

# **20MCA136 NETWORKING AND SYSTEM ADMINISTRATION LAB**

*Lab Report Submitted By*

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**Reg. No.: AJC21MCA-2091**

*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. Koovapally, 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 AND SYSTEM ADMINISTRATION LAB**" is the bonafide work of **SALINI K B (AJC21MCA-2091)** 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.

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## Program no:1

**Aim:** 1. 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.

### Output:

**Name: salini kb**

**Roll No:33**

**Batch: MCA-B**

**Date:4-4-2022**

## 1]MOTHERBOARD

The motherboard is the main circuit board of your computer and is also known as the mainboard or logic board. If you ever open your computer, the biggest piece of silicon you see is the motherboard. Attached to the motherboard, you'll find the CPU, ROM, memory RAM expansion slots, PCI slots, and USB ports.



## 2]MONITOR

A monitor is an electronic output device that is also known as a **video display terminal** (VDT) or a **video display unit** (VDU). It is used to display images, text, video, and graphics information generated by a connected computer via a computer's video card. Although it is almost like a TV, its resolution is much higher than a TV. The first computer monitor was introduced on **1 March 1973**, which was part of the Xerox Alto computer system.



### 3]PRINTER

A printer is a hardware output device that is used to generate hard copy and print any document. A document can be of any type such as a text file, image, or the combination of both. It accepts input command by users on a computer or on other devices to print the documents. For example, if you have to submit a project report at your college, you need to create a soft copy of your report and print it with the help of the printer.



### 4]PROCESSOR

A processor is an integrated electronic circuit that performs the calculations that run a computer. A processor performs arithmetical, logical, input/output (I/O) and other basic instructions that are passed from an operating system (OS). Most other processes are dependent on the operations of a processor.



## 5]RAM

RAM (Random Access Memory) is the hardware in a computing device where the operating system (OS) application programs and data in current use are kept so they can be quickly reached by the device's processor. RAM is the main memory in a computer. It is much faster to read from and write to than other kinds of storage, such as a hard disk drive (HDD), solid-state drive (SSD) or optical drive.



## 6]ROM

Read Only Memory (ROM) is computer memory that can permanently store data and applications within it. There are various types of ROM with names like EPROM (Erasable ROM) or EEPROM (Electrically Erasable ROM).

Unlike RAM, when a computer is powered down, the contents of the ROM are not lost. EPROM or EEPROM can have their contents rewritten by a special operation. This is called 'Flashing the EPROM' a term that came about because ultra violet light is used to clear the contents of the EPROM.



## 7]SYSTEM UNIT

A typical desktop computer is composed of a computer system unit, a keyboard, a mouse, and a monitor. The computer system unit is the outer shell of all other main internal components of the computer. It is also called a computer case, computer case, or computer tower. The housing is usually made of steel or aluminum, but plastics can also be used.



## 8]CPU

Stands for "Central Processing Unit." The CPU is the primary component of a computer that processes instructions. It runs the operating system and applications, constantly receiving input from the user or active software programs. It processes the data and produces output, which may be stored by an application or displayed on the screen.



## 9]MOUSE

A mouse is a hand-held device used for directly interacting with a graphical gui interface by controlling the movement of a cursor or pointer on a computer Display screen. The mouse detects the two-dimensional motion of the operator and translates it into the movement of the cursor on the screen. The most common operations are point-and-click and drag-and-drop.



## 10]KEYBOARD

The keyboard is the piece of computer hardware used to input text, characters, and other commands into a computer or similar device.

Even though the keyboard is an external peripheral device in a desktop system (it sits outside the main computer housing), or is "virtual" in a tablet PC, it is an essential part of the complete computer



system.

## 11]Flash memory card

The keyboard is the piece of computer hardware used to input text, characters, and other commands into a computer or similar device.

Even though the keyboard is an external peripheral device in a desktop system (it sits outside the main computer housing), or is "virtual" in a tablet PC, it is an essential part of the complete computer system.



## 12]STORAGE

- Primary Storage Devices: It is also known as internal memory and main memory. This is a section of the CPU that holds program instructions, input data, and intermediate results. It is generally smaller in size.



## 13]INPUT DEVICES AND OUTPUT DEVICES

The functioning of a computer system is based on the combined usage of both input and output devices. Using an input device we can give instructions to the computer to perform an action and the device reverts to our action through an output device.

## 14]GPU[GRAPHICS PROCESS UNIT]

A **graphics processing unit (GPU)** is a specialized electronic circuit designed to rapidly manipulate and alter memory to accelerate the creation of images in a frame buffer intended for output to a display device. GPUs are used in embedded systems, mobile phones personal computers, workstations and game consoles.



## 15]CONTROL UNIT

It is the responsibility of the Control Unit to tell the computer's memory, arithmetic/logic unit and input and output devices how to respond to the instructions that have been sent to the processor.



**Program no:2**

**Aim:** Install latest version of Ubuntu on a virtual box

**Output:**

1. Download and Virtualbox Windows 10 Installation
2. Ubuntu ISO download
3. Install Virtualbox
4. Create an Ubuntu VM
5. Install Ubuntu on Virtualbox Windows 10
6. Install Virtualbox Guest Additions

**Name: salini kb**

**Roll No:33**

**Batch: MCA-B**

**Date:4-4-2022**

**Download and Virtualbox Windows 10 Installation**

1. Install Ubuntu on VirtualBox
2. How To Install Ubuntu On Virtual Box?
  - 2.1. Open VirtualBox
  - 2.2. Click on “New” to create a virtual machine
  - 2.3. Enter Name for your Virtual Machine
  - 2.4. Select “Linux” Operating System from “Type”
  - 2.5. Click “Next”
  - 2.6. Enter amount of memory (RAM) =1024 MB and click “Next”
  - 2.7. Click “Create” to create hard drive
  - 2.8. Click “Next”
  - 2.9. Click “Next”
  - 2.10. Enter Size of Virtual Hard Drive= 20 GB and Click “Create”
  - 2.11. Select Virtual Machine
  - 2.12. Click on “Start” to start the virtual machine
  - 2.13. Select disk file source

2.14. After selecting the OS file to be installed click “Open”

2.15. Click “Start”

2.16. Click “Ok”

2.17. Click “Install Ubuntu”

2.18. Click “Continue”

2.19. Click “Install Now”

2.20. Click “Continue”

2.21. Select location and click “Continue”

2.22. Select keyboard layout & click “Continue”

2.23. Fill all the details and Click “Continue”

2.24. Now the installation process will start and installation window will appear

2.25. Click “Restart Now”

2.26. When the system will get restarted the following message will appear. Press “Enter”

2.27. Close the pop-up messages by clicking on the Close (×) button

### 3. Steps To Maximize The Size Of Ubuntu Desktop

3.1. Go to “Devices”

3.2. Click “Insert Guest Additions CD Image...”

3.3. Click “Run”

3.4. Click “Authenticate”

3.5. Press “Enter”

3.6. Now “Restart” your system for the changes to be applied.

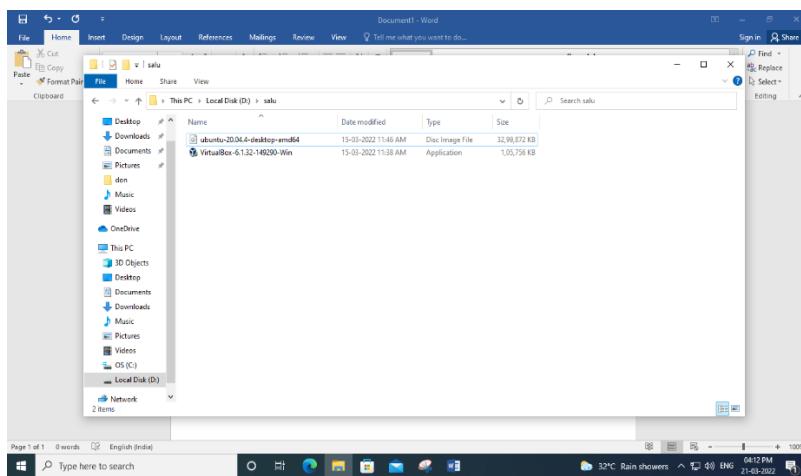
3.7. After the system gets restarted. Go to “View”

3.8. Click “Switch to Fullscreen”

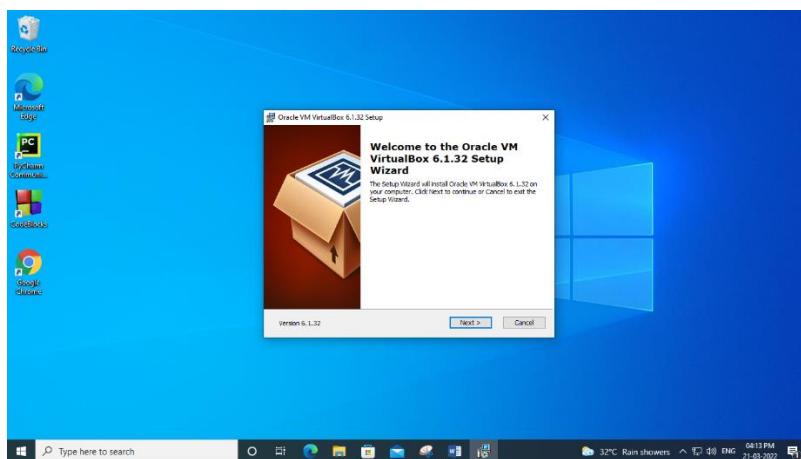
3.9. Click “Switch”

## Output Screenshot

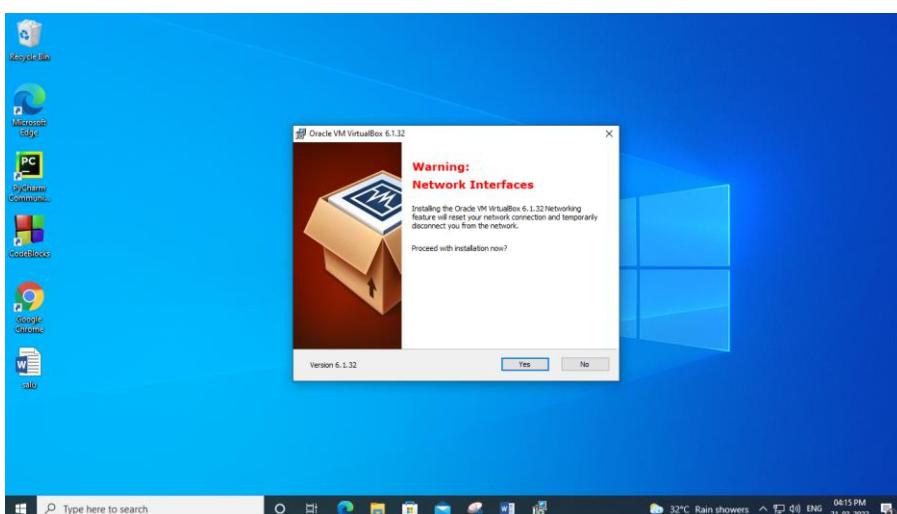
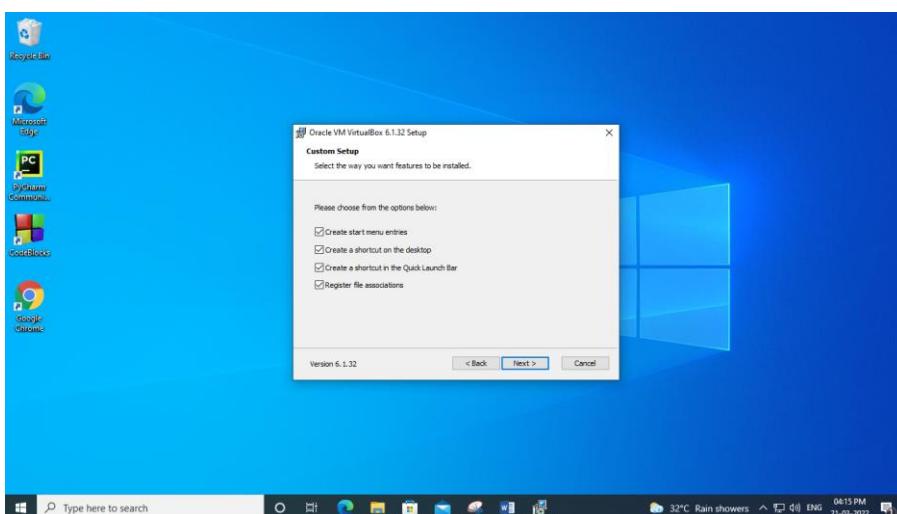
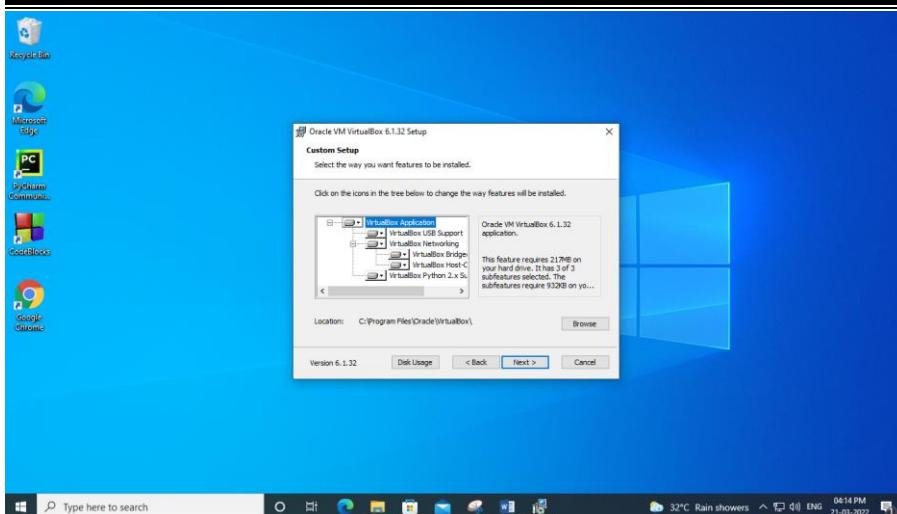
**Step 1:** Download VirtualBox for Windows and install it on your computer

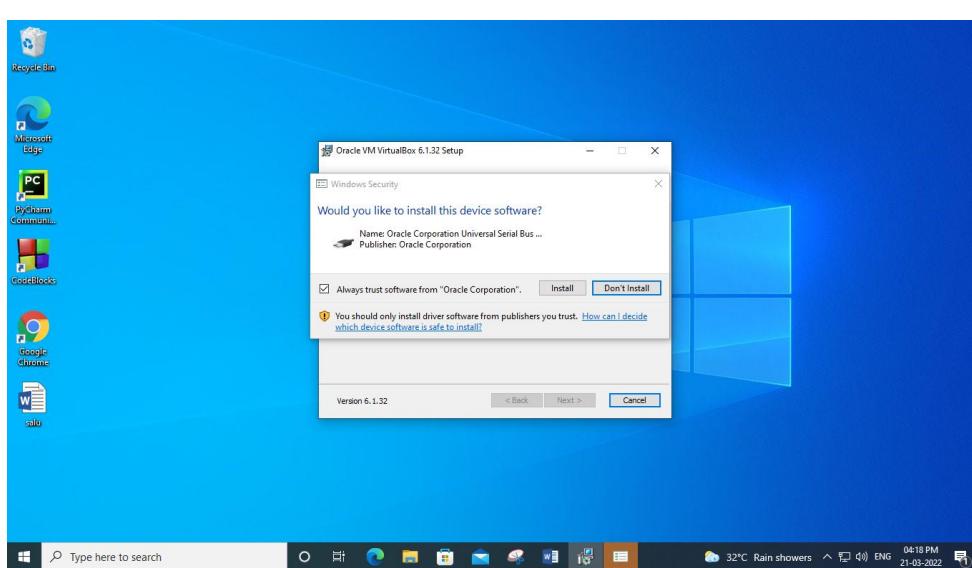
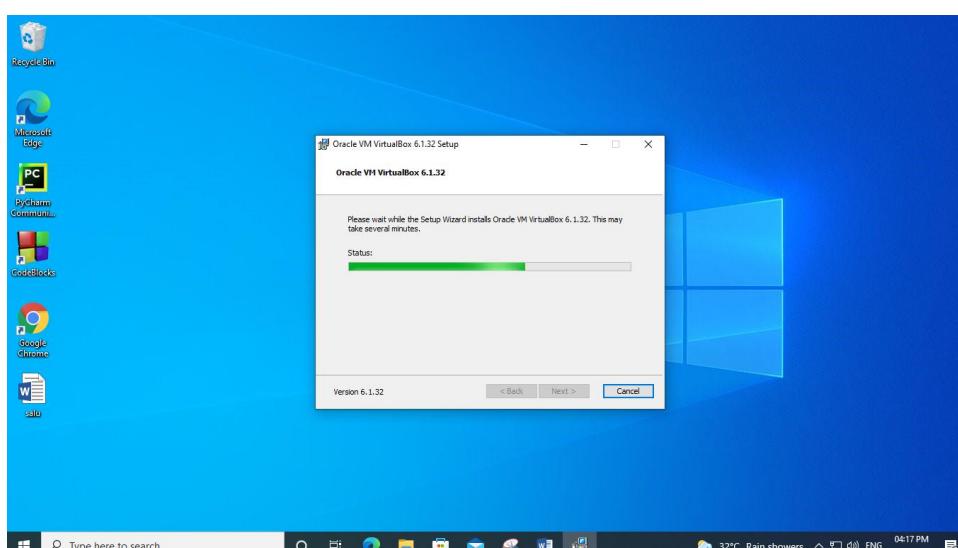
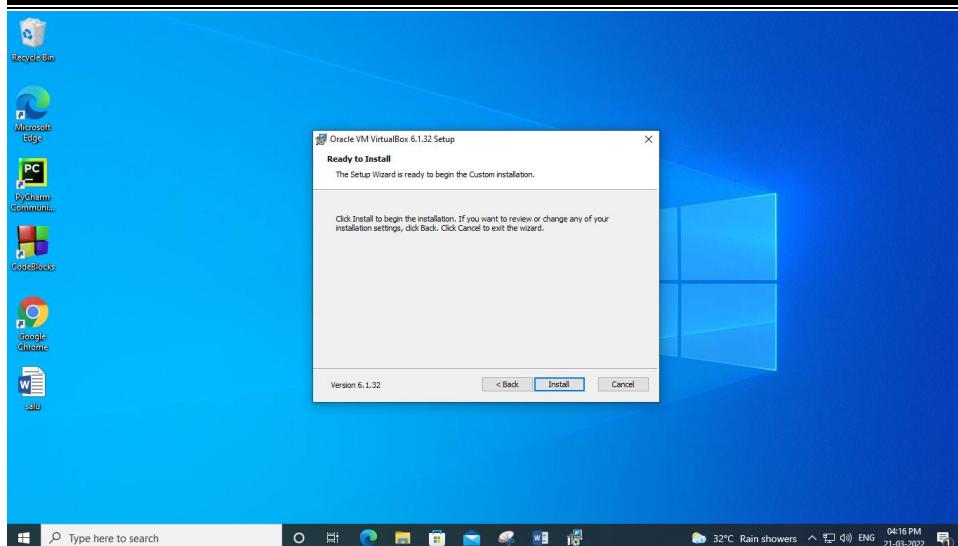


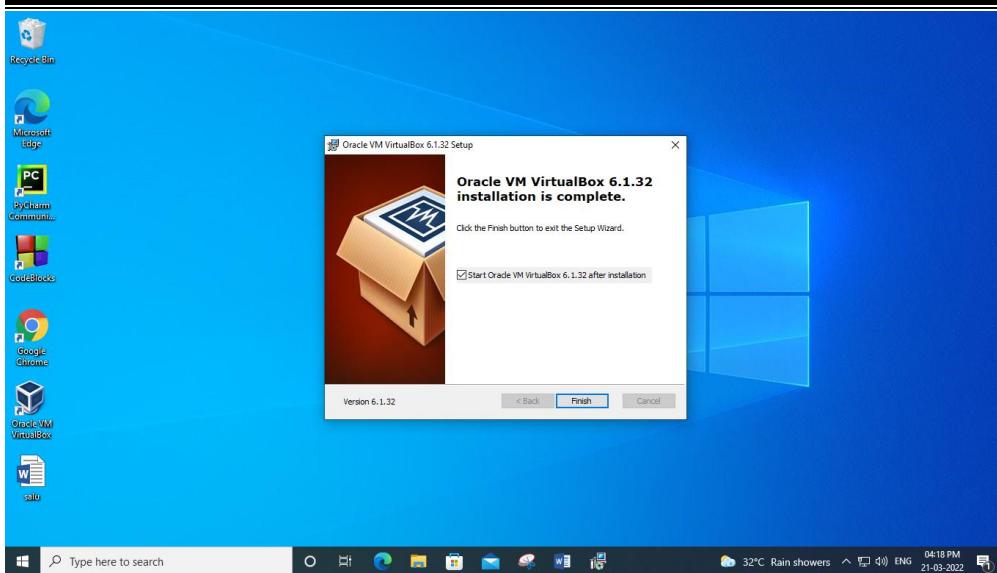
### INSTALL UBUNTU VIRTUAL BOX



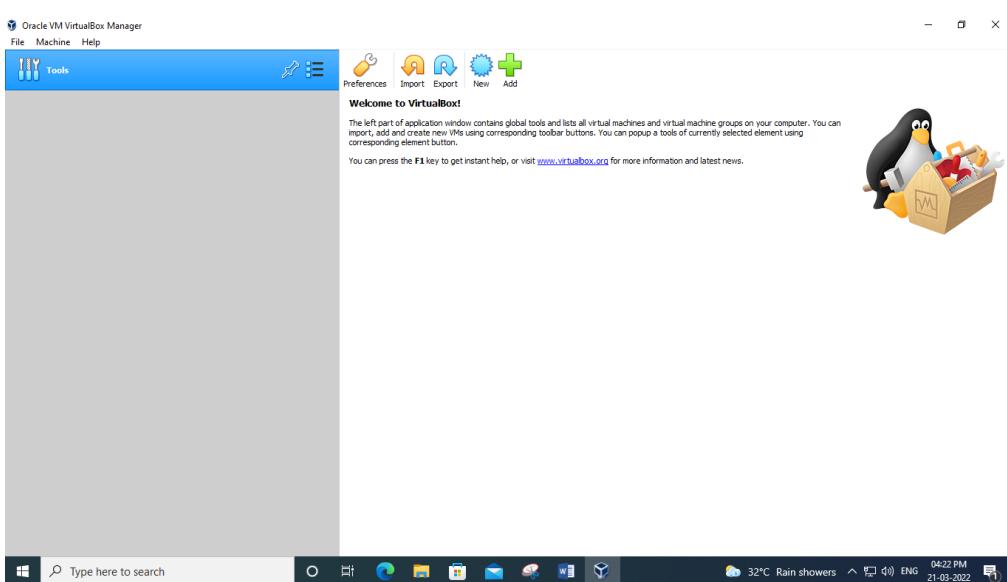
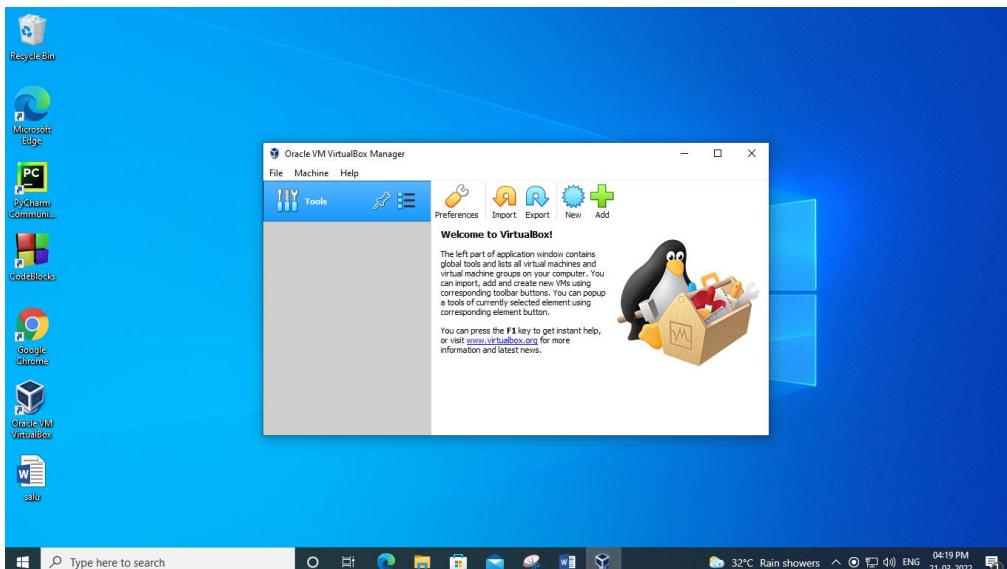
CLICK NEXT



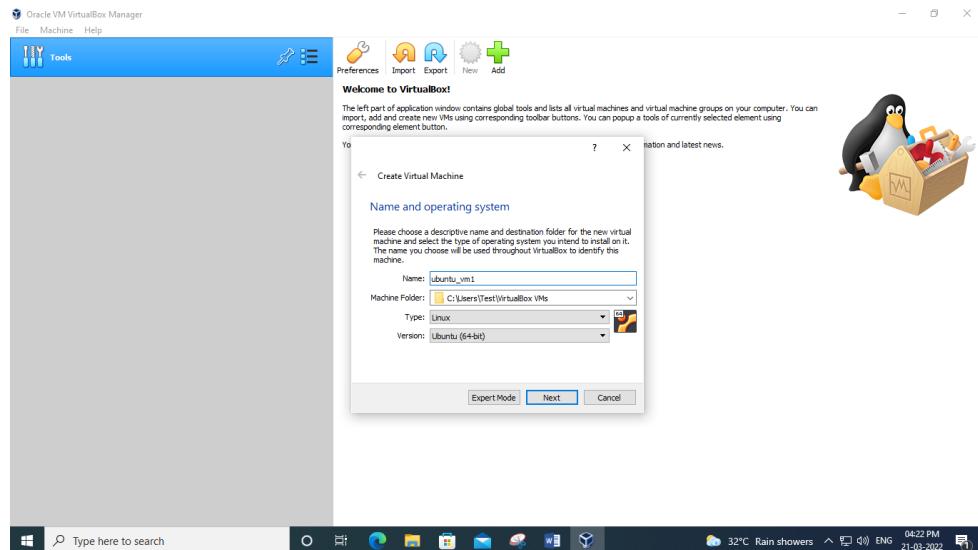




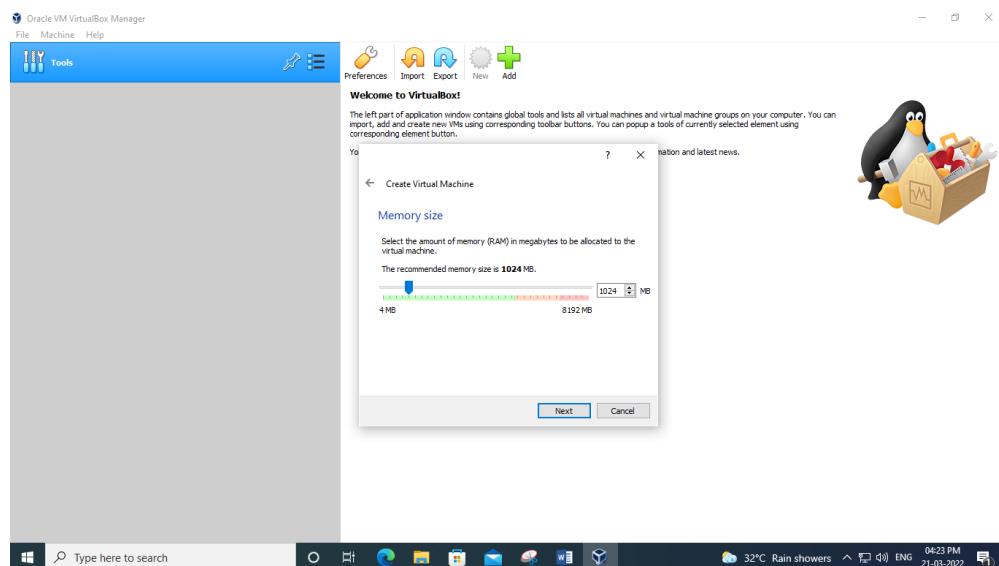
**Step 2:** Open VirtualBox and select New in the top toolbar.



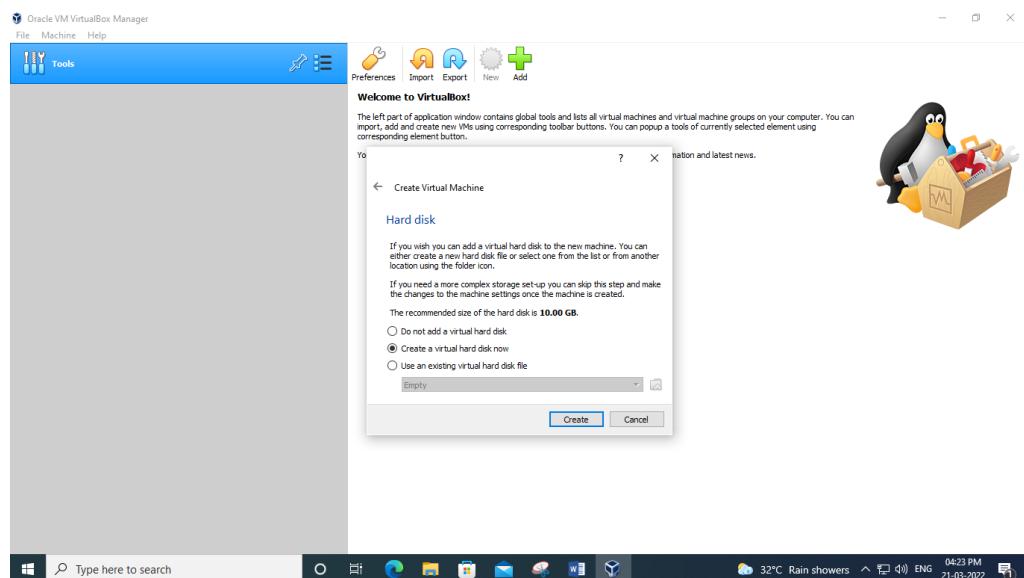
**Step 3:** Give your VM a name, choose **Linux** as the **Type**, then choose **Ubuntu** as the **Version** and select **Next**.



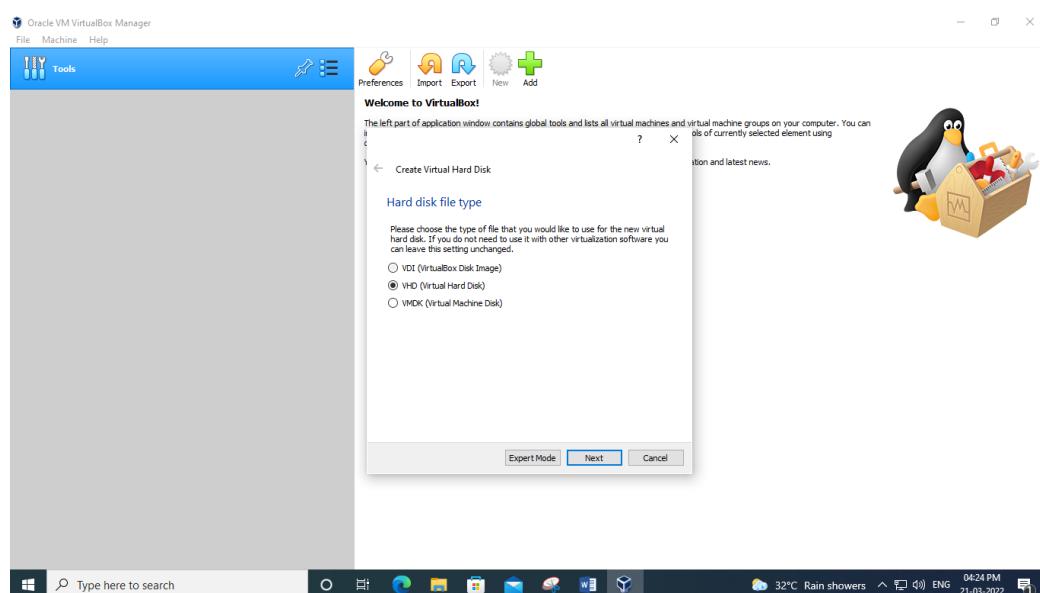
**Step 4:** Choose how much **RAM** you want to assign to the virtual machine and select **Next**. The recommended minimum is **1024 MB**



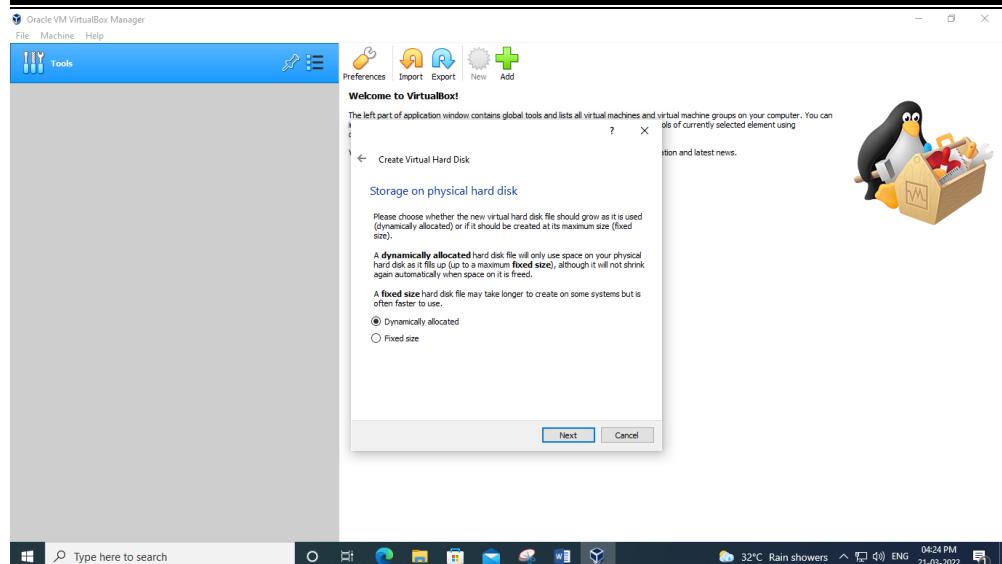
**Step 5:** Choose **Create a virtual hard disk now** and select **Create**.



