

20MCA136-NETWORKING &
ADMINISTRATION LAB

RECORD

VIVIN V. ABRAHAM

ROLL NO: 42

R MCA-2020-S2

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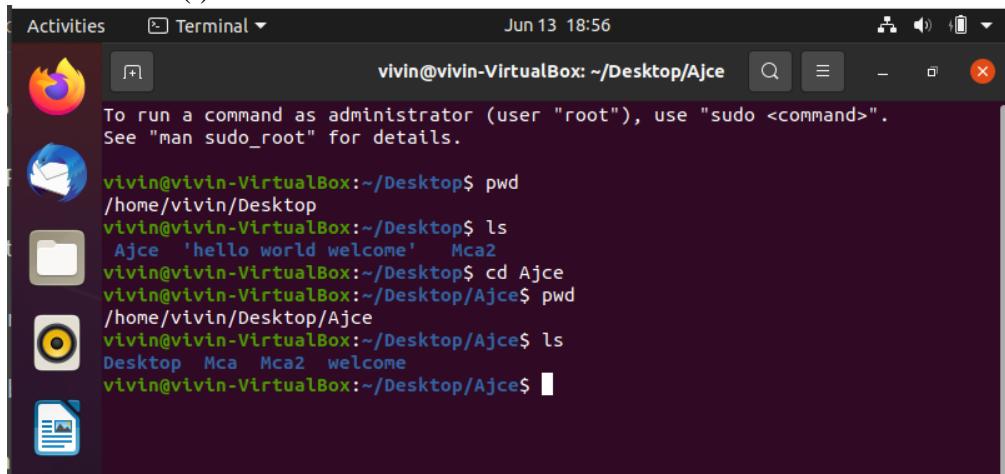
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Experiment No:1

Ubuntu Basic Commands-I

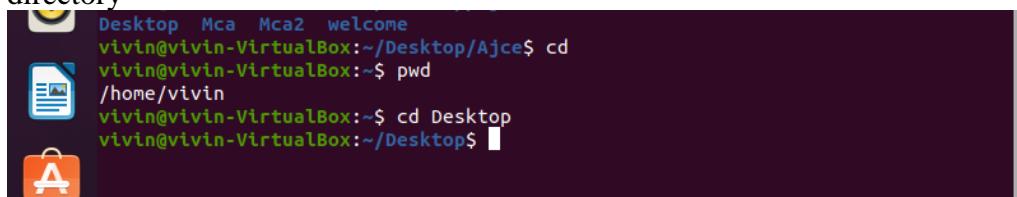
1. **pwd (Print Working Directory)**

- Used to find out the path of the current working directory
- **Absolute path** which is basically a path of all the directories that start with a forward slash(/)



```
vivin@vivin-VirtualBox:~/Desktop$ pwd
/home/vivin/Desktop
vivin@vivin-VirtualBox:~/Desktop$ ls
Ajce 'hello world welcome' Mca2
vivin@vivin-VirtualBox:~/Desktop$ cd Ajce
vivin@vivin-VirtualBox:~/Desktop/Ajce$ pwd
/home/vivin/Desktop/Ajce
vivin@vivin-VirtualBox:~/Desktop/Ajce$ ls
Desktop Mca Mca2 welcome
vivin@vivin-VirtualBox:~/Desktop/Ajce$
```

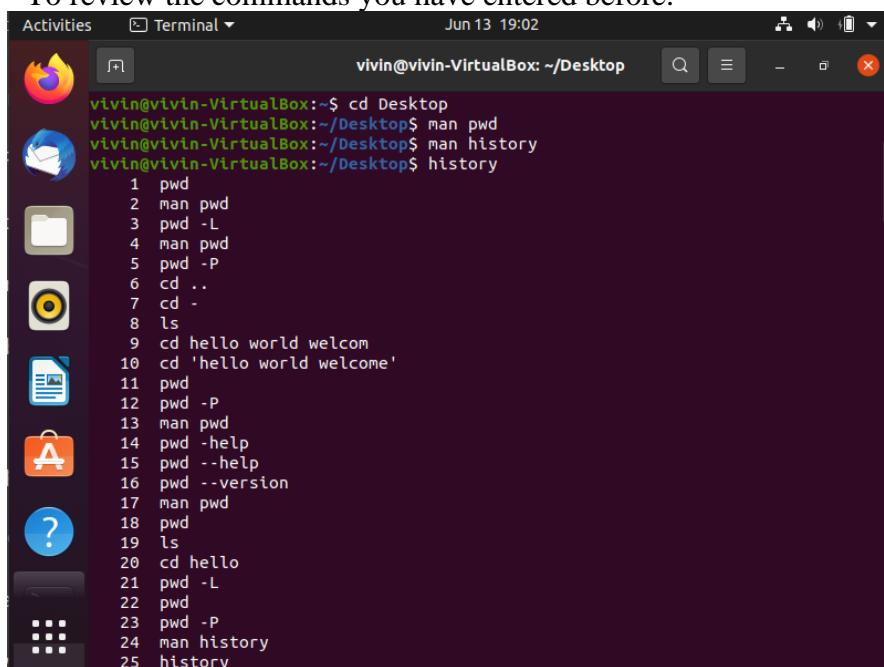
- **Relative path** defined as the path related to the present working directory from root directory



```
vivin@vivin-VirtualBox:~/Desktop$ cd Desktop
vivin@vivin-VirtualBox:~/Desktop$ pwd
/home/vivin
vivin@vivin-VirtualBox:~$ cd Desktop
vivin@vivin-VirtualBox:~/Desktop$
```

2. **history**

- To review the commands you have entered before.



```
vivin@vivin-VirtualBox:~$ cd Desktop
vivin@vivin-VirtualBox:~/Desktop$ man pwd
vivin@vivin-VirtualBox:~/Desktop$ man history
vivin@vivin-VirtualBox:~/Desktop$ history
  1  pwd
  2  man pwd
  3  pwd -L
  4  man pwd
  5  pwd -P
  6  cd ..
  7  cd -
  8  ls
  9  cd hello world welcom
 10 cd 'hello world welcome'
 11  pwd
 12  pwd -P
 13  man pwd
 14  pwd -help
 15  pwd --help
 16  pwd --version
 17  man pwd
 18  pwd
 19  ls
 20 cd hello
 21  pwd -L
 22  pwd
 23  pwd -P
 24  man history
 25 history
```

-!number to run that command

Activities Terminal Jun 13 19:03

vivin@vivin-VirtualBox: ~/Desktop

```
146 cd ..
147 man rm
148 rm -d
149 ls
150 rm newnew/
151 mkdir file.txt
152 ls
153 mkdir file2.txt
154 mkdir file3.txt
155 ls
156 cat file
157 cat>file
158 pwd
159 ls
160 cd Ajce
161 pwd
162 ls
163 cd
164 pwd
165 cd Desktop
166 man pwd
167 man history
168 history
```

vivin@vivin-VirtualBox:~/Desktop\$!166
man pwd
vivin@vivin-VirtualBox:~/Desktop\$!164
pwd
/home/vivin/Desktop
vivin@vivin-VirtualBox:~/Desktop\$

3. man

- shows the manual instruction of the tail command.
 - man man to start learning about man utility.

```
vivin@vivin-VirtualBox:~/Desktop$ !166
man pwd
vivin@vivin-VirtualBox:~/Desktop$ !164
pwd
/home/vivin/Desktop
vivin@vivin-VirtualBox:~/Desktop$ man man
vivin@vivin-VirtualBox:~/Desktop$ 
```

Activities Terminal ▾ Jun 13 19:05

vivin@vivin-VirtualBox: ~/Desktop

MAN(1) Manual pager utils MAN(1)

NAME

man - an interface to the system reference manuals

SYNOPSIS

```
man [man options] [[section] page ...]
man -k [apropos options] regexp ...
man -K [man options] [section] term ...
man -f [whatis options] page ...
man -l [man options] file ...
man -w|-W [man options] page ...
```

DESCRIPTION

man is the system's manual pager. Each page argument given to man is normally the name of a program, utility or function. The manual page associated with each of these arguments is then found and displayed. A section, if provided, will direct man to look only in that section of the manual. The default action is to search in all of the available sections following a pre-defined order (see DEFAULTS), and to show only the first page found, even if page exists in several sections.

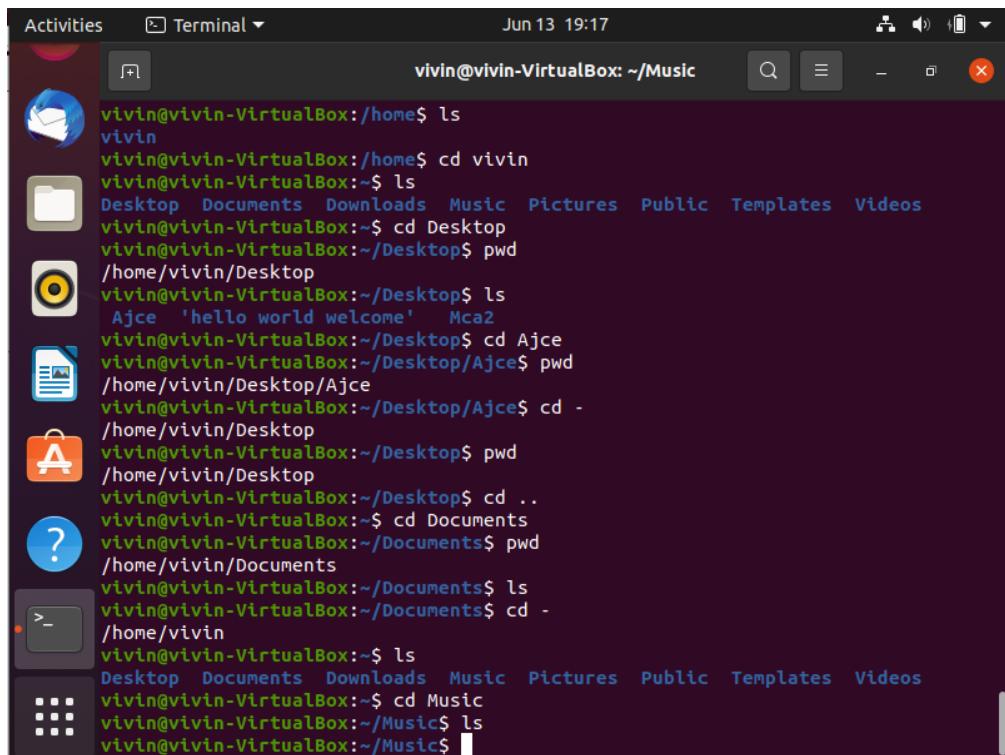
The table below shows the section numbers of the manual followed by the types of pages they contain.

1	Executable programs or shell commands
2	System calls (functions provided by the kernel)

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

4. cd

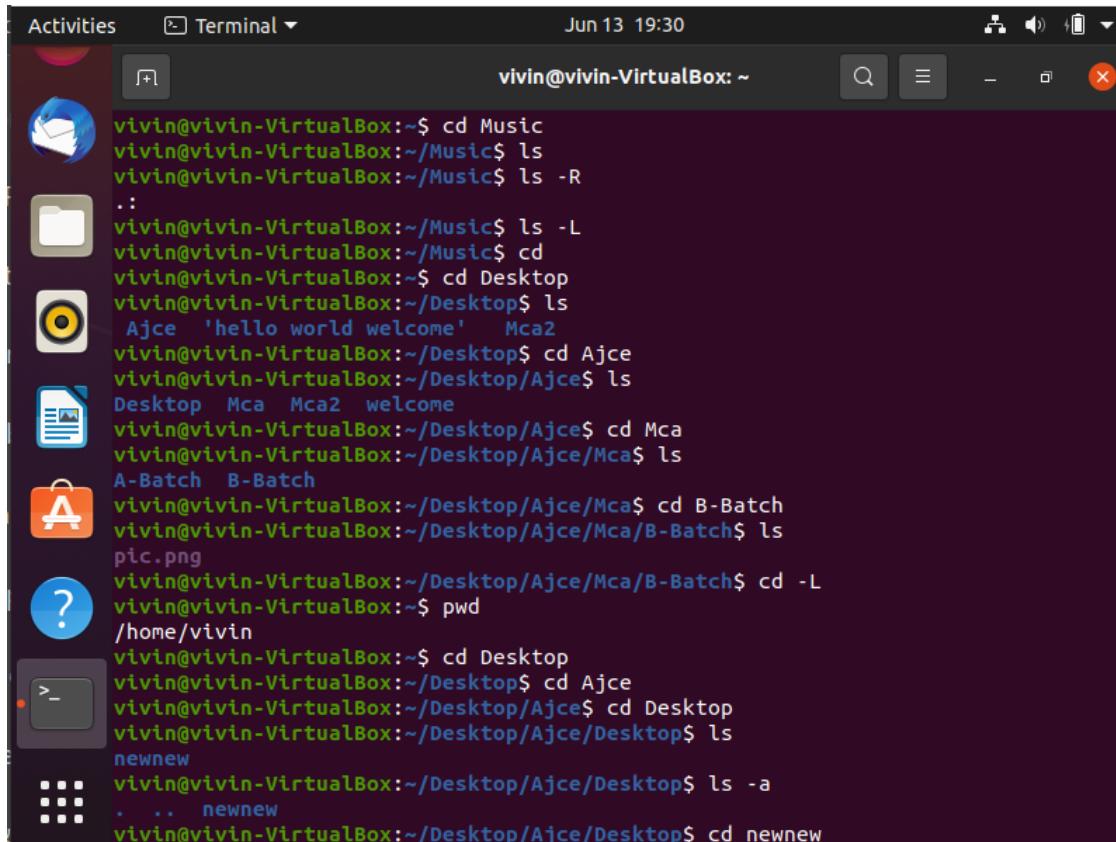
- To navigate through the Linux files and directories.
- cd .. (to move one directory up)
- cd (to go straight to the home folder)
- cd - (to move to a previous directory)



```
vivin@vivin-VirtualBox:~/Music$ ls
vivin
vivin@vivin-VirtualBox:~/Music$ cd vivin
vivin@vivin-VirtualBox:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
vivin@vivin-VirtualBox:~$ cd Desktop
vivin@vivin-VirtualBox:~/Desktop$ pwd
/home/vivin/Desktop
vivin@vivin-VirtualBox:~/Desktop$ ls
Ajce 'hello world welcome' Mca2
vivin@vivin-VirtualBox:~/Desktop$ cd Ajce
vivin@vivin-VirtualBox:~/Desktop/Ajce$ pwd
/home/vivin/Desktop/Ajce
vivin@vivin-VirtualBox:~/Desktop/Ajce$ cd -
/home/vivin/Desktop
vivin@vivin-VirtualBox:~/Desktop$ pwd
/home/vivin/Desktop
vivin@vivin-VirtualBox:~/Desktop$ cd ..
vivin@vivin-VirtualBox:~$ cd Documents
vivin@vivin-VirtualBox:~/Documents$ pwd
/home/vivin/Documents
vivin@vivin-VirtualBox:~/Documents$ ls
vivin@vivin-VirtualBox:~/Documents$ cd -
/home/vivin
vivin@vivin-VirtualBox:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
vivin@vivin-VirtualBox:~$ cd Music
vivin@vivin-VirtualBox:~/Music$ ls
vivin@vivin-VirtualBox:~/Music$
```

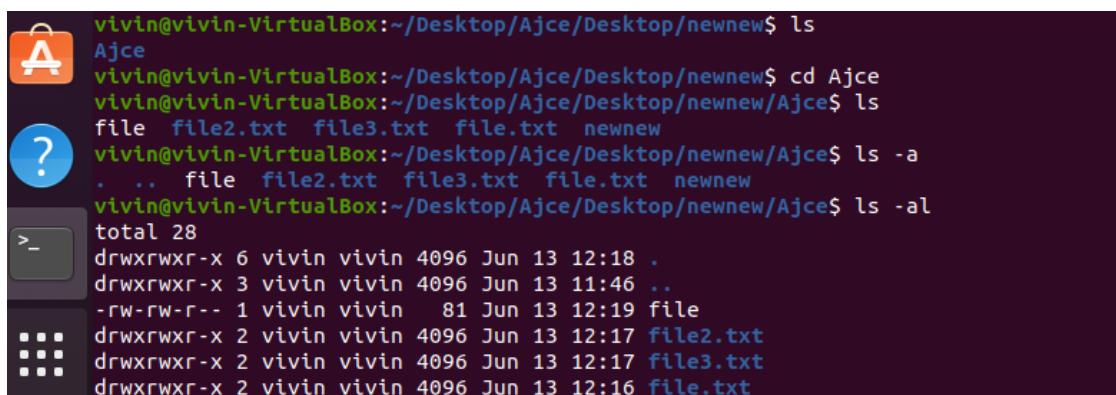
5. ls

- Used to view the content of the directory.
- ls -R (Will list all the files in the subdirectory).
- ls -l (long listing)
- ls -a (will show hidden files)
- ls -al (will list all the files and directories with detailed information like the permissions, size, owners.)
- ls -t (list files sorted in the order of last modified)
- ls -r (option will reverse the natural sorting order. usually used in combination with order switches such as ls -tr. This will reverse the time wise listing.)



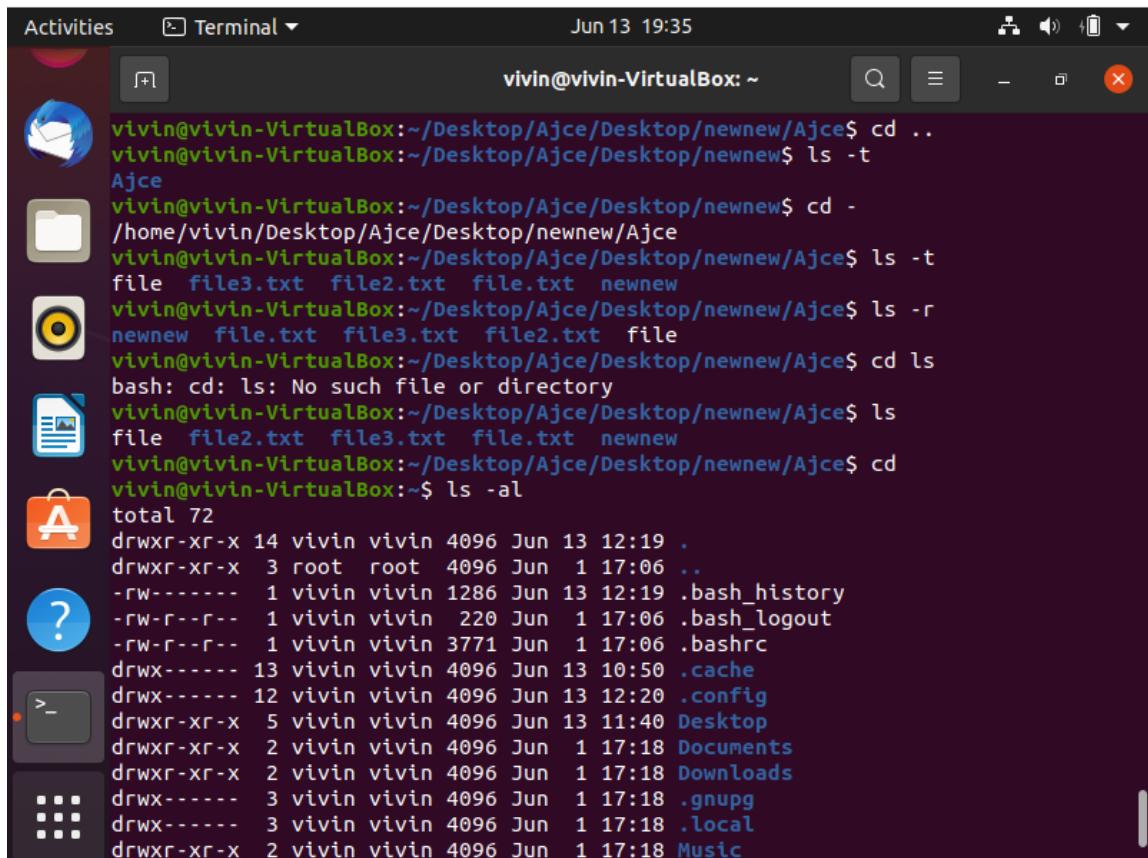
A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window titled "Terminal". The terminal window is open to a shell session for the user "vivin" on a VirtualBox machine. The session shows the user navigating through their home directory, specifically moving into the "Music" and "Desktop" folders, and listing files with various commands like "ls", "cd", and "pwd". The terminal window has a dark theme and is located at the top of the screen.

```
vivin@vivin-VirtualBox:~$ cd Music
vivin@vivin-VirtualBox:~/Music$ ls
vivin@vivin-VirtualBox:~/Music$ ls -R
.:
vivin@vivin-VirtualBox:~/Music$ ls -L
vivin@vivin-VirtualBox:~/Music$ cd
vivin@vivin-VirtualBox:~$ cd Desktop
vivin@vivin-VirtualBox:~/Desktop$ ls
Ajce 'hello world welcome' Mca2
vivin@vivin-VirtualBox:~/Desktop$ cd Ajce
vivin@vivin-VirtualBox:~/Desktop/Ajce$ ls
Desktop Mca Mca2 welcome
vivin@vivin-VirtualBox:~/Desktop/Ajce$ cd Mca
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca$ ls
A-Batch B-Batch
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca$ cd B-Batch
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ ls
pic.png
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cd -L
vivin@vivin-VirtualBox:~$ pwd
/home/vivin
vivin@vivin-VirtualBox:~$ cd Desktop
vivin@vivin-VirtualBox:~/Desktop$ cd Ajce
vivin@vivin-VirtualBox:~/Desktop/Ajce$ cd Desktop
vivin@vivin-VirtualBox:~/Desktop/Ajce/Desktop$ ls
newnew
vivin@vivin-VirtualBox:~/Desktop/Ajce/Desktop$ ls -a
. .. newnew
vivin@vivin-VirtualBox:~/Desktop/Ajce/Desktop$ cd newnew
```



A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window titled "Terminal". The terminal window is open to a shell session for the user "vivin" on a VirtualBox machine. The session shows the user navigating into a directory named "newnew" within the "Ajce" folder on the desktop, and then listing files with "ls" and viewing details with "ls -al". The terminal window has a dark theme and is located at the top of the screen.

```
vivin@vivin-VirtualBox:~/Desktop/Ajce/Desktop/newnew$ ls
Ajce
vivin@vivin-VirtualBox:~/Desktop/Ajce/Desktop/newnew$ cd Ajce
vivin@vivin-VirtualBox:~/Desktop/Ajce/Desktop/newnew/Ajce$ ls
file file2.txt file3.txt file.txt newnew
vivin@vivin-VirtualBox:~/Desktop/Ajce/Desktop/newnew/Ajce$ ls -a
. .. file file2.txt file3.txt file.txt newnew
vivin@vivin-VirtualBox:~/Desktop/Ajce/Desktop/newnew/Ajce$ ls -al
total 28
drwxrwxr-x 6 vivin vivin 4096 Jun 13 12:18 .
drwxrwxr-x 3 vivin vivin 4096 Jun 13 11:46 ..
-rw-rw-r-- 1 vivin vivin 81 Jun 13 12:19 file
drwxrwxr-x 2 vivin vivin 4096 Jun 13 12:17 file2.txt
drwxrwxr-x 2 vivin vivin 4096 Jun 13 12:17 file3.txt
drwxrwxr-x 2 vivin vivin 4096 Jun 13 12:16 file.txt
```

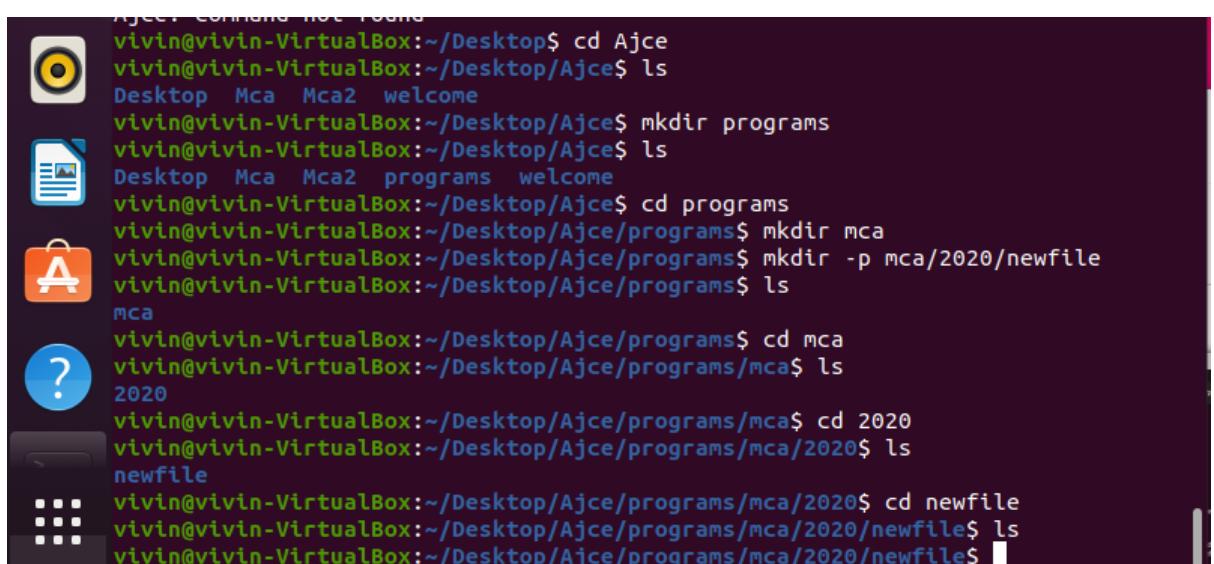


A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window title is "Terminal" and the date and time are "Jun 13 19:35". The terminal content shows a user named "vivin" navigating through a directory structure and listing files. The user runs commands like "cd ..", "ls -t", and "ls -al" to view the contents of their home directory and its subdirectories.

```
vivin@vivin-VirtualBox:~/Desktop/Ajce/Desktop/newnew/Ajce$ cd ..
vivin@vivin-VirtualBox:~/Desktop/Ajce/Desktop/newnew$ ls -t
Ajce
vivin@vivin-VirtualBox:~/Desktop/Ajce/Desktop/newnew$ cd -
/home/vivin/Desktop/Ajce/Desktop/newnew/Ajce
vivin@vivin-VirtualBox:~/Desktop/Ajce/Desktop/newnew/Ajce$ ls -t
file file3.txt file2.txt file.txt newnew
vivin@vivin-VirtualBox:~/Desktop/Ajce/Desktop/newnew/Ajce$ ls -r
newnew file.txt file3.txt file2.txt file
vivin@vivin-VirtualBox:~/Desktop/Ajce/Desktop/newnew/Ajce$ cd ls
bash: cd: ls: No such file or directory
vivin@vivin-VirtualBox:~/Desktop/Ajce/Desktop/newnew/Ajce$ ls
file file2.txt file3.txt file.txt newnew
vivin@vivin-VirtualBox:~/Desktop/Ajce/Desktop/newnew/Ajce$ cd
vivin@vivin-VirtualBox:~$ ls -al
total 72
drwxr-xr-x 14 vivin vivin 4096 Jun 13 12:19 .
drwxr-xr-x  3 root  root  4096 Jun  1 17:06 ..
-rw-----  1 vivin vivin 1286 Jun 13 12:19 .bash_history
-rw-r--r--  1 vivin vivin  220 Jun  1 17:06 .bash_logout
-rw-r--r--  1 vivin vivin 3771 Jun  1 17:06 .bashrc
drwx----- 13 vivin vivin 4096 Jun 13 10:50 .cache
drwx----- 12 vivin vivin 4096 Jun 13 12:20 .config
drwxr-xr-x  5 vivin vivin 4096 Jun 13 11:40 Desktop
drwxr-xr-x  2 vivin vivin 4096 Jun  1 17:18 Documents
drwxr-xr-x  2 vivin vivin 4096 Jun  1 17:18 Downloads
drwx-----  3 vivin vivin 4096 Jun  1 17:18 .gnupg
drwx-----  3 vivin vivin 4096 Jun  1 17:18 .local
drwxr-xr-x  2 vivin vivin 4096 Jun  1 17:18 Music
```

6. mkdir

- to make a new directory.
- `mkdir -p` (to create a directory in between two existing directories).

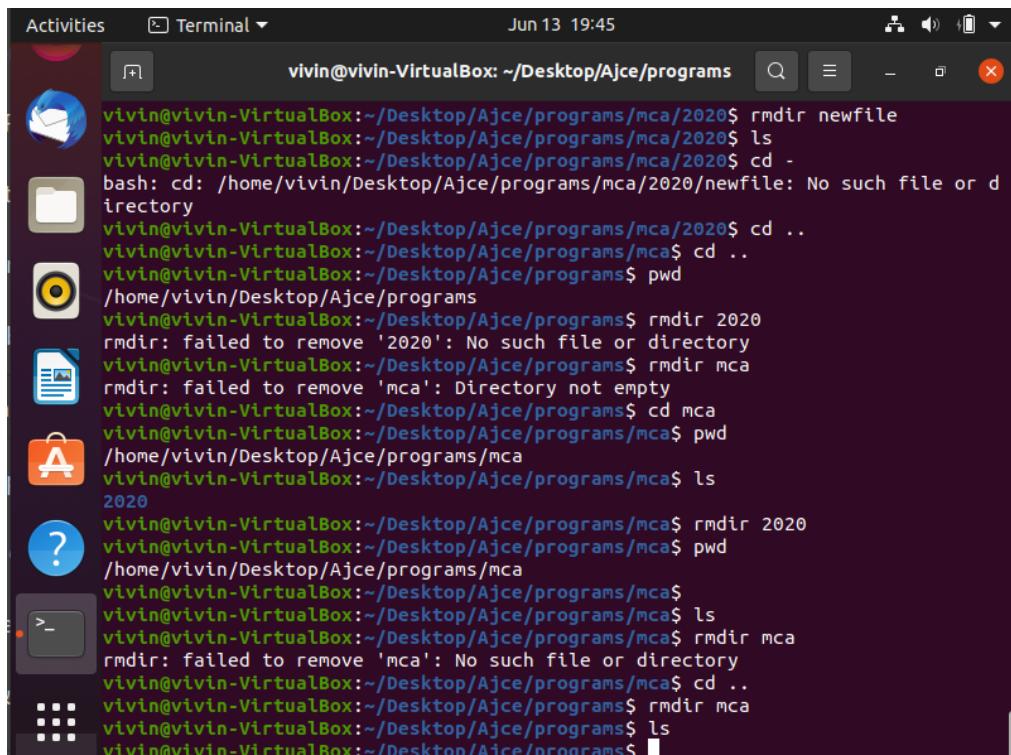


A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window title is "Terminal" and the date and time are "Jun 13 19:35". The terminal content shows a user named "vivin" navigating through a directory structure and creating new directories. The user runs commands like "cd Ajce", "mkdir programs", and "mkdir -p mca/2020/newfile" to create a directory structure within the "Ajce" directory.

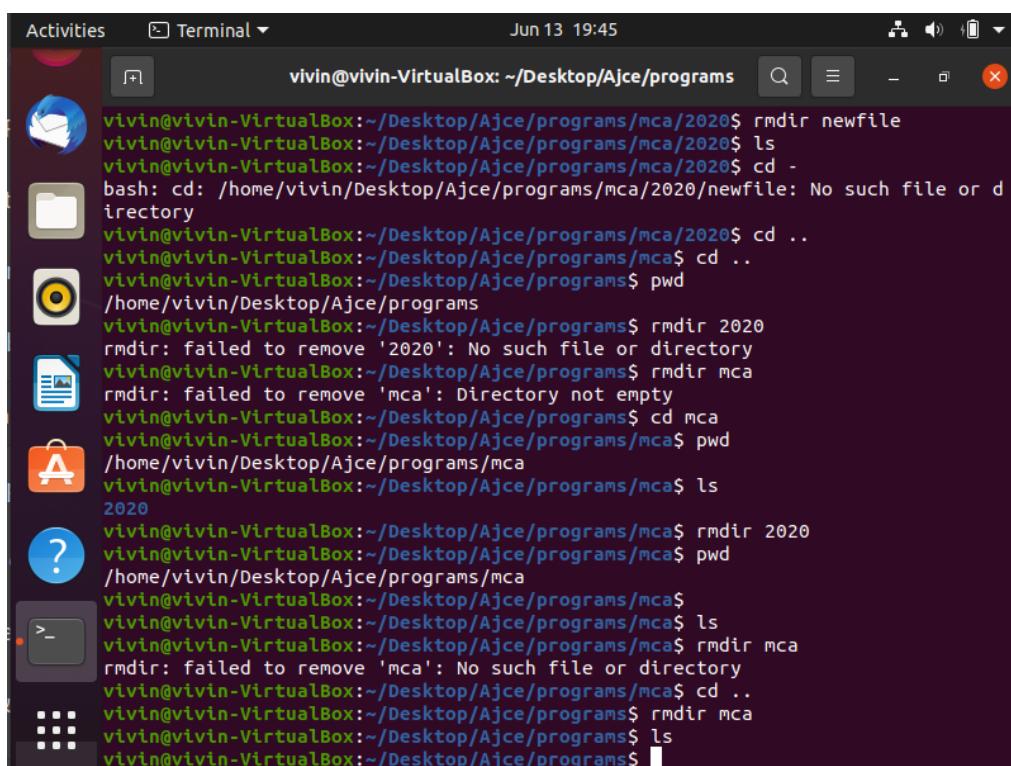
```
Ajce: command not found
vivin@vivin-VirtualBox:~/Desktop$ cd Ajce
vivin@vivin-VirtualBox:~/Desktop/Ajce$ ls
Desktop Mca Mca2 welcome
vivin@vivin-VirtualBox:~/Desktop/Ajce$ mkdir programs
vivin@vivin-VirtualBox:~/Desktop/Ajce$ ls
Desktop Mca Mca2 programs welcome
vivin@vivin-VirtualBox:~/Desktop/Ajce$ cd programs
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ mkdir mca
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ mkdir -p mca/2020/newfile
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ ls
mca
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ cd mca
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ ls
2020
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ cd 2020
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca/2020$ ls
newfile
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca/2020$ cd newfile
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca/2020/newfile$ ls
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca/2020/newfile$
```

7. rmdir

-to delete a directory.(only allows you to delete empty directories)



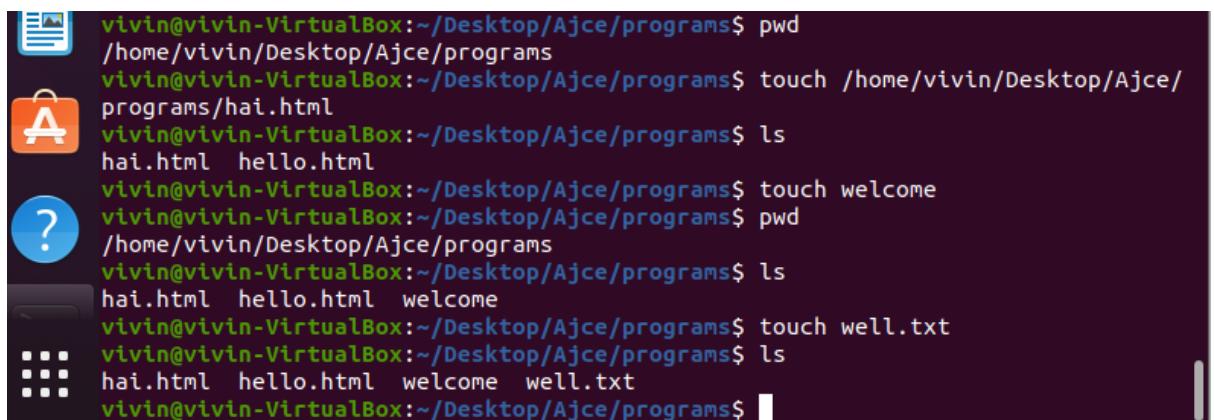
```
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ rmdir newfile
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca/2020$ ls
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca/2020$ cd -
bash: cd: /home/vivin/Desktop/Ajce/programs/mca/2020/newfile: No such file or directory
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca/2020$ cd ..
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ cd ..
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ pwd
/home/vivin/Desktop/Ajce/programs
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ rmdir 2020
rmdir: failed to remove '2020': No such file or directory
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ rmdir mca
rmdir: failed to remove 'mca': Directory not empty
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ cd mca
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ pwd
/home/vivin/Desktop/Ajce/programs/mca
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ ls
2020
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ rmdir 2020
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ pwd
/home/vivin/Desktop/Ajce/programs/mca
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ ls
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ rmdir mca
rmdir: failed to remove 'mca': No such file or directory
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ cd ..
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ rmdir mca
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ ls
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$
```



```
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ rmdir newfile
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca/2020$ ls
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca/2020$ cd -
bash: cd: /home/vivin/Desktop/Ajce/programs/mca/2020/newfile: No such file or directory
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca/2020$ cd ..
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ cd ..
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ pwd
/home/vivin/Desktop/Ajce/programs
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ rmdir 2020
rmdir: failed to remove '2020': No such file or directory
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ rmdir mca
rmdir: failed to remove 'mca': Directory not empty
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ cd mca
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ pwd
/home/vivin/Desktop/Ajce/programs/mca
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ ls
2020
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ rmdir 2020
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ pwd
/home/vivin/Desktop/Ajce/programs/mca
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ ls
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ rmdir mca
rmdir: failed to remove 'mca': No such file or directory
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs/mca$ cd ..
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ rmdir mca
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ ls
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$
```

8. touch

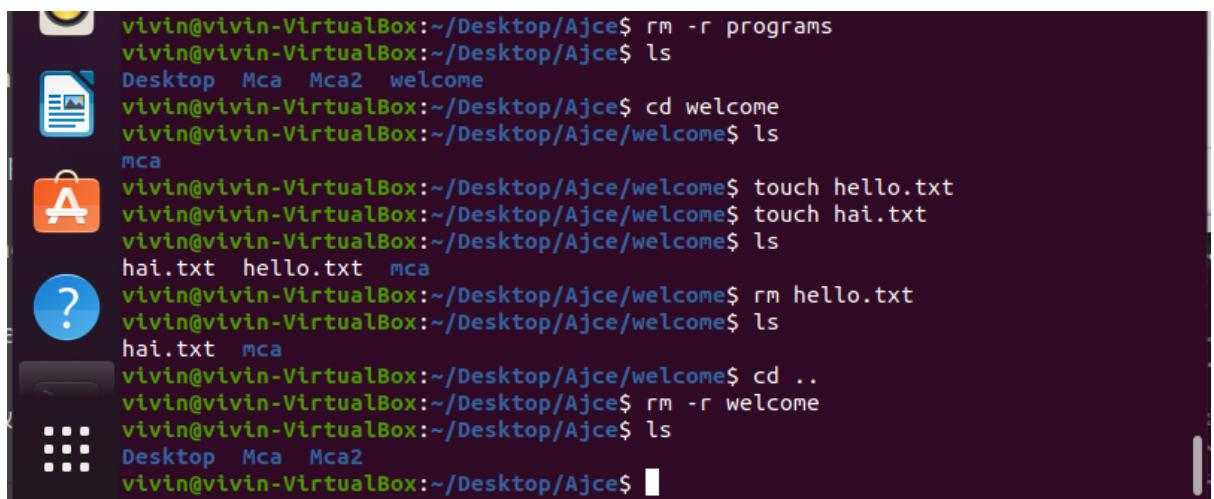
- to create a blank new file



```
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ pwd
/home/vivin/Desktop/Ajce/programs
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ touch /home/vivin/Desktop/Ajce/
programs/hai.html
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ ls
hai.html hello.html
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ touch welcome
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ pwd
/home/vivin/Desktop/Ajce/programs
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ ls
hai.html hello.html welcome
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ touch well.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$ ls
hai.html hello.html welcome well.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/programs$
```

9. rm

- to delete directories and the contents within them
- **rm -r** (to delete directory)
- **rm filename** (to remove a file)



```
vivin@vivin-VirtualBox:~/Desktop/Ajce$ rm -r programs
vivin@vivin-VirtualBox:~/Desktop/Ajce$ ls
Desktop Mca Mca2 welcome
vivin@vivin-VirtualBox:~/Desktop/Ajce$ cd welcome
vivin@vivin-VirtualBox:~/Desktop/Ajce/welcome$ ls
mca
vivin@vivin-VirtualBox:~/Desktop/Ajce/welcome$ touch hello.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/welcome$ touch hai.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/welcome$ ls
hai.txt hello.txt mca
vivin@vivin-VirtualBox:~/Desktop/Ajce/welcome$ rm hello.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/welcome$ ls
hai.txt mca
vivin@vivin-VirtualBox:~/Desktop/Ajce/welcome$ cd ..
vivin@vivin-VirtualBox:~/Desktop/Ajce$ rm -r welcome
vivin@vivin-VirtualBox:~/Desktop/Ajce$ ls
Desktop Mca Mca2
vivin@vivin-VirtualBox:~/Desktop/Ajce$
```

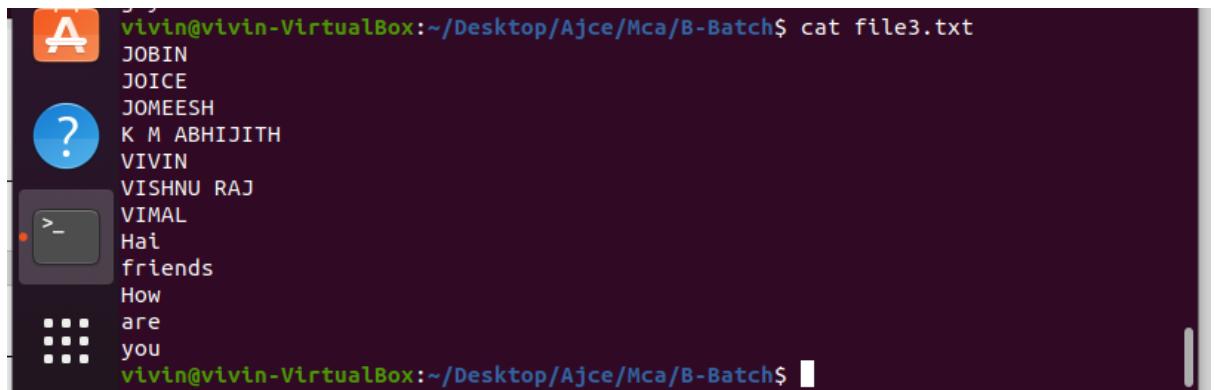
10. cat

- **list the content of a file**
- **cat >filename** (create a new file)
- **cat filename1 filename2>filename3** (join two files and store the output in the third file)
- **cat filename | tr a-z A-Z >output.txt** (to convert a file to upper or lower case)
- **cat >>myfile** (insert data to a file)

Activities Terminal Jun 13 20:49

```
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cd B-Batch
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ touch file1.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cat>file1.txt
Jobin
Joice
Jomeesh
K M Abhijith
^C
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cat file1.txt
Jobin
Joice
Jomeesh
K M Abhijith
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cat>file2.txt
Vivin
Vishnu Raj
Vimal
^C
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cat file2.txt
Vivin
Vishnu Raj
Vimal
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cat file1.txt file2.txt>file
.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ file.txt
file.txt: command not found
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cat file.txt
Jobin
Joice
```

```
Jobin
Joice
Jomeesh
K M Abhijith
Vivin
Vishnu Raj
Vimal
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cat file.txt | tr a-z A-Z>fi
le3.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cat file3.txt
JOBIN
JOICE
JOMEESH
K M ABHIJITH
VIVIN
VISHNU RAJ
VIMAL
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cat>>file3.txt
Hai
friends
How
are
you
guys^C
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cat file3.txt
JOBIN
JOICE
JOMEESH
K M ABHIJITH
```



vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch\$ cat file3.txt

JOBIN
JOICE
JOMEESH
K M ABHIJITH
VIVIN
VISHNU RAJ
VIMAL
Hai
friends
How
are
you

vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch\$

Experiment No:2

Ubuntu Basic Commands-II

11. echo

-Used to display a message

```
Hello, My name is Vivin
vivin@vivin-VirtualBox:~/Desktop$ echo Hello Every one
Hello Every one
vivin@vivin-VirtualBox:~/Desktop$
```

- Used to move some data into a file.

```
Ajce 'hello world welcome' Mca2
vivin@vivin-VirtualBox:~/Desktop$ echo Hello, My name is Vivin>>name.txt
vivin@vivin-VirtualBox:~/Desktop$ ls
Ajce 'hello world welcome' Mca2  name.txt
vivin@vivin-VirtualBox:~/Desktop$ cat name.txt
Hello, My name is Vivin
vivin@vivin-VirtualBox:~/Desktop$
```

12. head

- Used to view the first lines of any text file. By default, it will show the first ten lines, but you can change this number to your liking

```
vivin@vivin-VirtualBox:~/Desktop$ head /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
vivin@vivin-VirtualBox:~/Desktop$
```

-to print 4 lines from a text file from the top

```
vivin@vivin-VirtualBox:~/Desktop$ head -n 4 /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
vivin@vivin-VirtualBox:~/Desktop$
```

13. tail.

