris  
student@S33:~$ more b file1  
More: stat of b failed: No such file or directory  
:::::::  
file1  
:::::::
```



```

Activities Terminal Thu 15:15 ● student@S33: ~
marrigold pine apple
student@S33:~$ paste -d '-' flower fruits
lotus-apple
jasmine-orange
rose-star apple
marrigold-pine apple
student@S33:~$ paste -d '%' flower fruits
paste: delimiter list ends with an unescaped backslash: %
student@S33:~$ paste -d '%'\ flower fruits
paste: delimiter list ends with an unescaped backslash: %
student@S33:~$ paste -d '%|' flower fruits
lotus%apple
jasmine%orange
rose%star apple
marrigold%pine apple
student@S33:~$ paste -s flower fruits
lotus jasmine rose marrigold
apple orange star apple pine apple
student@S33:~$ cat > file1
This article is about the painting. For other uses, see Mona Lisa (disambiguation).
Mona Lisa
Italian: Gioconda, Monna Lisa
See adjacent text.
The Mona Lisa digitally retouched to reduce the effects of aging. The unretouched image is darker.[1][2][3]
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Dimensions 77 cm × 53 cm (30 in × 21 in)
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The Mona Lisa (/mɔnəˈliːsə/; Italian: Gioconda [dʒoˈkonda] or Monna Lisa [mɔnna ˈli:za]; French: Joconde [ʒɔkɔ̃d]) is a half-length portrait painting by Italian artist Leonardo da Vinci. Considered an archetypal masterpiece of the Italian Renaissance,[4][5] it has been described as "the best known, the most visited, the most written about, the most sung about, the most parodied work of art in the world".[6] The painting's novel qualities include the subject's enigmatic expression,[7] the monumentality of the composition, the subtle modelling of forms, and the atmospheric illusionism.^Z
[4]+ Stopped cat > file1
student@S33:~$ The painting is probably of the Italian noblewoman Lisa Gherardini,[9] the wife of Francesco del Giocondo. It is painted in oil on a white Lombardy poplar panel. Leonardo never gave the painting to the Giocondo family, and later it is believed he left it in his will to

```

Cat

print the content of a file onto the standard output stream.

syntax:

\$ cat name.txt



```

student@T70:~/salus$ cat > a.txt
networking and system administration lab
^Z
[1]+ Stopped cat > a.txt
student@T70:~/salus$ cat a.txt
networking and system administration lab
student@T70:~/salus$ cat >> a.txt
hal ^Z
[2]+ Stopped cat >> a.txt
student@T70:~/salus$ cat a.txt
networking and system administration lab
student@T70:~/salus$ cat >> a.txt
hal
^Z
[3]+ Stopped cat >> a.txt
student@T70:~/salus$ cat a.txt
networking and system administration lab
hal
student@T70:~/salus$ cat a.txt > b.txt
student@T70:~/salus$ cat b.txt
networking and system administration lab
hal
student@T70:~/salus$ 

```

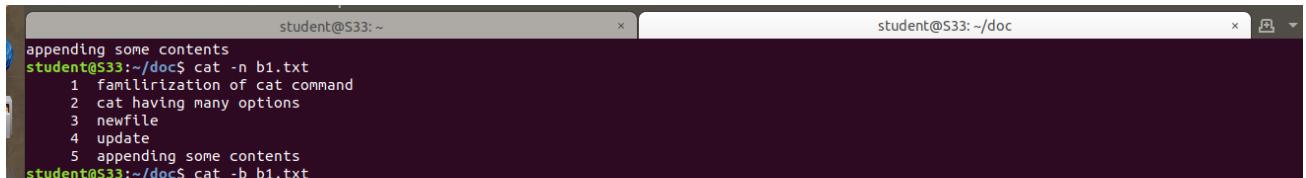
cat -n

print contents with number.

syntax:

```
$cat -n b1.txt
```

output:



```
student@S33: ~
appending some contents
student@S33:~/doc$ cat -n b1.txt
 1  familiarization of cat command
 2  cat having many options
 3  newfile
 4  update
 5  appending some contents
student@S33:~/doc$ cat -b b1.txt
```

cat -b

remove the empty lines and redirect the line number.

syntax:

```
$cat -b file.txt
```

output:



```
student@S33: ~
+ update
5 appending some contents
student@S33:~/doc$ cat -b b1.txt
 1  familiarization of cat command
 2  cat having many options
 3  newfile
 4  update
 5  appending some contents
student@S33:~/doc$ touch b3.txt
```

cd

command is used to change the current working directory in Linux and other Unix-like operating systems.

syntax:

```
$cd
```



```
student@T70:~/salu$ cd ..
student@T70:~$ cd -
/home/student/salu
student@T70:~/salu$ cat > a.txt
networking and system administration lab
^Z
```

mkdir - The mkdir command is used to create a new directory under any directory.

syntax:

```
$mkdir directory _name
```

output:

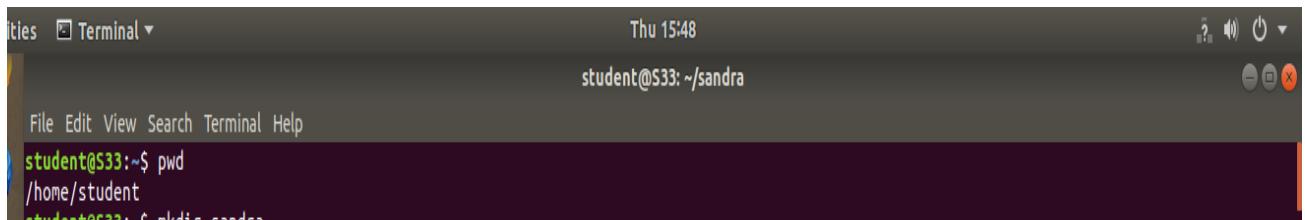
```
/home/student  
student@S33:~$ mkdir sandra  
student@S33:~$ pwd  
/home/student  
student@S33:~$ ls
```

pwd - print working directory it prints current working directory path starting from root.

syntax:

```
$pwd
```

output:



A screenshot of a Linux desktop environment showing a terminal window. The title bar says 'Terminal'. The window shows the following text:

```
File Edit View Search Terminal Help  
student@S33:~/sandra  
/home/student
```

find- find current directory.

syntax:

```
$find filename
```

output:

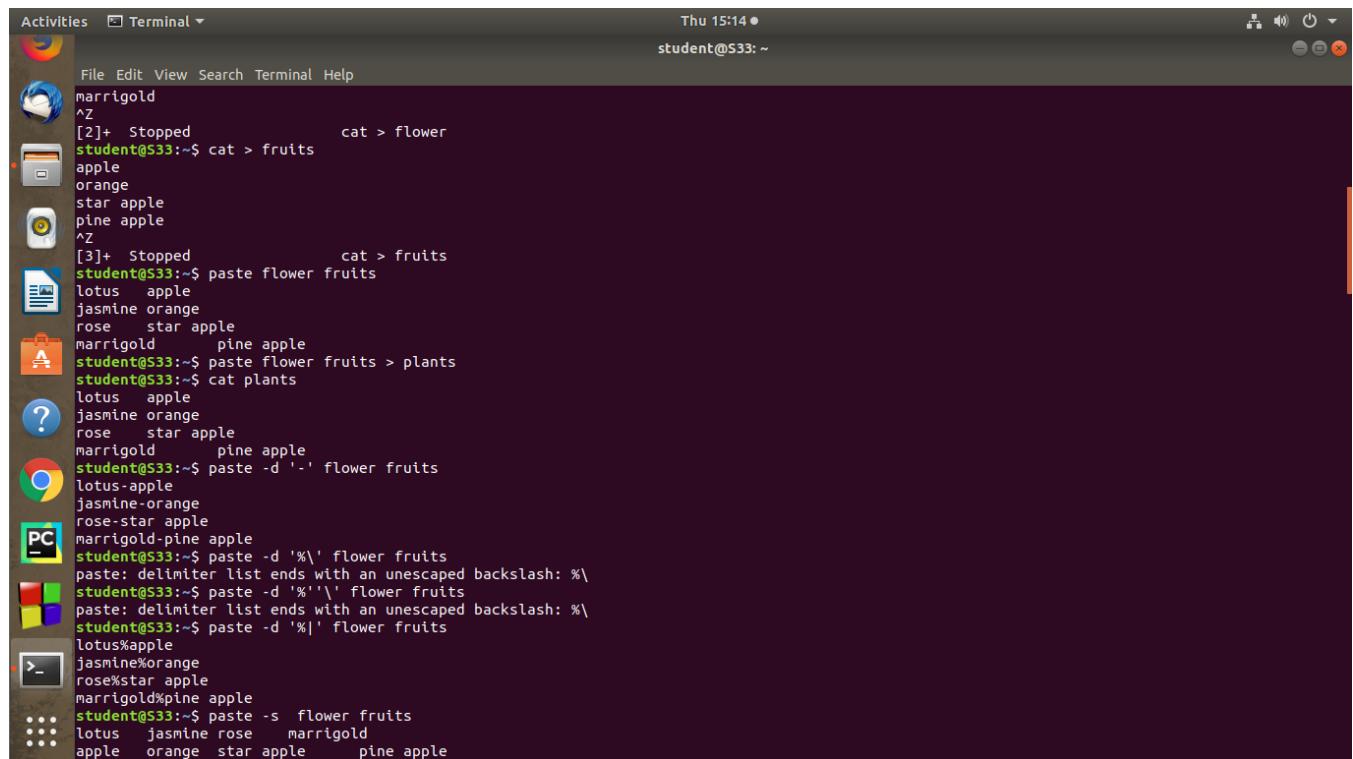
```
/home/student/Documents/Gokul k/file1.txt  
student@S33:~$ find file1.txt  
file1.txt  
student@S33:~$ cat file2.txt
```

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.

syntax:

```
$ paste file1
```

output:



The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is "Terminal". The terminal content shows the following session:

```
Activities Terminal Thu 15:14 ●
student@S33: ~

File Edit View Search Terminal Help
marrigold
^Z
[2]+ Stopped                  cat > flower
student@S33:~$ cat > fruits
apple
orange
star apple
pine apple
^Z
[3]+ Stopped                  cat > fruits
student@S33:~$ paste flower fruits
lotus    apple
jasmine orange
rose    star apple
marrigold    pine apple
student@S33:~$ paste flower fruits > plants
student@S33:~$ cat plants
lotus    apple
jasmine orange
rose    star apple
marrigold    pine apple
student@S33:~$ paste -d '-' flower fruits
lotus-apple
jasmine-orange
rose-star apple
marrigold-pine apple
student@S33:~$ paste -d '\\' flower fruits
paste: delimiter list ends with an unescaped backslash: \\
student@S33:~$ paste -d '\''\\'\' flower fruits
paste: delimiter list ends with an unescaped backslash: \\
student@S33:~$ paste -d '%' flower fruits
lotus%apple
jasmine%orange
rose%star apple
marrigold%pine apple
student@S33:~$ paste -s  flower fruits
lotus  jasmine rose  marrigold
apple  orange  star apple  pine apple
```

6. wc

word count used for count purpose it is used to find the number of lines, number of words number of characters and number of bytes.

Syntax

\$ wc -l filename

\$ wc -w filename

\$ wc -c filename

\$ wc -m filename

output

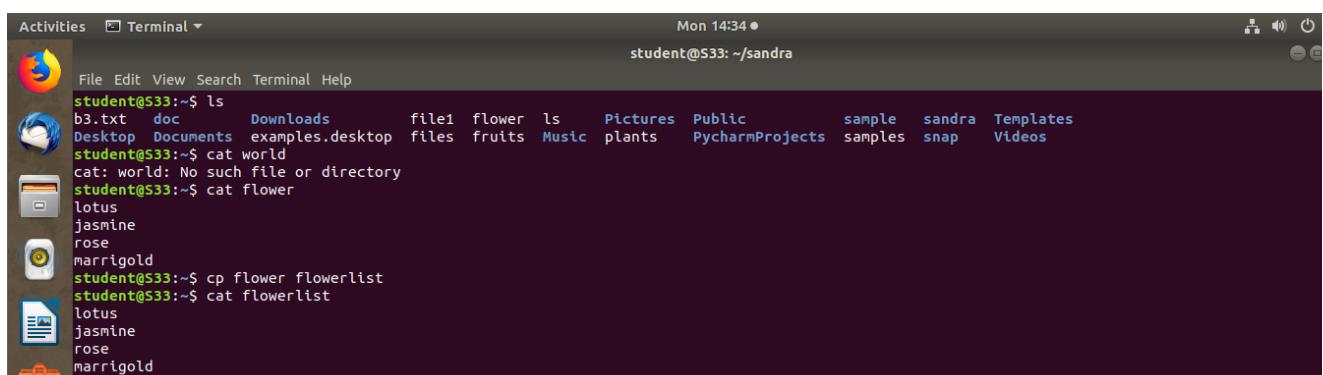
```
1290Z10 .
student@S33:~$ ls
b1.txt doc1.txt examples.desktop file1.txt flower    ls      plants       sample   snap
Desktop Documents exaple.txt     file2.txt flowerlist Music   Public      samples  Templates
doc    Downloads file1           files    fruits    Pictures PycharmProjects sandra  Videos
student@S33:~$ cat fruits
apple
orange
star apple
pine apple
student@S33:~$ wc -l fruits
4 fruits
student@S33:~$ wc -w fruits
6 fruits
student@S33:~$ wc -c fruits
35 fruits
student@S33:~$ wc -m fruits
35 fruits
student@S33:~$
```

cp – cp command used to copy

syntax:

\$cp flower flowerlist

output:



```
Activities Terminal ▾ Mon 14:34 ●
student@S33: ~/sandra
File Edit View Search Terminal Help
student@S33:~$ ls
b3.txt doc Downloads file1 flower ls Pictures Public sample sandra Templates
Desktop Documents examples.desktop files fruits Music plants PycharmProjects samples snap Videos
student@S33:~$ cat world
cat: world: No such file or directory
student@S33:~$ cat flower
lotus
jasmine
rose
marrigold
student@S33:~$ cp flower flowerlist
student@S33:~$ cat flowerlist
lotus
jasmine
rose
marrigold
```

cp -r - cp -r command is used to copy entier directory.

Syntax:

\$cp -r – sample sandra

output:



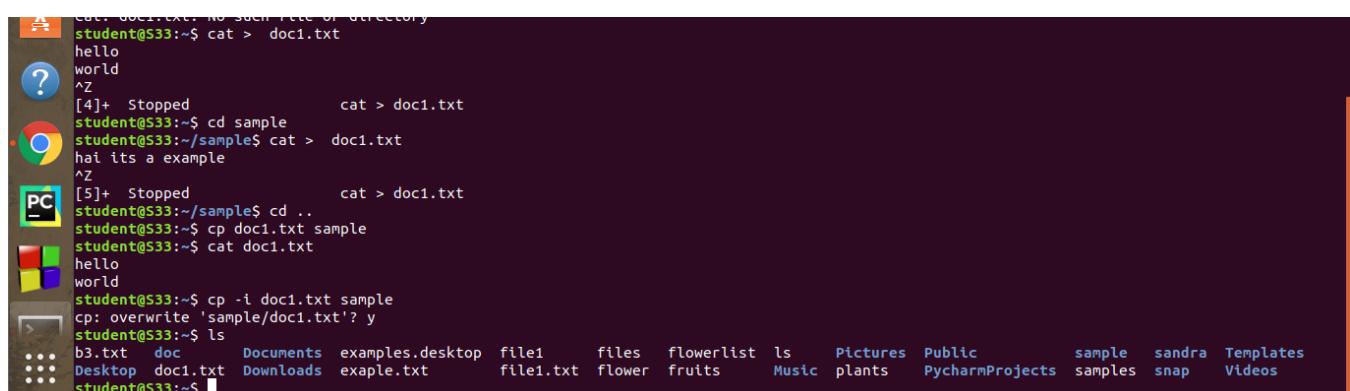
```
MariGold
student@S33:~$ cd sample
student@S33:~/sample$ ls
b1.txt
student@S33:~/sample$ cd ..
student@S33:~$ cd sandra
student@S33:~/sandra$ ls
b.txt sample.txt
student@S33:~/sandra$ cd ..
student@S33:~$ cp sample sandra
cp: r not specified; omitting directory 'sample'
student@S33:~$ cp -r sample sandra
student@S33:~$ cd sandra
student@S33:~/sandra$ ls
b.txt sample sample.txt
student@S33:~/sandra$
```

3. cp -i – this command is used to ask permission to overwrite

syntax:

```
cp -i doc1.txt sample
```

output :



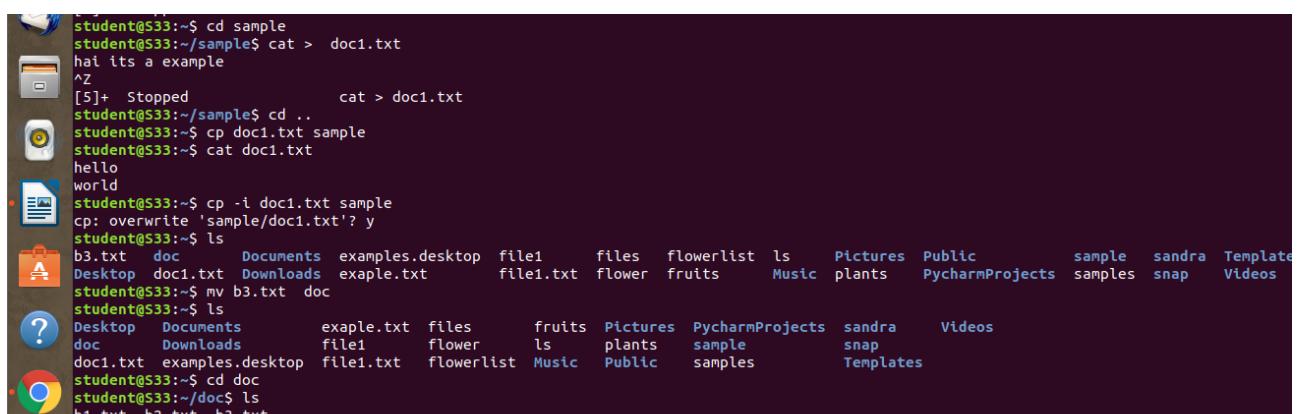
```
student@S33:~$ cat > doc1.txt
hello
world
^Z
[4]+ Stopped                  cat > doc1.txt
student@S33:~$ cd sample
student@S33:~/sample$ cat > doc1.txt
hai its a example
^Z
[5]+ Stopped                  cat > doc1.txt
student@S33:~/sample$ cd ..
student@S33:~$ cp doc1.txt sample
student@S33:~$ cat doc1.txt
hello
world
student@S33:~$ cp -i doc1.txt sample
cp: overwrite 'sample/doc1.txt'? y
student@S33:~$ ls
b3.txt  doc      Documents  examples.desktop  file1      files    flowerlist  ls      Pictures  Public      sample  sandra  Templates
Desktop  doc1.txt  Downloads  exaple.txt       file1.txt   flower   fruits     Music    plants    PycharmProjects  samples  snap   Videos
student@S33:~$
```

4. mv – mv command is used to move a file to another directory

syntax:

