

Networking and System Administration Lab

Lab Record

Vimal Thomson

Roll No: 40

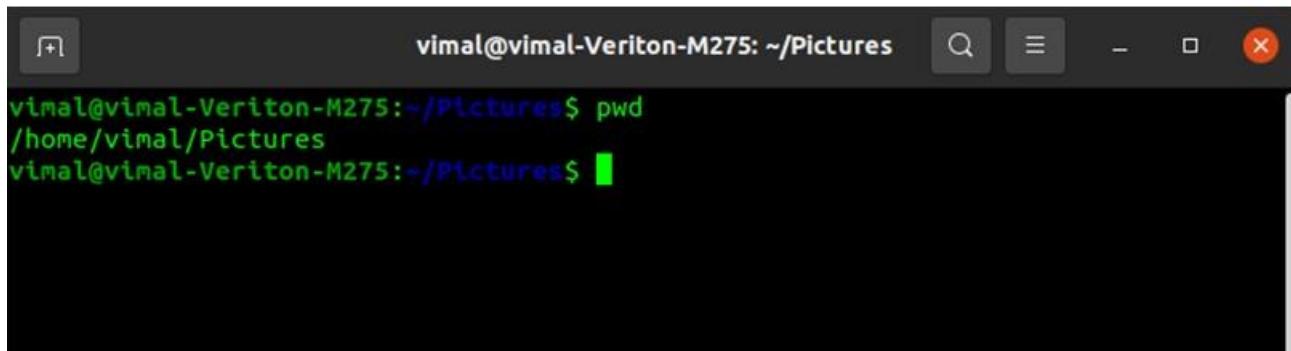
Batch: RMCA-B

S.No	Experiment
1	Basic Linux Commands (pwd,man,cd,ls etc....)
2	Basic Linux Commands (echo,read,head,more,less etc....)
3	Basic Linux Commands (cp,mv,grep,useradd,usermod etc....)
4	Basic Linux Commands (groupadd,groupdel etc...)
5	Practice Questions
6	Network Commands (tcpdump,route,traceroute etc....)
7	LAMP Stack Installation
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9	Analyzing network packet stream using tcpdump
10	Shell Scripting
11	Installation and deployment of docker
12	Analyzing network packet stream using nc and wireshark

BASIC LINUX COMMANDS

1. **pwd(PrintWorkingDirectory)**

Use the pwd command to find out the path of the current working directory (folder) you're in.

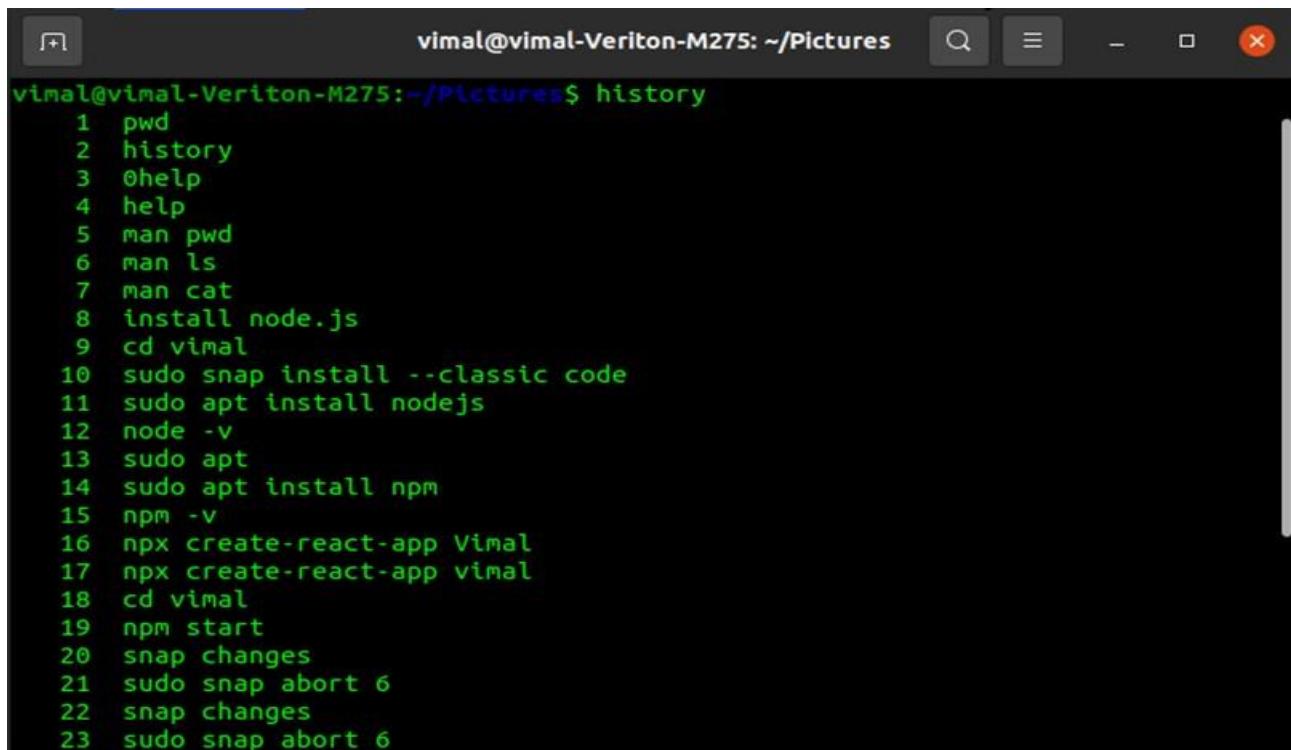


A screenshot of a terminal window titled "vimal@vimal-Veriton-M275: ~/Pictures". The window shows the command "pwd" being run, which outputs the path "/home/vimal/Pictures". The terminal has a dark background with light-colored text and standard window controls at the top.

```
vimal@vimal-Veriton-M275:~/Pictures$ pwd
/home/vimal/Pictures
vimal@vimal-Veriton-M275:~/Pictures$
```

2. **history**

- When you have been using Linux for a certain period of time, you will quickly notice that you can run hundreds of commands everyday. As such, running history command is particularly useful if you want to review the commands you have entered before.



A screenshot of a terminal window titled "vimal@vimal-Veriton-M275: ~/Pictures". The window shows the command "history" being run, displaying a list of 23 previous commands. The history includes various system and application commands like pwd, history, help, man pages, sudo, and npm. The terminal has a dark background with light-colored text and standard window controls at the top.

```
vimal@vimal-Veriton-M275:~/Pictures$ history
1  pwd
2  history
3  @help
4  help
5  man pwd
6  man ls
7  man cat
8  install node.js
9  cd vimal
10 sudo snap install --classic code
11 sudo apt install nodejs
12 node -v
13 sudo apt
14 sudo apt install npm
15 npm -v
16 npx create-react-app Vimal
17 npx create-react-app vimal
18 cd vimal
19 npm start
20 snap changes
21 sudo snap abort 6
22 snap changes
23 sudo snap abort 6
```

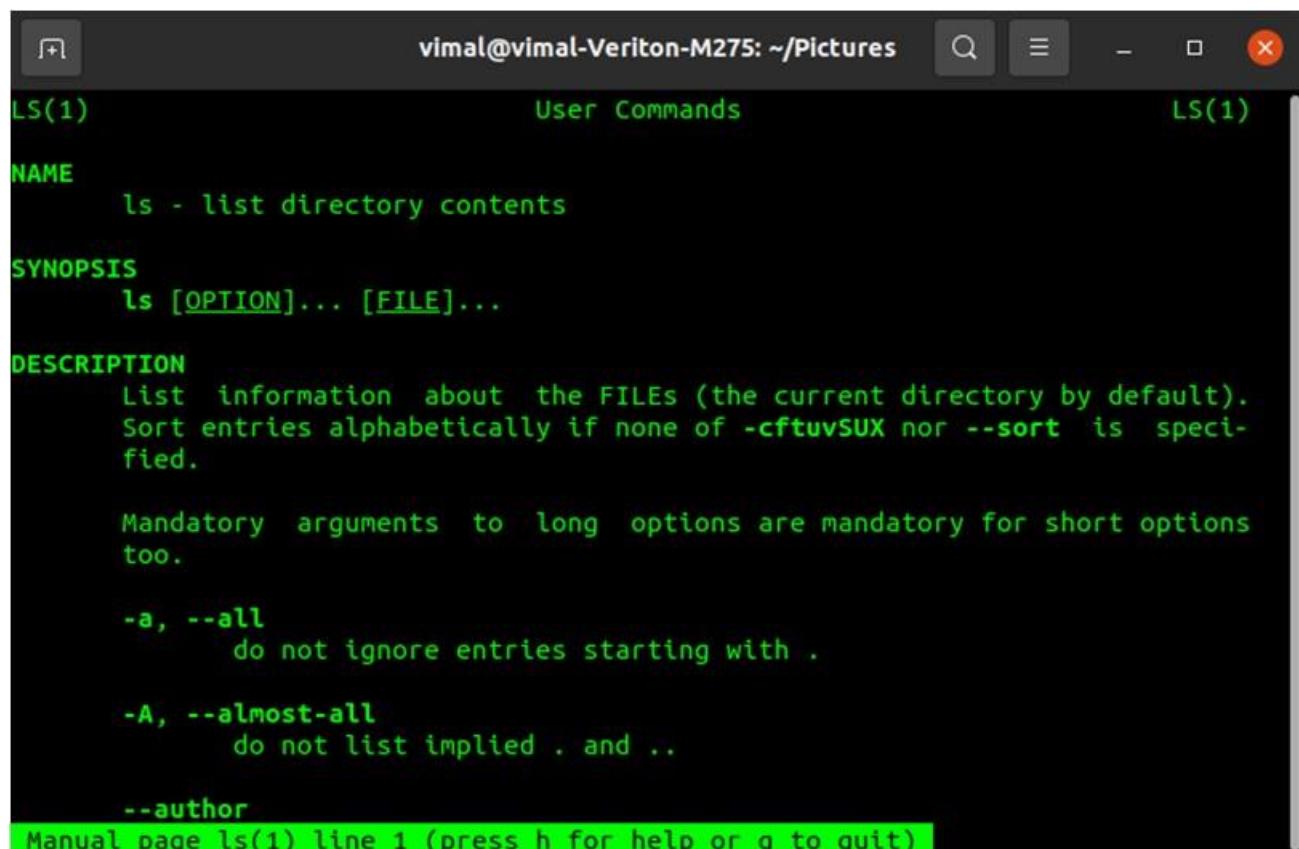
3. man

If we are confused about the function of certain Linux commands we can easily learn how to use them right from Linux's shell by using the **man** command. For instance, entering **man tail** will show the manual instruction of the **tail** command.

man ls



```
vimal@vimal-Veriton-M275: ~/Pictures
vimal@vimal-Veriton-M275:~/Pictures$ man ls
```



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

NAME
    ls - list directory contents

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

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

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

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

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

    --author
Manual page ls(1) line 1 (press h for help or q to quit)
```

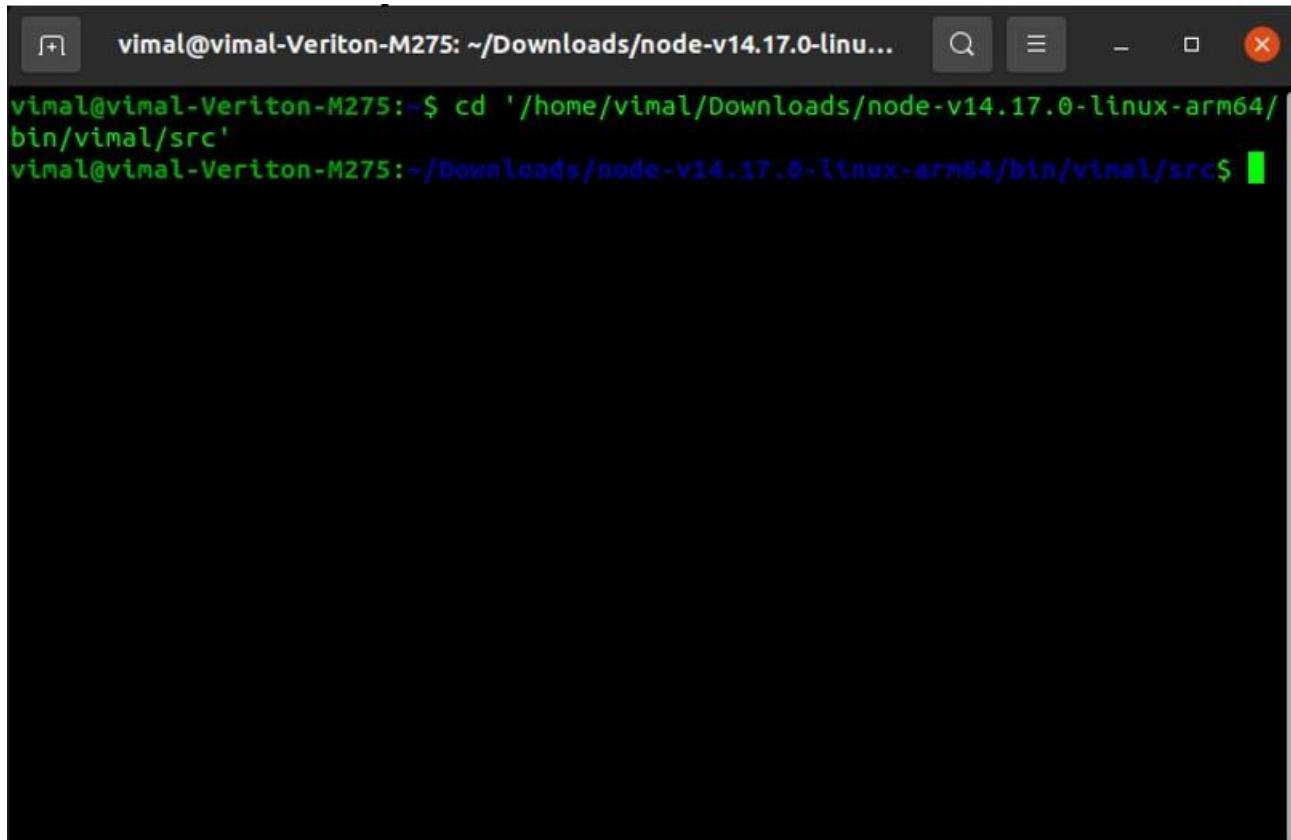
4. cd

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

It requires either the full path or the name of the directory, depending on the current working directory that you're in.

Shortcuts to help you navigate quickly:

- cd..(with two dots)to move one directory up
- cd to go straight to the home folder
- cd-(with a hyphen)to move to your previous directory



A screenshot of a terminal window titled "vimal@vimal-Veriton-M275: ~/Downloads/node-v14.17.0-linu...". The terminal shows the command `cd '/home/vimal/Downloads/node-v14.17.0-linux-arm64/bin/vimal/src'` being entered and executed, changing the directory to `/home/vimal/Downloads/node-v14.17.0-linux-arm64/bin/vimal/src`.

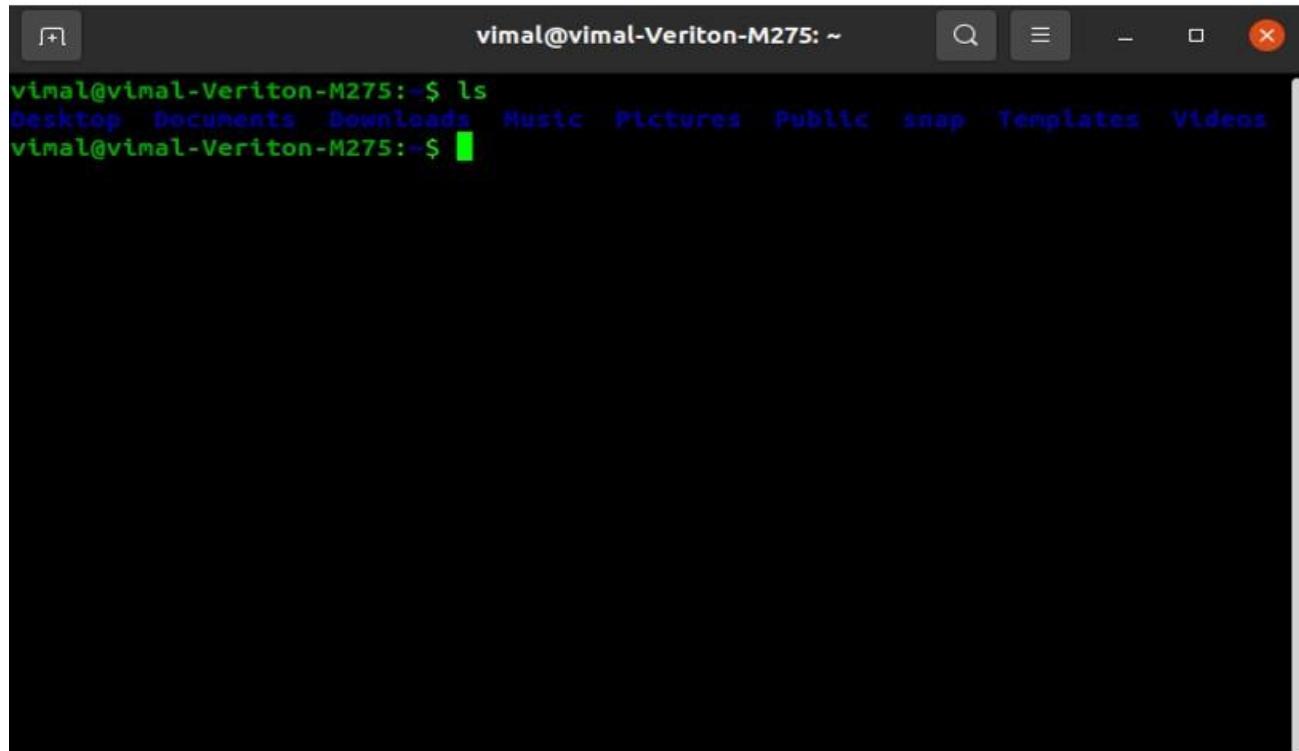
```
vimal@vimal-Veriton-M275:~/Downloads/node-v14.17.0-linu...
vimal@vimal-Veriton-M275:~$ cd '/home/vimal/Downloads/node-v14.17.0-linux-arm64/bin/vimal/src'
vimal@vimal-Veriton-M275:~/Downloads/node-v14.17.0-linux-arm64/bin/vimal/src$
```

5. ls

The ls command is used to view the contents of a directory. By default, this command will display the contents of your current working directory.

There are variations you can use with the ls command:

- **ls-R** will list the files in the sub-directories as well
- **ls-l**—long listing
- **ls-a** will show the hidden files
- **ls -al** will list the files and directories with detailed information like the permissions, size, owner, etc.
- **ls -t** lists files sorted in the order of “last modified”.
- **ls -r** option will reverse the natural sorting order. Usually used in combination with others. This will reverse the time-wise listing.



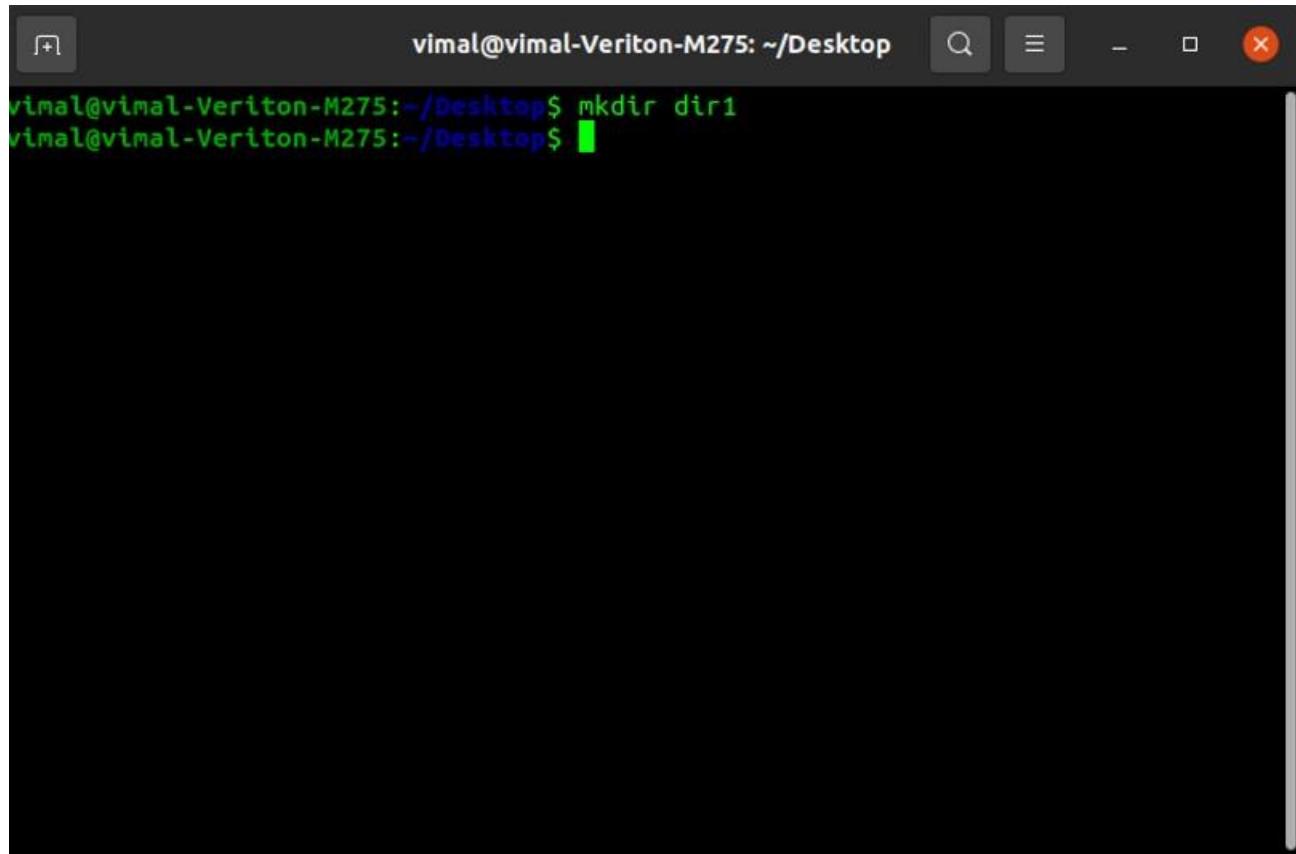
A screenshot of a terminal window titled "vimal@vimal-Veriton-M275: ~". The window shows the command "ls" being run, which lists the following directory contents: Desktop, Documents, Downloads, Music, Pictures, Public, snap, Templates, Videos. The terminal has a dark background with light-colored text. The window has standard Linux-style window controls at the top right.