- The tail command will display the last ten lines of a text file

```
vivin@vivin-VirtualBox:~/Desktop$ tail /etc/passwd
nm-openvpn:x:118:124:NetworkManager OpenVPN,,,:/var/lib/openvpn/chroot:/usr/sbin/nologin
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopsie:x:120:125::/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
vivin:x:1000:1000:Vivin V Abraham,,,:/home/vivin:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
vivin@vivin-VirtualBox:~/Desktop$
```

- to print last 4 lines from a text file

```
vivin@vivin-VirtualBox:~/Desktop$ tail -n 4 /etc/passwd
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
vivin:x:1000:1000:Vivin V Abraham,,,:/home/vivin:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
vivin@vivin-VirtualBox:~/Desktop$
```

14. read

- The read the contents of a line into a variable.

```
vivin@vivin-VirtualBox:~/Desktop$ read v1 v2 v3
Anu Jinu Manu
vivin@vivin-VirtualBox:~/Desktop$ echo ["$v1"] ["$v2"] ["$v3"]
[Anu] [Jinu] [Manu]
vivin@vivin-VirtualBox:~/Desktop$
```

The read command can be used with and without arguments.

```
vivin@vivin-VirtualBox:~/Desktop$ read
hello
vivin@vivin-VirtualBox:~/Desktop$
```

15. more

- Used to displays the content of a file. Only difference is that, in case of larger files

```
vivin@vivin-VirtualBox:~/Desktop$ more /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
```

-After passing the command the content that can show in the entire screen should display with percentage

```
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106::/nonexistent:/usr/sbin/nologin
syslog:x:104:110::/home/syslog:/usr/sbin/nologin
_apt:x:105:65534::/nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,,:/var/lib/tpm:/bin/false
--More--(48%)
```

To Scroll down Enter Key used

```

daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106::/nonexistent:/usr/sbin/nologin
syslog:x:104:110::/home/syslog:/usr/sbin/nologin
_apt:x:105:65534::/nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,,:/var/lib/tpm:/bin/false
uuidd:x:107:114::/run/uuidd:/usr/sbin/nologin
--More--(50%)

```

```

_apt:x:105:65534::/nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,,:/var/lib/tpm:/bin/false
uuidd:x:107:114::/run/uuidd:/usr/sbin/nologin
tcpdump:x:108:115::/nonexistent:/usr/sbin/nologin
avahi-autoipd:x:109:116:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin/nologin
usbmux:x:110:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
rtkit:x:111:117:RealtimeKit,,,:/proc:/usr/sbin/nologin
dnsmasq:x:112:65534:dnsmasq,,,:/var/lib/misc:/usr/sbin/nologin
cups-pk-helper:x:113:120:user for cups-pk-helper service,,,:/home/cups-pk-helper:/usr/sbin/nologin
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/run/speech-dispatcher:/bin/false
avahi:x:115:121:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/usr/sbin/nologin
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,,:/usr/sbin/nologin
saned:x:117:123::/var/lib/saned:/usr/sbin/nologin
nm-openvpn:x:118:124:NetworkManager OpenVPN,,,:/var/lib/openvpn/chroot:/usr/sbin/nologin
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopsie:x:120:125::/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
vivin:x:1000:1000:Vivin V Abraham,,,:/home/vivin:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
vivin@vivin-VirtualBox:~/Desktop$
```

16. less

- It is same as more command
- It automatically adjust with the width and height of the terminal window, while ' command cuts the content as the width of the terminal window get shorter.

```
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106::/nonexistent:/usr/sbin/nologin
syslog:x:104:110::/home/syslog:/usr/sbin/nologin
_apt:x:105:65534::/nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,,:/var/lib/tpm:/bin/false
:|
```

```
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106::/nonexistent:/usr/sbin/nologin
syslog:x:104:110::/home/syslog:/usr/sbin/nologin
_apt:x:105:65534::/nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,,:/var/lib/tpm:/bin/false
uuidd:x:107:114::/run/uuidd:/usr/sbin/nologin
tcpdump:x:108:115::/nonexistent:/usr/sbin/nologin
avahi-autoipd:x:109:116:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin/nologin
usbmux:x:110:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
rtkit:x:111:117:RealtimeKit,,,:/proc:/usr/sbin/nologin
:|
```

```

_apt:x:105:65534::/nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,,:/var/lib/tpm:/bin/false
uuidd:x:107:114::/run/uuidd:/usr/sbin/nologin
tcpdump:x:108:115::/nonexistent:/usr/sbin/nologin
avahi-autoipd:x:109:116:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin
/nologin
usbmux:x:110:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
rtkit:x:111:117:RealtimeKit,,,:/proc:/usr/sbin/nologin
dnsmasq:x:112:65534:dnsmasq,,,:/var/lib/misc:/usr/sbin/nologin
cups-pk-helper:x:113:120:user for cups-pk-helper service,,,:/home/cups-pk-helpe
r:/usr/sbin/nologin
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/run/speech-dispatcher:/bin/fal
se
avahi:x:115:121:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/usr/sbin/nologin
kernooops:x:116:65534:Kernel Oops Tracking Daemon,,,:/usr/sbin/nologin
saned:x:117:123::/var/lib/saned:/usr/sbin/nologin
nm-openvpn:x:118:124:NetworkManager OpenVPN,,,:/var/lib/openvpn/chroot:/usr/sbi
n/nologin
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopsie:x:120:125::/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/n
ologin
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
vivin:x:1000:1000:Vivin V Abraham,,,:/home/vivin:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
(END)

```

17. cut

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

```

vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cat file3.txt
JOBIN
JOICE
JOMEESH
K M ABHIJITH
VIVIN
VISHNU RAJ
VIMAL
Hai
friends
How
are
you
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cut -b 1,2 file3.txt
JO
JO
JO
K
VI
VI
VI
Ha
fr
Ho
ar
yo
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ █

```

18. paste

-It is used to join files horizontally (parallel merging) by outputting lines consisting of lines from each file specified, separated by tab as delimiter, to the standard output

```
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ ls
file1.txt file2.txt file3.txt file.txt hobby.txt pic.png roll.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ paste roll.txt file3.txt hobby.txt
1      JOBIN    swimming
2      JOICE    cricket
3      JOMEESH   hockey
4      K M ABHIJITH   cycling
5      VIVIN    walkinf
6      VISHNU RAJ    riding
7      VIMAL    travelling
8      Hai      gaming
9      friends   cards
10     How
      are
      you
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$
```

19. uname

- It is used to print detailed information about your Linux system like the machine name, operating system, kernel, and so on

```
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ uname
Linux
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ uname -v
#60~20.04.1-Ubuntu SMP Thu May 6 09:52:46 UTC 2021
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ uname -r
5.8.0-53-generic
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ uname -p
x86_64
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$
```

20. cp

- used to copy files from the current directory to a different directory

```
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ ls
fil  file1.txt  file3.txt  files  file.txt  hobby.txt  pic.png  roll.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ ls fil
file2.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cp file1.txt fil
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ ls
fil  file1.txt  file3.txt  files  file.txt  hobby.txt  pic.png  roll.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ ls fil
file1.txt  file2.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$
```

21. mv

- used to move files, it can also be used to rename files The arguments in mv are similar to the cp command You need to type mv, the file's name, and the destination's directory

```
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ ls
fil      file2.txt  files   hobby.txt  roll.txt
file1.txt  file3.txt  file.txt  pic.png
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ mv file2.txt fil
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ ls
fil  file1.txt  file3.txt  files  file.txt  hobby.txt  pic.png  roll.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ ls fil
file2.txt
```

Used to rename files/depositories,

```
vivin@vivin-VirtualBox:~/Desktop$ mv Ajce Amal
vivin@vivin-VirtualBox:~/Desktop$ ls
Amal  'hello world welcome'  Mca2  name.txt
vivin@vivin-VirtualBox:~/Desktop$ mv name.txt friends.txt
vivin@vivin-VirtualBox:~/Desktop$ ls
Amal  friends.txt  'hello world welcome'  Mca2
vivin@vivin-VirtualBox:~/Desktop$ █
```

22. locate

-Used to locate a file, just like the search command in Windows the i argument along with this command will make it case insensitive, so you can search for a file even if you don't remember its exact name To search for a file that contains two or more words, use an asterisk

```
vivin@vivin-VirtualBox:~/Desktop$ cat friends.txt
Hello, My name is Vivin
vivin@vivin-VirtualBox:~/Desktop$ locate -i name*vivin
Command 'locate' not found, but can be installed with:
sudo apt install mlocate
vivin@vivin-VirtualBox:~/Desktop$ █
```

23. find

-Used to searches for files and directories

The difference is, you use the find command to locate files within a given directory

```
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ find /home/ -name Mca
/home/vivin/Desktop/Ajce/Mca
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ find /home/ -name fil
/home/vivin/Desktop/Ajce/Mca/B-Batch/fil
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ ls
fil file1.txt file3.txt files file.txt hobby.txt pic.png roll.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ find /home/
/home/
/home/vivin
/home/vivin/Music
/home/vivin/.bash_logout
/home/vivin/.gnupg
/home/vivin/.gnupg/private-keys-v1.d
```

```
/home/vivin/.bashrc
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ find /home/ -name file3.txt
/home/vivin/Desktop/Ajce/Mca/B-Batch/file3.txt
/home/vivin/Desktop/Ajce/Desktop/newnew/Ajce/file3.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ █
```

24. grep

It helps to search through all the text in a given file

```
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ grep jobin file3.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ ls
fil file1.txt file3.txt files file.txt hobby.txt pic.png roll.txt
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cat file3.txt
JOBIN
JOICE
JOMEESH
K M ABHIJITH
VIVIN
VISHNU RAJ
VIMAL
Hai
friends
How
are
you
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ grep JOBIN file3.txt
JOBIN
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ grep vivin /etc/passwd
vivin:x:1000:1000:Vivin V Abraham,,,:/home/vivin:/bin/bash
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ █
```

25. du

-Used to check how much space a file or a directory takes, the du (Disk Usage) command is the answer However, the disk usage summary will show disk block numbers instead of the usual size format

If you want to see it in bytes, kilobytes, and megabytes, add the h argument to the command line

```
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ du -h
12K      ./fil
200K     .
```

```
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ cd
vivin@vivin-VirtualBox:~/Desktop/Ajce/Mca/B-Batch$ du -h
4.0K    ./Music
4.0K    ./gnupg/private-keys-v1.d
8.0K    ./gnupg
2.2M    ./Pictures
4.0K    ./cache/evolution/calendar/trash
8.0K    ./cache/evolution/calendar
4.0K    ./cache/evolution/addressbook/trash
8.0K    ./cache/evolution/addressbook
4.0K    ./cache/evolution/mail/trash
8.0K    ./cache/evolution/mail
4.0K    ./cache/evolution/memos/trash
8.0K    ./cache/evolution/memos
4.0K    ./cache/evolution/sources/trash
8.0K    ./cache/evolution/sources
4.0K    ./cache/evolution/tasks/trash
8.0K    ./cache/evolution/tasks
52K     ./cache/evolution
344K   ./cache/thumbnails/large
116K   ./cache/thumbnails/normal
464K   ./cache/thumbnails
12K    ./cache/update-manager-core
360K   ./cache/gstreamer-1.0
8.0K   ./cache/ubuntu-report
7.4M   ./cache/tracker
12K    ./cache/rhythmbox/album-art
8.0K   ./cache/rhythmbox/alternate-toolbar
```

26. df

-Used to get a report on the system's disk space usage, shown in percentage and KBs If you want to see the report in megabytes, type df m

```
vivin@vivin-VirtualBox:~$ df -m
Filesystem      1M-blocks  Used Available Use% Mounted on
udev              462     0      462   0% /dev
tmpfs             99     2      97   2% /run
/dev/sda5        9509    7167    1840  80% /
tmpfs             491     0      491   0% /dev/shm
tmpfs              5     1       5   1% /run/lock
tmpfs             491     0      491   0% /sys/fs/cgroup
/dev/loop1          56     56      0 100% /snap/core18/2066
/dev/loop2          219    219      0 100% /snap/gnome-3-34-1804/66
/dev/loop3          219    219      0 100% /snap/gnome-3-34-1804/72
/dev/loop4          65     65      0 100% /snap/gtk-common-themes/1514
/dev/loop5          66     66      0 100% /snap/gtk-common-themes/1515
/dev/loop8          51     51      0 100% /snap/snap-store/542
/dev/loop9          33     33      0 100% /snap/snapd/12057
/dev/sda1          511     1      511   1% /boot/efi
tmpfs              99     1      99   1% /run/user/1000
/dev/loop10         56     56      0 100% /snap/core18/2074
/dev/loop0          33     33      0 100% /snap/snapd/12159
/dev/loop7          51     51      0 100% /snap/snap-store/547
vivin@vivin-VirtualBox:~$
```

27. useradd.

-Since Linux is a multi user system, this means more than one person can interact with the same system at the same time used to create a new user, while passwd is adding a password

```
cat: cannot open '/etc/passwd' for reading: No such file or directory
vivin@vivin-VirtualBox:~$ sudo userdel anu
vivin@vivin-VirtualBox:~$ useradd anu
useradd: Permission denied.
useradd: cannot lock /etc/passwd; try again later.
vivin@vivin-VirtualBox:~$ sudo useradd anu
vivin@vivin-VirtualBox:~$ tail /etc/passwd
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopsie:x:120:125::/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
vivin:x:1000:1000:Vivin V Abraham,,,:/home/vivin:/bin/bash
systemd-coredump:x:999:999:system Core Dumper:/:/usr/sbin/nologin
anu:x:1001:1001::/home/anu:/bin/sh
vivin@vivin-VirtualBox:~$ passwd
```

28. userdel

-Used to remove a user is very similar to adding a new user To delete the users account type, userdel UserName

```
vivin@vivin-VirtualBox:~$ userdel anu
userdel: Permission denied.
userdel: cannot lock /etc/passwd; try again later.
vivin@vivin-VirtualBox:~$ sudo userdel anu
vivin@vivin-VirtualBox:~$ tail /etc/passwd
nm-openvpn:x:118:124:NetworkManager OpenVPN,,,:/var/lib/openvpn/chroot:/usr/sbin/nologin
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopsie:x:120:125::/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
vivin:x:1000:1000:Vivin V Abraham,,,:/home/vivin:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
vivin@vivin-VirtualBox:~$ man locate
```

29. sudo

-Used to perform tasks that require administrative or root permissions You must have sufficient permissions to use this command

```
useradd: cannot lock /etc/passwd; try again later.
vivin@vivin-VirtualBox:~$ sudo useradd anu
vivin@vivin-VirtualBox:~$ tail etc/passwd
tail: cannot open 'etc/passwd' for reading: No such file or directory
vivin@vivin-VirtualBox:~$ sudo userdel anu
vivin@vivin-VirtualBox:~$ useradd anu
useradd: Permission denied.
useradd: cannot lock /etc/passwd; try again later.
vivin@vivin-VirtualBox:~$ sudo useradd anu
vivin@vivin-VirtualBox:~$ tail /etc/passwd
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopsie:x:120:125::/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
vivin:x:1000:1000:Vivin V Abraham,,,:/home/vivin:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
anu:x:1001:1001::/home/anu:/bin/sh
vivin@vivin-VirtualBox:~$ passwd
```

30. passwd

-Used to changes passwords for user accounts normal user may only change the password for their own account, while the superuser may change the password for any account

```
vivin@vivin-VirtualBox:~$ passwd
Changing password for vivin.
Current password:
New password:
Retype new password:
passwd: password updated successfully
vivin@vivin-VirtualBox:~$ passwd anu
passwd: You may not view or modify password information for anu.
vivin@vivin-VirtualBox:~$ sudo passwd anu
New password:
Retype new password:
passwd: password updated successfully
vivin@vivin-VirtualBox:~$ userdel anu
```

Experiment No:3

Ubuntu Basic Commands-III

31. usermod

- Helps to modify user account
- Changing the userid

```
vivin@vivin-VirtualBox:~/Desktop$ sudo useradd anna
vivin@vivin-VirtualBox:~/Desktop$ id anna
uid=1501(anna) gid=1501(anna) groups=1501(anna)
vivin@vivin-VirtualBox:~/Desktop$ sudo usermod -u 2000 anna
vivin@vivin-VirtualBox:~/Desktop$ id anna
uid=2000(anna) gid=1501(anna) groups=1501(anna)
vivin@vivin-VirtualBox:~/Desktop$
```

- Add new secondary group to existing user

```
KERBLISTX:1502:
vivin@vivin-VirtualBox:~/Desktop$ groups anu
anu : anu
vivin@vivin-VirtualBox:~/Desktop$ sudo usermod -G kerala anu
vivin@vivin-VirtualBox:~/Desktop$ groups anu
anu : anu kerala
```

- Change the primary group of the user

```
vivin@vivin-VirtualBox:~/Desktop$ sudo usermod -g kerala anu
vivin@vivin-VirtualBox:~/Desktop$ groups anu
anu : kerala
vivin@vivin-VirtualBox:~/Desktop$ sudo usermod -G anu anu
vivin@vivin-VirtualBox:~/Desktop$ groups anu
anu : kerala anu
vivin@vivin-VirtualBox:~/Desktop$ sudo usermod -g anna anu
vivin@vivin-VirtualBox:~/Desktop$ groups anu
anu : anna anu
```

- Add multiple secondary group at a time

```
usermod: group 'cars' does not exist
vivin@vivin-VirtualBox:~/Desktop$ sudo usermod -G bikes,bus,xuvs anu
vivin@vivin-VirtualBox:~/Desktop$ groups anu
anu : anna bus bikes xuvs
```

32. groupadd

- Used to create a new group

```
vivin@vivin-VirtualBox:~/Desktop$ sudo groupadd bus
vivin@vivin-VirtualBox:~/Desktop$ sudo groupadd bikes
vivin@vivin-VirtualBox:~/Desktop$ sudo groupadd xuvs
```

- To display the groups

```
vivin@vivin-VirtualBox:~/Desktop$ cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,vivin
tty:x:5:syslog
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
uucp:x:10:
man:x:12:
proxy:x:13:
kmem:x:15:
dialout:x:20:
fax:x:21:
voice:x:22:
gdm:x:130:
lxde:x:131:vivin
vivin:x:1000:
sambashare:x:132:vivin
systemd-coredump:x:999:
anu:x:1001:anu
anna:x:1501:
kerala:x:1502:
car:x:1503:
bus:x:1504:
bikes:x:1505:
xuvs:x:1506:
```

(The lastly created group comes at every last only)

33. groups

- To print the groups the user is in

```
vivin@vivin-VirtualBox:~/Desktop$ groups anu
anu : anu
```

(The group which near to the user is primary group here it is anu)

```
useradd: group 'bikes' does not exist
vivin@vivin-VirtualBox:~/Desktop$ sudo usermod -G bikes,bus,xuvs anu
vivin@vivin-VirtualBox:~/Desktop$ groups anu
anu : anna bus bikes xuvs
```

(The groups that other than the primary are secondary group)

34. groupdel

- To delete a group, we can delete only secondary groups of a user only

```
[root] password for vivin
vivin@vivin-VirtualBox:~/Desktop$ groups anu
anu : anna xuvs
vivin@vivin-VirtualBox:~/Desktop$ sudo groupdel xuvs
vivin@vivin-VirtualBox:~/Desktop$ groups anu
anu : anna
```

-After deleting the group entire group is deleted from the system

```
vivin@vivin-VirtualBox:~/Desktop$ cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,vivin
tty:x:5:syslog
dialout:x:20:
fax:x:21:
voice:x:22:
cdrom:x:24:vivin
floppy:x:25:
tape:x:26:
sudo:x:27:vivin
audio:x:29:pulse
```

```
root:x:127:
whoopsie:x:125:
colord:x:126:
geoclue:x:127:
pulse:x:128:
pulse-access:x:129:
gdm:x:130:
lxde:x:131:vivin
vivin:x:1000:
s_Help_hare:x:132:vivin
s_coredump:x:999:
anu:x:1001:
anna:x:1501:
kerala:x:1502:anu
car:x:1503:anu
Lorries:x:1504:
vivin@vivin-VirtualBox:~/Desktop$
```

35. groupmod

- Used to modify a group definition on the system. That is, new group created and also it become secondary or primary group to the existing user

```
sun@sunain:~$ groups
systemd-coredump:x:999:
anu:x:1001:
car:x:1503:anu
Lorries:x:1504:
anscii:x:1502:anu
jeep:x:1501:
vivin@vivin-VirtualBox:~/Desktop$ groups anu
anu : jeep car anscii
vivin@vivin-VirtualBox:~/Desktop$ sudo groupmod -n trees jeep
vivin@vivin-VirtualBox:~/Desktop$ groups anu
anu : trees car anscii
vivin@vivin-VirtualBox:~/Desktop$ sudo groupmod -n plants car
vivin@vivin-VirtualBox:~/Desktop$ groups anu
anu : trees anscii plants
vivin@vivin-VirtualBox:~/Desktop$ cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,vivin
tty:x:5:syslog
disk:x:6:
lp:x:7:
mail:x:8:
Terminal:x:10:
uucp:x:11:
man:x:12:
proxy:x:13:
```

-new group created

```
bluetooth:x:112:
ssl-cert:x:113:
uuid:x:114:
tcpdump:x:115:
avahi-autoipd:x:116:
rtkit:x:117:
ssh:x:118:
netdev:x:119:
lpadmin:x:120:vivin
avahi:x:121:
scanner:x:122:saned
saned:x:123:
nm-openvpn:x:124:
whoopsie:x:125:
colord:x:126:
UbuntuSoftware:x:127:
pulse:x:128:
pulse-access:x:129:
gdm:x:130:
lxde:x:131:vivin
vivin:x:1000:
sambashare:x:132:vivin
systemd-coredump:x:999:
anu:x:1001:
Lorries:x:1504:
anscii:x:1502:anu
trees:x:1501:
plants:x:1503:anu
```

36. chmod

-Used to change the permission of the file/directory
 (to see the directory details use **ls -ld directory_name** command used)

```
vivin@vivin-VirtualBox:~/Desktop$ mkdir Buses
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Buses
drwxrwxr-x 2 vivin vivin 4096 Aug 10 23:26 Buses
vivin@vivin-VirtualBox:~/Desktop$
```

drwxrwxr-x 2 vivin vivin 4096 Aug 10 23:26 Buses
 where,

- d- directory
- rwx-permission of user
- rwx-permission of group
- r-x- permission of others

where

- r-read permission
- w-write permission
- x-executable permission

vivin-user name
 vivin- file created from the account of vivin
 4096- id
 Aug 10 23:26 – date and time
 Buses – file name

-Removing the write permission of group

```
vivin@vivin-VirtualBox:~/Desktop$ mkdir Buses
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Buses
drwxrwxr-x 2 vivin vivin 4096 Aug 10 23:26 Buses
vivin@vivin-VirtualBox:~/Desktop$ chmod g-w Buses
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Buses
drwxr-xr-x 2 vivin vivin 4096 Aug 10 23:26 Buses
vivin@vivin-VirtualBox:~/Desktop$
```

-Giving write permission to the others

```
drwxr-xr-x 2 vivin vivin 4096 Aug 10 23:26 Buses
vivin@vivin-VirtualBox:~/Desktop$ chmod o+w Buses
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Buses
drwxr-xrwx 2 vivin vivin 4096 Aug 10 23:26 Buses
vivin@vivin-VirtualBox:~/Desktop$
```

-Removing and giving the multiple permission

```
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Buses
drwxr-xrwx 2 vivin vivin 4096 Aug 10 23:26 Buses
vivin@vivin-VirtualBox:~/Desktop$ chmod o-r-w-x Buses
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Buses
drwxr-x-- 2 vivin vivin 4096 Aug 10 23:26 Buses
vivin@vivin-VirtualBox:~/Desktop$ chmod o+r+w+x Buses
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Buses
d Terminal x 2 vivin vivin 4096 Aug 10 23:26 Buses
vivin@vivin-VirtualBox:~/Desktop$ chmod u+r+w+x Buses
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Buses
drwxr-xrwx 2 vivin vivin 4096 Aug 10 23:26 Buses
```

-Assigning permission, only the current given permission only updated at a time

```
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Buses
d---rwxrwx 2 vivin vivin 4096 Aug 10 23:26 Buses
vivin@vivin-VirtualBox:~/Desktop$ chmod u+=rwx Buses
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Buses
drwxrwxrwx 2 vivin vivin 4096 Aug 10 23:26 Buses
vivin@vivin-VirtualBox:~/Desktop$ chmod u-=rwx Buses
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Buses
drwxrwxrwx 2 vivin vivin 4096 Aug 10 23:26 Buses
vivin@vivin-VirtualBox:~/Desktop$ chmod g-r-w Buses
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Buses
drwx--xrw 2 vivin vivin 4096 Aug 10 23:26 Buses
vivin@vivin-VirtualBox:~/Desktop$ chmod g=w Buses
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Buses
drwx-w-rwx 2 vivin vivin 4096 Aug 10 23:26 Buses
vivin@vivin-VirtualBox:~/Desktop$ chmod g=x Buses
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Buses
drwx--xrw 2 vivin vivin 4096 Aug 10 23:26 Buses
vivin@vivin-VirtualBox:~/Desktop$ chmod g=rw Buses
v Terminal in-VirtualBox:~/Desktop$ ls -ld Buses
drwxrwx-rwx 2 vivin vivin 4096 Aug 10 23:26 Buses
vivin@vivin-VirtualBox:~/Desktop$ chmod g=rwx Buses
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Buses
drwxrwxrwx 2 vivin vivin 4096 Aug 10 23:26 Buses
vivin@vivin-VirtualBox:~/Desktop$
```

37. chown

-It is used to change the user and group ownership of the given file directory

```
drwxrwxr-x 5 anna vivin 4096 Jun 13 20:34 Amal
vivin@vivin-VirtualBox:~/Desktop$ ls
Amal Buses friends.txt 'hello world welcome' Mca2
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Amal
drwxrwxr-x 5 anna vivin 4096 Jun 13 20:34 Amal
vivin@vivin-VirtualBox:~/Desktop$ sudo chown anu Amal
vivin@vivin-VirtualBox:~/Desktop$ ls -ld Amal
drwxrwxr-x 5 anu vivin 4096 Jun 13 20:34 Amal
vivin@vivin-VirtualBox:~/Desktop$ man chown
vivin@vivin-VirtualBox:~/Desktop$
```

38. id

-It is used to print real and effective user and group IDs

```
vivin@vivin-VirtualBox:~/Desktop$ man id
vivin@vivin-VirtualBox:~/Desktop$ id anu
uid=1500(anu) gid=1501(trees) groups=1501(trees),1502(anscii),1503(plants)
vivin@vivin-VirtualBox:~/Desktop$
```

39. ps

- It is used to report a snapshot of the current process

```
vivin@vivin-VirtualBox:~/Desktop$ man ps
vivin@vivin-VirtualBox:~/Desktop$ ps
 PID TTY      TIME CMD
 1779 pts/0    00:00:00 bash
 1937 pts/0    00:00:00 ps
```

Where,

PID- This is the unique process ID

TTY- This is the type of terminal that the user is logged in to

TIME-This is the time in minutes that the process has been running

CMD-The command that launched the process

-To select all process except both session leaders and processes not associated with terminal

```
vivin@vivin-VirtualBox:~/Desktop$ ps -a
  PID TTY      TIME CMD
  763 tty2    00:00:08 Xorg
  864 tty2    00:00:00 gnome-session-b
 1939 pts/0    00:00:00 ps
vivin@vivin-VirtualBox:~/Desktop$ man ps
```

-To get security info

```
/bin  864    /bin  1779  1779 pts/0      7400 S+   1000  0:00 /usr/libexec/
1771  1779    1779  1779 pts/0      7400 Ss   1000  0:00 bash GJS_DEB
1779  7400    7400  1779 pts/0      7400 R+   1000  0:00 ps -ejh SHEL
vivin@vivin-VirtualBox:~/Desktop$ man ps
vivin@vivin-VirtualBox:~/Desktop$ ps -eM
LABEL          PID TTY      TIME CMD
unconfined      1 ?      00:00:08 systemd
unconfined      2 ?      00:00:00 kthreadd
unconfined      3 ?      00:00:00 rcu_gp
unconfined      4 ?      00:00:00 rcu_par_gp
unconfined      6 ?      00:00:00 kworker/0:0H-kblockd
unconfined      9 ?      00:00:00 mm_percpu_wq
unconfined     10 ?      00:00:01 ksoftirqd/0
unconfined     11 ?      00:00:05 rcu_sched
unconfined     12 ?      00:00:00 migration/0
unconfined     13 ?      00:00:00 idle_inject/0
unconfined     14 ?      00:00:00 cpuhp/0
unconfined     15 ?      00:00:00 kdevtmpfs
unconfined     16 ?      00:00:00 netns
unconfined     17 ?      00:00:00 rcu_tasks_kthre
unconfined     18 ?      00:00:00 rcu_tasks_rude_
unconfined     19 ?      00:00:00 rcu_tasks_trace
unconfined     20 ?      00:00:00 kaudittd
unconfined     21 ?      00:00:00 khungtaskd
unconfined     22 ?      00:00:00 oom_reaper
unconfined     23 ?      00:00:00 writeback
unconfined     24 ?      00:00:00 kcompactd0
unconfined     25 ?      00:00:00 ksmd
unconfined     26 ?      00:00:00 khugepaged
```

-To get info about threads

VIVIN@VIVIN-VIRTUALBOX:~/Desktop\$ ps axms	UID	PID	PENDING	BLOCKED	IGNORED	CAUGHT	STAT	TTY	TIME	COMM
AND	0	1	00000000	-	-	-	-	?	0:08	/lib
	0	-	00000000	<28014a03	00001000	<800004ec	Ss	-	0:08	-
	0	2	00000000	-	-	-	-	?	0:00	[kth]
	0	-	00000000	00000000	<fffffff	00000000	S	-	0:00	-
	0	3	00000000	-	-	-	-	?	0:00	[rcu]
	0	-	00000000	00000000	<fffffff	00000000	I<	-	0:00	-
	0	4	00000000	-	-	-	-	?	0:00	[rcu]
	0	-	00000000	00000000	<fffffff	00000000	I<	-	0:00	-
	0	6	00000000	-	-	-	-	?	0:00	[kwo]
	0	-	00000000	00000000	<fffffff	00000000	I<	-	0:00	-
	0	9	00000000	-	-	-	-	?	0:00	[mm_]
	0	-	00000000	00000000	<fffffff	00000000	I<	-	0:00	-
	0	10	00000000	-	-	-	-	?	0:01	[kso]
	0	-	00000000	00000000	<fffffff	00000000	S	-	0:01	-
	0	11	00000000	-	-	-	-	?	0:05	[rcu]
	0	-	00000000	00000000	<fffffff	00000000	I	-	0:05	-
	0	12	00000000	-	-	-	-	?	0:00	[mig]
	0	-	00000000	00000000	<fffffff	00000000	S	-	0:00	-
	0	13	00000000	-	-	-	-	?	0:00	[idl]
	0	-	00000000	00000000	<fffffff	00000000	S	-	0:00	-
	0	14	00000000	-	-	-	-	?	0:00	[cpu]
	0	-	00000000	00000000	<fffffff	00000000	S	-	0:00	-

-To print a process tree

VIVIN@VIVIN-VIRTUALBOX:~/Desktop\$ ps -ejh	670	761	761	761	tty2	761	Ssl+	1000	0:00	/usr/lib/gdm
	761	763	761	761	tty2	761	Sl+	1000	0:08	/usr/lib/xor
	761	864	761	761	tty2	761	Sl+	1000	0:00	/usr/libexec
	1771	1779	1779	1779	pts/0	7400	Ss	1000	0:00	bash GJS_DEB
	1779	7400	7400	1779	pts/0	7400	R+	1000	0:00	ps -ejh SHEL

40. top

- Used to display Linux process

```
vivin@vivin-VirtualBox:~/Desktop$ top

top - 16:15:15 up 8:37, 1 user, load average: 0.00, 0.02, 0.00
Tasks: 172 total, 1 running, 171 sleeping, 0 stopped, 0 zombie
%Cpu(s): 2.0 us, 0.3 sy, 0.0 ni, 97.6 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 980.8 total, 106.0 free, 379.3 used, 495.4 buff/cache
MiB Swap: 448.5 total, 174.9 free, 273.6 used. 447.9 avail Mem

      PID USER      PR  NI    VIRT    RES    SHR S %CPU %MEM TIME+ COMMAND
 1033 vivin      20   0 3710196 178024 43876 S  2.0 17.7 1:43.12 gnome+-+
 1771 vivin      20   0 826600 28068 15036 S  0.3  2.8 0:09.52 gnome+-+
 29673 root      20   0      0      0      0 I  0.3  0.0 0:00.59 kworker+-
 1 root      20   0 169104 9284 5428 S  0.0  0.9 0:08.64 systemd
 2 root      20   0      0      0      0 S  0.0  0.0 0:00.01 kthrea+-
 3 root      0 -20      0      0      0 I  0.0  0.0 0:00.00 rcu_gp
 4 root      0 -20      0      0      0 I  0.0  0.0 0:00.00 rcu_pa+-
 6 root      0 -20      0      0      0 I  0.0  0.0 0:00.00 kworker+-
 9 root      0 -20      0      0      0 I  0.0  0.0 0:00.00 mm_per+-
10 root     20   0      0      0      0 S  0.0  0.0 0:01.52 ksofti+-
11 root     20   0      0      0      0 I  0.0  0.0 0:06.43 rcu_sc+-
12 root     rt   0      0      0      0 S  0.0  0.0 0:00.52 migrat+-
13 root    -51   0      0      0      0 S  0.0  0.0 0:00.00 idle_i+-
14 root     20   0      0      0      0 S  0.0  0.0 0:00.00 cpuhp/0
15 root     20   0      0      0      0 S  0.0  0.0 0:00.00 kdevtm+-
16 root     0 -20      0      0      0 I  0.0  0.0 0:00.00 netns
17 root     20   0      0      0      0 S  0.0  0.0 0:00.00 rcu_ta+-
18 root     20   0      0      0      0 S  0.0  0.0 0:00.00 rcu_ta+-
19 root     20   0      0      0      0 S  0.0  0.0 0:00.00 rcu_ta+
```

- To display the process of particular user

```
vivin@vivin-VirtualBox:~/Desktop$ top -u anu

top - 16:11:35 up 8:33, 1 user, load average: 0.03, 0.05, 0.01
Tasks: 171 total, 1 running, 170 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.0 us, 0.3 sy, 0.0 ni, 99.7 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 980.8 total, 106.0 free, 379.4 used, 495.4 buff/cache
MiB Swap: 448.5 total, 174.9 free, 273.6 used. 447.8 avail Mem

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

-To display the process of root user (vivin)

```
vivin@vivin-VirtualBox:~/Desktop$ top -u vivin

top - 16:12:47 up 8:34, 1 user, load average: 0.01, 0.04, 0.00
Tasks: 171 total, 1 running, 170 sleeping, 0 stopped, 0 zombie
%Cpu(s): 1.4 us, 0.0 sy, 0.0 ni, 98.6 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 980.8 total, 106.0 free, 379.4 used, 495.4 buff/cache
MiB Swap: 448.5 total, 174.9 free, 273.6 used. 447.8 avail Mem

      PID USER      PR  NI    VIRT    RES    SHR   S %CPU %MEM TIME+ COMMAND
 1033 vivin     20   0 3710196 177984 43876 S  1.3 17.7 1:42.60 gnome+-+
  763 vivin     20   0 526556 17468 9556 S  0.3  1.7  0:20.03 Xorg
 1771 vivin     20   0 826600 28068 15036 S  0.3  2.8  0:09.36 gnome+-+
  686 vivin     20   0 20152 6608 4324 S  0.0  0.7  0:02.83 systemd
  688 vivin     20   0 103608 8      0 S  0.0  0.0  0:00.00 (sd-pa+
  750 vivin     9 -11 1416888 9140 7028 S  0.0  0.9  0:02.24 pulsea+
  755 vivin    39  19 593628 6952 4424 S  0.0  0.7  0:00.89 tracke+
  757 vivin     20   0 248800 3416 2924 S  0.0  0.3  0:00.15 gnome+-+
  761 vivin     20   0 172652 3228 2940 S  0.0  0.3  0:00.05 gdm-x ++
  766 vivin     20   0 11224 7152 2800 S  0.0  0.7  0:01.61 dbus-d+
  779 vivin     20   0 248336 3180 2704 S  0.0  0.3  0:00.21 gvfsd
  794 vivin     20   0 378344 2708 2644 S  0.0  0.3  0:00.03 gvfsd ++
  801 vivin     20   0 322564 3144 2528 S  0.0  0.3  0:00.30 gvfs-u+
  819 vivin     20   0 244332 3012 2688 S  0.0  0.3  0:00.07 gvfs-m+
  823 vivin     20   0 244508 2752 2524 S  0.0  0.3  0:00.08 gvfs-g+
  832 vivin     20   0 553844 4020 3640 S  0.0  0.4  0:00.54 goa-da+
  855 vivin     20   0 323388 3384 3040 S  0.0  0.3  0:00.32 goa-id+
  863 vivin     20   0 246608 3132 2864 S  0.0  0.3  0:00.08 gvfs-g+
  864 vivin     20   0 196920 3516 3516 S  0.0  0.4  0:00.19 gnome+-+
```

Experiment No:4

Ubuntu Basic Commands-IV

41. wc

- Used to print newline, word, and byte counts for each file
- To print the counts of line, word, characters

```
vivin@vivin-VirtualBox:~/Desktop$ ls
Amal  Buses.txt  friends.txt  'hello world welcome'  Mca2
vivin@vivin-VirtualBox:~/Desktop$ cat Buses.txt
Ordinary
Fast Passenger
Super Fast
Delux
Super Delux
Ultra Delux
vivin@vivin-VirtualBox:~/Desktop$ wc Buses.txt
6 10 65 Buses.txt
vivin@vivin-VirtualBox:~/Desktop$ man wc
vivin@vivin-VirtualBox:~/Desktop$
```

6 10 65 Buses.txt

Where,

- 6-Number of lines
- 10-Number of words
- 65- Number of characters (including space)

- To print multiple file word count and find total word count