```
$mv b3.txt doc
```

output:



```
student@S33:~$ cd sample
student@S33:~/sample$ cat > doc1.txt
hai its a example
^Z
[5]+ Stopped                  cat > doc1.txt
student@S33:~/sample$ cd ..
student@S33:~$ cp doc1.txt sample
student@S33:~$ cat doc1.txt
hello
world
student@S33:~$ cp -i doc1.txt sample
cp: overwrite 'sample/doc1.txt'? y
student@S33:~$ ls
b3.txt  doc      Documents  examples.desktop  file1      files    flowerlist  ls      Pictures  Public      sample  sandra  Templates
Desktop  doc1.txt  Downloads  exaple.txt       file1.txt   flower   fruits     Music    plants    PycharmProjects  samples  snap   Videos
student@S33:~$ mv b3.txt doc
student@S33:~$ ls
Desktop  Documents      exaple.txt  files      fruits    Pictures  PycharmProjects  sandra      Videos
doc      Downloads       file1      flower     ls       plants    sample      snap
doc1.txt  examples.desktop  file1.txt  flowerlist  Music    Public    samples      Templates
student@S33:~$ cd doc
student@S33:/doc$ ls
b3.txt  b2.txt  b3.txt
```

mv -i - this command is used to ask permission to move one directory to another directory .

Syntax:

```
$mv -i red.txt sample
```

output:

```
MV: cannot stat 'b1.txt': No such file or directory
student@S33:~$ cat > b1.txt
ijnm
^Z
[9]+  Stopped                  cat > b1.txt
student@S33:~$ mv -i b1.txt sample
mv: overwrite 'sample/b1.txt'? [
```

locate- to locate a particular file or directory .

Syntax:

```
$locate filename
```

output:

```
student@S33:~$ locate file1.txt
/home/student/Documents/Gokul k/file1.txt
student@S33:~$ locate flower
```

find- find current directory .

syntax:

```
$find filename
```

output:

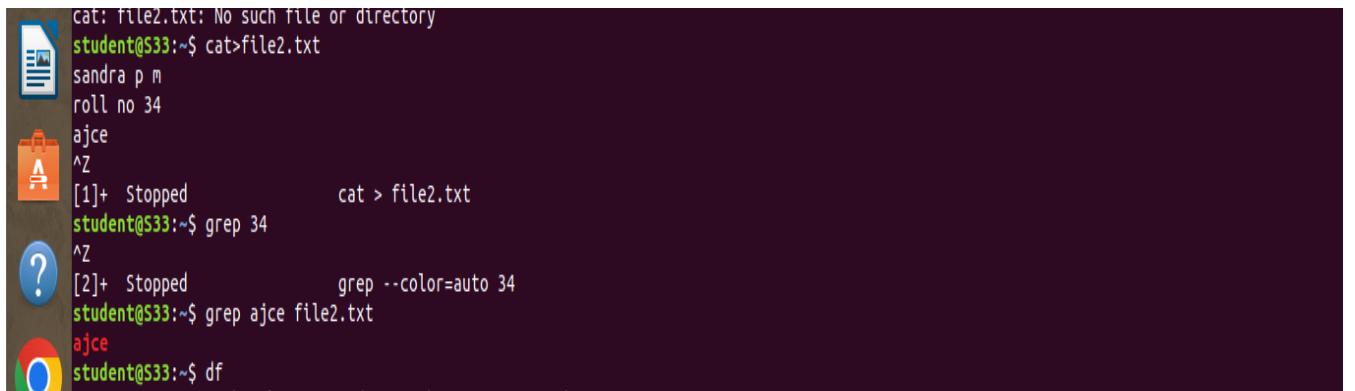
```
/home/student/Documents/Gokul k/file1.txt
student@S33:~$ find file1.txt
file1.txt
student@S33:~$ cat file2.txt
```

5.grep – grep command will let you search all text in a given file.

Syntax:

```
$grep content filename
```

output:



```
cat: file2.txt: No such file or directory
student@S33:~$ cat>file2.txt
sandra p m
roll no 34
ajce
^Z
[1]+  Stopped                  cat > file2.txt
student@S33:~$ grep 34
^Z
[2]+  Stopped                  grep --color=auto 34
student@S33:~$ grep ajce file2.txt
ajce
student@S33:~$ df
```

grep -i – for a case insensitive search

syntax:

```
$grep -i word filename
```

output:



```
student@S33:~$ wc -l fruits
35 fruits
student@S33:~$ grep -i star fruits
star apple
student@S33:~$ grep -v star fruits
```

7.grep -v - inverted search

syntax:

```
$grep -v word filename
```

output



```
star apple
student@S33:~$ grep -v star fruits
apple
orange
pine apple
```

grep | -search that particular word

syntax:

\$ cat filename | grep word

output

```
cat: mark.txt: No such file or directory
student@S33:~$ cat fruits| grep apple
apple
star apple
pine apple
student@S33:~$ grep -A orange fruits
```

9.grep -A1 – to display the line after the result.

Syntax:

\$grep -A1 word filename

output

```
grep: star: invalid context length argument
student@S33:~$ grep -A1 star fruits
star apple
pine apple
student@S33:~$ grep -A1 star fruits
```

10.grep -B1 -display the line before the result.

Syntax:

\$grep -B1 word filename

output

```
pine apple
student@S33:~$ grep -B1 star fruits
orange
star apple
student@S33:~$ orange -C1 star fruits
```

11.grep -C1 -display the line before and after the result

syntax

\$grep -C1 word filename

output

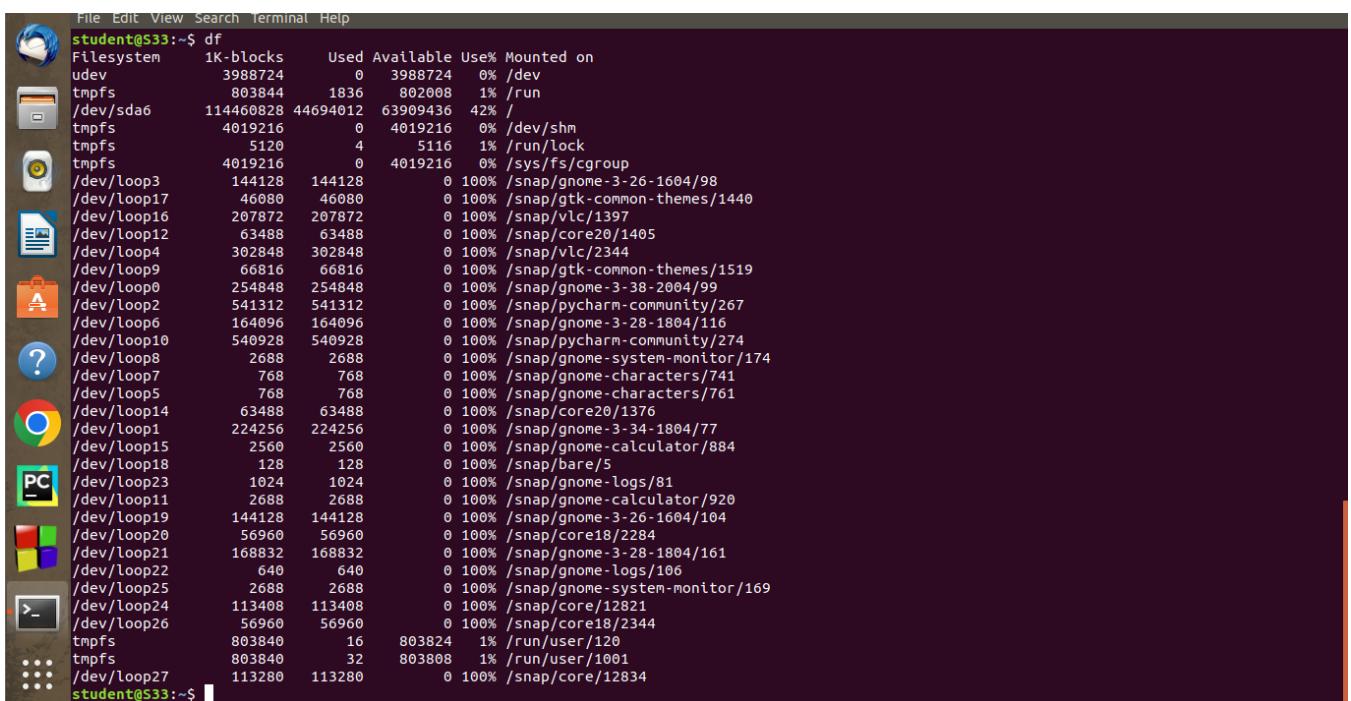
```
orange
star apple
student@S33:~$ grep -C1 star fruits
orange
star apple
pine apple
student@S33:~$
```

df -df command is used to report of system diskspace usage.

Syntax:

\$df

output



```
File Edit View Search Terminal Help
student@S33:~$ df
Filesystem      1K-blocks   Used   Available Use% Mounted on
udev             3988724     0   3988724  0% /dev
tmpfs            803844    1836   802008  1% /run
/dev/sda6       114460828 44694012 63909436 42% /
tmpfs            4019216     0   4019216  0% /dev/shm
tmpfs             5120      4    5116  1% /run/lock
tmpfs            4019216     0   4019216  0% /sys/fs/cgroup
/dev/loop3        144128   144128     0 100% /snap/gnome-3-26-1604/98
/dev/loop17       46080    46080     0 100% /snap/gtk-common-themes/1440
/dev/loop16       207872   207872     0 100% /snap/vlc/1397
/dev/loop12       63488    63488     0 100% /snap/core20/1405
/dev/loop4        302848   302848     0 100% /snap/vlc/2344
/dev/loop9        66816    66816     0 100% /snap/gtk-common-themes/1519
/dev/loop0         254848   254848     0 100% /snap/gnome-3-38-2004/99
/dev/loop2         541312   541312     0 100% /snap/pycharm-community/267
/dev/loop6         164096   164096     0 100% /snap/gnome-3-28-1804/116
/dev/loop10        540928   540928     0 100% /snap/pycharm-community/274
/dev/loop8          2688    2688     0 100% /snap/gnome-system-monitor/174
/dev/loop7           768    768     0 100% /snap/gnome-characters/741
/dev/loop5           768    768     0 100% /snap/gnome-characters/761
/dev/loop14        63488    63488     0 100% /snap/core20/1376
/dev/loop1          224256   224256     0 100% /snap/gnome-3-34-1804/77
/dev/loop15        2560    2560     0 100% /snap/gnome-calculator/884
/dev/loop18          128    128     0 100% /snap/bare/5
/dev/loop23         1024   1024     0 100% /snap/gnome-logs/81
/dev/loop11         2688   2688     0 100% /snap/gnome-calculator/920
/dev/loop19        144128   144128     0 100% /snap/gnome-3-26-1604/104
/dev/loop20        56960   56960     0 100% /snap/core18/2284
/dev/loop21        168832   168832     0 100% /snap/gnome-3-28-1804/161
/dev/loop22          640    640     0 100% /snap/gnome-logs/106
/dev/loop25          2688   2688     0 100% /snap/gnome-system-monitor/169
/dev/loop24        113408   113408     0 100% /snap/core/12821
/dev/loop26        56960   56960     0 100% /snap/core18/2344
tmpfs             803840      16   803824  1% /run/user/120
tmpfs             803840      32   803808  1% /run/user/1001
/dev/loop27       113280   113280     0 100% /snap/core/12834
student@S33:~$
```

du -to check how much space a file or directory takes.

Syntax

\$ du

output

```
/dev/loop27      111  111      0 100% /snap/core/12834
student@S33:~$ du
4      ./ssh
12     ./doc
8      ./java/.userPrefs/jetbrains/_!(!cg"p!{}!}@"j!(k!|w!"w!'8!b!"p!':le@==
8      ./java/.userPrefs/jetbrains/jetprofile/asset
16     ./java/.userPrefs/jetbrains/jetprofile
32     ./java/.userPrefs/jetbrains
40     ./java/.userPrefs
40     ./java/fonts/11.0.13
40     ./java/fonts/11.0.12
40     ./java/fonts/11.0.5
124    ./java/fonts
168    ./java
688    ./cache/fontconfig
24     ./cache/thumbnails/fail/gnome-thumbnail-factory
28     ./cache/thumbnails/fail
20     ./cache/thumbnails/normal
1728   ./cache/thumbnails/large
1780   ./cache/thumbnails
4      ./cache/gnome-control-center/backgrounds
8      ./cache/gnome-control-center
1900   ./cache/thunderbird/zae60yb3.default/cache2/entries
4      ./cache/thunderbird/zae60yb3.default/cache2/doomed
1908   ./cache/thunderbird/zae60yb3.default/cache2
4      ./cache/thunderbird/zae60yb3.default/safebrowsing
996    ./cache/thunderbird/zae60yb3.default/startupCache
2912   ./cache/thunderbird/zae60yb3.default
2916   ./cache/thunderbird
4      ./cache/ibus-table
12    ./cache/rhythmbox/album-art
8      ./cache/rhythmbox/alternate-toolbar
24    ./cache/rhythmbox
872    ./cache/gnome-software/fwupd/remotes.d/lvfs
876    ./cache/gnome-software/fwupd/remotes.d
880    ./cache/gnome-software/fwupd
4      ./cache/gnome-software/shell-extensions
4      ./cache/gnome-software/screenshots/112x63
```

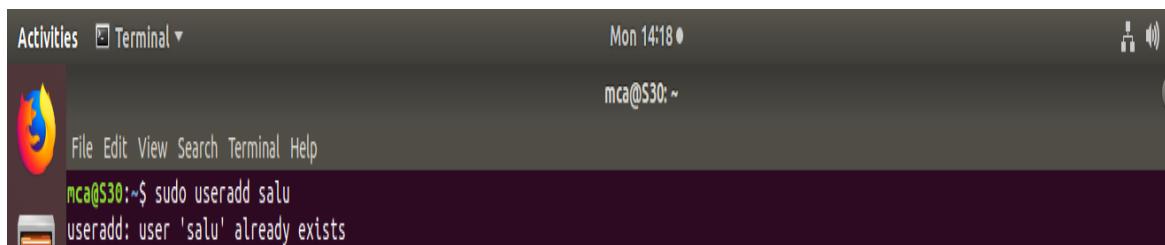
Procedure

1.To we want create new user or new group

->*Sudo useradd username*

->*sudo useradd salu*

Output Screenshot



```
Activities Terminal ▾ Mon 14:18 ●  
mca@S30:~$ sudo useradd salu  
useradd: user 'salu' already exists
```

2.set password

- >*Sudo passwd username*

Output



```
mca@S30:~$ sudo passwd salu  
Enter new UNIX password:  
Retype new UNIX password:  
passwd: password updated successfully
```

3.Group add/create

->*sudo groupadd -g 7000 "Groupname"*

-> sudo groupadd -G 7000 reg

Output

```
mca@S30:~$ sudo usermode -G
sudo: usermode: command not found
mca@S30:~$ 
mca@S30:~$ sudo groupadd -g reg
groupadd: invalid group ID 'reg'
mca@S30:~$ sudo groupadd -g 7000 reg
mca@S30:~$ sudo groupadd -G regt
groupadd: invalid option -- 'G'
Usage: groupadd [options] GROUP

Options:
  -f, --force           exit successfully if the group already exists,
                        and cancel -g if the GID is already used
  -g, --gid GID         use GID for the new group
  -h, --help             display this help message and exit
  -K, --key KEY=VALUE   override /etc/login.defs defaults
  -o, --non-unique       allow to create groups with duplicate
                        (non-unique) GID
  -p, --password PASSWORD use this encrypted password for the new group
  -r, --system           create a system account
  -R, --root CHROOT_DIR directory to chroot into
  --extrausers          Use the extra users database
```

4.Add new user

-> sudo usermod -G groupname username

->sudo usermod -G reg salu

Output