```
vimal@vimal-Veriton-M275:~$ ls
Desktop Documents Downloads Music Pictures Public snap Templates Videos
vimal@vimal-Veriton-M275:~$
```

6. mkdir

Use mkdir command to make a new directory .

To generate a new directory inside another directory, use this Linux basic command.

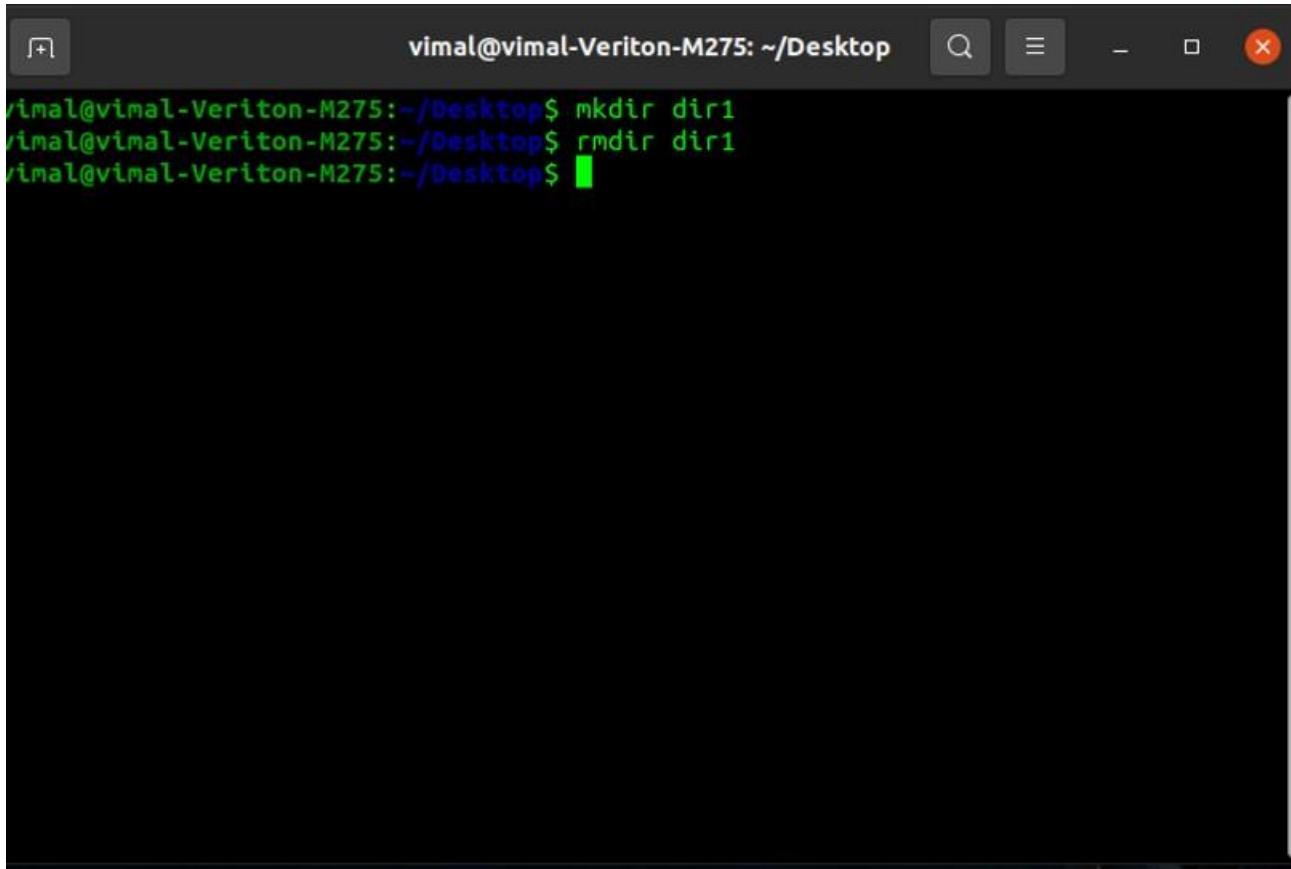


A screenshot of a terminal window titled "vimal@vimal-Veriton-M275: ~/Desktop". The window has a dark theme with light-colored text. In the terminal, the command "mkdir dir1" is typed and executed, followed by a new line character. The terminal window includes standard operating system icons for minimizing, maximizing, and closing the window.

```
vimal@vimal-Veriton-M275:~/Desktop$ mkdir dir1
vimal@vimal-Veriton-M275:~/Desktop$
```

7. rmdir

If you need to delete a directory, use the rmdir command. However, rmdir only allows you to delete empty directories.



```
vimal@vimal-Veriton-M275: ~/Desktop$ mkdir dir1
vimal@vimal-Veriton-M275: ~/Desktop$ rmdir dir1
vimal@vimal-Veriton-M275: ~/Desktop$
```

8. touch

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



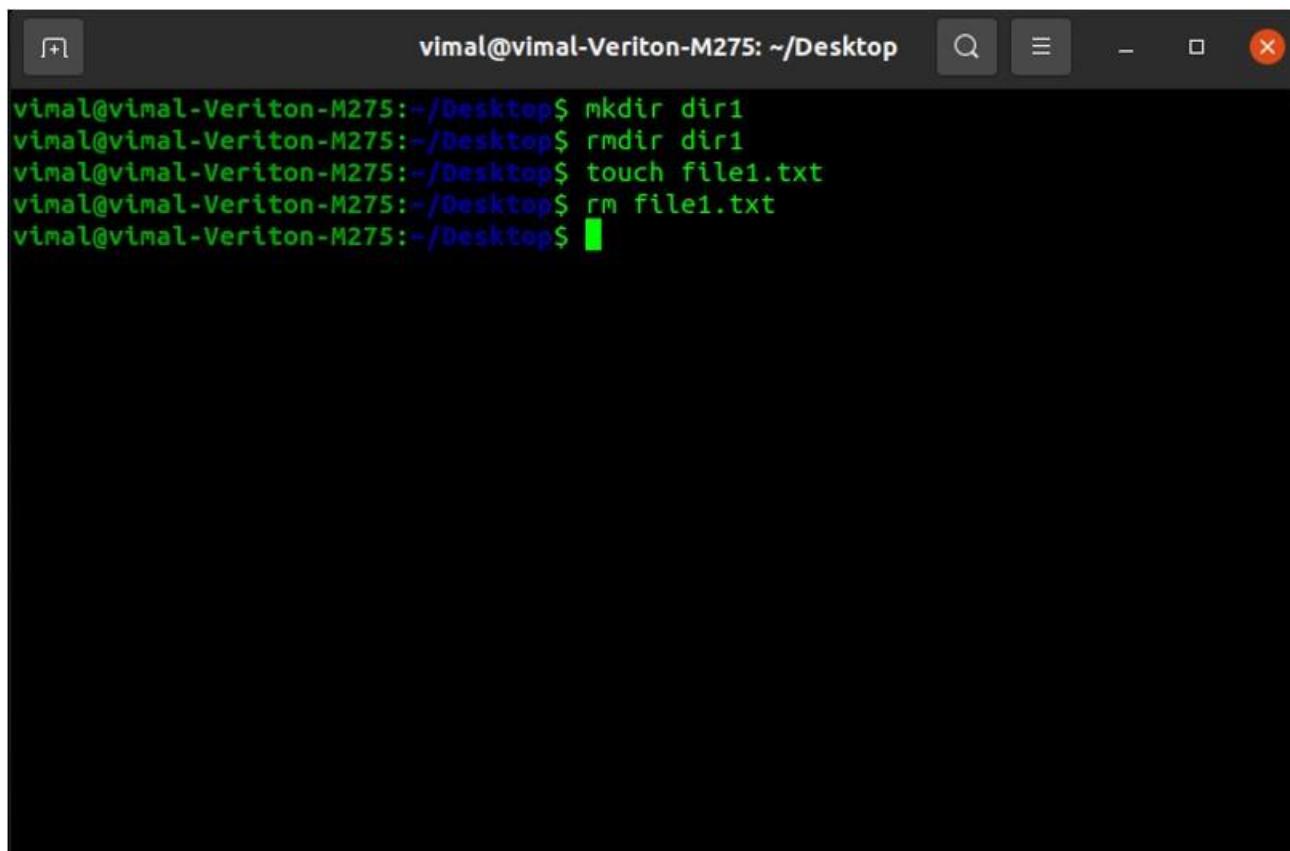
```
vimal@vimal-Veriton-M275: ~/Desktop$ mkdir dir1
vimal@vimal-Veriton-M275: ~/Desktop$ rmdir dir1
vimal@vimal-Veriton-M275: ~/Desktop$ touch file1.txt
vimal@vimal-Veriton-M275: ~/Desktop$
```

9. rm

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

If you only want to delete the directory—as an alternative to rmdir—use rm-r.

To remove a file use **rm filename**



A screenshot of a terminal window titled "vimal@vimal-Veriton-M275: ~/Desktop". The terminal shows the following sequence of commands:

```
vimal@vimal-Veriton-M275:~/Desktop$ mkdir dir1
vimal@vimal-Veriton-M275:~/Desktop$ rmdir dir1
vimal@vimal-Veriton-M275:~/Desktop$ touch file1.txt
vimal@vimal-Veriton-M275:~/Desktop$ rm file1.txt
vimal@vimal-Veriton-M275:~/Desktop$ █
```

10. cat

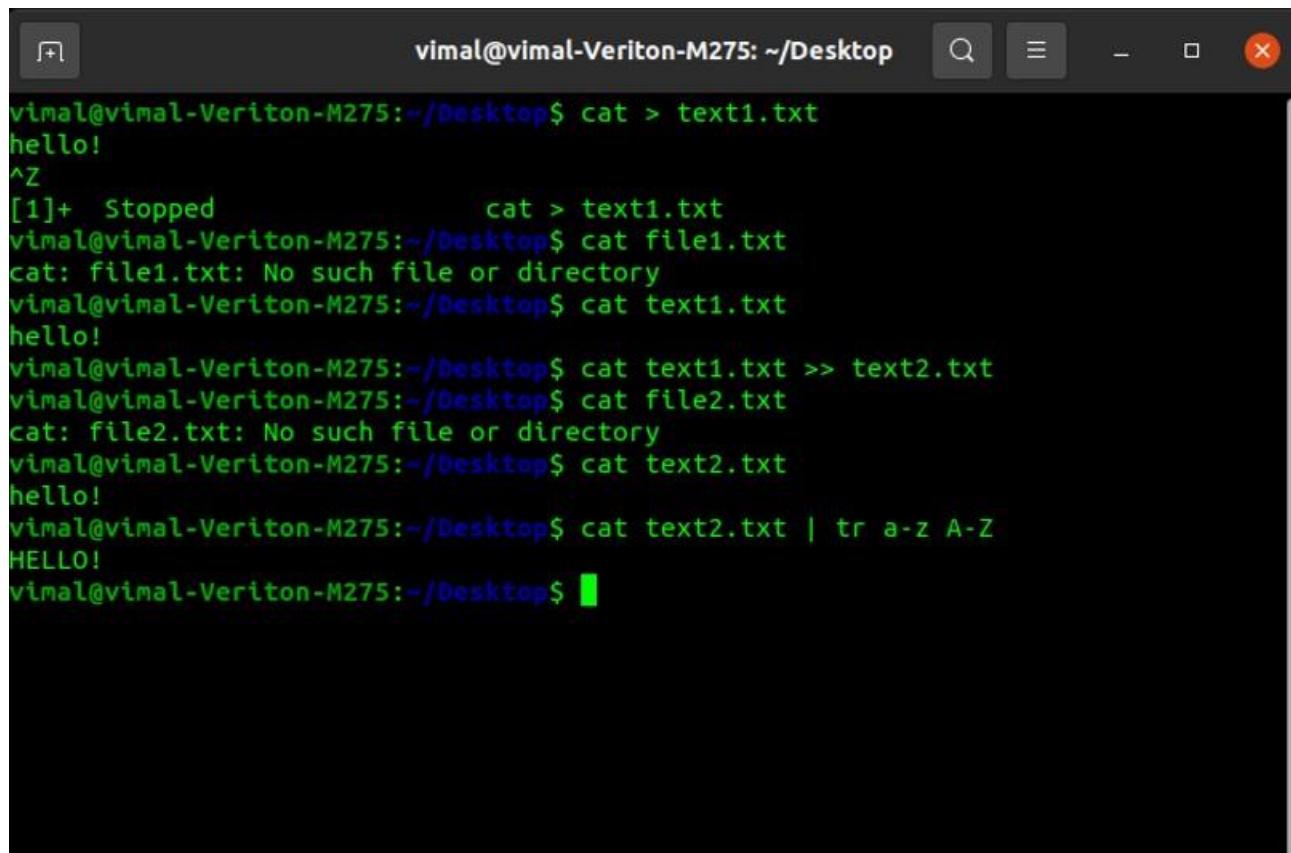
cat (short for concatenate) is one of the most frequently used commands in Linux. It is used to list the contents of a

file on the standard output stdout .

To run this command, type cat followed by the file's name and its extension. For instance: cat file.txt.

Here are other ways to use the cat command:

- **cat>filename** creates a new file
- **catfilename1filename2>filename3** joins two files(1 and2)and stores the output of them in a new file(3)
- to convert a file to upper or lower case use, **cat filename | tr a-z A-Z>output.txt**
- **cat>>myfile** insert data to a file



The screenshot shows a terminal window with the following session:

```
vimal@vimal-Veriton-M275: ~/Desktop
vimal@vimal-Veriton-M275:~/Desktop$ cat > text1.txt
hello!
^Z
[1]+  Stopped                  cat > text1.txt
vimal@vimal-Veriton-M275:~/Desktop$ cat file1.txt
cat: file1.txt: No such file or directory
vimal@vimal-Veriton-M275:~/Desktop$ cat text1.txt
hello!
vimal@vimal-Veriton-M275:~/Desktop$ cat text1.txt >> text2.txt
vimal@vimal-Veriton-M275:~/Desktop$ cat file2.txt
cat: file2.txt: No such file or directory
vimal@vimal-Veriton-M275:~/Desktop$ cat text2.txt
hello!
vimal@vimal-Veriton-M275:~/Desktop$ cat text2.txt | tr a-z A-Z
HELLO!
vimal@vimal-Veriton-M275:~/Desktop$
```

11. echo

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

If you want to add the text, “Hello, my name is John” into a file called name.txt,
you would type echo Hello, my name is John >> name.txt

```
amalthomson@amalthomson:~/Desktop$ echo Hello, my name is Vimal >> name.txt
amalthomson@amalthomson:~/Desktop$ █
```

12. head

The head command is 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. If you only want to show the first five lines, type head -n 5 filename.txt

```
amalthomson@amalthomson:~/Desktop$ head -n 5 name.txt
Hello, my name is Vimal1. Pather Panchali (1955)      8.5
2. Nayakan (1987)      8.5
3. Pariyerum Perumal (2018)    8.5
4. Anbe Sivam (2003)    8.5
5. Hanky Panky (1979)    8.5
amalthomson@amalthomson:~/Desktop$ █
```

13. tail

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

```
amalthomson@amalthomson:~/Desktop$ tail -n 5 name.txt
16. Visaaranai (2015)  8.4
17. 3 Idiots (2009)   8.3
18. Like Stars on Earth (2007) 8.3
19. Jersey (2019)     8.3
20. Soorarai Pottru (2020) 8.3
amalthomson@amalthomson:~/Desktop$ █
```

14. **read**

read the contents of a line into a variable.

The read command can be used with and without arguments
read command is used to read [options] [name...]

```
$read  
$read var1 var2 var3  
$echo "[${var1}] [${var2}] [${var3}]"
```

```
amalthomson@amalthomson:~/Desktop$ read name  
Vimal Thomson  
amalthomson@amalthomson:~/Desktop$ echo [$name]  
[Vimal Thomson]  
amalthomson@amalthomson:~/Desktop$ █
```

15. **more**

• Like cat command, more command displays the content of a file. Only difference is that, in case of larger files, 'cat' command output will scroll off your screen while 'more' command displays output one screenful at a time.

Enter key: To scroll down page line by line.

Space bar: To go to next page.

b key: To go to the backward page.

/ key: Lets you search the string.

Syntax: more <file name> more /etc/passwd

```
amalthomson@amalthomson:~/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  
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  
-More--(40%)
```

16. less

The 'less' command is same as 'more' command but include some more features.

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

```
less <file name>
```

```
$less /etc/passwd
```

```
amalthomson@amalthomson:~/Desktop$ less /etc/passwd
```

```
root:x:0:0: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
/etc/passwd
```

17. cut

The cut command 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

```
cut OPTION... [FILE]...
```

```
$cut -b 1,2,3 state.txt
```

```
amalthomson@amalthomson:~/Desktop$ cut -b 1,2,3 name.txt
Hel
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
14.
15.
16.
17.
18.
19.
20.
amalthomson@amalthomson:~/Desktop$
```

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.

paste [OPTION]... [FILES]...

\$ paste state.txt capital.txt

```
amalthomson@amalthomson:~/Desktop$ paste name1.txt name.txt
hai!!!!!!!!!!!!!!      Hello, my name is Vimali. Pather Panchali (1955)
3.5
    2. Nayakan (1987)      8.5
    3. Pariyerum Perumal (2018)      8.5
    4. Anbe Sivam (2003)      8.5
    5. Hanky Panky (1979)      8.5
    6. C/o Kancharapalem (2018)      8.5
    7. The World of Apu (1959)      8.5
    8. Kireedam (1989)      8.4
    9. Manichitrathazhu (1993)      8.4
   10. Natsamrat (2016)      8.4
   11. 96 (2018)      8.4
   12. Thevar Magan (1992) 8.4
   13. Black Friday (2004) 8.4
   14. Kumbalangi Nights (2019)      8.4
   15. Drishyam 2 (2021)      8.4
   16. Visaaranai (2015)      8.4
   17. 3 Idiots (2009)      8.3
   18. Like Stars on Earth (2007) 8.3
   19. Jersey (2019)      8.3
   20. Soorarai Pottru (2020)      8.3
amalthomson@amalthomson:~/Desktop$
```

19. uname

The uname command, short for Unix Name, will print detailed information about your Linux system like the machine name, operating system, kernel, and so on.

```
$uname
```

```
$uname -r
```

```
amalthomson@amalthomson:~/Desktop$ uname  
Linux  
amalthomson@amalthomson:~/Desktop$ uname -r  
5.8.0-55-generic  
amalthomson@amalthomson:~/Desktop$ █
```

20. cp

cp command is used to copy files from the current directory to a different directory. For instance, the command cp scenery.jpg /home/username/Pictures would create a copy of scenery.jpg (from your current directory) into the Pictures directory.

cp -i will ask for user's consent in case of a potential file

overwrite. cp -p will preserve source files' mode, ownership and timestamp. cp -r will copy directories recursively.

cp -u copies files only if the destination file is not existing or the source file is newer than the destination file.

```
amalthomson@amalthomson:~/Desktop$ sudo cp name1.txt /Downloads  
[sudo] password for amalthomson:  
amalthomson@amalthomson:~/Desktop$ █
```

21. mv

The primary use of the mv command is 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.

```
mv file.txt /home/username/Documents
```

To rename files, the Linux is mv oldname.extnewname.ext

```
amalthomson@amalthomson:~/Desktop$ sudo mv name1.txt /Downloads  
amalthomson@amalthomson:~/Desktop$ █
```

22. locate

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

What's more, using 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(*). For example, locate -i school*note command will search for any file that contains the word "school" and "note", whether it is uppercase or lowercase.

