

Experiment No.: 3

Aim

Familiarisation of Linux Commands

CO2

Perform System administration tasks

Procedure

1)pwd-The path of the current working directory

```
mca@t2:~$ pwd  
/home/mca
```

2)ls- To view the contents of the directory

```
mca@t2:~$ ls  
c.txt Desktop Documents Downloads file1 Music output.txt Pictures profile Public Templates tinu
```

a)ls -R – To view list of all files in subdirectory

```
mca@t2:~$ ls -R  
.:  
c.txt Desktop Documents Downloads file1 Music output.txt  
./Desktop:  
tinu
```

b)ls -l – Long listing of the contents

```
mca@t2:~$ ls -l  
total 56  
-rw-rw-r-- 1 mca mca 16 Mar 7 16:42 c.txt  
drwxr-xr-X 3 mca mca 4096 Mar 7 16:56 Desktop  
drwxr-xr-X 2 mca mca 4096 Jun 17 2022 Documents  
drwxr-xr-X 2 mca mca 4096 Jun 17 2022 Downloads  
-rw-rw-r-- 1 mca mca 41 Mar 7 16:44 file1  
drwxr-xr-X 2 mca mca 4096 Jun 17 2022 Music  
-rw-rw-r-- 1 mca mca 41 Mar 7 16:46 output.txt  
drwxr-xr-X 2 mca mca 4096 Jun 17 2022 Pictures  
-rw-rw-r-- 1 mca mca 83 Mar 13 11:33 profile  
drwxr-xr-X 2 mca mca 4096 Jun 17 2022 Public  
drwxr-xr-X 2 mca mca 4096 Jun 17 2022 Templates  
-rw-rw-r-- 1 mca mca 43 Mar 7 16:32 tinu  
-rw-rw-r-- 1 mca mca 15 Mar 7 16:37 tinusample  
drwxr-xr-X 2 mca mca 4096 Jun 17 2022 Videos
```

c)ls -a – To list all the hidden files

```
mca@t2:~$ ls -a
.          .bash_logout  .config  Documents
..         .bashrc       c.txt    Downloads
.bash_history .cache      Desktop  file1
```

d)ls –al- List the files and directories with detailed information such as owner, file size, permission etc.

```
mca@t2:~$ ls -al
total 104
drwxr-xr-x 16 mca  mca  4096 Mar 13 11:32 .
drwxr-xr-x  6 root root 4096 Jun 17 2022 ..
-rw-----  1 mca  mca   716 Mar 13 11:05 .bash_history
-rw-r--r--  1 mca  mca   220 Jun 17 2022 .bash_logout
-rw-r--r--  1 mca  mca  3771 Jun 17 2022 .bashrc
drwxr-xr-x 14 mca  mca  4096 Mar  7 16:48 .cache
drwxr-xr-x 13 mca  mca  4096 Mar 13 11:16 .config
-rw-rw-r--  1 mca  mca    16 Mar  7 16:42 c.txt
drwxr-xr-x  3 mca  mca  4096 Mar  7 16:56 Desktop
drwxr-xr-x  2 mca  mca  4096 Jun 17 2022 Documents
drwxr-xr-x  2 mca  mca  4096 Jun 17 2022 Downloads
-rw-rw-r--  1 mca  mca    41 Mar  7 16:44 file1
drwx-----  3 mca  mca  4096 Mar 13 10:55 .gnupg
drwxr-xr-x  3 mca  mca  4096 Jun 17 2022 .local
drwxr-xr-x  2 mca  mca  4096 Jun 17 2022 Music
-rw-rw-r--  1 mca  mca    41 Mar  7 16:46 output.txt
drwxr-xr-x  2 mca  mca  4096 Jun 17 2022 Pictures
drwx-----  3 mca  mca  4096 Mar  7 16:05 .pki
```

e)ls –t – List the files in the order of last modified

```
mca@t2:~$ ls -t
Desktop  file1  tinusample  Documents  Music  Public  Videos
output.txt  c.txt  tinu      Downloads  Pictures  Templates
```

f)ls –r – To reverse in natural sorting order

```
mca@t2:~$ ls -r
Videos  tinu  Public  output.txt  file1  Documents  c.txt
tinusample  Templates  Pictures  Music  Downloads  Desktop
```

3) history – To review the commands that have been previously executed for certain period of time

```
mca@t2:~$ history
1 ./studio.sh
2 sudo ./studio.sh
3 ./ studio
4 ./ studio.sh
5 ./studio.sh
6 sudo ./studio.sh
7 javac
8 sudo apt-get install openjdk-11-jdk
9 sudo ./studio.sh
10 su student
11 ls
12 ls
```

4)man – You can learn and understand about different commands, write from the shell using man command

```
LS(1)                               User Commands                               LS(1)

NAME
    ls - list directory contents

SYNOPSIS
    ls [OPTION]... [FILE]...

DESCRIPTION
    List information about the FILEs (the current directory by default). Sort entries alphabetically if none of -cftuvSUX nor --sort
    is specified.

    Mandatory arguments to long options are mandatory for short options too.

    -a, --all
        do not ignore entries starting with .

    -A, --almost-all
        do not list implied . and ..
```

5)mkdir – To create a new directory

```
mca@t2:~$ mkdir new
mca@t2:~$ cd new
mca@t2:~/new$ ls
mca@t2:~/new$ cd ..
mca@t2:~$ ls
Desktop  Documents  Downloads  Music  new  Pictures  Public  Templates  Videos
```

6)cd –Used to change the directory to previous directory

```
mca@t2:~$ cd
mca@t2:~$ cd new
mca@t2:~/new$ cd ..
```

7)rmdir - To remove the empty directory

```
mca@t2:~$ rmdir new
mca@t2:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
```

8)touch – To create a new empty file

```
mca@t2:~$ touch tinu
mca@t2:~$ man touch
mca@t2:~$ ls
Desktop Documents Downloads Music Pictures Public Templates tinu Videos
```

9)cat – To view, create, concatenate files

a)cat > file1.txt – To add contents

```
mca@t2:~$ cat > tinu
TINU CLARA EMMANUEL
AJCE
MCA
^Z
[1]+ Stopped cat > tinu
```

b)cat file1.txt – To view

```
mca@t2:~$ cat tinu
TINU CLARA EMMANUEL
AJCE
MCA
```

c)cat >> file1.txt – To append the contents

```
mca@t2:~$ cat >> tinu
kanjirappally
^Z
[2]+ Stopped cat >> tinu
mca@t2:~$ cat tinu
TINU CLARA EMMANUEL
AJCE
MCA
kanjirappally
```

d)cat file1.txt file2.txt > file3.txt – To store the contents of the two files to another file

```
mca@t2:~$ cat tinu
TINU CLARA EMMANUEL
AJCE
MCA
kanjirappally
```

```
mca@t2:~$ cat > tinusample
minu
anu
sebin
^Z
[3]+  Stopped                  cat > tinusample
mca@t2:~$ cat tinu tinusample > c.txt
mca@t2:~$ cat c.txt
TINU CLARA EMMANUEL
AJCE
MCA
kanjirappally
minu
anu
sebin
```

e)cat -n file3.txt – To display the contents with line numbers

```
mca@t2:~$ cat -n c.txt
 1 TINU CLARA EMMANUEL
 2 AJCE
 3 MCA
 4 kanjirappally
 5 minu
 6 anu
 7 sebin
```

f) cat -b file4.txt – To remove the empty line number

```
mca@t2:~$ cat file1
anu
minu
tinu
sebin
happy family

time
mca@t2:~$ cat -b file1
1 anu
2 minu
3 tinu
4 sebin
5 happy family

6 time
```

g)cat file1.txt | tr a-z A-Z > output.txt – To change the contents to capital letters

```
mca@t2:~$ cat file1|tr a-z A-Z > output.txt
mca@t2:~$ cat output.txt
ANU
MINU
TINU
SEBIN
HAPPY FAMTLY
```

Result

The program was executed and the result was successfully obtained. Thus CO₂ was obtained.

Experiment No.: 4

Aim

Familiarisation of Linux Commands

CO2

Perform System Administration tasks

Procedure

1)cut-For cutting out sections from each line of files and writing the result to standard output

a)\$cut -b1 filename-cut by byte position

```
ubuntu@Tinu:~/newfile$ cat > fil1
colours-green,red,black,blue
numbers-3,24,29,45
```

```
ubuntu@Tinu:~/newfile$ cut -b1 fil1
c
n
```

b)\$cut -c3 filename-cut by character position

```
ubuntu@Tinu:~/newfile$ cut -c3 fil1
l
m
```

c)cut -d - -f1 filename: cut command to just print the first field of the file using the delimiter “-”

```
ubuntu@Tinu:~/newfile$ cut -d - -f1 fil1
colours
numbers
```

```
ubuntu@Tinu:~/newfile$ cut -d - -f2 fil1
green,red,black,blue
3,24,29,45
```

d)cut -c 1,4,6 filename – cut command to cut and print the specified character position

```
ubuntu@Tinu:~/newfile$ cut -c 1,4,6 fil1
cor
nbr
```

e) **cut -d ‘ ‘-f filename** - cut command to just print the first field of the file using the empty delimiter “ ”

```
ubuntu@Tinu:~/newfile$ cut -d ' ' -f1 fil1
colours-green,red,black,blue
numbers-3,24,29,45
```

2)paste- Paste command is used to join files horizontally(Each file consisting of different lines)

a)paste file1 file2-To paste file1 contents in file2

```
ubuntu@Tinu:~/newfile$ cat > fil1
colours-green,red,black,blue
numbers-3,24,29,45
^Z
[1]+  Stopped                  cat > fil1
```

```
ubuntu@Tinu:~/newfile$ cat > fil2
year-2021,2022,2023,2024
months-jan,feb,march,april
^Z
[2]+  Stopped                  cat > fil2
ubuntu@Tinu:~/newfile$ paste fil1 fil2
colours-green,red,black,blue      year-2021,2022,2023,2024
numbers-3,24,29,45      months-jan,feb,march,april
```

b)paste file1 file2 > file3-To paste file1 and file2 contents in a new file

```
ubuntu@Tinu:~/newfile$ paste fil1 fil2 > fil3
ubuntu@Tinu:~/newfile$ cat fil3
colours-green,red,black,blue      year-2021,2022,2023,2024
numbers-3,24,29,45      months-jan,feb,march,april
```

c)paste -d ‘%’ file1 file2- By specifying the delimiter, we can also split the lines into columns with specified delimiter.

```
ubuntu@Tinu:~/newfile$ paste -d "%" fil1 fil2
colours-green,red,black,blue%year-2021,2022,2023,2024
numbers-3,24,29,45%months-jan,feb,march,april
```

d)paste -s file1- Helps to display the contents in the file in a horizontal format

```
ubuntu@Tinu:~/newfile$ cat > fil1
colours-green,red,black,blue
numbers-3,24,29,45
^Z
[1]+  Stopped                  cat > fil1
ubuntu@Tinu:~/newfile$ paste -s fil1
colours-green,red,black,blue      numbers-3,24,29,45
```

3) cp - To copy the content to a new file

a)cp file1 file2-To copy file1 contents in file2

```
ubuntu@Tinu:~/newfile$ cp fil1 fil2
ubuntu@Tinu:~/newfile$ cat fil2
colours-green,red,black,blue
numbers-3,24,29,45
```

b) \$cp -r tinu tinu2-to copy the directory along with its sub directories

```
ubuntu@Tinu:~$ cp -r new newfile
ubuntu@Tinu:~$ cd newfile
ubuntu@Tinu:~/newfile$
```

Result

The program was executed and the result was successfully obtained. Thus CO2 was obtained.

Aim

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CO2

Perform System Administration tasks

Procedure

1) read – To read the content of the line, we use read command. This line read the command into a variable

a)read

```
mca@t2:~$ read
computer network and system administration
mca@t2:~$ echo $REPLY
```

b)read variable1 variable2 variable3 -Declare variables to store data

```
mca@t2:~$ read var1 var2 var3
computer networking and system administration
```

```
mca@t2:~$ echo "[${var1}][${var2}][${var3}]"
[computer][networking][and system administration]
```

c) To read contents through multiple lines we use “\” at the end of each line.

```
mca@t2:~$ read
computer \
> networking and \
> system \
> administration
mca@t2:~$ echo $REPLY
computer networking and system administration
```

c)read -p “[Prompt message]” -Prompt user to enter data

```
mca@t2:~$ read -p "ENTER YOUR NAME"
ENTER YOUR NAME TINU
mca@t2:~$ echo "My name is $REPLY"
My name is TINU
```

d)read -n limit -p - Specifies the limit

```
mca@t2:~$ read -n 7 -p "Enter 6 characters only"  
Enter 6 characters only Emmanumca@t2:~$
```

e)read -s -p - it gives the security(hides the data)

```
mca@t2:~$ read -s -p "Enter the password"  
Enter the passwordmca@t2:~$ echo "Password is $REPLY"  
Password is 112325
```

2)wc -To display number of lines, number of words, number of bytes, filename

a)wc filename

```
mca@t2:~$ cat > profile  
My name is TINU  
Student of Amal Jyothi College of Engineering  
Koovappally  
Kottayam  
^Z  
[1]+ Stopped cat > profile  
mca@t2:~$ wc profile  
4 13 83 profile
```

b) wc -l filename

```
mca@t2:~$ wc -l profile  
4 profile
```

c) wc -m filename

```
mca@t2:~$ wc -m profile  
83 profile
```

d) wc -c filename

```
mca@t2:~$ wc -c profile  
83 profile
```

e)wc -w filename

```
mca@t2:~$ wc -w profile  
13 profile
```

f)wc -L filename – Print the length of the longest line

```
mca@t2:~$ wc -L profile  
45 profile
```

3)more - The more command is similar to cat command to display the content. The only difference is that in case of larger files cat command output will scroll off your screen while more command display output one screenful at a time.

a)more filename.txt

```
student@t2:~$ more corona.txt
```

Tasks
Analyses, develops, interprets and evaluates complex system design and architecture specifications, data models and diagrams in the development, configuration and integration of computer systems.

Researches, analyses, evaluates and monitors network infrastructure to ensure networks are configured to operate at optimal performance.

Assesses and recommends improvements to network operations and integrated hardware, software, communications and operating systems.

Computer Network and Systems Engineers plan, develop, deploy, test and optimise network and system services, taking responsibility for configuration.
--More--(52%)

b)more+[number] filename.txt

```
student@t2:~$ more +20 corona.txt
```

A bachelor or postgraduate degree in a related information technology field (such as computer science, network engineering or computer systems) is usually needed to work as a Computer Network and Systems Engineer. Some workers have Vocational Education and Training (VET) qualifications. There are also a wide range of vendor and industry certifications available that may substitute for formal qualifications.

Tasks
--More--(91%)

Activate

c)more +/ [word] [filename.txt] - This option is used to search the string inside your text document. We can view all the instances by navigating through the result.

```
student@t2:~$ more +/Human corona.txt  
  
...skipping  
as not realized at the time that these three different viruses were related.[20][12]  
  
Human coronaviruses were discovered in the 1960s[21][22] using two different methods in the United Kingdom and the United States.[23] E.C. Kendall, Malcolm By
```

d)more -d filename.txt – Helps the user to navigate according to the instruction.”Space key” to continue and “q” to quit.

```
student@t2:~$ more -d corona.txt
```

Researches, analyses, evaluates and monitors network infrastructure to ensure networks are configured to operate at optimal performance.
Assesses and recommends improvements to network operations and integrated hardware, software, communications and operating systems.
Computer Network and Systems Engineers plan, develop, deploy, test and optimise network and system services, taking responsibility for configuration.
--More--(52%)[Press space to continue, 'q' to quit.]

Activate Windows

Go to Settings to activate

Result

The program was executed and the result was successfully obtained. Thus CO2 was obtained.

Aim

Familiarisation of Linux Commands

CO2

Perform System administration tasks

Procedure

1)grep – Used to filter the content which makes our search easy

a)grep [search word] [filename] -To search for a specific content

```
mca@t2:~/new$ cat > details.txt
maths 50
english 40
science45
hindi 34
social 49
^Z
[3]+  Stopped                  cat > details.txt
mca@t2:~/new$ grep 40 details.txt
english 40
```

b)grep -i [search word] [filename] -Its a case insensitive search

```
mca@t2:~/new$ grep -i english details.txt
english 40
```

c)grep -v [search word] [filename] – All the contents except the searched content will be displayed

```
mca@t2:~/new$ grep -v 49 details.txt
maths 50
english 40
science45
hindi 34
```

d)grep -A1 [search word] [filename] – View the content with one line after

```
mca@t2:~/new$ grep -A1 english details.txt  
english 40  
science45
```

e)grep -B1 [search word] [filename] - View the content with one line before

```
mca@t2:~/new$ grep -B1 social details.txt  
hindi 34  
social 49
```

f)grep -C1 [search word] [filename] -View the content with one line before and after.

```
mca@t2:~/new$ grep -C1 science details.txt  
english 40  
science45  
hindi 34
```

2)head – To display the top contents of the file. By default it displays first 10 lines.

a)head [filename]-To display the first 10 lines of the file

```
mca@t2:~/new$ head demo  
1  
2  
3  
4  
5  
6  
7  
8  
9
```

b) head -[limit] [filename]-To display the contents of the file upto a specified limit

```
mca@t2:~/new$ head -5 demo
1
2
3
4
5
```

3)tail – To display the last contents of the file

a)tail [filename]-To display last 10 lines

```
mca@t2:~/new$ tail demo
7
8
9

10
34
56
67
78
89
```

b)tail -[limit] [filename]-To display the last contents of the file upto a specified limit

```
mca@t2:~/new$ tail -5 demo
34
56
67
78
89
```

4)mv – Used for moving a file from one location to another. Its a way of replacing the file. Already written files will be overwritten.

a)mv [file1] [file2] -To move contents from one file to another

```
mca@t2:~/new$ ls
demo details details.txt
mca@t2:~/new$ mv demo details.txt
mca@t2:~/new$ cat details.txt
1
2
3
4
5
6
7
8
9

10
34
56
67
78
89
mca@t2:~/new$ cat demo
```

```
mca@t2:~/new$ cat demo
cat: demo: No such file or directory
mca@t2:~/new$ ls
details details.txt
mca@t2:~/new$ cat details
```

b)mv -b [file1] [file2] – Back-up contents in a file

```
mca@t2:~/new$ cat >profile
hello
how are
you
^Z
[7]+  Stopped                  cat > profile
mca@t2:~/new$ mv -b details.txt profile
mca@t2:~/new$ ls
details profile profile~
mca@t2:~/new$ cat profile~
hello
how are
you
```

c) mv -i [file1] [file2] – To display the prompt message

```
mca@t2:~/new$ cat > profile1
Amal Jyothi clg
kanjirappally
kottayam
^Z
[8]+  Stopped                  cat > profile1
mca@t2:~/new$ mv -i profile profile1
mv: overwrite 'profile1'? [
```

Result

The program was executed and the result was successfully obtained. Thus CO2 was obtained.

Aim

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Procedure

- expr-To calculate the expression and print the output

```
mca@t2:~$ expr 12 \* 3  
36  
mca@t2:~$ expr 12 + 8  
20  
mca@t2:~$ expr 12 - 8  
4
```

```
mca@t2:~$ expr 12 / 4  
3
```

- expr-using user input

```
mca@t2:~$ read x  
20  
mca@t2:~$ read y  
25  
mca@t2:~$ expr $x + $y  
45
```

- df-It is used to get a report on system space usage

```
mca@t2:~$ df  
Filesystem      1K-blocks    Used   Available  Use% Mounted on  
udev            3966888       0    3966888   0% /dev  
tmpfs           799004     1732    797272   1% /run  
/dev/sda6      143135900  23654704  112140604  18% /  
tmpfs           3995016     17880   3977136   1% /dev/shm  
tmpfs            5120        4      5116   1% /run/lock  
tmpfs           3995016       0    3995016   0% /sys/fs/cgroup  
/dev/loop0        63488     63488          0  100% /snap/core20/1518  
/dev/loop1        128       128          0  100% /snap/bare/5  
/dev/loop3       64896     64896          0  100% /snap/core20/1828
```

4. du-It is used to check how much space a file or directory takes in the current directory

```
mca@t2:~$ du file1  
4      file1
```

5. sudo useradd [username]-Add or create a user

```
mca@t2:~$ sudo useradd tinu  
[sudo] password for mca:  
mca@t2:~$ sudo useradd tinu  
useradd: user 'tinu' already exists
```

6. sudo passwd [username]- To update password

```
mca@t2:~$ sudo passwd tinu  
New password:  
Retype new password:  
passwd: password updated successfully
```

7. sudo groupadd -g [group id] [groupname]- To create new group

```
mca@t2:~$ sudo groupadd -g 741 mcadept
```

8. sudo usermod -G [group name] [username]-To add the user to the specified group

```
mca@t2:~$ sudo usermod -G mcadept tinu
```

9. id [user name]-Used to find out user id, group id, group

```
mca@t2:~$ id tinu  
uid=1004(tinu) gid=1005(tinu) groups=1005(tinu),741(mcadept)
```

10. compgen -g – To display all the groups

```
mca@t2:~$ compgen -g  
root  
daemon  
bin  
sys  
adm  
tty  
disk  
lp  
mail  
news  
uucp
```

11)chmod -Used to change the access permissions or files and directories. It stands for change mode-(read(r),write(w),execute(x))

Here writing permission is denied

```
ubuntu@Tinu:~/newfile$ chmod -wx fil1
ubuntu@Tinu:~/newfile$ cat >> fil1
-bash: fil1: Permission denied
```

Here writing permission is granted

```
ubuntu@Tinu:~/newfile$ chmod +wx fil1
ubuntu@Tinu:~/newfile$ cat >> fil1
name-tinu sara riya jenny
^Z
[3]+  Stopped                  cat >> fil1
```

12)sudo chown [username] [filename]-Used to change a file ownership or directory ownership for a user or a group . Chown stands for change owner.

```
mca@t2:~$ sudo chown tinu new2.txt
```

```
mca@t2:~$ chmod +rwx new2.txt
chmod: changing permissions of 'new2.txt': Operation not permitted
mca@t2:~$ ls -l new2.txt
-rw-rw-r-- 1 tinu mca 37 Mar 13 11:50 new2.txt
```

13)\$sudo userdel username-to delete the user

```
mca@t2:~$ sudo userdel tinu
[sudo] password for mca:
```

```
mca@t2:~$ sudo userdel tinu
userdel: user 'tinu' does not exist
```

14)\$sudo groupdel groupname-to delete the group

```
mca@t2:~$ sudo groupdel mcadept
mca@t2:~$ sudo groupdel mcadept
groupdel: group 'mcadept' does not exist
```

Result

The program was executed and the result was successfully obtained. Thus CO2 was obtained.

Experiment No.:8

Date -21-03-2023

Aim

Familiarisation of Linux Commands

CO2

Perform System Administration tasks

Procedure

1)ip addr - Get ip address of the system

```
$ip addr
```

```
mca@t2:~$ ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    qlen 1000
        link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
        inet 127.0.0.1/8 scope host lo
            valid_lft forever preferred_lft forever
        inet6 ::1/128 scope host
            valid_lft forever preferred_lft forever
2: enp3s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 40:16:7e:ac:a5:b2 brd ff:ff:ff:ff:ff:ff
    inet 192.168.6.25/24 brd 192.168.6.255 scope global noprefixroute enp3s0
        valid_lft forever preferred_lft forever
    inet6 fe80::cd53:5b58:cc7a:ea37/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
```

2)ssh user@ip address- Stands for Secure Shell Protocol used to securely connect to a remote server or system. ssh is secure in the sense that it transfers data in encrypted form between host and client.

```
$ssh mca@192.168.6.39
```

```
mca@t2:~$ ssh mca@192.168.6.29
ssh: connect to host 192.168.6.29 port 22: Connection refused
```

a. sudo apt-get install openssh -server :- Update port

```
mca@t2:~$ sudo apt-get update
[sudo] password for mca:
Get:1 https://dl.google.com/linux/chrome/deb stable InRelease [1,811 B]
Get:2 http://ppa.launchpad.net/maarten-fonville/android-studio/ubuntu focal InRelease [17.6 kB]
Hit:3 http://archive.ubuntu.com/ubuntu focal InRelease
Get:4 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:5 https://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,079 B]
Get:6 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:7 http://ppa.launchpad.net/maarten-fonville/android-studio/ubuntu focal/main amd64 Packages [2,052 B]
Get:8 http://ppa.launchpad.net/maarten-fonville/android-studio/ubuntu focal/main Translation-en [324 B]
Get:9 http://archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [2,428 kB]
Get:11 http://security.ubuntu.com/ubuntu focal-security/main i386 Packages [568 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu focal-updates/main i386 Packages [797 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu focal-updates/main Translation-en [415 kB]
Get:14 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 DEP-11 Metadata [275 kB]
Get:15 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 c-n-f Metadata [16.2 kB]
Get:16 http://in.archive.ubuntu.com/ubuntu focal-updates/restricted i386 Packages [30.5 kB]
Get:17 http://in.archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [1,671 kB]
Get:18 http://in.archive.ubuntu.com/ubuntu focal-updates/restricted Translation-en [235 kB]
Get:19 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [2,046 kB]
Get:20 http://in.archive.ubuntu.com/ubuntu focal-updates/restricted amd64 c-n-f Metadata [620 B]
Get:21 http://in.archive.ubuntu.com/ubuntu focal-updates/universe i386 Packages [718 kB]
Get:22 http://security.ubuntu.com/ubuntu focal-security/main Translation-en [333 kB]
Get:23 http://security.ubuntu.com/ubuntu focal-security/main amd64 DEP-11 Metadata [59.8 kB]
Get:24 http://security.ubuntu.com/ubuntu focal-security/main amd64 c-n-f Metadata [12.3 kB]
Get:25 http://security.ubuntu.com/ubuntu focal-security/restricted i386 Packages [29.1 kB]
Get:26 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [1,556 kB]
Get:27 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [1,038 kB]
Get:28 http://security.ubuntu.com/ubuntu focal-security/restricted Translation-en [219 kB]
Get:29 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 c-n-f Metadata [624 B]
Get:30 http://security.ubuntu.com/ubuntu focal-security/universe i386 Packages [588 kB]
Get:31 http://in.archive.ubuntu.com/ubuntu focal-updates/universe Translation-en [243 kB]
Get:32 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 DEP-11 Metadata [410 kB]
Get:33 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 c-n-f Metadata [23.8 kB]
```

```
mca@t2:~$ sudo apt-get install openssh-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  ncurses-term openssh-client openssh-sftp-server ssh-import-id
Suggested packages:
  keychain libpam-ssh monkeysphere ssh-askpass molly-guard
The following NEW packages will be installed:
  ncurses-term openssh-server openssh-sftp-server ssh-import-id
The following packages will be upgraded:
  openssh-client
1 upgraded, 4 newly installed, 0 to remove and 682 not upgraded.
Need to get 1,359 kB of archives.
After this operation, 6,010 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 openssh-client amd64 1:8.2p1-4ubuntu0.5 [671 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal/main amd64 ncurses-term all 6.2-0ubuntu2 [249 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 openssh-sftp-server amd64 1:8.2p1-4ubuntu0.5 [51.5 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 openssh-server amd64 1:8.2p1-4ubuntu0.5 [377 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu focal/main amd64 ssh-import-id all 5.10-0ubuntu1 [10.0 kB]
Fetched 1,359 kB in 5s (281 kB/s)
Preconfiguring packages ...
(Reading database ... 157949 files and directories currently installed.)
Preparing to unpack .../openssh-client_1%3a8.2p1-4ubuntu0.5_amd64.deb ...
Unpacking openssh-client (1:8.2p1-4ubuntu0.5) over (1:8.2p1-4) ...
Selecting previously unselected package ncurses-term.
Preparing to unpack .../ncurses-term_6.2-0ubuntu2_all.deb ...
Unpacking ncurses-term (6.2-0ubuntu2) ...
Selecting previously unselected package openssh-sftp-server.
Preparing to unpack .../openssh-sftp-server_1%3a8.2p1-4ubuntu0.5_amd64.deb ...
```

b. sudo ufw allow 22

```
$sudo ufw allow 22
```

```
mca@t2:~$ sudo ufw allow 22
Rules updated
Rules updated (v6)
mca@t2:~$ █
```

```
mca@t2:~$ ssh mca@192.168.6.23
The authenticity of host '192.168.6.23 (192.168.6.23)' can't be established.
ECDSA key fingerprint is SHA256:4lKDpb+NxGk0v+HcC752LY9CAJEPPhNt1GbQHiROYXKI.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.6.23' (ECDSA) to the list of known hosts.
mca@192.168.6.23's password:
Connection closed by 192.168.6.23 port 22
```