```
mca@S30:~$ sudo usermod -G reg salu
...
mca@S30:~$ id salu
uid=1004(salu) gid=1005(salu) groups=1005(salu),7000(reg)
mca@S30:~$ 
```

5]id username

->user existing or not can be viewed.

->id salu

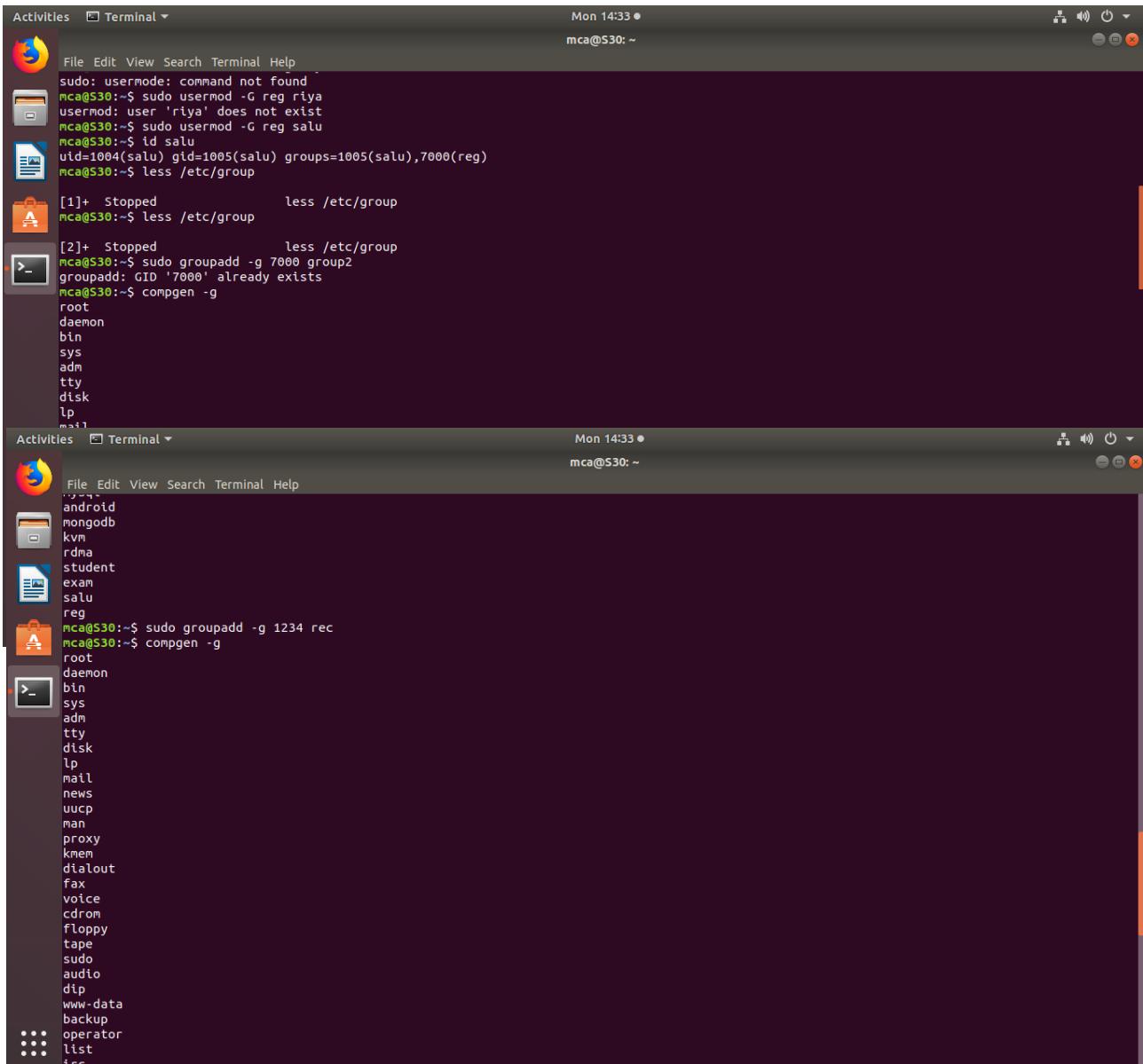
```

mca@S30:~$ id salu
uid=1004(salu) gid=1005(salu) groups=1005(salu),7000(reg)
mca@S30:~$ 
```

6]compgen -g

->View already existing group

Output



The image shows two terminal windows side-by-side on a Linux desktop environment. Both terminals have a dark theme and are running on the same session.

Terminal 1 (Top):

```
File Edit View Search Terminal Help
sudo: usermode: command not found
mca@S30:~$ sudo usermod -G reg riya
usermod: user 'riya' does not exist
mca@S30:~$ sudo usermod -G reg salu
mca@S30:~$ id salu
uid=1004(salu) gid=1005(salu) groups=1005(salu),7000(reg)
mca@S30:~$ less /etc/group

[1]+  Stopped                  less /etc/group
mca@S30:~$ less /etc/group

[2]+  Stopped                  less /etc/group
mca@S30:~$ sudo groupadd -g 7000 group2
groupadd: GID '7000' already exists
mca@S30:~$ compgen -g
root
daemon
bin
sys
adm
tty
disk
lp
mcs1
```

Terminal 2 (Bottom):

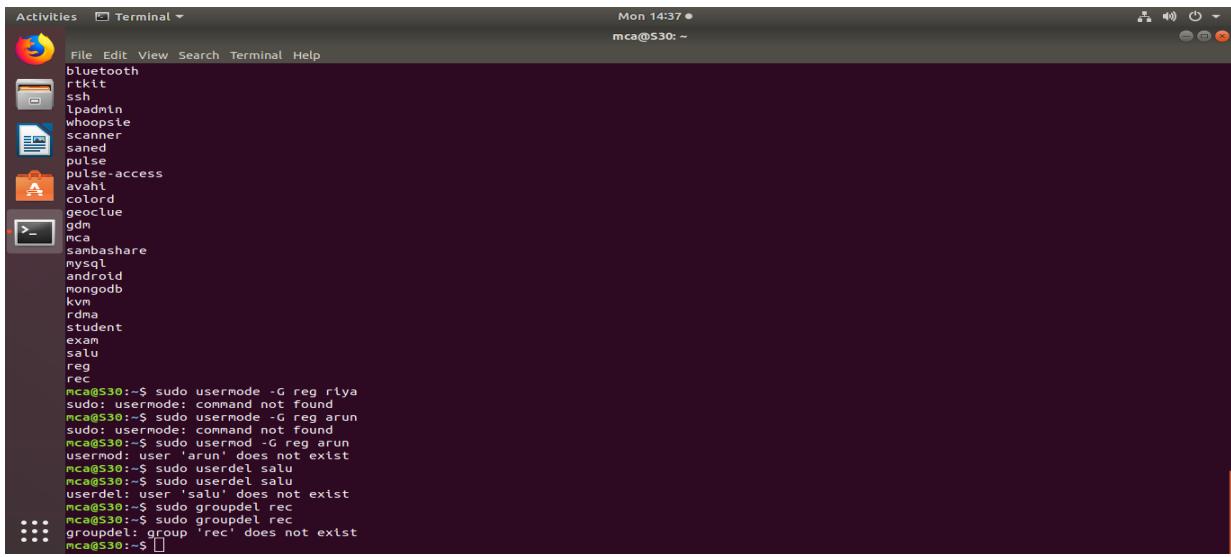
```
File Edit View Search Terminal Help
android
mongodb
kvm
rdma
student
exam
salu
reg
mca@S30:~$ sudo groupadd -g 1234 rec
mca@S30:~$ compgen -g
root
daemon
bin
sys
adm
tty
disk
lp
mail
news
uucp
man
proxy
kmem
dialout
fax
voice
cdrom
floppy
tape
sudo
audio
dip
www-data
backup
operator
list
irc
```

7]sudo useradd username

->Add new username

->sudo useradd user

Output



A screenshot of an Ubuntu desktop environment. A terminal window is open in the foreground, showing a list of users and groups. The user 'mca' is listed under both 'users' and 'groups'. Other users listed include bluetooth, rtkit, ssh, lpadmin, whoopsie, scanner, saned, pulse, pulse-access, vahil, colord, geoclue, gdm, mca, sambashare, mysql, android, mongodb, kvm, rdma, student, xam, salu, reg, rec. The terminal shows several failed attempts to use the 'usermode' command with various arguments. At the bottom, there are three ellipsis dots followed by a cursor.

```
mca@S30:~$ sudo usermode -G reg riya
sudo: usermode: command not found
mca@S30:~$ sudo usermode -G reg arun
sudo: usermode: command not found
mca@S30:~$ sudo usermod -G reg arun
usermod: user 'arun' does not exist
mca@S30:~$ sudo userdel salu
userdel: user 'salu' does not exist
mca@S30:~$ sudo groupdel rec
mca@S30:~$ sudo groupdel rec
groupdel: group 'rec' does not exist
mca@S30:~$ 
```

8]Delete user

->sudo userdel username

->sudo userdel salu



A screenshot of a terminal window showing the deletion of the user 'salu'. It first attempts to delete the user 'salu' using 'userdel', which fails because the user does not exist. Then it attempts to delete the user 'salu' using 'sudo userdel salu', which also fails. Finally, it attempts to delete the user 'salu' using 'groupdel rec', which fails because the group 'rec' does not exist. The terminal ends with a cursor at the bottom.

```
mca@S30:~$ sudo userdel salu
mca@S30:~$ sudo userdel salu
userdel: user 'salu' does not exist
mca@S30:~$ sudo groupdel rec
mca@S30:~$ sudo groupdel rec
groupdel: group 'rec' does not exist
mca@S30:~$ 
```

9]view particular group

->compgen -g groupname

10]Delete group

->sudo userdel rec



A screenshot of a terminal window showing the deletion of the group 'rec'. It first attempts to delete the group 'rec' using 'groupdel', which fails because the group does not exist. The terminal ends with a cursor at the bottom.

```
mca@S30:~$ sudo groupdel rec
mca@S30:~$ sudo groupdel rec
groupdel: group 'rec' does not exist
mca@S30:~$ 
```

11]Directory permission of the file

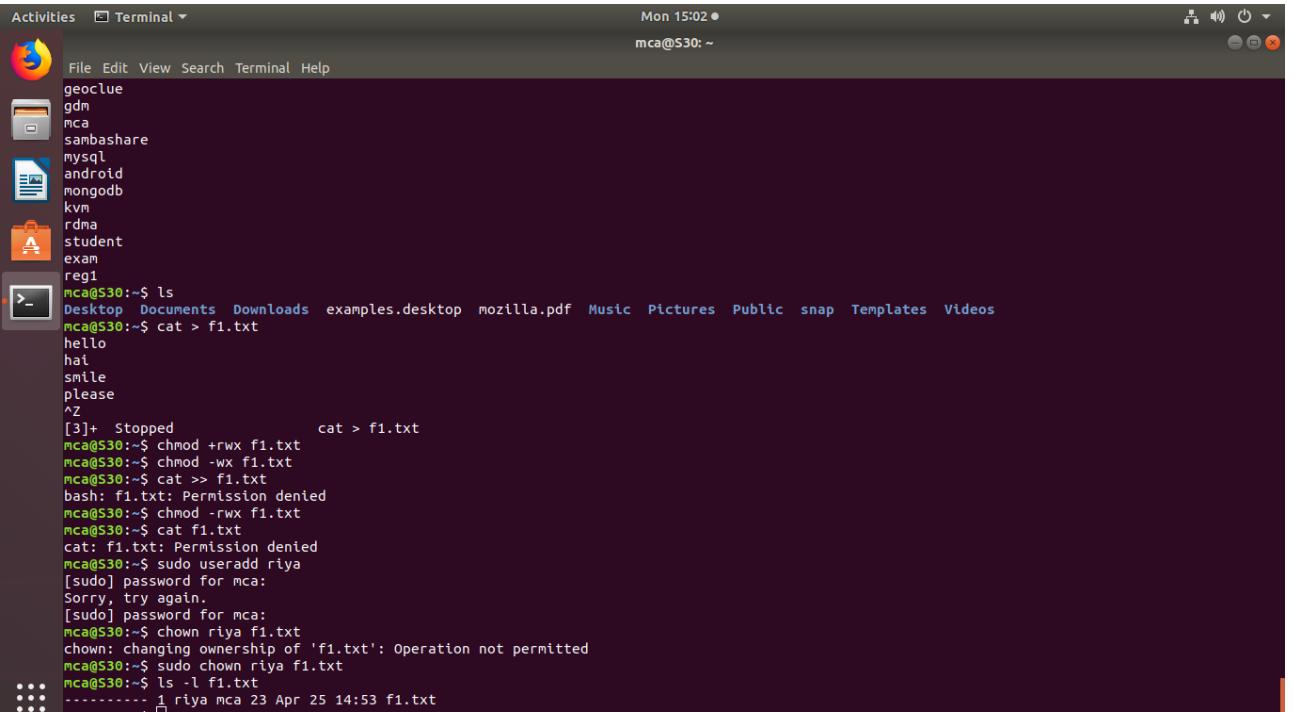
Chmod

->rws-read write execute

->chmod +rws filename

->chmod -ws filename

->chmod -rws filename



The screenshot shows a terminal window on a dark-themed desktop environment. The terminal window title is "Terminal". The terminal content shows the following session:

```
Activities Terminal Mon 15:02 ● mca@S30: ~
File Edit View Search Terminal Help
geoclue
gdm
mca
sambashare
mysql
android
mongodb
kvm
rdma
student
exam
reg1
mca@S30:~$ ls
Desktop Documents Downloads examples.desktop mozilla.pdf Music Pictures Public snap Templates Videos
mca@S30:~$ cat > f1.txt
hello
hal
smile
please
^Z
[3]+  Stopped                  cat > f1.txt
mca@S30:~$ chmod +rwx f1.txt
mca@S30:~$ chmod -wx f1.txt
mca@S30:~$ cat >> f1.txt
bash: f1.txt: Permission denied
mca@S30:~$ chmod -rwx f1.txt
mca@S30:~$ cat f1.txt
cat: f1.txt: Permission denied
mca@S30:~$ sudo useradd riya
[sudo] password for mca:
Sorry, try again.
[sudo] password for mca:
mca@S30:~$ chown riya f1.txt
chown: changing ownership of 'f1.txt': Operation not permitted
mca@S30:~$ sudo chown riya f1.txt
mca@S30:~$ ls -l f1.txt
----- 1 riya mca 23 Apr 25 14:53 f1.txt
mca@S30:~$
```

12]change ownership

->sudo chown newusername filename

->sudo chown riya f1.txt

output



The screenshot shows a terminal window with the following output:

```
mca@S30:~$ chown riya f1.txt
chown: changing ownership of 'f1.txt': Operation not permitted
mca@S30:~$ sudo chown riya f1.txt
mca@S30:~$ ls -l f1.txt
----- 1 riya mca 23 Apr 25 14:53 f1.txt
mca@S30:~$
```

13]useradd

->sudo useradd username

->sudo useradd riya

output

```
mca@S30:~$ chmod +rwx f1.txt
mca@S30:~$ cat f1.txt
cat: f1.txt: Permission denied
mca@S30:~$ sudo useradd riya
[sudo] password for mca:
Sorry, try again.
```

14]New ownership can be viewed

->ls -l filename

->ls -l f1.txt

output

```
mca@S30:~$ ls -l f1.txt
..... 1 riya mca 23 Apr 25 14:53 f1.txt
mca@S30:~$
```

. chmod

This command is used change directory permission of files.

chmod +rwx

chmod -wx

chmod -rwx

Syntax :- \$ chmod +wx filename
 \$ chmod -wx filename
 \$ chmod -rwx filename

Output :-

```
mca@s47:~$ chmod +rwx a4.txt
```

```
mca@s47:~$ chmod -rwx a4.txt
mca@s47:~$ cat >>a4.txt
bash: a4.txt: Permission denied
mca@s47:~$ 
```

chown

This command is used to give ownership to user .

Syntax :-

```
$ sudo chown username filename
```

Output :-

```
mca@s40:~$ cat > ds.txt
this is my page
^Z
[2]+  Stopped                  cat > ds.txt
mca@s40:~$ sudo chown sree ds.txt
[sudo] password for mca:
```

ssh

This command is used to provide a secure encrypted connection between two hosts over an insecure network.

Syntax :-

```
$ ssh mca@ipaddress
```

```
mca@s40:~$ sudo ssh mca@192.168.6.46
The authenticity of host '192.168.6.46 (192.168.6.46)' can't be established.
ECDSA key fingerprint is SHA256:hQC0bgw7WBI7zuABHq2AKWIpGnXDeBBGWGvJqDHPNY.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.6.46' (ECDSA) to the list of known hosts.
mca@192.168.6.46's password:
Welcome to Ubuntu 18.04 LTS (GNU/Linux 4.15.0-23-generic x86_64)

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

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

8 packages can be updated.
0 updates are security updates.

Last login: Mon Apr 25 15:48:44 2022 from 192.168.6.63
mca@s46:~$ █
```

Experiment no:4

Aim

Shell scripting: study bash syntax, environment variables, variables, control constructs such as if, for and while, aliases and functions, accessing command line arguments passed to shell scripts. Study of startup scripts, login and logout scripts, familiarity with systemd and system 5 init scripts is expected.

Program

```
#!/bin/bash
echo "Enter a number"
read num
s=0
while [ $num -gt 0 ]
do
mod=$((num % 10))
s=$((s +mod))
num=$((num / 10))
done
echo $s
```

Output:

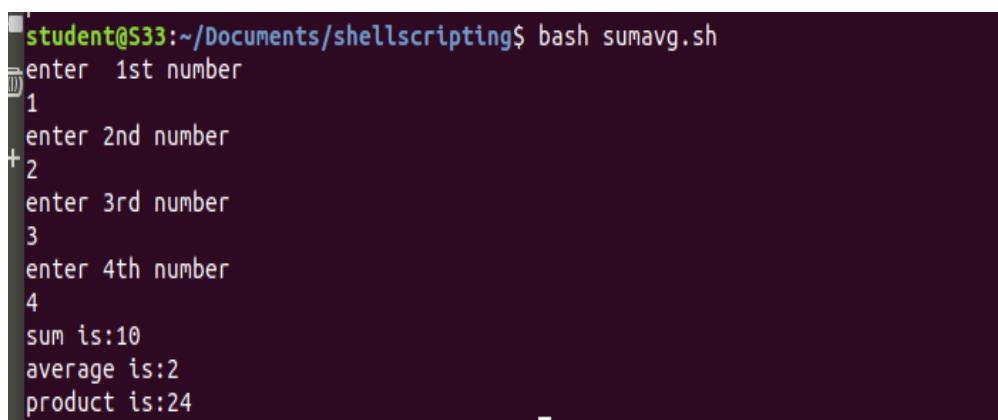
```
student@S40:~$ ./sum.sh
Enter a number
255
12
```

Aim

write a shell script for sum and average of given numbers

Procedure:

```
#!/bin/bash
echo "enter 1st number"
read num1
echo "enter 2nd number"
read num2
echo "enter 3rd number"
read num3
echo "enter 4th number"
read num4
sum=$(($num1+$num2+$num3+$num4))
avg=$(($sum/4 | bc))
prod=$(($num1*$num2*$num3*$num4))
echo "sum is:$sum"
echo "scale=2; average is:$avg"
echo "product is:$prod"
```



```
student@S33:~/Documents/shells scripting$ bash sumavg.sh
enter 1st number
1
enter 2nd number
2
enter 3rd number
3
enter 4th number
4
sum is:10
average is:2
product is:24
```

Aim

write a shell script for factorial of given number

Procedure:

```
#!/bin/bash
```

```
read -p "enter the number " num
```

```
fact=1
```

```
while [ $num -gt 1 ]
```

```
do
```

```
fact=$((fact*num))
```

```
num=$((num-1))
```

```
done
```

```
echo $fact
```

Output:

```
student@S33:~/Documents/shellscripting$ gedit fact.sh
student@S33:~/Documents/shellscripting$ bash fact.sh
enter the number 5
120
student@S33:~/Documents/shellscripting$
```

Aim

write shell script to check whether the number is palindrome or not .

Program