```
vivin@vivin-VirtualBox:~/Desktop$ ls
Amal  Buses.txt  friends.txt  'hello world welcome'  Mca2
vivin@vivin-VirtualBox:~/Desktop$ cat friends.txt
Hello, My name is Vivin
vivin@vivin-VirtualBox:~/Desktop$ wc friends.txt Buses.txt
1 5 24 friends.txt
6 10 65 Buses.txt
7 15 89 total
vivin@vivin-VirtualBox:~/Desktop$
```

-To print the number of lines

```
vivin@vivin-VirtualBox:~/Desktop$ wc Buses.txt
6 10 65 Buses.txt
vivin@vivin-VirtualBox:~/Desktop$ wc -l Buses.txt
6 Buses.txt
```

-To print the number of words

```
vivin@vivin-VirtualBox:~/Desktop$ wc -w Buses.txt
10 Buses.txt
```

-To print the number of characters

```
10 Buses.txt
vivin@vivin-VirtualBox:~/Desktop$ wc -c Buses.txt
65 Buses.txt
vivin@vivin-VirtualBox:~/Desktop$ wc -m Buses.txt
65 Buses.txt
vivin@vivin-VirtualBox:~/Desktop$ █
```

42. tar

- Used to create archive and extract archive files

-Create a tar file

```
vivin@vivin-VirtualBox:~/Desktop/ever$ cat >>Road
Car
jeep
bike
lorries
^C
vivin@vivin-VirtualBox:~/Desktop/ever$ tar cf hello.tar Buses.txt friends.txt s
chool Road
```

-To Extract a tar file in new directory

```
vivin@vivin-VirtualBox:~/Desktop/ever$ mkdir hai
vivin@vivin-VirtualBox:~/Desktop/ever$ cd hai
vivin@vivin-VirtualBox:~/Desktop/ever/hai$ tar xf /home/vivin/Desktop/ever/hell
o.tar
vivin@vivin-VirtualBox:~/Desktop/ever/hai$ ls
Buses.txt friends.txt Road school
vivin@vivin-VirtualBox:~/Desktop/ever/hai$ cat Buses.txt
Ordinary
Fast Passenger
Super Fast
Delux
S Help Delux
U... Delux
vivin@vivin-VirtualBox:~/Desktop/ever/hai$ cat Road
Car
jeep
bike
lorries
vivin@vivin-VirtualBox:~/Desktop/ever/hai$ █
```

Experiment No:5

Lab Exercises

1. Managing Files, Creating Users and Groups Using Command-line tools
 - a. Create six files with name of the form songX.mp3 where X=1 to 6

```
vivin@vivin-VirtualBox:~/Desktop$ touch song1.mp3 song2.mp3 song3.mp3 song4.mp3
song5.mp3 song6.mp3
vivin@vivin-VirtualBox:~/Desktop$ ls
song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3
vivin@vivin-VirtualBox:~/Desktop$
```

- b. Create six files with name of the form snapX.mp3 where X=1 to 6

```
vivin@vivin-VirtualBox:~/Desktop$ touch snap1.mp3 snap2.mp3 snap3.mp3 snap4.mp3
snap5.mp3 snap6.mp3
vivin@vivin-VirtualBox:~/Desktop$ ls
snap1.mp3 snap3.mp3 snap6.mp3 song2.mp3 song4.mp3 song6.mp3
snap2.mp3 snap4.mp3 snap5.mp3 song1.mp3 song3.mp3 song5.mp3
vivin@vivin-VirtualBox:~/Desktop$
```

- c. Create six files with name of the form filmX.mp3 where X=1 to 6

```
snap2.mp3 snap4.mp3 snap5.mp3 song1.mp3 songs.mp3 song5.mp3
vivin@vivin-VirtualBox:~/Desktop$ touch film1.mp3 film2.mp3 film3.mp3 film4.mp3
film5.mp3 film6.mp3
vivin@vivin-VirtualBox:~/Desktop$ ls
film1.mp3 film4.mp3 snap1.mp3 snap4.mp3 snap5.mp3 song2.mp3 song5.mp3
film2.mp3 film5.mp3 snap2.mp3 snap6.mp3 song3.mp3 song6.mp3
film3.mp3 film6.mp3 snap3.mp3 song1.mp3 song4.mp3
```

Display all the files in home directory

```
vivin@vivin-VirtualBox:~/Desktop$ ls
film1.mp3 film4.mp3 snap1.mp3 snap4.mp3 song1.mp3 song4.mp3
film2.mp3 film5.mp3 snap2.mp3 snap5.mp3 song2.mp3 song5.mp3
film3.mp3 film6.mp3 snap3.mp3 snap6.mp3 song3.mp3 song6.mp3
vivin@vivin-VirtualBox:~/Desktop$
```

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

Music

```
film1.mp3 film3.mp3 film5.mp3 music snap2.mp3 snap4.mp3 snap6.mp3
vivin@vivin-VirtualBox:~/Desktop$ mkdir music
vivin@vivin-VirtualBox:~/Desktop$ mv song1.mp3 song2.mp3 song3.mp3 song4.mp3 so
ng5.mp3 song6.mp3 music
vivin@vivin-VirtualBox:~/Desktop$ ls
film1.mp3 film3.mp3 film5.mp3 music snap2.mp3 snap4.mp3 snap6.mp3
film2.mp3 film4.mp3 film6.mp3 snap1.mp3 snap3.mp3 snap5.mp3
vivin@vivin-VirtualBox:~/Desktop$ cd music
vivin@vivin-VirtualBox:~/Desktop/music$ ls
song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3
vivin@vivin-VirtualBox:~/Desktop/music$
```

Pictures

```
snap1.mp3 snap2.mp3 snap3.mp3 snap4.mp3 snap5.mp3 snap6.mp3
vivin@vivin-VirtualBox:~/Desktop/music$ cd ..
vivin@vivin-VirtualBox:~/Desktop$ mkdir pictures
vivin@vivin-VirtualBox:~/Desktop$ mv snap1.mp3 snap2.mp3 snap3.mp3 snap4.mp3 sn
ap5.mp3 snap6.mp3 pictures
vivin@vivin-VirtualBox:~/Desktop$ ls
film1.mp3 film3.mp3 film5.mp3 music
film2.mp3 film4.mp3 film6.mp3 pictures
vivin@vivin-VirtualBox:~/Desktop$ cd pictures
vivin@vivin-VirtualBox:~/Desktop/pictures$ ls
snap1.mp3 snap2.mp3 snap3.mp3 snap4.mp3 snap5.mp3 snap6.mp3
vivin@vivin-VirtualBox:~/Desktop/pictures$
```

Videos

```
snap1.mp3 snap2.mp3 snap3.mp3 snap4.mp3 snap5.mp3 snap6.mp3
vivin@vivin-VirtualBox:~/Desktop/pictures$ cd ..
vivin@vivin-VirtualBox:~/Desktop$ mkdir videos
vivin@vivin-VirtualBox:~/Desktop$ mv film1.mp3 film2.mp3 film3.mp3 film4.mp3 fi
lm5.mp3 film6.mp3 videos
vivin@vivin-VirtualBox:~/Desktop$ ls
music pictures videos
vivin@vivin-VirtualBox:~/Desktop$ cd ..
vivin@vivin-VirtualBox:~$ cd Desktop
vivin@vivin-VirtualBox:~/Desktop$ cd videos
vivin@vivin-VirtualBox:~/Desktop/videos$ ls
film1.mp3 film2.mp3 film3.mp3 film4.mp3 film5.mp3 film6.mp3
vivin@vivin-VirtualBox:~/Desktop/videos$
```

3. In your home directory, create three subdirectories for organizing your files. Call these directories friends, family, and work. Create all three with one command.

```
vivin@vivin-VirtualBox:~/Desktop/videos$ mkdir friends family work
vivin@vivin-VirtualBox:~/Desktop/videos$ cd ..
vivin@vivin-VirtualBox:~/Desktop$ ls
music pictures videos
vivin@vivin-VirtualBox:~/Desktop$ mkdir friends family work
vivin@vivin-VirtualBox:~/Desktop$ ls
family friends music pictures videos work
vivin@vivin-VirtualBox:~/Desktop$
```

4. Copy song files to the friends folder.

```
vivin@vivin-VirtualBox:~/Desktop$ cp music/song1.mp3 music/song2.mp3 music/song3.mp3 music/song4.mp3 music/song5.mp3 music/song6.mp3 friends
vivin@vivin-VirtualBox:~/Desktop$ cd music
vivin@vivin-VirtualBox:~/Desktop/music$ ls
song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3
vivin@vivin-VirtualBox:~/Desktop/music$ cd ..
vivin@vivin-VirtualBox:~/Desktop$ cd friends
vivin@vivin-VirtualBox:~/Desktop/friends$ ls
song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3
vivin@vivin-VirtualBox:~/Desktop/friends$
```

- b. snap files to family folder

```
vivin@vivin-VirtualBox:~/Desktop/friends$ cd ..
vivin@vivin-VirtualBox:~/Desktop$ cp pictures/snap1.mp3 pictures/snap2.mp3 pictures/snap3.mp3 pictures/snap4.mp3 pictures/snap5.mp3 pictures/snap6.mp3 family
vivin@vivin-VirtualBox:~/Desktop$ ls
family friends music pictures videos work
vivin@vivin-VirtualBox:~/Desktop$ cd family
vivin@vivin-VirtualBox:~/Desktop/family$ ls
snap1.mp3 snap2.mp3 snap3.mp3 snap4.mp3 snap5.mp3 snap6.mp3
vivin@vivin-VirtualBox:~/Desktop/family$ cd ..
vivin@vivin-VirtualBox:~/Desktop$ cd pictures
vivin@vivin-VirtualBox:~/Desktop/pictures$ ls
.s Show Applications .mp3 snap3.mp3 snap4.mp3 snap5.mp3 snap6.mp3
vivin@vivin-VirtualBox:~/Desktop/pictures$
```

5. Attempt to delete both family and friends projects with a single rmdir command

```
vivin@vivin-VirtualBox:~/Desktop$ rmdir family friends
rmdir: failed to remove 'family': Directory not empty
rmdir: failed to remove 'friends': Directory not empty
vivin@vivin-VirtualBox:~/Desktop$
```

6. Use another command that will succeed in deleting both the family and friends folder.

```
vivin@vivin-VirtualBox:~/Desktop$ rm -r family friends
vivin@vivin-VirtualBox:~/Desktop$ ls
music pictures videos work
vivin@vivin-VirtualBox:~/Desktop$
```

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

```
vivin@vivin-VirtualBox:~$ ls -al>>allfiles.txt
vivin@vivin-VirtualBox:~$ ls -al
total 160
drwxr-xr-x 25 vivin vivin 4096 Aug 17 21:30 .
drwxr-xr-x  3 root  root  4096 Jun  1 17:06 ..
-rw-rw-r--  1 vivin vivin     0 Aug 17 21:30 allfiles.txt
drwxrwxr-x  5 anu  vivin 4096 Jun 13 20:34 Amal
-rw-----  1 vivin vivin 3006 Aug 17 19:56 .bash_history
-rw-r--r--  1 vivin vivin 220 Jun  1 17:06 .bash_logout
-rw-r--r--  1 vivin vivin 3771 Jun  1 17:06 .bashrc
drwxrwxrwx  2 vivin vivin 4096 Aug 10 23:26 Buses
-rw-rw-r--  1 vivin vivin 65 Aug 11 17:10 Buses.txt
drwx----- 15 vivin vivin 4096 Aug 12 15:29 .cache
-rw-rw-r--  1 vivin vivin 22 Aug 11 18:16 cat.txt
drwx----- 14 vivin vivin 4096 Aug 11 16:07 .config
drwxr-xr-x  6 vivin vivin 4096 Aug 17 21:22 Desktop
drwxr-xr-x  2 vivin vivin 4096 Jun  1 17:18 Documents
drwxr-xr-x  2 vivin vivin 4096 Jun  1 17:18 Downloads
drwxrwxr-x  3 vivin vivin 4096 Aug 11 18:06 ever
-rw-rw-r--  1 vivin vivin 10240 Aug 11 17:58 every.tar
```

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

```
vivin@vivin-VirtualBox:~$ date
Tuesday 17 August 2021 09:44:42 PM IST
vivin@vivin-VirtualBox:~$
```

9. Add the user Juliet

```
vivin@vivin-VirtualBox:~$ sudo useradd juliet
[sudo] password for vivin:
vivin@vivin-VirtualBox:~$
```

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

```
vivin@vivin-VirtualBox:~$ sudo useradd juliet
[sudo] password for vivin:
vivin@vivin-VirtualBox:~$ tail /etc/passwd
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
vivin:x:1000:1000:Vivin V Abraham,,,:/home/vivin:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
anu:x:1500:1501::/home/anu:/bin/sh
anna:x:2000:1501::/home/anna:/bin/sh
sshd:x:126:65534::/run/sshd:/usr/sbin/nologin
mysql:x:127:133:MySQL Server,,,:/nonexistent:/bin/false
juliet:x:2001:2001::/home/juliet:/bin/sh
vivin@vivin-VirtualBox:~$
```

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

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

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

```
vivin@vivin-VirtualBox:~$ sudo groupadd -g 30000 Shakespeare
```

13. Create a supplementary group called artists.

```
vivin@vivin-VirtualBox:~$ sudo groupadd artists
vivin@vivin-VirtualBox:~$
```

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

```
vivin@vivin-VirtualBox:~/Desktop$ tail /etc/group
systemd-coredump:x:999:
anu:x:1001:
Lorries:x:1504:
a Help :x:1502:anu
t....x:1501:
plants:x:1503:anu
mysql:x:133:
juliet:x:2001:
Shakespeare:x:30000:
artists:x:30001:
vivin@vivin-VirtualBox:~/Desktop$
```

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

```
vivin@vivin-VirtualBox:~/Desktop$ sudo usermod -G Shakespeare juliet
vivin@vivin-VirtualBox:~/Desktop$ groups juliet
juliet : juliet Shakespeare
vivin@vivin-VirtualBox:~/Desktop$
```

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

```
vivin@vivin-VirtualBox:~/Desktop$ id juliet
uid=2001(juliet) gid=2001(juliet) groups=2001(juliet),30000(Shakespeare)
vivin@vivin-VirtualBox:~/Desktop$
```

17. Add Romeo and Hamlet to the Shakespeare group..

```
vivin@vivin-VirtualBox:~/Desktop$ sudo useradd Romeo
vivin@vivin-VirtualBox:~/Desktop$ sudo useradd Hamlet
vivin@vivin-VirtualBox:~/Desktop$ sudo usermod -G Shakespeare Romeo
vivin@vivin-VirtualBox:~/Desktop$ groups Romeo
Romeo : Romeo Shakespeare
vivin@vivin-VirtualBox:~/Desktop$ id Romeo
uid=2002(Romeo) gid=2002(Romeo) groups=2002(Romeo),30000(Shakespeare)
vivin@vivin-VirtualBox:~/Desktop$ sudo usermod -G Shakespeare Hamlet
vivin@vivin-VirtualBox:~/Desktop$ group Hamlet

Command 'group' not found, did you mean:

  command 'grop' from deb grop (2:0.10-1.1build1)
  command 'groups' from deb coreutils (8.30-3ubuntu2)

  Help
T... sudo apt install <deb name>

vivin@vivin-VirtualBox:~/Desktop$ groups Hamlet
Hamlet : Hamlet Shakespeare
vivin@vivin-VirtualBox:~/Desktop$ id Hamlet
uid=2003(Hamlet) gid=2003(Hamlet) groups=2003(Hamlet),30000(Shakespeare)
vivin@vivin-VirtualBox:~/Desktop$
```

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

```

useradd user Dolly already exists
vivin@vivin-VirtualBox:~/Desktop$ sudo usermod -G artists Reba
vivin@vivin-VirtualBox:~/Desktop$ groups Reb
groups: 'Reb': no such user
vivin@vivin-VirtualBox:~/Desktop$ groups Reba
groups: 'Reba': no such user
vivin@vivin-VirtualBox:~/Desktop$ groups Reba
Reba : Reba artists
vivin@vivin-VirtualBox:~/Desktop$ sudo usermod -G artists Dolly
vivin@vivin-VirtualBox:~/Desktop$ groups Dolly
Dolly : Dolly artists
vivin@vivin-VirtualBox:~/Desktop$ sudo usermod -G artists Elvis
vivin@vivin-VirtualBox:~/Desktop$ groups Elvis
Elvis : Elvis artists
vivin@vivin-VirtualBox:~/Desktop$ id Reba
uid=2004(Reba) gid=2004(Reba) groups=2004(Reba),30001(artists)
vivin@vivin-VirtualBox:~/Desktop$ id Dolly
uid=2005(Dolly) gid=2005(Dolly) groups=2005(Dolly),30001(artists)
vivin@vivin-VirtualBox:~/Desktop$ id Elvis
uid=2006(Elvis) gid=2006(Elvis) groups=2006(Elvis),30001(artists)
vivin@vivin-VirtualBox:~/Desktop$ ■

vivin@vivin-VirtualBox:~/Desktop$ sudo useradd Reba
vivin@vivin-VirtualBox:~/Desktop$ 
vivin@vivin-VirtualBox:~/Desktop$ sudo useradd Dolly
vivin@vivin-VirtualBox:~/Desktop$ sudo useradd Elvis

```

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

```

vivin@vivin-VirtualBox:~$ tail /etc/group
mysql:x:133:
juliet:x:2001:
Shakespeare:x:30000:juliet,Romeo,Hamlet
artists:x:30001:Rebas,Reba,Dolly,Elvis
Romeo:x:2002:
Hamlet:x:2003:
Reba:x:2004:
Dolly:x:2005:
Elvis:x:2006:
Rebas:x:2007:
vivin@vivin-VirtualBox:~$ ■

```

20. Attempt to remove user Dolly

```

vivin@vivin-VirtualBox:~$ sudo userdel Dolly
[sudo] password for vivin:
vivin@vivin-VirtualBox:~$ id Dolly
id: 'Dolly': no such user
vivin@vivin-VirtualBox:~$ ■

```

Experiment No:6

Networking Commands

Ping & traceroute tests

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

Ping test

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

WINDOWS

```
C:\vivin>ping www.google.com

Pinging www.google.com [142.250.205.228] with 32 bytes of data:
Reply from 142.250.205.228: bytes=32 time=226ms TTL=119
Reply from 142.250.205.228: bytes=32 time=45ms TTL=119
Reply from 142.250.205.228: bytes=32 time=20ms TTL=119
Reply from 142.250.205.228: bytes=32 time=18ms TTL=119

Ping statistics for 142.250.205.228:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 18ms, Maximum = 226ms, Average = 77ms

C:\vivin>
```

UBUNTU

```
vivin@vivin-VirtualBox:~/Desktop$ ping www.google.com
PING www.google.com (142.250.205.228) 56(84) bytes of data.
64 bytes from maa05s28-in-f4.1e100.net (142.250.205.228): icmp_seq=1 ttl=118 time=20.1 ms
64 bytes from maa05s28-in-f4.1e100.net (142.250.205.228): icmp_seq=2 ttl=118 time=22.7 ms
64 bytes from maa05s28-in-f4.1e100.net (142.250.205.228): icmp_seq=3 ttl=118 time=20.6 ms
64 bytes from maa05s28-in-f4.1e100.net (142.250.205.228): icmp_seq=4 ttl=118 time=20.6 ms
64 bytes from maa05s28-in-f4.1e100.net (142.250.205.228): icmp_seq=5 ttl=118 time=21.2 ms
64 bytes from maa05s28-in-f4.1e100.net (142.250.205.228): icmp_seq=6 ttl=118 time=98.8 ms
64 bytes from maa05s28-in-f4.1e100.net (142.250.205.228): icmp_seq=7 ttl=118 time=21.1 ms
64 bytes from maa05s28-in-f4.1e100.net (142.250.205.228): icmp_seq=8 ttl=118 time=19.3 ms
64 bytes from maa05s28-in-f4.1e100.net (142.250.205.228): icmp_seq=9 ttl=118 time=20.5 ms
64 bytes from maa05s28-in-f4.1e100.net (142.250.205.228): icmp_seq=10 ttl=118 time=21.2 ms
```

-c represents certain number of packet can use -c3 means 3 packets used

```
vivin@vivin-VirtualBox:~/Desktop$ ping -c3 www.google.com
PING www.google.com (142.250.205.228) 56(84) bytes of data.
64 bytes from maa05s28-in-f4.1e100.net (142.250.205.228): icmp_seq=1 ttl=118 time=20.2 ms
64 bytes from maa05s28-in-f4.1e100.net (142.250.205.228): icmp_seq=2 ttl=118 time=30.9 ms
64 bytes from maa05s28-in-f4.1e100.net (142.250.205.228): icmp_seq=3 ttl=118 time=19.5 ms

--- www.google.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 19.527/23.521/30.852/5.190 ms
vivin@vivin-VirtualBox:~/Desktop$
```

Trace Route test

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

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

WINDOWS

```
C:\vivin>tracert www.google.com

Tracing route to www.google.com [142.250.205.228]
over a maximum of 30 hops:

 1    1 ms      1 ms      1 ms  192.168.1.1
 2    3 ms      4 ms      3 ms  10.11.29.139
 3   18 ms     18 ms     18 ms  103.231.217.153
 4   19 ms     18 ms     19 ms  45.125.116.86
 5   21 ms     20 ms     20 ms  216.239.54.75
 6   18 ms     19 ms     30 ms  142.251.60.187
 7   18 ms     18 ms     18 ms  maa05s28-in-f4.1e100.net [142.250.205.228]

Trace complete.

C:\vivin>
```

UBUNTU

```
vivin@vivin-VirtualBox:~/Desktop$ traceroute www.google.com
traceroute to www.google.com (142.250.196.164), 30 hops max, 60 byte packets
 1 _gateway (10.0.2.2)  0.384 ms  0.350 ms  0.341 ms
 2 _gateway (10.0.2.2)  327.454 ms  327.443 ms  328.437 ms
vivin@vivin-VirtualBox:~/Desktop$
```

1. nslookup

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

WINDOWS

```
C:\vivin>nslookup amazon.in
Server: UnKnown
Address: 192.168.1.1

Non-authoritative answer:
Name: amazon.in
Addresses: 54.239.33.92
           52.95.120.67
           52.95.116.115

C:\vivin>
```

UBUNTU

```
vivin@vivin-VirtualBox:~/Desktop$ nslookup amazon.in
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
Name:  amazon.in
Address: 54.239.33.92
Name:  amazon.in
Address: 52.95.116.115
Name:  amazon.in
Address: 52.95.120.67

vivin@vivin-VirtualBox:~/Desktop$
```

Type nslookup -q=XX where XX is a type of a DNS record. Some of the available types are MX, A, CNAME, and TXT. The records are then displayed, to exit the tool type exit

WINDOWS

```
C:\vivin>nslookup -type=ns amazon.in
Server: UnKnown
Address: 192.168.1.1

Non-authoritative answer:
amazon.in      nameserver = pdns4.ultradvns.org
amazon.in      nameserver = pdns1.ultradvns.net
amazon.in      nameserver = pdns2.ultradvns.net
amazon.in      nameserver = ns1.p31.dynect.net
amazon.in      nameserver = pdns3.ultradvns.org
amazon.in      nameserver = pdns6.ultradvns.co.uk
amazon.in      nameserver = ns4.p31.dynect.net
amazon.in      nameserver = pdns5.ultradvns.info
amazon.in      nameserver = ns3.p31.dynect.net
amazon.in      nameserver = ns2.p31.dynect.net

pdns5.ultradvns.info      internet address = 204.74.114.1
pdns2.ultradvns.net      internet address = 204.74.109.1
pdns3.ultradvns.org      internet address = 199.7.68.1
pdns4.ultradvns.org      internet address = 199.7.69.1
ns1.p31.dynect.net      internet address = 208.78.70.31
ns2.p31.dynect.net      internet address = 204.13.250.31
pdns5.ultradvns.info      AAAA IPv6 address = 2610:a1:1016::1
pdns2.ultradvns.net      AAAA IPv6 address = 2610:a1:1014::1
pdns3.ultradvns.org      AAAA IPv6 address = 2610:a1:1015::1
pdns1.ultradvns.net      AAAA IPv6 address = 2001:502:f3ff::1

C:\vivin>
```

UBUNTU

```
vivin@vivin-VirtualBox:~/Desktop$ nslookup -type=ns amazon.in
Server:          127.0.0.53
Address:         127.0.0.53#53

Non-authoritative answer:
amazon.in        nameserver = ns1.p31.dynect.net.
amazon.in        nameserver = pdns5.ultradns.info.
amazon.in        nameserver = pdns6.ultradns.co.uk.
amazon.in        nameserver = pdns4.ultradns.org.
amazon.in        nameserver = pdns1.ultradns.net.
amazon.in        nameserver = pdns2.ultradns.net.
amazon.in        nameserver = ns4.p31.dynect.net.
amazon.in        nameserver = ns3.p31.dynect.net.
amazon.in        nameserver = ns2.p31.dynect.net.
amazon.in        nameserver = pdns3.ultradns.org.

Authoritative answers can be found from:
```

To use **nslookup** as a troubleshooting tool, you can set the specific type of record to lookup for a domain by using the **-type=record_type** where **record_type** is A, CNAME, MX, PTR, NS, ANY.

Type **nslookup -type=ns domain_name** where **domain_name** is the domain for your query and hit **Enter**. Now the tool will display the name servers for the domain you specified.

WINDOWS

```
C:\vivin>nslookup -q=MX amazon.in
Server: UnKnown
Address: 192.168.1.1

Non-authoritative answer:
amazon.in      MX preference = 10, mail exchanger = amazon-smtp.amazon.com

amazon.in      nameserver = ns3.p31.dynect.net
amazon.in      nameserver = pdns2.ultradns.net
amazon.in      nameserver = pdns3.ultradns.org
amazon.in      nameserver = pdns4.ultradns.org
amazon.in      nameserver = ns4.p31.dynect.net
amazon.in      nameserver = pdns1.ultradns.net
amazon.in      nameserver = ns1.p31.dynect.net
amazon.in      nameserver = pdns5.ultradns.info
amazon.in      nameserver = pdns6.ultradns.co.uk
amazon.in      nameserver = ns2.p31.dynect.net
pdns5.ultradns.info   internet address = 204.74.114.1
pdns5.ultradns.info   AAAA IPv6 address = 2610:a1:1016::1
ns4.p31.dynect.net   internet address = 204.13.251.31
pdns2.ultradns.net   internet address = 204.74.109.1
pdns2.ultradns.net   AAAA IPv6 address = 2610:a1:1014::1
pdns3.ultradns.org   internet address = 199.7.68.1
pdns3.ultradns.org   AAAA IPv6 address = 2610:a1:1015::1
pdns1.ultradns.net   internet address = 204.74.108.1
pdns1.ultradns.net   AAAA IPv6 address = 2001:502:f3ff::1

C:\vivin>
```

UBUNTU

```
v Terminal in-VirtualBox:~/Desktop$ nslookup -q=MX amazon.in
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
amazon.in      mail exchanger = 10 amazon-smtp.amazon.com.

Authoritative answers can be found from:

vivin@vivin-VirtualBox:~/Desktop$
```

2. Netstat

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

WINDOWS

```
vivin@vivin-VirtualBox:~/Desktop$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
udp      0      0 vivin-VirtualBox:bootpc _gateway:bootps      ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State         I-Node    Path
unix  2      [ ]           DGRAM                    26894   /run/user/1000/systemd/notify
unix  3      [ ]           DGRAM                    15431   /run/systemd/journal
unix  2      [ ]           DGRAM                    15445   /run/systemd/journal
/syslog
unix  16     [ ]           DGRAM                    15455   /run/systemd/journal
/dev-log
unix  8      [ ]           DGRAM                    15459   /run/systemd/journal
/socket
unix  3      [ ]           STREAM     CONNECTED     61872
unix  3      [ ]           STREAM     CONNECTED     31628
unix  3      [ ]           STREAM     CONNECTED     24035   /run/systemd/journal
/stdout
unix  3      [ ]           STREAM     CONNECTED     60420   /run/dbus/system_bus
_socket
unix  3      [ ]           STREAM     CONNECTED     33414
unix  3      [ ]           STREAM     CONNECTED     30929   /run/user/1000/bus
unix  3      [ ]           STREAM     CONNECTED     26830   /run/dbus/system_bus
_socket
unix  3      [ ]           STREAM     CONNECTED     31336
unix  3      [ ]           STREAM     CONNECTED     30352
unix  3      [ ]           STREAM     CONNECTED     29882
```

UBUNTU

```
C:\vivin>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:3745        LAPTOP-U2SEQKP4:11015  ESTABLISHED
  TCP    127.0.0.1:3746        LAPTOP-U2SEQKP4:11012  ESTABLISHED
  TCP    127.0.0.1:4110        LAPTOP-U2SEQKP4:11015  ESTABLISHED
  TCP    127.0.0.1:4112        LAPTOP-U2SEQKP4:11012  ESTABLISHED
  TCP    127.0.0.1:4113        LAPTOP-U2SEQKP4:11013  ESTABLISHED
  TCP    127.0.0.1:4114        LAPTOP-U2SEQKP4:11011  ESTABLISHED
  TCP    127.0.0.1:4116        LAPTOP-U2SEQKP4:4117   ESTABLISHED
  TCP    127.0.0.1:4117        LAPTOP-U2SEQKP4:4116   ESTABLISHED
  TCP    127.0.0.1:4119        LAPTOP-U2SEQKP4:4120   ESTABLISHED
  TCP    127.0.0.1:4120        LAPTOP-U2SEQKP4:4119   ESTABLISHED
  TCP    127.0.0.1:11011       LAPTOP-U2SEQKP4:4114   ESTABLISHED
  TCP    127.0.0.1:11012       LAPTOP-U2SEQKP4:3746   ESTABLISHED
  TCP    127.0.0.1:11012       LAPTOP-U2SEQKP4:4112   ESTABLISHED
  TCP    127.0.0.1:11013       LAPTOP-U2SEQKP4:4113   ESTABLISHED
  TCP    127.0.0.1:11015       LAPTOP-U2SEQKP4:3745   ESTABLISHED
  TCP    127.0.0.1:11015       LAPTOP-U2SEQKP4:4110   ESTABLISHED
  TCP    127.0.0.1:13827       LAPTOP-U2SEQKP4:13828  ESTABLISHED
  TCP    127.0.0.1:13828       LAPTOP-U2SEQKP4:13827  ESTABLISHED
  TCP    127.0.0.1:13829       LAPTOP-U2SEQKP4:13830  ESTABLISHED
  TCP    127.0.0.1:13830       LAPTOP-U2SEQKP4:13829  ESTABLISHED
  TCP    127.0.0.1:13831       LAPTOP-U2SEQKP4:13832  ESTABLISHED
  TCP    127.0.0.1:13832       LAPTOP-U2SEQKP4:13831  ESTABLISHED
  TCP    127.0.0.1:13833       LAPTOP-U2SEQKP4:13834  ESTABLISHED
  TCP    127.0.0.1:13834       LAPTOP-U2SEQKP4:13833  ESTABLISHED
  TCP    127.0.0.1:14740       LAPTOP-U2SEQKP4:14741  ESTABLISHED
  TCP    127.0.0.1:14741       LAPTOP-U2SEQKP4:14740  ESTABLISHED
  TCP    127.0.0.1:14742       LAPTOP-U2SEQKP4:14743  ESTABLISHED
  TCP    127.0.0.1:14743       LAPTOP-U2SEQKP4:14742  ESTABLISHED
  TCP    192.168.1.3:7259      a23-205-88-40:https  CLOSE_WAIT
  TCP    192.168.1.3:7331      20.197.71.89:https  ESTABLISHED
  TCP    192.168.1.3:7368      s3-us-west-2-r-w:https CLOSE_WAIT
  TCP    192.168.1.3:10599     stackoverflow:https  ESTABLISHED
  TCP    192.168.1.3:11087     91.108.56.146:https ESTABLISHED
  TCP    192.168.1.3:12193     sa-in-f188:5228   ESTABLISHED
  TCP    192.168.1.3:13758     a23-215-205-230:https CLOSE_WAIT
  TCP    192.168.1.3:13759     a23-215-205-230:https CLOSE_WAIT
  TCP    192.168.1.3:13762     a104-97-76-186:https CLOSE_WAIT
  TCP    192.168.1.3:13940     a104-91-32-10:https ESTABLISHED
  TCP    192.168.1.3:13955     20.44.229.112:https TIME_WAIT
  TCP    192.168.1.3:13959     20.189.173.6:https  TIME_WAIT
  TCP    192.168.1.3:13964     a23-54-80-26:http   TIME_WAIT
  TCP    192.168.1.3:13972     20.44.229.112:https ESTABLISHED
  TCP    192.168.1.3:13974     a23-54-80-26:http   TIME_WAIT
  TCP    192.168.1.3:14402     20.195.65.204:https ESTABLISHED
  TCP    192.168.1.3:14404     20.198.162.76:https ESTABLISHED
```

C:\vivin>

netstat -n**WINDOWS**

```
C:\vivin>netstat -n

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:9921         127.0.0.1:9922       ESTABLISHED
  TCP    127.0.0.1:9922         127.0.0.1:9921       ESTABLISHED
  TCP    127.0.0.1:9923         127.0.0.1:9924       ESTABLISHED
  TCP    127.0.0.1:9924         127.0.0.1:9923       ESTABLISHED
  TCP    127.0.0.1:9925         127.0.0.1:9926       ESTABLISHED
  TCP    127.0.0.1:9926         127.0.0.1:9925       ESTABLISHED
  TCP    127.0.0.1:9927         127.0.0.1:9928       ESTABLISHED
  TCP    127.0.0.1:9928         127.0.0.1:9927       ESTABLISHED
  TCP    192.168.1.3:1587        52.218.197.169:443  CLOSE_WAIT
  TCP    192.168.1.3:4045        20.197.71.89:443   ESTABLISHED
  TCP    192.168.1.3:4356        23.212.252.48:443  CLOSE_WAIT
  TCP    192.168.1.3:4357        23.212.252.48:443  CLOSE_WAIT
  TCP    192.168.1.3:4358        23.212.252.48:443  CLOSE_WAIT
  TCP    192.168.1.3:4359        23.212.252.48:443  CLOSE_WAIT
  TCP    192.168.1.3:4362        52.84.6.80:443     CLOSE_WAIT
  TCP    192.168.1.3:4363        52.84.12.201:80    CLOSE_WAIT
  TCP    192.168.1.3:4365        23.213.0.11:443   CLOSE_WAIT
  TCP    192.168.1.3:4367        104.121.254.87:443 CLOSE_WAIT
  TCP    192.168.1.3:5315        40.100.136.114:443 ESTABLISHED
  TCP    192.168.1.3:5320        40.100.136.114:443 ESTABLISHED
  TCP    192.168.1.3:7800        13.107.6.158:443   ESTABLISHED
  TCP    192.168.1.3:7801        52.109.56.20:443   TIME_WAIT
  TCP    192.168.1.3:7802        161.69.226.27:443  ESTABLISHED
  TCP    192.168.1.3:7803        52.109.56.20:443   TIME_WAIT
  TCP    192.168.1.3:7804        52.109.56.20:443   TIME_WAIT
  TCP    192.168.1.3:7807        204.79.197.200:443 ESTABLISHED
  TCP    192.168.1.3:7808        40.100.136.114:443 TIME_WAIT
  TCP    192.168.1.3:7810        204.79.197.254:443 ESTABLISHED
  TCP    192.168.1.3:7811        131.253.33.254:443 TIME_WAIT
  TCP    192.168.1.3:7812        13.107.3.254:443   TIME_WAIT
  TCP    192.168.1.3:7813        204.79.197.222:443 TIME_WAIT
  TCP    192.168.1.3:7814        52.182.141.63:443  ESTABLISHED
  TCP    192.168.1.3:7815        52.182.141.63:443  ESTABLISHED
  TCP    192.168.1.3:7816        20.189.173.5:443   ESTABLISHED
  TCP    192.168.1.3:7820        40.100.136.114:443 ESTABLISHED
  TCP    192.168.1.3:7821        23.205.88.48:443   ESTABLISHED
  TCP    192.168.1.3:7822        131.253.33.254:443 ESTABLISHED
  TCP    192.168.1.3:7823        13.107.3.254:443   ESTABLISHED
  TCP    192.168.1.3:7824        204.79.197.222:443 ESTABLISHED
  TCP    192.168.1.3:9214        20.195.65.204:443  ESTABLISHED
  TCP    192.168.1.3:9219        20.198.162.78:443   ESTABLISHED

C:\vivin>
```

UBUNTU

```
vivin@vivin-VirtualBox:~$ netstat -n

Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp      0      0 10.0.2.15:58324          35.224.170.84:80      TIME_WAIT
udp      0      0 10.0.2.15:68            10.0.2.2:67           ESTABLISHED

Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State      I-Node Path
unix    2      [ ]        DGRAM                    26978  /run/user/1000/systemd
md/notify
unix    3      [ ]        DGRAM                    15432  /run/systemd/notify
unix    2      [ ]        DGRAM                    15446  /run/systemd/journal
/syslog
unix   17     [ ]        DGRAM                    15456  /run/systemd/journal
/dev-log
unix    8      [ ]        DGRAM                    15460  /run/systemd/journal
/socket
unix    3      [ ]        STREAM     CONNECTED  31877  /run/user/1000/bus
unix    3      [ ]        STREAM     CONNECTED  29737  @/tmp/.X11-unix/X0
unix    3      [ ]        STREAM     CONNECTED  31722  @/tmp/dbus-x4e6fARF5
/stdout
unix    3      [ ]        STREAM     CONNECTED  30208
unix    3      [ ]        STREAM     CONNECTED  21250
unix    3      [ ]        STREAM     CONNECTED  33915  @/tmp/dbus-x4e6fARF5
u
unix    3      [ ]        STREAM     CONNECTED  31741
u
unix    3      [ ]        STREAM     CONNECTED  29715
u Show Applications
/stdout
```

netstat -n INTERVAL

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

WINDOWS

```
C:\vivin>netstat -n 3

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:9921         127.0.0.1:9922       ESTABLISHED
  TCP    127.0.0.1:9922         127.0.0.1:9921       ESTABLISHED
  TCP    127.0.0.1:9923         127.0.0.1:9924       ESTABLISHED
  TCP    127.0.0.1:9924         127.0.0.1:9923       ESTABLISHED
  TCP    127.0.0.1:9925         127.0.0.1:9926       ESTABLISHED
  TCP    127.0.0.1:9926         127.0.0.1:9925       ESTABLISHED
  TCP    127.0.0.1:9927         127.0.0.1:9928       ESTABLISHED
  TCP    127.0.0.1:9928         127.0.0.1:9927       ESTABLISHED
  TCP    192.168.1.3:1587       52.218.197.169:443  CLOSE_WAIT
  TCP    192.168.1.3:4045       20.197.71.89:443    ESTABLISHED
  TCP    192.168.1.3:4356       23.212.252.48:443   CLOSE_WAIT
  TCP    192.168.1.3:4357       23.212.252.48:443   CLOSE_WAIT
  TCP    192.168.1.3:4358       23.212.252.48:443   CLOSE_WAIT
  TCP    192.168.1.3:4359       23.212.252.48:443   CLOSE_WAIT
  TCP    192.168.1.3:4362       52.84.6.80:443      CLOSE_WAIT
  TCP    192.168.1.3:4363       52.84.12.201:80     CLOSE_WAIT
```

UBUNTU

```
vivin@vivin-VirtualBox:~$ netstat -n 3
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
  udp      0      0 10.0.2.15:68           10.0.2.2:67          ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State          I-Node Path
  unix    2      [ ]      DGRAM          26978   /run/user/1000/systemd/notify
  unix    3      [ ]      DGRAM          15432   /run/systemd/notify
  unix    2      [ ]      DGRAM          15446   /run/systemd/journal
  /syslog
  unix   15      [ ]      DGRAM          15456   /run/systemd/journal
  /dev-log
  unix    8      [ ]      DGRAM          15460   /run/systemd/journal
  /socket
  unix    3      [ ]      STREAM     CONNECTED    31877   /run/user/1000/bus
  unix    3      [ ]      STREAM     CONNECTED    29737   @/tmp/.X11-unix/X0
  unix    3      [ ]      STREAM     CONNECTED    31722
  unix    3      [ ]      STREAM     CONNECTED    30208
  unix    3      [ ]      STREAM     CONNECTED    21250
  unix    3      [ ]      STREAM     CONNECTED    33915   @/tmp/dbus-x4e6fARF5
  u
  unix    3      [ ]      STREAM     CONNECTED    31741
  unix    3      [ ]      STREAM     CONNECTED    29715
  unix    3      [ ]      STREAM     CONNECTED    31720   /run/systemd/journal
  /stdout
  unix    2      [ ]      DGRAM          30618
```

netstat -a

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

WINDOWS