c. \$ssh mca@192.168.6.28

```
mca@t2:~$ ssh mca@192.168.6.23
mca@192.168.6.23's password:
Welcome to Ubuntu 20.04 LTS (GNU/Linux 5.4.0-26-generic x86_64)

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

698 updates can be installed immediately.
459 of these updates are security updates.
To see these additional updates run: apt list --upgradable

Your Hardware Enablement Stack (HWE) is supported until April 2025.

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
```

```
mca@t2:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  rijul  Templates  Videos
mca@t2:~$ █
```

d. ssh-keygen :- Generating a key for secure shell

\$ssh-keygen

```
mca@t2:~$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/mca/.ssh/id_rsa): abc.txt
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in abc.txt
Your public key has been saved in abc.txt.pub
The key fingerprint is:
SHA256:d2kI+wkB9Z1VikEHqJB1xeote2eXKJ0IwWAymAxC4ow mca@t2
The key's randomart image is:
+---[RSA 3072]---+
|+oo o .+o ==o...|
|* + oot o...* . |
|Eo +.=....+ . |
| .*... . |
| S.+.+ |
| =o+. |
| +oo o . |
| .o.+o.. |
| ..o . |
+---[SHA256]---+
mca@t2:~$
```

```
mca@t2:~$ cat abc.txt
-----BEGIN OPENSSH PRIVATE KEY-----
b3BlnNzaC1rZXktdjEAAAACmFlczI1Ni1jdHIAAAAGYmNyeXB0AAAAGAAAABn3gJ1hP
Y3u7LU1xKUtn0iAAAAEAAAAAEEAAAGXAAAAB3NzaC1yc2EAAAQABAAAQDXTTzbZ47C
P6eFPLn55/TFNxogWrHeuuTOEpKShf7753abXKNlVMMlrHRrEQ3cKMjsZM25siPMcP/Fhk
95NMvkvMEwAAQAsQrsQW6it1PVFT1Ti52yP08et2J5SwvpjQNuvXi5imsQ2QCQlzeayD1L
AaTuilr8IMp8mMHo6BbjALE2p26bpTG/ff9ppYV/mWDmtbBlLb/Y6HjfbybvolgTsYfkvih
3JNMAAn487rlXDHKgWGPZt3JwEgRdRG0mHmmz2UwxipHZp8PkP++BFf6UGwCAWE8BDC3Y1u
TJrNY2WDnAb6pVx8IzsNHksk/poZ1ebk6v9XIGYkKiEgEWOn8BB+GvnSBtCWVGjA5nFuZ
gpyYjcaQy8fa7+xRdk5BrbzeWjhLWKscNntdWSfGmzV+tsLLVYM1R2BS86IXFc/r5kgZHQ
LbZG6UCRqslRhNZPIZFMRLsvqMIKDctbOl50nbwvaWThhbGw4DjonrItz+mzY56/FQ0q2w
VG98uNTa3u1R0AAWAISJpbkrK56rYoj+toR6KZh7frKCLnZqQh7/Yqyg1wYyf9zsamZNib
Yia1BMaPtgFYmfmozwzcuWoJgwG8F+ZbBfhxuRP1TUjqzpxQGqpPOz7zAKKNXp63zgxCa
hLAdkkgd5JUhjad9tCUHKXFt10wq6iH0zRztgQhuhZWDNTL02Ut5rqUFs6reu1B33dNuzy
FoKALnRqssIdjLt46g+Z7vsAwN03d+QiLMTSFoU8C5Bk84urM8kjw+jXaYD9DP3UMSelih
5vcNy/43qvzrfeRKBoaYqbNHiunK6IEEjQoUZx1epWp/5XI7YM940iVgGLj0I2S9cXy3k
l4NdeJHJKBwAq+pPAD4l1BV3w9w/vcYm0tcs6cC7piytO0inSU4N+qAUmRNaiOWGM05Fju
ktP03KHmVM/NSw/fcTznVKXBjPosNRqn/uMITBxpX0gckj34Q853Q91cBqgJXAA4nmW3BZ
i8eykwYK1yR8hzrFATrHDuAyP+GMfHHiKfpzIQ8NfR/Z8qxfDfnvWR9GvL8cIfA6IancTa
07HeKGJh2cPEzGUk97j6nCa635VnDcI9kd+D1N0Z5qxhcjdLqAbWec5Gax1qNwa07JDq9h
Y+WSgBKAXksjeRQt1Qt5EENFU35jXclC/4yqmsYK0IoJkVS00mNLBgBs3XXqcxXzQo8mRw
o2n5ISjuI8+tGilogsBBdvcP3yPmqw7T1T2LdUTHk9aDzDV1SepCsyYgMdeYTHixccdrz
7Z7RfdPwkLXNd4g0Wyt6w00tkrmE2+h72F2XsetQv9qj5c/nnV3T+0FJqFRMspWrX9wSp1
Joh8So7UvLo67eKZ015WglbzNaPSQN6soikzIqWHcnSE2GYRunGuq8eD1p78DmvkhB0jXh
lsjjYmaAZVWkEsXVtzD+1zHl//uLSVmknYaPEEMrHBpailQkVKjt9Zirs/iFqDb3tMi88
cY5U30mKDDRSooxeavykvCJYIlJa6sUtjupPQWjhHuBsQaaaUDhwV9YtA9ZQRc1tDUEehk
Tp/R+ry+ga2y64oDH4TDkCz4cmR43FIaZtZ48Wht52LF6ko98pfosve3HTta9gDlpTYIyE
lyE/Ff09EppBlnnPHurmfpsy9ViDZT8hUYUjiNo1LIX8yd2eLZKji5MgJPCggjopEvOCvez
WIX2ivmsGEoC9Q1WA8TRW55W4WhVmzx/tiR1M/x3FyRYL7BXI0yZKKTktbe60yYvYaMoGV
cQLewe2IwLltmGMTvc8etuUwq31ko21bjAY+DKtz+NzGPEHC7vYOrAC/rY879GQDbe8Em
A9QZrxR4Tw+u11HDcgBf+H8zbuae72SDodzZ3H7F7vwZ1MhmVig/qZ+gn/a/HWMyxPfscM
twHhjTcj3LwatAYCFIn7yAceKAaQJy/GjnqvFTyasweG+R07EOGkUXt/5kqK6LK8yQFy0H
l1xL+MHINO7y9stFu0Nh7HEH6VKLbDrM4/oQt2MlbCHSFgtkVEramGqjdzazCjlNibRpWA
Cmatd5MmorsNxM33cfPWPHClWTi<TvXc81RwhRP0T3RRi34o/kIIwKe1itf0+vxsvnX577A
```

3) ps - Stands for Process. Currently running programs and running instances.

a. \$ps

```
END OF ENCRYPTION PRIVATE KEY  
mca@t2:~$ ps  
  PID TTY      TIME CMD  
 7271 pts/1    00:00:00 bash  
 8446 pts/1    00:00:00 ps  
mca@t2:~$ █
```

b)ps -u [user] :- Display all running processes of a particular user

\$ps -u mca

```
mca@t2:~$ ps -u mca  
  PID TTY      TIME CMD  
 1377 ?        00:00:00 systemd  
 1387 ?        00:00:00 (sd-pam)  
 1395 ?        00:00:00 pulseaudio  
 1397 ?        00:00:00 tracker-miner-f  
 1400 ?        00:00:00 dbus-daemon  
 1405 ?        00:00:00 gnome-keyring-d  
 1408 ?        00:00:00 gvfsd  
 1413 ?        00:00:00 gvfsd-fuse  
 1432 ?        00:00:00 gvfs-udisks2-vo  
 1437 ?        00:00:00 gvfs-mtp-volume  
 1442 ?        00:00:00 gvfs-goa-volume  
 1446 ?        00:00:00 goa-daemon  
 1454 ?        00:00:00 goa-identity-se  
 1459 ?        00:00:00 gvfs-gphoto2-vo  
 1464 ?        00:00:00 gvfs-afc-volume  
 1471 tty2     00:00:00 gdm-x-session  
 1473 tty2     00:00:53 Xorg  
 1497 tty2     00:00:00 gnome-session-b  
 1575 ?        00:00:00 ssh-agent  
 1592 ?        00:00:03 ibus-daemon  
 1599 ?        00:00:00 ibus-dconf  
 1600 ?        00:00:00 ibus-ui-gtk3  
 1603 ?        00:00:01 ibus-extension-  
 1609 ?        00:00:00 ibus-x11  
 1612 ?        00:00:00 ibus-portal  
 1613 ?        00:00:00 at-spi-bus-laun  
 1622 ?        00:00:00 dbus-daemon  
 1631 ?        00:00:00 at-spi2-registr  
 1639 ?        00:00:00 xdg-desktop-por  
 1644 ?        00:00:00 gnome-session-c  
 1652 ?        00:00:00 xdg-document-po  
 1655 ?        00:00:00 xdg-permission-  
 1664 ?        00:00:00 gnome-session-h
```

c)ps -C :- Specific process

\$ps -C chrome

```
mca@t2:~$ ps -C chrome
 PID TTY      TIME CMD
 2979 ?        00:00:48 chrome
 2996 ?        00:00:00 chrome
 2997 ?        00:00:00 chrome
 3001 ?        00:00:00 chrome
 3024 ?        00:00:37 chrome
 3025 ?        00:00:20 chrome
 3049 ?        00:00:00 chrome
 3271 ?        00:00:00 chrome
 3496 ?        00:00:38 chrome
 3508 ?        00:00:56 chrome
 7677 ?        00:00:04 chrome
 7758 ?        00:00:00 chrome
 8127 ?        00:00:00 chrome
```

d)ps -f -p PID :- List the process by id

```
$ps -f -p 2762
```

```
mca@t2:~$ ps -f -p 2979
UID      PID  PPID  C STIME TTY          TIME CMD
mca      2979  1708  1 14:58 ?        00:00:49 /opt/google/chrome/chrome --enable-crashpad
```

Result

The program was executed and the result was successfully obtained. Thus CO2 was obtained

Aim :

Shell scripting

CO4

Write shell scripts required for system administration

Procedure

1. Shell Script to display the date

```
ubuntu@Tinu:~$ vi firstprogram.sh
ubuntu@Tinu:~$ chmod +x firstprogram.sh
ubuntu@Tinu:~$ ./firstprogram.sh
./firstprogram.sh: line 2: date#!/bin/bash: No such file or directory
Mon Apr  3 07:34:35 IST 2023
ubuntu@Tinu:~$
```

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

2. Shell Script to display your name

```
ubuntu@Tinu:~$ vi secondprogram.sh
ubuntu@Tinu:~$ chmod +x secondprogram.sh
ubuntu@Tinu:~$ ./secondprogram.sh
What is your name
Tinu
My name is Tinu
```

```
#!/bin/bash
echo "What is your name"
read name
echo "My name is $name"
~
```

3. Shell Script to display date , pwd , ls(multiple commands)

```
ubuntu@Tinu:~$ vi program3.sh
ubuntu@Tinu:~$ chmod +x program3.sh
ubuntu@Tinu:~$ ./program3.sh
Mon Apr  3 07:50:23 IST 2023
1stprgm.sh  firstprgm.sh    newfile      secondprogram.sh
file1       firstprogram.sh  program3.sh   thirdprogram.sh
file2       new             programthird.sh
/home/ubuntu
mkdir: cannot create directory 'new': File exists
Mon Apr  3 07:50:23 IST 2023
1stprgm.sh  firstprgm.sh    newfile      secondprogram.sh
file1       firstprogram.sh  program3.sh   thirdprogram.sh
file2       new             programthird.sh
/home/ubuntu
mkdir: cannot create directory 'new': File exists
```

```
#!/bin/bash
date
ls
pwd
mkdir file1
```

4.Shell Script to demonstrate special variables

```
ubuntu@Tinu:~$ chmod +x spclvariable.sh
ubuntu@Tinu:~$ ./spclvariable.sh Tinu clara Emmanuel
File name: ./spclvariable.sh
First parameter: Tinu
Second parameter: clara
Quoted values: Tinu clara Emmanuel
Quoted values: Tinu clara Emmanuel
Total parameters: 3
File name: ./spclvariable.sh
First parameter: Tinu
Second parameter: clara
Quoted values: Tinu clara Emmanuel
Quoted values: Tinu clara Emmanuel
Total parameters: 3
```

```
#!/bin/bash
echo "File name: $0"
echo "First parameter: $1"
echo "Second parameter: $2"
echo "Quoted values: $@"
echo "Quoted values: $*"
echo "Total parameters: $#"
```

5.Shell Script to count lines and words of the file

```
ubuntu@Tinu:~$ readlink -f secondprogram.sh
/home/ubuntu/secondprogram.sh
```

```
ubuntu@Tinu:~$ vi countwords2.sh
ubuntu@Tinu:~$ chmod +x countwords2.sh
ubuntu@Tinu:~$ ./countwords2.sh
Number of lines:4
Number of words: 13
```

```
file_path=/home/ubuntu/secondprogram.sh
countlines=`wc --lines < $file_path`
countwords=`wc --word <$file_path`
echo "Number of lines:$countlines"
echo "Number of words:$countwords"
```

6.Shell Script to display array index

```
Number of words: 13
ubuntu@Tinu:~$ vi array.sh
ubuntu@Tinu:~$ chmod +x array.sh
ubuntu@Tinu:~$ ./array.sh
First index: Tinu
Second index: Sara
```

```
Name[0]="Tinu"
Name[1]="Sara"
Name[2]="Jenny"
Name[3]="Riya"
Name[4]="sebin"
echo "First index: ${Name[0]}"
echo "Second index: ${Name[1]}"
```

Result

The program was executed and the result was successfully obtained. Thus CO4 was obtained

Aim :**Shell scripting****CO4**

Write shell scripts required for system administration

Procedure**1.Shell Script to add 2 numbers**

```
ubuntu@Tinu:~$ vi add.sh
ubuntu@Tinu:~$ chmod +x add.sh
ubuntu@Tinu:~$ ./add.sh
Total value: 15
+^[[?1~
```

```
#!/bin/bash
a=`expr 2 + 13`
echo "Total value: $a"
```

2. Write a shell script to initialise two numeric variables then perform an addition operation on both the values and store the result in the third variable.

```
ubuntu@Tinu:~$ vi add1.sh
ubuntu@Tinu:~$ chmod +x add1.sh
ubuntu@Tinu:~$ ./add1.sh
sum: 30
ubuntu@Tinu:~$
```

```
a=20
b=10
sum=$(( $a + $b ))
echo "sum: $sum"
```

3.Shell script to read two numbers as command line parameters and perform the addition operation

```
ubuntu@Tinu:~$ vi add_command_line.sh
ubuntu@Tinu:~$ chmod +x add_command_line.sh
ubuntu@Tinu:~$ ./add_command_line.sh 10 10
Sum: 20
+^[[?1~
```

```
#!/bin/bash
sum=$(( $1 +$2 ))
echo "Sum: $sum"
```

4. Shell script which take input from the user at run time, then calculate the sum of given numbers and store to the variable and show the results

```
ubuntu@Tinu:~$ vi add_user_input.sh
ubuntu@Tinu:~$ chmod +x add_user_input.sh
ubuntu@Tinu:~$ ./add_user_input.sh
Enter first number: 10
Enter second number: 20
Sum: 30
```

```
#!/bin/bash
#!/bin/bash
read -p "Enter first number: " num1
read -p "Enter second number: " num2
sum=$(( $num1 + $num2 ))
echo "Sum: $sum"
```

1.Shell Script to subtract 2 numbers

```
ubuntu@Tinu:~$ vi subt.sh
ubuntu@Tinu:~$ chmod +x subt.sh
ubuntu@Tinu:~$ ./subt.sh
Difference= 10
ubuntu@Tinu:~$
```

```
#!/bin/bash
diff=`expr 20 - 10`
echo "Difference= $diff"
```

2. Write a shell script to initialise two numeric variables then perform an subtraction operation on both the values and store the result in the third variable.

```
ubuntu@Tinu:~$ vi subt_initialise.sh
ubuntu@Tinu:~$ chmod +x subt_initialise.sh
ubuntu@Tinu:~$ ./subt_initialise.sh
Difference= 11
```

```
#!/bin/bash
a=20
b=9
diff=$(( $a - $b ))
echo "Difference= $diff"
```

3.Shell script to read two numbers as command line parameters and perform the subtraction operation

```
ubuntu@Tinu:~$ vi subt_command_line.sh
ubuntu@Tinu:~$ chmod +x subt_command_line.sh
ubuntu@Tinu:~$ ./subt_command_line.sh 30 9
Difference: 21
+ + + + +
```

```
#!/bin/bash
diff=$(( $1 - $2 ))
echo "Difference: $diff"
```

4. Shell script which take input from the user at run time, then calculate the difference of given numbers and store to the variable and show the results

```
ubuntu@Tinu:~$ vi subt_user_input.sh
ubuntu@Tinu:~$ chmod +x subt_user_input.sh
ubuntu@Tinu:~$ ./subt_user_input.sh
Enter number 1: 40
Enter number 2: 10
Difference = 30
```

```
#!/bin/bash
read -p "Enter number 1: " num1
read -p "Enter number 2: " num2
diff=$(( $num1 - $num2 ))
echo "Difference = $diff"
```

1.Shell Script to multiply 2 numbers

```
ubuntu@Tinu:~$ vi prdct.sh
ubuntu@Tinu:~$ chmod +x prdct.sh
ubuntu@Tinu:~$ ./prdct.sh
Product= 40
+ + + + +
```

```
#!/bin/bash
p=`expr 20 \* 2`
echo "Product= $p"
```

2. Write a shell script to initialise two numeric variables then perform an multiplication operation on both the values and store the result in the third variable.

```
ubuntu@Tinu:~$ vi prdct_initialise.sh
ubuntu@Tinu:~$ chmod +x prdct_initialise.sh
ubuntu@Tinu:~$ ./prdct_initialise.sh
Product= 60
```

```
#!/bin/bash
a=20
b=3
p=$(( $a * $b ))
echo "Product= $p"
```

3. Shell script to read two numbers as command line parameters and perform the multiplication operation

```
ubuntu@Tinu:~$ vi prdct_command_line.sh
ubuntu@Tinu:~$ chmod +x prdct_command_line.sh
ubuntu@Tinu:~$ ./prdct_command_line.sh 60 3
Product= 180
```

```
#!/bin/bash
prdct=$(( $1 * $2 ))
echo "Product= $prdct"
```

4. Shell script which take input from the user at run time, then calculate the product of given numbers and store to the variable and show the results

```
ubuntu@Tinu:~$ vi prdct_user_input.sh
ubuntu@Tinu:~$ chmod +x prdct_user_input.sh
ubuntu@Tinu:~$ ./prdct_user_input.sh
Enter first number: 20
Enter second number: 3
Product= 60
```

```
#!/bin/bash
read -p "Enter first number: " num1
read -p "Enter second number: " num2
p=$(( $num1 * $num2 ))
echo "Product= $p"
```

1. Shell Script to divide 2 numbers

```
ubuntu@Tinu:~$ vi quo.sh
ubuntu@Tinu:~$ chmod +x quo.sh
ubuntu@Tinu:~$ ./quo.sh
Quotient= 6
```

```
#!/bin/bash
q=`expr 20 / 3`
echo "Quotient= $q"
```

2. Write a shell script to initialise two numeric variables then perform an division operation on both the values and store the result in the third variable.

```
ubuntu@Tinu:~$ vi quo_initialise.sh
ubuntu@Tinu:~$ chmod +x quo_initialise.sh
ubuntu@Tinu:~$ ./quo_initialise.sh
Quotient= 30
```

```
#!/bin/bash
a=60
b=2
q=$(( $a / $b ))
echo "Quotient= $q"
```

3. Shell script to read two numbers as command line parameters and perform the division operation

```
ubuntu@Tinu:~$ vi quo_command_line.sh
ubuntu@Tinu:~$ chmod +x quo_command_line.sh
ubuntu@Tinu:~$ ./quo_command_line.sh 6 3
Quotient= 2
```

```
#!/bin/bash
q=$(( $1 / $2 ))
echo "Quotient= $q"
```

4. Shell script which take input from the user at run time, then calculate the quotient of given numbers and store to the variable and show the results

```
ubuntu@Tinu:~$ vi quo_user_inpt.sh
ubuntu@Tinu:~$ chmod +x quo_user_inpt.sh
ubuntu@Tinu:~$ ./quo_user_inpt.sh
Enter first number: 6
Enter second number: 3
Quotient= 2
```

```
#!/bin/bash
read -p "Enter first number: " num1
read -p "Enter second number: " num2
q=$(( num1 / num2 ))
echo "Quotient= $q"
```

1.Shell Script to find modulo of 2 numbers

```
ubuntu@Tinu:~$ vi modulo.sh
ubuntu@Tinu:~$ chmod +x modulo.sh
ubuntu@Tinu:~$ ./modulo.sh
Remainder= 0
```

2. Write a shell script to initialise two numeric variables then perform modulus operation on both the values and store the result in the third variable.

```
ubuntu@Tinu:~$ vi modulo_initialise.sh
ubuntu@Tinu:~$ chmod +x modulo_initialise.sh
ubuntu@Tinu:~$ ./modulo_initialise.sh
Remainder= 1
```

```
#!/bin/bash
a=6
b=5
r=$(( $a % $b ))
echo "Remainder= $r"
```

3. Shell script to read two numbers as command line parameters and perform the modulus operation

```
ubuntu@Tinu:~$ vi modulo_command_line.sh
ubuntu@Tinu:~$ chmod +x modulo_command_line.sh
ubuntu@Tinu:~$ ./modulo_command_line.sh 6 3
Remainder= 0
```

```
#!/bin/bash
r=$(( $1 % $2 ))
echo "Remainder= $r"
```

4. Shell script which take input from the user at run time, then calculate the modulus of given numbers and store to the variable and show the results

```
ubuntu@Tinu:~$ vi modulo_user_input.sh
ubuntu@Tinu:~$ chmod +x modulo_user_input.sh
ubuntu@Tinu:~$ ./modulo_user_input.sh
Enter a: 20
Enter b: 3
Remainder= 2
```

```
#!/bin/bash
read -p "Enter a: " a
read -p "Enter b: " b
r=$(( $a % $b ))
echo "Remainder= $r"
```

Result

The program was executed and the result was successfully obtained. Thus CO4 was obtained

Aim :**Shell scripting****CO4**

Write shell scripts required for system administration

Procedure**1.Shell Script to demonstrate arithmetic operations**

```
ubuntu@Tinu:~$ vi operations.sh
ubuntu@Tinu:~$ chmod +x operations.sh
ubuntu@Tinu:~$ ./operations.sh
Enter a number: 13
Enter another number: 10
Sum: 23
Difference: 3
Product: 130
Quotient: 1
Remainder: 3
a is not equal to b
Increment operator on a is 14
Decrement operator on b is 9
ubuntu@Tinu:~$
```

```
#!/bin/bash
read -p "Enter a number: " a
read -p "Enter another number: " b
add=$(( a + b ))
echo "Sum: $add"
diff=$(( a - b ))
echo "Difference: $diff"
product=$(( a * b ))
echo "Product: $product"
quo=$(( a / b ))
echo "Quotient: $quo"
mod=$(( a % b ))
echo "Remainder: $mod"
if [ $a == $b ]
then
    echo "a is equal to b"
fi
if [ $a != $b ]
then
    echo "a is not equal to b"
fi
(( ++a ))
echo "Increment operator on a is $a"
(( --b ))
echo "Decrement operator on b is $b"
```

2.Shell script to demonstrate relational operation

```
ubuntu@Tinu:~$ vi relation.sh
ubuntu@Tinu:~$ ./relation.sh
Enter a: 20
Enter b: 10
a not equal to b
a not equal to b
a not less than b
a not less than or equal to b
a greater than b
a greater than or equal to b
ubuntu@Tinu:~$
```

```
#!/bin/bash
read -p "Enter a: " a
read -p "Enter b: " b
if((a == b))
then
    echo "a = b"
else
    echo "a not equal to b"
fi
if((a != b))
then
    echo "a not equal to b"
else
    echo "a equal to b"
fi
if((a < b))
then
    echo "a less than b"
else
    echo "a not less than b"
fi
if((a <= b))
then
    echo "a less than or equal to b"
else
    echo "a not less than or equal to b"
fi
if((a > b))
then
    echo "a greater than b"
else
    echo "a not greater than b"
fi
if((a >= b))
then
    echo "a greater than or equal to b"
else
    echo "a not greater than or equal to b"
fi
~
```

3.Shell script to demonstrate relational operation(another method)

```
ubuntu@Tinu:~$ vi relation1.sh
ubuntu@Tinu:~$ chmod +x relation1.sh
ubuntu@Tinu:~$ ./relation1.sh
a not equal to b
a not equal to b
a less than b
a less than or equal to b
a not greater than b
a not geater than or equal to b
+ + + + +
```

```
#!/bin/bash
a=10
b=20
if [ $a -eq $b ]
then
        echo "a equal b"
else
        echo "a not equal to b"
fi
if [ $a -ne $b ]
then
        echo "a not equal to b"
else
        echo "a equal to b"
fi
if [ $a -lt $b ]
then
        echo "a less than b"
else
        echo "a not less than b"
fi
if [ $a -le $b ]
then
        echo "a less than or equal to b"
else
        echo "a not less than or equal to b"
fi
if [ $a -gt $b ]
then
        echo "a greater than b"
else
        echo "a not greater than b"
fi
if [ $a -ge $b ]
then
        echo "a greater than or equal to b"
else
        echo "a not geater than or equal to b"
fi
```

4.Shell script to demonstrate logical operations

```
ubuntu@Tinu:~$ vi logical.sh
ubuntu@Tinu:~$ chmod +x logical.sh
ubuntu@Tinu:~$ ./logical.sh
Enter a: true
Enter b: true
Both are true
One of them is true
a was initially true
```

```
#!/bin/bash
read -p "Enter a: " a
read -p "Enter b: " b
if((a == "true" & b == "true"))
then
    echo "Both are true"
else
    echo "Both are not true"
fi
if((a == "true" || b == "true"))
then
    echo "One of them is true"
else
    echo "None is true"
fi
if [ !a == "true" ]
then
    echo "a was initially false"
else
    echo "a was initially true"
fi
```

5. Write a shell script to check whether a number is odd or even

```
ubuntu@Tinu:~$ vi odd_or_even.sh
ubuntu@Tinu:~$ chmod +x odd_or_even.sh
ubuntu@Tinu:~$ ./odd_or_even.sh
Enter a number: 20
Number is even
ubuntu@Tinu:~$ vi odd_or_even.sh
ubuntu@Tinu:~$ ./odd_or_even.sh
Enter a number: 13
Number is odd
```

```
#!/bin/bash
read -p "Enter a number: " a
if((a % 2 == 0))
then
    echo "Number is even"
else
    echo "Number is odd"
fi
```

6. Write a shell script to check whether a number is positive, negative or zero

```
ubuntu@Tinu:~$ vi positive_or_not.sh
ubuntu@Tinu:~$ chmod +x positive_or_not.sh
ubuntu@Tinu:~$ ./positive_or_not.sh
Enter a number: 20
Number is positive
ubuntu@Tinu:~$ ./positive_or_not.sh
Enter a number: -2
Number is negative
ubuntu@Tinu:~$ ./positive_or_not.sh
Enter a number: 0
The number is zero
```

```
#!/bin/bash
read -p "Enter a number: " a
if((a > 0))
then
    echo "Number is positive"
elif((a < 0))
then
    echo "Number is negative"
else
    echo "The number is zero"
fi
```

7. Write a shell script to find the greatest among two numbers

```
ubuntu@Tinu:~$ vi largest_two.sh
ubuntu@Tinu:~$ chmod +x largest_two.sh
ubuntu@Tinu:~$ ./largest_two.sh
Enter a: 20
Enter b: 10
20 is greater
```

```
#!/bin/bash
read -p "Enter a: " a
read -p "Enter b: " b
if [ $a > $b ]
then
    echo "$a is greater"
else
    echo "$b is greater"
fi
```