```
#!/bin/bash
```

```
echo "Enter the number"
```

```
read n
```

```

number=$n
reverse=0
while [ $n -gt 0 ]
do
a=`expr $n % 10 `
n=`expr $n / 10 `
reverse=`expr $reverse \* 10 + $a`
done
echo $reverse
if [ $number -eq $reverse ]
then
echo "Number is palindrome"
else
echo "Number is not palindrome"
fi

```

Output:

```

student@S47:~/Documents/mca-47$ ./palindrom.sh
Enter the number
212
212
Number is palindrome
student@S47:~/Documents/mca-47$ 

```

Aim

write shell script to check whether the given year is leap year or not .

Program

```

echo "enter the year :"
read y

```

```

a=`expr $y % 4`
b=`expr $y % 100`
c=`expr $y % 400`
# -eq is for equal to
#-ne is for not equal to
if [ $a -eq 0 -a $b -ne 0 -o $c -eq 0 ]
then
echo "$y is leap year"
else
echo "$y is not leap year"
fi

```

Output:

```

student@S47:~/Documents/mca-47$ ./leapyear.sh
LEAP YEAR
Enter a year:2020
2020 is a leap year
student@S47:~/Documents/mca-47$ █

```

Aim

write a shell script for factorial of given number

Procedure:

```
#!/bin/bash
```

```
read -p "enter the number " num
```

```
fact=1
```

```
while [ $num -gt 1 ]
```

```
do
```

```
fact=$((fact*num))
```

```
num=$((num-1))
```

```
done
```

```
echo $fact
```

output:

```
student@S33:~/Documents/shellscripting$ gedit fact.sh
student@S33:~/Documents/shellscripting$ bash fact.sh
enter the number 5
120
student@S33:~/Documents/shellscripting$
```

Aim

write a shell script for display current date and calender.

Procedure:

```
#!/bin/bash
```

```
echo "today is $(date)"
```

```
echo " "
```

```
echo "calender:"
```

```
cal
```

```
echo "the current date" $(date)
```

```
student@S33:~/Documents/shellscripting$ gedit calender.sh
student@S33:~/Documents/shellscripting$ bash calender.sh
today is Mon May 9 14:36:01 IST 2022
```

```
calender:
      May 2022
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
```

```
the current date Mon May 9 14:36:01 IST 2022
```

```
student@S33:~/Documents/shellscripting$
```

Aim

write shell script to find addition using switch case.

Program

```
#!/bin/bash
echo "Enter two numbers"
read a
read b
echo "Enter choice :"
echo "1. addition"
echo "2. Substraction"
echo "3. Multiplication"
echo "4. Division"
read ch
case $ch in
    1)res=`echo $a + $b | bc`;;
    2)res=`echo $a - $b | bc`;;
    3)res=`echo $a \* $b | bc`;;
    4)res=`echo "scale=2; $a / $b" | bc`;;
esac
echo "Result : $res"
```

Output:

```
student@S47:~/Documents/mca47$ ./switchcase.sh
Enter Two numbers :
2
3
Enter Choice :
1. Addition
2. Subtraction
3. Multiplication
4. Division
1
Result is : 5
```

Experiment:5

Aim

Installation and configuration of LAMP stack. Deploy an open source application such as phpmyadmin and Wordpress.

Procedure

Installing Apache and Updating the Firewall .

Step 1: First, make sure your apt cache is updated with:

Command : sudo apt update

```
mca@S26:~$ sudo apt update
[sudo] password for mca:
Hit:1 http://in.archive.ubuntu.com/ubuntu bionic InRelease
Hit:2 https://dl.google.com/linux/chrome/deb stable InRelease
Err:3 http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease
  403 Forbidden [IP: 185.125.190.52 80]
Ign:4 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 InRelease
Get:5 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release [2,495 B]
Hit:6 http://ppa.launchpad.net/ubuntu-mozilla-security/ppa/ubuntu bionic InRelease
Hit:7 http://ppa.launchpad.net/webupd8team/java/ubuntu bionic InRelease
Get:8 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release.gpg [801 B]
Err:8 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release.gpg
```

Step 2 : Once the cache has been updated, you can install Apache with:

Command : Sudo apt install apache2

After entering this command, apt will tell you which packages it plans to install and how much extra disk space they'll take up. Press Y and hit ENTER to confirm, and the installation will proceed.

```
mca@S26:~$ sudo apt install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  debhelper dh-autoreconf dh-strip-nondeterminism libarchive-cpio-perl
  libfile-stripnondeterminism-perl libmail-sendmail-perl libpcre16-3
  libpcre3-dev libpcre32-3 libpcrecpp0v5 libssl-dev libssl-doc
  libsys-hostname-long-perl php-common php-pear php-xml php7.2-cli
  php7.2-common php7.2-json php7.2-opcache php7.2-readline php7.2-xml
  pkg-php-tools po-debconf shtool
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libapr1 libaprutil1
  libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.2-0
```

```
Processing triggers for ureadahead (0.100.0-20) ...
Processing triggers for systemd (237-3ubuntu10) ...
Processing triggers for man-db (2.8.3-2) ...
Processing triggers for ufw (0.35-5) ...
```

Step 3 : Check that UFW has an application profile for Apache:

Command : sudo ufw app list

```
mca@S26:~$ sudo ufw app list
Available applications:
  Apache
  Apache Full
  Apache Secure
  CUPS
```

Step 4 : If you look at the Apache Full profile details, you'll see that it enables traffic to ports 80 and 443:

Command : sudo ufw app info "Apache Full"

Step 5 : To allow incoming HTTP and HTTPS traffic for this server, run:

Command : sudo ufw allow "Apache Full"

```
mca@S26:~$ sudo ufw allow "Apache Full"
Rules updated
Rules updated (v6)
```

Step 6 : You can do a spot check right away to verify that everything went as planned by visiting your server's public IP address in your web browser:

The screenshot shows a web browser window with the URL 192.168.6.26 in the address bar. The page title is "Apache2 Ubuntu Default Page". The page content includes the Ubuntu logo, the text "ubuntu", and a red banner with "It works!". Below the banner, there is a paragraph about the default welcome page and a "Configuration Overview" section. The configuration overview explains the layout of Apache2 configuration files, mentioning /etc/apache2/apache2.conf as the main file. A sidebar on the right lists bullet points, one of which is about apache2.conf being the main configuration file.

192.168.6.26

aps

Apache2 Ubuntu Default Page

ubuntu

It works!

This is the default welcome page used to test the correct operation of the Apache2 server after installation on Ubuntu systems. It is based on the equivalent page on Debian, from which the Ubuntu Apache packaging is derived. If you can read this page, it means that the Apache HTTP server installed at this site is working properly. You should **replace this file** (located at `/var/www/html/index.html`) before continuing to operate your HTTP server.

If you are a normal user of this web site and don't know what this page is about, this probably means that the site is currently unavailable due to maintenance. If the problem persists, please contact the site's administrator.

Configuration Overview

Ubuntu's Apache2 default configuration is different from the upstream default configuration, and split into several files optimized for interaction with Ubuntu tools. The configuration system is **fully documented in `/usr/share/doc/apache2/README.Debian.gz`**. Refer to this for the full documentation. Documentation for the web server itself can be found by accessing the **manual** if the `apache2-doc` package was installed on this server.

The configuration layout for an Apache2 web server installation on Ubuntu systems is as follows:

```
/etc/apache2/
|-- apache2.conf
|   '-- ports.conf
|-- mods-enabled
|   '-- *.load
|   '-- *.conf
|-- conf-enabled
|   '-- *.conf
|-- sites-enabled
|   '-- *.conf
```

- `apache2.conf` is the main configuration file. It puts the pieces together by including all remaining configuration files when starting up the web server.

Installing MySQL

Step 1: Use apt to acquire and install this software.

Command : sudo apt install mysql-server

This command, too, will show you a list of the packages that will be installed, along with the amount of disk space they'll take up. Enter Y to continue.

```
mca@S26:~$ sudo apt install mysql-server
Reading package lists... Done
Building dependency tree...
Reading state information... Done
The following additional packages will be installed:
  libevent-core-2.1-6 mysql-client-5.7 mysql-client-core-5.7 mysql-common mysql-server-
mysql-server-core-5.7
Suggested packages:
  mailx tinyca
The following NEW packages will be installed:
  libevent-core-2.1-6 mysql-client-5.7 mysql-client-core-5.7 mysql-common mysql-server-
-server-5.7 mysql-server-core-5.7
0 upgraded, 7 newly installed, 0 to remove and 1 not upgraded.
Need to get 0 B/20.3 MB of archives.
After this operation, 160 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Preconfiguring packages ...
```

Step 2 : Start the interactive script by running:

Command : sudo mysql_secure_installation

```
mca@S26:~$ sudo mysql_secure_installation
Securing the MySQL server deployment.

Connecting to MySQL using a blank password.

VALIDATE PASSWORD PLUGIN can be used to test passwords
and improve security. It checks the strength of password
and allows the users to set only those passwords which are
secure enough. Would you like to setup VALIDATE PASSWORD plugin?

Press y|Y for Yes, any other key for No: y

There are three levels of password validation policy:

LOW    Length >= 8
MEDIUM Length >= 8, numeric, mixed case, and special characters
STRONG Length >= 8, numeric, mixed case, special characters and dictionary

Reload privilege tables now? (Press y|Y for Yes, any other key for No) :
... skipping.
All done!
```

This will ask if you want to configure the VALIDATE PASSWORD PLUGIN. Answer Y for yes, or anything else to continue without enabling.

Step 3 : Test if you're able to log in to the MySQL console by typing:

Command : sudo mysql

This will connect to the MySQL server as the administrative database user root, which is inferred by the use of sudo when running this command.

To exit the MySQL console, type: **exit**

```
mca@S26:~$ sudo mysql
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 5
Server version: 5.7.21-1ubuntu1 (Ubuntu)

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owners.
```

Installing PHP

Step 1 : In addition to the php package, you'll also need libapache2-mod-php to integrate PHP into Apache, and the php-mysql package to allow PHP to connect to MySQL databases. Run the following command to install all three packages and their dependencies:

Command : sudo apt install php libapache2-mod-php php-mysql

```
mca@S26:~$ sudo apt install php libapache2-mod-php php-mysql
Reading package lists... Done
Building dependency tree
Reading state information... Done
libapache2-mod-php is already the newest version (1:7.2+60ubuntu1).
```

Step 2 : Restart the Apache web server in order for your changes to be recognized.

Command : sudo systemctl restart apache2

```
mca@S26:~$ sudo systemctl restart apache2
```

Step 3 : In order to test that your system is properly configured for PHP, create a PHP script called info.php. In order for Apache to find this file and serve it correctly, it must be saved to your web root directory.

Command : sudo nano /var/www/your_domain/info.php

This will open a blank file. Add the text, which is valid PHP code, inside the file. When you are finished, save and close the file.

```
mca@S26:~$ sudo nano /var/www/html/info.php
```

Step 4 : Test whether your web server is able to correctly display content generated by this PHP script. To try this out, visit this page in your web browser. You'll need your server's public IP address or domain name again.

Command : http://your_domain/info.php

PHP Version 7.2.3-1ubuntu1



| | |
|---|--|
| System | Linux S26 4.15.0-23-generic #25-Ubuntu SMP Wed May 23 18:02:16 UTC 2018 x86_64 |
| Build Date | Mar 14 2018 22:03:58 |
| Server API | Apache 2.0 Handler |
| Virtual Directory Support | disabled |
| Configuration File (php.ini) Path | /etc/php/7.2/apache2 |
| Loaded Configuration File | /etc/php/7.2/apache2/php.ini |
| Scan this dir for additional .ini files | /etc/php/7.2/apache2/conf.d |
| Additional .ini files parsed | /etc/php/7.2/apache2/conf.d/10-mysqlind.ini, /etc/php/7.2/apache2/conf.d/10-opcache.ini, /etc/php/7.2/apache2/conf.d/10-pdo.ini, /etc/php/7.2/apache2/conf.d/20-calendar.ini, /etc/php/7.2/apache2/conf.d/20-ctype.ini, /etc/php/7.2/apache2/conf.d/20-exif.ini, /etc/php/7.2/apache2/conf.d/20-fileinfo.ini, /etc/php/7.2/apache2/conf.d/20-ftp.ini, /etc/php/7.2/apache2/conf.d/20-gettext.ini, /etc/php/7.2/apache2/conf.d/20-iconv.ini, /etc/php/7.2/apache2/conf.d/20-json.ini, /etc/php/7.2/apache2/conf.d/20-mysqli.ini, /etc/php/7.2/apache2/conf.d/20-pdo_mysql.ini, /etc/php/7.2/apache2/conf.d/20-phar.ini, /etc/php/7.2/apache2/conf.d/20-posix.ini, /etc/php/7.2/apache2/conf.d/20-readline.ini, /etc/php/7.2/apache2/conf.d/20-shmop.ini, /etc/php/7.2/apache2/conf.d/20-sockets.ini, /etc/php/7.2/apache2/conf.d/20-sysvmsg.ini, /etc/php/7.2/apache2/conf.d/20-sysvsem.ini, /etc/php/7.2/apache2/conf.d/20-sysvshm.ini, /etc/php/7.2/apache2/conf.d/20-tokenizer.ini |
| PHP API | 20170718 |
| PHP Extension | 20170718 |
| Zend Extension | 320170718 |
| Zend Extension Build | API320170718,NTS |
| PHP Extension Build | API20170718,NTS |
| Debug Build | no |
| Thread Safety | disabled |
| Zend Signal Handling | enabled |
| Zend Memory Manager | enabled |
| Zend Multibyte Support | disabled |

Install WordPress with LAMP on Ubuntu

Step 1 – Download WordPress

Download the latest version of the WordPress package and extract it

```
mca@S26:~$ wget -c http://wordpress.org/latest.tar.gz
--2022-06-13 15:15:13--  http://wordpress.org/latest.tar.gz
Resolving wordpress.org (wordpress.org)... 198.143.164.252
Connecting to wordpress.org (wordpress.org)|198.143.164.252|:80... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://wordpress.org/latest.tar.gz [following]
--2022-06-13 15:15:14--  https://wordpress.org/latest.tar.gz
Connecting to wordpress.org (wordpress.org)|198.143.164.252|:443... connected.
```

```
mca@S26:~$ tar -xzvf latest.tar.gz
wordpress/
wordpress/xmlrpc.php
wordpress/wp-blog-header.php
wordpress/readme.html
wordpress/wp-signup.php
wordpress/index.php
wordpress/wp-cron.php
wordpress/wp-config-sample.php
wordpress/wp-login.php
wordpress/wp-settings.php
wordpress/license.txt
```

Then move the WordPress files

from the extracted folder to the Apache default root directory, /var/www/html/:

```
mca@S26:~$ sudo mv wordpress/* /var/www/html/
[sudo] password for mca:
```

```
mca@S26:~$ sudo chown -R www-data:www-data /var/www/html/
mca@S26:~$ sudo chmod -R 755 /var/www/html/
mca@S26:~$ sudo mysql
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 5
Server version: 5.7.21-1ubuntu1 (Ubuntu)
```

Next, set the correct permissions on the website directory, that is give ownership of the WordPress files to the webserver

Step 2 – Creating a MySQL Database and User for WordPress

The first step to create a database to manage and store the user information for WordPress to use. To get started, log into the MySQL root (administrative) account

Create the database for WordPress by writing the following:

```
CREATE DATABASE wordpress DEFAULT CHARACTER SET utf8 COLLATE utf8_unicode_ci;
```

create the account, set a password for it, and then grant it access to the database:

```
GRANT ALL ON wordpress.* TO 'wordpressuser'@'localhost' IDENTIFIED BY 'password';
```

After creating this user, flush the privileges to ensure that the current instance of MySQL knows about the recent changes

FLUSH PRIVILEGES;

EXIT;

```
mca@S26:~$ sudo mysql
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 11
Server version: 5.7.21-1ubuntu1 (Ubuntu)

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> CREATE DATABASE wordpress DEFAULT CHARACTER SET utf8
      -> COLLATE utf8_unicode_ci;
Query OK, 1 row affected (0.00 sec)

mysql> GRANT ALL ON wordpress.* TO 'wordpressuser'@'localhost' IDENTIFIED BY 'password';
Query OK, 0 rows affected, 1 warning (0.00 sec)

mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.00 sec)

mysql> exit
Bye
```

Go the /var/www/html/ directory and rename existing wp-config-sample.php to wpconfig.php. Also, make sure to remove the default Apache index page:

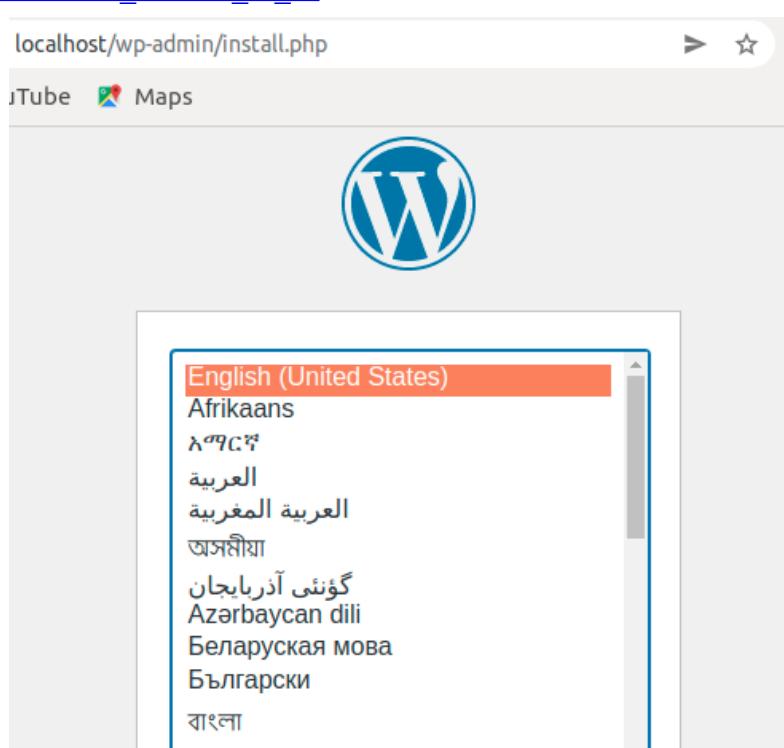
```
mca@S26:~$ cd /var/www/html/
mca@S26:/var/www/html$ sudo mv wp-config-sample.php wp-config.php
mca@S26:/var/www/html$ sudo rm -rf index.html
```

Restart the web server and mysql service