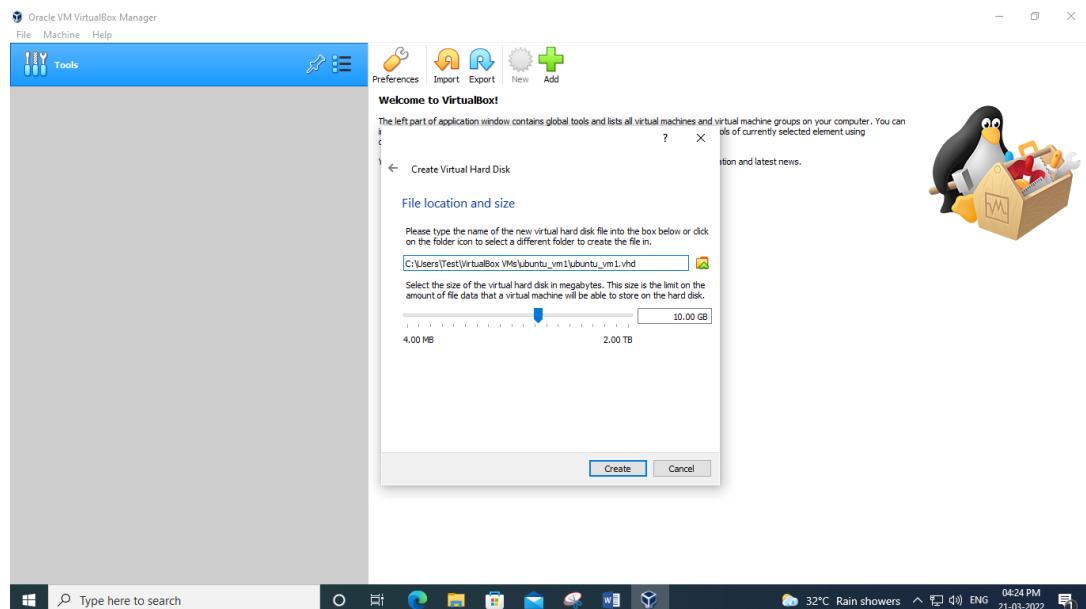
**Step 6:** Choose VDI (VirtualBox Disk Image) and select Next



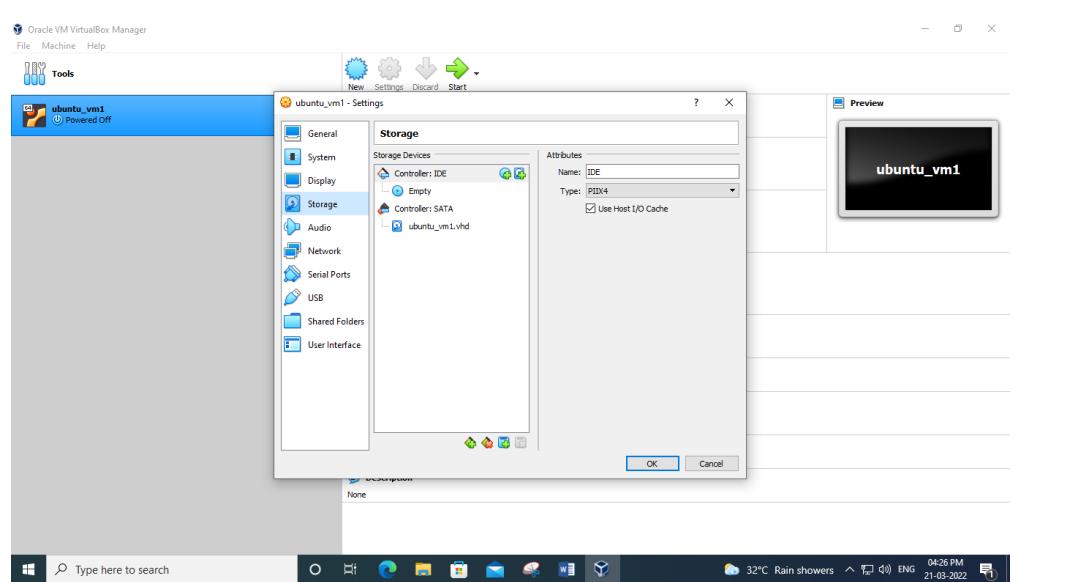
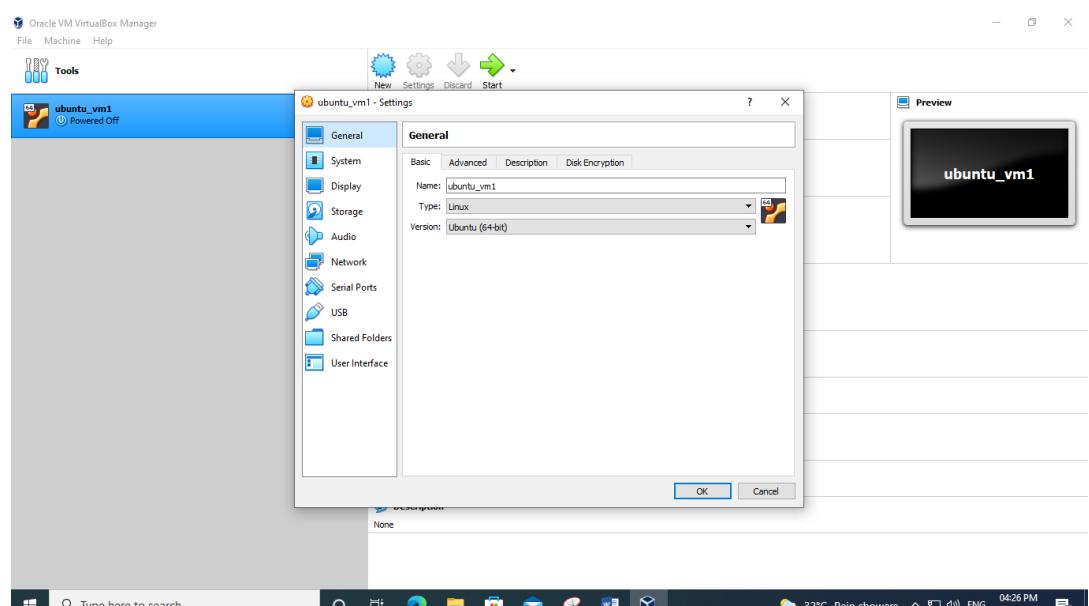
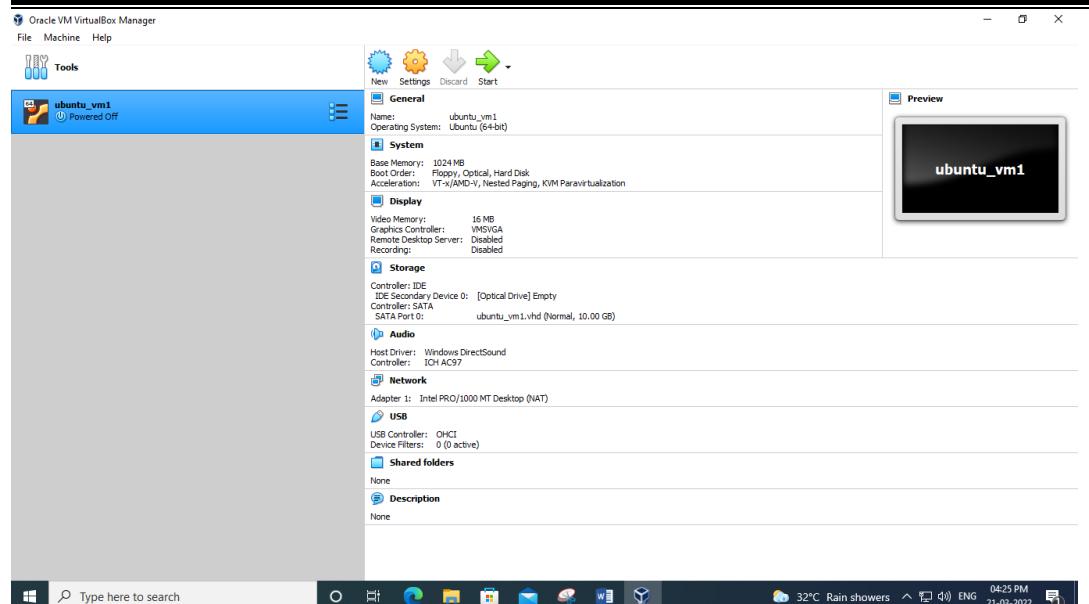
**Step 7:** Choose Dynamically allocated or Fixed size for the storage type and select Next.

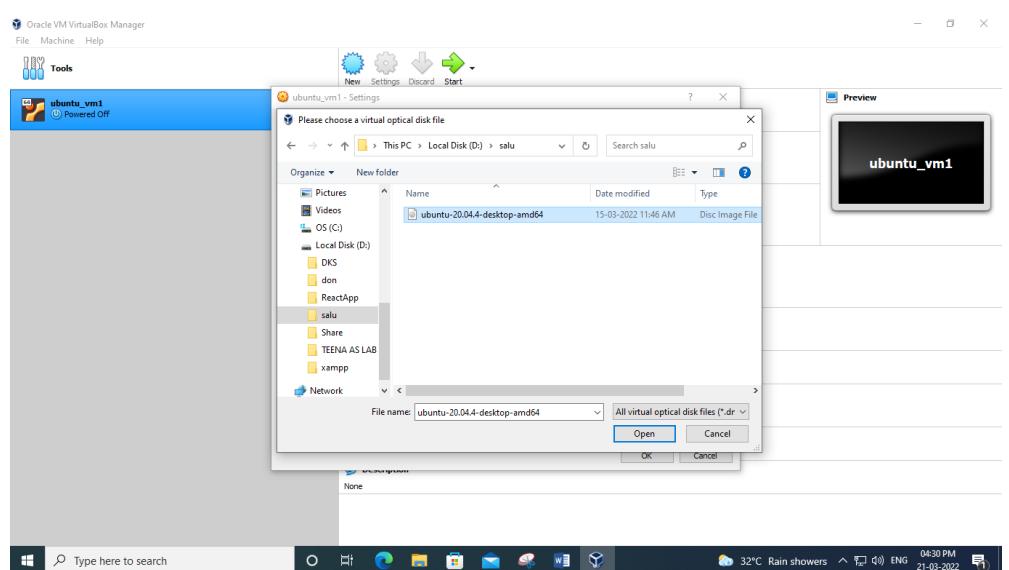
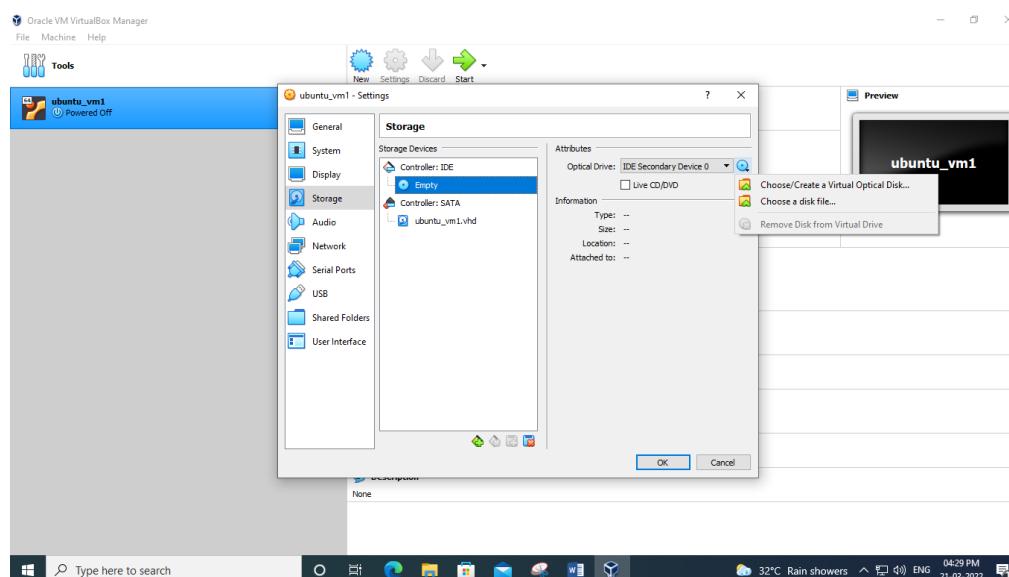
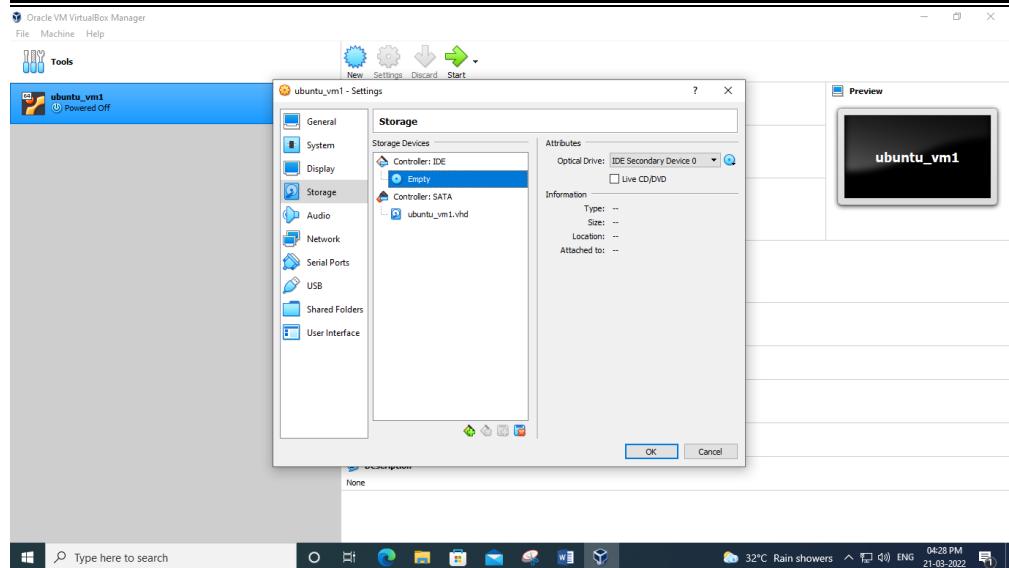


**Step 8:** Choose how much space you wish to set aside for Ubuntu and select **Create**.

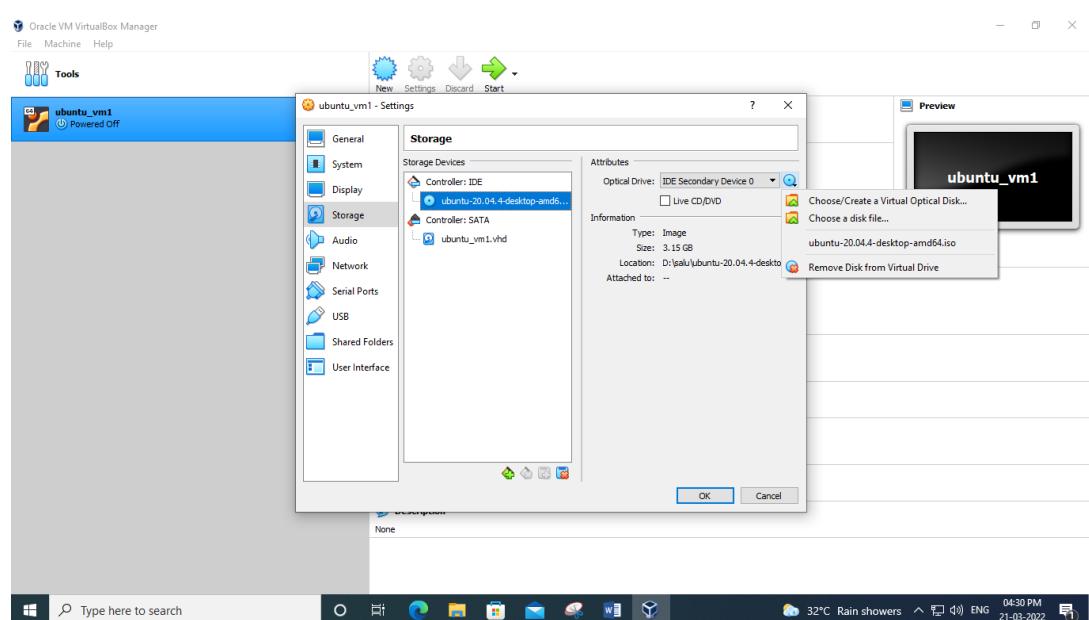
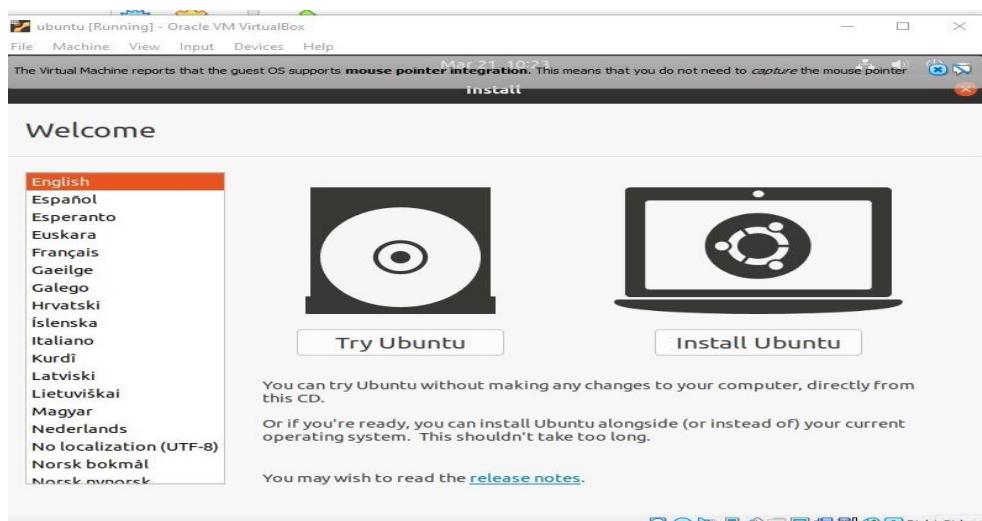


**Step 9:** The name of our virtual machine will now appear on the left side of the VirtualBox manager. Select **Start** in the toolbar to launch your VM.

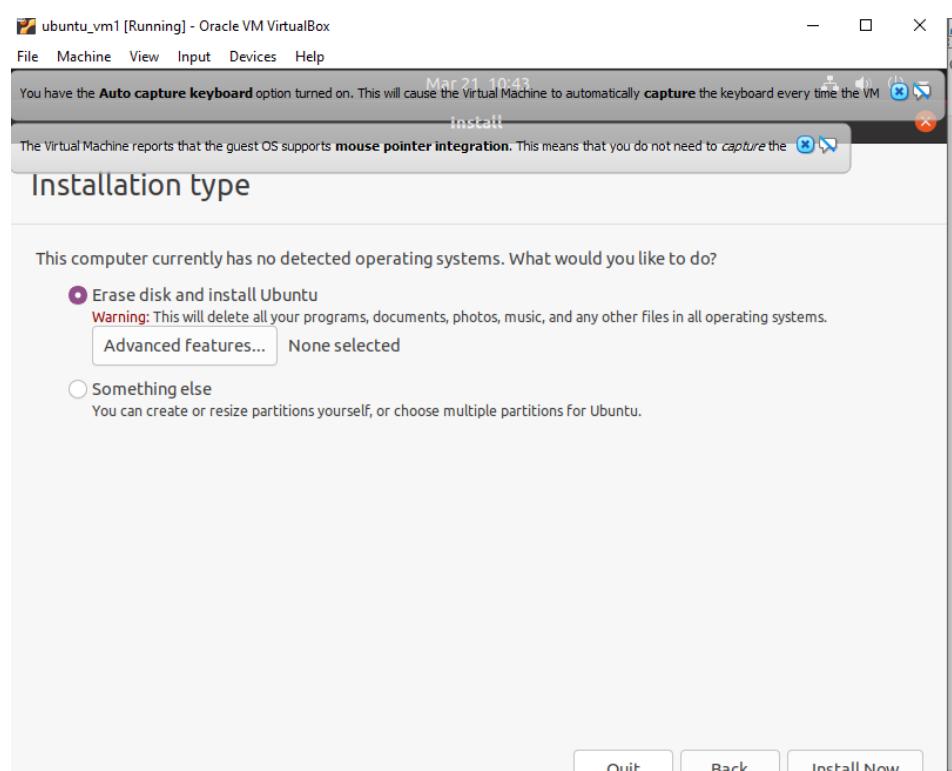
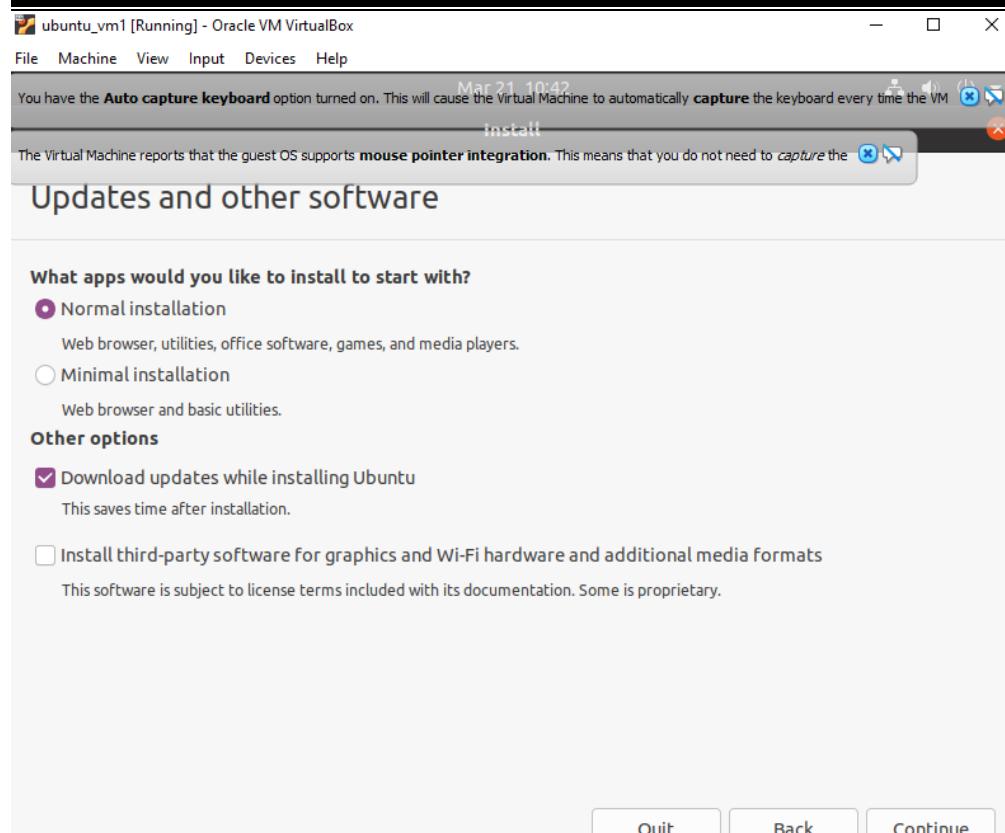


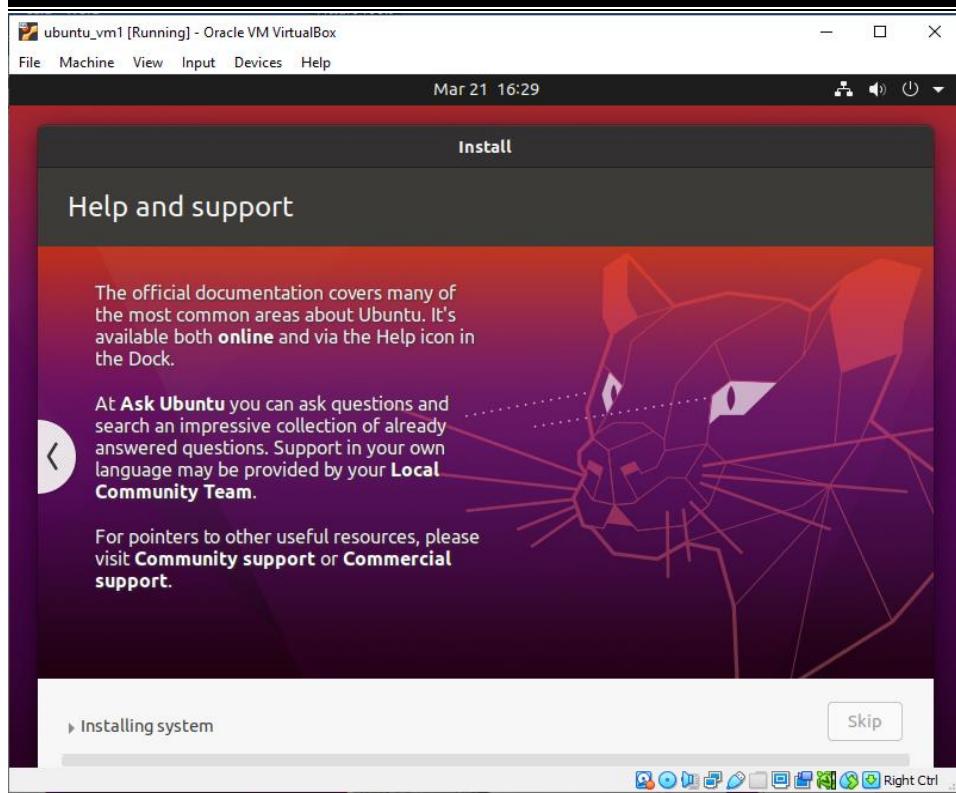


**Step 10:** VM will now boot into a live version of Ubuntu. Choose your language and select **Install Ubuntu**.

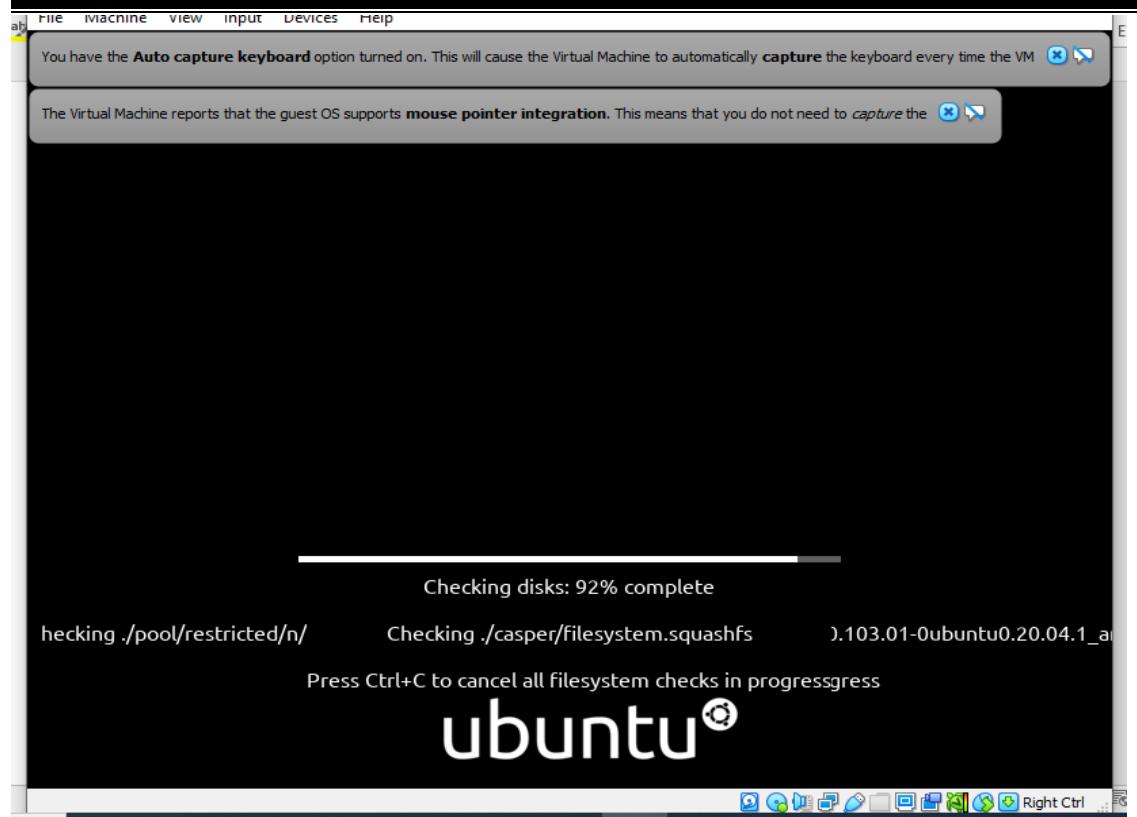


### Step 11:Continue

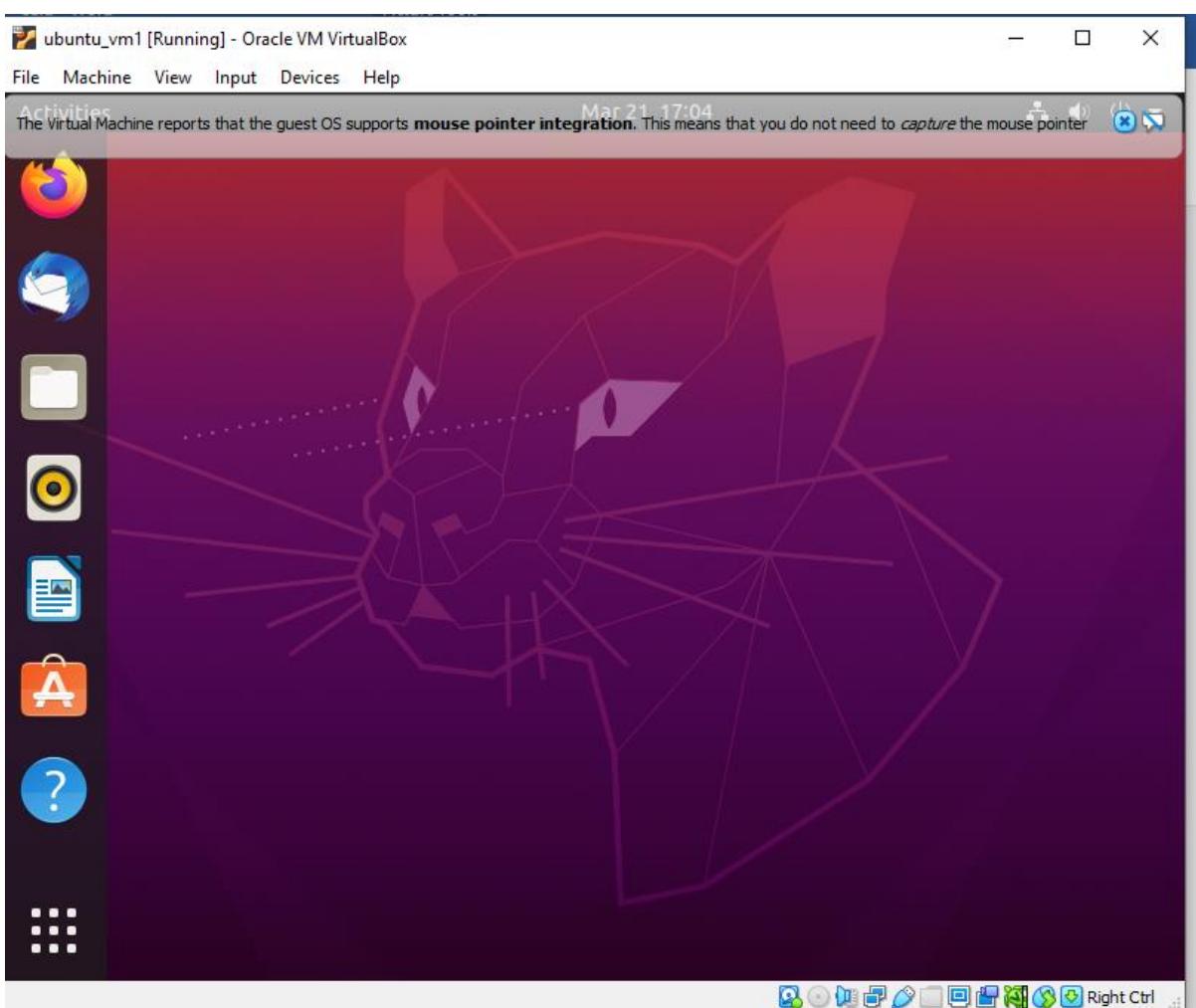
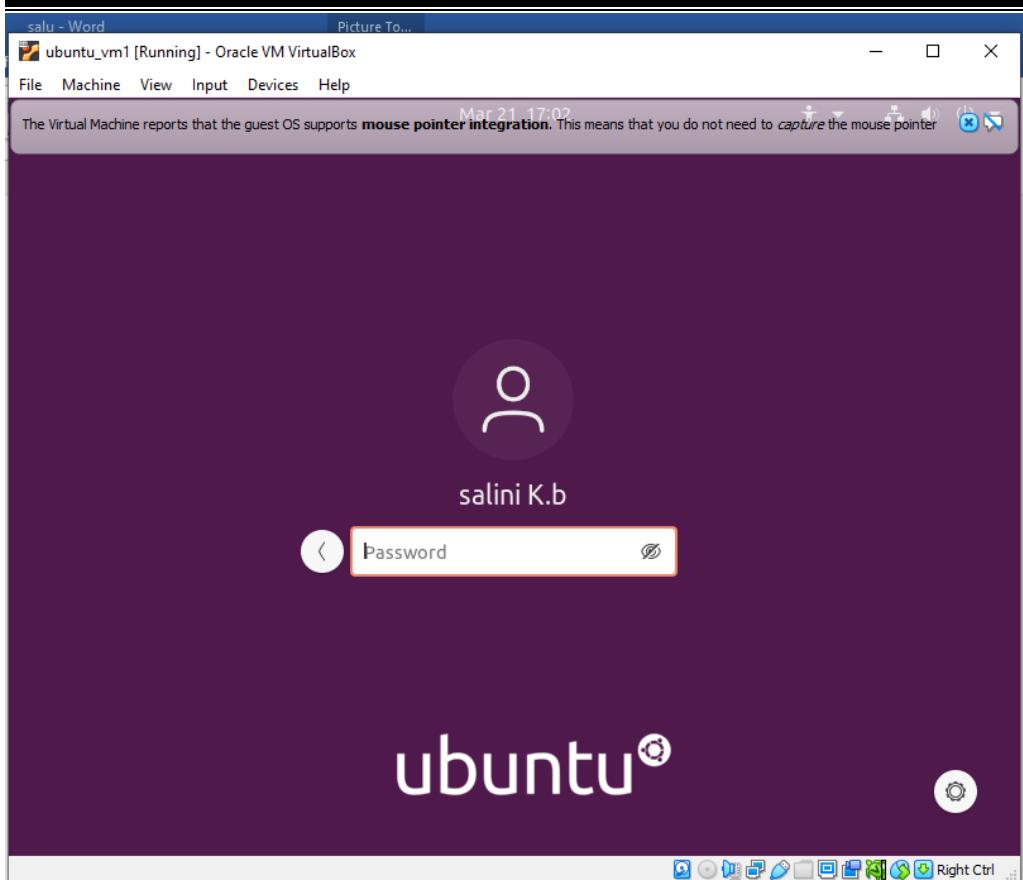




**Step 12:** Choose **Erase disk and install Ubuntu** and select **Install Now**, then select **Continue** to ignore the warning.