```
C:\vivin>netstat -a

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135           LAPTOP-U2SEQKP4:0      LISTENING
  TCP    0.0.0.0:445           LAPTOP-U2SEQKP4:0      LISTENING
  TCP    0.0.0.0:1027          LAPTOP-U2SEQKP4:0      LISTENING
  TCP    0.0.0.0:5040          LAPTOP-U2SEQKP4:0      LISTENING
  TCP    0.0.0.0:5357          LAPTOP-U2SEQKP4:0      LISTENING
  TCP    0.0.0.0:6646          LAPTOP-U2SEQKP4:0      LISTENING
  TCP    0.0.0.0:49664         LAPTOP-U2SEQKP4:0      LISTENING
  TCP    0.0.0.0:49665         LAPTOP-U2SEQKP4:0      LISTENING
  TCP    0.0.0.0:49666         LAPTOP-U2SEQKP4:0      LISTENING
  TCP    0.0.0.0:49667         LAPTOP-U2SEQKP4:0      LISTENING
  TCP    0.0.0.0:49668         LAPTOP-U2SEQKP4:0      LISTENING
  TCP    127.0.0.1:9921        LAPTOP-U2SEQKP4:9922    ESTABLISHED
  TCP    127.0.0.1:9922        LAPTOP-U2SEQKP4:9921    ESTABLISHED
  TCP    127.0.0.1:9922        LAPTOP-U2SEQKP4:9921    ESTABLISHED
```

UBUNTU

```
vivin@vivin-VirtualBox:~$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp    0      0      localhost:mysql       0.0.0.0:*
tcp    0      0      localhost:domain     0.0.0.0:*
tcp    0      0      0.0.0.0:ssh          0.0.0.0:*
tcp    0      0      localhost:ipp        0.0.0.0:*
tcp6   0      0      [::]:http            [::]:*
tcp6   0      0      [::]:ssh             [::]:*
tcp6   0      0      ip6-localhost:ipp   [::]:*
udp    0      0      0.0.0.0:52272       0.0.0.0:*
udp    0      0      localhost:domain     0.0.0.0:*
udp    0      0      vivin-VirtualBox:bootpc _gateway:bootps    ESTABLISHED
udp    0      0      0.0.0.0:631          0.0.0.0:*
udp    0      0      0.0.0.0:mdns         0.0.0.0:*
udp6   0      0      [::]:40374          [::]:*
udp6   0      0      [::]:mdns          [::]:*
raw6   0      0      [::]:ipv6-icmp      [::]:*                7

Active UNIX domain sockets (servers and established)
Proto RefCnt Flags      Type      State      I-Node  Path
unix  2      [ ]        DGRAM     LISTENING  26978   /run/user/1000/systemd-notify
unix  2      [ ACC ]     STREAM    LISTENING  26981   /run/user/1000/systemd-private-*
unix  2      [ ACC ]     STREAM    LISTENING  26990   /run/user/1000/bus
unix  2      [ ACC ]     STREAM    LISTENING  26991   /run/user/1000/gnupg
```

netstat -r

The netstat -r to display routing table

WINDOWS

```
C:\vivin>netstat -r
=====
Interface List
16...f8 0d ac 7e 99 47 ....Realtek PCIe GbE Family Controller
20...0a 00 27 00 00 14 ....VirtualBox Host-Only Ethernet Adapter
17...1a 47 3d 8b cd bf ....Microsoft Wi-Fi Direct Virtual Adapter
8...9a 47 3d 8b cd bf ....Microsoft Wi-Fi Direct Virtual Adapter
18...18 47 3d 8b cd bf ....Realtek RTL8821CE 802.11ac PCIe Adapter
11...18 47 3d 8b cd c6 ....Bluetooth Device (Personal Area Network)
1.....Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask     Gateway       Interface   Metric
          0.0.0.0        0.0.0.0   192.168.1.1    192.168.1.3      55
        127.0.0.0        255.0.0.0   On-link        127.0.0.1      331
        127.0.0.1        255.255.255.255  On-link        127.0.0.1      331
  127.255.255.255        255.255.255.255  On-link        127.0.0.1      331
        192.168.1.0        255.255.255.0  On-link      192.168.1.3      311
        192.168.1.3        255.255.255.255  On-link      192.168.1.3      311
  192.168.1.255        255.255.255.255  On-link      192.168.1.3      311
        192.168.56.0        255.255.255.0  On-link      192.168.56.1      281
  192.168.56.1        255.255.255.255  On-link      192.168.56.1      281
  192.168.56.255        255.255.255.255  On-link      192.168.56.1      281
        224.0.0.0        240.0.0.0   On-link        127.0.0.1      331
        224.0.0.0        240.0.0.0   On-link      192.168.56.1      281
        224.0.0.0        240.0.0.0   On-link      192.168.1.3      311
  255.255.255.255        255.255.255.255  On-link        127.0.0.1      331
  255.255.255.255        255.255.255.255  On-link      192.168.56.1      281
  255.255.255.255        255.255.255.255  On-link      192.168.1.3      311
=====
Persistent Routes:
Network Address      Netmask   Gateway Address Metric
          0.0.0.0        0.0.0.0   192.168.6.100 Default
=====

IPv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
18    311 ::/0                  fe80::1
1     331 ::1/128               On-link
20    281 fe80::/64              On-link
18    311 fe80::/64              On-link
18    311 fe80::55bc:1aea:ebb0:f88d/128
20    281 fe80::d9dd:6d29:fd05:769f/128
1     331 ff00::/8              On-link
20    281 ff00::/8              On-link
18    311 ff00::/8              On-link
=====
Persistent Routes:
None
C:\vivin>
```

UBUNTU

```
vivin@vivin-VirtualBox:~$ netstat -r
Kernel IP routing table
Destination      Gateway          Genmask         Flags  MSS Window irtt Iface
default        _gateway        0.0.0.0        UG            0 0          0 enp0s3
10.0.2.0        0.0.0.0        255.255.255.0  U            0 0          0 enp0s3
link-local      0.0.0.0        255.255.0.0    U            0 0          0 enp0s3
vivin@vivin-VirtualBox:~$
```

netstat -e

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

WINDOWS

```
C:\vivin>netstat -e
Interface Statistics

                                Received          Sent
Bytes                      2204777267    424569838
Unicast packets             3669512     1977710
Non-unicast packets          19810      28966
Discards                     0           0
Errors                       0           0
Unknown protocols            0           0
C:\vivin>
```

UBUNTU

```
vivin@vivin-VirtualBox:~$ netstat -e
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
User      Inode
udp        0      0 vivin-VirtualBox:bootpc _gateway:bootps          ESTABLISHED
root     26543
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State          I-Node Path
unix    2          [ ]      DGRAM    UNCONN       26978  /run/user/1000/systemd
md/notify
unix    3          [ ]      DGRAM    UNCONN       15432  /run/systemd/notify
unix    2          [ ]      DGRAM    UNCONN       15446  /run/systemd/journal
/syslog
unix   15          [ ]      DGRAM    UNCONN       15456  /run/systemd/journal
/dev-log
unix    8          [ ]      DGRAM    UNCONN       15460  /run/systemd/journal
/socket
unix    3          [ ]      STREAM   CONNECTED   31877  /run/user/1000/bus
unix    3          [ ]      STREAM   CONNECTED   29737  @/tmp/.X11-unix/X0
unix    3          [ ]      STREAM   CONNECTED   31722
unix    3          [ ]      STREAM   CONNECTED   36208
unix    3          [ ]      STREAM   CONNECTED   21250
unix    3          [ ]      STREAM   CONNECTED   33915  @/tmp/dbus-x4e6fARF5
u
unix    3          [ ]      STREAM   CONNECTED   31741
unix    3          [ ]      STREAM   CONNECTED   29715
unix    3          [ ]      STREAM   CONNECTED   31720  /run/systemd/journal
/stdout
unix    2          [ ]      DGRAM    UNCONN       30618
```

3. Ipconfig(WINDOWS)

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

```
C:\vivin>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

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

Ethernet adapter VirtualBox Host-Only Network:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::d9dd:6d29:fd05:769f%20
  IPv4 Address. . . . . : 192.168.56.1
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . :

Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Local Area Connection* 2:

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

PARAMETERS:

ipconfig /flushdns:

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

```
C:\vivin>ipconfig /flushdns  
Windows IP Configuration  
Successfully flushed the DNS Resolver Cache.  
C:\vivin>
```

ipconfig /registerdns:

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

```
C:\vivin>ipconfig /registerdns  
The requested operation requires elevation.  
C:\vivin>
```

ipconfig /displaydns:

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

```
C:\vivin>ipconfig /displaydns

Windows IP Configuration

sec-tws-prod-vip.webex.com
-----
Record Name . . . . . : sec-tws-prod-vip.webex.com
Record Type . . . . . : 1
Time To Live . . . . . : 45283
Data Length . . . . . : 4
Section . . . . . . . : Answer
A (Host) Record . . . . : 66.163.35.36

Record Name . . . . . : ns1.as13445.net
Record Type . . . . . : 1
Time To Live . . . . . : 45283
Data Length . . . . . : 4
Section . . . . . . . : Additional
A (Host) Record . . . . : 66.163.52.1

Record Name . . . . . : ns2.as13445.net
Record Type . . . . . : 1
Time To Live . . . . . : 45283
Data Length . . . . . : 4
Section . . . . . . . : Additional
A (Host) Record . . . . : 66.163.53.1

226.195.250.142.in-addr.arpa
-----
Record Name . . . . . : 226.195.250.142.in-addr.arpa
Record Type . . . . . : 12
Time To Live . . . . . : 44455
Data Length . . . . . : 8
Section . . . . . . . : Answer
PTR Record . . . . . : maa03s43-in-f2.1e100.net

Record Name . . . . . : ns2.google.com
Record Type . . . . . : 1
Time To Live . . . . . : 44455
Data Length . . . . . : 4
Section . . . . . . . : Additional
A (Host) Record . . . . : 216.239.34.10

Record Name . . . . . : ns2.google.com
Record Type . . . . . : 28
```

ipconfig /all:

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

```
C:\vivin>ipconfig /all

Windows IP Configuration

  Host Name . . . . . : LAPTOP-U2SEQKP4
  Primary Dns Suffix . . . . . :
  Node Type . . . . . : Hybrid
  IP Routing Enabled. . . . . : No
  WINS Proxy Enabled. . . . . : No

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . . . . . :
    Description . . . . . : Realtek PCIe GbE Family Controller
    Physical Address. . . . . : F8-0D-AC-7E-99-47
    DHCP Enabled. . . . . : No
    Autoconfiguration Enabled . . . . . : Yes

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix . . . . . :
    Description . . . . . : VirtualBox Host-Only Ethernet Adapter
    Physical Address. . . . . : 0A-00-27-00-00-14
    DHCP Enabled. . . . . : No
    Autoconfiguration Enabled . . . . . : Yes
    Link-local IPv6 Address . . . . . : fe80::d9dd:6d29:fd05:769f%20(Preferred)
    IPv4 Address. . . . . : 192.168.56.1(Preferred)
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :
    DHCPv6 IAID . . . . . : 134873127
    DHCPv6 Client DUID. . . . . : 00-01-00-01-27-38-85-CC-F8-0D-AC-7E-99-47
    DNS Servers . . . . . : fec0:0:0:ffff::1%1
                           fec0:0:0:ffff::2%1
                           fec0:0:0:ffff::3%1
    NetBIOS over Tcpip. . . . . : Enabled

Wireless LAN adapter Local Area Connection* 1:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . . . . . :
    Description . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
    Data Length . . . . . : 8
```

3.1 Ifconfig(UBUNTU)

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

```
vivin@vivin-VirtualBox:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
        inet6 fe80::9eff:cca8:cb07:9c54 prefixlen 64 scopeid 0x20<link>
          ether 08:00:27:ce:5f:d4 txqueuelen 1000 (Ethernet)
            RX packets 495 bytes 85124 (85.1 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 583 bytes 58517 (58.5 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
        inet6 ::1 prefixlen 128 scopeid 0x10<host>
          loop txqueuelen 1000 (Local Loopback)
            RX packets 265 bytes 22609 (22.6 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 265 bytes 22609 (22.6 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

vivin@vivin-VirtualBox:~$
```

PARAMETERS:

ifconfig -a:

This option is used to display all the interfaces available, even if they are down

```
vivin@vivin-VirtualBox:~$ ifconfig -a
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
        inet6 fe80::9eff:cca8:cb07:9c54 prefixlen 64 scopeid 0x20<link>
          ether 08:00:27:ce:5f:d4 txqueuelen 1000 (Ethernet)
            RX packets 515 bytes 86874 (86.8 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 652 bytes 64046 (64.0 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
        inet6 ::1 prefixlen 128 scopeid 0x10<host>
          loop txqueuelen 1000 (Local Loopback)
            RX packets 285 bytes 24393 (24.3 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 285 bytes 24393 (24.3 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

vivin@vivin-VirtualBox:~$
```

ifconfig -s:

This option is used to display a short list, instead of details

Iface	MTU	RX-OK	RX-ERR	RX-DRP	RX-OVR	TX-OK	TX-ERR	TX-DRP	TX-OVR	Flg
enp0s3	1500	521	0	0	0	658	0	0	0	BMRU
lo	65536	285	0	0	0	285	0	0	0	LRU

ifconfig -v:

To run the command in verbose mode -log more details about execution

```
vivin@vivin-VirtualBox:~$ ifconfig -v
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
        inet6 fe80::9eff:cca8:cb07:9c54 prefixlen 64 scopeid 0x20<link>
          ether 08:00:27:ce:5f:d4 txqueuelen 1000 (Ethernet)
            RX packets 524 bytes 87785 (87.7 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 661 bytes 64801 (64.8 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
        inet6 ::1 prefixlen 128 scopeid 0x10<host>
          loop txqueuelen 1000 (Local Loopback)
            RX packets 287 bytes 24565 (24.5 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 287 bytes 24565 (24.5 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

vivin@vivin-VirtualBox:~$
```

ifconfig lo:

To view the configuration of an interface

```
vivin@vivin-VirtualBox:~$ ifconfig lo
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 297 bytes 25313 (25.3 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 297 bytes 25313 (25.3 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

vivin@vivin-VirtualBox:~$
```

Other Networking Commands (WINDOWS)

1. Hostname Command

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

```
C:\vivin>hostname
LAPTOP-U2SEQKP4

C:\vivin>
```

2. getmac Command

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

```
C:\vivin>getmac
Physical Address      Transport Name
=====
F8-0D-AC-7E-99-47    Media disconnected
18-47-3D-8B-CD-BF   \Device\Tcpip_{CD0EDC26-52E2-4932-A709-C7A49C870736}
18-47-3D-8B-CD-C0   Media disconnected
0A-00-27-00-00-14   \Device\Tcpip_{FB7C38EF-5099-4AB8-8D51-DBE21F92AA63}

C:\vivin>
```

3.arp Command

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

```
C:\vivin>arp -a
Interface: 192.168.1.4 --- 0x12
  Internet Address      Physical Address      Type
  192.168.1.1            bc-62-d2-17-87-d0  dynamic
  192.168.1.6            58-00-e3-a0-b5-4d  dynamic
  192.168.1.255          ff-ff-ff-ff-ff-ff  static
  224.0.0.2              01-00-5e-00-00-02  static
  224.0.0.22             01-00-5e-00-00-16  static
  224.0.0.251            01-00-5e-00-00-fb  static
  224.0.0.252            01-00-5e-00-00-fc  static
  239.255.102.18         01-00-5e-7f-66-12  static
  239.255.255.250         01-00-5e-7f-ff-fa  static

Interface: 192.168.56.1 --- 0x14
  Internet Address      Physical Address      Type
  224.0.0.2              01-00-5e-00-00-02  static
  224.0.0.22             01-00-5e-00-00-16  static
  224.0.0.251            01-00-5e-00-00-fb  static
  224.0.0.252            01-00-5e-00-00-fc  static
  239.255.102.18         01-00-5e-7f-66-12  static
  239.255.255.250         01-00-5e-7f-ff-fa  static

C:\vivin>
```

4. Nbtstat

Diagnostic tool for troubleshooting netBIOS problems.

```
C:\vivin>nbtstat
Displays protocol statistics and current TCP/IP connections using NBT
(NetBIOS over TCP/IP).

NBTSTAT [ [-a RemoteName] [-A IP address] [-c] [-n]
          [-r] [-R] [-RR] [-s] [-S] [interval] ]

-a (adapter status) Lists the remote machine's name table given its name
-A (Adapter status) Lists the remote machine's name table given its
IP address.
-c (cache)           Lists NBT's cache of remote [machine] names and their IP addresses
-n (names)           Lists local NetBIOS names.
-r (resolved)        Lists names resolved by broadcast and via WINS
-R (Reload)          Purges and reloads the remote cache name table
-S (Sessions)        Lists sessions table with the destination IP addresses
-s (sessions)        Lists sessions table converting destination IP
                     addresses to computer NETBIOS names.
-RR (ReleaseRefresh) Sends Name Release packets to WINS and then, starts Refresh

RemoteName   Remote host machine name.
IP address    Dotted decimal representation of the IP address.
interval     Redisplays selected statistics, pausing interval seconds
             between each display. Press Ctrl+C to stop redisplaying
             statistics.

C:\vivin>
```

5. Net Command

Used for managing users,service,shares etc..

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

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

Other Networking Commands(UBUNTU)

1. Hostname Command

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

```
getrlang: command not found
vivin@vivin-VirtualBox:~$ hostname
vivin-VirtualBox
vivin@vivin-VirtualBox:~$
```

2. ip route list

This command will display all the IP addresses with their device names that are currently available.

```
vivin@vivin-VirtualBox:~$ ip route list
default via 10.0.2.2 dev enp0s3 proto dhcp metric 100
10.0.2.0/24 dev enp0s3 proto kernel scope link src 10.0.2.15 metric 100
169.254.0.0/16 dev enp0s3 scope link metric 1000
vivin@vivin-VirtualBox:~$
```

3. arp

This command manipulates the system's ARP cache. ARP stands for Address Resolution Protocol

```
vivin@vivin-VirtualBox:~$ arp
Address          HWtype  HWaddress          Flags Mask      Ifac
e_gw_gateway     ether    52:54:00:12:35:02  C          enp0
s3
vivin@vivin-VirtualBox:~$
```

4. sed command

The sed command is also known as **stream editor**. It is used to edit files using a regular expression. It does not permanently edit files; instead, the edited content remains only on display. It does not affect the actual file.

```
vivin@vivin-VirtualBox:~$ sed
Usage: sed [OPTION]... {script-only-if-no-other-script} [input-file]...

-n, --quiet, --silent
                     suppress automatic printing of pattern space
--debug
                     annotate program execution
-e script, --expression=script
                     add the script to the commands to be executed
-f script-file, --file=script-file
                     add the contents of script-file to the commands to be executed
--follow-symlinks
                     follow symlinks when processing in place
-i[SUFFIX], --in-place[=SUFFIX]
                     edit files in place (makes backup if SUFFIX supplied)
-l N, --line-length=N
                     specify the desired line-wrap length for the 'l' command
--posix
                     disable all GNU extensions.
-E, -r, --regexp-extended
                     use extended regular expressions in the script
                     (for portability use POSIX -E).
-s, --separate
                     consider files as separate rather than as a single,
                     continuous long stream.
--sandbox
                     operate in sandbox mode (disable e/r/w commands).
-u, --unbuffered
```

4. time command

The time command is used to display the time to execute a command.

```
vivin@vivin-VirtualBox:~$ time

real    0m0.000s
user    0m0.000s
sys     0m0.000s
vivin@vivin-VirtualBox:~$
```

Experiment No:7

Installing LAMP Stack on Ubuntu

Apache Installation

Step 1: Update Package Repository

Cache sudo apt-get update

Step 2: Install Apache

sudo apt-get install

apache2

Check If apache is installed
correctly **sudo service
apache2 status**

Check if everything run correctly

By verifying, **Active:ctive (running)**

```
vivin@vivin:~$ sudo apt-get update
[sudo] password for vivin:
Hit:1 http://in.archive.ubuntu.com/ubuntu bionic InRelease
Get:2 http://in.archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:3 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [2,262 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu bionic-updates/main i386 Packages [1,360 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu bionic-updates/main Translation-en [438 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 DEP-11 Metadata [292 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu bionic-updates/restricted amd64 Packages [492 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu bionic-updates/restricted Translation-en [66.7 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe i386 Packages [1,576 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [1,750 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe Translation-en [375 kB]
Get:14 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 DEP-11 Metadata [294 kB]
Get:15 http://in.archive.ubuntu.com/ubuntu bionic-updates/multiverse amd64 DEP-11 Metadata [2,468 B]
Get:16 http://in.archive.ubuntu.com/ubuntu bionic-backports/universe amd64 DEP-11 Metadata [9,268 B]
Fetched 9,170 kB in 11s (831 kB/s)
Reading package lists... Done
vivin@vivin:~$ sudo apt-get install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
apache2 is already the newest version (2.4.29-1ubuntu4.18).
0 upgraded, 0 newly installed, 0 to remove and 3 not upgraded.
vivin@vivin:~$ sudo service apache2 status
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset:
   Drop-In: /lib/systemd/system/apache2.service.d
             └─apache2-systemd.conf
     Active: active (running) since Wed 2021-09-29 00:41:22 IST; 2min 35s ago
       Process: 845 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
      Main PID: 936 (apache2)
        Tasks: 55 (limit: 4663)
       CGroup: /system.slice/apache2.service
               ├─936 /usr/sbin/apache2 -k start
               ├─937 /usr/sbin/apache2 -k start
               ├─938 /usr/sbin/apache2 -k start
               ├─939 /usr/sbin/apache2 -k start
               └─940 /usr/sbin/apache2 -k start

Sep 29 00:41:22 vivin systemd[1]: Starting The Apache HTTP Server...
Sep 29 00:41:22 vivin apachectl[845]: AH00558: apache2: Could not reliably deter
Sep 29 00:41:22 vivin systemd[1]: Started The Apache HTTP Server.
```

Make sure UFW firewall has an application profile **sudo ufw app list**

Make sure it allows traffic on ports 80 and 443 **sudo ufw app info "Apache Full"**

Identify the Ip address
Ifconfig

```
Sep 29 00:41:22 vivin systemd[1]: Starting The Apache HTTP Server...
Sep 29 00:41:22 vivin apachectl[845]: AH00558: apache2: Could not reliably deter
Sep 29 00:41:22 vivin systemd[1]: Started The Apache HTTP Server.

vivin@vivin:~$ sudo ufw app list
Available applications:
  Apache
  Apache Full
  Apache Secure
  CUPS
vivin@vivin:~$ sudo ufw app info "Apache Full"
Profile: Apache Full
Title: Web Server (HTTP,HTTPS)
Description: Apache v2 is the next generation of the omnipresent Apache web
server.

Ports:
  80,443/tcp
vivin@vivin:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
      inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
          inet6 fe80::34f5:79af:ce05:ed83  prefixlen 64  scopeid 0x20<link>
            ether 08:00:27:e6:f9:04  txqueuelen 1000  (Ethernet)
              RX packets 7997  bytes 11346516 (11.3 MB)
              RX errors 0  dropped 0  overruns 0  frame 0
              TX packets 1895  bytes 199765 (199.7 KB)
              TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
      inet 127.0.0.1  netmask 255.0.0.0
          inet6 ::1  prefixlen 128  scopeid 0x10<host>
            loop  txqueuelen 1000  (Local Loopback)
              RX packets 450  bytes 54038 (54.0 KB)
              RX errors 0  dropped 0  overruns 0  frame 0
              TX packets 450  bytes 54038 (54.0 KB)
              TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0
```

Step 3: Verify Apache is running by enter ip address at browser

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

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

Configuration Overview

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

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

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

- apache2.conf is the main configuration file. It puts the pieces together by including all remaining configuration files when starting up the web server.
- ports.conf is always included from the main configuration file. It is used to determine the listening ports for incoming connections, and this file can be customized anytime.
- Configuration files in the mods-enabled/. conf-enabled/ and sites-enabled/ directories contain

Mariadb- Installation

Step1: Install mariadb

sudo apt install mariadb-server mariadb-Client

```
vivin@vivin:~$ sudo apt install mariadb-server mariadb-client
Reading package lists... Done
Building dependency tree
Reading state information... Done
mariadb-client is already the newest version (1:10.1.48-0ubuntu0.18.04.1).
mariadb-server is already the newest version (1:10.1.48-0ubuntu0.18.04.1).
```

```
vivin@vivin:~$ sudo apt install mariadb-server mariadb-client
Reading package lists... Done
Building dependency tree
Reading state information... Done
mariadb-client is already the newest version (1:10.1.48-0ubuntu0.18.04.1).
mariadb-server is already the newest version (1:10.1.48-0ubuntu0.18.04.1).
```

Step2: Check mariadb
installation **sudo**
systemctl status mysql
 Step3: Secure mariadb
sudo

mysql_secure_installation

```
mariadb-client is already the newest version (1:10.1.48-0ubuntu0.18.04.1).
mariadb-server is already the newest version (1:10.1.48-0ubuntu0.18.04.1).
0 upgraded, 0 newly installed, 0 to remove and 3 not upgraded.
vivin@vivin:~$ sudo systemctl status mysql
● mariadb.service - MariaDB 10.1.48 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor preset:
     Active: active (running) since Wed 2021-09-29 00:41:23 IST; 5min ago
       Docs: man:mysqld(8)
              https://mariadb.com/kb/en/library/systemd/
   Process: 1156 ExecStartPost=/bin/sh -c systemctl unset-environment _WSREP_STAR
   Process: 1153 ExecStartPost=/etc/mysql/debian-start (code=exited, status=0/SUC
   Process: 871 ExecStartPre=/bin/sh -c [ ! -e /usr/bin/galera_recovery ] && VAR=
   Process: 855 ExecStartPre=/bin/sh -c systemctl unset-environment _WSREP_START_
   Process: 846 ExecStartPre=/usr/bin/install -m 755 -o mysql -g root -d /var/run
 Main PID: 1055 (mysqld)
   Status: "Taking your SQL requests now..."
      Tasks: 27 (limit: 4663)
     CGroup: /system.slice/mariadb.service
             └─1055 /usr/sbin/mysqld

Sep 29 00:41:22 vivin systemd[1]: Starting MariaDB 10.1.48 database server...
Sep 29 00:41:22 vivin mysqld[1055]: 2021-09-29  0:41:22 140226726513792 [Note] /
Sep 29 00:41:23 vivin /etc/mysql/debian-start[1155]: Upgrading MySQL tables if n
Sep 29 00:41:23 vivin systemd[1]: Started MariaDB 10.1.48 database server.
Sep 29 00:41:23 vivin /etc/mysql/debian-start[1159]: /usr/bin/mysql_upgrade: the
Sep 29 00:41:23 vivin /etc/mysql/debian-start[1159]: Looking for 'mysql' as: /us
Sep 29 00:41:23 vivin /etc/mysql/debian-start[1159]: Looking for 'mysqlcheck' as

vivin@vivin:~$ sudo mysql_secure_installation

NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MariaDB
      SERVERS IN PRODUCTION USE! PLEASE READ EACH STEP CAREFULLY!

In order to log into MariaDB to secure it, we'll need the current
password for the root user. If you've just installed MariaDB, and
you haven't set the root password yet, the password will be blank,
so you should just press enter here.

Enter current password for root (enter for none):
OK, successfully used password, moving on...

Setting the root password ensures that nobody can log into the MariaDB
```

```

ensures that someone cannot guess at the root password from the network.

Disallow root login remotely? [Y/n] n
... skipping.

By default, MariaDB comes with a database named 'test' that anyone can
access. This is also intended only for testing, and should be removed
before moving into a production environment.

Remove test database and access to it? [Y/n] n
... skipping.

Reloading the privilege tables will ensure that all changes made so far
will take effect immediately.

Reload privilege tables now? [Y/n] n
... skipping.

Cleaning up...

All done! If you've completed all of the above steps, your MariaDB
installation should now be secure.

Thanks for using MariaDB!
vivin@vivin:~$ sudo apt install php libapache2-mod-php php-opcache php-cli php-gd php-curl php-mysql
Reading package lists... Done
Building dependency tree
Reading state information... Done
Note, selecting 'php7.2-opcache' instead of 'php-opcache'
libapache2-mod-php is already the newest version (1:7.2+60ubuntu1).
php is already the newest version (1:7.2+60ubuntu1).
php-cli is already the newest version (1:7.2+60ubuntu1).
php-curl is already the newest version (1:7.2+60ubuntu1).
php-gd is already the newest version (1:7.2+60ubuntu1).
php-mysql is already the newest version (1:7.2+60ubuntu1).
php7.2-opcache is already the newest version (7.2.24-0ubuntu0.18.04.9).
0 upgraded, 0 newly installed, 0 to remove and 3 not upgraded.
vivin@vivin:~$ sudo systemctl restart apache2
vivin@vivin:~$ sudo echo "<?php phpinfo(); ?>" | sudo tee -a /var/www/html/phpinfo.php > /dev/null
vivin@vivin:~$ sudo mysql_secure_installation

NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MariaDB
      SERVERS IN PRODUCTION USE! PLEASE READ EACH STEP CAREFULLY!

```

PHP and commonly used modules Installation

Step1: Install PHP **sudo apt install php libapache2-mod-php php-opcache phpcli php-gd php-curl php-mysql**

Step 2: Restart apache2

sudo systemctl restart

apache2 Step 3: Check PHP

installation

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

Step4: Verify the php in browser

http://127.0.0.1/phpinfo.php

PHP Version 7.2.24-Oubuntu0.18.04.9

System	Linux vivin-VirtualBox 5.4.0-84-generic #94~18.04.1-Ubuntu SMP x86_64
Build Date	Aug 16 2021 05:46:32
Server API	Apache 2.0 Handler
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc/php/7.2/apache2
Loaded Configuration File	/etc/php/7.2/apache2/php.ini
Scan this dir for additional .ini files	/etc/php/7.2/apache2/conf.d
Additional .ini files parsed	/etc/php/7.2/apache2/conf.d/10-mysqlind.ini, /etc/php/7.2/apache2/7.2/apache2/conf.d/10-pdo.ini, /etc/php/7.2/apache2/conf.d/20-ca/conf.d/20-ctype.ini, /etc/php/7.2/apache2/conf.d/20-curl.ini, /etc/p/etc/php/7.2/apache2/conf.d/20-fileinfo.ini, /etc/php/7.2/apache2/c/7.2/apache2/conf.d/20-gd.ini, /etc/php/7.2/apache2/conf.d/20-get/conf.d/20-iconv.ini, /etc/php/7.2/apache2/conf.d/20-json.ini, /etc/pmysqli.ini, /etc/php/7.2/apache2/conf.d/20-pdo_mysql.ini, /etc/php/7.2/apache2/conf.d/20-posix.ini, /etc/php/7.2/apache2/conf.d/20-shmop.ini, /etc/php/7.2/apache2/conf.d/20-sysvmsg.ini, /etc/php/7.2/apache2/conf.d/20-sysvsem.ini, /etc/php/7.2/apache2/conf.d/20-tokenizer.ini

phpmydmin Installation

Step 1: Install phpmyadmin **sudo apt install
phpmyadmin php-mbstring php-zip php-gd php-
json php-curl**

```
vivin@vivin-VirtualBox:~$ sudo apt install phpmyadmin php-mbstring php-zip php-gd php-json php-curl
[sudo] password for vivin:
Reading package lists... Done
Building dependency tree
Reading state information... Done
php-curl is already the newest version (1:7.2+60ubuntu1).
php-gd is already the newest version (1:7.2+60ubuntu1).
The following additional packages will be installed:
  dbconfig-common dbconfig-mysql javascript-common libjs-jquery
  libjs-sphinxdoc libjs-underscore libzip4 php-bz2 php-pear php-php-gettext
  php-phpseclib php-tcpdf php-xml php7.2-bz2 php7.2-mbstring php7.2-xml
  php7.2-zip
Suggested packages:
  php-libsodium php-mcrypt php-gmp php-imagick
The following NEW packages will be installed:
  dbconfig-common dbconfig-mysql javascript-common libjs-jquery
  libjs-sphinxdoc libjs-underscore libzip4 php-bz2 php-json php-mbstring
  php-pear php-php-gettext php-phpseclib php-tcpdf php-xml php-zip php7.2-bz2
  php7.2-mbstring php7.2-xml php7.2-zip phpmyadmin
0 upgraded, 21 newly installed, 0 to remove and 14 not upgraded.
Need to get 13.7 MB of archives.
After this operation, 53.7 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 dbconfig-common all 2.0.9 [601 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 dbconfig-mysql all 2.0.9 [1,038 B]
Get:3 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 javascript-common a
```

(While asks for webserver select apache2, select db-configuration and set password) Step 2: Restart apache2 **sudo systemctl restart apache2**

If phpmyadmin is not found error while run on browser

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

Then add

Include /etc/phpmyadmin/apache.conf

On end/15 th line

Restart apache:

sudo systemctl restart apache2

Install phpdmin again

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

Step3: Check phpmyadmin

Open a browser

http://localhost/phpmyadmi

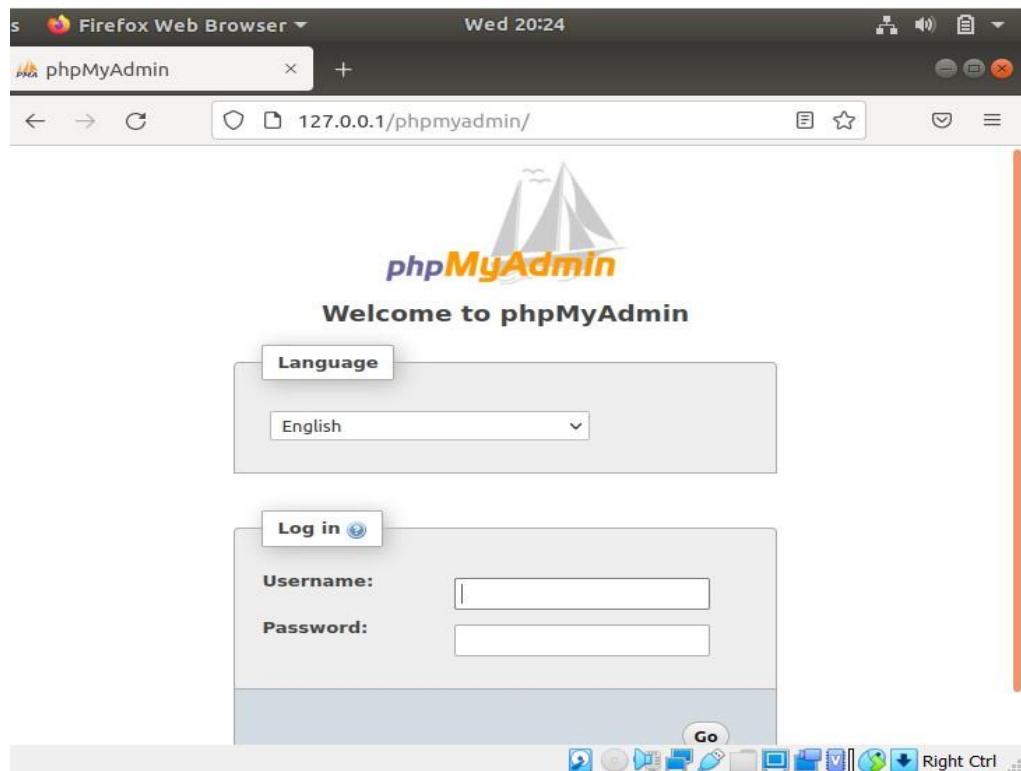
n if phpmyadmin till no

code at then

```
vivin@vivin-VirtualBox:~$ sudo mysql -p -u root  
[sudo] password for vivin:  
Enter password:  
Welcome to the MariaDB monitor. Commands end with ; or \g.  
Your MariaDB connection id is 45  
Server version: 10.1.48-MariaDB-0ubuntu0.18.04.1 Ubuntu 18.04  
  
Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.  
  
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.  
  
MariaDB [(none)]> CREATE USER 'admin'@'%' IDENTIFIED BY '1234';  
Query OK, 0 rows affected (0.00 sec)  
  
MariaDB [(none)]> GRANT ALL PRIVILEGES ON *.* TO 'admin'@'%' WITH GRANT OPTION;  
Query OK, 0 rows affected (0.00 sec)  
  
MariaDB [(none)]> exit  
Bye  
vivin@vivin-VirtualBox:~$ █
```

Step4: repeat step 2 and 3

Login-apache



The screenshot shows the phpMyAdmin configuration interface in a Firefox browser window. The title bar reads "Wed 22:43". The address bar shows "127.0.0.1 / localhost | phpMyAdmin 4.6.6deb5ubuntu0.5". The main content area includes a sidebar with "Recent" and "Favorites" tabs, and a tree view showing databases: "New", "information_schema", "mysql", "performance_schema", and "phpmyadmin". The main panel has tabs for "Databases", "SQL", "Status", and "More". The "General settings" section contains "Change password" and "Server connection collation" set to "utf8mb4_unicode_ci". The "Appearance settings" section includes "Language" (set to "English"), "Theme" (set to "pmahomme"), and "Font size" (set to "82%"). To the right, a "Database server" panel lists the server details: "Server: Localhost via UNIX socket", "Server type: MariaDB", "Server version: 10.1.48-MariaDB-Ubuntu0.18.04.1 - Ubuntu 18.04", "Protocol version: 10", "User: admin@localhost", "Server charset: UTF-8 Unicode (utf8)". A "Web server" panel is also visible at the bottom.

Experiment No:8

Ansible Installation

Step 1: Ansible

Installation sudo apt-get

install ansible

```
vivin@vivin:~$ sudo apt-get install ansible
[sudo] password for vivin:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  ieee-data libpython-stdlib python python-asn1crypto python-certifi
  python-cffi-backend python-chardet python-crypto python-cryptography
  python-enum34 python-httplib2 python-idna python-ipaddress python-jinja2
  python-jmespath python-kerberos python-libcloud python-lockfile
  python-markupsafe python-minimal python-netaddr python-openssl
  python-paramiko python-pkg-resources python-pyasn1 python-requests
  python-selinux python-simplejson python-six python-urllib3 python-xmltodict
  python-yaml python2.7 python2.7-minimal
Suggested packages:
  cowsay sshpass python-doc python-tk python-crypto-doc
  python-cryptography-doc python-cryptography-vectors python-enum34-doc
  python-jinja2-doc python-lockfile-doc ipython python-netaddr-docs
  python-openssl-doc python-openssl-dbg python-gssapi python-setuptools
  python-socks python-ntlm python2.7-doc binfmt-support
Recommended packages:
  python-winrm
The following NEW packages will be installed:
  ansible ieee-data libpython-stdlib python python-asn1crypto python-certifi
  python-cffi-backend python-chardet python-crypto python-cryptography
  python-enum34 python-httplib2 python-idna python-ipaddress python-jinja2
  python-jmespath python-kerberos python-libcloud python-lockfile
  python-markupsafe python-minimal python-netaddr python-openssl
  python-paramiko python-pkg-resources python-pyasn1 python-requests
  python-selinux python-simplejson python-six python-urllib3 python-xmltodict
  python-yaml python2.7 python2.7-minimal
0 upgraded, 35 newly installed, 0 to remove and 0 not upgraded.
Need to get 9,874 kB of archives.
After this operation, 67.9 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 python2.7-minimal amd64 2.7.17-1~18.04ubuntu1.6 [1,291 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 python-minimal amd64 2.7.15-rc1-1 [28.1 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 python2.7 amd64 2.7.17-1~18.04ubuntu1.6 [248 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libpython-stdlib amd64 2.7.15-rc1-1 [7,620 B]
Get:5 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 python amd64 2.7.15-rc1-1 [140 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 python-asn1crypto all 0.24.0-1 [72.7 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 python-cffi-backend amd64 1.11.5-1 [63.4 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 python-enum34 all 1.1.6-2 [34.8 kB]
```

Step 2: Check version of ansible and pythonansible --version

```
vivin@vivin:~$ ansible --version
ansible 2.5.1
  config file = /etc/ansible/ansible.cfg
  configured module search path = [u'/home/vivin/.ansible/plugins/modules', u'/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python2.7/dist-packages/ansible
  executable location = /usr/bin/ansible
  python version = 2.7.17 (default, Feb 27 2021, 15:10:58) [GCC 7.5.0]
vivin@vivin:~$
```

Experiment No:9

Analysing network packet stream using tcpdump

Tcpdump Installation

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

sudo apt update

```
vivin@vivin:~$ sudo apt update
Hit:1 http://in.archive.ubuntu.com/ubuntu bionic InRelease
Get:2 http://in.archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:3 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu bionic-updates/main i386 Packages [1,360 kB]
Get:6 http://security.ubuntu.com/ubuntu bionic-security/main amd64 DEP-11 Metadata [50.3 kB]
Get:7 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [1,140 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [2,249 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 DEP-11 Metadata [292 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe i386 Packages [1,580 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [1,755 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe Translation-en [376 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 DEP-11 Metadata [299 kB]
Get:14 http://security.ubuntu.com/ubuntu bionic-security/universe i386 Packages [988 kB]
Get:15 http://in.archive.ubuntu.com/ubuntu bionic-updates/multiverse amd64 DEP-11 Metadata [2,464 kB]
Get:16 http://in.archive.ubuntu.com/ubuntu bionic-backports/universe amd64 DEP-11 Metadata [9,272 kB]
Get:17 http://security.ubuntu.com/ubuntu bionic-security/universe Translation-en [260 kB]
Get:18 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 DEP-11 Metadata [57.9 kB]
Get:19 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 DEP-11 Metadata [2,468 kB]
Fetched 10.7 MB in 39s (276 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
All packages are up to date.
vivin@vivin:~$
```

sudo apt install tcpdump

```
vivin@vivin:~$ sudo apt install tcpdump
Reading package lists... Done
Building dependency tree
Reading state information... Done
tcpdump is already the newest version (4.9.3-0ubuntu0.18.04.1).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
```

Capturing Packets with tcpdump

- The general syntax for the tcpdump command is as follows:

tcpdump[options] [expression]

- The command options allow you to control the behavior of the command.
- The filter expression defines which packets will be captured.
- Only root or user with sudo privileges can run tcpdump. If you try to run the command as an unprivileged user, you'll get an error saying: "You don't have permission to capture on that device".
- The most simple use case is to invoke tcpdump without any options and filters:
 - **sudo tcpdump**
 - tcpdump will continue to capture packets and write to the standard output until it receives an interrupt signal. Use the Ctrl+C key combination to send an interrupt signal and stop the command.

```
vivin@vivin:~$ sudo tcpdump
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
10:26:36.486245 IP vivin.52158 > dns.google.domain: 33417+ [1au] AAAA? connectivity-check.ubuntu.co
10:26:36.504086 IP vivin.48683 > dns.google.domain: 22668+ [1au] PTR? 15.2.0.10.in-addr.arpa. (51)
10:26:36.508052 IP dns.google.domain > vivin.52158: 33417 0/1/1 (119)
10:26:36.549234 IP dns.google.domain > vivin.48683: 22668 NXDomain 0/0/1 (51)
10:26:36.549569 IP vivin.48683 > dns.google.domain: 22668+ PTR? 15.2.0.10.in-addr.arpa. (40)
10:26:36.568895 IP dns.google.domain > vivin.48683: 22668 NXDomain 0/0/0 (40)
10:26:37.489104 IP vivin.57084 > 84.170.224.35.bc.googleusercontent.com.http: Flags [S], seq 291644
671221 ecr 0,nop,wscale 7], length 0
10:26:37.491374 IP vivin.41634 > dns.google.domain: 52895+ [1au] PTR? 84.170.224.35.in-addr.arpa. (1
10:26:37.533112 IP dns.google.domain > vivin.41634: 52895 1/0/1 PTR 84.170.224.35.bc.googleusercontent
10:26:37.732880 IP 84.170.224.35.bc.googleusercontent.com.http > vivin.57084: Flags [S.], seq 15936
length 0
10:26:37.733262 IP vivin.57084 > 84.170.224.35.bc.googleusercontent.com.http: Flags [.., ack 1, win
10:26:37.735495 IP vivin.57084 > 84.170.224.35.bc.googleusercontent.com.http: Flags [P.], seq 1:88,
10:26:37.737753 IP 84.170.224.35.bc.googleusercontent.com.http > vivin.57084: Flags [.., ack 88, wi
10:26:37.980967 IP 84.170.224.35.bc.googleusercontent.com.http > vivin.57084: Flags [P.], seq 1:149
No Content
10:26:37.981024 IP 84.170.224.35.bc.googleusercontent.com.http > vivin.57084: Flags [F.], seq 149,
10:26:37.981039 IP vivin.57084 > 84.170.224.35.bc.googleusercontent.com.http: Flags [.., ack 149, wi
10:26:37.983083 IP vivin.57084 > 84.170.224.35.bc.googleusercontent.com.http: Flags [F.], seq 88, a
10:26:37.983719 IP 84.170.224.35.bc.googleusercontent.com.http > vivin.57084: Flags [.., ack 89, wi
^C
18 packets captured
18 packets received by filter
0 packets dropped by kernel
```

tcpdump command options

You need to be root to run tcpdump. It includes many options and filters. Running tcp dump without any options will capture all packets flowing through the default interface.