```
mca@S26:~$ sudo systemctl restart apache2
```

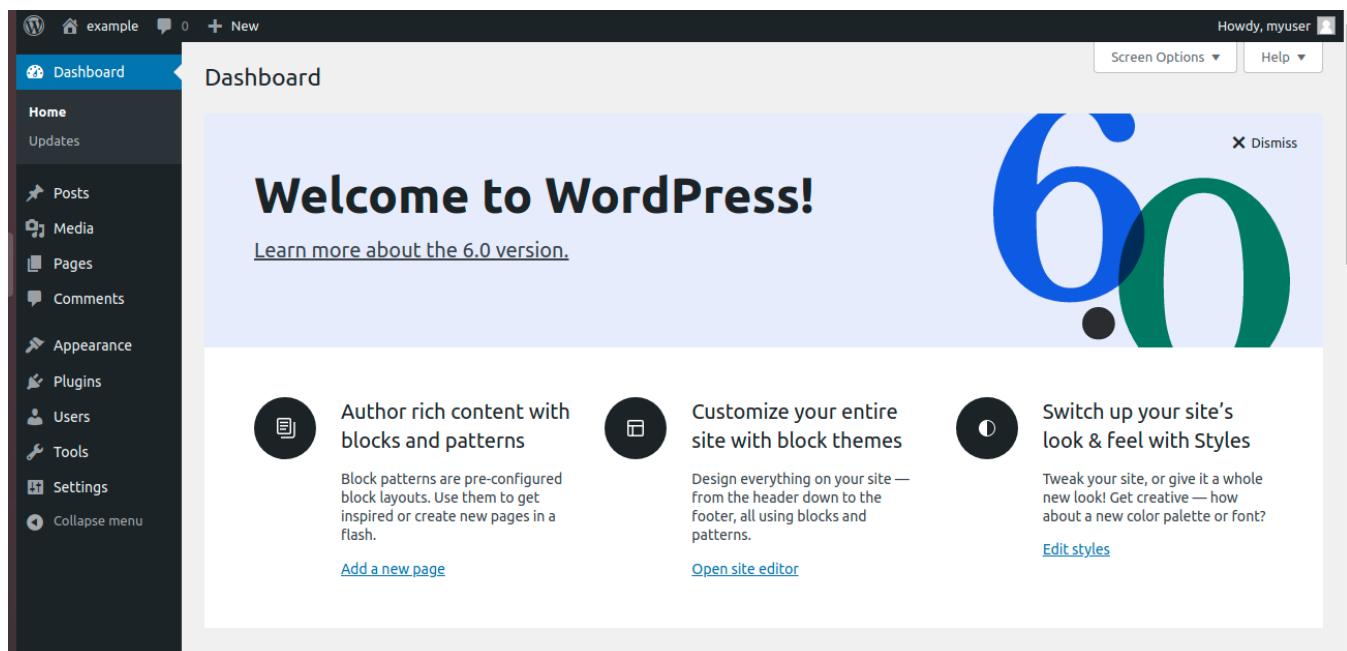
Step 3 – Completing the Installation Through the Web Interface

https://server_domain_or_IP



Select a name for your WordPress site and choose a username. A strong password is generated automatically. Save this password or select an alternative strong password.

WordPress administration dashboard:



Experiment no:6

Aim

Build and install software from source code, familiarity with cmake utility expected.

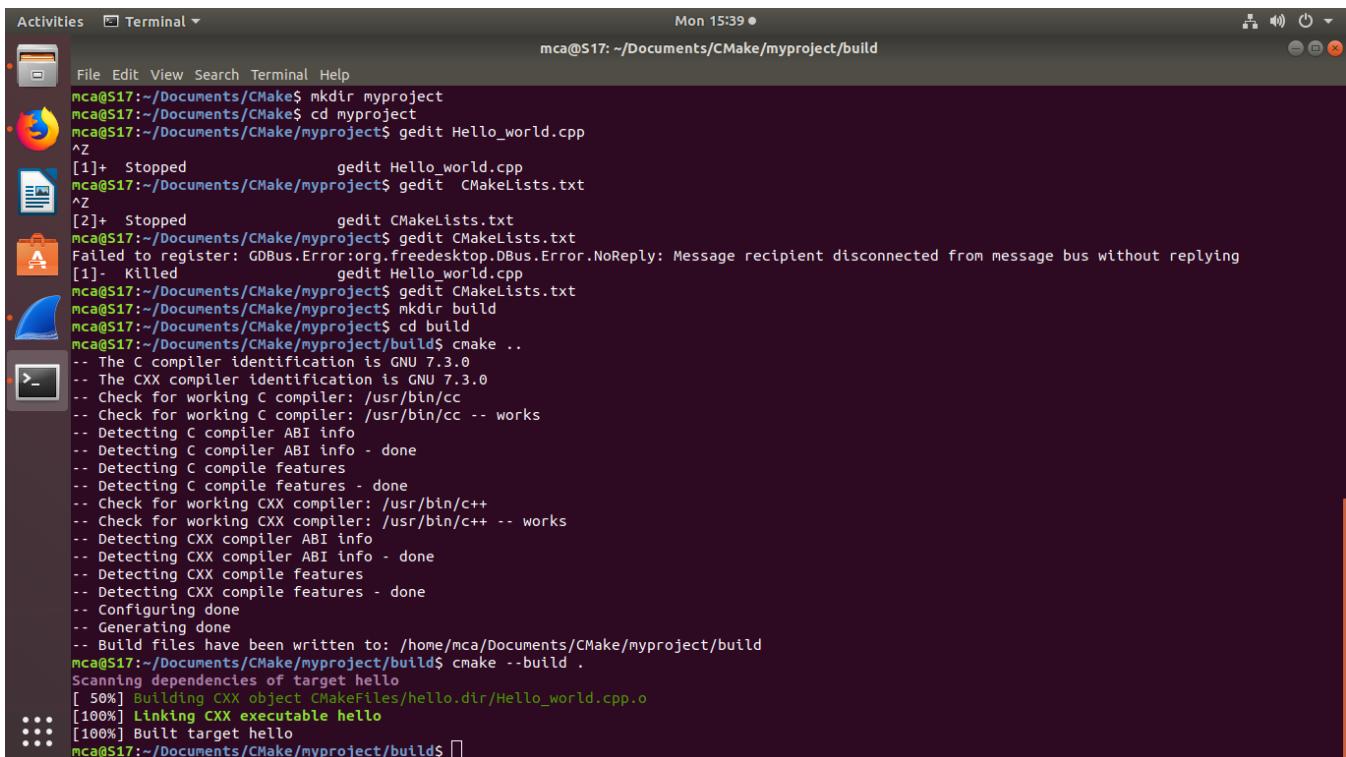
cmake tool for defining and managing code builds primarily for c++.cmake is a cross platform

```
Activities Terminal Mon 15:40 ●
mca@S17: ~/Documents/CMake/myproject/build

File Edit View Search Terminal Help
mca@S17:~/Documents/CMake$ sudo apt install cmake g++ make
[sudo] password for mca:
Reading package lists... Done
Building dependency tree
Reading state information... Done
g++ is already the newest version (4:7.3.0-3ubuntu2).
make is already the newest version (4.1-9.1ubuntu1).
make set to manually installed.
The following packages were automatically installed and are no longer required:
  debhelper dh-autoreconf dh-strip-nondeterminism libarchive-cpio-perl libblas3 libfile-stripnondeterminism-perl libfluidsynth1 libgfortran4
  liblapack3 libmad0 libmail-sendmail-perl libmklmod3 libpcre16-3 libpcre3-dev libpcre32-3 libpcrepp0v5 libportmidi0 libsdl-mixer1.2
  libssl-ttf2.0-0 libmpeg0 libssl-dev libssl-doc libsys-hostname-long-perl php-common php-pear php-xml php7.2-cli php7.2-common php7.2-json
  php7.2-opcache php7.2-readline php7.2-xml pkg-php-tools po-debconf python-numpy python-pygame shtool timgm6mb-soundfont
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  cmake-data libcurl4 libjsoncpp1 librhash0 libuv1
Suggested packages:
  cmake-doc ninja-build
The following NEW packages will be installed:
  cmake cmake-data libcurl4 libjsoncpp1 librhash0 libuv1
0 upgraded, 6 newly installed, 0 to remove and 6 not upgraded.
Need to get 4,900 kB of archives.
After this operation, 25.3 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu bionic amd64 cmake-data all 3.10.2-1ubuntu2 [1,331 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic amd64 libcurl4 amd64 7.58.0-2ubuntu3 [214 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libjsoncpp1 amd64 1.7.4-3 [73.6 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 librhash0 amd64 1.3.6-2 [78.1 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libuv1 amd64 1.18.0-3 [64.4 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 cmake amd64 3.10.2-1ubuntu2 [3,138 kB]
Fetched 4,900 kB in 6 (6,309 kB/s)
Selecting previously unselected package cmake-data.
(Reading database ... 181615 files and directories currently installed.)
Preparing to unpack .../0-cmake-data_3.10.2-1ubuntu2_all.deb ...
Unpacking cmake-data (3.10.2-1ubuntu2) ...
Selecting previously unselected package libcurl4:amd64.
Preparing to unpack .../1-libcurl4_7.58.0-2ubuntu3_amd64.deb ...
Unpacking libcurl4:amd64 (7.58.0-2ubuntu3) ...
```

```
Activities Terminal Mon 15:40 ●
mca@S17: ~/Documents/CMake/myproject/build

File Edit View Search Terminal Help
Setting up cmake-data (3.10.2-1ubuntu2) ...
Setting up librhash0:amd64 (1.3.6-2) ...
Processing triggers for libc-bin (2.27-3ubuntu1) ...
Processing triggers for man-db (2.8.3-2) ...
Setting up libjsoncpp1:amd64 (1.7.4-3) ...
Setting up cmake (3.10.2-1ubuntu2) ...
Processing triggers for libc-bin (2.27-3ubuntu1) ...
[mca@S17:~/Documents/CMake]$ mkdir myproject
[mca@S17:~/Documents/CMake]$ cd myproject
[mca@S17:~/Documents/CMake/myproject]$ gedit Hello_world.cpp
^Z
[1]+  Stopped                  gedit Hello_world.cpp
[mca@S17:~/Documents/CMake/myproject]$ gedit CMakeLists.txt
^Z
[2]+  Stopped                  gedit CMakeLists.txt
[mca@S17:~/Documents/CMake/myproject]$ gedit CMakelists.txt
Failed to register: GDBus.Error:org.freedesktop.DBus.Error.NoReply: Message recipient disconnected from message bus without replying
[1]-  Killed                  gedit Hello_world.cpp
[mca@S17:~/Documents/CMake/myproject]$ gedit CMakelists.txt
[mca@S17:~/Documents/CMake/myproject]$ mkdir build
[mca@S17:~/Documents/CMake/myproject]$ cd build
[mca@S17:~/Documents/CMake/myproject]$ cmake ..
-- The C compiler identification is GNU 7.3.0
-- The CXX compiler identification is GNU 7.3.0
-- Check for working C compiler: /usr/bin/cc
-- Check for working C compiler: /usr/bin/cc -- works
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Detecting C compile features
-- Detecting C compile features - done
-- Check for working CXX compiler: /usr/bin/c++
-- Check for working CXX compiler: /usr/bin/c++ -- works
-- Detecting CXX compiler ABI info
-- Detecting CXX compiler ABI info - done
-- Detecting CXX compile features
-- Detecting CXX compile features - done
-- Configuring done
-- Generating done
```



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 series of command-line entries. The commands include creating a directory, changing to it, opening files in gedit, and running cmake to build a project named "hello". The terminal shows the progress of the build, including linking and final target output.

```
mca@S17:~/Documents/CMake/myproject$ mkdir myproject
mca@S17:~/Documents/CMake$ cd myproject
mca@S17:~/Documents/CMake/myproject$ gedit Hello_world.cpp
^Z
[1]+  Stopped                  gedit Hello_world.cpp
mca@S17:~/Documents/CMake/myproject$ gedit CMakeLists.txt
^Z
[2]+  Stopped                  gedit CMakeLists.txt
mca@S17:~/Documents/CMake/myproject$ gedit CMakeLists.txt
Failed to register: GDBus.Error:org.freedesktop.DBus.Error.NoReply: Message recipient disconnected from message bus without replying
[1]+  Killed                  gedit Hello_world.cpp
mca@S17:~/Documents/CMake/myproject$ mkdir build
mca@S17:~/Documents/CMake/myproject$ cd build
mca@S17:~/Documents/CMake/myproject/build$ cmake ..
-- The C compiler identification is GNU 7.3.0
-- The CXX compiler identification is GNU 7.3.0
-- Check for working C compiler: /usr/bin/cc
-- Check for working C compiler: /usr/bin/cc -- works
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Detecting C compile features
-- Detecting C compile features - done
-- Check for working CXX compiler: /usr/bin/c++
-- Check for working CXX compiler: /usr/bin/c++ -- works
-- Detecting CXX compiler ABI info
-- Detecting CXX compiler ABI info - done
-- Detecting CXX compile features
-- Detecting CXX compile features - done
-- Configuring done
-- Generating done
-- Build files have been written to: /home/mca/Documents/CMake/myproject/build
mca@S17:~/Documents/CMake/myproject/build$ cmake --build .
Scanning dependencies of target hello
[ 50%] Building CXX object CMakeFiles/hello.dir/Hello_world.cpp.o
[100%] Linking CXX executable hello
[100%] Built target hello
mca@S17:~/Documents/CMake/myproject/build$
```

\$sudo apt install cmake

\$sudo apt install cmake g++ make

\$mkdir projectzero

\$cd projectzero

\$gedit cmakeLists.txt

\$mkdir build

\$cd build

\$cmake

\$cmake - -build.

\$./hello

Experiment no:7

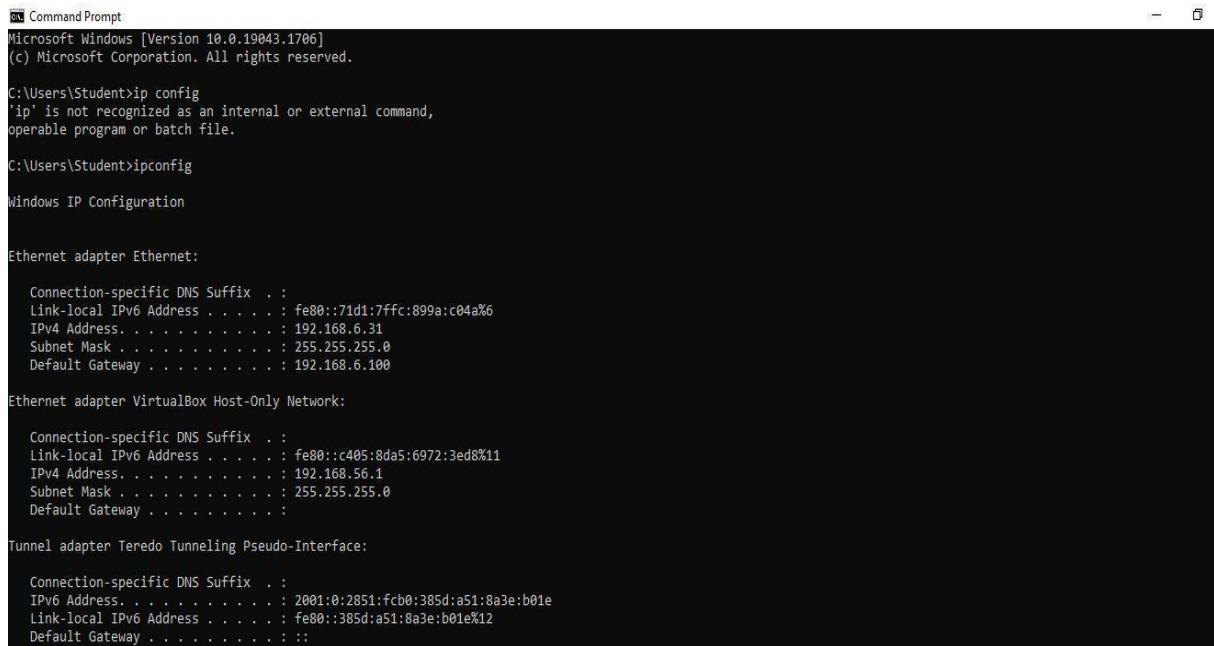
Aim

Introduction to command line tools for networking IPv4 networking, network commands: ping route traceroute, nslookup, ip. Setting up static and dynamic IP addresses. Concept of Subnets, CIDR address schemes, Subnet masks, iptables, setting up a firewall for LAN, Application layer (L7)proxies.

Network commands

ip config

Basic details of system connected to a network



The screenshot shows a Windows Command Prompt window with the following text output:

```
Command Prompt
Microsoft Windows [Version 10.0.19043.1706]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Student>ip config
'ip' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\Student>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::71d1:7ffc:899a:c04a%6
  IPv4 Address. . . . . : 192.168.6.31
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 192.168.6.100

Ethernet adapter VirtualBox Host-Only Network:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::c405:8da5:6972:3ed8%11
  IPv4 Address. . . . . : 192.168.56.1
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . :

Tunnel adapter Teredo Tunneling Pseudo-Interface:

  Connection-specific DNS Suffix . :
  IPv6 Address. . . . . : 2001:0:2851:fcb0:385d:a51:8a3e:b01e
  Link-local IPv6 Address . . . . . : fe80::385d:a51:8a3e:b01e%12
  Default Gateway . . . . . : ::
```

ipconfig/all

Detailed study of system connected to network

```
Command Prompt
Microsoft Windows [Version 10.0.19043.1706]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Student>ip config
'ip' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\Student>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

Connection-specific DNS Suffix . :
Link-local IPv6 Address . . . . . : fe80::71d1:7ffc:899a:c04a%6
IPv4 Address. . . . . : 192.168.6.31
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.6.100

Ethernet adapter VirtualBox Host-Only Network:

Connection-specific DNS Suffix . :
Link-local IPv6 Address . . . . . : fe80::c405:8da5:6972:3ed8%11
IPv4 Address. . . . . : 192.168.56.1
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . ::