### Outputscreenshot



### Program no:3

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

**Name: salini k.b**

**Roll No:33**

**Batch:mca-B**

**Date:24/3/2022**

### pwd

This command is used to display the location of the current working directory.

Syntax :-    \$ pwd

Output :-

```
student@S47:~$ pwd
/home/student
```

### mkdir

This command is used to create a new directory under any directory.

Syntax :-    \$ mkdir<directory name>

Output :-

```
student@S47:~$ mkdir mca47
```

### ls

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

Syntax :-    \$ ls

Output :-

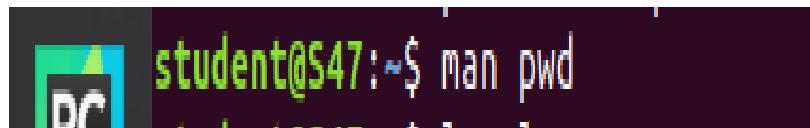
```
student@S47:~$ ls
Desktop  Downloads  Firefox_wallpaper.png  Music  Public  snap  Videos
Documents  examples.desktop  mca47  Pictures  PycharmProjects  Templates
```

**man**

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

Syntax :-    \$ man <command name>

Output :-



**ls -l** This command is used to shows file or directory, size, modified date and time, file or folder name and owner of the file, and its permission.

Syntax :-    \$ ls -l

Output:-

```
student@547:~$ ls -l
total 636
drwxr-xr-x 2 student student 4096 Jun 12 2018 Desktop
drwxr-xr-x 4 student student 4096 Dec 20 08:49 Documents
drwxr-xr-x 2 student student 4096 Jan 3 12:06 Downloads
-rw-r--r-- 1 student student 8980 May 30 2018 examples.desktop
-rw-rw-r-- 1 student student 592110 Mar 24 14:12 Firefox_wallpaper.png
drwxr-xr-x 2 student student 4096 Mar 24 14:29 mca47
drwxr-xr-x 2 student student 4096 May 30 2018 Music
drwxr-xr-x 2 student student 4096 May 30 2018 Pictures
drwxr-xr-x 2 student student 4096 May 30 2018 Public
drwxrwxr-x 3 student student 4096 Nov 22 11:20 PycharmProjects
drwx----- 3 student student 4096 Nov 22 11:18 snap
drwxr-xr-x 2 student student 4096 May 30 2018 Templates
drwxr-xr-x 2 student student 4096 May 30 2018 Videos
```

**ls -r**

This command is used to display files and directories in reverse order.

Syntax :-    \$ls -r

Output :-

```
y.txt      stardust      popo      h.txt      Desktop    a.pdf
Videos     snap          Pictures   examples.desktop c.txt      a
text.txt   PycharmProjects  Music    Downloads   b.txt      46.Navya
Templates  Public        leapyear.py Documents  b
```

**ls -a**

This command is used to list all files including hidden files.

Syntax :-    \$ls -a

**Output :-**

```
student@S47:~$ ls -a
. .bash_logout .config Downloads .gnupg .local Music .profile snap Videos
.. .bashrc Desktop examples.desktop .ICEauthority mca47 .oracle_jre_usage Public .ssh
.bash_history .cache Documents Firefox_wallpaper.png .java .mozilla Pictures PycharmProjects Templates
student@S47:~$ ls -t
```

**ls –al**

This command is used to

Syntax :-     \$ ls -al

**Output :-**

```
student@S47:~$ ls -al
total 188
drwxr-Xr-x 27 student student 4096 Mar 24 14:29 .
drwxr-Xr-x 7 root root 4096 Jan 13 14:42 ..
drwxrwxr-x 2 student student 4096 Feb 25 13:00 46.Navya
-rw-r--r-- 1 student student 0 Jan 18 2020 a
-rw-r--r-- 1 student student 0 Jan 18 2020 a.pdf
drwxr-Xr-x 2 student student 4096 Jan 14 2020 b
-rw----- 1 student student 11952 Nov 24 10:07 .bash_history
-rw-r--r-- 1 student student 220 Jan 3 2020 .bash_logout
-rw-r--r-- 1 student student 3771 Jan 3 2020 .bashrc
-rw-r--r-- 1 student student 6 Jan 14 2020 b.txt
drwx----- 20 student student 4096 Nov 18 09:38 .cache
drwx----- 19 student student 4096 Nov 22 08:55 .config
-rw-r--r-- 1 student student 25 Jan 14 2020 c.txt
drwxr-Xr-x 7 student student 4096 Nov 19 11:55 Desktop
drwxr-Xr-x 2 student student 4096 Dec 20 10:50 Documents
```

**ls –t**

This command is used to display files in the last modified order.

Syntax :-     \$ ls –t

**Output :-**

```
student@S47:~$ ls -t
mca47 Downloads PycharmProjects Desktop Pictures Templates examples.desktop
Firefox_wallpaper.png Documents snap Music Public Videos
student@S47:~$ cd mca47
```

**cd**

This command is used to change the current directory.

Syntax :-    \$ cd <directory name>

Output :-

```
student@S47:~$ cd mca47
student@S47:~/mca47$ cd..
```

### **cd ..**

This command is used to move to the parent directory of current directory, or the directory one level up from the current directory.

Syntax :-    \$ cd ..

Output :-

```
student@S47:~/mca47$ cd ..
student@S47:~$ cd ..
```

### **cd –**

This command is used to switch back to previous directory we were working earlier.

Syntax :-    \$ cd –

Output :-

```
student@S47:~/mca47$ cd ..
...
student@S47:~$ cd ..
...
/home/student/mca47
```

### **cat > filename**

---

This command is used to create a file and add contents to that file.

Syntax :-    \$ cat > filename.txt

Output :-

```
student@S47:~/mca47$ cat > Bbatch.txt
B batch student welcome to our new world
^Z
[1]+  Stopped                  cat > Bbatch.txt
```

### **cat filename**

This command is used to view the contents in the file.

Syntax :-    \$ cat filename.txt

Output :-

```
student@S47:~/mca47$ cat >> Bbatch.txt
he lo guyzzz lets enjoy
^Z
[2]+  Stopped                  cat >> Bbatch.txt
```

### **cat>>filename**

This command is used to add contents to an existing file.

Syntax :-    \$ cat >> filename.txt

Output :-

```
student@S47:~/mca47$ cat Bbatch.txt
B batch student welcome to our new world
...
he lo guyzzz lets enjoy
... student@S47:~/mca47$ cat Bbatch.txt > Abatch.txt
```

### **cat filename1 > filename2**

This command is used to copy the content from one file to another file.

Syntax :-    \$ cat filename1 > filename2

Output :-

```
student@S47:~/mca47$ cat Bbatch.txt > Abatch.txt
```

**read**

This command is used to read the content of a line to a variable.

Syntax :-     \$ read variablename

Output :-

```
student@s40:~$ read name
My name is sreekutty
student@s40:~$ echo $name
My name is sreekutty
```

**find**

This command is used to display contents of particular directory.

Syntax :-     \$ find filename.txt

Output :-

```
student@s40:~$ find marvel2
marvel2
```

**grep**

This command will let you search through all the text in a given file.

Syntax :-     \$ grep word filename.txt

Output:-

```
student@s40:~$ grep maths mark1
maths 78
```

**grep -i**

command used for a case insensitive search

Syntax: \$ grep -i filename.txt

Output:

```
student@s40:~$ grep -i THOR marvel1
thor
```

### grep -v

command used for inverted search.

Syntax: \$ grep -v filename.txt

Output:

```
student@s40:~$ grep -v hulk marvel1
captain america
iron man
thor
black widow
spider man
```

### grep -A1

command used to display line after the result.

Syntax: \$ grep -A1 filename.txt

Output:

```
student@s40:~$ grep -A1 thor marvel1
thor
black widow
```

### grep -B1

command used to display line before the result.

---

Syntax: \$ grep -B1 filename.txt

Output:

```
student@s40:~$ grep -B1 thor marvel1
iron man
thor
```

### **grep -C1**

command used to display line before and after the result.

Syntax: \$ grep -C1 filename.txt

Output:

```
student@s40:~$ grep -C1 thor marvel1
iron man
thor
black widow
```

### **wc -word count**

This command is used for counting purpose which is used to find the number of lines, the number of words, the number of characters and the number of bytes.

**wc -l** (count number of lines)

**wc -w** (count number of words)

**wc -c** (count number of characters)

**wc -m** (count number of bytes)

Syntax :-      \$ wc -l filename.txt

                  \$ wc -w filename.txt

                  \$ wc -c filename.txt

                  \$ wc -m filename.txt

---

Output :-

```
student@S40:~$ wc -l marvel1
6 marvel1
student@S40:~$ wc -w marvel1
10 marvel1
student@S40:~$ wc -c marvel1
60 marvel1
student@S40:~$ wc -m marvel1
60 marvel1
```

## df

This command is used to get a report on system disc space usage.

Syntax :-    \$ df filename.txt

Output :-

```
student@S40:~$ df mark1
Filesystem      1K-blocks    Used Available Use% Mounted on
/dev/sda6        114460828  54815724  53787724  51% /
```

## df -m

This command is used to see the report in mega bytes.

Syntax :-    \$ def -m filename.txt

Output :-

```
student@S40:~$ df -m mark1
Filesystem      1M-blocks   Used Available Use% Mounted on
/dev/sda6        111779     53532      52528  51% /
```

## wc -word count

This command is used for counting purpose which is used to find the number of lines, the number of words, the number of characters and the number of bytes.

**wc -l** (count number of lines)

**wc -w** (count number of words)

**wc -c** (count number of characters)

**wc -m** (count number of bytes)

Syntax :-      \$ wc -l filename.txt

\$ wc -w filename.txt

\$ wc -c filename.txt

\$ wc -m filename.txt

Output :-

```
student@S40:~$ wc -l marvel1
6 marvel1
student@S40:~$ wc -w marvel1
10 marvel1
student@S40:~$ wc -c marvel1
60 marvel1
student@S40:~$ wc -m marvel1
60 marvel1
```

**cut -d**

This command is used to cut and display the content based on the delimiter given.

Syntax :-      \$ cut -d delimiter -fieldnumber filename

Output :-

```
student@S47:~$ cat > mark.txt
english 49
science 43
hindi 49
maths 40
cs 50
^Z
[2]+ Stopped                  cat > mark.txt
student@S47:~$ cut -d ' ' -f2 mark.txt
49
43
49
40
50
...
50
```

## **cut -b**

This command is used to cut and display the content based on the specified byte number.

Syntax :- \$ cut -b bytelenumber filename

Output :-

```
student@S47:~$ cut -b 2 mark.txt
n
c
i
a
s
```

## **cut --complement -c**

This command is used to erase the specified character and display the remaining content of the file.

Syntax :- \$ cut --complement -c characternumber filename.txt

Output :-

```
student@S47:~$ cut --complement -c 1 mark.txt
nglish 49
cience 43
indi 49
aths 40
s 50
```

## **paste**

This command is used to paste the contents from the specified file.

Syntax :- \$ paste filename

Output :-

```

student@S47:~$ cat > marvel1.txt
captain america
iron man
thor
spider man
black widow
^Z
[3]+  Stopped                  cat > marvel1.txt
student@S47:~$ cut > marvel2.txt
cut: you must specify a list of bytes, characters, or fields
Try 'cut --help' for more information.
student@S47:~$ cat > marvel2.txt
nebula
banda
dr strange
hulk
^Z
[4]+  Stopped                  cat > marvel2.txt

```

### **paste file1 file2 > file3**

This command is used to paste the contents from the specified files to another file.

Syntax :-    \$ paste file1 file2 > file3

Output:-

```

student@S47:~$ paste marvel1.txt  marvel2.txt > marvel3.txt
student@S47:~$ cat marvel3.txt
captain america nebula
iron man      banda
thor    dr strange
spider man    hulk
black widow

```

### **paste -s**

This command is used to paste the contents sequentially. It reads all the lines from the file and merges all these lines into a single line with each line separated by tab.

Syntax :-    paste -s file1 file2

Output :-

```

student@S47:~$ paste -s marvel1.txt  marvel2.txt
captain america iron man      thor    spider man      black widow
nebula      banda   dr strange      hulk

```

### **paste -d**

This command is used to paste the contents from the given files with the delimiter given.

Syntax :- \$ paste -d delimiter file1 file2

Output :-

```
student@547:~$ cat marvel3.txt
captain america nebula
iron man      banda
thor    dr strange
spider man    hulk
black widow

student@547:~$ paste -d '-' marvel1.txt marvel2.txt
captain america-nebula
iron man-banda
thor-dr strange
spider man-hulk
black widow-
student@547:~$
```

## more

This command is used to view the text files in the command prompt, displaying one screen at a time in case the file is large.

Syntax :- \$ more filename

Output :-

```
student@546:~$ cat > space.txt
In olden days man worshipped Sun and Moon thinking them to be scared. But the scientists proved that the Sun is a star and the moon is a planet like other planets. After the atomic age man has entered the age of space travel.

In 1957 the scientists succeeded in launching the first earth satellite into the outer surface. A Russian dog called Laika was the first living being to go into space. In April 1961 Yuri Gagarin of the USSR became the first man to make an orbit of the earth. USA then sent spacemen into the space. In 1969 Russia launched Lunik 1. It passed within 6500 kms of the moon. It was the first space-ship which went into its own orbit round earth. In the same year the Russians landed Lunik 3 and Americans Ranger 7 on the moon.

In July 1969 the American Apollo 11 landed on the moon with Neil Armstrong, Aldrin and Collins. Neil Armstrong was the first man to step on the moon. He was joined by Edwin Aldrin. They took photographs, collected rock samples and returned to the earth. After atomic age dawned the space age. Man has been now using space to a great advantage. For example, travel through space by means of aeroplanes of various types has brought the world much closer. Now we can fly from one continent to another in a few hours. The progress in space technology and travel during the last three decades has almost been miraculous. During this period, several satellites and space craft's have been launched for various purposes. The launching of satellites in the space has revolutionized the means of mass communication like radio and T.V. broadcasting, but the possibility of use of space for military purpose s has been a source of constant worry.

The space age began in 1957 with the successful launching of the Russian Satellite Sputnik-I. Then Sputnik-II was sent into space carrying the dog Lika. Space travel has immensely enriched our knowledge of the solar system. It has afforded us a new scientific understanding of our own planet, the earth, through photographs taken by the astronauts. In April 1961 Russian cosmonaut Yuri Gagarin made man's first space-flight. It was a milestone in space travel. In 1962 American astronaut John Glenn made three orbits of the earth in the space.

The U.S. Ranger IV was the first unmanned spacecraft to reach the moon. The moon is our nearest neighbour. Therefore, it was quite natural that space scientists tried to reach the moon first of all. It was only on July 20, 1969 that two American astronauts could reach the moon in their space-ship Apollo-II. American astronaut Neil Armstrong became the first man to walk on the moon. He was followed by his co-astronaut Edwin Buzz Aldrin. The third co-astronaut Michael Collins remained in orbit commanding the module. The two astronauts stayed on the surface of the moon for about 21 hours collecting rock samples, etc. and then returned to the earth on July 24, 1969. The U.S. made second landing on the moon on November 14, 1969.

In 1970 the Russians soft landed their unmanned Luna-II on the moon and then sent a first propelled space-ship on the Venus. The Americans again landed on the moon for the third time in 1971 in their space-craft Apollo-14. Then Apollo-15 landed on the moon for the fourth time. But the conquest of the moon is not enough. Man's quest of the space knows no limits and therefore, the flights to other planets continue. The Americans landed Pioneer-1 in March 1972 on 21-month mission into space post Jupiter, Saturn, Uranus, Neptune and Pluto. It became the first man made object to escape the solar system. Apollo-16 made the fifth landing on the moon in 1972. The same year Apollo-17 landed on the moon in December. The two astronauts Cernan and Schmitt stayed there for 75 hours collecting various samples.

Since man's last landing on the moon there have been scores of space-flights by the U.S. and the U.S.S.R. In 1978 the U.S.S.R. sent the first international crew in the space consisting a Russian and a Czech Cosmonaut. In 1979 the Soviet Cosmonauts succeeded in growing onion sprouts on board Salyut-6. In 1977 the U.S. launched Voyager-I to probe the outer space and the solar system. The Voyager-II was sent into space the same year past the planet S

Columbia, the first space-shuttle was launched by America on April 12, 1981 which returned to the earth after 54 hours in space. It is a multi-purpose reusable space craft which take off like a satellite and a glider. It can be used to launch satellites, contact, retrieve and repair space crafts in the orbit. The U.S. space craft Pioneer-10 was launched in June 1983 to travel for over past the planets and the sun amidst the stars. In 1984 the U.S. space shuttle challenger became the first space-craft to return from space to its launching site. Again spaceship retrieved and repaired an ailing solar Satellite April, 1984.

Thus, great progress has been made in space travel in these years. The day is not far when the moon may be used as a Spring-board for deep research and travel to the other planets and neighbouring stars. But it is imperative that the various countries reach an agreement at the earliest so as to confine the use of space for peaceful purposes only.

After atomic age dawned the space age. Man has been now using space to a great advantage. For example, travel through space by means of aeroplanes of various types has brought the world much closer. Now we can fly from one continent to another in a few hours. The progress in space technology and travel during the last three decades has almost been miraculous. During this period, several satellites and space craft's have been launched for various purposes. The launching of satellites in the space has revolutionized the means of mass communication like radio and T.V. broadcasting, but the possibility of use of space for military purpose s has been a source of constant worry.

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```

## more -number

This command is used to display display the lines to the specified number from head.

Syntax :- \$ more -number

**Output :-**

```
student@546:~$ more -3 space.txt
In olden days man worshipped Sun and Moon thinking them to be scared. But the scientists proved that the Sun is a star and the moon is a planet like other planets. After the atomic age man has entered the age of space travel.

--More--(1%)
[9]+ Stopped                  more -3 space.txt
```

**more +number**

This command uses the line number from where we want to displaying the text content.

**Syntax :-** \$ more +number

**Output :-**

```
student@546:~$ more +3 space.txt
In 1957 the scientists succeeded in launching the first earth satellite into the outer surface. A Russian dog called Laika was the first living being to go into space. In April 1961 Yuri Gagarin of the USSR became the first man to make an orbit of the earth. USA then sent spacemen into the space. In 1969 Russia launched Lunik I. It passed within 6500 kms of the moon. It was the first space-ship which went into its own orbit round earth. In the same year the Russians landed Lunik 3 and Americans Ranger 7 on the moon.

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--More--(27%)
```

**cp**

This command is used to copy the contents from an existing file to a new file.

**Syntax :-** \$ cpexisting\_filenamenew\_filename

**Output :-**

```
student@S46:~$ cat star2.txt
Sun      Nebula
Alpha Centauri  Cateye
Galaxy   Helion
Supercluster   Stardust
Twinkle  Sapphire
student@S46:~$ cp star2.txt star3.txt
student@S46:~$ cat star3.txt
Sun      Nebula
Alpha Centauri  Cateye
Galaxy   Helion
Supercluster   Stardust
Twinkle  Sapphire
```

## cp -r

This command is used to copy a directory along with its subdirectories.

Syntax :-    \$ cp -r source\_directory destination\_directory

Output :-

```
student@S46:~$ mkdir swethap
student@S46:~$ cd stardust
student@S46:~/stardust$ ls
a.txt b.txt y.txt z1.txt z.txt
student@S46:~/stardust$ cd ..
student@S46:~$ cp -r stardust swethap
student@S46:~$ cd swethap
student@S46:~/swethap$ ls
stardust
student@S46:~/swethap$ cd stardust
student@S46:~/swethap/stardust$ ls
a.txt b.txt y.txt z1.txt z.txt
```

## cp overwriting

This method is used to overwrite the contents of an existing file from one directory to an existing file with the same name in another directory with the cp command.

Syntax :- \$ cp filename directoryname

Output :-

```
student@s46:~$ cat > new.txt
Writing some commands
^Z
[1]+  Stopped                  cat > new.txt
student@s46:~$ cd stardust
student@s46:~/stardust$ cat > new.txt
Content is copied
^Z
[2]+  Stopped                  cat > new.txt
student@s46:~/stardust$ cd ..
student@s46:~$ cp new.txt stardust
student@s46:~$ cat new.txt
Writing some commands
```

## cp-i

This command is used to ask the confirmation message once before overwriting the file. We give ‘y’ or ‘n’ as the response.

Syntax :- \$ cp -i filename destination\_directory

Output :-

```
student@s46:~$ cp -i new.txt stardust
cp: overwrite 'stardust/new.txt'? n
```

## mv

This command is used to move an existing file or directory from one location to another.

Syntax :- \$ mv filename directory\_name

Output:-

```

student@S46:~$ cd stardust
student@S46:~/stardust$ ls
a.txt b.txt new.txt y.txt z1.txt z.txt
student@S46:~/stardust$ cd ..
student@S46:~$ ls
46.Navya b Desktop examples.desktop mark.txt Pictures PycharmProjects snap star2.txt starnew.txt swetha text.txt
a b.txt Documents h.txt Music popo Sapphire space.txt star3.txt star.txt swethap Travel
a.pdf c.txt Downloads leapyear.py new.txt Public Sapphire.txt star1.txt stardust s.txt Templates Videos
student@S46:~$ mv space.txt stardust
student@S46:~$ ls
46.Navya b Desktop examples.desktop mark.txt Pictures PycharmProjects snap star3.txt star.txt swethap Travel
a b.txt Documents h.txt Music popo Sapphire star1.txt stardust s.txt Templates Videos
a.pdf c.txt Downloads leapyear.py new.txt Public Sapphire.txt star2.txt starnew.txt swetha text.txt
student@S46:~$ cd stardust
student@S46:~/stardust$ ls
a.txt b.txt new.txt space.txt y.txt z1.txt z.txt

```

## mv overwriting

This method is used to overwrite the contents of an existing file from one directory to an existing file with the same name in another directory with the mv command.

Syntax :-    \$ mv filename directory\_name

Output :-

```

student@S46:~$ cd stardust
student@S46:~/stardust$ cat z1.txt
Hello World
student@S46:~/stardust$ cd ..
student@S46:~$ cat z1.txt
welcome
good morning
student@S46:~$ mv z1.txt stardust
student@S46:~$ cd stardust
student@S46:~/stardust$ cat z1.txt
welcome
good morning

```

## head

This command is used to display the first 10 lines of the file by default.

Syntax :-    \$ head filename

Output:-

```

student@S66:~$ head s.txt
PIP
A package
Downloading
Open
Once
Import
Find
Press y
Use the list
The try

```

## head -number

This command is used to display the lines of the file to the specified number from head.

Syntax :-    \$ head -number filename

Output :-

```
student@S66:~$ head -4 s.txt
PIP
A package
Downloading
Open
```

## **tail**

This command is used to display the last 10 lines of the file by default.    Syntax :-    \$ tail filename

Output :-

```
student@S66:~$ tail s.txt
Import
Find
Press y
Use the list
The try
The except
The else

Since
Without
```

## **tail -number**

This command is used to display the lines of the file to the specified number from tail.

Syntax :-    \$ tail -number filename

Output :-

```
student@S66:~$ tail -4 s.txt
The else

Since
Without
```

## **sudo useradd**

This command is used to add new user.

Syntax :-    \$ sudo useradd username

Output :-

```
mca@S47:~$ sudo useradd upas
[sudo] password for mca:
mca@S47:~$ sudo useradd upas
useradd: user 'upas' already exists
```

### **sudo passwd**

This command is used to add password to the user.

Syntax :-     \$ sudo passwd username

Output :-

```
mca@S47:~$ passwd upas
passwd: You may not view or modify password information for upas.
mca@S47:~$ sudo passwd upas
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
```

### **sudo usermod**

This command is used to add members.

Syntax :-     \$ sudo usermod -G groupname username

Output :-

```
mca@S40:~$ sudo usermod -G we sree
```

### **delete**

**sudo userdel username**     - used to delete user.

**sudo groupdel groupname** - used to delete group name.

Syntax :-     \$ **sudo userdel username**

                  \$ **sudo groupdel groupname**

Output :-

```
mca@S47:~$ sudo userdel upas
```

```
mca@S47:~$ sudo groupdel MCA-C
```

## **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:hQC0bgw7WBI7zuABHq2AKWIpGnXDeBBGWGvJqDHDPNY.
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:~$ █
```

## Program 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.

### Source code:

### Output:

1]Aim:Write a program to print sum of all digits of a number.

#### program

```
echo "Enter Size(N)"
read N
i=1
sum=0
echo "Enter Numbers"
while [ $i -le $N ]
do
    read num
    sum=$((sum + num))
    i=$((i + 1))
done

echo "the sum of $N numbers is $sum"
```

#### output

Name: salini kb

Roll No:33

Batch: MCA-B

Date:5/5/2022

```

Activities Terminal Thu 14:16 ●
mca@T70: ~/Documents/scripting
File Edit View Search Terminal Help
mca@T70:~/Documents/scripting$ gedit sum.sh
Gtk-Message: 14:13:34.734: Failed to load module "canberra-gtk-module"
Gtk-Message: 14:13:34.762: Failed to load module "canberra-gtk-module"
Fontconfig warning: "/etc/fonts/conf.avail/53-monospace-lcd-filter.conf", line 10: Having multiple values in <test> isn't supported and may no
t work as expected
(gedit:3158): GLib-GIO-WARNING **: 14:13:35.830: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)
mca@T70:~/Documents/scripting$ bash sum.sh
Enter a number
100
1
mca@T70:~/Documents/scripting$ gedit sum1.sh
Gtk-Message: 14:14:58.723: Failed to load module "canberra-gtk-module"
Gtk-Message: 14:14:58.724: Failed to load module "canberra-gtk-module"
Fontconfig warning: "/etc/fonts/conf.avail/53-monospace-lcd-filter.conf", line 10: Having multiple values in <test> isn't supported and may no
t work as expected
(gedit:3261): GLib-GIO-WARNING **: 14:14:58.785: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)
mca@T70:~/Documents/scripting$ bash sum1.sh
Enter a number
123
The sum of digits of a number is:
6
mca@T70:~/Documents/scripting$ 

```

## program-2

Aim:

write a shell script program to find the average of a number entered in a command line.

```

program
echo "Enter Limit"
read N
sum=0
echo "Enter Numbers"
for((i=0;i<N;i++))
{
    read num
    sum=$((sum + num))
}
avg=$(echo "scale=2; $sum / $N "| bc -l)
echo "the average of entered numbers is $avg"

```

output

```

Activities Terminal Thu 15:09 ●
mca@T70: ~/Documents/scripting

File Edit View Search Terminal Help
(1 % 5) + 2 = 3
(2 % 5) + 2 = 4
(3 % 5) + 2 = 5
(4 % 5) + 2 = 6
(5 % 5) + 2 = 2
(6 % 5) + 2 = 3
(7 % 5) + 2 = 4
(8 % 5) + 2 = 5
(9 % 5) + 2 = 6
(10 % 5) + 2 = 2

mca@T70:~/Documents/scripting$ gedit avg.sh
Gtk-Message: 15:06:21.432: Failed to load module "canberra-gtk-module"
Gtk-Message: 15:06:21.433: Failed to load module "canberra-gtk-module"
Fontconfig warning: "/etc/fonts/conf.avail/53-monospace-lcd-filter.conf", line 10: Having multiple values in <test> isn't supported and may not work as expected

(gedit:2719): GLib-GIO-WARNING **: 15:06:21.494: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)
mca@T70:~/Documents/scripting$ gedit ag.sh
Gtk-Message: 15:09:14.320: Failed to load module "canberra-gtk-module"
Gtk-Message: 15:09:14.321: Failed to load module "canberra-gtk-module"
Fontconfig warning: "/etc/fonts/conf.avail/53-monospace-lcd-filter.conf", line 10: Having multiple values in <test> isn't supported and may not work as expected

(gedit:2979): GLib-GIO-WARNING **: 15:09:14.383: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)
mca@T70:~/Documents/scripting$ bash ag2.sh
bash: ag2.sh: No such file or directory
mca@T70:~/Documents/scripting$ bash ag.sh
Enter Limit
5
Enter Numbers
1
2
3
4
5
6
the average of enetered numbers is 3.20
mca@T70:~/Documents/scripting$ 

```

### program-3

Aim:

Addition subtract and multiplication using switch case.

#### Program

```

echo "Enter the first number"
read a

echo "Enter the second number"
read b

echo "Enter the operator:"
echo -e "Addition: +\nSubtraction: -\nMultiplication: x\nDivision: /"
read op

case $op in
+) c=`expr $a + $b`
   echo "Sum of $a and $b is $c";;

-) c=`expr $a - $b`
   echo "Difference of $a and $b is $c";;

```

```

x) c=`expr $a \* $b`
echo "Product of $a and $b is $c";;

/) c=`expr $a / $b`
echo "Division of $a and $b is $c";;

*) echo "Invalid Operator"
exit;;
esac

```

4] Aim : write a shell script to display current date and calendar.