```
amalthomson@amalthomson:~/Desktop$ locate name.txt  
/home/amalthomson/Desktop/name.txt  
/usr/share/doc/syslinux-common/asciidoc/com-name.txt  
amalthomson@amalthomson:~/Desktop$
```

23. find

Similar to the locate command, using find also searches for files and directories. The difference is, you use the find command to locate files within a given directory.

As an example, find /home/ -name notes.txt command will search for a file called notes.txt within the home directory and its subdirectories.

Other variations when using the find are:

To find files in the current directory use, find .-name.txt To look for directories use, / -type d -name. Txt

```
amalthomson@amalthomson:~/Desktop$ find name.txt  
name.txt  
amalthomson@amalthomson:~/Desktop$
```

24. grep

Another basic Linux command that is undoubtedly helpful for everyday use is grep. It lets you search through all the text in a given file. To illustrate, grep blue notepad.txt will search for the word blue in the notepad file.

Lines that contain the searched word will be displayed fully. Usually output of a previous command is piped into the grep command. For example ls -l | grep "kernel"

```
amalthomson@amalthomson:~/Desktop$ grep Vimal name.txt  
Hello, my name is Vimal1. Pather Panchali (1955) 8.5  
amalthomson@amalthomson:~/Desktop$
```

25. df

Use df command 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.

```
amalthomson@amalthomson:~/Desktop$ df -m
Filesystem      1M-blocks  Used Available Use% Mounted on
udev              3912      0     3912   0% /dev
tmpfs             789       2      787   1% /run
/dev/sda5      467922  34591    409494   8% /
tmpfs             3941      0     3941   0% /dev/shm
tmpfs                 5       1       5   1% /run/lock
tmpfs             3941      0     3941   0% /sys/fs/cgroup
/dev/loop1            65      65       0 100% /snap/caprine/48
/dev/loop7            62      62       0 100% /snap/core20/1026
/dev/loop3            56      56       0 100% /snap/core18/2066
/dev/loop2              2       2       0 100% /snap/fast/4
/dev/loop8            160     160       0 100% /snap/signal-desktop/354
/dev/loop9            62      62       0 100% /snap/core20/975
/dev/loop10           9       9       0 100% /snap/pdfmixtool/862
/dev/loop11           66      66       0 100% /snap/gtk-common-themes/1515
/dev/loop13           65      65       0 100% /snap/gtk-common-themes/1514
/dev/loop0            100     100       0 100% /snap/core/11167
/dev/loop12           56      56       0 100% /snap/core18/1997
/dev/loop6            713     713       0 100% /snap/intellij-idea-community/302
/dev/loop14           167     167       0 100% /snap/signal-desktop/358
/dev/loop15           51      51       0 100% /snap/snap-store/542
/dev/loop4            219     219       0 100% /snap/gnome-3-34-1804/66
/dev/loop19           56      56       0 100% /snap/teams-for-linux/156
```

26. du

If you want 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.

```
$du -h
```

```
amalthomson@amalthomson:~/Desktop$ du -h
24K    ./idea
12K    ./src
12K    ./out/production/java-progs
16K    ./out/production
20K    ./out
132K   .
amalthomson@amalthomson:~/Desktop$
```

27. useradd

This is available only to system admins

Since Linux is a multi-user system, this means more than one person can interact with the same system at the same time.

useradd is used to create a new user, while passwd is adding a password to that user's account. To add a new person named John type, useradd John and then to add his password type, passwd

123456789

```
amalthomson@amalthomson:~/Desktop$ sudo useradd VimalT
useradd: user 'VimalT' already exists
amalthomson@amalthomson:~/Desktop$
```

28. userdel

Remove a user is very similar to adding a new user. To delete the users account type, userdel User Name

```
amalthomson@amalthomson:~/Desktop$ sudo userdel VimalT
amalthomson@amalthomson:~/Desktop$ sudo userdel VimalT
userdel: user 'VimalT' does not exist
amalthomson@amalthomson:~/Desktop$
```

29. sudo

Short for “SuperUser Do”, this command enables you to perform tasks that require administrative or root permissions. You must have sufficient permissions to use this command.

sudouseradd Vimal

```
amalthomson@amalthomson:~/Desktop$ sudo useradd VimalT
amalthomson@amalthomson:~/Desktop$ sudo useradd VimalT
useradd: user 'VimalT' already exists
```

30. passwd

Changes passwords for user accounts.

A normal user may only change the password for their own account, while thesuperuser may change the password for any account.

passwd[option]
[username] passwd
passwd user1

```
amalthomson@amalthomson:~/Desktop$ passwd amalthomson
Changing password for amalthomson.
Current password:
New password:
Retype new password:
Password unchanged
```

31. usermod

usermod command is used to change the properties of a user in Linux through the commandline command-line utility that allows you to modify a user's login information
#usermod--help
#usermod -u 2000Vimal

```
vimal@LAPTOP-0SOSJJH6:/home$ sudo usermod -u 2000 student
vimal@LAPTOP-0SOSJJH6:/home$ sudo usermod -u 2000 student
usermod: no changes
vimal@LAPTOP-0SOSJJH6:/home$
```

32. groupadd

- groupadd command creates a new group account using the values specified on the command line and the default values from the system.
- #groupadd vimal1

```
vimal@LAPTOP-0SOSJJH6:/home$ sudo groupadd vimal1
vimal@LAPTOP-0SOSJJH6:/home$ sudo groupadd vimal1
groupadd: group 'vimal1' already exists
vimal@LAPTOP-0SOSJJH6:/home$ sudo groupadd vimal2
vimal@LAPTOP-0SOSJJH6:/home$ sudo groupadd vimal3
```

```
vimal@LAPTOP-0SOSJJH6:/home$ compgen -g vimal
vimal
vimal12
vimal1
vimal2
vimal3
```

33. groups - print the groups a user is in

- #groups vimal

```
vimal@LAPTOP-0SOSJJH6:/home$ groups vimal
vimal : vimal adm dialout cdrom floppy sudo audio dip video plugdev netdev
```

34. **groupdel**-**groupdel** command modifies the system account files, deleting all entries that refer to group. The named group must exist

➤ #groupdel vimal12

```
vimal@LAPTOP-0SOSJJH6:/home$ compgen -g vimal
vimal
vimal12
vimal1
vimal2
vimal3
vimal@LAPTOP-0SOSJJH6:/home$ sudo groupdel vimal12
vimal@LAPTOP-0SOSJJH6:/home$ compgen -g vimal
vimal
vimal1
vimal2
vimal3
vimal@LAPTOP-0SOSJJH6:/home$
```

35. **groupmod** - The **groupmod** command modifies the definition of the specified group by modifying the appropriate entry in the group database.

groupmod -n group1 group2

```
vimal@LAPTOP-0SOSJJH6:/home$ compgen -g vimal
vimal
vimal1
vimal2
vimal3
vimal@LAPTOP-0SOSJJH6:/home$ sudo groupmod -n new_group vimal1
vimal@LAPTOP-0SOSJJH6:/home$ compgen -g vimal
vimal
vimal2
vimal3
vimal@LAPTOP-0SOSJJH6:/home$ compgen -g new_group
new_group
```

36. chmod - To change directory permissions of file/ Directory in Linux.

#chmod who what which file/directory
chmod +rwx filename to add permissions.
chmod -rwx directory name to remove permissions.
chmod +x filename to allow executable permissions.
chmod-wx file name to take out write and executable permissions.
#chmod u+x test #chmod g-rwx test #chmod o-rtest

```
vimal@LAPTOP-0SOSJJH6:/mnt/f$ chmod +rwx vimal.txt
vimal@LAPTOP-0SOSJJH6:/mnt/f$ chmod -w vimal.txt
chmod: vimal.txt: new permissions are r-xrwxrwx, not r-xr-xr-x
vimal@LAPTOP-0SOSJJH6:/mnt/f$
```

37. chown - The chown command allows you to change the user and/or group ownership of a given file, directory.
#chown vimal vimal.txt

```
vimal@LAPTOP-0SOSJJH6:/mnt/f$ chown vimal vimal.txt
```

```
vimal@LAPTOP-0SOSJJH6:/mnt/f$ ls -l vimal.txt
-rwxrwxrwx 1 vimal vimal 0 Aug 10 22:15 vimal.txt
vimal@LAPTOP-0SOSJJH6:/mnt/f$
```

38. id - id command in Linux is used to find out user and group names and numeric ID's (UID or group ID) of the current user. #id

```
vimal@LAPTOP-0SOSJJH6:/home$ id vimal
uid=1000(vimal) gid=1000(vimal) groups=1000(vimal),4(adm)
vimal@LAPTOP-0SOSJJH6:/home$
```

39. ps - The ps command, short for Process Status, is a command line utility that is used to display or view information related to the processes running in a Linux system.

- PID – This is the unique processID
- TTY –This is the type of terminal that the user is logged into
- TIME–This is the time in minutes and seconds that the process has been running
- CMD – The command that launched the process #ps-a

```
vimal@LAPTOP-0SOSJJH6:/mnt/f$ ps -a
PID TTY      TIME CMD
160 tty1    00:00:00 bash
308 tty1    00:00:00 ps
vimal@LAPTOP-0SOSJJH6:/mnt/f$ .
```

40. top-top command is used to show the Linux processes. It provides a dynamic real-time view of the running system

```
#top -u vimal
```

```
vimal@LAPTOP-0SOSJJH6:/mnt/f$ top
top - 22:31:56 up 1:06, 0 users, load average: 0.52, 0.58, 0.59
Tasks: 4 total, 1 running, 3 sleeping, 0 stopped, 0 zombie
%Cpu(s): 1.9 us, 2.0 sy, 0.0 ni, 95.8 id, 0.0 wa, 0.2 hi, 0.0 si, 0.0 st
MiB Mem : 7549.3 total, 3282.7 free, 4042.7 used, 224.0 buff/cache
MiB Swap: 12834.0 total, 12741.0 free, 93.0 used. 3376.1 avail Mem

          PID USER      PR  NI    VIRT    RES    SHR S %CPU %MEM     TIME+ COMMAND
            1 root      20   0   8940   320   276 S  0.0  0.0  0:00.17 init
           159 root      20   0   8940   228   184 S  0.0  0.0  0:00.00 init
           160 vimal     20   0  18216  3776  3672 S  0.0  0.0  0:00.33 bash
           307 vimal     20   0  18920  2184  1524 R  0.0  0.0  0:00.03 top
```

41. WC

wc stands for word count.

Used for counting purpose.

It is used to find out number of lines, word count, byte and characters counting the files specified in the file arguments.

```
#wc state.txt  
#wc state.txt capital.txt  
wc -l state.txt  
wc-wstate.txtcapital.txt  
wc -cstate.txt  
wc -m state.txt
```

```
amalthomson@amalthomson:~/Downloads$ wc assign1.txt  
10 12 79 assign1.txt  
amalthomson@amalthomson:~/Downloads$ wc -l assign1.txt  
10 assign1.txt  
amalthomson@amalthomson:~/Downloads$ wc -w assign1.txt  
12 assign1.txt  
amalthomson@amalthomson:~/Downloads$ wc -c assign1.txt  
79 assign1.txt  
amalthomson@amalthomson:~/Downloads$ wc -m assign1.txt  
77 assign1.txt  
amalthomson@amalthomson:~/Downloads$ █
```

42. TAR

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

Linux tar command to create compressed or uncompressed Archive files

Options:

- c : Creates Archive
- x : Extract the archive
- f : creates archive with given filename
- t : displays or lists files in archived file
- u : archives and adds to an existing archive file
- v : Displays Verbose Information
- A:Concatenates the archive files
- z : zip, tells tar command that creates tar file using gzip
- j : filter archive tar file using tb zip
- W : Verify a archive file
- r:update or add file or directory in already existed .tarfile #tar cfarchive.tar state.txt capital.txt //create archive file
- #lsarchive.tar
- #tartf /archive.tar // list contents of tar archive file

- Extract an archive created with tar

```
#mkdir backup
#cd backup
#tar xf /home/meera/Documents/Meera_Linux/archive.tar
```

- Compression Types

```
gzip(z), bzip2(j), xz(J)
#tarczf/abc.tar.gz/etc
#mkdirbackup2
#tarcjf/abcd.tar.b2z /etc
#cd backup2
#tarcJf/abcde.tar.xz/etc
#tar xjf/abcd.tar.b2z
Extract an archive
#mkdirbackup3
#mkdir backup1
#cd backup3 #cd
backup1
#tar xJf /abcde.tar.xz#tar
xzf /abc.tar.gz
```

```
amalthomson@amalthomson:~/Downloads$ tar czf archive1.tar.gz file.txt
amalthomson@amalthomson:~/Downloads$ ls
archive1.tar  archive1.tar.gz  assign1.txt.gz  assign2.txt.gz  file.txt  rsa  rsa.pub
amalthomson@amalthomson:~/Downloads$ tar xzf archive1.tar.gz
amalthomson@amalthomson:~/Downloads$ ls
archive1.tar  archive1.tar.gz  assign1.txt.gz  assign2.txt.gz  file.txt  rsa  rsa.pub
amalthomson@amalthomson:~/Downloads$ tar cJf arc2.tar.b2z file.txt
amalthomson@amalthomson:~/Downloads$ ls
arc2.tar.b2z  archive1.tar.gz  file.txt  nsal
amalthomson@amalthomson:~/Downloads$ tar xjf arc2.tar.b2z
amalthomson@amalthomson:~/Downloads$ tar cJf arc3.tar.x2 file.txt
amalthomson@amalthomson:~/Downloads$ ls
arc2.tar.b2z  arc3.tar.x2  archive1.tar.gz  file.txt  nsal
amalthomson@amalthomson:~/Downloads$ tar xJf arc3.tar.x2
amalthomson@amalthomson:~/Downloads$
```

43. expr

The expr command evaluates a given expression and displays its 6 corresponding output. It is used for:

Basic operations like addition, subtraction, multiplication, division, and modulus on integers.

```
amalthomson@amalthomson:~/Downloads$ expr 10 + 5
15
```

44. Redirections & Piping

A pipe is a form of redirection to send the output of one command/program/process to another command/program/process for further processing.

Pipe is used to combine two or more commands, the output of one command acts as input to another command, and this command's output may act as input to the next command and soon.

```
#ls -l | wc -l
```

```
amalthomson@amalthomson:~/Downloads$ ls -l|wc -l
4
amalthomson@amalthomson:~/Downloads$ █
```

45. ssh

ssh stands for “Secure Shell”.

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

Ssh is secure in the sense that it transfers the data in encrypted form between the host and the client.

It transfers inputs from the client to the host and relays back the output. ssh runs at TCP/IP port 22.

```
#ssh user_name@host(IP/Domain_name)
#ssh -X root@server1.example.com
```

```
ssh: connect to host amalthomson port 22: Connection refused
amalthomson@amalthomson:~/Downloads$ █
```

46. ssh-keygen

ssh-keygen command to generate a public/private authentication key pair. Authentication keys allow a user to connect to a remote system without supplying a password. Keys must be generated for each user separately. If you generate key pairs as the root user, only the root can use the keys.

```
$ssh-keygen -t rsa
```

```
amalthomson@amalthomson:~/Downloads$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/amalthomson/.ssh/id_rsa): rsa
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in rsa
Your public key has been saved in rsa.pub
The key fingerprint is:
SHA256:qCHen8zB40Xvjo6iIxQqVIZ2S90g8j0g/NgBQauVbT0 amalthomson@amalthomson
The key's randomart image is:
+---[RSA 3072]---+
| .+o.o |
| .o+o o |
| ++o.= E |
| o*+=. o |
| +.+o+ . S |
| oo o = . . |
| o . o + . . |
| . . . = * o |
| ..o .B.o.o |
+---[SHA256]---+
amalthomson@amalthomson:~/Downloads$ █
```

Questions using the ubuntu terminal

- Create six files with name of the form songX.mp3
- Create six files with name of the form snapX.jpg
- Create six files with name of the form filmX.mp4 (In each set, replace X with the numbers 1 through 6)

```
amalthomson@amalthomson:~$ touch song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3  
amalthomson@amalthomson:~$ touch snap1.jpg snap2.jpg snap3.jpg snap4.jpg snap5.jpg snap6.jpg  
amalthomson@amalthomson:~$ touch film1.mp4 film2.mp4 film3.mp4 film4.mp4 film5.mp4 film6.mp4
```

- 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.

```
amalthomson@amalthomson:~$ mv *.jpg ./Pictures/  
amalthomson@amalthomson:~$ mv *.mp4 ./Videos/  
amalthomson@amalthomson:~$ █
```

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

```
amalthomson@amalthomson:~$ mkdir -p {friends,family,work}  
amalthomson@amalthomson:~$ █
```

- Copy song files to the friends folder and snap files to family folder

```
amalthomson@amalthomson:~$ cp /home/amalthomson/Music song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3 /home/amalthomson/friends/  
cp: -r not specified; omitting directory '/home/amalthomson/Music'  
amalthomson@amalthomson:~$ cp /home/amalthomson/Pictures snap1.jpg snap2.jpg snap3.jpg snap4.jpg snap5.jpg snap6.jpg /home/amalthomson/family/  
cp: -r not specified; omitting directory '/home/amalthomson/Pictures'  
amalthomson@amalthomson:~$ █
```

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

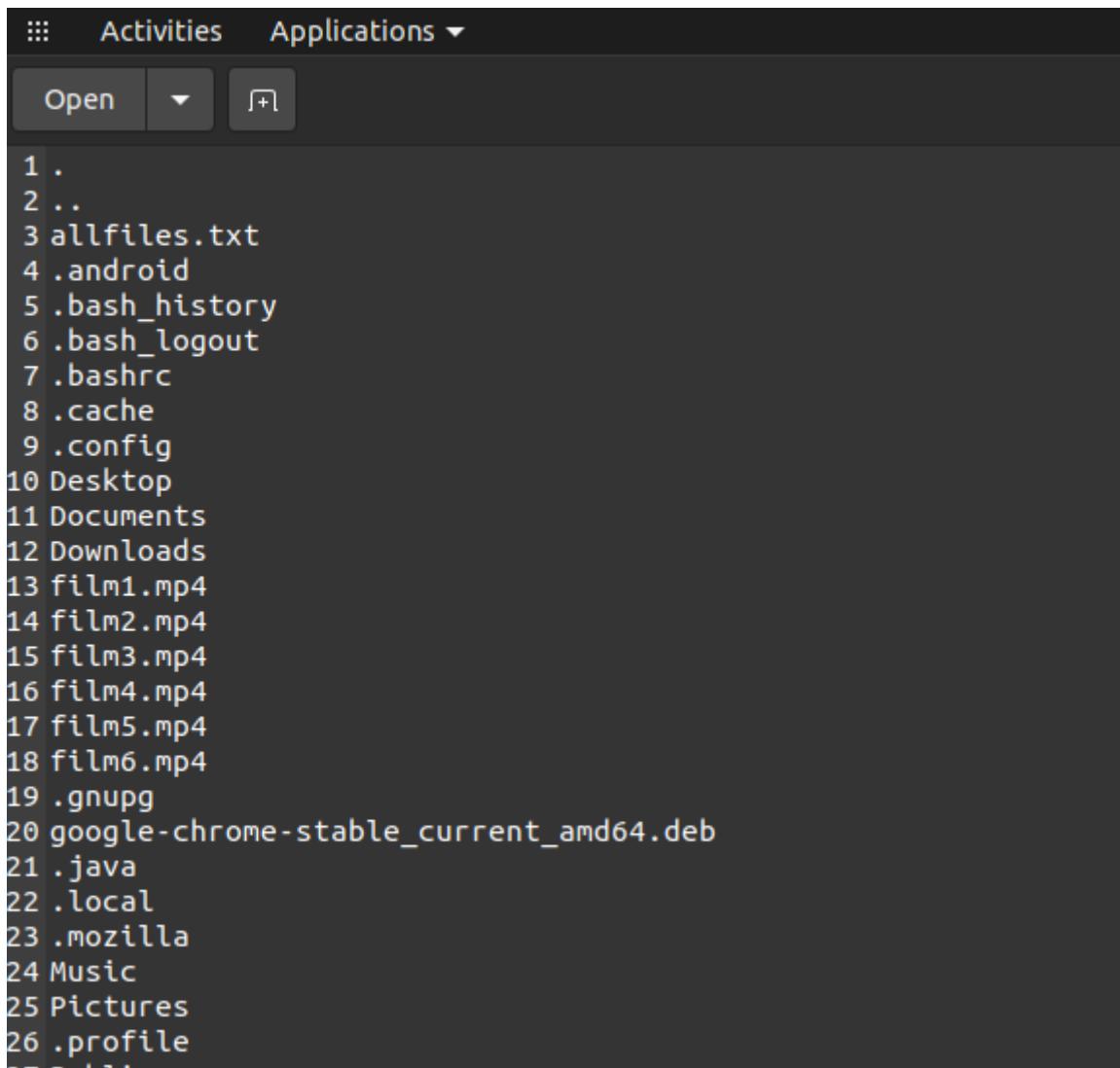
```
amalthomson@amalthomson:~$ rmdir {friends,family}  
rmdir: failed to remove 'friends': Directory not empty  
rmdir: failed to remove 'family': Directory not empty  
amalthomson@amalthomson:~$ █
```

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

```
amalthomson@amalthomson:~$ rm -r friends family  
amalthomson@amalthomson:~$ █
```

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

```
amalthomson@amalthomson:~$ ls -a > allfiles.txt  
amalthomson@amalthomson:~$
```



```
1 .
2 ..
3 allfiles.txt
4 .android
5 .bash_history
6 .bash_logout
7 .bashrc
8 .cache
9 .config
10 Desktop
11 Documents
12 Downloads
13 film1.mp4
14 film2.mp4
15 film3.mp4
16 film4.mp4
17 film5.mp4
18 film6.mp4
19 .gnupg
20 google-chrome-stable_current_amd64.deb
21 .java
22 .local
23 .mozilla
24 Music
25 Pictures
26 .profile
```

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

```
amalthomson@amalthomson:~$ date  
Tuesday 17 August 2021 04:11:12 PM IST
```

- Add the user Juliet

```
amalthomson@amalthomson:~$ sudo useradd Juliet  
[sudo] password for amalthomson:  
amalthomson@amalthomson:~$
```

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

```
amalthomson@amalthomson:~$ cat /etc/passwd | grep Juliet
Juliet:x:1002:1002::/home/Juliet:/bin/sh
```

- Use the passwd command to initialize Juliet's password

```
amalthomson@amalthomson:~$ sudo passwd Juliet
[sudo] password for amalthomson:
New password:
Retype new password:
passwd: password updated successfully
amalthomson@amalthomson:~$
```

- Create a supplementary group called Shakespeare with a groupid of 30000

```
amalthomson@amalthomson:~$ sudo groupadd -g 30000 Shakesphere
amalthomson@amalthomson:~$
```

- Create a supplementary group called artists.