Tunnel adapter Teredo Tunneling Pseudo-Interface:

Connection-specific DNS Suffix . :
IPv6 Address. . . . . : 2001:0:2851:fcb0:385d:a51:8a3e:b01e
Link-local IPv6 Address . . . . . : fe80::385d:a51:8a3e:b01e%12
Default Gateway . . . . . ::

C:\Users\Student>ipconfig/all

Windows IP Configuration

Host Name . . . . . : S31
Primary Dns Suffix . . . . . : mca.com
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
```

```
Command Prompt
Ethernet adapter Ethernet:

Connection-specific DNS Suffix . :
Description . . . . . : Realtek PCIe GBE Family Controller
Physical Address. . . . . : 78-24-AF-BA-C2-22
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::71d1:7ffc:899a:c04a%6(Preferred)
IPv4 Address. . . . . : 192.168.6.31(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.6.100
DHCPv6 IID . . . . . : 102532098
DHCPv6 Client DUID . . . . . : 00-01-00-01-22-BB-A7-53-78-24-AF-BA-C2-22
DNS Servers . . . . . : 192.168.6.254
          8.8.8.8
NetBIOS over Tcpip. . . . . : Enabled

Ethernet adapter VirtualBox Host-Only Network:

Connection-specific DNS Suffix . :
Description . . . . . : VirtualBox Host-Only Ethernet Adapter
Physical Address. . . . . : 0A-00-27-00-00-0B
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::c405:8da5:6972:3ed8%11(Preferred)
IPv4 Address. . . . . : 192.168.56.1(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . :
DHCPv6 IID . . . . . : 403308583
DHCPv6 Client DUID . . . . . : 00-01-00-01-22-BB-A7-53-78-24-AF-BA-C2-22
DNS Servers . . . . . : fec0:0:0:ffff:1%1
                      fec0:0:0:ffff:2%1
                      fec0:0:0:ffff:3%1
NetBIOS over Tcpip. . . . . : Enabled

Tunnel adapter Teredo Tunneling Pseudo-Interface:

Connection-specific DNS Suffix . :
Description . . . . . : Microsoft Teredo Tunneling Adapter
Physical Address. . . . . : 00-00-00-00-00-00-E0
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . . : Yes
IPv6 Address . . . . . : 2001:0:2851:fcb0:385d:a51:8a3e:b01e(Preferred)
```

ping

identify the destination host

```
cmd Command Prompt
Description . . . . . : Microsoft Teredo Tunneling Adapter
Physical Address. . . . . : 00-00-00-00-00-00-E0
DHCP Enabled. . . . . : No
Autoconfiguration Enabled : Yes
IPv6 Address . . . . . :
 2001:0:2851:fcb0:385d:a51:8a3e:b01e(PREFERRED)
  fe80::385d:a51:8a3e:b01e%12(PREFERRED)
Link-local IPv6 Address . . . . . :
Default Gateway . . . . . :
DHCPv6 IAID . . . . . : 167772160
DHCPv6 Client DUID . . . . . : 00-01-00-01-22-BB-A7-53-78-24-AF-BA-C2-22
NetBIOS over Tcpip. . . . . : Disabled

C:\Users\Student>nslookup
Default Server: Unknown
Address: 192.168.6.254

> www.google.com
Server: Unknown
Address: 192.168.6.254

Non-authoritative answer:
Name: www.google.com
Addresses: 2404:6800:4007:826::2004
          142.250.195.164

> www.amazon.com
Server: Unknown
Address: 192.168.6.254

Non-authoritative answer:
Name: d3agdhukkh02yn.cloudFront.net
Address: 52.84.12.185
Aliases: www.amazon.com
          tp.47cf2c8c9-frontier.amazon.com

>
C:\Users\Student>
C:\Users\Student>ping 192.168.6.254
C:\Users\Student>ping 142.250.195.164

Pinging 142.250.195.164 with 32 bytes of data:
Reply from 142.250.195.164: bytes=32 time=20ms TTL=59
Reply from 142.250.195.164: bytes=32 time=20ms TTL=59
```

traceroute

How many router ie needed to overcome to reach destination

traceart “ip address”

```
cmd Command Prompt
C:\Users\Student>ping 192.168.6.254
C:\Users\Student>ping 142.250.195.164

Pinging 142.250.195.164 with 32 bytes of data:
Reply from 142.250.195.164: bytes=32 time=20ms TTL=59

Ping statistics for 142.250.195.164:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 20ms, Maximum = 20ms, Average = 20ms

C:\Users\Student>ping 192.168.6.254

Pinging 192.168.6.254 with 32 bytes of data:
Reply from 192.168.6.254: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.6.254:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\Student>traceroute 142.250.195.164

Tracing route to maa03s41-in-f4.1e100.net [142.250.195.164]
over a maximum of 30 hops:
  1  <1 ms    <1 ms    <1 ms  192.168.6.100
  2  2 ms     2 ms     2 ms  172.24.9.34
  3  *         *         *      Request timed out.
  4  *         *         *      Request timed out.
  5  18 ms    17 ms    17 ms  72.14.218.250
  6  18 ms    17 ms    17 ms  216.239.43.133
  7  16 ms    17 ms    16 ms  142.251.55.91
  8  20 ms    20 ms    20 ms  maa03s41-in-f4.1e100.net [142.250.195.164]

Trace complete.
```

route print

to access our system routing table

```
Command Prompt
Trace complete.
C:\Users\Student>route print
=====
Interface List
 6...78 24 af ba c2 22 .....Realtek PCIe GBE Family Controller
 11...0a 00 27 00 00 0b .....VirtualBox Host-Only Ethernet Adapter
 1.....Software Loopback Interface 1
 12...00 00 00 00 00 00 e0 Microsoft Teredo Tunneling Adapter
=====
IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask     Gateway       Interface Metric
  0.0.0.0          0.0.0.0   192.168.6.100  192.168.6.31    281
    127.0.0.0        255.0.0.0         On-link     127.0.0.1    331
    127.0.0.1        255.255.255         On-link     127.0.0.1    331
 127.255.255.255  255.255.255.255         On-link     127.0.0.1    331
    192.168.6.0        255.255.255.0        On-link  192.168.6.31    281
  192.168.6.31        255.255.255.255        On-link  192.168.6.31    281
  192.168.6.255  255.255.255.255        On-link  192.168.6.31    281
  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  192.168.6.31    281
 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  192.168.6.31    281
=====
Persistent Routes:
 Network Address      Netmask     Gateway Address Metric
  0.0.0.0          0.0.0.0   192.168.6.100  Default
=====
IPv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
12  331 ::/0        On-link
 1  331 ::1/128     On-link
=====
Persistent Routes:
None
```

netstat

the available number of connection through tcp and udp

```
Command Prompt
=====
IPv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
12  331 ::/0        On-link
 1  331 ::1/128     On-link
12  331 2001::/32     On-link
12  331 2001:0:2851:fcb0:385d:a51:8a3e:b01e/128
 11  281 fe80::/64     On-link
 6  281 fe80::/64     On-link
12  331 fe80::/64     On-link
12  331 fe80::385d:a51:8a3e:b01e/128
 11  281 fe80::71d1:7ffc:899a:c04a/128
 6  281 fe80::405:8da5:6972:3ed8/128
 1  331 ff00::/8      On-link
11  281 ff00::/8      On-link
 6  281 ff00::/8      On-link
12  331 ff00::/8      On-link
=====
Persistent Routes:
None
C:\Users\Student>netstat
Active Connections

 Proto Local Address      Foreign Address      State
 TCP   192.168.6.31:1037  20.198.162.76:https ESTABLISHED
 TCP   192.168.6.31:1111  49.44.50.18:https  CLOSE_WAIT
 TCP   192.168.6.31:1112  117.18.237.29:http  CLOSE_WAIT
 TCP   192.168.6.31:1155  117.18.232.200:https CLOSE_WAIT
 TCP   192.168.6.31:1157  a23-205-88-48:https CLOSE_WAIT
 TCP   192.168.6.31:1164  117.18.237.29:http  CLOSE_WAIT
 TCP  [2001:0:2851:fcb0:385d:a51:8a3e:b01e]:1207 [2001:0:2851:fcb0:490:6e2c:fe45:445b]:ms-do  SYN_SENT
```

Experiment no:8

Aim

Analyzing network packet stream using tcpdump and wireshark. Perform basic network service tests using nc.

sudo tcpdump -i emp3s0 -c port80

To capture the packets of specific protocol

```
tcpdump: syntax error in filter expression. syntax error
mca@S17:~$ sudo tcpdump -i emp3s0 -c 5 port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on emp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
^Z
[1]+  Stopped                  sudo tcpdump -i emp3s0 -c 5 port 80
mca@S17:~$ sudo tcpdump -i emp3s0 -c 5 port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on emp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
^Z
[2]+  Stopped                  sudo tcpdump -i emp3s0 -c 5 port 80
```

sudo tcpdump -i emp3s0 icmp

```
^Z
[2]+  Stopped                  sudo tcpdump -i emp3s0 -c 5 port 80
mca@S17:~$ sudo tcpdump -i emp3s0 icmp
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on emp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
^C
0 packets captured
0 packets received by filter
0 packets dropped by kernel
```

sudo tcpdump -i emp3s0 -c 10 -w icmp.pcap

saves 10 lines of output on the interface to icmp.pcap

```
mca@S17:~$ sudo tcpdump -i emp3s0 -c 5 port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on emp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
^Z
[2]+  Stopped                  sudo tcpdump -i emp3s0 -c 5 port 80
mca@S17:~$ sudo tcpdump -i emp3s0 icmp
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on emp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
^C
0 packets captured
0 packets received by filter
0 packets dropped by kernel
mca@S17:~$ sudo tcpdump -i emp3s0 -c 10 -w icmp.pcap
tcpdump: listening on emp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
10 packets captured
11 packets received by filter
0 packets dropped by kernel
mca@S17:~$ 
```

```

0 packets dropped by kernel
mca@517:~$ tcpdump -r icmp.pcap
reading from file icmp.pcap, link-type EN10MB (Ethernet)
14:19:34.588656 IP 192.168.6.69.57897 > 239.255.255.250.1900: UDP, length 175
14:19:34.758231 IP 192.168.6.190.37933 > 239.255.255.250.1900: UDP, length 172
14:19:34.850312 IP 192.168.6.26.48314 > 239.255.255.250.1900: UDP, length 171
14:19:35.183628 STP 802.1w, Rapid STP, Flags [Forward], bridge-id 8000.44:31:92:f1:18:5b.800b, length 47
14:19:35.190678 IP 192.168.6.240.50951 > 239.255.255.250.1900: UDP, length 175
14:19:35.207025 IP 192.168.6.236.57798 > 192.168.6.255.6866: UDP, length 395
14:19:35.492596 IP6 fe80::184b:57ad:c06c:fda7.mdns > ff02::fb.mdns: 0 [2q] PTR (QM)? _ipps._tcp.local. PTR (QM)? _ipp._tcp.local. (45)
14:19:35.748433 IP 169.254.95.210.bootpc > 255.255.255.255.bootps: BOOTP/DHCP, Request from 78:48:59:b4:5f:d3 (oui Unknown), length 334
14:19:35.758881 IP 192.168.6.190.37933 > 239.255.255.250.1900: UDP, length 172
14:19:35.862400 IP 192.168.6.226.40303 > 239.255.255.250.1900: UDP, length 171
mca@517:~$ 

```

sudo tcpdump -r icmp.pcap

wireshark

sudo apt update

```

14:19:35.862400 IP 192.168.6.226.40303 > 239.255.255.250.1900: UDP, length 171
mca@517:~$ sudo apt update
Hit:1 http://in.archive.ubuntu.com/ubuntu bionic InRelease
Ign:2 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 InRelease
Err:3 http://ppa.launchpad.net/jonathonfon/python-3.6/ubuntu bionic InRelease
  403 Forbidden [IP: 185.125.190.52 80]
Get:4 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release [2,495 B]
Get:5 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release.gpg [801 B]
Hit:6 http://ppa.launchpad.net/pasqui/ppa/ubuntu bionic InRelease
Err:5 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release.gpg
  The following signatures were invalid: EXPKEYSIG 58712A2291FA4AD5 MongoDB 3.6 Release Signing Key <packaging@mongodb.com>
Hit:7 http://ppa.launchpad.net/webupd8team/java/ubuntu bionic InRelease
Reading package lists... 45%

```

```

mca@517: ~
File Edit View Search Terminal Help

The following packages were automatically installed and are no longer required:
  debhelper dh-autoreconf dh-strip-nondeterminism libarchive-cpio-perl libblas3 libfile-stripnondeterminism-perl libfluidsynth1 libgfortran4
  liblapack3 libmad0 libmail-sendmail-perl libmikmod3 libpcre16-3 libpcre3-dev libpcrepp0v5 libportmidi0 libsdl-mixer1.2
  libstdc++-tf2-0.0 libmpeg0 libssl-dev libssl-doc libsys-hostname-long-perl php-common php-pear php-xml php7.2-cli php7.2-common php7.2-json
  php7.2-opcache php7.2-readline php7.2-xml pkg-php-tools po-debconf python-numpy python-pygame shtool timgm6mb-soundfont
Use 'sudo apt autoremove' to remove them.

The following additional packages will be installed:
  geoip-database-extra javascript-common libc-ares2 libjs-openlayers libqt5multimedia5 libsmi2ldbl libsnappy1v5 libspandsp2 libssh-gcrypt-4
  libwireshark-data libwireshark10 libwiretap7 libwscodecs1 libwsutil8 wireshark-common wireshark-qt
Suggested packages:
  snmp-mibs-downloader wireshark-doc

The following NEW packages will be installed:
  geoip-database-extra javascript-common libc-ares2 libjs-openlayers libqt5multimedias libsmi2ldbl libsnappy1v5 libspandsp2 libssh-gcrypt-4
  libwireshark-data libwireshark10 libwiretap7 libwscodecs1 libwsutil8 wireshark wireshark-common wireshark-qt
0 upgraded, 17 newly installed, 0 to remove and 6 not upgraded.
Need to get 31.1 MB of archives.
After this operation, 138 MB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 geoip-database-extra all 20180315-1 [11.1 MB]
Get:2 http://in.archive.ubuntu.com/ubuntu/bionic/main amd64 javascript-common all 11 [6,066 B]
Get:3 http://in.archive.ubuntu.com/ubuntu/bionic/universe amd64 libqt5multimedia5 amd64 5.9.5-0ubuntu1 [293 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu/bionic/main amd64 libsmi2ldbl amd64 0.4.8+dfsg2-15 [100 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu/bionic/universe amd64 libspandsp2 amd64 0.0.6+dfsg-0.1 [273 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu/bionic/main amd64 libssh-gcrypt-4 amd64 0.8.0~20170825.94fa1e38-1build1 [171 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 libwireshark-data all 2.4.5-1 [958 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu/bionic/main amd64 libc-ares2 amd64 1.14.0-1 [37.1 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu/bionic/main amd64 libsnappy1v5 amd64 1.1.7-1 [16.0 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu/bionic/universe amd64 libwsutil8 amd64 2.4.5-1 [50.2 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu/bionic/universe amd64 libwiretap7 amd64 2.4.5-1 [172 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu/bionic/universe amd64 libwscodecs1 amd64 2.4.5-1 [10.6 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu/bionic/universe amd64 libwireshark10 amd64 2.4.5-1 [13.5 MB]
Get:14 http://in.archive.ubuntu.com/ubuntu/bionic/universe amd64 wireshark-common amd64 2.4.5-1 [369 kB]
Get:15 http://in.archive.ubuntu.com/ubuntu/bionic/universe amd64 wireshark-qt amd64 2.4.5-1 [3,357 kB]
Get:16 http://in.archive.ubuntu.com/ubuntu/bionic/universe amd64 wireshark amd64 2.4.5-1 [4,484 B]
Get:17 http://in.archive.ubuntu.com/ubuntu/bionic/universe amd64 libjs-openlayers all 2.13.1+ds2-4 [704 kB]
Fetched 31.1 MB in 1s (24.1 MB/s)
Preconfiguring packages ...

```

sudo apt install wireshark

```

0 Release Signing Key <packaging@mongodb.com>
mca@517:~$ sudo apt install wireshark
Reading package lists... Done
Building dependency tree
Reading state information... Done