8. Write a shell script to find largest among three numbers

```
ubuntu@Tinu:~$ vi largest_three.sh
ubuntu@Tinu:~$ ./largest_three.sh
Enter a: 20
Enter b: 10
Enter c: 5
20 is greater
```

```
#!/bin/bash
read -p "Enter a: " a
read -p "Enter b: " b
read -p "Enter c: " c
if((a > b && a > c))
then
    echo "$a is greater"
elif((b > a && b > c))
then
    echo "$b is greater"
else
    echo "$c is greater"
fi
```

Result

The program was executed and the result was successfully obtained. Thus CO4 was obtained

Aim :**Shell scripting****CO4**

Write shell scripts required for system administration

Procedure

1)Shell script to demonstrate String operators (Equal, Not Equals, Size is zero, Size is non-zero, Empty string) by taking user input

```
ubuntu@Tinu:~$ vi string.sh
ubuntu@Tinu:~$ chmod +x string.sh
ubuntu@Tinu:~$ ./string.sh
Enter 1st string: anu
Enter 2nd string: tinu
Both strings are not equal
Both strings are equal
String size is not zero
String size is zero
String is not empty
```

```

#!/bin/bash
read -p "Enter 1st string: " a
read -p "Enter 2nd string: " b
if(( $a==$b ))
then
    echo "Both strings are equal"
else
    echo "Both strings are not equal"
fi
if(( $a!=$b ))
then
    echo "Both strings are not equal"
else
    echo "Both strings are equal"
fi
if(( -z$a ))
then
    echo "String size is zero"
else
    echo "String size is not zero"
fi
if(( -n$a ))
then
    echo "String size is non zero"
else
    echo "String size is zero"
fi
if (( $a ))
then
    echo "String is empty"
else
    echo "String is not empty"
fi

```

2) Shell script to demonstrate Bitwise operators (AND, OR, XOR, Complement, Right Shift, Left Shift) by taking user input

```

ubuntu@Tinu:~$ vi bitwiseop.sh
ubuntu@Tinu:~$ chmod +x bitwiseop.sh
ubuntu@Tinu:~$ ./bitwiseop.sh
Enter 1st value: 10
Enter 2nd value: 8
Bitwise AND: 8
Bitwise OR: 10
Bitwise XOR: 2
Bitwise Complement of 1st value: -11
Bitwise right shift(4) of 1st value: 40
Bitwise left shift(4) of 1st value: 2

```

```
#!/bin/bash
read -p "Enter 1st value: " a
read -p "Enter 2nd value: " b
result=$(( $a&$b ))
echo "Bitwise AND: $result"
result=$(( $a|$b ))
echo "Bitwise OR: $result"
result=$(( $a^$b ))
echo "Bitwise XOR: $result"
result=$(( ~$a ))
echo "Bitwise Complement of 1st value: $result"
result=$(( $a<<2 ))
echo "Bitwise right shift(4) of 1st value: $result"
result=$(( $a>>2 ))
echo "Bitwise left shift(4) of 1st value: $result"

~
```

3)Shell script to demonstrate File Test operators (Exist(e), Size(s), Read Permission(r), Execute Permission(x), Write Permission(w)) by taking user input

```
ubuntu@Tinu:~$ vi filetest.sh
ubuntu@Tinu:~$ chmod +x filetest.sh
ubuntu@Tinu:~$ ./filetest.sh
Enter file name: new
new does not exist
new is not empty
new has read permission
new has execute permission
new has write permission
```

```
#!/bin/bash
read -p "Enter file name: " f
if(( -e$f ))
then
    echo "$f exist"
else
    echo "$f does not exist"
fi
if [ -s$f ]
then
    echo "$f is not empty"
else
    echo "$f is empty"
fi
if [ -r$f ]
then
    echo "$f has read permission"
else
    echo "$f does not have read permission"
fi
if [ -x$f ]
then
    echo "$f has execute permission"
else
    echo "$f does not have execute permission"
fi
if [ -w$f ]
then
    echo "$f has write permission"
else
    echo "$f does not have write permission"
fi
~
```

4) Shell Script to check if two numbers are equal using if statement

```
ubuntu@Tinu:~$ vi equal.sh
ubuntu@Tinu:~$ chmod +x equal.sh
ubuntu@Tinu:~$ ./equal.sh
enter 1st number: 12
Enter 2nd number: 16
Both numbers are not equal
^[[A^[[C^[[D^[[B
```

```
#!/bin/bash
read -p "enter 1st number: " a
read -p "Enter 2nd number: " b
if(( $a==$b ))
then
    echo "Both numbers are equal"
fi
if(( $a!=$b ))
then
    echo "Both numbers are not equal"
fi
```

5) Shell Script to check the range of a number using else if ladder

```
ubuntu@Tinu:~$ vi range.sh
ubuntu@Tinu:~$ chmod +x range.sh
ubuntu@Tinu:~$ ./range.sh
Enter the number between 0 and 150: 60
60 is between 51 and 100
```

```
#!/bin/bash
read -p "Enter the number between 0 and 150: " a
if(( $a>0&&$a<50 ))
then
    echo "$a is between 1 and 50"
elif(( $a>51&&$a<100 ))
then
    echo "$a is between 51 and 100"
else
    echo "$a is between 101 and 150"
fi
~
```

6) Shell Script to display the grade of a student by accepting his mark.

```
ubuntu@Tinu:~$ vi grade.sh
ubuntu@Tinu:~$ chmod +x grade.sh
ubuntu@Tinu:~$ ./grade.sh
Enter the mark: 90
B1
```

```
#!/bin/bash
read -p "Enter the mark: " a
if(( $a<=100&&$a>=91 ))
then
    echo "A1"
elif(( $a<=90&&$a>=81 ))
then
    echo "B1"
elif(( $a<=80&&$a>=71 ))
then
    echo "C1"
elif(( $a<=70&&$a>=61 ))
then
    echo "D1"
else
    echo "FAIL"
fi
~
```

Result

The program was executed and the result was successfully obtained. Thus CO4 was obtained

Experiment :13

10/07/2023

Aim :

Hierarchical structure of directories and files in a file system

CO2

Perform system administration tasks.

Procedure

/root-Contains all other directories and files

/bin-Essential binary files which are accessible to all users.These files are required for basic functioning and for various system operations and user interactions.

/boot-Files required for boot process including kernel,boot loader and initial Ram disk. We want to load the Operating System and prepare the system for use. All the files required for booting are stored in boot directory.

/dev- Device files representing the physical and virtual devices such as hard drives,printers,CPU etc.

/etc-The system configuration files for various applications and services.Configuration files determine the behaviour functionalities and the appearance of the software.

/home-Home is a home directory for regular users.

/lib-Libraries required by binaries in /bin

/media,/mnt-Temporary mounted files

/media-Temporary attaching file system.For example, external drives, network shares.

/media-Removable media. Temporary mount system for removable media such as USB, optical disk or external hard drives.

/opt-For storing optional software packages.

/sys-Exposes information about system hardware and devices.

/tmp-Temporary files created by users and applications.

/usr-Basically user programs and libraries.

/var-var is a variable data that changes frequently such as log files and cache files

Commands

sudo su-To become the root user

```
mca@u45:~$ sudo su  
[sudo] password for mca:
```

tree -To check whether tree is already installed

```
root@u45:/home/mca# tree  
  
Command 'tree' not found, but can be installed with:  
  
snap install tree # version 1.8.0+pkg-3fd6, or  
apt install tree # version 1.8.0-1  
  
See 'snap info tree' for additional versions.
```

updating

```
root@u45:/home/mca# apt update  
Hit:1 http://in.archive.ubuntu.com/ubuntu focal InRelease  
Get:2 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]  
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]  
Get:4 http://security.ubuntu.com/ubuntu focal-security/main i386 Packages [620 kB]  
Get:5 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]  
Get:6 http://in.archive.ubuntu.com/ubuntu focal-updates/main i386 Packages [851 kB]  
Get:7 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [2,304 kB]  
Get:8 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [2,6
```

apt install tree-To install tree

```
root@u45:/home/mca# apt install tree  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following packages were automatically installed and are no longer required:  
  linux-headers-5.4.0-26 linux-headers-5.4.0-26-generic  
  linux-image-5.4.0-26-generic linux-modules-5.4.0-26-generic  
  linux-modules-extra-5.4.0-26-generic  
Use 'sudo apt autoremove' to remove them.  
The following NEW packages will be installed:  
  tree  
0 upgraded, 1 newly installed, 0 to remove and 317 not upgraded.  
Need to get 43.0 kB of archives.  
After this operation, 115 kB of additional disk space will be used.  
Get:1 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 tree amd64 1.8.0-1 [43.0 kB]  
Fetched 43.0 kB in 1s (44.8 kB/s)
```

tree-to view the tree structure

```
root@u45:/home/mca# tree
.
├── 192.168.6.255.netbios-dgm:
├── 192.168.6.255.netbios-ns:
├── 224.0.0.252.hostmon:
├── 239.255.255.250.1900:
├── ab.txt
├── An Introduction to Local Area Networks.pdf
├── armstrong.sh
├── capital.sh
├── dc
│   └── Justice
└── Dc
    ├── dC
    │   ├── JusticeLeague.txt
    │   ├── Woman.txt
    │   └── Wonder
    ├── file1.txt
    ├── Justice
    ├── Woman.txt
    └── Wonder
└── DC
    ├── Justice
    └── League.txt
```

Tree / [directory_name]-to scrutinize each directory

```
root@u45:/home/mca# tree /bin
/bin
├── [
├── aa-enabled
├── aa-exec
├── aconnect
├── acpi_listen
├── add-apt-repository
├── addpart
├── addr2line -> x86_64-linux-gnu-addr2line
├── alsabat
├── alsaloop
├── alsamixer
├── alsatplg
├── alsaucm
├── amidi
├── amixer
├── amuFormat.sh
├── apg
├── apgbfm
├── aplay
├── aplaymidi
└── aconnect-hwg
```

```
root@u45:/home/mca# tree /home
/home
└── ajce
    ├── Desktop
    ├── Documents
    ├── Downloads
    │   └── xampp-linux-x64-8.1.17-0-installer.run
    ├── Music
    ├── Pictures
    ├── Public
    └── PycharmProjects
        └── pythonProject
            ├── main.py
            └── venv
                └── bin
                    ├── activate
                    ├── activate.csh
                    ├── activate.fish
                    ├── activate.nu
                    ├── activate.ps1
                    └── activate_this.py
```

Result

The program was executed and the result was successfully obtained. Thus CO2 was obtained

Experiment :14

10/07/2023

Aim :

Installation and deployment of KVM

CO5

Acquire skill sets required for a DevOps.

Procedure

Installing KVM/QEMU

```
mca@u45:~$ egrep -c '(vmx|svm)' /proc/cpuinfo
12
mca@u45:~$ sudo apt install cpu-checker
```

```
mca@u45:~$ sudo apt install cpu-checker
[sudo] password for mca:
Reading package lists... Done
Building dependency tree
Reading state information... Done
cpu-checker is already the newest version (0.7-1.1).
0 upgraded, 0 newly installed, 0 to remove and 319 not upgraded.
```

```
mca@u45:~$ sudo apt install qemu-kvm libvirt-daemon-system libvirt-clients bridge-utils
Reading package lists... Done
Building dependency tree
Reading state information... Done
bridge-utils is already the newest version (1.6-2ubuntu1).
libvirt-clients is already the newest version (6.0.0-0ubuntu8.16).
libvirt-daemon-system is already the newest version (6.0.0-0ubuntu8.16).
qemu-kvm is already the newest version (1:4.2-3ubuntu6.27).
0 upgraded, 0 newly installed, 0 to remove and 319 not upgraded.
```

```
mca@u45:~$ sudo systemctl status libvirtd
● libvirtd.service - Virtualization daemon
   Loaded: loaded (/lib/systemd/system/libvirtd.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2023-06-20 19:27:25 IST; 3h 46min left
     TriggeredBy: ● libvirtd-admin.socket
                  ● libvirtd.socket
                  ● libvirtd-ro.socket
       Docs: man:libvirtd(8)
              https://libvirt.org
    Main PID: 917 (libvirtd)
      Tasks: 20 (limit: 32768)
     Memory: 38.2M
      CGroup: /system.slice/libvirtd.service
              ├─ 917 /usr/sbin/libvirtd
              ├─ 1293 /usr/sbin/dnsmasq --conf-file=/var/lib/libvirt/dnsmasq/default.conf --leasefile-ro --dhcp-script=/usr/lib/libvirt/libvirt-dnsmasq
              └─ 1294 /usr/sbin/dnsmasq --conf-file=/var/lib/libvirt/dnsmasq/default.conf --leasefile-ro --dhcp-script=/usr/lib/libvirt/libvirt-dnsmasq

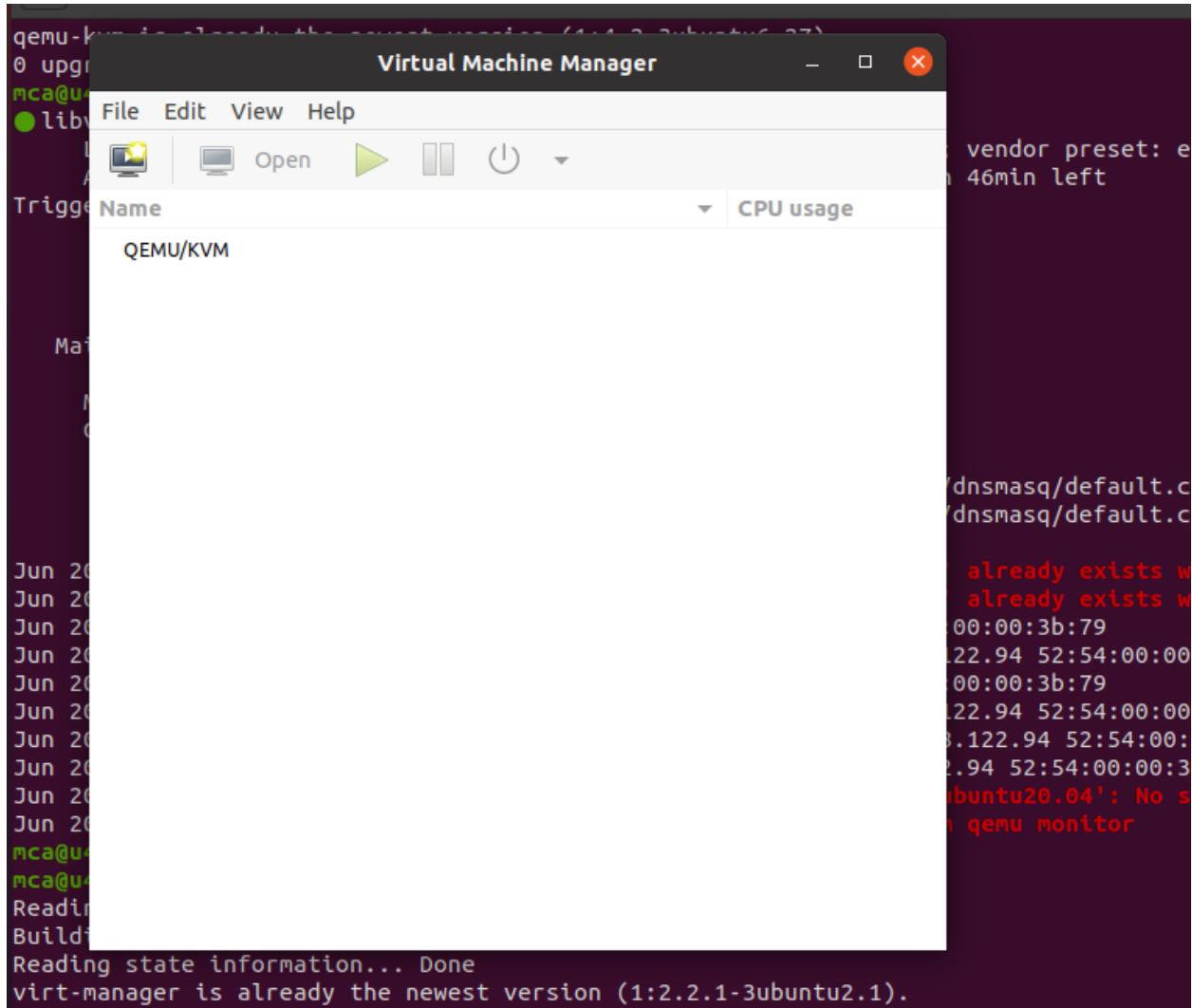
Jun 20 14:14:43 u45 libvirtd[917]: operation failed: pool 'default' already exists with uuid 22baa9e8-8625-48ed-bdb3-07be8356a356
Jun 20 14:24:39 u45 libvirtd[917]: operation failed: pool 'default' already exists with uuid 22baa9e8-8625-48ed-bdb3-07be8356a356
Jun 20 14:29:32 u45 dnsmasq-dhcp[1293]: DHCPDISCOVER(virbr0) 52:54:00:00:3b:79
Jun 20 14:29:32 u45 dnsmasq-dhcp[1293]: DHCPOFFER(virbr0) 192.168.122.94 52:54:00:00:3b:79
Jun 20 14:29:32 u45 dnsmasq-dhcp[1293]: DHCPDISCOVER(virbr0) 52:54:00:00:3b:79
Jun 20 14:29:32 u45 dnsmasq-dhcp[1293]: DHCPOFFER(virbr0) 192.168.122.94 52:54:00:00:3b:79
Jun 20 14:29:32 u45 dnsmasq-dhcp[1293]: DHCPREQUEST(virbr0) 192.168.122.94 52:54:00:00:3b:79
Jun 20 14:29:32 u45 dnsmasq-dhcp[1293]: DHCPACK(virbr0) 192.168.122.94 52:54:00:00:3b:79 ubuntu
Jun 20 14:42:53 u45 libvirtd[917]: Failed to open file '/home/mca/ubuntu20.04': No such file or directory
Jun 20 15:04:37 u45 libvirtd[917]: internal error: End of file from qemu monitor
lines 1-26/26 (END)
```

sudo systemctl enable --now libvirtd

```
sudo apt install virt-manager
```

```
mca@u45:~$ sudo systemctl enable --now libvиртd
mca@u45:~$ sudo apt install virt-manager
Reading package lists... Done
Building dependency tree
Reading state information... Done
virt-manager is already the newest version (1:2.2.1-3ubuntu2.1).
0 upgraded, 0 newly installed, 0 to remove and 319 not upgraded.
```

```
sudo virt-manager
```



New VM



Create a new virtual machine

Step 1 of 5

Connection: QEMU/KVM

Choose how you would like to install the operating system

- Local install media (ISO image or CDROM)
- Network Install (HTTP, HTTPS, or FTP)
- Network Boot (PXE)
- Import existing disk image

Cancel

Back

Forward

New VM



Create a new virtual machine

Step 2 of 5

Choose ISO or CDROM install media:

No media selected



Browse...

Choose the operating system you are installing:

Waiting for install media / source

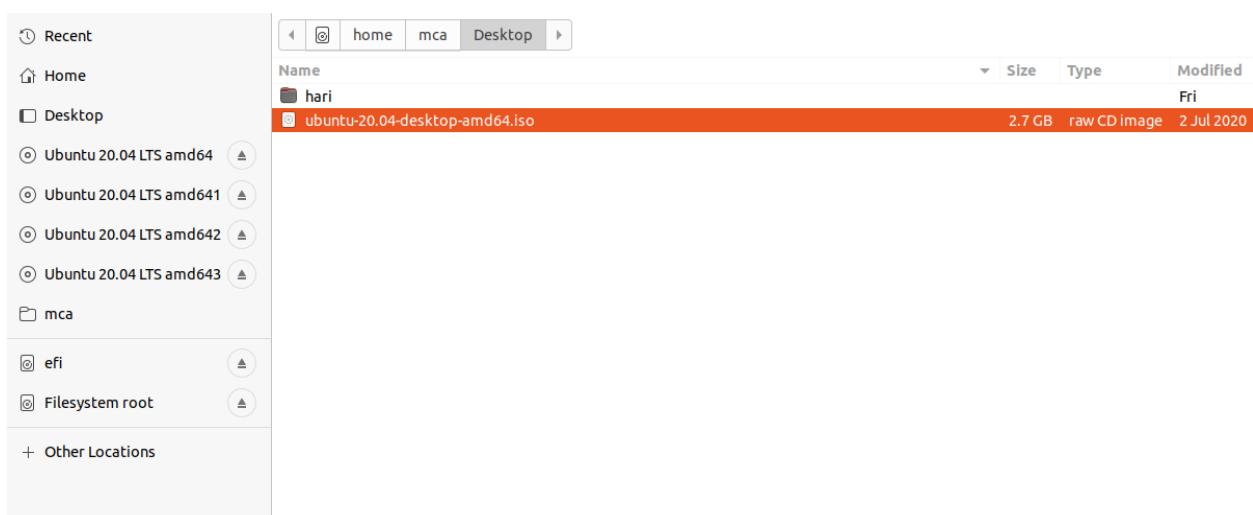
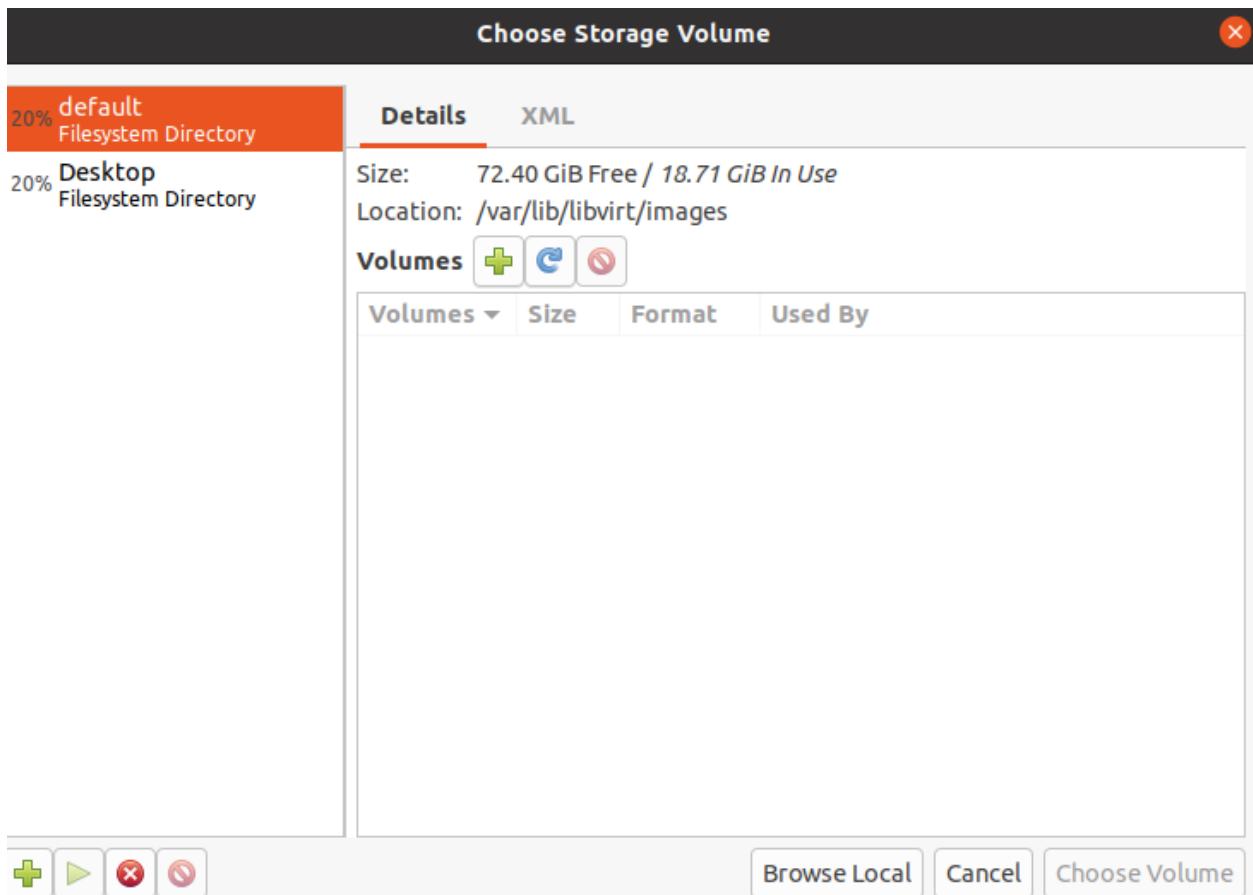


Automatically detect from the installation media / source

Cancel

Back

Forward



New VM



Create a new virtual machine

Step 2 of 5

Choose ISO or CDROM install media:

:/mca/Desktop/ubuntu-20.04-desktop-amd64.iso



[Browse...](#)

Choose the operating system you are installing:

Ubuntu 20.04



Automatically detect from the installation media / source

[Cancel](#)

[Back](#)

[Forward](#)

New VM



Create a new virtual machine

Step 3 of 5

Choose Memory and CPU settings:

Memory: **4096** - +

Up to 7790 MiB available on the host

CPUs: **2** - +

Up to 6 available

[Cancel](#)

[Back](#)

[Forward](#)

New VM



Create a new virtual machine

Step 4 of 5

Enable storage for this virtual machine

Create a disk image for the virtual machine

25.0 - + GiB

72.4 GiB available in the default location

Select or create custom storage

Manage...