### Program

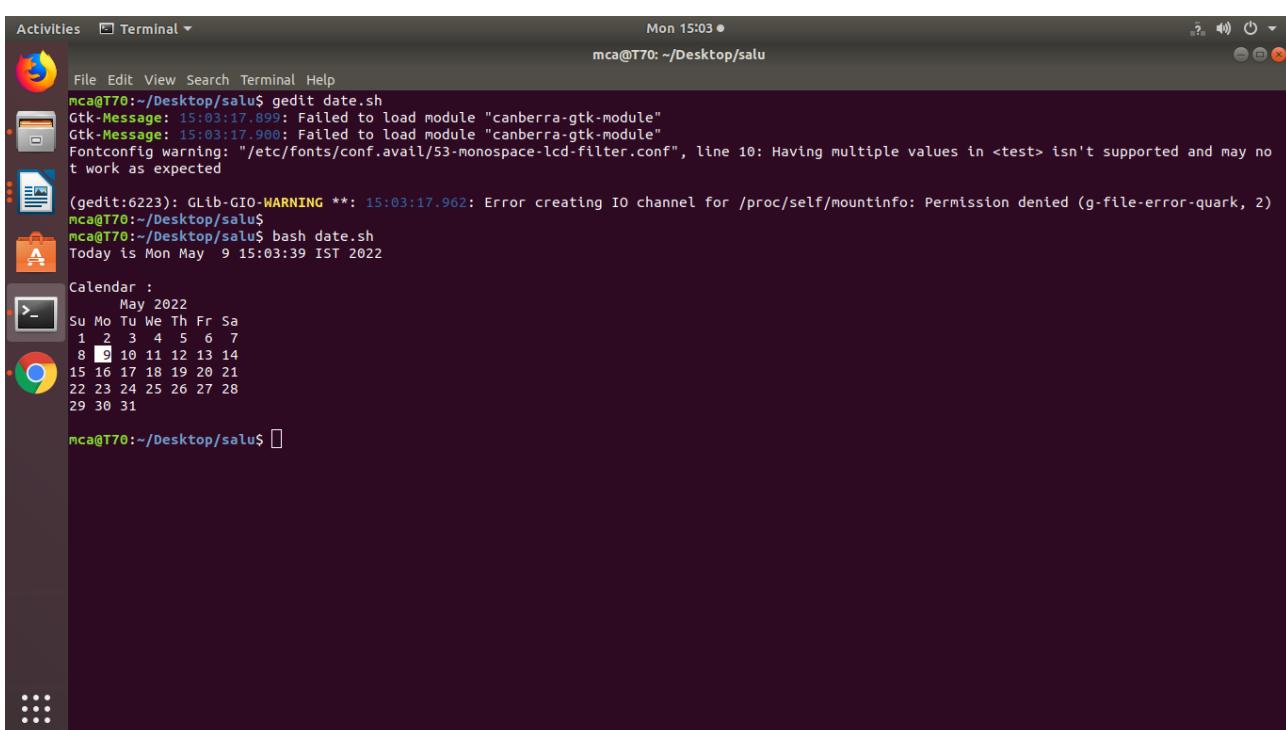
```

echo "Today is $(date)"
echo ""

echo "Calendar :"
cal

```

### output



```

Activities Terminal Mon 15:03 ●
mca@T70: ~/Desktop/salu$ gedit date.sh
Gtk-Message: 15:03:17.899: Failed to load module "canberra-gtk-module"
Gtk-Message: 15:03:17.900: Failed to load module "canberra-gtk-module"
Fontconfig warning: "/etc/fonts/conf.avail/53-monospace-lcd-filter.conf", line 10: Having multiple values in <test> isn't supported and may not work as expected
(gedit:6223): GLib-GIO-WARNING **: 15:03:17.962: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)
mca@T70:~/Desktop/salu$ bash date.sh
Today is Mon May  9 15:03:39 IST 2022
Calendar :
      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
mca@T70:~/Desktop/salu$ 

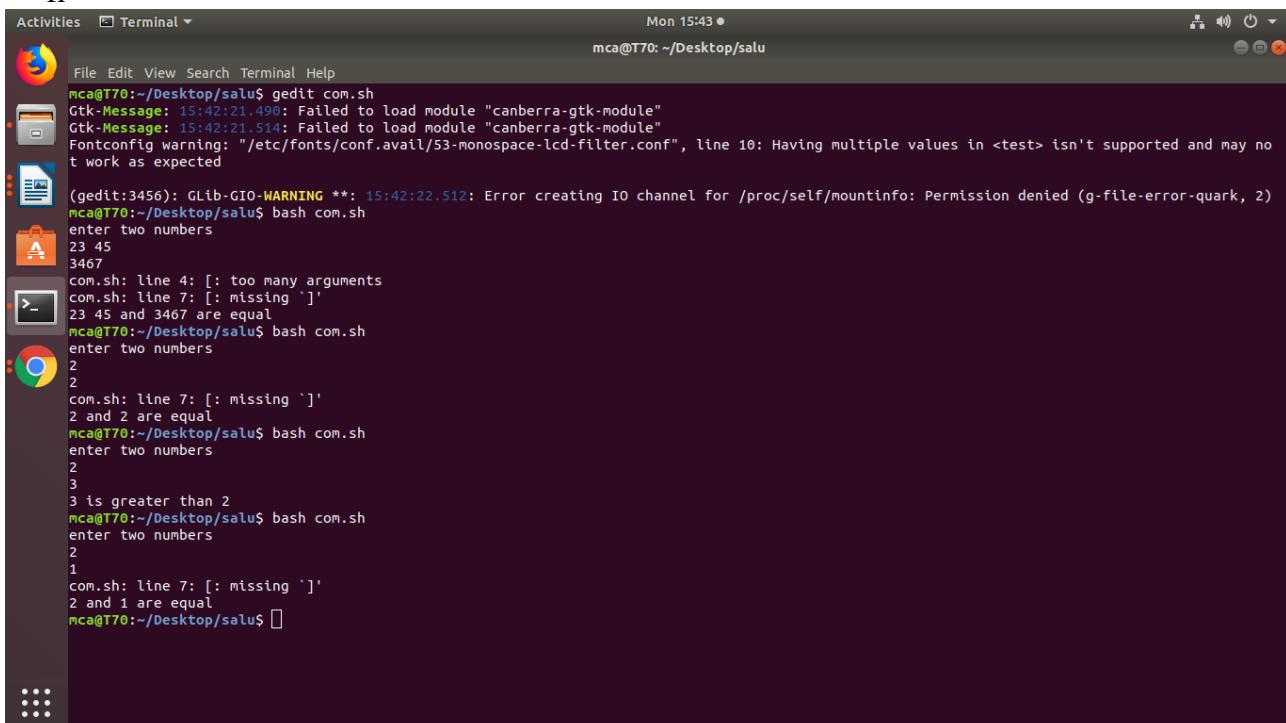
```

program no-5

**Aim:**

write a shell script to check a number is  $>$ ,  $<$ ,  $=$  another number.

```
echo "enter two numbers"
read var1
read var2
if [ $var2 -gt $var1 ]
then
echo "$var2 is greater than $var1"
elif [ $var1 -gt $var2]
then
echo "$var1 is greater than $var2"
else
echo "$var1 and $var2 are equal"
fi
```



The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is 'Terminal' and the command line shows the path 'mca@T70:~/Desktop/salu'. The terminal content displays the execution of a shell script named 'com.sh'. The script prompts for two numbers, reads them, and compares them. It handles three cases: one where the second number is greater, one where the first number is greater, and one where they are equal. The terminal also shows some system messages like GTK errors and font configuration warnings.

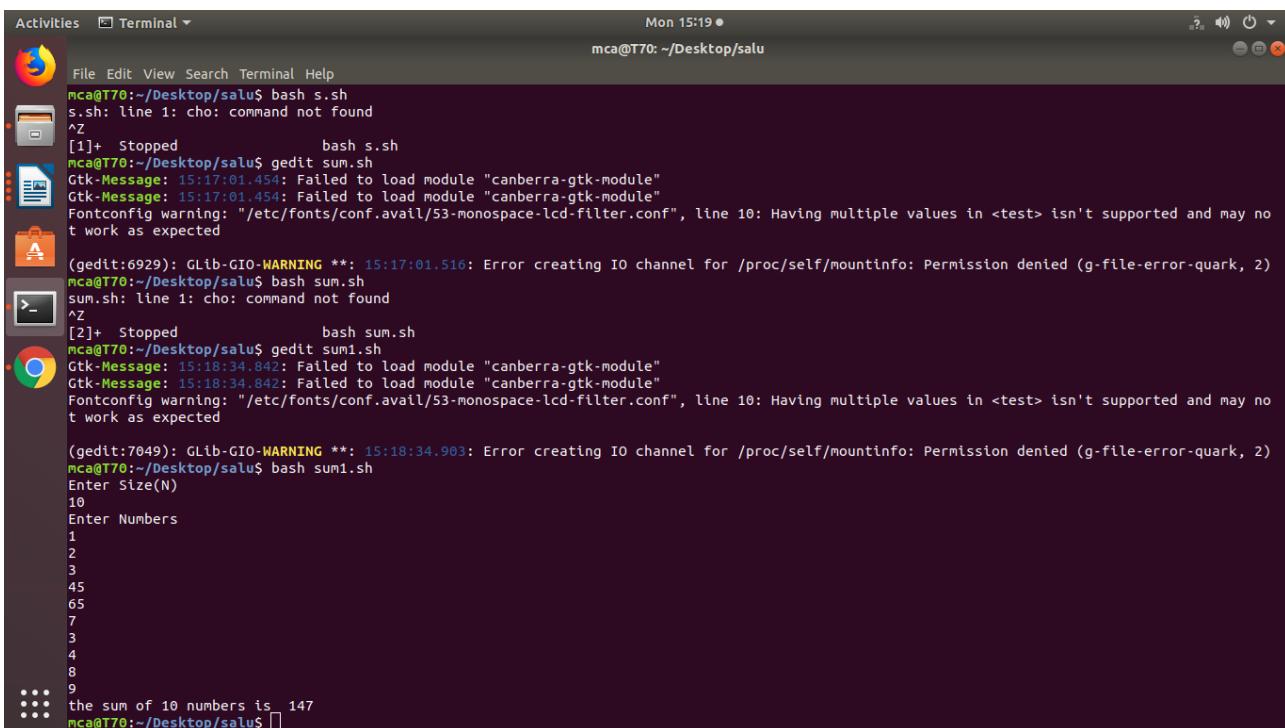
```
mca@T70:~/Desktop/salu$ gedit com.sh
Gtk-Message: 15:42:21.490: Failed to load module "canberra-gtk-module"
Gtk-Message: 15:42:21.514: Failed to load module "canberra-gtk-module"
Fontconfig warning: "/etc/fonts/conf.avail/53-monospace-lcd-filter.conf", line 10: Having multiple values in <test> isn't supported and may not work as expected
(gedit:3456): GLib-GIO-WARNING **: 15:42:22.512: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)
mca@T70:~/Desktop/salu$ bash com.sh
enter two numbers
23 45
23 45 and 3467 are equal
mca@T70:~/Desktop/salu$ bash com.sh
enter two numbers
2
2
com.sh: line 7: [: missing ']'
2 and 2 are equal
mca@T70:~/Desktop/salu$ bash com.sh
enter two numbers
2
3
3 is greater than 2
mca@T70:~/Desktop/salu$ bash com.sh
enter two numbers
2
1
com.sh: line 7: [: missing ']'
2 and 1 are equal
mca@T70:~/Desktop/salu$
```

**Program no-6****Aim:**

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

```
echo "Enter Size(N)"
read N
i=1
sum=0
echo "Enter Numbers"
while [ $i -le $N ]
do
    read num
    sum=$((sum + num))
    i=$((i + 1))
done

echo "the sum of $N numbers is $sum"
```

**output**

The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is 'Terminal'. The terminal content shows the execution of a shell script named 'sum.sh' which calculates the sum of the first 10 numbers entered by the user. The user enters '10' as the size and then lists the numbers 1 through 9. The terminal output shows the command being run, the script's logic, and the final result 'the sum of 10 numbers is 144'.

```
mca@T70:~/Desktop/salu$ bash s.sh
s.sh: line 1: cho: command not found
^Z
[1]+  Stopped                  bash s.sh
mca@T70:~/Desktop/salu$ gedit sum.sh
Gtk-Message: 15:17:01.454: Failed to load module "canberra-gtk-module"
Gtk-Message: 15:17:01.454: Failed to load module "canberra-gtk-module"
Fontconfig warning: "/etc/fonts/conf.avail/53-monospace-lcd-filter.conf", line 10: Having multiple values in <test> isn't supported and may not work as expected
(gedit:6929): GLib-GIO-WARNING **: 15:17:01.516: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)
mca@T70:~/Desktop/salu$ bash sum.sh
sum.sh: line 1: cho: command not found
^Z
[2]+  Stopped                  bash sum.sh
mca@T70:~/Desktop/salu$ gedit sum1.sh
Gtk-Message: 15:18:34.842: Failed to load module "canberra-gtk-module"
Gtk-Message: 15:18:34.842: Failed to load module "canberra-gtk-module"
Fontconfig warning: "/etc/fonts/conf.avail/53-monospace-lcd-filter.conf", line 10: Having multiple values in <test> isn't supported and may not work as expected
(gedit:7049): GLib-GIO-WARNING **: 15:18:34.903: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)
mca@T70:~/Desktop/salu$ bash sum1.sh
Enter Size(N)
10
Enter Numbers
1
2
3
45
65
7
3
4
8
9
the sum of 10 numbers is 144
```

## Program no-7

## Aim:

write a shell script to find the sum average and the product of the 4 numbers.

```
#!/bin/bash
echo "enter four integers"
read a b c d
sum=$(echo "$a + $b + $c + $d" | bc -l)
average=$(echo "$sum / 4" | bc -l)
product=$(echo "$a * $b * $c * $d" | bc -l)
echo "sum = $sum"
echo "Average = $average"
echo "Product = $product"
```

## output

Activities Terminal ▾ Mon 15:09 ●  
mca@T70: ~/Desktop/salu

File Edit View Search Terminal Help

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

mca@T70:~/Desktop/salu\$ gedit sap.sh

Gtk-Message: 15:08:19.920: Failed to load module "canberra-gtk-module"  
Gtk-Message: 15:08:19.921: Failed to load module "canberra-gtk-module"  
Fontconfig warning: "/etc/fonts/conf.avail/53-monospace-lcd-filter.conf", line 10: Having multiple values in <test> isn't supported and may not work as expected

(gedit:6371): GLib-GIO-WARNING \*\*: 15:08:19.982: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)

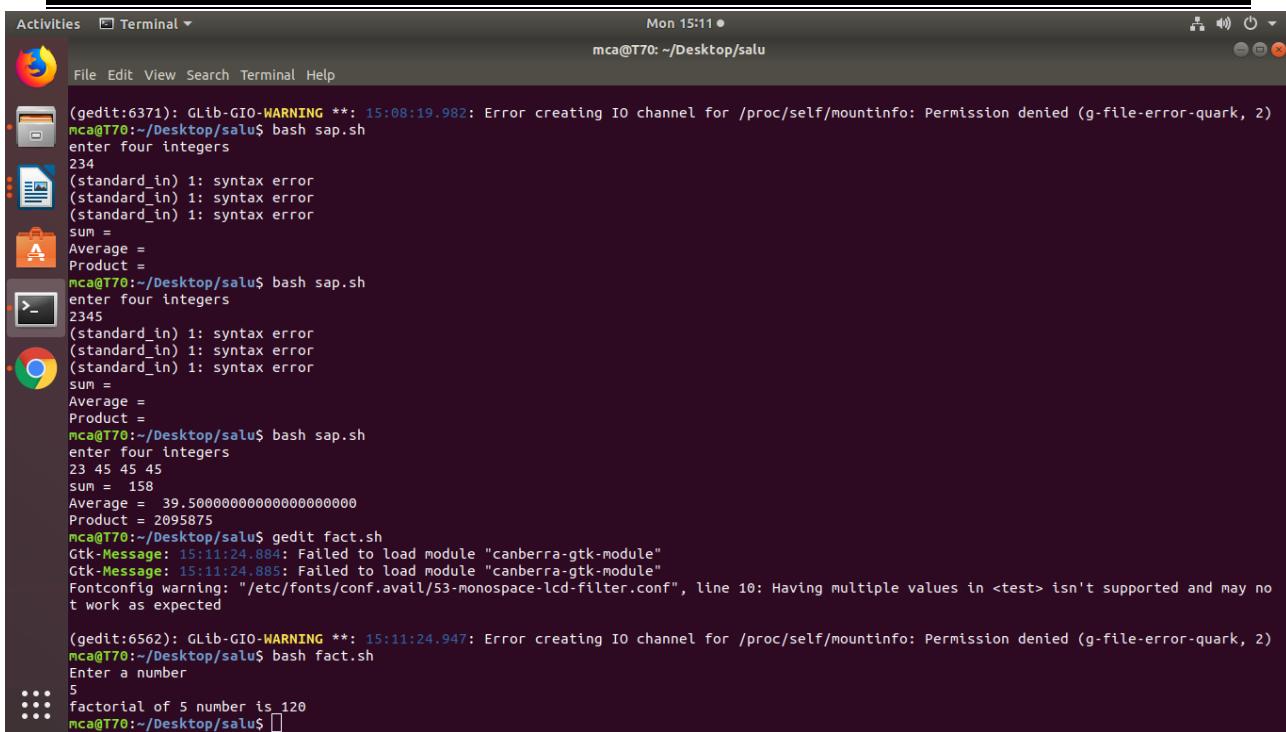
mca@T70:~/Desktop/salu\$ bash sap.sh  
enter four integers  
234  
(standard\_in) 1: syntax error  
(standard\_in) 1: syntax error  
(standard\_in) 1: syntax error  
sum =  
Average =  
Product =  
mca@T70:~/Desktop/salu\$ bash sap.sh  
enter four integers  
2345  
(standard\_in) 1: syntax error  
(standard\_in) 1: syntax error  
(standard\_in) 1: syntax error  
sum =  
Average =  
Product =  
mca@T70:~/Desktop/salu\$ bash sap.sh  
enter four integers  
23 45 45 45  
sum = 158  
Average = 39.500000000000000000000000000000  
Product = 2095875  
mca@T70:~/Desktop/salu\$

## **program no-8**

Aim: write the shell script program to find factorial of a given number.

```
echo "Enter a number"
read num
fact=1
for((i=2;i<=num;i++))
{
    fact=$((fact * i))
}
echo "factorial of $num number is $fact"
```

## output



The screenshot shows a terminal window titled "Terminal" with the following command-line history:

```

Activities Terminal Mon 15:11 ●
mca@T70: ~/Desktop/salu
(gedit:6371): GLib-GIO-WARNING **: 15:08:19.982: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)
mca@T70:~/Desktop/salu$ bash sap.sh
enter four integers
234
(standard_in) 1: syntax error
(standard_in) 1: syntax error
(standard_in) 1: syntax error
sum =
Average =
Product =
mca@T70:~/Desktop/salu$ bash sap.sh
enter four integers
2345
(standard_in) 1: syntax error
(standard_in) 1: syntax error
(standard_in) 1: syntax error
sum =
Average =
Product =
mca@T70:~/Desktop/salu$ bash sap.sh
enter four integers
23 45 45
sum = 158
Average = 39.500000000000000000000000000000
Product = 2095875
mca@T70:~/Desktop/salu$ gedit fact.sh
Gtk-Message: 15:11:24.884: Failed to load module "canberra-gtk-module"
Gtk-Message: 15:11:24.885: Failed to load module "canberra-gtk-module"
Fontconfig warning: "/etc/fonts/conf.avail/53-monospace-lcd-filter.conf", line 10: Having multiple values in <test> isn't supported and may not work as expected

(gedit:6562): GLib-GIO-WARNING **: 15:11:24.947: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)
mca@T70:~/Desktop/salu$ bash fact.sh
Enter a number
5
Factorial of 5 number is 120
mca@T70:~/Desktop/salu$ 

```

program no:9

Aim:display the palindrome of a given number.

```

echo "Enter the number"
read n
function pal
{
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
}
r=`pal $n`
echo "$r"

```

output

```

Activities Terminal Mon 15:14 ●
mca@T70: ~/Desktop/salu
File Edit View Search Terminal Help
23 45 45 45
sum = 158
Average = 39.500000000000000000000000000000
Product = 2095875
mca@T70:~/Desktop/salu$ gedit fact.sh
Gtk-Message: 15:11:24.884: Failed to load module "canberra-gtk-module"
Gtk-Message: 15:11:24.885: Failed to load module "canberra-gtk-module"
Fontconfig warning: "/etc/fonts/conf.avail/53-monospace-lcd-filter.conf", line 10: Having multiple values in <test> isn't supported and may not work as expected
(gedit:6562): GLib-GIO-WARNING **: 15:11:24.947: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)
mca@T70:~/Desktop/salu$ bash fact.sh
Enter a number
5
factorial of 5 number is 120
mca@T70:~/Desktop/salu$ gedit palin.sh
Gtk-Message: 15:13:26.853: Failed to load module "canberra-gtk-module"
Gtk-Message: 15:13:26.854: Failed to load module "canberra-gtk-module"
Fontconfig warning: "/etc/fonts/conf.avail/53-monospace-lcd-filter.conf", line 10: Having multiple values in <test> isn't supported and may not work as expected
(gedit:6666): GLib-GIO-WARNING **: 15:13:26.916: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)
mca@T70:~/Desktop/salu$ bash palin.sh
Enter the number
3
3
Number is palindrome
mca@T70:~/Desktop/salu$ bash pali.sh
Enter the number
345
543
Number is not palindrome
mca@T70:~/Desktop/salu$ bash pali.sh
Enter the number
343
343
Number is palindrome
mca@T70:~/Desktop/salu$ 

```

program no 10

Aim:program to display leap year or not.

```

leap=$(date +"%Y")
echo taking year as $leap
if [ `expr $leap % 400` -eq 0 ]
then
echo leap year
elif [ `expr $leap % 100` -eq 0 ]
then
echo not a leap year
elif [ `expr $leap % 4` -eq 0 ]
then
echo leap year
else
echo not a leap year
fi

```

```

Activities Terminal Mon 15:53 ●
mca@T70: ~/Desktop/salu
File Edit View Search Terminal Help
t work as expected
gedit:3456: GLib-GIO-WARNING **: 15:42:22.512: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)
mca@T70:~/Desktop/salu$ bash com.sh
enter two numbers
23 45
23 45 and 3467 are equal
mca@T70:~/Desktop/salu$ bash com.sh
enter two numbers
2
2
com.sh: line 7: [: too many arguments
com.sh: line 7: [: missing `]'
23 45 and 2 are equal
mca@T70:~/Desktop/salu$ bash com.sh
enter two numbers
2
3
3 is greater than 2
mca@T70:~/Desktop/salu$ bash com.sh
enter two numbers
2
1
com.sh: line 7: [: missing `]'
2 and 1 are equal
mca@T70:~/Desktop/salu$ gedit leap.sh
Gtk-Message: 15:53:30.043: Failed to load module "canberra-gtk-module"
Gtk-Message: 15:53:30.043: Failed to load module "canberra-gtk-module"
Fontconfig warning: "/etc/fonts/conf.avail/53-monospace-lcd-filter.conf", line 10: Having multiple values in <test> isn't supported and may no
t work as expected

(gedit:3960): GLib-GIO-WARNING **: 15:53:30.106: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)
mca@T70:~/Desktop/salu$ bash leap.sh
taking year as 2022
not a leap year
mca@T70:~/Desktop/salu$ 

```

```

Activities Terminal Thu 14:36 ●
mca@T70: ~/Documents/scripting
File Edit View Search Terminal Help
45
56
The average of a given numbers is:
29.200000000000000000000000000000
mca@T70:~/Documents/scripting$ gedit switch.sh
Gtk-Message: 14:33:10.318: Failed to load module "canberra-gtk-module"
Gtk-Message: 14:33:10.319: Failed to load module "canberra-gtk-module"
Fontconfig warning: "/etc/fonts/conf.avail/53-monospace-lcd-filter.conf", line 10: Having multiple values in <test> isn't supported and may no
t work as expected

(gedit:4536): GLib-GIO-WARNING **: 14:33:10.381: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)
mca@T70:~/Documents/scripting$ bash switch.sh
1. Addition
2. Subtraction
3. Multiplication
4. Division
1
Sum 0
mca@T70:~/Documents/scripting$ gedit switch1.sh
Gtk-Message: 14:34:49.240: Failed to load module "canberra-gtk-module"
Gtk-Message: 14:34:49.241: Failed to load module "canberra-gtk-module"
Fontconfig warning: "/etc/fonts/conf.avail/53-monospace-lcd-filter.conf", line 10: Having multiple values in <test> isn't supported and may no
t work as expected

(gedit:4712): GLib-GIO-WARNING **: 14:34:49.303: Error creating IO channel for /proc/self/mountinfo: Permission denied (g-file-error-quark, 2)
mca@T70:~/Documents/scripting$ bash switch1.sh
Enter the first number
12
Enter the second number
13
Enter the operator:
Addition: +
Subtraction: -
Multiplication: x
Division: /
+
Sum of 12 and 13 is 25
mca@T70:~/Documents/scripting$ 

```

## Program no:5

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

Name: salini kb

Roll No:33

Batch: MCA-B

Date:23/5/2022

### 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
  libcurlutil1-dbd-sqlite3 libcurlutil1-ldan 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"

```
mca@S26:~$ sudo ufw app info "Apache Full"
Profile: Apache Full
Title: Web Server (HTTP,HTTPS)
Description: Apache v2 is the next generation of the omnipresent Apache web
server.

Ports:
  80,443/tcp
```

**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:

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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affiliates. Other names may be trademarks of their respective
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](http://your_domain/info.php)

**PHP Version 7.2.3-1ubuntu1**

<b>System</b>	Linux S26 4.15.0-23-generic #25-Ubuntu SMP Wed May 23 18:02:16 UTC 2018 x86_64
<b>Build Date</b>	Mar 14 2018 22:03:58
<b>Server API</b>	Apache 2.0 Handler
<b>Virtual Directory Support</b>	disabled
<b>Configuration File (php.ini) Path</b>	/etc/php/7.2/apache2
<b>Loaded Configuration File</b>	/etc/php/7.2/apache2/php.ini
<b>Scan this dir for additional .ini files</b>	/etc/php/7.2/apache2/conf.d
<b>Additional .ini files parsed</b>	/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-finfo.info.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_mysqli.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
<b>PHP API</b>	20170718
<b>PHP Extension</b>	20170718
<b>Zend Extension</b>	320170718
<b>Zend Extension Build</b>	API320170718,NTS
<b>PHP Extension Build</b>	API20170718,NTS
<b>Debug Build</b>	no
<b>Thread Safety</b>	disabled
<b>Zend Signal Handling</b>	enabled
<b>Zend Memory Manager</b>	enabled
<b>Zend Multibyte Support</b>	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
wordpress/wp-content/
```

Then move the WordPress files from the extracted folder to the Apache default root

directory,

```
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;**

```
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
EXIT;
```

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 -f index.html
```



Restart the web server and  
mysql service

### Step 3 – Completing the Installation Through the Web Interface

[https://server\\_domain\\_or\\_IP](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.

Welcome to the famous five-minute WordPress installation process! Just fill in the information below and you'll be on your way to using the most extendable and powerful personal publishing platform in the world.

## Information needed

---

Please provide the following information. Do not worry, you can always change these settings later.

**Site Title**

example

**Username**

myuser

Usernames can have only alphanumeric characters, spaces, underscores, hyphens, periods, and the @ symbol.

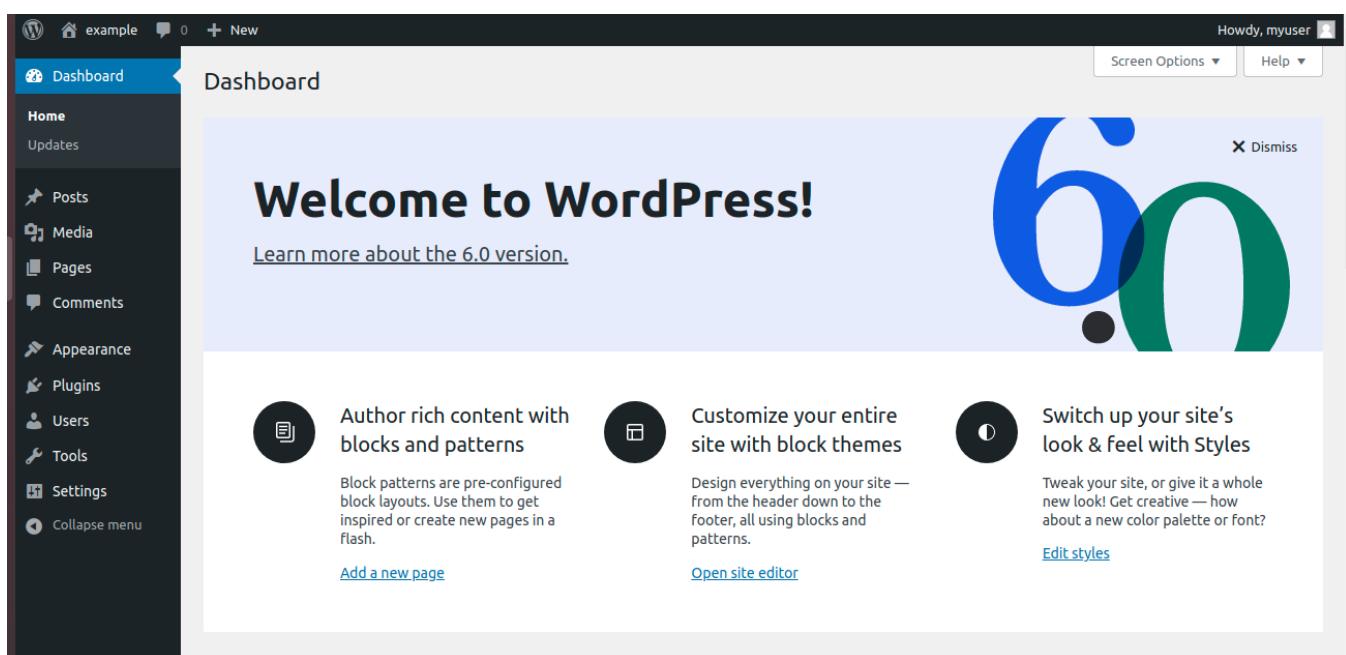
**Password**

@a1b2c3d4e5f6g7h8#A

 Hide

Strong

**Important:** You will need this password to log in. Please store it in a secure location.



WordPress administration dashboard:

## Program no:6

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

### Source code:

Install the cmake

Name: salini kb

Roll No:33

Batch: MCA-B

Date:4/4/2022

### 1]Procedure

Apt show cmake

### Output Screenshot

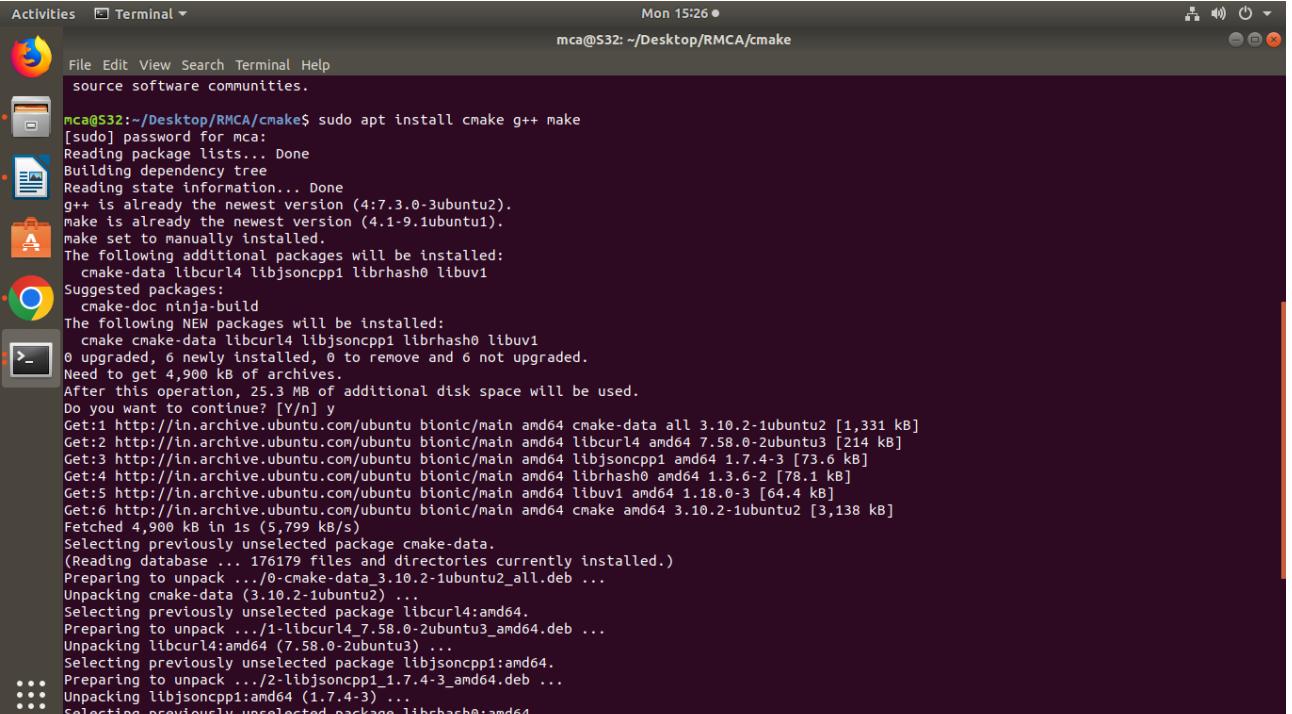
```
mca@S32:~/Desktop/RMCA/cmake$ apt show cmake
Package: cmake
Version: 3.10.2-1ubuntu2
Priority: optional
Section: devel
Origin: Ubuntu
Maintainer: Ubuntu Developers <ubuntu-devel-discuss@lists.ubuntu.com>
Original-Maintainer: Debian CMake Team <pkg-cmake-team@lists.alioth.debian.org>
Bugs: https://bugs.launchpad.net/ubuntu/+filebug
Installed-Size: 17.3 MB
Depends: cmake-data (= 3.10.2-1ubuntu2), procps, libarchive13 (>= 3.0.4), libc6 (>= 2.15), libcurl4 (>= 7.16.2), libexpat1 (>= 2.0.1), libgcc1 (>= 1:3.0), libjsoncpp1 (>= 1.7.4), librhash0 (>= 1.2.6), libstdc++6 (>= 5.2), libuv1 (>= 1.4.2), zlib1g (>= 1:1.2.3.3)
Recommends: gcc, make
Suggests: cmake-doc, ninja-build
Homepage: https://cmake.org/
Supported: 5y
Download-Size: 3,138 kB
APT-Sources: http://in.archive.ubuntu.com/ubuntu bionic/main amd64 Packages
Description: cross-platform, open-source make system
CMake is used to control the software compilation process using simple platform and compiler independent configuration files. CMake generates native makefiles and workspaces that can be used in the compiler environment of your choice. CMake is quite sophisticated: it is possible to support complex environments requiring system configuration, pre-processor generation, code generation, and template instantiation.
.
CMake was developed by Kitware as part of the NLM Insight Segmentation and Registration Toolkit project. The ASCII VIEWS project also provided support in the context of their parallel computation environment. Other sponsors include the Insight, VTK, and VXL open source software communities.