The following packages were automatically installed and are no longer required:
  debhelper dh-autoreconf dh-strip-nondeterminism libarchive-cpio-perl libblas3 libfile-stripnondeterminism-perl libfluidsynth1 libgfortran4
  liblapack3 libmado libmail-sendmail-perl libmkmf03 libpcre16-3 libpcre3-dev libpcre32-3 libpcrecpp0v5 libportmidi0 libssl-mixer1.2
  libstdc++-5-dev libsmpeg0 libssl-dev libssl-doc libsys-hostname-long-perl php-common php-pear php-xml php7.2-cli php7.2-common php7.2-json
  php7.2-opcache php7.2-readline php7.2-xml pkg-php-tools po-debconf python-numpy python-pygame shtool timgm6mb-soundfont
Use 'sudo apt autoremove' to remove them.

```

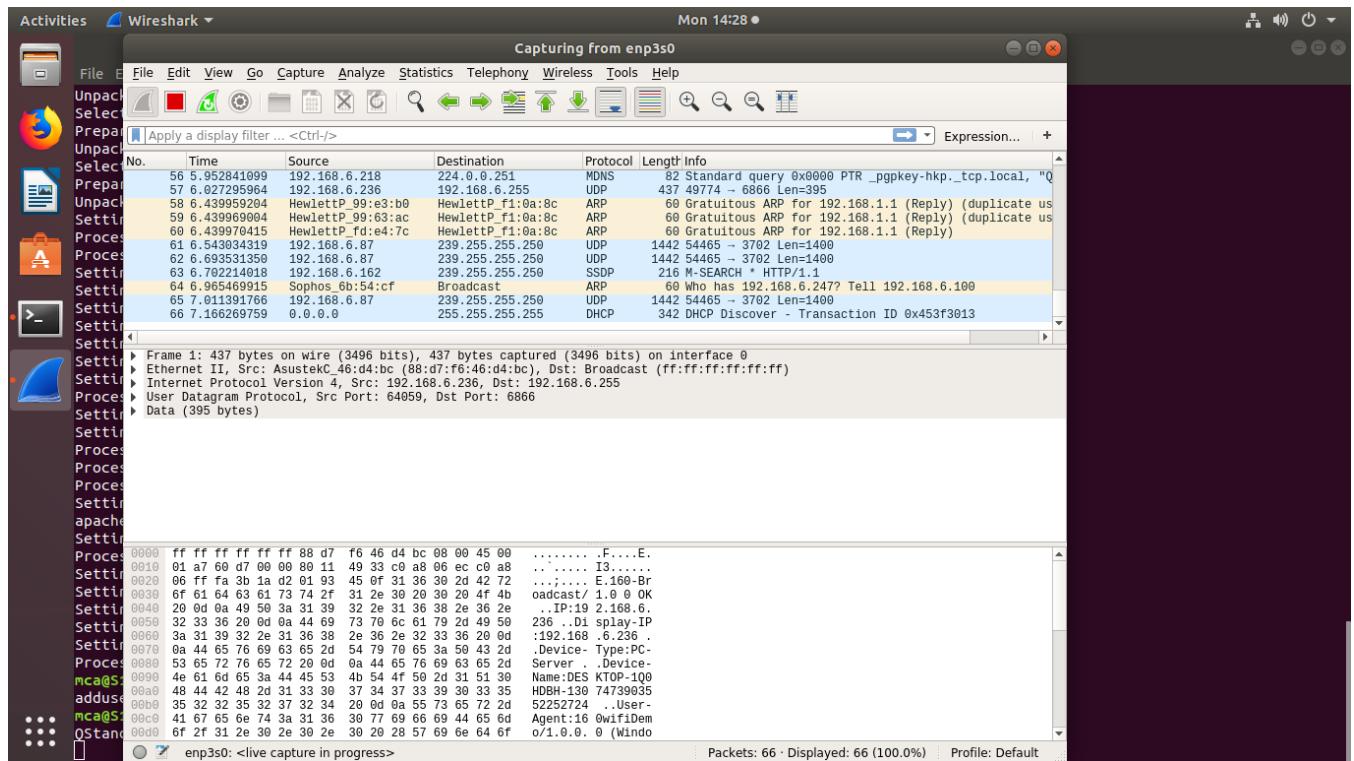
sudo adduser \$mca wireshark

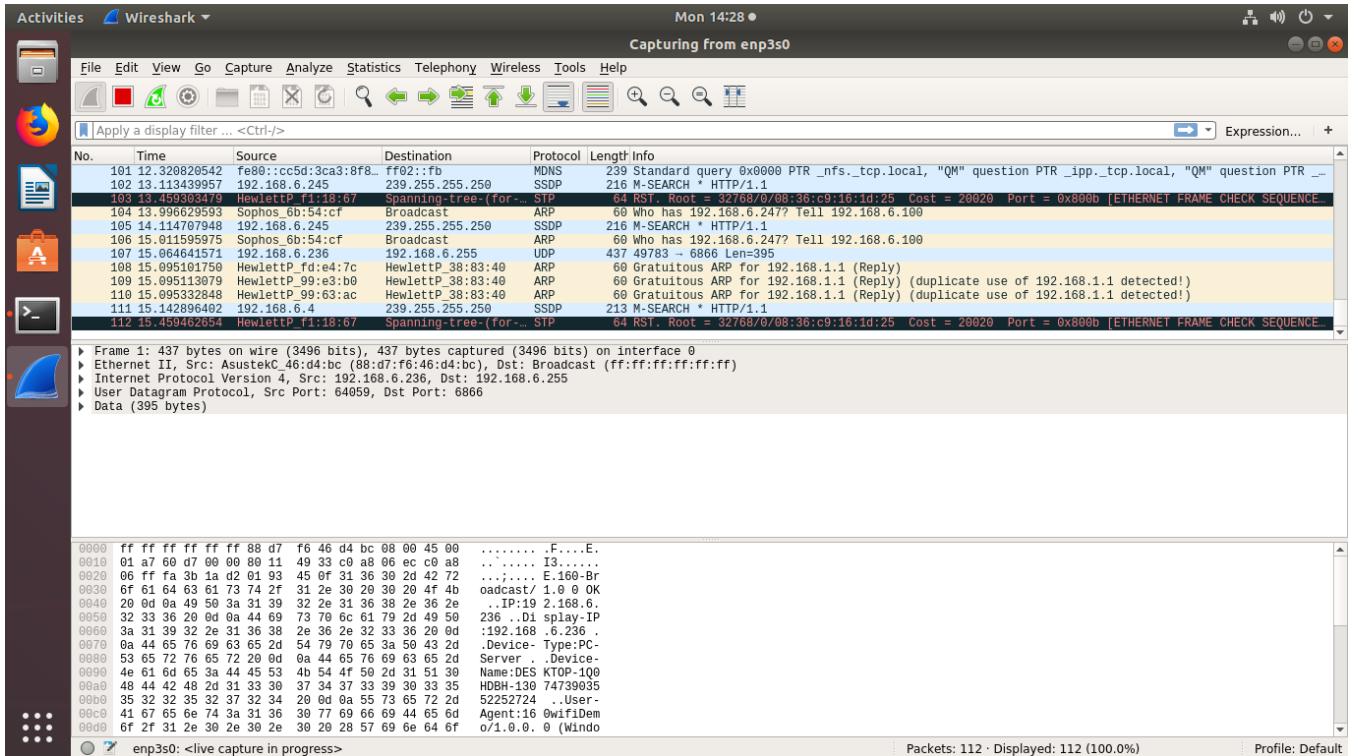
```

Processing triggers for libc-bin (2.27-3ubuntu1) ...
mca@517:~$ sudo adduser $mca wireshark
adduser: The group `wireshark' already exists.
mca@517:~$ 

```

sudo wireshark



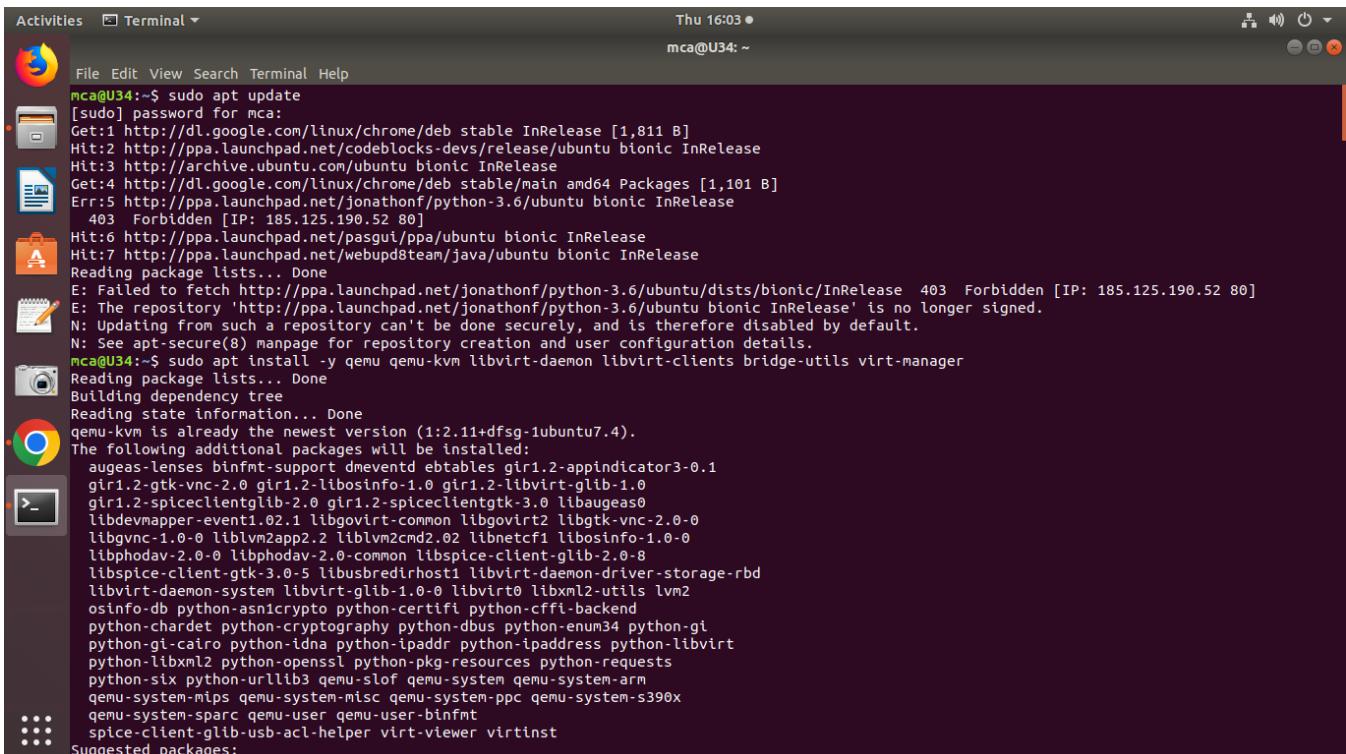


Experiment no:9

Aim

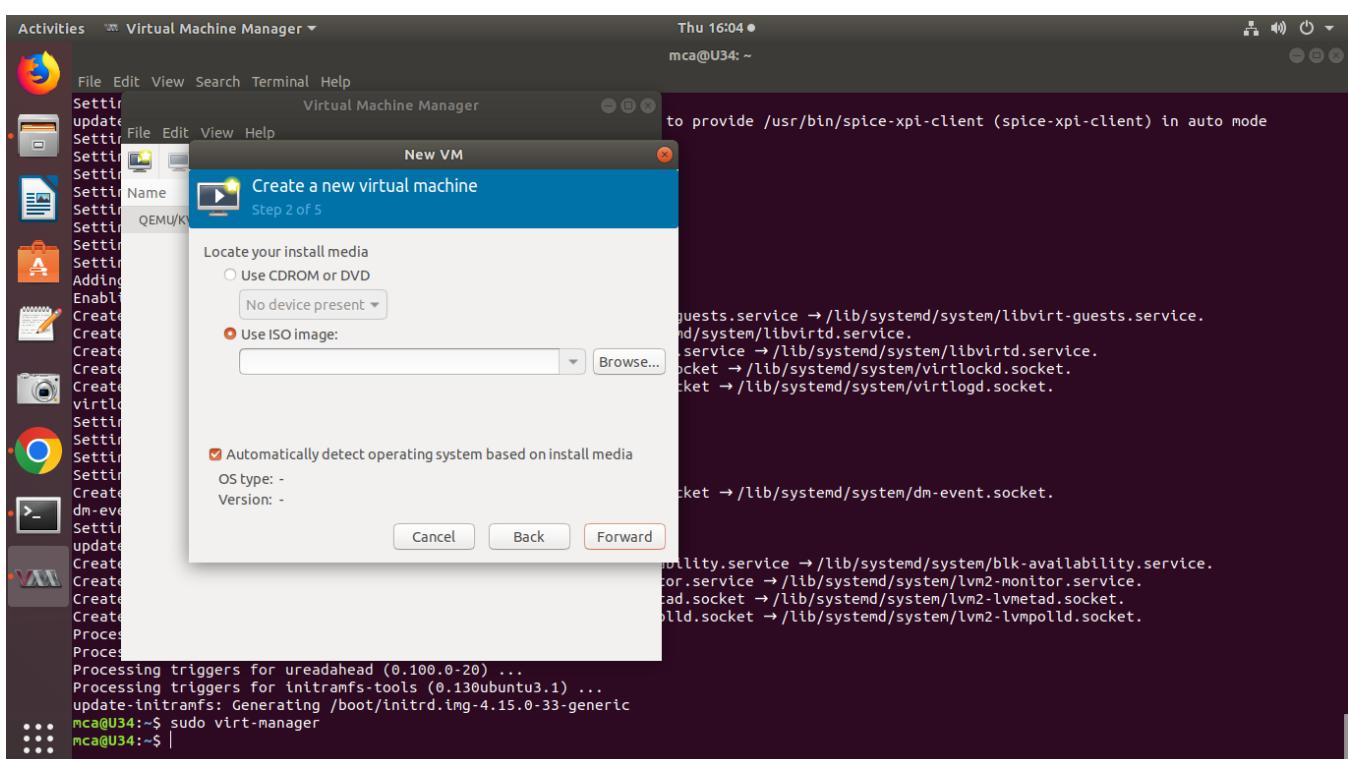
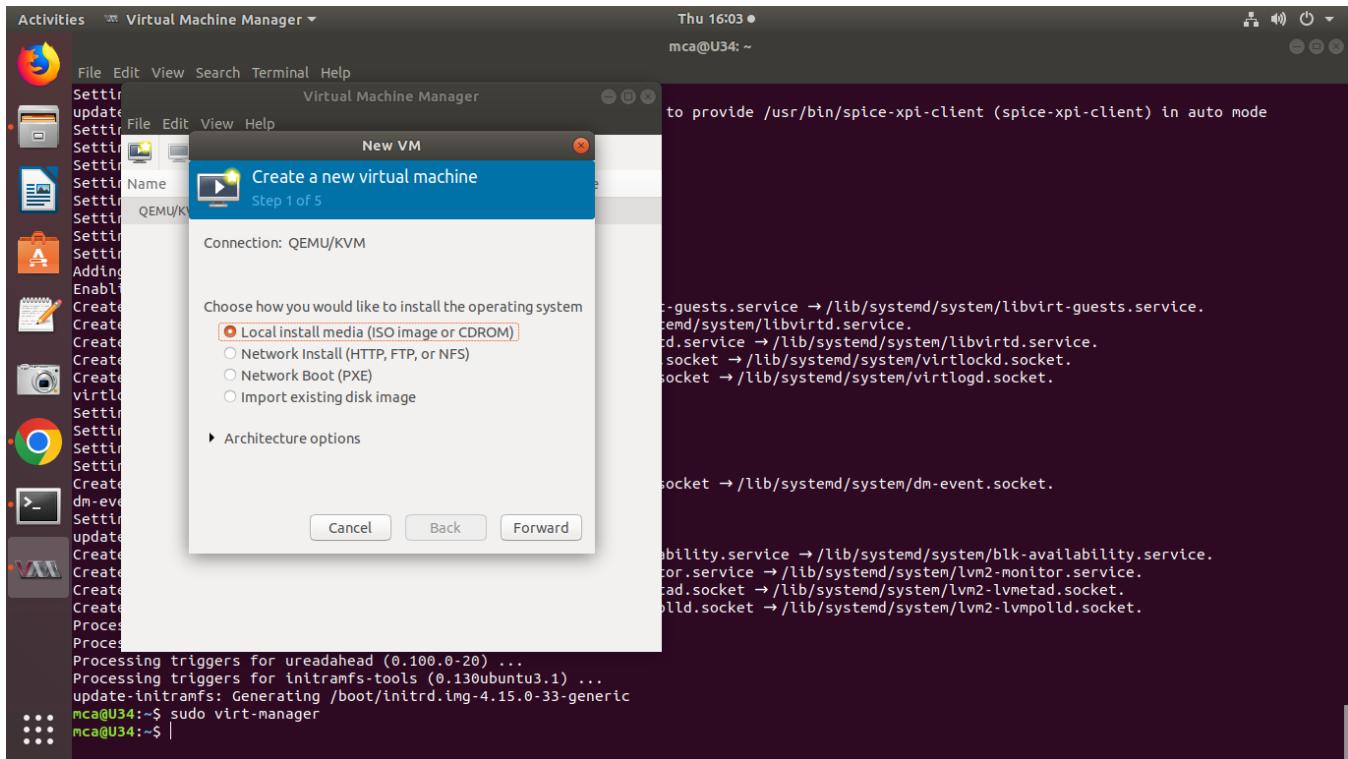
Introduction to Hypervisors and VMs: KVM installation and commands.

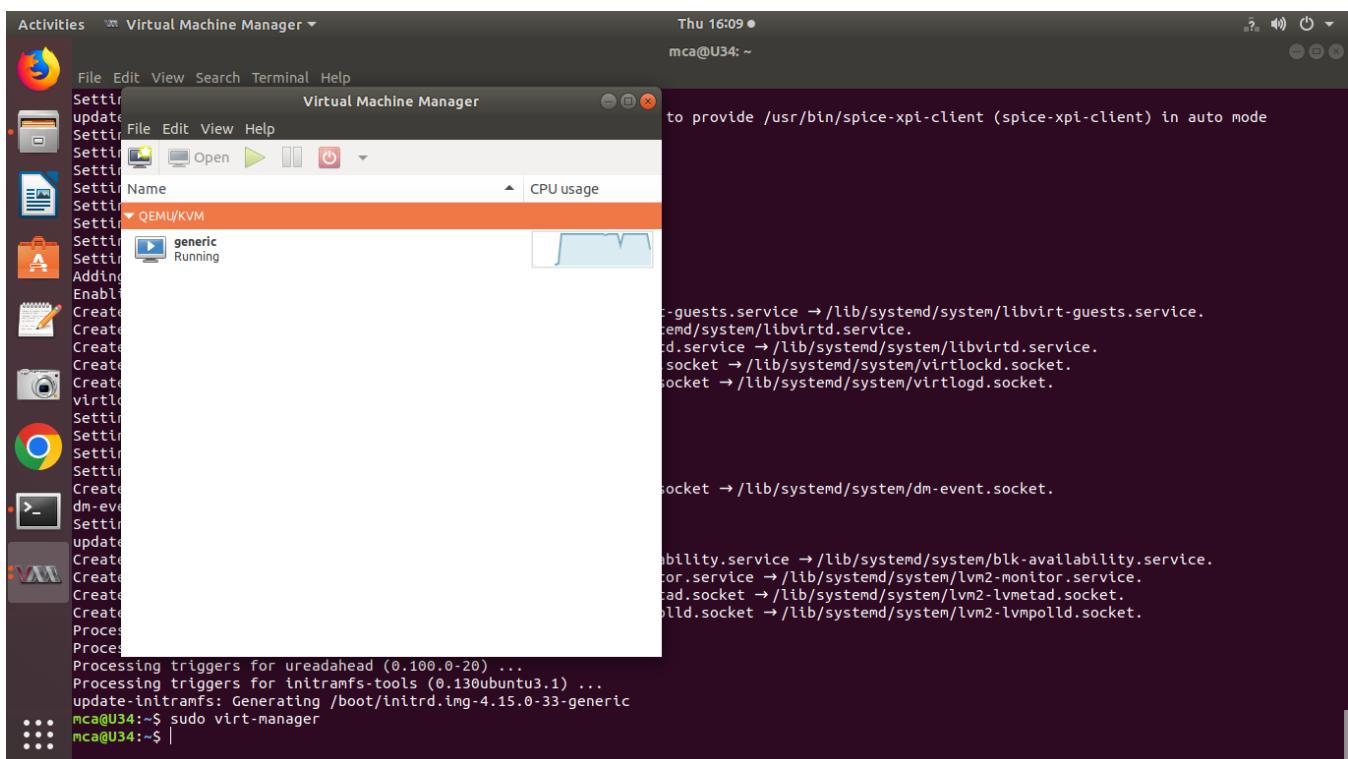
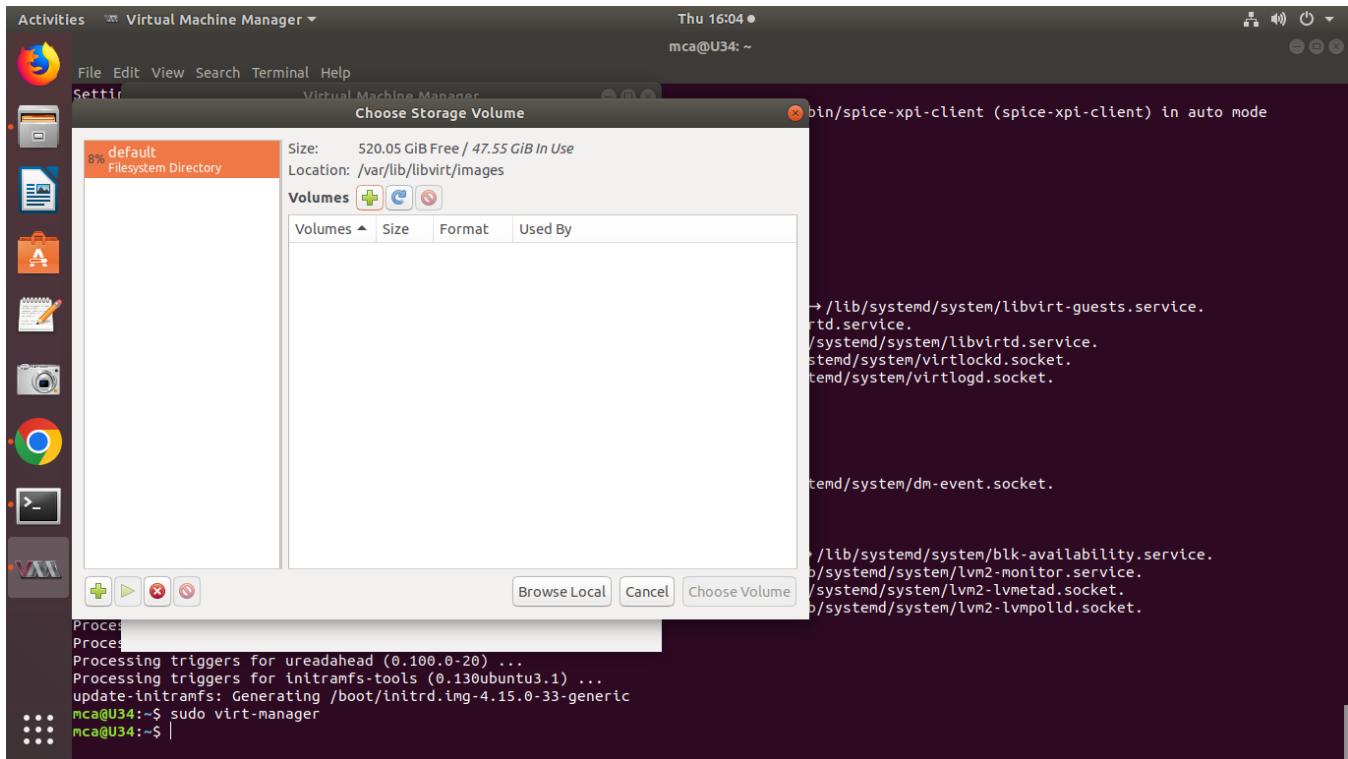
```
$sudo apt update
```



The screenshot shows a terminal window titled "Terminal" with the command `sudo apt update` being run. The output indicates that the command failed to fetch packages from a repository due to a 403 Forbidden error (IP: 185.125.190.52 80) and that the repository is no longer signed. It also shows that the repository 'http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu' is disabled by default. The command then proceeds to install additional packages required for QEMU-KVM, including libvirt-daemon-system, libvirt-clients, and bridge-utils. The terminal window has a dark theme and includes icons for various applications in the top bar.