Cancel

Back

Forward

New VM



Create a new virtual machine

Step 5 of 5

Ready to begin the installation

Name:

OS: Ubuntu 20.04

Install: Local CDROM/ISO

Memory: 4096 MiB

CPUs: 2

Storage: 25.0 GiB ...b/libvirt/images/ubuntu20.04.qcow2

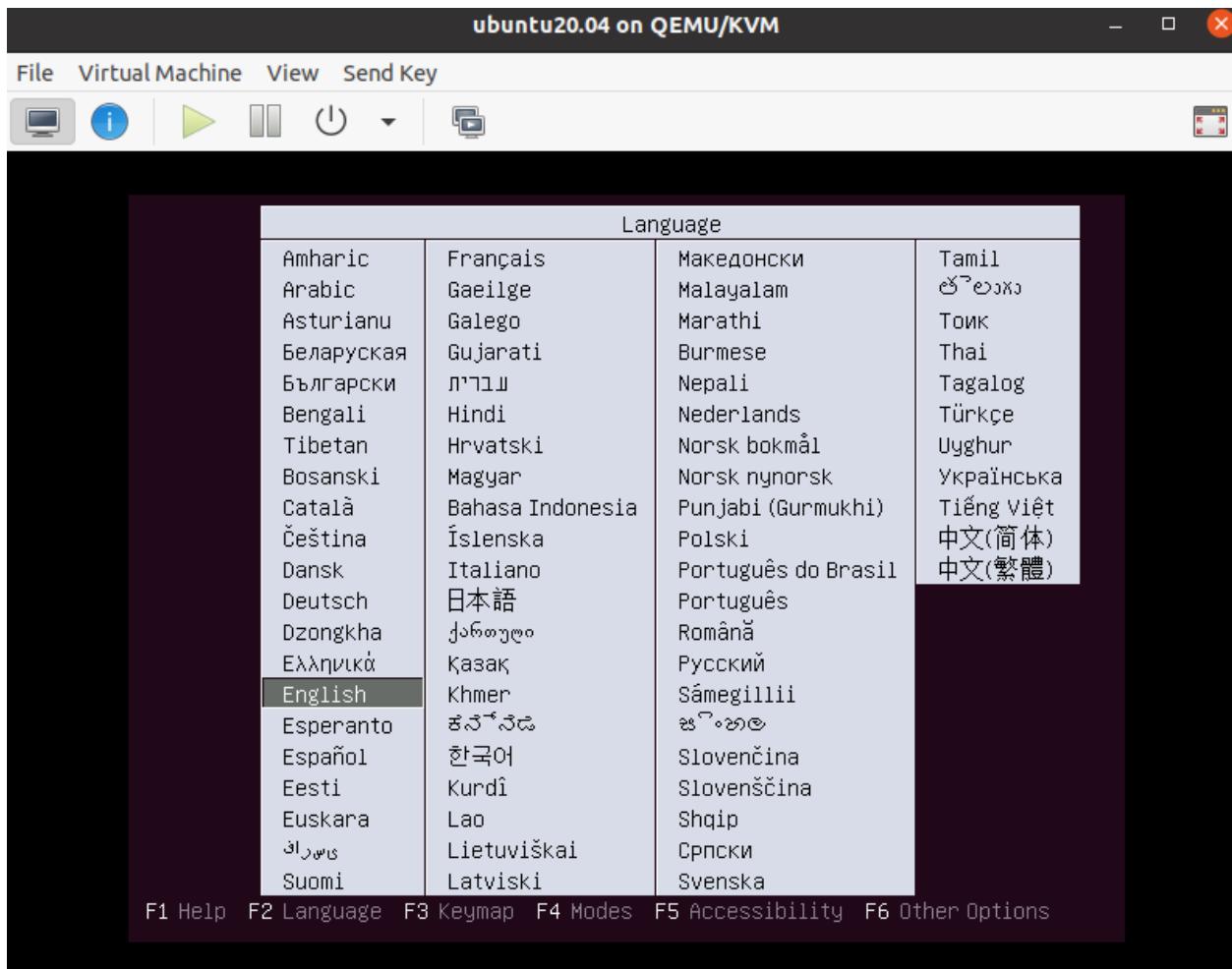
Customize configuration before install

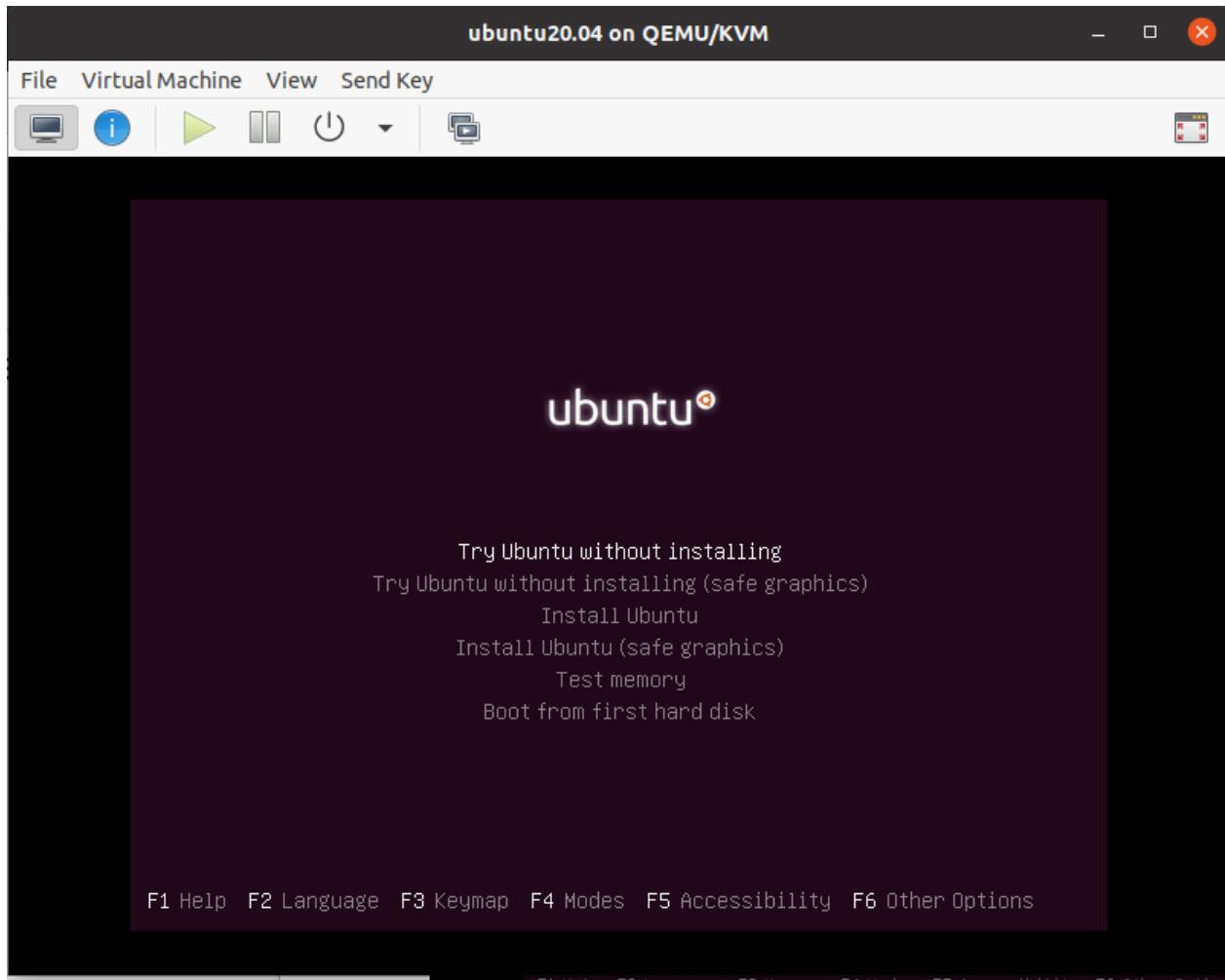
► Network selection

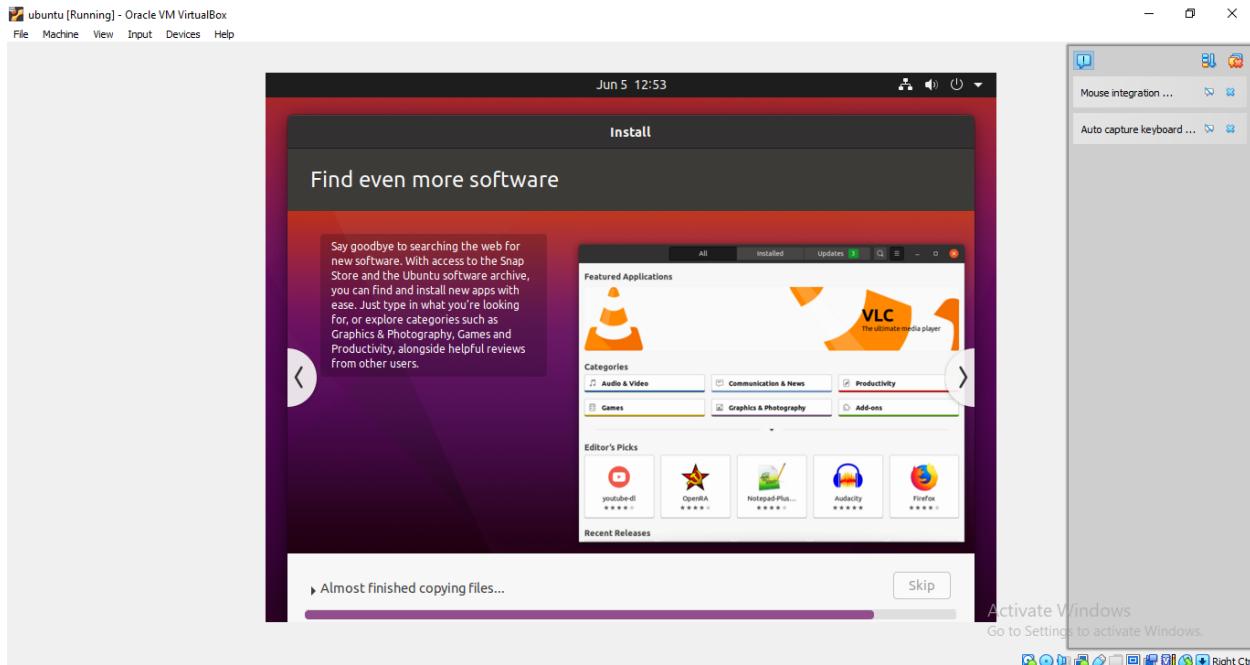
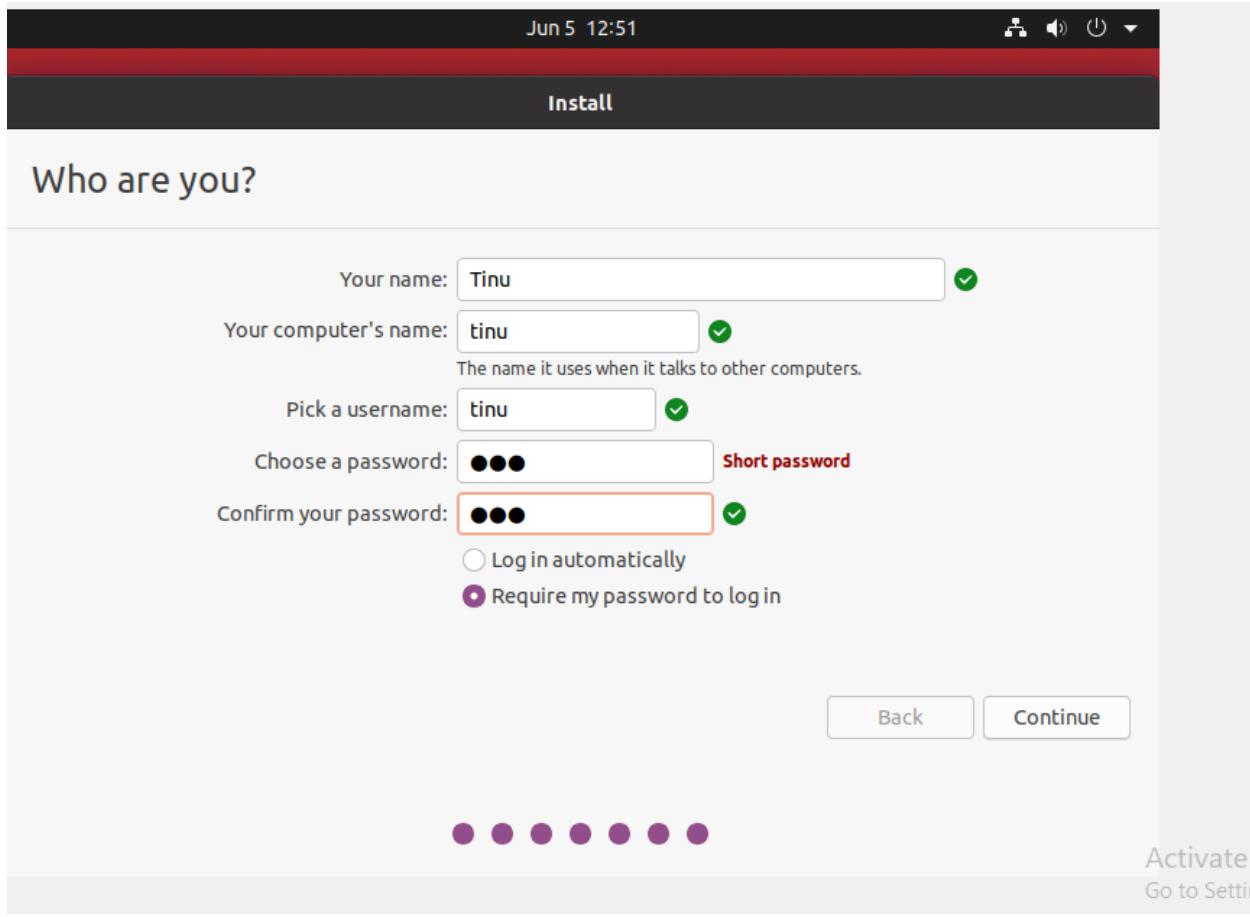
[Cancel](#)

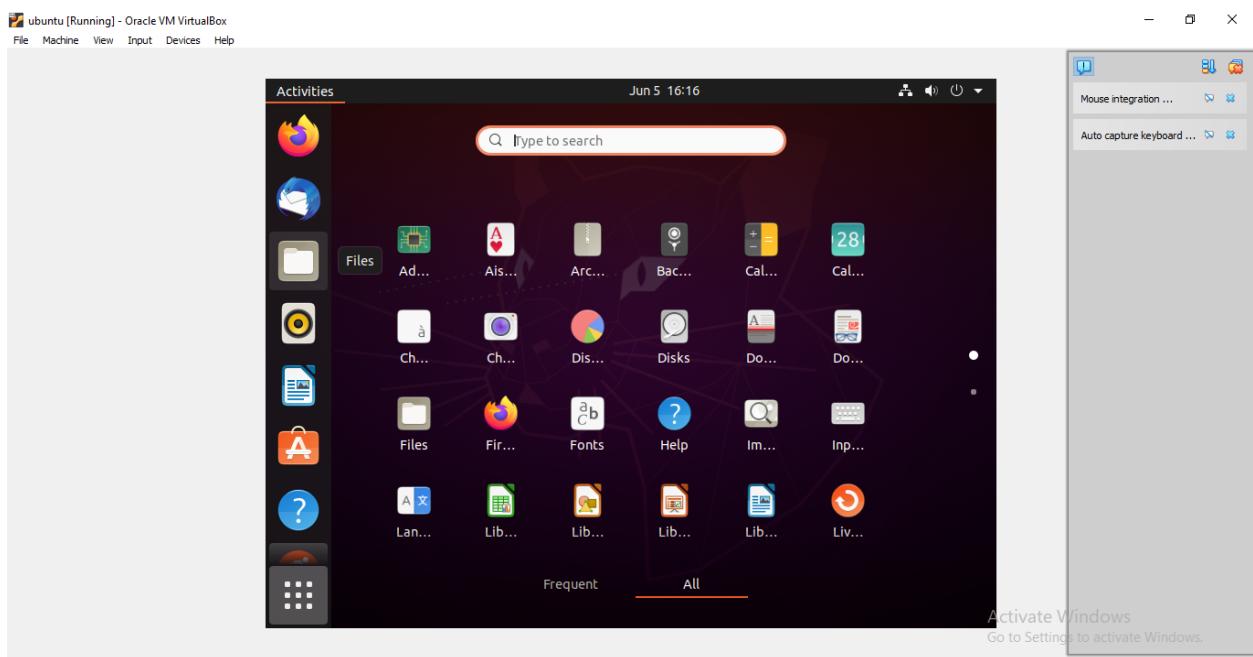
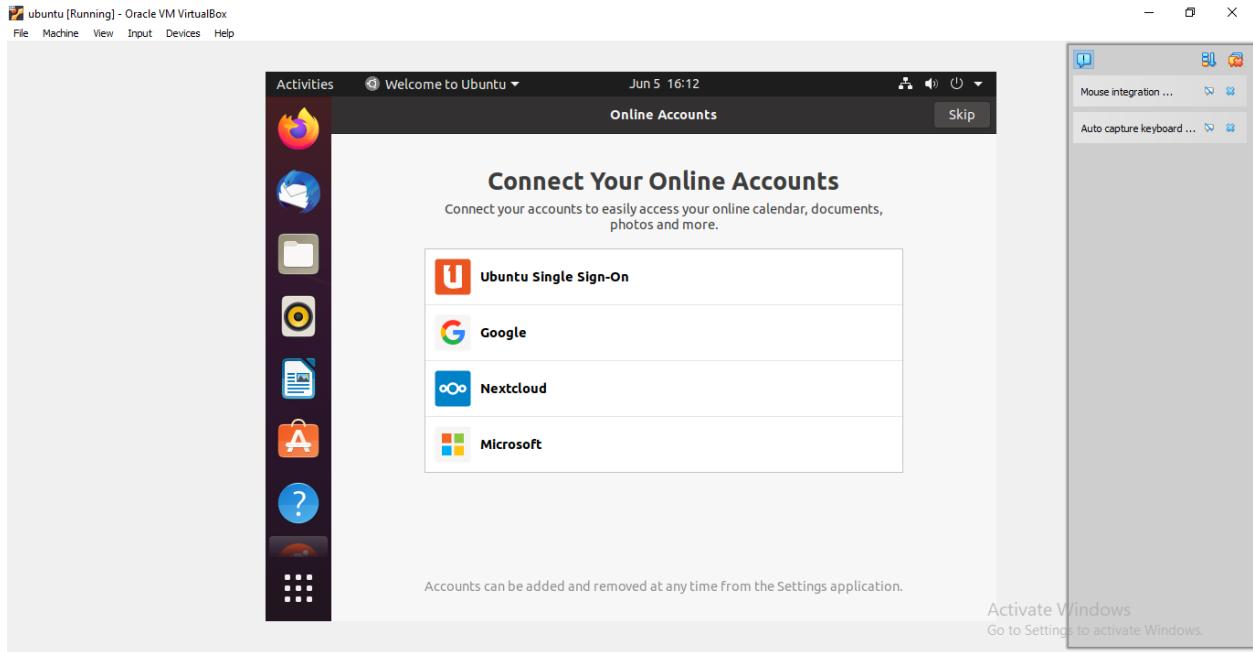
[Back](#)

[Finish](#)









KVM COMMANDS

```
mca@u45:~$ sudo virsh
[sudo] password for mca:
Welcome to virsh, the virtualization interactive terminal.

Type: 'help' for help with commands
      'quit' to quit
```

sudo virsh list

```
virsh # list
  Id  Name          State
  --:--:--
  2   ubuntu20.04-2 running
```

sudo virsh list - -all

```
virsh # list --all
  Id  Name          State
  --:--:--
  1   ubuntu20.04    running
  2   ubuntu20.04-2  running
```

sudo virsh nodeinfo

```
virsh # nodeinfo
CPU model:           x86_64
CPU(s):              6
CPU frequency:       871 MHz
CPU socket(s):       1
Core(s) per socket: 6
Thread(s) per core: 1
NUMA cell(s):        1
Memory size:         7977500 KiB
```

sudo virsh help list

```
virsh # help list
  NAME
    list - list domains

  SYNOPSIS
    list [--inactive] [--all] [--transient] [--persistent] [--with-snapshot] [--without-snapshot] [--with-checkpoint] [--without-checkpoint] [--state-running] [--state-paused] [--state-shutoff] [--state-other] [--autostart] [--no-autostart] [--with-managed-save] [--without-managed-save] [--uuid] [--name] [--table] [--managed-save] [--title]

  DESCRIPTION
    Returns list of domains.

  OPTIONS
    --inactive      list inactive domains
    --all          list inactive & active domains
    --transient     list transient domains
    --persistent    list persistent domains
    --with-snapshot list domains with existing snapshot
    --without-snapshot list domains without a snapshot
    --with-checkpoint list domains with existing checkpoint
    --without-checkpoint list domains without a checkpoint
    --state-running list domains in running state
    --state-paused  list domains in paused state
    --state-shutoff list domains in shutoff state
    --state-other   list domains in other states
    --autostart     list domains with autostart enabled
    --no-autostart  list domains with autostart disabled
    --with-managed-save list domains with managed save state
    --without-managed-save list domains without managed save
    --uuid          list uuid's only
    --name          list domain names only
    --table         list table (default)
```

sudo virsh start <vmname>

```
virsh # start ubuntu20.04
error: Domain is already active
```

sudo virsh reboot <vmname>

```
virsh # reboot ubuntu20.04  
Domain ubuntu20.04 is being rebooted
```

sudo virsh dominfo <vmname>

```
virsh # dominfo ubuntu20.04  
Id: 1  
Name: ubuntu20.04  
UUID: 3f4b34f8-72d7-41d1-97a0-afaf3e531cb0  
OS Type: hvm  
State: running  
CPU(s): 2  
CPU time: 27.2s  
Max memory: 4194304 KiB  
Used memory: 4194304 KiB  
Persistent: yes  
Autostart: disable  
Managed save: no  
Security model: apparmor  
Security DOI: 0  
Security label: libvirt-3f4b34f8-72d7-41d1-97a0-afaf3e531cb0 (enforcing)
```

sudo virsh suspend <vmname>

```
virsh # suspend ubuntu20.04  
Domain ubuntu20.04 suspended
```

sudo virsh resume <vmname>

```
virsh # resume ubuntu20.04  
Domain ubuntu20.04 resumed
```

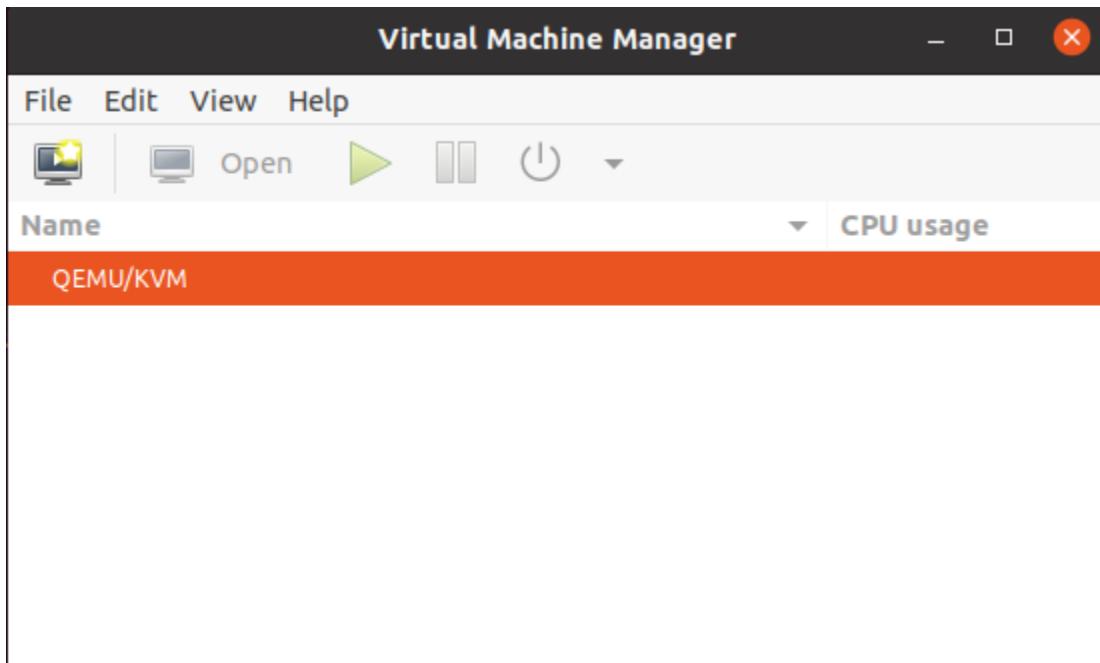
sudo virsh destroy <vmname>

```
virsh # destroy ubuntu20.04  
Domain ubuntu20.04 destroyed
```

```
virsh # list  
 Id  Name          State  
----  
  2  ubuntu20.04-2  running
```

sudo virsh undefine --domain <vmname> --remove-all-storage

```
virsh # undefine --domain ubuntu20.04 --remove-all-storage
Domain ubuntu20.04 has been undefined
Volume 'vda'(/var/lib/libvirt/images/ubuntu20.04.qcow2) removed.
```



Result

The program was executed and the result was successfully obtained. Thus CO5 was obtained

Experiment :15

04/07/2023

Aim :

Docker installation and deployment

CO5

Acquire skill sets required for a DevOps.

Procedure

Step 1: sudo su

```
[ec2-user@ip-172-31-37-95 ~]$ sudo su
```

Step 2: yum update -y - To update

```
[root@ip-172-31-37-95 ec2-user]# yum update -y
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
No packages marked for update
```

Step 3: which docker - To check whether docker is already installed

```
[root@ip-172-31-37-95 ec2-user]# which docker
/usr/bin/which: no docker in (/sbin:/bin:/usr/sbin:/usr/bin)
```

Step 4: yum install docker -y - To install docker

```
[root@ip-172-31-37-95 ec2-user]# yum install docker -y
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
Resolving Dependencies
--> Running transaction check
--> Package docker.x86_64 0:20.10.23-1.amzn2.0.1 will be installed
--> Processing Dependency: runc >= 1.0.0 for package: docker-20.10.23-1.amzn2.0.1.x86_64
--> Processing Dependency: libcgroup >= 0.40.rc1-5.15 for package: docker-20.10.23-1.amzn2.0.1.x86_64
--> Processing Dependency: containerd >= 1.3.2 for package: docker-20.10.23-1.amzn2.0.1.x86_64
--> Processing Dependency: pigz for package: docker-20.10.23-1.amzn2.0.1.x86_64
--> Running transaction check
--> Package containerd.x86_64 0:1.6.19-1.amzn2.0.1 will be installed
--> Package libcgroup.x86_64 0:0.41-21.amzn2 will be installed
--> Package pigz.x86_64 0:2.3.4-1.amzn2.0.1 will be installed
--> Package runc.x86_64 0:1.1.7-1.amzn2 will be installed
--> Finished Dependency Resolution

Dependencies Resolved
```

```

Dependencies Resolved

=====
= Package           Arch      Version            Repository        Size
=====
= Installing:
  docker           x86_64    20.10.23-1.amzn2.0.1   amzn2extra-docker  41 M
Installing for dependencies:
  containerd       x86_64    1.6.19-1.amzn2.0.1   amzn2extra-docker  27 M
  libcgroup        x86_64    0.41-21.amzn2          amzn2-core          66 k
  pigz             x86_64    2.3.4-1.amzn2.0.1   amzn2-core          81 k
  runc             x86_64    1.1.7-1.amzn2          amzn2extra-docker  2.9 M

Transaction Summary
=====
= Install 1 Package (+4 Dependent packages)

Total download size: 72 M
Installed size: 272 M
Downloading packages:
(1/5): libcgroup-0.41-21.amzn2.x86_64.rpm | 66 kB 00:00:00

Total download size: 72 M
Installed size: 272 M
Downloading packages:
(1/5): libcgroup-0.41-21.amzn2.x86_64.rpm | 66 kB 00:00:00
(2/5): pigz-2.3.4-1.amzn2.0.1.x86_64.rpm | 81 kB 00:00:00
(3/5): containerd-1.6.19-1.amzn2.0.1.x86_64.rpm | 27 MB 00:00:00
(5/5): runc-1.1.7-1.amzn2.x86_64.rpm          81% [=====] 0.0 B/s | 59 MB --::-- ETA
(4/5): runc-1.1.7-1.amzn2.x86_64.rpm          | 2.9 MB 00:00:00
(5/5): docker-20.10.23-1.amzn2.0.1.x86_64.rpm | 41 MB 00:00:00

-
Total                                         100 MB/s | 72 MB 00:00:00

Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : runc-1.1.7-1.amzn2.x86_64          1/5
  Installing : containerd-1.6.19-1.amzn2.0.1.x86_64 2/5

  Installing : libcgroup-0.41-21.amzn2.x86_64      3/5
  Installing : pigz-2.3.4-1.amzn2.0.1.x86_64      4/5
  Installing : docker-20.10.23-1.amzn2.0.1.x86_64  5/5
  Verifying   : containerd-1.6.19-1.amzn2.0.1.x86_64 1/5
  Verifying   : pigz-2.3.4-1.amzn2.0.1.x86_64      2/5
  Verifying   : docker-20.10.23-1.amzn2.0.1.x86_64  3/5
  Verifying   : runc-1.1.7-1.amzn2.x86_64          4/5
  Verifying   : libcgroup-0.41-21.amzn2.x86_64      5/5

Installed:
  docker.x86_64 0:20.10.23-1.amzn2.0.1

```

Step 5:docker --version-To check the version of installed docker

```
[root@ip-172-31-37-95 ec2-user]# docker --version
Docker version 20.10.23, build 7155243
```

Step 6:docker info-To find the information of docker

```
[root@ip-172-31-37-95 ec2-user]# docker info
Client:
  Context:    default
  Debug Mode: false
  Plugins:
    buildx: Docker Buildx (Docker Inc., 0.0.0+unknown)

Server:
ERROR: Cannot connect to the Docker daemon at unix:///var/run/docker.sock. Is the docker daemon running?
errors pretty printing info
[root@ip-172-31-37-95 ec2-user]#
```

Step 7:service docker status-To check the current status of the docker

```
[root@ip-172-31-37-95 ec2-user]# service docker status
Redirecting to /bin/systemctl status docker.service
● docker.service - Docker Application Container Engine
  Loaded: loaded (/usr/lib/systemd/system/docker.service; disabled; vendor preset: disabled)
  Active: inactive (dead)
    Docs: https://docs.docker.com
```

Step 8:service docker start-To start the docker

```
[root@ip-172-31-37-95 ec2-user]# service docker start
Redirecting to /bin/systemctl start docker.service
```