mca@S32:~/Desktop/RMCA/cmake$
```

### 2]Procedure

\$sudo apt install cmake g++ make

## Output Screenshot



```

Activities Terminal Mon 15:26 ●
mca@S32: ~/Desktop/RMCA/cmake
File Edit View Search Terminal Help
source software communities.

mca@S32:~/Desktop/RMCA/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 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/main amd64 cmake-data all 3.10.2-1ubuntu2 [1,331 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic/main 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 1s (5,799 kB/s)
Selecting previously unselected package cmake-data.
(Reading database ... 176179 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) ...
Selecting previously unselected package libjsoncpp1:amd64.
Preparing to unpack .../2-libjsoncpp1_1.7.4-3_amd64.deb ...
Unpacking libjsoncpp1:amd64 (1.7.4-3) ...
Selecting previously unselected package librhash0:amd64.

```

## 3]Procedure

**Create directory**

**Mkdir cmake**

**Cd cmake**

**gedit Helloworld.cpp**

**gedit CmakeLists.txt**

## Output Screenshot

```

Activities Terminal Mon 15:38 ●
mca@S32: ~/Desktop/RMCA/cmake/cmake/build

File Edit View Search Terminal Help
Unpacking libuv1:amd64 (1.18.0-3) ...
Selecting previously unselected package cmake.
Preparing to unpack ./5-cmake_3.10.2-1ubuntu2_amd64.deb ...
Unpacking cmake (3.10.2-1ubuntu2) ...
Setting up libuv1:amd64 (1.18.0-3) ...
Setting up libcurl4:amd64 (7.58.0-2ubuntu3) ...
Setting up cmake-data (3.10.2-1ubuntu2) ...
Setting up librhash0:amd64 (1.3.6-2)
Processing triggers for man-db (2.8.3-2) ...
Setting up libjsoncpp:amd64 (1.7.4-3) ...
Setting up cmake (3.10.2-1ubuntu2) ...
Processing triggers for libuv1:amd64 (1.18.0-3) ...
mca@S32:~/Desktop/RMCA/cmake$ mkdir cmake
mca@S32:~/Desktop/RMCA/cmake$ cd cmake
mca@S32:~/Desktop/RMCA/cmake$ cmake .. 
mca@S32:~/Desktop/RMCA/cmake$ gedit hello_world.cpp
mca@S32:~/Desktop/RMCA/cmake$ gedit CMakeLists.txt
mca@S32:~/Desktop/RMCA/cmake$ cmake .
mca@S32:~/Desktop/RMCA/cmake$ cd build
mca@S32:~/Desktop/RMCA/cmake$ make
mca@S32:~/Desktop/RMCA/cmake$ make
-- The compiler identification is: GNU 3.0
-- The CXX compiler identification is: GNU 3.0
-- Check for working C compiler: /usr/bin/c
-- Check for working C compiler: /usr/bin/c -- 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
-- Generating done
-- Build files have been written to: /home/mca/Desktop/RMCA/cmake/cmake/build
mca@S32:~/Desktop/RMCA/cmake$ make

```

#### 4]Procedure

Create directory called

**Mkdir build**

**Cmake ..**

**Cmake –build**

**run hello**

**./hello**

#### Output Screenshot

```

Activities Terminal Mon 15:39 ●
mca@532: ~/Desktop/RMCA/cmake/cmake/build
File Edit View Search Terminal Help
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) ...
Processing triggers for libc-bin (2.27-3ubuntu1) ...
mca@532:~/Desktop/RMCA/cmake/cmake$ mkdir cmake
mca@532:~/Desktop/RMCA/cmake/cmake$ cd cmake
mca@532:~/Desktop/RMCA/cmake/cmake$ gedit hello_world.cpp
mca@532:~/Desktop/RMCA/cmake/cmake$ gedit CMakeLists.txt
mca@532:~/Desktop/RMCA/cmake/cmake$ mkdir build
mca@532:~/Desktop/RMCA/cmake/cmake$ cd build
mca@532:~/Desktop/RMCA/cmake/cmake$ 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 -- works
-- 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/Desktop/RMCA/cmake/cmake/build
mca@532:~/Desktop/RMCA/cmake/cmake$ 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@532:~/Desktop/RMCA/cmake/cmake$ ./hello
Hello World!
mca@532:~/Desktop/RMCA/cmake/cmake$ []

```

```

Activities Text Editor Mon 15:39 ●
hello_world.cpp
~/Desktop/RMCA/cmake/cmake
Save Undo Redo
#include <iostream>
int main() {
    std::cout<<"Hello World!"<<std::endl;
    return 0 ;
}

```

Loading file "/home/mca/Desktop/RMCA/cmake/cmake/hello\_world.cpp"...

C++ Tab Width: 8 Ln 6, Col 1 INS

A screenshot of a Linux desktop environment, likely Ubuntu, showing a text editor window titled "CMakeLists.txt". The window displays the following CMake configuration code:

```
cmake_minimum_required(VERSION 3.10)
project(Project1)
add_executable(hello hello_world.cpp)
```

The desktop interface includes a docked application menu on the left, a system tray at the top right, and a status bar at the bottom indicating the file is being loaded from "/home/mca/Desktop/RMCA/cmake/cmake/CMakeLists.txt".

## **Program 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.

### **Source code:**

**Name: salini kb**  
**Roll No:33**  
**Batch: MCA-B**  
**Date:6/6/2022**

## **Procedure**

### **1. ipconfig**

This commands in windows allows you to see a summarized information of your network such as ip address, subnet mask , server address etc.

**Syntax :-** \$ ipconfig

**Output :-**

```
C:\Users\Student>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet 4:

  Connection-specific DNS Suffix  . : 
  Link-local IPv6 Address . . . . . : fe80::142f:9783:684f:a27d%7
  IPv4 Address. . . . . : 192.168.6.46
  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::60c6:9871:f4d0:b304%3
  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:d3:14b6:8a3e:b01e
  Link-local IPv6 Address . . . . . : fe80::d3:14b6:8a3e:b01e%12
  Default Gateway . . . . . : :
```

## 2. ipconfig/all

To see the the network information in detail. It is an extension of ipconfig command

**Syntax :-** \$ ipconfig/all

**Output :-**

```
C:\Users\Student>ipconfig/all

Windows IP Configuration

Host Name . . . . . : S46
Primary Dns Suffix . . . . . : mca.com
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
DNS Suffix Search List. . . . . : mca.com

Ethernet adapter Ethernet 4:

Connection-specific DNS Suffix . . . . . :
Description . . . . . : Realtek PCIe GBE Family Controller #2
Physical Address. . . . . : 78-24-AF-BA-C2-13
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::142f:9783:684f:a27d%7(PREFERRED)
IPv4 Address. . . . . : 192.168.6.46(PREFERRED)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.6.100
DHCPv6 IAID . . . . . : 410526895
DHCPv6 Client DUID. . . . . : 00-01-00-01-22-BD-FA-08-F0-79-59-8F-00-CC
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-00-27-00-00-03
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::60c6:9871:f4d0:b304%3(PREFERRED)
IPv4 Address. . . . . : 192.168.56.1(PREFERRED)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . :
DHCPv6 IAID . . . . . : 470417447
DHCPv6 Client DUID. . . . . : 00-01-00-01-22-BD-FA-08-F0-79-59-8F-00-CC
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:d3:14b6:8a3e:b01e(Preferred)
Link-local IPv6 Address . . . . : fe80::d3:14b6:8a3e:b01e%12(Preferred)
Default Gateway . . . . . : :::
DHCPv6 IAID . . . . . : 167772160
DHCPv6 Client DUID. . . . . : 00-01-00-01-22-BD-FA-08-F0-79-59-8F-00-CC
NetBIOS over Tcpip. . . . . : Disabled
```

### 3. nslookup

To show the server to which the system is connected by default. If we want to find the ip address of a particular domain name, we can also use nslookup

**Syntax :-** \$ nslookup

**Output :-**

```
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: d3ag4hukkh62yn.cloudfront.net
Address: 52.84.12.185
Aliases: www.amazon.com
          tp.47cf2c8c9-frontier.amazon.com
```

### 4. ping

---

The command used to check the availability of a host. The response shows the URL you are pinging, the ip address associated with the URL and the size of packets being sent on the first line . The next four lines shows the replies from each individual packets including the time(in milliseconds) for the response and the time to live(TLL) of the packet, that is the amount of time that must pass before the packet discarded.

**Syntax :-** \$ ping <IP\_address>

**Output :-**

```
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>

C:\Users\Student>ping 2404:6800:4007:826::2004

Pinging 2404:6800:4007:826::2004 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 2404:6800:4007:826::2004:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

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
```

---

## 5. tracert

The command used to show the packets that are passed through the router to which our system is connected to.

**Syntax :-** \$ tracert <ip\_address\_of\_system>

## Output :-

```
C:\Users\Student>tracert

Usage: tracert [-d] [-h maximum_hops] [-j host-list] [-w timeout]
                [-R] [-S srcaddr] [-4] [-6] target_name

Options:
  -d           Do not resolve addresses to hostnames.
  -h maximum_hops   Maximum number of hops to search for target.
  -j host-list     Loose source route along host-list (IPv4-only).
  -w timeout      Wait timeout milliseconds for each reply.
  -R             Trace round-trip path (IPv6-only).
  -S srcaddr      Source address to use (IPv6-only).
  -4             Force using IPv4.
  -6             Force using IPv6.

C:\Users\Student>tracert 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    1 ms       1 ms       5 ms   172.24.9.34
  3    *          *          *       Request timed out.
  4    *          *          *       Request timed out.
  5    17 ms      17 ms      17 ms  72.14.218.250
  6    17 ms      19 ms      18 ms  216.239.43.133
  7    16 ms      15 ms      15 ms  142.251.55.91
  8    20 ms      20 ms      20 ms  maa03s41-in-f4.1e100.net [142.250.195.164]

Trace complete.
```

## 6. route print

The command used to display and updates network routing table

---

**Syntax :-** \$ route print

**Output :-**

```
C:\Users\Student>route print
=====
Interface List
 7...78 24 af ba c2 13 .....Realtek PCIe GBE Family Controller #2
 3...0a 00 27 00 00 03 .....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  192.168.6.46    281
        127.0.0.0        255.0.0.0   On-link        127.0.0.1    331
        127.0.0.1        255.255.255.255  On-link        127.0.0.1    331
 127.255.255.255        255.255.255.255  On-link        127.0.0.1    331
        192.168.6.0        255.255.255.0   On-link      192.168.6.46    281
 192.168.6.46        255.255.255.255  On-link      192.168.6.46    281
 192.168.6.255        255.255.255.255  On-link      192.168.6.46    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      192.168.6.46    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      192.168.6.46    281
=====

Persistent Routes:
 Network Address      Netmask     Gateway Address Metric
          0.0.0.0        0.0.0.0   192.168.6.100 Default
          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
 12    331 2001::/32                 On-link
 12    331 2001:0:2851:fcb0:d3:14b6:8a3e:b01e/128
                                         On-link
  3    281 fe80::/64                 On-link
  7    281 fe80::/64                 On-link
 12    331 fe80::/64                 On-link
 12    331 fe80::d3:14b6:8a3e:b01e/128
                                         On-link
  7    281 fe80::142f:9783:684f:a27d/128
                                         On-link
  3    281 fe80::60c6:9871:f4d0:b304/128
                                         On-link
  1    331 ff00::/8                  On-link
  3    281 ff00::/8                  On-link
  7    281 ff00::/8                  On-link
 12    331 ff00::/8                  On-link
=====

Persistent Routes:
 None
```

## 7. netstat

The network statistics or netstat command is a networking tool used for troubleshooting and configuration that can also serve a monitoring tool for the connections over the network.

**Syntax :-** netstat

**Output :-**

```
C:\Users\Student>netstat
```

Active Connections

Proto	Local Address	Foreign Address	State
TCP	192.168.6.46:2754	20.198.162.76:https	ESTABLISHED
TCP	192.168.6.46:2795	a104-104-60-83:https	CLOSE_WAIT
TCP	192.168.6.46:2829	117.18.237.29:http	CLOSE_WAIT
TCP	192.168.6.46:2941	maa03s37-in-f3:https	TIME_WAIT
TCP	192.168.6.46:2942	maa05s20-in-f5:https	TIME_WAIT
TCP	192.168.6.46:2943	maa05s15-in-f10:https	TIME_WAIT
TCP	192.168.6.46:2944	maa03s47-in-f14:https	TIME_WAIT
TCP	192.168.6.46:2945	maa03s34-in-f1:https	TIME_WAIT
TCP	192.168.6.46:2946	maa03s45-in-f3:https	TIME_WAIT
TCP	192.168.6.46:2947	maa03s43-in-f10:https	TIME_WAIT
TCP	192.168.6.46:2948	maa03s38-in-f14:https	TIME_WAIT
TCP	192.168.6.46:2949	maa05s22-in-f14:https	TIME_WAIT
TCP	192.168.6.46:2950	maa03s47-in-f14:https	TIME_WAIT
TCP	192.168.6.46:2951	maa03s34-in-f1:https	TIME_WAIT
TCP	192.168.6.46:2952	maa03s47-in-f14:https	ESTABLISHED
TCP	192.168.6.46:2953	maa03s34-in-f1:https	ESTABLISHED
TCP	192.168.6.46:2954	maa05s24-in-f13:https	ESTABLISHED
TCP	192.168.6.46:2955	123:http	ESTABLISHED
TCP	192.168.6.46:2956	maa05s19-in-f14:https	ESTABLISHED
TCP	192.168.6.46:2957	maa05s19-in-f14:https	ESTABLISHED
TCP	192.168.6.46:2960	maa05s16-in-f10:https	ESTABLISHED
TCP	192.168.6.46:2961	maa05s20-in-f5:https	ESTABLISHED
TCP	192.168.6.46:2962	maa03s40-in-f11:https	ESTABLISHED
TCP	192.168.6.46:2963	maa05s10-in-f10:https	ESTABLISHED
TCP	192.168.6.46:2964	maa03s41-in-f4:https	ESTABLISHED
TCP	192.168.6.46:2965	si-in-f188:5228	ESTABLISHED
TCP	192.168.6.46:2966	maa03s37-in-f3:https	ESTABLISHED
TCP	192.168.6.46:2967	sf-in-f139:https	ESTABLISHED
TCP	192.168.6.46:2968	maa05s12-in-f10:https	ESTABLISHED
TCP	192.168.6.46:2969	maa05s22-in-f14:https	ESTABLISHED
TCP	192.168.6.46:2973	maa05s24-in-f3:https	ESTABLISHED
TCP	192.168.6.46:2977	maa03s38-in-f14:https	ESTABLISHED
TCP	192.168.6.46:2978	maa03s46-in-f10:https	ESTABLISHED
TCP	192.168.6.46:2982	maa05s10-in-f3:https	ESTABLISHED
TCP	192.168.6.46:2986	maa05s19-in-f14:https	ESTABLISHED
TCP	192.168.6.46:2987	maa05s21-in-f14:https	ESTABLISHED
TCP	192.168.6.46:2988	maa05s12-in-f14:https	ESTABLISHED
TCP	192.168.6.46:2989	maa05s12-in-f14:https	ESTABLISHED

## Program no:8

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

Install the the wireshark on ubuntu

Name: salini kb  
 Roll No:33  
 Batch: MCA-B  
 Date:

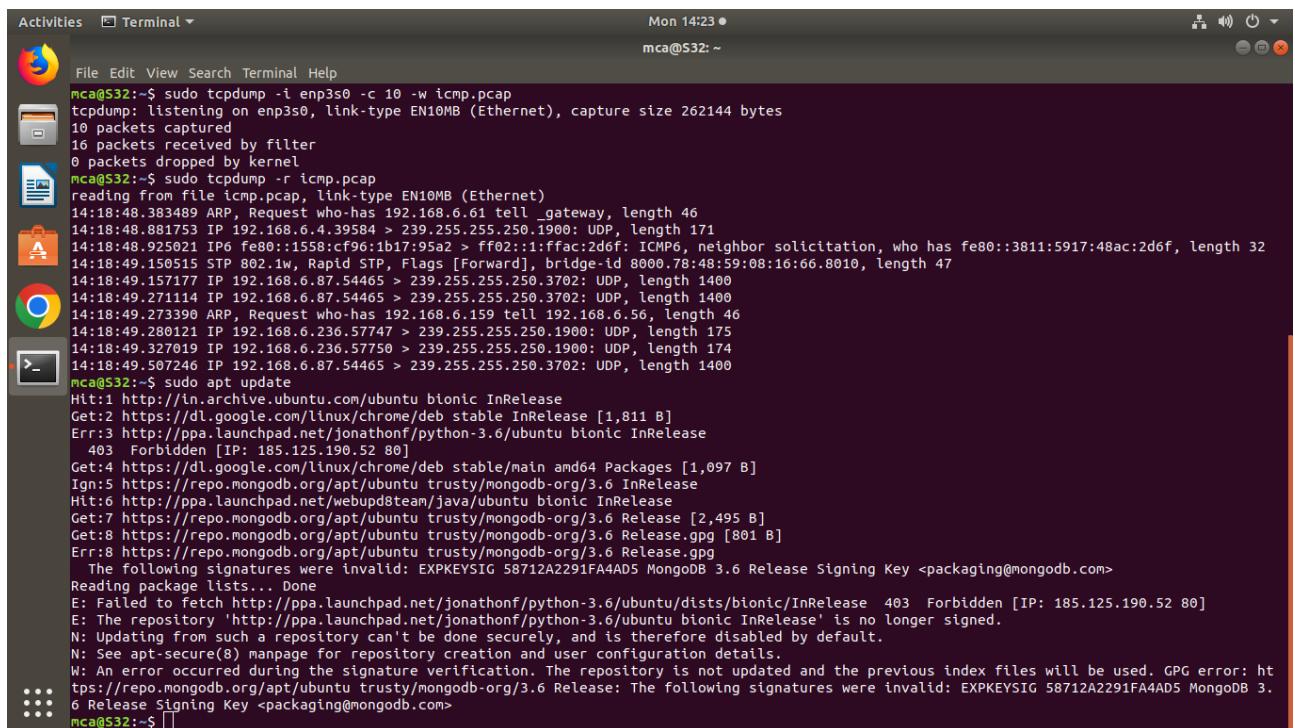
## Procedure

### Step 1

Sudo update

Sudo apt update

## Output Screenshot



```
mca@S32:~$ sudo apt update
Hit:1 http://in.archive.ubuntu.com/ubuntu bionic InRelease
Get:2 https://dl.google.com/linux/chrome/deb stable InRelease [1,811 B]
Err:3 http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease
  403 Forbidden [IP: 185.125.190.52 80]
Get:4 https://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,097 B]
Ign:5 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 InRelease
Hit:6 http://ppa.launchpad.net/webupd8team/java/ubuntu bionic InRelease
Get:7 https://repo.mongodb.org/apt/ubuntu/trusty/mongodb-org/3.6 Release [2,495 B]
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
  The following signatures were invalid: EXPKEYSIG 58712A2291FA4ADS MongoDB 3.6 Release Signing Key <packaging@mongodb.com>
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.
W: An error occurred during the signature verification. The repository is not updated and the previous index files will be used. GPG error: ht
tps://repo.mongodb.org/apt/ubuntu/trusty/mongodb-org/3.6 Release: The following signatures were invalid: EXPKEYSIG 58712A2291FA4ADS MongoDB 3.
6 Release Signing Key <packaging@mongodb.com>
```

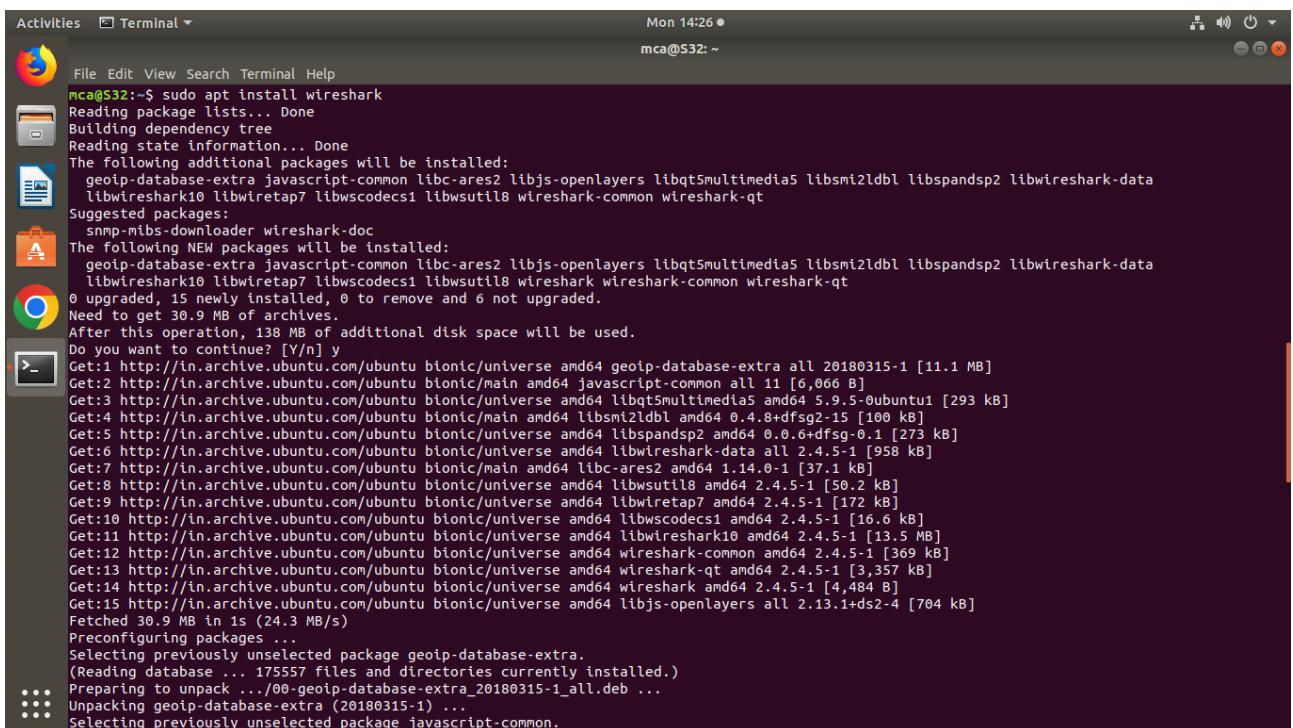
## Procedure

### Step 2

Sudo latest version can be added to the apt.

## Sudo apt install wireshark

### Output Screenshot



```
mca@532:~$ sudo apt install wireshark
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  geoip-database-extra javascript-common libc-ares2 libjs-openlayers libqt5multimedia5 libsmi2ldbl libspandsp2 libwireshark-data
  libwireshark10 libwretap7 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 libqt5multimedia5 libsmi2ldbl libspandsp2 libwireshark-data
  libwireshark10 libwretap7 libwscodecs1 libwsutil8 wireshark-common wireshark-qt
0 upgraded, 15 newly installed, 0 to remove and 0 not upgraded.
Need to get 30.9 MB of archives.
After this operation, 138 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/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/universe amd64 libwireshark-data all 2.4.5-1 [958 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libc-ares2 amd64 1.14.0-1 [37.1 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 libwsutil8 amd64 2.4.5-1 [50.2 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 libwretap7 amd64 2.4.5-1 [172 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 libwscodecs1 amd64 2.4.5-1 [16.6 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 libwireshark10 amd64 2.4.5-1 [13.5 MB]
Get:12 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 wireshark-common amd64 2.4.5-1 [369 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 wireshark-qt amd64 2.4.5-1 [3,357 kB]
Get:14 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 wireshark amd64 2.4.5-1 [4,484 B]
Get:15 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 libjs-openlayers all 2.13.1+ds2-4 [704 kB]
Fetched 30.9 MB in 1s (24.3 MB/s)
Preconfiguring packages ...
Selecting previously unselected package geoip-database-extra.
(Reading database ... 175557 files and directories currently installed.)
Preparing to unpack .../00-geoip-database-extra_20180315-1_all.deb ...
Unpacking geoip-database-extra (20180315-1) ...
Selecting previously unselected package javascript-common.
```

## Procedure

### **Step 3**

#### **Add user**

**Sudo adduser \$user wireshark**

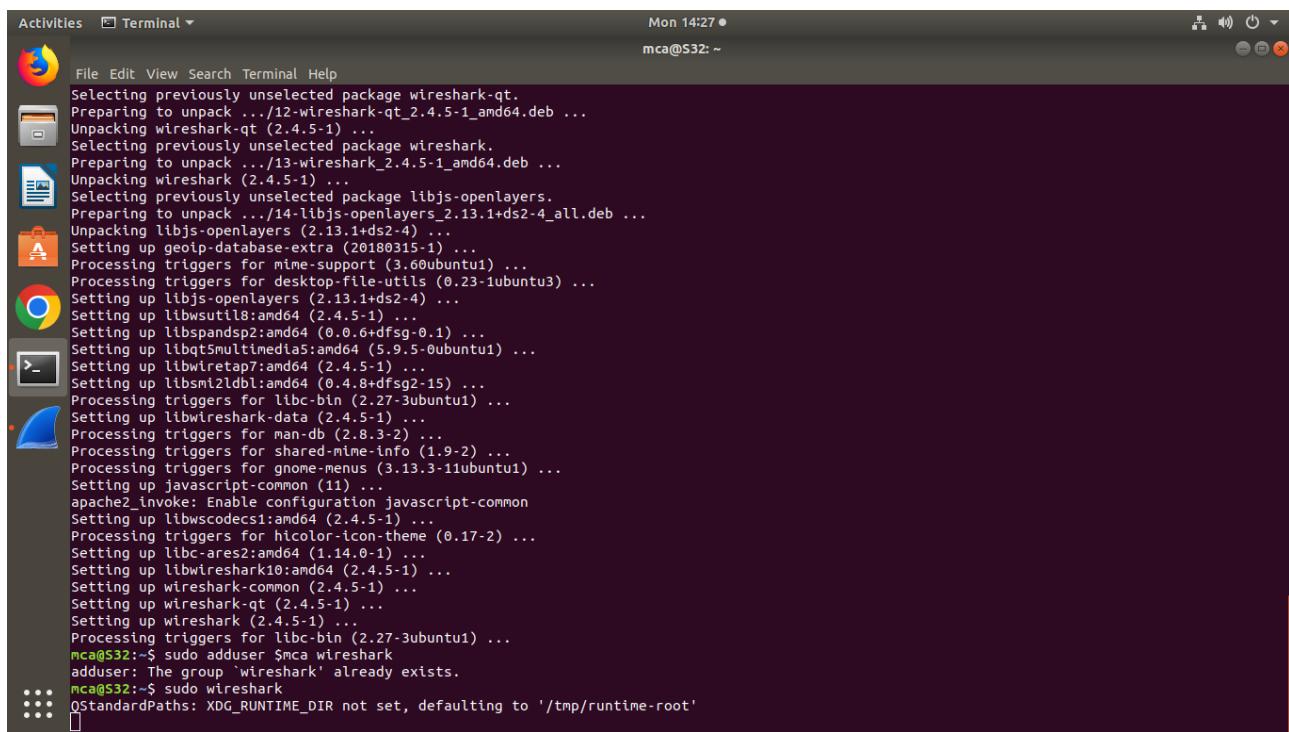
**Sudo adduser \$mca wireshark**

## Procedure

### **Step 4**

#### **Sudo wireshark**

#### **Open wireshark window**



```

Activities Terminal Mon 14:27 ● mca@532: ~
File Edit View Search Terminal Help
Selecting previously unselected package wireshark-qt.
Preparing to unpack .../12-wireshark-qt_2.4.5-1_amd64.deb ...
Unpacking wireshark-qt (2.4.5-1) ...
Selecting previously unselected package wireshark.
Preparing to unpack .../13-wireshark_2.4.5-1_amd64.deb ...
Unpacking wireshark (2.4.5-1) ...
Selecting previously unselected package libjs-openlayers.
Preparing to unpack .../14-libjs-openlayers_2.13.1+ds2-4_all.deb ...
Unpacking libjs-openlayers (2.13.1+ds2-4) ...
Setting up geoip-database-extra (20180315-1) ...
Processing triggers for mime-support (3.60ubuntu1) ...
Processing triggers for desktop-file-utils (0.23-ubuntu3) ...
Setting up libjs-openlayers (2.13.1+ds2-4) ...
Setting up libwsutil8:amd64 (2.4.5-1) ...
Setting up libspandsp2:amd64 (0.0.6+dfsg-0.1) ...
Setting up libqt5multimedia5:amd64 (5.9.5-0ubuntu1) ...
Setting up libwritap7:amd64 (2.4.5-1) ...
Setting up libsmi2ldbl:amd64 (0.4.8+dfsg2-15) ...
Processing triggers for libc-bin (2.27-Subuntu1) ...
Setting up libwireshark-data (2.4.5-1) ...
Processing triggers for man-db (2.8.3-2) ...
Processing triggers for shared-mime-info (1.9-2) ...
Processing triggers for gnome-menus (3.13.3-11ubuntu1) ...
Setting up javascript-common (11) ...
apache2_invoke: Enable configuration javascript-common
Setting up libwscodecs1:amd64 (2.4.5-1) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Setting up libc-ares2:amd64 (1.14.0-1) ...
Setting up libwireshark10:amd64 (2.4.5-1) ...
Setting up wireshark-common (2.4.5-1) ...
Setting up wireshark-qt (2.4.5-1) ...
Setting up wireshark (2.4.5-1) ...
Processing triggers for libc-bin (2.27-3ubuntu1) ...
mca@532:~$ sudo adduser $mca wireshark
adduser: The group `wireshark' already exists.
mca@532:~$ sudo wireshark
QStandardPaths: XDG_RUNTIME_DIR not set, defaulting to '/tmp/runtime-root'