To see the list of network interfaces available on the system and on which tcpdump can capture packets.

tcpdump -D

```
vivin@vivin:~$ tcpdump -D
1.enp0s3 [Up, Running]
2.any (Pseudo-device that captures on all interfaces) [Up, Running]
3.lo [Up, Running, Loopback]
4.nflog (Linux netfilter log (NFLOG) interface)
5.nfqueue (Linux netfilter queue (NFQUEUE) interface)
6.usbmon1 (USB bus number 1)
```

To capture packets flowing through a specific interface, use the -i flag with the interface name. Without the -i interface tcpdump will pick up the first network interface it comes across.

sudo tcpdump -i enp0s3

```
vivin@vivin:~$ sudo tcpdump -i enp0s3
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
10:28:40.873191 IP6 vivin.mdns > ff02::fb.mdns: 0 [2q] PTR (QM)? _ipps._tcp.local. PTR (QM)? _ipp._ipp
10:28:41.003574 IP vivin.mdns > 224.0.0.251.mdns: 0 [2q] PTR (QM)? _ipps._tcp.local. PTR (QM)? _ipp._ipp
10:28:41.009158 IP vivin.47013 > dns.google.domain: 35897+ [1au] PTR? 15.2.0.10.in-addr.arpa. (51)
10:28:41.039893 IP dns.google.domain > vivin.47013: 35897 NXDomain 0/0/1 (51)
10:28:41.040973 IP vivin.47013 > dns.google.domain: 35897+ PTR? 15.2.0.10.in-addr.arpa. (40)
10:28:41.192536 IP dns.google.domain > vivin.47013: 35897 NXDomain 0/0/0 (40)
10:28:46.163906 ARP, Request who-has _gateway tell vivin, length 28
10:28:46.164953 ARP, Reply _gateway is-at 52:54:00:12:35:02 (oui Unknown), length 46
10:28:46.166031 IP vivin.54475 > dns.google.domain: 30998+ [1au] PTR? 2.2.0.10.in-addr.arpa. (50)
10:28:46.187142 IP dns.google.domain > vivin.54475: 30998 NXDomain 0/0/1 (50)
10:28:46.187718 IP vivin.54475 > dns.google.domain: 30998+ PTR? 2.2.0.10.in-addr.arpa. (39)
10:28:46.210882 IP dns.google.domain > vivin.54475: 30998 NXDomain 0/0/0 (39)
^C
12 packets captured
12 packets received by filter
0 packets dropped by kernel
```

tcpdump-ienp2s0

Now your devices use the "Predictable Interface Names", which are based onNames incorporating Firmware/BIOS provided index numbers for on-board devices (example: eno1)

Names incorporating Firmware/BIOS provided PCI Express hotplugslot index numbers (example: ens1)

Names incorporating physical/geographical location of the connector of the hardware (example: enp2s0)

Names incorporating the interfaces'sMAC address (example: enx78e7d1ea46da)

Classic, unpredictable kernel-native ethXnaming (example: eth0)

- tcpdumpwill continue to capture packets and write to the standard output until it receives an interrupt signal.

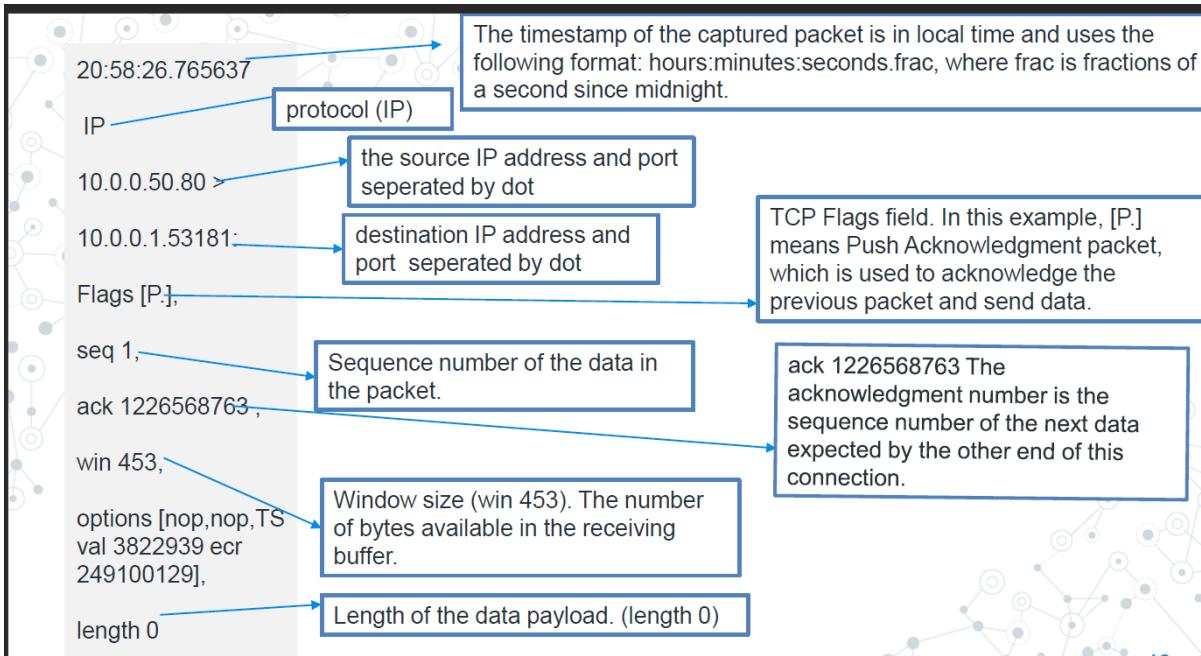
- Use the Ctrl+Ckey combination to send an interrupt signal and stop the command.

tcpdump output look like

20:58:26.765637 IP 10.0.0.50.80 > 10.0.0.1.53181: Flags [F.], seq 1, ack 2, win 453, options [nop,nop,TS val 3822939 ecr 249100129], length 0

tcpdumpoutputs information for each captured packet on a new line. Each line includes a timestamp and information about that packet, depending on the protocol.

- The typical format of a TCP protocol line is as follows:
[Timestamp] [Protocol] [SrcIP].[SrcPort] > [DstIP].[DstPort]: [Flags], [Seq], [Ack], [Win Size], [Options], [Data Length]



seq201747193:201747301 -The sequence number is in the first: lastnotation. It shows the number of data contained in the packet. Except for the first packet in the data stream where these numbers are absolute, all subsequent packets use as relative byte positions. In this example, the number is 201747193:201747301, meaning that this packet contains bytes 201747193 to 201747301 of the data stream. Use the -S option to print absolute sequence numbers.

- TCP Flags field. In this example, [P.] means Push Acknowledgment packet, which is used to acknowledge the previous packet and send data. This field can have the following values :
- S –SYN. The first step in establishing the connection.
- F –FIN. Connection termination.
- ACK. Acknowledgment packet received successfully.
- P –PUSH. Tells the receiver to process packets instead of buffering them.
- R –RST. Communication stopped.

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

sudo tcpdump -c 5

```
vivin@vivin:~$ sudo tcpdump -c 5
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
10:31:36.490932 IP vivin.36031 > dns.google.domain: 34068+ [1au] A? connectivity-check.ubuntu.com.
10:31:36.498066 IP vivin.56583 > dns.google.domain: 28867+ [1au] PTR? 15.2.0.10.in-addr.arpa. (51)
10:31:36.538264 IP dns.google.domain > vivin.56583: 28867 NXDomain 0/0/1 (51)
10:31:36.538275 IP dns.google.domain > vivin.36031: 34068 3/0/1 A 35.224.170.84, A 35.232.111.17, A
10:31:36.539450 IP vivin.56583 > dns.google.domain: 28867+ PTR? 15.2.0.10.in-addr.arpa. (40)
5 packets captured
6 packets received by filter
0 packets dropped by kernel
```

tcpdump filter expressions

Filter expressions select which packet headers will be displayed.

If no filters are applied, all packet headers are displayed.

Commonly used filters are port, host, src, dst, tcp, udp, icmp.

Filters are one of the most powerful features of the tcpdump command.

They allow you to capture only those packets matching the expression.

For example, when troubleshooting issues related to a webserver, you can use filters to obtain only the HTTP traffic.

port filter

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

sudo tcpdump -i enp0s3 -c 5 port 80.

```
vivin@vivin:~$ sudo tcpdump -i enp0s3 -c 5 port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
10:36:37.502626 IP vivin.50782 > 17.111.232.35.bc.googleusercontent.com.http: Flags [S], seq 148497
4616900 ecr 0,nop,wscale 7], length 0
10:36:37.805347 IP 17.111.232.35.bc.googleusercontent.com.http > vivin.50782: Flags [S.], seq 18752
length 0
10:36:37.805510 IP vivin.50782 > 17.111.232.35.bc.googleusercontent.com.http: Flags [.], ack 1, win
10:36:37.807580 IP vivin.50782 > 17.111.232.35.bc.googleusercontent.com.http: Flags [P.], seq 1:88,
10:36:37.808612 IP 17.111.232.35.bc.googleusercontent.com.http > vivin.50782: Flags [.], ack 88, wi
5 packets captured
5 packets received by filter
0 packets dropped by kernel
vivin@vivin:~$ sudo tcpdump host vivin
```

host filter

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

sudo tcpdump host 10.0.2.15

```
vivin@vivin:~$ sudo tcpdump host 10.0.2.15
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
10:51:36.487821 IP vivin.59996 > dns.google.domain: 5490+ [1au] A? connectivity-check.ubuntu.com. (0)
10:51:36.488673 IP vivin.41024 > dns.google.domain: 6643+ [1au] AAAA? connectivity-check.ubuntu.com. (0)
10:51:36.494034 IP vivin.41983 > dns.google.domain: 52697+ [1au] PTR? 15.2.0.10.in-addr.arpa. (51)
10:51:36.516582 IP dns.google.domain > vivin.41983: 52697 NXDomain 0/0/1 (51)
10:51:36.516594 IP dns.google.domain > vivin.41024: 6643 0/1/1 (119)
10:51:36.517693 IP vivin.41983 > dns.google.domain: 52697+ PTR? 15.2.0.10.in-addr.arpa. (40)
10:51:36.540424 IP dns.google.domain > vivin.59996: 5490 3/0/1 A 34.122.121.32, A 35.224.170.84, A
10:51:37.488518 IP vivin.42650 > 32.121.122.34.bc.googleusercontent.com.http: Flags [S], seq 406561
522414 ecr 0,nop,wscale 7], length 0
10:51:37.490762 IP vivin.57671 > dns.google.domain: 22399+ [1au] PTR? 32.121.122.34.in-addr.arpa. (0)
10:51:37.610180 IP dns.google.domain > vivin.57671: 22399 1/0/1 PTR 32.121.122.34.bc.googleusercontent.com.http: Flags [S], seq 406561
10:51:38.514609 IP vivin.42650 > 32.121.122.34.bc.googleusercontent.com.http: Flags [S], seq 406561
523440 ecr 0,nop,wscale 7], length 0
10:51:40.531902 IP vivin.42650 > 32.121.122.34.bc.googleusercontent.com.http: Flags [S], seq 406561
525458 ecr 0,nop,wscale 7], length 0
10:51:40.754174 IP 32.121.122.34.bc.googleusercontent.com.http > vivin.42650: Flags [S.], seq 22080
length 0
10:51:40.754546 IP vivin.42650 > 32.121.122.34.bc.googleusercontent.com.http: Flags [.], ack 1, win
10:51:40.755416 IP vivin.42650 > 32.121.122.34.bc.googleusercontent.com.http: Flags [P.], seq 1:88,
10:51:40.757948 IP 32.121.122.34.bc.googleusercontent.com.http > vivin.42650: Flags [.], ack 88, wi
10:51:41.079740 IP 32.121.122.34.bc.googleusercontent.com.http > vivin.42650: Flags [P.], seq 1:149
No Content
10:51:41.080045 IP vivin.42650 > 32.121.122.34.bc.googleusercontent.com.http: Flags [.], ack 149, w
10:51:41.080730 IP vivin.42650 > 32.121.122.34.bc.googleusercontent.com.http: Flags [F.], seq 88, a
10:51:41.081331 IP 32.121.122.34.bc.googleusercontent.com.http > vivin.42650: Flags [F.], seq 149,
10:51:41.081639 IP vivin.42650 > 32.121.122.34.bc.googleusercontent.com.http: Flags [.], ack 150, w
10:51:41.083626 IP 32.121.122.34.bc.googleusercontent.com.http > vivin.42650: Flags [F.], seq 149,
^C
22 packets captured
23 packets received by filter
1 packet dropped by kernel
```

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

(tcpdump-ieth1 icmp)

sudo tcpdump -n net 10.10

```
vivin@vivin:~$ sudo tcpdump -n net 10.0
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
11:01:08.828857 IP 10.0.2.15.38280 > 8.8.8.53: 34424+ [1au] A? detectportal.firefox.com. (53)
11:01:08.835613 IP 10.0.2.15.52670 > 8.8.8.53: 37074+ [1au] AAAA? detectportal.firefox.com. (53)
11:01:08.859498 IP 8.8.8.53 > 10.0.2.15.52670: 37074 3/0/1 CNAME detectportal.prod.mozaws.net., C
AA 2600:1901:0:38d7:: (176)
11:01:08.867027 IP 8.8.8.53 > 10.0.2.15.38280: 34424 3/0/1 CNAME detectportal.prod.mozaws.net., C
34.107.221.82 (164)
11:01:08.876039 IP 10.0.2.15.48732 > 34.107.221.82.80: Flags [S], seq 3595848603, win 64240, option
e 7], length 0
11:01:08.914319 IP 34.107.221.82.80 > 10.0.2.15.48732: Flags [S.], seq 24960001, ack 3595848604, wi
11:01:08.914412 IP 10.0.2.15.48732 > 34.107.221.82.80: Flags [.], ack 1, win 64240, length 0
11:01:08.918768 IP 10.0.2.15.48732 > 34.107.221.82.80: Flags [P.], seq 1:300, ack 1, win 64240, len
11:01:08.921139 IP 34.107.221.82.80 > 10.0.2.15.48732: Flags [.], ack 300, win 65535, length 0
11:01:08.953958 IP 34.107.221.82.80 > 10.0.2.15.48732: Flags [P.], seq 1:303, ack 300, win 65535, l
11:01:08.954055 IP 10.0.2.15.48732 > 34.107.221.82.80: Flags [.], ack 303, win 63938, length 0
11:01:09.017965 IP 10.0.2.15.37373 > 8.8.8.53: 25711+ [1au] A? example.org. (40)
11:01:09.019047 IP 10.0.2.15.48734 > 34.107.221.82.80: Flags [S], seq 3129221381, win 64240, option
e 7], length 0
11:01:09.024077 IP 10.0.2.15.55399 > 8.8.8.53: 10592+ [1au] A? ipv4only.arpa. (42)
11:01:09.024266 IP 10.0.2.15.56541 > 8.8.8.53: 64241+ [1au] AAAA? ipv4only.arpa. (42)
11:01:09.024548 IP 10.0.2.15.52626 > 8.8.8.53: 1577+ [1au] AAAA? example.org. (40)
11:01:09.040651 IP 8.8.8.8.53 > 10.0.2.15.37373: 25711 1/0/1 A 93.184.216.34 (56)
11:01:09.043274 IP 34.107.221.82.80 > 10.0.2.15.48734: Flags [S.], seq 25024001, ack 3129221382, wi
11:01:09.043367 IP 10.0.2.15.48734 > 34.107.221.82.80: Flags [.], ack 1, win 64240, length 0
11:01:09.048309 IP 8.8.8.8.53 > 10.0.2.15.56541: 64241 0/1/ (99)
11:01:09.048315 IP 8.8.8.8.53 > 10.0.2.15.52626: 1577 1/0/1 AAAA 2606:2800:220:1:248:1893:25c8:1946
11:01:09.048316 IP 8.8.8.8.53 > 10.0.2.15.55399: 10592 2/0/1 A 192.0.0.170, A 192.0.0.171 (74)
11:01:09.050444 IP 10.0.2.15.48734 > 34.107.221.82.80: Flags [P.], seq 1:302, ack 1, win 64240, len
11:01:09.051566 IP 34.107.221.82.80 > 10.0.2.15.48734: Flags [.], ack 302, win 65535, length 0
11:01:09.088021 IP 34.107.221.82.80 > 10.0.2.15.48734: Flags [P.], seq 1:221, ack 302, win 65535, l
11:01:09.088094 IP 10.0.2.15.48734 > 34.107.221.82.80: Flags [.], ack 221, win 64020, length 0
11:01:09.236462 IP 10.0.2.15.57392 > 8.8.8.8.53: 11266+ [1au] A? content-signature-2.cdn.mozilla.ne
11:01:09.236658 IP 10.0.2.15.43550 > 8.8.8.8.53: 50151+ [1au] AAAA? content-signature-2.cdn.mozilla
11:01:09.287441 IP 8.8.8.8.53 > 10.0.2.15.57392: 11266 5/0/1 CNAME d2nxq2uap88usk.cloudfront.net.,
3.33.179.113 (168)
11:01:09.290938 IP 8.8.8.8.53 > 10.0.2.15.43550: 50151 9/0/1 CNAME d2nxq2uap88usk.cloudfront.net.,
9000:2075:da00:a:da5e:7900:93a1, AAAA 2600:9000:2075:2000:a:da5e:7900:93a1, AAAA 2600:9000:2075:a60
7900:93a1, AAAA 2600:9000:2075:2800:a:da5e:7900:93a1, AAAA 2600:9000:2075:5a00:a:da5e:7900:93a1, AA
11:01:09.294915 IP 10.0.2.15.53392 > 13.33.179.113.443: Flags [S], seq 3292949818, win 64240, option
e 7], length 0
11:01:09.327113 IP 13.33.179.113.443 > 10.0.2.15.53392: Flags [S.], seq 25088001, ack 3292949819, w
```

Combining filter expressions

We can combine filter expressions with AND, OR, and NOT operators. This will enable you to write commands which can isolate packets more precisely:

Packets from a specific IP and destined for a specific port:

sudo tcpdump -n -i enp0s3 src 10.0.2.15 and dst port 80

```
vivin@vivin:~$ sudo tcpdump -n -i enp0s3 src 10.0.2.15 and dst port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
11:05:06.565618 IP 10.0.2.15.48840 > 34.107.221.82.80: Flags [S], seq 1915239324, win 64240, options [T], length 0
11:05:06.602919 IP 10.0.2.15.48840 > 34.107.221.82.80: Flags [.], ack 32832002, win 64240, length 0
11:05:06.603492 IP 10.0.2.15.48840 > 34.107.221.82.80: Flags [P.], seq 0:299, ack 1, win 64240, length 0
11:05:06.638688 IP 10.0.2.15.48840 > 34.107.221.82.80: Flags [.], ack 303, win 63938, length 0
11:05:06.707155 IP 10.0.2.15.48842 > 34.107.221.82.80: Flags [S], seq 653363996, win 64240, options [T], length 0
11:05:06.729318 IP 10.0.2.15.48842 > 34.107.221.82.80: Flags [.], ack 32896002, win 64240, length 0
11:05:06.732073 IP 10.0.2.15.48842 > 34.107.221.82.80: Flags [P.], seq 0:301, ack 1, win 64240, length 0
11:05:06.802359 IP 10.0.2.15.48842 > 34.107.221.82.80: Flags [.], ack 221, win 64020, length 0
11:05:07.317901 IP 10.0.2.15.44736 > 49.44.194.34.80: Flags [S], seq 2223868270, win 64240, options [T], length 0
11:05:07.360890 IP 10.0.2.15.44736 > 49.44.194.34.80: Flags [.], ack 33152002, win 64240, length 0
11:05:07.519144 IP 10.0.2.15.44736 > 49.44.194.34.80: Flags [P.], seq 0:421, ack 1, win 64240, length 0
11:05:07.570527 IP 10.0.2.15.44736 > 49.44.194.34.80: Flags [.], ack 890, win 64008, length 0
11:05:08.282267 IP 10.0.2.15.44736 > 49.44.194.34.80: Flags [P.], seq 421:842, ack 890, win 64008, length 0
11:05:08.342668 IP 10.0.2.15.44736 > 49.44.194.34.80: Flags [.], ack 1779, win 64008, length 0
11:05:08.360626 IP 10.0.2.15.42936 > 117.18.237.29.80: Flags [S], seq 1980972959, win 64240, options [T], length 0
11:05:08.360758 IP 10.0.2.15.42938 > 117.18.237.29.80: Flags [S], seq 4058021181, win 64240, options [T], length 0
11:05:08.397898 IP 10.0.2.15.42938 > 117.18.237.29.80: Flags [.], ack 34048002, win 64240, length 0
11:05:08.399111 IP 10.0.2.15.42938 > 117.18.237.29.80: Flags [P.], seq 0:422, ack 1, win 64240, length 0
11:05:08.407875 IP 10.0.2.15.42936 > 117.18.237.29.80: Flags [.], ack 34112002, win 64240, length 0
11:05:08.408446 IP 10.0.2.15.42936 > 117.18.237.29.80: Flags [P.], seq 0:422, ack 1, win 64240, length 0
11:05:08.451452 IP 10.0.2.15.42938 > 117.18.237.29.80: Flags [.], ack 740, win 63554, length 0
11:05:08.454148 IP 10.0.2.15.42936 > 117.18.237.29.80: Flags [.], ack 740, win 63554, length 0
11:05:09.013298 IP 10.0.2.15.42938 > 117.18.237.29.80: Flags [P.], seq 422:844, ack 740, win 63554, length 0
11:05:09.044378 IP 10.0.2.15.42938 > 117.18.237.29.80: Flags [.], ack 1479, win 63554, length 0
11:05:10.236126 IP 10.0.2.15.44736 > 49.44.194.34.80: Flags [P.], seq 842:1263, ack 1779, win 64008, length 0
11:05:10.273464 IP 10.0.2.15.44774 > 49.44.194.34.80: Flags [S], seq 2358098742, win 64240, options [T], length 0
11:05:10.287717 IP 10.0.2.15.44736 > 49.44.194.34.80: Flags [.], ack 2667, win 64008, length 0
11:05:10.288968 IP 10.0.2.15.44736 > 49.44.194.34.80: Flags [P.], seq 1263:1684, ack 2667, win 64008, length 0
11:05:10.320909 IP 10.0.2.15.44774 > 49.44.194.34.80: Flags [.], ack 34752002, win 64240, length 0
11:05:10.356810 IP 10.0.2.15.44736 > 49.44.194.34.80: Flags [.], ack 3555, win 64008, length 0
11:05:15.383039 IP 10.0.2.15.44774 > 49.44.194.34.80: Flags [F.], seq 0, ack 1, win 64240, length 0
11:05:15.431909 IP 10.0.2.15.44774 > 49.44.194.34.80: Flags [.], ack 2, win 64240, length 0
^X11:05:16.756350 IP 10.0.2.15.48840 > 34.107.221.82.80: Flags [.], ack 303, win 63938, length 0
11:05:16.809834 IP 10.0.2.15.48842 > 34.107.221.82.80: Flags [.], ack 221, win 64020, length 0
```

sudo tcpdump -n -i enp0s3 src 10.0.2.15 or dst port 80

```
vivin@vivin:~$ sudo tcpdump -n -i enp0s3 src 10.0.2.15 or dst port 80
[sudo] password for vivin:
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
11:26:36.486639 IP 10.0.2.15.49163 > 8.8.4.4.53: 55878+ [1au] A? connectivity-check.ubuntu.com. (58
11:26:37.487447 IP 10.0.2.15.57326 > 35.224.170.84.80: Flags [S], seq 1850181661, win 64240, option
7], length 0
11:26:38.064499 IP 10.0.2.15.57326 > 35.224.170.84.80: Flags [.], ack 196544002, win 64240, length
11:26:38.065211 IP 10.0.2.15.57326 > 35.224.170.84.80: Flags [P.], seq 0:87, ack 1, win 64240, leng
11:26:38.566038 IP 10.0.2.15.57326 > 35.224.170.84.80: Flags [.], ack 149, win 64092, length 0
11:26:38.566737 IP 10.0.2.15.57326 > 35.224.170.84.80: Flags [F.], seq 87, ack 150, win 64091, leng
11:26:48.203915 IP 10.0.2.15.53059 > 8.8.4.4.53: 63064+ [1au] A? incoming.telemetry.mozilla.org. (5
11:26:48.204161 IP 10.0.2.15.39523 > 8.8.4.4.53: 54443+ [1au] AAAA? incoming.telemetry.mozilla.org.
11:26:48.204752 IP 10.0.2.15.49368 > 35.227.207.240.443: Flags [P.], seq 1455609112:1455609269, ack
11:26:48.205037 IP 10.0.2.15.49368 > 35.227.207.240.443: Flags [P.], seq 157:620, ack 1, win 64015,
11:26:48.206865 IP 10.0.2.15.49368 > 35.227.207.240.443: Flags [P.], seq 620:753, ack 1, win 64015,
11:26:48.207051 IP 10.0.2.15.49368 > 35.227.207.240.443: Flags [P.], seq 753:1111, ack 1, win 64015
11:26:48.209939 IP 10.0.2.15.49368 > 35.227.207.240.443: Flags [P.], seq 1111:1239, ack 1, win 6401
11:26:48.213274 IP 10.0.2.15.49368 > 35.227.207.240.443: Flags [P.], seq 1239:1796, ack 1, win 6401
11:26:48.464307 IP 10.0.2.15.49368 > 35.227.207.240.443: Flags [.], ack 89, win 64015, length 0
11:26:48.465896 IP 10.0.2.15.49368 > 35.227.207.240.443: Flags [P.], seq 1796:1842, ack 89, win 640
11:26:48.497894 IP 10.0.2.15.49368 > 35.227.207.240.443: Flags [.], ack 177, win 64015, length 0
11:26:48.501287 IP 10.0.2.15.49368 > 35.227.207.240.443: Flags [P.], seq 1842:1888, ack 177, win 64
11:26:48.508349 IP 10.0.2.15.49368 > 35.227.207.240.443: Flags [.], ack 248, win 64015, length 0
11:26:58.595562 IP 10.0.2.15.39272 > 8.8.4.4.53: 30496+ [1au] A? www.google.com. (43)
11:26:58.597547 IP 10.0.2.15.45683 > 8.8.4.4.53: 305+ [1au] AAAA? www.google.com. (43)
11:26:59.019537 IP 10.0.2.15.50144 > 142.250.67.36.443: Flags [S], seq 992690073, win 64240, option
e 7], length 0
11:26:59.168054 IP 10.0.2.15.50144 > 142.250.67.36.443: Flags [.], ack 199232002, win 64240, length
11:26:59.170431 IP 10.0.2.15.50144 > 142.250.67.36.443: Flags [P.], seq 0:517, ack 1, win 64240, le
11:26:59.316962 IP 10.0.2.15.50144 > 142.250.67.36.443: Flags [.], ack 1431, win 62920, length 0
11:26:59.327849 IP 10.0.2.15.50144 > 142.250.67.36.443: Flags [.], ack 4288, win 62920, length 0
11:26:59.330750 IP 10.0.2.15.50144 > 142.250.67.36.443: Flags [P.], seq 517:581, ack 4288, win 6292
11:26:59.331645 IP 10.0.2.15.50144 > 142.250.67.36.443: Flags [P.], seq 581:751, ack 4288, win 6292
11:26:59.332245 IP 10.0.2.15.50144 > 142.250.67.36.443: Flags [P.], seq 751:1493, ack 4288, win 629
11:26:59.333651 IP 10.0.2.15.50144 > 142.250.67.36.443: Flags [P.], seq 1493:1524, ack 4288, win 62
11:26:59.357327 IP 10.0.2.15.50144 > 142.250.67.36.443: Flags [.], ack 4896, win 62920, length 0
11:26:59.357638 IP 10.0.2.15.50144 > 142.250.67.36.443: Flags [.], ack 4927, win 62920, length 0
11:26:59.358311 IP 10.0.2.15.50144 > 142.250.67.36.443: Flags [P.], seq 1524:1555, ack 4927, win 62
11:26:59.397068 IP 10.0.2.15.50144 > 142.250.67.36.443: Flags [.], ack 5212, win 62920, length 0
11:26:59.401561 IP 10.0.2.15.50144 > 142.250.67.36.443: Flags [.], ack 5282, win 62920, length 0
11:26:59.404937 IP 10.0.2.15.50144 > 142.250.67.36.443: Flags [P.], seq 1555:1594, ack 5282, win 62
```

Saving packet headers to a file

Store packet headers to a file with the -w flag. The files to save the output use pcap format and have an extension of .pcap.

PCAP stands for packet capture. The following command saves 10 lines of output on the eth1 interface to icmp.pcap.

sudo tcpdump -i enp0s3 -c 10 -w icmp.pcap

```
vivin@vivin:~$ sudo tcpdump -i enp0s3 -c 10 -w icmp.pcap
tcpdump: listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
10 packets captured
20 packets received by filter
0 packets dropped by kernel
```

You can read this file with -r flag:

sudo tcpdump -r icmp.pcap

```
vivin@vivin:~$ sudo tcpdump -r icmp.pcap
reading from file icmp.pcap, link-type EN10MB (Ethernet)
11:08:06.996146 IP vivin.46574 > ec2-44-235-150-209.us-west-2.compute.amazonaws.com.https: Flags [.]
11:08:06.996798 IP ec2-44-235-150-209.us-west-2.compute.amazonaws.com.https > vivin.46574: Flags [.]
11:08:07.250142 IP vivin.42960 > 117.18.237.29.http: Flags [., ack 52161480, win 63554, length 0
11:08:07.250658 IP 117.18.237.29.http > vivin.42960: Flags [., ack 1, win 65535, length 0
11:08:08.053062 IP vivin.51312 > dns.google.domain: 43501+ [1au] A? incoming.telemetry.mozilla.org.
11:08:08.053233 IP vivin.49462 > dns.google.domain: 21636+ [1au] AAAA? incoming.telemetry.mozilla.o
11:08:08.057923 IP vivin.49278 > 240.207.227.35.bc.googleusercontent.com.https: Flags [P.], seq 275
152
11:08:08.058339 IP vivin.49278 > 240.207.227.35.bc.googleusercontent.com.https: Flags [P.], seq 152
11:08:08.058565 IP 240.207.227.35.bc.googleusercontent.com.https > vivin.49278: Flags [., ack 152,
11:08:08.058561 IP vivin.49278 > 240.207.227.35.bc.googleusercontent.com.https: Flags [P.], seq 615
```

Viewing packet details

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

sudo tcpdump -c10 -i enp0s3 -n -A port 80

```
vivin@vivin:~$ sudo tcpdump -c10 -i enp0s3 -n -A port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
11:10:03.607569 IP 10.0.2.15.49094 > 142.250.76.67.80: Flags [S.], seq 3377322174, win 64240, option
e 7], length 0
E..<.1@.>@..
.....LC...P.M.....z.....
.n#.....
11:10:03.632317 IP 142.250.76.67.80 > 10.0.2.15.49094: Flags [S.], seq 70464001, ack 3377322175, wi
E.,.,.,@....LC
....P...32..M.. ....r.....
11:10:03.632443 IP 10.0.2.15.49094 > 142.250.76.67.80: Flags [.], ack 1, win 64240, length 0
E..(2@.Q..Q
....LC...P.M...32.P....f..
11:10:03.632885 IP 10.0.2.15.49094 > 142.250.76.67.80: Flags [P.], seq 1:425, ack 1, win 64240, len
E....3@.Q..
.....LC...P.M...32.P.....POST /gts1c3 HTTP/1.1
Host: ocsp.pki.google
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:92.0) Gecko/20100101 Firefox/92.0
Accept: */
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Content-Type: application/ocsp-request
Content-Length: 83
Connection: keep-alive
Pragma: no-cache
Cache-Control: no-cache
0Q000M0K010    ...+.....y...a4...GB...$.c...t.....=...F..q5.'..$Wu..S..
.....f.
11:10:03.633780 IP 142.250.76.67.80 > 10.0.2.15.49094: Flags [.], ack 425, win 65535, length 0
E..(....@....LC
....P...32..M.gP.....
11:10:03.702554 IP 142.250.76.67.80 > 10.0.2.15.49094: Flags [P.], seq 1:702, ack 425, win 65535, l
E.....@|....LC
....P...32..M.gP...m...HTTP/1.1 200 OK
Content-Type: application/ocsp-response
Date: Sat, 02 Oct 2021 05:40:05 GMT
Cache-Control: public, max-age=86400
Server: ocsp_responder
Content-Length: 471
X-XSS-Protection: 0
X-Frame-Options: SAMEORIGIN
```

Experiment No:10

Lab Exercises

1. Create a directory SAMPLE under your home directory.

```
vivin@vivin:/home$ ls
vivin
vivin@vivin:/home$ sudo mkdir SAMPLE
vivin@vivin:/home$ ls
SAMPLE vivin
vivin@vivin:/home$
```

2. Create a sub-directory by name TRIAL under SAMPLE

```
vivin@vivin:/home$ cd SAMPLE
vivin@vivin:/home/SAMPLE$ ls
vivin@vivin:/home/SAMPLE$ sudo mkdir TRIAL
vivin@vivin:/home/SAMPLE$ ls
TRIAL
vivin@vivin:/home/SAMPLE$
```

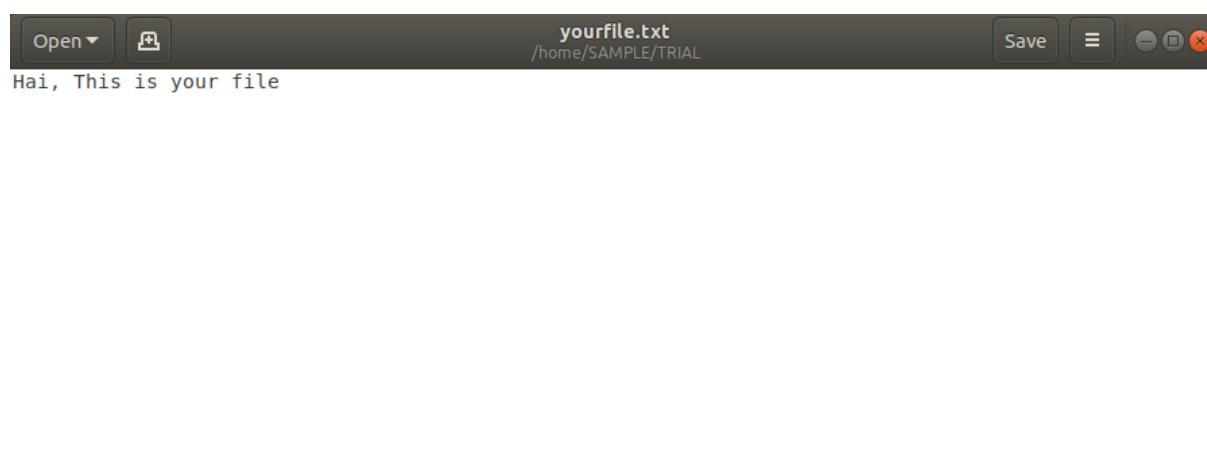
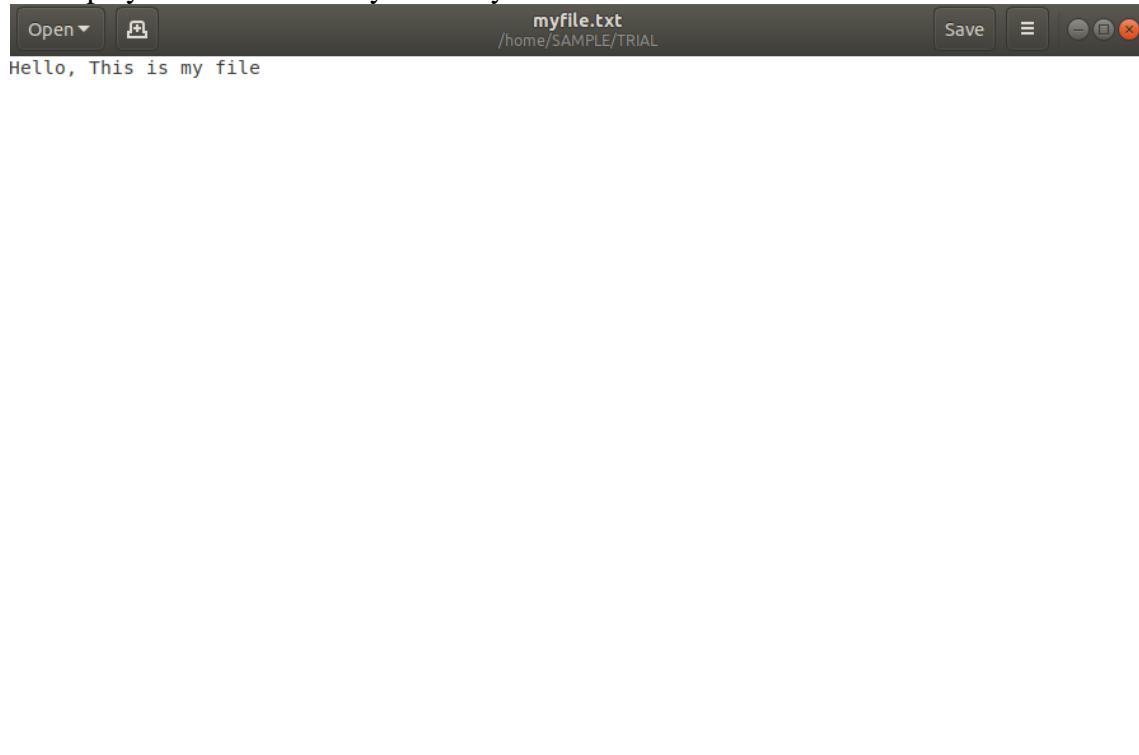
3. Create file1,file2, file3, file4, file5, file6 under TRIAL directory using a single command.

```
vivin@vivin:/home/SAMPLE$ cd TRIAL
vivin@vivin:/home/SAMPLE/TRIAL$ sudo touch file1.txt file2.txt file3.txt file4.t
xt file5.txt file6.txt
vivin@vivin:/home/SAMPLE/TRIAL$ ls
file1.txt file2.txt file3.txt file4.txt file5.txt file6.txt
```