Step 9:service docker status-To check the status of the docker

```
[root@ip-172-31-37-95 ec2-user]# service docker start
Redirecting to /bin/systemctl start docker.service
[root@ip-172-31-37-95 ec2-user]# service docker status
Redirecting to /bin/systemctl status docker.service
● docker.service - Docker Application Container Engine
  Loaded: loaded (/usr/lib/systemd/system/docker.service; disabled; vendor preset: disabled)
  Active: active (running) since Fri 2023-06-23 10:15:10 UTC; 1min 26s ago
    Docs: https://docs.docker.com
   Process: 3094 ExecStartPre=/usr/libexec/docker/docker-setup-runtimes.sh (code=exited, status=0/SUCCESS)
   Process: 3093 ExecStartPre=/bin/mkdir -p /run/docker (code=exited, status=0/SUCCESS)
 Main PID: 3097 (dockerd)
   Tasks: 8
  Memory: 22.5M
     CPU: 0.000 CPU(s)
    CGroup: /system.slice/docker.service
            └─3097 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock --default-ulimit nofile=32768:65536
```

```
Jun 23 10:15:10 ip-172-31-37-95.eu-north-1.compute.internal dockerd[3097]: time="2023-06-23T10:15:10.301060552Z" level=info msg="ClientConn sw...=grp
c
Jun 23 10:15:10 ip-172-31-37-95.eu-north-1.compute.internal dockerd[3097]: time="2023-06-23T10:15:10.327101739Z" level=warning msg="Your kerne...ight
"
Jun 23 10:15:10 ip-172-31-37-95.eu-north-1.compute.internal dockerd[3097]: time="2023-06-23T10:15:10.327130163Z" level=warning msg="Your kerne...vice
"
Jun 23 10:15:10 ip-172-31-37-95.eu-north-1.compute.internal dockerd[3097]: time="2023-06-23T10:15:10.327311893Z" level=info msg="Loading conta...art.
"
Jun 23 10:15:10 ip-172-31-37-95.eu-north-1.compute.internal dockerd[3097]: time="2023-06-23T10:15:10.463316326Z" level=info msg="Default bridg...ress
"
Jun 23 10:15:10 ip-172-31-37-95.eu-north-1.compute.internal dockerd[3097]: time="2023-06-23T10:15:10.510694215Z" level=info msg="Loading conta...one.
"
Jun 23 10:15:10 ip-172-31-37-95.eu-north-1.compute.internal dockerd[3097]: time="2023-06-23T10:15:10.526342535Z" level=info msg="Docker daemon...10.2
3
Jun 23 10:15:10 ip-172-31-37-95.eu-north-1.compute.internal dockerd[3097]: time="2023-06-23T10:15:10.526436032Z" level=info msg="Daemon has co...tion
"
Jun 23 10:15:10 ip-172-31-37-95.eu-north-1.compute.internal systemd[1]: Started Docker Application Container Engine.
Jun 23 10:15:10 ip-172-31-37-95.eu-north-1.compute.internal dockerd[3097]: time="2023-06-23T10:15:10.553005127Z" level=info msg="API listen on...sock
"
Hint: Some lines were ellipsized, use -l to show in full.
```

Step 10: docker ps -a-To list all running

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES

Step 10:docker ps

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES

Step 11:docker pull ubuntu

```
[root@ip-172-31-37-95 ec2-user]# docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
6b851dcae6ca: Pull complete
Digest: sha256:6120be6a2b7ce665d0cbddc3ce6eae60fe94637c6a66985312d1f02f63cc0bcd
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest
```

docker run -it --name [name] [image] /bin/bash

```
[root@ip-172-31-37-95 ec2-user]# docker run -it --name tinu ubuntu /bin/bash
root@e6843c1ecce4:/# docker ps
bash: docker: command not found
root@e6843c1ecce4:/# docker ps -a
bash: docker: command not found
root@e6843c1ecce4:/# exit
exit
[root@ip-172-31-37-95 ec2-user]# docker ps -a
CONTAINER ID        IMAGE       COMMAND       CREATED          STATUS           PORTS     NAMES
e6843c1ecce4        ubuntu      "/bin/bash"   About a minute ago   Exited (127)  12 seconds ago          tinu
```

docker start [image_name]

```
[root@ip-172-31-37-95 ec2-user]# docker start tinu
tinu
```

docker attach [image_name]

```
[root@ip-172-31-37-95 ec2-user]# docker attach tinu
```

```
root@e6843c1ecce4:/# cat > tinufile.txt
tinu
clara
emmanuel
^C
root@e6843c1ecce4:/# ls
bin  boot  dev  etc  home  lib  lib32  lib64  libx32  media  mnt  opt  proc  root  run  sbin  srv  sys  tinufile.txt  tmp  usr  var
root@e6843c1ecce4:/# cat tinufile.txt
tinu
clara
emmanuel
```

```

root@e6843c1ecce4:/# apt update
Get:1 http://archive.ubuntu.com/ubuntu jammy InRelease [270 kB]
Get:2 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:4 http://archive.ubuntu.com/ubuntu jammy-backports InRelease [108 kB]
Get:5 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [634 kB]
Get:6 http://archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [266 kB]
Get:7 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [541 kB]
Get:8 http://archive.ubuntu.com/ubuntu jammy/restricted amd64 Packages [164 kB]
Get:9 http://archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [17.5 MB]
Get:10 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [36.3 kB]
Get:11 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [939 kB]
Get:12 http://archive.ubuntu.com/ubuntu jammy/main amd64 Packages [1792 kB]
Get:13 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1191 kB]
Get:14 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [922 kB]
Get:15 http://archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [42.2 kB]
Get:16 http://archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [545 kB]
Get:17 http://archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [49.4 kB]
Get:18 http://archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [25.5 kB]
Fetched 25.2 MB in 2s (12.3 MB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
1 package can be upgraded. Run 'apt list --upgradable' to see it.

```

```

root@e6843c1ecce4:/# apt install apache2
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils bzip2 ca-certificates file libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap libbrotli1 libcurl4
  libexpat1 libgdbm-compat4 libgdbm6 libicu70 libjansson4 libldap-2.5-0 libldap-common liblua5.3-0 libmagic-mgc libmagic1 libnghttp2-14 libperl5.34
  libpsl5 librtmp1 libssasl2-2 libssasl2-modules libssasl2-modules-db libsqlite3-0 libssh-4 libxml2 mailcap media-types mime-support netbase openssl
  perl perl-modules-5.34 publicsuffix ssl-cert xz-utils
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom www-browser ufw bzip2-doc gdm-110n libssasl2-modules-gssapi-mit
  libssasl2-modules-gssapi-heimdal libssasl2-modules-ldap libssasl2-modules-otp libssasl2-modules-sql perl-doc libterm-readline-gnu-perl
  libterm-readline-perl perl make libtap-harness-archive-perl
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils bzip2 ca-certificates file libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap libbrotli1
  libcurl4 libexpat1 libgdbm-compat4 libgdbm6 libicu70 libjansson4 libldap-2.5-0 libldap-common liblua5.3-0 libmagic-mgc libmagic1 libnghttp2-14
  libperl5.34 libpsl5 librtmp1 libssasl2-2 libssasl2-modules libssasl2-modules-db libsqlite3-0 libssh-4 libxml2 mailcap media-types mime-support
  netbase openssl perl perl-modules-5.34 publicsuffix ssl-cert xz-utils
0 upgraded, 43 newly installed, 0 to remove and 1 not upgraded.
Need to get 25.6 MB of archives.
After this operation, 111 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 perl-modules-5.34 all 5.34.0-3ubuntu1.2 [2977 kB]

```

```

root@e6843c1ecce4:/# which apache2
/usr/sbin/apache2

```

```

root@e6843c1ecce4:/# exit
exit

```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
[root@ip-172-31-37-95 ec2-user]# docker ps -a						
CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
e6843c1ecce4	ubuntu	"/bin/bash"	5 minutes ago	Exited (0) 16 seconds ago		tinu

```
Last login: Tue Jul  4 08:19:38 2023 from ec2-13-48-4-203.eu-north-1.compute.amazonaws.com
 _\   _ )   Amazon Linux 2 AMI
 _\|_|_|
https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-37-95 ~]$ sudo su
[root@ip-172-31-37-95 ec2-user]# yum update -y
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
No packages marked for update
[root@ip-172-31-37-95 ec2-user]# service docker start
Redirecting to /bin/systemctl start docker.service
[root@ip-172-31-37-95 ec2-user]# service docker status
Redirecting to /bin/systemctl status docker.service
● docker.service - Docker Application Container Engine
  Loaded: loaded (/usr/lib/systemd/system/docker.service; disabled; vendor preset: disabled)
  Active: active (running) since Tue 2023-07-04 08:22:49 UTC; 6s ago
    Docs: https://docs.docker.com
 Process: 3279 ExecStartPre=/usr/libexec/docker/docker-setup-runtimes.sh (code=exited, status=0/SUCCESS)
 Process: 3276 ExecStartPre=/bin/mkdir -p /run/docker (code=exited, status=0/SUCCESS)
 Main PID: 3282 (dockerd)
   Tasks: 8
  Memory: 85.6M
 CGroub: /system.slice/docker.service
         └─3282 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock --default-ulimit nofile=32768:65536

hint: Some lines were ellipsized, use -l to show in full.
[root@ip-172-31-37-95 ec2-user]# docker images
REPOSITORY  TAG      IMAGE ID      CREATED     SIZE
ubuntu      latest   99284ca6cea0  4 weeks ago  77.8MB
[root@ip-172-31-37-95 ec2-user]# docker ps -a
CONTAINER ID  IMAGE      COMMAND      CREATED     STATUS      PORTS      NAMES
c08bbfbf19117  ubuntu    "/bin/bash"  8 hours ago  Exited (129)  8 hours ago  tinu_container
05f3945fa72b  ubuntu    "/bin/bash"  4 days ago   Exited (137)  4 days ago  tinucontainer
478fbde5dc1a  ubuntu    "/bin/bash"  6 days ago   Exited (137)  4 days ago  tinu2
e6843c1cccc4  ubuntu    "/bin/bash"  10 days ago  Exited (137)  7 days ago  tinu
[root@ip-172-31-37-95 ec2-user]# docker start tinu_container
tinu_container
[root@ip-172-31-37-95 ec2-user]# docker attach tinu_container
root@c08bbfbf19117:/# which apache2
/usr/sbin/apache2
root@c08bbfbf19117:/# ls
bin  boot  dev  dir1  etc  file  home  lib  lib32  lib64  libx32  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr  var
root@c08bbfbf19117:/# cd dir1
root@e0be30239acd1:/dir1# ls
file
```

docker commit [image_name] [new_img_name]-A new image is created

```
root@e0be30239acd1:/dir1# docker commit tinu_container tinu_image
bash: docker: command not found
root@e0be30239acd1:/dir1# docker commit tinu_container tinu
bash: docker: command not found
root@e0be30239acd1:/dir1# exit
exit
[root@ip-172-31-37-95 ec2-user]# docker commit tinu_container tinu_image
sha256:8b6b639aafe29dfc073629ba16c3ad3fbb478ae25f8cf7b85b39d5ea86d169b4
[root@ip-172-31-37-95 ec2-user]# docker images
REPOSITORY  TAG      IMAGE ID      CREATED     SIZE
tinu_image  latest   8b6b639aafe2  6 seconds ago  227MB
ubuntu      latest   99284ca6cea0  4 weeks ago  77.8MB
[root@ip-172-31-37-95 ec2-user]# docker run -it --name new_container tinu_image /bin/bash
root@e0be30239acd1:/# docker start new_container
bash: docker: command not found
root@e0be30239acd1:/# ls
bin  boot  dev  dir1  etc  file  home  lib  lib32  lib64  libx32  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr  var
root@e0be30239acd1:/# cd dir1
root@e0be30239acd1:/dir1# ls
file
```

```

root@abe30239acd1:/dir1# which apache2
/usr/sbin/apache2
root@abe30239acd1:/dir1# tree
.
`-- file

0 directories, 1 file
root@abe30239acd1:/dir1# apt update
Get:1 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Hit:2 http://archive.ubuntu.com/ubuntu jammy InRelease
Get:3 http://archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:4 http://archive.ubuntu.com/ubuntu jammy-backports InRelease [108 kB]
Fetched 337 kB in 0s (763 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
1 package can be upgraded. Run 'apt list --upgradable' to see it.

```

docker tag [new_image name] [username]/[name in which the image should be saved in the hub]-To reserve space for our image

```

root@abe30239acd1:/dir1# exit
exit
[root@ip-172-31-37-95 ec2-user]# docker tag tinu_image tinuclara16/new_tinu_image

```

docker login

```

[root@ip-172-31-95 ec2-user]# docker login
Login with your Docker ID to push and pull images from Docker Hub. If you don't have a Docker ID, head over to https://hub.docker.com to create one.
Username: tinuclara16
Password:
WARNING! Your password will be stored unencrypted in /root/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded

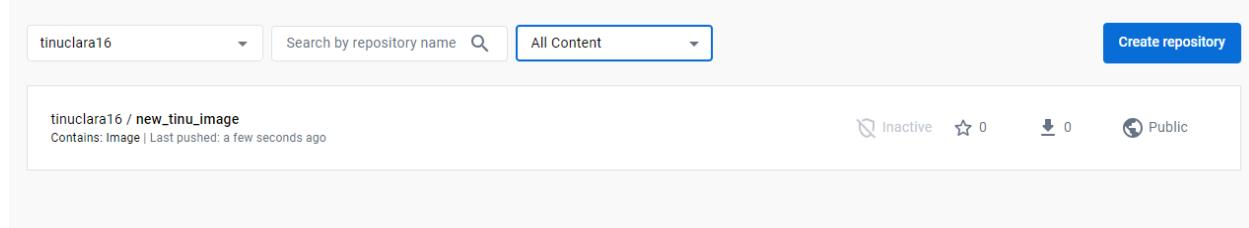
```

docker push [username]/[name in which space is reserved for the image]

```

[root@ip-172-31-37-95 ec2-user]# docker push tinuclara16/new_tinu_image
Using default tag: latest
The push refers to repository [docker.io/tinuclara16/new_tinu_image]
b84a1028aa0f: Pushed
cdd7c7392317: Mounted from library/ubuntu
latest: digest: sha256:8864bdf5619bc007794020ee6a4f77b214a34fb337bdbe644fec8c9600750981 size: 741

```



Mumbai(create another instance)

```

Amazon Linux 2 AMI

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-35-228 ~]$ sudo su
[root@ip-172-31-35-228 ec2-user]# yum update -y
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
amzn2-core
No packages marked for update
[root@ip-172-31-35-228 ec2-user]# yum install socker -y
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
No package socker available.
Error: Nothing to do
[root@ip-172-31-35-228 ec2-user]# yum install docker -y
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
Resolving Dependencies
--> Running transaction check
--> Package docker.x86_64 0:20.10.23-1.amzn2.0.1 will be installed
--> Processing Dependency: runc >= 1.0.0 for package: docker-20.10.23-1.amzn2.0.1.x86_64
--> Processing Dependency: libcgROUP >= 0.40.rc1-5.15 for package: docker-20.10.23-1.amzn2.0.1.x86_64
--> Processing Dependency: containerd >= 1.3.2 for package: docker-20.10.23-1.amzn2.0.1.x86_64

Dependencies Resolved

=====
| Package           | Arch | Version      | Repository | Size |
|=====             |===== |=====         |=====       |===== |
| Installing:      |       |              |            |       |
| docker            | x86_64 | 20.10.23-1.amzn2.0.1 | amzn2extra-docker | 41 M |
| Installing for dependencies: |       |              |            |       |
| containerd        | x86_64 | 1.6.19-1.amzn2.0.1 | amzn2extra-docker | 27 M |
| libcgROUP         | x86_64 | 0.41-21.amzn2 | amzn2-core | 66 k |
| pigz              | x86_64 | 2.3.4-1.amzn2.0.1 | amzn2-core | 81 k |
| runc              | x86_64 | 1.1.7-1.amzn2 | amzn2extra-docker | 2.9 M |

Transaction Summary
=====
Install 1 Package (+4 Dependent packages)

Total download size: 72 M
Installed size: 272 M
Downloading packages:
(1/5): libcgROUP-0.41-21.amzn2.x86_64.rpm | 66 kB 00:00:00
(2/5): pigz-2.3.4-1.amzn2.0.1.x86_64.rpm | 81 kB 00:00:00

=====
[root@ip-172-31-35-228 ec2-user]# service docker start
Redirecting to /bin/systemctl start docker.service
[root@ip-172-31-35-228 ec2-user]# service docker status
Redirecting to /bin/systemctl status docker.service
● docker.service - Docker Application Container Engine
   Loaded: loaded (/usr/lib/systemd/system/docker.service; disabled; vendor preset: disabled)
   Active: active (running) since Tue 2023-07-04 09:07:51 UTC; 4s ago
     Docs: https://docs.docker.com
     Process: 3883 ExecStartPre=/usr/libexec/docker/docker-setup-runtimes.sh (code=exited, status=0/SUCCESS)
    Process: 3882 ExecStartPre=/bin/mkdir -p /run/docker (code=exited, status=0/SUCCESS)
   Main PID: 3886 (dockerd)
      Tasks: 7
     Memory: 21.6M
      CGroup: /system.slice/docker.service
              └─3886 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock --default-ulimit nofile=32768:65536

```

docker pull [username]/[name in which image is saved in the hub]

```

Run 'docker image COMMAND --help' for more information on a command.
[root@ip-172-31-35-228 ec2-user]# docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
[root@ip-172-31-35-228 ec2-user]# docker pull tinuclaral6/new_tinu_image
Using default tag: latest
latest: Pulling from tinuclaral6/new_tinu_image
6b851dcae6ca: Pull complete
9f260566d52f: Pull complete
Digest: sha256:8864bdf5619bc007794020ee6a4f77b214a34fb337bdbe644fec8c9600750981
Status: Downloaded newer image for tinuclaral6/new_tinu_image:latest
docker.io/tinuclaral6/new_tinu_image:latest
[root@ip-172-31-35-228 ec2-user]# docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
tinuclaral6/new_tinu_image latest 8b6b639aa4e2 39 minutes ago 227MB
[root@ip-172-31-35-228 ec2-user]# docker run -it --name tinuclaral6/new_tinu_image /bin/bash
docker: invalid reference format.
See 'docker run --help'.
[root@ip-172-31-35-228 ec2-user]# docker run -it --name tinu tinuclaral6/new_tinu_image /bin/bash
root@0ddf82a3a625:/# which apache2
root@0ddf82a3a625:/# which apache2
/usr/sbin/apache2
root@0ddf82a3a625:/# ls
bin boot dev dirl etc file home lib lib32 lib64 libx32 media mnt opt proc root run sbin srv sys tmp usr var
root@0ddf82a3a625:/# cd dirl
root@0ddf82a3a625:/dirl# ls
file

```

```

root@0ddf82a3a625:/dir1# tree
:
|-- file

0 directories, 1 file
root@0ddf82a3a625:/dir1# exit
exit
[root@ip-172-31-35-228 ec2-user]# docker rmi tinuclara16/new_tinu_image
Error response from daemon: conflict: unable to remove repository reference "tinuclara16/new_tinu_image" (must force) - container 0ddf82a3a625 is using its referenced image 8b6b639aa4e2
[root@ip-172-31-35-228 ec2-user]# docker rmi tinuclara16/new_tinu_image
Error response from daemon: conflict: unable to remove repository reference "tinuclara16/new_tinu_image" (must force) - container 0ddf82a3a625 is using its referenced image 8b6b639aa4e2
[root@ip-172-31-35-228 ec2-user]# docker rmi tinu
Error: No such image: tinu
[root@ip-172-31-35-228 ec2-user]# docker rm tinu
tinu
[root@ip-172-31-35-228 ec2-user]# docker rmi tinuclara16/new_tinu_image
Untagged: tinuclara16/new_tinu_image:latest
Untagged: tinuclara16/new_tinu_image@sha256:8864bdf5619bc007794020ee6a4f77b214a34fb337bdbe644fec8c9600750981
Deleted: sha256:8b6b639aa4e29dfc073629ba16c3ad3fb478ae25f8cf7b85b39d5ea86d169b4
Deleted: sha256:17ec52f36800e3386ecd1a3742d2743645193933a9bd5e5085b59c2bf3059fb9
Deleted: sha256:cdd7c73923174e45ea648d6699665c288e1b17a0f45efdbeca860f6dafdf731

```

Features and controls that help you uncover, understand, and fix issues with your container images in Docker Hub

Advanced image analysis is provided by Docker Scout (Early Access). [Learn more](#) and [upgrade](#)
This account is on the Docker Scout Free tier. Upgrade for increased image analysis limits and additional software supply chain features.

Advanced image analysis prov
Know when new CVEs impact your
 Basic Hub vulnerability scanning
Images will be scanned once when
 None

Visibility Settings: tinuclara16/new_tinu_image

This repository will not appear in Docker Hub search results, and will only be accessible to you, or members of your organization.

Please type the name of your repository to make it private: `new_tinu_image`

`new_tinu_image|`

Visibility settings

Using 0 of 1 private repositories. [Get more](#)

Make this repository private. Private repositories are only available to you or members of your organization.

[Make private](#)

Cancel **Make private**

```

[root@ip-172-31-35-228 ec2-user]# docker pull tinuclara16/new_tinu_image
Using default tag: latest
Error response from daemon: pull access denied for tinuclara16/new_tinu_image, repository does not exist or may require 'docker login': denied: requested access to the resource is denied

```

Result

The program was executed and the result was successfully obtained. Thus CO5 was obtained

Experiment :16

04/07/2023

Aim :

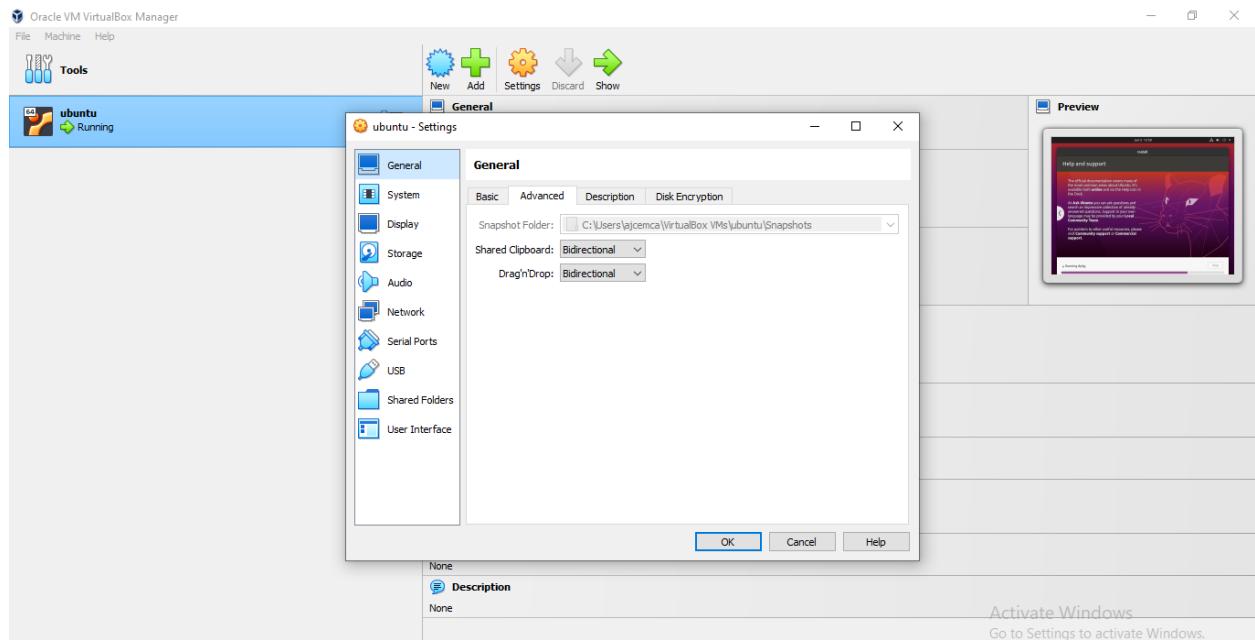
Deploy an open source application phpMyAdmin

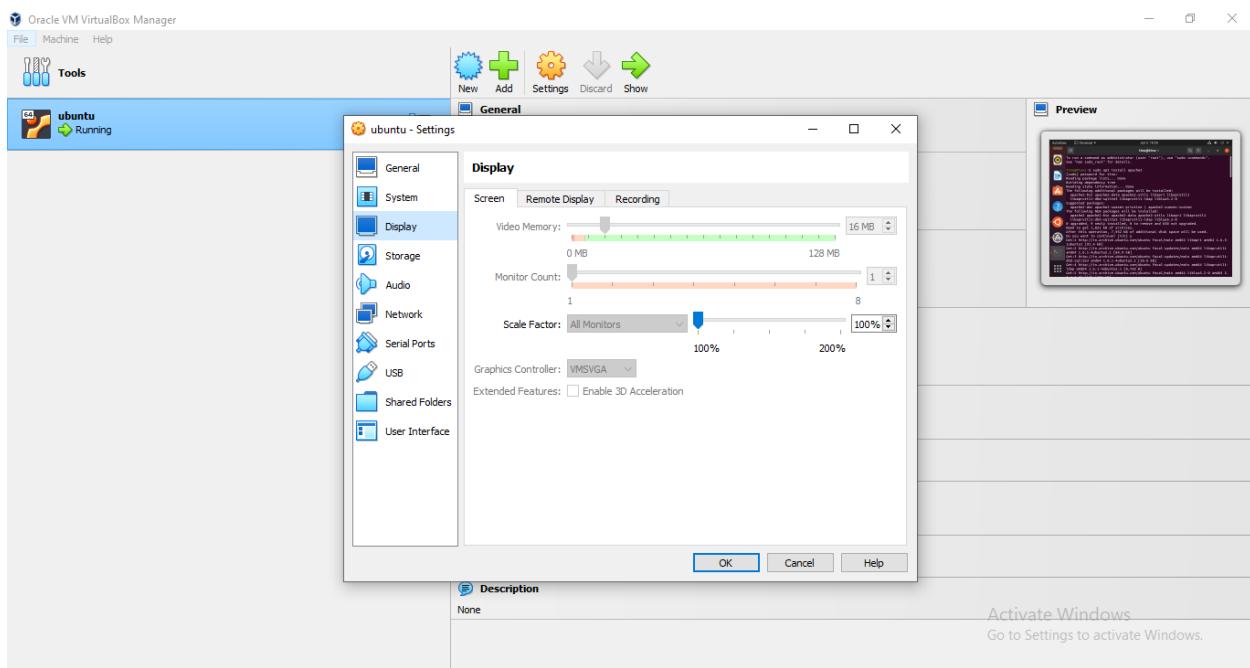
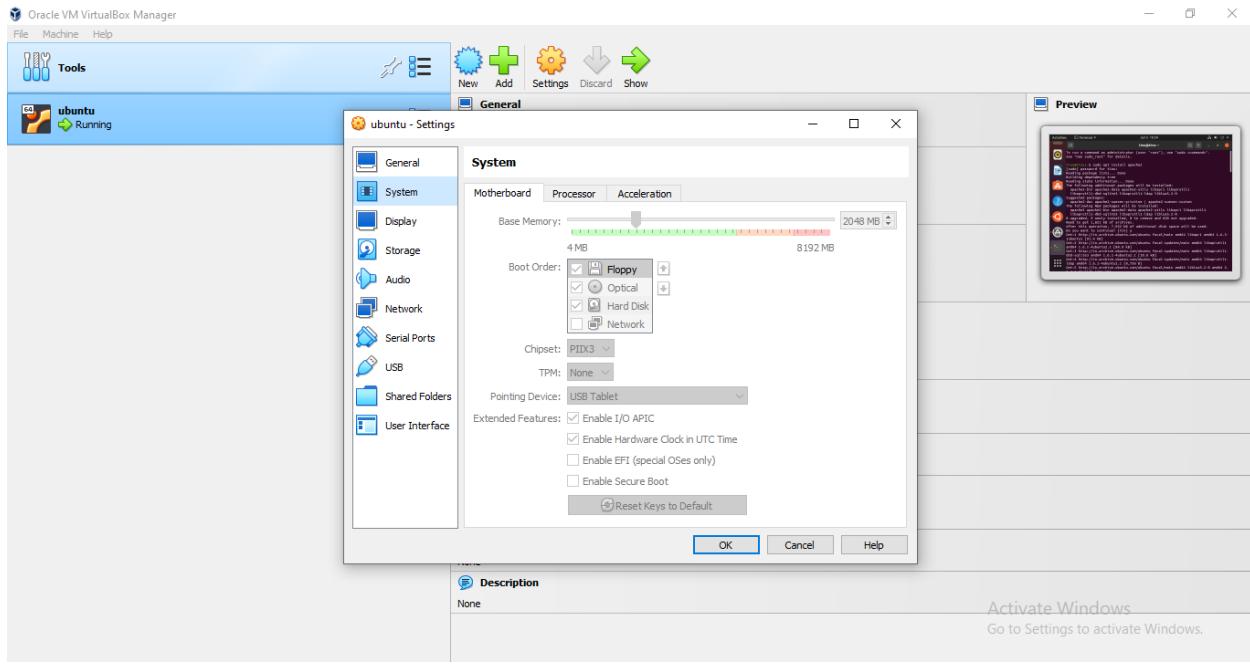
CO3