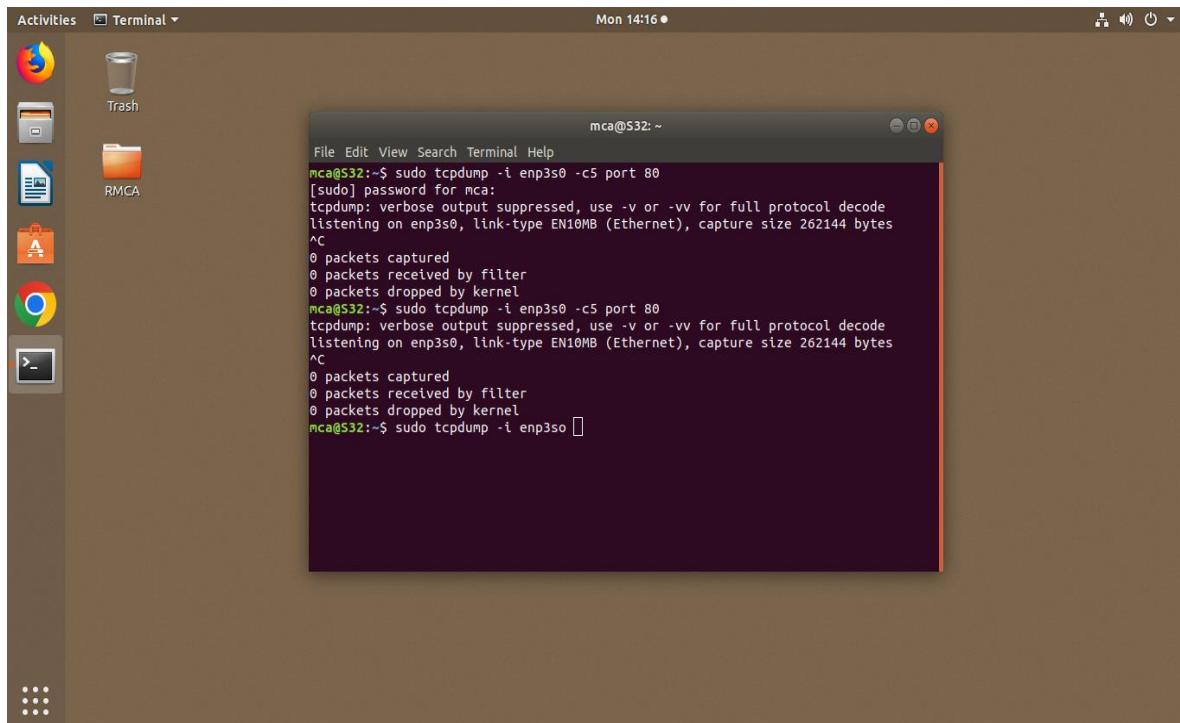
```

## **Tcp Filter Expressions**

## **1]Procedure**

sudo tcpdump -i enp3s0 -c 5 port 80

To capture all packets leaving and arriving



## **Output Screenshot**

## 2]Procedure

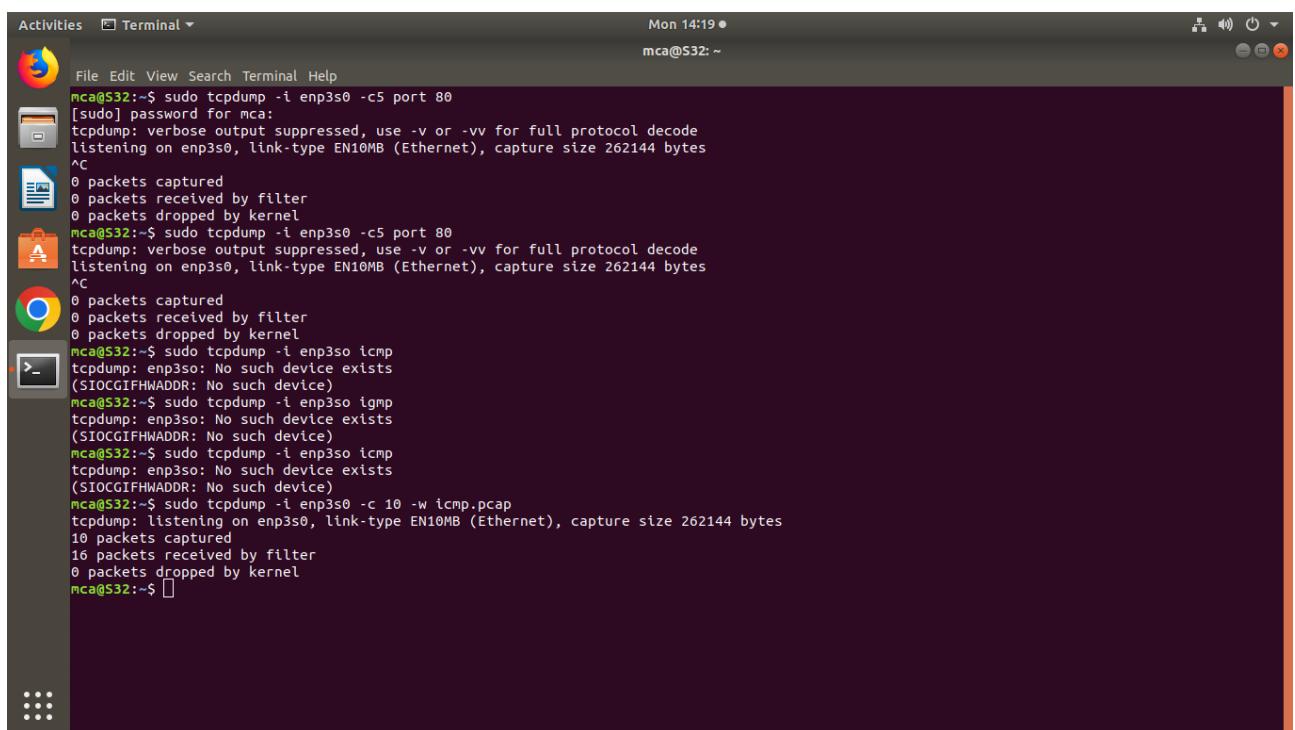
```
sudo tcpdump -i enp3s0 icmp
```

packets using particular protocol

```
sudo tcpdump -i enp3s0 -c 10 -w icmp.pcap
```

following command saves 10 lines of output on the enp3s0 interface to icmp.pcap

## Output Screenshot



The screenshot shows a terminal window on a Linux desktop environment. The terminal window title is "Terminal". The terminal content displays the following sequence of commands and their outputs:

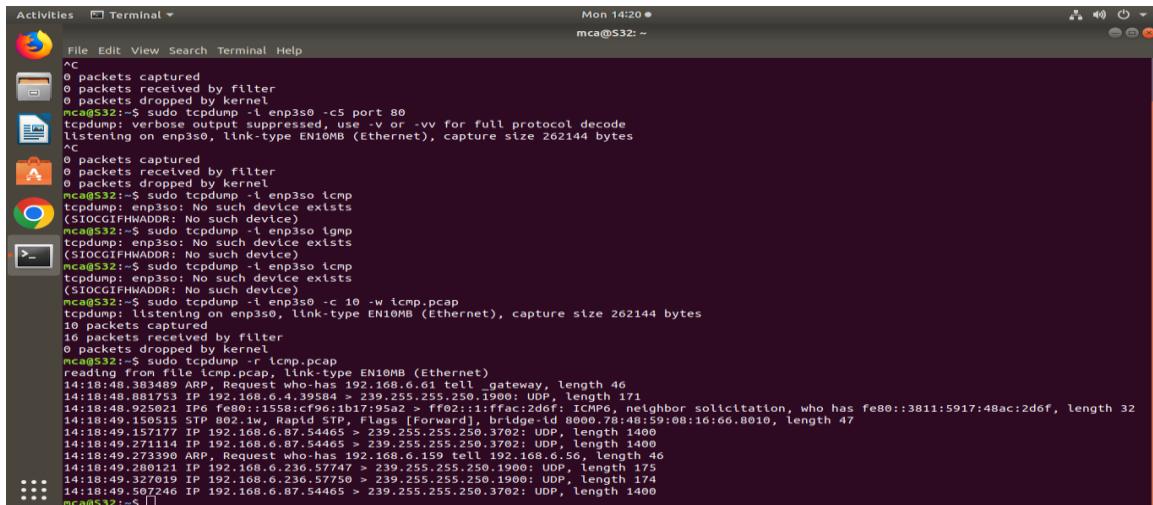
```
File Edit View Search Terminal Help
mca@S32:~$ sudo tcpdump -i enp3s0 -c5 port 80
[sudo] password for mca:
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
^C
0 packets captured
0 packets received by filter
0 packets dropped by kernel
mca@S32:~$ sudo tcpdump -i enp3s0 -c5 port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
^C
0 packets captured
0 packets received by filter
0 packets dropped by kernel
mca@S32:~$ sudo tcpdump -i enp3s0 icmp
tcpdump: enp3s0: No such device exists
(SIOCGIFHWADDR: No such device)
mca@S32:~$ sudo tcpdump -i enp3s0 igmp
tcpdump: enp3s0: No such device exists
(SIOCGIFHWADDR: No such device)
mca@S32:~$ sudo tcpdump -i enp3s0 icmp
tcpdump: enp3s0: No such device exists
(SIOCGIFHWADDR: No such device)
mca@S32:~$ sudo tcpdump -i enp3s0 -c 10 -w icmp.pcap
tcpdump: listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
10 packets captured
16 packets received by filter
0 packets dropped by kernel
mca@S32:~$
```

## 3]Procedure

```
sudo tcmpdump -r icmp.pcap
```

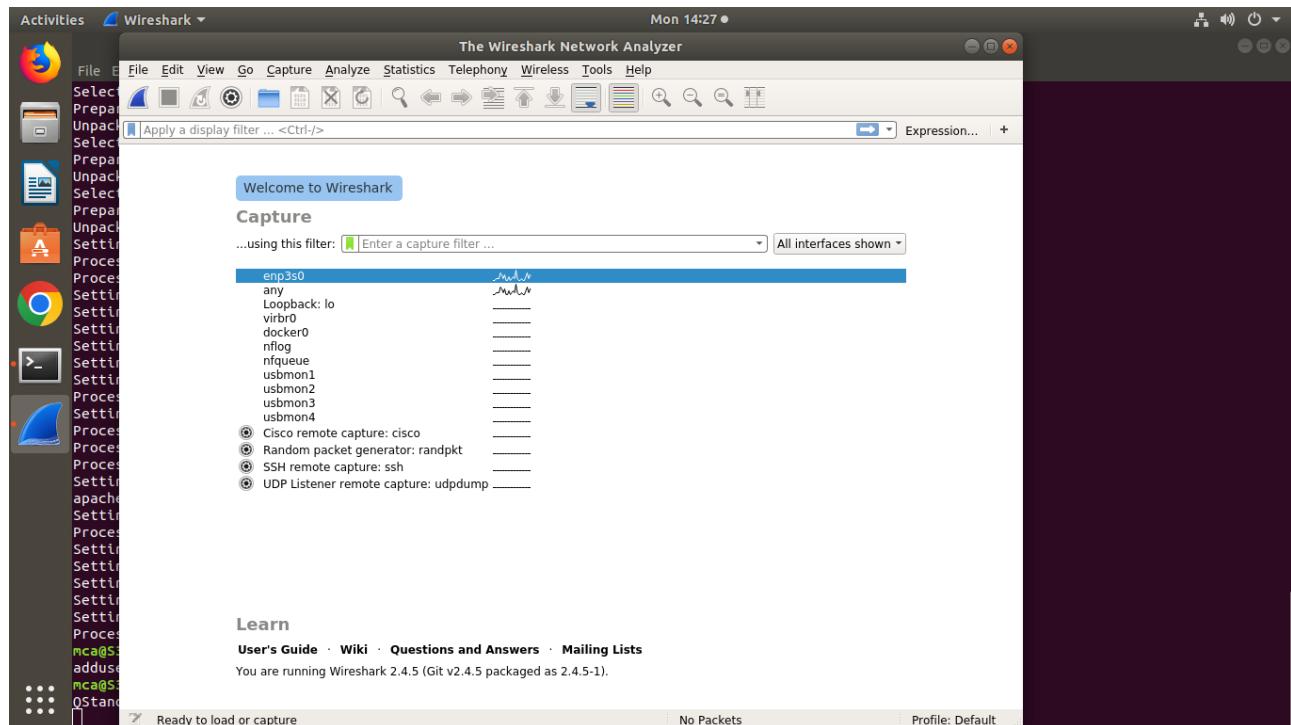
read those 10 lines

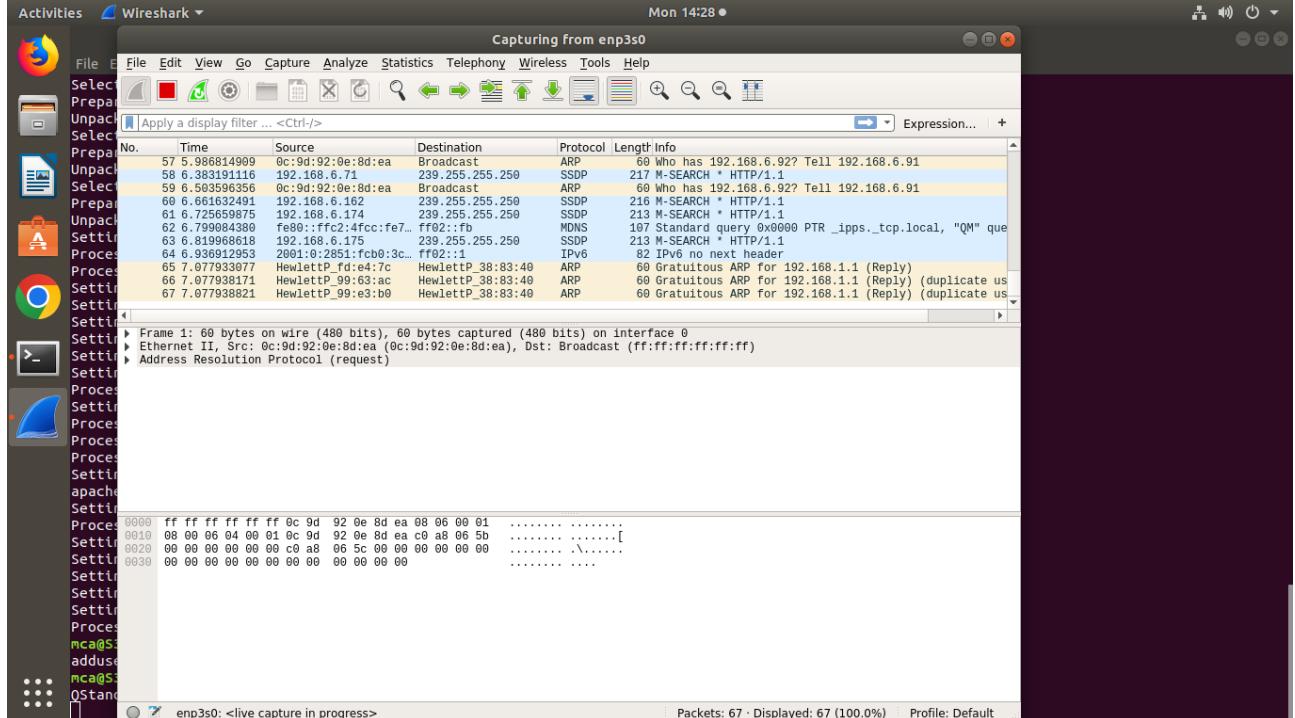
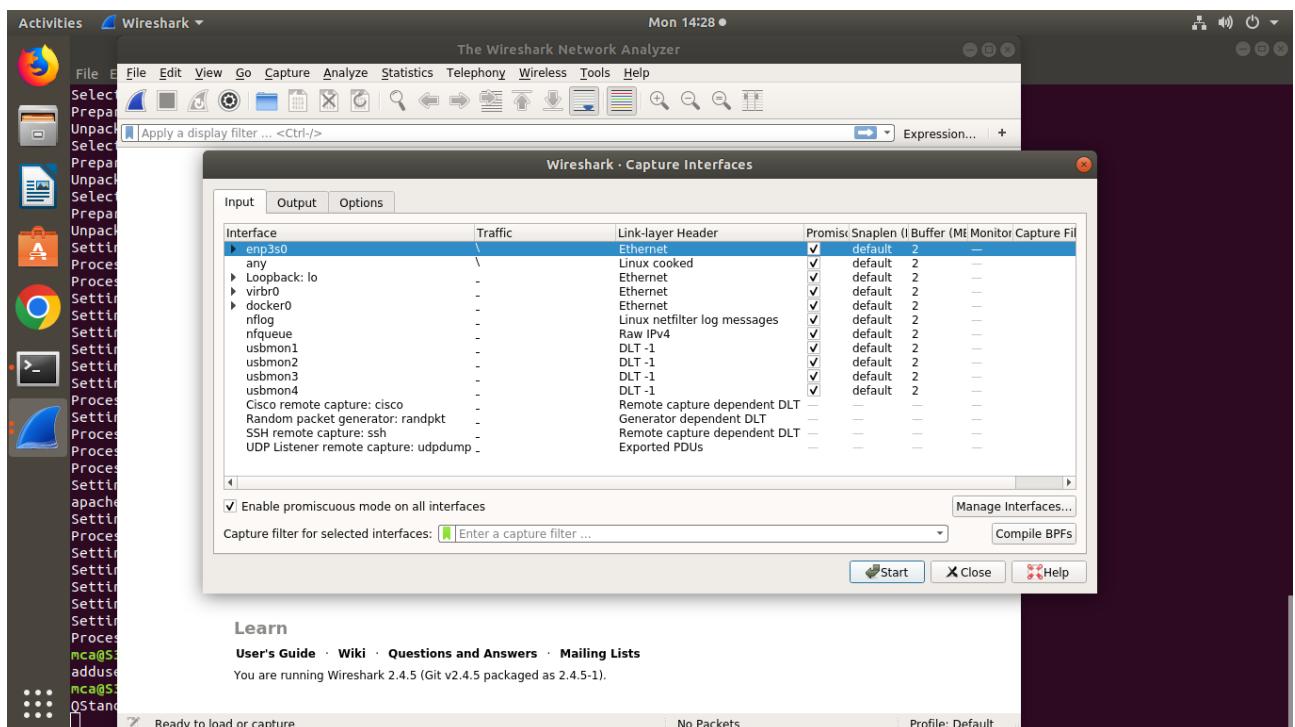
## Output Screenshot



The screenshot shows a terminal window titled "Terminal" with the following command history and output:

```
Activities Terminal Mon 14:20 ● mca@532: ~
File Edit View Search Terminal Help
^C
0 packets captured
0 packets received by filter
0 packets dropped by kernel
mca@532:~$ sudo tcpdump -l enp3s0 -c5 port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
0 packets captured
0 packets received by filter
0 packets dropped by kernel
mca@532:~$ sudo tcpdump -l enp3s0 icmp
tcpdump: enp3s0: No such device exists
(SIOCGIFHWADDR: No such device)
mca@532:~$ sudo tcpdump -l enp3s0 igmp
tcpdump: enp3s0: No such device exists
(SIOCGIFHWADDR: No such device)
mca@532:~$ sudo tcpdump -l enp3s0 icmp
tcpdump: enp3s0: No such device exists
(SIOCGIFHWADDR: No such device)
mca@532:~$ sudo tcpdump -l enp3s0 -c 10 -w icmp.pcap
tcpdump: listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
10 packets captured
16 packets received by filter
0 packets dropped by kernel
mca@532:~$ sudo tcpdump -r icmp.pcap
reading from file icmp.pcap, link-type EN10MB (Ethernet)
14:18:48.383489 ARP Request who-has 192.168.6.61 tell _gateway, length 46
14:18:48.881753 IP 192.168.6.4.39584 > 239.255.255.250.1900: UDP, length 171
14:18:48.925021 IP6 fe80::1558:c961:b17:95a2 > ff02::1:ffac:2d6f: ICMP6, neighbor solicitation, who has fe80::3811:5917:48ac:2d6f, length 32
14:18:49.150515 STP 802.lw, Rapid STP, Flags [Forward], bridge-id 8000.78:48:59:08:16:66.8010, length 47
14:18:49.157177 IP 192.168.6.87.54465 > 239.255.255.250.3702: UDP, length 1400
14:18:49.160000 IP 192.168.6.87.54465 > 239.255.255.250.3702: UDP, length 1400
14:18:49.273300 ARP Request who has 192.168.6.159 tell 192.168.6.56, length 46
14:18:49.280121 IP 192.168.6.230.57747 > 239.255.255.250.1900: UDP, length 175
14:18:49.327019 IP 192.168.6.230.57750 > 239.255.255.250.1900: UDP, length 174
14:18:49.507246 IP 192.168.6.87.54465 > 239.255.255.250.3702: UDP, length 1400
mca@532:~$
```



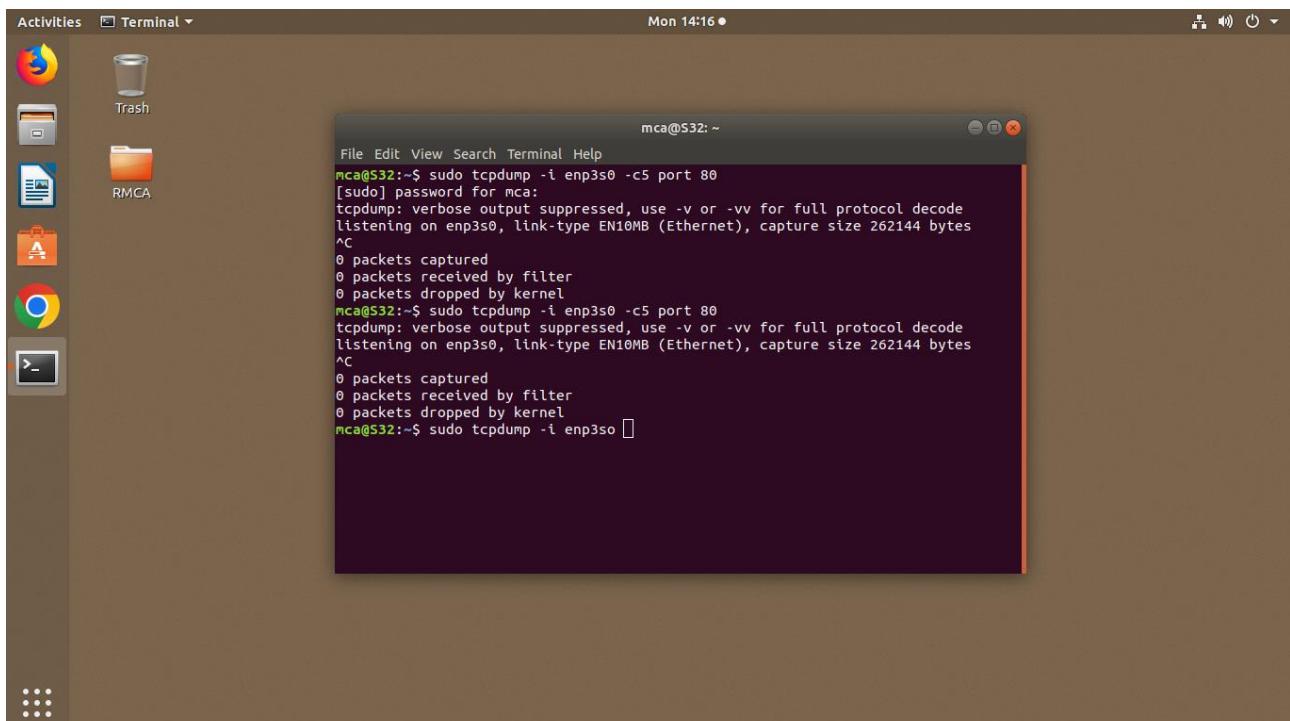


## Tcp filter expression

## **1]Procedure**

sudo tcpdump -i enp3s0 -c 5 port 80

To capture all packets leaving and arriving



## **2]Procedure**

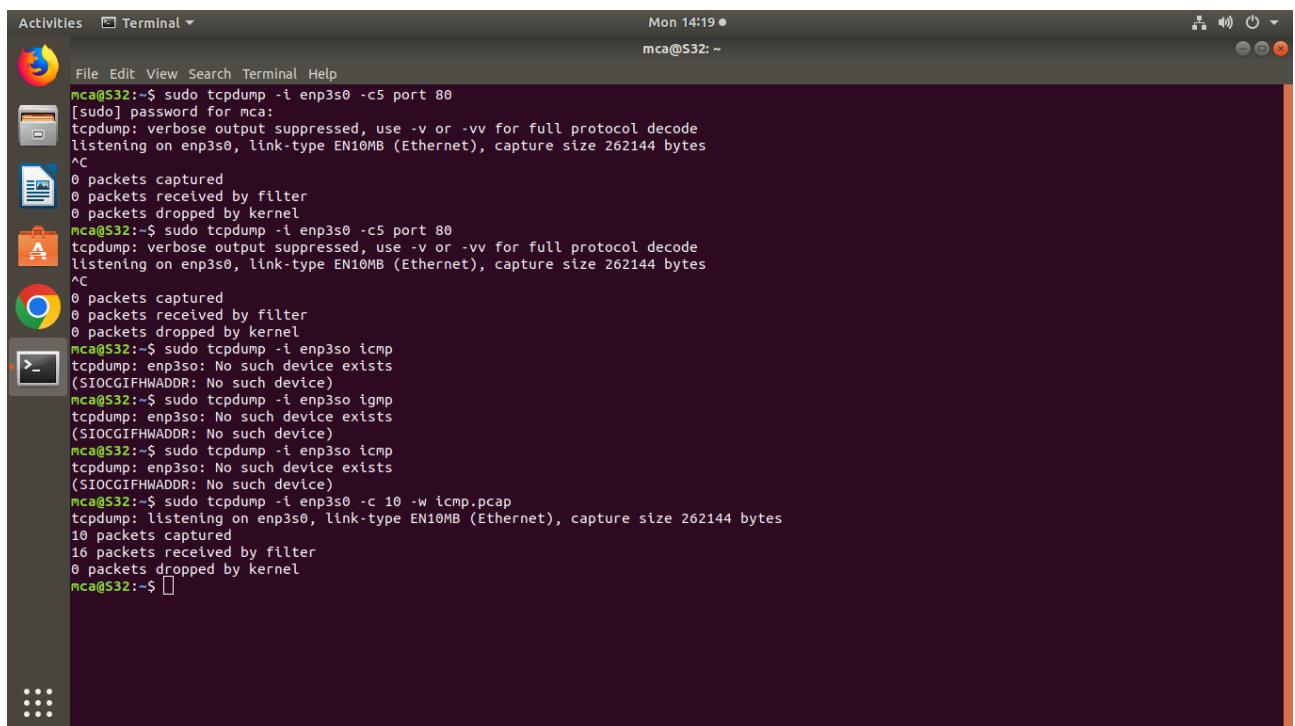
sudo tcpdump -i enp3s0 icmp

packets using particular protocol

sudo tcpdump -i enp3s0 -c 10 -w icmp.pcap

following command saves 10 lines of output on the enp3s0 interface to icmp.pcap

## **Output Screenshot**



The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is "Terminal". The terminal content displays several commands run by the user "mca" on a system with an interface named "enp3s0". The commands include:

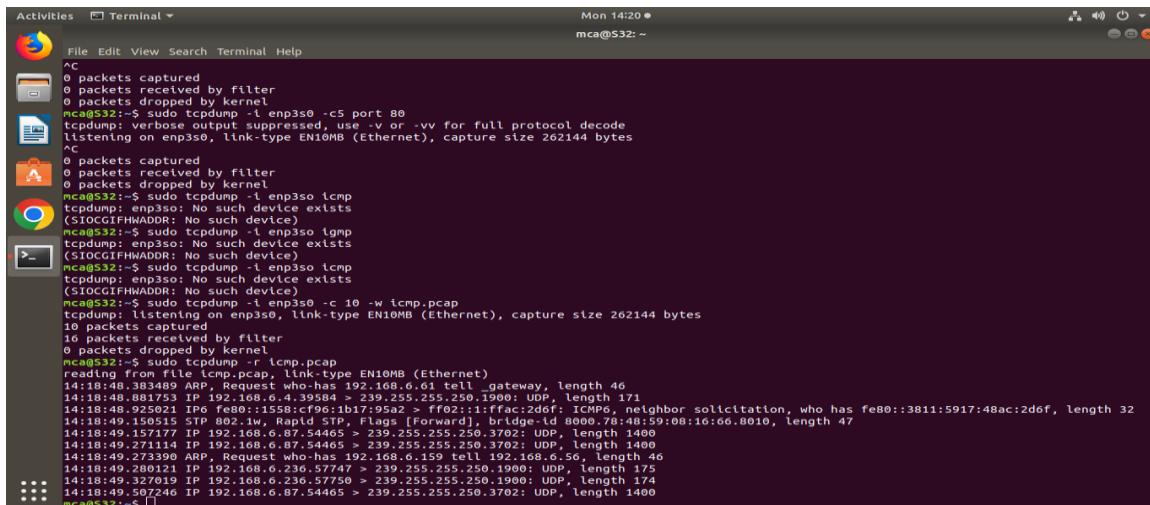
```
mca@S32:~$ sudo tcpdump -i enp3s0 -c5 port 80
[sudo] password for mca:
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
^C
0 packets captured
0 packets received by filter
0 packets dropped by kernel
mca@S32:~$ sudo tcpdump -i enp3s0 -c5 port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
^C
0 packets captured
0 packets received by filter
0 packets dropped by kernel
mca@S32:~$ sudo tcpdump -i enp3s0 icmp
tcpdump: enp3s0: No such device exists
(SIOCGIFHWADDR: No such device)
mca@S32:~$ sudo tcpdump -i enp3s0 igmp
tcpdump: enp3s0: No such device exists
(SIOCGIFHWADDR: No such device)
mca@S32:~$ sudo tcpdump -i enp3s0 icmp
tcpdump: enp3s0: No such device exists
(SIOCGIFHWADDR: No such device)
mca@S32:~$ sudo tcpdump -i enp3s0 -c 10 -w icmp.pcap
tcpdump: listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
10 packets captured
16 packets received by filter
0 packets dropped by kernel
mca@S32:~$
```

### 3]Procedure

sudo tcmpdump -r icmp.pcap

read those 10 lines

### Output Screenshot



A screenshot of a Linux terminal window titled "Terminal". The window shows a command-line interface with the following session:

```
Activities Terminal Mon 14:20 mca@532: ~
^C
0 packets captured
0 packets received by kernel
0 packets dropped by kernel
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
^C
0 packets captured
0 packets received by kernel
0 packets dropped by kernel
mca@532:~$ sudo tcpdump -i enp3s0 icmp
tcpdump: enp3s0: No such device exists
(SIOCGIFHWADDR: No such device)
mca@532:~$ sudo tcpdump -i enp3s0 igmp
tcpdump: enp3s0: No such device exists
(SIOCGIFHWADDR: No such device)
mca@532:~$ sudo tcpdump -i enp3s0 icmp
tcpdump: enp3s0: No such device exists
(SIOCGIFHWADDR: No such device)
mca@532:~$ sudo tcpdump -i enp3s0 -c 10 -w icmp.pcap
tcpdump: listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
10 packets captured
10 packets received by filter
0 packets dropped by kernel
mca@532:~$ sudo tcpdump -r icmp.pcap
reading from file icmp.pcap, link-type EN10MB (Ethernet)
14:18:48.383489 ARP, Request who-has 192.168.6.61 tell _gateway, length 46
14:18:48.881753 IP 192.168.6.61.39580 > 239.255.255.250.1900: UDP, length 171
14:18:49.150515 IP 192.168.6.61.39580 > 239.255.255.250.1900: UDP, length 171
14:18:49.150515 STP 002.1w, Rapid STP, Flags [Forward], bridge_id 8000.70:49:08:16:06.8010, length 32
14:18:49.157177 IP 192.168.6.87.54465 > 239.255.255.250.3702: UDP, length 1400
14:18:49.271114 IP 192.168.6.87.54465 > 239.255.255.250.3702: UDP, length 1400
14:18:49.273390 ARP, Request who-has 192.168.6.159 tell 192.168.6.56, length 46
14:18:49.280121 IP 192.168.6.236.57747 > 239.255.255.250.1900: UDP, length 175
14:18:49.327019 IP 192.168.6.236.57750 > 239.255.255.250.1900: UDP, length 174
14:18:49.507246 IP 192.168.6.87.54465 > 239.255.255.250.3702: UDP, length 1400
mca@532:~$
```

## Program no:9

**Aim:** Introduction to Hypervisors and VMs: KVM installation and commands.

For the Ubuntu system, all packages required to run KVM are available on official upstream repositories. Install them using the commands:

**Name: salini kb**

**Roll No:33**

**Batch: MCA-B**

**Date:23/5/2022**

1] `sudo apt update`

`apt-get install qemu qemu-kvm libvirt-bin bridge-utils virt-manager virt-viewer -y`

2] Create Virtual Machine • You can create virtual machine using virt-manager utility. Run the following command to start the virt-manager:

`sudo virt-manager`

`virsh help`  
`virsh help`

`virsh help list`

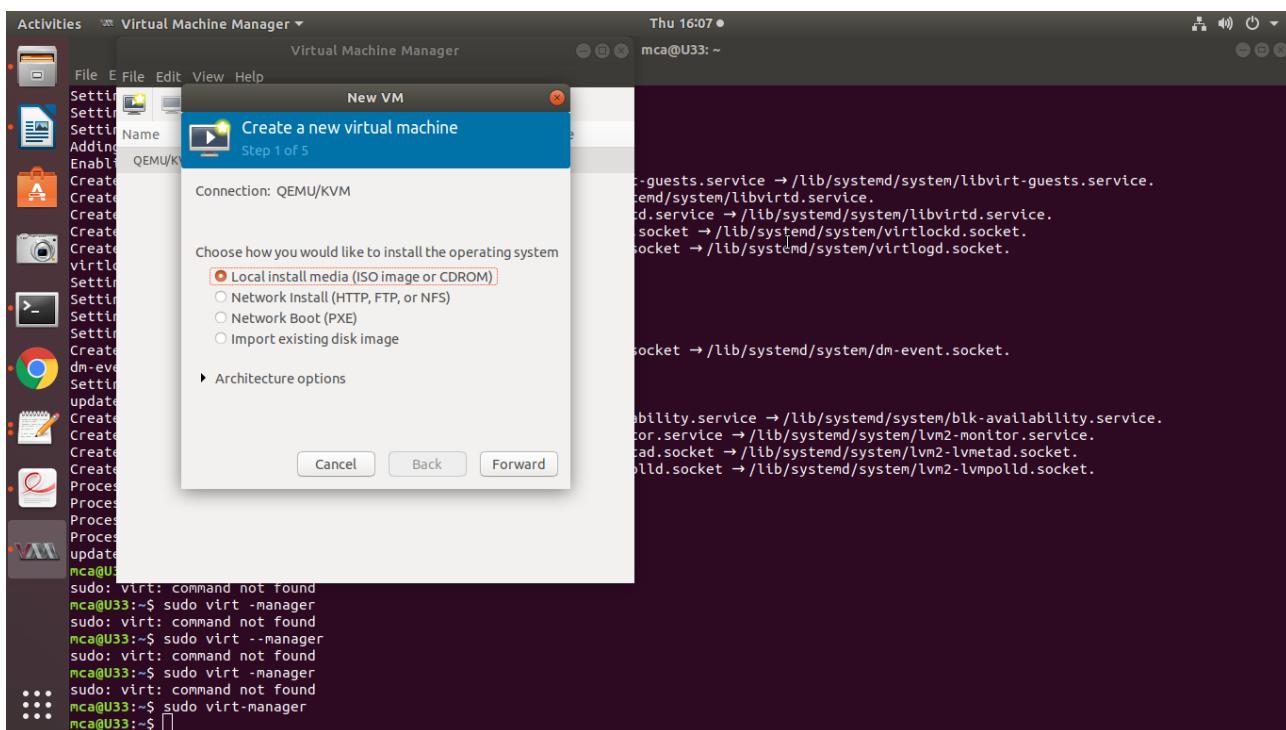
Sudo virsh nodeinfo

Virsh start  
vm virsh start  
virsh start testvm1

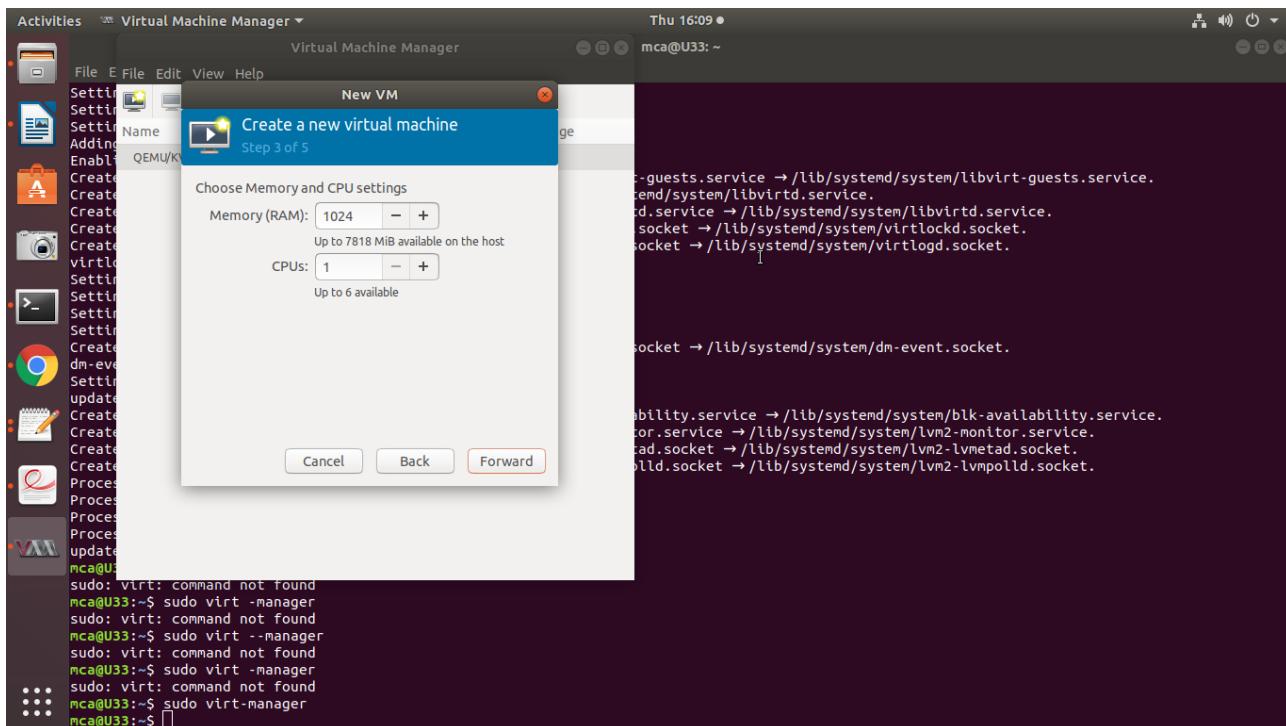
Activities Terminal Thu 16:03 ● mca@U33: ~

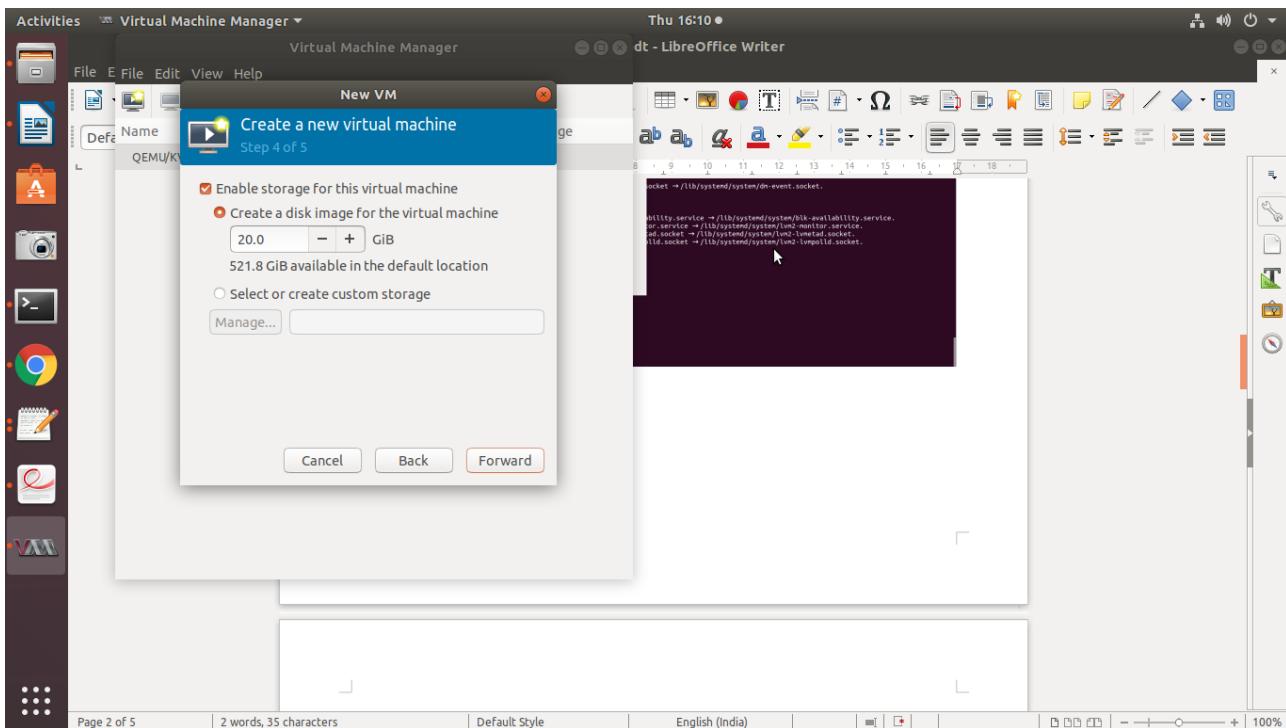
```
$: command not found
mca@U33:~$ sudo apt install -y qemu qemu-kvm libvirt-daemon libvirt-clients bridge-utils virt-manager
Reading package lists... Done
Building dependency tree
Reading state information... Done
bridge-utils is already the newest version (1.5-15ubuntu1).
bridge-utils set to manually installed.
qemu-kvm is already the newest version (1:2.11+dfsg-1ubuntu7.4).
The following additional packages will be installed:
  augoeas-lenses binfmt-support dmeventd ebttables 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
    libgvcn-1.0-0 liblvm2app2.2 liblvm2cmd2.02 libnetcf1 libosinfo-1.0-0
    libphadov-2.0-0 libphadov-2.0-common libreadlines libspice-client-glib-2.0-8
    libspice-client-gtk-3.0-5 libusbredirhost1 libvirt-daemon-driver-storage-rbd
    libvirt-daemon-system libvirt-glib-1.0-0 libvirt0 libxml2-utils lvm2
    osinfo-db python python-dbus python-gi python-gi-common python-ipaddr python-libvirt
    python-libxml2 qemu-slof 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:
  augoeas-doc augoeas-tools libosinfo-l10n gstreamer1.0-plugins-bad
  gstreamer1.0-libav libvirt-daemon-driver-storage-gluster
  libvirt-daemon-driver-storage-sheepdog libvirt-daemon-driver-storage-zfs
  numad radvd auditd systemtap nfs-common zfsutils pm-utils
  thin-provisioning-tools python-dbus-dbg python-dbus-doc qemu-user-static
  samba vde2 qemu-block-extra qemu-efi openbios-ppc openhwkware
  openbios-sparc ssh-askpass python-guestfs
The following NEW packages will be installed:
  augoeas-lenses binfmt-support dmeventd ebttables 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
    libgvcn-1.0-0 liblvm2app2.2 liblvm2cmd2.02 libnetcf1 libosinfo-1.0-0
    libphadov-2.0-0 libphadov-2.0-common libreadlines libspice-client-glib-2.0-8
    libspice-client-gtk-3.0-5 libusbredirhost1 libvirt-daemon libvirt-clients libvirt-daemon
```

Next, right click on localhost(QEMU) and click on New button.

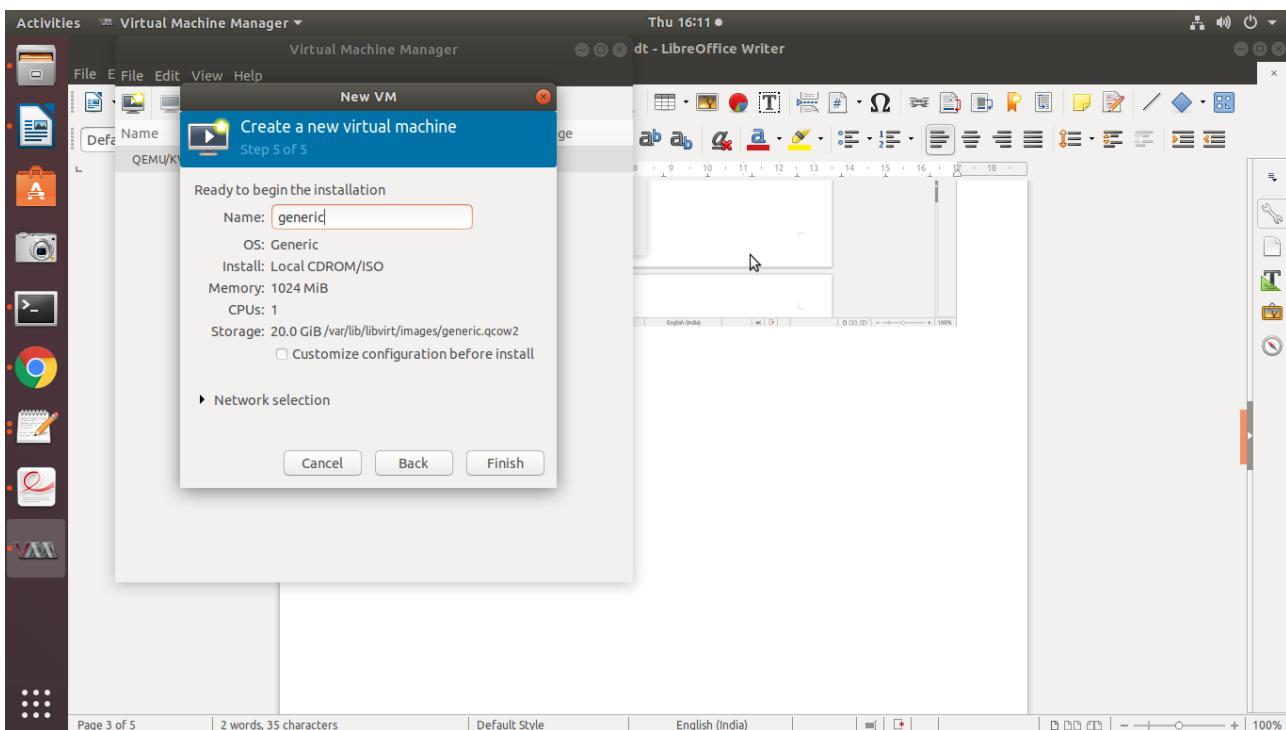


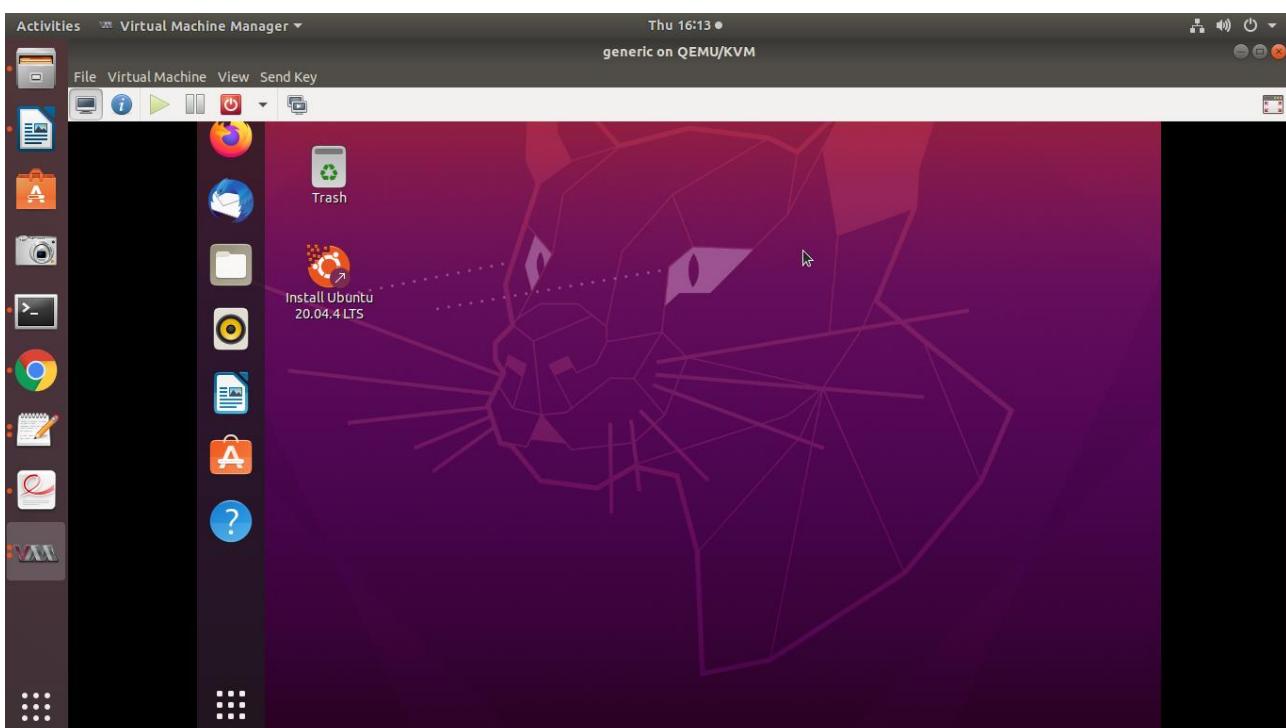
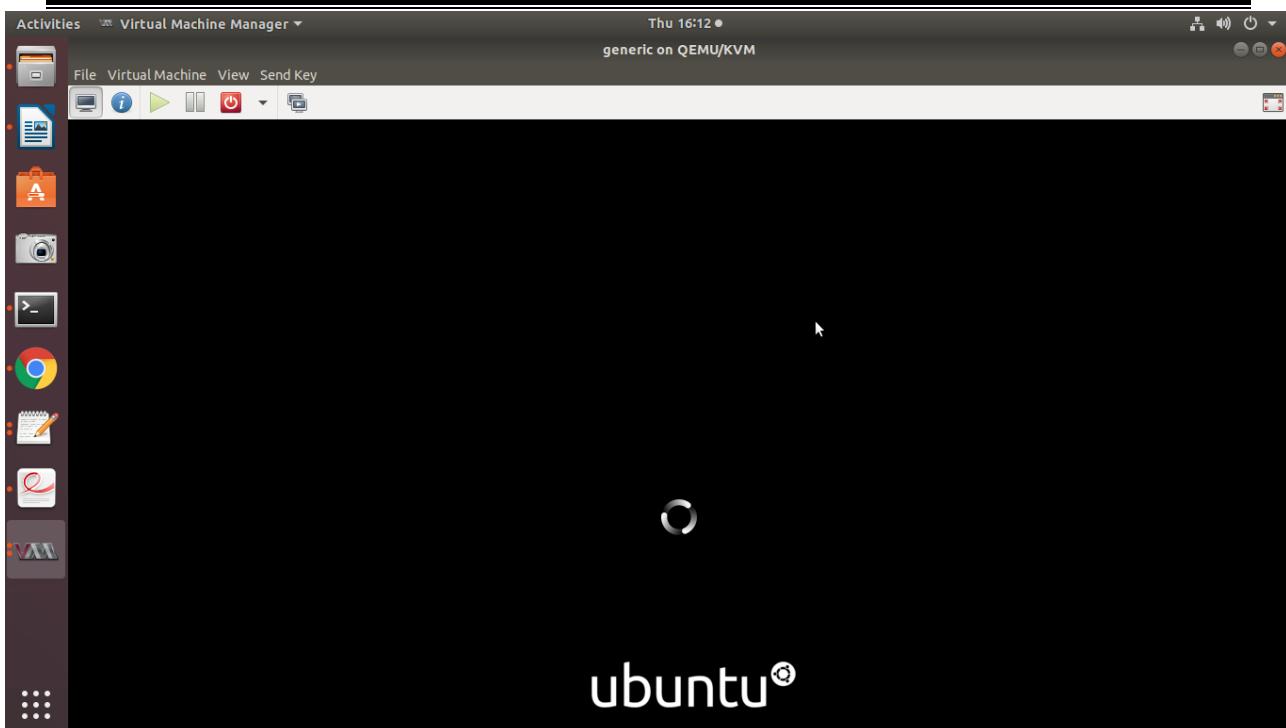
Next, provide your ISO image path, OS type and Version. Then, click on the Forward button.

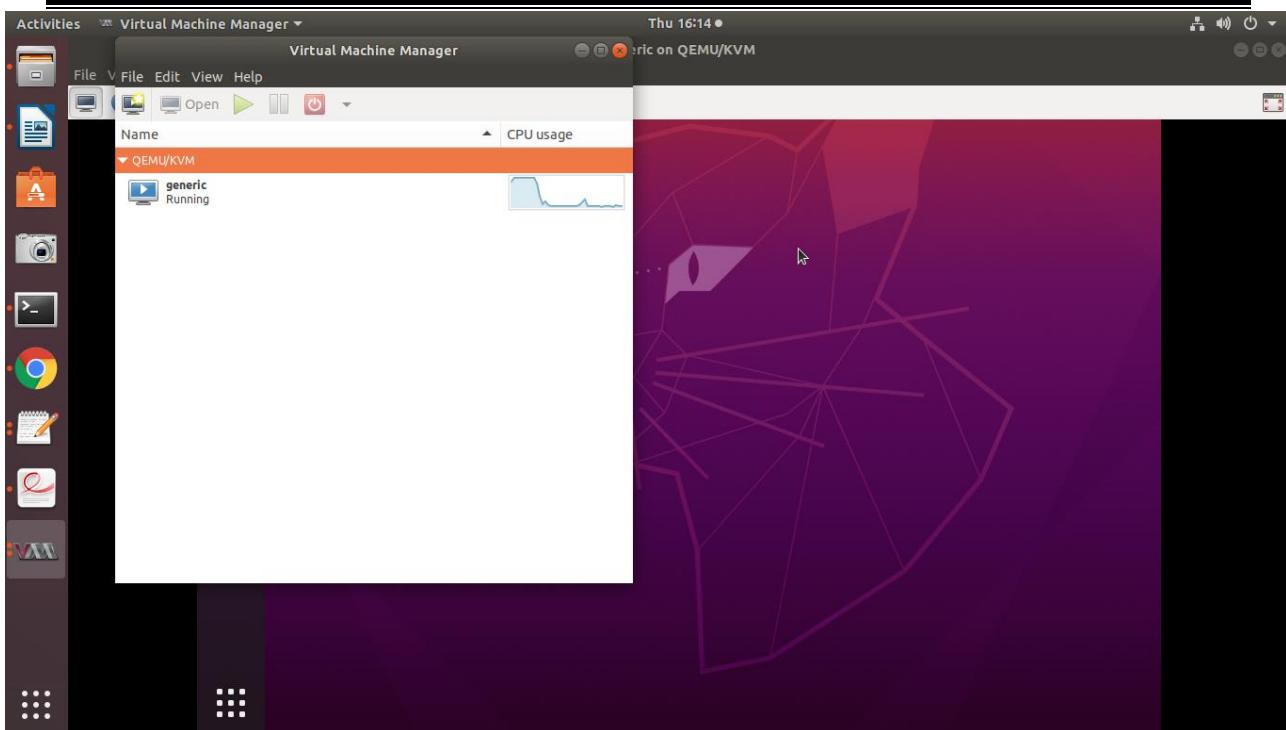




Next, provide the amount of storage that you want to assign to a virtual machine. Then, click on the Forward button







## Program no:10

**Aim:** Introduction to Containers: Docker installation and deployment

### Source code:

### procedure

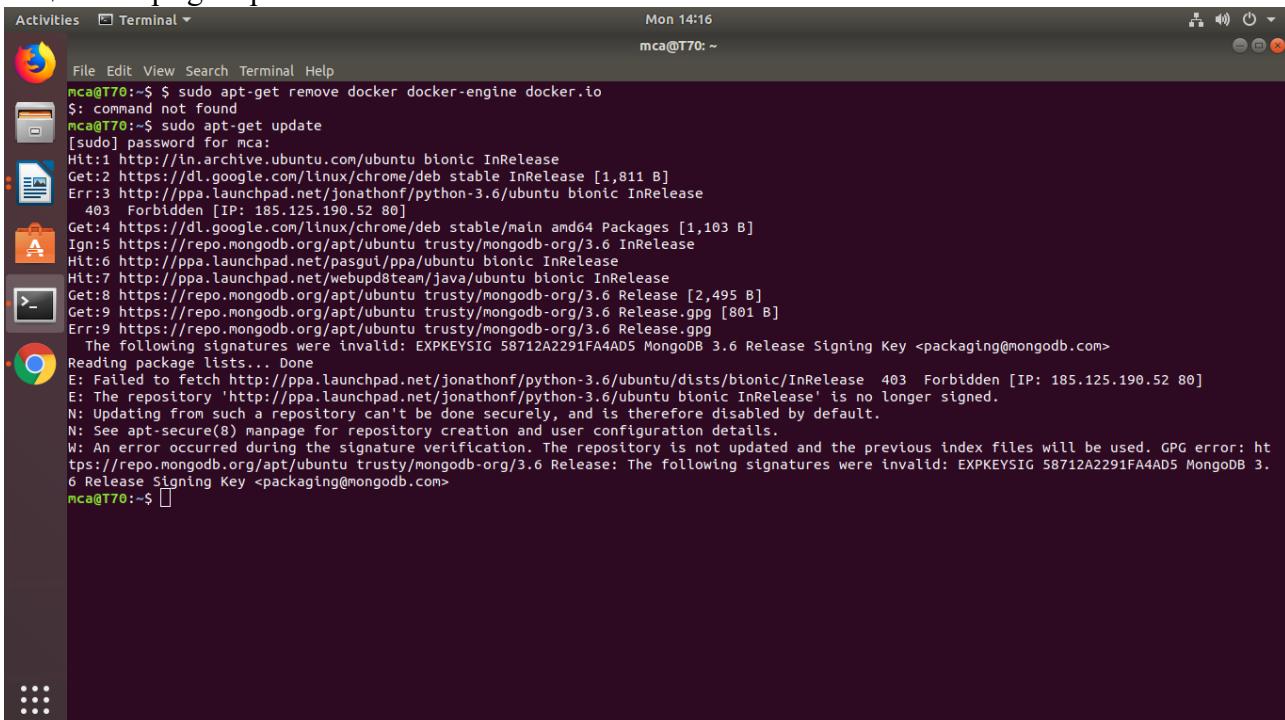
1. Open the terminal on Ubuntu.
2. Remove any Docker files that are running in the system, using the following command

```
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.

3]Check if the system is up-to-date using the following command:

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



```
mca@T70:~$ sudo apt-get update
[sudo] password for mca:
Hit:1 http://in.archive.ubuntu.com/ubuntu bionic InRelease
Get:2 https://dl.google.com/linux/chrome/deb stable InRelease [1,811 B]
Err:3 http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease
  403 Forbidden [IP: 185.125.190.52 80]
Get:4 https://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,103 B]
Ign:5 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 InRelease
Hit:6 http://ppa.launchpad.net/pasgul/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 [2,495 B]
Get:9 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release.gpg [801 B]
Err:9 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release.gpg
  The following signatures were invalid: EXPKEYSIG 58712A2291FA4ADS MongoDB 3.6 Release Signing Key <packaging@mongodb.com>
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.
W: An error occurred during the signature verification. The repository is not updated and the previous index files will be used. GPG error: ht
tps://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release: The following signatures were invalid: EXPKEYSIG 58712A2291FA4ADS MongoDB 3.
6 Release Signing Key <packaging@mongodb.com>
mca@T70:~$
```

**Name: salini kb**

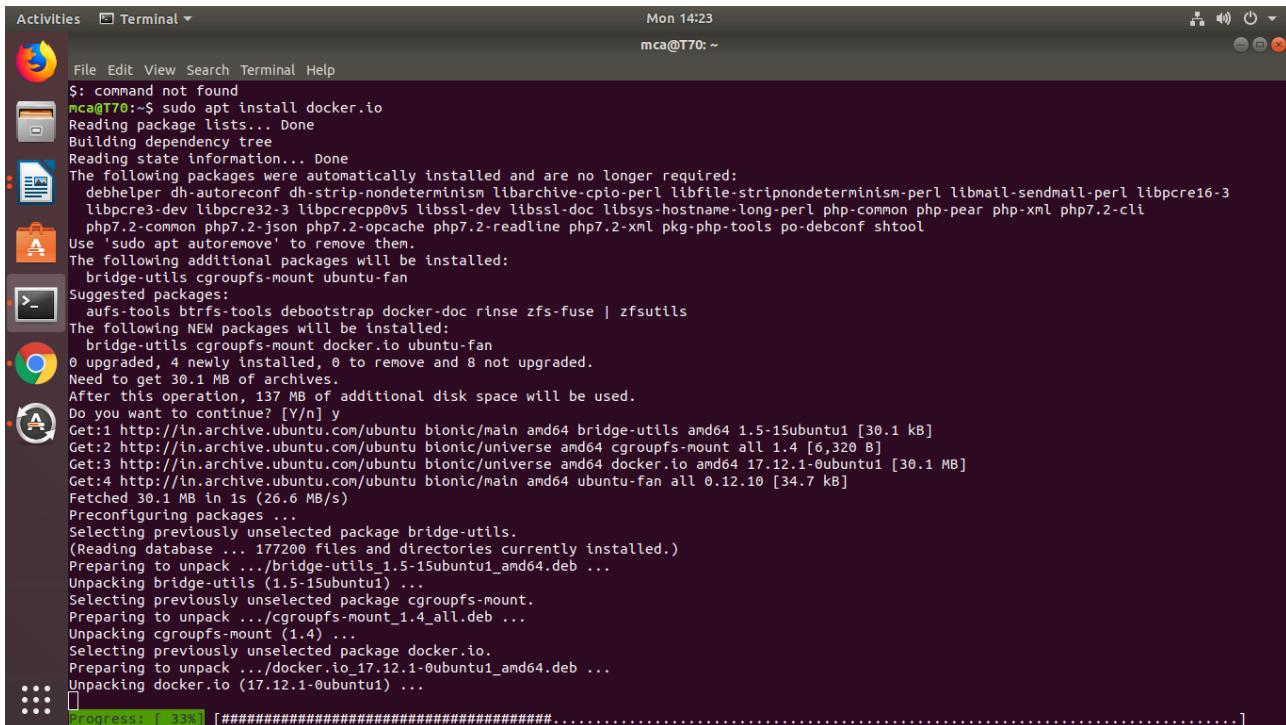
**Roll No:33**

**Batch: MCA-B**

**Date:23/5/2022**

#### 4. Install Docker using the following command:

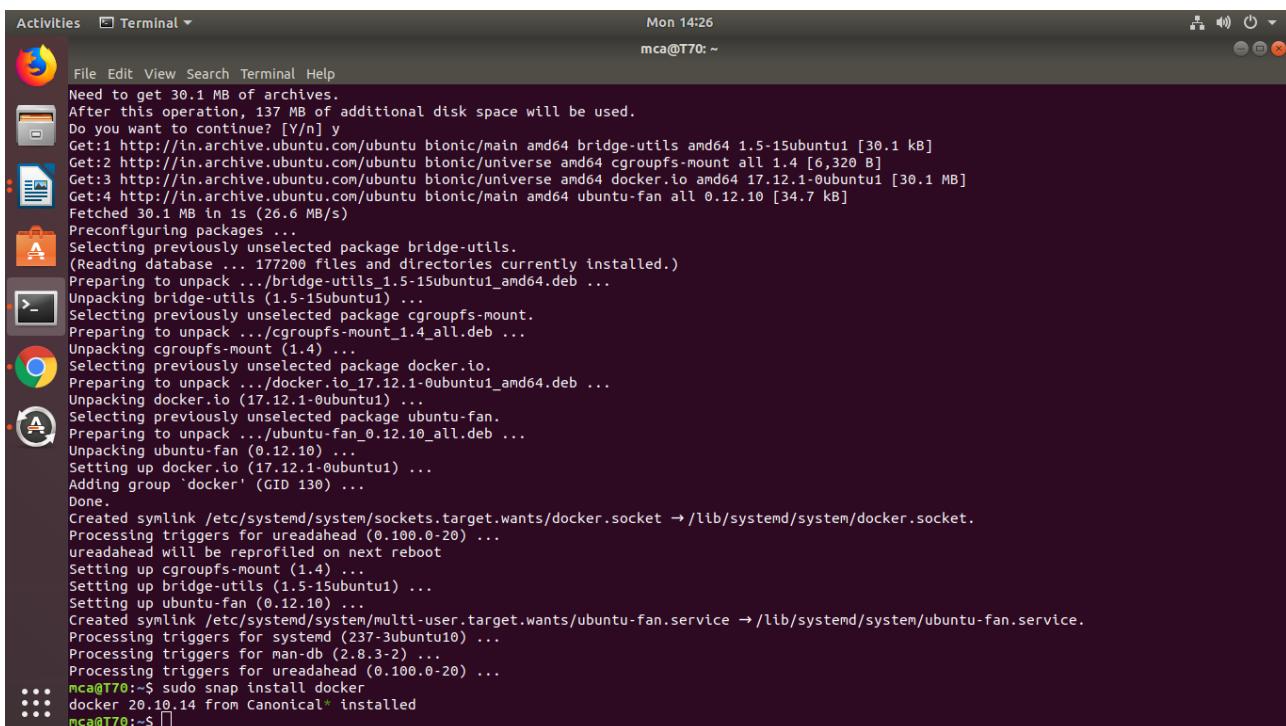
```
$ sudo apt install docker.io
```



```
File Edit View Search Terminal Help
$: command not found
mca@T70:~$ 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 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.
Need to get 30.1 MB of archives.
After this operation, 137 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 bridge-utils amd64 1.5-15ubuntu1 [30.1 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 cgroupfs-mount all 1.4 [6,320 B]
Get:3 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 docker.io amd64 17.12.1-0ubuntu1 [30.1 MB]
Get:4 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 ubuntu-fan all 0.12.10 [34.7 kB]
Fetched 30.1 MB in 1s (26.6 MB/s)
Preconfiguring packages ...
Selecting previously unselected package bridge-utils.
(Reading database ... 177200 files and directories currently installed.)
Preparing to unpack .../bridge-utils_1.5-15ubuntu1_amd64.deb ...
Unpacking bridge-utils (1.5-15ubuntu1) ...
Selecting previously unselected package cgroupfs-mount.
Preparing to unpack .../cgroupfs-mount_1.4_all.deb ...
Unpacking cgroupfs-mount (1.4) ...
Selecting previously unselected package docker.io.
Preparing to unpack .../docker.io_17.12.1-0ubuntu1_amd64.deb ...
Unpacking docker.io (17.12.1-0ubuntu1) ...
Progress: [ 33% [#####
.....]
```