4. Create files myfile and yourfile under Present Working Directory.

```
vivin@vivin:/home/SAMPLE/TRIAL$ ls
file1.txt file2.txt file3.txt file4.txt file5.txt file6.txt
vivin@vivin:/home/SAMPLE/TRIAL$ sudo touch myfile.txt yourfile.txt
vivin@vivin:/home/SAMPLE/TRIAL$ ls
file1.txt file3.txt file5.txt myfile.txt
file2.txt file4.txt file6.txt yourfile.txt
```

5. Display the contents in myfile and yourfile.



```
vivin@vivin:/home/SAMPLE/TRIAL$ sudo cat myfile.txt
Hello, This is my file
vivin@vivin:/home/SAMPLE/TRIAL$ sudo cat yourfile.txt
Hai, This is your file
vivin@vivin:/home/SAMPLE/TRIAL$
```

6. Copy myfile file to emp

```
vivin@vivin:/home/SAMPLE$ ls
TRIAL
vivin@vivin:/home/SAMPLE$ sudo mkdir emp
vivin@vivin:/home/SAMPLE$ ls
emp TRIAL
vivin@vivin:/home/SAMPLE$ cd TRIAL
vivin@vivin:/home/SAMPLE/TRIAL$ ls
file1.txt file3.txt file5.txt myfile.txt
file2.txt file4.txt file6.txt yourfile.txt
vivin@vivin:/home/SAMPLE/TRIAL$ sudo cp myfile.txt /home/SAMPLE/emp
vivin@vivin:/home/SAMPLE/TRIAL$ cd ..
vivin@vivin:/home/SAMPLE$ ls
emp TRIAL
vivin@vivin:/home/SAMPLE$ cd emp
vivin@vivin:/home/SAMPLE/emp$ ls
myfile.txt
vivin@vivin:/home/SAMPLE/emp$ cat myfile.txt
Hello, This is my file
vivin@vivin:/home/SAMPLE/emp$ █
```

7. Create a supplementary group called College with a group id 30000. Check group is created or not.

```
vivin@vivin:/home/SAMPLE$ sudo groupadd -g 30000 College
```

```
vivin@vivin:/home/SAMPLE$ less /etc/group
```

```
vivin@vivin:/home/SAMPLE$ █
```

```
mysql> mysql>
mysql:x:127:
College:x:30000:
(END)█
```

8. Execute the following commands and write their output

a. Ping

```
vivin@vivin:/home/SAMPLE$ cd ..
vivin@vivin:/home$ cd ..
vivin@vivin:$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=116 time=37.6 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=116 time=61.4 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=116 time=59.7 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=116 time=43.6 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=116 time=125 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=116 time=27.3 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=116 time=25.4 ms
64 bytes from 8.8.8.8: icmp_seq=8 ttl=116 time=20.3 ms
64 bytes from 8.8.8.8: icmp_seq=9 ttl=116 time=66.1 ms
64 bytes from 8.8.8.8: icmp_seq=10 ttl=116 time=22.5 ms
64 bytes from 8.8.8.8: icmp_seq=11 ttl=116 time=30.7 ms
64 bytes from 8.8.8.8: icmp_seq=12 ttl=116 time=21.8 ms
64 bytes from 8.8.8.8: icmp_seq=13 ttl=116 time=49.8 ms
64 bytes from 8.8.8.8: icmp_seq=14 ttl=116 time=21.8 ms
64 bytes from 8.8.8.8: icmp_seq=15 ttl=116 time=21.9 ms
64 bytes from 8.8.8.8: icmp_seq=16 ttl=116 time=20.7 ms
64 bytes from 8.8.8.8: icmp_seq=17 ttl=116 time=21.5 ms
64 bytes from 8.8.8.8: icmp_seq=18 ttl=116 time=22.1 ms
64 bytes from 8.8.8.8: icmp_seq=19 ttl=116 time=19.0 ms
```

b. Traceroute

```
vivin@vivin:$ traceroute 8.8.8.8
traceroute to 8.8.8.8 (8.8.8.8), 30 hops max, 60 byte packets
 1 _gateway (10.0.2.2)  10.481 ms  10.321 ms  0.308 ms
 2 _gateway (10.0.2.2)  10.758 ms  10.685 ms  10.618 ms
vivin@vivin:$
```

c. Netstat

```
vivin@vivin:/$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp      0      0 vivin:32834              104.26.3.27:https       TIME_WAIT
tcp      0      0 vivin:54776              server-13-249-208:https ESTABLISHED
tcp      0      0 vivin:52796              server-54-230-106:https TIME_WAIT
tcp      0      0 vivin:47224              server-99-86-20-7:https ESTABLISHED
tcp      0      0 vivin:34194              104.18.164.34:https     TIME_WAIT

Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State      I-Node    Path
unix   2      [ ]        DGRAM                    15606    /run/systemd/journal/syslog
unix   18     [ ]        DGRAM                   15608    /run/systemd/journal/dev-log
unix   2      [ ]        DGRAM                   25121    /run/user/1000/systemd/notify
unix   3      [ ]        DGRAM                   15586    /run/systemd/notify
unix   7      [ ]        DGRAM                   15596    /run/systemd/journal/socket
unix   3      [ ]        STREAM     CONNECTED  26944    /run/systemd/journal/stdout
unix   3      [ ]        STREAM     CONNECTED  22070    /run/systemd/journal/stdout
unix   3      [ ]        STREAM     CONNECTED  20503    36189
unix   3      [ ]        STREAM     CONNECTED  28451    25661    /run/systemd/journal/stdout
unix   3      [ ]        STREAM     CONNECTED  26447    31816    /run/systemd/journal/stdout
unix   3      [ ]        STREAM     CONNECTED  26886    /run/systemd/journal/stdout
unix   3      [ ]        STREAM     CONNECTED  26953    25846
unix   3      [ ]        STREAM     CONNECTED  20755    /run/systemd/journal/stdout
unix   3      [ ]        STREAM     CONNECTED  28161    /run/user/1000/bus
unix   3      [ ]        STREAM     CONNECTED  28137    @/tmp/dbus-nWKicRv
unix   3      [ ]        STREAM     CONNECTED  25662    /run/systemd/journal/stdout
```

d. Ifconfig

```
vivin@vivin:/$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
          inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
          inet6 fe80::34f5:79af:ce05:ed83  prefixlen 64  scopeid 0x20<link>
            ether 08:00:27:e6:f9:04  txqueuelen 1000  (Ethernet)
              RX packets 3788  bytes 4962289 (4.9 MB)
              RX errors 0  dropped 0  overruns 0  frame 0
              TX packets 1871  bytes 158112 (158.1 KB)
              TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
          inet 127.0.0.1  netmask 255.0.0.0
          inet6 ::1  prefixlen 128  scopeid 0x10<host>
            loop  txqueuelen 1000  (Local Loopback)
              RX packets 231  bytes 22471 (22.4 KB)
              RX errors 0  dropped 0  overruns 0  frame 0
              TX packets 231  bytes 22471 (22.4 KB)
              TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0

vivin@vivin:/$
```

e. tcpdump

```
vivin@vivin:~$ sudo tcpdump
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
09:52:55.427608 IP vivin.49769 > dns.google.domain: 25989+ [1au] A? connectivity-check.ubuntu.com.
09:52:55.428880 IP vivin.44797 > dns.google.domain: 14158+ [1au] AAAA? connectivity-check.ubuntu.co
09:52:55.448463 IP vivin.41731 > dns.google.domain: 19956+ [1au] PTR? 4.4.8.8.in-addr.arpa. (49)
09:52:55.478627 IP dns.google.domain > vivin.41731: 19956 1/0/1 PTR dns.google. (73)
09:52:55.478632 IP dns.google.domain > vivin.44797: 14158 0/1/1 (119)
09:52:55.478633 IP dns.google.domain > vivin.49769: 25989 3/0/1 A 34.122.121.32, A 35.224.170.84, A
09:52:55.480480 IP vivin.47407 > dns.google.domain: 53979+ [1au] PTR? 15.2.0.10.in-addr.arpa. (51)
09:52:56.426734 IP vivin.56316 > 32.121.122.34.bc.googleusercontent.com.http: Flags [S], seq 344553
7561233 ecr 0,nop,wscale 7], length 0
09:52:56.430612 IP vivin.41484 > dns.google.domain: 26224+ [1au] PTR? 32.121.122.34.in-addr.arpa. (
09:52:56.576389 IP dns.google.domain > vivin.41484: 26224 1/0/1 PTR 32.121.122.34.bc.googleusercontent
09:52:57.438238 IP vivin.34565 > dns.google.domain: 46997+ [1au] A? firefox.settings.services.mozilla
09:52:57.439187 IP vivin.35142 > dns.google.domain: 10552+ [1au] AAAA? firefox.settings.services.mozilla
09:52:57.458888 IP dns.google.domain > vivin.35142: 10552 0/1/1 (150)
09:52:57.459811 IP vivin.56316 > 32.121.122.34.bc.googleusercontent.com.http: Flags [S], seq 344553
7562266 ecr 0,nop,wscale 7], length 0
09:52:57.480729 IP dns.google.domain > vivin.34565: 46997 4/0/1 A 99.86.20.72, A 99.86.20.57, A 99.
09:52:57.482707 IP vivin.47224 > server-99-86-20-72.blr50.r.cloudfront.net.https: Flags [S], seq 17
2947646262 ecr 0,nop,wscale 7], length 0
09:52:57.487143 IP vivin.34467 > dns.google.domain: 34491+ [1au] PTR? 72.20.86.99.in-addr.arpa. (53
09:52:57.512251 IP server-99-86-20-72.blr50.r.cloudfront.net.https > vivin.47224: Flags [S.], seq 6
0], length 0
09:52:57.512416 IP vivin.47224 > server-99-86-20-72.blr50.r.cloudfront.net.https: Flags [.], ack 1,
09:52:57.514558 IP vivin.47224 > server-99-86-20-72.blr50.r.cloudfront.net.https: Flags [P.], seq 1
09:52:57.515417 IP server-99-86-20-72.blr50.r.cloudfront.net.https > vivin.47224: Flags [.], ack 51
09:52:57.561396 IP server-99-86-20-72.blr50.r.cloudfront.net.https > vivin.47224: Flags [P.], seq 1
09:52:57.598575 IP server-99-86-20-72.blr50.r.cloudfront.net.https > vivin.47224: Flags [P.], seq 3
09:52:57.598691 IP server-99-86-20-72.blr50.r.cloudfront.net.https > vivin.47224: Flags [P.], seq 5
09:52:57.598715 IP vivin.47224 > server-99-86-20-72.blr50.r.cloudfront.net.https: Flags [.], ack 54
09:52:57.598976 IP vivin.47224 > server-99-86-20-72.blr50.r.cloudfront.net.https: Flags [.], ack 68
09:52:57.601395 IP server-99-86-20-72.blr50.r.cloudfront.net.https > vivin.47224: Flags [P.], seq 6
09:52:57.601548 IP vivin.47224 > server-99-86-20-72.blr50.r.cloudfront.net.https: Flags [.], ack 11
09:52:57.607732 IP server-99-86-20-72.blr50.r.cloudfront.net.https > vivin.47224: Flags [P.], seq 1
09:52:57.607921 IP vivin.47224 > server-99-86-20-72.blr50.r.cloudfront.net.https: Flags [.], ack 19
09:52:57.612823 IP server-99-86-20-72.blr50.r.cloudfront.net.https > vivin.47224: Flags [P.], seq 1
09:52:57.612991 IP vivin.47224 > server-99-86-20-72.blr50.r.cloudfront.net.https: Flags [.], ack 22
09:52:57.613772 IP server-99-86-20-72.blr50.r.cloudfront.net.https > vivin.47224: Flags [P.], seq 2
```

Experiment No:11

Shell Scripting

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

```
vivin@vivin:~$ vi Student.sh
vivin@vivin:~$ bash Student.sh
Enter the Details and view
=====
Enter Your Name
Vivin V Abraham
Enter Your College Name
Amal Jyothi College Of Engineering
```

The screenshot shows a terminal window with a dark background and light-colored text. At the top, the window title is "vivin@vivin: ~". The menu bar includes "File", "Edit", "View", "Search", "Terminal", and "Help". The main area of the terminal contains the following code:

```
#!/bin/bash
echo "Enter the Details and view"
echo "===== "
echo "Enter Your Name"
read name
echo "Enter Your College Name"
read college
clear
echo "Details you entered"
echo "Name :"$name
echo "College :"$college
```

Below the code, there are several blank lines followed by the command ":wq" at the bottom left. The terminal prompt "vivin@vivin: ~\$" is visible at the bottom right.

```
Details you entered
Name :Vivin V Abraham
College :Amal Jyothi College Of Engineering
vivin@vivin:~$
```

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

```
vivin@vivin:~$ vi display.sh
vivin@vivin:~$ bash display.sh
Display the value of a Variable
=====
78
vivin@vivin:~$
```

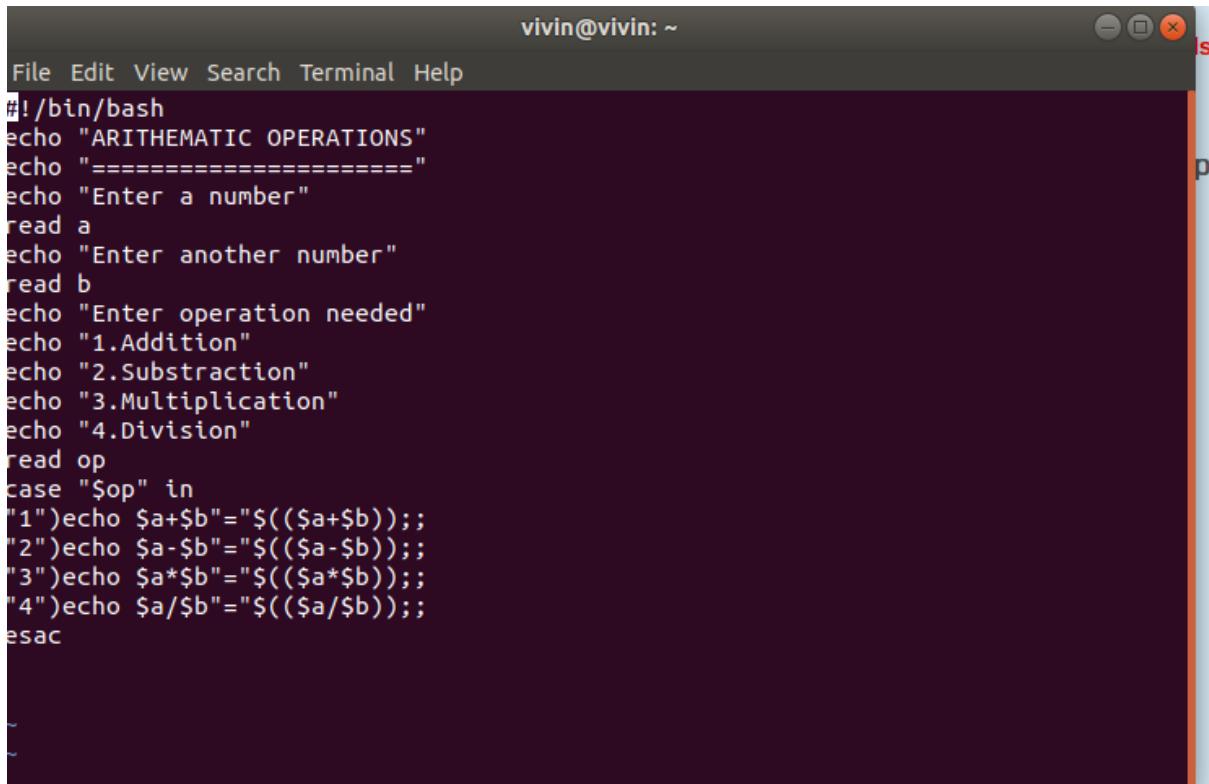
The screenshot shows a terminal window titled 'vivin@vivin: ~'. The window has a dark background and light-colored text. At the top, there's a menu bar with 'File', 'Edit', 'View', 'Search', 'Terminal', and 'Help'. Below the menu, the terminal prompt is 'vivin@vivin: ~'. The user has run the command 'vi display.sh' to edit the script. The script content is:

```
#!/bin/bash
echo "Display the value of a Variable"
echo =====
a=78
echo $a
```

After saving the script, the user runs 'bash display.sh'. The output is displayed in the terminal, showing the value '78' on a new line. The terminal ends with ':q' to quit.

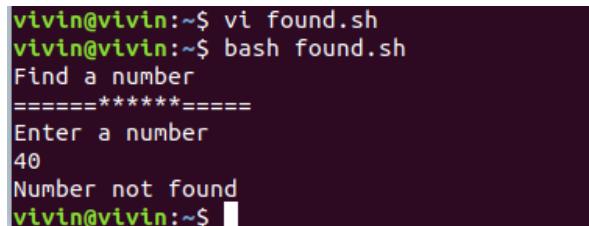
3. Write a shell script to perform addition, subtraction, multiplication, division with two numbers that is accepted from user.

```
vivin@vivin:~$ bash arithmetic.sh
ARITHMETIC OPERATIONS
=====
Enter a number
4
Enter another number
3
Enter operation needed
1.Addition
2.Subtraction
3.Multiplication
4.Division
3
4*3=12
vivin@vivin:~$
```

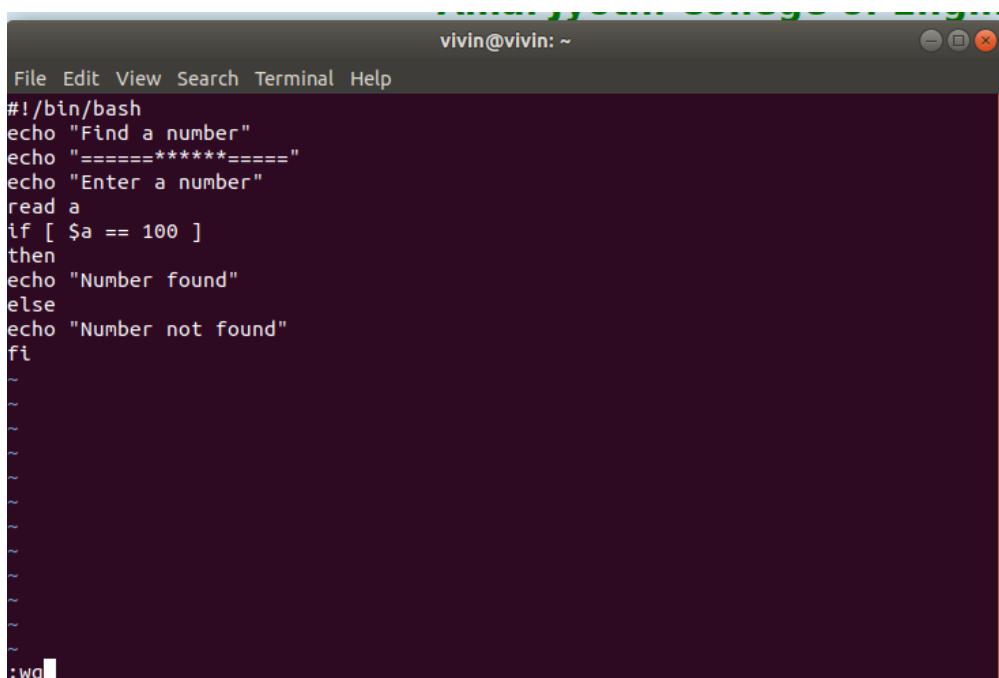


```
vivin@vivin: ~
File Edit View Search Terminal Help
#!/bin/bash
echo "ARITHMETIC OPERATIONS"
echo "=====***===="
echo "Enter a number"
read a
echo "Enter another number"
read b
echo "Enter operation needed"
echo "1.Addition"
echo "2.Subtraction"
echo "3.Multiplication"
echo "4.Division"
read op
case "$op" in
"1")echo $a+$b="$((a+b));;
"2")echo $a-$b="$((a-b));;
"3")echo $a*$b="$((a*b));;
"4")echo $a/$b="$((a/b));;
esac
~
```

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



```
vivin@vivin:~$ vi found.sh
vivin@vivin:~$ bash found.sh
Find a number
=====*****=====
Enter a number
40
Number not found
vivin@vivin:~$
```



```
vivin@vivin: ~
File Edit View Search Terminal Help
#!/bin/bash
echo "Find a number"
echo "=====*****====="
echo "Enter a number"
read a
if [ $a == 100 ]
then
echo "Number found"
else
echo "Number not found"
fi
~
~
~
~
~
~
~
~
:wo
```

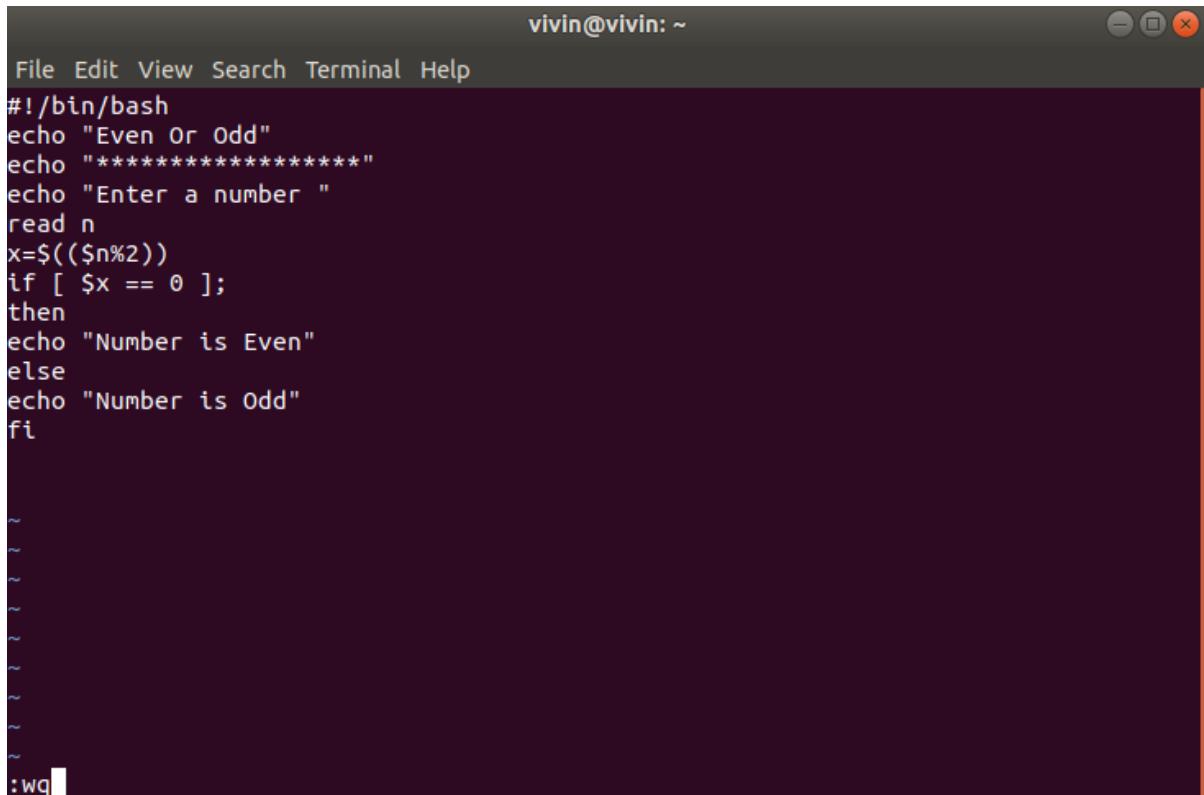
5. Write a shell script to display current date, calendar.

```
vivin@vivin:~$ vi found.sh
vivin@vivin:~$ vi calender.sh
vivin@vivin:~$ bash calender.sh
Time and Calender
*****
Today is Sat Oct  2 20:33:48 IST 2021

Calender:
      October 2021
Su Mo Tu We Th Fr Sa
                1 2
 3  4  5  6  7  8  9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
vivin@vivin:~$
```

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

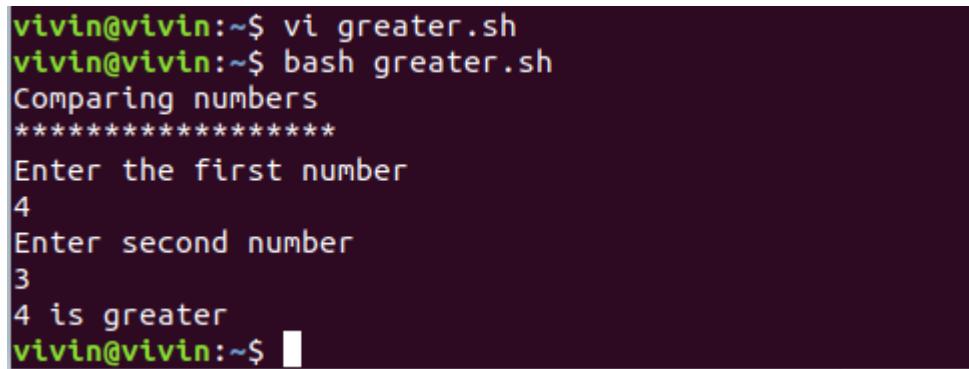
```
vivin@vivin:~$ vi evenodd.sh
vivin@vivin:~$ bash evenodd.sh
Even Or Odd
*****
Enter a number
2
Number is Even
vivin@vivin:~$ bash evenodd.sh
Even Or Odd
*****
Enter a number
3
Number is Odd
vivin@vivin:~$
```



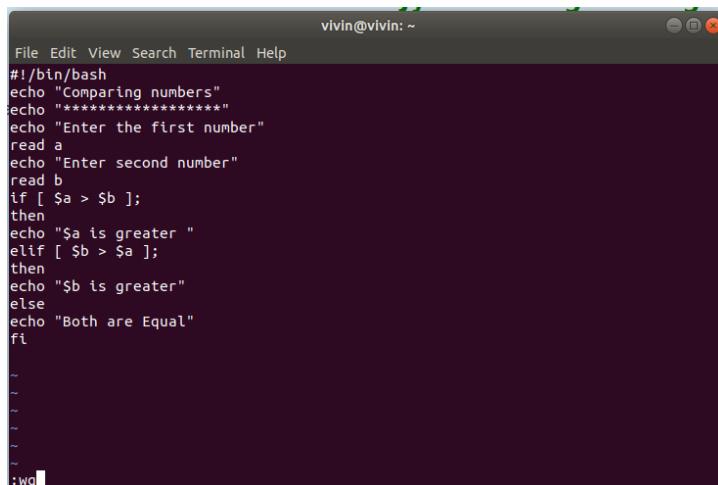
```
vivin@vivin: ~
File Edit View Search Terminal Help
#!/bin/bash
echo "Even Or Odd"
echo ****
echo "Enter a number "
read n
x=$((n%2))
if [ $x == 0 ];
then
echo "Number is Even"
else
echo "Number is Odd"
fi

~
~
~
~
~
~
~
:wq
```

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



```
vivin@vivin:~$ vi greater.sh
vivin@vivin:~$ bash greater.sh
Comparing numbers
*****
Enter the first number
4
Enter second number
3
4 is greater
vivin@vivin:~$
```



```
vivin@vivin: ~
File Edit View Search Terminal Help
#!/bin/bash
echo "Comparing numbers"
echo ****
echo "Enter the first number"
read a
echo "Enter second number"
read b
if [ $a > $b ];
then
echo "$a is greater"
elif [ $b > $a ];
then
echo "$b is greater"
else
echo "Both are Equal"
fi

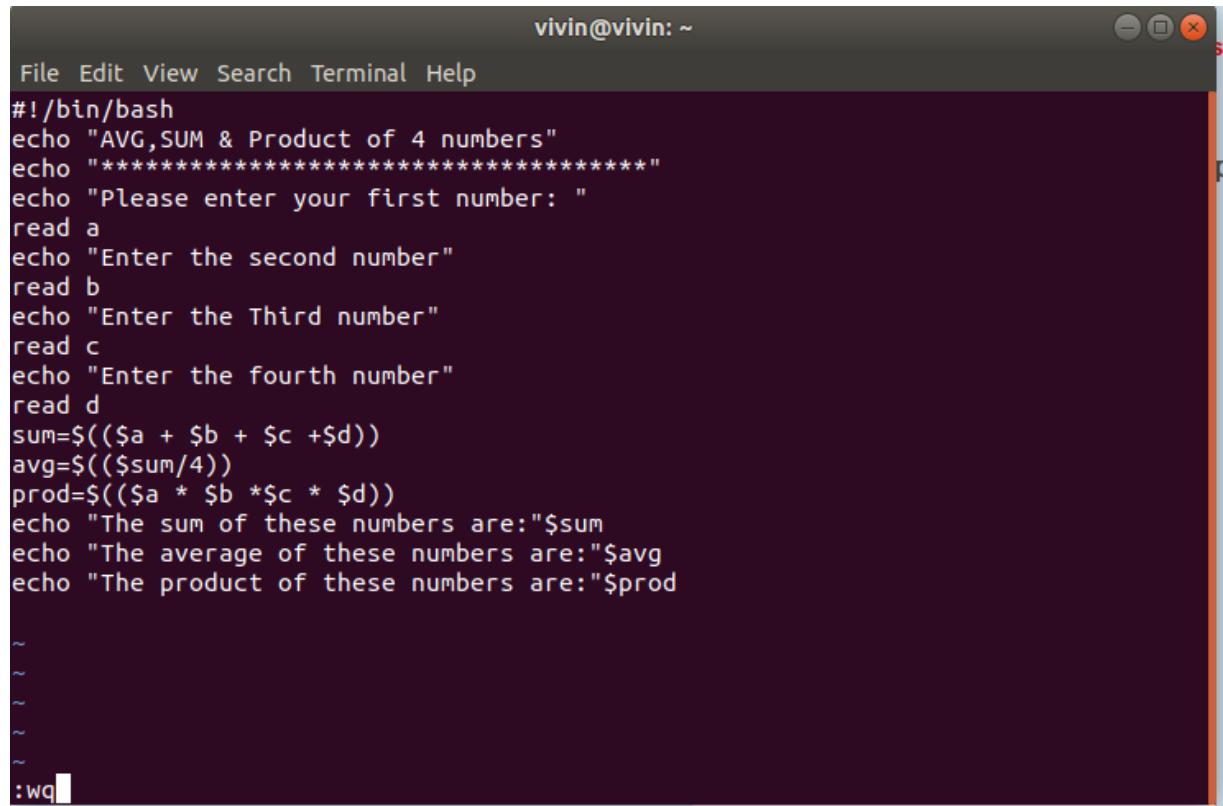
~
~
~
~
~
:wq
```

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

```
vivin@vivin:~$ vi sum.sh
vivin@vivin:~$ bash sum.sh
Sum of Numbers
*****
Sum of first 10 numbers =55
vivin@vivin:~$
```

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

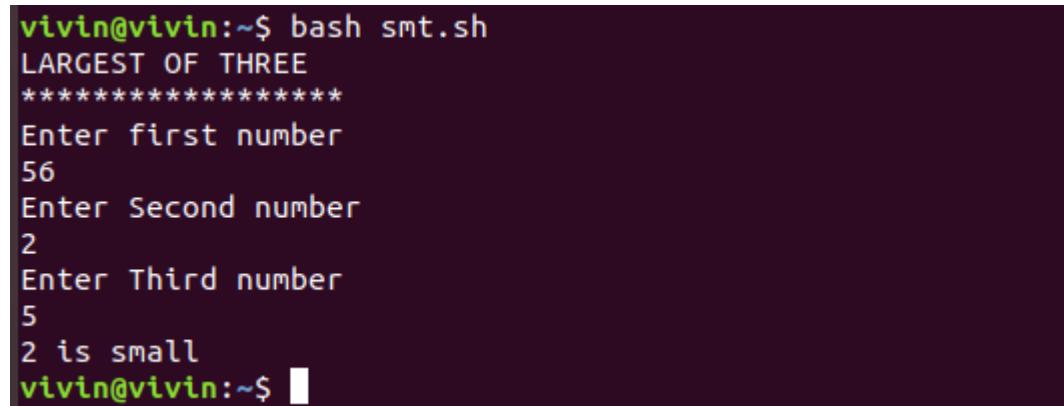
```
vivin@vivin:~$ bash sap.sh
AVG,SUM & Product of 4 numbers
*****
Please enter your first number:
6
Enter the second number
4
Enter the Third number
7
Enter the fourth number
3
The sum of these numbers are:20
The average of these numbers are:5
The product of these numbers are:504
vivin@vivin:~$
```



```
vivin@vivin: ~
File Edit View Search Terminal Help
#!/bin/bash
echo "AVG,SUM & Product of 4 numbers"
echo ****
echo "Please enter your first number: "
read a
echo "Enter the second number"
read b
echo "Enter the Third number"
read c
echo "Enter the fourth number"
read d
sum=$((a + b + c + d))
avg=$((sum/4))
prod=$((a * b * c * d))
echo "The sum of these numbers are:$sum"
echo "The average of these numbers are:$avg"
echo "The product of these numbers are:$prod"

~
~
~
~
~
:wq
```

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



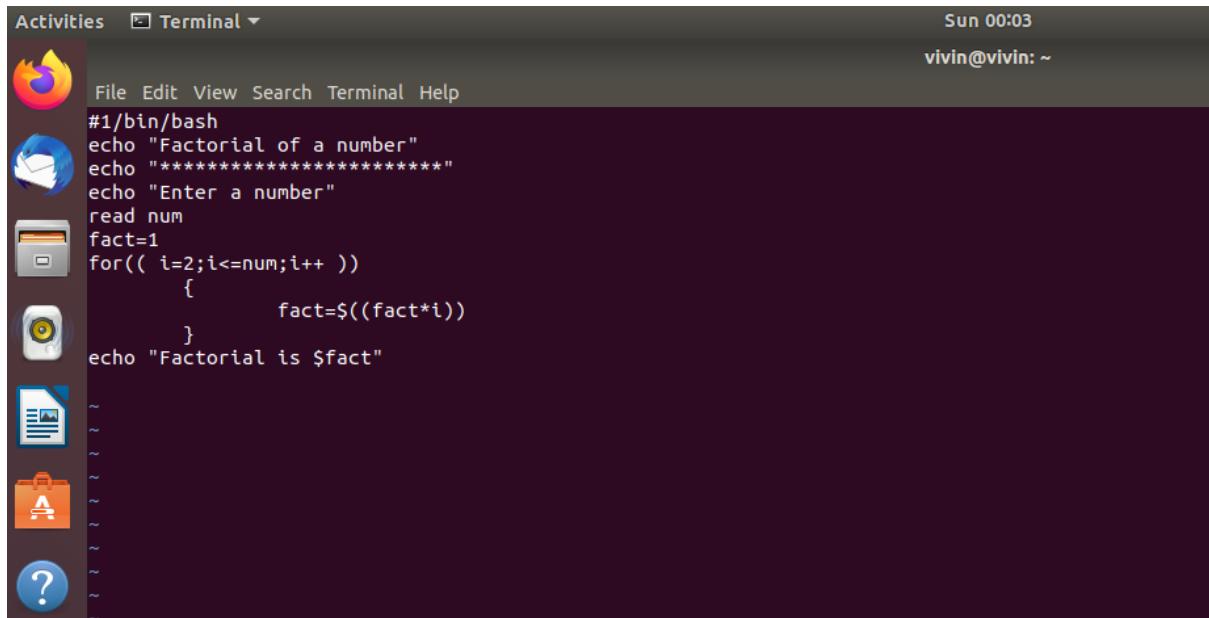
```
vivin@vivin:~$ bash smt.sh
LARGEST OF THREE
*****
Enter first number
56
Enter Second number
2
Enter Third number
5
2 is small
vivin@vivin:~$
```

```
#!/bin/bash
echo "LARGEST OF THREE"
echo ****
echo "Enter first number"
read a
echo "Enter Second number"
read b
echo "Enter Third number"
read c
if [ $a -lt $b ];
then
    if [ $a -lt $c ];
    then
        echo "$a is small"
    else
        echo "$c is small"
    fi
elif [ $b -lt $c ];
then
    echo "$b is small"
else
    echo "$c is small"
fi
```

~
~
~
~

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

```
vivin@vivin:~$ vi fact.sh
vivin@vivin:~$ bash fact.sh
Factorial of a number
*****
Enter a number
5
Factorial is 120
vivin@vivin:~$
```

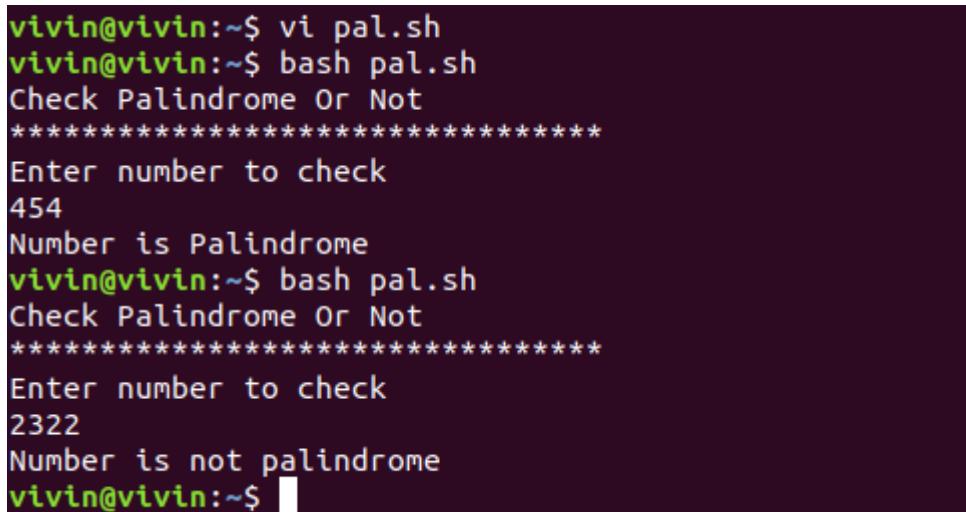


The screenshot shows a standard Ubuntu desktop environment. On the left, there's a dock with various icons: a browser, email, file manager, system settings, and a help/question icon. The main area is a terminal window titled "Terminal". The terminal shows a shell script named "factorial.sh" with the following code:

```
#!/bin/bash
echo "Factorial of a number"
echo ****
echo "Enter a number"
read num
fact=1
for(( i=2;i<=num;i++ ))
{
    fact=$((fact*i))
}
echo "Factorial is $fact"
```

The terminal output shows the script running and calculating the factorial of 5, which is 120.