```
amalthomson@amalthomson:~$ sudo groupadd artists
amalthomson@amalthomson:~$
```

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

```
amalthomson@amalthomson:~$ less /etc/group
```

```
Juliet:x:1002:
Shakesphere:x:30000:
artists:x:30001:
(END)
```

- Add the Juliet user to the Shakespeare group as a supplementary group

```
amalthomson@amalthomson:~$ sudo usermod -G Shakesphere Juliet
[sudo] password for amalthomson:
amalthomson@amalthomson:~$
```

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

```
amalthomson@amalthomson:~$ id Juliet
uid=1002(Juliet) gid=1002(Juliet) groups=1002(Juliet),30000(shakesphere)
amalthomson@amalthomson:~$
```

- Add Romeo and Hamlet to the Shakespeare group

```
amalthomson@amalthomson:~$ sudo usermod -G Shakesphere Romeo
amalthomson@amalthomson:~$ sudo usermod -G Shakesphere Hamlet
amalthomson@amalthomson:~$ id Romeo
uid=1003(Romeo) gid=1003(Romeo) groups=1003(Romeo),30000(Shakesphere)
amalthomson@amalthomson:~$ id Hamlet
uid=1004(Hamlet) gid=1004(Hamlet) groups=1004(Hamlet),30000(Shakesphere)
amalthomson@amalthomson:~$ █
```

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

```
amalthomson@amalthomson:~$ sudo useradd Reba
^[[Aamalthomson@amalthomson:~$ sudo useradd Dolly
amalthomson@amalthomson:~$ sudo useradd Elvis
amalthomson@amalthomson:~$ sudo usermod -G artists Reba
amalthomson@amalthomson:~$ sudo usermod -G artists Dolly
amalthomson@amalthomson:~$ sudo usermod -G artists Elvis
amalthomson@amalthomson:~$ █
```

- Verify the supplemental group memberships by examining the/etc/group file

```
Shakesphere:x:30000:Juliet,Romeo,Hamlet
artists:x:30001:Reba,Dolly,Elvis
```

- Attempt to remove user Dolly

```
amalthomson@amalthomson:~$ sudo userdel Dolly
amalthomson@amalthomson:~$ id Dolly
id: 'Dolly': no such user
amalthomson@amalthomson:~$ █
```

1. Try out these network commands in Window as well as in Linux and perform at least 4 options with each command: ping, route, traceroute, nslookup, IpConfig, NetStat.

WINDOWS

Ping:

```
C:\Users\Vimal Thomson>ping google.com

Pinging google.com [142.250.182.46] with 32 bytes of data:
Reply from 142.250.182.46: bytes=32 time=29ms TTL=115
Reply from 142.250.182.46: bytes=32 time=28ms TTL=115
Reply from 142.250.182.46: bytes=32 time=50ms TTL=115
Reply from 142.250.182.46: bytes=32 time=39ms TTL=115

Ping statistics for 142.250.182.46:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 28ms, Maximum = 50ms, Average = 36ms
```

```
C:\Users\Vimal Thomson>ping -a google.com

Pinging google.com [142.250.182.46] with 32 bytes of data:
Reply from 142.250.182.46: bytes=32 time=43ms TTL=115
Reply from 142.250.182.46: bytes=32 time=40ms TTL=115
Reply from 142.250.182.46: bytes=32 time=149ms TTL=115
Reply from 142.250.182.46: bytes=32 time=91ms TTL=115

Ping statistics for 142.250.182.46:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 40ms, Maximum = 149ms, Average = 80ms
```

```
C:\Users\Vimal Thomson>
```

```
C:\Users\Vimal Thomson>ping -t google.com

Pinging google.com [142.250.182.46] with 32 bytes of data:
Reply from 142.250.182.46: bytes=32 time=164ms TTL=115
Reply from 142.250.182.46: bytes=32 time=62ms TTL=115
Reply from 142.250.182.46: bytes=32 time=218ms TTL=115
Reply from 142.250.182.46: bytes=32 time=79ms TTL=115
Reply from 142.250.182.46: bytes=32 time=82ms TTL=115
Reply from 142.250.182.46: bytes=32 time=41ms TTL=115
Reply from 142.250.182.46: bytes=32 time=49ms TTL=115
Reply from 142.250.182.46: bytes=32 time=56ms TTL=115
Reply from 142.250.182.46: bytes=32 time=45ms TTL=115
Reply from 142.250.182.46: bytes=32 time=63ms TTL=115
Reply from 142.250.182.46: bytes=32 time=44ms TTL=115
Reply from 142.250.182.46: bytes=32 time=188ms TTL=115
Reply from 142.250.182.46: bytes=32 time=83ms TTL=115

Ping statistics for 142.250.182.46:
    Packets: Sent = 13, Received = 13, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 41ms, Maximum = 218ms, Average = 90ms
Control-C
^C
```

```
C:\Users\Vimal Thomson>ping -j google.com

Pinging google.com [142.250.182.46] with 32 bytes of data:
General failure.
General failure.
General failure.
General failure.

Ping statistics for 142.250.182.46:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
C:\Users\Vimal Thomson>ping -4 google.com

Pinging google.com [142.250.182.46] with 32 bytes of data:
Reply from 142.250.182.46: bytes=32 time=87ms TTL=115
Reply from 142.250.182.46: bytes=32 time=49ms TTL=115
Reply from 142.250.182.46: bytes=32 time=256ms TTL=115
Reply from 142.250.182.46: bytes=32 time=77ms TTL=115

Ping statistics for 142.250.182.46:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 49ms, Maximum = 256ms, Average = 117ms
```

Route:

```
C:\Users\Vimal Thomson>route print
=====
Interface List
 4...38 f3 ab b7 e6 34 .....Realtek PCIe GbE Family Controller
 17...92 0f 0c a3 cb 05 .....Microsoft Wi-Fi Direct Virtual Adapter
 6...d2 0f 0c a3 cb 05 .....Microsoft Wi-Fi Direct Virtual Adapter #2
 2...90 0f 0c a3 cb 05 .....Realtek 8822CE Wireless LAN 802.11ac PCI-E NIC
 1.....Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask          Gateway        Interface Metric
          0.0.0.0        0.0.0.0    192.168.43.1  192.168.43.30    50
         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
        192.168.43.0  255.255.255.0        On-link     192.168.43.30    306
        192.168.43.30  255.255.255.255        On-link     192.168.43.30    306
        192.168.43.255  255.255.255.255        On-link     192.168.43.30    306
          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     192.168.43.30    306
      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     192.168.43.30    306
=====
Persistent Routes:
  None

IPv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
 1    331  ::1/128        On-link
 2    306 fe80::/64        On-link
 2    306 fe80::1d21:697e:17bd:94ce/128
          On-link
 1    331 ff00::/8        On-link
 2    306 ff00::/8        On-link
=====
Persistent Routes:
  None
```

```
C:\Users\Vimal Thomson>route print -4
=====
Interface List
 4...38 f3 ab b7 e6 34 ....Realtek PCIe GbE Family Controller
 17...92 0f 0c a3 cb 05 ....Microsoft Wi-Fi Direct Virtual Adapter
 6...d2 0f 0c a3 cb 05 ....Microsoft Wi-Fi Direct Virtual Adapter #2
 2...90 0f 0c a3 cb 05 ....Realtek 8822CE Wireless LAN 802.11ac PCI-E NIC
 1.....Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask        Gateway       Interface Metric
          0.0.0.0        0.0.0.0    192.168.43.1  192.168.43.30    50
         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
         192.168.43.0  255.255.255.0     On-link    192.168.43.30    306
    192.168.43.30  255.255.255.255     On-link    192.168.43.30    306
 192.168.43.255  255.255.255.255     On-link    192.168.43.30    306
         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    192.168.43.30    306
 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    192.168.43.30    306
=====
Persistent Routes:
  None
```

```
C:\Users\Vimal Thomson>route print -6
=====
Interface List
 4...38 f3 ab b7 e6 34 ....Realtek PCIe GbE Family Controller
 17...92 0f 0c a3 cb 05 ....Microsoft Wi-Fi Direct Virtual Adapter
 6...d2 0f 0c a3 cb 05 ....Microsoft Wi-Fi Direct Virtual Adapter #2
 2...90 0f 0c a3 cb 05 ....Realtek 8822CE Wireless LAN 802.11ac PCI-E NIC
 1.....Software Loopback Interface 1
=====

IPv6 Route Table
=====
Active Routes:
 If Metric Network Destination      Gateway
  1     331 ::1/128        On-link
  2     306 fe80::/64        On-link
  2     306 fe80::1d21:697e:17bd:94ce/128
                On-link
  1     331 ff00::/8        On-link
  2     306 ff00::/8        On-link
=====
Persistent Routes:
  None
```

```
C:\Users\Vimal Thomson>route print *157
=====
Interface List
 4...38 f3 ab b7 e6 34 .....Realtek PCIe GbE Family Controller
 17...92 0f 0c a3 cb 05 .....Microsoft Wi-Fi Direct Virtual Adapter
 6...d2 0f 0c a3 cb 05 .....Microsoft Wi-Fi Direct Virtual Adapter #2
 2...90 0f 0c a3 cb 05 .....Realtek 8822CE Wireless LAN 802.11ac PCI-E NIC
 1.....Software Loopback Interface 1
=====

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

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

Traceroute:

```
C:\Users\Vimal Thomson>tracert 192.168.1.1

Tracing route to RTK_GW.bbrouter [192.168.1.1]
over a maximum of 30 hops:

 1  25 ms    4 ms    3 ms  192.168.43.1
 2  80 ms    26 ms   63 ms  RTK_GW.bbrouter [192.168.1.1]

Trace complete.

C:\Users\Vimal Thomson>
```

```
C:\Users\Vimal Thomson>tracert www.google.com

Tracing route to www.google.com [142.250.196.68]
over a maximum of 30 hops:

 1   3 ms    3 ms    3 ms  192.168.43.1
 2   34 ms   8 ms    6 ms  RTK_GW.bbrouter [192.168.1.1]
 3   12 ms   10 ms   46 ms  117.222.160.1
 4   60 ms   66 ms   35 ms  static.ill.218.248.113.138/24.bsnl.in [218.248.113.138]
 5   *        *        *      Request timed out.
 6   *        *        *      Request timed out.
 7   49 ms   89 ms   87 ms  72.14.205.109
 8   83 ms   113 ms  150 ms  108.170.253.113
 9   99 ms   44 ms   160 ms  142.250.236.157
10   49 ms   53 ms   77 ms  maa03s46-in-f4.1e100.net [142.250.196.68]
```

Trace complete.

```
C:\Users\Vimal Thomson>tracert -d www.yahoo.com
```

```
Tracing route to new-fp-shed.wg1.b.yahoo.com [202.165.107.50]
over a maximum of 30 hops:
```

```
 1   21 ms    4 ms    3 ms  192.168.43.1
 2   7 ms     6 ms    7 ms  192.168.1.1
 3   30 ms   63 ms   83 ms  117.222.160.1
 4   69 ms   30 ms   81 ms  218.248.120.170
 5   *        *        43 ms  117.216.207.220
 6   14 ms   35 ms   13 ms  117.216.207.221
 7   57 ms   36 ms   52 ms  203.101.76.113
 8   149 ms  110 ms  92 ms  116.119.42.9
 9   124 ms  89 ms   87 ms  27.111.228.131
10   81 ms   78 ms   86 ms  203.84.209.77
11   79 ms   84 ms   78 ms  106.10.128.7
12   87 ms   86 ms   84 ms  106.10.131.217
13   62 ms   85 ms   87 ms  106.10.128.247
14   73 ms   63 ms   92 ms  202.165.107.50
```

Trace complete.

```
C:\Users\Vimal Thomson>tracert 22.110.0.1

Tracing route to 22.110.0.1 over a maximum of 30 hops

 1  40 ms    4 ms    3 ms  192.168.43.1
 2  45 ms    26 ms   61 ms  RTK_GW.bbrouter [192.168.1.1]
 3  30 ms    60 ms   67 ms  117.222.160.1
 4  41 ms    64 ms   82 ms  static.ill.218.248.113.14/24.bsnl.in [218.248.113.14]
 5  *         *       *      Request timed out.
 6  *         35 ms   32 ms  117.216.207.221
 7  73 ms    70 ms   102 ms 203.101.76.113
 8  362 ms   408 ms   329 ms 182.79.222.237
 9  336 ms   405 ms   407 ms  ve951.core2.nyc6.he.net [184.105.64.178]
10  394 ms   355 ms   283 ms  100ge13-1.core1.nyc4.he.net [184.105.64.177]
11  462 ms   344 ms   290 ms  100ge16-1.core1.ash1.he.net [184.105.223.165]
12  283 ms   408 ms   329 ms  100ge5-1.core2.ash1.he.net [72.52.92.226]
13  *         *       *      Request timed out.
14  *         *       *      Request timed out.
15  *         *       *      Request timed out.
16  *         *       *      Request timed out.
17  *         *       *      Request timed out.
18  *         *       *      Request timed out.
19  *         *       *      Request timed out.
20  *         *       *      Request timed out.
21  *         *       *      Request timed out.
22  *         *       *      Request timed out.
23  *         *       *      Request timed out.
24  *         *       *      Request timed out.
25  *         *       *      Request timed out.
26  *         *       *      Request timed out.
27  *         *       *      Request timed out.
28  *         *       *      Request timed out.
29  *         *       *      Request timed out.
30  *         *       *      Request timed out.

Trace complete.
```

Nslookup:

```
C:\Users\Vimal Thomson>nslookup
Default Server: UnKnown
Address: 192.168.43.1
```

```
C:\Users\Vimal Thomson>nslookup google.com
Server: UnKnown
Address: 192.168.43.1

Non-authoritative answer:
Name: google.com
Addresses: 2404:6800:4007:81a::200e
           142.250.182.46
```

```
C:\Users\Vimal Thomson>nslookup -q=MX google.com
Server: UnKnown
Address: 192.168.43.1

Non-authoritative answer:
google.com      MX preference = 20, mail exchanger = alt1.aspmx.l.google.com
google.com      MX preference = 30, mail exchanger = alt2.aspmx.l.google.com
google.com      MX preference = 40, mail exchanger = alt3.aspmx.l.google.com
google.com      MX preference = 50, mail exchanger = alt4.aspmx.l.google.com
google.com      MX preference = 10, mail exchanger = aspmx.l.google.com

alt1.aspmx.l.google.com internet address = 173.194.202.27
alt1.aspmx.l.google.com AAAA IPv6 address = 2607:f8b0:400e:c00::1a
alt2.aspmx.l.google.com internet address = 142.250.141.27
alt2.aspmx.l.google.com AAAA IPv6 address = 2607:f8b0:4023:c0b::1b
alt3.aspmx.l.google.com internet address = 142.250.115.27
alt3.aspmx.l.google.com AAAA IPv6 address = 2607:f8b0:4023:1004::1b
alt4.aspmx.l.google.com internet address = 64.233.171.27
alt4.aspmx.l.google.com AAAA IPv6 address = 2607:f8b0:4003:c15::1b
aspmx.l.google.com      internet address = 172.217.194.27
aspmx.l.google.com      AAAA IPv6 address = 2404:6800:4003:c03::1b

C:\Users\Vimal Thomson>
```

```
C:\Users\Vimal Thomson>nslookup -type=ns google.com
Server: UnKnown
Address: 192.168.43.1

Non-authoritative answer:
google.com      nameserver = ns2.google.com
google.com      nameserver = ns3.google.com
google.com      nameserver = ns1.google.com
google.com      nameserver = ns4.google.com

ns2.google.com  internet address = 216.239.34.10
ns2.google.com  AAAA IPv6 address = 2001:4860:4802:34::a
ns3.google.com  internet address = 216.239.36.10
ns3.google.com  AAAA IPv6 address = 2001:4860:4802:36::a
ns1.google.com  internet address = 216.239.32.10
ns1.google.com  AAAA IPv6 address = 2001:4860:4802:32::a
ns4.google.com  internet address = 216.239.38.10
ns4.google.com  AAAA IPv6 address = 2001:4860:4802:38::a
```

Ip Config:

```
C:\Users\Vimal Thomson>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

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

Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Local Area Connection* 2:

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

Wireless LAN adapter Wi-Fi:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::1d21:697e:17bd:94ce%2
  IPv4 Address. . . . . : 192.168.43.30
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 192.168.43.1
```

```
C:\Users\Vimal Thomson>ipconfig /release

Windows IP Configuration

No operation can be performed on Ethernet while it has its media disconnected.
No operation can be performed on Local Area Connection* 1 while it has its media disconnected.

Ethernet adapter Ethernet:

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

Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Local Area Connection* 2:

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

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix . :
    Link-local IPv6 Address . . . . . : fe80::1d21:697e:17bd:94ce%2
    Default Gateway . . . . . :
```

```
C:\Users\Vimal Thomson>ipconfig /displaydns

Windows IP Configuration

bid.g.doubleclick.net
-----
Record Name . . . . . : bid.g.doubleclick.net
Record Type . . . . . : 5
Time To Live . . . . . : 21
Data Length . . . . . : 8
Section . . . . . : Answer
CNAME Record . . . . . : ads-bid.l.doubleclick.net

Record Name . . . . . : ads-bid.l.doubleclick.net
Record Type . . . . . : 1
Time To Live . . . . . : 21
Data Length . . . . . : 4
Section . . . . . : Answer
A (Host) Record . . . . . : 142.251.10.157

Record Name . . . . . : ads-bid.l.doubleclick.net
Record Type . . . . . : 1
Time To Live . . . . . : 21
Data Length . . . . . : 4
Section . . . . . : Answer
A (Host) Record . . . . . : 142.251.10.156

Record Name . . . . . : ads-bid.l.doubleclick.net
Record Type . . . . . : 1
Time To Live . . . . . : 21
Data Length . . . . . : 4
Section . . . . . : Answer
A (Host) Record . . . . . : 172.217.194.156
```

```
C:\Users\Vimal Thomson>ipconfig /showclassid
Error: unrecognized or incomplete command line.

USAGE:
    ipconfig [/allcompartments] [/? | /all |
                                /renew [adapter] | /release [adapter] |
                                /renew6 [adapter] | /release6 [adapter] |
                                /flushdns | /displaydns | /registerdns |
                                /showclassid adapter |
                                /setclassid adapter [classid] |
                                /showclassid6 adapter |
                                /setclassid6 adapter [classid] ]

where
    adapter           Connection name
                      (wildcard characters * and ? allowed, see examples)

Options:
    /?               Display this help message
    /all             Display full configuration information.
    /release         Release the IPv4 address for the specified adapter.
    /release6        Release the IPv6 address for the specified adapter.
    /renew           Renew the IPv4 address for the specified adapter.
    /renew6          Renew the IPv6 address for the specified adapter.
    /flushdns        Purges the DNS Resolver cache.
    /registerdns    Refreshes all DHCP leases and re-registers DNS names
    /displaydns     Display the contents of the DNS Resolver Cache.
    /showclassid    Displays all the dhcp class IDs allowed for adapter.
    /setclassid     Modifies the dhcp class id.
    /showclassid6   Displays all the IPv6 DHCP class IDs allowed for adapter.
    /setclassid6   Modifies the IPv6 DHCP class id.
```