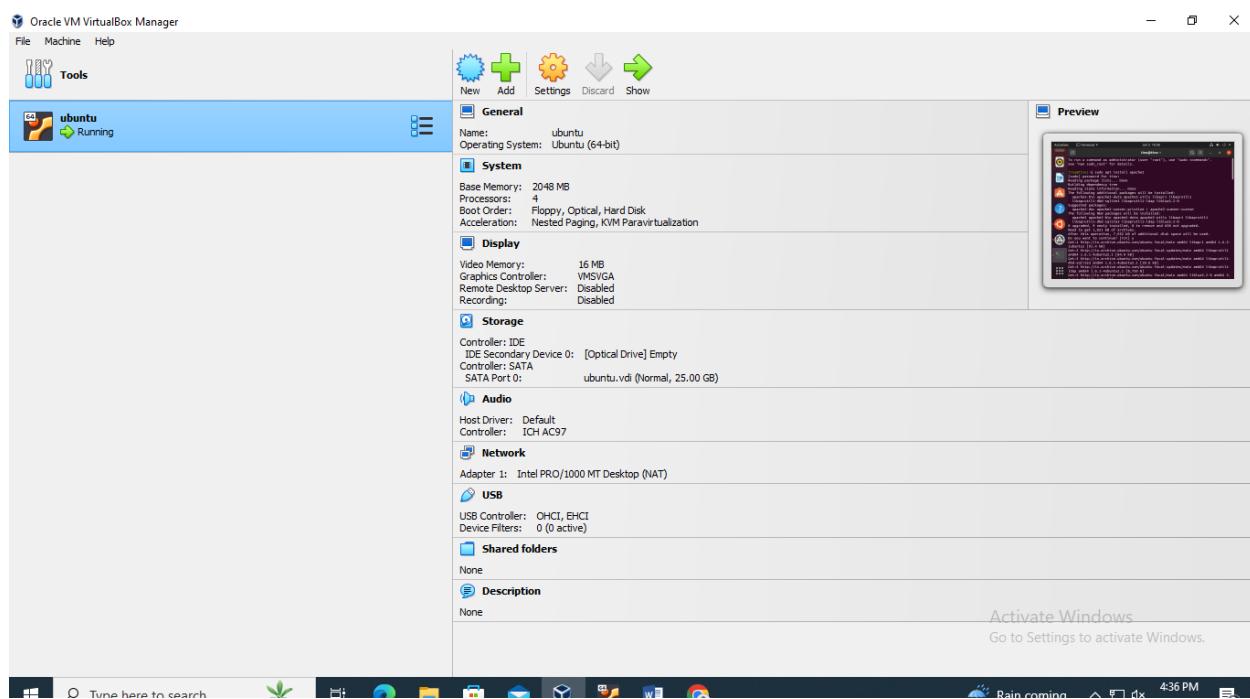
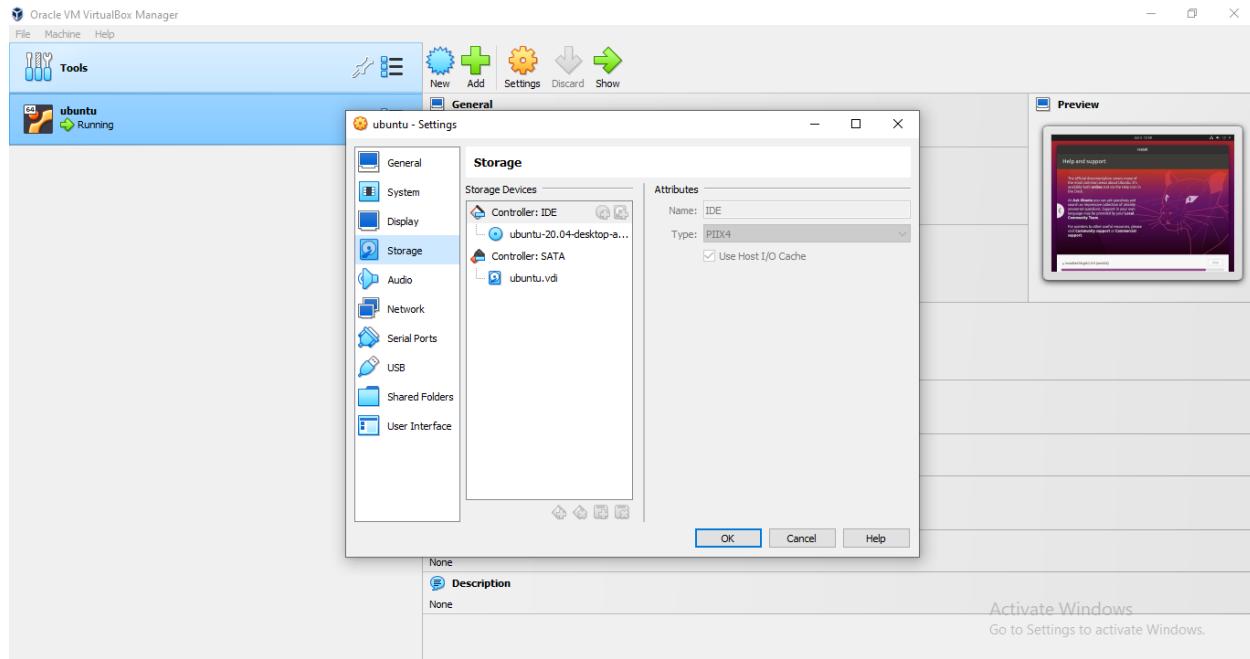
Install and manage servers for web applications. .

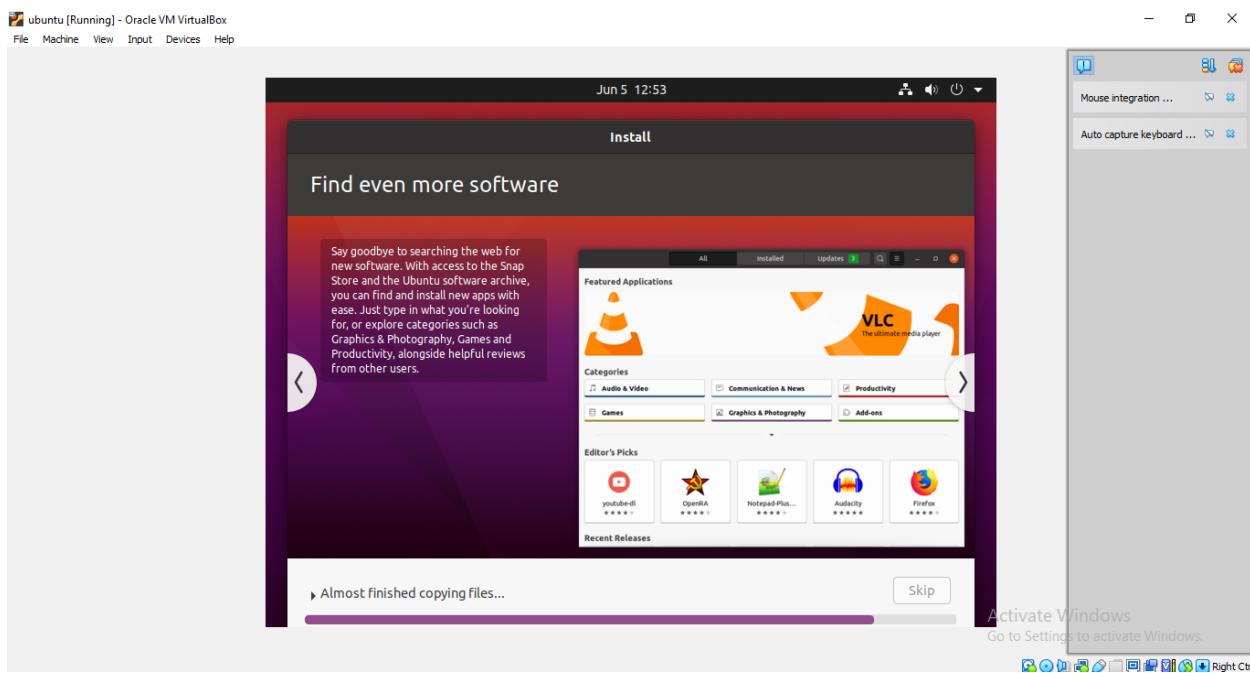
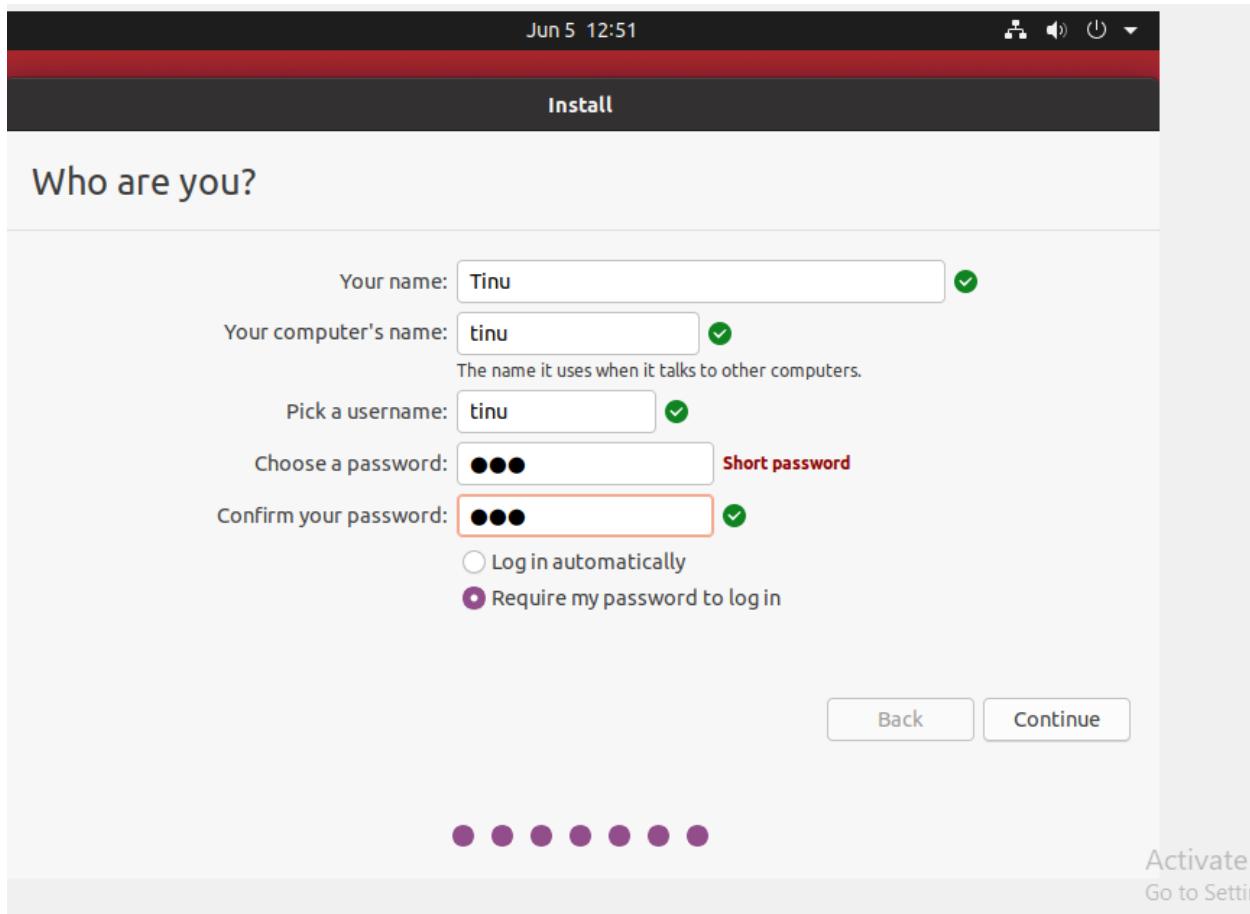
Procedure

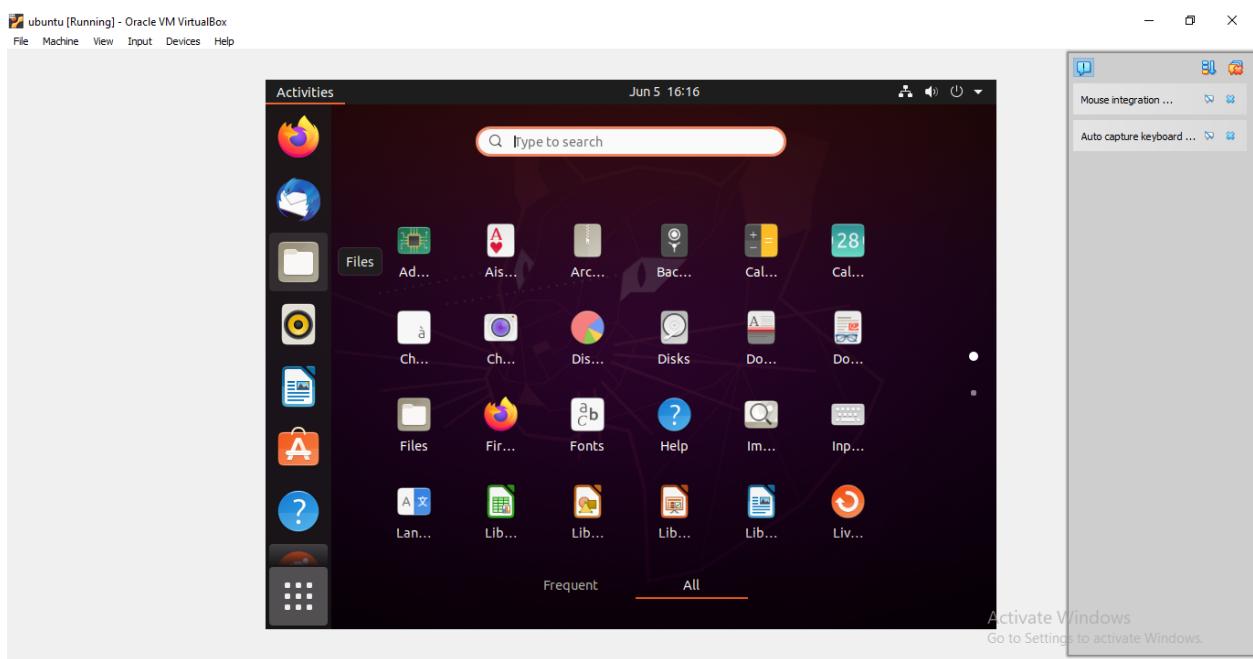
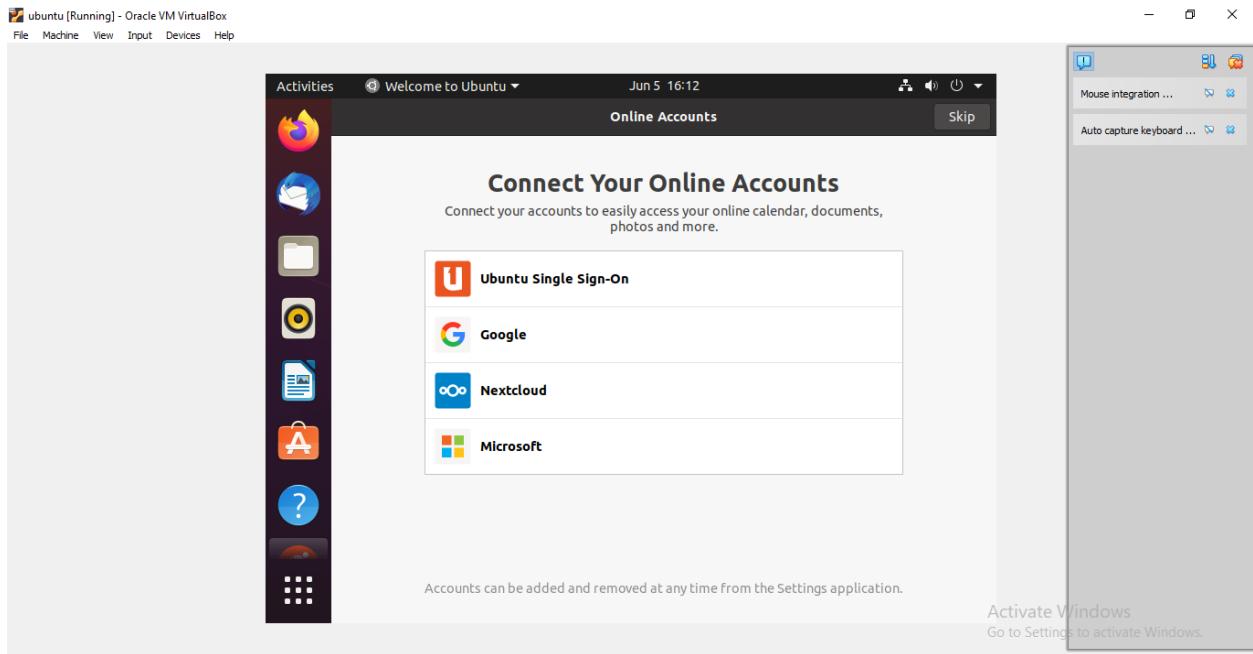
Installing Ubuntu on virtual machine







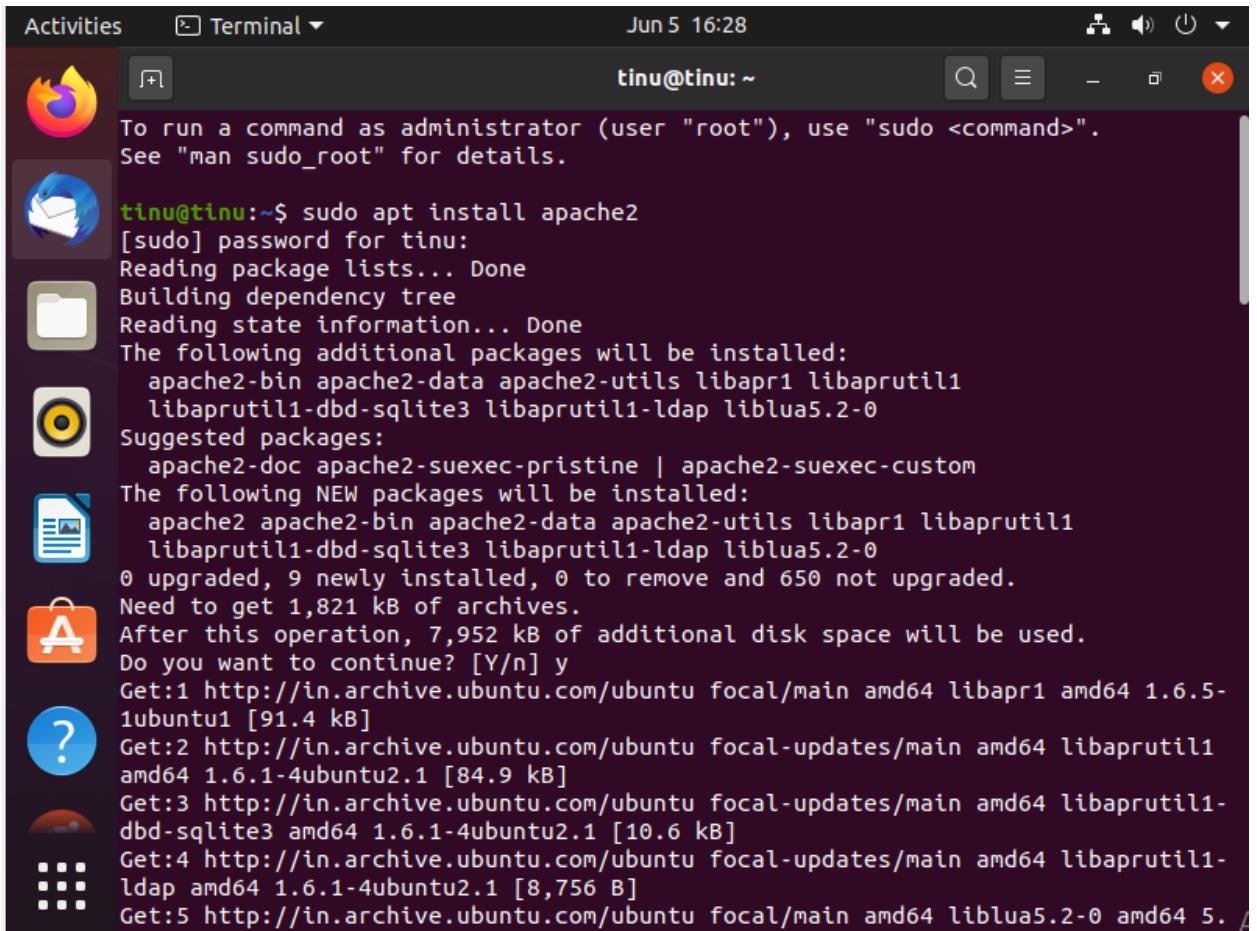




Installing apache2

sudo apt update

sudo apt install apache2



The screenshot shows a terminal window in the Unity desktop environment of Ubuntu. The title bar indicates it is a Terminal window. The command `sudo apt install apache2` was run, and the output is displayed. The output shows the package being installed, dependencies being built, and suggested packages. It also lists the number of upgraded, newly installed, and removed packages, along with the amount of disk space required and the user's confirmation to proceed.

```
tinu@tinu:~$ sudo apt install apache2
[sudo] password for tinu:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libapr1 libaprutil1
    libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.2-0
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils libapr1 libaprutil1
    libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.2-0
0 upgraded, 9 newly installed, 0 to remove and 650 not upgraded.
Need to get 1,821 kB of archives.
After this operation, 7,952 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libapr1 amd64 1.6.5-1ubuntu1 [91.4 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 libaprutil1 amd64 1.6.1-4ubuntu2.1 [84.9 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 libaprutil1-dbd-sqlite3 amd64 1.6.1-4ubuntu2.1 [10.6 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 libaprutil1-ldap amd64 1.6.1-4ubuntu2.1 [8,756 B]
Get:5 http://in.archive.ubuntu.com/ubuntu focal/main amd64 liblua5.2-0 amd64 5.1.4-1 [1,144 kB]
```

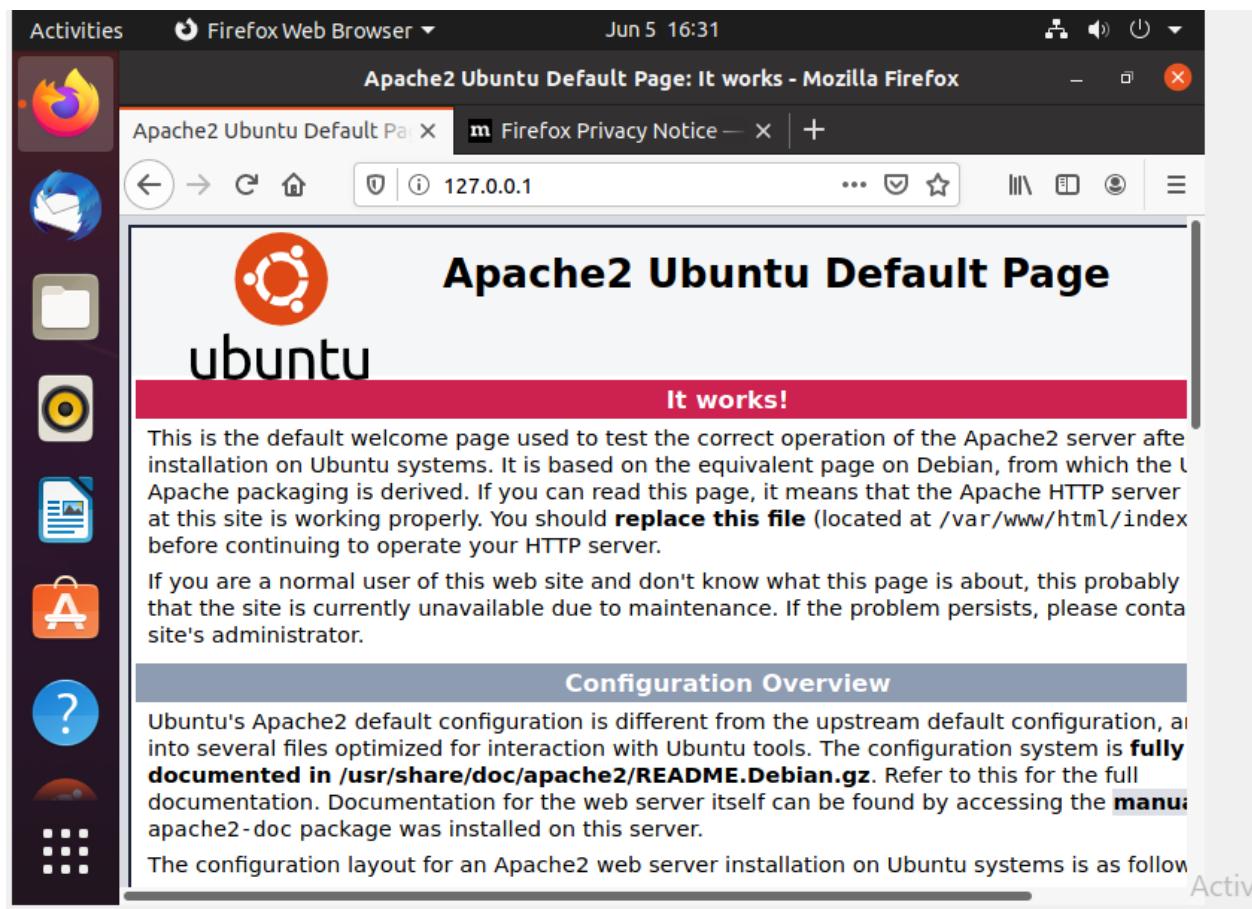
sudo systemctl status apache2-To check status of apache2

```
tinu@tinu:~$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor pres>
   Active: active (running) since Mon 2023-06-05 16:18:04 IST; 10min ago
     Docs: https://httpd.apache.org/docs/2.4/
 Main PID: 5357 (apache2)
    Tasks: 55 (limit: 2285)
   Memory: 5.2M
      CGrou: /system.slice/apache2.service
              └─5357 /usr/sbin/apache2 -k start
                  ├─5358 /usr/sbin/apache2 -k start
                  ├─5359 /usr/sbin/apache2 -k start

Jun 05 16:18:04 tinu systemd[1]: Starting The Apache HTTP Server...
Jun 05 16:18:04 tinu apachectl[5356]: AH00558: apache2: Could not reliably det>
Jun 05 16:18:04 tinu systemd[1]: Started The Apache HTTP Server.
```

sudo service apache2 start-To start apache2

```
tinu@tinu:~$ sudo service apache2 start
tinu@tinu:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defau
lt qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP g
roup default qlen 1000
    link/ether 08:00:27:5e:7f:8b brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 85075sec preferred_lft 85075sec
    inet6 fe80::524d:80b2:a544:c91/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
```



sudo apt install mysql-server

```
mca@mca:~$ sudo apt install mysql-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libaio1 libcgi-fast-perl libcgi-pm-perl libevent-core-2.1-7
  libevent-pthreads-2.1-7 libfcgi-perl libhtml-template-perl libmecab2
  mecab-ipadic mecab-ipadic-utf8 mecab-utils mysql-client-8.0
  mysql-client-core-8.0 mysql-server-8.0 mysql-server-core-8.0
Suggested packages:
  libipc-sharedcache-perl mailx tinyca
The following NEW packages will be installed:
  libaio1 libcgi-fast-perl libcgi-pm-perl libevent-core-2.1-7
  libevent-pthreads-2.1-7 libfcgi-perl libhtml-template-perl libmecab2
  mecab-ipadic mecab-ipadic-utf8 mecab-utils mysql-client-8.0
  mysql-client-core-8.0 mysql-server mysql-server-8.0 mysql-server-core-8.0
0 upgraded, 16 newly installed, 0 to remove and 427 not upgraded.
Need to get 36.5 MB of archives.
After this operation, 218 MB of additional disk space will be used.
```

systemctl status mysql

```
mca@mca:~$ systemctl status mysql
● mysql.service - MySQL Community Server
  Loaded: loaded (/lib/systemd/system/mysql.service; enabled; vendor preset: enabled)
  Active: active (running) since Wed 2023-06-21 16:29:33 IST; 1min 25s ago
    Main PID: 7749 (mysqld)
      Status: "Server is operational"
        Tasks: 37 (limit: 2295)
      Memory: 353.1M
        CGroup: /system.slice/mysql.service
                  └─7749 /usr/sbin/mysqld

Jun 21 16:29:31 mca systemd[1]: Starting MySQL Community Server...
Jun 21 16:29:33 mca systemd[1]: Started MySQL Community Server.

[4]+  Stopped                  systemctl status mysql
```

sudo su

mysql

```
mca@mca:~$ sudo su
root@mca:/home/mca# embedded
embedded: command not found
root@mca:/home/mca# mysql
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 10
Server version: 8.0.33-0ubuntu0.20.04.2 (Ubuntu)

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affiliates. Other names may be trademarks of their respective
owners.

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