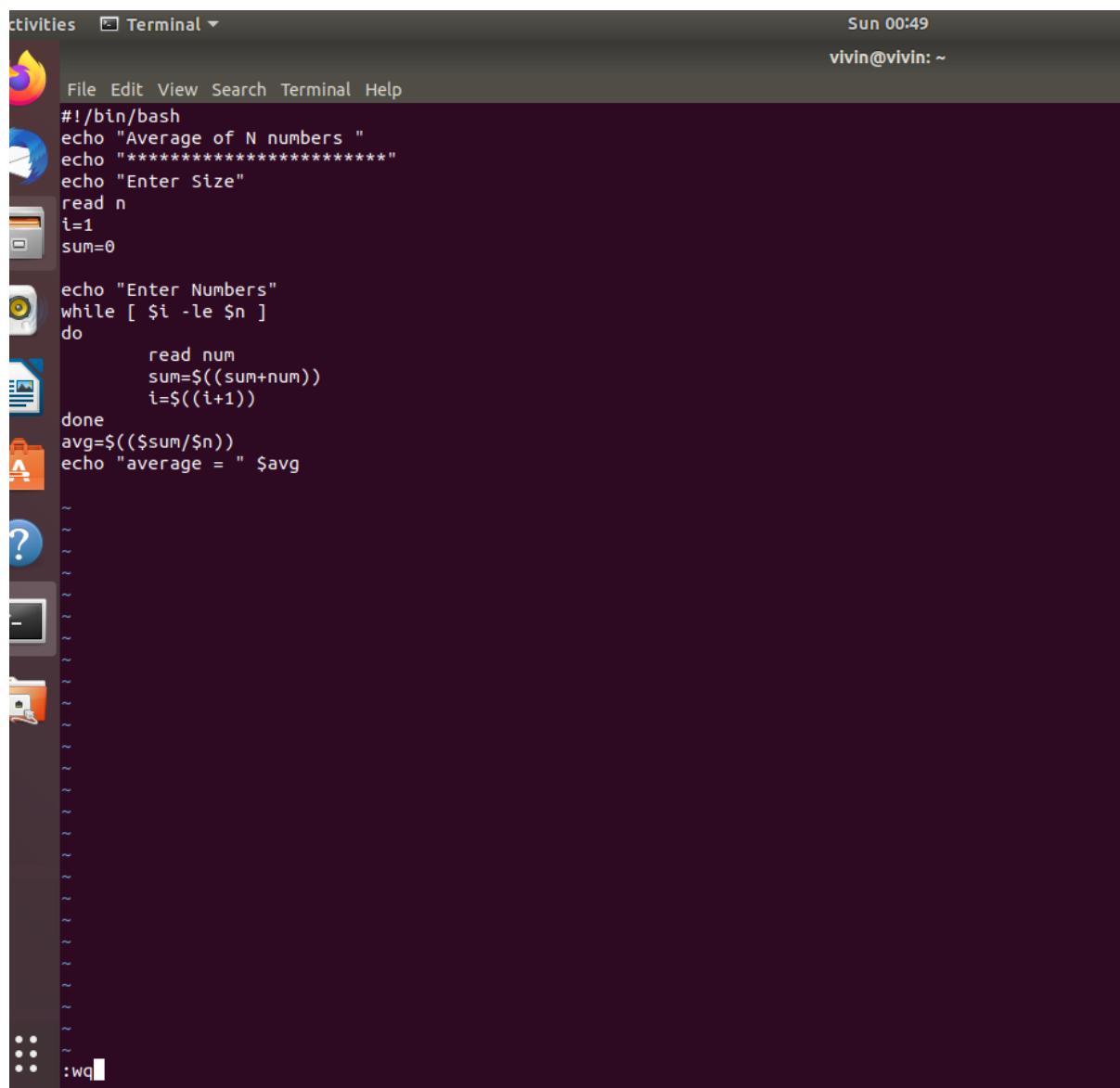
12. Write a shell program to check a number is palindrome or not



```
vivin@vivin:~$ vi pal.sh
vivin@vivin:~$ bash pal.sh
Check Palindrome Or Not
*****
Enter number to check
454
Number is Palindrome
vivin@vivin:~$ bash pal.sh
Check Palindrome Or Not
*****
Enter number to check
2322
Number is not palindrome
vivin@vivin:~$
```


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

```
vivin@vivin:~$ vi fa.sh
vivin@vivin:~$ bash fa.sh
Average of N numbers
*****
Enter Size
4
Enter Numbers
23
25
23
25
average = 24
vivin@vivin:~$
```



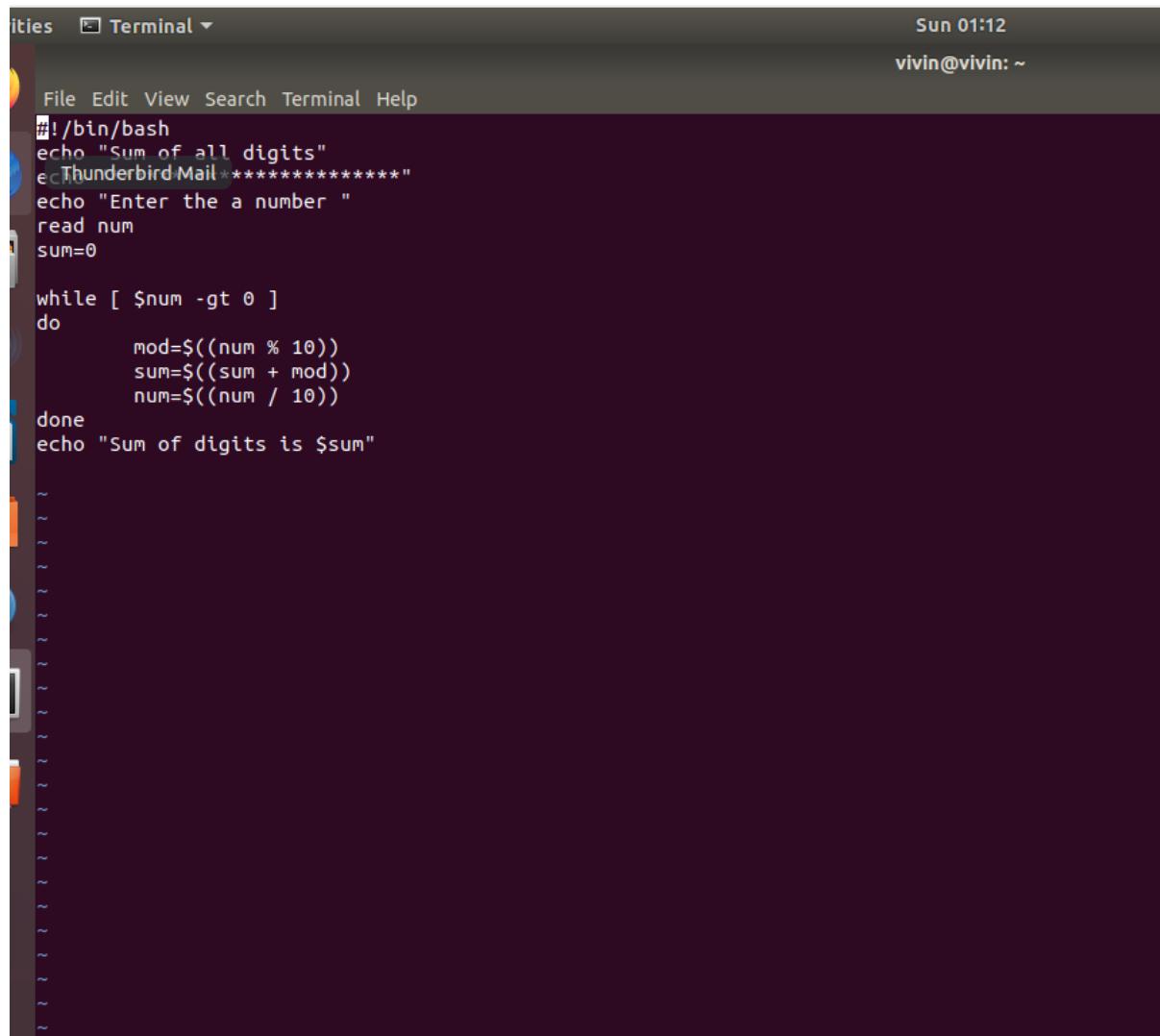
The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is "Terminal". The window contains a shell script named "fa.sh" which calculates the average of four input numbers (23, 25, 23, 25) and outputs "average = 24". The desktop background is dark, and there are various icons in the dock at the bottom.

```
#!/bin/bash
echo "Average of N numbers "
echo *****
echo "Enter Size"
read n
i=1
sum=0

echo "Enter Numbers"
while [ $i -le $n ]
do
    read num
    sum=$((sum+num))
    i=$((i+1))
done
avg=$((sum/n))
echo "average = " $avg
```

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

```
vivin@vivin:~$ vi sd.sh
vivin@vivin:~$ bash sd.sh
Sum of all digits
*****
Enter the a number
154
Sum of digits is 10
vivin@vivin:~$
```



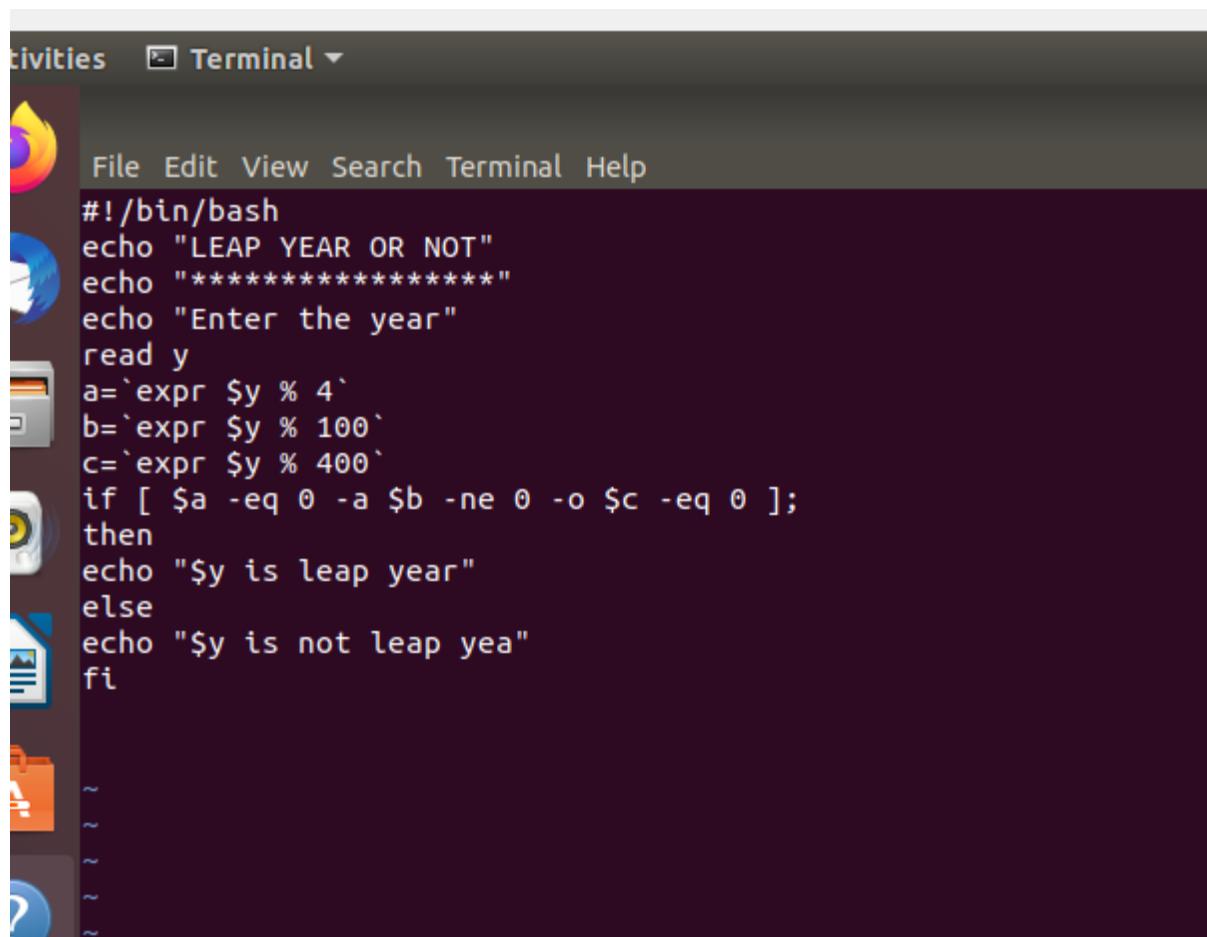
The screenshot shows a Linux desktop environment with a terminal window open. The terminal window has a dark background and light-colored text. At the top, it says "Terminal". In the title bar, there are icons for file, edit, view, search, terminal, and help. The status bar at the top right shows "Sun 01:12" and "vivin@vivin: ~". The terminal window contains the following code:

```
#!/bin/bash
echo "Sum of all digits"
echo *****
echo "Enter the a number "
read num
sum=0

while [ $num -gt 0 ]
do
    mod=$((num % 10))
    sum=$((sum + mod))
    num=$((num / 10))
done
echo "Sum of digits is $sum"
```

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

```
vivin@vivin:~$ vi lp.sh
vivin@vivin:~$ bash lp.sh
LEAP YEAR OR NOT
*****
Enter the year
2000
2000 is leap year
vivin@vivin:~$ bash lp.sh
LEAP YEAR OR NOT
*****
Enter the year
1997
1997 is not leap yea
vivin@vivin:~$
```



A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window titled "Terminal". The terminal window has a dark background and contains the source code for a shell script named "lp.sh". The script prompts the user for a year and checks if it's a leap year using the rules: divisible by 4, not divisible by 100, or divisible by 400. The terminal shows two runs of the script, one for the year 2000 (leap year) and one for the year 1997 (not a leap year).

```
File Edit View Search Terminal Help
#!/bin/bash
echo "LEAP YEAR OR NOT"
echo *****
echo "Enter the year"
read y
a=`expr $y % 4`
b=`expr $y % 100`
c=`expr $y % 400`
if [ $a -eq 0 -a $b -ne 0 -o $c -eq 0 ];
then
echo "$y is leap year"
else
echo "$y is not leap yea"
fi
```

Experiment No:12

Docker Installation

&

Run Ubuntu image in docker

Since no Hyper-V backend and Windows container in the System

Step 1: Install WSL 2backend

Open windows PowerShell as administrator and run then command:

```
dism.exe /online /enable-feature /featurename:Microsoft-Windows-Subsystem-Linux /all /norestart
```

Step 2: Enable Virtual Machine feature

Open windows PowerShell as administrator and run

```
dism.exe /online /enable-feature /featurename:VirtualMachinePlatform /all /norestart
```

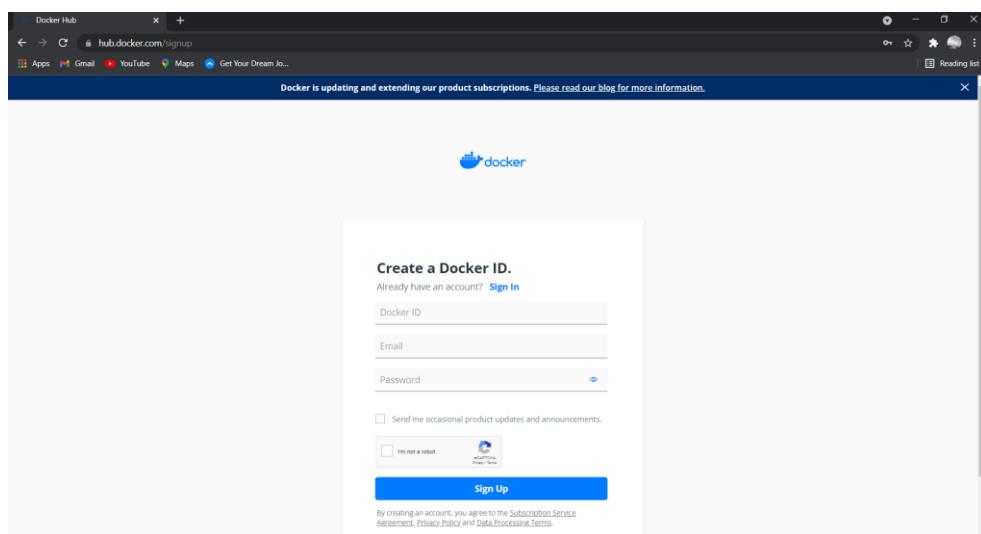
Step 3: Download the linux kernel update package from

<https://docs.microsoft.com/en-us/windows/wsl/install-manual>

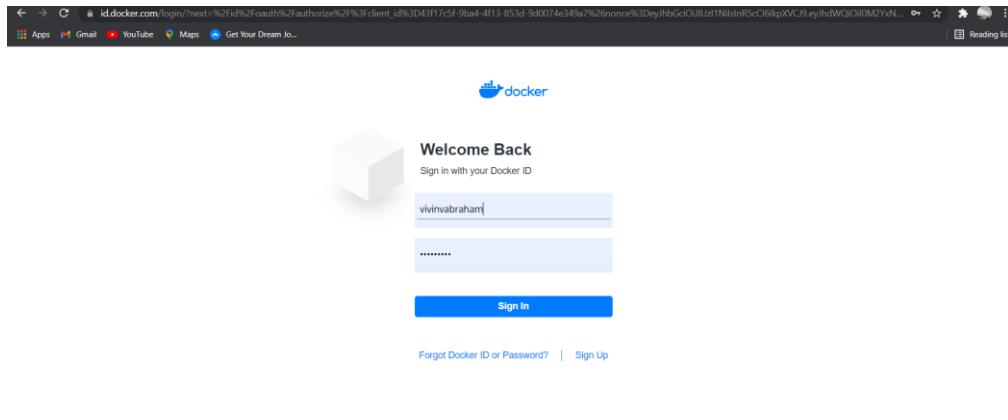
And run and check version in powershell by

```
wsl --set-default-version 2
```

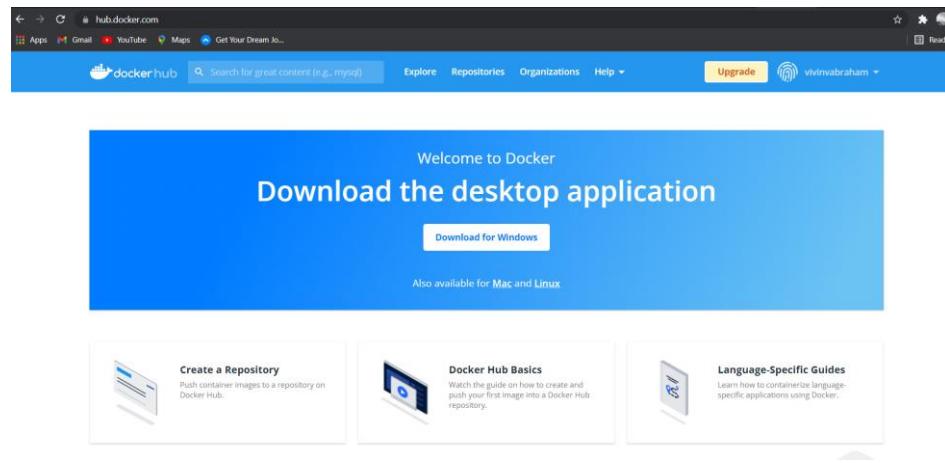
- Create an account in <https://hub.docker.com/>



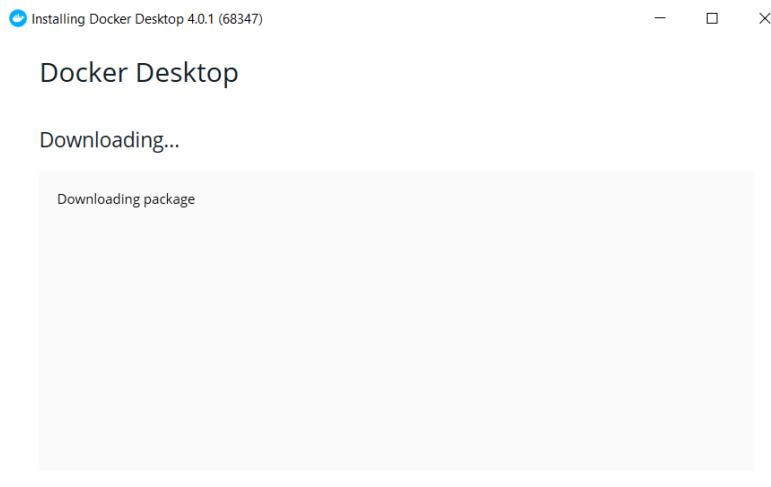
- Sign in



➤ Download Docker for desktop



➤ Run Docker desktop installer





➤ Open cmd as run as administrator

To check docker work properly

```
C:\Windows\System32\cmd.exe
(c) Microsoft Corporation. All rights reserved.

C:\Program Files\Docker\Docker>docker

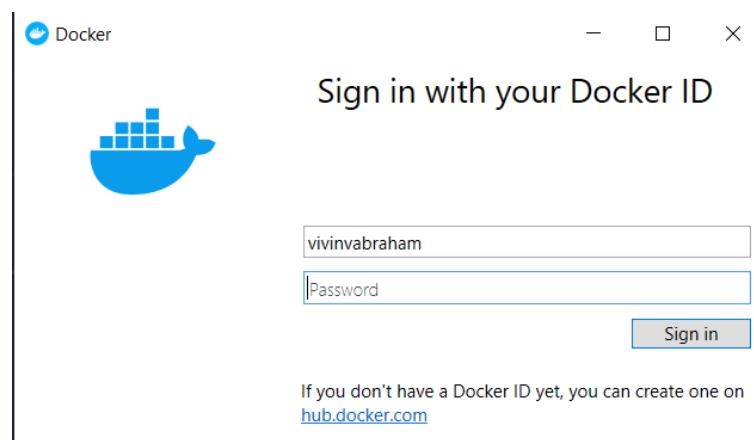
Usage: docker [OPTIONS] COMMAND

A self-sufficient runtime for containers

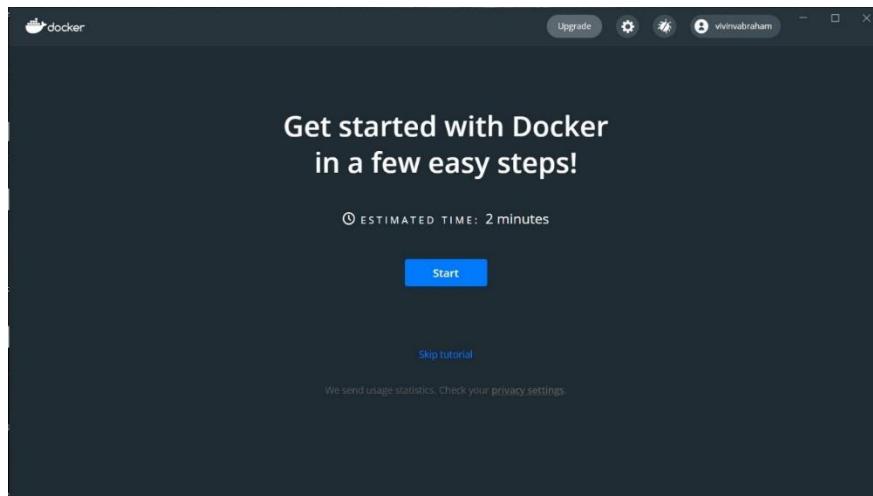
Options:
  --config string      Location of client config files (default "C:\\\\Users\\\\hp\\\\.docker")
  -c, --context string Name of the context to use to connect to the
                        daemon (overrides DOCKER_HOST env var and
                        default context set with "docker context use")
  -D, --debug          Enable debug mode
  -H, --host list      Daemon socket(s) to connect to
  -l, --log-level string Set the logging level
                        ("debug"|"info"|"warn"|"error"|"fatal")
                        (default "info")
  --tls               Use TLS; implied by --tlsverify
  --tlscacert string  Trust certs signed only by this CA (default
                        "C:\\\\Users\\\\hp\\\\.docker\\\\ca.pem")
  --tlscert string    Path to TLS certificate file (default
                        "C:\\\\Users\\\\hp\\\\.docker\\\\cert.pem")
  --tlskey string     Path to TLS key file (default
                        "C:\\\\Users\\\\hp\\\\.docker\\\\key.pem")
  --tlsverify         Use TLS and verify the remote
  -v, --version        Print version information and quit

Management Commands:
```

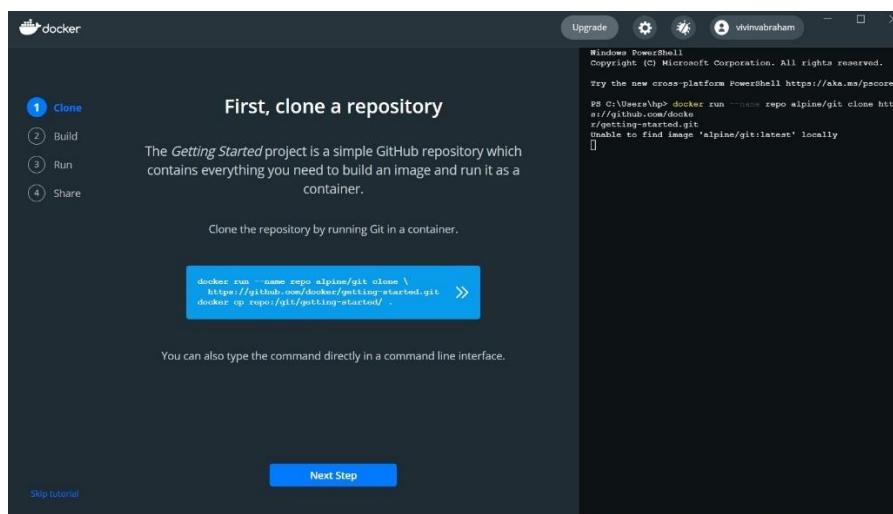
➤ Open docker desktop and Sign in



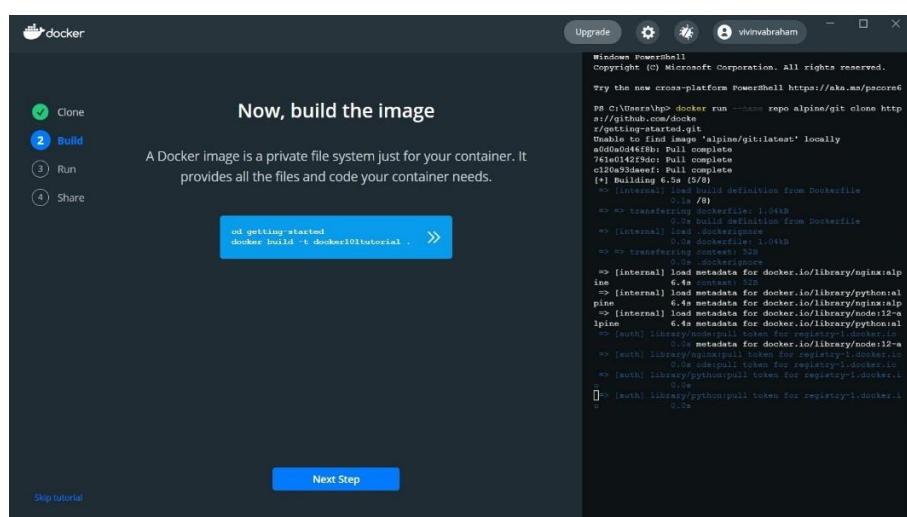
➤ Trial Steps to create container



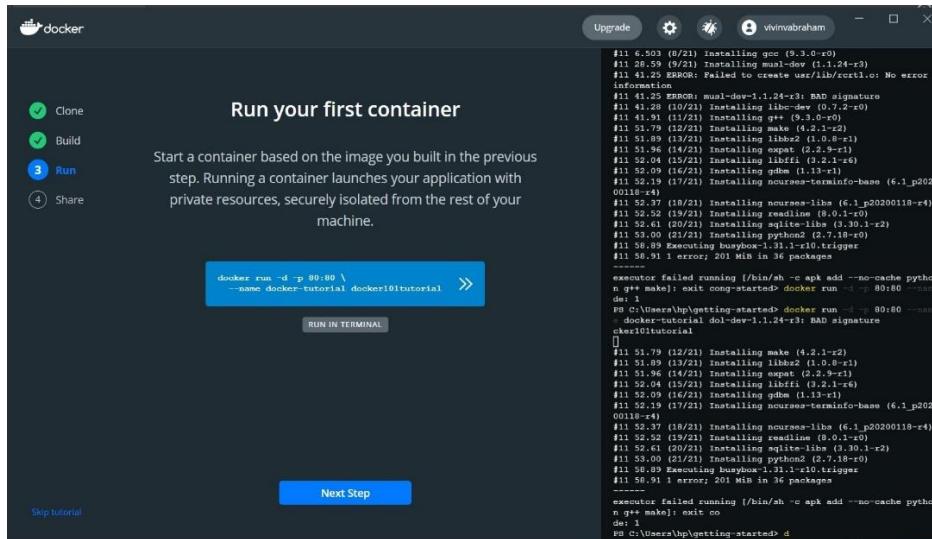
➤ Clone



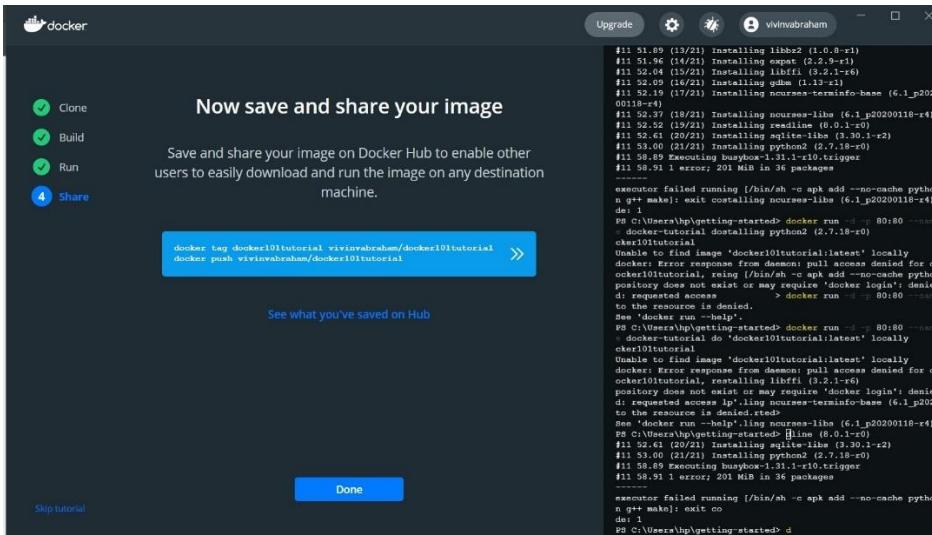
➤ Build



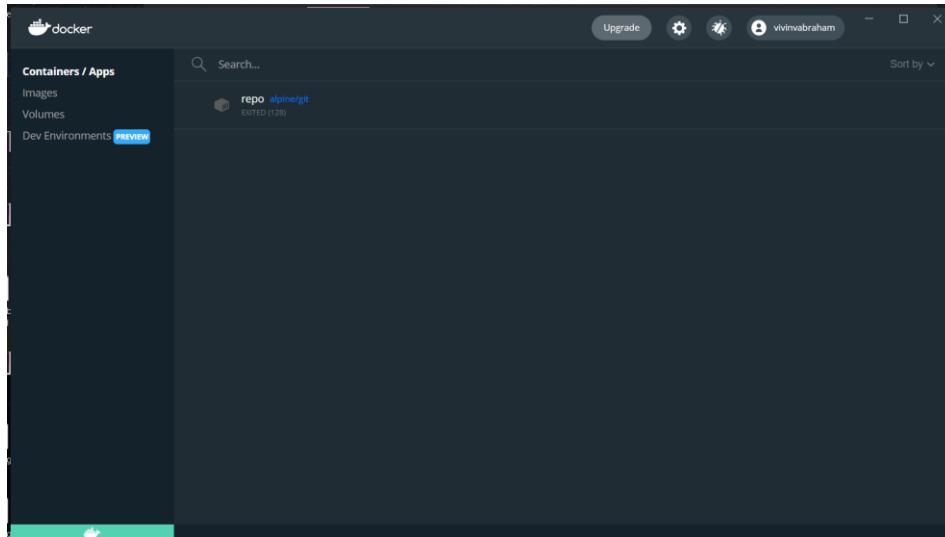
➤ Run



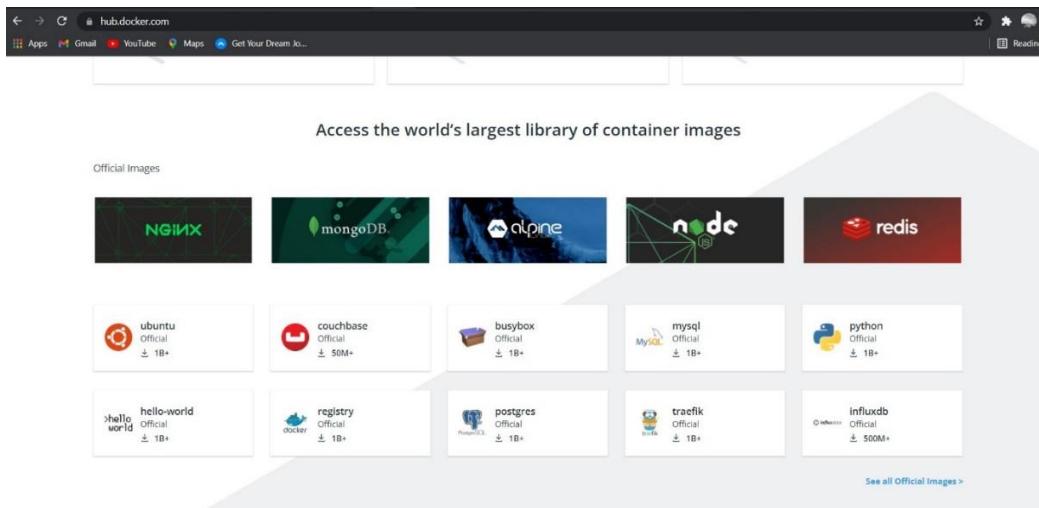
➤ Share



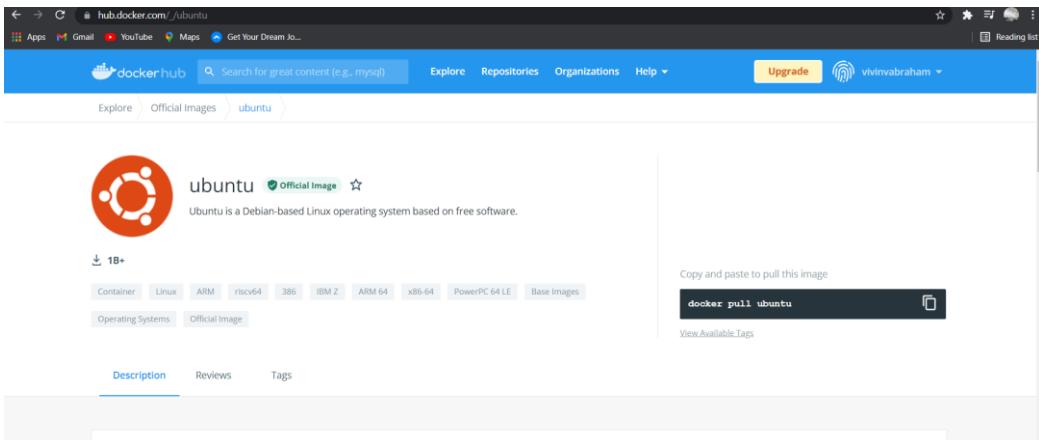
➤ After this



- Go to <https://hub.docker.com/> select image of ubuntu



- Copy the command



- And run that on cmd

```
C:\Windows\System32\cmd.exe
search      Search the Docker Hub for images
start       Start one or more stopped containers
stats       Display a live stream of container(s) resource usage statistics
stop        Stop one or more running containers
tag         Create a tag TARGET_IMAGE that refers to SOURCE_IMAGE
top         Display the running processes of a container
unpause    Unpause all processes within one or more containers
update     Update configuration of one or more containers
version    Show the Docker version information
wait       Block until one or more containers stop, then print their exit codes

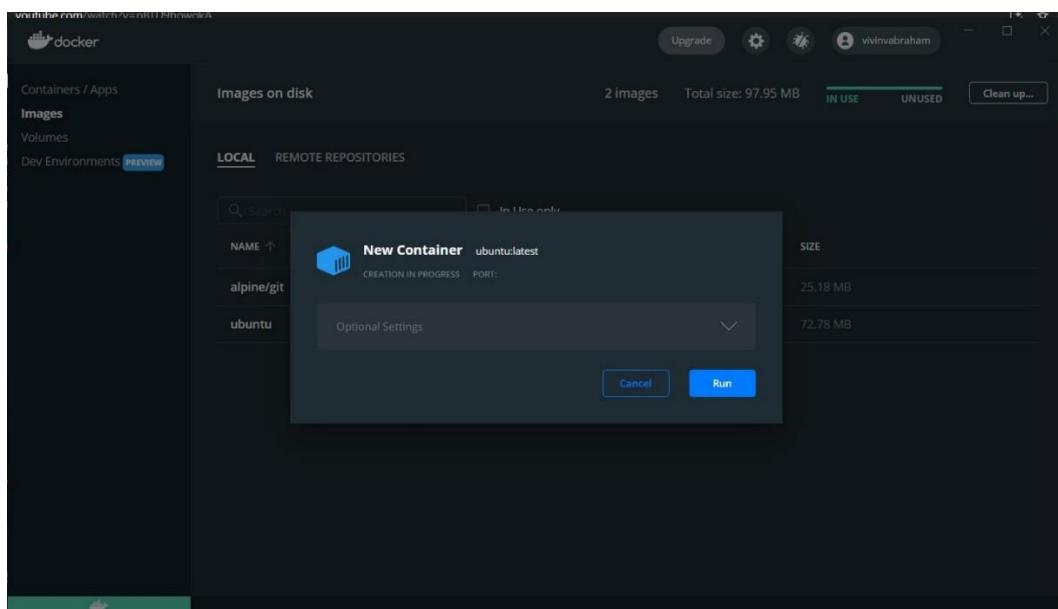
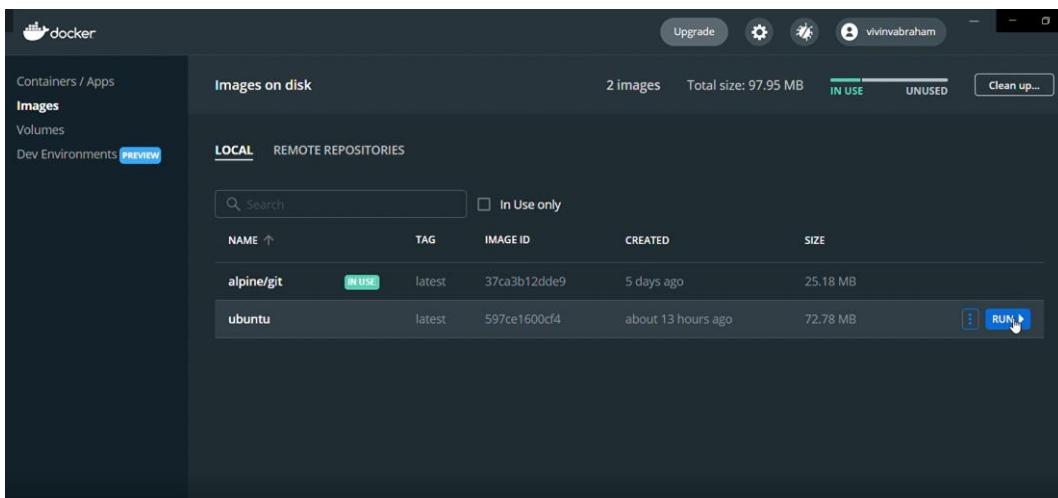
Run 'docker COMMAND --help' for more information on a command.

To get more help with docker, check out our guides at https://docs.docker.com/go/guides/

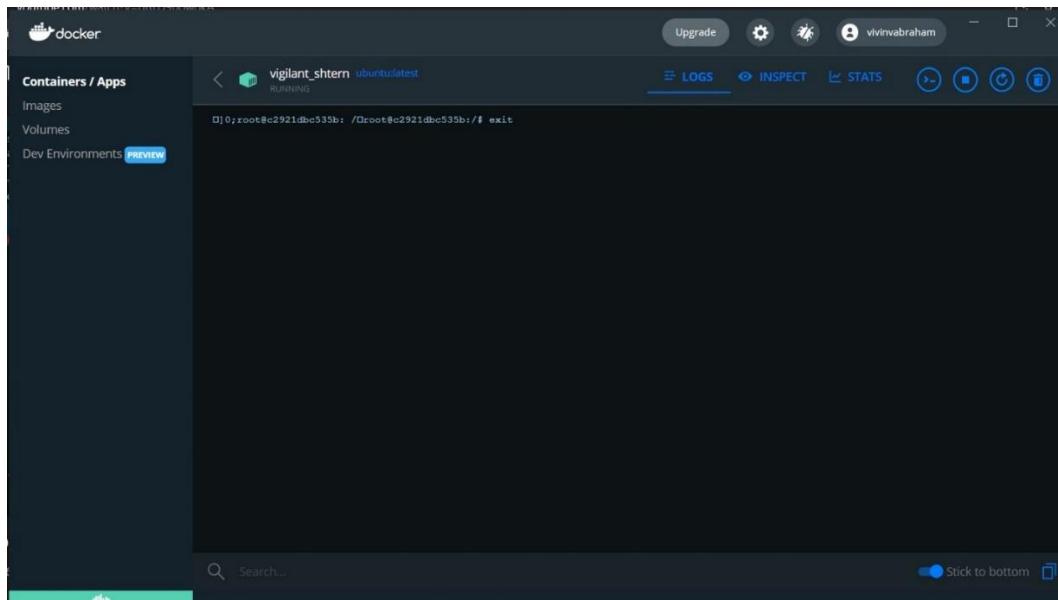
C:\Program Files\Docker\Docker>docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
35807b77a593: Pull complete
Digest: sha256:9d6a8699fb5c9c39cf08a0871bd6219f0400981c570894cd8cbea30d3424a31f
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest

C:\Program Files\Docker\Docker>
```