NetStat:

```
C:\Users\Vimal Thomson>netstat
Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.43.30:49185   18.66.139.14:https    TIME_WAIT
  TCP    192.168.43.30:49260   server-13-33-179-59:https ESTABLISHED
  TCP    192.168.43.30:49282   146.20.132.64:https  ESTABLISHED
  TCP    192.168.43.30:49540   104.16.92.60:https  ESTABLISHED
  TCP    192.168.43.30:49918   a104-114-67-50:https ESTABLISHED
  TCP    192.168.43.30:50199   ec2-52-205-167-202:https ESTABLISHED
  TCP    192.168.43.30:50281   104.18.188.55:https  ESTABLISHED
  TCP    192.168.43.30:50450   26:https              ESTABLISHED
  TCP    192.168.43.30:50548   103.231.98.196:https ESTABLISHED
  TCP    192.168.43.30:50721   maa05s20-in-f1:https  TIME_WAIT
  TCP    192.168.43.30:50722   whatsapp-cdn-shv-01-maa2:https TIME_WAIT
  TCP    192.168.43.30:51071   a23-34-24-47:https  ESTABLISHED
  TCP    192.168.43.30:51123   52.46.133.124:https ESTABLISHED
  TCP    192.168.43.30:51442   ec2-52-209-141-213:https ESTABLISHED
  TCP    192.168.43.30:51457   216.46.185.183:https TIME_WAIT
  TCP    192.168.43.30:51516   114:https              ESTABLISHED
  TCP    192.168.43.30:51720   ec2-13-228-251-204:https ESTABLISHED
  TCP    192.168.43.30:51775   ec2-34-206-120-37:https TIME_WAIT
  TCP    192.168.43.30:51836   151.101.158.49:https ESTABLISHED
```

```
C:\Users\Vimal Thomson>netstat -n
```

Active Connections

Proto	Local Address	Foreign Address	State
TCP	192.168.43.30:49260	13.33.179.59:443	ESTABLISHED
TCP	192.168.43.30:49414	104.244.36.20:443	ESTABLISHED
TCP	192.168.43.30:49540	104.16.92.60:443	ESTABLISHED
TCP	192.168.43.30:49918	104.114.67.50:443	ESTABLISHED
TCP	192.168.43.30:50281	104.18.188.55:443	ESTABLISHED
TCP	192.168.43.30:50450	35.227.202.26:443	ESTABLISHED
TCP	192.168.43.30:50548	103.231.98.196:443	ESTABLISHED
TCP	192.168.43.30:50631	104.244.36.20:443	ESTABLISHED
TCP	192.168.43.30:51071	23.34.24.47:443	ESTABLISHED
TCP	192.168.43.30:51123	52.46.133.124:443	TIME_WAIT
TCP	192.168.43.30:51836	151.101.158.49:443	ESTABLISHED
TCP	192.168.43.30:52091	52.95.123.167:443	ESTABLISHED
TCP	192.168.43.30:52216	104.114.67.50:443	ESTABLISHED
TCP	192.168.43.30:52834	52.223.2.229:443	TIME_WAIT
TCP	192.168.43.30:52871	52.46.129.238:443	ESTABLISHED
TCP	192.168.43.30:52926	35.227.248.159:443	ESTABLISHED
TCP	192.168.43.30:53264	34.120.155.137:443	ESTABLISHED
TCP	192.168.43.30:53612	151.101.157.44:443	ESTABLISHED

```
C:\Users\Vimal Thomson>netstat -n
```

Active Connections

Proto	Local Address	Foreign Address	State
TCP	192.168.43.30:49260	13.33.179.59:443	ESTABLISHED
TCP	192.168.43.30:49540	104.16.92.60:443	ESTABLISHED
TCP	192.168.43.30:49918	104.114.67.50:443	ESTABLISHED
TCP	192.168.43.30:50281	104.18.188.55:443	ESTABLISHED
TCP	192.168.43.30:50300	104.244.36.20:443	ESTABLISHED
TCP	192.168.43.30:50450	35.227.202.26:443	ESTABLISHED
TCP	192.168.43.30:50548	103.231.98.196:443	ESTABLISHED
TCP	192.168.43.30:50631	104.244.36.20:443	CLOSING
TCP	192.168.43.30:50968	161.69.226.70:443	ESTABLISHED
TCP	192.168.43.30:51071	23.34.24.47:443	ESTABLISHED
TCP	192.168.43.30:51123	52.46.133.124:443	TIME_WAIT
TCP	192.168.43.30:51211	151.101.157.253:443	ESTABLISHED
TCP	192.168.43.30:51348	151.101.157.108:443	ESTABLISHED
TCP	192.168.43.30:51836	151.101.158.49:443	ESTABLISHED
TCP	192.168.43.30:52091	52.95.123.167:443	ESTABLISHED
TCP	192.168.43.30:52153	218.248.112.60:443	SYN_SENT
TCP	192.168.43.30:52216	104.114.67.50:443	ESTABLISHED
TCP	192.168.43.30:52530	35.172.127.48:443	ESTABLISHED
TCP	192.168.43.30:52834	52.223.2.229:443	TIME_WAIT
TCP	192.168.43.30:52871	52.46.129.238:443	ESTABLISHED
TCP	192.168.43.30:52926	35.227.248.159:443	ESTABLISHED
TCP	192.168.43.30:53034	34.194.161.83:443	ESTABLISHED
TCP	192.168.43.30:53264	34.120.155.137:443	ESTABLISHED
TCP	192.168.43.30:53612	151.101.157.44:443	ESTABLISHED
TCP	192.168.43.30:53870	13.33.145.67:443	TIME_WAIT
TCP	192.168.43.30:53925	35.211.149.16:443	ESTABLISHED

```
C:\Users\Vimal Thomson>netstat -a
```

```
Active Connections
```

Proto	Local Address	Foreign Address	State
TCP	0.0.0.0:135	LAPTOP-0SOSJJH6:0	LISTENING
TCP	0.0.0.0:445	LAPTOP-0SOSJJH6:0	LISTENING
TCP	0.0.0.0:5040	LAPTOP-0SOSJJH6:0	LISTENING
TCP	0.0.0.0:49664	LAPTOP-0SOSJJH6:0	LISTENING
TCP	0.0.0.0:49665	LAPTOP-0SOSJJH6:0	LISTENING
TCP	0.0.0.0:49666	LAPTOP-0SOSJJH6:0	LISTENING
TCP	0.0.0.0:49667	LAPTOP-0SOSJJH6:0	LISTENING
TCP	0.0.0.0:49668	LAPTOP-0SOSJJH6:0	LISTENING
TCP	0.0.0.0:49673	LAPTOP-0SOSJJH6:0	LISTENING
TCP	127.0.0.1:27017	LAPTOP-0SOSJJH6:0	LISTENING
TCP	192.168.43.30:139	LAPTOP-0SOSJJH6:0	LISTENING
TCP	192.168.43.30:49184	ec2-54-205-54-107:https	TIME_WAIT
TCP	192.168.43.30:49608	whatsapp-cdn-shv-01-maa2:https	CLOSE_WAIT
TCP	192.168.43.30:49609	20.190.146.38:https	ESTABLISHED
TCP	192.168.43.30:50255	ec2-13-251-82-178:https	ESTABLISHED
TCP	192.168.43.30:50465	te1-0:https	ESTABLISHED
TCP	192.168.43.30:50796	593:https	ESTABLISHED
TCP	192.168.43.30:51201	139.45.197.253:https	ESTABLISHED

```
^C
```

```
C:\Users\Vimal Thomson>
```

UBUNTU

Ping

```
vimalthomson@vimal-thomson:~$ ping www.google.com
PING www.google.com (142.250.196.36) 56(84) bytes of data.
64 bytes from maa03s45-in-f4.1e100.net (142.250.196.36): icmp_seq=1 ttl=116 time=263 ms
64 bytes from maa03s45-in-f4.1e100.net (142.250.196.36): icmp_seq=2 ttl=116 time=82.4 ms
64 bytes from maa03s45-in-f4.1e100.net (142.250.196.36): icmp_seq=3 ttl=116 time=105 ms
64 bytes from maa03s45-in-f4.1e100.net (142.250.196.36): icmp_seq=4 ttl=116 time=127 ms
^C
--- www.google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3003ms
rtt min/avg/max/mdev = 82.372/144.366/262.932/70.277 ms
```

```
vimalthomson@vimal-thomson:~$ ping -a google.com
PING google.com (142.250.182.14) 56(84) bytes of data.
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=1 ttl=116 time=298 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=2 ttl=116 time=528 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=3 ttl=116 time=141 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=4 ttl=116 time=157 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=5 ttl=116 time=399 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=6 ttl=116 time=223 ms
^C
--- google.com ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5002ms
rtt min/avg/max/mdev = 141.193/290.981/527.541/137.138 ms
```

```
vimalthomson@vimal-thomson:~$ ping -V google.com
ping from iputils s20190709
```

```
vimalthomson@vimal-thomson:~$ ping -b google.com
PING google.com (142.250.182.14) 56(84) bytes of data.
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=1 ttl=116 time=194 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=2 ttl=116 time=225 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=3 ttl=116 time=241 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=4 ttl=116 time=262 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=5 ttl=116 time=80.3 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=6 ttl=116 time=120 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=7 ttl=116 time=132 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=8 ttl=116 time=152 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=9 ttl=116 time=281 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=10 ttl=116 time=205 ms
^C
--- google.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9012ms
rtt min/avg/max/mdev = 80.326/189.219/280.515/62.629 ms
```

Route

```
vimalthomson@vimal-thomson:~$ route
Kernel IP routing table
Destination     Gateway         Genmask        Flags Metric Ref    Use Iface
default         _gateway       0.0.0.0        UG    600      0        0 wlo1
link-local      0.0.0.0        255.255.0.0   U     1000     0        0 wlo1
192.168.43.0   0.0.0.0        255.255.255.0 U     600      0        0 wlo1
```

```
vimalthomson@vimal-thomson:~$ route -n
Kernel IP routing table
Destination     Gateway         Genmask        Flags Metric Ref    Use Iface
0.0.0.0         192.168.43.1   0.0.0.0        UG    600      0        0 wlo1
169.254.0.0     0.0.0.0        255.255.0.0   U     1000     0        0 wlo1
192.168.43.0   0.0.0.0        255.255.255.0 U     600      0        0 wlo1
```

```
vimalthomson@vimal-thomson:~$ route -Cn
Kernel IP routing cache
Source          Destination      Gateway        Flags Metric Ref    Use Iface
```

```
vimalthomson@vimal-thomson:~$ ip route
default via 192.168.43.1 dev wlo1 proto dhcp metric 600
169.254.0.0/16 dev wlo1 scope link metric 1000
192.168.43.0/24 dev wlo1 proto kernel scope link src 192.168.43.30 metric 600
```

Traceroute

```
vimalthomson@vimal-thomson:~$ traceroute google.com
traceroute to google.com (142.250.182.14), 30 hops max, 60 byte packets
1 * _gateway (192.168.43.1)  10.475 ms  10.487 ms
2 RTK_GW_bbrouter (192.168.1.1)  236.207 ms  236.212 ms  236.200 ms
3 117.222.160.1 (117.222.160.1)  240.229 ms  240.233 ms  240.223 ms
4 218.248.113.14 (218.248.113.14)  236.143 ms 218.248.113.142 (218.248.113.142)  236.130 ms 218.248.113.14 (218.248.113.14)  236.119 ms
5 117.216.207.214 (117.216.207.214)  240.171 ms  240.153 ms  240.133 ms
6 * * *
7 72.14.218.250 (72.14.218.250)  89.417 ms * 72.14.205.109 (72.14.205.109)  357.992 ms
8 74.125.242.145 (74.125.242.145)  452.409 ms 10.252.190.62 (10.252.190.62)  452.390 ms 74.125.242.145 (74.125.242.145)  452.382 ms
9 142.251.55.217 (142.251.55.217)  452.374 ms  452.361 ms  452.341 ms
10 maa05s18-in-f14.1e100.net (142.250.182.14)  447.994 ms 452.292 ms 108.170.253.104 (108.170.253.104)  447.974 ms
```

```
vimalthomson@vimal-thomson:~$ traceroute -4 google.com
traceroute to google.com (142.250.182.14), 30 hops max, 60 byte packets
1 _gateway (192.168.43.1)  8.003 ms  7.974 ms  7.962 ms
2 RTK_GW_bbrouter (192.168.1.1)  246.726 ms  246.712 ms  246.700 ms
3 117.222.160.1 (117.222.160.1)  246.610 ms  246.646 ms  246.636 ms
4 218.248.113.138 (218.248.113.138)  250.264 ms  250.254 ms 218.248.113.142 (218.248.113.142)  250.214 ms
5 * * *
6 * * *
7 72.14.205.109 (72.14.205.109)  234.385 ms  196.324 ms 72.14.218.250 (72.14.218.250)  196.296 ms
8 * 74.125.242.145 (74.125.242.145)  200.217 ms 10.23.216.62 (10.23.216.62)  196.239 ms
9 142.251.55.219 (142.251.55.219)  412.614 ms 142.251.55.238 (142.251.55.238)  196.213 ms 142.251.55.219 (142.251.55.219)  211.221 ms
10 maa05s18-in-f14.1e100.net (142.250.182.14)  211.153 ms  211.130 ms  214.702 ms
```

```
vimalthomson@vimal-thomson:~$ traceroute -6 google.com
traceroute to google.com (2404:6800:4007:819::200e), 30 hops max, 80 byte packets
connect: Network is unreachable
```

```
vimalthomson@vimal-thomson:~$ traceroute -d google.com
traceroute to google.com (142.250.182.14), 30 hops max, 60 byte packets
setsockopt SO_DEBUG: Permission denied
```

Nslookup

```
vimalthomson@vimal-thomson:~$ nslookup google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.182.14
Name:   google.com
Address: 2404:6800:4007:819::200e
```

```
vimalthomson@vimal-thomson:~$ nslookup -q=MX google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
google.com      mail exchanger = 20 alt1.aspmx.l.google.com.
google.com      mail exchanger = 10 aspmx.l.google.com.
google.com      mail exchanger = 50 alt4.aspmx.l.google.com.
google.com      mail exchanger = 30 alt2.aspmx.l.google.com.
google.com      mail exchanger = 40 alt3.aspmx.l.google.com.

Authoritative answers can be found from:
```

```
vimalthomson@vimal-thomson:~$ nslookup -type=soa redhat.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
redhat.com
origin = a1-68.akam.net
mail addr = noc.redhat.com
serial = 2021091002
refresh = 300
retry = 180
expire = 604800
minimum = 14400

Authoritative answers can be found from:
```

```
vimalthomson@vimal-thomson:~$ nslookup -type=a google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.182.14
```

Ifconfig

```
vimalthomson@vimal-thomson:~$ ifconfig -v
enp2s0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
          ether 38:f3:ab:b7:e6:34  txqueuelen 1000  (Ethernet)
          RX packets 0  bytes 0 (0.0 B)
          RX errors 0  dropped 0  overruns 0  frame 0
          TX packets 0  bytes 0 (0.0 B)
          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 11900  bytes 1076603 (1.0 MB)
          RX errors 0  dropped 0  overruns 0  frame 0
          TX packets 11900  bytes 1076603 (1.0 MB)
          TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0

wlo1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
          inet 192.168.43.30  netmask 255.255.255.0  broadcast 192.168.43.255
          inet6 fe80::5dbb:f21c:3ca8:23a1  prefixlen 64  scopeid 0x20<link>
          ether 90:0f:0c:a3:cb:05  txqueuelen 1000  (Ethernet)
          RX packets 37636  bytes 27244146 (27.2 MB)
          RX errors 0  dropped 0  overruns 0  frame 0
          TX packets 37473  bytes 6463782 (6.4 MB)
          TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0
```

```
vimalthomson@vimal-thomson:~$ ifconfig
enp2s0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether 38:f3:ab:b7:e6:34 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    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 10812 bytes 960826 (960.8 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 10812 bytes 960826 (960.8 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlo1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.43.30 netmask 255.255.255.0 broadcast 192.168.43.255
        inet6 fe80::5dbb:f21c:3ca8:23a1 prefixlen 64 scopeid 0x20<link>
    ether 90:0f:0c:a3:cb:05 txqueuelen 1000 (Ethernet)
    RX packets 32122 bytes 23740186 (23.7 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 31869 bytes 5332697 (5.3 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Iface	MTU	RX-OK	RX-ERR	RX-DRP	RX-OVR	TX-OK	TX-ERR	TX-DRP	TX-OVR	Flg
enp2s0	1500	0	0	0	0	0	0	0	0	BMU
lo	65536	11668	0	0	0	11668	0	0	0	LRU
wlo1	1500	36667	0	0	0	36570	0	0	0	BMRU