```
create database database_name;
```

```
show databases;
```

```
mysql> create database db;
Query OK, 1 row affected (0.00 sec)

mysql> show databases;
+-----+
| Database      |
+-----+
| db           |
| information_schema |
| mysql         |
| performance_schema |
| sys           |
+-----+
5 rows in set (0.00 sec)

mysql> █
```

```
mca@mca:~$ sudo su
[sudo] password for mca:
root@mca:/home/mca# sudo apt update
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Hit:2 http://in.archive.ubuntu.com/ubuntu focal InRelease
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:4 http://security.ubuntu.com/ubuntu focal-security/main i386 Packages [613 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [2,648 kB]
Get:7 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [2,267 kB]
Get:8 http://security.ubuntu.com/ubuntu focal-security/main Translation-en [362 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu focal-updates/main i386 Packages [844 kB]
Get:10 http://security.ubuntu.com/ubuntu focal-security/main amd64 DEP-11 Metadata [60.0 kB]
Get:11 http://security.ubuntu.com/ubuntu focal-security/main amd64 c-n-f Metadata [13.0 kB]
Get:12 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [1,885 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu focal-updates/main Translation-en [444 kB]
Get:14 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 DEP-11 Metadata [275 kB]
Get:15 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 c-n-f Metadata [16.9 kB]
```

```
root@mca:/home/mca# systemctl status mysql
● mysql.service - MySQL Community Server
   Loaded: loaded (/lib/systemd/system/mysql.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2023-06-27 13:50:26 IST; 4min 29s ago
     Process: 663 ExecStartPre=/usr/share/mysql/mysql-systemd-start pre (code=exited, status=0)
    Main PID: 993 (mysqld)
      Status: "Server is operational"
        Tasks: 37 (limit: 2295)
       Memory: 376.8M
      CGroup: /system.slice/mysql.service
              └─993 /usr/sbin/mysqld

Jun 27 13:50:14 mca systemd[1]: Starting MySQL Community Server...
Jun 27 13:50:26 mca systemd[1]: Started MySQL Community Server.

root@mca:/home/mca# mysql
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.33-0ubuntu0.20.04.2 (Ubuntu)

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```

```
root@mca:/home/mca# mysql
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.33-0ubuntu0.20.04.2 (Ubuntu)

Copyright (c) 2000, 2023, Oracle and/or its affiliates.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

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

```
root@mca:/var# which apache2
/usr/sbin/apache2
root@mca:/var# systemctl status mysql
● mysql.service - MySQL Community Server
   Loaded: loaded (/lib/systemd/system/mysql.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2023-06-27 13:50:26 IST; 11min ago
     Process: 663 ExecStartPre=/usr/share/mysql/mysql-systemd-start pre (code=exited, status=0)
    Main PID: 993 (mysqld)
      Status: "Server is operational"
        Tasks: 38 (limit: 2295)
       Memory: 377.4M
      CGroup: /system.slice/mysql.service
              └─993 /usr/sbin/mysqld

Jun 27 13:50:14 mca systemd[1]: Starting MySQL Community Server...
Jun 27 13:50:26 mca systemd[1]: Started MySQL Community Server.
```

```
apt install php libapache2-mod-php mysql
```

```
root@mca:/var# apt install php libapache2-mod-php php-mysql
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libapache2-mod-php7.4 php-common php7.4 php7.4-cli php7.4-common
  php7.4-json php7.4-mysql php7.4-opcache php7.4-readline
Suggested packages:
  php-pear
The following NEW packages will be installed:
  libapache2-mod-php libapache2-mod-php7.4 php php-common php-mysql php7.4
  php7.4-cli php7.4-common php7.4-json php7.4-mysql php7.4-opcache
  php7.4-readline
0 upgraded, 12 newly installed, 0 to remove and 427 not upgraded.
Need to get 4,158 kB of archives.
After this operation, 18.5 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 php-common all 2:75
[11.9 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 php7.4-commo
n amd64 7.4.3-4ubuntu2.18 [982 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 php7.4-json
amd64 7.4.3-4ubuntu2.18 [19.2 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 php7.4-opcac
```

```
ap install phpMyadmin -y
```

```
root@mca:/var/www/html# apt install phpmyadmin -y
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock. It is held by pr
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock. It is held by pr
ocess 2963 (unattended-upgr)
Reading package lists... 0%
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  linux-headers-5.13.0-30-generic linux-hwe-5.13-headers-5.13.0-30
  linux-image-5.13.0-30-generic linux-modules-5.13.0-30-generic
  linux-modules-extra-5.13.0-30-generic
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  dbconfig-common dbconfig-mysql icc-profiles-free javascript-common
  libjs-jquery libjs-openlayers libjs-sphinxdoc libjs-underscore libonig5
  libzip5 php-bz2 php-curl php-gd php-google-recaptcha php-mbstring
  php-phpmyadmin-motranslator php-phpmyadmin-shapefile
  php-phpmyadmin-sql-parser php-phpseclib php-psr-cache php-psr-container
  php-psr-log php-symfony-cache php-symfony-cache-contracts
  php-symfony-expression-language php-symfony-service-contracts
  php-symfony-var-exporter php-tcpdf php-twig php-twig-extensions php-xml
  php-zip php7.4-bz2 php7.4-curl php7.4-gd php7.4-mbstring php7.4-xml
  php7.4-zip
Suggested packages:
```

```
processing triggers for php7.4-common (7.4.3-1ubuntu2.10) ...
root@mca:/var/www/html# apt update
Hit:1 http://in.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Fetched 336 kB in 3s (129 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
378 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@mca:/var/www/html# service phpmyadmin start
Failed to start phpmyadmin.service: Unit phpmyadmin.service not found.
root@mca:/var/www/html# service apache2 status
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor pres>
   Active: active (running) since Tue 2023-06-27 14:14:12 IST; 25min ago
     Docs: https://httpd.apache.org/docs/2.4/
   Process: 35934 ExecReload=/usr/sbin/apachectl graceful (code=exited, statu>
 Main PID: 11980 (apache2)
    Tasks: 7 (limit: 2295)
   Memory: 16.5M
      CGrou: /system.slice/apache2.service
              └─11980 /usr/sbin/apache2 -k start
                  ├─36206 /usr/sbin/apache2 -k start
                  ├─36207 /usr/sbin/apache2 -k start
                  ├─36208 /usr/sbin/apache2 -k start
```

```
root@mca:/var/www/html# service phpmyadmin start
Failed to start phpmyadmin.service: Unit phpmyadmin.service not found.
root@mca:/var/www/html# service phpmyadmin status
Unit phpmyadmin.service could not be found.
root@mca:/var/www/html# vi /etc/phpmyadmin/apache.com
root@mca:/var/www/html# vi /etc/phpmyadmin/apache2.conf

[11]+  Stopped                  vi /etc/phpmyadmin/apache2.conf
root@mca:/var/www/html# vi /etc/apache2/apache2.conf
root@mca:/var/www/html# vim /etc/apache2/apache2.conf

Command 'vim' not found, but can be installed with:

apt install vim          # version 2:8.1.2269-1ubuntu5.15, or
apt install vim-tiny      # version 2:8.1.2269-1ubuntu5.15
apt install vim-athena    # version 2:8.1.2269-1ubuntu5.15
apt install vim-gtk3       # version 2:8.1.2269-1ubuntu5.15
apt install vim-nox        # version 2:8.1.2269-1ubuntu5.15
apt install neovim         # version 0.4.3-3

root@mca:/var/www/html# vi /etc/apache2/apache2.conf
root@mca:/var/www/html# vi /etc/apache2/apache2.conf
root@mca:/var/www/html# systemctl restart apache2
root@mca:/var/www/html#
```

```
root@mca:/var/www/html# vi /etc/apache2/apache2.conf
root@mca:/var/www/html# vi /etc/apache2/apache2.conf
root@mca:/var/www/html# systemctl restart apache2
root@mca:/var/www/html#
root@mca:/var/www/html# mysql
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 10
Server version: 8.0.33-0ubuntu0.20.04.2 (Ubuntu)

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affiliates. Other names may be trademarks of their respective
owners.

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

mysql> show databases;
+-----+
| Database      |
+-----+
| information_schema |
| mysql          |
| performance_schema |
| sys            |
+-----+
```

```
mysql> select user,authentication_string,plugin,host from mysql.user
      -> select user,authentication_string,plugin,host from mysql.user;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that
corresponds to your MySQL server version for the right syntax to use near 'sel
ect user,authentication_string,plugin,host from mysql.user' at line 2
mysql> select user,authentication_string,plugin,host from mysql.user;
+-----+
-----+-----+-----+
| user          | authentication_string
      | plugin          | host      |
-----+-----+-----+
| debian-sys-maint | $A$005$4,
                                @c9fxwz:&(q,Xu~I5990iTtq84QcY5zaI9Wf1euJKcsm3NXz
Mq1Pd0EGKB | caching_sha2_password | localhost |
| mysql.infoschema | $A$005$THISISACOMBINATIONOFPASSWORDTHATMUSTNEVERBEUSED | caching_sha2_password | localhost |
| mysql.session    | $A$005$THISISACOMBINATIONOFPASSWORDTHATMUSTNEVERBEUSED | caching_sha2_password | localhost |
| mysql.sys        | $A$005$THISISACOMBINATIONOFPASSWORDTHATMUSTNEVERBEUSED | caching_sha2_password | localhost |
| root            | auth_socket          | localhost |
-----+-----+-----+
```

```
mysql> alter user root@localhost identify with caching_sha2_password by "root";
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that
corresponds to your MySQL server version for the right syntax to use near 'ide
ntify with caching_sha2_password by "root"' at line 1
mysql> alter user rot@localhost identified with caching_sha2_password "root";
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that
corresponds to your MySQL server version for the right syntax to use near '"ro
ot"' at line 1
mysql> alter user root@localhost identified with caching_sha2_password by "root"
";
Query OK, 0 rows affected (0.82 sec)
```

The screenshot shows the phpMyAdmin login interface. At the top, there's a browser header with the URL 'localhost/phpmyadmin/index.php'. Below the header is the phpMyAdmin logo, which is a stylized sailboat. The main title 'Welcome to phpMyAdmin' is centered above the login form. The 'Language' section has a dropdown menu set to 'English'. The 'Log in' section contains fields for 'Username' (set to 'root') and 'Password' (empty). A 'Go' button is positioned at the bottom right of the login area.

Result

The program was executed and the result was successfully obtained. Thus CO5 was obtained

Experiment :17

04/07/2023

Aim :

Make

CO3

Install and manage servers for web applications.

Procedure

Sudo

```
mca@s45:~$ sudo snap install --classic code  
code 695af097 from Visual Studio Code (vscode**) installed
```

```
mca@s45:~$ make --version  
GNU Make 4.2.1  
Built for x86_64-pc-linux-gnu  
Copyright (C) 1988-2016 Free Software Foundation, Inc.  
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>  
This is free software: you are free to change and redistribute it.  
There is NO WARRANTY, to the extent permitted by law.
```

```
mca@s45:~$ sudo apt install make  
[sudo] password for mca:  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Suggested packages:  
  make-doc  
The following NEW packages will be installed:  
  make  
0 upgraded, 1 newly installed, 0 to remove and 663 not upgraded.  
Need to get 162 kB of archives.  
After this operation, 393 kB of additional disk space will be used.  
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 make amd64 4.2.1-1.2  
[162 kB]  
Fetched 162 kB in 1s (109 kB/s)  
Selecting previously unselected package make.  
(Reading database ... 153306 files and directories currently installed.)  
Preparing to unpack .../make_4.2.1-1.2_amd64.deb ...  
Unpacking make (4.2.1-1.2) ...  
Setting up make (4.2.1-1.2) ...  
Processing triggers for man-db (2.9.1-1) ...
```

```
mca@s45:~$ sudo apt update
Hit:1 http://in.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu focal-updates/main i386 Packages [849 kB]
Get:6 http://security.ubuntu.com/ubuntu focal-security/main i386 Packages [619 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [2,679 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu focal-updates/main Translation-en [448 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 DEP-11 Metadata [275 kB]
```

Make - -version

Make directory

```
mca@s45:~$ make --version
GNU Make 4.2.1
Built for x86_64-pc-linux-gnu
Copyright (C) 1988-2016 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
```

Make directory

```
mca@s45:~$ ls /usr/bin/make
/usr/bin/make
```

If there is no such directory

Sudo apt install build-essential

Open vs code

Create folder

Createfile named main.cpp

```
tinu > main.cpp
1 #include<iostream>
2 #include "functions.h"
3 int main(){}
4     print_hello();
5     std::cout << std::endl;
6     std::cout << "the factorial of 5 is "<<factorial(5)<<std::endl;
7     return 0;
8 }
9
```

Another file name function1.cpp

```
tinu > function1.cpp
1 #include "functions.h"
2 int factorial(int n)
3 {
4     if(n!=1)
5     {
6         return(n*factorial(n-1));
7     }
8     else return 1;
9 }
```

Another file name function2.cpp

```
tinu > C function2.cpp
1 #include<iostream>
2 #include "functions.h"
3 void print_hello()
4 {
5     std::cout << "Hello World";
6 }
7
```

Another file name functions.h

```
tinu > C functions.h
1 void print_hello();
2 int factorial(int n);
3 |
```

Another file name Makefile

```
tinu > M Makefile
1 all:
2     g++ main.cpp function1.cpp function2.cpp -o hello
3 |
```

Take extension and install Make file tools and Make

```
mca@s45:~$ make
make: *** No targets specified and no makefile found. Stop.
```

```
mca@s45:~$ cd Desktop
mca@s45:~/Desktop$ cd tinu
mca@s45:~/Desktop/tinu$ ls
function1.cpp  function2.cpp  functions.h  main.cpp  Makefile
mca@s45:~/Desktop/tinu$ g++ main.cpp function1.cpp function2.cpp -o hello
Command 'g++' not found, but can be installed with:
sudo apt install g++
```

```
mca@u45:~/Desktop/tinu$ make
g++ main.cpp function1.cpp function2.cpp -o hello
mca@u45:~/Desktop/tinu$ ls
function1.cpp  function2.cpp  functions.h  hello  main.cpp  Makefile
mca@u45:~/Desktop/tinu$ ./hello
Hello World
the factorial of 5 is 120
```

Result

The program was executed and the result was successfully obtained. Thus CO5 was obtained

Experiment :18

11/07/2023

Aim :

Make

CO3

Install and manage servers for web applications. .

Procedure

```
mca@u45:~$ cmake --version
mca@u45:~$ sudo update
[sudo] password for mca:
sudo: update: command not found

mca@u45:~$ sudo apt install cmake
Reading package lists... Done
Building dependency tree
Reading state information... Done
cmake is already the newest version (3.16.3-1ubuntu1.20.04.1).
The following packages were automatically installed and are no longer required:
  linux-headers-5.4.0-26 linux-headers-5.4.0-26-generic
  linux-image-5.4.0-26-generic linux-modules-5.4.0-26-generic
  linux-modules-extra-5.4.0-26-generic
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 317 not upgraded.
```

From extension,install cmake and cmake tools

```
cmake > ↗ main.cpp
 1 #include<iostream>
 2 #include "add.h"
 3 int main()
 4 {
 5     std::cout << "Sum of 20 and 30: "<<add(20,30)<<"\n";
 6     return 0;
 7 }
 8

#include<iostream>
#include "add.h"
int main()
{
    std::cout << "Sum of 20 and 30: "<<add(20,30)<<"\n";
    return 0;
}
```

```
:MakeLists.txt tinu/... C++ add.cpp cmake X  
cmake > C++ add.cpp  
1 #include "add.h"  
2 int add(int a,int b)  
3 {  
4 |     return a+b;  
5 }  
CMakeLists.txt tinu/... C++ add.cpp cmake X
```

```
#include "add.h"  
int add(int a,int b)  
{  
    return a+b;  
}
```

```
:MakeLists.txt tinu/... C++ add.cpp cmake M Makefile cmake C add.h cmake X  
cmake > C add.h  
1 #pragma once  
2 int add(int a,int b);  
CMakeLists.txt tinu/... C++ add.cpp cmake M Makefile cmake C add.h cmake X
```

```
#pragma once  
int add(int a,int b);
```

```
:MakeLists.txt tinu/... C++ add.cpp cmake M Makefile cmake C add.h cmake  
cmake > M CMakeLists.txt  
1  
2 cmake_minimum_required(VERSION 3.16.3)  
3 PROJECT("Hello world")  
4 add_executable(result.out main.cpp add.cpp)  
CMakeLists.txt tinu/... C++ add.cpp cmake M Makefile cmake C add.h cmake
```

```
cmake_minimum_required(VERSION 3.16.3)  
PROJECT("Hello world")  
add_executable(result.out main.cpp add.cpp)
```

```
mca@u45:~$ cd Desktop  
mca@u45:~/Desktop$ cd cmake
```

```
mca@u45:~/Desktop/cmake$ cmake .
-- The C compiler identification is GNU 9.4.0
-- The CXX compiler identification is GNU 9.4.0
-- Check for working C compiler: /usr/bin/cc
-- Check for working C compiler: /usr/bin/cc -- works
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Detecting C compile features
-- Detecting C compile features - done
-- Check for working CXX compiler: /usr/bin/c++
-- Check for working CXX compiler: /usr/bin/c++ -- works
-- Detecting CXX compiler ABI info
-- Detecting CXX compiler ABI info - done
-- Detecting CXX compile features
-- Detecting CXX compile features - done
-- Configuring done
-- Generating done
-- Build files have been written to: /home/mca/Desktop/cmake
```

```
mca@u45:~/Desktop/cmake$ make
Scanning dependencies of target result.out
[ 33%] Building CXX object CMakeFiles/result.out.dir/main.cpp.o
[ 66%] Building CXX object CMakeFiles/result.out.dir/add.cpp.o
[100%] Linking CXX executable result.out
[100%] Built target result.out
```

```
mca@u45:~/Desktop/cmake$ ./result.out
Sum of 20 and 30: 50
```

Result

The program was executed and the result was successfully obtained. Thus CO5 was obtained

Experiment :19

19/06/2023

Aim :

Shell scripting

CO4

Write shell scripts required for system administration.

Procedure

1)Shell script program to study switch case

```
mca@u45:~$ vi switchcase.sh
mca@u45:~$ chmod +x switchcase.sh
mca@u45:~$ ./switchcase.sh
I love apple
```

```
#!/bin/bash

fruit="apple"
case "$fruit" in

    "banana")echo "I love banana";;

    "orange")echo "I love orange";;

    "apple")echo "I love apple";;

esac
```

2)Write a shell script to display the capital of a state using case....esac statement

```
mca@u45:~$ vi capital.sh
mca@u45:~$ chmod +x capital.sh
mca@u45:~$ ./capital.sh
Thiruvananthapuram
```

```
#!/bin/bash

state="Kerala"
case "$state" in
    "Kerala")echo "Thiruvananthapuram";;
    "Tamil Nadu")echo "Chennai";;
    "Karnataka")echo "Banglore";;
esac
```

USER-INPUT

```
mca@u45:~$ vi capital.sh
mca@u45:~$ chmod +x capital.sh
mca@u45:~$ ./capital.sh
Enter the state:Kerala
Thiruvananthapuram
```

```
#!/bin/bash
read -p "Enter the state:" state
case "$state" in
    "Kerala")echo "Thiruvananthapuram";;
    "Tamil Nadu")echo "Chennai";;
    "Karnataka")echo "Banglore";;
esac
```

3)Write a shell script to display the color of rainbow

```
mca@u45:~$ vi rainbow.sh
mca@u45:~$ chmod +x rainbow.sh
mca@u45:~$ ./rainbow.sh
violet indigo blue green yellow orange red
[REDACTED]
#!/bin/bash
color="rainbow"

case "$color" in

    "rainbow")echo "violet indigo blue green yellow orange red";;
    "r")echo "red green black blue ash violet peach saffron";;
    "g")echo "saffron red black blue yellow white";;
esac
```

WHILE LOOP

1) Write a shell script to display numbers in a certain limit using a while loop

```
mca@u45:~$ vi displaynumbers.sh
mca@u45:~$ chmod +x displaynumbers.sh
mca@u45:~$ ./displaynumbers.sh
0
1
2
3
4
5
6
7
8
9
```

```
#!/bin/bash
a=0
while [ $a -lt 10 ]
do
    echo $a
    a=`expr $a + 1`
done
~
~
```

2) Write a shell script to display numbers in a certain limit in reverse order using a while loop

```
mca@u45:~$ vi displaynumrev.sh
mca@u45:~$ chmod +x displaynumrev.sh
mca@u45:~$ ./displaynumrev.sh
10
9
8
7
6
5
4
3
2
1
```

```
#!/bin/bash
a=10

while [ $a -gt 0 ]
do
    echo $a
    a=`expr $a - 1`
done
```

4. Write a shell script to implement for loop

```
mca@u45:~$ vi forloop.sh
mca@u45:~$ chmod +x forloop.sh
mca@u45:~$ ./forloop.sh
Welcome 1 times
Welcome 2 times
Welcome 3 times
Welcome 4 times
Welcome 5 times
```

```
#!/bin/bash
#!/bin/bash
for i in 1 2 3 4 5
do
    echo "Welcome $i times"
done
```

5. Write a shell script to implement for loop with break statement

```
mca@u45:~$ vi for_breakk.sh
mca@u45:~$ chmod +x for_breakk.sh
mca@u45:~$ ./for_breakk.sh
Iteration no 1
Iteration no 2
Iteration no 3
Iteration no 4
Iteration no 5
Iteration no 6
```

```
#!/bin/bash
for a in 1 2 3 4 5 6 7 8 9 10
do
    if [ $a == 7 ]
    then
        break
    fi
    echo "Iteration no $a"
done

~
```

Write a shell script to implement for loop with continue statement

```
mca@u45:~$ vi for_continue.sh
mca@u45:~$ chmod +x for_continue.sh
mca@u45:~$ ./for_continue.sh
Iteration no 1
Iteration no 2
Iteration no 3
Iteration no 4
Iteration no 5
Iteration no 6
Iteration no 8
Iteration no 9
Iteration no 10
mca@u45:~$
```

```
#!/bin/bash
for a in 1 2 3 4 5 6 7 8 9 10
do
    if [ $a == 7 ]
    then
        continue
    fi
    echo "Iteration no $a"
done
```

Write a shell script to display colors using for loop

```
mca@u45:~$ vi for_colors.sh
mca@u45:~$ chmod +x for_colors.sh
mca@u45:~$ ./for_colors.sh
blue
black
green
red
yellow
white
```

```
#!/bin/bash
for a in blue black green red yellow white
do
    echo $a
done
```

Write a shell script to display numbers upto 10

```
mca@u45:~$ vi for_break.sh
mca@u45:~$ chmod +x for_break.sh
mca@u45:~$ ./for_break.sh
1
2
3
4
5
6
7
8
9
```

```
#!/bin/bash
for (( i=1; i<10; i++ ))
do
    echo "$i"
done
~
```

Write a shell script to count the numbers in reverse direction

```
mca@u45:~$ vi for_reverse.sh
mca@u45:~$ chmod +x for_reverse.sh
mca@u45:~$ ./for_reverse.sh
10
9
8
7
6
5
4
3
2
1
```

```
#!/bin/bash
for (( i=10; i>0; i-- ))
do
    echo $i
done
```

Write a shell script to display numbers from 2 to 15 until loop

```
mca@u45:~$ vi until.sh
mca@u45:~$ chmod +x until.sh
mca@u45:~$ ./until.sh
number 2
number 3
number 4
number 5
number 6
number 7
number 8
number 9
number 10
number 11
number 12
number 13
number 14
number 15
```

```
#!/bin/bash
i=2
until [ $i -gt 15 ];
do
    echo "number $i"
    i=$(( i+1 ))
done
```

Write a shell script to print “Hello wrl”

```
mca@u45:~$ vi function.sh
mca@u45:~$ chmod +x function.sh
mca@u45:~$ ./function.sh
Hello world
```

```
#!/bin/bash
fun(){
    echo "Hello world"
}
fun

~
```

Write a shell script to check whether a number is palindrome or not

```
ubuntu@Tinu:~$ vi palindrome
ubuntu@Tinu:~$ chmod +x palindrome
ubuntu@Tinu:~$ ./palindrome
Enter a number: 371
371 is not palindrome
ubuntu@Tinu:~$ ./palindrome
Enter a number: 121
121 is palindrome
```

```

#!/bin/bash
read -p "Enter a number: " n
dup=$n
while [ $n -gt 0 ]
do
    r=$(( n%10 ))
    s=$(( r+$(( s*10 )) ))
    n=$(( n/10 ))
done
if [ $dup -eq $s ]
then
    echo "$dup is palindrome"
else
    echo "$dup is not palindrome"
fi

```

Write a shell script to check whether a number is armstrong or not

```

ubuntu@Tinu:~$ vi armstrong
ubuntu@Tinu:~$ chmod +x armstrong
ubuntu@Tinu:~$ ./armstrong
Enter a number: 371
371 is an Armstrong number
ubuntu@Tinu:~$ ./armstrong
Enter a number: 121
121 is not an armstrong number

```

```

#!/bin/bash
read -p "Enter a number: " n
dup=$n
s=0
while [ $n -gt 0 ]
do
    r=$(( n%10 ))
    s=$(( s+${r}**3 ))
    n=$(( n/10 ))
done
if [ $dup -eq $s ]
then
    echo "$dup is an Armstrong number"
else
    echo "$dup is not an armstrong number"
fi

```

Write a shell script to check whether a number is prime or not

```

ubuntu@Tinu:~$ vi prime.sh
ubuntu@Tinu:~$ ./prime.sh
Enter a number: 6
6 is not a prime number.
ubuntu@Tinu:~$ ./prime.sh
Enter a number: 5
5 is a prime number.

```

```
#!/bin/bash
read -p "Enter a number: " n
for((i=2; i<=$n/2; i++))
do
    ans=$(( n%i ))
    if [ $ans -eq 0 ]
    then
        echo "$n is not a prime number."
        exit 0
    fi
done
echo "$n is a prime number"
~
```

Write a shell script for factorial of a number

```
ubuntu@Tinu:~$ vi factorial.sh
ubuntu@Tinu:~$ ./factorial.sh
Enter the number whose factorial is to be finded: 6
720
```

```
#!/bin/bash
read -p "Enter the number whose factorial is to be finded: " num
fact=1
while [ $num -gt 1 ]
do
    fact=$((fact * num))
    num=$((num - 1))
done
echo $fact
~
```

Write a shell script to print Fibonacci series

```
#!/bin/bash
read -p "Enter the number upto which fibonacci series is to be finded: " n
a=0
b=1
count=2
echo "$a"
echo "$b"
while [ $count -lt $n ]
do
    count=`expr $count + 1`
    sum=`expr $a + $b`
    echo "$sum"
    a = $b
    b = $sum
done
```

```
ubuntu@Tinu:~$ vi fibonacci.sh
ubuntu@Tinu:~$ ./fibonacci.sh
Enter the number upto which fibonacci series is to be finded: 6
Fibonacci Series Upto 6 Number:
0
1
1
2
3
5
```

```
#!/bin/bash
read -p "Enter the number upto which fibonacci series is to be finded: " number
x=0
y=1
i=2
echo "Fibonacci Series Upto $number Number: "
echo "$x"
echo "$y"
while [ $i -lt $number ]
do
    i=`expr $i + 1`
    z=`expr $x + $y`
    echo "$z"
    x=$y
    y=$z
done
~
```

Write a shell script to check if the current year is a leap year or not