➤ Run ubuntu from docker



➤ Another screen will open



Experiment No:13

Wireshark Installation

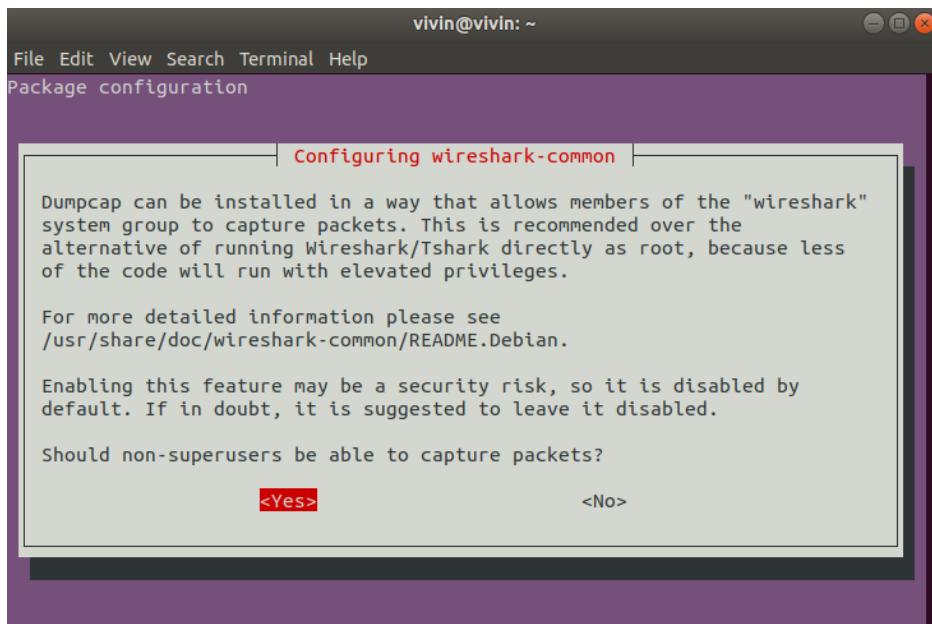
In terminal of ubuntu

sudo apt-get install wireshark

```
vivin@vivin:~$ sudo apt-get install wireshark
[sudo] password for vivin:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libc-ares2 libdouble-conversion1 libmaxminddb0 libnl-route-3-200
  libqgstools-p1 libqt5core5a libqt5dbus5 libqt5gui5 libqt5multimedia5
  libqt5multimedia5-plugins libqt5multimedawidgets5 libqt5networks
  libqt5opengl5 libqt5printsupport5 libqt5svg5 libqt5widgets5 libsmi2l
  libsnappy1v5 libspandsp2 libssh-gcrypt-4 libwireshark-data libwireshark11
  libwiretap8 libwscodecs2 libwsutil9 libxcb-xinerama0 qt5-gtk-platformtheme
  qttranslations5-l10n wireshark-common wireshark-qt
Suggested packages:
  mmdb-bin qt5-image-formats-plugins qtwayland5 snmp-mibs-downloader
  wireshark-doc
The following NEW packages will be installed:
  libc-ares2 libdouble-conversion1 libmaxminddb0 libnl-route-3-200
  libqgstools-p1 libqt5core5a libqt5dbus5 libqt5gui5 libqt5multimedias
  libqt5multimedia5-plugins libqt5multimedawidgets5 libqt5networks
  libqt5opengl5 libqt5printsupport5 libqt5svg5 libqt5widgets5 libsmi2l
  libsnappy1v5 libspandsp2 libssh-gcrypt-4 libwireshark-data libwireshark11
  libwiretap8 libwscodecs2 libwsutil9 libxcb-xinerama0 qt5-gtk-platformtheme
  qttranslations5-l10n wireshark wireshark-common wireshark-qt
0 upgraded, 31 newly installed, 0 to remove and 0 not upgraded.
Need to get 30.2 MB of archives.
After this operation, 149 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libdouble-conversion1 amd64 2.0.1-4ubuntu1
Get:2 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 libqt5core5a amd64 5.9.5+dfsg-0ubuntu1
Get:3 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 libqt5dbus5 amd64 5.9.5+dfsg-0ubuntu1
Get:4 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 libqt5networks amd64 5.9.5+dfsg-0ubuntu1
Get:5 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 libxcb-xinerama0 amd64 1.13-2ubuntu1
Get:6 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 libqt5gui5 amd64 5.9.5+dfsg-0ubuntu1
Get:7 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 libqt5widgets5 amd64 5.9.5+dfsg-0ubuntu1
Get:8 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libqt5svg5 amd64 5.9.5-0ubuntu1 [128 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 libmaxminddb0 amd64 1.3.1-1 [25.6 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libnl-route-3-200 amd64 3.2.29-0ubuntu1
Get:11 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 libqt5multimedia5 amd64 5.9.5-0ubuntu1
Get:12 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 libqt5opengl5 amd64 5.9.5+dfsg-0ubuntu1
Get:13 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 libqt5multimedawidgets5 amd64 5.9.5+dfsg-0ubuntu1
Get:14 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 libqgstools-p1 amd64 5.9.5-0ubuntu1
Get:15 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 libqt5multimedia5-plugins amd64 5.9.5+dfsg-0ubuntu1
Get:16 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 libqt5printsupport5 amd64 5.9.5+dfsg-0ubuntu1
Get:17 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libsmi2l amd64 0.4.8+dfsg2-15 [100 kB]
Get:18 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 libspandsp2 amd64 0.0.6+dfsg-0.1 [5 kB]
```

sudo dpkg-reconfigure wireshark-common

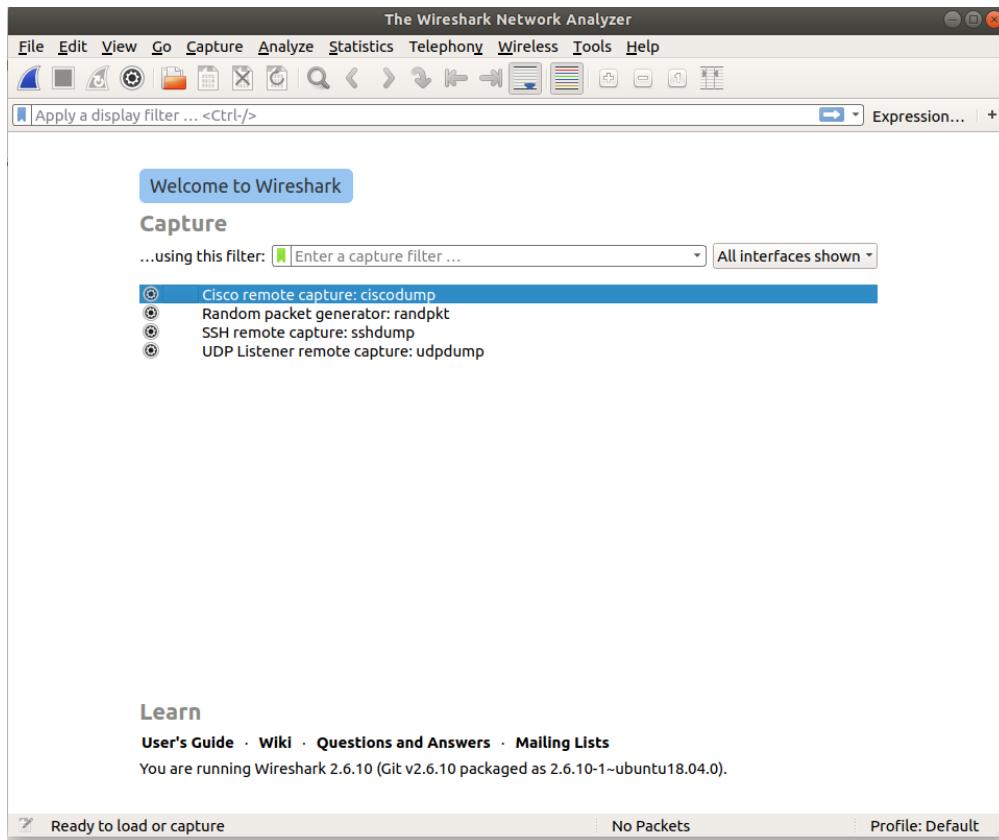
```
vivin@vivin:~$ Processing triggers for mime-support (3.60ubuntu1) ...
vivin@vivin:~$ sudo dpkg-reconfigure wireshark-common
vivin@vivin:~$
```



sudo adduser \$USER wireshark

```
vivin@vivin:~$ sudo dpkg-reconfigure wireshark-common
vivin@vivin:~$ sudo adduser $USER wireshark
Adding user `vivin' to group `wireshark' ...
Adding user vivin to group wireshark
Done.
vivin@vivin:~$
```

Open Wireshark from Applications

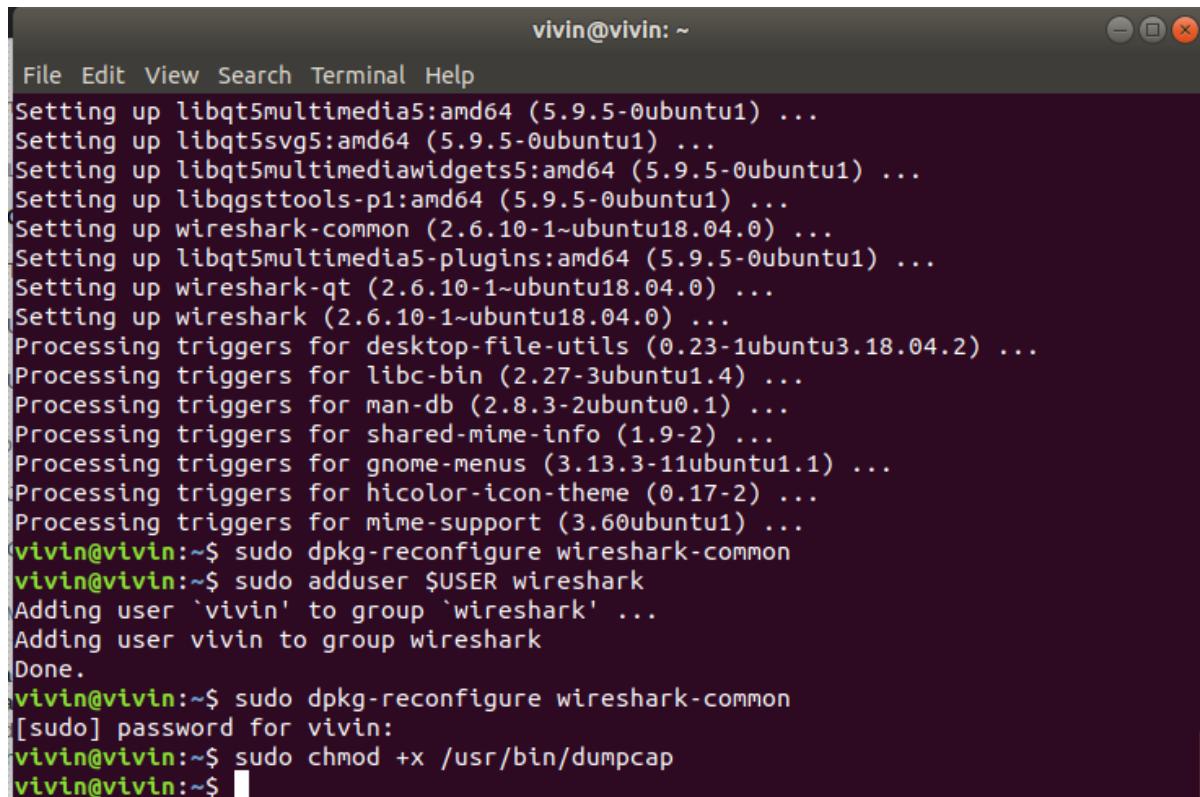


Since showing

"couldn't run /usr/bin/dumpcap in child process

Use command

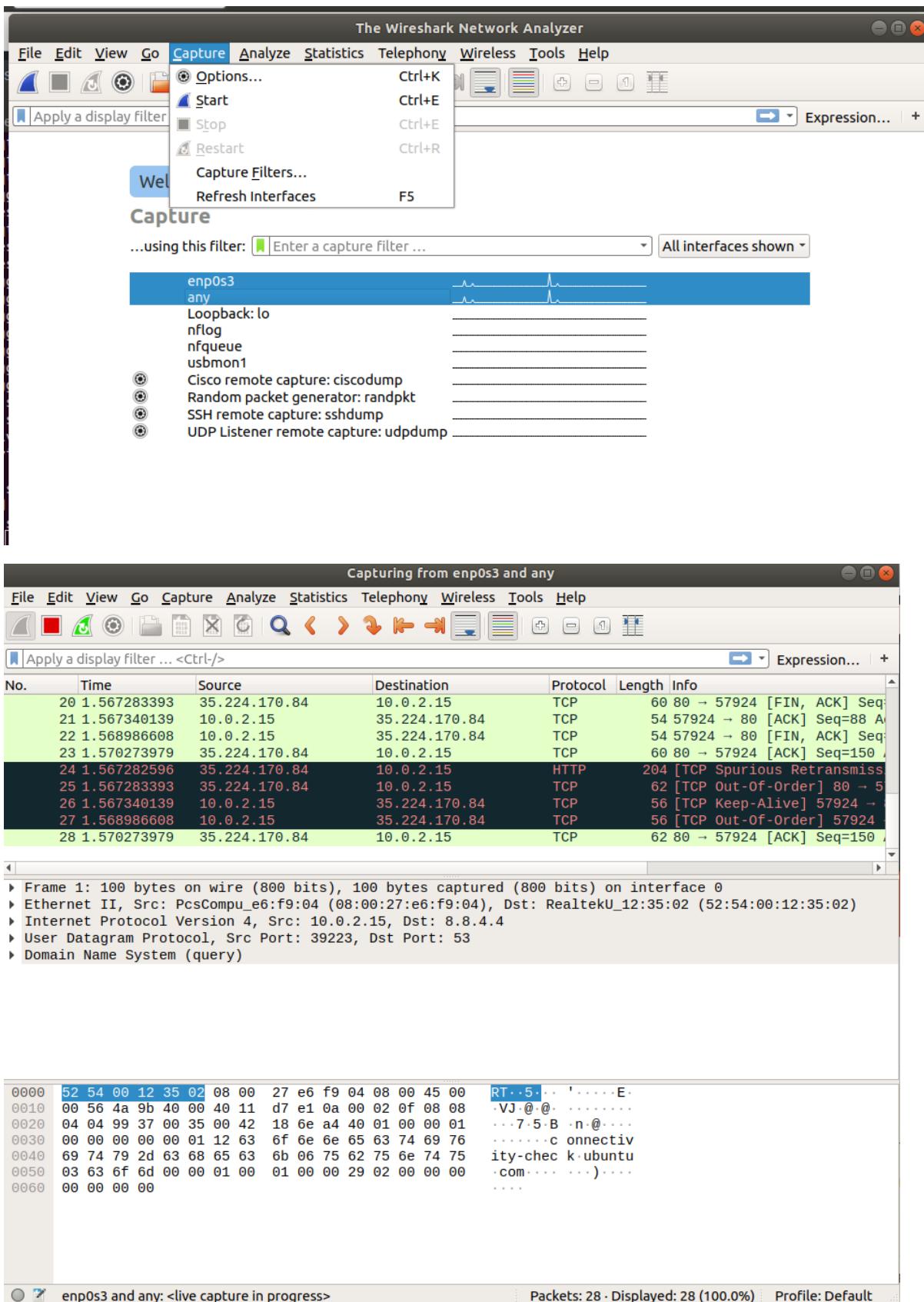
sudo chmod +x /usr/bin/dumpcap



```
vivin@vivin: ~
File Edit View Search Terminal Help
Setting up libqt5multimedia5:amd64 (5.9.5-0ubuntu1) ...
Setting up libqt5svg5:amd64 (5.9.5-0ubuntu1) ...
Setting up libqt5multimediawidgets5:amd64 (5.9.5-0ubuntu1) ...
Setting up libqgsttools-p1:amd64 (5.9.5-0ubuntu1) ...
Setting up wireshark-common (2.6.10-1~ubuntu18.04.0) ...
Setting up libqt5multimedia5-plugins:amd64 (5.9.5-0ubuntu1) ...
Setting up wireshark-qt (2.6.10-1~ubuntu18.04.0) ...
Setting up wireshark (2.6.10-1~ubuntu18.04.0) ...
Processing triggers for desktop-file-utils (0.23-1ubuntu3.18.04.2) ...
Processing triggers for libc-bin (2.27-3ubuntu1.4) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for shared-mime-info (1.9-2) ...
Processing triggers for gnome-menus (3.13.3-11ubuntu1.1) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for mime-support (3.60ubuntu1) ...
vivin@vivin:~$ sudo dpkg-reconfigure wireshark-common
vivin@vivin:~$ sudo adduser $USER wireshark
Adding user `vivin' to group `wireshark' ...
Adding user vivin to group wireshark
Done.
vivin@vivin:~$ sudo dpkg-reconfigure wireshark-common
[sudo] password for vivin:
vivin@vivin:~$ sudo chmod +x /usr/bin/dumpcap
vivin@vivin:~$
```

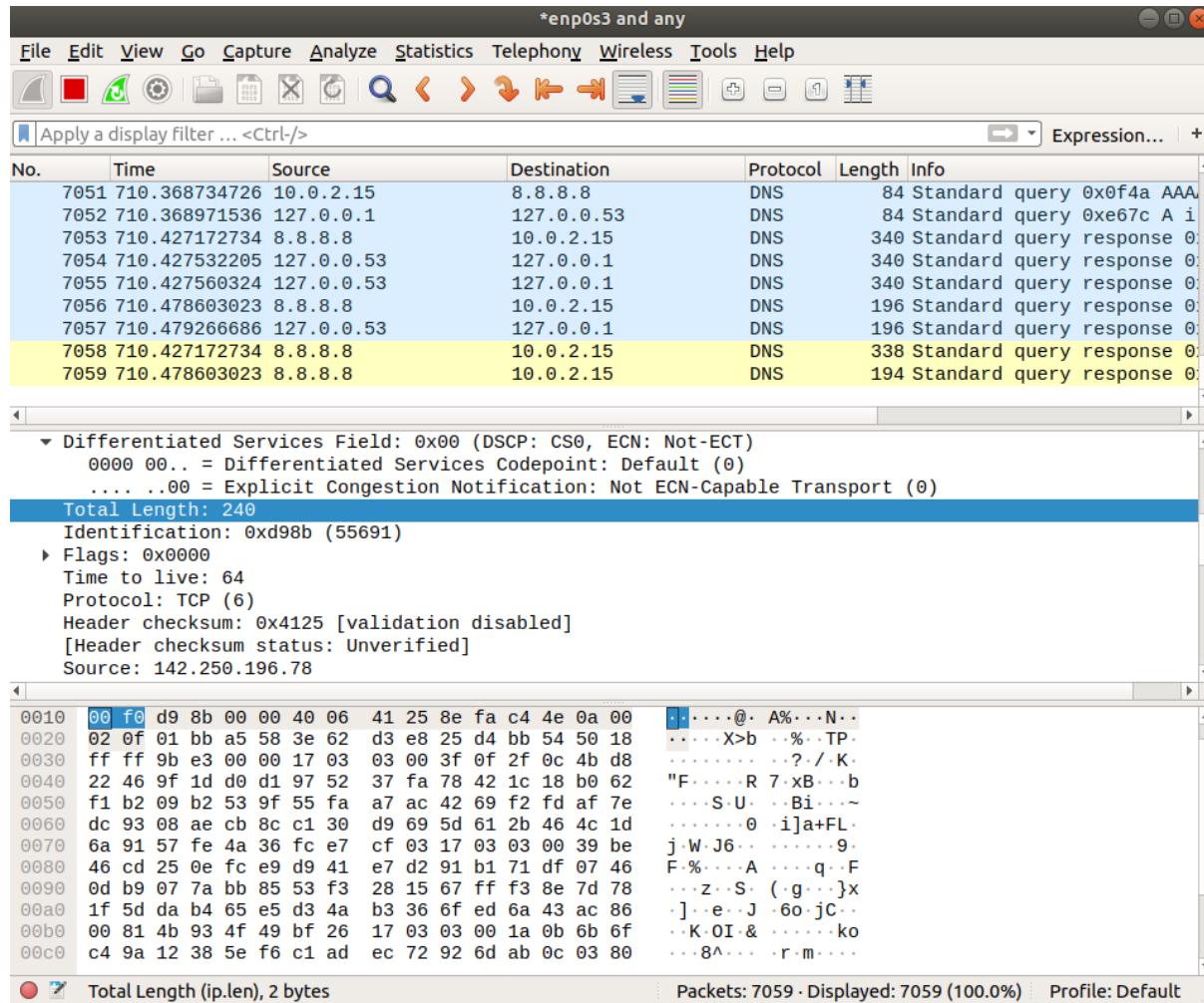
Capturing Data Packets on Wireshark

- When you open Wireshark, you see a screen that shows you a list of all of the network connections you can monitor. You also have a capture filter field, so you only capture the network traffic you want to see.
- You can select one or more of the network interfaces using “shift left-click.” Once you have the network interface selected, you can start the capture, and there are several ways to do that.
- Click the first button on the toolbar, titled “Start Capturing Packets.”



Analyzing Data Packets on Wireshark

- Wireshark shows you three different panes for inspecting packet data. The Packet List, the top pane, is a list of all the packets in the capture. When you click on a packet, the other two panes change to show you the details about the selected packet. You can also tell if the packet is part of a conversation. Here are some details about each column in the top pane:



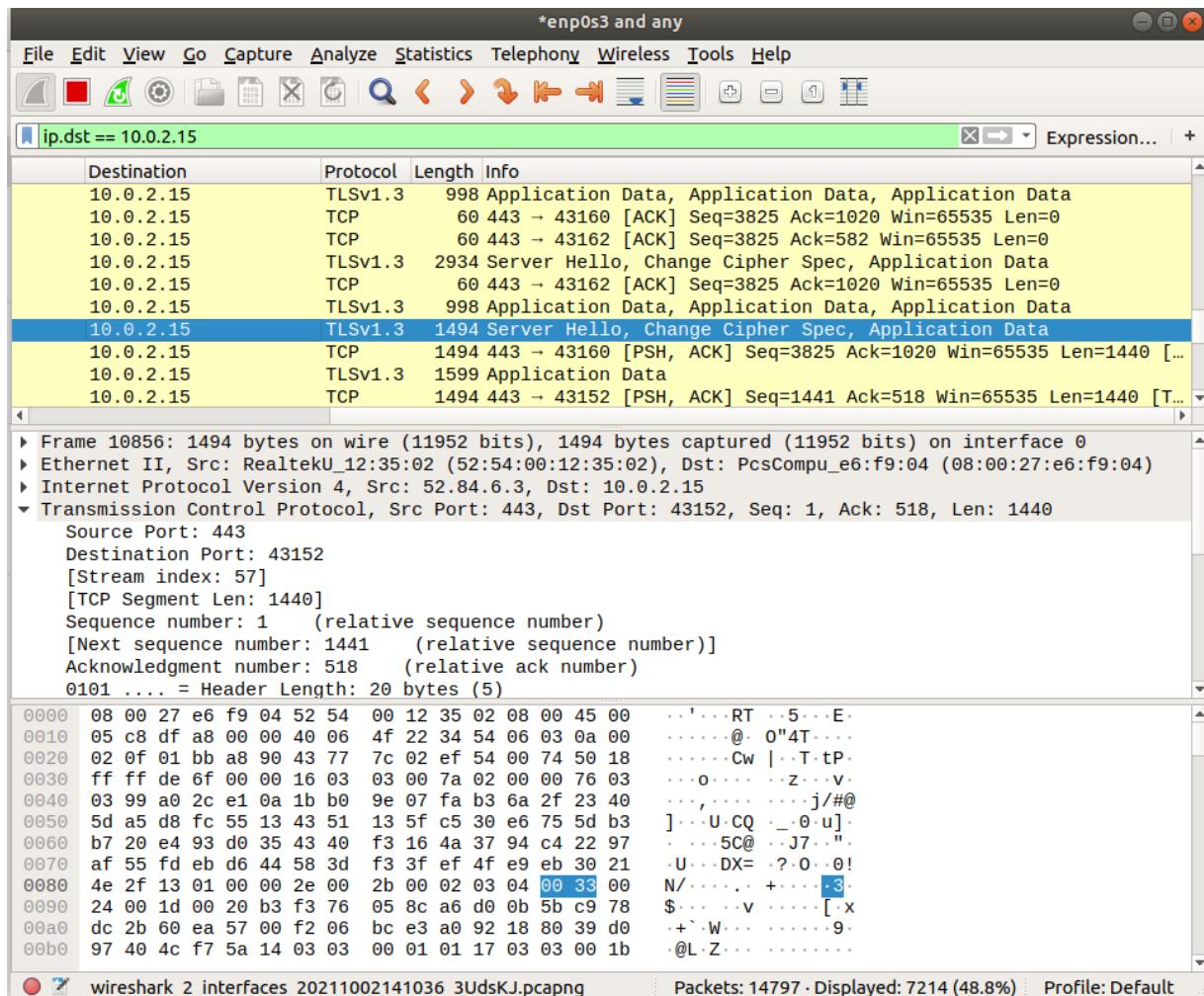
In panel

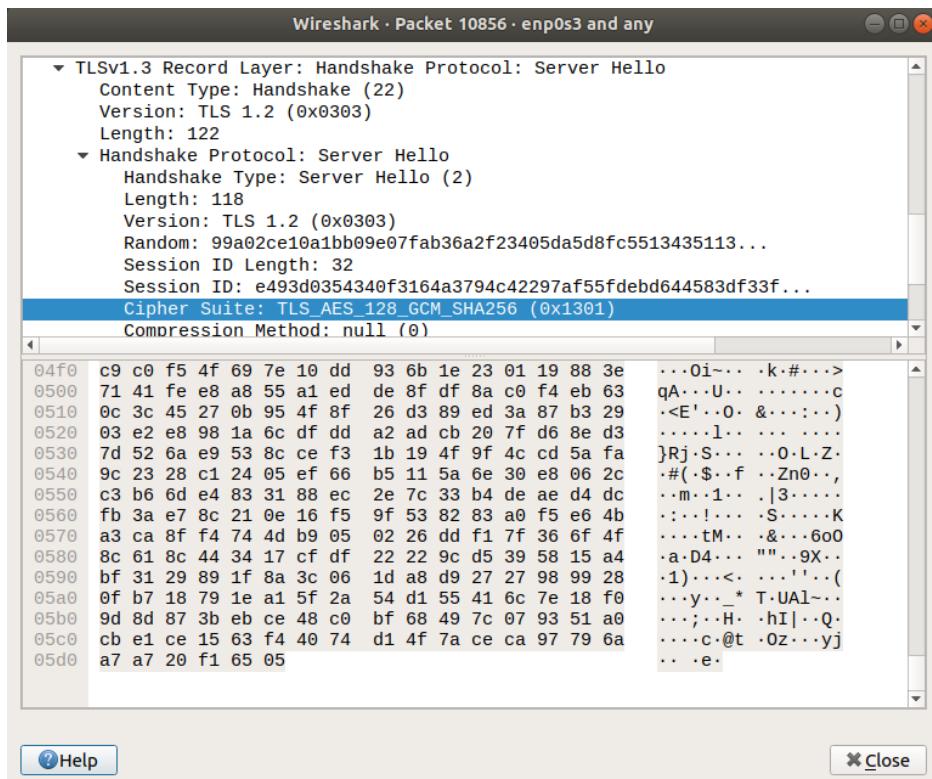
- No.:** This is the number order of the packet that got captured. The bracket indicates that this packet is part of a conversation.
- Time:** This column shows you how long after you started the capture that this packet got captured. You can change this value in the Settings menu if you need something different displayed.
- Source:** This is the address of the system that sent the packet.
- Destination:** This is the address of the destination of that packet.

- Protocol:** This is the type of packet, for example, TCP, DNS, DHCPv6, or ARP.
- Length:** This column shows you the length of the packet in bytes.
- Info:** This column shows you more information about the packet contents, and will vary depending on what kind of packet it is.

Find details of a particular packet by clicking that on first panel

Details can take on the below panels or new window

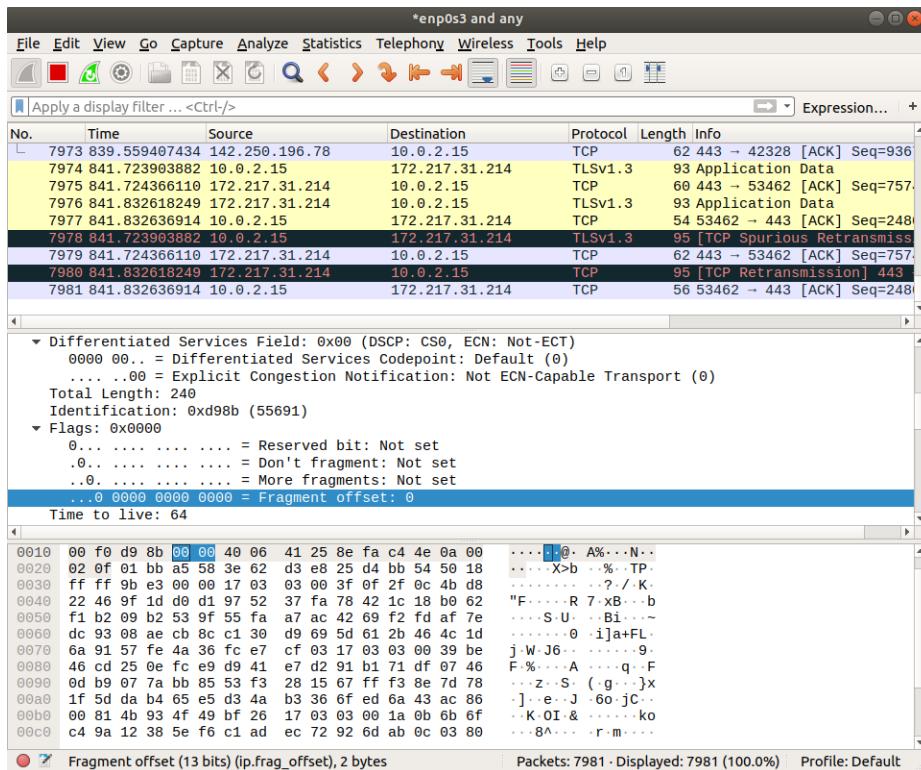




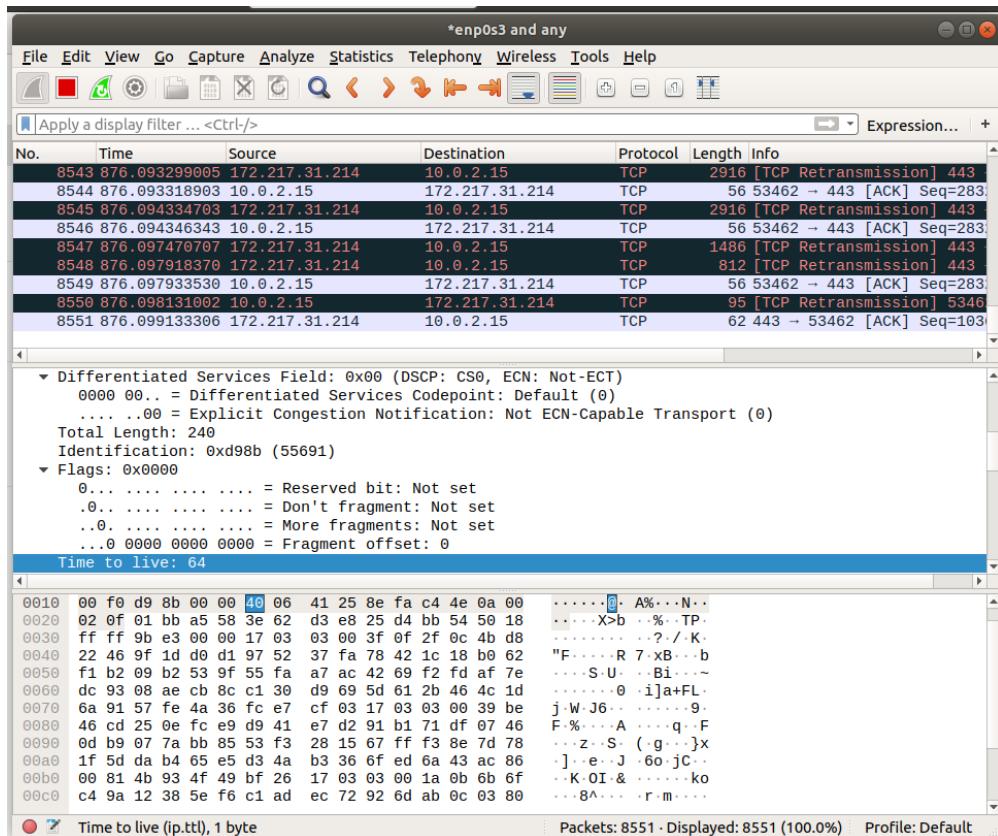
Find the fields from 3 rd panel by clicking them and the field will automatically select from 2 nd panel

Some fields

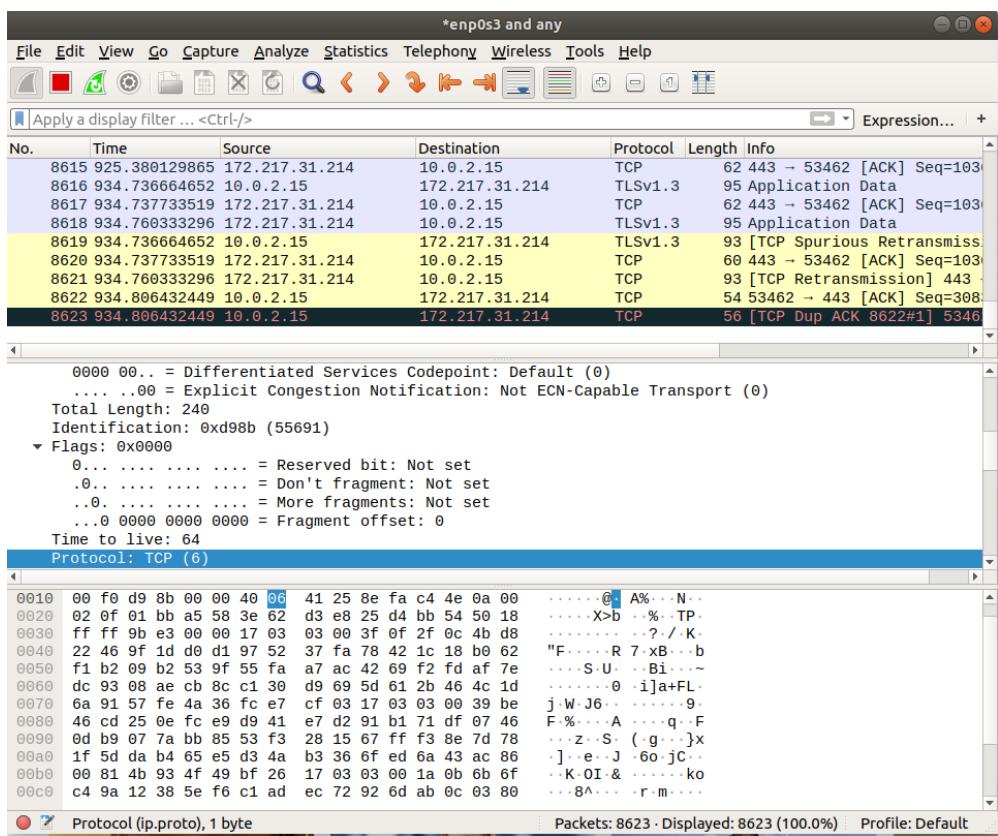
1. Fragment offset



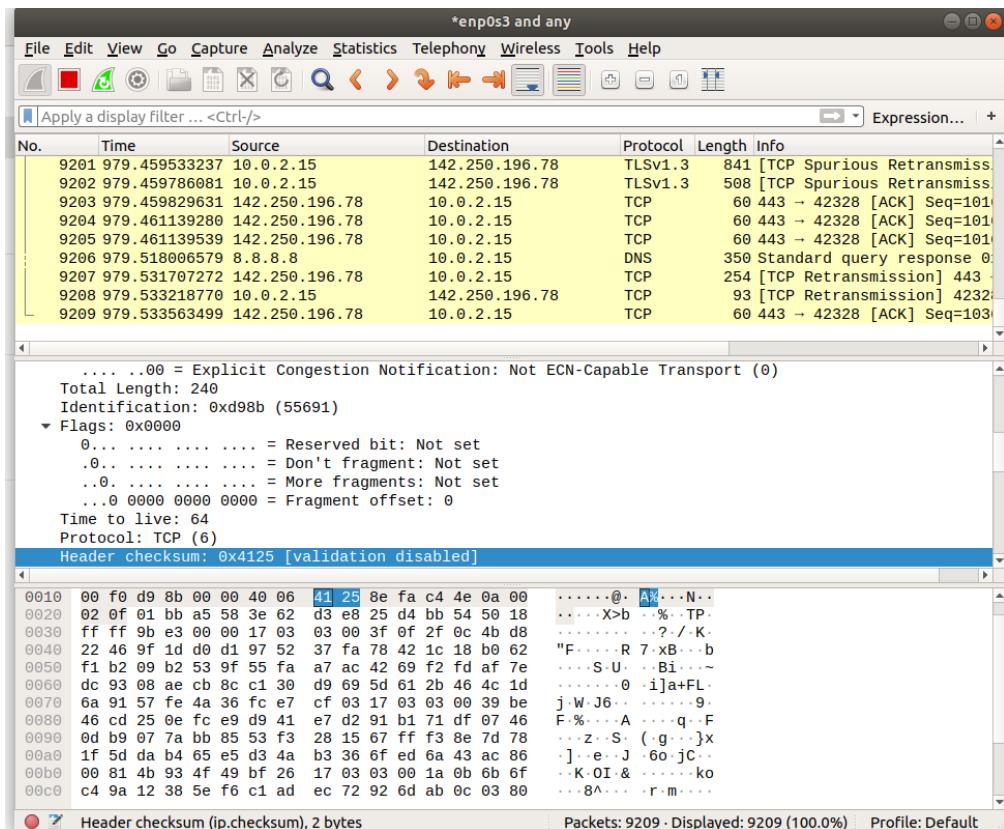
2. Time to live



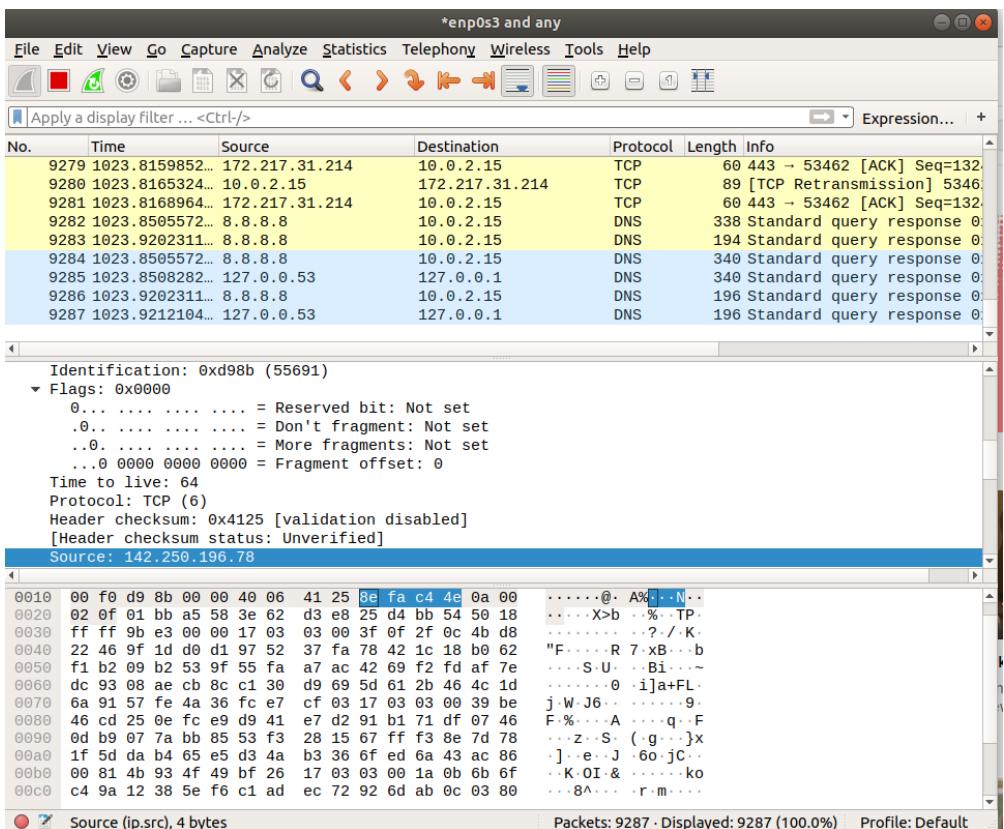
3. Protocol



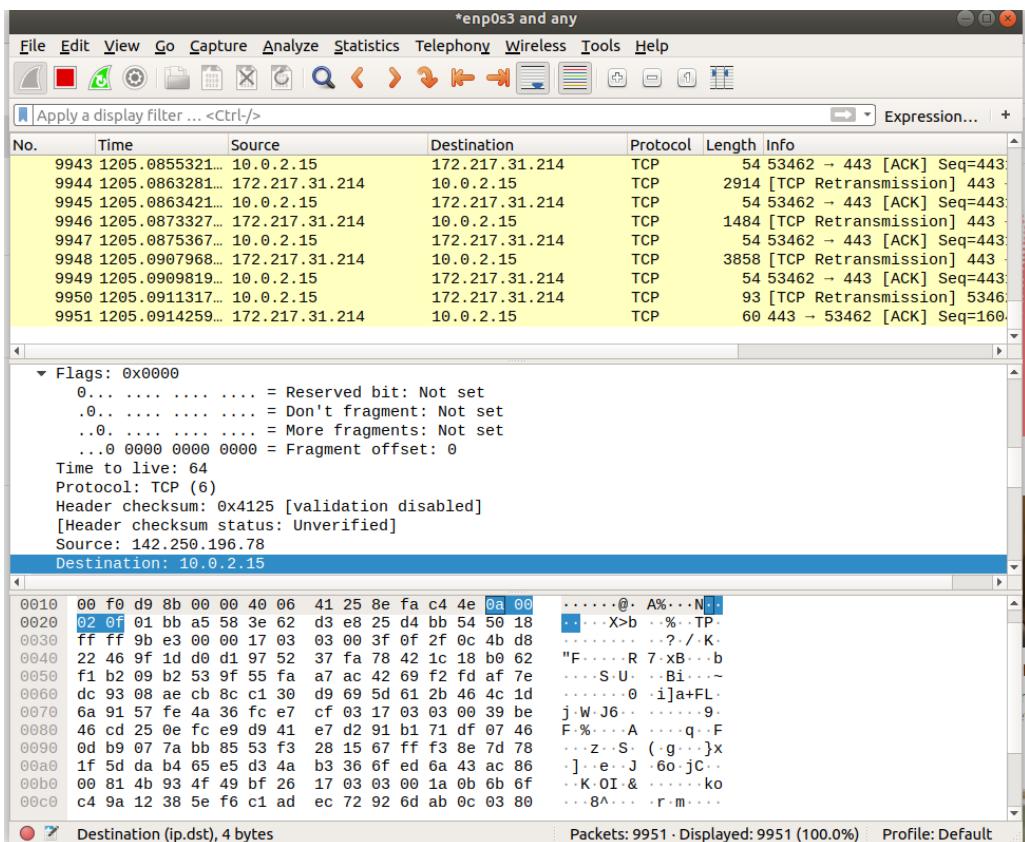
4.Header Checksum



6.Source address



7.Destination address



8.Nest Sequence number