```
vimalthomson@vimal-thomson:~$ ifconfig -a
enp2s0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether 38:f3:ab:b7:e6:34 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    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 11654 bytes 1050406 (1.0 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 11654 bytes 1050406 (1.0 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlo1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.43.30 netmask 255.255.255.0 broadcast 192.168.43.255
        inet6 fe80::5dbb:f21c:3ca8:23a1 prefixlen 64 scopeid 0x20<link>
    ether 90:0f:0c:a3:cb:05 txqueuelen 1000 (Ethernet)
    RX packets 36531 bytes 26708455 (26.7 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 36410 bytes 6223162 (6.2 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Netstat

```
vimalthomson@vimal-thomson:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp      0      0 vimal-thomson:41726    maa03s38-in-f2.1e:https ESTABLISHED
tcp      0      0 vimal-thomson:52064    104.16.19.94:https   ESTABLISHED
tcp      1      32 vimal-thomson:33228   72.34.250.78:https  CLOSING
tcp      0      0 vimal-thomson:42934    ec2-13-228-38-195:https ESTABLISHED
tcp      0      0 vimal-thomson:41814    69.173.144.138:https TIME_WAIT
tcp      0      0 vimal-thomson:38996    maa05s20-in-f1.1e:https ESTABLISHED
tcp      0      0 vimal-thomson:41946    ip22.67-202-105.s:https ESTABLISHED
tcp      0      0 vimal-thomson:49176    maa05s16-in-f14.1:https ESTABLISHED
tcp      0      0 vimal-thomson:49502    a104-114-94-38.de:https ESTABLISHED
tcp      0      0 vimal-thomson:36562    ec2-44-229-115-17:https ESTABLISHED
tcp      0      0 vimal-thomson:44908    193.122.174.27:https ESTABLISHED
tcp      0      0 vimal-thomson:56220    ec2-54-241-83-91.:https ESTABLISHED
tcp      0      0 vimal-thomson:57414    218.64.98.34.bc.g:https ESTABLISHED
tcp      0      0 vimal-thomson:49600    maa05s12-in-f1.1e:https ESTABLISHED
tcp      0      0 vimal-thomson:56568    maa05s26-in-f14.1:https ESTABLISHED
tcp      0      0 vimal-thomson:57748    ip-185-184-8-65.r:https ESTABLISHED
```

```
vimalthomson@vimal-thomson:~$ netstat -n
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp      0      0 192.168.43.30:41726  142.250.195.66:443  TIME_WAIT
tcp      0      0 192.168.43.30:52064  104.16.19.94:443   TIME_WAIT
tcp      0      0 192.168.43.30:42934  13.228.38.195:443  TIME_WAIT
tcp      0      0 192.168.43.30:38996  142.250.182.65:443 ESTABLISHED
tcp      0      0 192.168.43.30:41946  67.202.105.22:443  TIME_WAIT
tcp      0      0 192.168.43.30:49176  142.250.77.142:443 TIME_WAIT
tcp      0      0 192.168.43.30:49502  104.114.94.38:443  ESTABLISHED
tcp      0      0 192.168.43.30:36562  44.229.115.174:443 ESTABLISHED
tcp      0      0 192.168.43.30:44908  193.122.174.27:443 TIME_WAIT
tcp      0      0 192.168.43.30:56220  54.241.83.91:443  TIME_WAIT
tcp      0      0 192.168.43.30:57414  34.98.64.218:443  ESTABLISHED
tcp      0      0 192.168.43.30:49600  142.250.57.33:443 ESTABLISHED
tcp      0      0 192.168.43.30:56568  142.250.193.174:443 TIME_WAIT
tcp      0      0 192.168.43.30:57748  185.184.8.65:443  TIME_WAIT
tcp      0      0 192.168.43.30:41290  142.250.76.66:443  TIME_WAIT
tcp      0      0 192.168.43.30:51748  142.250.71.34:443  TIME_WAIT
tcp      0      0 192.168.43.30:59846  142.250.196.6:443 TIME_WAIT
tcp      0      0 192.168.43.30:54500  103.231.98.195:443 TIME_WAIT
tcp      0      0 192.168.43.30:48250  104.114.94.38:443 ESTABLISHED
tcp      1      32 192.168.43.30:34142  20.36.164.126:443 CLOSING
tcp      0      0 192.168.43.30:47316  142.250.182.98:443 TIME_WAIT
tcp      0      0 192.168.43.30:47252  142.250.195.162:443 ESTABLISHED
tcp      0      1 192.168.43.30:47796  104.114.107.195:443 FIN_WAIT1
tcp      0      0 192.168.43.30:48270  103.231.98.193:443 ESTABLISHED
tcp      0      0 192.168.43.30:41228  142.250.76.66:443 ESTABLISHED
tcp      0      0 192.168.43.30:41516  142.250.195.66:443 ESTABLISHED
tcp      0      0 192.168.43.30:44144  47.241.6.33:443  TIME_WAIT
tcp      0      0 192.168.43.30:35520  142.250.77.162:443 ESTABLISHED
```

```
vimalthomson@vimal-thomson:~$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp      0      0 localhost:domain        0.0.0.0:*
tcp      0      0 localhost:ipp          0.0.0.0:*
tcp      0      0 localhost:mysql        0.0.0.0:*
tcp      0      0 0.0.0.0:sunrpc       0.0.0.0:*
tcp      0      0 vimal-thomson:38996    maa05s20-in-f1.1e:https TIME_WAIT
tcp      0      0 vimal-thomson:49502    a104-114-94-38.de:https ESTABLISHED
tcp      0      0 vimal-thomson:36562    ec2-44-229-115-17:https ESTABLISHED
tcp      0      0 vimal-thomson:49600    maa05s12-in-f1.1e:https TIME_WAIT
tcp      0      0 vimal-thomson:48250    a104-114-94-38.de:https ESTABLISHED
tcp      0      0 vimal-thomson:47252    maa03s41-in-f2.1e:https TIME_WAIT
tcp      0      0 vimal-thomson:41228    maa05s14-in-f2.1e:https TIME_WAIT
tcp      0      0 vimal-thomson:41516    maa03s38-in-f2.1e:https TIME_WAIT
tcp      0      0 vimal-thomson:35520    maa05s17-in-f2.1e:https TIME_WAIT
tcp      0      0 vimal-thomson:35902    maa05s25-in-f13.1:https TIME_WAIT
tcp      0      0 vimal-thomson:45656    ec2-18-203-227-77:https TIME_WAIT
tcp      0      0 vimal-thomson:53236    maa03s46-in-f4.1e:https TIME_WAIT
tcp      0      0 vimal-thomson:47258    maa05s21-in-f2.1e:https TIME_WAIT
tcp6     0      0 [::]:http            [::]:*                  LISTEN
tcp6     0      0 ip6-localhost:ipp     [::]:*                  LISTEN
tcp6     0      0 [::]:sunrpc        [::]:*                  LISTEN
udp      0      0 0.0.0.0:49073      0.0.0.0:*
udp      0      0 localhost:domain    0.0.0.0:*
udp      0      0 vimal-thomson:bootpc _gateway:bootps      ESTABLISHED
udp      0      0 0.0.0.0:sunrpc      0.0.0.0:*
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 [::]:44355        [::]:*                  LISTEN
udp6     0      0 [::]:sunrpc        [::]:*                  LISTEN
udp6     0      0 [::]:mdns         [::]:*                  LISTEN
raw6    0      0 [::]:ipv6-icmp     [::]:*                  7
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags     Type      State       I-Node Path
unix    2      [ ACC ]   STREAM    LISTENING  36424   @/tmp/.ICE-unix/1556
unix    2      [ ACC ]   STREAM    LISTENING  45216   @/tmp/dbus-zUX41SHpa
```

```
vimalthomson@vimal-thomson:~$ netstat -n 5
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp      0      0 192.168.43.30:38996    142.250.182.65:443   TIME_WAIT
tcp      0      0 192.168.43.30:41946    67.202.105.22:443   TIME_WAIT
tcp      0      0 192.168.43.30:49176    142.250.77.142:443   TIME_WAIT
tcp      0      0 192.168.43.30:49502    104.114.94.38:443   ESTABLISHED
tcp      0      0 192.168.43.30:36562    44.229.115.174:443   ESTABLISHED
tcp      0      0 192.168.43.30:44908    193.122.174.27:443   TIME_WAIT
tcp      0      0 192.168.43.30:56220    54.241.83.91:443   TIME_WAIT
tcp      0      0 192.168.43.30:57414    34.98.64.218:443   TIME_WAIT
tcp      0      0 192.168.43.30:49600    142.250.67.33:443   TIME_WAIT
tcp      0      0 192.168.43.30:48250    104.114.94.38:443   ESTABLISHED
tcp      0      0 192.168.43.30:47252    142.250.195.162:443   TIME_WAIT
tcp      0      1 192.168.43.30:47796    104.114.107.195:443  FIN_WAIT1
tcp      0      0 192.168.43.30:48270    103.231.98.193:443   TIME_WAIT
tcp      0      0 192.168.43.30:41228    142.250.76.66:443   TIME_WAIT
tcp      0      0 192.168.43.30:41516    142.250.195.66:443   TIME_WAIT
tcp      0      0 192.168.43.30:44144    47.241.6.33:443   TIME_WAIT
tcp      0      0 192.168.43.30:35520    142.250.77.162:443   TIME_WAIT
tcp      0      0 192.168.43.30:51512    103.231.98.194:443   TIME_WAIT
tcp      0      0 192.168.43.30:41270    104.16.68.69:443   TIME_WAIT
tcp      0      0 192.168.43.30:34524    13.227.227.202:443   TIME_WAIT
tcp      0      0 192.168.43.30:35902    142.250.193.141:443   TIME_WAIT
tcp      0      0 192.168.43.30:45656    18.203.227.77:443   TIME_WAIT
tcp      0      0 192.168.43.30:41786    52.1.239.227:443   TIME_WAIT
tcp      0      0 192.168.43.30:53236    142.250.196.68:443   TIME_WAIT
tcp      0      0 192.168.43.30:45572    13.114.203.146:443   TIME_WAIT
tcp      0      0 192.168.43.30:47258    142.250.182.98:443   TIME_WAIT
udp      0      0 192.168.43.30:68      192.168.43.1:67      ESTABLISHED
Active UNIX domain sockets (w/o servers)
```

2. Identify and perform 5 more network commands and it's working.

i. ARP

The ARP command corresponds to the [Address Resolution Protocol](#).

Although it is easy to think of network communications in terms of IP addressing, packet delivery is ultimately dependent on the Media Access Control (MAC) address of the device's network adapter. This is where the Address Resolution Protocol comes into play. Its job is to map IP addresses to MAC addresses.

Windows devices maintain ARP cache, which contains the results of recent ARP queries. You can see the contents of this cache by using the ARP -A command. If you are having problems communicating with one specific host, you can append the remote host's IP address to the ARP-A command.

```
C:\Users\Vimal Thomson>arp -a

Interface: 192.168.43.30 --- 0x2
  Internet Address      Physical Address      Type
  192.168.43.1          0a-94-f0-cb-3f-0f    dynamic
  192.168.43.255        ff-ff-ff-ff-ff-ff    static
  224.0.0.22             01-00-5e-00-00-16    static
  224.0.0.251            01-00-5e-00-00-fb    static
  224.0.0.252            01-00-5e-00-00-fc    static
  239.255.255.250       01-00-5e-7f-ff-fa    static
  255.255.255.255       ff-ff-ff-ff-ff-ff    static
```

ii. NbtStat

A slam sure you probably know, computers that are running a Windows operating system are assigned a computer name. Often times, there is a domain name or a workgroup name that is also assigned to the computer. The computer name is sometimes referred to as the Net BIOS name.

Windows uses several different methods to map NetBIOS names to IP addresses, such as broadcast, LM Host lookup, or even using the nearly extinct method of querying a WINS server.

Of course, Net BIOS over TCP/IP can occasionally break down. The NbtStat command can help you to diagnose and correct such problems. The NbtStat-n command for example, shows the Net BIOS names that are in use by a device. The NbtStat-r command shows how many Net BIOS names the device has been able to resolve recently.

```
C:\Users\Vimal Thomson>nbtstat -r

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

Registered By Broadcast   = 3
Registered By Name Server = 0
```

iii. Hostname

The previously discussed NbtStat command can provide you with the host name that has been assigned to a Windows device, if you know which Switch to use with the command. However, if you're just looking for a fast and easy way of verifying a computer's name, then try using the Hostname command. Typing Hostname at the command prompt returns the local computer name.

```
C:\Users\Vimal Thomson>hostname
LAPTOP-0SOSJJH6
```

iv. PathPing

Earlier, I talked about the Ping utility and the Tracert utility, and the similarities between them. As you might have guessed, the PathPing tool is a utility that combines the best aspects of Tracert and Ping.

Entering the PathPing command followed by a hostname initiates what looks like a somewhat standard Tracert process. Once this process completes however, the tool takes 300 seconds (five minutes) to gather statistics, and then reports latency and packet loss statistics that are more detailed than those provided by Ping or Tracert.

```
C:\Users\Vimal Thomson>pathping www.google.com

Tracing route to www.google.com [142.250.196.36]
over a maximum of 30 hops:
  0  LAPTOP-0SOSJJH6 [192.168.43.30]
  1  192.168.43.1
  2  RTK_GW.bbrouter [192.168.1.1]
  3  117.222.160.1
  4  *       *       *
Computing statistics for 75 seconds...
```

v. Get mac Command

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

```
C:\Users\Vimal Thomson>getmac  
Physical Address      Transport Name  
===== =========  
38-F3-AB-B7-E6-34    Media disconnected  
90-0F-0C-A3-CB-05    \Device\Tcpip_{05947E02-80A7-4193-93E1-D3A45A8D19BC}
```

LAMP Stack installation

The name LAMP is an acronym of the following programs:

Linux Operating System

Apache HTTP Server

MySQL database management system PHP
programming language

1. Installation of Apache Server.

Command:

```
sudo apt-get install apache2
```

Press y (yes) and hit ENTER to permit the installation

Check if Apache is installed correctly by running the Apache service status. Use the following the command:

```
sudo service apache2 status
```

```
vimalthomson@vimal-thomson:~$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
  Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
  Active: active (running) since Wed 2021-09-29 14:35:43 IST; 5h 23min left
    Docs: https://httpd.apache.org/docs/2.4/
   Process: 1008 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
 Main PID: 1220 (apache2)
   Tasks: 6 (limit: 8716)
  Memory: 19.0M
    CGroup: /system.slice/apache2.service
            └─1220 /usr/sbin/apache2 -k start
              ├─1228 /usr/sbin/apache2 -k start
              ├─1229 /usr/sbin/apache2 -k start
              ├─1230 /usr/sbin/apache2 -k start
              ├─1231 /usr/sbin/apache2 -k start
              └─1232 /usr/sbin/apache2 -k start

Sep 29 14:35:36 vimal-thomson systemd[1]: Starting The Apache HTTP Server...
Sep 29 14:35:43 vimal-thomson apachectl[1061]: AH00558: apache2: Could not reliably determine th
Sep 29 14:35:43 vimal-thomson systemd[1]: Started The Apache HTTP Server.
lines 1-19/19 (END)
```

2. Installation of MariaDB

MariaDB is an open source relational database management system (RDBMS)

Command:

```
sudo apt install mariadb-server mariadb-client Check
```

mariadb Installation

```
sudo systemctl status mysql
```

(if it is not working sudo systemctl start mysql)

```
vimalthomson@vimal-thomson:~$ sudo systemctl status mysql
● mariadb.service - MariaDB 10.3.31 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor preset: enabled)
   Active: active (running) since Wed 2021-09-29 14:35:49 IST; 5h 23min left
     Docs: man:mysqld(8)
           https://mariadb.com/kb/en/library/systemd/
  Process: 1010 ExecStartPre=/usr/bin/install -m 755 -o mysql -g root -d /var/run/mysqld (code=exited, status=0/SUCCESS)
  Process: 1024 ExecStartPre=/bin/sh -c systemctl unset-environment _WSREP_START_POSITION (code=exited, status=0/SUCCESS)
  Process: 1032 ExecStartPre=/bin/sh -c [ ! -e /usr/bin/galera_recovery ] && VAR= || VAR=`cat /var/run/mysqld/mariadb.pid` (code=exited, status=0/SUCCESS)
  Process: 1347 ExecStartPost=/bin/sh -c systemctl unset-environment _WSREP_START_POSITION (code=exited, status=0/SUCCESS)
  Process: 1349 ExecStartPost=/etc/mysql/debian-start (code=exited, status=0/SUCCESS)
 Main PID: 1123 (mysqld)
    Status: "Taking your SQL requests now..."
      Tasks: 31 (limit: 8716)
     Memory: 108.8M
        CGroup: /system.slice/mariadb.service
                  └─1123 /usr/sbin/mysqld
```

3. Install PHP

Command:

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

Restart apache2

```
Sudo systemctl restart apache2
```

check installation

open <http://127.0.0.1/phpinfo.php> in any browser

4. Install phpmyadmin

Command:

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

(It asks for web server select apache2, select db-configuration and set password)

Restart apache2

```
Sudo systemctl restart apache2
```

Check phpmyadmin

Open a browser

<http://localhost/phpmyadmin>

:root

password :yourpassword



Welcome to phpMyAdmin

Language

English

Log in

Username: admin

Password:

Go

localhost/phpmyadmin/index.php

General settings

- Change password
- Server connection collation: utf8mb4_unicode_ci

Appearance settings

- Language: English
- Theme: pmahomme
- Font size: 82%

Database server

- Server: Localhost via UNIX socket
- Server type: MariaDB
- Server connection: SSL is not being used
- Server version: 10.3.31-MariaDB-0ubuntu0.20.04.1 - Ubuntu 20.04
- Protocol version: 10
- User: admin@localhost
- Server charset: UTF-8 Unicode (utf8mb4)

Web server

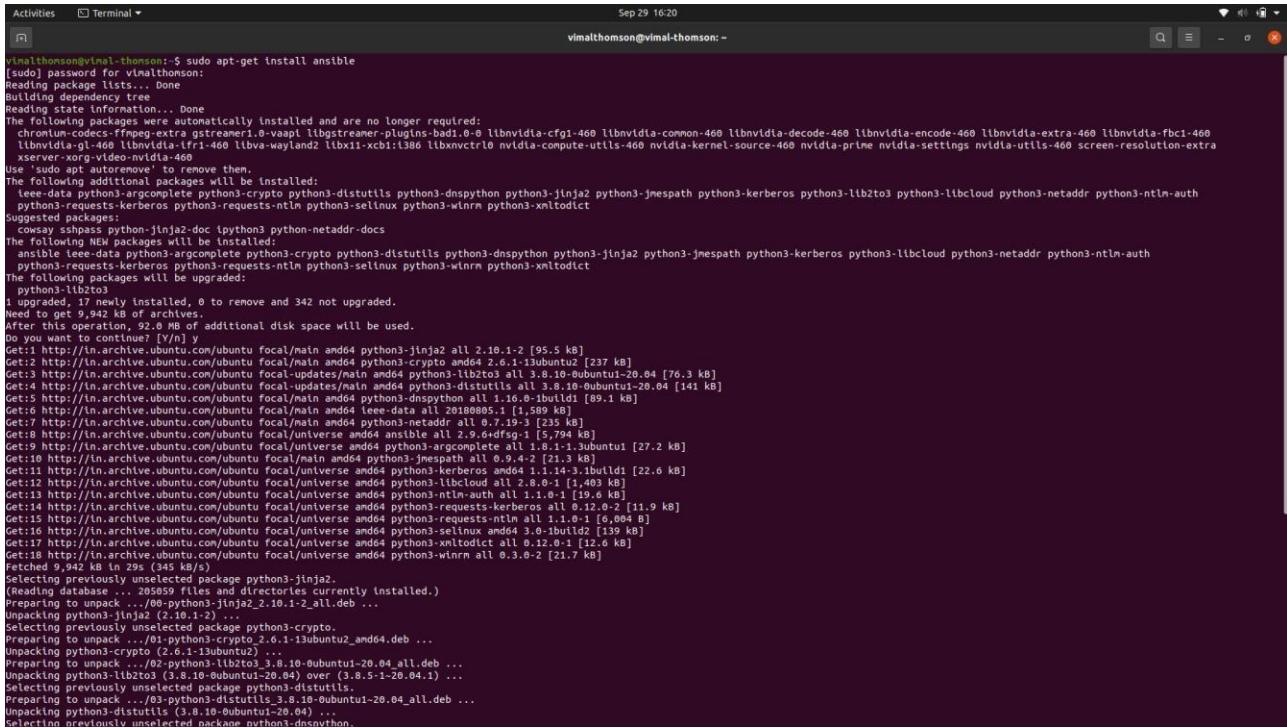
- Apache/2.4.41 (Ubuntu)
- Database client version: libmysql - mysqlnd 7.4.3
- PHP extension: mysqli curl mbstring
- PHP version: 7.4.3

phpMyAdmin

- Version information: 4.9.5deb2
- Documentation
- Official Homepage
- Contribute
- Get support
- List of changes
- License

Ansible Installation

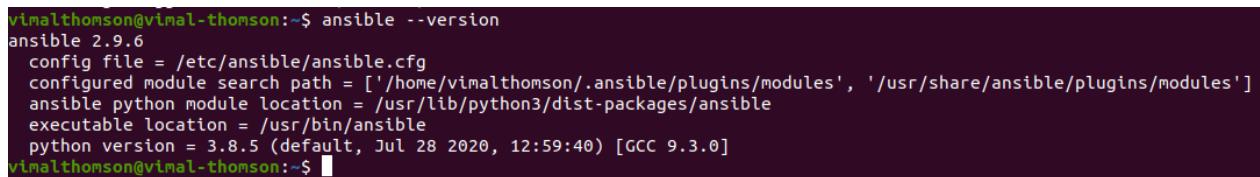
Command: sudo apt-get install ansible



```
vimalthomson@vimal-thomson:~$ sudo apt-get install ansible
[sudo] password for vimalthomson:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi libgstreamer-plugins-bad1.0-0 libnvidia-cfg1-460 libnvidia-common-460 libnvidia-decode-460 libnvidia-encode-460 libnvidia-extra-460 libnvidia-fbc1-460
  libnvidia-gl-460 libnvidia-ifr-460 libva-wayland libx11-xcb1:130 libxnvctrl0 nvidia-compute-utils-460 nvidia-kernel-source-460 nvidia-prime nvidia-settings nvidia-utils-460 screen-resolution-extra
  xserver-xorg-video-nvidia-460
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  ieeefloat-data python3-argcomplete python3-crypto python3-distro python3-dsutils python3-dsutils-python python3-jinja2 python3-jmespath python3-kerberos python3-lib2to3 python3-libcloud python3-netaddr python3-ntlm-auth
  python3-requests-kerberos python3-requests-ntlm python3-selinux python3-wlrm python3-xmtdict
Suggested packages:
  docutils sphinx python-jinja2-doc python3-jinja2 python3-netaddr-docs
The following NEW packages will be installed:
  ansible ieeefloat-data python3-argcomplete python3-crypto python3-dsutils python3-dsutils-python python3-jinja2 python3-jmespath python3-kerberos python3-lib2to3 python3-libcloud python3-netaddr python3-ntlm-auth
  python3-requests-kerberos python3-requests-ntlm python3-selinux python3-wlrm python3-xmtdict
The following packages will be upgraded:
  python3-lib2to3
0 upgraded, 0 newly installed, 0 to remove and 342 not upgraded.
Need to get 9,942 kB of archives.
After this operation, 92.0 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 python3-jinja2 all 2.10.1-2 [95.5 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal/main amd64 python3-crypto amd64 2.6.1-13ubuntu2 [237 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 python3-lib2to3 all 3.8.10-0ubuntu1-20.04 [76.3 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 python3-argcomplete all 1.16.0-0ubuntu1-20.04 [141 kB]
Get:5 https://in.archive.ubuntu.com/ubuntu focal/main amd64 python3-dsutils all 1.16.0-0ubuntu1 [89.1 kB]
Get:6 https://in.archive.ubuntu.com/ubuntu focal/main amd64 ieeefloat-data all 20190805.1 [1,589 kB]
Get:7 https://in.archive.ubuntu.com/ubuntu focal/universe amd64 ansible all 2.9.19-3 [235 kB]
Get:8 https://in.archive.ubuntu.com/ubuntu focal/universe amd64 ieeefloat-ntnl all 2.9.6+dfsg-1 [5,794 kB]
Get:9 https://in.archive.ubuntu.com/ubuntu focal/universe amd64 python3-argcomplete all 1.8.1-1.3ubuntu1 [27.2 kB]
Get:10 https://in.archive.ubuntu.com/ubuntu focal/universe amd64 python3-dsutils all 0.9.4-2 [21.3 kB]
Get:11 https://in.archive.ubuntu.com/ubuntu focal/universe amd64 python3-jmespath all 1.0.0-1 [1,403 kB]
Get:12 https://in.archive.ubuntu.com/ubuntu focal/universe amd64 python3-libcloud all 2.8.0-1 [1,403 kB]
Get:13 https://in.archive.ubuntu.com/ubuntu focal/universe amd64 python3-ntlm-auth all 1.1.0-1 [19.6 kB]
Get:14 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 python3-requests-kerberos all 0.12.0-2 [11.9 kB]
Get:15 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 python3-requests-ntlm all 1.1.0-1 [6,004 kB]
Get:16 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 python3-selinux amd64 3.0-1ubuntu2 [139 kB]
Get:17 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 python3-xmtdict all 0.12.0-1 [12.6 kB]
Get:18 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 python3-wlrm all 0.3.0-2 [21.7 kB]
Fetched 9,942 kB in 29s (345 kB/s)
Selecting previously unselected package python3-jinja2.
(Reading database ... 205859 files and directories currently installed.)
Preparing to unpack .../00-python3-jinja2_2.10.1-2_all.deb ...
Unpacking python3-jinja2 (2.10.1-2) ...
Selecting previously unselected package python3-crypto.
Preparing to unpack .../01-python3-crypto_2.6.1-13ubuntu2_amd64.deb ...
Unpacking python3-crypto (2.6.1-13ubuntu2) ...
Preparing to unpack .../02-python3-lib2to3_3.8.10-0ubuntu1-20.04_all.deb ...
Unpacking python3-lib2to3 (3.8.10-0ubuntu1-20.04) over (3.8.5-1-20.04.1) ...
Selecting previously unselected package python3-dsutils.
Preparing to unpack .../03-python3-dsutils_3.8.10-0ubuntu1-20.04_all.deb ...
Unpacking python3-dsutils (3.8.10-0ubuntu1-20.04) ...
Processing triggers for man-db (2.9.1-2) ...
Processing triggers for menu (2.6.1-13ubuntu2) ...
Processing triggers for initramfs-tools (0.133ubuntu3) ...
Processing triggers for udev (249.4-1ubuntu1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.2) ...
Processing triggers for logrotate (3.1.1-1ubuntu1) ...
Processing triggers for ureadahead (0.100.0-19) ...
Processing triggers for man-db (2.9.1-2) ...
Processing triggers for menu (2.6.1-13ubuntu2) ...
Processing triggers for initramfs-tools (0.133ubuntu3) ...
Processing triggers for udev (249.4-1ubuntu1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.2) ...
Processing triggers for logrotate (3.1.1-1ubuntu1) ...
Processing triggers for ureadahead (0.100.0-19) ...
```

installation check

command: ansible --version



```
vimalthomson@vimal-thomson:~$ ansible --version
ansible 2.9.6
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['~/home/vimalthomson/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  executable location = /usr/bin/ansible
  python version = 3.8.5 (default, Jul 28 2020, 12:59:40) [GCC 9.3.0]
vimalthomson@vimal-thomson:~$
```