```
mca@t2:~$ vi leap.sh
mca@t2:~$ chmod +x leap.sh
mca@t2:~$ ./leap.sh
Enter the year: 2024
2024 is a leap year
mca@t2:~$ ./leap.sh
Enter the year: 1992
1992 is a leap year
mca@t2:~$ ./leap.sh
Enter the year: 2023
2023 is not a leap year
```

```
#!/bin/bash
read -p "Enter the year: " a
if(( $a%4==0 & $a%100!=0 ))
then
    echo "$a is a leap year"

elif(( $a%100==0 | $a%400==0 ))
then
    echo "$a is a leap year"

else
    echo "$a is not a leap year"
fi
```

Result

The program was executed and the result was successfully obtained. Thus CO4 was obtained

Experiment :20

19/06/2023

Aim :

Shell scripting

CO4

Write shell scripts required for system administration.

Procedure

Sudo apt update

```
mca@u45:~$ sudo apt update
[sudo] password for mca:
Get:1 http://in.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu focal-updates/main i386 Packages [838 kB]
Get:6 http://security.ubuntu.com/ubuntu focal-security/main i386 Packages [607 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [2,616 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu focal-updates/main Translation-en [440 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 DEP-11 Metadata [275 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 c-n-f Metadata [16.8 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [1,941 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu focal-updates/restricted Translation-en [272 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [1,071 kB]
Get:14 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [2,232 kB]
Get:15 http://in.archive.ubuntu.com/ubuntu focal-updates/universe i386 Packages [732 kB]
Get:16 http://security.ubuntu.com/ubuntu focal-security/main Translation-en [359 kB]
Get:17 http://security.ubuntu.com/ubuntu focal-security/main amd64 DEP-11 Metadata [59.9 kB]
Get:18 http://security.ubuntu.com/ubuntu focal-security/main amd64 c-n-f Metadata [13.0 kB]
Get:19 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [1,833 kB]
Get:20 http://security.ubuntu.com/ubuntu focal-security/restricted Translation-en [256 kB]
Get:21 http://security.ubuntu.com/ubuntu focal-security/universe i386 Packages [601 kB]
Get:22 http://security.ubuntu.com/ubuntu focal-security/universe amd64 Packages [844 kB]
Get:23 http://security.ubuntu.com/ubuntu focal-security/universe Translation-en [174 kB]
Get:24 http://security.ubuntu.com/ubuntu focal-security/universe amd64 DEP-11 Metadata [95.8 kB]
Get:25 http://in.archive.ubuntu.com/ubuntu focal-updates/universe Translation-en [255 kB]
Get:26 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 DEP-11 Metadata [409 kB]
Get:27 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 c-n-f Metadata [25.0 kB]
Get:28 http://in.archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 DEP-11 Metadata [940 B]
Get:29 http://in.archive.ubuntu.com/ubuntu focal-backports/main i386 Packages [36.1 kB]
Get:30 http://in.archive.ubuntu.com/ubuntu focal-backports/main amd64 Packages [45.7 kB]
Get:31 http://in.archive.ubuntu.com/ubuntu focal-backports/main amd64 DEP-11 Metadata [7,996 B]
Get:32 http://in.archive.ubuntu.com/ubuntu focal-backports/main amd64 c-n-f Metadata [1,420 B]
Get:33 http://in.archive.ubuntu.com/ubuntu focal-backports/universe i386 Packages [13.8 kB]
Get:34 http://in.archive.ubuntu.com/ubuntu focal-backports/universe amd64 Packages [25.0 kB]
Get:35 http://in.archive.ubuntu.com/ubuntu focal-backports/universe amd64 DEP-11 Metadata [30.6 kB]
```

sudo apt install net-tools

```
mca@u45:~$ sudo apt install net-tools
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  net-tools
0 upgraded, 1 newly installed, 0 to remove and 696 not upgraded.
Need to get 196 kB of archives.
After this operation, 864 kB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 net-tools amd64 1.60+git20180626.aebd88e-1ubuntu1 [196 kB]
Fetched 196 kB in 1s (132 kB/s)
Selecting previously unselected package net-tools.
(Reading database ... 153306 files and directories currently installed.)
Preparing to unpack .../net-tools_1.60+git20180626.aebd88e-1ubuntu1_amd64.deb ...
Unpacking net-tools (1.60+git20180626.aebd88e-1ubuntu1) ...
Setting up net-tools (1.60+git20180626.aebd88e-1ubuntu1) ...
Processing triggers for man-db (2.9.1-1) ...
mca@u45:~$ ifconfig
enp5s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
  inet 192.168.6.115 netmask 255.255.255.0 broadcast 192.168.6.255
    inet6 fe80::724ef66f:c414:1316 prefixlen 64 scopeid 0x20<link>
      ether 0c:9d:92:0e:7d:c6 txqueuelen 1000 (Ethernet)
        RX packets 1221935 bytes 1832505046 (1.8 GB)
        RX errors 0 dropped 30 overruns 0 frame 0
        TX packets 201482 bytes 13471147 (13.4 MB)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
  inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
      loop txqueuelen 1000 (Local Loopback)
        RX packets 338 bytes 29600 (29.6 KB)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 338 bytes 29600 (29.6 KB)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

ifconfig-gives ideas about network setup configuration. It gives the information about mtu, IP address, mac address.

```
mca@u45:~$ ifconfig
enp5s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
  inet 192.168.6.115 netmask 255.255.255.0 broadcast 192.168.6.255
    inet6 fe80::724ef66f:c414:1316 prefixlen 64 scopeid 0x20<link>
      ether 0c:9d:92:0e:7d:c6 txqueuelen 1000 (Ethernet)
        RX packets 1221935 bytes 1832505046 (1.8 GB)
        RX errors 0 dropped 30 overruns 0 frame 0
        TX packets 201482 bytes 13471147 (13.4 MB)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
  inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
      loop txqueuelen 1000 (Local Loopback)
        RX packets 338 bytes 29600 (29.6 KB)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 338 bytes 29600 (29.6 KB)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Sudo apt install ifupdown

```
mca@u45:~$ sudo apt install ifupdown
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  rdnssd
The following NEW packages will be installed:
  ifupdown
0 upgraded, 1 newly installed, 0 to remove and 696 not upgraded.
Need to get 60.5 kB of archives.
After this operation, 234 kB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 ifupdown amd64 0.8.35ubuntu1 [60.5 kB]
Fetched 60.5 kB in 1s (53.5 kB/s)
Selecting previously unselected package ifupdown.
(Reading database ... 153355 files and directories currently installed.)
Preparing to unpack .../ifupdown_0.8.35ubuntu1_amd64.deb ...
Unpacking ifupdown (0.8.35ubuntu1) ...
Setting up ifupdown (0.8.35ubuntu1) ...
Creating /etc/network/interfaces.
Created symlink /etc/systemd/system/multi-user.target.wants/networking.service → /lib/systemd/system/networking.service.
Created symlink /etc/systemd/system/network-online.target.wants/networking.service → /lib/systemd/system/networking.service.
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for systemd (245.4-4ubuntu3) ...
```

Ping google

Ping is command which is used to identify the connectivity between the host and server

It is used for detecting devices on a network and for troubleshooting problems

```
mca@u45:~$ ping google.com
PING google.com (142.250.182.78) 56(84) bytes of data.
64 bytes from maa05s20-in-f14.1e100.net (142.250.182.78): icmp_seq=1 ttl=248 time=15.9 ms
64 bytes from maa05s20-in-f14.1e100.net (142.250.182.78): icmp_seq=2 ttl=248 time=15.9 ms
64 bytes from maa05s20-in-f14.1e100.net (142.250.182.78): icmp_seq=3 ttl=248 time=17.0 ms
64 bytes from maa05s20-in-f14.1e100.net (142.250.182.78): icmp_seq=4 ttl=248 time=15.9 ms
64 bytes from maa05s20-in-f14.1e100.net (142.250.182.78): icmp_seq=5 ttl=248 time=16.0 ms
```

```
mca@u45:~$ ping 142.250.182.78
PING 142.250.182.78 (142.250.182.78) 56(84) bytes of data.
64 bytes from 142.250.182.78: icmp_seq=1 ttl=248 time=15.9 ms
64 bytes from 142.250.182.78: icmp_seq=2 ttl=248 time=15.9 ms
```

Ping -c 5 google.com-To specify the number of lines

```
mca@u45:~$ ping -c 5 google.com
PING google.com (142.250.182.78) 56(84) bytes of data.
64 bytes from maa05s20-in-f14.1e100.net (142.250.182.78): icmp_seq=1 ttl=248 time=16.1 ms
64 bytes from maa05s20-in-f14.1e100.net (142.250.182.78): icmp_seq=2 ttl=248 time=15.9 ms
64 bytes from maa05s20-in-f14.1e100.net (142.250.182.78): icmp_seq=3 ttl=248 time=15.9 ms
64 bytes from maa05s20-in-f14.1e100.net (142.250.182.78): icmp_seq=4 ttl=248 time=15.9 ms
64 bytes from maa05s20-in-f14.1e100.net (142.250.182.78): icmp_seq=5 ttl=248 time=15.9 ms

--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4004ms
rtt min/avg/max/mdev = 15.874/15.933/16.087/0.078 ms
```

```
mca@u45:~$ traceroute google.com
Command 'traceroute' not found, but can be installed with:

sudo apt install inetutils-traceroute # version 2:1.9.4-11ubuntu0.1, or
sudo apt install traceroute          # version 1:2.1.0-2

mca@u45:~$ sudo apt install traceroute
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  traceroute
0 upgraded, 1 newly installed, 0 to remove and 696 not upgraded.
Need to get 45.4 kB of archives.
After this operation, 152 kB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 traceroute amd64 1:2.1.0-2 [45.4 kB]
Fetched 45.4 kB in 1s (32.7 kB/s)
Selecting previously unselected package traceroute.
(Reading database ... 153394 files and directories currently installed.)
Preparing to unpack .../traceroute_1%3a2.1.0-2_amd64.deb ...
Unpacking traceroute (1:2.1.0-2) ...
Setting up traceroute (1:2.1.0-2) ...
update-alternatives: using /usr/bin/traceroute.db to provide /usr/bin/traceroute (traceroute) in auto mode
update-alternatives: using /usr/bin/lft.db to provide /usr/bin/lft (lft) in auto mode
update-alternatives: using /usr/bin/traceproto.db to provide /usr/bin/traceproto (traceproto) in auto mode
update-alternatives: using /usr/sbin/tcptraceroute.db to provide /usr/sbin/tcptraceroute (tcptraceroute) in auto mode
Processing triggers for man-db (2.9.1-1) ...
```

```
mca@u45:~$ whois google.com
Command 'whois' not found, but can be installed with:

sudo apt install whois

mca@u45:~$ sudo apt install whois
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  whois
0 upgraded, 1 newly installed, 0 to remove and 696 not upgraded.
Need to get 44.7 kB of archives.
After this operation, 279 kB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 whois amd64 5.5.6 [44.7 kB]
Fetched 44.7 kB in 1s (42.0 kB/s)
Selecting previously unselected package whois.
(Reading database ... 153414 files and directories currently installed.)
Preparing to unpack .../archives/whois_5.5.6_amd64.deb ...
Unpacking whois (5.5.6) ...
Setting up whois (5.5.6) ...
Processing triggers for man-db (2.9.1-1) ...
```

```
mca@u45:~$ whois google.com
Domain Name: GOOGLE.COM
Registry Domain ID: 2138514_DOMAIN_COM-VRSN
Registrar WHOIS Server: whois.markmonitor.com
Registrar URL: http://www.markmonitor.com
Updated Date: 2019-09-09T15:39:04Z
Creation Date: 1997-09-15T04:00:00Z
Registry Expiry Date: 2028-09-14T04:00:00Z
Registrar: MarkMonitor Inc.
Registrar IANA ID: 292
Registrar Abuse Contact Email: abusecomplaints@markmonitor.com
Registrar Abuse Contact Phone: +1.2086851750
Domain Status: clientDeleteProhibited https://icann.org/epp#clientDeleteProhibited
Domain Status: clientTransferProhibited https://icann.org/epp#clientTransferProhibited
Domain Status: clientUpdateProhibited https://icann.org/epp#clientUpdateProhibited
Domain Status: serverDeleteProhibited https://icann.org/epp#serverDeleteProhibited
Domain Status: serverTransferProhibited https://icann.org/epp#serverTransferProhibited
Domain Status: serverUpdateProhibited https://icann.org/epp#serverUpdateProhibited
Name Server: NS1.GOOGLE.COM
Name Server: NS2.GOOGLE.COM
Name Server: NS3.GOOGLE.COM
Name Server: NS4.GOOGLE.COM
DNSSEC: unsigned
URL of the ICANN Whois Inaccuracy Complaint Form: https://www.icann.org/wicf/
>>> Last update of whois database: 2023-06-13T09:17:43Z <<<
```

For more information on Whois status codes, please visit <https://icann.org/epp>

NOTICE: The expiration date displayed in this record is the date the registrar's sponsorship of the domain name registration in the registry is currently set to expire. This date does not necessarily reflect the expiration date of the domain name registrant's agreement with the sponsoring registrar. Users may consult the sponsoring registrar's Whois database to view the registrar's reported date of expiration for this registration.

TERMS OF USE: You are not authorized to access or query our Whois database through the use of electronic processes that are high-volume and automated except as reasonably necessary to register domain names or

sudo ifconfig enp5s0 down -Used to down the network interface

sudo ifconfig enp5s0 up-Used to activate the network interface

```
mca@u45:~$ sudo ifconfig enp5s0 down
mca@u45:~$ sudo ifconfig enp5s0 down
mca@u45:~$ sudo ifconfig enp5s0 up
mca@u45:~$ nslookup google.com
Server:          127.0.0.53
Address:         127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.182.78
Name:   google.com
Address: 2404:6800:4007:81b::200e
```

```
mca@u45:~$ nslookup 142.250.182.78
78.182.250.142.in-addr.arpa      name = maa05s20-in-f14.1e100.net.
```

Authoritative answers can be found from:

```
mca@u45:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
mca@u45:~$ wget https://bjpcjp.github.io/pdfs/devops/linux-commands-handbook.pdf
--2023-06-13 15:00:02-- https://bjpcjp.github.io/pdfs/devops/linux-commands-handbook.pdf
Resolving bjpcjp.github.io (bjpcjp.github.io)... 185.199.109.153, 185.199.109.153, 185.199.110.153, ...
Connecting to bjpcjp.github.io (bjpcjp.github.io)|185.199.109.153|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 14824851 (14M) [application/pdf]
Saving to: 'linux-commands-handbook.pdf'

linux-commands-handbook.pdf      100%[=====] 14.14M 55.2MB/s   in 0.3s

2023-06-13 15:00:02 (55.2 MB/s) - 'linux-commands-handbook.pdf' saved [14824851/14824851]

mca@u45:~$ ls
Desktop Documents Downloads linux-commands-handbook.pdf Music Pictures Public Templates Videos
```

Sudo tcpdump-To capture the packets of current network interface

Sudo tcpdump -D-To display available network interface

```
mca@u45:~$ sudo tcpdump -D
1.enp5s0 [Up, Running]
2.lo [Up, Running, Loopback]
3.any (Pseudo-device that captures on all interfaces) [Up, Running]
4.bluetooth-monitor (Bluetooth Linux Monitor) [none]
5.nflog (Linux netfilter log (NFLOG) interface) [none]
6.nfqueue (Linux netfilter queue (NFQUEUE) interface) [none]
```

Sudo tcpdump -c 5 -i enp5s0-To capture specified number of packets from particular interface

```
mca@u45:~$ sudo tcpdump -D
1.enp5s0 [Up, Running]
2.lo [Up, Running, Loopback]
3.any (Pseudo-device that captures on all interfaces) [Up, Running]
4.bluetooth-monitor (Bluetooth Linux Monitor) [none]
5.nflog (Linux netfilter log (NFLOG) interface) [none]
6.nfqueue (Linux netfilter queue (NFQUEUE) interface) [none]
```

Sudo tcpdump -A -i enp5s0-To print the captured packets in aski format

```
mca@u45:~$ sudo tcpdump -A -i enp5s0
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp5s0, link-type EN10MB (Ethernet), capture size 262144 bytes
15:26:35.028783 IP 192.168.6.93.6771 > 239.192.152.143.6771: UDP, length 137
E..... .8....].....s.s....UBT-SEARCH * HTTP/1.1
Host: 239.192.152.143:6771
Port: 28028
Infohash: 47fb43691fd7b9b40362c104b68995a94475e405
cookie: 21a5e596

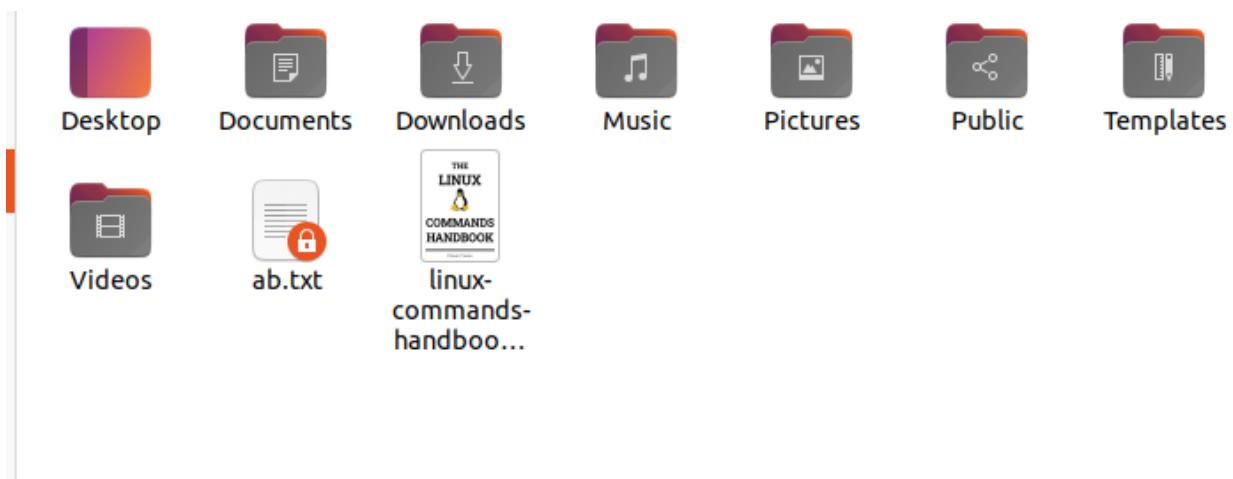
15:26:35.030411 IP u45.43678 > dns.google.domain: 10500+ [1au] PTR? 143.152.192.239.in-addr.arpa. (57)
E..U.F@. ....5.A.,.....143.152.192.239.in-addr.arpa.....).....
15:26:35.070215 IP dns.google.domain > u45.43678: 10500 NXDomain 0/1/1 (114)
E..o.....zt.....5..z.[(.).....143.152.192.239.in-addr.arpa.....sns.dns.icann.org..noc.>x..... .
...
15:26:35.070493 IP u45.43678 > dns.google.domain: 10500+ PTR? 143.152.192.239.in-addr.arpa. (46)
E..J.J@. ....5.6.,.....143.152.192.239.in-addr.arpa.....
15:26:35.087568 IP dns.google.domain > u45.43678: 10500 NXDomain 0/1/0 (103)
E..3.....H.....5..0..(.).....143.152.192.239.in-addr.arpa.....sns.dns.icann.org..noc.>x..... .
15:26:35.088735 IP u45.51997 > dns.google.domain: 5839+ [1au] PTR? 93.6.168.192.in-addr.arpa. (54)
E..R.R@. ....5.>.....93.6.168.192.in-addr.arpa.....).....
15:26:35.105287 IP dns.google.domain > u45.51997: 5839 NXDomain 0/0/1 (54)
E..R.....M.....5.>>0.....93.6.168.192.in-addr.arpa.....)
```

Sudo tcpdump -XX -i enp5s0-To print the captured packets in hexadecimal format

```
mca@u45:~$ sudo tcpdump -XX -i enp5s0
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp5s0, link-type EN10MB (Ethernet), capture size 262144 bytes
15:29:13.941615 ARP, Request who-has 192.168.6.108 tell 192.168.6.126, length 46
    0x0000: ffff ffff 0862 66c7 ce0e 0806 0001 .....bf.....
    0x0010: 0800 0604 0001 0862 66c7 ce0e c0a8 067e .....bf.....~
    0x0020: 0000 0000 0000 c0a8 066c 0000 0000 0000 .....l.....
    0x0030: 0000 0000 0000 0000 0000 0000 .....'.
15:29:13.943246 IP u45.50610 > dns.google.domain: 33104+ [1au] PTR? 108.6.168.192.in-addr.arpa. (55)
    0x0000: 001a 8c6b 54cf 0c9d 920e 7dc6 0800 4500 ...kT.....}...E.
    0x0010: 0053 0f19 4000 4011 53f2 c0a8 06d7 0808 .S..@.S......
    0x0020: 0808 c5b2 0035 003f d7df 8150 0100 0001 .....5.?...P....
    0x0030: 0000 0000 0001 0331 3038 0136 0331 3638 .....108.6.168
    0x0040: 0331 3932 0769 6e2d 6164 6472 0461 7270 .192.in-addr.arp
    0x0050: 6100 000c 0001 0000 2902 0000 0000 0000 a.....).....
    0x0060: 00 .
15:29:13.958762 IP dns.google.domain > u45.50610: 33104 NXDomain 0/0/1 (55)
    0x0000: 0c9d 920e 7dc6 001a 8c6b 54cf 0800 4580 ....}....kT...E.
    0x0010: 0053 5754 0000 f811 9336 0808 0808 c0a8 .SWT.....6......
    0x0020: 06d7 0035 c5b2 003f 7869 8150 8183 0001 ..5....?xi.P.....
    0x0030: 0000 0000 0001 0331 3038 0136 0331 3638 .....108.6.168
    0x0040: 0331 3932 0769 6e2d 6164 6472 0461 7270 .192.in-addr.arp
    0x0050: 6100 000c 0001 0000 2902 0000 0000 0000 a.....).....
    0x0060: 00 .
```

Sudo tcpdump -w [filename] -i enp5s0-To save the captured packets in a particular file

```
mca@u45:~$ sudo tcpdump -w ab.txt -i enp5s0
tcpdump: listening on enp5s0, link-type EN10MB (Ethernet), capture size 262144 bytes
```



Sudo apt update

```
mca@u45:~$ sudo apt update
[sudo] password for mca:
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Hit:2 http://in.archive.ubuntu.com/ubuntu focal InRelease
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:4 http://security.ubuntu.com/ubuntu focal-security/main amd64 DEP-11 Metadata [60.0 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:6 http://security.ubuntu.com/ubuntu focal-security/universe amd64 DEP-11 Metadata [95.5 kB]
Get:7 http://security.ubuntu.com/ubuntu focal-security/multiverse amd64 DEP-11 Metadata [940 B]
Get:8 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [2,630 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu focal-updates/main i386 Packages [838 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 DEP-11 Metadata [275 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [1,071 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 DEP-11 Metadata [410 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 DEP-11 Metadata [944 B]
Get:14 http://in.archive.ubuntu.com/ubuntu focal-backports/main amd64 DEP-11 Metadata [7,980 B]
Get:15 http://in.archive.ubuntu.com/ubuntu focal-backports/universe amd64 DEP-11 Metadata [30.5 kB]
Fetched 5,754 kB in 4s (1,353 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
696 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

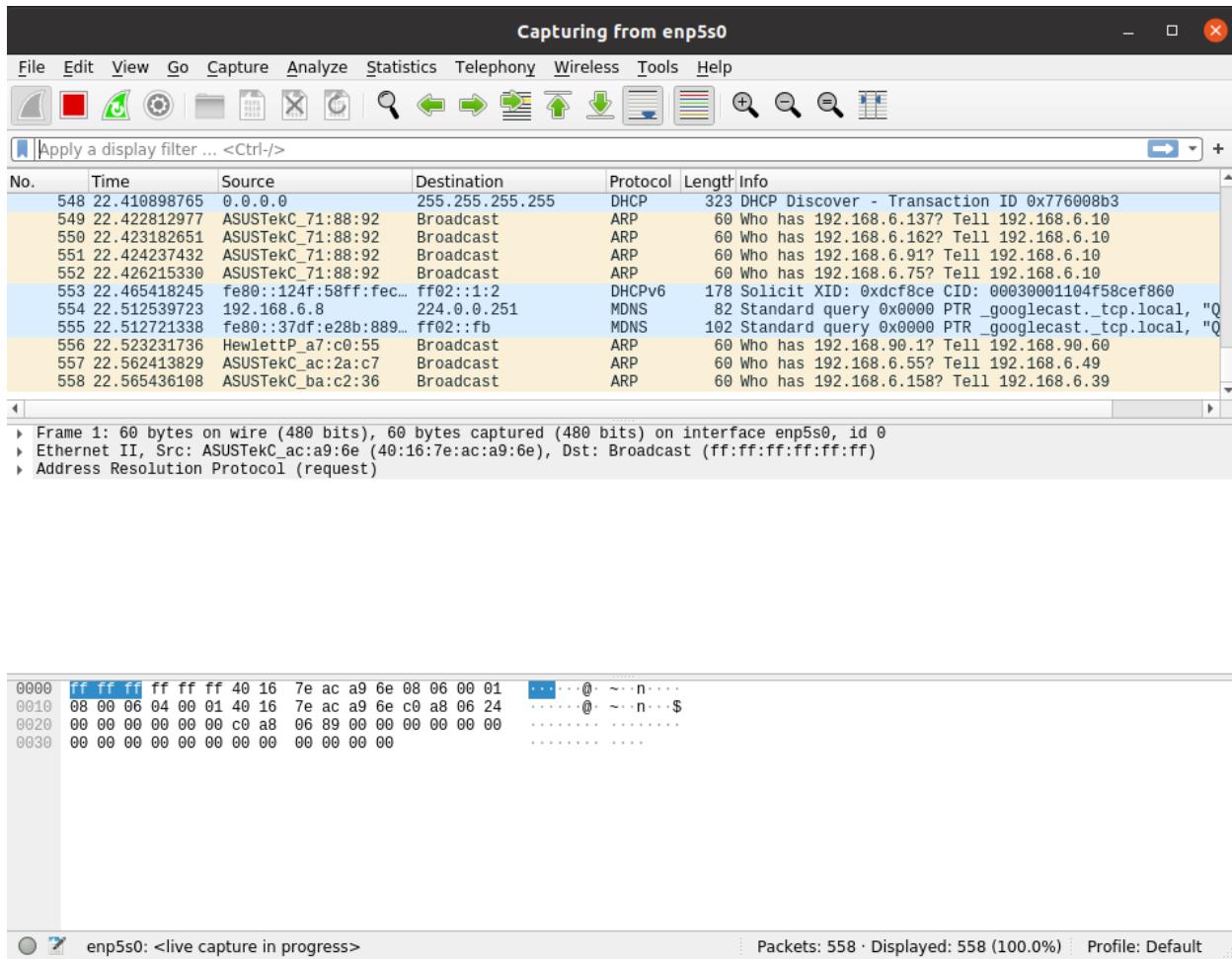
Sudo apt install wireshark

```
mca@u45:~$ sudo apt install wireshark
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libc-ares2 libluas5.2-0 libqt5multimedia5 libqt5multimedia5-plugins libqt5multimediasettings5 libqt5multimediawidgets5 libqt5opengl5
  libsmi2ldbl libsnappy1v5 libspandsp2 libssh-gcrypt-4 libwireshark-data libwireshark13 libwiresharktap10 libwsutil11 wireshark-common
  wireshark-qt
Suggested packages:
  snmp-mibs-downloader geoipupdate geoip-database geoip-database-extra libjs-leaflet libjs-leaflet.markercluster wireshark-doc
The following NEW packages will be installed:
  libc-ares2 libluas5.2-0 libqt5multimedia5 libqt5multimedia5-plugins libqt5multimediasettings5 libqt5multimediawidgets5 libqt5opengl5
  libsmi2ldbl libsnappy1v5 libspandsp2 libssh-gcrypt-4 libwireshark-data libwireshark13 libwiresharktap10 libwsutil11 wireshark wireshark-common
  wireshark-qt
```

Sudo wireshark

```
mca@u45:~$ sudo wireshark
QStandardPaths: XDG_RUNTIME_DIR not set, defaulting to '/tmp/runtime-root'
mca@u45:~$ █
```

Select enp5s0



Result

The program was executed and the result was successfully obtained. Thus CO5 was obtained