```
mca@U34:~$ sudo apt update
[sudo] password for mca:
Get:1 http://dl.google.com/linux/chrome/deb stable InRelease [1,811 B]
Hit:2 http://ppa.launchpad.net/codeblocks-devs/release/ubuntu bionic InRelease
Hit:3 http://archive.ubuntu.com/ubuntu bionic InRelease
Get:4 http://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,101 B]
Err:5 http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease
  403  Forbidden [IP: 185.125.190.52 80]
Hit:6 http://ppa.launchpad.net/pasqui/ppa/ubuntu bionic InRelease
Hit:7 http://ppa.launchpad.net/webupd8team/java/ubuntu bionic InRelease
Reading package lists... Done
E: Failed to fetch http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu/dists/bionic/InRelease  403  Forbidden [IP: 185.125.190.52 80]
E: The repository 'http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease' is no longer signed.
N: Updating from such a repository can't be done securely, and is therefore disabled by default.
N: See apt-secure(8)'manpage for repository creation and user configuration details.
mca@U34:~$ sudo apt install -y qemu qemu-kvm libvirt-daemon libvirt-clients bridge-utils virt-manager
Reading package lists... Done
Building dependency tree
Reading state information... Done
qemu-kvm is already the newest version (1:2.11+dfsg-1ubuntu7.4).
The following additional packages will be installed:
  augeas-lenses binfmt-support dmeventd ebtables gir1.2-appindicator3-0.1
  gir1.2-gtk-vnc-2.0 gir1.2-libosinfo-1.0 gir1.2-libvirt-glib-1.0
  gir1.2-spiceclientglib-2.0 gir1.2-spiceclientgtk-3.0 libaugeas0
  libdevmapper-event1.02.1 libgovirt-common libgovirt2 libgtk-vnc-2.0-0
  libgvnc-1.0-0 liblvm2app2.2 liblvm2cmd2.02 libnetcf1 libosinfo-1.0-0
  libphodav-2.0-0 libphodav-2.0-common libspice-client-glib-2.0-8
  libspice-client-gtk-3.0-5 libusbredirhost1 libvirt-daemon-storage-rbd
  libvirt-daemon-system libvirt-glib-1.0-0 libvirt0 libxml2-utils lvm2
  osinfo-db python-asn1crypto python-certifi python-cffi-backend
  python-chardet python-cryptography python-dbus python-enum34 python-gi
  python-gi-cairo python-idna python-ipaddr python-ipaddress python-libvirt
  python-libxml2 python-openssl python-pkg-resources python-requests
  python-six python-urllib3 qemu-slof qemu-system qemu-system-arm
  qemu-system-mips qemu-system-misc qemu-system-ppc qemu-system-s390x
  qemu-system-sparc qemu-user qemu-user-binfmt
  spice-client-glib-usb-acl-helper virt-viewer virtinst
Suggested packages:
```





Experiment no:10

Aim

Introduction to Containers: Docker installation and deployment.

Steps for installing Docker

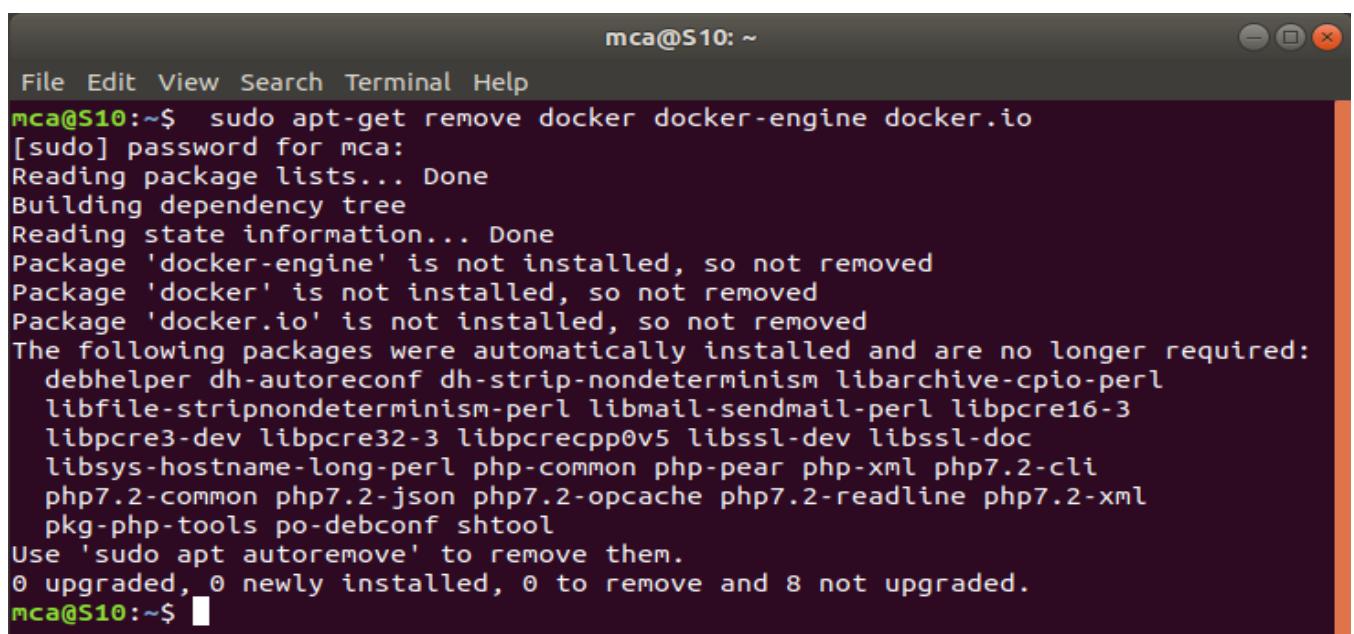
Procedure

1. Open the terminal on Ubuntu.
2. Remove any Docker files that are running in the system

command:

```
$ sudo apt-get remove docker docker-engine docker.io
```

After entering the above command, you will need to enter the password of the root and press enter.



```
mca@S10:~$ sudo apt-get remove docker docker-engine docker.io
[sudo] password for mca:
Reading package lists... Done
Building dependency tree
Reading state information... Done
Package 'docker-engine' is not installed, so not removed
Package 'docker' is not installed, so not removed
Package 'docker.io' is not installed, so not removed
The following packages were automatically installed and are no longer required:
  debhelper dh-autoreconf dh-strip-nondeterminism libarchive-cpio-perl
  libfile-stripnondeterminism-perl libmail-sendmail-perl libpcre16-3
  libpcre3-dev libpcre32-3 libpcrecpp0v5 libssl-dev libssl-doc
  libsys-hostname-long-perl php-common php-pear php-xml php7.2-cli
  php7.2-common php7.2-json php7.2-opcache php7.2-readline php7.2-xml
  pkg-php-tools po-debconf shtool
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 8 not upgraded.
mca@S10:~$
```

3. Check if the system is up-to-date

command:

```
$ sudo apt-get update
```

```
mca@S10:~$ sudo apt-get update
Err:1 http://in.archive.ubuntu.com/ubuntu bionic InRelease
      Could not resolve 'in.archive.ubuntu.com'
Err:2 https://dl.google.com/linux/chrome/deb stable InRelease
      Could not resolve 'dl.google.com'
Err:3 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 InRelease
      Could not resolve 'repo.mongodb.org'
Err:4 http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease
      Could not resolve 'ppa.launchpad.net'
Err:5 http://ppa.launchpad.net/pasgui/ppa/ubuntu bionic InRelease
      Could not resolve 'ppa.launchpad.net'
Err:6 http://ppa.launchpad.net/webupd8team/java/ubuntu bionic InRelease
      Could not resolve 'ppa.launchpad.net'
Reading package lists... Done
W: Failed to fetch http://in.archive.ubuntu.com/ubuntu/dists/bionic/InRelease  Could not resolve 'in.archive.ubuntu.com'
W: Failed to fetch https://dl.google.com/linux/chrome/deb/dists/stable/InRelease
```

4. Install Docker

command:

```
$ sudo apt install docker.io
```

You'll then get a prompt asking you to choose between y/n - choose y

```
mca@S10:~$ sudo apt install docker.io
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  debhelper dh-autoreconf dh-strip-nondeterminism libarchive-cpio-perl
  libfile-stripnondeterminism-perl libmail-sendmail-perl libpcre16-3
  libpcre3-dev libpcre32-3 libpcrecpp0v5 libssl-dev libssl-doc
  libsys-hostname-long-perl php-common php-pear php-xml php7.2-cli
  php7.2-common php7.2-json php7.2-opcache php7.2-readline php7.2-xml
  pkg-php-tools po-debconf shtool
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  bridge-utils cgroupfs-mount ubuntu-fan
Suggested packages:
  aufs-tools btrfs-tools debootstrap docker-doc rinse zfs-fuse | zfsutils
The following NEW packages will be installed:
  bridge-utils cgroupfs-mount docker.io ubuntu-fan
0 upgraded, 4 newly installed, 0 to remove and 8 not upgraded.
```

5. Install all the dependency packages

command:

```
$ sudo snap install docker
```

```
mca@S10:~$ sudo snap install docker
docker 20.10.14 from Canonical* installed
mca@S10:~$
```

6. Before testing Docker, check the version installed

command:

```
$ docker --version
```

```
mca@S10:~$ docker --version
Docker version 17.12.1-ce, build 7390fc6
mca@S10:~$
```

7. Pull an image from the Docker hub

command:

```
$ sudo docker run hello-world
```

```
mca@S10:~$ sudo docker run hello-world
Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/
```

8. Check if the docker image has been pulled and is present in your system

command:

\$ sudo docker images

```
mca@S10:~$ sudo docker images
REPOSITORY          TAG      IMAGE ID      CREATED
SIZE
hello-world        latest   feb5d9fea6a5  8 months ago
13.3kB
mca@S10:~$
```

9. To display all the containers pulled

command:

\$ sudo docker ps -a

```
mca@S10:~$ sudo docker ps -a
CONTAINER ID        IMAGE           COMMAND
STATUS             PORTS
1b55dc24a2e0      hello-world    "/hello"
Exited (0) About a minute ago
221fdf4c9d9a      hello-world    "/hello"
Exited (0) 6 minutes ago
mca@S10:~$
```

10. To check for containers in a running state

command:

```
$ sudo docker ps
```

| CONTAINER ID | IMAGE | COMMAND | CREATED |
|--------------|-------|---------|---------|
| STATUS | PORTS | NAMES | |
| mca@S10:~\$ | | | |

successfully installed Docker on Ubuntu!

docker deployment

Step 1:

Syntax :- \$ sudo docker run -dit --name tecmint-web -p 8080:80 -v /home/user/website/:/usr/local/apache2/htdocs/ httpd:2.4

```
mca@s26:~$ sudo docker run -dit --name tecmint-web -p 8080:80 -v /home/user/website/:/usr/local/apache2/htdocs/ httpd:2.4
[sudo] password for mca:
Unable to find image 'httpd:2.4' locally
2.4: Pulling from library/httpd
214ca5fb9032: Pull complete
7cf31a2eeec6: Pull complete
bf666e57b9f2: Pull complete
c15a4e94ae6b: Pull complete
dc25474c7f97: Pull complete
Digest: sha256:2d1f8839d6127e400ac5f65481d8a0f17ac46a3b91de40b01e649c9a0324dea0
Status: Downloaded newer image for httpd:2.4
0bf6c07ac551d9dbe2d5afa6a31fb8da667cf668b8563572fc2e3b0bf2587ecb
mca@s26:~$
```

Step 2:

Syntax :- \$ sudo docker ps

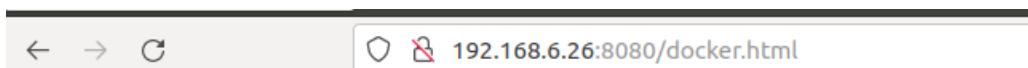
| CONTAINER ID | IMAGE | COMMAND | CREATED | STATUS | PORTS |
|--------------|-----------|--------------------|--------------------|-------------------|---------------------------------------|
| NAMES | | | | | |
| 0bf6c07ac551 | httpd:2.4 | "httpd-foreground" | About a minute ago | Up About a minute | 0.0.0.0:8080->80/tcp, :::8080->80/tcp |
| tecmint-web | | | | | |

Step 3:

Syntax :- \$ sudo gedit /home/user/website/docker.html

```
mca@S26:~$ sudo gedit /home/user/website/docker.html
```

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>Learn Docker at Tecmint.com</title>
</head>
<body>
  <h1>Learn Docker With Us</h1>
</body>
</html>
```



Learn Docker With Us

Step 4:

Syntax :- \$ sudo docker stop tecmint-web

```
mca@S26:~$ sudo docker stop tecmint-web
[sudo] password for mca:
tecmint-web
mca@S26:~$
```

Step 5:

Syntax :- \$ sudo docker rm tecmint-web

```
mca@S26:~$ sudo docker rm tecmint-web
tecmint-web
mca@S26:~$
```

Step 6:

Syntax :- \$ sudo docker image remove httpd:2.4

```
mca@526:~$ sudo docker image remove httpd:2.4
Untagged: httpd:2.4
Untagged: httpd@sha256:2d1f8839d6127e400ac5f65481d8a0f17ac46a3b91de40b01e649c9a0324dea0
Deleted: sha256:c58ef9bfbb5789a9882cee610ba778b1368d21b513d6caf32e3075542e13fe81
Deleted: sha256:312672a18b7ce4fbbaa736a0e87a4a1cef47e3341b50cb3a0c5a865457347c10
Deleted: sha256:d67e67a5fbad035b2603029110722ed2af07c5ae52e741663c2d09cf6cc90e2c
Deleted: sha256:eb38b82c45692bc0a2e14adece681e2673d35f9ee5d047f498d0077d17a3bf68
Deleted: sha256:c21e2c36645f68249254b6d72c2ae0af5c1ba110a92d7b7b05c67ee4705cea49
Deleted: sha256:fd95118eade99a75b949f634a0994e0f0732ff18c2573fabdfc8d4f95b092f0e
mca@526:~$
```