Docker installation on Windows 10

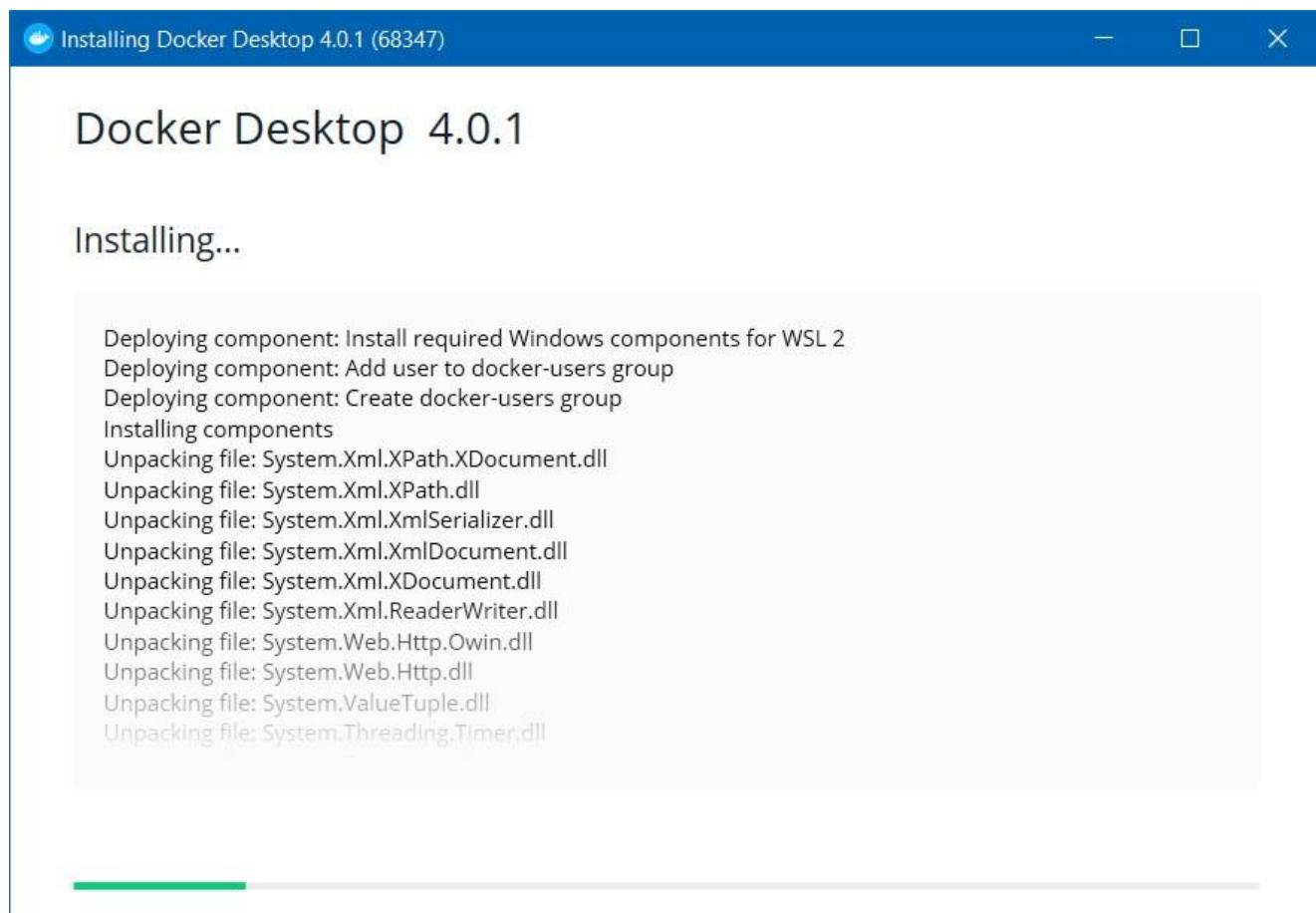
Step-I

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



Step-II

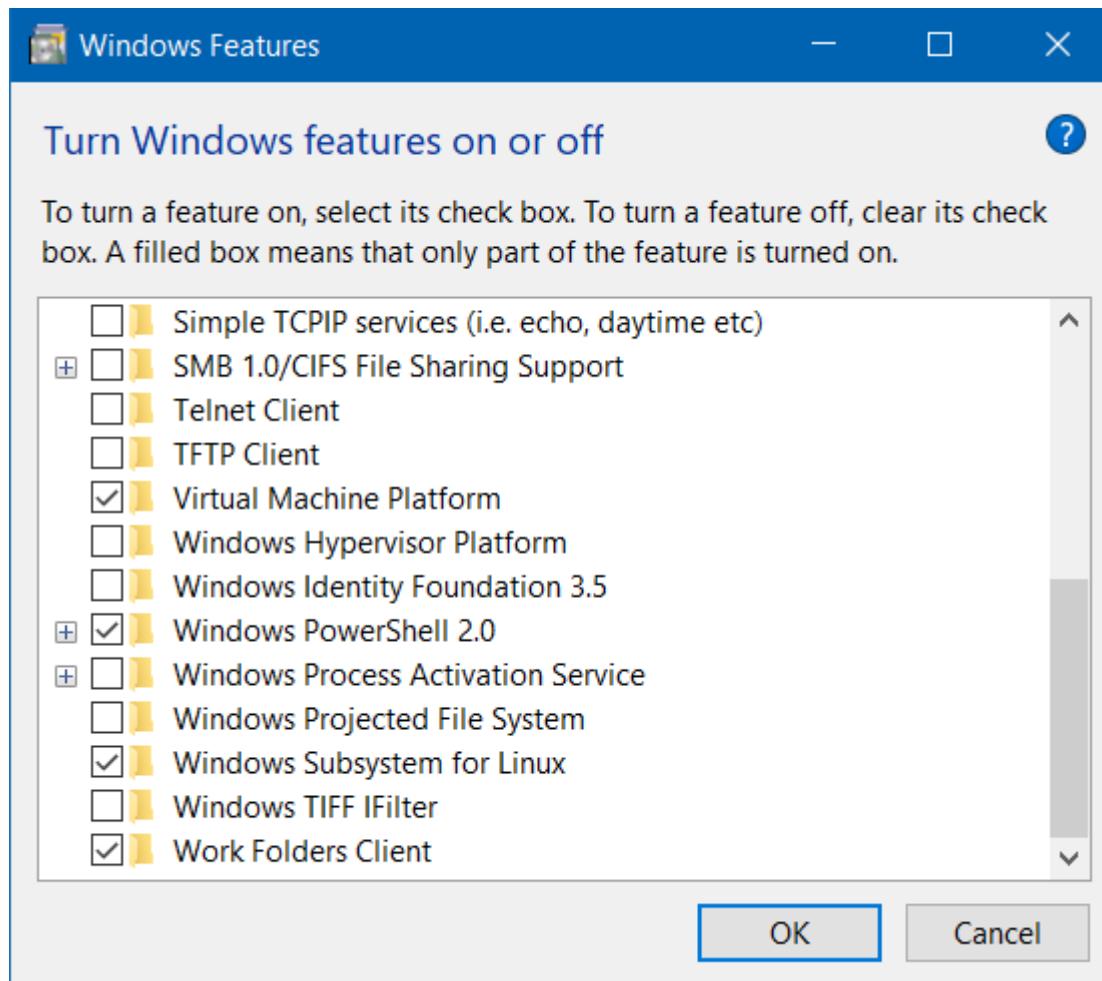
Open the .exe file and follow the steps after clicking install button.



Step-III

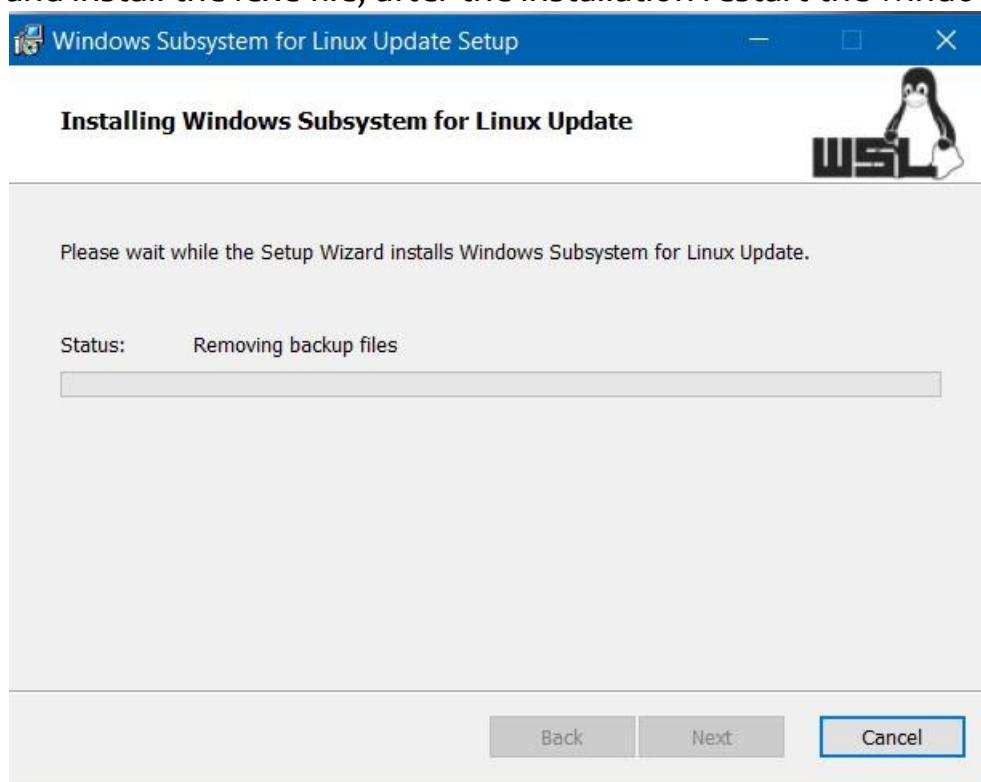
Once installed go to programs and features and click turn on windows features on or off

Scroll to the bottom and select windows subsystem for Linux



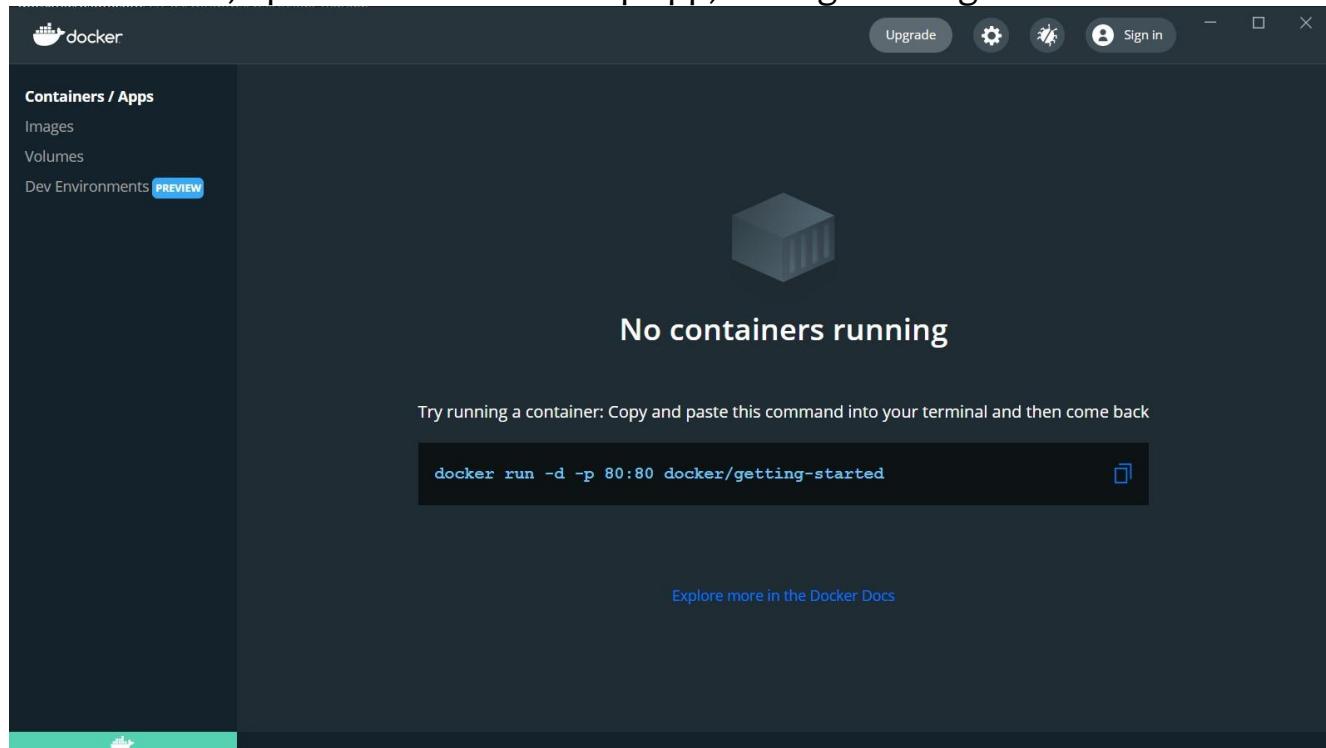
Step-IV

If any WSL 2 error occurs download windows subsystem for linux update package and install the .exe file, after the installation restart the windows device.



Step-V

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



Step-VI

Now pull any image from docker hub using the docker pull command in the command prompt (eg: docker pull ubuntu)

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

C:\Windows\system32>docker run -d -p 80:80 docker/getting-started
Unable to find image 'docker/getting-started:latest' locally
docker: Error response from daemon: Get "https://registry-1.docker.io/v2/": dial tcp: lookup registry-1.docker.io on 192.168.65.5:53: no such host.
See 'docker run --help'.

C:\Windows\system32>docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
f3ef4ff62e0d: Pull complete
Digest: sha256:65de08a8dabf289ef114053ab32f79e0c333a4fbfa1fe3778bb13ae921a7849b
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest

C:\Windows\system32>
```

Now in the images tab an image of ubuntu will be displayed, we can run the ubuntu instance using the cli.

The screenshot shows the Docker desktop application interface. The left sidebar has options for 'Containers / Apps', 'Images' (which is selected), 'Volumes', and 'Dev Environments' with a 'PREVIEW' button. The main area is titled 'Images on disk' and shows '1 images' with a total size of '72.78 MB'. There are tabs for 'LOCAL' and 'REMOTE REPOSITORIES', with 'LOCAL' selected. A search bar and a checkbox for 'In Use only' are at the top. A table below lists the image details:

NAME	TAG	IMAGE ID	CREATED	SIZE
ubuntu	latest	597ce1600cf4	about 8 hours ago	72.78 MB

Working with various tcpdump options in ubuntu

You need to be root to run tcpdump. It includes many options and filters. Running tcpdump 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.

Command: Sudo tcpdump -D

```
vimalthomson@vimal-thomson:~$ sudo tcpdump -D
1.wlo1 [Up, Running]
2.lo [Up, Running, Loopback]
3.any (Pseudo-device that captures on all interfaces) [Up, Running]
4.enp2s0 [Up]
5.bluetooth-monitor (Bluetooth Linux Monitor) [none]
6.nflog (Linux netfilter log (NFLOG) interface) [none]
7.nfqueue (Linux netfilter queue (NFQUEUE) interface) [none]
8.bluetooth0 (Bluetooth adapter number 0) [none]
```

Command: Sudo tcpdump host 8.8.8.8

```
vimalthomson@vimal-thomson:~$ sudo tcpdump host 8.8.8.8
[sudo] password for vimalthomson:
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on wlo1, link-type EN10MB (Ethernet), capture size 262144 bytes

^C
0 packets captured
0 packets received by filter
0 packets dropped by kernel
```

Command: sudo tcpdump -l any -c 5 port 80

```
vimalthomson@vimal-thomson:~$ sudo tcpdump -i any -c 5 port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on any, link-type LINUX_SLL (Linux cooked v1), capture size 262144 bytes
12:13:26.007976 IP vimal-thomson.mshome.net.35960 > 82.221.107.34.bc.googleusercontent.com.http: Flags [.], ack 1, win 32, options [nop,nop,TS val 111111 us 100000]
12:13:26.267744 IP 82.221.107.34.bc.googleusercontent.com.http > vimal-thomson.mshome.net.35960: Flags [.], ack 1, win 32, options [nop,nop,TS val 111111 us 100000]
12:13:28.824027 IP vimal-thomson.mshome.net.56478 > maa05s22-in-f3.1e100.net.http: Flags [.], ack 1, win 32, options [nop,nop,TS val 111111 us 100000]
12:13:28.865945 IP maa05s22-in-f3.1e100.net.http > vimal-thomson.mshome.net.56478: Flags [.], ack 1, win 32, options [nop,nop,TS val 111111 us 100000]
12:13:29.591975 IP vimal-thomson.mshome.net.39454 > 117.18.237.29.http: Flags [.], ack 2293278109, win 32, options [nop,nop,TS val 111111 us 100000]
5 packets captured
8 packets received by filter
0 packets dropped by kernel
```

Command: sudo tcpdump -l wlo1

```
vimalthomson@vimal-thomson:~$ sudo tcpdump -i wlo1
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on wlo1, link-type EN10MB (Ethernet), capture size 262144 bytes
12:13:45.362539 IP 82.221.107.34.bc.googleusercontent.com.http > vimal-thomson.mshome.net.35956: Flags [.], ack 4174885558,
12:13:45.363622 IP vimal-thomson.mshome.net.33113 > LAPTOP-U2SEQKP4.mshome.net.domain: 16557+ PTR? 35.137.168.192.in-addr.a
12:13:45.694020 IP LAPTOP-U2SEQKP4.mshome.net.domain > vimal-thomson.mshome.net.33113: 16557- 1/0/0 PTR vimal-thomson.mshom
12:13:45.695434 IP vimal-thomson.mshome.net.43682 > LAPTOP-U2SEQKP4.mshome.net.domain: 23165+ PTR? 1.137.168.192.in-addr.ar
12:13:45.705315 IP LAPTOP-U2SEQKP4.mshome.net.domain > vimal-thomson.mshome.net.43682: 23165- 1/0/0 PTR LAPTOP-U2SEQKP4.msh
12:13:46.235520 IP vimal-thomson.mshome.net.52402 > 65.8.80.90.https: Flags [P.], seq 2714391647:2714391686, ack 1264927035
12:13:46.235657 IP vimal-thomson.mshome.net.60914 > ec2-35-164-91-82.us-west-2.compute.amazonaws.com.https: Flags [F.], seq
length 0
12:13:46.236136 IP vimal-thomson.mshome.net.40846 > LAPTOP-U2SEQKP4.mshome.net.domain: 41615+ PTR? 90.80.8.65.in-addr.arpa.
12:13:46.551982 IP vimal-thomson.mshome.net.52402 > 65.8.80.90.https: Flags [P.], seq 0:39, ack 1, win 501, options [nop,no
12:13:46.614252 IP LAPTOP-U2SEQKP4.mshome.net.51450 > 239.255.255.250.1900: UDP, length 173
12:13:46.614264 IP ec2-35-164-91-82.us-west-2.compute.amazonaws.com.https > vimal-thomson.mshome.net.60914: Flags [.], ack
12:13:46.614285 IP vimal-thomson.mshome.net.60914 > ec2-35-164-91-82.us-west-2.compute.amazonaws.com.https: Flags [.], ack
12:13:46.614294 IP 65.8.80.90.https > vimal-thomson.mshome.net.52402: Flags [.], ack 39, win 135, options [nop,nop,TS val 2
12:13:46.614304 IP 65.8.80.90.https > vimal-thomson.mshome.net.52402: Flags [P.], seq 1:40, ack 39, win 135, options [nop,n
12:13:46.614310 IP vimal-thomson.mshome.net.52402 > 65.8.80.90.https: Flags [.], ack 40, win 501, options [nop,nop,TS val 2
12:13:46.630592 IP LAPTOP-U2SEQKP4.mshome.net.51454 > 239.255.255.250.1900: UDP, length 173
```

Command: sudo tcpdump -c 5 -l wlo1 -n -A port 80