#### 5. Install all the dependency packages using the following command:

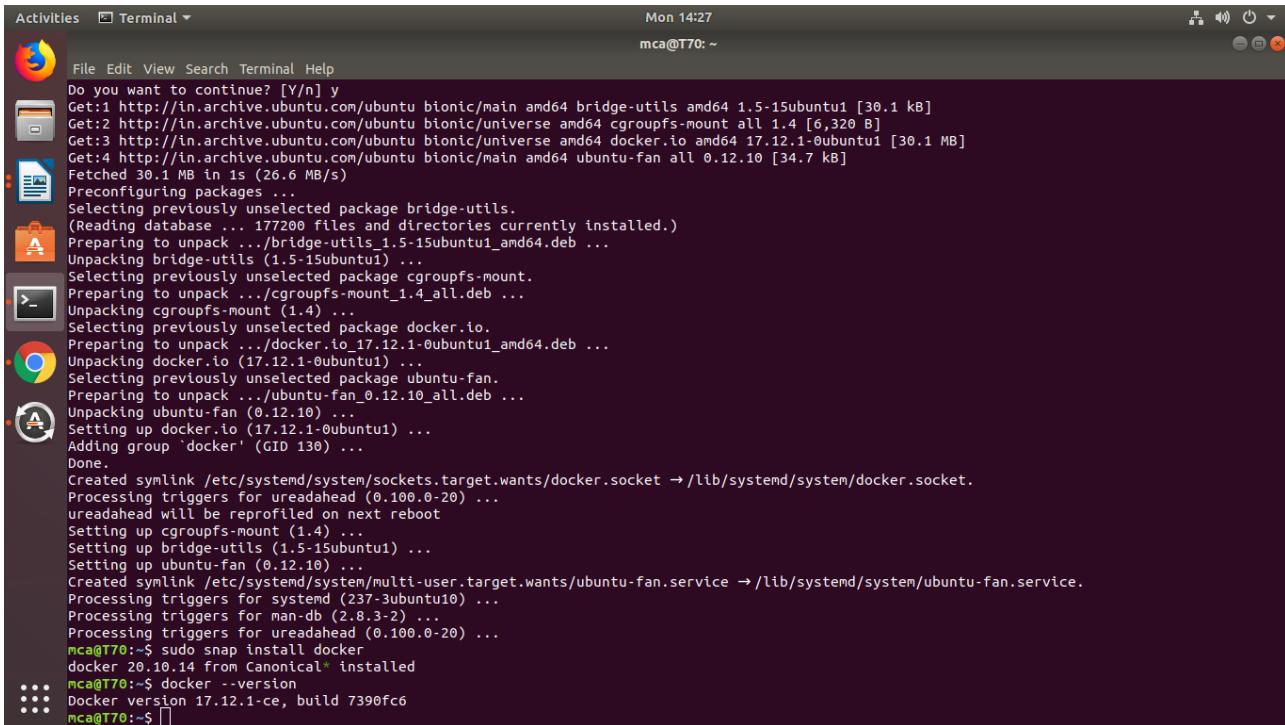
```
$ sudo snap install docker
```



```
File Edit View Search Terminal Help
Need to get 30.1 MB of archives.
After this operation, 137 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 bridge-utils amd64 1.5-15ubuntu1 [30.1 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 cgroupfs-mount all 1.4 [6,320 B]
Get:3 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 docker.io amd64 17.12.1-0ubuntu1 [30.1 MB]
Get:4 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 ubuntu-fan all 0.12.10 [34.7 kB]
Fetched 30.1 MB in 1s (26.6 MB/s)
Preconfiguring packages ...
Selecting previously unselected package bridge-utils.
(Reading database ... 177200 files and directories currently installed.)
Preparing to unpack .../bridge-utils_1.5-15ubuntu1_amd64.deb ...
Unpacking bridge-utils (1.5-15ubuntu1) ...
Selecting previously unselected package cgroupfs-mount.
Preparing to unpack .../cgroupfs-mount_1.4_all.deb ...
Unpacking cgroupfs-mount (1.4) ...
Selecting previously unselected package docker.io.
Preparing to unpack .../docker.io_17.12.1-0ubuntu1_amd64.deb ...
Unpacking docker.io (17.12.1-0ubuntu1) ...
Selecting previously unselected package ubuntu-fan.
Preparing to unpack .../ubuntu-fan_0.12.10_all.deb ...
Unpacking ubuntu-fan (0.12.10) ...
Setting up docker.io (17.12.1-0ubuntu1) ...
Adding group 'docker' (GID 130) ...
Done.
Created symlink /etc/systemd/system/sockets.target.wants/docker.socket → /lib/systemd/system/docker.socket.
Processing triggers for ureadahead (0.100.0-20) ...
ureadahead will be reprofiled on next reboot
Setting up cgroupfs-mount (1.4) ...
Setting up bridge-utils (1.5-15ubuntu1) ...
Setting up ubuntu-fan (0.12.10) ...
Created symlink /etc/systemd/system/multi-user.target.wants/ubuntu-fan.service → /lib/systemd/system/ubuntu-fan.service.
Processing triggers for systemd (237-3ubuntu10) ...
Processing triggers for man-db (2.8.3-2) ...
Processing triggers for ureadahead (0.100.0-20) ...
mca@T70:~$ sudo snap install docker
docker 20.10.14 from Canonical* installed
mca@T70:~$
```

6. Before testing Docker, check the version installed using the following command:

```
$ docker --version
```

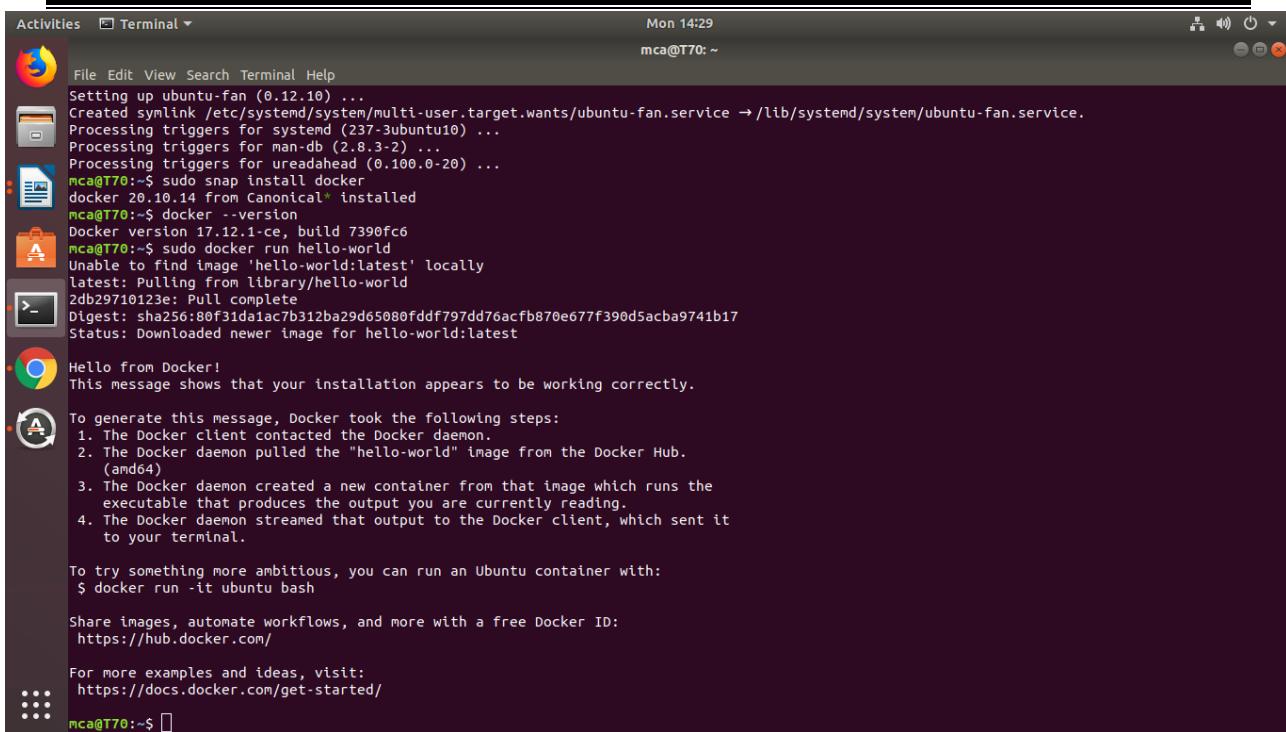


The screenshot shows a terminal window titled "Terminal" with the command \$ docker --version. The output indicates that Docker version 17.12.1-ce, build 7390fc6 is installed. The terminal also shows the process of installing Docker via snap, including file downloads and package installations for bridge-utils, cgroupfs-mount, docker.io, and ubuntu-fan.

```
File Edit View Search Terminal Help
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 bridge-utils amd64 1.5-15ubuntu1 [30.1 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 cgroupfs-mount all 1.4 [6,320 B]
Get:3 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 docker.io amd64 17.12.1-0ubuntu1 [30.1 MB]
Fetched 30.1 MB in 1s (26.6 MB/s)
Preconfiguring packages ...
Selecting previously unselected package bridge-utils.
(Reading database ... 177200 files and directories currently installed.)
Preparing to unpack .../bridge-utils_1.5-15ubuntu1_amd64.deb ...
Unpacking bridge-utils (1.5-15ubuntu1) ...
Selecting previously unselected package cgroupfs-mount.
Preparing to unpack .../cgroufs-mount_1.4_all.deb ...
Unpacking cgroupfs-mount (1.4) ...
Selecting previously unselected package docker.io.
Preparing to unpack .../docker.io_17.12.1-0ubuntu1_amd64.deb ...
Unpacking docker.io (17.12.1-0ubuntu1) ...
Selecting previously unselected package ubuntu-fan.
Preparing to unpack .../ubuntu-fan_0.12.10_all.deb ...
Unpacking ubuntu-fan (0.12.10) ...
Setting up docker.io (17.12.1-0ubuntu1) ...
Adding group 'docker' (GID 130) ...
Done.
Created symlink /etc/systemd/system/sockets.target.wants/docker.socket → /lib/systemd/system/docker.socket.
Processing triggers for ureadahead (0.100.0-20) ...
ureadahead will be reprofilled on next reboot
Setting up cgroupfs-mount (1.4) ...
Setting up bridge-utils (1.5-15ubuntu1) ...
Setting up ubuntu-fan (0.12.10) ...
Created symlink /etc/systemd/system/multi-user.target.wants/ubuntu-fan.service → /lib/systemd/system/ubuntu-fan.service.
Processing triggers for systemd (237-3ubuntu10) ...
Processing triggers for man-db (2.8.3-2) ...
Processing triggers for ureadahead (0.100.0-20) ...
mca@T70:~$ sudo snap install docker
docker 20.10.14 from Canonical* installed
mca@T70:~$ docker --version
Docker version 17.12.1-ce, build 7390fc6
mca@T70:~$
```

7. Pull an image from the Docker hub using the following command:

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



```

Activities Terminal Mon 14:29
mca@T70: ~

File Edit View Search Terminal Help
Setting up ubuntu-fan (0.12.10) ...
Created symlink /etc/systemd/system/multi-user.target.wants/ubuntu-fan.service → /lib/systemd/system/ubuntu-fan.service.
Processing triggers for systemd (237-3ubuntu10) ...
Processing triggers for man-db (2.8.3-2) ...
Processing triggers for ureadahead (0.100.0-20) ...
mca@T70:~$ sudo snap install docker
docker 20.10.14 from Canonical* installed
mca@T70:~$ docker --version
Docker version 17.12.1-ce, build 7390fc6
mca@T70:~$ sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:80f31da1c7b312ba29d65080ffdf797dd76acf870e677f390d5acba9741b17
Status: Downloaded newer image for hello-world:latest

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

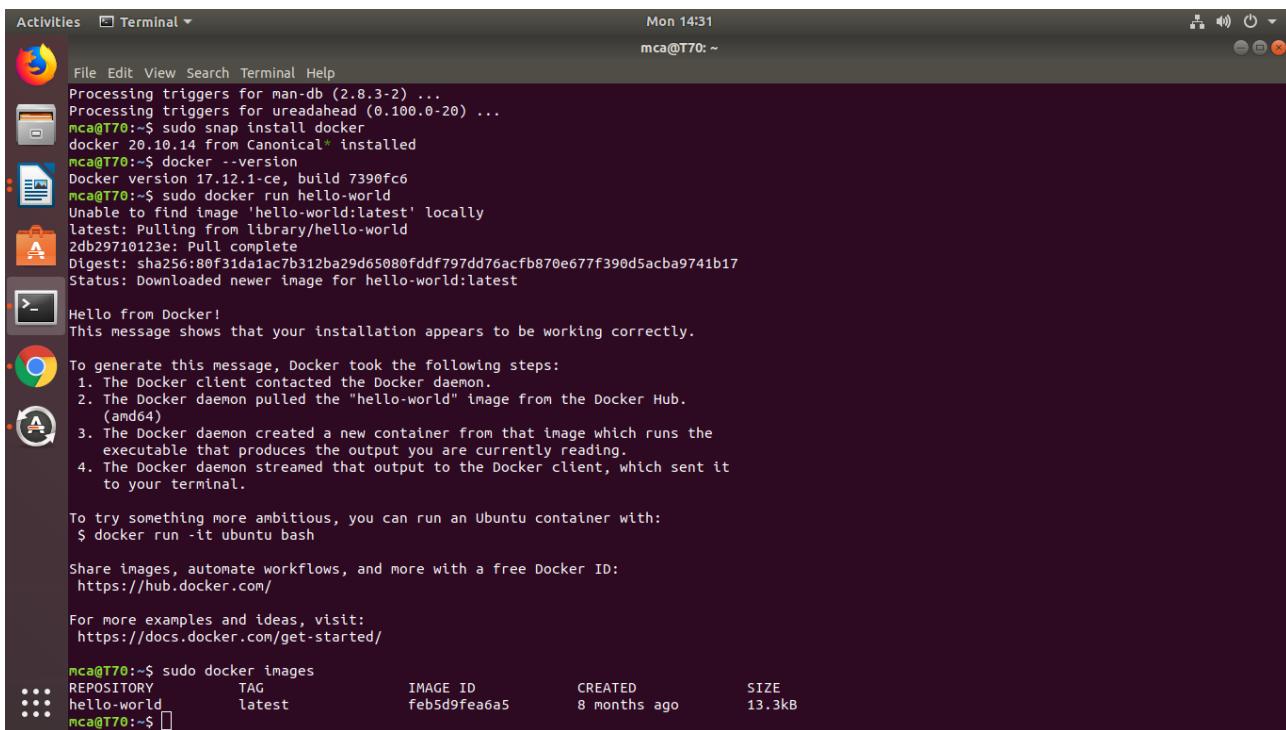
Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/
mca@T70:~$ 

```

## 8. Check if the docker image has been pulled and is present in your system using the following command:

**\$ sudo docker images**



```

Activities Terminal Mon 14:31
mca@T70: ~

File Edit View Search Terminal Help
Processing triggers for man-db (2.8.3-2) ...
Processing triggers for ureadahead (0.100.0-20) ...
mca@T70:~$ sudo snap install docker
docker 20.10.14 from Canonical* installed
mca@T70:~$ docker --version
Docker version 17.12.1-ce, build 7390fc6
mca@T70:~$ sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:80f31da1c7b312ba29d65080ffdf797dd76acf870e677f390d5acba9741b17
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.

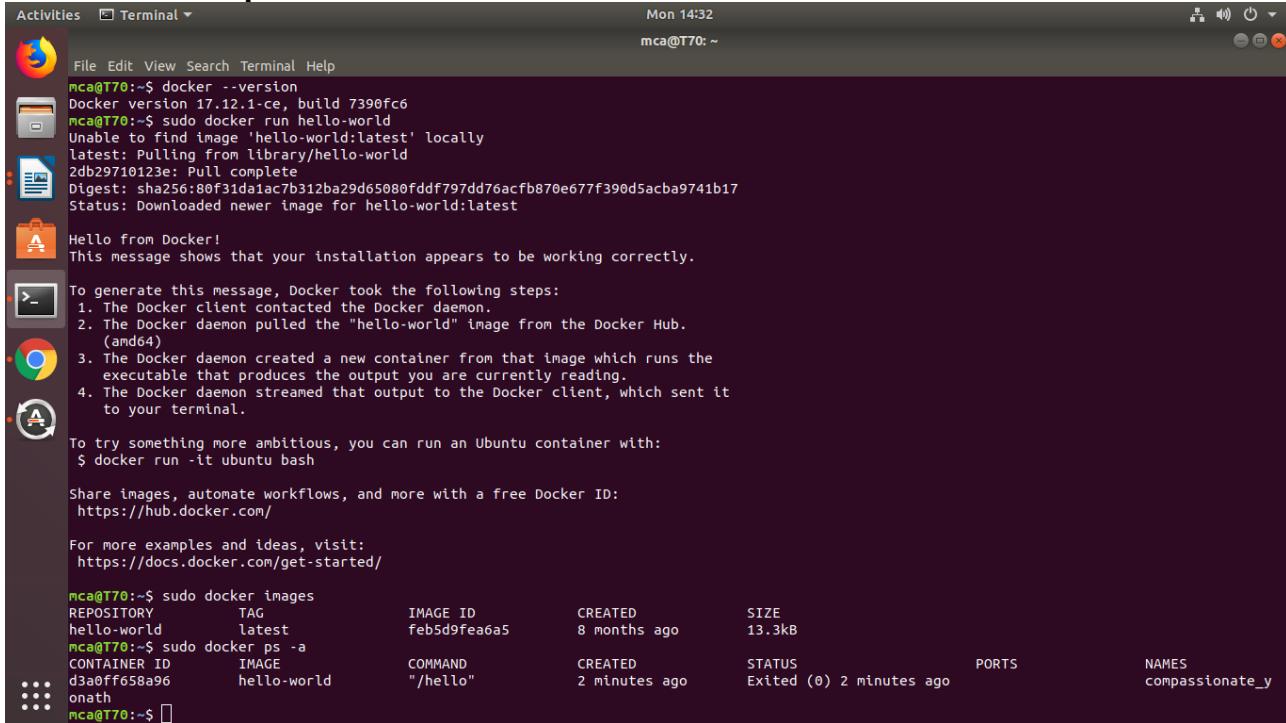
To generate this message, Docker took the following steps:
1. The Docker client contacted the Docker daemon.
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
   (amd64)
3. The Docker daemon created a new container from that image which runs the
   executable that produces the 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/
mca@T70:~$ sudo docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
hello-world     latest   feb5d9fea6a5   8 months ago  13.3kB
mca@T70:~$ 

```

**9. To display all the containers pulled, use the following command:****\$ sudo docker ps -a**

```
Activities Terminal Mon 14:32 mca@T70: ~
File Edit View Search Terminal Help
mca@T70:~$ docker --version
Docker version 17.12.1-ce, build 7390fc6
mca@T70:~$ sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:80f31dalac7b312ba29d65080ffdf797dd76acf870e677f390d5acba9741b17
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.

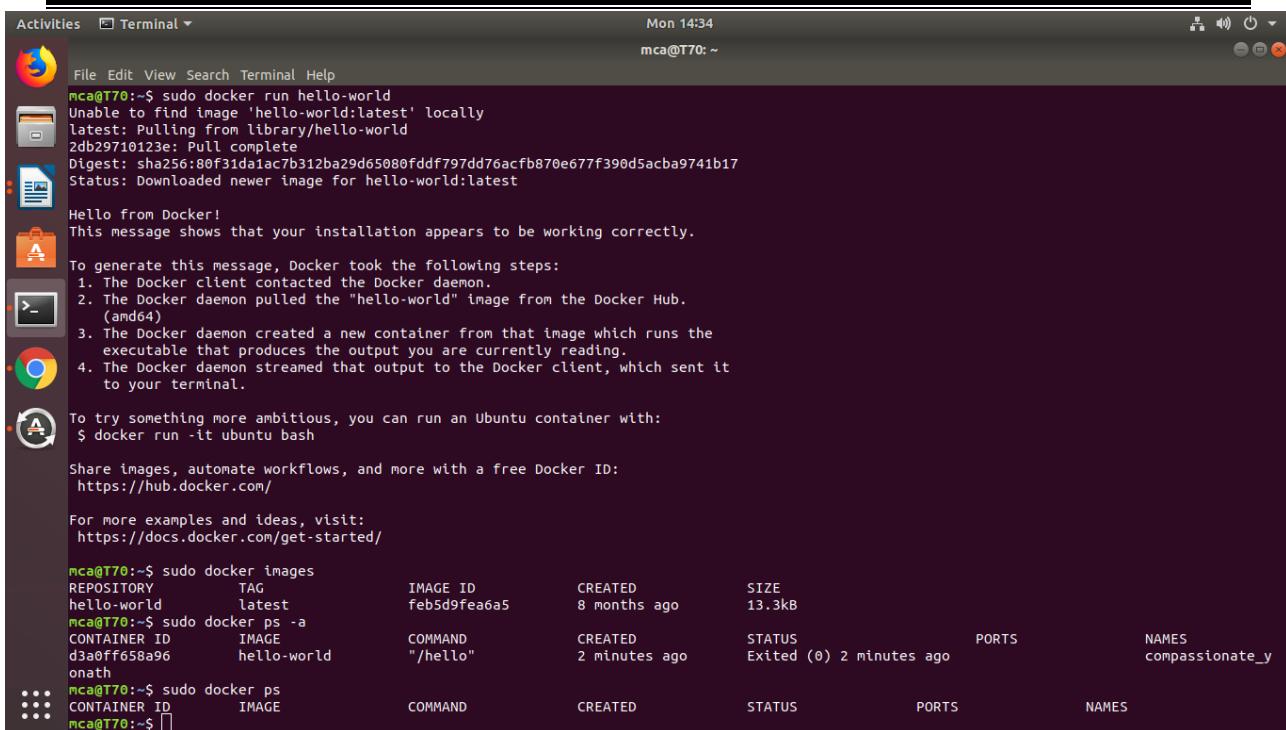
To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
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mca@T70:~$ sudo docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
hello-world    latest    feb5d9fea6a5    8 months ago   13.3kB
mca@T70:~$ sudo docker ps -a
CONTAINER ID      IMAGE      COMMAND      CREATED      STATUS      PORTS      NAMES
d3a0ff658a96    hello-world    "/hello"    2 minutes ago   Exited (0) 2 minutes ago   compassionate_y
mca@T70:~$
```

**10. To check for containers in a running state, use the following command:****\$ sudo docker ps**



```

Activities Terminal Mon 14:34
mca@T70:~$ sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:80f31da1ac7b312ba29d65080ffdf797dd76acf870e677f390d5acba9741b17
Status: Downloaded newer image for hello-world:latest

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/

mca@T70:~$ sudo docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
hello-world     latest   feb5d9fea6a5  8 months ago  13.3kB
mca@T70:~$ sudo docker ps -a
CONTAINER ID   IMAGE      COMMAND      CREATED      STATUS      PORTS      NAMES
d3a0ff658a96   hello-world "/hello"   2 minutes ago   Exited (0) 2 minutes ago   compassionate_y
onath
mca@T70:~$ sudo docker ps
CONTAINER ID   IMAGE      COMMAND      CREATED      STATUS      PORTS      NAMES
mca@T70:~$ 

```

**successfully installed Docker on Ubuntu!**

## Aim: Setting Up an Apache Container

One of the amazing things about the **Docker** ecosystem is that there are tens of standard containers that you can easily download and use.

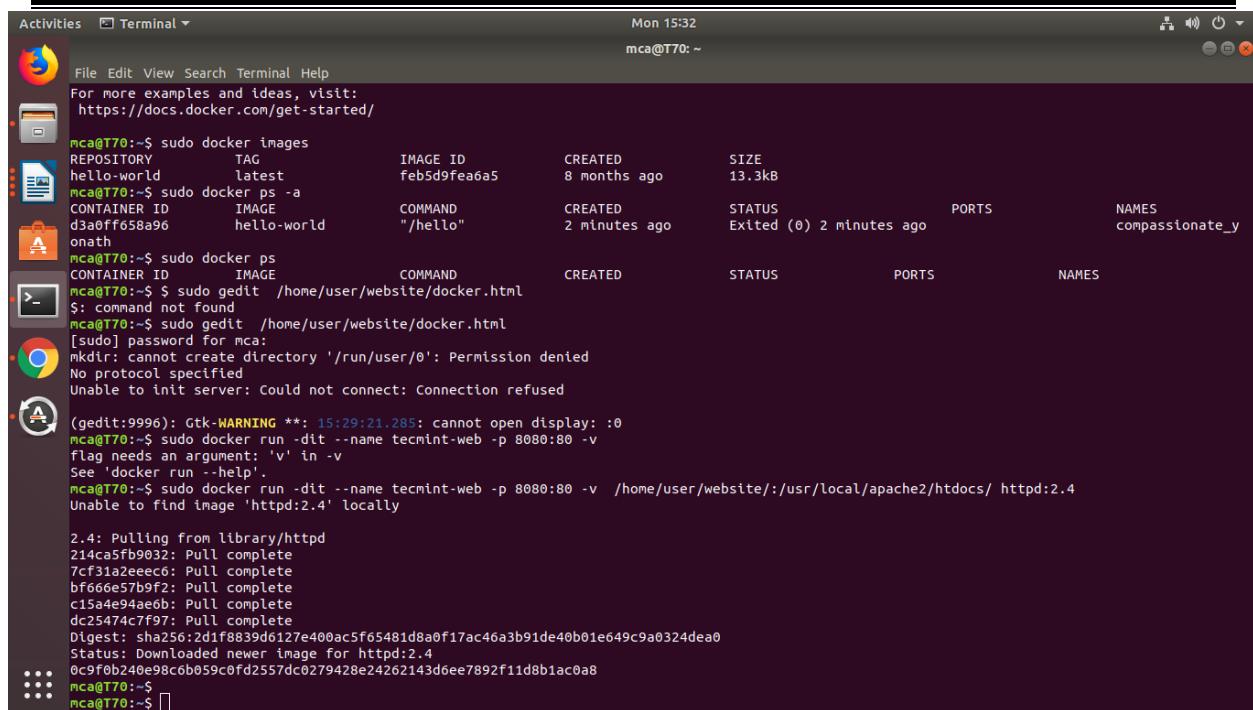
In the following example, we will instantiate an **Apache 2.4** container named **tecmint-web**, detached from the current terminal. We will use an image called **httpd:2.4** from **Docker Hub**

Our plan is to have requests made to our public IP address on port **8080** be redirected to port **80** on the container. Also, instead of serving content from the container itself, we will serve a simple web page from **/home/user/website**.

We do this by mapping **/home/user/website** on the **/usr/local/apache2/htdocs** on the container. Note that you will need to use **sudo** or login as **root** to proceed, and do not omit the forward slashes at the end of each directory.

### Step-1

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



```

Activities Terminal Mon 15:32
mca@T70:~$ sudo docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
hello-world latest feb5d9fea6a5 8 months ago 13.3kB
mca@T70:~$ sudo docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
d3a0ff658a96 hello-world "/hello" 2 minutes ago Exited (0) 2 minutes ago
onath
mca@T70:~$ sudo docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
mca@T70:~$ sudo gedit /home/user/website/docker.html
$: command not found
mca@T70:~$ sudo gedit /home/user/website/docker.html
[sudo] password for mca:
mkdir: cannot create directory '/run/user/0': Permission denied
No protocol specified
Unable to init server: Could not connect: Connection refused
mca@T70:~$ sudo docker run -dit --name tecmint-web -p 8080:80 -v /home/user/website/:/usr/local/apache2/htdocs/ httpd:2.4
Unable to find image 'httpd:2.4' locally
2.4: Pulling from library/httpd
214ca5fb9032: Pull complete
7cf31a2e0ec6: Pull complete
bf666e57b9f2: Pull complete
c15a4e94ae6b: Pull complete
dc25474c7f97: Pull complete
Digest: sha256:d1df8839d6127e400ac5f65481d8a0f17ac46a3b91de40b01e649c9a0324dea0
Status: Downloaded newer image for httpd:2.4
0c9f0b240e98c6b059c0fd2557dc0279428e24262143d6ee7892f11d8b1ac0a8
mca@T70:~$ 
mca@T70:~$ 

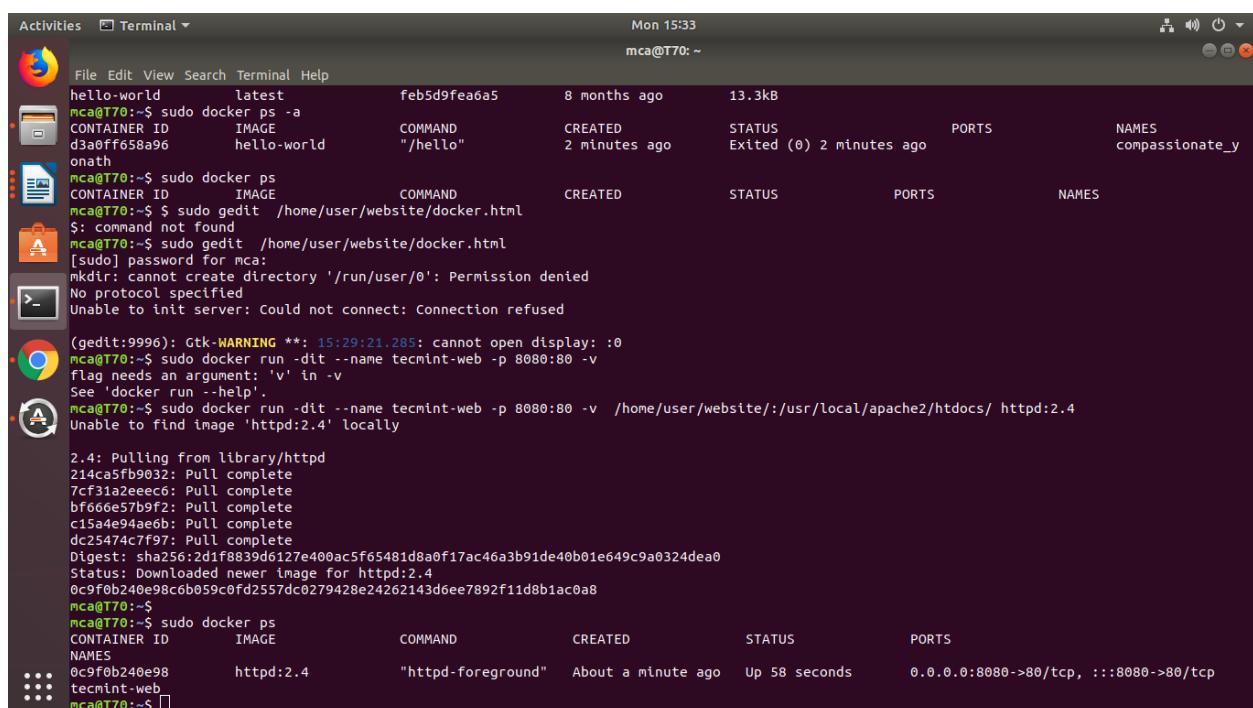
```

## Pull Docker Apache Container

At this point, our **Apache** container should be up and running.

### Step-2

`$ sudo docker ps`



```

Activities Terminal Mon 15:33
mca@T70:~$ sudo docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
d3a0ff658a96 hello-world "/hello" 2 minutes ago Exited (0) 2 minutes ago
onath
mca@T70:~$ sudo docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
mca@T70:~$ sudo gedit /home/user/website/docker.html
$: command not found
mca@T70:~$ sudo gedit /home/user/website/docker.html
[sudo] password for mca:
mkdir: cannot create directory '/run/user/0': Permission denied
No protocol specified
Unable to init server: Could not connect: Connection refused
mca@T70:~$ sudo docker run -dit --name tecmint-web -p 8080:80 -v /home/user/website/:/usr/local/apache2/htdocs/ httpd:2.4
Unable to find image 'httpd:2.4' locally
2.4: Pulling from library/httpd
214ca5fb9032: Pull complete
7cf31a2e0ec6: Pull complete
bf666e57b9f2: Pull complete
c15a4e94ae6b: Pull complete
dc25474c7f97: Pull complete
Digest: sha256:d1df8839d6127e400ac5f65481d8a0f17ac46a3b91de40b01e649c9a0324dea0
Status: Downloaded newer image for httpd:2.4
0c9f0b240e98c6b059c0fd2557dc0279428e24262143d6ee7892f11d8b1ac0a8
mca@T70:~$ 
mca@T70:~$ sudo docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
0c9f0b240e98c6b059c0fd2557dc0279428e24262143d6ee7892f11d8b1ac0a8 tecmint-web
mca@T70:~$ 

```

### Check Apache Docker Container

Now let's create a simple web page named **docker.html** inside the **/home/user/website** directory.

#### Step-3

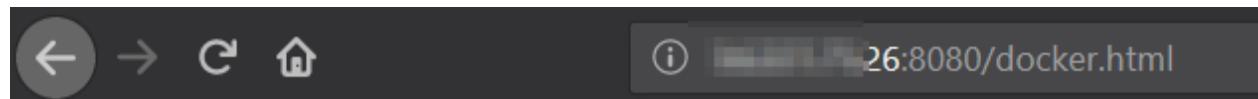
```
$ sudo gedit /home/user/website/docker.html
```

Add the following sample HTML content to the file.

```
<!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>
```

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

Next, point your browser to **Server-IP:8080/docker.html** (where **Server-IP** is your host's public IP address). You should be presented with the page we created previously.



## Learn Docker With Us

### Check Apache Page

If you wish, you can now stop the container.

#### Step-4

```
$ sudo docker stop tecmint-web
```

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

and remove it:

#### step-5

```
$ sudo docker rm tecmint-web
```

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

To finish cleaning up, you may want to delete the image that was used in the container (omit this step if you're planning on creating other **Apache 2.4** containers soon).

#### Step-6

```
$ sudo docker image remove httpd:2.4
```

```
mca@S26:~$ 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@S26:~$
```