```
vimalthomson@vimal-thomson:~$ sudo tcpdump -c 5 -l wlo1 -n -A port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on wlo1, link-type EN10MB (Ethernet), capture size 262144 bytes
12:14:50.999973 IP 192.168.137.35.56478 > 142.250.182.131.80: Flags [.], ack 382654594, win 501, options [nop,nop,TS val 2844057322 ecr 2613070546], length 0
E..4...@.....#.....P.....J.
12:14:51.042148 IP 142.250.182.131.80 > 192.168.137.35.56478: Flags [.], ack 1, win 265, options [nop,nop,TS val 2613080756 ecr 2843944324], length 0
E..4....9. G.....#P.....)E.....
.....%.
12:14:53.560060 IP 192.168.137.35.56480 > 142.250.182.131.80: Flags [.], ack 72505591, win 501, options [nop,nop,TS val 2844059882 ecr 3563992377], length 0
E..4..Y@.....#.....P..FN.RX.....N9
12:14:53.560100 IP 192.168.137.35.56476 > 142.250.182.131.80: Flags [.], ack 2608649050, win 501, options [nop,nop,TS val 2844059882 ecr 2625550507], length 0
E..4.1@.....I.#.....PC".....Z......
12:14:53.560242 IP 192.168.137.35.39454 > 117.18.237.29.80: Flags [.], ack 2293278109, win 501, options [nop,nop,TS val 1537812176 ecr 3541123674], length 0
E..4.1@.....#U.....P..KB.....].
[&...BZ
5 packets captured
6 packets received by filter
0 packets dropped by kernel
```

Command: sudo tcpdump -r icmp.pcap

```
vimalthomson@vimal-thomson:~$ sudo tcpdump -r icmp.pcap
reading from file icmp.pcap, link-type EN10MB (Ethernet)
12:36:27.787721 IP 142.250.82.18.19305 > 192.168.43.30.53597: UDP, length 254
12:36:27.787746 IP 142.250.82.18.19305 > 192.168.43.30.53597: UDP, length 254
12:36:27.787749 IP 142.250.82.18.19305 > 192.168.43.30.53597: UDP, length 133
12:36:27.787752 IP 142.250.82.18.19305 > 192.168.43.30.53597: UDP, length 254
12:36:27.787756 IP 142.250.82.18.19305 > 192.168.43.30.53597: UDP, length 254
12:36:27.787759 IP 142.250.82.18.19305 > 192.168.43.30.53597: UDP, length 254
12:36:27.787763 IP 142.250.82.18.19305 > 192.168.43.30.53597: UDP, length 254
12:36:27.787765 IP 142.250.82.18.19305 > 192.168.43.30.53597: UDP, length 254
12:36:27.787769 IP 142.250.82.18.19305 > 192.168.43.30.53597: UDP, length 254
12:36:27.787772 IP 142.250.82.18.19305 > 192.168.43.30.53597: UDP, length 254
```

Command: sudo tcpdump -I wlo1 not icmp

Shell Scripting

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

```
#!/bin/bash
echo "Enter the details and view"
echo "Enter your Name:"
read name
echo "Enter the name of your college"
read college
clear
echo "The entered details are:"
echo Name: $name
echo College: $college
```

```
vimalthomson@vimal-thomson:~$ vi 1.sh
vimalthomson@vimal-thomson:~$ chmod +x 1.sh
vimalthomson@vimal-thomson:~$ ./1.sh
Enter the details and view
Enter your Name:
vimal
Enter the name of your college
Amal Jyothi College of Engineering
```

```
The entered details are:
Name: vimal
College: Amal Jyothi College of Engineering
vimalthomson@vimal-thomson:~$
```

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

```
#!/bin/bash
echo "Display value of a Variable"
a=10
echo "$a"
```

```
vimalthomson@vimal-thomson:~$ 
vimalthomson@vimal-thomson:~$ vi 2.sh
vimalthomson@vimal-thomson:~$ chmod +x 2.sh
vimalthomson@vimal-thomson:~$ ./2.sh
```

```
Display value of a Variable
10
vimalthomson@vimal-thomson:~$
```

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

```
#!/bin/bash
echo "Arthematic Operations"
echo "Enter a number"
read a
echo "Enter another number"
read b
echo "Enter operation needed"
echo "\n1.Addition\n2.Subtraction\n3.Multiplication\n4.Division"
read op
case "$op" in
    "1") echo "a+b=\"$((a+b))";;
    "2") echo "a-b=\"$((a-b))";;
    "3") echo "a*b=\"$((a*b))";;
    "4") echo "a/b=\"$((a/b))";;
esac
```

```
vimalthomson@vimal-thomson:~$ vi 3.sh
vimalthomson@vimal-thomson:~$ chmod +x 3.sh
vimalthomson@vimal-thomson:~$ ./3.sh
```

```
Arthematic Operations
Enter a number
5
Enter another number
6
Enter operation needed
\n1.Addition\n2.Subtraction\n3.Multiplication\n4.Division
1
a+b=11
vimalthomson@vimal-thomson:~$ ./3.sh
Arthematic Operations
Enter a number
5
Enter another number
6
Enter operation needed
\n1.Addition\n2.Subtraction\n3.Multiplication\n4.Division
3
a*b=30
vimalthomson@vimal-thomson:~$ █
```

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

```
#!/bin/bash
echo "Finding a number"

echo "Enter a number"
read a
if [ $a == 10];
then
    echo "Number found!"
else
    echo "Number not found!"
fi
```

```
vimalthomson@vimal-thomson:~$ vi 4.sh
vimalthomson@vimal-thomson:~$ chmod +x 4.sh
vimalthomson@vimal-thomson:~$ ./4.sh
Finding a number
Enter a number
5
./4.sh: line 6: [5: command not found
Number not found!
vimalthomson@vimal-thomson:~$
```

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

```
#!/bin/bash
echo "Time and Calender"

echo "Today is $(date)"

echo "Calender"
```

```
vimalthomson@vimal-thomson:~$ vi 5.sh
vimalthomson@vimal-thomson:~$ chmod +x 5.sh
vimalthomson@vimal-thomson:~$ ./5.sh
Time and Calender
Today is Saturday 02 October 2021 06:17:42 PM IST
Calender
vimalthomson@vimal-thomson:~$
```

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

```
#!/bin/bash
echo "EVEN OR ODD"

echo "Enter a number"
read n
x=$((n%2))
if [ $x -eq 0];
then
    echo "Number is even"
else
    echo "Number is odd"
fi
```

```
vimalthomson@vimal-thomson:~$ vi 6.sh
vimalthomson@vimal-thomson:~$ chmod +x 6.sh
vimalthomson@vimal-thomson:~$ ./6.sh
EVEN OR ODD
Enter a number
5
./6.sh: line 7: [1-eq: command not found
Number is odd
vimalthomson@vimal-thomson:~$
```

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

```
#!/bin/bash
echo "Comparing numbers"

echo "Enter first number"
read a
echo "Enter second number"
read b
if [ $a -gt $b];
then
    echo "$a is greater"
elif [ $b -gt $a];
    echo "$b is greater"
else
    echo "Both are Equal"
fi
```

```
vimalthomson@vimal-thomson:~$ vi 7.sh
vimalthomson@vimal-thomson:~$ ./7.sh
Comparing numbers
Enter first number
100
Enter second number
20
100 is greater
vimalthomson@vimal-thomson:~$
```

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

```
#!/bin/bash
echo "Sum of Numbers"

a=0
for (( i=1;i<=10;i++ ))
do
    a=`expr $a + $i`
done
echo "Sum of 1 numbers=$a"
```

```
vimalthomson@vimal-thomson:~$ vi 8.sh
vimalthomson@vimal-thomson:~$ chmod +x 8.sh
vimalthomson@vimal-thomson:~$ ./8.sh
Sum of Numbers
Sum of first 10 numbers=55
vimalthomson@vimal-thomson:~$
```

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

```
#!/bin/bash
echo "avg, sum & product of 4 numbers"
echo "enter first number"
read a
echo "enter second number"
read b
echo "enter third number"
read c
echo "enter forth number"
read d

sum=$((a + b + c + d))
avg=$(echo $sum/4 | bc -l)
prod=$((a * b * c * d))

echo "the sum of the numbers is:" $sum
echo "the average of the numbers is:" $avg
echo "the product of the numbers is:" $prod
```

```
vimalthomson@vimal-thomson:~$ vi 9.sh
vimalthomson@vimal-thomson:~$ chmod +x 9.sh
vimalthomson@vimal-thomson:~$ ./9.sh
avg, sum & product of 4 numbers
enter first number
1
enter second number
2
enter third number
3
enter forth number
4
./9.sh: line 14: bc-l: command not found
the sum of the numbers is: 10
the average of the numbers is:
the product of the numbers is: 24
vimalthomson@vimal-thomson:~$ █
```

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

```
#!/bin/bash
echo "Largest of Three"

echo "enter first number"
read a
echo "enter second number"
read b
echo "enter third number"
read c

if [ $a -gt $b ];
then
    if [ $a -gt $c ];
    then
        echo "$a is greater"
    else
        echo "$c is greater"
    fi
elif [ $b -gt $c ];
then
    echo "$b is greater"
else
    echo "$c is greater"
fi█
```

```
vimalthomson@vimal-thomson:~$ vi 10.sh
vimalthomson@vimal-thomson:~$ chmod +x 10.sh
vimalthomson@vimal-thomson:~$ ./10.sh
./10.sh: command not found
vimalthomson@vimal-thomson:~$ ./10.sh
Largest of Three
enter first number
5
enter second number
6
enter third number
4
./10.sh: line 11: [5: command not found
./10.sh: line 19: [6: command not found
4 is greater
vimalthomson@vimal-thomson:~$
```

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

```
#!/bin/bash
echo "Factorial"

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

```
vimalthomson@vimal-thomson:~$ vi 11.sh
vimalthomson@vimal-thomson:~$ chmod +x 11.sh
vimalthomson@vimal-thomson:~$ ./11.sh
Factorial
enter a number
5
factorial is 120
```

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

```

#!/bin/bash
echo "Palindrome or NOT"

echo "Enter number to check"
read n
rev=$(echo $n | rev)
if [ $n -eq $rev ];
then
    echo "Number is Palindrome"
else
    echo "Number is not Palindrome"
fi

```

```

vimalthomson@vimal-thomson:~$ vi 12.sh
vimalthomson@vimal-thomson:~$ chmod +x 12.sh
vimalthomson@vimal-thomson:~$ ./12.sh
Palindrome or NOT
Enter number to check
565
Number is Palindrome
vimalthomson@vimal-thomson:~$ 

```

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

```

#!/bin/bash
echo "Avg of n numbers"

echo "enter size"
read n
i=1
sum=0

echo "Enter numbers"
while [ $i -le $n ]
do
    read num
    sum=$((sum + num))
    i=$((i + 1))
done
avg=$(echo $sum/$n | bc -l)
echo $avg

```

```
vimalthomson@vimal-thomson:~$ vi 13.sh
vimalthomson@vimal-thomson:~$ chmod +x 13.sh
vimalthomson@vimal-thomson:~$ ./13.sh
Avg of n numbers
enter size
5
Enter numbers
2
2
2
2
2
./13.sh: line 16: avg+2.00000000000000000000000000000000: command not found
```

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

```
#!/bin/bash
echo "Sum of all digits"

echo "Enter 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"
```

```
vimalthomson@vimal-thomson:~$ vi 14.sh
vimalthomson@vimal-thomson:~$ chmod +x 14.sh
vimalthomson@vimal-thomson:~$ ./14.sh
Sum of all digits
Enter a number
1221
Sum of digits is 6
vimalthomson@vimal-thomson:~$ █
```

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

```
#!/bin/bash
echo "Leap year or Not"

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 year"
fi
```

```
vimalthomson@vimal-thomson:~$ vi 15.sh
vimalthomson@vimal-thomson:~$ chmod +x 15.sh
vimalthomson@vimal-thomson:~$ ./15.sh
Leap year or Not
Enter the year
1998
./15.sh: line 9: [: missing `]'
1998 is not leap year
vimalthomson@vimal-thomson:~$
```

Wireshark installation

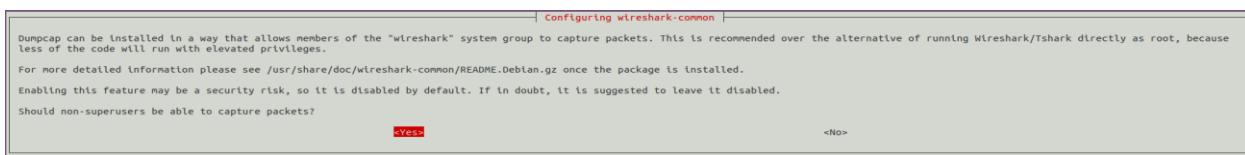
1. Command: sudo apt-get install wireshark

```
vimalthomson@vimal-thomson:~$ sudo apt-get install wireshark
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi libgstreamer-plugins-bad1.0-0 libnvidia-cfg1-460 libnvidia-common-460 libnvidia-gl-460 libnvidia-ifr1-460 libva-wayland2 libx11-xcb1:i386 libxnvctrl0 nvidia-compute-utils-460 nvidia-kernel-xserver-xorg-video-nvidia-460
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  libdouble-conversion3 libpcre2-16-0 libqt5core5a libqt5dbus5 libqt5gui5 libqt5multimedia5 libqt5multimedia5-plugins libqt5sprintsupports5 libqt5svg5 libqt5widgets5 libsmi2lql libspandsp2 libwireshark-data libwireshark13 libwireshark13 libwiretap10 libwireshark-common wireshark-qt
Suggested packages:
  qt5-image-formats-plugins qtwayland5 snmp-mibs-downloader geoipupdate geoip-database geoip-database-extra libjs-leaflet
The following NEW packages will be installed:
  libdouble-conversion3 libpcre2-16-0 libqt5core5a libqt5dbus5 libqt5gui5 libqt5multimedia5 libqt5multimedia5-plugins libqt5sprintsupports5 libqt5svg5 libqt5widgets5 libsmi2lql libspandsp2 libwireshark-data libwireshark13 libwiretap10 libwireshark wireshark-common wireshark-qt
0 upgraded, 27 newly installed, 0 to remove and 342 not upgraded.
Need to get 32.6 MB of archives.
After this operation, 162 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 libdouble-conversion3 amd64 3.1.5-4ubuntu1 [37.9 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libpcre2-16-0 amd64 10.34-7 [181 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 libqt5core5a amd64 5.12.8+dfsg-0ubuntu1 [2,005 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 libqt5dbus5 amd64 5.12.8+dfsg-0ubuntu1 [208 kB]
```

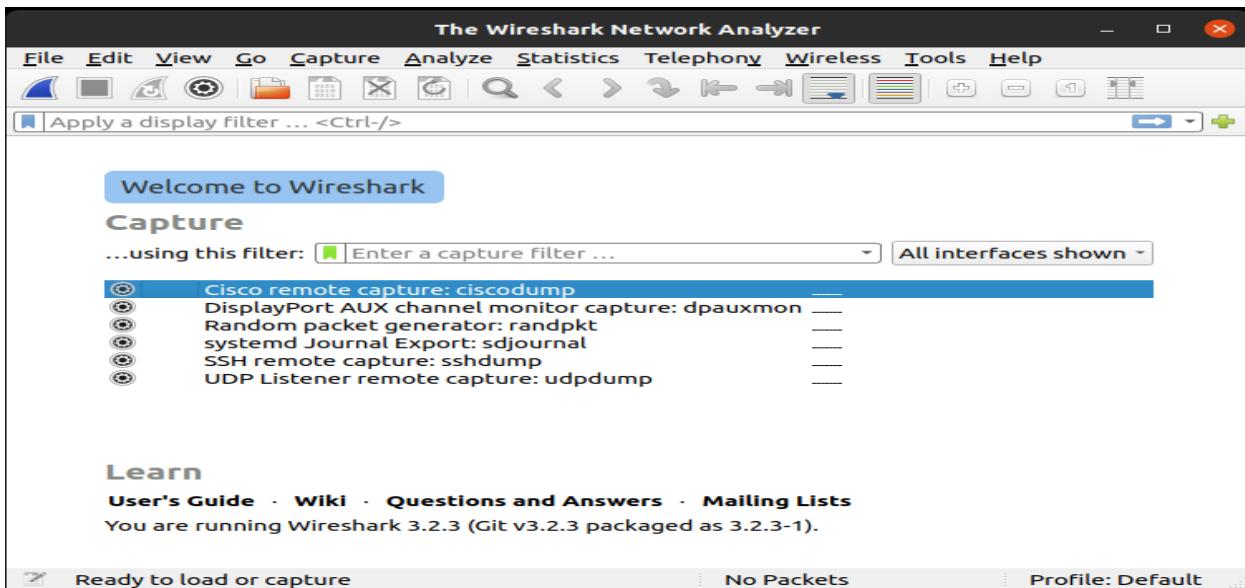
2. Command: sudo dpkg-reconfigure wireshark-common

```
vimalthomson@vimal-thomson:~$ sudo dpkg-reconfigure wireshark-common
vimalthomson@vimal-thomson:~$ █
```

3. Command: Select Yes and press enter



4. Open wireshark from the applist



5. Start Capturing

The screenshot shows the Wireshark interface with a list of captured network packets. The top menu bar includes File, Edit, View, Go, Capture, Analyze, Statistics, Telephony, Wireless, Tools, and Help. Below the menu is a toolbar with various icons for file operations and analysis. A search bar at the top right contains the placeholder "Apply a display filter ... <Ctrl-/>". The main window displays a table of packet details:

No.	Time	Source	Destination	Protocol	Length	Info
1	0.0000000000	99.86.20.82	192.168.43.30	TCP	78	443 → 42392 [ACK]
2	0.000051484	99.86.20.82	192.168.43.30	TCP	66	443 → 42392 [ACK]
3	0.000085738	99.86.20.82	192.168.43.30	TCP	66	443 → 42392 [FIN, ACK]
4	0.000121021	192.168.43.30	99.86.20.82	TCP	66	42392 → 443 [ACK]
5	0.000142919	2404:6800:4002:82c::2409:4073:200f:e3b4...	2404:6800:4002:82c::2409:4073:200f:e3b4...	TCP	86	80 → 34038 [FIN, ACK]
6	0.000177173	2409:4073:200f:e3b4...	2404:6800:4002:82c::2409:4073:200f:e3b4...	TCP	86	34038 → 80 [ACK]
7	2.078644321	2409:4073:200f:e3b4...	2404:6800:4007:820::2409:4073:200f:e3b4...	TLSv1.2	125	Application Data
8	2.217526210	2404:6800:4007:820::2409:4073:200f:e3b4...	2404:6800:4007:820::2409:4073:200f:e3b4...	TLSv1.2	125	Application Data

Below the table, a detailed description of Frame 1 is provided:

- Frame 1: 78 bytes on wire (624 bits), 78 bytes captured (624 bits) on interface wlo1, id 0
- Ethernet II, Src: da:4e:4b:7e:36:b2 (da:4e:4b:7e:36:b2), Dst: 90:0f:0c:a3:cba:05 (90:0f:0c:a3:cba:05)
- Internet Protocol Version 4, Src: 99.86.20.82, Dst: 192.168.43.30
- Transmission Control Protocol, Src Port: 443, Dst Port: 42392, Seq: 1, Ack: 1, Len: 0

The bottom section shows the raw hex and ASCII data for the selected packet (Frame 1):

Hex	ASCII
0000 90 0f 0c a3 cb 05 da 4e 4b 7e 36 b2 08 00 45 28N K~6...E(
0010 00 40 29 64 00 00 f0 06 3d bd 63 56 14 52 c0 a8	@)d.....=·cV·R··
0020 2b 1e 01 bb a5 98 2e 8f c9 89 34 f4 16 54 b0 10	+.....·..4..T··
0030 00 87 66 f9 00 00 01 01 08 0a c6 2d f5 44 56 a9	..f.....·..DV·
0040 e2 24 01 01 05 0a 34 f4 16 6c 34 f4 16 6d	\$.....4·..14·m

At the bottom of the interface, there are status indicators: a yellow circle, a blue square, the file name "wireshark_wlo1_20211005055830_Ux1IMr.pcapng", the count "Packets: 23 · Displayed: 23 (100.0%)", and the profile "Profile: Default".